H3K4 methyl marks landscape during *Caenorhabditis elegans* embryogenesis and their implication in lifespan regulation

A thesis submitted to The University of Manchester for the degree of DOCTOR OF PHILOSOPHY in the Faculty of Biology, Medicine and Health

2017

NURULHAFIZAH BINTI SAMSUDIN

School of Biological Sciences

Table of Contents

Final word count: 39,951

List of Figures

List of Tables

List of Abbreviations

a.a.	Amino acid
ABM	ASH2L binding motif
Ac	Acetylation
AS	Activation segment
ASH-2	Absent small homeotic discs-2
BPTF	Bromodomain and PHD domain transcription factor
BSA	Bovine serum albumin
CFP	CXXC1 finger protein
ChIP	Chromatin immunoprecipitation
CI	Confidence Interval
COMPASS	Complex associated with SET1
CpG	5'-C-phosphate-G-3' (cytosine and guanine separated by a phosphate group)
Cps	COMPASS protein subunit (of yeast)
CTD	C-terminal domain
DAPI	4’,6-diamidino-2-phenylindole
DCC	Dosage compensation complex
DIC	Differential interference contrast
DNA	Deoxyribonucleic acid
dNTP	Deoxyribonucleotide triphosphate mix
Down-R	Downregulated
DPY-30	DumPY-30
E. coli	*Escherichia coli*
EDTA	Ethylenediaminetetraacetic acid
F1	First filial generation
F2	Second filial generation
F3	Third filial generation
F4	Fourth filial generation
F5	Fifth filial generation
gDNA	genomic DNA
GFP	Green fluorescent protein
GH	Glycine-histidine
GO	Gene ontology
H1	Histone 1
H2A	Histone 2A

H2B	Histone 2B
H2O2	Hydrogen peroxide
H3	Histone 3
H3K27	Histone 3 Lysine 27
H3K36	Histone 3 Lysine 36
H3K4	Histone 3 Lysine 4
H3K9	Histone 3 Lysine 9
H4	Histone 4
HAT	Histone acetyltransferase
HCF	Host cell factor
HDAC	Histone
HER-1	Human epidermal growth factor receptor
IF	Immunofluorescence
I-SET	Insertion SET
JMJD	Jumonji domain-containing proteins
KDM	Lysine demethylase
KMT	Lysine methyltransferase
lincRNA	Long intergenic noncoding RNA
LSD	Lysine demethylases
Me1	Mono-methylation
Me2	Di-methylation
Me3	Tri-methylation
MLL	Mixed lineage leukaemia
MYND	Myeloid-Nervy-DEAD1
mRNA	Messenger RNA
P0	Parental generation
PCR	Polymerase chain reactions
PHD	Plant homeodomain
PIC	Preinitiation complex
PRMT	Protein arginine methyltransferase
P-TEFb	Positive transcription elongation factor b
PTM	Post translational modification
qRT-PCR	Quantitaive real time polymerase chain reaction
RBBP-5	Retinoblastoma-binding protein 5
RNA	Ribonucleic acid
RNAPII	RNA polymerase II

RPKM	Reads per kilobase permilion reads placed
S. cerevisiae	*Saccharomyces cerevisiae*
SAGA	Spt-Ada-Gcn5 acetyltransferase
SAM	S-adenosyl-L-methionine-methyl
SDC-2	Sex determination and dosage compensation protein-2
SEM	Standard error of mean
Seq	Sequencing
SET	Suppressor of variegation 3-9 (Su(var)3-9), Enhancer of zester (E(z)), and Trithorax
SPR-5	Suppressor of presenilin defect
SPRY	SPIa and ryanodine receptor
TAF3	Transcription associated factor 3
TBP	TATA-binding protein
TES	Transcription end sites
TF	Transcription factor
TPR	Tetratrico-peptide Repeat
TSS	Transcription start site
TTS	Transcription termination site
Up-R	Upregulated
UTX	Ubiquitously transcribed tetratricopeptide repeat, X chromosome
VPC	Vulval precursor cell
WBM	WDR5 binding motif
WDR-5	WD repeat domain 5
WRAD	WDR5, RbBP5, ASH2L and DPY-30
Xm	Maternal X
XOL-1	XO lethal protein 1
Xp	Paternal X

Abstract

The University of Manchester

Nurulhafizah Binti Samsudin

H3K4 methyl marks landscape during *Caenorhabditis elegans* embryogenesis and their implication in lifespan regulation

Doctor of Philosophy

2017

How long organisms may live is not determined by genetic code alone. Recent findings reveal that components of MLL/SET/COMPASS complex, ASH-2, WDR-5 and SET-2, regulate H3K4 methylation levels on genome and limit how long nematode *Caenorhabditis elegans* may live. This suggest that histone modifications could also determine life expectancy. We conducted lifespan assay and transgenerational study to investigate if another core component of the COMPASS complex, RBBP-5, is also a regulator of lifespan. We mapped H3K4me1/me2/me3 attributed to WDR-5 and RBBP-5 and then find any correlation between changes in gene expression and altered methylation levels in *wdr-5(-)* and *rbbp-5(-).* Our study reveals that in absence of RBBP-5, lifespan is shortened. The H3K4 methylation levels also reduce as the animal aged. Moreover, the *rbbp-5(-)* mutant descendants from wild type ancestors inherit normal lifespan for up to three generations, before gaining back short lifespan. The transgenerational inheritance is specific for lifespan regulation and does not affect brood size (Chapter 3). Mapping of H3K4me1/me2/me3 using *rbbp-5(-) C. elegans* embryos reveals severe depletion of all states throughout the genome. In contrast, in absence of WDR-5, we observe global increase in H3K4me1, decrease in H3K4me3 and excessive accumulation of H3K4me2 at chromosome X. Correlation between RNA-seq and ChIP-seq data using *wdr-5(-)* and *rbbp-5(-)* embryos uncover more genes being upregulated than downregulated, despite depletion in H3K4 methylation levels in both mutants. Absence of WDR-5 also causes higher incidence of male, all of which have abnormal tail morphology (Chapter 4). While exploring the landscape of H3K4me1/me2/me3, we developed new technique for the amplification of massive amount of *C. elegans* on solid media (Chapter 5). In conclusion, the work presented in this thesis shows that H3K4 methylation attributed by RBBP prevents lifespan shortening. The work also shows WDR-5 as a key player in promoting the acquisition of H3K4me3 and in preventing excessive accumulation of H3K4me2 at chromosome X.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

COPYRIGHT STATEMENT

i. The author of this thesis (including any appendices and/or schedules to this thesis) owns certain copyright or related rights in it (the "Copyright") and s/he has given The University of Manchester certain rights to use such Copyright, including for administrative purposes.

ii. Copies of this thesis, either in full or in extracts and whether in hard or electronic copy, may be made only in accordance with the Copyright, Designs and Patents Act 1988 (as amended) and regulations issued under it or, where appropriate, in accordance with licensing agreements which the University has from time to time. This page must form part of any such copies made.

iii. The ownership of certain Copyright, patents, designs, trademarks and other intellectual property (the "Intellectual Property") and any reproductions of copyright works in the thesis, for example graphs and tables ("Reproductions"), which may be described in this thesis, may not be owned by the author and may be owned by third parties. Such Intellectual Property and Reproductions cannot and must not be made available for use without the prior written permission of the owner(s) of the relevant Intellectual Property and/or Reproductions.

iv. Further information on the conditions under which disclosure, publication and commercialisation of this thesis, the Copyright and any Intellectual Property University IP Policy (see

http://documents.manchester.ac.uk/display.aspx?DocID=24420), in any relevant Thesis restriction declarations deposited in the University Library, The University Library's regulations (see

http://www.library.manchester.ac.uk/about/regulations/) and in The University's policy on Presentation of Theses.

Acknowledgements

The completion of this undertaking could not have been possible without the participation and assistance of so many people whose names may not all be enumerated in this section. Their contributions are sincerely appreciated and gratefully acknowledged.

On this opportunity, I would like to acknowledge my supervisor, Dr. Gino Poulin, foremost for his continuous guidance, knowledge sharing, and supports. I would also like to thank my academic advisor, Prof. Andy Sharrocks, for his helpful comments and the Malaysian Council of Trust for the People (Majlis Amanah Rakyat (MARA)) for funding.

I wish to thank all the members of Poulin lab group, past and present, for their help, advice and friendship: Dr. Kate Fisher, Dr. Siyao Wang, Dr. Robert Barnes, Laura Mellor, Adriana Raluca Vintila and Pang Yoke Fei. Special thanks go to Karen Lim Tzia Wei for lending a helping hand while I am not in Manchester.

I thank my mom Morsidah Elias, my family and my husband Muhammad ‘Uzair Mohamed Zain for their love, support and prayers throughout the past four years.

I would also like to acknowledge that my chapter 4 on “WDR-5 prevents excessive accumulation of H3K4 di-methyl marks on chromosome X” forms the basis of a paper currently being submitted to Nucleic Acid Research. Thank you to Dr. Siyao Wang for her contribution on immunofluorescence staining, Dr. Kate Fisher for preparing embryo sample for RNA-seq, Functional Genomic Facility for the analysis on RNA-seq data and ActiveMotifs for the processing of ChIP-Seq.

Chapter 1

General Introduction

Chapter 1 : General Introduction

1. Inheritance of epigenetic information

Producing the next generation is a major challenge for all species using sexual reproduction. It involves the production of highly specialized and differentiated cells (oocytes and sperms) that must regenerate an entire organism from a one-cell embryo. Fertilization implies reprogramming to produce a totipotent one-cell embryo from which all the other cells of the organism will derive. Crucially, the germ lineage will undergo a fundamentally different program than the somatic lineage. This process ensures continuation of the species. In principle, the next generation does not inherit mild environmental stress that do not change the DNA sequence of the genome in gametes because of the Weissman barrier (Weismann 1892). The Weissman barrier stipulates that information flows from the gametes to the somatic cells and never the other way around. This is especially true for the genetic information; a mutation in somatic cells will not end up in the gametes. However, epigenetic information might behave differently.

Epigenetics is the process by which patterns of gene expression are inherited following mitosis or meiosis. Epigenetics is also highly connected to the environment and provide a degree of plasticity required for animals to adjust and sometimes adapt (Yao et al. 2014; Manikkam et al. 2012; Anway et al. 2005; Dunn & Bale 2011; Lagisz et al. 2014). Klosin and Lehner (2016) proposed the term “epigenetic wounds” as the establishment of epigenetic memory, imparted by environment, in new regions of chromatin that is supposedly be condensed and silenced (heterochromatin). These regions experience temporary inhibition of gene silencing, thus triggering phenotypic adaptation (Klosin & Lehner 2016). It is therefore conceivable that exposure to environmental stresses might change the pattern of gene expression in the gametes. The change could resist embryonic epigenetic reprogramming and hence remains active in progeny for several generations. The epigenetic inheritance then, is either passively lost due to molecule dilution or actively lost by specific eraser complexes (Klosin & Lehner 2016)

Caenorhabditis elegans is an excellent system to study epigenetic inheritance and it has the advantage of being devoid of CpG methylation (Chen et al. 2014). Methylation at Histone 3 Lysine 4 (H3K4me) has been identified as an epigenetic mark which could potentially regulate transgenerational inheritance of longevity in *C. elegans* (Greer et al. 2011). The exposure to environmental stresses on the epigenetic landscape could be transmitted for multiple generations and H3K4 methylation might play an important role in this process. The inheritance of H3K4 methylation in human is however unexplored. The general introduction is therefore aimed to introduce the post-translational modifications on chromatin; complexes that write, erase and read H3K4 methylation; association with transcription; inheritance of H3K4 methylation; *C. elegans* as the study model; and *C. elegans*’ phenotypes linked with deficiencies in H3K4 methylation.

1.1 Chromatin

DNA is not naked in a cell. It is wrapped around nucleosomes. This wrapping allows a 2 m long genome to be packed into few microns of nuclear space. It is also important that mechanisms are in place to allow access to the genome for transcription, replication, and repair to occur. In this section, I will introduce how the nucleosome is important for packaging, how histones are modified to regulate access to DNA, and describe the mechanisms by which the epigenetic state is restored following mitosis.

1.1.1 Chromatin packaging

To understand how chromatin modulates nuclear processes, one must understand the organisation of the chromatin. Chromatin is packaged in such a way that DNA wraps around histones to form nucleosomes, nucleosomes align into beads-on-a-string chromatin structure, chromatins condenses into fibers and fibers tightly coil into chromosomes.

The size of the eukaryotic genome is massive. The haploid genome may range from 100 million nucleotides in *C. elegans* (Hodgkin et al. 1995) to three billion nucleotides in human (Venter et al. 2001). If stretched out end to end, the diploid genome can span approximately two meters long (Alberts et al. 2002). It is also negatively charged and constantly producing electrostatic repulsion with adjacent DNA regions. Due to its massive size and charge, it requires a special structuring function to allow it to fit into a 6 µm cell nucleus (Alberts et al. 2002). Packaging is one of the chromatin's many features which allows genetic materials to be compacted and stored into the tiny nucleus. Chromatin comprises DNA and histones. Histones are very important for packaging the genome; they are basic and positively charged proteins overcoming the electrostatic repulsion of DNA (Olins & Olins 1974; Kornberg 1974).

The fundamental unit of chromatin is a nucleosome. A nucleosome core consists of approximately 147 base pairs of DNA double helix wrapped in 1.7 left-handed super-helical turns around a histone octamer (Kornberg 1974). Each histone octamer has two copies of each H2A, H2B, H3 and H4. The octamer is produced when a H3-H4 tetramer combines with two H2A/H2B dimers (Kornberg 1974). Each nucleosome core is held together by a linker histone (H1) and is connected to the next nucleosome by a linker DNA (20 – 80 base pairs). The structure repeats throughout the genome every 160-240 base pairs forming a long strand of nucleosomes, famously described as 'beads-on-a string' (McGhee & Felsenfeld 1980; Olins & Olins 1974; Woodcock 1973). The packaging of chromatin is illustrated in Figure 1.1

Core histone proteins share similar structure in general. Each core histone has a characteristic histone-fold domain (Arents & Moudrianakis 1995) composed of a long central helix that is flanked on each side by a loop and a shorter helix (Ramakrishnan 1994). This resembles an elongated and interlocking structure and is about 7 Å in size. In addition to the histone-fold, each core histone also has an N-terminal tail that can vary in amino acid sequence depending on the histone type. The tails appear to have random coils (disordered) and protrude from the nucleosome core.

Interestingly, a striking feature of the N-terminal tail is its amino acid residues, which are subjected to extensive post translational modifications. The post-translational modifications can change the chemical landscape of the nucleosome or orchestrate recruitment of enzyme complexes used for DNA-dependent processes, such as replication, transcription and repair.

When two tetramers of H3-H4 and H2A-H2B combine to form a histone octamer, a left-handed helical ramp with a pitch of about 28 Å forms along the surface indicative of where the DNA-histones contact is (Ramakrishnan 1994). The histone octamer bears a flat disk shape with a diameter of about 65 Å (Ramakrishnan 1994). The ramp path for the DNA-histones interaction is built along the loops of the core histones (Luger et al. 1997). DNA makes contact with histone proteins primarily through the phosphodiester backbone and not the DNA bases (Luger et al. 1997), thus explaining the sequence-independent nature of nucleosome formation. The order of the DNA-histones contacts is (H2A-H2B)(H3-H4)(H3-H4)(H2A-H2B) (Ramakrishnan 1994; Burlingame et al. 1985).

The beads-on-a string of nucleosomes (10 nm) folds into 30 nm chromatin fibers (Finch & Klug 1976). Since the length of DNA linker can vary, the folding into an intermediate 30 nm chromatin fiber has no uniform structure. Even a variation in 1 base pair can correspond to a 360º rotation and change the entire structure of the fiber (van Holde & Zlatanova 2007). The 30 nm chromatin is further condensed into a higher order chromatin structures. Two models describe the higher order chromatin structures. Based on the “hierarchial helical folding model” the 30 nm fiber is folded into a larger 100 nm fiber and then 200 nm fiber, to form large interphase or mitotic chromatin (Sedat & Manuelidis 1978; Belmont & Bruce 1994; Belmont et al. 1989). On the other hand, the “radial loop model” predicts that the 30 nm fiber is radially looped to form mitotic chromosomes (Paulson & Laemmli 1977; Laemmli et al. 1978; Marsden & Laemmli 1979).

According to the cell cycle chromatin changes its appearance. Chromatin is very condensed at mitosis. Following mitosis and into interphase, most domains of the chromatin de-condense, become transcriptionally accessible and appear as lightly stained regions of the chromatin by Giemsa (G-banding) or C-banding visualization techniques (Goyanes 1980; Dorota et al. 2005). The term for this material is euchromatin. However, there are still some domains surrounding telomeres and centromeres that appear highly condensed and darkly stained by the same visualization techniques (Goyanes 1980; Dorota et al. 2005). This material is called heterochromatin (Eissenberg et al. 2014). Heterochromatin is further categorized into constitutive heterochromatin and facultative heterochromatin. The constitutive heterochromatin is the static, gene-poor, highly dense chromatin that form at pericentromeric and telomere regions (Saksouk et al. 2015). On the other hand, facultative heterochromatin refers to silenced gene regions that may be activated upon cues (Saksouk et al. 2015).

Thus, chromatin packaging involves intricate processes that starts with DNA-histones interactions and end up having an impact on transcription. This impact on transcription is intimately driven by post translational modifications on histone tails. Here, I have described the basic principle of packaging which underlines the importance of the nucleosome to determine accessibility to the

genome. I will next explain how nucleosomes can be used as regulators of DNA templated functions by post-translational modifications of their N terminal tails.

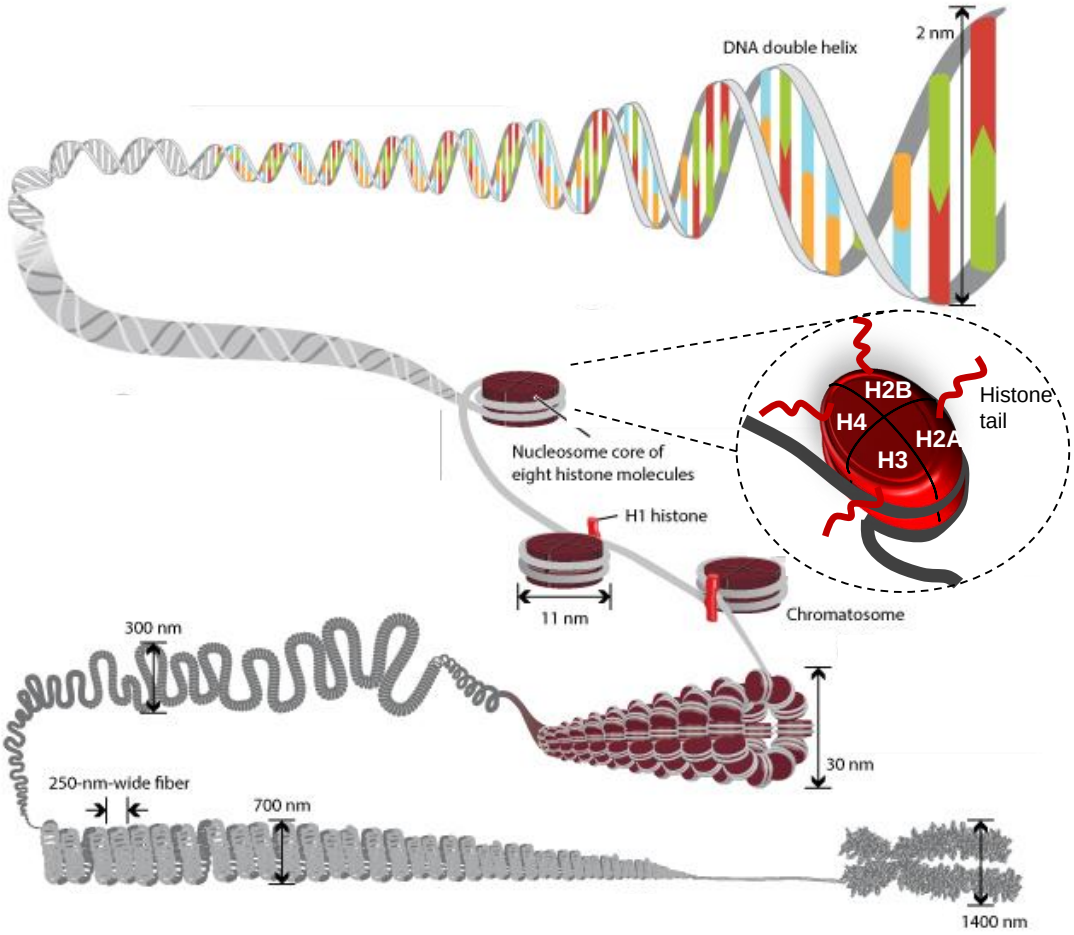


Figure 1.1 Packaging of chromatin

A double stranded helical DNA wraps 1.65 times around a histone octamer to form nucleosome. Nucleosome is the fundamental unit of chromatin. The linker histone, H1, binds to the nucleosome and linker DNA to help stabilize the fiber. The 11 nm nucleosome fiber folds into 30 nm fiber that forms loops averaging 300 nm in length. Tight coiling of the fiber produces the chromatid of a chromosome. (Insert) Two H2A-H2B dimers and a H3-H4 tetramer assemble into a histone octamer. Each of the histone subunit has an N-terminal tail protruding from the core. The histone tail may be subjected to various post-translational modifications that could be associated with gene activation (such as H3K4me1/me2/me3 and H3K36me3) or repression (H3K9me3, H3K27me3) (Adapted from Annunziato A.T., 2008).

1.1.2 Post translational modification of histones

Post-translational modification (PTM) of histones refers to the covalent addition or removal of a functional group to the tail of histone protein after its synthesis. Most of the modifications on histone tails are reversible. There are specific enzymes that can write or erase these marks. The histone tails are susceptible to modifications such as acetylation, phosphorylation, methylation, ubiquitylation and sumoylation. Figure 1.2 illustrates the structures of these histone post-translational modifications.

Histone acetylation was the first PTM on histones to be discovered (Phillips 1963). The reactions are catalyzed by histone acetyltransferases (Allis et al. 2007). Acetyl groups are negatively charged (Csordas 1990). Hence, acetylation neutralizes the positive charge on histone surface. It makes the histones become less attractive to the negatively charged DNA, causing the chromatin to loosen up and transcription to gain access to the genome (Hong et al. 1993; Bell & Dutta 2002). Examples of histone acetylation on lysine residues include H3K4ac, H3K9ac, H3K27ac and H3K36ac. ChIP-chip analysis shows that H3K4ac peaks upstream of H3K4me3 at active promoters. It was hypothesised that H3K4ac cooperates with other acetylated histone residues at promoters to increase chromatin accessibility and gene expression (Guillemette et al. 2011). The modification is reversible by the histone deacetylases enzymes. Histone acetylation and deacetylation are both rapid and highly dynamic, making nucleosome accessibility and mobilization also highly dynamic (Barth & Imhof 2010; Waterborg 2002).

Histone phosphorylation has a similar role to acetylation in regulating nucleosome dynamic. Phosphorylation imparts negative charge to its modified residue. The negative charge interrupts the electrostatic interactions between the positively charged histones and negatively charged DNA backbone (Cheung et al. 2000). The histone-DNA contacts are then loosened (Zentner & Henikoff 2013). Phosphorylation occurs at serine and threonine on histone tails such as at the S10, S28, T3 and T11. Phosphorylations of serine and threonine residues on histone tail have been linked to a wide variety of molecular functions and biological contexts, such as DNA repair and development (Paull et al. 2000; Talbert et al. 2012; Kusch et al. 2004; Green & Poccia 1985). For instance, phosphorylation of H3 at S10, S28, T3 and T11 are associated with mitosis and chromatin condensation. H3 phosphorylation opens up the chromatin fibers and allows recruitment of deacetylase, which in turn promotes chromatin condensation (Wilkins et al. 2014; Cheung et al. 2000). Collectively, acetyl and phosphate groups are two chemical moieties which are negatively charged and can weaken the DNA-histone interactions.

Methylation adds a weak positive charge to the already heavily positively charged histone tails. Thus, it does not affect the electrostatic interactions between DNA and histone proteins like acetylation and phosphorylation do. Instead, histone methylation serves as a binding platform for readers that can regulate other modifications (e.g. acetylation, phosphorylation and ubiquitination) (Izzo & Schneider 2010). There are a variety of histone methyltransferase and demethylase enzymes responsible for the addition or removal of methyl marks, making histone methylation reversible too. Various histone methylation marks have been associated with transcription. For instance, H3K9, H3K27, and H4K20 methylation are associated with transcriptional silencing,

whereas, H3K4 and H3K36 have been implicated in transcriptional activation (Izzo & Schneider 2010; Hublitz et al. 2009). Histone methylation can occur on lysine (K) and arginine (R) (Byvoet et al. 1972; Murray 1964; Fischle et al. 2008). Lysine can be mono-, di- or tri-methylated whereas arginine can be mono- and di-methylated (Murray 1964; Paik & Kim 1967; Gershey et al. 1969; Borun et al. 1972). Dimethylated arginine has asymmetric chemical conformation if catalyzed by Type I protein arginine methyltransferase (PRMT). Otherwise, it acquires a symmetric conformation when catalyzed by Type II PRMT (Figure 1.3) (Zhang & Reinberg 2001). Yeast has tightly coupled symmetric H3R2me2s with K4me3 throughout its active promoters (C.-C. Yuan et al. 2012). On the contrary, asymmetric H3R2me2a peaks more throughout heterochromatin and inactive euchromatin (Kirmizis et al. 2007). H3R2me2a deposition abrogates H3K4 trimethylation (Guccione et al. 2007). In contrast with phosphorylation and acetylation, methylation at histone does not change chromatin charge but serves as platform for the recruitment of readers involve in regulating transcription.

Unlike any other PTMs, ubiquitylation and sumoylation are large histone modifications to a single lysine side chain. Histone modifications by ubiquitylation and sumoylation involve the addition of bigger substrate of a 76 amino acid domain and 100 amino acid domains, respectively (Zentner & Henikoff 2013). In contrast, only small chemical moieties are added during acetylation, phosphorylation and methylation. Both ubiquitylation and sumoylation are known to exert diverse effects on nucleosome dynamics. Ubiquitylation functions to promote or inhibit transcriptional elongation, establish chromatin reassembly and recruit DNA repair proteins (Moyal et al. 2011; Zhou et al. 2008; Lee et al. 2012; Batta et al. 2011; Fleming et al. 2008). For instance, monoubiquitination H2Bub can promote H3K4me2/me3 at actively transcribing genes (Shilatifard 2012). Histone sumoylation is generally associated with transcription repression (Zentner & Henikoff 2013). In conclusion, histone tails are exposed to various post-translational modifications; from smaller chemical moieties such as acetylation, phosphorylation and methylation to larger proteins like ubiquitin and SUMO proteins.

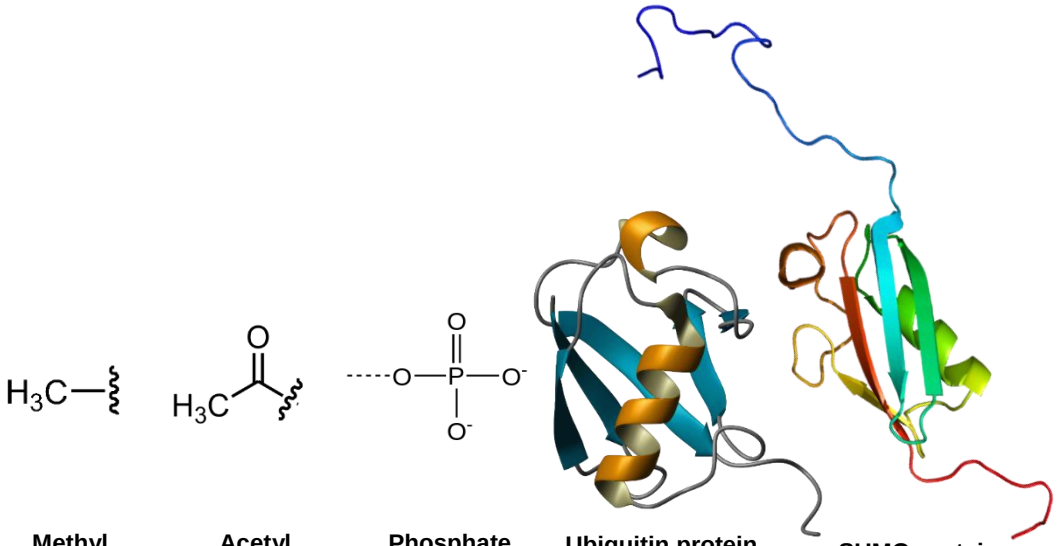


Figure 1.2 Histone post translational modifications involving small chemical moieties and large proteins

Chemical structure of methyl, acetyl and phosphate with molar mass shown for each group. Crystal structures of ubiquitin and SUMO proteins and their respective molecular weight.

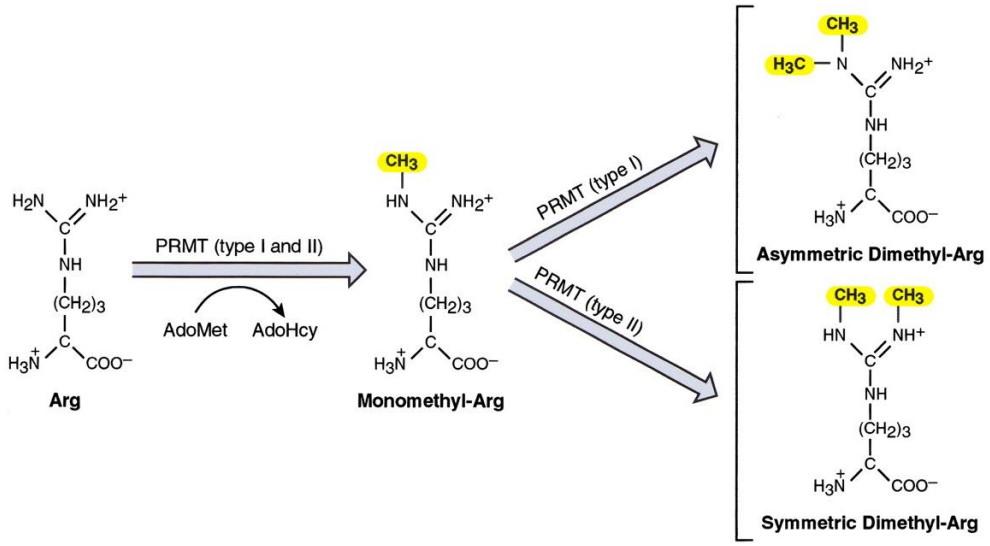


Figure 1.3 Chemical structures of histone methylation at arginine

Arginine can be monomethylated, asymmetric dimethylated or symmetric dimethylated. The methyl groups are highlighted in yellow (Zhang & Reinberg 2001)

1.2 Methylation on H3K4

To deposit methyl marks at H3K4, the cell employs a specialized complex conserved from yeast to humans. Essentially, the complex is composed of a core and an enzymatic part. The core complex is obligatory for full enzymatic activity and can be found associated with numerous enzymes with non-redundant functions. I will discuss how methyl marks at H3K4 have been uncovered, how these are deposited, removed, and interpreted by readers.

1.2.1 Discovery of H3K4 methylation

The discovery of histone methylation can be traced back to the work of Sangduk Kim and Woon Ki Paik in 1965. Their successful discovery on methylation of lysine residues on histone tails has open boundless opportunities for the current and future findings on H3K4 methylation. Here, I summarize the discovery of methylation at lysine residue of histone tails and different levels of lysine methylation

The first discovery of Ɛ-N-methyl-lysine was in the flagellar protein of bacteria *Salmonella typhimurium* approximately sixty years ago (Ambler & Rees 1959). Following the first discovery, histone proteins of calf thymus were also found to be methylated at the Ɛ-N-lysine residue. Most of the Ɛ-N-methyl-lysine were found to be on histone 3 and 4 (Murray 1964). The origin of methylation on lysine residue was later found to be as a result of post-translational modification by S-adenosyl-L-methionine-methyl (SAM) instead of incorporation of pre-formed Ɛ-N-methyl-lysine into histones (Kim & Paik 1965). It was initially thought that this histone methylation might regulate the functions of DNA (Allfrey et al. 1964; Kim & Paik 1965). SAM is the principal biological methyl donor in all living organisms. It can donate its methyl group to a wide range of recipients including nucleic acids, proteins, histones, lipids and secondary metabolites.

It was in 1968 that the three different types (mono-, di- and tri-) of histone methyl-lysine were discovered (Figure 1.4) (Paik & Kim 1967; Hempel et al. 1968) thanks to technological advances in chromatography and amino acid analysis techniques. The amino acids of histone 3 N-terminal tail were completely sequenced and found to be evolutionary conserved across organisms such as bovine, mouse, chicken and yeast (Delange et al. 1972; Ohe & Iwai 1981; von Holt et al. 1989). It was later established that lysines (K4, K9 and K27) of histone 3 are sites of histone post-translational methylation (Wu et al. 1986).

Ever since the discovery of methylation at lysine 4 of histone 3 (H3K4), there has been a growing number of studies on its mechanisms of deposition, removal, recognition and its biological functions. The surge in research interest came about because it has been associated with both active and repressed transcription ((Cheng et al. 2014; Wong et al. 2012)). It serves as a platform that promotes the binding of general transcription factors and histone modifiers such as histone acetyltransferases, deacetyltransferases and demethylases. H3K4 methylation has also been implicated in epigenetic transgenerational inheritance. Detailed description and more recent discoveries on H3K4 methylation will be introduced in the following sections. To summarise, the

uncovering of methylation at H3K4 approximately sixty years ago has led to never-ending investigations on its regulation, association with transcription and its epigenetic inheritance.

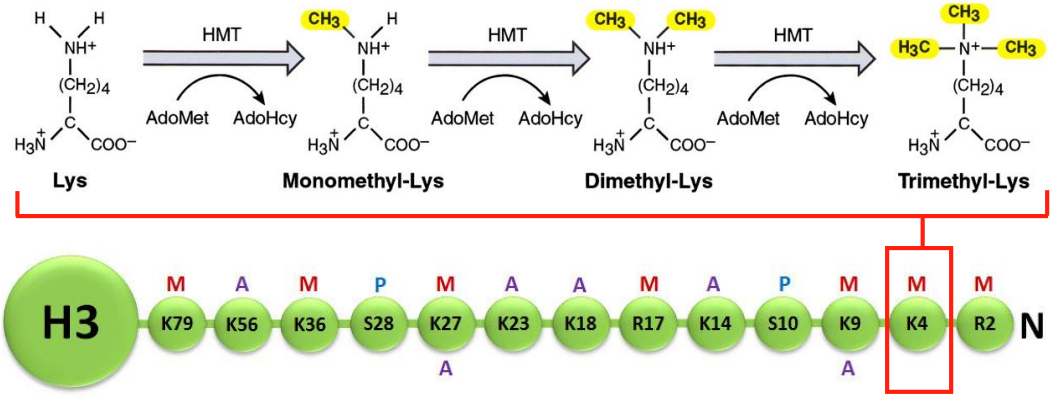


Figure 1.4 Methylation states of lysine 4 residue in histone 3

Change in chemical structure illustrating that lysine 4 (K4) can replace each of its hydrogen on Ɛ-amino group with mono-, di- or tri-methyl group (CH3). The letters on H3 tail amino acid residues (lysine (K), arginine (R), and serine (S)) represent different post-translational modifications: methylation (M), acetylation (A) and phosphorylation (P) (Epigenetics 2013; Zhang & Reinberg 2001).

1.2.2 The yeast COMPASS complex

About 15 years ago, the COMPASS (Complex associated with SET1) complex was discovered in the yeast *Saccharomyces cerevisae* (Figure 1.5) (Miller et al. 2001; Roguev et al. 2001). It was the first identified methyltransferase complex for H3K4. Yeast only has one H3K4 methyltransferase complex, which is capable to mono-, di-, and tri-methylate H3K4. The COMPASS complex has two main components: (1) the catalytic H3K4 methyltransferase subunit and (2) the core components of the complex. The catalytic methyltransferase subunit is called the Set1 protein. Set1 is a member of the trithorax gene family and has been implicated in the control of gene transcription. Its gene encodes a large protein of 1080-amino acid, containing a C-terminal SET domain (Nislow et al. 1997). It was later found that the yeast SET domain shares great similarity to its human and *drosophila* homologs. The complex core subunits include: Cps60 (Bre2/Ash2), Cps50 (Swd1/Rbbp5), Cps40 (Spp1), Cps35 (Swd2/Wdr82), Cps30 (Swd3/WDR5), Cps25 (Sdc1/Dpy30) and Cps15. The core protein subunits are essential for full enzyme activity (Shilatifard 2012). The activity of the catalytic H3K4 methyltransferase is greatly influenced by the core components (Meeks & Shilatifard 2017). Without the core complex, the methyltransferases become less active to different degrees depending of the core component lacking. The yeast complex depleted of both Cps60 (Ash2) and Cps25 (Dpy30) has a total loss of H3K4me3 and a great reduction in H3K4me1/me2 (Takahashi et al. 2011). Defective Cps40 (Spp1) reduces the H3K4me3 levels in yeast (Schneider et al. 2005). On the other hand, absence of SET1 leads to complete abolishment of H3K4me1/me2/me3 (Briggs et al. 2001).

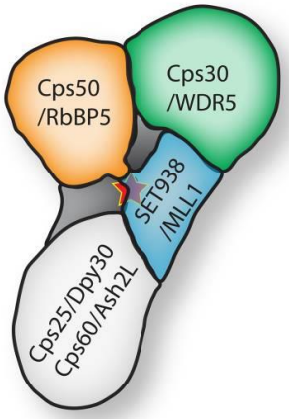


Figure 1.5 Schematic model of yeast Set1/COMPASS

Schematic model of the yeast core Set1/COMPASS complex showing Set1 (938-1080) methyltranferase in BLUE, Cps50/RbBP5 in ORANGE, and Cps30/WDR5 in GREEN and Cps25/DPy30-Cps60/Ash2L in WHITE. The red star indicates the binding region between histone peptide and SET1 methyltransferase (Takahashi et al. 2011).

1.2.3 The conserved MLL/SET/COMPASS complex

Over the year, more COMPASS-like complexes have been discovered in other organisms such as *C. elegans*, *Drosophila* and *Homo sapiens*. Although most components are conserved, some may be missing. The current section is dedicated to comparing the MLL/SET/ COMPASS complexes between human and *C. elegans* and demonstrating that the *C. elegans* complexes are highly conserved.

1.2.3.1 MLL/SET/COMPASS in *Homo sapiens*

The human COMPASS complex is the most diverse. There are at least six family members of H3K4 methyltransferases, which include Set1A (KMT2F), Set1B (KMT2G), MLL1 (KMT2A), MLL2 (KMT2B), MLL3 (KMT2C) and MLL4 (KMT2D) (Eissenberg & Shilatifard 2010; Shilatifard 2008; Malik & Bhaumik 2010). More details on the important domains will be explained in later section when describing the catalytic reaction. Evidences show that human has a wide range of methyltransferases to cater for specific functions or situations. Firstly, human methyltransferase has high enzymatic specificity towards the degree of lysine methylation. For instance, the MLL3 and MLL4 complexes are H3K4 mono-methyltransferases (Hu et al. 2013; Xiao et al. 2003). Secondly, the enzymatic specificity may also be affected by other endogenous members of the complex. It has been shown that purified MLL1 converts H3K4 to H3K4me2 whereas MLL1/COMPASS complex catalyzes H3K4 to H3K4me3 (Dou et al. 2006; Schneider et al. 2005). Thirdly, although SET1A and SET1B are both H3K4 trimethylase (Lee et al. 2007; Gu & Lee 2013), immunostaining study suggests that they have distinct subnuclear localization, suggesting they have different gene targets in vivo (Lee et al. 2007). Abnormal methyltransferases may lead to pathogenesis such as the chromosomal 11 rearrangement at MLL gene that has been

associated with increased risk of acute myeloid leukemia (Muntean & Hess 2012). Hence, human H3K4 methyltransferases are very diverse and have none redundant activities.

The human complexes have all the core components WDR5, ASH2L, RbBP5 and DPY30. Human WD-40 Repeat Protein 5 (WDR5) gene is located on chromosome 9 and is about 24.6kb long. The WDR5 protein is 334 amino acid residues (36 kDa). The full length WDR5 protein has seven WD40 repeats that fold into a seven-blade β-propeller structure which is illustrated in WDR5 crystal structure (Figure 1.6). The WD40 motif is characterized by repeats of 40 amino acids that begins with glycine-histidine (GH) and ends with tryptophan-aspartic acid (WD) (van der Voorn & Ploegh 1992). It is important for the formation of multi-protein complexes (Mylona et al. 2006; Stirnimann et al. 2010). The WD40 repeats in WDR5 protein are located between amino acid 43 and 333. WDR5 can be found in most human tissues in general. Interestingly however, level of WDR5 transcripts are highest in testis (mean reads per kilobase per million reads placed (RPKM): 24.217 ± 3.667) compared to the other tissues (mean RPKM: 7.5) ((NCBI) 2017; Fagerberg et al. 2014). How WDR5 influences H3K4 methylation in testis is unknown. However, an in vitro study has shown that WDR5 is a direct target of a sex-determining gene, SRY, which encodes for a transcription factor. WDR5-SRY interaction can further activate expression of the Sox9 gene and repress β-catenin. Sox9 is the master regulator of sex determination, whereas, β-catenin is important for development of ovaries (Xu et al. 2012). Thus, in human, WDR5 is one of the core COMPASS complex complement and is involved in sex determination.

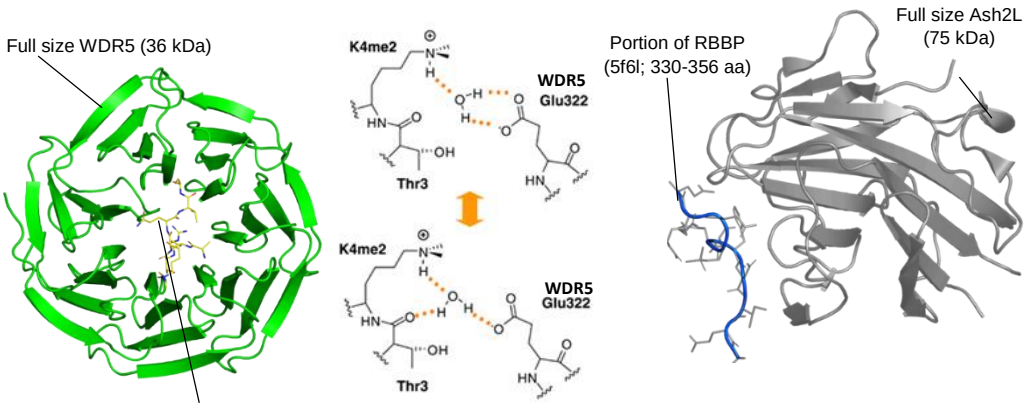
WDR5 recognizes A1, R2 and T3 on histone H3 tail (Couture et al. 2006). H3R2 dips into the central channel of WDR5 hereby exposing the adjacent H3K4me2 to the top face of WDR5 (Schuetz et al. 2006). The Nε atom of H3K4me2 forms a hydrogen bond with a water molecule, which in turn forms another one or two hydrogen bonds with the carboxylate groups of Glu322 of WDR5 (Schuetz et al. 2006). Truncated WDR5 protein missing the Glu322 residue shows no interaction with H3K4me2. On the other hand, H3K4me3 abolishes its interaction with WDR5, whereas H3K4me1 and H3K4me0 hydrophilicity is too high to make interaction with WDR5. H3K4me0/me1 has three and two hydrogen bond donors, respectively, making it greatly hydrophilic (Schuetz et al. 2006). To sum, WDR5 Glu322 places the K4 at a position suitable for the catalytic reaction by H3K4 methyltransferase.

Human Retinoblastoma-binding protein 5 (RbBP5) gene is located on chromosome 1 and is approximately 35.9 kb long. An alternative name for RBBP5 is RBQ3. The gene has 14 exons and encodes for 538 amino acids (60 kDa). RBBP5 protein has six WD40 repeats structure that are located between amino acid 22 and 331. The WD40 repeat sequences allow bindings and interactions between proteins. Thus far, there is no complete protein crystal structure of RBBP5 yet. Only the following portions of the protein crystal structure have been illustrated: RBBP5(369-381)-peptide (Odho et al. 2010); RBBP5(344-355)-peptide (P. Zhang et al. 2015); and RBBP5(330-356)-peptide (Li et al. 2016). The RBBP5 protein can be found in the nuclear of most human tissue, at approximately the same level (Fagerberg et al. 2014).

Absent small homoeotic discs-2-like (ASH2L) gene is located at chromosome 8. The gene, which is approximately 35kb long and has eight exons encodes for ASH2L protein of 75 kDa. ASH2L is

a trithorax protein and has SPRY domain (SPIa and the Ryanodine Receptor), which is a protein interaction module (D'Cruz et al. 2013). DPY-30 gene is located on chromosome 2 and is about 172 kb long. It contains 10 exons and encodes a protein that is about 11 kDA. Several complexes may also have other core components such as CXXC1 Finger Protein 1 (CFP1), WD Repeat Domain 82 (WDR82), Host Cell Factor 1/2 (HCF1/2), Menin and Ubiquitously Transcribed Tetratricopeptide repeat, X chromosome (UTX). CFP1, of the SET1A/1B complex, has a zinc finger domain CXXC that can interact with unmethylated CpG (Carlone et al. 2005). Despite *C. elegans* being deprived of CpG methylation, there is a CFP-1 homolog found at unmethylated CpG (Chen et al. 2014).

The human MLL/SET complexes can be divided into three categories based on their components. Each of these three category retains the conserved WRAD (WDR-5, RbBP-5, ASH2L, and DPY-30) core components. Firstly, the SET1A/SET1B complexes which contain WRAD complex, HCF, CFP1 and WDR82. Secondly, the MLL1/2 complexes containing WRAD complexes, HCF and menin. Lastly, the MLL3/4 complexes which contain WRAD complex, HCF, Pax2 transactivation domain-interacting protein (PTIP), UTX and Lost Plant homeodomains [PHDs] of Trithorax-related [Trr] (LPT) (Table 1.1). The crystal structures of human WDR5, a portion of RBBP5 and ASHL is shown in Figure 1.6. The position of WD40 repeats of WDR5 and RBBP5 are shown in Figure 1.7. Figure 1.8 depicts the levels of WDR5 and RBBP5 transcriptome in human in various tissues. In all, there are at least six human H3K4 methyltransferase complexes and all of them have the conserved WRAD complex as well as a few other components.



(Protein structures from EMBL-EBI, Protein Data Bank in Europe)

Figure 1.6 Human MLL/SET/COMPASS core components: WDR5, RBBP5 and ASH2L

Crystal structure models of the core components of the MLL/SET/COMPASS complexes showing WDR5 (green) with histone H3K4me3 9-residue peptide (yellow stick figure), a portion of RBBP5 from amino acid 330 to 356 (blue) and ASH2L (grey). The chemical structure shows that amino acid Glu322 of WDR5 can recognize and form either one or two hydrogen bonds with H3K4me2. Yellow arrow indicates the two types of bonding that WDR5 and Kme2 can have.

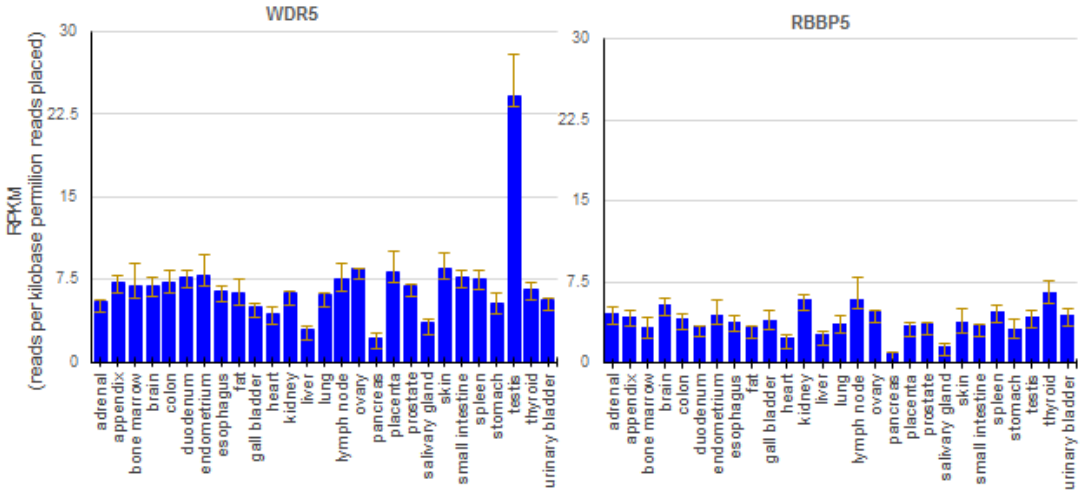
WDR5 (334 aa; 36 kDa)		
Description	a.a. position	Graphical view
WD1	43-82	
WD2	85-126	
WD3	128-168	
WD4	169-208	
WD5	212-253	
WD6	256-296	
WD7	299-333	

RBBP5/RBQ-3 (538 aa; 60 kDa)		
Description	a.a. position	Graphical view
WD1	22-63	
WD2	64-103	
WD3	148-188	
WD4	196-235	
WD5	249-291	
WD6	293-331	

(Data on WD40 position taken from UniProt)

Figure 1.7 WD40 repeats in human WDR5 and RBBP5 facilitate protein-protein interactions

Illustrative map showing the positions of seven WD40 repeats in human WDR5 and six WD40 repeats in RBBP5. WD40 repeats is labelled from WD1 to WD7. Amino acid positions indicate the start and end of each WD40 repeats. The dark yellow bars in the graphical view illustrate the position of WD40 repeats in each protein.



(Source: NCBI gene portal; Fagerberg et al. 2014*)*

Figure 1.8 WDR5 transcriptome levels is the highest in testis compared to other tissues

Bar chart showing the transcriptome levels of WDR5 and RBBP5. Y-axis is reads per kilobase per million reads placed. X-axis is the different tissues measured. Bar chart was plotted for mean of RPKM ± SEM.

Table 1.1 The conserved SET/MLL/COMPASS complexes in yeast, human and worm.

Yeast SET1/ COMPASS	Human SET1/ COMPASS	Human MLL1/2	Human MLL3/4	Worm SET-2	Worm SET-16
Cps60/Bre2	ASH2L	ASH2L	ASH2L	ASH-2	ASH-2
Cps50/Swd1	RBBP5	RBBP5	RBBP5	RBBP-5	RBBP-5
Cpd25/Sdc1	DPY30	DPY30	DPY30	DPY-30	DPY-30
Cps30/Swd3	WDR5	WDR5	WDR5	WDR-5	WDR-5
Cps35/Swd2	WDR82				
Cps40/Spp1	CFP1				
	HCF1/2	HCF1/2	HCF1/2		
		MENIN			
			PTIP		
			UTX		UTX-1
			LPT		
SET1	SET1A/B			SET-2	
		MLL1/2			
			MLL3/4		SET-16

Adapted from (Mohan et al. 2011; Fisher et al. 2010)

1.2.3.2 MLL/SET/COMPASS complexes in *C. elegans*

The MLL/SET/COMPASS complexes are highly and structurally conserved even in the *C. elegans*. I will describe the methyltransferases and the core components, with mainly focusing on WDR-5.1 and RBBP-5 to show their similarities with their human counterparts.

C. elegans has only two complexes that are involved in H3K4 methylation: The SET-2/COMPASS and SET-16/COMPASS. SET-16/COMPASS was discovered by our lab during a screen for genes that attenuate RAS signaling (Fisher et al. 2010). The catalytic subunits in these complexes are the methyltransferases SET-2 and SET-16. SET-16, which is the orthologue of mammalian MLL3/4, is required for H3K4me3 during embryonic development (Fisher et al. 2010; Wilkins 2016). On the other hand, SET-2, which is the orthologue of yeast SET1, is required for H3K4me2/me3 (Simonet et al. 2007; Wilkins 2016). Interestingly, none of these two complexes are responsible for H3K4me1 deposition (Wilkins 2016). Not long ago, another two new H3K4 methyltransferase SET-17 and SET-30 were discovered. While SET-17 is required for H3K4me1/me2, SET-30 is required for H3K4me1/me2/me3 during larval development (Greer et al. 2014). Perhaps, these are the enzymes that catalyze H3K4me1 methylation. However, SET-17 and SET-30 homology are not similar to any of the SET/MLL family of enzymes. In both of the SET-2/COMPASS and SET-16/COMPASS complexes, the four core components of WDR-5, RBBP-5, ASH-2 and DPY-30 are conserved.

The WDR-5 gene in *C. elegans* is located in chromosome III. WDR-5.1 has 1519 base pairs, produces a transcript of about 1.3 kb long, and encodes a protein which is 376 amino acid long (41 kDa). WDR5 has another protein orthologue, WDR-5.2. However, knockout *wdr-5.2* (ok1444) does not reduce the level of H3K4me2/me3 (Li & Kelly 2011), indicating that it is not required for H3K4 methylation. *C. elegans* WDR-5.1 protein shares 68% protein sequence identity with the human WDR5 (Schuetz et al. 2006). The WD40 repeats in worm WDR5.1 are located between

amino acid 85 and 373 (Figure 1.9) (UniProt ID: Q17963). When the WD40 repeats of worm WDR-5 are aligned with its human homologue (Figure 1.10), great similarities were observed. Importantly, there is a null mutant strain *wdr-5(ok1417)* that carries 695 base pairs deletion targeting its WD40 repeats from WD1 to WD6. Another *C. elegans* knockdown strain, *wdr-5(90743),* could be an alternative model since depletion in its WDR-5 has also been associated with reduced H3K4 methylation and prolonged lifespan (Greer et al., 2011). The mutant *wdr-5(ok1417)* worm are fertile but has moderate embryo lethality and egg laying defect (Li & Kelly 2011).

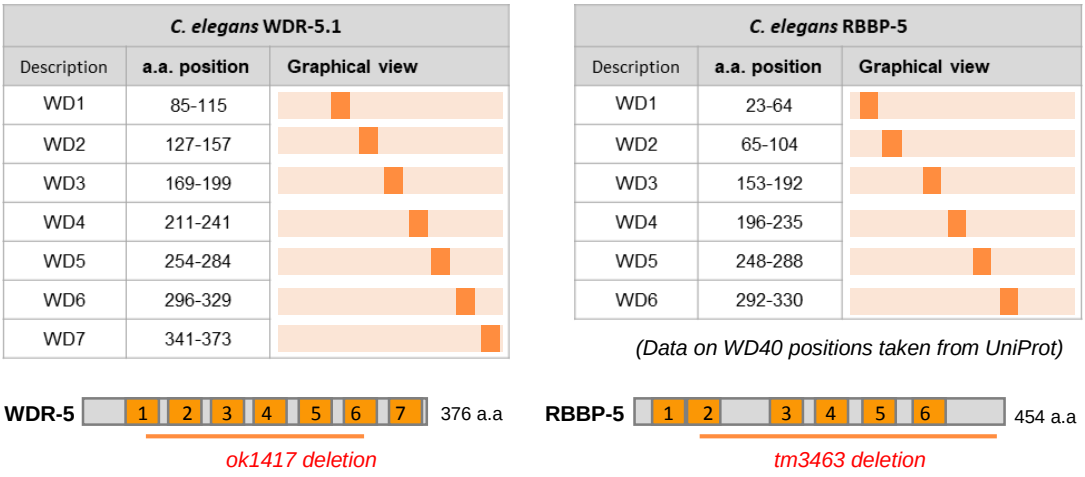
The worm rbbp-5 gene is located in chromosome II, approximately 1.5 kb long and encodes 454 amino acids. The WD40 repeats which are located between amino acid 23 and 330 (Figure 1.9) (UniProt ID: Q09309), show that the worm RBBP-5 has six WD40 repeats similar to the number of repeats found in human RBBP-5. When aligned based on amino acid sequence and WD positions, great similarities were observed also between worm RBBP-5 and human RBBP5 proteins (Figure 1.11). In addition, *C. elegans* has a mutant strain *rbbp-5(tm3463)* with a deletion of 1005 base pairs out of 1505 base pairs of the *rbbp-5* wild type sequence. The deletion occurs in exon 3 to exon 4, affecting WD2 to WD6. The *rbbp-5(tm3463)* is a null mutant, hence, it does not have a functional RBBP-5. Another *C. elegans* strain with a knockout in *rbbp-5* gene is *rbbp-5(tm3530),* however, it has been classified as lethal or sterile. The *rbbp-5(-)* mutant worm exhibits Dumpy phenotype, egg laying defect and substantial sterility (24% sterile compared to wild type) (Li & Kelly 2011).

The *ash-2* gene is located on worm chromosome II. It is approximately 2 kb long and encodes a 570 amino acid protein. Similar to human, it also has a SPRY domain. The SPRY domain of *C. elegans* is located between amino acid 272 and 470 (UniProt ID: Q9XXH4). *Dpy-30* gene, which is located in chromosome V, is about 600 bp long and encodes a protein with 123 amino acids. It has been associated with two multiprotein complexes: the MLL/SET/COMPASS complex and the SDC complex. DPY-30 is required in the SDC complex for sex-specific association of dosage compensation (Hsu et al. 1995).

In addition, the SET-16/COMPASS complex in *C. elegans* also contains the ubiquitously transcribed tetratricopeptide repeat, X chromosome protein 1 (UTX-1). The worm UTX-1, which is encoded by the X chromosome, is similar to the human UTX found in MLL3/4 COMPASS complexes (Swigut & Wysocka 2007). Our lab has shown that while SET-16/MLL regulates H3K4 methylation, the UTX-1 regulates H3K27 methylation (Fisher et al. 2010). The UTX-1 protein has tetratricopeptide repeats (Tpr) in the N-terminal half and JmjC domains in the C-terminal half. The Tpr domains are required for H3K27me1 demethylation but are dispensable for the activity on H3K27me2/me3 (Hong et al. 2007). On the other hand, the catalytically active JmjC domain is required for UTX-1 demethylase activity (Hong et al. 2007). UTX-1 is an aging regulator and a demethylase responsible for bulk removal of H3K27me2/me3. RNA interference of UTX-1 in *C. elegans* increases H3K27 methylation and causes lifespan extension (Swigut & Wysocka 2007).

To sum up, the SET1/MLL methyltransferases are highly conserved from yeast to humans. For simplicity, these highly conserved complexes will be referred to as the MLL/SET/COMPASS

complexes. There may be more than one type of catalytic subunit that can associate with the complex. Although human has more diverse H3K4 methylation complexes, the structures and functions of most of the components are highly conserved in other organisms including *C. elegans*.



***C. elegans* WDR-5.1**

Description	a.a. position	Graphical view
WD1	85-115	
WD2	127-157	
WD3	169-199	
WD4	211-241	
WD5	254-284	
WD6	296-329	
WD7	341-373	

***C. elegans* RBBP-5**

Description	a.a. position	Graphical view
WD1	23-64	
WD2	65-104	
WD3	153-192	
WD4	196-235	
WD5	248-288	
WD6	292-330	

(Data on WD40 positions taken from UniProt)

Figure 1.9 WD40 repeats in *C. elegans* WDR-5.1 and RBBP-5

Illustrative map showing the positions of seven WD40 repeats in *C. elegans* WDR-5.1 and six WD40 repeats in RBBP-5. WD40 repeats is labelled from WD1 to WD7. Amino acid positions indicate the start and end of each WD40 repeats. The dark yellow bars in the graphical view illustrate the position of WD40 repeats in each protein.

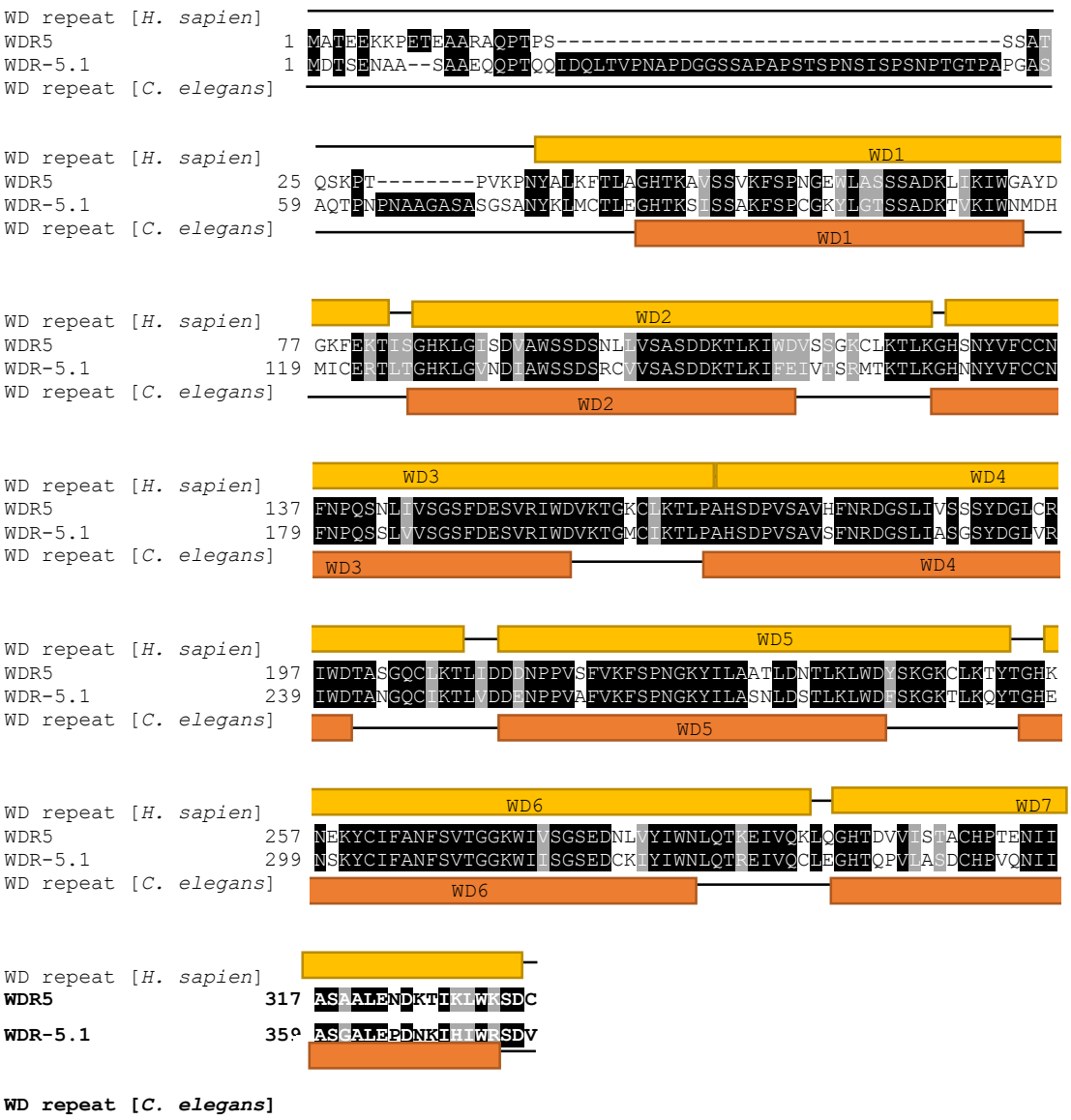


Figure 1.10 Conserved WD40 repeats in human WDR5 and worm WDR-5.1

Comparison between human WDR5 protein sequence alignment (NCBI reference sequence: NP_438172.1) and *C. elegans* WDR-5.1 protein (WormBase ID WP:CE00901). Amino acids highlighted in black indicate a strong alignment between the two organisms. Grey amino acids indicate less strong alignment between the two. Positions of WD40 repeats are illustrated in yellow box for human and orange box for *C. elegans*, labelled WD1-7.

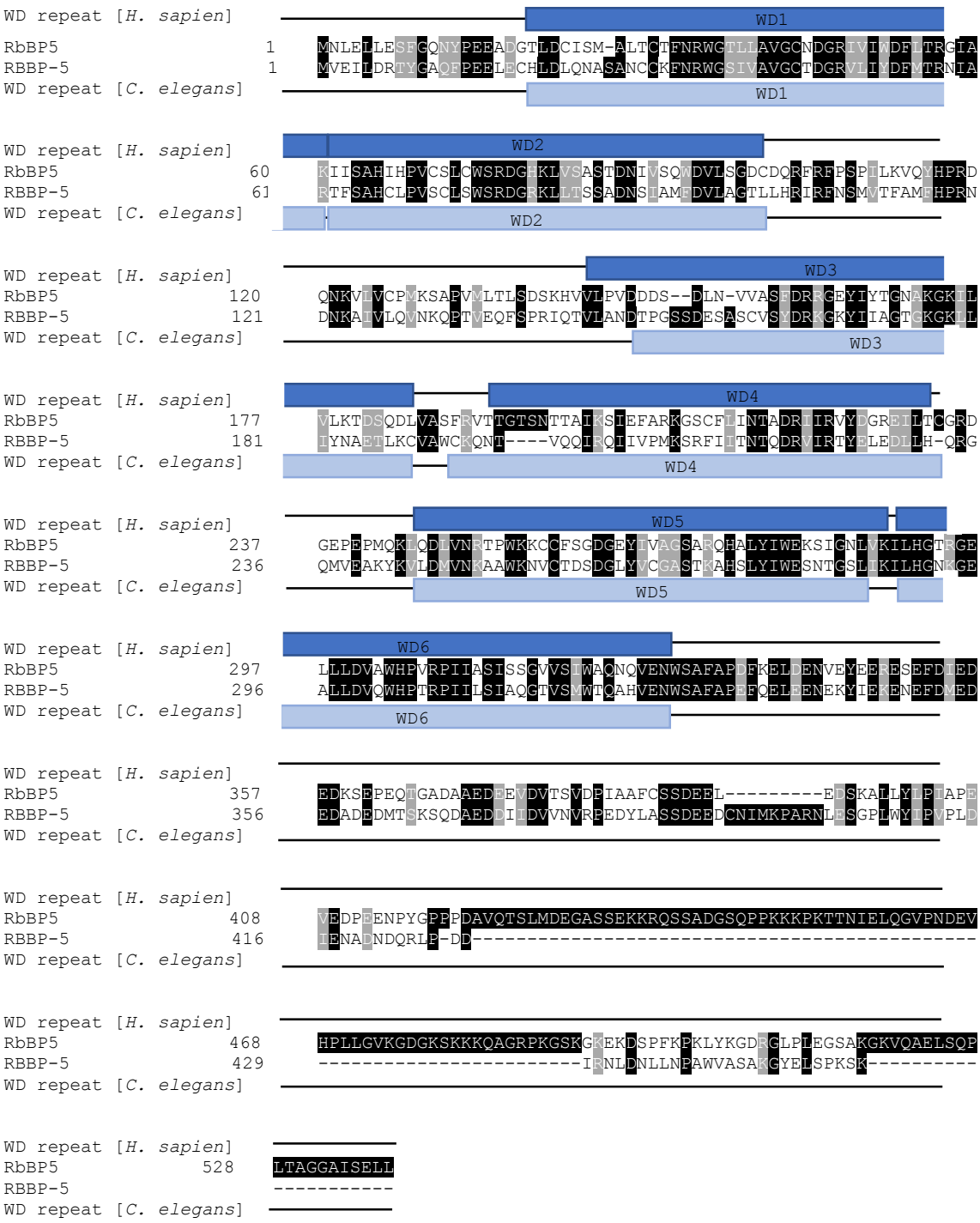


Figure 1.11 Conserved WD40 repeats in human RbBP5 and worm RBBP-5

Comparison between human RbBP5 protein sequence alignment (NCBI reference sequence: NP_005048.2) and *C. elegans* RBBP-5 protein (WormBase ID WP:CE32634). Amino acids highlighted in black indicate strong alignment while grey amino acids indicate less strong alignment between the two species. The positions of the six WD40 repeats (WD1 to WD6) are illustrated as darker blue in human and lighter blue in *C. elegans*.

1.2.4 The structure and function of SET and MLL enzymes

SET-domain-containing methyltransferases are the catalytic subunits of the MLL/SET/COMPASS complex (Mozzetta et al. 2015). It is highly conserved from yeast to human (Figure 1.12A). SET domain is named after the *Drosophila* Suppressor of variegation 3-9 (Su(var)3-9), Enhancer of zester (E(z)), and Trithorax (Trx) proteins. SET is characterized by its approximately 130 amino acid long and it has catalytic activity towards the Ɛ-amino group of lysine residues (Herz et al. 2013). In this section, I will introduce the structure of the SET domain, its function in catalyzing the methyltransferase activity and other motifs that could be found adjacent to the SET domain.

The catalytic core SET domain is structurally conserved in most lysine methyltransferase (KMT). It is surrounded by adjacent domains such as Pre-SET, N-SET, Myeloid-Nervy-DEAF1 (MYND), Insertion SET (I-SET), Post-SET and C-terminal domain (CTD) (Figure 1.12B) (Schapira 2011). The SET domain adopts a series of folded structure that surrounds a knot-like structure (Upadhyay & Cheng 2011). The I-SET is structurally fixed and static, whereas, the Post-SET is dynamic and highly folded. Together, the I-SET and Post-SET act like a shell around the SET fold and serve as a substrate binding groove for lysine (Schapira 2011). The electropositive histone tail attracts the substrate binding groove, which is electronegative (Schapira 2011). Hence, an electrostatic attraction pulls the KMT to the lysine substrate, causing the lysine side chain to insert into a narrow channel at the junction of SET, Post-SET and I-SET (Xiao et al. 2003; Han et al. 2007; Collins et al. 2008; Huang et al. 2010; Wu et al. 2010). As the narrow channel is hydrophobic, the lysine is shielded from solvent, which is essential for the catalysis to happen (Smith & Denu 2009).

SET methyltransferases catalyze the transfer of methyl group from S-Adenosyl-L-methionine (SAM) to H3K4 residue. The SET domain has two sequence motifs ELx(F/Y)DY and NHS/CxxPN (Dillon et al. 2005; Qian & Zhou 2006; Xiao et al. 2003). In the knot-like structure, these motifs bring S-Adenosyl-L-methionine (SAM)-binding region in close proximity to lysine peptide-binding channel (Upadhyay & Cheng 2011). With the binding of SAM, the initial partially folded Post-SET conformation becomes more stabilized (Schapira 2011). The Ɛ-nitrogen of the lysine residue on histone tail becomes deprotonated (Smith & Denu 2009). It loses a proton into a solvent. As a result, the deprotonated amino acid group (NH2) from lysine attacks the positively charged SAM (Zhang et al. 2003). Following the nucleophilic attack, the lysine is methylated and the SAM by-product, S-adenosyl-homo-cysteine (SAH), is released. The SET-domain methylase is the catalytic subunit of the COMPASS complex. However, without the complex's core components, the enzyme is less active and restricted to monomethylation.

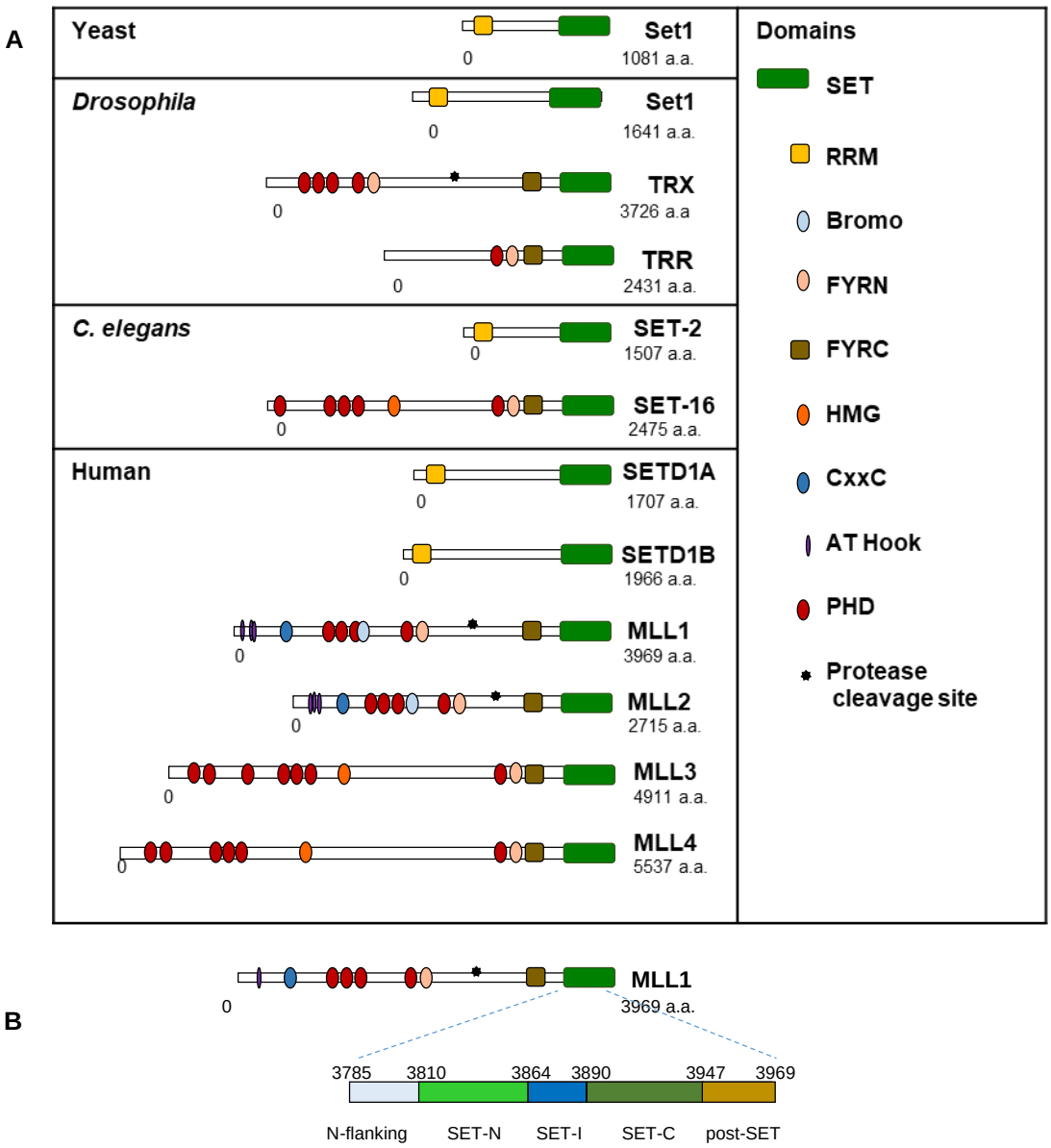


Figure 1.12 SET domain in H3K4 methyltransferases are highly conserved from yeast to human

(A) Illustration of SET domain and adjacent motifs in H3K4 methyltransferases in yeast, drosophila, worm and human. SET (green); RNA recognition motif, RRM (yellow); Bromo domain (light blue); FY-rich N-terminal, FYRN (light brown); FY-rich C-terminal, FYRC (dark brown); high mobility group domain, HMG (orange); CxxC (cyan); AT hook (grey disk); PHD fingers (red); and protease cleavage site (*).

(B) The elements adjacent to the SET domain. N-flanking (light blue); SET-N (green); insertion SET, SET-I (dark blue); SET-C (emerald); and postSET (brown).

1.2.5 The structure and function of the core complex

Assembly of the methyltransferase subunit and the WDR5-RBBP5-ASH2L-DPY-30 complex is organized in a specific structural order: MLL1↔WDR5↔RBBP5↔ASH2L↔DPY30 (Dou et al. 2006; Patel et al. 2009; Ernst & Vakoc 2012). The MLL/SET/COMPASS complex activity is highly compromised by the absence of the core components WDR-5, RBPP-5 and ASH-2. For instance, our lab has demonstrated that *rbbp-5(-)* mutant *C. elegans* embryos lack H3K4me1/me2/me3, *ash-2(-)* mutant embryos lack H3K4me2/me3 and *wdr-5(-)* mutant embryos lack H3K4me3 as well as a displaying a reduction in H3K4me2 levels (Wang 2015). I will describe the structures of the core components, their roles in the assembly of the complex and their interactions with other proteins or molecules.

WDR5 is known for its seven WD40 repeats. The WD40 repeats on WDR5 interacts with WIN motif located at the carboxy-terminal regions of MLL proteins (Figure 1.13) (Patel et al. 2009). Although human SET1A, SET1B and MLL1-4 each contains WIN motif, they have different binding affinities, which range from 50 to 2800 nM (Dharmarajan et al. 2012). The strongest binding affinity is between MLL3 and WDR5 (Dharmarajan et al. 2012). In addition, the opposite side of the WDR5's β-propeller, which are formed by the folding of the WD40 repeats, can recognize the RBBP5's WDR5 binding motif (WBM) (Figure 1.13) (Odho et al. 2010; Avdic et al. 2011). In human, WDR5 and RBBP5 are required for complex formation and integrity (Meeks & Shilatifard 2017). WDR5 preferentially binds to H3 if the H3 tail is symmetrically dimethylated at H3R2 (Migliori et al. 2012). This explain the tight coupling of H3R2me2s with H3K4me3, which are commonly found at active promoters (C.-C. Yuan et al. 2012). WDR5 has also been shown to physically interact with the product of HOXA locus, the long intergenic noncoding RNA (lincRNA) HOTTIP (Wang et al. 2011). The interaction promotes gene activation at the HOXA locus via MLL-mediated H3K4me3 (Geisler & Paro 2015; Wang et al. 2011).

Other domains found in RBBP5 include WD40 repeats, activation segment (AS) and ASH2L binding motif (ABM) domains (Li et al. 2016). On the other hand, domains of ASH2L proteins are PHD and an SPRY (SPIa and ryanodine receptor) domains (Figure 1.13) (Li et al. 2016). RBBP5's ABM has a cluster of acidic residues of D/E box (Y. Zhang et al. 2015) that recognizes the concave structure of the ASH2L's SPRY domain. ASH2L has a winged-helix domain that can bind to DNA in chromatin (Sarvan et al. 2011; Chen et al. 2011). ASH2L can also bind directly to DPY-30 (Cho et al. 2007). Both ASH2L and CFP1 are required for the implementation of proper levels of H3K4me2/me3 (Meeks & Shilatifard 2017).

Interactions between SET-domain and WDR5-RBBP5-ASH2L structure upregulates H3K4 methylation. For instance, MLL1 is a "slow" H3K4me1 methylase, whereas, the MLL1-WRAD subcomplex (WDR5, RbBP5, ASH2L and DPY-30) is a "fast" H3K4me1/me2 methylase (Shinsky & Cosgrove 2015; Patel et al. 2009). Phosphorylation of RBBP5 stimulates WRAD complex formation and enhance SET1A/B and MLL1-4 H3K4 methyltransferase activity in human (P. Zhang et al. 2015). DPY30 can enhance MLL1 methyltransferase catalytic activity by up to five fold (Southall et al. 2009; Patel et al. 2009).

To sum, SET catalytic activity at H3K4 is regulated by the core components of WDR5, RBBP5, ASH2L and DPY-30 (WRAD). Association with WRAD complex enhances the SET activity. In addition to providing interaction within the MLL/SET/COMPASS complex, WRAD can also interact with other molecules such as H3 protein, DNA and RNA.

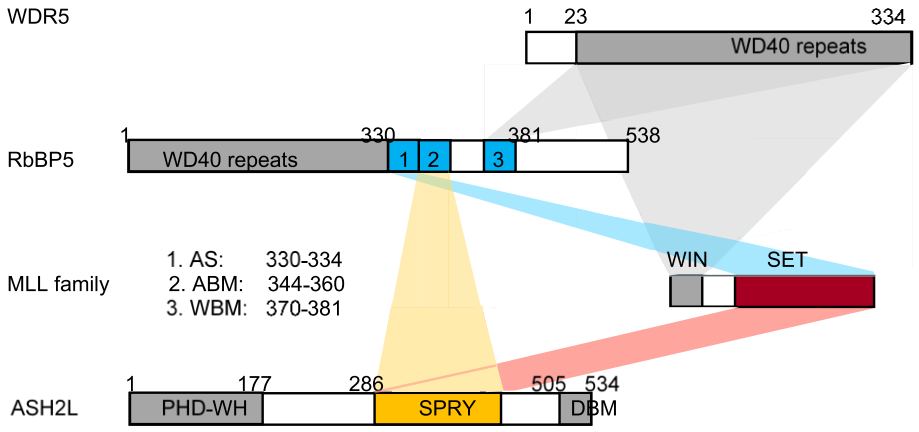


Figure 1.13 Interactions amongst SET-containing enzyme, WDR5, RBBP5 and ASH2L

WDR5's WD40 repeats (grey) show interactions with RBBP5 and SET enzyme. RBBP5 has WD40 repeats (grey); activation segment; AS (blue, labelled '1'); ASH2L binding motif, ABM (blue, labelled '2'); and a WDR5 binding motif, WBM (blue, labelled '3'). MLL has a SET domain (red) and a WIN motif (grey). ASH2L has PHD fingers (grey) and SPRY domain (yellow). Source (Li et al. 2016).

1.2.6 Removal of methylated marks at H3K4

Methylation at H3K4 is mediated through the balance between methyltransferases and demethylases. Demethylases are enzymes that can reverse the methylation at H3K4. Several H3K4 demethylases can be found in human and *C. elegans*.

Within the histone demethylase, there is a catalytic domain and chromatin targeting domains (Zhang et al. 2014). There are two families of demethylase catalytic domains: the amine oxidases family and the Jumonji C-domain-containing dioxygenases family (Greer & Shi 2012). KDM1A (LSD1) and KDM1B (LSD2) are examples of the two earliest discovered flavin-dependent monoamine oxidase family (Shi et al. 2004; Ciccone et al. 2009). Since KDM1A and KDM1B require protonated lysine, they can act only on H3K4me1/me2 but not H3K4me3 (Anand & Marmorstein 2007). In the catalysis, the α-carbon of the lysine substrate is cleaved, generating imine intermediate. Imine becomes hydrolyzed into carbolamine, which then degrades, releasing formaldehyde and amine (Anand & Marmorstein 2007). Following the catalysis, H3K4me1/me2 is converted to unmodified H3K4 (Shi et al. 2004; Chen et al. 2013; Nowak et al. 2016). The Jumonji dioxygenase histone demethylase family has a wide range of members. There are more than 20 identified members in human, which include KDM2B, KDM5A, KDM5B, KDM5C and KDM5D (Nowak et al. 2016). This family of histone demethylase has a conserved JmjC domain (Nowak et al. 2016). The JmjC domain directs iron to mediate dioxygenase-dependent demethylation reaction (Tsukada et al. 2005).

Histone demethylases often exist within large multi-protein complexes. Domains such as PHD, Tudor and Tetratrico-peptide Repeat (TPR), within the complexes help with the complexes binding to histone post-translational modifications (Dimitrova et al. 2015). For instance, the PHD1 domain on the co-repressor and H3K4me2/me3 demethylase, KDM5B, binds to the demethylation product, H3K4me0, to prevent re-methylation of H3K4 (Zhang et al. 2014). Histone demethylases can also have domains that interact with lncRNAs. lncRNAs has been found to bind with WDR5 and KMD1A/CoREST demethyltransferase complex (Wang et al. 2011; Greer & Shi 2012).

In *C. elegans*, there are fewer H3K4 demethylases. *C. elegans* SPR-5 is the homolog of human LSD amine oxidase family. It is the H3K4me1/me2 histone demethylase. Absence of SPR-5 causes progressive impairment in fertility and increases global level of H3K4me2 (Greer et al. 2016; Katz et al. 2009; Nottke et al. 2011). Moreover, loss of SPR-5 leads to transgenerational longevity. The study found that the first five *spr-5(-)* mutant generations had normal lifespan, whereas generation 10 and 20 displayed extended lifespan by 19%-44% (Greer et al. 2016) rbr-2 is the *C. elegans* homolog of the human JmjC demethylase family (Nishibuchi et al. 2014). It is the H3K4me2/me3 demethylase and is thought to negatively regulate transcription initiation by removing H3K4me3 at Transcription Start Sites (TSS). Absence of RBR-2 result in excess H3K4me3 in *C. elegans* and shortened lifespan (Greer et al. 2010).

To conclude, human and *C. elegans* have H3K4 demethylases, which could be members of either the amine oxidase family or Jumonji family. The demethylases ensure balanced level of H3K4 methylation and allow H3K4 methylation to be reversible.

1.2.7 Readers of methylated H3K4

As explained earlier, H3K4 methylation levels does not affect the overall charge of the nucleosome. To impact on transcription, it serves as a binding platform for several chromatin readers. The readers may harbor several domains, such as the PHD fingers, chromodomain, Tudor, and zinc finger (Zf) CW (Yun et al. 2011; Musselman et al. 2012). The readers may have two to four aromatic rings, serving as binding pockets for lysine (Musselman et al. 2012). A smaller or negatively charged pocket prefers H3K4me1/me2 over H3K4me3 binding (Yun et al. 2011). In this section, I will introduce H3K4 methylation readers that have roles in regulating other histone post-translational modifications, chromatin-remodeling mechanisms, and transcription.

Several H3K4 methylation readers are associated with recruitments of histone acetylations (HATs), histone deacetylations (HDACs) and histone demethylases. Examples of these readers are ING2, ING4, PHF2, PHF8, JMJD2A and JMJD2B. Upon DNA damage during transcription, ING2 binds to H3K4me3 through its PHD domain and recruits Sin3 histone deacetylase complex to silence transcription (Shi et al. 2006). Binding of complexes containing ING4 (or yeast Yng1) to H3K4me2/me3 stimulates acetylation at H3K14 which has been associated with transcription processes (Lalonde et al. 2013; Lalonde et al. 2014; Taverna et al. 2006; Hung et al. 2009). Another example is the PHF2 lysine demethylase, which has a JmjC domain for H3K9me1

demethylation and a PHD domain for H3K4me2/me3 recognition (Wen et al. 2010). PHF8 is a JmjC-containing histone demethylase that recognizes H3K4me3 and removes H3K9me2 repressive marks (Cloos et al. 2008; Horton et al. 2010). Double tudor domains of JMJD2A and JMJD2B demethylases binds to H3K4me3 and H4K20me2. Upon DNA damage, JMJD2 degrades thus exposing H4K20me2 to DNA repair pathway (Mallette et al. 2012). Thus, H3K4 methylation can be associated with readers that function as post-translational modifiers for histone peptides.

Some readers of methylated H3K4 have also been linked to chromatin-modifying and chromatin-remodeling mechanisms such as 'Chromodomain-helicase-DNA-binding protein 1' (CHD1) and 'Bromodomain and PHD domain transcription factor' (BPTF) (Musselman & Kutateladze 2009). The double chromo domain of CHD1 ATP-dependent chromatin remodeling enzyme has a preference for H3K4me2/me3 over H3K4me1 (Flanagan et al. 2005; Pray-Grant et al. 2005; Sims et al. 2005). The CHD1 protein has been implicated in replication-independent histone exchange or assembly (Radman-Livaja et al. 2012). Another domain, PHD of BPTF, is known to bind more strongly to H3K4me3 in presence of H3K9AcK14Ac for nucleosome association (Vermeulen et al. 2010). The BPTF subunit is part of the NURF chromatin remodeling complex (Musselman & Kutateladze 2009). The evidence indicates that H3K4 methylation serves as a platform for a number of chromatin remodelers.

H3K4 methylation readers importantly are directly associated with the general transcriptional machinery. Human TAF3 (Transcription associated factor 3), a subunit of the basal transcription complex TFIID, binds to H3K4me3 through its PHD domain (Lauberth et al. 2013). TFIID then, along with other general transcription factors, forms the PIC complex for transcription initiation. SAGA histone acetyltransferase complex is important in the activation of transcription of RNA polymerase II targets. SAGA is linked to H3K4me2/me3 through a double tudor domain in Sgf29 subunit. The bindings of H3K4 methyl marks to TAF3 and Sgf29 are strengthen in a presence of H3K9AcK14Ac (Vermeulen et al. 2010). Zf-CW domain of AOF1 can recognize H3K4me1/me2 and stimulate the demethylation of these marks (Yang et al. 2010). LSD2/KDM1B/AOF1 associates with H3K36me3-enriched coding regions of transcriptionally active genes. Its demethylase activity coordinates the levels of H3K4me1/me2, H3K9me2 and H3K36me2 (Fang et al. 2010). Thus, some readers of H3K4 methylation are directly associated with transcription processes.

In summary, H3K4 methylation can recruit various readers. Recruitments of these readers are essential for other post-translational modifications on histone proteins, chromatin remodeling and transcription initiation (Table 1.2). One can imagine the wide range of biological consequences that may occur if the levels of H3K4 methylation become aberrant.

Table 1.2 Readers of H3K4 modifications

Histone modifications		Recognition module	Protein	Related modifications		Functions	References
				Enhanced by	Inhibited by		
H3	K4me2/me3	Chromo	CHD1			ATP-dependent chromatin remodeling	(Flanagan et al. 2005; Sims et al. 2005; Pray-Grant et al. 2005)
	K4me3	PHD	RAG2			Recombination	(Ramon-Maiques et al. 2007; Ji et al. 2010)
	K4me3	PHD	ING2			HDAC	(Shi et al. 2006)
	K4me3	PHD	BPTF	H3K9Ac H3K14Ac		ATP-dependent chromatin remodeling	(Musselman et al. 2012; Vermeulen et al. 2010)
	K4me3	PHD	TAF3	H3K9Ac H3K14Ac	H3R2me2	TFIID transcription Activation	(Kungulovski et al. 2016; Vermeulen et al. 2007)
	K4me2/me3	PHD	PHF2			H3K9 demethylation	(Wen et al. 2010)
	K4me2/me3	PHD	ING4			HBO1 H3 acetylation	(Lalonde et al. 2013; Lalonde et al. 2014; Hung et al. 2009)
	K4me2/me3	PHD	YNG1			NuA3 H3 acetylation	(Taverna et al. 2006)
	K4me3	PHD	PHF8	H3K9Ac H3K14Ac		Histone demethylation	(Cloos et al. 2008; Horton et al. 2010)
	K4me3	Tudor	JMJD2A			Histone demethylase	(Mallette et al. 2012)
	K4me3	Tudor	JMJD2C			Histone demethylase	(Mallette et al. 2012)
	K4me2/me3	Tudor	Sgf29	H3K9Ac H3K14Ac		Histone acetylation (SAGA)	(Vermeulen et al. 2010)
	K4me1/me2	zf-CW	AOF1			Histone demethylase	(Yang et al. 2010; Fang et al. 2010)
	K4me0	PHD	BHC80			LSD1.com	(Yun et al. 2011)
	K4me0	WD40	WDR5/WDR9			HAT	(Yun et al. 2011)
	K4me0	Dnmt3L			K4me	DNA methylation	(Yun et al. 2011)

Adapted from (Yun et al. 2011)

1.3 H3K4 methylation and transcription regulation

In general, methylation at H3K4 has been associated with active transcription. The current section aims to introduce how H3K4 methylation is linked to transcription initiation and elongation, how it is distributed throughout the genome and how it defines bivalent domains.

1.3.1 Initiation of transcription

Initiation of transcription in eukaryotes is a complex process. It involves many multiprotein complexes and requires synergy between the CTD (carboxy terminal domain) and histone codes. Transcription initiation involves RNAPII recruitment, PIC formation, RNAPII CTD phosphorylation and clearance of RNAPII from promoters.

RNA polymerase II (RNAPII) is the protein complex responsible for transcribing the eukaryotic genome into messenger RNA (mRNA) and some noncoding RNA, such as microRNA, eRNA and lncRNA. RNAPII is composed of 12 protein subunits (RNA polymerase II subunit, RPB1-12) (Acker et al. 1997; Edwards et al. 1991). Among the subunits, RPB1 is the largest and contains the CTD (Cramer 2001). The CTD is extended from the catalytic core of the enzymes and is positions close to the mRNA exit tunnel (Cramer 2001). It has an unusual repetitive sequence of Tyr1-Ser2-Pro3-Thr4-Ser5-Pro6-Ser7 (YSPTSPS) that can undergo extensive post-translational modifications, termed the CTD code (Allison et al. 1985; Corden et al. 1985). Coordination between histone modification and CTD code is essential for the delicate regulation of transcription (Corden 2013; Hsin & Manley 2012). Ser2 and ser5 of the RNAPII CTD in most species can be phosphorylated at various stages of transcription. In yeast and some mammalian cells, transcription-associated Ser-7 phosphorylation has also been observed.

RNAPII binds to a preinitiation complex (PIC) assembled at the promoters. PIC is a multiprotein complex comprising an unphosphorylated RNAPII, general transcription factors (TFIIA, TFIIB, TFIID, TFIIE, TFIIF and TFIIH) and a mediator complex (Thomas & Chiang 2006). The selection of promoters is facilitated by TFIID, which is the first step in PIC formation. TFIID is made up of several subunits including TAF1-13 and a TBP (Goodrich & Tjian 2010). Although there are various core promoter elements, the promoters with TATA-box element can be recognized by the TBP subunit of the TFIID complex (Juven-Gershon et al. 2008). Another subunit of the TFIID, TAF3, has a PHD domain that recognizes H3K4me3 (Vermeulen et al. 2007). H3K4me3 is essential for the PHD to bind to native nucleosomes in vitro an in vivo (Vermeulen et al. 2007). The importance in the H3K4me3-TFIID interaction has been demonstrated in an RNAi experiment against WDR5 (Vermeulen et al. 2007). Depletion in WDR5 leads to reduction in H3K4me3 levels, weakened the TBP/TFIID association with the core promoters and decreased mRNA levels at specific loci (Vermeulen et al. 2007). After binding of TFIID to the promoter, the remaining general transcription factors (TFIIA, TFIIB, TFIIE, TFIIF and TFIIH) are recruited to form the PIC. The PIC by now is fully formed but will remain poised (Ioshikhes et al. 2006).

Following PIC formation, the TFIIH-kinase (CDK7) is recruited and phosphorylates Ser5 and Ser7 of the RNAPII CTD (Egloff et al. 2007; Kim et al. 2009; Rodriguez et al. 2000). There are also

various kinases that can phosphorylate Ser5. Ser5 phosphorylation marks the transition between transcription initiation and elongation (Ng et al. 2003). The phosphorylated Ser5 (Ser5-P) induces dissociation of mediator complex and stimulates promoter clearance (Rodriguez et al. 2000; Max et al. 2007; Viladevall et al. 2009; Ho & Shuman 1999; Schroeder et al. 2000; Wen & Shatkin 1999).

Clearance of RNAPII from promoters is linked to further chromatin modifications. The phosphorylation at Ser5 results in recruitment of MLL/SET/COMPASS complex at 5' end of active genes by the transcription elongation machinery (Ng et al. 2003). The complex converts H3K4me1 to more active marks, H3K4me2/me3 (Dehé et al. 2005). Deposition of H3K4me3 by the complex creates binding sites for effector proteins, such as the HATs and HDACs, which in turn contribute to gene-specific transcription activation by chromatin remodeling (Ng et al. 2003; Laribee et al. 2005; Li et al. 2007; Kim & Buratowski 2009).

Since transcription has to proceed through chromatinized DNA, the HATs or HDACs chromatin remodelers are necessary to produce open active or close repressive chromatin state, respectively (Santos-Rosa et al. 2002). An example of a HAT complex is the yeast SAGA complex (human STAGA/TFTC). It is a multiprotein complex consists of Tra1, Gcn5, Ada2, Ada3, Spt3, Spt8, Ubp8, Sus1, Sgf11, Sgf73, Spt7, Spt20, Ada1, TAF5, TAF6, TAF9 and TAF12 subunits in yeast (Koutelou et al. 2010). Interestingly, in human, the SAGA complex also has a SGF29 subunit which can bind H3K4me2/me3 (Vermeulen et al. 2010). SAGA is known for its histone acetyltransferase and deubiquitinase activities (Nagy & Tora 2007; Rodríguez-Navarro 2009). ySAGA binds to acetylated H3 (H3K9 and H3K14) and H4 through a bromodomain of its Gcn5 subunit (Li & Shogren-Knaak 2009; Owen et al. 2000). The deubiquitinase activity on H2B sustains RNAPII Ser2, whereas, activity on H2A monoubiquitination promotes histone acetylation and passage of RNAPII (Stock et al. 2007; Wyce et al. 2007; Zhou et al. 2008). The binding potentiates cooperative H3 acetylation which opens up chromatin for the binding of transcription factors and PIC. ySAGA recruits TBP through its Spt3 subunit for PIC formation (Mohibullah & Hahn 2008). To summuarize, TAFIID-H3K4me3 interaction strengthen PIC association with promoters; Ser5-P on the CTD promotes the recruitment of the MLL/SET/COMPASS complexes; methylated H3K4 recruits HATs; and acetylation causes chromatin to open up for the next step of transcription.

1.3.2 Elongation of transcription

In order for RNAPII to initiate elongation, it must have promoter clearance and form a transcription bubble. During promoter clearance, RNAPII lost its contact with the PIC and establish a stable connection with the nascent transcript (Luse 2013). RNAPII is modified through insertion of several new elongation-supportive factors. Phosphorylation of RNAPII CTD at Ser2 promotes recruitment of mRNA processing and termination factors (Lee & Greenleaf 1991; Ahn et al. 2004; Bartkowiak et al. 2010). RNAPII CTD Ser2 is catalyzed by CDK9, which interacts with the positive transcription elongation factor b (P-TEFb) (Brès et al. 2008). Hence, Ser2-P on CTD is often used as a marker of transcription elongation. For the formation of the transcription bubble, RNAPII

requires XPB helicase of TFIIH complex since RNAPII cannot drive opening of the DNA template (Tirode et al. 1999; Coin et al. 1999). The newly formed RNA-DNA hybrid is short and unstable. Subsequently, addition of adequate NTPs reduce the chance of transcript abortion (Luse & Jacob 1987; Jiang et al. 1995; Holstege et al. 1997). Bubble collapse marks the end of promoter clearance. Upon quitting the RNA-DNA hybrid state, the future mRNA enters the exit channel (Luse 2013).

It is important to note that once RNAPII encounters a nucleosome during elongation, it must break the nucleosome barrier to gain access to DNA. Breaking the nucleosome barrier can be achieved through nucleosome sliding or exchange of histones. Nucleosome occupancy is generally reduced upstream of the TSS (Transcription Start Site), this area is often referred to as the nucleosome-free region. There is often one nucleosome located exactly at the TSS (Segal & Widom 2009; Kaplan et al. 2009). Interestingly, the nucleosomes marked by H3K4me2/me3 can be recognized by CHD1, which contains double chromo domains (Flanagan et al. 2005; Pray-Grant et al. 2005; Sims et al. 2005). CHD1 co-localizes with RNAPII and interacts with FACT (facilitates chromatin transcription) and RNAPII elongation factor DSIF (DRB (5,6-dichloro-1-β-D-ribofuranosylbenzimidazole) sensitivity-inducting factor) (Simic et al. 2003). CHD1 functions to slide the nucleosomes into an ordered array throughout gene bodies (Nodelman & Bowman 2013), whereas FACT mediates the removal and assembly of H2A-H2B dimers. Together, this leads to RNAPII gaining access to DNA.

Another chromatin remodeler, ISW1, also possesses nucleosome-sliding capabilities (Venkatesh & Workman 2015). ISW1 complex can bind to H3K36me3 and H3K4me3 via the PHD fingers of its BPTF subunit and PWWP domain of LOC4, respectively (Ruthenburg et al. 2011). Both H3K36me3 and H3K4 methylation are important marks in gene bodies. Enrichment of H3K36me3 by Set2 methyltransferase marks active exons (Kolasinska-Zwierz et al. 2009; Kizer et al. 2005), whereas introns are enriched for H3K4me1/me2 (Huff et al. 2010). The level of H3K36me3 within alternative exons correlates with their inclusion in spliced transcripts (Kolasinska-Zwierz et al. 2009; Spies et al. 2009). Following the breaking of nucleosome barrier, the methylated nucleosomes are re-incorporated in irregularly spaced manner. ISW1 reinstates properly spaced nucleosome array (Venkatesh & Workman 2015). Histone exchange becomes restricted when H3K36 methylation is enriched at body regions (Venkatesh & Workman 2015). It helps establish the transcription memory that persists through several rounds of transcription.

In conclusion, following transcription initiation, RNAPII is modified to resume transcription elongation. RNAPII has to face several challenges like transcript abortion and nucleosome barriers during the elongation process. Thankfully, H3K4 methylation can recruit readers associated with chromatin remodelers to help overcome the nucleosome barrier.

1.3.3 Distribution of histone modifications on active, repressed and poised genes

Enrichment of specific histone post-translational marks that facilitate transcription processes can be found in enhancer, promoter and gene bodies of active genes. An enhancer is a short DNA

sequence located up to 1 Mbp away upstream or downstream from the TSS. The DNA sequence of an enhancer defines the type of transcription factors recruited. On the other hand, a promoter is not completely defined by the DNA sequence, but by a genomic region where transcription of a particular gene starts. In this section, I will explain the distribution of histone post-translational modifications near enhancer, promoter and gene bodies of active, repressed and poised genes.

H3K4me3 enrichment has been observed in region surrounding the TSS of active promoters in many cells such as the human T cell (Barski et al. 2007), human embryonic stem (ES) cell (Guenther et al. 2007) and human HeLa cells (Heintzman et al. 2007). On the other hand, silent promoters have high levels of H3K27me3 as shown in human T cells (Barski et al. 2007). Hence, H3K4me3 marks active promoters whereas H3K27me3 marks silent promoters.

Enhancer regions are often marked by H3K4me1 as has been shown in human HeLa cells (Heintzman et al. 2007). However, both H3K4me1 and H3K27ac represent putative active enhancers in human embryonic stem cells (hESC) (Rada-Iglesias et al. 2011) and in five different murine cells (Creyghton et al. 2010). The H3K27ac enrichment found in active enhancers distinguish active from poised enhancers (Creyghton et al. 2010).

Enrichment of H3K4me1/me2 can be found downstream of TSS towards the gene body (Kimura 2013; Dunham et al. 2012; Barski et al. 2007; Guenther et al. 2007). Another mark associated with gene bodies of transcriptionally active genes is the H3K36me3. H3K36me3 signals are sharply elevated after the TSSs in active genes in human T cells (Barski et al. 2007). The H3K36me3 is thought to be involved in splicing process (Pradeepa et al. 2012; Luco et al. 2010; Kolasinska-Zwierz et al. 2009).

Promoters that have both H3K4me3 activating marks and H3K27me3 repressive marks are transcriptionally poised. They represent bivalent domains and are chromatin segments that have both activating and repressive epigenetic marks. Genes of self-renewing pluripotent cells often harbor bivalent active H3K4me3 and repressive H3K27me3 marks at promoter regions. Deposition of H3K4me3 is constricted to TSS region while H3K27me3 deposition is relatively broader (Bernstein et al. 2006). The abundance of RNAPII CTD Ser5-P at promoter regions indicate that the bivalent genes are competent in initiating transcription (Brookes et al. 2012). Ser5-P recruits Trithorax MLL/SET/COMPASS complex to trimethylate H3K4 (Ng et al. 2003; Milne et al. 2005). However, since the polycomb repressive complex 2 (PRC2) also deposit H3K27me3 on the same promoters, the transcription become poised, meaning that transcription is blocked but ready to switch into either a fully active or repressive state. The genes are poised until there is cue for differentiation. Upon differentiation, bivalent genes become enriched with transcription factors and lose the H3K27me3 marks (Pan et al. 2007; Zhao et al. 2007). It has been shown in *C. elegans* that the UTX-1 subunit, a member of the SET-16/COMPASS complex, is responsible for the bulk removal of H3K27me3 (Wang et al. 2010). On the other hand, silenced genes will lose H3K4me3 from their promoter regions (Bernstein et al. 2006).

The bivalent genes are capable of initiating transcription but not elongation (Brookes et al. 2012). One factor that inhibits elongation and fortifues gene repression is the co-existence of Polycomb PRC1 and PRC2. PRC1 compacts chromatin (Francis et al. 2004; Grau et al. 2011), which then

stimulates PRC2 to methylate H3K27 (W. Yuan et al. 2012). PRC1-mediated H2AK119Ub1 tracks and restrains RNAPII across the genes, preventing gene expression (Zhou et al. 2008). The coding regions of bivalent genes have no detectable association with the CTD Ser2-P (Brookes et al. 2012) and H3K36me3 (Brookes & Pombo 2009). The initial deposition of H3K27me3 impedes the deposition of H3K36me3 (Schmitges et al. 2011). Nevertheless, RNAPII can escape and produce immature aborted transcripts that are degraded, but importantly there is no production of functional mRNAs.

In summary, there are specific distributions of histone post-translational modifications throughout the genome. Active genes in general are associated with enhancers enriched with H3K4me1 and H3K27ac and promoters with H3K4me3. There are bivalent domains defined by enrichments in both H3K4me3 and H3K27me3. Interestingly, the enrichments and combinations of histone modifications can produce signatures for active, poised or repressed genes.

1.4 Epigenetic inheritance

Epigenetics is the inheritance of patterns of gene expression independent of changes in the DNA sequence. Epigenetic effects can be mediated by mRNAs, noncoding RNAs, proteins (prions), DNA modifications, and histone modifications (Heard & Martienssen 2014). Here, I will describe about heritable traits associated with the transmittance of H3K4 methylation in mitosis and across several generations of progeny (transgenerational).

1.4.1 Mitotic inheritance and H3K4 methylation

Inheritance of H3K4 methylation during mitotic division has been reported in amoeba *Dictyostelium discoideum* and human HeLa cells (Muramoto et al. 2010; Mishra et al. 2009). The cell cycle is comprised of a G1 phase, an S-phase, a G2-phase, and the mitotic phase that further divides into prophase, metaphase, anaphase and telophase. The MLL/SET/COMPASS complex and H3K4 methylation are normally associated with transcriptionally active chromatin in G1 phase. In human HeLa cells, MLL1 dissociates during mitosis and returns only after telophase ended. In contrast, H3K4me3 remains associated with chromatin throughout the cell cycle (Mishra et al. 2009), suggesting that the mark is successfully retained into the daughter cells. H3K4 methylation is associated with active transcription and can persist several hours after the onset of transcription (Santos-Rosa et al. 2002; Ng et al. 2003). To determine if active transcription state is also inherited, Muramoto followed single-gene transcription events through mitotic division in amoeba. Interestingly, absence of Set1, absence of Ash2 or change of H3 Lysine 4 into H3 Alanine 4 eliminate the inheritance of active transcriptional states (Muramoto et al. 2010). Both findings show that H3K4 methylation and active transcription states are inherited during mitotic division. On the other hand, HK36me3 is not required for inheritance of active transcriptional states during mitosis (Muramoto et al. 2010).

1.4.2 Transgenerational inheritance and H3K4 methylation

Parental exposure to environmental factors, such as stress, toxicants, and abnormal nutrition may alter the phenotypes of offspring for up to several generations (Yao et al. 2014; Manikkam et al. 2012; Anway et al. 2005; Dunn & Bale 2011; Lagisz et al. 2014). It has emerged that a variety of non-genetic mechanisms are behind this transgenerational inheritance, including inheritance of DNA methylation, prions, maternal RNAs (mRNAs, lncRNAs, siRNAs), metabolites and histone modifications (Daxinger & Whitelaw 2012). The epigenetic inheritance system allows adaptation response crucial for survival and species continuation.

Among these epigenetic systems, H3K4 methylation and modifiers have been shown to regulate transgenerational inheritance in *C. elegans*. However, the exact mechanism is still unclear. It is believed that even though specific traits can be inherited for several generations, there is no change in the global H3K4 methylation levels, suggesting that subtle changes are sufficient for these specific traits to become inherited (Greer et al. 2011; Kishimoto et al. 2017). In experiments designed to assess epigenetic inheritance, *C. elegans* parents stressed by exposure to stimuli (arsenite, NaCl and caloric restriction) managed to adapt and build resistance. This resistance to stress was passed on to unstressed descendant (F1). No significant changes in the global H3K4me3 levels was observed in both stressed parents and the immediate descendants (Kishimoto et al. 2017). Another piece of evidence showing that the global H3K4me3 levels was not significantly different after several generations was done on transgenerational inheritance of longevity in *C. elegans* (Greer et al. 2011). The descendants are the third genotypically wild-type generation (F3) that inherit extended lifespan from epimutated ancestors (Greer et al. 2011). This transgenerational inheritance is still mostly unexplained, it might be: 1) associated with H3K4me3 level at specific gene loci (Benayoun & Brunet 2012); 2) associated with H3K4me3 within specific tissue; or 3) dependent on only specific methyl marks at H3K4 like H3K4me1/me2, but not H3K4me3. Although the literature on what loci or which H3K4 marks involved is still very sparse, the gametes must serve as the carrier of the transgenerational epigenetic marks.

In mammals, epigenetic marks undergo two large genome-wide erasure events: after fertilization and during the embryonic phase of germline development (Klosin & Lehner 2016; Messerschmidt et al. 2014). Following fertilization between two gametes, massive erasure and reprogramming occurs to facilitate totipotency and generate a whole organism. The epigenetic marks in mature gametes that escape erasure and reprogramming can contribute to the offspring phenotype (Chong et al. 2007; Daxinger & Whitelaw 2012). Interestingly, it has been found that elevated COMPASS-mediated H3K4me3 could correlate with germ cell reprogramming. Its removal by H3K4 demethylase SPR-5/LSD1 along with another remodeler LET-418/Mi2 prevent reprogramming (Käser-Pébernard et al. 2014).

In general, the passage of the epigenetic marks can be through maternal or paternal germline (Daxinger & Whitelaw 2012). For instance, proper levels of H3K4me2/me3 and H3K27me3 in sperm of *Xenopus laevis* can be carried through to the egg upon fertilization to regulate the offspring gene expression during embryogenesis (Teperek et al. 2016). Another evidence corroborating maternally and paternally transgenerational inheritance involves crossing between

H2O2-stressed male or H2O2-stressed hermaphrodite *C. elegans* with unstressed mate. Several generations of the unstressed descendant still inherit the increased oxidative resistance trait, regardless if the stressed parent is male or female (Kishimoto et al. 2017). Further investigation is required to determine whether H3K4 methylation can be inherited paternally, maternally, or both in *C. elegans*.

H3K4 methyltransferase or demethylase ensure appropriate reprograming during gamete maturation and fertilization (Katz et al. 2009). Germline reprograming facilitates zygote totipotency (Heard & Martienssen 2014). Defective H3K4 methyltransferase or demethylase complexes have been implicated in transgenerational effects on animals. For instance, the SPR-5 demethylase is required for proper resetting of H3K4me2 across generations. The mutants of SPR-5 display progressive sterility over 20-30 generations, which is resulted from the misregulaton of spermatogenesis-expressed genes due to accumulation of H3K4me2 at those loci (Katz et al. 2009). The study indicates that H3K4me2 can function as an epigenetic memory and the activity of SPR-5 demethylation reset this memory (Katz et al. 2009). In addition to that, three generations of wild-type *C. elegans*, descendants of worms deficient for subunits of the MLL/SET/COMPASS methyltransferase complex display transgenerational inheritance of longevity by acting in the germline (Greer et al. 2011; Greer et al. 2010). However, only absence in SET-2, ASH-2 and WDR-5 subunit of the MLL/SET/COMPASS was tested in the experiment. It is unknown what effect does depletion of other subunit, like RBBP-5, have on the lifespan. In all, both examples show that manipulation of specific chromatin modifier in one generation can induce lasting effects on offspring traits.

The largest barrier to epigenetic inheritance is the reprograming of epigenetic patterns between generations. Most of histone marks are erased during this event (Benayoun & Brunet 2012). But many questions remain: how H3K4 methylation marks escape reprogramming, which genetic loci bear the transgenerational marks, and why transgenerational traits can be progressively or abruptly reprogrammed between generations?

1.5 *Caenorhabditis elegans*: a model to link epigenetic and ageing

C. elegans is a great model for studying epigenetics and ageing rates. Most of the worm's histone modifications and their associated machineries are evolutionary conserved in *C. elegans*. Meanwhile, the ageing studies are facilitated by the short life lifespan of adult worms. In addition, studies on inheritance (epigenetics and genetics) are practical because of its fast developing rate and large brood size. In this section, I will introduce *C. elegans* as the ideal model to study the epigenetics basis of ageing.

1.5.1 Introduction to *C. elegans*

C. elegans is a small, transparent, non-parasitic soil nematode (roundworm) that feeds mainly on microbes such as bacteria. Many basic physiological processes in higher organisms are conserved in *C. elegans*. In addition, *C. elegans* is an excellent model organism because of its compact genome, ease of maintenance and propagation. The *C. elegans* genome has been completely sequenced, revealing approximately 97-megabase of DNA sequence that encodes about 20,000 genes (*C. elegans* Sequencing Consortium 1998). More than half of the protein products in *C. elegans* are conserved in other organisms including human (*C. elegans* Sequencing Consortium 1998; Kamath et al. 2003). The worm is also amenable to genetic crosses. For instance, genetic recombination can be performed through the mating between male and hermaphrodite worms with different genetic backgrounds. Otherwise, maintenance of descendants with specific genotype can be easily done through the self-fertilizing hermaphrodites. *C. elegans* can be maintained in the laboratory on a nematode growth medium agar plate or in a liquid culture. In laboratory, the *Escherichia coli OP50* bacteria strain serves as food source for the worm (Brenner 1974). Due to its small size of approximately 1mm in adult, viewing is performed under a microscope. It is also transparent throughout its lifespan, which makes it easy to visualize transgene expressing fluorescent proteins. *C. elegans* is a great model organism for studying ageing. Measuring its lifespan is feasible during a short timeframe because they live for a short period of time (about two to three weeks). Their lifespan is largely invariant making it easy to differentiate short and long-lived worms from those with normal lifespan.

1.5.2 From germ lineage in adult gonad to embryo, larva and adulthood

Gametes are the medium for the transmission of epigenetic marks to the next generations. The haploid gamete is generated through mitosis and meiosis. While the gonad's distal ends are filled with germ cells undergoing mitosis, cells in stages of meiosis populate the rest of the gonad (Hubbard 2007). As the germ cells enter leptotene, zygotene, pachytene, diplotene and diakenesis, their duplicated chromosomes go through condensation, synapsis and crossover recombination (Figure 1.14) (Dernburg et al. 1998; Hirsh et al. 1976; MacQueen et al. 2002; Villeneuve 1994). At the end of prophase I, each oocyte have two copies of diploid genome ready for metaphase I (Oegema & Hyman 2006). Haploid sperms are produced during L4 larval stage and stored in the spermatheca (L'Hernault 2006). Fertilization occurs when oocyte squeezes

through spermatheca. Sperm donates its haploid pronucleus and a pair of centrioles (Oegema & Hyman 2006). Meiosis then resumes with metaphase I and finishes with telophase II. Following two rounds of meiotic divisions, two polar bodies are extruded and the two pronuclei (sperm-derived and oocyte-derived) fused (Rose & Kemphues 1998). At this point, the newly formed embryo is in the diploid state.

The next step is the proliferation stage of early embryogenesis, which occurs through five asymmetric divisions, where six founder cells AB, MS, E, C, D and P4 are established (Gönczy & Rose 2005). The founder cells are essential in determining the anterior from posterior, distal from ventral and left from right. The final germline blastomere, P4, will divide into Z2 and Z3 (Sulston et al. 1983). Z2-Z3 cells are the germ line precursors which will continuously divide in larva and adulthood (Kimble & Hirsh 1979). Laid embryos will undergo gastrulation to develop three germ layers: ectoderm, mesoderm and endoderm (Bucher & Seydoux 1994). Cells start differentiating to form organs: ectoderm will give rise to hypodermis and neurons; mesoderm turns into pharynx and muscle; and endoderm into germline and intestine (Sulston et al. 1983). Morphogenesis then occurs at “comma/lima bean” stage, where the embryo appears elongated and start to take the form of a worm. Muscle will start to twitch, pharynx will start to pump and embryo is ready to hatch (von Ehrenstein G. & Schierenberg E. 1980; Sulston et al. 1983). The *C. elegans* embryos inherit maternally supplied gene products. The maternal products can last to up to the first 6 to 7 cell cycles and is important for determination of cell lineage and patterning (Laufer et al. 1980; Strome & Wood 1983; Cowan & McIntosh 1985; Edgar et al. 1994; Kemphues et al. 1988). Transcription in early embryo only starts at around 8- to 12-cell stage (Edgar et al. 1994). Following the proliferation and morphogenesis, the embryos are ready to hatch.

Larval development begins with stage L1 and ends with stage L4. Hatched L1 larva can proceed to development when in presence of food (Ambros 2000), but are arrested in the absence of food (Johnson et al. 1984). The worm passes through four larval stages (L1-L4) with the end of each larval stage marked by cuticle molting (Cassada & Russell 1975). If the larva enters an unfavorable environment at the end of L2 stage, it may switch into a facultative dauer stage until the environment becomes favorable. Examples of unfavorable environment includes absence of food, high temperature and presence of a pheromone, which is released by worms in highly dense population (Riddle D. 1988). Dauer larva can live for several months. During the larval stages, the nervous system and the reproduction system continue to develop.

Adult *C. elegans* has a simple, unsegmented, cylindrical body shape that is tapered at the ends. Its outer body wall is covered with a layer of cuticle and is lined with hypodermis, excretory, neuron and muscle systems. The *C. elegans* can be male (XO) or hermaphrodite (XX). The male *C. elegans* has clearer ventral gonad and distinctive tail at lateral end. The tail copulatory apparatus exhibit the following features: a fan equipped with sensory rays, a hook, spicules and post-cloacal (male anus) sensila (Lints & Hall 2009).

In conclusion, *C. elegans* gametes, which are produced through mitotic and meiotic divisions in adult gonad, give rise to an embryo following fertilization between sperm and oocyte. The worm life cycle then resumes from embryonic stage to larval stage (L1-L4) and to adulthood. The fast

life cycle and easy to manipulate make *C. elegans* a great model for studying the link between epigenetics and ageing.

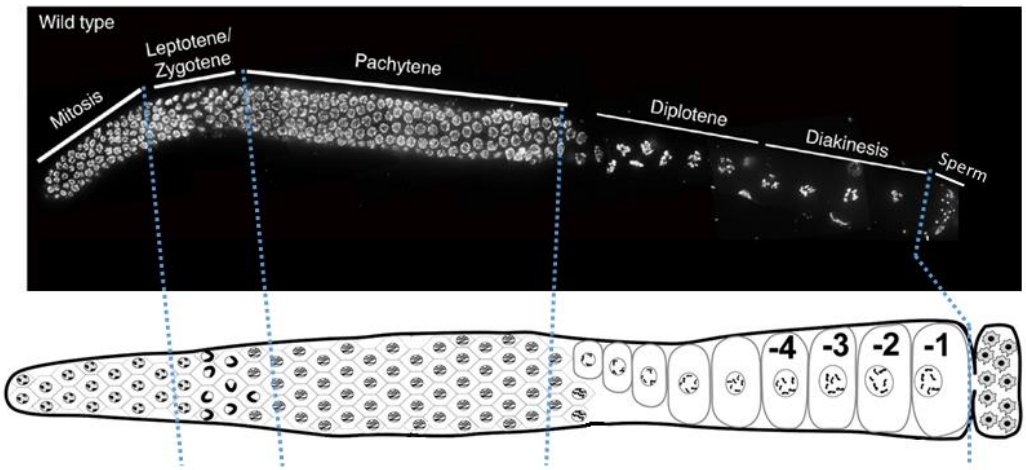


Figure 1.14 *C. elegans* hermaphrodite's germ line development inside a gonadal arm.

DAPI staining (top) and illustration (bottom) showing the different stages of phrophase I of first round of meiotic division. The most distal lobe is populated with germ cells in mitosis. Moving towards the arm center, germ cells enter transition zone (leptotene/zygotene) where chromosomes condensed and synapsed. Cells then undergo pachytene, diplotene and diakinesis stages to produce oocyte. Oocyte is fertilized as it squeezed through spermatheca. The first and second rounds of meiotic division resume, releasing two polar bodies. Embryogenesis starts when maternal and paternal pronuclei fused to produce a diploid cell. Figures from (Nadarajan et al. 2016; M.-H. Lee et al. 2007).

1.6 Phenotypes associated with altered H3K4 methylation levels in *C. elegans*

Several *C. elegans* phenotypes are affected by the alteration in the levels of H3K4 methylation. In this section, I will introduce the effects of altering H3K4 methyl mark levels on ageing (and lifespan), RAS-signaling, fertility, trans-differentiation and germline defects.

1.6.1 Ageing and lifespan regulation

Components of the SET-2/COMPASS complex regulate ageing rates and lifespan. Depletion in the levels of H3K4 methylation resulting from absence in ASH-2, WDR-5 and SET-2, extends the worm lifespan by 20% to 30% (Greer et al. 2010). Interestingly, the longevity effect *of ash-2, wdr-5* and *set-2* depletion is transgenerational (Greer et al. 2011). Regulation of lifespan by H3K4 methylation is complicated and not well understood. Initially, it was thought that the reduction in H3K4 methylation causes longevity, whereas increase in H3K4 methylation shortens lifespan. Reason being, when the gene that encodes H3K4 demethylase, *rbp-2*, is mutated, they found that the worm lifespan is shortened (Greer et al. 2010). However, later it was found that *spr-5* mutant from wild type ancestor has normal lifespan in earlier generations (1 to 5) but inherit transgenerational longevity in later generations (10 to 20) (Greer et al. 2016). We also know that depletion of RBBP-5, another core components of the COMPASS complex, also reduced H3K4 methylation (Wang 2015). However, its effect on lifespan regulation has never been reported. Regulations of longevity by ASH-2, SET-2 and WDR-5 require germline and active production of mature eggs (Greer et al. 2010). However, how H3K4 methylation affects lifespan regulation and ageing is still unclear.

1.6.2 RAS-signaling

The SET-16/COMPASS complex has been found to constrict the RAS signaling pathway. In *C. elegans*, activation of RAS signaling pathway in several vulval precursor cells (VPCs) is required for cell fate specification during vulval development (Sundaram 2005; Hill & Sternberg 1992; Kimble 1981). In the search for RAS signaling attenuators, Poulin's group investigated the gap-1 mutant worm, which is known to have a normal vulval development but hypersensitive to increased level of LET-60 RAS signaling (Hajnal et al. 1997). An additional depletion of set-16, *rbbp-5, wdr-5*, *ash-2* or *utx-1* (all of which are members of the SET-16/COMPASS in worm) increases the number of VPCs adopting vulval fate that causes multiple ventral protrusions (Mvp) (Fisher et al. 2010). Moreover, our lab also found that the SET-16/COMPASS complex cooperates with a histone acetyltransferase, NuA4/TIP60, complex to attenuate RAS signaling (Fisher et al. 2010). The study indicates that the SET-16/COMPASS constricts the RAS signaling pathway to prevent erroneous adoption of the vulval fate.

1.6.3 Fertility

Another phenotype associated with H3K4 methylation is fertility. *spr-5* is the H3K4me1/me2 demethylase in worm. When compared to wild type, the *spr-5(-)* mutant has H3K4me2 enrichment. Initially, they are still fertile despite having slight retention of embryos within adult worm and slightly reduced brood size (Katz et al. 2009). However, over generations, H3K4me2 continues to accumulate, brood size steadily declines, germline mortality escalates, and percentage of sterile worms increases (Katz et al. 2009). The germline mortality was due to abnormal oocyte, loss of oocyte and wrongly-placed spermatid in oocyte location in the *spr-5* mutant. Hence, SPR-5 has roles in the epigenetic reprogramming of H3K4me2 mark and failure to reprogram is detrimental to worm fertility.

In addition, *wdr-5* and *rbbp-5* mutants has an increase sterility when grown at 25ºC (Li & Kelly 2011). Investigation on the cause of sterility reveals that the gonad of sterile *rbbp-5* mutant at 25ºC is populated with endomitotic oocytes (Emo). Emo can be caused by unfertilized eggs that are trapped inside the gonad, undergoing several rounds of DNA replications and has no cytokinesis. The gonad of sterile *wdr-5* mutant at 25ºC on the other hand, has high percentage of endomitotic oocytes, low percentage with polyploid nuclei, and detectable masculinization of germline phenotype. Masculinized germline lacks the spermatogenesis to oogenesis transition. Defective sperms in the sterile *wdr-5* and *rbbp-5* contribute to the Emo phenotype (Li & Kelly 2011).

1.6.4 Transdifferentiation

Mutation in MLL/SET/COMPASS complex subunit can lower the penetrance of hindgut to neuron cells transdifferentiation (Zuryn et al. 2014). Transdifferetiation from one cell to another allows proper tissue and organ regeneration. In *C. elegans*, there are four KDM6 family members: *jmjd-3.1, jmjd-3.2, jmjd-3.3* and *utx-1* (Vandamme et al. 2012). The members of the KDM6 subfamily are responsible for the demethylation of H3K27me2/me3. It has been reported that *C. elegans* JMJD-3.1 and MLL/SET/COMPASS complex cooperate for transdifferentiation of post-mitotic hindgut cells into motor neurons. The hindgut cells can disengage from rectal tube and transformed into motor neurons. In lab, null deficiencies *of set-2, wdr-5, ash-2, rbbp-5, dpy-30* or *cfp-1* reduced transdifferentiation. The mutant of *set-2* has a mixed population of hindgut cells with fried-egg-shaped nuclear morphology and cells with speckled nuclear morphology. The nuclease inside the hindgut cells of *Jmjd-3.1* mutant on the other hand, are exclusively speckled (Zuryn et al. 2014). Hence, H3K4 methylation is required for natural transdifferentiation to occur properly.

1.6.5 Germline defects

The MLL/SET/COMPASS complex help preserve germline pluripotency in *C. elegans*. Loss of H3K4 methylation results in germline transdifferentiation. In particular, SET-2, WDR-5 and ASH-2 are required for proper expression of germline genes and repression of somatic genes in the cells (Robert et al. 2014). Germline deficient for *set-2* and *wdr-5* has misexpression of genes related to somatic cells. The misexpression causes the germline cells to convert into somatic-like cells. For instance, the germline cell lacking H3K4 methylation due to set-2 loss of function mutation acquires somatic cell fate that resemble neuronal cells, but only at 25ºC (Robert et al. 2014).

In addition to that, WDR-5 and RBBP-5 are required for the maintenance of germ line stem cells (GSCs). GSCs, located at the distal end of the gonad, are the proliferative cells that can generate haploid gametes, sperms or oocytes. Absence of SET-2, WDR-5 and RBBP-5 dramatically reduce H3K4me3 in GSCs. Absence of WDR-5 and RBBP-5 causes the *C. elegans* at 25ºC to have shorter GSC zones compared to wild type. This suggest that in absence of WDR-5 or RBBP-5, there is an improper maintenance of germline stem cells that reduce the number of nuclei and the length of the pre-meiotic region where GSCs reside (Li & Kelly 2011). In all, alteration in the levels of H3K4 methylation in germline can cause transdifferentiation from germline to somatic cell as well as improper maintenance of germline stem cells.

To summarize, this chapter has provided detailed information on chromatin and H3K4 methylation. I have shown how H3K4 methylation is important for transcription processes and epigenetic inheritance. Alteration in the levels of H3K4 methylation gives a wide range of impact on *C. elegans* phenotype such as ageing, attenuation of RAS signaling, reduced fertility, abnormal trandifferentiation and germline defects. Since the SET-16/MLL and SET-2/COMPASS complexes in *C. elegans* are homologous to the complexes found in human, I will be using *C. elegans* as a model to link epigenetic with ageing.

1.7 Aims of the project

The uncovering that H3K4 methylation regulates the rate of ageing was a milestone but its link to transgenerational inheritance of longevity a revelation. Albeit compelling, these studies have left a number of outstanding questions. Are the levels of H3K4 methylation altered during ageing? Is the core component RBBP-5 a regulator of ageing rate? Can short lifespan be transgenerationally inherited? Finally, it has been generally assumed that depleting core components such as WDR-5 or RBBP-5 should mostly affect activation of transcription and that H3K4 methylation will necessarily be down regulated. I will assess these two points using RNA-seq and ChIP-seq. Overall, my project will delineate the function of methyl marks at H3K4 in transgenerational inheritance of the ageing rate and take advantage of the embryo as a system to link alterations in the levels of methyl marks at H3K4 to transcriptional output in *C. elegans*.

Chapter 2

Materials and Methods

Chapter 2 : Materials and Methods

2.1 Worm strains

C. elegans strains were obtained from the Caenorhabditis Genetics Centre (CGC). Worm strains used in this project were: N2 (wild type Bristol), *rbbp-5(tm3463) II, wdr-5 (ok1417).* WDR-5 is referred to as WDR-5.1 in WormBase. The deletions in *rbbp-5(tm3463)* and *wdr-5(ok1417)* are shown in Fig. 2.1.

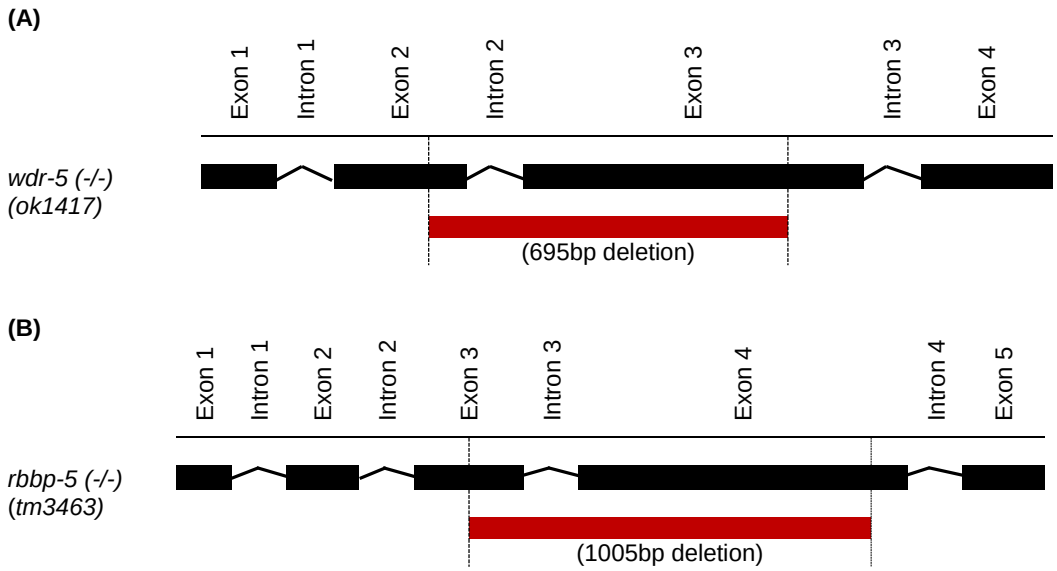


Figure 2.1 Illustration of the deletion in *C. elegans* mutant strains rbbp-5(tm3463) and wdr-5(ok1417)

(A) *wdr-5(ok1417)* null deletion of 695 nucleotides, affecting exon 2 and exon 3. (B) *rbbp-5(tm3463)* null deletion of 1005 nucleotides in exon 3 and 4.

2.2 General maintenance

The general maintenance described the methodology for worm maintenance, bleaching and synchronisation, genomic DNA extraction, and genotyping by single worm PCR.

2.2.1 Worm maintenance

The strains were maintained as previously described (Brenner 1974). Briefly, strains were maintained on 6 cm plates (Greiner) containing NGM (nematode growth medium) agar (0.05 M NaCl, 0.25% (w/v) bacto-peptone, 1.7 % (w/v) agar, 1 mM CaCl2, 12.9 µM cholesterol, 1 mM MgSO4, 25 mM KH2PO4 pH6.0), seeded with *E. coli OP50*. Nematode strains were incubated at 20 ˚C, unless otherwise stated. Five L4 (Larval stage 4) hermaphrodite worms were transferred to fresh NGM plates every 4 to 5 days. For the maintenance of male wild type N2, nine adult wild type males and three L4 wild type hermaphrodites were transferred onto fresh NGM plates.

2.2.2 Bleaching and synchronization

All gravid hermaphrodites from a 6 cm plate were collected into a 15 ml falcon tube. The worms were disintegrated in 1 ml bleaching solution (0.7 M NaOH, 21.4% sodium hypochlorite) to release the eggs. The embryos were rinsed three times with M9 buffer (9 mM Na2HPO4.12H2O, 45 mM KH2PO4, 85.6 mM NaCl, and 0.1 mM MgSO4), transferred onto unseeded NGM plates and allowed to hatch overnight. The synchronized L1 (Larval stage 1) were transferred to NGM plates seeded with OP50.

2.2.3 Genomic DNA (gDNA) extraction

The N2 worms were amplified on a 10 cm OP50 seeded NGM plate and rinsed off into a 15 ml tube with M9 buffer.The pellet was frozen overnight at -80 ˚C. 1.8 mL of worm lysis buffer (0.1 M Tris-HCl pH 8.5, 0.1 M Na Cl, 50 mM EDTA pH 8.0, 1% (w/v) SDS), 80 µl of 20 mg/ml proteinase K and 40 µl of ribonuclease A (boiled to inactivate DNAse) was added to a 200ul worm pellet. Worms were mixed by inverting and lysed at 65 ˚C for 60 minutes. gDNA was extracted with 1 volume of phenol:chloroform. Extraction was repeated by mixing the aqueous layer, first with 1 volume of phenol:chloroform and then with 1 volume of chloroform. 0.1 volume of 3M NaOAc was added to the final aqueous layer and DNA was precipitated with 2.5 volumes ice cold EtOH (100%). The gDNA pellet was washed with ice cold EtOH (70%) and air dried for 10 minutes. The final pellet was re-suspended in ddH2O and stored at -80 ˚C.

2.2.4 Genotyping by single worm PCR

Primers were designed to amplify a region spanning the expected deletion as indicated on WormBase and Fig 2.1. Primers used for single worm PCR are listed in Table 2.1. Briefly, a single worm was transferred using a platinum wire into a 0.2 mL PCR tube containing 3 µl lysis buffer (1x NH4 reaction buffer (Bioline), 1 mg/mL proteinase K (Sigma)). Worms were frozen at -80 ˚C for 60 minutes, thawed and frozen for another 30 minutes. Worms were lysed at 65 °C for 90 minutes to release genomic DNA, followed by proteinase K inactivation at 95 °C for 30 minutes. PCR was carried out in a 30 µl volume (0.2 mM dNTP's (Bioline), 1x NH4 PCR reaction buffer (Bioline), 0.5 µM forward and reverse primers, 1.5 mM MgCl2 (Bioline), 0.5 µl BioTaq DNA polymerase (Bioline). Following initial denaturation at 95 ˚C for 5 minutes, DNA was amplified for 40 cycles. Each cycle consisted of 30 seconds of denaturation at 95 ˚C, 30 seconds of annealing at 55 ˚C and 1 minute per kbp of elongation at 72 ˚C. PCR amplification was completed with a final elongation at 72 ˚C for 5 minutes. 8 µl of PCR product was analysed on 1% agarose gel (1% (w/v) agarose in 0.5 x TBE (0.04 M Tris, 0.04 M H3BO3, 0.001 M EDTA, pH 8.0, Sybr Safe) for size. Following confirmation of the correct size product, PCR products were sequenced (GATC Biotech).

Table 2.1 Primers for genotyping of gDNA and single worm PCR

Gene	Primer	Extension time (min)	Product size in wild type (bp)	Product size in mutant (bp)
rbbp-5	F: ggggacaagtttgtacaaaaaagcaggcttcATGGTCGAAATACTCGATCG	2	1753 bp	746 bp
	R: ggggaccactttgtacaagaaagctgggtcTCACTTTGATTTTGGTGAAAG			
wdr-5	F: ggggacaagtttgtacaaaaaagcaggcttcATGGATACCAGCGAAAATGC	1.5	1291 bp	596 bp
	R: ggggaccactttgtacaagaaagctgggtcTTAAACATCCGAGCGCCATATATG			

Table 2.2 Primers for real time quantitative PCR

Gene	Forward primer	Reverse primer	RT-qPCR amplicon
act-1	F: GTGATCTTACTGATTACCTC	R: TGTCCGTCAGGAAGTTCGTA	160 bp
gcy-19	F: ACCCGCCGAAGATACTTGA	R: ATTTCGTCAGCCCTGCACTT	121 bp
ttr-15	F: GGAGGTTACCCTTTGGGAGA	R: GCCTTCTTCACGTTGCAGTT	162 bp
fbxa-192	F: CCAGGAGAATGCAGAATTGG	R: AGCTCGATGGGCTTCACA	117 bp
ugt-29	F: GGACACATTGACGGAACGA	R: TCCTCATCCAGCGTAACTCC	165 bp
arc-1	F: TTTCATCGAAAGTCGAGTTGTTT	R: GGAGCCATTACTGTGTCCATTT	102 bp
pars-1	F: CTCATCGCGATCTTCCAATC	R: CACGAGTACGAAGGAATGGTGT	90 bp
nxf-2	F: GCATACAGTTGTCTGCTTGTGG	R: TGCACCGTGTGATATTCTGG	148 bp
apc-10	F: ATCGAAGAGTGGACCAACCA	R: CGGAGTGGATTGCCAAAG	70 bp
pqn-74	F: GACAATCGGTCTGCCAAGTC	R: TGCGGAAGTAGCAGCAAAC	66 bp
grl-7	F: CGGTGGACGATTTGATGTG	R: CCCTTTGGTCTCTTGGCAGT	85 bp

2.3. Protein analysis by Western Blot

2.3.1 Western Blot

Samples were prepared by transferring 100 synchronised worms (day 1 adults or day 8 adults) into 50 µl of 1x PBS (140 mM Na Cl, 2.7 mM KCl, 10 mM Na2HPO4 and 1.8 mM KH2PO4, pH 7.4) and pelleted. 50 µl of 2x Laemmli sample buffer (120 mM Tris-HCl, pH 6.8, 4 % (w/v) sodium dodecyl sulfate, 20 % (w/v) glycerol, 0.02 % (w/v) bromophenol blue, 200 mM DTT) was added and samples were boiled for 10 minutes. Samples underwent sonication for 15 minutes (Diagenode Bioruptor UCD-200, 30 seconds on, 30 seconds off) to ensure complete cell lysis and shearing of DNA. Western blot was carried out using BioRad Mini Trans-Blot® Cell system and standard BioRad protocol. Briefly, 20 µl of samples were loaded and run on a 15% polyacrylamide gel against 5 µl of pre-boiled Colour Pre-stained Protein Standard, Broad Range (11-245kDa) (NEB). Proteins were separated at 120 V for 15 minutes and then at 200 V for 30 minutes. Proteins were then wet transferred to an Amersham Hybond-P membrane (GE Healthcare) at 350 mA for 30 minutes. Membranes were blocked in 10% milk in 1xPBS with 0.2 % tween for blot against H3 antibody. Otherwise, membranes were blocked in 5% BSA in 1xPBS with 0.2% tween for blots against H3K4me1/me2/me3. Primary antibodies were incubated at room temperature for 2 hours. Membrane washing was performed 6x, each time in 1x PBS with 0.2% tween for 10 minutes. Incubation of secondary antibodies was at room temperature for 1 hour. Washing steps were repeated. Detection was performed using the Amersham ECL Plus Western Blotting Detection System (GE Healthcare) by incubating the membrane in ECL for 5 minutes at room temperature and following manufacturer's instruction. The ChemiDoc XRS+ imager system (BioRad) was used to view and capture blot image.

The primary antibodies used in Western Blots analysis were rabbit polyclonal anti-H3 antibody (Abcam, ab1791, 1/1000); mouse monoclonal anti-H3 (tri methyl K4) (Abcam, ab1012, 1/250); rabbit monoclonal anti-H3 (di methyl K4) (Abcam, ab32356, 1/10,000); and rabbit polyclonal H3 (mono methyl K4) (Abcam, ab8895, 1/500).

The secondary antibodies used in Western Blots analysis were Peroxidase-conjugated AffiniPure Goat Anti-Mouse IgG (H+L) (Jackson ImmunoResearch 115-035-003, 1/5000); and Peroxidase-conjugated AffiniPure Goat Anti-Rabbit IgG (H+L) (Jackson ImmunoResearch 111-035-003).

2.3.2 Quantification for Western Blots

Image Processing and Analysis in Java (ImageJ) 1.51j8 software was used to measure the density of Western Blot bands. Western Blot image was saved as 8-bit tiff image. Rectangular selection was made on a horizontal band lane. The selection was analysed to profile the plot peaks. Data analysis was performed using the percentages of peak area after removing background.

2.4 Immunofluorescence for embryo

Immunofluorescence by freeze crack was performed on 0.3% poly-lysine treated slides. Slides were treated by application of 75µl of 0.3% poly-lysine, dried 10 minutes at 70°C, quickly rinsed in distilled water and excess liquid is wiped off. The slides were 3 × 14 mm printed wells slides from Fisher Scientific LTD UK. About 30 mothers were placed in a well with a drop of M9 buffer to wash off bacteria. These mothers were transferred into a 7 µl drop of M9 on the poly-lysine treated well by using an eyelash picker. Embryos were released from these mothers by dissecting with a syringe needle. A cover slip (22 mm × 50 mm) was applied at a right angle and placed at −80°C for at least 20 minutes. The cover slip was then promptly removed and the slide with embryos is methanol fixed at −20°C for 10 minutes, washed 5 minutes in PBS, and then followed by two washes in PBS-tween 0.2%. Primary antibody was diluted in PBS-tween 0.2% and incubated overnight at 4 °C in a humid chamber, following with three washes in PBS-tween 0.2%. Secondary antibody was incubated 2 h at 37 °C. Three washes are performed as described above. 5 µl Mowiol was applied to preserve fluorescence.

The primary antibodies used in co-immunofluorescence were mouse monoclonal anti-H3 (tri methyl K4) (Abcam, ab1012, 1/100); rabbit monoclonal anti-H3 (di methyl K4) (Abcam, ab32356, 1/100); mouse anti-H3K4me2 (Millipore CMA303, 1:5,000); and rabbit polyclonal H3 (mono methyl K4) (Abcam, ab8895, 1/100,000).

The secondary antibodies used in co-immunofluorescence were DyLight 594 AffiniPure Goat Anti-Mouse IgG (H+L) (Jackson ImmunoResearch 115-515-146, 1:200); DyLight 488 AffiniPure Goat Anti-Rabbit IgG (H + L) (Jackson ImmunoResearch 111-485-144, 1:200); DyLight 488 Goat Anti-Mouse IgM mu chain (Abcam ab97007, 1:200) and DAPI (Sigma 28718-90-3, 2 ug/ul). Our controls performed without primary antibody show that these secondary antibodies do not produce significant background (data not shown).

2.5 Real time quantitative PCR (RT-qPCR)

Embryo pellets were prepared by harvesting synchronised gravid adults, washing the pellet in M9 and bleaching as routine. Total RNA was extracted using TRIzol (Invitrogen) and samples were kept at -80 °C. First strand cDNA synthesis was performed using the SuperScript VILO cDNA Synthesis Kit (Invitrogen), according to the manufacturer's instructions. Quantitative RT-PCR was performed using the FastStart SYBR Green Master (ROX) mix (Roche) on a Biorad C1000 thermal cycler coupled with a CFX96 Real time system. Three biological samples from each strain were prepared and analysed in triplicate by the $\Delta\Delta$CT method (Livak & Schmittgen 2001). act-1 was used as the internal reference for data normalization. Primers used in the RT-qPCR experiments are listed in Table 2.1.

2.6 Lifespan assay

2.6.1 Lifespan assay using mutant strain

100 synchronised L4 worms were placed onto five OP50 seeded NGM plates. Longevity assay was commenced at day 1 adult stage. Fertile worms were transferred onto fresh seeded NGM plates every 24 hours until they entered post-fertile stage. Lifespan and mortality were recorded every day by checking their movement. Worms were censored and removed from the analysis if they crawled off the plates or became bag of worms. Worms with no movement response to a prodding pick were considered as dead. Using the log-rank function in Online Application for Survival Analysis version 2.0 (OASIS 2), we plot Kaplan Meier survival curves and compare lifespans between different strains. The log-rank test calculation follows the following equations, with d_i is number of death, e_i is expected death and n_i is population size at *i*th interval:

$$X^2 = \frac{\left|\sum_{i:t_i \le \tau}(d_i - e_i)\right|^2}{\sum_{i:t_i \le \tau}(d_i - e_i)} \text{ followed by } Var(d_i - e_i) = \frac{d_i(n_i - d_i)n_{1i}(n_i - n_{1i})}{{n_i}^2(n_i - 1)}$$

2.6.2 Lifespan assay using RNAi by feeding protocol

100 synchronized L1 wild type worms were placed onto five OP50 seeded RNAi plates (0.05 M NaCl, 0.25 % (w/v) bacto-peptone, 1.7 % (w/v) agar, 1 mM CaCl2, 12.9 µM cholesterol, 1 mM MgSO4, 25 mM KH2PO4 pH6.0, 1 mM isopropyl-b-D-thiogalactopyranoside (IPTG), 25 µg/mL carbenicilin, Nystatin (50,000 units)). The plates were seeded with empty vector (RNAi) (ev(RNAi)) or wdr-5(RNAi) HT115 bacteria. Longevity assay was commenced at day 1 adult stage following the general protocol described above.

2.7 Transgenerational study

2.7.1 Crosses, genotyping and maintenance

To prepare the parental generation (P0) crosses, 10 wild-type adult N2 (Bristol) males were crossed with five L4 rbbp-5(tm3463) hermaphrodites referred herein as rbbp-5(-) on ten 3 cm plate. Any rbbp-5(-) mother with “bag of worms” were immediately removed during the genetic crossing. P0 worms were incubated for two days until they laid sufficient amount of eggs before they were removed. All worm incubation steps in these transgenerational experiments were done at 20 ºC, unless otherwise stated. In parallel, wild type and rbbp-5(-) control worms were maintained for each generation. Wild type males and wild type hermaphrodites were crossed to generate pure wild type N2 descendants and control for any effect resulting from crossing.

150 of the first filial L4 hermaphrodite progeny (F1) were single cloned on 3 cm plates. The heterozygous rbbp-5(+/-) F1 worms were used in the transgenerational lifespan assay. To infer the genotype of F1, six second filial adult progeny (F2) from each of the F1 clone were pooled into a 1.5 mL micro centrifuge tube and genotyped for the rbbp-5 deletion. Any F1 males and F1 rbbp-5(-) from self-fertilizing rbbp-5(-) mothers were discarded.

To obtain wild type and mutant progeny from the F1 heterozygous mothers, 48 F2 worms were single cloned onto 6 cm plates. Worms were transferred every day. When they became day 2 adult and laid many eggs, they were genotyped for rbbp-5 deletion. F2 rbbp-5(+/-) clones were discarded from the experiment. Both of the wild type F2 rbbp-5(+/+) from F1 rbbp-5(+/-) mother and the mutant F2 rbbp-5(-/-) from F1 rbbp-5 (+/-) mother were maintained.

Third, fourth and fifth filial generations (F3, F4 and F5) from the F1 rbbp-5(+/-) ancestor, having either the wild type rbbp-5(+/+) or the mutant rbbp-5(-/-) genotype were collected. For the F3 generation of each condition, the following experimental setup was performed: 100 L4 worms were for maintenance; 100 L4 worms were for transgenerational lifespan assays; 100 L4 worms were for transgenerational Western Blot analysis; and 10 L1 worms were for brood size assays. The worms for brood size assays were incubated at 25 ºC. Maintenance worms were left to lay eggs overnight before the mothers were removed. Similar scheme but excluding the brood size assay was used in F4 generation. Similar scheme but excluding the maintenance and brood size assay was used in F5 generation.

2.7.2 Transgenerational lifespan assay

For the transgenerational lifespan assay on F1 generation, 100 wild type, 100 *rbbp-5(-)* and 150 anticipated F1 heterozygous *rbbp-5(+/-)* were used. Pure wild type and mutant controls were placed onto 6 cm NGM plates. The anticipated F1 *rbbp-5(+/-)* worms were single cloned onto 3 cm NGM plates. Worms were transferred every day during their fertile stage. Lifespan assay was started at day 1 adult and data was recorded every day. At this stage, since lifespan was started prior to genotyping, there is a possibility that the anticipated heterozygous F1 population was a mixed between F1 *rbbp-5(+/-)* from the crosses and F1 *rbbp-5(-)* from self-fertilizing mothers. Hence, lifespan needed to be recorded individually for each clone. Following genotyping, worms and data on F1 *rbbp-5(-)* from the self-fertilizing mothers were discarded. Moreover, since worms were initially transferred at L4 stage, any males were also discarded from the study.

For the transgenerational lifespan assays on F3, F4 and F5 generations, 100 wild type, 100 *rbbp-5(-),* 100 wild type from F1 *rbbp-5(+/-)* ancestor and 100 *rbbp-5(-)* from F1 *rbbp-5(+/-)* were used. Worms from each condition were placed on five 6 cm plates. Lifespan assays were started at day 1 adult. Numbers of worms alive, dead and censored were recorded each day. Crawled off worms and bag of worms were censored and removed from the analysis. Worms with no movement response to a prodding pick were considered dead. Average lifespan was calculated and Kaplan-Meier survival plots (log rank test) were used to compare lifespans between different strains.

2.7.3 Transgenerational brood size assay

Ten F3 larval stage 1 (L1) for each pure wild type, pure *rbbp-5(-),* wild type from F1 *rbbp-5(+/-)* and *rbbp-5(-)* from F1 *rbbp-5(+/-)* were used in the transgenerational brood size assay. L1 worms were single cloned onto 6 cm plates and maintained at 25 ºC. Worms were transferred every day

until they finished laying eggs and then discarded. To determine the brood size assay, the numbers of all F4 progeny were counted when they reached day 1 adult. Mean value and standard error of mean (SEM) were calculated.

2.7.4 Transgenerational Western Blot analysis

For transgenerational western blot study, precisely 100 wild-type N2; 100 *rbbp-5(tm3463)* control; 100 *rbbp-5(+/+)* worms from heterozygous F1 ancestor; and 100 *rbbp-5(-/-)* from heterozygous F1 ancestor from F3, F4 and F5 generations were used. Adult day 1 worms were picked using an eye lash to omit any bacteria. Worms were transferred into 50 µl 1X PBS into which another 50 µl of 2X Laemmli sample buffer was added. The protein lysates were kept at -20 ºC until used. Western Blots analysis was performed according to the general Western Blot protocol and quantification as described earlier.

2.8 Male study

2.8.1 Male occurrence assay

Wild type, *rbbp-5(-)* and *wdr-5(-)* strains were used for male occurrence assay. To compensate the different brood size each strain is having, different starting numbers of hermaphrodite mothers were used. Five 6 cm NGM plates were used per condition, with each plate having 10 wild type, 20 *wdr-5(-)* or 30 *rbbp-5(-)* L1 worms. Two experimental sets with different incubation temperatures were used. The first set had the worms incubated at 20 ºC, whereas the second set had the worms incubated at 25 ºC. The hermaphrodite mothers were transferred onto fresh plates every day and removed once they finished laying eggs. When the progeny reached adulthood, percentages of male from the total number of progeny were counted. Data was represented as mean percentage of male occurrence ± SEM.

2.8.2 Male fertility experiment by genetic crossing

Two sets of genetic crossings were used in this experiment. In the first set, six *wdr-5(-)* males were crossed with two *wdr-5(-)* hermaphrodites. Then, the next progeny was checked for number of males which are expected to be abundant if the genetic crossing is successful. In the second set, six *wdr-5(-)* males were crossed with two wild type hermaphrodites. Then, the number of male progeny was counted and the next progeny was genotyped. Heterozygous progeny for wdr-5(+/-) were expected if the genetic cross is successful

2.8.3 Analysis of male tail morphology

10 wild type, 20 *wdr-5(-)* and 30 *rbbp-5(-)* larval stage 4 (L4) worms were placed on four 6 cm plates. The plates were kept at 25 ºC for six days or until the next progeny become adult day 1.

Adult males were mounted on 2% (w/v) agarose pads in 20 mM tetramisole (Sigma). Male tail morphology was observed under differential interference contrast (DIC) microscopy.

2.9 RNA-Seq

2.9.1 Embryo preparation for RNA-Seq

Strains were kept at 20°C. 20 x 10 cm plates of gravid adults were bleached and synchronised L1s were seeded on 2 Corning tissue culture dishes (245 x 245 mm) seeded with 20x OP50. When the synchronised young gravid mothers started to lay eggs, they were bleached to obtained embryos. These embryos were scored to ensure comparative stages between wild type and the mutants. About 10-12% of embryos are at <28-cell stage, 25-30% of embryos are between the 28-cell stage and 100-cell stage, 45-55% are between ~100-cell stage and pre-coma stage (~400 cell), and 5-15% are post-coma stage. Three independent biological replicates were prepared for RNA-seq. Total RNA was extracted using TRIzol (Invitrogen) and samples were frozen at -80°C. First strand cDNA synthesis was performed using the SuperScript VILO cDNA Synthesis Kit (Invitrogen), according to the manufacturer's instructions.

2.9.2 Quantification and statistical analysis for RNA-Seq

Strand-specific RNA-seq libraries were prepared using the Illumina workflow with the TruSeq Stranded mRNA Sample Preparation Kit. 101bp×101bp paired-end reads were generated from each sample. The fastq files generated by HiSeq platform were analysed with FastQC, any low quality reads and contaminated barcodes were trimmed with Trimmomactic (Bolger et al. 2014). All libraries were aligned to ce10 assembly of *C. elegans* genome using Tophat-2.1.0 (Kim et al. 2013) and only matches with the best score were reported for each read. The mapped reads were counted by genes with HTSeq (Anders et al. 2015) against the C_elegans WS220.annotations.gtf. The differentially expressed (DE) genes are identified by comparing the wild type with different mutant with DESeq2 (Love et al. 2014).

2.10 ChIP-Seq

2.10.1 Embryo preparation for ChIP-Seq and ChIP-qPCR

Synchronised population of embryos were prepared from bleached young adult hermaphrodites. These were harvested from 20 Corning tissue culture dishes (245 x 245 mm) seeded with synchronised L1 (larval stage 1) obtained from bleaching large amount of gravid adults. Dishes were pre-seeded with 0.5 ml of 20x OP50 stock left to dry for at least two days before use. To amplify large amount of gravid adults, 20 of these dishes per strain were seeded with synchronised L1s: ~1000 L1s for N2 (wild type), ~2000 L1s for *wdr-5(-),* and ~3000 L1s for *rbbp-5(-).* When the F1s reached L4 stages, all worms were harvested and transferred onto 20 new dishes. Otherwise, the worms will run out of food. After reaching adulthood, the worms were

bleached and embryo harvested. To obtain synchronised embryos, an additional step whereby all synchronised L1s were re-seeded onto 20 new dishes was performed. N2 (wild type) were left to grow about 54 h, *wdr-5(-)* and *rbbp-5(-)* 64h. Following bleaching, embryos were collected on routine sucrose gradient, re-suspended in 47 ml of M9 buffer and 2.8 ml of 37% formaldehyde solution (~2% final). Embryos were placed on shaker (50 rpm) at room temperature for 30 minutes. Spun down and pellets collected. Quenched on formaldehyde adding 50 ml 100 mM Tris pH 7.5. Fixed embryos were spun down and washed twice with 50 ml M9. Spun down and added 10 ml FA buffer containing protease inhibitor cocktail. 5 µl of embryos were taken out, fixed with methanol, and stained with DAPI for scoring (store at -20°C). Between 200 and 500 µl of packed embryos can be obtained from this method. The embryo preparations for N2 (wild type), *wdr-5(-),* and *rbbp-5(-)* used for ChIP-seq were comparable: about 20-40% of embryos are at <28-cell stage, 20-27% of embryos are between the 28-cell stage and the 100-cell stage, 32-52% are >100-cell stage but pre-coma stage (~400 cells), and 0-4% are post-coma stage.

2.10.2 Chromatin Immunoprecipitation

ChIP was performed following a detailed protocol from (Ercan et al. 2007) and as previously described (Liu et al. 2011). Briefly, we re-suspended embryo pellets with 1.5 ml FA buffer with protease inhibitor cocktail. The embryos were dounced 40 times on ice using pastel B homogeniser. We aliquoted 250 µl of the embryos in six 1.5 ml eppendorf tubes and then sonicated for 15 minutes, cool every 5 minutes on dry ice for 5 seconds. DNA size (200-600 bp) was verified on 1.5% agarose gel. Then, the sonicated embryos were snapped freeze and kept at -80°C. We used 250 µl for each ChIP experiment. For each ChIP, we topped up to 400 µl with FA buffer containing protease inhibitor cocktail. 25 µl of 20% sarkosyl solution were added (~1.2% final), spun and kept the supernatant. 10% of the ChIP volume was used as input DNA. Magnetic beads (Magna ChIP Protein A+G from Merck Millipore (cat. 16-663)) that has been coupled with antibody were added to supernatant. We washed with 1 ml with FA buffer twice, FA buffer with 1 M NaCl, FA buffer with 500 mM NaCl, TEL buffer and TE buffer. We then eluted twice in 150 µl of ChIP elution buffer at 65°C for 15 minutes and vortexed every 5 minutes. Then we treated with proteinase K for 2 h at 55°C and reversed cross-link at 65°C for 18 h. We purified DNA with Qiaquick PCR Kit from Qiagen and eluted with 50 µl of water. Quantitative PCR was performed using the ΔΔCT method (Livak and Schmittgen, 2001). For ChIP-PCR against rgs-6 and smo-1, we used anti-H3 (Ab1791), anti-H3K4me3 (Ab1012), and anti-H3K4me2 (Ab32356). For ChIP-seq and ChIP-PCR against untranscribed locus, act-1 and ftt-2, we used anti-H3K4me1 (AM39297), anti-H3K4me2 (AM39141), and anti-H3K4me3 (AM39159). The primers used in the ChIP-qPCR experiment are listed in Table 2.3.

Table 2.3 Primers for ChIP followed by qPCR

Gene	Forward primer	Reverse primer
smo-1	F: taccgtaccctcgtgttgct	R: cgttgcagagtgtgcatgtt
rgs-6	F: agtaaacagtggctgaggcaag	R: tcgtcgtagcatcgagtcaag

2.10.3 Quantification and statistical analysis for ChIP-Seq

Illumina sequencing libraries were prepared from the ChIP and input DNAs by the standard consecutive enzymatic steps of end-polishing, dA-addition, and adaptor ligation. After a final PCR amplification step, the resulting DNA libraries were quantified and sequenced on Illumina's NextSeq 500 (75 nt reads, single end). Reads were aligned to the *C. elegans* genome (ce6) using the BWA algorithm (default settings) (Li and Durbin, 2009). Duplicate reads were removed and only uniquely mapped reads (mapping quality >= 25) were used for further analysis. Alignments were extended in silico at their 3'-ends to a length of 200 bp, which is the average genomic fragment length in the size-selected library, and assigned to 32-nt bins along the genome. The resulting histograms (genomic "signal maps") were stored in bigWig files. Peak locations were determined using the MACS algorithm (v1.4.2) with a cut off of p-value = 1e-7 (Zhang et al. 2008). Signal maps and peak locations were used as input data to Active Motifs proprietary analysis program, which creates Excel tables containing detailed information on sample comparison, peak metrics, peak locations and gene annotations. These tables (Supplementary Table 3, 4, 5) were used for Odds Ratio Statistics analysis.

2.10.4 Quantification and statistical analysis for ChIP followed by qPCR

For qPCR analysis primers against regions of interest (Table 2.2) were used to amplify DNA in both ChIPs and inputs. Fold enrichment is calculated as a percentage of input using the following formulae: 2X = input dilution factor; total input Ct value = input Ct–X; sample percentage of input = 2(totalinputCt−sampleCt) × 100. Values from anti-H3 ChIP are used to normalise. Quantitative PCR (qPCR) reactions were carried out in triplicate on specific genomic regions using SYBR Green Supermix (Bio-Rad). The same calculation was performed using beads only control. Biological duplicates were analysed in triplicates. The data are represented as mean ± SEM.

2.10.5 Quantification and statistical analysis for odd ratio analysis

We mapped H3K4me1/me2/me3 peaks according to their location (promoters, gene bodies, or downstream of genes) using Supplementary Table 3-5. This mapping produced nine classes of peaks (3 methylation states by 3 genomic locations). We then asked whether these peaks disappear in absence of WDR-5 or RBBP-5, or whether new peaks are produced by the absence of WDR-5 or RBBP-5. We called the former WDR-5 or RBBP-5 dependent peaks and the latter

de novo peaks, since these are not detected in wild type. We used all significantly misregulated genes found by RNA-Seq profiling of *wdr-5(-)* and *rbbp-5(-)* mutants and examined to which peak class they can be associated with. When an association was identified, the misregulated genes of that peak class were categorised as 'Down' or 'Up' regulated genes. Finally, we calculated the number of genes in each Down' or 'Up' category and calculated a ratio that is the reference ratio found by dividing the number of genes in 'Down' by the number of genes in 'Up' for the two genetic backgrounds analysed, *wdr-5(-)* and *rbbp-5(-)*. The reference ratio is then compared to the experimental ratio, which is calculated by dividing the number of genes 'Down' and associated with one of the nine classes of peaks by the number of genes 'Up' and associated with the same class of peak. If the experimental ratio is the same as the reference ratio, the correlation between misexpressed genes and the presence of a class of peak is independent of this class of peak. The Odds Ratio are expressed in log2 such as a positive log2(Odds Ratio) indicates a enrichment towards up regulation of gene expression and a negative value a tendency towards down regulation of gene expression. We used the chi-squared test to establish whether differences between the Odds ratios are statistically significant and calculated the 95% Confidence Interval using Odds Ratio statistics. A significant difference between ratios is considered at a p value <0.01 and a 95% C.I. Odds Ratio > 2 fold.

2.10.6 Data and software availability

The ChIP-seq data have been deposited in the GEO repository under ID code GSE94639 and RNA-seq data have been deposited in the ArrayExpress repository under ID code E-MTAB-5500.

Chapter 3

RBBP-5 imparts transgenerational memory of normal lifespan regulation in *rbbp-5(-)* mutant descendants of wild type ancestors

Chapter 3 : RBBP-5 imparts transgenerational memory of normal lifespan regulation in *rbbp-5(-)* mutant descendants of wild type ancestors

3.1 Abstract

Genetics and epigenetics factors are amongst the determinants of ageing process. The absence of WDR-5 or ASH-2, which are subunits of the H3K4 methyltransferase MLL/SET/COMPASS complex, causes longevity in *Caenorhabditis elegans* lifespan. Moreover, the extended lifespan is also transgenerationally inherited in three generations of wild type progeny. Interestingly, there is another core component of the complex, RBBP-5, whose absent causes more detrimental reduction in all H3K4me1/me2/me3 in embryos. Yet, it is unknown whether RBBP regulates lifespan or has transgenerational effects on lifespan regulation. In this study, we undertook the investigation on whether H3K4 methylation attributed by RBBP-5 is required for lifespan regulation and its transgenerational inheritance. We discovered that in absence of RBBP-5, *C. elegans* lifespan is shorten. We also found H3K4 methylation to be reduced as the worm aged. We showed that the complex has a strong reliance on RBBP-5 for maintaining H3K4me1/me2/me3 in young adults. However, as the animal aged, the reliance on RBBP-5 for H3K4me1/me3 lessened. The complex reliance on WDR-5 in both young and old adults, is strong for H3K4me2 but the reliance is minor for H3K4me1/me3. Interestingly, we also uncovered that an ancestor having a wild type copy of RBBP-5 can transmit normal lifespan in three generations of the mutant descendants. The transgenerational inheritance was specific for lifespan regulation and does not affect other *rbbp-5(-)* associated phenotype such as smaller brood size. In conclusion, H3K4 methylation is reduced during ageing and regulation of H3K4 methylation by RBBP-5 is required for normal lifespan.

KEYWORDS: H3K4 methylation, ageing, lifespan assay, transgenerational inheritance, epigenetics

3.2 Introduction

Ageing is a universal phenomenon in the vast majority of living organisms. It is the progressive deterioration of physiological function that accompanies the passage of time over the course of life. How to attain a healthy ageing has been one of the major goals in the bio-gerontology field. However, manipulation of the deterioration processes during ageing remains controversial. Based on the theory of ageing, two crucial allocations of physiological resources during ageing are for the soma maintenance and reproduction (Kirkwood & Holliday 1979). The careful choreography of these two events, described as lifespan regulation, is the determinant of how long an organism lives (Carnes 2011). Lifespan is described as the duration of observed life, short or long, whereas longevity refers to prolonged duration of life (Carnes 2011).

The members of the MLL/SET/COMPASS complex have been implicated in the lifespan regulation of *C. elegans*. The longevity of the soma is determined, in part, by the components of the MLL/SET/COMPASS acting on germline stem cells (Greer et al. 2010). Based on whole-mount immunocytoshemistry analysis, germline is highly enriched with ASH-2, SET-2 and H3K4me3 marks (Greer et al. 2010). When SET-2, ASH-2 or WDR-5 is absent, lifespan becomes extended (Greer et al. 2010; Greer et al. 2011). If *set-2, ash-2* or *wdr-5* is knocked down in *glp-1* or *pgl-1* sterile worms lacking germline, lifespan is no longer extended (Greer et al. 2010), suggesting the germline requirement for lifespan regulation by MLL/SET/COMPASS complex.

Deposition of H3K4 methylation by the MLL/SET/COMPASS complex has been observed during *C. elegans* embryogenesis and larval development. Whether the level of H3K4 methylation is altered in ageing adults is unknown. Absence of WDR-5 or ASH-2 in embryos has been associated with great reduction in the levels of H3K4me3 and H3K4me2 (Wang et al. 2011). Another core component of the MLL/SET/COMPASS complex is the RBBP-5. Importantly, absence in RBBP-5 causes depletion in all H3K4me1/me2/me3 during embryogenesis (Wang et al. 2011), suggesting a greater reliance on this core component. However, many aspects on the roles of RBBP-5 is still not well understood for instance whether RBBP-5 regulates lifespan or how the depletion of H3K4 methylation in absence of RBBP-5 affects transcription.

Absence in SET-2, WDR-5 and ASH-2, are implicated in inheritance of longevity for several generations (Greer et al. 2011). To prove transgenerational inheritance, the Brunet laboratory used genetic crosses and RNAi approaches. The genetic crossing between wild type males (P0) and mutant hermaphrodites of *wdr-5* or *set-2* re-introduces the wild type allele in the progeny. The Mendelian laws of genetics predicted that the animals should resume a normal lifespan. Instead, the descendants inherit longevity from the mutant ancestor until F4 generation, At F5 generation, the longevity trait was loss, ruling out a spontaneous genetic mutation to explain longevity (Figure 3.1). Using the RNAi approach produced similar results. When wild type hermaphrodite (P0) was treated with *ash-2(RNAi),* their untreated F1 to F3 wild type descendants were long-lived (Figure 3.1). The inheritance of longevity was loss at the F4 generation. The loss of longevity after a specific number of generations indicates that the inheritance occurs epigenetically rather genetically. This study indicates that deficiency in WDR-5, SET-2 or ASH-2 only in the parental generation (P0) extends the lifespan of descendants for several generations. It is thought that inheritance of longevity is not due to inheritance of global changes in the level of H3K4me3, since global H3K4me3 resumes wild type levels after re-introduction of the wdr-5 wild type allele. Instead, inheritance might be mediated by heritable changes of H3K4me3 at specific loci. Whether RBBP-5 also has impact on transgenerational lifespan regulation is unknown.

In this study, we aim to gain a more detailed understanding of how ageing and lifespan regulation were modulated by H3K4 methylation. We are interested in investigating whether RBBP-5 has role on lifespan regulation similar to the roles shown by the other components, WDR-5, ASH-2 and SET-2. Interestingly, we found *rbbp-5(-)* mutant to be short-lived. Since involvement of the H3K4 methylation marks over the course of ageing has never been documented before, we determine their levels by Western Blot analysis. In total, we found that there is a reduction in H3K4 methylation that accompanies ageing. We uncovered that RBBP-5 is required to maintain

H3K4me1/me2/me3 in young adult but its reliance to maintain H3K4me1/me3 is reduced in old adults. On the other hand, WDR-5 is required for maintenance of H3K4me2 in young and old adults, as well as for H3K4me1/me3 in old adults, albeit the role is minor. In addition, we found that H3K4 methylation in wild type *rbbp-5* is transgenerationally inherited and normalised lifespan of mutant progenies for up to three generations. The transgenerational inheritance implicated by RBBP-5 is specific for lifespan regulation. Taken together, our work adds to previous finding that components of MLL/SET/COMPASS are involved in lifespan regulation and H3K4 methylation is reduced during ageing.

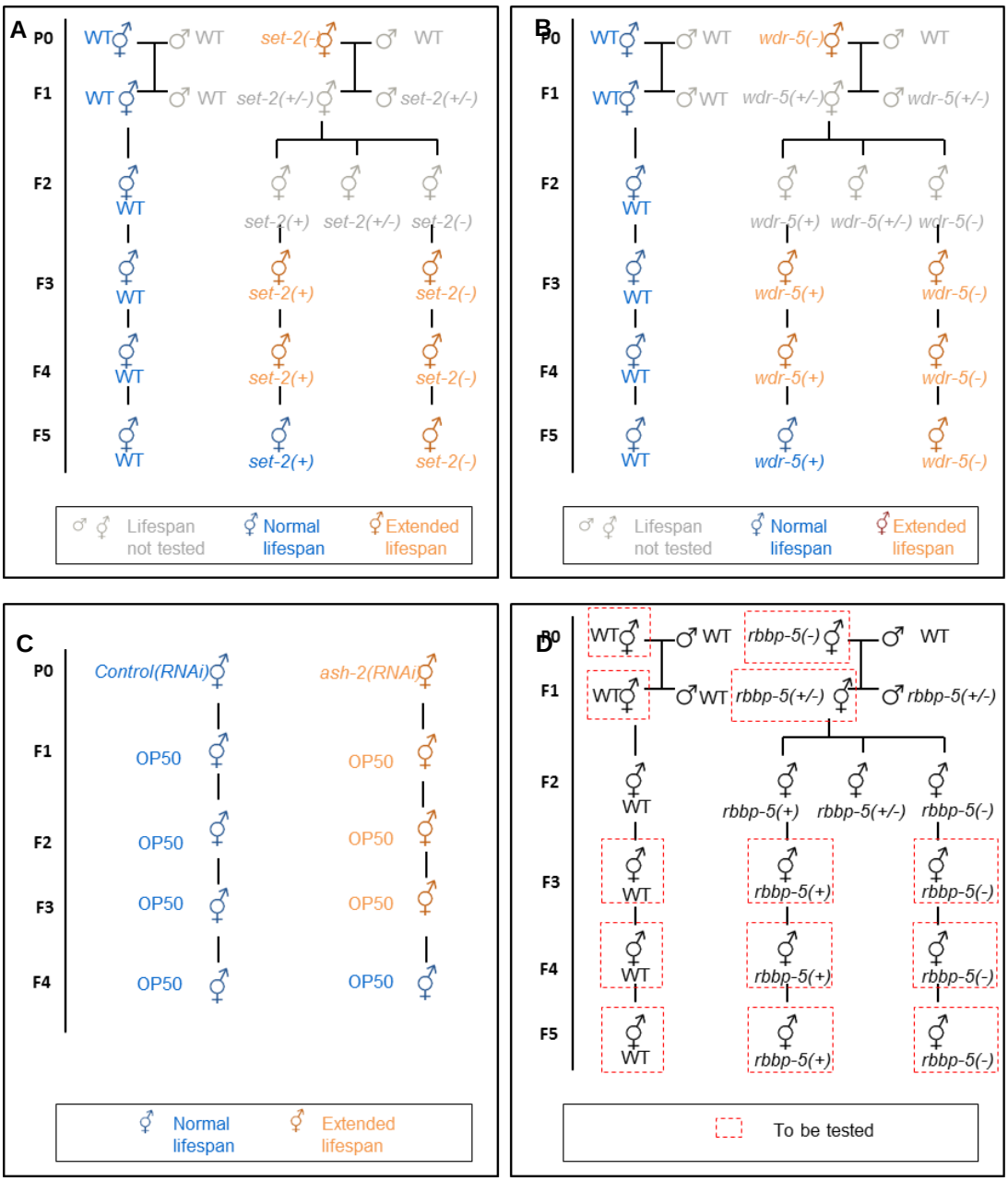


Figure 3.1 Schematic illustration of transgenerational inheritance of longevity by components of the MLL/SET/COMPASS complex

(A-B) Transgenerational inheritance of longevity in wild type progeny (F3 and F4) from crosses between wild type males and *set-2(-)* or *wdr-5(-)* hermaphrodites. (C) Transgenerational inheritance of longevity in normal progeny (F3 and F4) from ash-2(RNAi) mother. Normal lifespan (blue); extended lifespan (orange); ancestor generation (P0); First to fifth generations of progeny (F1-F5); wild type *(+/+)*; heterozygous *(+/-)*; and mutant *(-/-)* lacking *set-2* or *wdr-5*. (D) Schematic illustration of the current study showing the crosses between wild type males (N2) and *rbbp-5(-)* hermaphrodites (P0). The first filial generation F1 which are heterozygous for *rbbp-5* produce wild type, mutant and heterozygous progenies. The generations whose lifespan are to be measured are indicated in red dotted box.

3.3 Results

3.3.1 Absence in RBBP-5 shortens *C. elegans* lifespan

The core MLL/SET/COMPASS complex comprises WDR-5, RBBP-5, and ASH-2. It has been reported that absence of WDR-5 or ASH-2 can increase lifespan by preventing H3K4 methylation in germ cells of *C. elegans* (Greer et al. 2010; Greer et al. 2011). Yet the effect of depleting RBBP-5, also a core component, has not been reported. We thus assessed whether lifespan is affected by the absence of RBBP-5. To determine if RBBP-5 is implicated in lifespan regulation, we used a mutant, *rbbp-5(tm3463),* predicted to be a null allele (referred herein as *rbbp-5(-))* and conducted lifespan assays comparing with wild type N2. We analysed the data using Kaplan-Meier survival. We found that *rbbp-5(-)* were short-lived compared to the wild type (Figure 3.2A). The median lifespan for wild type N2 was 21 days, whereas, the median lifespan for *rbbp-5(-)* was only 16 days, equivalent to a reduction in median lifespan of 24% ($P < 0.001$) (Table 3.1). To confirm previously published data on WDR-5 and lifespan, we used the same predicted null allele of *wdr-5* and the knockdown by RNAi followed by lifespan assessment. In both cases, we were able to detect the extended lifespan (Figure 3.2B and C) (Greer et al. 2010; Greer et al. 2011). Taken together, the lifespan assays show that even though WDR-5 and RBBP-5 are core components of the same complex, they act differently on lifespan regulation: WDR-5 accelerates ageing whilst RBBP-5 slows ageing rate down.

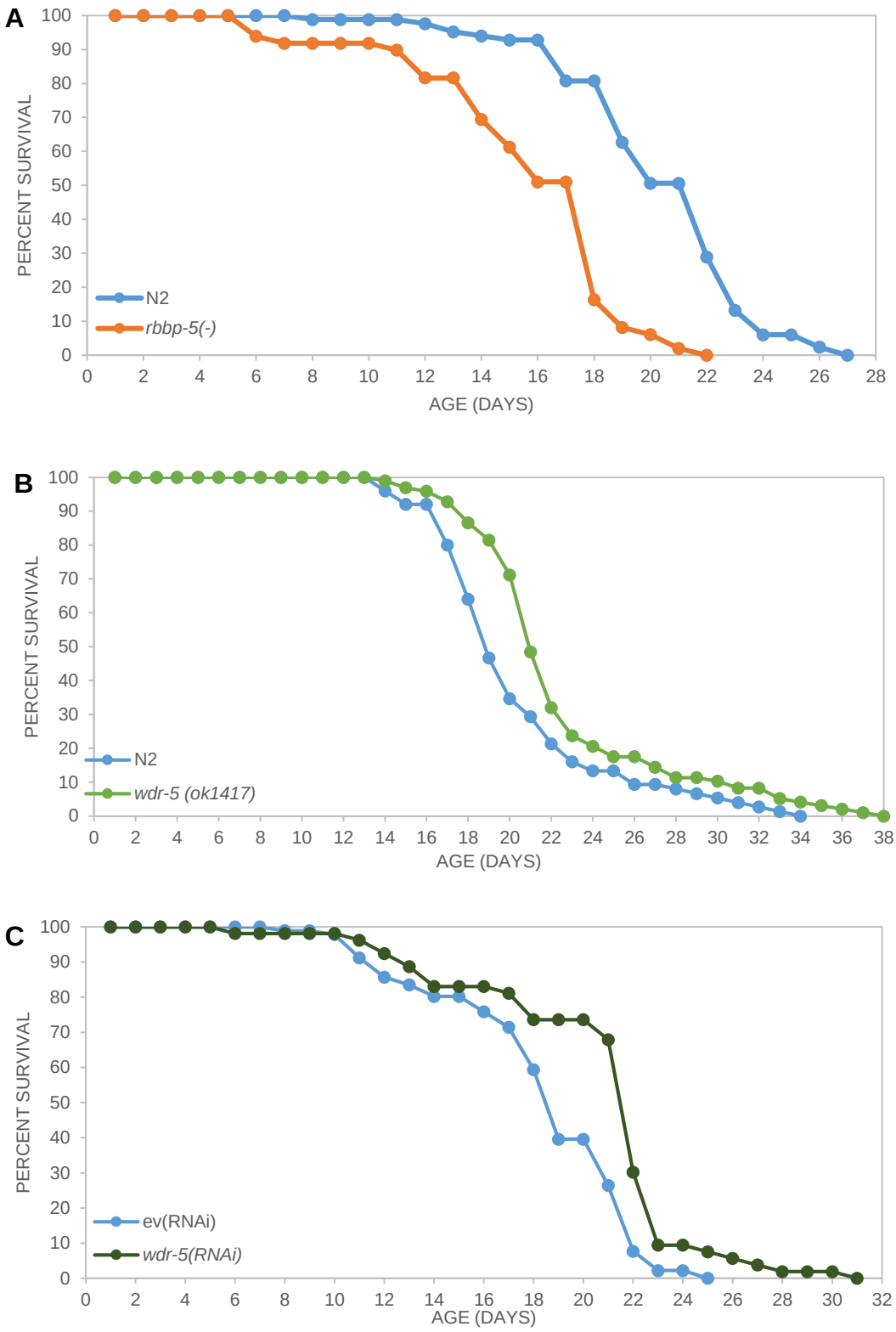


Figure 3.2 RBBP-5 and WDR-5 function together to regulate lifespan in *C. elegans*

A) *rbbp-5(tm3463)* mutant worms have short lifespan compared to wild type. B) *wdr-5(ok1417)* mutant worms have extended lifespan compared to wild type. C) Knock down by RNA interference on *wdr-5* extends the lifespan of worms compared to worms treated with empty vector (RNAi). (Replicates, (A) =7, (B) =2, (C) =1)

Table 3.1 Statistics for lifespan assays on strains deficient for RBBP-5 or WDR-5

Condition	No of subjects	Days	Standard error	95% CI
Lifespan assay on *rbbp-5(-)*				
N2	120	21	0.35	20.15 ~ 21.50
rbbp-5(-)	120	16	0.49	15.08 ~ 17.01
Lifespan assay on *wdr-5(-)*				
N2	97	21	0.49	20.52 ~ 22.46
wdr-5(-)	111	24	0.49	22.67 ~ 24.59
Lifespan assay on *wdr-5(RNAi)*				
ev(RNAi)	166	19	0.37	18.42 ~ 19.88
wdr-5(RNAi)	102	22	0.56	20.91 ~ 23.09

Condition	P-value
N2 vs *rbbp-5(-)*	≤ 0.001
N2 vs *wdr-5(-)*	≤ 0.05
ev (RNAi) vs. *wdr-5(RNAi)*	≤ 0.001

Shown is a representative data from seven biological replicates for rbbp-5(-), two for wdr-5(-) and one for wdr-5(RNAi) replicates.

3.3.2 Levels of H3K4 methylation decrease with age

Implication of the MLL/SET/COMPASS complex in lifespan regulation raises the possibility that H3K4 methylation levels could change during ageing. To address this point, we performed Western blot experiments on young (day 1) adults versus old (day 8) adults of the wild type N2 strains (Figure 3.3). To appreciate levels of H3K4 methylation, we expressed their values relative to the global H3 levels in young or old wild type. The Western blot quantification (Figure 3.3) represents the mean ± standard error of the mean (SEM) and depicts representative distributions of the quantitative results. An important limitation of this study is we observed an increase in levels of our loading control, H3, during ageing. Due to time constraint, we are unable to provide a different loading control. It would be of interest in future to test if tubulin is a better loading control in ageing study. We observed that the levels of H3K4me1 and H3K4me2 in old wild type adults are three times lower than that found in the young wild type adults. The reduction of H3K4me3 in old wild type adults reached approximately 2.5 times lower compared to the young adults (Figure 3.4). Thus, H3K4me1/me2/me3 levels are reduced during ageing relative to the levels of H3, which are increased during ageing.

To determine whether the H3K4 methylation activity during ageing depends on the RBBP-5 and WDR-5, we used the *rbbp-5(-)* and *wdr-5(-)* mutants and performed Western Blots analysis for H3K4me1/me2/me3 levels as above (Figure 3.3). The western blot quantification compared the levels of H3K4 methylation relative to H3 in the mutants versus the levels of H3K4 methylation relative to H3 in wild type strain. Our data showed that H3K4me1 levels were reduced only in the young adult lacking RBBP-5 (Figure 3.5A). H3K4me2 levels were greatly reduced in either mutant as well as in young or old adults, (Figure 3.5B). H3K4me3 levels were reduced in young adults lacking RBBP-5. But in old adults, the H3K4me3 levels were reduced by the absence of RBBP-5 or WDR-5, though to a lesser extent (Figure 3.5C). Taken together, our data indicate that RBBP-5 is required to maintain H3K4me1/me2/me3 levels in young adults. However, the reliance on RBBP-5 to maintain H3K4me1/me3 is lessening in old adults. On the other hand, WDR-5 is required for H3K4me2 in either young or old. However, its role for maintaining the global levels of H3K4me1/me3 appears minor albeit detectable regardless of the age. Therefore, this analysis revealed that methylation at H3K4 is altered during ageing and suggest that the H3K4 methylation activity in old adults is different than the activity found in young adults.

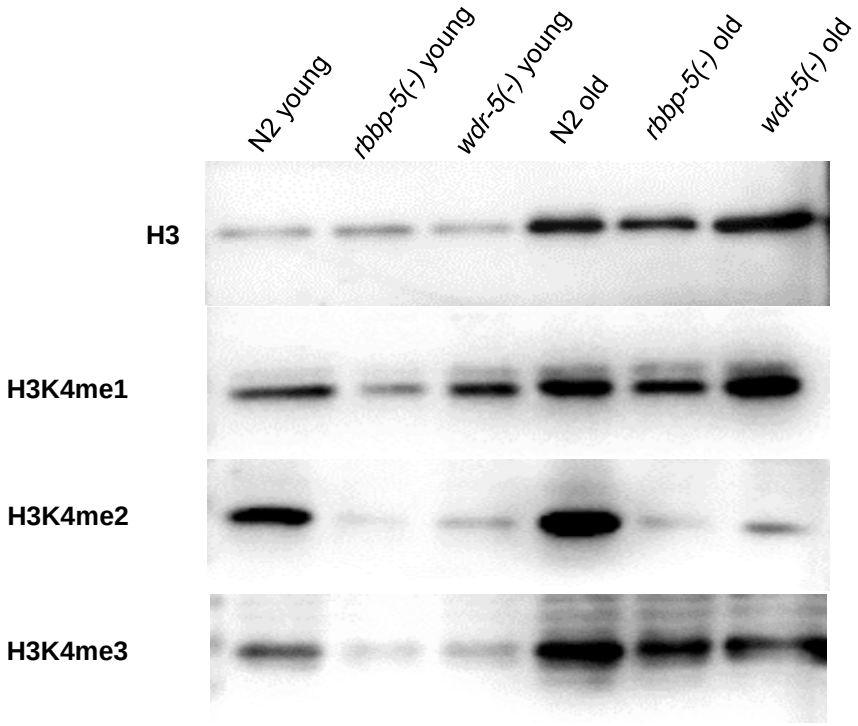


Figure 3.3 Western blot on young (day 1) and old (day 8) adults extracts

Representative of four independent western blot experiments for H3K4me1/me2/me3 on young (day 1) and old (day 8) adult extracts (N=5).

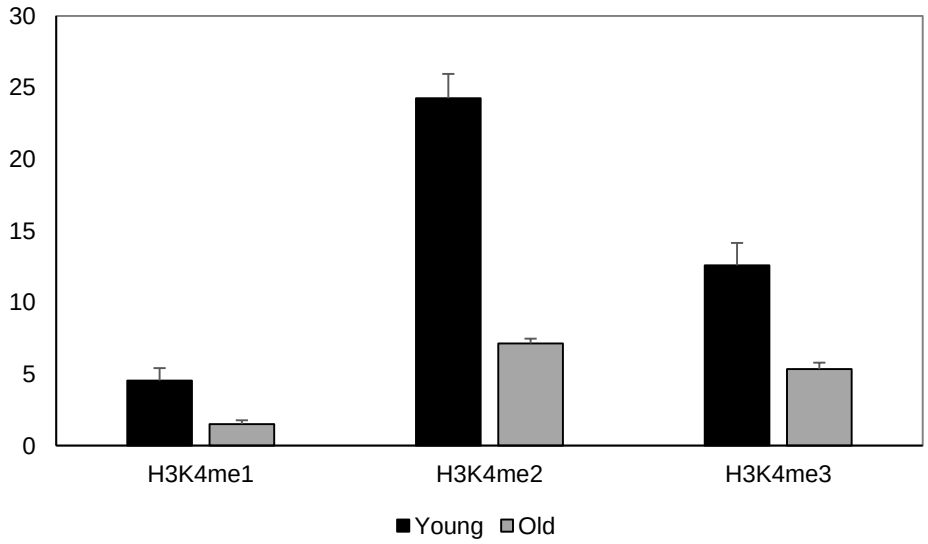


Figure 3.4 Wild type *C. elegans* has reduced H3K4me1/me2/me3 levels during ageing

Quantification was performed using ImageJ (1.51j8) software on four Western Blot replicates. The plot represents the mean of H3K4me1/me2/me3 levels relative to H3 in young adult (black) wild type and old adult wild type. For each gel, the intensity of the given wild type band was first divided by the intensity of the H3 control of similar age wild type for that treatment. Means and standard error of means (SEM) were then calculated across gels. Data was plotted as mean ± SEM, n=4).

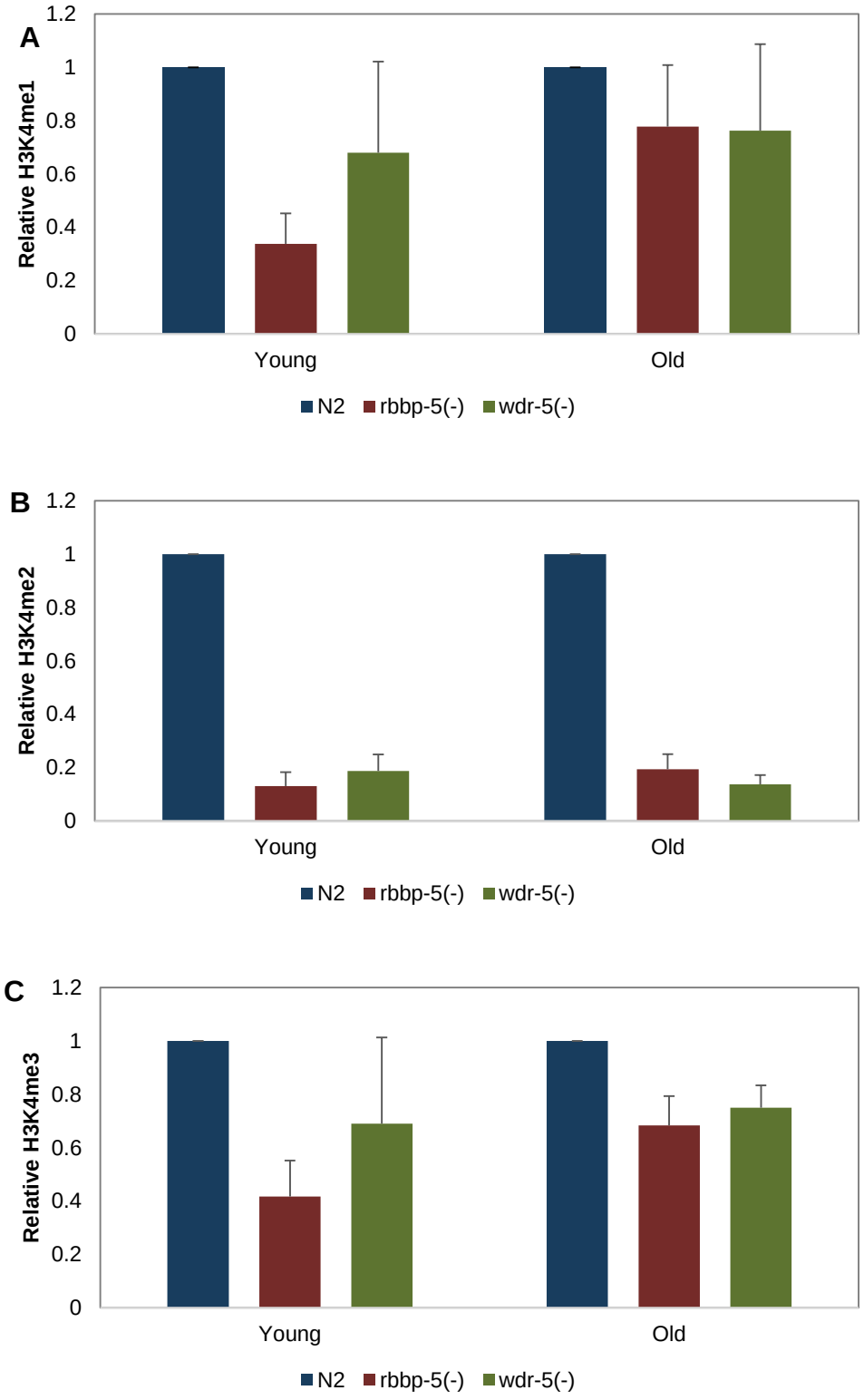


Figure 3.5 Reliance on RBBP-5 and WDR-5 for H3K4 methylation is different in old and adults.

Western blot quantification using ImageJ (1.51j8) software. The plot represents the mean of H3K4me1/me2/me3 levels relative to H3 in young and old adult of mutants rbbp-5(-) and wdr-5(-) when compared to wild type N2. For each gel, the intensity of the given band was first divided by the intensity of the H3 control for that treatment. These normalized values were then divided by the normalized value for the same methylation of the same age of N2 in the same gel. Means and standard error of means (SEM) were then calculated across gels. Data was plotted as mean ± SEM (n=4).

3.3.3 A copy of functional rbbp-5 allele rescues lifespan regulation

Transgenerational inheritance of longevity has been observed in the wild type descendants from ancestor lacking WDR-5, ASH-2 or SET-2 (Greer et al. 2011). The long-lived wild type progenies were obtained from self-fertilizing heterozygous, which descended from the cross between the mutant and the wild type strains. It is still unknown whether RBBP-5 is also implicated in the transgenerational inheritance of lifespan. As the starting point of our transgenerational study, we investigated what happen to the lifespan of the heterozygous *rbbp-5(+/-).*

In this experiment, the wild type and *rbbp-5(-)* strains were used. We crossed the wild type adult males with the *rbbp-5(-)* hermaphrodites and we referred to them as the P0 generation (Figure 3.6A). After an overnight mating and egg-laying, we removed the P0 generation. We then single cloned the next F1 progeny when they reached L4 stage. The genotype of each of the F1 single clones was inferred by pooling six F2 progeny into a tube and performing PCR on them. The genotyping step is crucial to eliminate any self-fertilising progeny from the *rbbp-5(-)* P0 mothers. In parallel to the genotyping step, we started assessing the lifespan of the F1 generation from day 1 adult. We measured the lifespan of the F1 wild type, F1 *rbbp-5(-)* and F1 *rbbp-5(+/-)* strains. We analysed the data using Kaplan Meier survival curve and comparison was made to the wild type.

We found that the median lifespan was 19 days for the wild type and the F1 *rbbp-5(+/-)* strains ($P > 0.05$). The median lifespan was 14 days for *rbbp-5(-)* ($P \leq 0.001$) (Table 3.2). Our data showed that the F1 *rbbp-5(+/-)* has a normal lifespan compared to wild type N2 (Figure 3.6B). Taken together, RBBP-5 deficiency in parental generation does not shorten the lifespan of the next heterozygous descendant. Instead, a single *rbbp-5* wild type allele rescues lifespan regulation, shifting lifespan to normal.

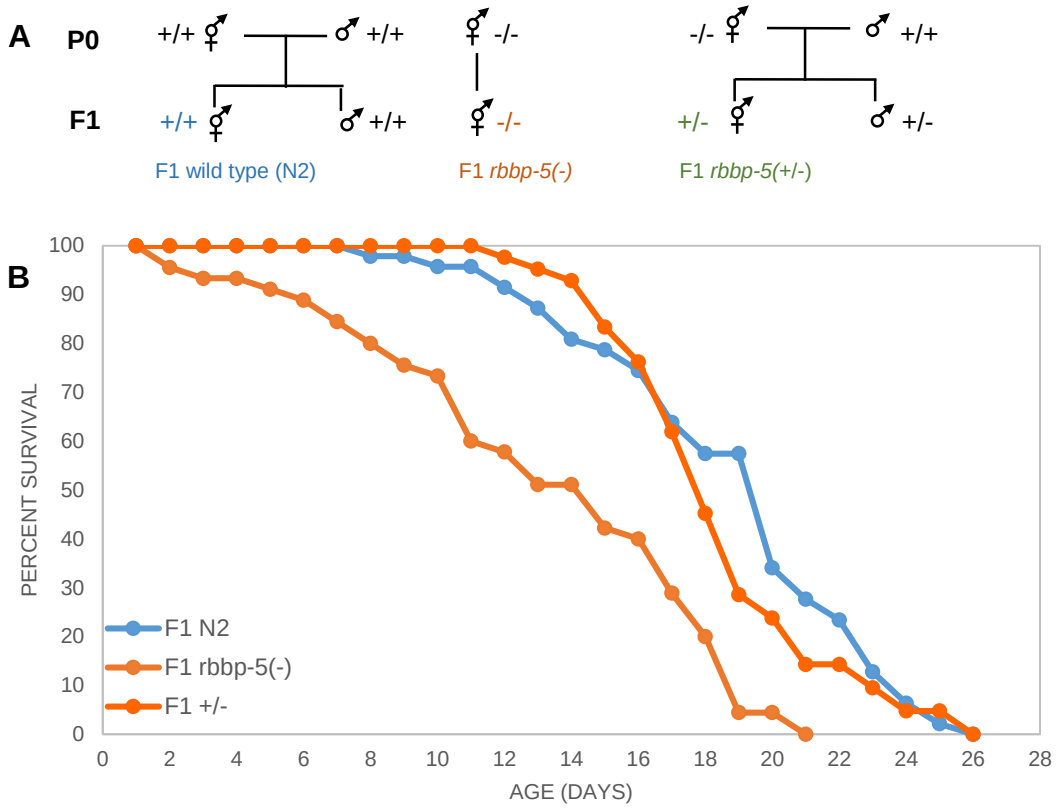


Figure 3.6 Heterozygous rbbp-5(+/-) has a normal lifespan

(A) Scheme for generating heterozygous F1 *rbbp-5(+/-).* (B) Representative of the Kaplan-Meier survival curves for wild type (blue), *rbbp-5(-)* (orange) and *rbbp-5(+/-)* (dark purple) of F1 generation. The Y axis is the percent survival and the X axis is age in days (N=3).

Table 3.2 Representative statistics for F1 generation of transgenerational study

Condition	No of subjects	Days	SE	95% CI
F1 N2	70	19	0.59	17.85 – 20.17
F1 *rbbp-5*(-)	76	14	0.70	12.45 – 15.19
F1 *rbbp-5(+/-)*	98	19	0.48	17.69 – 19.56
Condition			P-value	
F1 N2 vs. F1 *rbbp-5*(-)			≤ 0.001	
F1 N2 *vs.* F1 *rbbp-5*(+/-)			Not significant	
F1 *rbbp-5(-)* vs. F1 *rbbp-5*(+/-)			≤ 0.001	

3.3.4 Lifespan regulation by RBBP-5 is transgenerationally inherited

Heterozygous *rbbp-5(+/-)* animals have a normal lifespan similar to the wild type. Which negated the investigation of the inheritance of the short lifespan of the *rbbp-5(-)* parents in F3 descendants. But it did not impair the investigation of whether normal lifespan can be resumed in F3 *rbbp-5(-)* mutant descendant from the F1 *rbbp-5(+/-)* mothers. We continued the same mating scheme from the previous experiment (Figure 3.6). The F2 progeny from the F1 *rbbp-5(+/-)* mothers were single cloned, left overnight to lay eggs and then genotyped. Next, we transferred the F3 wild type, F3 *rbbp-5(-)*, F3 +/+ from F1 *(+/-)* ancestor and F3 -/- from F1 *(+/-)* ancestor onto fresh plates when they were at L4 stage. We started the lifespan assessment at day 1 adult. The workflow is illustrated in Figure 3.7A.

We envisaged two scenarios if RBBP-5 is implicated in the transgenerational inheritance of lifespan. First, deficiency in RBBP-5 in P0 parent could shorten the lifespan of the F3 +/+ from the F1 +/- ancestor, but this unlikely because one wild allele rescues the short lifespan phenotype. Alternatively, functional RBBP-5 in the heterozygous generation could shift the lifespan of the F3 -/- from F1 +/- ancestor to normal. However, if there is no transgenerational inheritance, the lifespan should be reflective of the genotype. The F3 +/+ from F1 +/- ancestor would have normal lifespan whereas the F3 -/- from F1 +/- would be short-lived.

As expected, the F3 *rbbp-5(-)* was short-lived compared to the wild type (median lifespan = 13 days; $P \leq 0.001$). The median lifespan of wild type was approximately 18 days. The F3 +/+ from F1 +/- ancestor has normal lifespan (median lifespan = 19 days; $P > 0.05$), indicating that deficiency in RBBP-5 in parents does not shorten the lifespan of the wild type descendants. Surprisingly, the F3 -/- from F1 +/- ancestor displayed a normal lifespan (median lifespan = 17 days; $P > 0.05$) (Figure 3.7B and Table 3.3) instead of being genotypically mutant. The data suggest that the wild type allele of *rbbp-5* can impart transgenerational epigenetic memory for lifespan regulation, hence delaying the manifestation of the short lifespan observed in the *rbbp-5(-)* mutant.

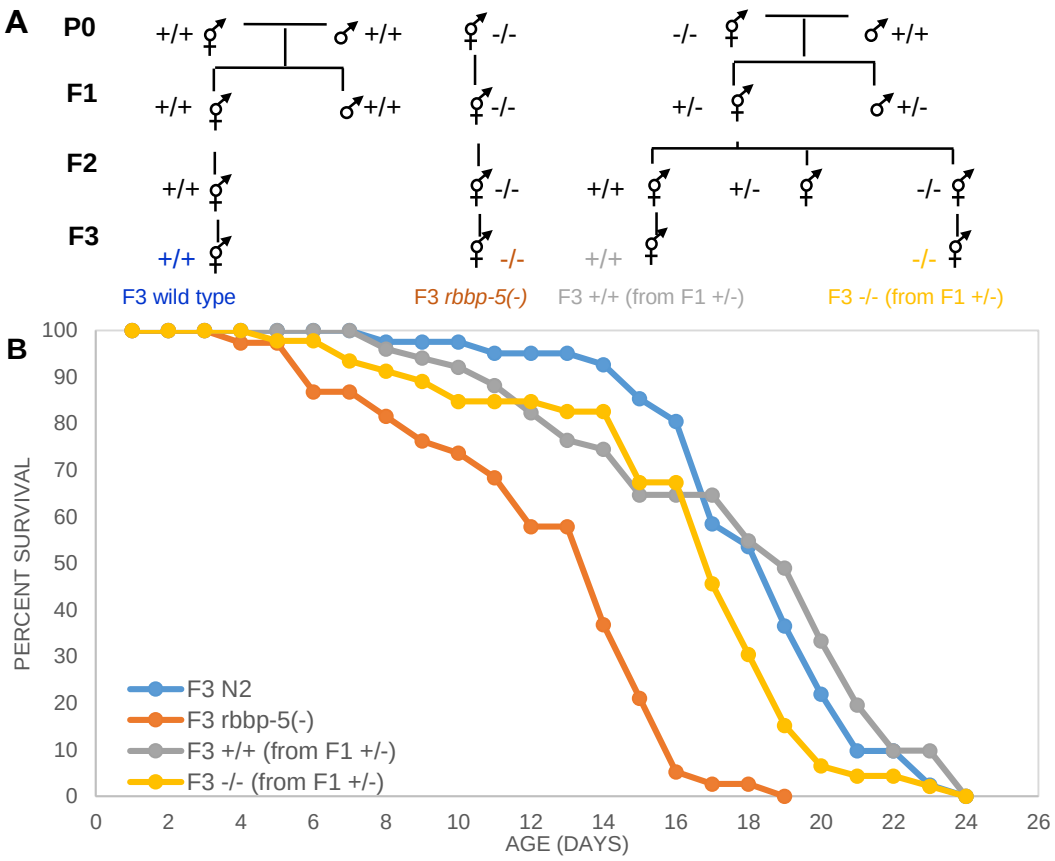


Figure 3.7 Normal lifespan in presence of RBBP-5 is transgenerationally inherited

(A) Scheme for generating F3 generation of wild type *(+/+)* and mutant *(-/-)* from F1 *rbbp-5(+/-)* ancestor. (B) Representative of Kaplan-Meier survival curves for F3 generation of wild type (blue), *rbbp-5(-)* (orange), +/+ from F1 +/- ancestor (grey) and -/- from F1 +/- ancestor (yellow) (N=3).

Table 3.3 Representative statistics for F3 generation for the transgenerational lifespan study

Condition	No of subjects	Days	SE	95% CI
F3 N2	75	18	0.48	17.41 – 19.28
F3 *rbbp-5(-)*	67	13	0.56	11.59 – 13.77
F3 +/+ (from F1 +/-)	105	19	0.54	17.48 – 19.59
F3 -/- (from F1 +/-)	105	17	0.54	15.65 – 17.76

Condition	P-value
F3 N2 vs. F3 *rbbp-5(-)*	≤ 0.001
F3 N2 *vs.* F3 +/+ (from F1 +/-)	Not significant
F3 N2 *vs.* F3 -/- (from F1 +/-)	Not significant
F3 *rbbp-5(-) vs.* F3 +/+ (from F1 +/-)	≤ 0.001
F3 *rbbp-5(-) vs.* F3 -/- (from F1 +/-)	≤ 0.001
F3 +/+ (from F1 +/-) *vs.* F3 -/- (from F1 +/-)	≤ 0.01

3.3.5 Lifespan regulation is transgenerationally inherited for three generations

The inheritance of longevity from parents having deficiency in WDR-5, ASH-2 or SET-2 can last for up to three generations of the wild type descendants. We have shown that the normal lifespan from the wild type allele of *rbbp-5* +/- parents could be transgenerationally inherited in the *rbbp-5(-)* mutant descendants. Next, we determined for how long the inheritance for normal lifespan imparted by RBBP-5 could last. We performed the previous workflow scheme (Figure 3.8A). We measured the lifespan of F4 wild type, F4 *rbbp-5(-),* F4 +/+ from F1 +/- ancestor and F4 -/- from F1 +/- ancestor. We found that the lifespan of F4 -/- from the F1 +/- ancestor to be intermediate (median lifespan = 16 days). The F4 -/- median lifespan was 6% shorter than wild type ($P > 0.05$; N2 median lifespan = 17 days) but 7% extended from *rbbp-5(-)* ($P = 0.04$; *rbbp-5(-)* median lifespan = 15 days) (Table 3.4). The lifespan of F4 +/+ from F1 +/- ancestor was similar to wild type ($P > 0.05$). Hence, the corrected lifespan regulation from parents with RBBP-5 is partially inherited in the F4 mutant descendants (Figure 3.8B). We performed similar assessment on the F5 generation. Our observation showed that the F5 -/- from F1 +/- ancestor does not inherit normal lifespan anymore. Instead, it has a short lifespan when compared to the F5 wild type ($P \leq 0.001$) (Figure 3.8C and Table 3.5). Thus, the lifespan regulation by wild type RBBP-5 in parents can last for up to three generations of *rbbp-5(-)* mutant descendant.

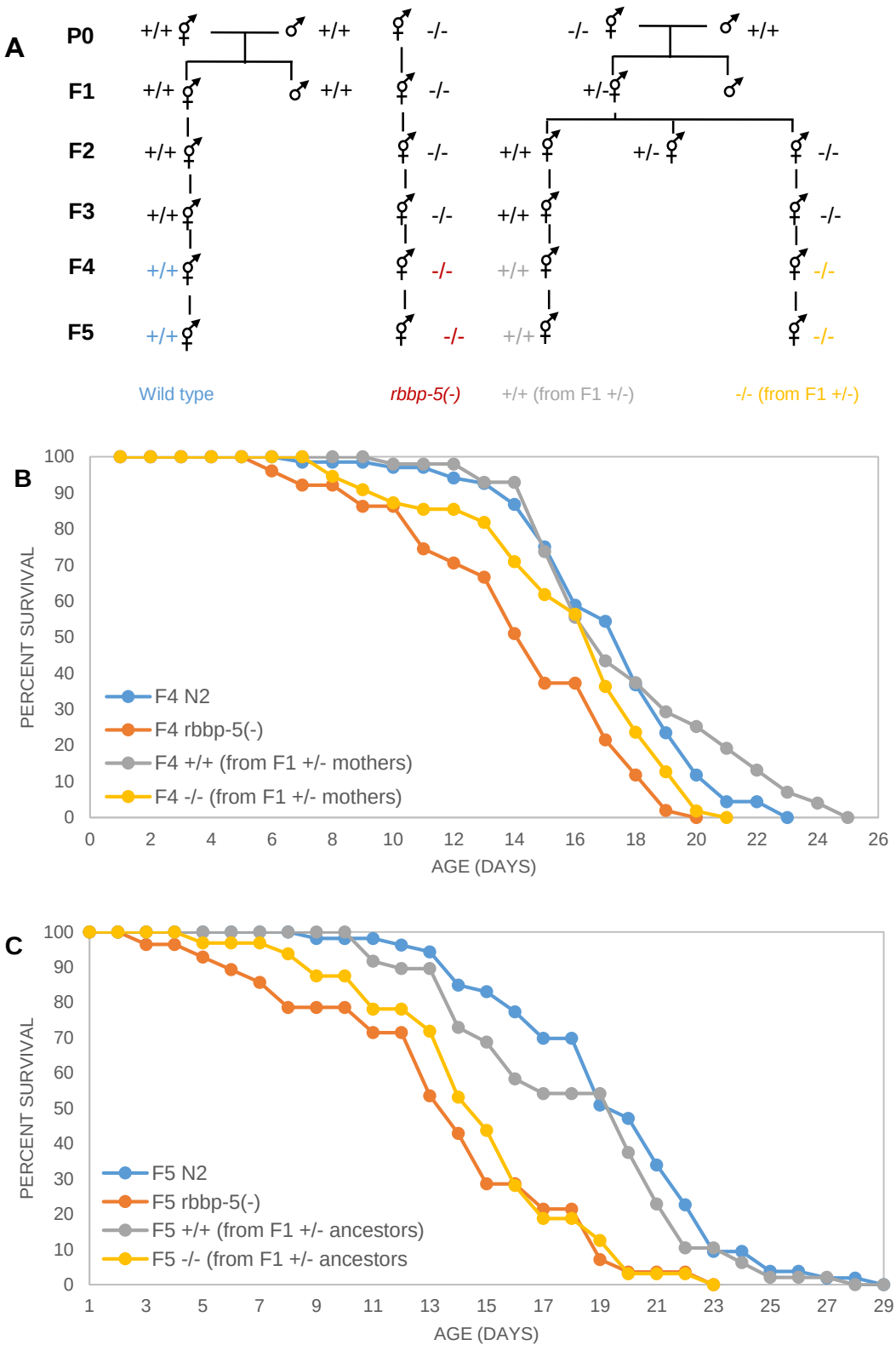


Figure 3.8 Genetically mutant descendants from heterozygous rbbp-5 parents inherit normal lifespan for up to three generations

(A) Scheme for generating F4 and F5 generations of +/+ from F1 +/- ancestor and -/- from F1 +/- ancestor. (B) Representative of Kaplan-Meier survival curves for F4 generation and (C) F5 generation showing wild type (blue), *rbbp-5(-)* (orange), +/+ from F1 +/- ancestor (grey) and -/- from F1 +/- ancestor (yellow) (N=4).

Table 3.4 Representative statistics for transgenerational lifespan assay on F4 generation

Condition	No of subjects	Days	SE	95% CI
F4 N2	100	17	0.34	16.74 ~ 18.09
F4 rbbp-5	100	15	0.48	13.59 ~ 15.46
F4 +/+ (from F1 +/-)	122	18	0.34	17.26 ~ 18.58
F4 -/- (from F1 +/-)	90	16	0.44	15.19 ~ 16.91
Condition			P-value	
F4 N2 vs. F4 rbbp-5			≤ 0.001	
F4 N2 vs. F4 +/+ (from F1 +/-)			Not significant	
F4 N2 vs. F4 -/- (from F1 +/-)			**0.0573 (intermediate)**	
F4 rbbp-5 vs. F4 +/+ (from F1 +/-)			≤ 0.001	
F4 rbbp-5 vs. F4 -/- (from F1 +/-)			**0.0393 (intermediate)**	
F4 +/+ (from F1 +/-) vs. F4 -/- (from F1 +/-)			≤ 0.01	

Bold font indicates that median lifespan for F4 -/- from F1 +/- ancestor is intermediate between the lifespan of wild type and rbbp-5(-).

Table 3.5 Representative statistics for transgenerational lifespan assay on F5 generation

Condition	No of subjects	Days	SE	95% CI
F5 N2	81	19.6	0.53	18.57 – 20.64
F5 rbbp-5(-)	90	14.28	0.75	12.80 – 15.75
F5 +/+ (from F1 +/-)	75	18.54	0.58	17.40 – 19.68
F5 -/- (from F1 +/-)	90	15.28	0.62	14.05 – 16.50
Condition			P-value	
F5 N2 vs. F5 *rbbp-5(-)*			≤ 0.001	
F5 N2 *vs.* F5 +/+ (from F1 +/-)			Not significant	
F5 N2 *vs.* F5 -/- (from F1 +/-)			≤ 0.001	
F5 *rbbp-5(-)* vs. F5 +/+ (from F1 +/-)			≤ 0.001	
F5 *rbbp-5(-)* vs. F5 -/- (from F1 +/-)			Not significant	
F5 +/+ (from F1 +/-) *vs.* F5 -/- (from F1 +/-)			≤ 0.001	

3.3.6 Epigenetic memory from RBBP-5 does not affect brood size

The descendants inheriting the normal lifespan are genotypically mutant that lack RBBP-5. Instead of having a short lifespan, they display a normal lifespan for up to three generations. It is unknown if the transgenerational inheritance is specific to lifespan regulation. Hence, we investigated another phenotype linked to deficiency in RBBP-5. Absence of RBBP-5 reduces brood size (Wang et al. 2011). To determine whether the F3 -/- from F1 +/- ancestor has normal (as for lifespan) or reduced number of progeny, we conducted a brood size assay. We single cloned F3 wild type, F3 *rbbp-5(-),* F3 +/+ from F1 +/- ancestor and F3 -/- from F1 +/- ancestor at L4 stage. The worms were incubated at 25 ºC and transferred onto a new plate every day. Their progenies were counted and compared to wild type. We found a reduction in brood size of both the F3 *rbbp-5(-)* and F3 -/- from F1 +/- ancestor when compared to the wild type ($P \leq 0.01$) (Figure 3.9, Table 3.6). The F3 +/+ from F1 +/- ancestor on the other hand has a normal size of progeny. Thus, the presence of RBBP-5 in heterozygous parents can rescue lifespan regulation for up to three generations but does not rescue the reduced brood size phenotype of the F3 -/- mutants from the F1 +/- ancestors.

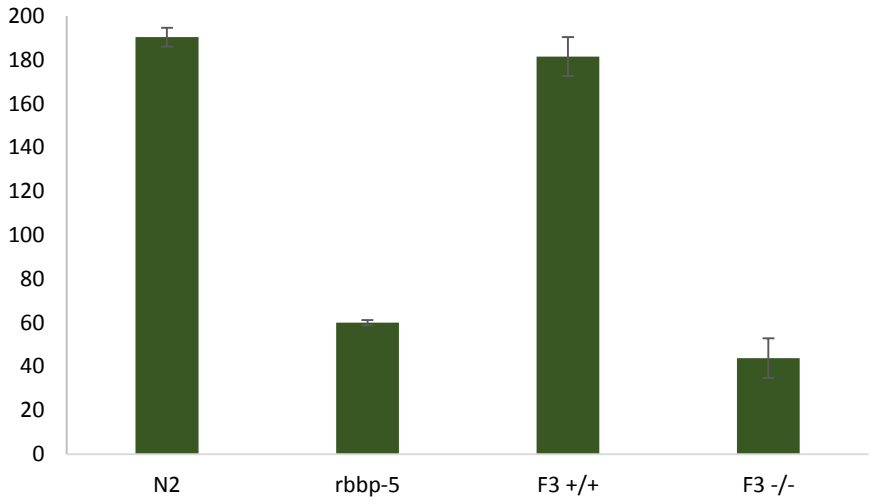


Figure 3.9 Mutant progeny from ancestor having RBBP-5 has smaller brood size and does not inherit normal brood size

Average number of progeny per worm for wild type, *rbbp-5(-),* F3 +/+ from F1 +/- ancestor and F3 -/- from F1 +/- ancestor (n=10, average of 3 biological trials).

Table 3.6 Parameters and statistics for brood size assay

Condition	Average brood size	SEM
N2	190	4.32
rbbp-5	60	1.12
F3 +/+	181	8.87
F3 -/-	44	9.05
Condition		P-value
N2 vs. *rbbp-5*		≤ 0.001
N2 vs. F3 +/+ from F1 +/-		Not significant
N2 vs. F3 -/- from F1 +/-		≤ 0.01
***rbbp-5* vs. F3 +/+ from F1 +/-**		≤ 0.01
***rbbp-5* vs. F3 -/- from F1 +/-**		Not significant

3.3.7 Global H3K4 methylation levels were not increased in mutant descendants

Absence in RBBP-5 shortens lifespan. Conversely, lifespan of the F1 *rbbp-5(+/-)* is normal. We reasoned that the shift of lifespan from short to normal might result from RBBP-5-containing complex recapitulating the H3K4 methylation activity at loci important for lifespan regulation. The H3K4 methylation regained during F1 *rbbp-5(+/-)* generation may have been epigenetically inherited in the subsequent generations. We prepared protein lysate of day 1 adult from the following strains: wild type; *rbbp-5(-);* F3 +/+ (from F1 +/-); F3 -/- (from F1 +/-); F4 +/+ (from F1 +/-); F4 -/- (from F1 +/-); F5 +/+ (from F1 +/-); and F5 -/- (from F1 +/-). We assessed the global methylation levels of H3K4me1/me2/me3 by Western Blotting. A representative western blot is shown in Figure 3.10. Western blot quantification for each condition of H3K4 methylation was made relative to H3 levels and compared to wild type. Consistent with our previous finding*, rbbp-5(-)* mutants display a reduction in H3K4me1/me2/me3 levels when compared to wild type. The F3, F4 and F5 mutant descendants from F1 +/- ancestor have reduced H3K4me1/me2/me3 levels compared to the F3, F4 and F5 wild type descendants, respectively (Figure 3.11). A limitation in our sampling is we introduced a wide time interval between control preparations and while waiting from one generation to the next for the descendants of F1(+/-). We observed H3K4 methylation levels in our genetically wild type F5 to be very different from wild type control F5, probably due to variables introduced during the waiting. In future, for every generation of F1(+/-) descendants, the wild type and mutant controls should be collected concurrently and separate Western blot should be performed for each generation, instead of doing it collectively. In sum, the trend indicates that the global levels of H3K4 methylation corresponds to the worm genotype: The H3K4 methylation in F3, F4 and F5 -/- worm descendants from F1 +/- are reduced compared to wild type.

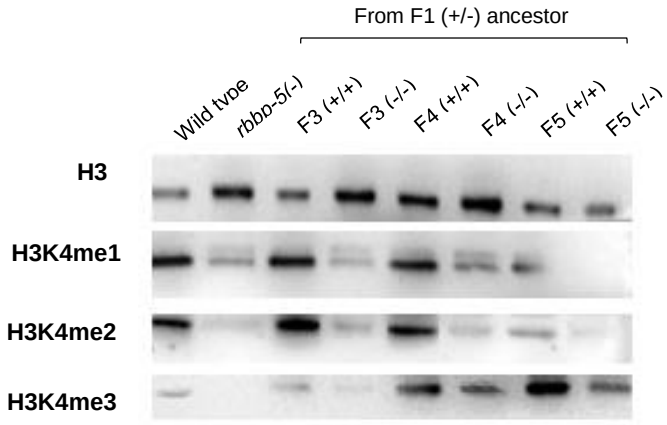


Figure 3.10 Global level of H3K4 methylation was reduced in *C. elegans* with *rbbp-5(-)* deletion regardless if they descended from mutant or heterozygous ancestor

Representative Western Blot showing global H3K4me1/me2/me3 levels in F3, F4 and F5 generations compared to wild type (n=3).

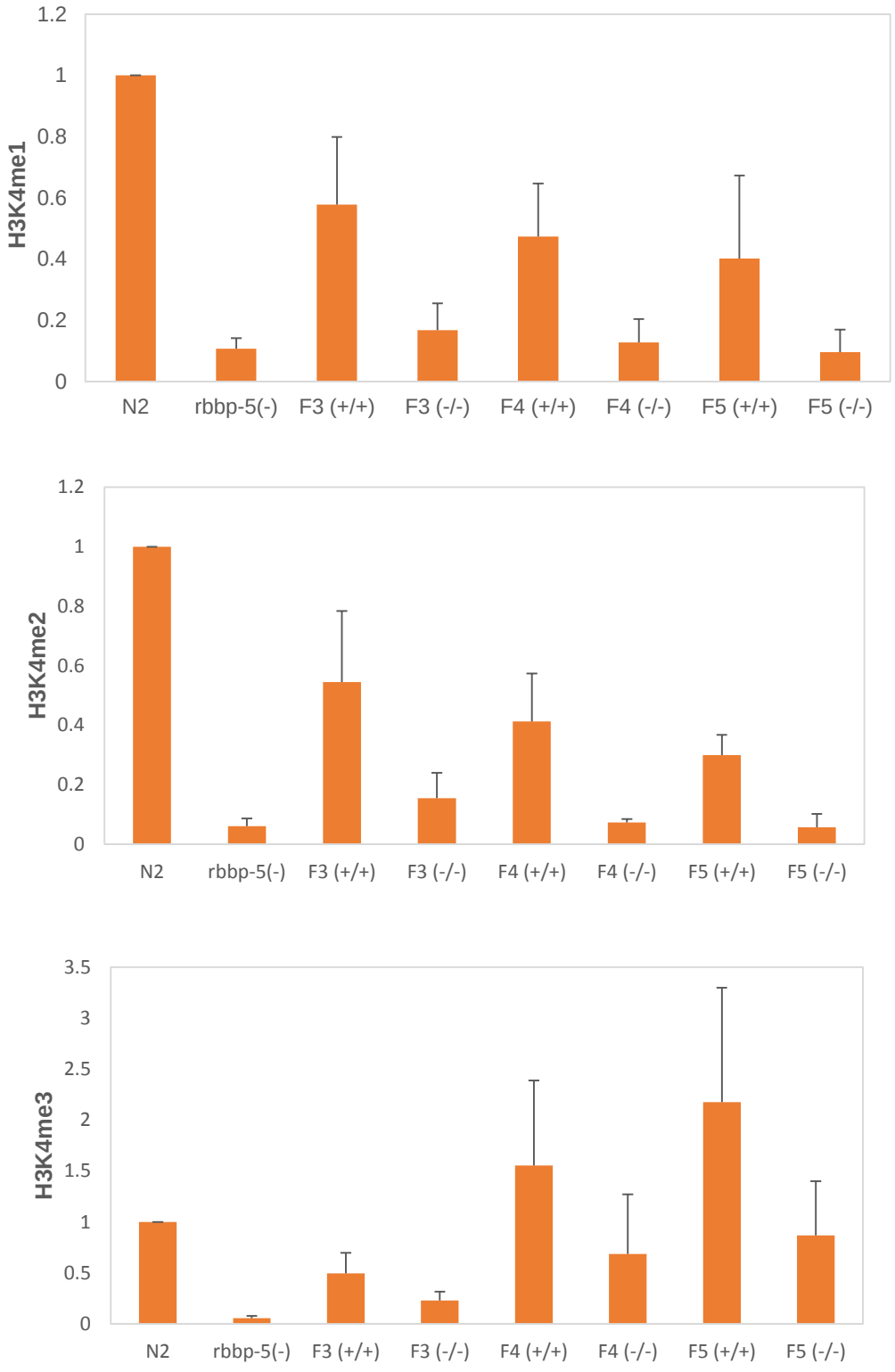


Figure 3.11 Genetically mutant descendants from heterozygous ancestor *rbbp-5(+/-)* have reduced H3K4me1/me2/me3 compared to the their respective wild type descendants

Quantification of western blot analysis on H3K4me1/me2/me3 levels relative to H3, compared to the levels in wild type (n=3).

3.4 Discussion

3.4.1 RBBP-5 prevents lifespan shortening

The increasingly appreciated role of MLL/SET/COMPASS complex in regulating lifespan necessitates further understanding at mechanistic level. With the recent data on the absence of ASH-2, WDR-5 or SET-2 causing longevity, we investigate the RBBP-5's role in lifespan regulation. Since absence in RBBP-5 causes greater reduction in H3K4me1/me2/me3 during embryogenesis compared to when WDR-5 or ASH-2 is absence (Wang et al. 2011), we are interested to measure the lifespan of *rbbp-5(-)* mutant worms. Interestingly, our work revealed that in absence of RBBP-5, lifespan is shortened.

Why there is a contrasting effect on lifespan in absence of different MLL/SET/COMPASS core components is unclear. Perhaps, the different levels of the residual H3K4 methylation in absence of different component determine how long an animal lives. Having a slight depletion in H3K4 methylation may cause their lifespan to be extended. The depletion of H3K4 methylation in worms lacking WDR-5, ASH-2 or SET-2 is not fully absolute and does not reduce each state of the H3K4 methylation. Instead, mutant embryos lacking WDR-5 or ASH-2 only have decreased levels of both H3K4me3 and H3K4me2 to various degrees (Wang et al. 2011; Simonet et al. 2007). Similarly, inactivation of *set-2* causes significant reduction in the global level of H3K4me3, but only to a lower degree for the H3K4me2 (Simonet et al. 2007; Wilkins 2016). The reduced residual H3K4 methylation might regulate gene expressions important for longevity.

On the other hand, while partial depletion may extend lifespan, alteration in H3K4 methylation that is too great for the *C. elegans*,can shorten its lifespan. In absence of RBBP-5 for instance, all of the H3K4me1/me2/me3 states are greatly reduced during embryogenesis. The great reduction in H3K4me1/me2/me3 is also observed later during early adulthood as shown by our Western Blot analysis. H3K4 methylation has been associated with active transcription. Greater reduction in H3K4 methylation in the *rbbp-5(-),* affecting all three methyl marks, may have cause misregulation of genes that can result in acceleration of ageing process.

The hypothesis on prominent alteration in H3K4 methylation shortens *C. elegans* lifespan is also supported by lifespan data on *rbr-2(-)* mutant worms. RBR-2 is the *C. elegans* homolog of the human JmjC H3K4 demethylase (Nishibuchi et al. 2014). Its absence results in a great accumulation of approximately 6.5-fold higher for H3K4me3 and 3.5-fold increase in H3K4me2 in *C. elegans* (Christensen et al. 2007). The enrichment of H3K4me3 in absence of RBR-2 was observed during larval development (L1, L2, L3 and L4) as well as in adult (Christensen et al. 2007). Lifespan analysis on *rbr-2(-)* mutants uncover their short life expectancy (Greer et al. 2010). The determinant of life expectancy could be the levels of H3K4 methylation: partial reduction in H3K4 methylation might cause longevity but prominent reduction or accumulation of H3K4 methylation might shorten the worm lifespan. Further work will be required to confirm the mechanism on how H3K4 methylation can negatively and positively control life expectancy.

3.4.2 H3K4 methylation is reduced during ageing process

Histone modification is one of the components of ageing. It mediates the interaction between genome and environment for adaptation and survival. Histone modifications have active roles in ageing if they are functionally associated with ageing phenotypes and if their levels are altered over the course of ageing (Calvanese et al. 2009). Previously, we have shown that reducing the H3K4 methylation through a null mutation in *C. elegans* RBBP-5 can shorten lifespan. We also have successfully confirmed that partially reducing the H3K4 methylation via a null mutation or RNAi treatment on *wdr-5* can extend the worm lifespan. Our work suggests that H3K4 methylation can shorten or extend lifespan possibly by acting on genes that could accelerate or impede ageing process. The next aim of this dissertation is to investigate if H3K4 methylation is altered over the course of ageing. We found that all states, H3K4me1/me2/me3, are reduced during ageing.

A possible explanation on why H3K4 methylation has ageing-associated reduction is that as animal aged, chromatin function may start to decline. Chromatin is one of the many biological structures that undergo functional decline during ageing (Oberdoerffer & Sinclair 2007). The methylation at H3K4 is a histone modification that gives an additional layer of control over chromatin structure and ultimately over gene expression. It does so by recruiting various readers for chromatin remodelling such as CHD1 and BPTF; readers associated with HATs, HDACs and HDMTs such as ING2, ING4, PHF2, PHF8, JMJD2A and JMJD2B; or readers related to the general transcription factors such as TAF3 and SAGA (Musselman & Kutateladze 2009; Shi et al. 2006; Hung et al. 2009; Wen et al. 2010; Cloos et al. 2008; Mallette et al. 2012). Hence, reduction in H3K4 methylation during ageing may limit the recruitment of readers for H3K4 methylation, which in turn decline chromatin function.

Further supporting our data is that chromatin becomes more heterochromatinised during ageing (Kreiling et al. 2011). In general, chromatin can be either in the form of euchromatin or heterochromatin. Euchromatin is a de-condensed chromatin during interphase and is permissive for transcription. On the other hand, the heterochromatin has a compact structure that hinders transcription activity (Talbert & Henikoff 2006; Berger 2007; Grewal & Jia 2007). It has been documented that ageing mammalian cells exhibit higher levels of heterochromatin-associated proteins, histone macro H2A (mH2A) and heterochromatin protein 1 beta (HP1β) (Kreiling et al. 2011). In *Drosophila melanogaster*, ageing flies have been shown to exhibit higher repressive marks (H3K9me3) but lower activation marks such as RNA pol II, H3K4me3 and H3K36me3 (Wood et al. 2010). The binding of HP1 protein to H3K9me3 results in gene-silencing activity and the assembly of heterochromatin (Lachner et al. 2001; Bannister et al. 2001; Nakayama et al. 2001; Rice & Allis 2001; Jenuwein 2001). Our data on the global reduction in H3K4me1/me2/me3 during ageing provides a new piece of evidence in *C. elegans*, supporting the claim that activation marks are reduced during ageing in other species. Though, further investigation is required to determine if any heterochromatic mark is reduced in ageing *C. elegans*. The increase in the global heterochromatic marks but decrease in euchromatic marks, such as H3K4 methylation, during ageing may impinge gene expression and important cellular function, resulting in deterioration of physiological function.

3.4.3 RBBP-5 imparts transgenerational inheritance on lifespan regulation.

The mechanisms of transgenerational inheritance of a specific phenotype include heritable histone modifications and heritable changes in gene expressions (Greer et al. 2011). Our study, importantly, provides an updated model for the transgenerational inheritance of lifespan regulation by core components of MLL/SET/COMPASS complex. Based on our work and data from Greer et al., (2011), transgenerational inheritance was observed only when there is a reducing degree of life expectancy and never the other way around. For instance, the wild type descendants from ancestor lacking WDR-5, SET-2 or ASH-2 inherit longevity for up to three generations before their lifespans return to normal. In this scenario, there is a reducing degree of life expectancy from long to normal lifespan in the wild type descendants. Similarly, in the mutant descendants from ancestor having wild type RBBP-5, three generations of mutant descendants inherit normal lifespan. Then, the next mutant descendant's lifespan becomes short again. The reducing degree of lifespan expectancy is from normal to short lifespan. Perhaps, the effect on lifespan imparted by components of MLL/SET/COMPASS complex stays longer and is observable only when there is a reducing degree of life expectancy.

On the other hand, in an increasing degree of life expectancy such as from "normal to long" or "short to normal", transgenerational inheritance for lifespan regulation was not observed. When wild type *wdr-5(+)* or *set-2(+)* ancestors have normal lifespan, the subsequent *wdr-5(-) or set-2(-)* descendants immediately have extended lifespan. Similarly, when the mutant *rbbp-5(-)* ancestor has short lifespan, the subsequent wild type descendants immediately have normal lifespan. Life expectancy immediately is in accordance to the genotype. In conclusion, the lifespan regulation imparted by the cores of MLL/SET/COMPASS complex take longer to be erased between generations with reducing degree of life expectancy but were immediately erased between generations with increasing degree of life expectancy.

We tested if inheritance of transgenerational lifespan regulation by RBBP-5 is specific for lifespan regulation. The transgenerational inheritance however, does not affect brood size. It is possible that the *rbbp-5* mutant descendants from wild type mother do not inherit normal brood size-associated gene expressions. They only inherit normal gene expression associated with lifespan regulation. This will be in accordance to previous findings that uncover the transgenerational inheritance of some misregulated longevity genes in wild type descendants from the WDR-5 deficient mothers (Greer et al. 2011). Our data also confirmed that no global changes in H3K4 methylation was inherited from mothers (Greer et al. 2011; Kishimoto et al. 2017). Most, but not all, marks are reprogrammed between generations. Thus, the transgenerational inheritance imparted by the core components of the MLL/SET/COMPASS complex in *C. elegans* has phenotype specificity towards lifespan regulation and not others.

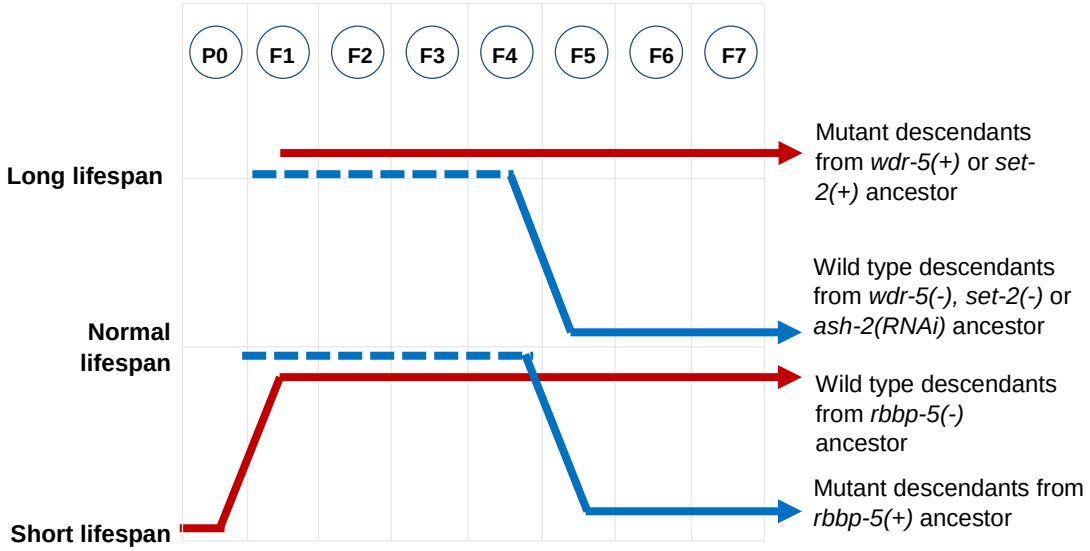


Figure 3.12 Proposed model for how transgenerational inheritance imparted by components of MLL/SET/COMPASS complex control lifespan regulation

Transgenerational inheritance for lifespan regulation takes longer to disappear between generations of descendant with reducing degree of life expectancy ("long to normal" or "normal to short"). However, the inheritance immediately disappears in descendants with increasing degree of life expectancy ("normal to long" or "short to normal"). Increasing degree of life expectancy (red line); reducing degree of life expectancy (blue line); transgenerational inheritance of lifespan regulation (blue dashed line); parental generation (P0); filial generation 1-7 (F1-F7).

3.4.4 Summary

In summary, our work demonstrates that RBBP-5 is required to prevent the shortening of *C. elegans* lifespan. Our data also suggests even though the core components are members of the same MLL/SET/COMPASS complex, removal of one of them can have diverse effect on lifespan: either prolonged or shortened. H3K4 methylation level is decreased during ageing, which maintenance requires RBBP-5 and WDR-5. Young adults rely on RBBP-5 for the maintenance of H3K4me1/me2/me3 but the reliance on H3K4me1/me3 reduces in old adults. On the other hand, young and old adults rely on WDR for the maintenance of H3K4me2 but the reliance is minimal for H3K4me1/me3 maintenance. Importantly, we also found that RBBP-5 can impart transgenerational memory on lifespan regulation. Presence of RBBP-5 only in parent causes lifespan to become normal in mutant descendants for up to three generations. The transgenerational inheritance by H3K4 methylation in presence of RBBP5 appears to be specific for lifespan regulation, does not affect brood size and does not increase the global methyl marks at H3K4.

Chapter 4

WDR-5 prevents excessive accumulation of H3K4 di-methyl marks on chromosome X

Chapter 4 : WDR-5 prevents excessive accumulation of H3K4 di-methyl marks on chromosome X

4.1 Abstract

The epigenetic landscape is crucial to establish and maintain patterns of gene expression. Evidence shows that appropriate levels of H3K4 methylation require the core complex comprising WDR-5, ASH-2, and RBBP-5. However, it is unclear whether the core complex contributes to the specific locations of H3K4 methyl marks within the epigenome. To address this, we mapped H3K4me1/me2/me3 using *C. elegans* embryos lacking WDR-5 or RBBP-5. The absence of RBBP-5 reduces the global levels H3K4me1/me2/me3 indistinctive of their locations. In contrast, we found that the absence of WDR-5 increases the levels of H3K4me2 at the chromosomal scale on X, but not of H3K4me3 or me1. Interestingly, RNA-seq and ChIP-seq data show that a significant proportion of genes erroneously enriched for H3K4me2 on chromosome X are up regulated. Taken together, this work revealed that WDR-5 prevents excessive accumulation of H3K4me2 on the chromosome X and dampens X-linked gene expression.

KEYWORDS: Chromatin, H3K4, histone methylation, MLL/SET/COMPASS complex, chromosome X, ChIP-seq, RNA-seq, embryo, *C. elegans*.

4.2 Introduction

The epigenetic landscape is important to determine and maintain patterns of gene expression during development. An important contributor of the epigenetic landscape is the methylation state at histone 3 lysine 4 (H3K4) (Piunti & Shilatifard 2016; Ruthenburg et al. 2007). The conserved core complex comprised of WDR5, RBBP5, and ASH2 is key to maintain appropriate levels of H3K4 methylation. However, very little is known about how inactivation of the core complex components affects the precise location and levels of methyl marks at H3K4 within a metazoan epigenome.

Inactivating core complex components can affect functions such as transgenerational inheritance (Greer et al. 2011; Katz et al. 2009; Kerr et al. 2014; Xiao et al. 2011), transdifferentiation (Zuryn et al. 2014), pluripotency (Ang et al. 2011; Käser-Pébernard et al. 2014; Robert et al. 2014), RAS signalling (Fisher et al. 2010), and differentiation of stem cells (Jiang et al. 2011). To understand how H3K4 methylation regulates these important functions will require mapping location and levels as well as the consequences on transcription.

The transfer of methyl groups on H3K4 is performed by the evolutionary conserved SET/COMPASS/MLL complex (Miller et al. 2001; Nagy et al. 2002; Roguev et al. 2001; Shilatifard 2008). The SET/COMPASS/MLL complex consists of specific SET domain-containing enzymes and a structural core complex. Together, they target lysine 4 of histone 3 for mono-, di-, and tri-

methylation (me1, me2, and me3) (Ruthenburg et al. 2007). In *C. elegans*, WDR-5, ASH-2, and RBBP-5 each contributes to varied degrees to maintain the global levels of H3K4me2/me3 (Li & Kelly 2011; Simonet et al. 2007; Chen et al. 2011). However, the role that each component plays in regulating the genomic distribution of H3K4me1/me2/me3 and their levels at precise loci remain unclear. Interestingly, the depletion of H3K4me2 levels in primordial germ cells demonstrated by Schaner et al. (Schaner et al. 2003) has been shown by Xiao et al. to require ASH-2, indicating that ASH-2 can prevent as well as promote deposition of methyl marks at H3K4 (Schaner et al. 2003; Xiao et al. 2011).

H3K4 methylation states have been associated with distinct transcriptional activities. Enrichment in H3K4me3 is found at active transcription start sites (Santos-Rosa et al. 2002). Broad H3K4me3 domains have been shown to regulate transcriptional consistency and expression of tumour suppressor genes (Benayoun et al. 2014; Chen et al. 2015). Enrichment in H3K4me1 is an epigenetic feature of enhancers; its co-occurrence with H3K27 acetylation defines active enhancers (Creyghton et al. 2010; Heintzman et al. 2007). H3K4me1 and H3K27 acetylation are also detected at latent enhancers where they create a stimulus-dependent memory in macrophages, facilitating re-stimulation responses (Ostuni et al. 2013). In addition, enhancer transcription in TLR4-activated macrophages stimulates de novo acquisition of H3K4me1/me2 to produce new enhancer-like regions (Kaikkonen et al. 2013). However, a specific transcriptional state associated with H3K4me2 enrichment remains elusive.

Herein, we used *C. elegans* embryos to determine the contribution of WDR-5 and RBBP-5 towards the precise location and levels of H3K4me1/me2/me3 and address whether their presence correlates with changes in gene expression. Our ChIP-seq data in embryos depleted of WDR-5 revealed excessive acquisition of H3K4me2 at the chromosomal scale on X. This excessive di-methylation at H3K4 is associated with up regulation of gene expression, indicating that dosage compensation is likely affected by de novo H3K4me2. The higher incidence of males observed specifically in the absence of WDR-5 supports this notion. Taken together, this work shows that WDR-5 has a novel activity, which prevents excessive acquisition of H3K4me2 on the chromosome X.

4.3 Results

4.3.1 H3K4me3 levels are reduced in the absence of either WDR-5 or RBBP-5

To address whether the core complex regulates the genomic distribution of methyl marks at H3K4 as well as their levels, we compared H3K4me1/me2/me3 distribution in the absence of either WDR-5 or RBBP-5 relative to wild type using spiked-in ChIP-seq. I harvested and fixed synchronised embryos mostly of late embryogenesis (Z2-Z3 stage). ActiveMotif performed the ChIP spiked-in by combining *C. elegans* chromatin, antibody of interest (H3K3me1, me2 or me3), *Drosophila melanogaster* chromatin and *Drosophila* specific H2Av antibody into a same tube. Standard immunoprecipitation was performed followed by Next-Generation sequencing. *C. elegans* and *Drosophila* sequence tags were aligned, *Drosophila* tag counts across samples were equalised and the ratios were used to normalise tag counts across *C. elegans* samples. As expected, the absence of either WDR-5 or RBBP-5 caused a strong and general reduction in the levels of H3K4me3. The depletion in H3K4me3 is observed at active regions (enrichment regardless of location and defined by at last one peak), promoters, gene bodies, and downstream of gene bodies (Figure 4.1A and Table 4.1). The effect is stronger in the absence of RBBP-5 than in the absence of WDR-5 (Figure 4.1A). To verify these results, we performed ChIP-qPCR at an untranscribed region, at the house keeping gene *act-1*, and at *ftt-2*, a 14-3-3 gene expressed during embryogenesis. All three loci displayed a reduction in the levels of H3K4me3 in absence of either WDR-5 or RBBP-5 relative to wild type and as indicated by the UCSC genome browser (Figure 4.1B). The levels of H3K4me3 in wild type are higher for the actively transcribed loci than the untranscribed locus (Figure 4.1B). Immunofluorescence staining on *wdr-5(-)* and *rbbp-5(-)* mutant embryos confirmed that H3K4me3 levels are depleted relative to wild type (Figure 4.1C). Taken together, these data show that WDR-5 and RBBP-5 are crucial to ensure robust levels of H3K4me3 in embryos.

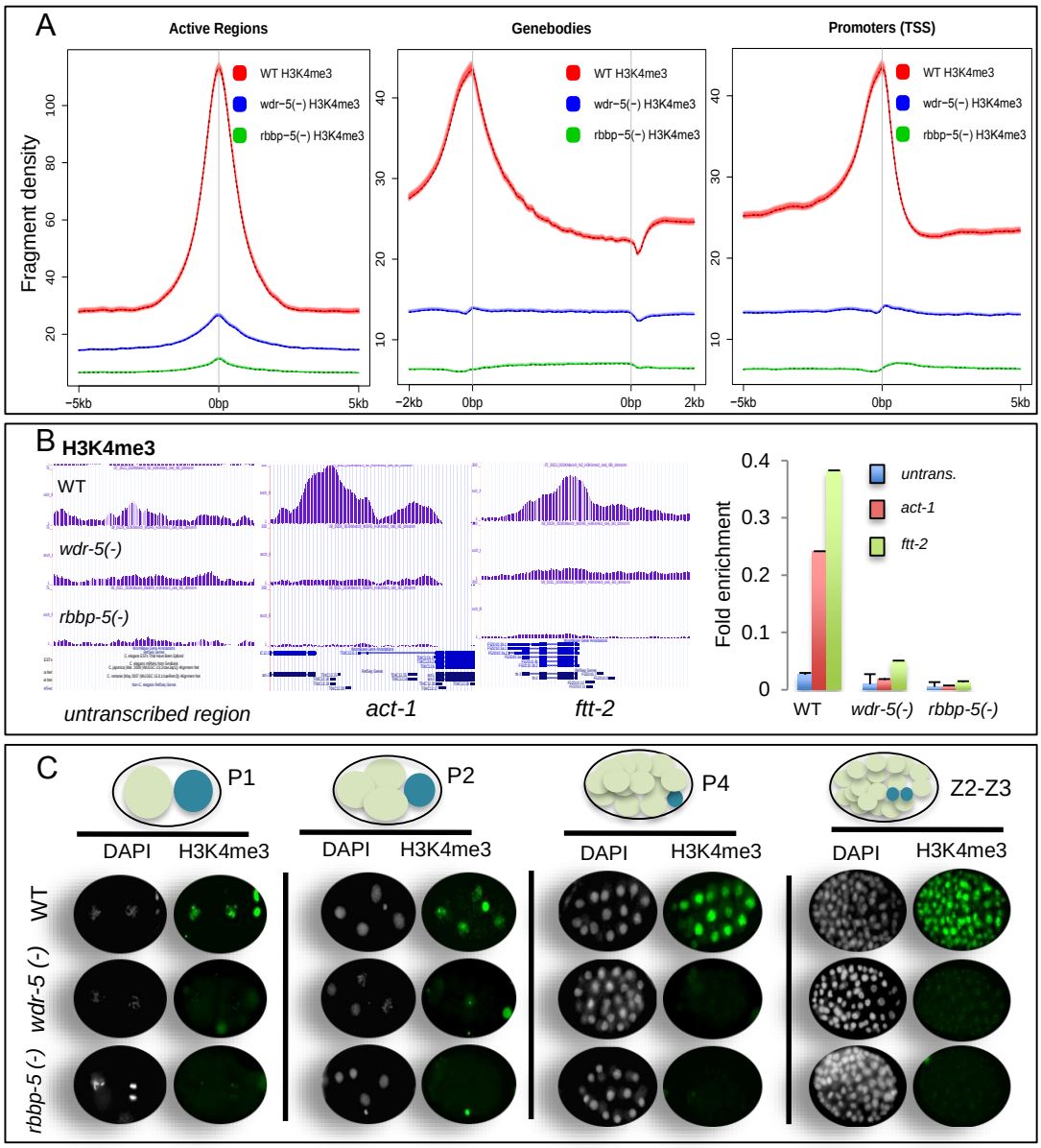


Figure 4.1 Genomic distribution and relative abundance of H3K4me3 in the absence of WDR-5 or RBBP-5

(A) Spiked-in ChIP-seq shows that WDR-5 and RBBP-5 are important to maintain high levels of H3K4me3. At active regions, the maximal values (peak of fragment density) are averaged and set to 0bp with ±5 kb of flanking values (see methods; Chip-seq). Genebodies values are averaged along the relative position of genes. Transcription Start Sites (TSS) and Transcription End Sites (TES) are set respectively at 0 bp with ±2kb of flanking values. Promoters values are averaged along their relative position to genes determined by Transcription Start Sites (TSS) set at 0bp with ±5kb of flanking values. (B) UCSC genome browser screen shots from ChIP-seq data at three loci and ChIP-qPCR for these loci. The ChIP-qPCR data show that H3K4me3 levels are significantly depleted in the absence of WDR-5 or RBBP-5. Data were presented as fold enrichment calculated by normalising the values of percent input relative to H3. Percent input was calculated by 100 x 2^ (Ct total input – Ct sample). Data are represented as mean ±SEM. (C) Immunostaining on embryos lacking WDR-5 or RBBP-5 showing their global contributions towards H3K4me3 during embryonic development. P1, P2, P4, and Z2-Z4 stages of embryogenesis are depicted on top. Dark green cells represent the germblastomere or their descendants. The DAPI staining is shown in grey tone and H3K4me3 in green.

Table 4.1 H3K4me3 peaks in active regions

N2	wdr-5(-)	rbbp-5(-)	Peaks	
YES	x	x	2,314	
x	YES	x	429	
YES	YES	x	621	
x	x	YES	157	
YES	x	YES	67	
x	YES	YES	205	
YES	YES	YES	312	
3,314	1,567	741	4,105	**TOTAL PEAKS**

YES indicates in which background(s) the peaks were counted from.

4.3.2 Global levels of H3K4me1 increase in the absence of WDR-5

We found that WDR-5 and RBBP-5 regulate H3K4me1 differentially. *Wdr-5(-)* mutants display a global increase in H3K4me1 levels (Figure 4.2A). The overall number of active regions is increased by 183.5%, with 1,445 unique to the *wdr-5(-)* mutant (Table 4.2). Accordingly, the averaged levels of H3K4me1 at active regions increase by 1.8 folds relative to wild type. The increase is evident at promoters, gene bodies, and downstream of gene bodies (Figure 4.2A). Moreover, the total number of reads after normalisation, regardless of enrichment or not, is increased in the *wdr-5(-)* mutant (140.2%). These effects can be visualised at a whole genome scale using the UCSC genome browser (Figure 4.3). ChIP-qPCR at the same three loci as for H3K4me3 showed significant increase (~2 fold) in the H3K4me1 levels (Figure 4.2B). Immunofluorescence against H3K4me1 during embryogenesis did not detect the increase in the H3K4me1 levels found by ChIP-seq and ChIP-qPCR. We concluded that our immunofluorescence staining lacks in sensitivity to detect small increase in the global levels of H3K4me1. On the other hand, the *rbbp-5(-)* mutant display general reduction in the levels of H3K4me1 relative to wild type as detected by ChIP-seq, ChiP-qPCR, and immunofluorescence (Figure 4.2A-C). Thus, RBBP-5 is crucial to maintain the bulk of embryonic H3K4me1 and WDR-5 is essential to prevent excessive and global accumulation of H3K4me1.

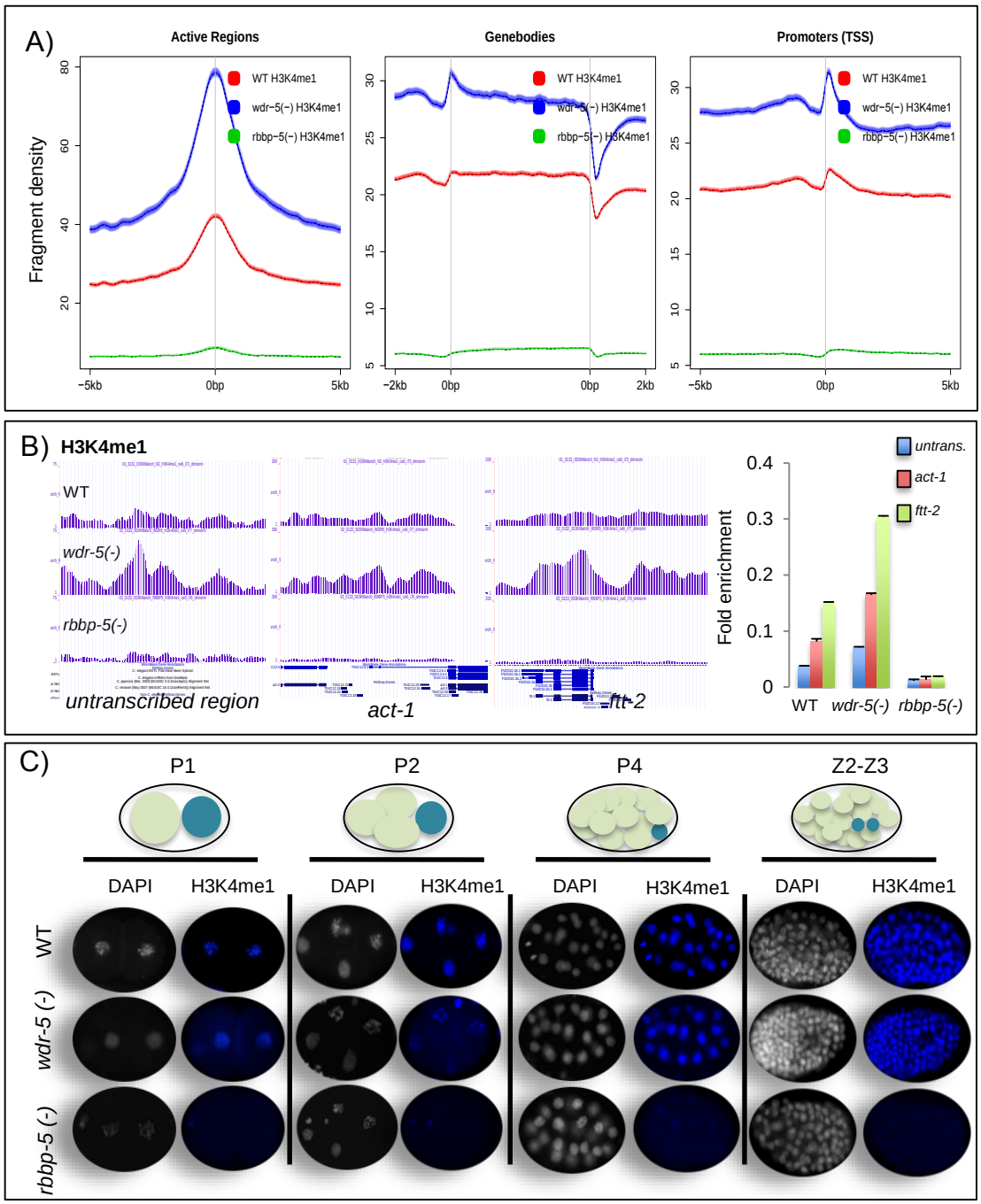


Figure 4.2 The global levels of H3K4me1 increase in the absence of WDR-5.

(A) Spiked-in ChIP-seq shows that WDR-5 prevents excessive mono-methylation at H3K4. The levels of H3K4me1 are strikingly reduced in absence of RBBP-5. For detailed explanation see legend Figure 1. (B) UCSC genome browser screen shots from ChIP-seq data at three loci and ChIP-qPCR for these loci. The data show that H3K4me1 levels are increased significantly in the absence of WDR-5 but depleted by a lack of RBBP-5. Data were presented as fold enrichment calculated by normalising the values of percent input relative to H3. Percent input was calculated by 100 x 2^ (Ct total input – Ct sample). Data are represented as mean ±SEM. (C) Immunostaining on embryos lacking WDR-5 or RBBP-5 showing their global contributions towards H3K4me1 during embryonic development. Embryos lacking WDR-5 appear not affected, but embryos lacking RBBP-5 are depleted in H3K4me1. DAPI staining is shown in grey tone and H3K4me1 in blue.

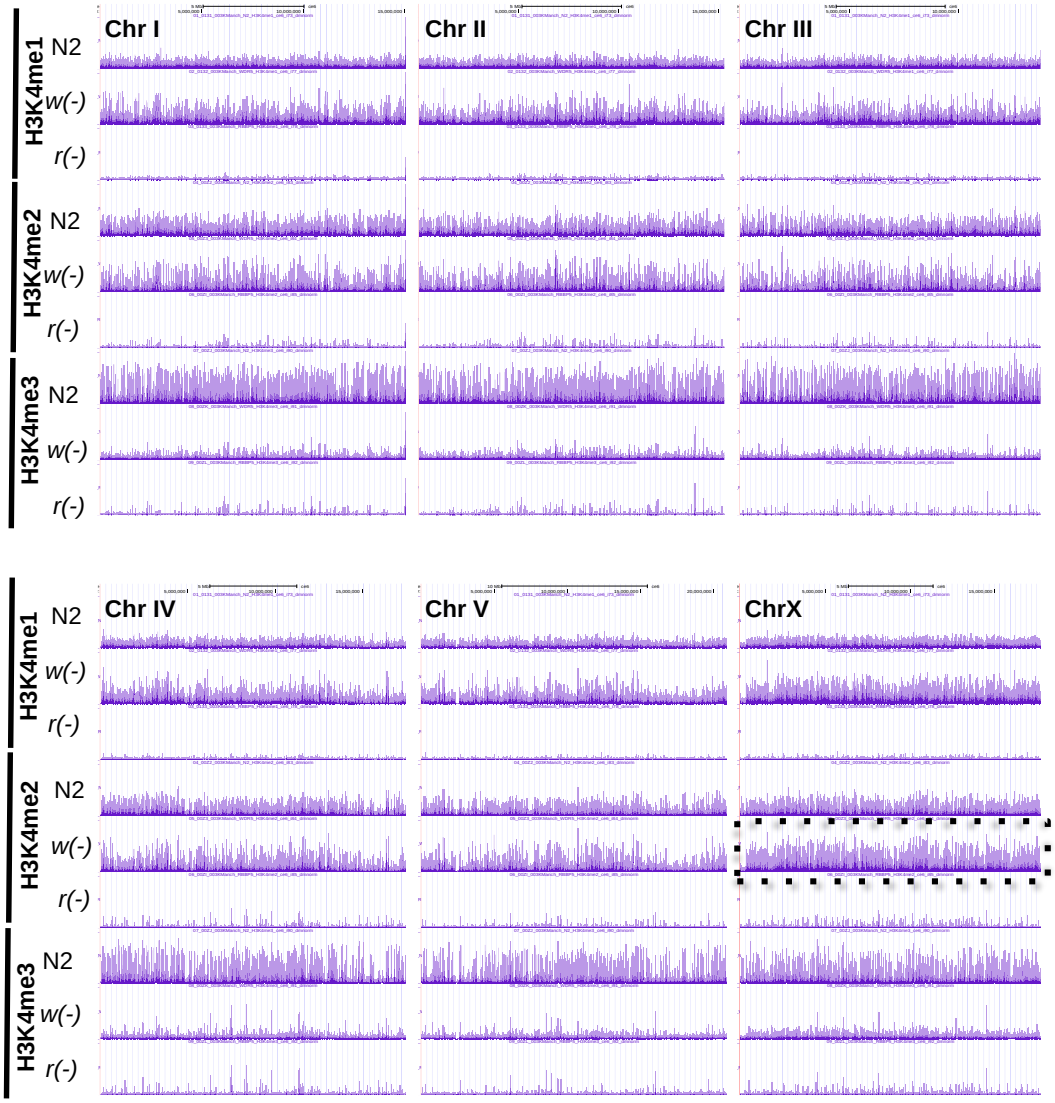


Figure 4.3 Whole genome displayed by chromosomes as indicated

The levels of H3K4me1/me2/me3 in three different backgrounds are represented by purple bars. The dotted box indicates the X chromosome levels of H3K4me2 in the absence of WDR-5. These were taken as screenshots from GeneBrowser.

Table 4.2 H3K4me1 at active regions

N2	*wdr-5(-)*	*rbbp-5(-)*	Peaks	
YES	x	x	222	
x	YES	x	1,445	
YES	YES	x	1,244	
x	x	YES	193	
YES	x	YES	9	
x	YES	YES	92	
YES	YES	YES	89	
1,564	2,870	383	3,294	**TOTAL PEAKS**

YES indicates in which background(s) the active regions were counted from.

4.3.3 WDR-5 has a dual function toward H3K4me2

When analysing the levels of H3K4me2 in the absence of WDR-5 or RBBP-5, we uncovered a complex function for WDR-5. In the *wdr-5(-)* mutant, we found that the H3K4me2 levels at active regions are comparable to wild type. However, we found that the total number of active regions in *wdr-5(-)* mutants is reduced to 85% compared to wild type, suggesting that an increased in the levels of H3K4me2 occurs at some loci to produce comparable levels found in active regions between the *wdr-5(-)* mutant and wild type (Figure 4.4, Table 4.3). Moreover, if we focus the analysis at genic regions, we found that the levels of H3K4me2 are reduced compared to wild type (Figure 4.4A). Since active regions are found at both genic and intergenic regions, we can deduce that intergenic regions are displaying higher levels of H3K4me2 than genic regions in the absence of WDR-5. Importantly, these ChIP-seq data show that the effect that the absence of WDR-5 has on H3K4me2 enrichment is complex and depends on the genomic location implicated. ChIP-qPCR results at the previously described three loci for H3K4me2 show no significant effect in the absence of WDR-5 and match the ChIP-seq data displayed in the UCSC genome browser tool (Figure 4.4B). Immunofluorescence experiments show that the *wdr-5(-)* late embryos display reduced levels of H3K4me2 (Figure 4.4C). But, this reduction is more penetrant at earlier stages of embryogenesis (Figure 4.4C). The absence of RBBP-5 reduces the levels of H3K4me2 as detected by all three methods used herein (ChIP-seq, ChIP-qPCR, and immunofluorescence) (Figure 4.4A-C). In aggregate, these data have underpinned a dual role for WDR-5 in the acquisition of H3K4me2, indicating that it can promote as well as prevent the acquisition of H3K4me2 depending on the genomic location implicated.

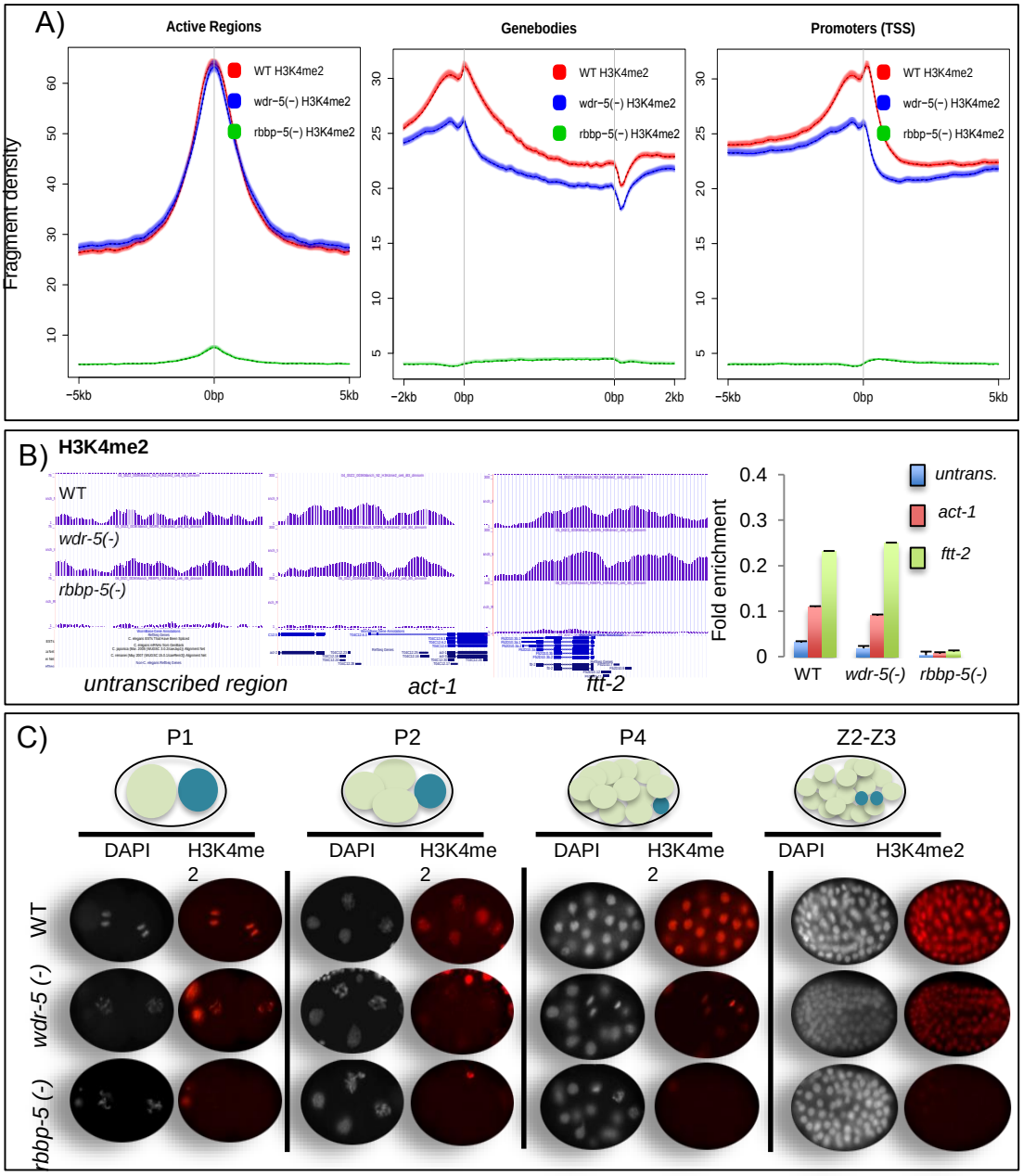


Figure 4.4 The levels of H3K4me2 are altered differentially in the absence of WDR-5.

(A) Spiked-in ChIP-seq shows that the absence of WDR-5 alters di-methylation at H3K4 according to the genomic location. Active regions are not affected but genic regions show a decrease. The levels of H3K4me2 are strikingly reduced in absence of RBBP-5. For detailed explanation see legend Figure 1. (B) UCSC genome browser screen shots from ChIP-seq data at three loci and ChIP-qPCR for these loci. The data show that H3K4me2 levels are mostly unaffected in the absence of WDR-5. The H3K4me2 levels are depleted in the absence of RBBP-5. Data were presented as fold enrichment calculated by normalising the values of percent input relative to H3. Percent input was calculated by 100 x 2^(Ct total input – Ct sample). Data are represented as mean ±SEM. (C) Immunostaining on embryos lacking WDR-5 or RBBP-5 showing their global contributions towards H3K4me2 during embryonic development. Embryos lacking WDR-5 or RBBP-5 are depleted in H3K4me2. In the case of *wdr-5(-)*, the effect is most apparent during early embryogenesis. DAPI staining is shown in grey tone and H3K4me2 in red.

Table 4.3 H3K4me2 peaks in active regions

N2	*wdr-5(-)*	*rbbp-5(-)*	Peaks	
YES	x	x	1,521	
x	YES	x	986	
YES	YES	x	1,431	
x	x	YES	300	
YES	x	YES	103	
x	YES	YES	136	
YES	YES	YES	384	
3,439	2,937	923	4,861	**TOTAL PEAKS**

YES indicates in which background(s) the peaks were counted from.

4.3.4 H3K4me2 levels increase on the chromosome X in the absence of WDR-5

The complex function that WDR-5 has on the acquisition of H3K4me2 motivated us to analyse more closely its distribution. We examined whether autosomes and the X chromosome could be differentially affected by the loss of WDR-5 or RBBP-5. We found an increase in the levels of H3K4me2 in the *wdr-5(-)* mutants spread out on almost the whole of the chromosome X relative to wild type (Figure 4.5A). An exception to this is on the extreme left region of chromosome X. A band of ~300 kb appears to be protected against excessive accumulation of H3K4me2 (Figure 4.5A and B). Interestingly, this band is enriched in H3K9me2/me3 in wild type embryos (Gerstein et al. 2010), suggesting that enrichment in H3K9me2/me3 blocks the excessive accumulation of H3K4me2. At a gene-by-gene level, we found that ~45% of the genes on the X chromosome (1,145 out of 2,487 genes) display H3K4me2 peak values higher than wild type in the absence of WDR-5. This is an effect specific to chromosome X, since the levels of H3K4me2 on chromosomes I, II, III, and IV are reduced when compared with wild type (Figure 4.5E-H). Little or no effect is found on chromosome V (Figure 4.5H). We did not detect a chromosome X effect for H3K4me1 or H3K4me3 in either *wdr-5(-)* or *rbbp-5(-)* backgrounds (data not shown and Figure 4.3). Taken together, these data show that WDR-5 acts at a chromosomal scale to dampen down the levels of H3K4me2 on the X.

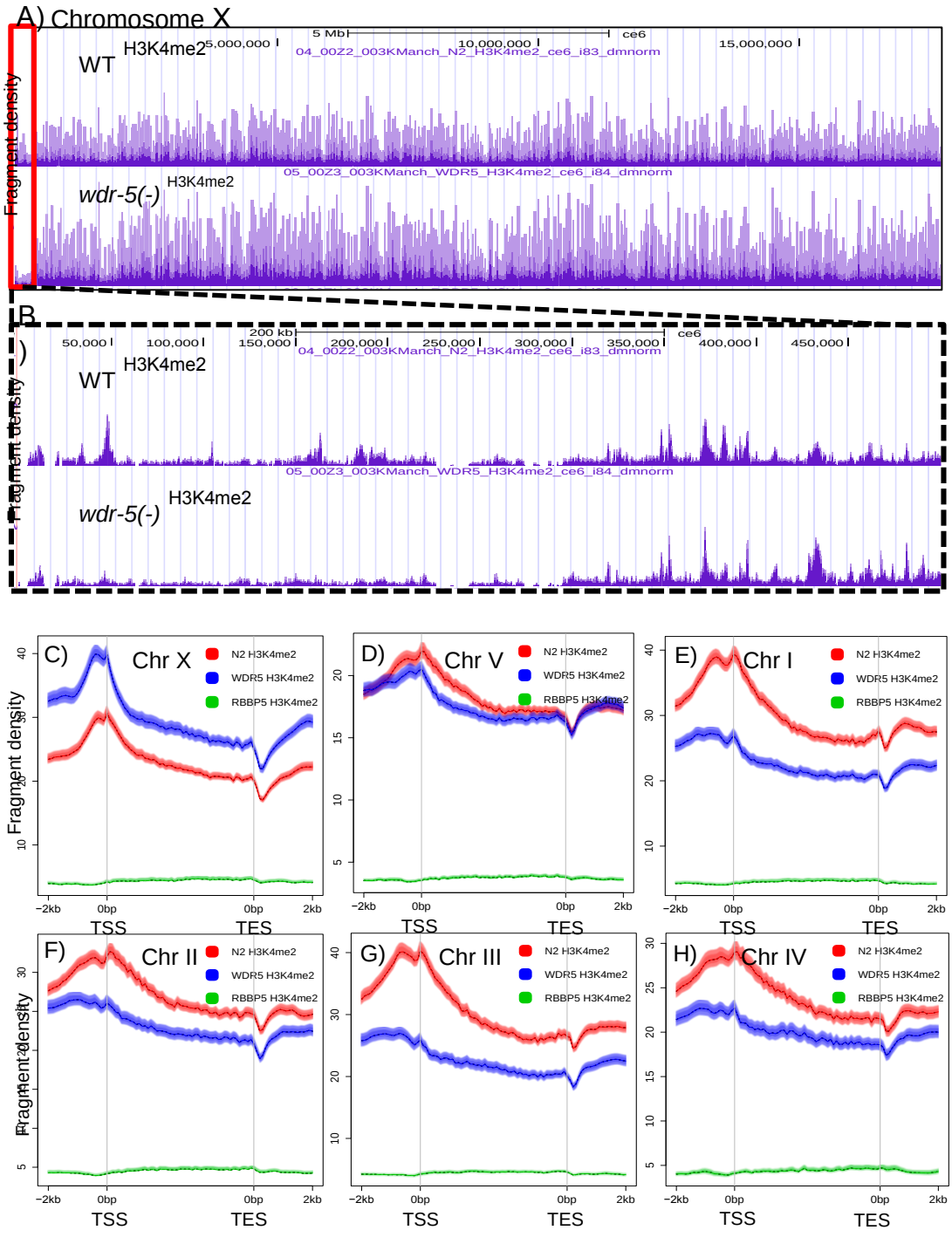


Figure 4.5 The levels of H3K4me2 are increased on the chromosome X.

(A) The whole chromosome X is depicted from a UCSC genome browser screen shot with the levels of H3K4me2 in wild type (WT) and *wdr-5(-)* represented by purple bars along the chromosome (B) The left side of the chromosome X is protected from excessive di-methylation at H3K4. The dotted box indicates the first ~500 kb of the chromosome X. There is a decrease or no effect on the levels of H3K4me2 between wild type (WT) and *wdr-5(-)* for roughly the first ~300 kb. (C-H) WDR-5 prevents excessive accumulation of H3K4me2 on the chromosome X. Wild type, *wdr-5(-),* and *rbbp-5(-)* backgrounds were analysed for the genomic distribution and abundance of H3K4me2 for each chromosome, as indicated. Transcription Start Sites (TSS) and Transcription End Sites (TES) are set respectively at 0 bp with ±2kb of flanking values. There is no effect on chromosome V and a reduction at genic regions on chromosomes I, II, III, and IV. All chromosomes are depleted in H3K4me2 in the absence of RBBP-5.

4.3.5 Differential expression is linked to specific chromosomes

Ablation of different members of the core complex has profoundly different effects on the levels of H3K4 methylation. To determine whether these different alterations in H3K4 methylation affect the respective transcriptomes differentially, we used RNA-seq. We found 4,120 differentially expressed genes between wild type and *wdr-5(-)* (Figure 4.6A ($p < 0.01$ and fold change >2)). For different cut offs see Table 4.4. Consistent with our RNA-seq, qRT-PCR showed similar trends to RNA-seq. In *wdr-5(-)* mutant, we detected an increase in expression for *pqn-74* and *grl-7*; a decrease in expression for *nfx-2* and *apc-10*; and no significant effect for *arc-1* and *pars-1* (Figure 4.6B). In rbbp-5(-) mutants, we found 1,561 differentially expressed genes compare with wild type (Figure 4.6G). QRT-PCR results are consistent with our RNA-seq data. We found an increase in expression for *gcy-19* and *ttr-15*; a decrease for *fbxa-192* and *ugt-29*; and no significant effect on *arc-1* and *pars-1 (*Figure 4.6H). Since WDR-5 and RBBP-5 sit in the same MLL/SET/COMPASS complex, we would like to determine whether they have shared and/or specific targets. We compared the set of misregulated genes in absence of WDR-5 with the misregulated genes in absence of RBBP-5 from the RNA-Seq data. Out of the 4,120 genes targeted by WDR-5 and out of 1,561 RBBP-5 gene targets, 1,148 targets are shared between both WDR-5 and RBBP-5 (Table 4.5). Hence, since WDR-5 and RBBP-5 are components of the core complex, accordingly they share many of their targets.

We next assessed the number of genes up or down regulated in each mutant. We found more genes up regulated (2,973) in *wdr-5(-)* embryos than down regulated (1,147) (Figure 4.6A). The bias towards up regulation of gene expression is even more pronounced in absence of RBBP-5: 1,453 genes are up regulated compared to only 108 down regulated (Figure 4.6G). Thus, the absence of WDR-5 produces the most altered transcriptome with over 4,000 genes misregulated.

To examine whether differential expression is influenced by chromosomal location, we used Odds Ratios statistics. The Odds Ratios is calculated from the frequency of down regulated versus up regulated genes found at each chromosome relative to the genome wide frequency. In the *wdr-5(-)* mutant, we found that gene located on the chromosome X will tend to be up regulated far more frequently than the frequency observed across the genome (Figure 4.6C and F). The genes at the chromosome I to V are found at roughly the same frequency as the frequency found at the whole genome level (Figure 4.6D-F). Moreover, there is no overlap between the confidence intervals of autosomes and the chromosome X, indicating that this is a distinctive feature unique to chromosome X. We analysed similarly the *rbbp-5(-)* mutant. We found that genes located on the chromosome V tend to be down regulated more frequently than observed across the genome, indeed nearly half of the down regulated genes are found on chromosome V (Figure 4.6K and L). However, albeit statistically significant, the confidence interval overlaps with both chromosomes I and X and is as such not as distinctive as the chromosome X effect found in absence of WDR-5 (Figure 4.6F). Thus, our analysis shows that RBBP-5 and WDR-5 regulate gene expression preferentially on chromosome V and X, respectively. RBBP-5 tends to stimulate expression of genes on chromosome V and WDR-5 to dampen expression on the chromosome X.

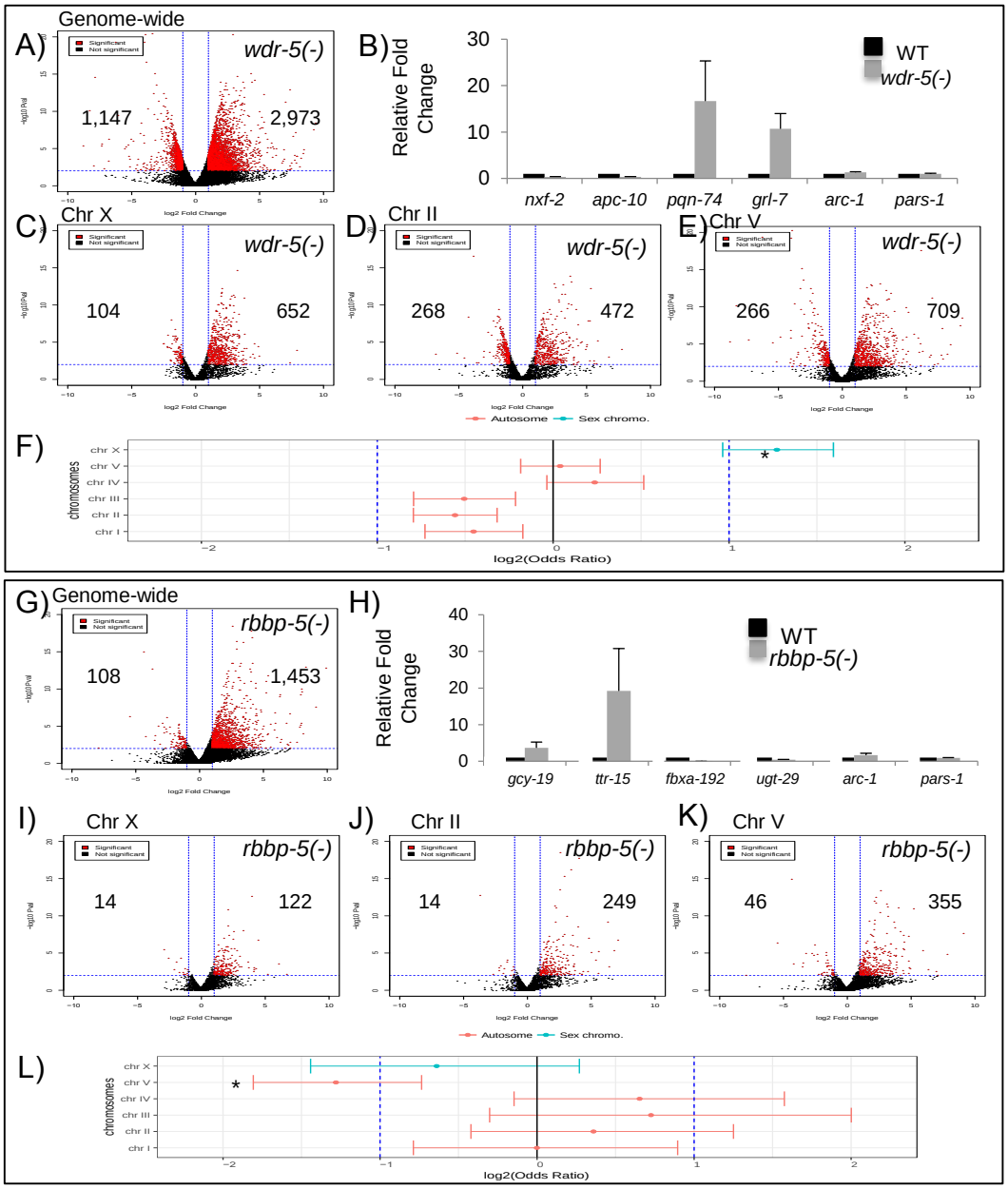


Figure 4.6 Gene expression on the chromosome X tends to be up regulated in the absence of WDR-5 but not of RBBP-5.

(A and G) Up regulated genes are over represented in absence of WDR-5 or RBBP-5. Volcano plots relative to wild type for *wdr-5(-)* and *rbbp-5(-)* mutants are shown. Differential expression is considered significant at ± 2 fold change pvalues <0.01 (dotted lines) and are depicted in red. Differential expression considered not significant is in black. The Y axis is the –log10 of p values and the X axis is the log2 fold change. Stats were performed using the DSeq2 package in R. (B and H) Quantitative RT-PCR performed in triplicate on three separate biological samples show the same trend as the RNA-seq data. Values are normalised using act-1 (actin), the ΔΔct method was used for quantification, and the data are represented as mean ±SEM. (C-E and I-K) Volcano plots on each chromosome has been performed and chromosome X, II, and V are shown as representative. (F and L) Odds ratio analysis per chromosome shows that the genes expressed on the chromosome X tend to be up regulated in the absence of WDR-5, but genes expressed on the chromosome V tend to be down regulated in the absence of RBBP-5. Odds ratio measures the statistical difference between the genome wide frequency of up versus down regulated genes and the frequency at specific chromosomes. The statistical significance is set at pvalue <0.001 and ± 1 log2(Odds Ratio) as indicated by asterisks. Chromosomes are indicated on the Y axis. Whiskers indicate the 95% CI (confidence interval). A positive Odds ratio indicates a bias towards up regulation of gene expression and a negative ratio towards down regulation of gene expression

Table 4.4 Number of genes misregulated according to stringincency levels.

Up-R and Down-R indicates the number of genes up regulated and down regulated excluding the genes we considered silenced (Sil.) and desilenced (Desil.). These genes with less than 10 normalised counts are considered not expressed and this is used to form the silenced and desilenced categories.

Mutant	Stringency level		Up-R	Down-R	Sil.	Desil.	Total
	p-val	fold change					
wdr-5(-)	**<0.01**	**≥2**	**2714**	**1103**	**44**	**259**	**4120**
	<0.01	≥1.5	3024	1659	44	259	4986
	<0.05	≥2	3373	1259	62	434	5128
	<0.05	≥1.5	3963	2882	62	434	7341
rbbp-5(-)	**<0.01**	**≥2**	**1263**	**105**	**3**	**190**	**1561**
	<0.01	≥1.5	1460	127	3	190	1780
	<0.05	≥2	1945	170	6	383	2504
	<0.05	≥1.5	2499	371	6	383	3259

Table 4.5 WDR-5 and RBBP-5 have both shared and specific gene targets

	WDR-5	RBBP-5
Total number of genes	4120	1561
Specific targets	2972	413
Shared	1148	

4.3.6 H3K4me2 de novo peaks on the chromosome X are associated with up regulation of gene expression

To address whether the altered levels of H3K4 methylation in *wdr-5(-)* and *rbbp-5(-)* mutants correlate with changes in gene expression, we analysed our RNA-seq and ChIP-seq data using Odds Ratio statistics (see Methods). For each mutant, we calculated the frequency of down regulated versus up regulated genes found at 18 specific genomic features relative to the genome wide frequency. These 18 genomic features are comprised of de novo H3K4me1/me2/me3, loss of H3K4me1/me2/me3 peaks found at three possible genomic locations (upstream of gene bodies, in gene bodies, and downstream of gene bodies).

The analysis shows that WDR-5 regulated genes segregate into two groups. In group I, a population of genes that tends to be up regulated is linked to de novo H3K4me2, but not to de novo H3K4me1 or me3 (Figure 4.7A; in red). This de novo H3K4me2 associated with up regulation of gene expression is independent of the genomic locations because it is found upstream of gene bodies, in gene bodies, as well as downstream of gene bodies (Figure 4.7A; in red). In group II, a population of genes down regulated is linked to the loss of H3K4me1, me2, or

me3 peaks (Figure 4.7A; in blue). However, this loss of H3K4me1/me2/me3 associated with down regulation of gene expression is found upstream of gene bodies and in gene bodies (Figure 4.7A; in blue). This indicates that the genomic location at which these H3K4me1/me2/me3 peaks are lost is determinant because no association is found downstream of gene bodies (Figure 4.7A; in blue).

For both group I and II, we analysed whether the associated genes display enrichment at a particular chromosome. In group II, which shows an association with down regulation of gene expression and loss of H3K4me1/me2/me3, we found that the chromosome X is under represented (Figure 4.7B). In contrast, in group I, which shows an association with up regulation of gene expression and de novo H3K4me2, the X chromosome is over represented. The *rbbp-5(-)* mutant did not display enrichment in regards to de novo H3K4 methylation (Figure 4.7D; in red). The loss of H3K4 methyl marks bare no significance because the number of genes down regulated per genomic features is too low (Figure 4.7D; in blue). Thus, there no correlation between changes in gene expression and alterations in the levels of H3K4 methylation could be established in the absence of RBBP-5.

Two examples of de novo H3K4me2 are shown using the UCSC genome browser at *rgs-6* (regulator of G protein signalling) and *dapk-1* (death associated protein kinase) loci (Figure 4.7E). These genes display an increase in levels of mRNA expression [3.9 and 2.1 fold, respectively (Supplementary Table 1)]. ChIP-qPCR against H3K4me2 at the *rgs-6* locus confirmed an increase in H3K4me2 levels (Figure 4.7F). Two examples in loss of H3K4me3 peaks are shown using the UCSC genome browser at *smo-1* and *mes-2* loci (Figure 4.7G). These genes display a concurrent reduction in their expression [2.6 and 2.1 fold, respectively (Supplementary Table 1)]. ChIP-qPCR against H3K4me3 at the *smo-1* locus confirmed the decrease in H3K4me3 levels (Figure 4.7H).

Taken together, these experiments show that WDR-5 regulated levels of H3K4 methylation impact on activation of gene expression in two ways. The loss of H3K4me1/me2/me3 peaks associates with down regulation of gene expression and the acquisition of H3K4me2 de novo peaks associates with up regulation in of gene expression. Interestingly, most H3K4me2 de novo peaks associated with up regulated transcription are found on the chromosome X and most H3K4me1/me2/me3 lost peaks associated with down regulated transcription are on autosomes.

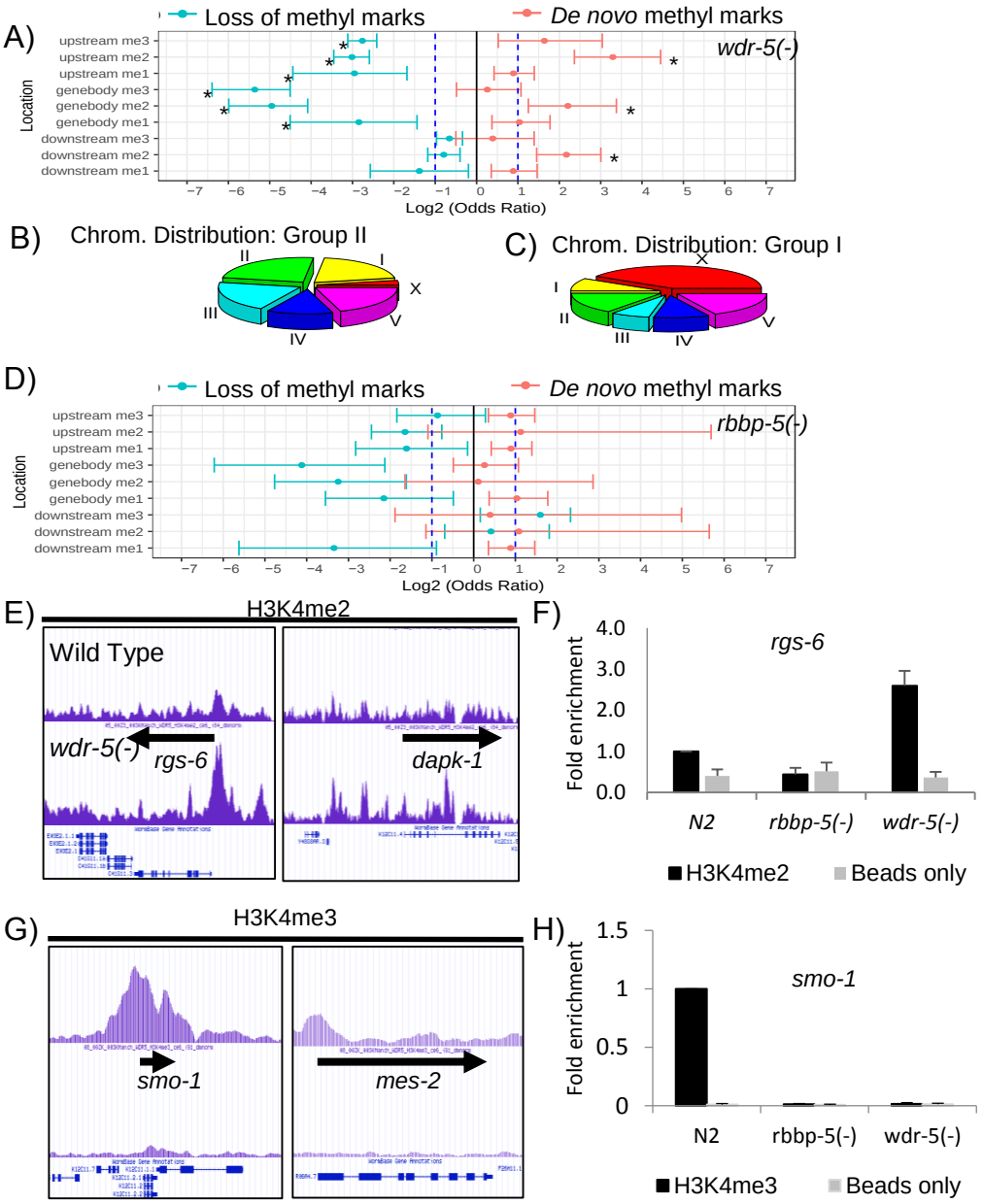


Figure 4.7 Correlation between the H3K4 methylation states at specific genomic features and gene expression.

(A) The presence of de novo H3K4me2 peaks and the loss of H3K4me peaks (produced in the absence of WDR-5) are associated with up and down regulated genes, respectively. Odds ratio statistics was used to analyse whether the presence of de novo H3K4 methylation (red) and the loss of H3K4me peaks (blue) are associated with an effect on gene expression. Each peak was assigned a position: upstream of gene body, gene body, or downstream of gene body as indicated on the Y axis. The statistical significance is set at p-value <0.001 and ± 1 log2 (Odds Ratio) as indicted by asterisks and dotted lines, respectively. Whiskers indicate the 95% CI (confidence interval). A positive Odds ratio indicates a bias towards up regulation of gene expression and a negative ratio towards down regulation of gene expression. (B) Genes on the chromosome X are underrepresented compared to genes on the autosomes. The 401 genes associated with down regulation of gene expression, as indicated by a negative log2 (Odds Ratio), were assigned to their respective chromosomes. (C) Genes on the chromosome X are over represented compared to genes on the autosomes. The 399 genes associated with up regulation of gene expression, as indicated by a positive log2(Odds Ratio), were assigned to their respective chromosomes. (D) There is no correlation between de novo or loss of H3K4 methyl marks and gene expression. Odds ratio statistics was used as in panel A. The confidence interval in absence of RBBP-5 is larger due to fewer misregulated genes than in the absence of WDR-5. (E) Screen shots from the UCSC genome browser showing an increase in the levels of H3K4me2 at two genes (*rgs-6* and *dapk-1).* (F) ChIP-qPCR experiments showing a decrease in the levels of H3K4me2 in the *rbbp-5(-)* mutant but an increase in the *wdr-5(-)* mutant. ChIP-qPCR was performed from

three independent biological samples in triplicates. Fold enrichment was calculated by normalising the values of percent input relative to H3. Percent input was calculated by 100 x 2^(Ct total input – Ct sample). Data are represented as mean ±SEM. Beads only is the omission of antibody and represent an estimate of the background ChIP. (G) Screen shots from the UCSC genome browser showing a decrease in the H3K4me3 levels at two genes (*smo-1* and *mes-2*). (H) ChIP-qPCR experiments showing a decrease in the levels of H3K4me3 in either the *rbbp-5(-)* or the *wdr-5(-)* background. ChIP-qPCR was performed as in panel F.

4.3.7 Genes up regulated and associated with de novo H3K4me2 are enriched for neuron functions

Our association study between altered levels of H3K4 methylation and regulation of gene expression has identified 800 differentially expressed genes forming two groups: group I (399 genes) and group II (401 genes). To determine whether there is any specific functions associated with these two groups, we performed Gene Ontology analysis on each set of genes. The group I genes, of which 41% of these are located on the chromosome X (Figure 4.7C), are involved in processes such as signal transduction, synaptic transmission, and behaviour (Supplementary Table 2). The gene products tend to be found at the plasma membrane and the cilium, a structure found in sensory neurones. The group II genes, mostly found on autosomes (Figure 4.7B), are enriched for processes such as reproduction, embryonic development, chromosomal organisation, and DNA replication as well as associated with the spliceosome and proteins containing the F box motif involved in protein degradation (Supplementary Table 2). The exceptionally strong enrichment for F-box containing proteins suggests a link with proteostasis. In aggregate, Gene Ontology analysis of the *wdr-5(-)* mutant reveals that group I is a neuro-enriched group of up regulated genes coinciding with de novo H3K4me2 peaks. Group II is a development-enriched group of down regulated genes associated with the loss of H3K4me peaks.

4.3.8 The absence of WDR-5 increases male incidence

Chromosome-wide up regulation of gene expression on the X chromosome is an indicator of a dosage compensation problem. Dosage compensation is the mechanism by which gene expression on sex chromosomes is balanced between genders. In *C. elegans*, dosage compensation and sex determination are triggered by the same signal, the ratio of X chromosomes to sets of autosomes. Thus, dosage compensation and sex determination are two interwoven processes. This is reflected in the Dosage Compensation Complex composition, which involves components that regulate both dosage compensation and sex determination, such as XOL-1, SDC-2, and HER-1.

We first examined whether the genes up regulated on chromosome X in the absence of WDR-5 are genes regulated by the dosage compensation complex (DCC). From an analysis based on a study from Kramer et al. (Kramer et al. 2015), we identified 241 DCC regulated genes (J. Semple, personal communication). 66 of those (~28%) are up regulated in the absence of WDR-5. This result shows an overlap between WDR-5- and DCC-regulated genes. It also suggests that a large

number of up regulated genes on chromosome X (>500 genes) appears dosage compensated yet not under the regulation of the DCC.

We next asked whether sex-enriched genes identified by transcription profiling (Thoemke et al. 2005) and located on the X chromosome are also up regulated genes in the absence of WDR-5. We found that ~30% of genes (11/37) differentially expressed between male and hermaphrodite larvae are up regulated in the *wdr-5(-)* mutants. This result prompted us to directly assess whether sex determination is affected in the absence of WDR-5. To this end, we scored large populations of nematodes for males. For the *wdr-5(-)* mutant, the incidence of males is of 0.44% (n=4034; Figure 4.8A). We did not observe any males in either wild type (n=3670; pval=0.00014) or rbbp-5(-) mutants (n=2474; pval=0.0021). We also examined the incidence of males at 25°C and found a 4-fold increase, reaching an average of 1.8% (n=2591) for the *wdr-5(-)* background. No males were found in wild type (n=2227; p=6.8e-10) or *rbbp-5(-)* backgrounds (n=2117; p=1.8e-9) (Figure 4.8A). DIC microscopy shows that the *wdr-5(-)* males display defects in the fan and ray structures (Figure 4.8B). The absence of males in the *rbbp-5(-)* mutants suggests that the higher than normal incidence of males in the *wdr-5(-)* mutants is not caused by a generic defect in chromosomal segregation. Taken together, the up regulation of gene expression on the chromosome X and the increase in incidence of males indicate that WDR-5 contributes positively to dosage compensation and appropriate sex determination.

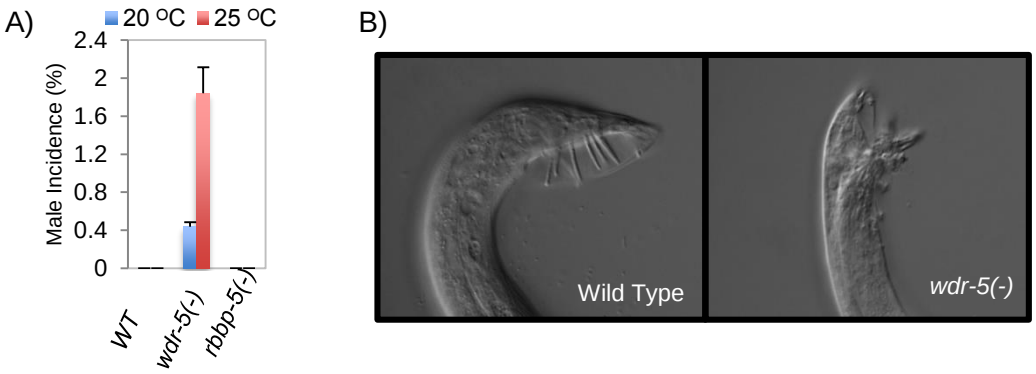


Figure 4.8 Incidence of males is increased in the absence of WDR-5.

(A) Large populations were analysed for the presence of males. At 20°C, 3670 wild type, 4037 *wdr-5(-),* and 2473 *rbbp-5(-)* animals were counted and 18 males were found in the *wdr-5(-)* background as indicated. At 25°C, 2227 wild type, 2591 *wdr-5(-),* and 2117 *rbbp-5(-)* were counted and 46 males were found in the *wdr-5(-)* background as indicated. Data are represented as mean percentage of male occurrence ± SEM. The experiments were independently repeated at least three times. (B) DIC image showing the tails of wild type and *wdr-5(-)* males. The tails of *wdr-5(-)* mutants display notable abnormalities in the fan and rays.

4.4 DISCUSSION

Modifications on histones are highly repeated on each chromosome. Their enrichment and under-enrichment create peaks, troughs, and plains defining what is often referred to as the epigenetic landscape. The role of WDR-5 and RBBP-5 in the genome distribution and abundance of methyl marks at H3K4 and hence their contributions towards the epigenetic landscape had yet to be explored in metazoans. Herein, we used spiked-in ChIP-seq and RNA-seq technologies in *C. elegans* embryos and revealed unsuspected functions unique to WDR-5 such as preventing excessive methylation at H3K4.

4.4.1 WDR-5 prevents deposition of mono-methyl marks at H3K4

This work has revealed that WDR-5 can prevent global and excessive accumulation of H3K4me1. This result suggests that a core complex comprised of RBBP-5 and ASH-2 is sufficient to stimulate the deposition of methyl marks at H3K4. In support for an active core complex minus WDR-5 is a recent structural study, which has identified a 'minimized human RBBP5/ASH2L heterodimer'. This RBBP5/ASH2L heterodimer is sufficient to activate most enzymes known to associate with the complete core complex (Li et al. 2016). Thus, one possibility to explain the global and excessive mono-methylation at H3K4 is a lack of regulation towards a core complex lacking WDR-5.

There is also the possibility that WDR-5 could antagonise the deposition of H3K4me1. Indeed, a number of studies have shown that WDR5 inhibits MLL3, an H3K4 monomethyl transferase (Herz et al. 2012; Hu et al. 2013; Shinsky & Cosgrove 2015). A possible MLL3/4 homolgue in *C. elegans* is SET-16 (Fisher et al. 2010; Smith et al. 2011). Thus, the global increase in H3K4me1 levels could come from the erroneous activation of SET-16, or another H3K4 monomethyl transferase yet to be identified, due to a lack of WDR-5. However, we cannot rule out other possibilities such as impaired recruitment of H3K4 demethylases, increased enhancer transcription (Kaikkonen et al. 2013; Ostuni et al. 2013), and incapacity to transform H3K4me1 into H3K4me3.

4.4.2 WDR-5 prevents deposition of di-methyl marks at H3K4; an early defect in spermatogenesis?

Excess H3K4me2 is different from H3K4me1 because it mostly targets the chromosome X. The chromosome X differs from autosomes in many aspects (Strome et al. 2014). It is poor in essential genes (Kamath et al. 2003), transcriptionally inactive in germlines (Kelly et al. 2002), dosage compensated (Meyer 2010), and paternally imprinted via meiotic sex chromosome inactivation (Arico et al. 2011). In the gametes, the paternal X (Xp) is transcriptionally inactivated and depleted in the levels of H3K4me2, in contrast the maternal X (Xm) is enriched in H3K4me2 and transcriptionally active. This differential pattern in H3K4me2 levels of gametes is maintained in the early embryo, but at around 24-cell stage this distinction between Xp and Xm is lost. Thus, the embryo inherits two X chromosomes with strikingly different transcriptional and epigenetic

histories (Strome et al. 2014). Our ChIP-seq data show an increase in the levels of H3K4me2 mostly directed on the chromosome X, in the absence of WDR-5. It is possible that this defect occurs early, perhaps during spermatogenesis. This would imply that the accumulation of H3K4me2 on chromosome X could persist until late embryogenesis. There is a precedent for histone methylation mitotic heritability. H3K27me3 in sperms can resist several rounds of replication cycles in *C. elegans* embryos (Gaydos et al. 2014), perhaps H3K4me2 also has this ability.

4.4.3 WDR-5 prevents deposition of di-methyl marks at H3K4; a dosage compensation defect?

Excessive accumulation of H3K4me2 could as well be a consequence of aberrant transcription caused by a defect in the dosage compensation complex. It has previously been shown that a component of the core SET/COMPASS/MLL complex, DPY-30, is also part of the dosage compensation complex (Pferdehirt et al. 2011). Dosage compensation is a mechanism to ensure that both sexes express similar levels of transcription of genes located on chromosome X. In *C. elegans* hermaphrodites, both X chromosomes are transcriptionally dampened by 50% to express genes at the same levels as in males, which have only one chromosome X. WDR-5 does not physically interact with the dosage compensation complex, however, its absence may disrupt the stoichiometry of the other subunits (ASH-2 and DPY-30) part of both the dosage compensation and the core SET/COMPASS/MLL complexes. This would lead to an increase in gene expression on the chromosome X.

4.4.4 WDR-5 contributes to dosage compensation and sex determination

The dosage compensation and sex determination pathways share key components such as XOL-1, SDC-2, and HER-1, of which two*, xol-1* and *sdc-2*, are down regulated by ~2 fold in the absence of WDR-5 (Strome et al. 2014). We also show that the absence of WDR-5 increases the incidence of males (Figure 4.8) and up regulates gene expression on chromosome X, indicating that WDR-5's function could be at the intersection of these two pathways. However, the complete elimination of the dosage compensation complex is lethal in hermaphrodites (Dawes et al. 1999) and a partial defect produces the dumpy phenotype. These phenotypes are not observed in *wdr-5(-)* animals. In fact, the *wdr-5(-)* mutants live longer and is generally healthy (Greer et al. 2010). Nevertheless, the increase in the incidence of males and the up regulation of >650 genes on chromosome X are highly significant. In addition, in line with the higher than normal incidence of males, *wdr-5(-)* hermaphrodites raised at 25°C have been reported to display a masculinisation of the germline phenotype (Li & Kelly 2011). Taken together, these data provide strong evidence that WDR-5 contributes positively towards appropriate dosage compensation and sex determination.

In conclusion, our data show that WDR-5 is a key player in promoting the acquisition of H3K4me3 and of H3K4me2 at genic regions. Unexpectedly, WDR-5 also prevents excessive accumulation of H3K4me2 at a chromosomal-scale on X. This de novo acquisition of H3K4me2 is associated with increased gene expression. Interestingly, the H3K4 methylation mark that associates the strongest with regulation of gene expression is H3K4me2, since both H3K4me2 depletion and its de novo occurrence are consistent with a role in active transcription. A limitation in our study is we have not looked into any possible correlation between our ChIP-seq/RNA-seq data and known ageing genes. It will be an interesting field of investigation for future researchers.

Chapter 5

Design and implementation for harvesting *C. elegans* embryos from large-scale solid culture media

Chapter 5 : Design and implementation for harvesting *C. elegans* embryos from large-scale solid culture media

5.1 Abstract

C. elegans can be propagated either in liquid media in flask or on solid in plates at small scale. However, only liquid media techniques have been developed for large-scale propagation of *C. elegans*. Maintaining the technique for culturing worms can minimise any variations from the usual method of worm maintenance that may influence the biological process, development or gene expression of the worms. I have designed and implemented a new protocol for harvesting large volume of *C. elegans* embryos from solid culture. In this chapter, I present the required material, workflow for growing worms on solid medium, and series of experimentations for harvesting large amount of synchronised *C. elegans* embryos with a majority of population at >100-cell stage. Using this newly developed method, a large volume of worm embryos (0.5 ml to 1.0 ml) were reliably harvested suitable for use in all of the ChIP-Seq and ChIP-qPCR analyses as described previously in Chapter 4.

KEYWORDS: Large-scale, *C. elegans*, amplification, synchronised, solid culture, Nematode Growth Medium (NGM), chromatin immunoprecipitation.

5.2 Introduction

Model organisms have prominent roles in understanding basic, molecular and cellular biology as well as to making advances in these fields. The non-parasitic nematode, *C. elegans*, has been identified as a model organism for pursuing various fields for instance in developmental, molecular and neuro biology. Many disease pathways and cellular as well as molecular complexity are conserved between *C. elegans* and higher organisms like *Homo sapiens*. Since *C. elegans* is a very small organism, it is convenient to culture them in lab. In general, there are two techniques for culturing worms in laboratory: Liquid culture and solid medium.

I have constantly been using *C. elegans* embryos as my study model. I have analysed H3K4 methylation levels, using Western Blot, in mutants lacking core components of the MLL/SET/COMPASS complex, which is responsible for regulating H3K4 methylation levels. The wild type N2 (Bristol) and the mutants used in the study were *rbbp-5(-) (tm3463)* and *wdr-5(-) (ok1417).* We have also used the same mutants to measure lifespan and evaluate gene expressions by means of RNA-Seq method and quantitative real time PCR. The *C. elegans* served as the perfect model organism since its MLL/SET/COMPASS complexes are highly conserved to the complexes found in human and other organisms. All of my experiments were done on solid Nematode Growth Medium (NGM) at small-scale worm amplification. The amplification was usually done on 30 mm or 55 mm NGM plates seeded with *E. coli OP50*.

I next aimed to embark on a study dedicated to mapping the landscape of H3K4 methylation attributed to RBBP-5 and WDR-5 of the MLL/SET/COMPASS complexes. To do so, I would pull down all DNA fragments interacting with H3K4me1/me2/me3 in wild type, *rbbp-5(-),* and *wdr-5(-)*

background by using chromatin immunoprecipitation (ChIP) technique. Then, I would analyse and map the DNA fragment by using next generation sequencing (ChIP-Seq). However, it is important to note that a large scale *C. elegans* culture is required for ChIP sample preparation for *C. elegans*. Thus far, protocols for growing large-scale *C. elegans* have been developed only for liquid culture. The protocol for large-scale amplification in liquid culture is considerably straightforward. Worms are basically grown in large swirling flasks containing 500 ml of liquid media (S-Medium, 1X PSN antibiotics, 1X nystatin antifungal), seeded with concentrated *E. coli* OP50 or other strains such as HB101 as the food source and grown at 20 ºC in an incubator shaking at 100 rpm (Lewis & Fleming 1995; Ercan et al. 2007). However, growing worms in liquid culture may introduce different oxygenation and environmental stresses to the worms, as worms grown in liquid culture tend to thinner and more elongated (Lewis & Fleming 1995; Rahmani et al. 2015).

Hence, I designed and implemented a new protocol for growing large-scale *C. elegans* on solid medium.

5.3 Results

5.3.1 Preparation of Nunc dishes

Large-scale *C. elegans* amplification is commonly performed in large flasks. In my study, the worm amplification was performed on solid media using 55 mm petri dishes and 245 mm x 245 mm x 25 mm Nunc dishes. The preparation of Nunc dishes comprises of three important steps: the sterilisation, media preparation and seeding with concentrated *Escherichia coli OP50*. Plate contamination can be reduced by cleaning the dishes with a multi-purpose disinfectant (Virkon), drying and ultra violet cross-linking at 265 nm with energy dose of 0.400 J/cm2 (Fisher Scientific UV Crosslinker FB-UVXL-1000). Short wave UV light at approximately 254 nm has been shown to have strong sterilisation effect and can effectively kill microorganisms by disrupting their nucleic acids (Soloshenko et al. 2000; Kubyshkina et al. 2011). To each dish, 200 ml of nematode growth medium (NGM) (0.05 M NaCl, 025 % (w/v) bacto-peptone, 1.7 % (w/v) agar, 1 mM CaCl2, 12.9 µM cholesterol, I mM MgSO4, 25 mM KH2PO4 PH6.0) was poured in a sterile flow hood and set to dry. Finally, 0.5 ml of 20X OP50 were pipetted to each plate and spread using a cell spreader. Each strain amplification requires three batches of plate preparation, with each batch having at least 20 dishes. My study involves the use of P0 to F5 worm generations. The first batch of at least 20 dishes were for the amplification of F2 worms, second batch for F3 and third batch for F4 generation as shown in the schematic workflow in Figure 5.1. Hence, in total, NGM were prepared on at least 60 Nunc dishes for each strain amplification for chromatin immunoprecipitation study.

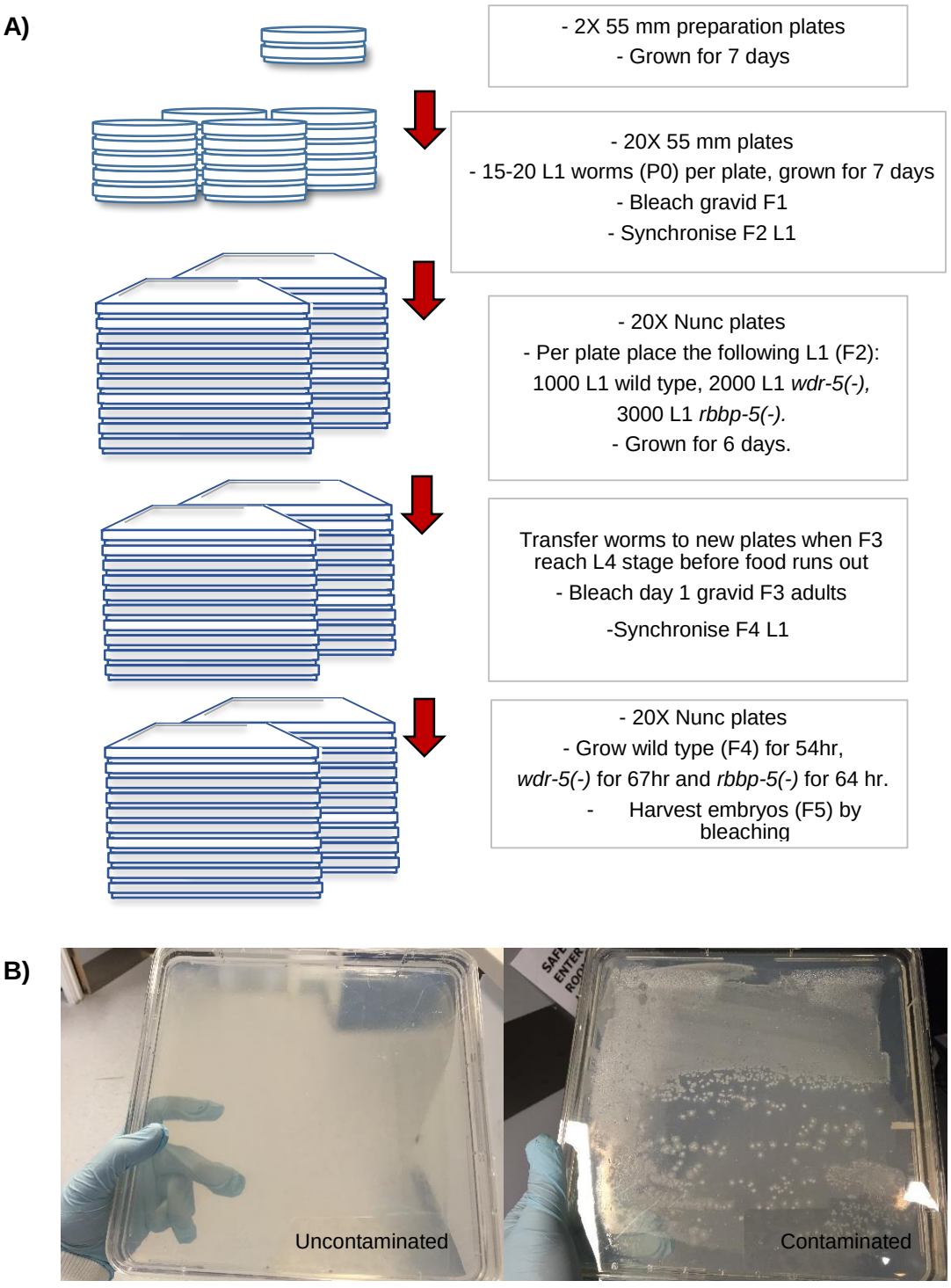


Figure 5.1 Schematic workflow for preparation of plates and dishes for the large-scale amplification of *C. elegans* on solid nematode growth media

(A) Worms were grown on Nematode Growth Media (NGM) in 55 mm petri plates and 245 mm x 245 mm Nunc dishes. Each of the Nunc plate were seeded with 0.5 ml of 20X concentrated OP50. (B) Representative image of clean (uncontaminated) plate used in the worm propagation and contaminated plate, which were discarded.

5.3.2 Amplification of *C. elegans* grown on solid culture media

In the early series of experiments, I determined the amplification technique for harvesting massive amount of *C. elegans* from solid Nematode Growth Media (NGM). I established worm amplification factor from P0 to F2 generation, sets of 5, 10, 15 and 20 L1 (P0) wild type were grown on 6 cm plates for 7 days. Their gravid L1 (F1) progenies were bleached and then synchronised L1 of F2 generation were counted. I discovered that approximately 5000 F2 generation can be harvested from 15 to 20 P0 mothers grown on solid media (Figure 5.2A). Accordingly, I developed a large-scale worm amplification technique as illustrated in Figure 5.1. The strains used in this experiment were wild type N2*, rbbp-5(-) (tm34643)* mutants and *wdr-5(-) (ok1417)* mutants. Approximately 15-20 L1 (P0) of each strain, harvested from preparation plates, were placed on each of twenty 6 cm and grew for 7 days until F1 worms reached day 1 adult stage. Then the F1 gravid mothers were bleached to harvest F2 embryos. The *wdr-5(-)* and *rbbp-5(-)* mutants have smaller brood size compared to the wild type (Wang et al. 2011). According to the amplification factor (Figure 5.2A) and the brood size of the mutants, I could obtained approximately 100,000 wild type. 50,000 *wdr-5(-)* and 25,000 *rbbp-5(-)* in total. Next, on twenty Nunc plates, I transferred L1 (F2) larvae and cultured for 6 days (1000 for wild type, 2000 for *wdr-5(-)* and 3000 for *rbbp-5(-)* per plate due to their different brood size) (Wang et al. 2011). To avoid running out of food, I transferred F3 at L4 stage to fresh Nunc plates, bleached them the day after, and harvested embryos (F4). Synchronised L1 of F4 generation were placed on new 20 Nunc plates before they were bleached at day 1 adult to harvest their embryos (F5). Approximately 0.5 ml to 1 ml embryos can be obtained by this method.

I also assessed bleaching and embryo synchronisation techniques. Large scale culture produces approximately 15 to 20 mL total worm pellet, hence, it requires alteration in the bleaching technique. I divided equally the worm pellet into 5 mL in each of a 50 mL falcon tube (Figure 5.2B). The tube was added with 20 mL of alkaline hypochlorite (bleach) solution, vortexed for 1.5 minutes, toped up with M9 buffer to 50 mL, centrifuged at 3000 rpm for 1 minute, and supernatant was removed by aspiration. The bleaching to aspiration steps were repeated one more time and then eggs were collected and washed three times with M9 buffer. Approximately 0.5 to 1 mL of F5 embryo pellet were obtained. I encountered that the bleached embryos tended to clump together if synchronised in liquid growth media (M9) on a rocker at 20ºC, even if the embryos were diluted. Synchronisation is highly effective if embryos were diluted in 2 ml M9 buffer, spread on two unseeded Nunc plates, and left overnight at 20ºC to hatch.

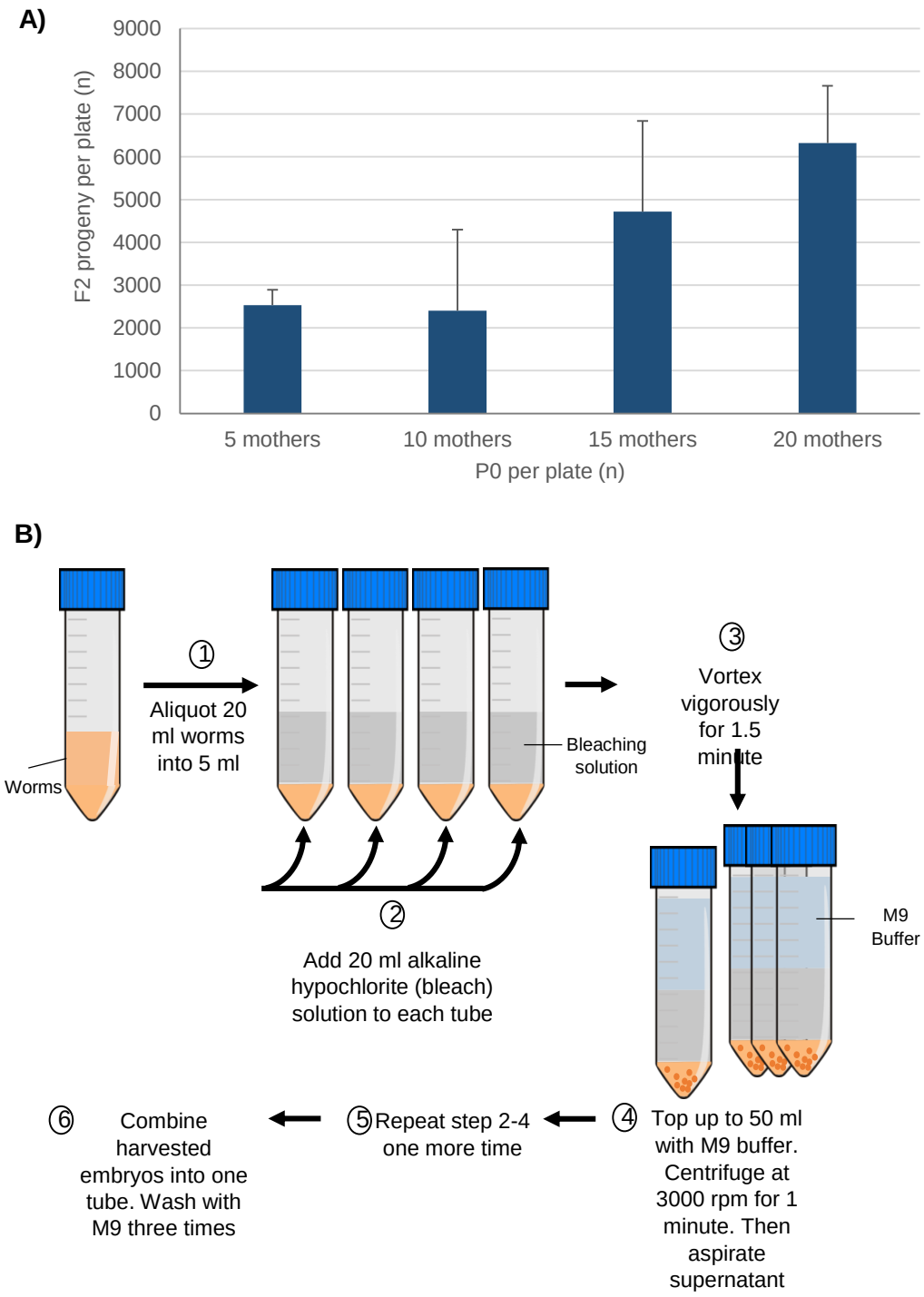


Figure 5.2 Propagation of *C. elegans* on solid culture containing NGM

(A) Amplification factor of P0 wild type hermaphrodites to F2 progeny. (B) Modified bleaching technique for harvesting embryos from large volume of worms.

5.3.3 Harvesting synchronised embryos

The next experiment aimed to evaluate the synchronised embryos that I have harvested. I first defined conditions for the *C. elegans* embryos for my chromatin immunoprecipitation analysis. Proliferation stage of early embryogenesis produces several developmental stages such as P0 (1 cell), P1 (2 to 3 total cells in an embryo), P2 (4 to 7 cells), P3 (8 to 15 cells), P4 (16 to 100

cells) and Z2-Z3 (more than 100). The aim of the amplification step is to harvest a synchronised population of >100-cell stage embryos from day 1 gravid hermaphrodites for chromatin immunoprecipitation (ChIP) analysis. The reasons for the selection were the cells as well as embryos were the most abundant, and importantly, the embryos have their own embryonic transcription at this stage (Edgar et al. 1994). To obtain a majority population of >100-cell stage embryos, I harvested embryos from synchronised F4 mothers in my worm amplification (Figure 5.1). The F4 synchronised L1 were placed on newly prepared Nunc dishes and then grown for 54 hours for wild-type, 67 hours for *wdr-5(-)* and 64 hours for *rbbp-5(-).* I bleached the day 1 gravid hermaphrodites (F4). Following fixation in formaldehyde and quenching of cross-linking with Tris-HCl 100 mM, 5 µl of embryo extract was fixed in 100% methanol for storage at -20ºC until further DAPI staining. Embryos were then scored according to the following categories 2-cell, 4-cell, 8-cell, >16-cell, >28-cell, >100 cell embryos and old embryos, which comprised of comma-stage embryos. I found that all of the wild-type, *wdr-5(-)* and *rbbp-5(-)* repeats that were used in my chromatin immunoprecipitation have a majority population of >100-cell stage embryos. Taken together, massive amount of >100-cell stage embryos can be harvested from large-scale amplification of *C. elegans* solid culture media.

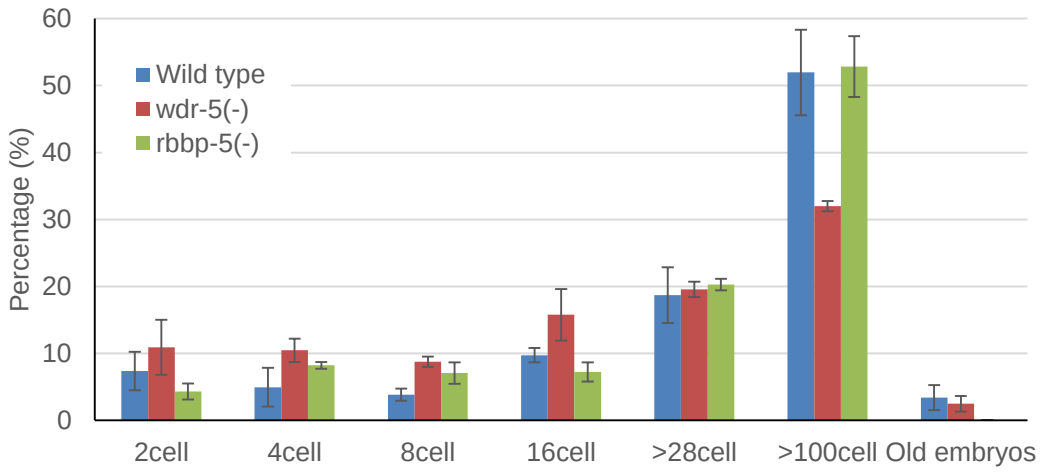


Figure 5.3 Synchronisation of *C. elegans* embryos for harvesting a majority of >100-cell stage embryo population.

Comparison of the embryo scoring of wild type (BLUE), *wdr-5(-)* (RED), and *rbbp-5(-)* (GREEN).

5.3.4 Verification of chromatin immunoprecipitation technique for H3K4me3 by Western Blot

Chromatin immunoprecipitation (ChIP) is a powerful tool to study DNA-protein interactions. It allows a delicate detection and mapping of histone modifications throughout the genome. ChIP requires small chromatin fragments between 300 and 600 base pairs. Hence, my first aim for immunoprecipitation technique was to evaluate the sonication time suitable for the large-scale *C. elegans* embryos. Approximately 500 µl of packed embryos were toped up to 1.5 ml with FA buffer

(with protease inhibitor cocktail) and dounced on ice for 40 strokes with a pastel B glass homogeniser. The mixture was then aliquoted to 250 µl in 1.5 ml micro-centrifuge tube and sonicated using Bioruptor UCD-200 (Diagenode). Sonication was performed under the cycle of 30 second ON and 30 second OFF for a total of 4, 6, 8, 10, 15 or 20 minutes. The levels of fragmentation were then observed using 1.5% gel electrophoresis. I found that the desired fragments of 300-600 base pairs were obtained when samples sonicated for a total of 15 minutes (5 seconds rest in dried ice-ethanol bath after every 2.5 minutes of sonication). Shorter sonication time (4, 6, 8 or 10 minutes) produced inadequate fragmentation whereas longer period (20 minutes) caused excessive fragmentation.

Next, I performed chromatin immunoprecipitation and verified my pull down technique using Western Blot. I performed ChIP for H3K4me3 on wild type and *rbbp-5(-)* embryos and verify the result using Western Blot against H3. For each strain, I prepared 0.5% input, beads only control and immunoprecipitated samples. I used strains which levels of H3K4 methylation has been tested before. Based on immunofluorescent staining, in absence of RBBP-5, *C. elegans* embryo lacks H3K4me3 when compared to the wild type (Wang et al. 2011). Hence, I expected to observe a Western Blot band for H3 in the wild type but not in the *rbbp-5(-)* as there would be no H3K4me3 being pulled down in the mutant. As illustrated in Figure 5.4B, H3 band is detected in the wild type but not in the rbbp-5(-), supporting the immunofluorescence results that there was no H3K4me3 in the mutant. H3 is presence in both of the wild type and *rbbp-5(-)* 0.5% input controls, which were original samples that were not immunoprecipitated for H3K4me3. Beads mixed with lysate without antibody did not have the H3 band, as expected, suggesting that there is no detectable cross reaction in the background. To sum, my new model for the large-scale amplification of *C. elegans* yield high quality synchronised embryos suitable for chromatin immunoprecipitation. My chromatin immunoprecipitation reproduces and verifies the previous immunofluorescence data on mutant *rbbp-5(-)* embryos lacking H3K4me3.

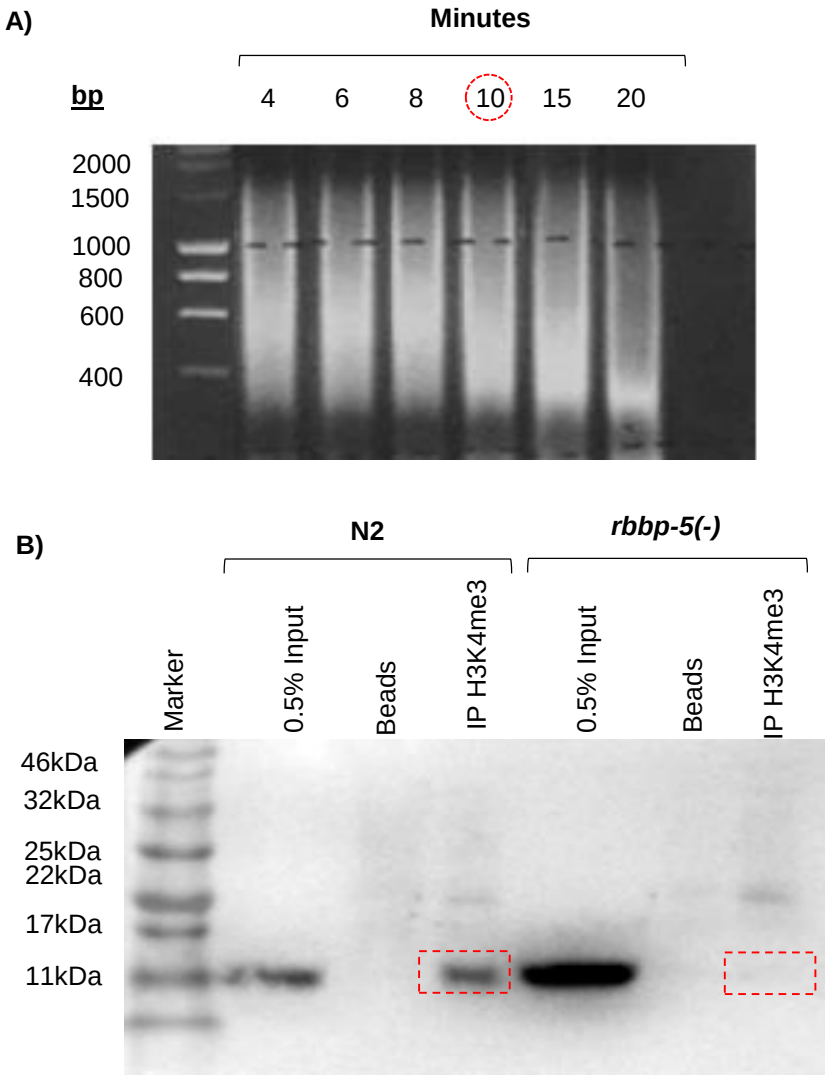


Figure 5.4 Chromatin immunoprecipitation for H3K4me3 using embryo sample harvested from the newly designed large-scale worm amplification on solid media

(A) Sonication at different time length of 4, 6, 8, 10, 15 and 20 minutes. (B) Verification of chromatin immunoprecipitation for the pulling down of H3K4me3 in wild type and *rbbp-5(-)* mutant, followed by Western blot for H3. The red dotted boxes illustrate the absence of H3K4me3 pull down from *rbbp-5(-)* mutant sample.

5.4 Discussion

The two general methods for growing *C. elegans* are liquid and solid culture. For a large-scale amplification, only liquid culture method has been described in detail before. Worms are basically amplified in large swirling flasks containing S-Medium seeded with concentrated *E. coli* OP50 as the food source (Lewis & Fleming 1995). The method is easy to manage since the concentrated *E. coli* can be added as needed throughout the amplification to prevent worm starvation. However, differences in oxygenation and environmental variables between solid and liquid culture have been shown to influence many biological aspects such as the worm phenotype, growth and development. For instance, worms harvested from liquid culture tend to be longer, thinner and

more prone to retain eggs (Lewis & Fleming 1995; Rahmani et al. 2015). In view of this, I designed and developed a method for growing large quantities of *C. elegans* on solid medium with the aim to maintain my method of culturing *C. elegans* throughout the study.

5.4.1 Ease of containing contamination

My large-scale *C. elegans* amplification on solid medium involved the use of stacks of 245 x 245 mm Nunc dishes. At least 60 dishes were used per strain in total. Although plenty of works were needed, especially in preparing the solid medium dishes, I have populations of worm that were contained in sets of isolated dish setting. In other words, my *C. elegans* amplification method has an advantage of containing further spread of unwanted contamination. The dishes do get contaminated by fungus or bacteria at times. The sources of contamination may come from the surrounding or also from the bacteria inside the worm's gut (Johnstone 2002). Since worms were grown on dishes, contamination can be curbed easily by discarding the sample from contaminated dishes. Decontamination could also be performed during the bleaching of gravid mothers to harvest embryos. More dishes could be prepared as a precaution for contamination. Growing a large-scale worm in liquid culture for chromatin immunoprecipitation study is done generally by transferring embryos to a flask containing 500 ml liquid media (S medium, 1X Penicillin-Streptomycin-Neomycin antibiotics (PSN) and antifungal nystatin) that is swirled at 100 rpm at 20 ºC (Ercan et al. 2007). Extra precautions are needed because the liquid culture can get contaminated even in presence of antibiotics and antifungal. Moreover, the contamination will affect the whole population. Hence repeating the whole amplification would be more preferable as some contamination may make worms sick or have influences on the biological processes.

5.4.2 Produced synchronised population of harvest

It is sometimes essential to synchronise *C. elegans* to the same embryo, larval or adult stage in experiments. Mainly synchronisation is required for the reproducibility of the data. In this report, I established a protocol for harvesting large-scale *C. elegans* embryos with a majority of population are at >100-cell stage. The embryos were harvested from young hermaphrodites grown at specific times. The wild type worms were grown for exactly 54 hours from L1, *rbbp-5(-)* for 64 hours and *wdr-5(-)* for 67 hours. In my study, I managed to obtain embryos with approximately 52% of wild type, 53% of *rbbp-5(-)* and 32% of *wdr-5(-)* to be in the >100-cell stage. I have adjusted the time for harvesting *wdr-5(-)* from 67 hours to 64 hours but I saw no difference in the percentage of the scored embryos. Despite *wdr-5(-)* having the smallest percentage amongst all, the massive number of cells within the embryos make up the majority of similar stage of cell population. A wild-type *C. elegans* embryo can produce a total of 671 cells (Sulston et al. 1983). The >100-cell stage embryo I are interested to harvest has approximately between ~101 and ~550 cells. Embryos with >550-cells present are bean and comma stage embryos, which I referred to as the old embryos (Richards et al. 2013). The 671 cells will eventually decline to 558 cells due to cell death after the onset of movement at hatching (Sulston et al. 1983). The large

number of cells (101-550 cells) within each of the >100-cell embryos make up the majority source of my extracted chromatin in my study.

5.4.3 Large-scale solid culture for *C. elegans* is largely flexible

The protocol described in this chapter illustrate a basic framework for obtaining reproducible synchronised stage of embryos. By making some alterations, this protocol can be adapted for harvesting worms under a variety of conditions. For instance, it can be used for harvesting different *C. elegans* mutant strains, different developmental stages in *C. elegans*, other worm species, or for use with different bacterium as source of food. However, the amplification factor for other worm strains must be determined prior to growing worms using this method to be careful not to cause starvation. It is important to frequently check the plates and transfer worms to new plates before food runs out. It is always a good idea to have well prepared dishes ready. Starvation in *C. elegans* has been shown to cause various effects. Starvation can induce adult reproductive diapause (Angelo & Van Gilst 2009), promote developmental arrest and cause multigenerational increase in the lifespan of progeny (Rechavi et al. 2014). Moreover, if there is no concern to harvest specific stage of embryos, the eggs can be harvested by bleaching gravid F3 adults (Figure 5.1A). The step for growing F4 worms for specific hours is unnecessary in this case. Hence, with the method developed in this chapter, it is now possible to grow large-scale *C. elegans* on solid medium.

I believe that large-scale amplification of *C. elegans* on solid medium could contribute to consistency, especially when other experiments performed in the study were also performed on solid media. It would not only provide comparable oxidation levels but would also offer almost equivalent environmental variables, thus reducing any possible alteration in biological process between the experiments.

Chapter 6

General discussion

Chapter 6 : General Discussion

Our study was conducted with the main purposes to investigate if RBBP-5 is a regulator of ageing rate; where on genome H3K4 methylation levels are depleted in absence of WDR-5 or RBBP-5; and whether depleting core components WDR-5 and RBBP-5 decreases H3K4 methylation and thus will affect activation of transcription. In the process of answering these questions, I have developed a procedure for amplifying large amount of *C. elegans* on solid NGM media and harvesting large amount of embryos from it (Chapter 5). As a summary, our study found that H3K4 methylation by RBBP-5 regulate lifespan and has transgenerational effects. We also found that removal of RBBP-5 depletes H3K4 methylations levels throughout the genome, whereas removal of WDR-5 depletes H3K4me3, increases H3K4 methylation and causes excessive accumulation of H3K4me2 at chromosome X. The loss of WDR-5 and RBBP-5 causes more upregulation of genes than downregulation. The study uncovers several new and novel findings which I will discuss in this chapter.

6.1 RBBP-5 prevents short-lifespan and its regulation on lifespan is transgenerationally inherited

Components of the MLL/SET/COMPASS complex are regulators of lifespan in Caenorhanditis elegans. Depleting ASH-2, WDR-5 or SET-2 causes lifespan extension. On the other hand, deficiency in the H3K4-demethylase RBR-2, shortens lifespan (Greer et al. 2010). My work supports another core components of MLL/SET/COMPASS complex, RBBP-5, is also a regulator of lifespan. However, we found that lifespan is shortened in RBBP-5 absence. Could the lifespan extension in worms lacking ASH-2, WDR-5 or SET-2; or shortening of lifespan in absence of RBBP-5 or RBR-2 correlated to the lack or de novo H3K4 methylations at specific loci. For instance, our ChIP-seq analysis has uncovered that there is de novo H3K4me2 marks on chromosome X and loss of H3K4me3 marks in autosomes. It is possible that these alterations may influence gene expressions involved in lifespan regulations. However further study is required to find the correlation between alterations in the levels of H3K4 methylations and change in lifespan regulation in the absence of core components of the MLL/SET/COMPASS complex.

The findings from our study and Greer et al., (2011) have importantly illustrate that components within the same MLL/COMPASS/COMPLEX can impart transgenerational inheritance on lifespan regulation of *C. elegans*. Epigenetic inheritance, however, is not foreign in animal kingdom. Fruit fly, *Drosophila melanogaster*, for instance, with a high-sugar maternal diet produced two generations of obese off-springs (Buescher et al., 2013). Fly embryos exposed to gamma irradiation enhances lifespan and resistance to heat shock and starvation for two generations (Shameer et al., 2015). In rodents, utero exposure to maternal obesity increases offspring's risks of developing metabolic syndrome, type 2 diabetes and cardiovascular disease (Dunn et al., 2011). Exposure to insecticide dichlorodiphenyltrichloroethane (DDT) in pregnant rodents increase the risk of developing tumours and disorders of prostate, kidney and ovary in the next

offspring (Skinner et al., 2013). Epigenetic inheritance has also been observed in human. For an example, two generations of offspring of women exposed to great Netherlands famine in 1944 had 1.8-folds increase risk in developing health problems (Painter et al., 2008). The epigenetic inheritance observed in fly, rodents and human mostly are intergenerational. It implies that stressor is directly exposed to parents (P0), germ cells or fetus in utero (F1) and developing germ cells of F1 (F2). On the other hand, our study illustrates transgenerational effect, where transmission occurs till F3 generation even though this generation had no direct exposure to the stressor. In future study, *C. elegans* might be amongst the best candidate models for discovering the underlying molecular mechanisms in transgenerational epigenetic inheritance.

Levels of H3K4 methylation in ancestors may influence the lifespan of the subsequent generations. I have shown that in the presence of RBBP-5 in wild type parents, the next three generations of mutant *rbbp-5(-)* progeny inherit normal lifespan. This implies that some ancestral H3K4 methylation marks were not completely erased across generations. After three generations, the inheritance of normal lifespan in *rbbp-5(-)* descendants from wild type ancestor was lost. Passive removal by molecule dilution or actively by specific eraser complexes could result in the loss (Klosin & Lehner 2016). The plasticity and reversible nature of the H3K4 methyl marks supports the transgenerational inheritance of lifespan regulation. If the lifespan longevity fate is written in the genes, it will not change after three generation of descendants.

We proposed a model (Figure 3.12) that illustrates the occurrence of transgenerational inheritance only if there is a reducing degree of life expectancy and never the other way around. An example of reducing degree of life expectancy is when descendant gain long or normal lifespan from ancestors, before losing it and returned to having normal or short lifespan, respectively. Wild type *C. elegans* is supposed to have normal lifespan. Instead, the wild type descendants from mutant *wdr-5(-), set-2(-)* or *ash-2(RNAi*) ancestors inherit longevity that would last for up to three generations (Greer et al. 2011). Similarly, the rbbp-5(-) mutant descendants from ancestor having sufficient RBBP-5 *(rbbp-5(+/-),* instead of being short-lived they acquire normal lifespan that would also last for up to three generations. However, if there is an increasing degree of life expectancy, the altered levels of H3K4 methylation for lifespan regulation is quickly lost across generations (Figure 3.12). We observed that wild type descendants of *rbbp-5(-)* ancestors do not inherit short lifespan, instead they quickly acquire normal lifespan. Similarly, *wdr-5(-)* and *set-2(-)* mutant descendants from wild type ancestors do not inherit normal lifespan but they immediately acquire longevity, which correspond to their genotype.

Previously, Greer et al. (2011) uncovers that there is no global decrease in H3K4me3 in wild type *C. elegans* that inherit longevity from parents with WDR-5, SET-2 or ASH-2 deficiency. Our Western blot data supports the findings and shows that there is no global increase in mutant progenies that inherit normal lifespan from the heterozygous rbbp-5(+/-) parents. This suggest that the reduction of H3K4 methylation occurs at specific loci instead of globally. Our ChIP-seq data uncover the alteration patterns in embryos lacking WDR-5 or RBBP-5. In absence of WDR-5, H3K4me3 is reduced; H3K4me1 is increased; and H3K4me2 is increased at chromosome X but decreased at genic and promotor regions. We also found that there is an extreme decline in the overall levels of H3K4me1/me2/me3 throughout the genome of *rbbp-5(-)* embryos. Future

works may be required to analyse which of these loci are involved in lifespan regulation and in its transgenerational inheritance.

In conclusion, my data shows that RBBP-5 is another component of the MLL/SET/COMPASS complex that is a regulator of lifespan in C. elegens. Depletion of H3K4 methylation due to absence in RBBP-5 is linked to lifespan limitation. This H3K4 methylation that is attributed to RBBP-5 can be transgenerationally inherited. It rescues the lifespan regulation in *rbbp-5(-)* mutant progeny, causing them to have normal instead of short lifespan for up to three generations. The transgenerational inheritance of lifespan probably involves heritable changes of H3K4 methylation at specific loci.

6.2 The landscape of H3K4 methylation attributed by WDR-5 and RBBP-5 during embryogenesis

WDR-5 and RBBP-5 are core components of the MLL/SET/COMPASS complex. They regulate the complex for the deposition of H3K4 methylation. Previous immunofluorescent and Western blot analyses have documented great reduction in global H3K4 methylation in *wdr-5(-)* and *rbbp-5(-)* mutant embryos (Fisher et al. 2010; Wang et al. 2011; Simonet et al. 2007). However, prior to my study, it was not known where exactly on the genome the H3K4 methylation was reduced in absence of either WDR-5 or RBBP-5. Hence, our ChiP-Seq analysis provides data on the deposition of H3K4 methylation attributed to WDR-5 and RBBP-5 during *C. elegans* embryogenesis.

This work has revealed that RBBP-5 contributes to the deposition of H3K4me1/me2/me3 throughout the whole genome during *C. elegans* embryogenesis. In the absence of RBBP-5 during embryogenesis, H3K4me1/me2/me3 were almost entirely depleted throughout the genome. This suggests that RBBP-5 absence can highly compromise the MLL/SET/COMPASS complex activity. Human RBBP5 has been shown to have domains that allow bindings and interactions with MLL proteins, ASH2L and WDR5 (Li et al. 2016). For instance, its activation segment (AS) interacts with SET domain; ASH2L binding motif (ABM) with ASH2L's SPRY domain; and WDR5 binding motif with WDR5's WD40 repeats (Li et al. 2016). Without RBBP-5, the MLL/SET/COMPASS complex formation may severely be impaired, reducing the complex activity.

Our ChIP-Seq analysis also uncovers the distinctive regulatory roles that WDR-5 has in the deposition of methyl marks at H3K4 during embryogenesis. We have observed that WDR-5 prevents excessive accumulation of H3K4me1 at a global level (Figure 4.2); while boosts the deposition of H3K4me3 (Figure 4.1). On the other hand, H3K4me2 attributed to WDR-5 is more complex because it implicates specific genomic and chromosomal regions. WDR-5 contributes to the deposition of H3K4me2 at gene bodies and promoters while possibly limiting H3K4me2 at intergenic regions. Interestingly, WDR-5 also prevents excessive accumulation of H3K4me2 on the entire chromosome X.

Why loss of RBBP-5 globally and severely disrupts every methylation levels but loss of WDR-5 has regional and chromosomal effects on specific methyl states? A potential explanation is WDR-5 might be dispensable while RBBP-5 is not. WDR5 can directly interact with MLL/SET domain and stabilises its interaction with the RBBP5/ASH2L heterodimer (Dou et al. 2006). The activation allows methyl transfer following H3 substrate binding (Li et al. 2016). However, without WDR-5, human RBB5-ASH2L heterodimer could still sufficiently interact, stabilise and activate MLL family histone methyltransferases (Li et al. 2016). This notion supports the hypothesis that WDR5 in *C. elegans* is also dispensable for the COMPASS complex activity. On the other hand, RBBP-5 might not be dispensable because of its many motifs that are important for the interactions with WDR5, ASH-2, and MLL family. Reducing RBBP-5 can potentially compromise the complex stability and activity.

Two known catalytic subunits for *C. elegans* MLL/SET/COMPASS complex are SET-2 and SET-16 (Simonet et al. 2007; Fisher et al. 2010). SET-2 and SET-16 are the orthologue of human SET1 and MLL3/4, respectively. During *C. elegans* embryogenesis, SET-2 is required for H3K4me2/me3 while SET-16 for H3K4me3 (Wilkins 2016). It is possible that the removal of WDR-5 from the complex could sufficiently activate SET-2 and SET-16, but in non-optimal manner, and disrupt their activities to varying degrees. In support of this, loss of interaction with WDR5 in human cells has been shown to affect SET/MLL family to varying degrees, The loss severely reduce MLL1 and SETd1A activities, but not MLL2/4 and SETd1B (Alicea-Velázquez et al. 2016). Erroneous or non-optimal activation of the complexes, in absence of WDR-5, may severely reduce the deposition of H3K4me3. We have also seen excessive accumulation of H3K4me2 at chromosome X and possibly intergenic regions. However, a gap in our study is that we cannot rule out whether accumulation in those regions is resulted from more H3K4me2 being deposited or H3K4me2 is halted from being transformed into H3K4me3.

6.3 Roles of WDR-5 and RBBP-5 in influencing transcription and worm phenotypes

One of the aim of this study was to find a possible link between alterations in the levels of H3K4 methylation and transcriptional output. In general, H3K4 methylation has been associated with active gene expression. For instance, there are many readers of H3K4 methylation, such as TAF3 (of TFIID), Sgf29 (SAGA complex), ING4 and PHF8, that are linked to active gene expression (Lauberth et al. 2013; Vermeulen et al. 2010; Taverna et al. 2006; Cloos et al. 2008; Horton et al. 2010). Previous study investigates the role of SET-2 in *C. elegans* germline found that loss of H3K4 methylation in germlines due to removal of SET-2 or WDR-5 could also result in more genes being upregulated (87% and 73%, respectively) than downregulated (Robert et al. 2014). However, only limited H3K4 methylation readers have been associated with repression of genes up until now. As an example, binding of ING2 to H3K4me3 leads to recruitment Sin3 histone deacetylase that promote gene repression during DNA damage (Shi et al. 2006).

Our data reveals that absence in RBBP-5 causes more upregulation of genes (1,453) than downregulation (108). Similarly, loss of WDR-5 also upregulates more genes (2,973) than downregulates (1,147). Our findings add further support to previous research that H3K4

methylation could be associated with both activation and repression of gene expression. We have selected several loci with down- or up-regulation of gene expressions from our RNA-seq data and verified their misregulated expressions using qPCR. The chosen upregulated genes in absence of WDR-5 are *pqn-74* and *grl-7* and downregulated genes are *nxf-2* and *apc-10*. Loss of NXF-2 or APC-10 in *C. elegans* has been linked with reduced embryonic viability, while PQN-74 is important for eggshell synthesis as well as early embryonic development, and GRL-7 is involved in intercellular signalling in intestine, hypodermis and seam cells (Piano et al., 2000; Tan et al., 2000; Johnston et al., 2006). Loss of NXF-2 and APC-10 might be amongst the many factors of why *wdr-5(-)* mutants have 4% increase in embryonic lethality and almost 2-fold reduction in brood size (Wang et al., 2011). Whereas, the chosen upregulated genes in absence of RBBP-5 are *gcy-19* and *ttr-15* and downregulated genes are *fbxa-192* and *ugt-29.* All of the misregulated genes are located on autosomes. GCY-19 is predicted to involve in chemosensory signal transduction (Birnby et al., 2000), FBXA-192 in protein-protein interaction (Kipreos et al., 2000), UGT-29 in detoxification of detrimental compunds to host (Wong et al., 2014), and TTR-15 to be enriched in germline precursor cell, hypodermis and intestine (Reinke et al., 2017).

X inactivation is the transcriptional silencing of one of the X chromosome per diploid nucleus, as observed in mammalian females (XX). It is one of the mechanisms of dosage compensation for equalisation of X-linked gene products between females and males (O'Neill et al. 2003). (O'Neill et al. 2003). On the other hand, dosage compensation in *C. elegans* hermaphrodites (XX) is through the reduction of transcript levels by half in both of the X chromosomes (Meyer & Casson 1986). 'Open' and transcriptionally active chromosomes have been generally associated with histones hyper-acetylation, hyper-H3K4me and hypo-H3K9me (O'Neill et al. 2003). Interestingly, there is an evidence that shows upon X inactivation, mammalian female exhibits reduced histone acetylation, reduced H3K4me2 and increased H3K9me2 on chromosome X. This distinctive 'close' chromatin patterns observed in the mammalian females may subsequently facilitate transcriptional silencing for dosage compensation. Our data supports the view. Excessive accumulation of H3K4me2 on chromosome X was observed in embryos from self-fertilising wdr-5(-) hermaphrodites. Surprisingly, we uncover that the lack of WDR-5 is also associated with higher incidence of males. Together, our data suggests that sex determination and dosage compensation may occur as early as during embryogenesis and the processes may be facilitated by the levels of H3K4me2 at chromosome X.

In addition, an alternative explanation for an increase in male incidence in *wdr-5(-)* mutant could be due to elevation of nondisjunction during meiosis. In normal condition, wild type males are maintained at low frequency in populations of self-fertilising hermaphrodites. It was proposed that males are spontaneously maintained through nondisjunction of sex chromosomes during meiosis in hermaphrodites (Chasnov & Chow, 2002). Nondisjunction is a phenomenon where chromosome failed to separate, hence producing male *C. elegans* (XO) and females (XX) (Hodgkin et al., 1979). However, there are mutants such as 'high incidence of males' (him) with increased X-chromosome nondisjunction and decreased male fertility (Hodgkin et al., 1979). Coincidently, *wdr-5(-)* mutants also have high incidence of males and decreased fertility. It will be interesting to further compare *wdr-5(-)* mutant with meiotic mutants like him.

Karyotyping could be done in future to determine if the high incidence of males observed in *wdr-5(-)* are true 'males' with XO. Reason being, the sterile *wdr-5(-)* hermaphrodites at 25°C has been linked with detectable masculinisation of germline phenotype (Li & Kelly, 2011). Masculinisation of germline alters sexual fate. Instead of developing as a hermaphrodite, the worm develops as a male (Graham & Kimble, 1993). For instance, *mog-1* worm is a masculinised hermaphrodite (XX), produces sperm continuously, does not switch to oocyte production and possesses female tail because *mog-1* does not masculinise hermaphrodite soma (Graham & Kimble, 1993). Masculinisation may also affect the soma like masculinised tails. In a different worm species, C. briggsae Cb-tra-2(nm1) and Cb-tra-2(ed23ts) are XX but with incomplete masculinisation, abnormal male tails lacking sensory rays, and lack of male mating behaviour (Kelleher et al., 2008). Abnormal tail sensory rays and lack of male mating behaviour were also observed in the high incidence of spontaneous males in *wdr-5(-).* To investigate if the *wdr-5(-)* 'males' are XX or XO will delineate whether its occurrence is due to masculinisation or X-chromosome nondisjunction.

In conclusion, we show that WDR-5 contributes to acquisition of H3K4me3 and genic H3K4me2 but prevents excessive H3K4me2 accumulation at chromosome X. Crucially, we found that WDR-5 dampens expressions on chromosome X. It, however, stimulate expressions on autosomal chromosomes by preventing the loss of H3K4me1/me2/me3 peaks.

6.4 Future perspectives

The study on epigenetic transmission is important since growing number of studies found that many chronic diseases in human are contributed by both genetic and epigenetic mechanisms (Kaelin & McKnight 2013; Jones & Baylin 2007). Since my work is on transgenerational inheritance of H3K4 methylation for lifespan regulation, it is hoped that future works on it will help us better understand the pattern of epigenetic transmission across generations. A new area for investigation could be where on the genome the H3K4 methylation for lifespan regulation is transgenerationally inherited. For instance, our ChIP-Seq data reveals that *rbbp-5(-)* mutants severely lack H3K4me1/me2/me3 throughout the genome. To find the specific loci associated with transgenerational inheritance for lifespan, one could investigate any newly acquired H3K4 methylation peaks in *rbbp-5(-)* mutant descendants from wild type ancestors. Alternative investigation is on which genes with altered expression could be inherited for lifespan regulation of subsequent generation. For instance, a microarray study to compare gene expression between F4 and F5 generations. Strains to be used could be *rbbp-5(-)* mutant descendants from wild type ancestors and *rbbp-5(-)* ancestors, as well as wild type descendants from wild type ancestors. F4 generation of *rbbp-5(-)* mutants from wild type ancestors would still inherit the normal lifespan, whereas the F5 would already lost it.

Another suggestion for future work is a closer investigation into how the MLL/SET/COMPASS complex may contribute to dosage compensation. A subunit of MLL/SET/COMPASS complex, DPY-30, is shared with the dosage compensation complex (DCC). DPY-30 facilitates DCC to target X chromosomes for transcriptional regulation (Pferdehirt et al. 2011). Removal of DPY-30

compromises the binding of DCC to chromatin (Petty et al. 2011) but disruption of DCC (by the removal of SDC-2 subunit) does not affect H3K4 methylation levels (Pferdehirt et al. 2011). Interestingly, we have shown that absence of WDR-5 leads to increase incidence of males, all with defective tail morphology. Since the dosage compensation and sex determination pathways share key components, H3K4 methylation in some way may be involved with the process of dosage compensation.

6.5 Conclusion

To conclude, the major findings of our study demonstrate:

1. H3K4 methylation by RBBP-5 is a regulator of lifespan, depleting its levels shorten the lifespan of *C. elegans*. The regulation of lifespan by H3K4 methylation attributed to RBBP-5 is transgenerationally inherited.

2. Removal of RBBP-5 depletes H3K4 methylations levels throughout the genome, whereas removal of WDR-5 depletes global H3K4me3, increases global H3K4me1 and causes excessive accumulation of H3K4me2 throughout chromosome X.

3. The loss of WDR-5 and RBBP-5 causes more upregulation of genes than downregulation. WDR-5 deficient *C. elegans* has higher incidence of males, possibly associated with defective dosage compensation and excessive accumulation of H3K4me2 at chromosome X.

Chapter 7 : Appendix

Supplementary Table 1. Raw data from the RNA-Seq data using wild type and *wdr-5(-)* embryos

The base mean value comparison between wild type (N2) and *wdr-5(-)* embryos. Log2 fold change lower than 1 (negative) indicates that the gene is downregulated in *wdr-5(-)* compared to wild type. Log2 fold change greater than 1 (positive) indicates the gene in *wdr-5(-)* is more upregulated than in wild type. Only raw data with P-value < 0.01 was shown. Padj is adjusted P-value.

gene WB name	baseMean N2	baseMean WDR-5	log2 Fold Change	pval	padj	gene WB name	baseMean N2	baseMean WDR-5	log2 Fold Change	pval	padj	gene WB name	baseMean N2	baseMean WDR-5	log2 Fold Change	pval	padj
WBGene00010212	20059	239	-6.39	1.21E-51	2.18E-47	WBGene00006418	261	1110	2.09	3.61E-11	7.54E-09	WBGene00044411	74	430	2.54	1.46E-09	1.53E-07
WBGene00001730	8	523	6.04	1.09E-31	9.77E-28	WBGene00014955	785	61	-3.68	3.88E-11	7.93E-09	WBGene00022675	658	2587	1.98	1.55E-09	1.62E-07
WBGene00011654	14	601	5.41	2.70E-31	1.62E-27	WBGene00077697	556	2238	2.01	3.89E-11	7.93E-09	WBGene00012704	318	1380	2.12	1.66E-09	1.72E-07
WBGene00011594	166	2078	3.65	9.88E-30	4.44E-26	WBGene00007891	62	459	2.9	4.15E-11	8.35E-09	WBGene00007919	137	655	2.25	1.81E-09	1.87E-07
WBGene00006474	45320	3707	-3.61	2.44E-24	8.75E-21	WBGene00015227	98	613	2.65	4.18E-11	8.35E-09	WBGene00019111	113	595	2.4	1.87E-09	1.91E-07
WBGene00017496	394	2	-7.71	7.11E-24	2.13E-20	WBGene00017727	366	1513	2.05	4.74E-11	9.36E-09	WBGene00013083	553	2031	1.88	1.88E-09	1.91E-07
WBGene00007131	44	708	4	2.34E-23	6.00E-20	WBGene00000723	50	353	2.81	4.90E-11	9.58E-09	WBGene00017297	19	210	3.43	1.88E-09	1.91E-07
WBGene00021226	2392	185	-3.69	5.83E-23	1.31E-19	WBGene00008453	262	1174	2.17	4.98E-11	9.58E-09	WBGene00044414	1001	183	-2.45	1.92E-09	1.94E-07
WBGene00014954	223	0	-11.12	2.48E-22	4.94E-19	WBGene00010714	892	3233	1.86	5.01E-11	9.58E-09	WBGene00020757	12986	2351	-2.47	1.96E-09	1.97E-07
WBGene00044608	10242	885	-3.53	2.85E-22	5.12E-19	WBGene00009109	125	694	2.47	5.21E-11	9.85E-09	WBGene00019914	149	673	2.17	2.03E-09	2.03E-07
WBGene00013030	6138	606	-3.34	3.56E-21	5.82E-18	WBGene00020051	719	3109	2.11	5.70E-11	1.07E-08	WBGene00008300	26	249	3.24	2.09E-09	2.08E-07
WBGene00018920	1380	93	-3.89	5.04E-21	7.02E-18	WBGene00018639	461	1975	2.1	5.81E-11	1.08E-08	WBGene00013119	83	461	2.47	2.13E-09	2.10E-07
WBGene00015236	421	3268	2.96	5.08E-21	7.02E-18	WBGene00020329	21	256	3.63	6.03E-11	1.11E-08	WBGene00019967	137	635	2.22	2.26E-09	2.22E-07
WBGene00010295	314	4	-6.22	4.56E-20	5.85E-17	WBGene00014300	266	1324	2.32	6.32E-11	1.15E-08	WBGene00022295	107	521	2.29	2.29E-09	2.23E-07
WBGene00012564	1164	74	-3.97	5.30E-20	6.34E-17	WBGene00016957	294	1164	1.99	6.58E-11	1.18E-08	WBGene00006759	4115	13351	1.7	2.29E-09	2.23E-07
WBGene00008187	25	482	4.27	1.12E-18	1.25E-15	WBGene00022335	2659	587	-2.18	6.73E-11	1.20E-08	WBGene00020125	470	1731	1.88	2.46E-09	2.38E-07
WBGene00013079	3	207	6.21	2.31E-18	2.44E-15	WBGene00018910	805	3	-8.26	6.89E-11	1.21E-08	WBGene00010166	26	1088	5.37	2.48E-09	2.38E-07
WBGene00044213	186	0	-10.86	3.26E-18	3.25E-15	WBGene00044461	100	607	2.6	7.71E-11	1.34E-08	WBGene00007152	2016	6134	1.61	2.55E-09	2.43E-07
WBGene00019142	1022	73	-3.81	2.34E-17	2.21E-14	WBGene00018298	16	229	3.85	7.78E-11	1.34E-08	WBGene00008711	3915	12062	1.62	2.55E-09	2.43E-07
WBGene00009608	15	305	4.36	7.22E-16	6.25E-13	WBGene00003055	553	2040	1.88	8.03E-11	1.37E-08	WBGene00004003	14	170	3.64	2.57E-09	2.43E-07
WBGene00018912	1442	165	-3.13	7.31E-16	6.25E-13	WBGene00019988	1036	3556	1.78	8.23E-11	1.39E-08	WBGene00000645	208	1374	2.72	2.71E-09	2.54E-07
WBGene00001622	52	517	3.31	2.24E-15	1.83E-12	WBGene00021325	974	3501	1.85	9.17E-11	1.54E-08	WBGene00007401	121	618	2.36	2.71E-09	2.54E-07
WBGene00022754	293	1	-7.82	2.67E-15	2.08E-12	WBGene00022744	204	942	2.2	9.54E-11	1.57E-08	WBGene00045416	0	69	9.43	3.09E-09	2.88E-07
WBGene00001692	21	528	4.68	6.15E-15	4.60E-12	WBGene00018731	64	421	2.71	9.55E-11	1.57E-08	WBGene00011439	343	1286	1.9	3.17E-09	2.92E-07
WBGene00019154	6326	24911	1.98	1.01E-14	7.12E-12	WBGene00007177	8	264	5.03	1.05E-10	1.72E-08	WBGene00010204	292	1794	2.62	3.18E-09	2.92E-07
WBGene00011548	11	240	4.43	1.03E-14	7.12E-12	WBGene00044144	67	443	2.73	1.23E-10	1.97E-08	WBGene00009158	5756	17181	1.58	3.28E-09	3.00E-07
WBGene00001775	29	394	3.75	1.26E-14	8.40E-12	WBGene00014077	73	473	2.7	1.23E-10	1.97E-08	WBGene00016886	5749	1513	-1.93	3.29E-09	3.00E-07
WBGene00045062	482	2577	2.42	1.37E-14	8.79E-12	WBGene00010258	849	2895	1.77	1.24E-10	1.97E-08	WBGene00019001	3313	9770	1.56	3.42E-09	3.11E-07
WBGene00021566	1105	137	-3.01	2.42E-14	1.50E-11	WBGene00001451	44	355	3.02	1.25E-10	1.97E-08	WBGene00000244	444	1630	1.88	3.55E-09	3.21E-07
WBGene00003590	264	1369	2.38	3.29E-14	1.97E-11	WBGene00009326	147	734	2.32	1.26E-10	1.97E-08	WBGene00015216	488	2288	2.23	3.71E-09	3.33E-07
WBGene00012912	24	347	3.85	6.61E-14	3.78E-11	WBGene00009595	145	721	2.31	1.40E-10	2.17E-08	WBGene00009593	98	522	2.41	3.76E-09	3.36E-07
WBGene00013489	72	571	2.99	6.73E-14	3.78E-11	WBGene00009917	218	994	2.19	1.49E-10	2.28E-08	WBGene00016880	6504	1828	-1.83	3.78E-09	3.36E-07
WBGene00016845	1	131	7.42	1.06E-13	5.76E-11	WBGene00009433	559	2783	2.32	1.53E-10	2.31E-08	WBGene00018669	343	19	-4.2	4.01E-09	3.55E-07
WBGene00009968	359	1748	2.28	1.10E-13	5.79E-11	WBGene00012565	5650	1300	-2.12	1.53E-10	2.31E-08	WBGene00017781	183	724	1.98	4.14E-09	3.65E-07
WBGene00009723	222	1147	2.37	1.21E-13	6.23E-11	WBGene00015704	630	2327	1.89	1.55E-10	2.32E-08	WBGene00015815	6940	1955	-1.83	4.29E-09	3.76E-07

WBGene00010041	169	968	2.52	1.38E-13	6.90E-11	WBGene00012640	655	103	-2.66	1.67E-10	2.48E-08	WBGene00015522	39	305	2.98	4.38E-09	3.82E-07
WBGene00017807	31	371	3.59	1.48E-13	7.17E-11	WBGene00015731	3760	836	-2.17	1.83E-10	2.69E-08	WBGene00000136	187	1002	2.42	4.58E-09	3.97E-07
WBGene00019592	52	479	3.21	1.87E-13	8.85E-11	WBGene00017717	410	2205	2.43	2.06E-10	3.01E-08	WBGene00008495	78	787	3.33	4.90E-09	4.24E-07
WBGene00010285	1215	4725	1.96	2.34E-13	1.08E-10	WBGene00018915	478	52	-3.2	2.24E-10	3.25E-08	WBGene00011331	1495	4639	1.63	5.25E-09	4.49E-07
WBGene00008016	4253	783	-2.44	3.60E-13	1.59E-10	WBGene00009541	336	1336	1.99	2.50E-10	3.60E-08	WBGene00006632	76	414	2.44	5.25E-09	4.49E-07
WBGene00001864	1082	114	-3.24	3.63E-13	1.59E-10	WBGene00001476	397	2426	2.61	2.55E-10	3.64E-08	WBGene00011433	349	1298	1.9	5.63E-09	4.80E-07
WBGene00044395	141	864	2.62	4.75E-13	2.03E-10	WBGene00010644	15	196	3.75	2.78E-10	3.94E-08	WBGene00001052	41	319	2.95	5.77E-09	4.87E-07
WBGene00004397	4	163	5.37	5.18E-13	2.17E-10	WBGene00020567	92	498	2.44	2.86E-10	4.01E-08	WBGene00004793	373	1346	1.85	5.77E-09	4.87E-07
WBGene00003485	776	3335	2.1	5.90E-13	2.41E-10	WBGene00016768	158	783	2.31	2.92E-10	4.06E-08	WBGene00003741	189	969	2.36	6.02E-09	5.06E-07
WBGene00007440	27	296	3.48	6.11E-13	2.44E-10	WBGene00007149	24	279	3.54	2.95E-10	4.07E-08	WBGene00021928	258	1062	2.04	6.20E-09	5.18E-07
WBGene00009958	1483	5675	1.94	7.93E-13	3.10E-10	WBGene00006772	2372	7735	1.71	3.02E-10	4.14E-08	WBGene00015632	731	2417	1.73	6.30E-09	5.24E-07
WBGene00013882	533	2366	2.15	8.33E-13	3.18E-10	WBGene00001091	277	1347	2.28	3.19E-10	4.34E-08	WBGene00017270	10	149	3.87	6.32E-09	5.24E-07
WBGene00008076	445	2073	2.22	9.07E-13	3.39E-10	WBGene00006064	312	1422	2.19	3.24E-10	4.38E-08	WBGene00009957	226	1039	2.2	6.52E-09	5.34E-07
WBGene00016095	22	310	3.85	1.42E-12	5.21E-10	WBGene00013449	130	2	-6.01	3.39E-10	4.54E-08	WBGene00022689	2366	716	-1.72	6.54E-09	5.34E-07
WBGene00009297	7181	1491	-2.27	1.60E-12	5.74E-10	WBGene00001386	452	1677	1.89	3.50E-10	4.66E-08	WBGene00014164	939	2945	1.65	6.54E-09	5.34E-07
WBGene00004831	741	3138	2.08	2.08E-12	7.32E-10	WBGene00016505	31	549	4.13	3.62E-10	4.77E-08	WBGene00016335	217	900	2.05	6.69E-09	5.43E-07
WBGene00000902	1294	5442	2.07	2.45E-12	8.46E-10	WBGene00016578	9729	2751	-1.82	3.64E-10	4.77E-08	WBGene00019828	102	492	2.27	6.74E-09	5.46E-07
WBGene00009626	29	301	3.36	3.34E-12	1.13E-09	WBGene00009579	199	882	2.15	4.09E-10	5.33E-08	WBGene00011656	23	690	4.92	7.13E-09	5.75E-07
WBGene00017101	1895	265	-2.84	3.61E-12	1.20E-09	WBGene00001447	8	148	4.23	4.15E-10	5.36E-08	WBGene00013819	888	2823	1.67	7.18E-09	5.76E-07
WBGene00000169	54	471	3.12	3.76E-12	1.23E-09	WBGene00016292	3885	12214	1.65	4.65E-10	5.96E-08	WBGene00004058	291	1089	1.9	8.00E-09	6.38E-07
WBGene00020192	234	2273	3.28	4.26E-12	1.37E-09	WBGene00015270	2007	423	-2.25	5.07E-10	6.45E-08	WBGene00001242	1033	3278	1.67	8.08E-09	6.41E-07
WBGene00010348	51	426	3.06	4.80E-12	1.51E-09	WBGene00017489	68	398	2.55	5.64E-10	7.13E-08	WBGene00019998	152	920	2.6	8.10E-09	6.41E-07
WBGene00007343	346	2752	2.99	4.90E-12	1.52E-09	WBGene00011197	3	119	5.21	5.81E-10	7.30E-08	WBGene00000233	185	1067	2.53	8.24E-09	6.49E-07
WBGene00018470	166	868	2.38	5.43E-12	1.65E-09	WBGene00019314	44	368	3.05	5.99E-10	7.48E-08	WBGene00008229	68	636	3.23	8.52E-09	6.68E-07
WBGene00011185	484	2012	2.06	5.66E-12	1.69E-09	WBGene00004719	3007	9371	1.64	6.47E-10	8.02E-08	WBGene00044463	153	847	2.47	8.57E-09	6.69E-07
WBGene00000556	1	104	7.08	6.41E-12	1.86E-09	WBGene00000784	46	371	3.02	7.16E-10	8.81E-08	WBGene00003178	86	534	2.64	8.63E-09	6.71E-07
WBGene00018031	83	604	2.87	6.42E-12	1.86E-09	WBGene00007153	137	890	2.7	7.22E-10	8.82E-08	WBGene00020086	80	493	2.62	8.69E-09	6.73E-07
WBGene00007325	382	1563	2.03	7.14E-12	2.04E-09	WBGene00002178	1495	5073	1.76	7.36E-10	8.90E-08	WBGene00017374	1121	3191	1.51	8.77E-09	6.76E-07
WBGene00015225	19	252	3.7	8.18E-12	2.26E-09	WBGene00009110	25	229	3.22	7.38E-10	8.90E-08	WBGene00017942	1700	469	-1.86	9.47E-09	7.27E-07
WBGene00000048	82	704	3.11	8.19E-12	2.26E-09	WBGene00021587	1	89	7.41	7.47E-10	8.95E-08	WBGene00013081	2556	7821	1.61	9.84E-09	7.53E-07
WBGene00011705	452	1954	2.11	8.60E-12	2.34E-09	WBGene00021059	887	2891	1.7	7.72E-10	9.18E-08	WBGene00000490	885	2875	1.7	1.01E-08	7.73E-07
WBGene00021389	250	3138	3.65	9.31E-12	2.50E-09	WBGene00045509	1398	324	-2.11	7.79E-10	9.21E-08	WBGene00012256	17077	48541	1.51	1.02E-08	7.75E-07
WBGene00017772	335	1395	2.06	9.77E-12	2.58E-09	WBGene00020483	38	317	3.06	8.43E-10	9.90E-08	WBGene00007191	775	2422	1.64	1.06E-08	8.03E-07
WBGene00009619	16	234	3.84	1.02E-11	2.65E-09	WBGene00013592	338	1334	1.98	9.17E-10	1.07E-07	WBGene00018985	607	1925	1.67	1.08E-08	8.13E-07
WBGene00000722	43	493	3.52	1.15E-11	2.95E-09	WBGene00006693	306	1275	2.06	9.50E-10	1.10E-07	WBGene00018414	50	379	2.92	1.09E-08	8.13E-07
WBGene00001403	603	2465	2.03	1.24E-11	3.14E-09	WBGene00044774	405	1534	1.92	9.85E-10	1.13E-07	WBGene00012916	10006	2878	-1.8	1.13E-08	8.45E-07
WBGene00021253	20	248	3.64	1.29E-11	3.22E-09	WBGene00010907	166	734	2.14	1.00E-09	1.15E-07	WBGene00018791	133	608	2.19	1.15E-08	8.57E-07
WBGene00010873	273	1247	2.19	1.32E-11	3.24E-09	WBGene00012851	13576	3683	-1.88	1.03E-09	1.17E-07	WBGene00044202	731	146	-2.33	1.16E-08	8.57E-07
WBGene00008292	467	1874	2.01	1.46E-11	3.56E-09	WBGene00005468	292	38	-2.94	1.04E-09	1.17E-07	WBGene00009515	66	384	2.55	1.17E-08	8.59E-07
WBGene00011866	216	1061	2.29	1.49E-11	3.57E-09	WBGene00010128	123	644	2.39	1.05E-09	1.17E-07	WBGene00011287	64	394	2.61	1.23E-08	9.02E-07
WBGene00045210	66	440	2.75	1.56E-11	3.69E-09	WBGene00003835	3615	815	-2.15	1.10E-09	1.23E-07	WBGene00016717	2068	434	-2.25	1.32E-08	9.61E-07
WBGene00044734	3021	541	-2.48	1.67E-11	3.91E-09	WBGene00020807	20	218	3.47	1.15E-09	1.27E-07	WBGene00001479	1711	7992	2.22	1.34E-08	9.71E-07
WBGene00022623	577	2148	1.9	1.74E-11	4.00E-09	WBGene00006662	249	1110	2.16	1.21E-09	1.34E-07	WBGene00016119	3	104	5.29	1.36E-08	9.84E-07
WBGene00001373	59	426	2.86	1.80E-11	4.09E-09	WBGene00017792	56	390	2.79	1.22E-09	1.34E-07	WBGene00016776	3	98	5.17	1.38E-08	9.93E-07
WBGene00019263	219	999	2.19	1.93E-11	4.34E-09	WBGene00013711	357	1419	1.99	1.25E-09	1.36E-07	WBGene00010811	428	1485	1.8	1.40E-08	1.00E-06
WBGene00011561	396	3562	3.17	2.05E-11	4.54E-09	WBGene00020581	4216	13519	1.68	1.26E-09	1.37E-07	WBGene00010652	170	702	2.05	1.43E-08	1.03E-06
WBGene00002259	401	1592	1.99	2.27E-11	4.96E-09	WBGene00003057	404	3109	2.95	1.30E-09	1.40E-07	WBGene00020143	443	1715	1.95	1.45E-08	1.04E-06
WBGene00010350	750	2940	1.97	2.55E-11	5.52E-09	WBGene00017515	490	1834	1.9	1.33E-09	1.42E-07	WBGene00018726	99	694	2.81	1.56E-08	1.11E-06
WBGene00044131	1608	315	-2.35	2.59E-11	5.54E-09	WBGene00020651	123	592	2.26	1.35E-09	1.43E-07	WBGene00020330	1518	4701	1.63	1.58E-08	1.11E-06
WBGene00013450	42	369	3.12	2.63E-11	5.56E-09	WBGene00010252	974	3131	1.68	1.39E-09	1.47E-07	WBGene00007254	224	797	1.83	1.61E-08	1.13E-06

WBGene00010293	1271	305	-2.06	1.61E-08	1.13E-06	WBGene00004119	0	71	7.86	7.35E-08	3.86E-06	WBGene00001187	9408	23799	1.34	2.26E-07	9.47E-06
WBGene00013306	824	168	-2.29	1.62E-08	1.13E-06	WBGene00019037	11418	2706	-2.08	7.42E-08	3.89E-06	WBGene00001505	460	1684	1.87	2.27E-07	9.49E-06
WBGene00004364	1708	6888	2.01	1.65E-08	1.15E-06	WBGene00004878	30	213	2.8	7.51E-08	3.90E-06	WBGene00018216	1110	3044	1.45	2.29E-07	9.54E-06
WBGene00194692	17	186	3.44	1.66E-08	1.15E-06	WBGene00017429	3094	8255	1.42	7.52E-08	3.90E-06	WBGene00044921	214	718	1.74	2.29E-07	9.54E-06
WBGene00044564	476	1545	1.7	1.69E-08	1.17E-06	WBGene00044107	338	1127	1.74	7.52E-08	3.90E-06	WBGene00017506	97	699	2.85	2.32E-07	9.64E-06
WBGene00020029	670	2180	1.7	1.72E-08	1.18E-06	WBGene00013860	2441	6697	1.46	7.65E-08	3.96E-06	WBGene00043994	557	1632	1.55	2.32E-07	9.64E-06
WBGene00017449	150	716	2.26	1.75E-08	1.20E-06	WBGene00022101	1642	461	-1.83	7.93E-08	4.09E-06	WBGene00044283	431	1319	1.61	2.40E-07	9.94E-06
WBGene00021527	38	268	2.83	1.76E-08	1.20E-06	WBGene00009547	198	835	2.08	8.01E-08	4.12E-06	WBGene00014235	153	561	1.87	2.41E-07	9.95E-06
WBGene00044484	148	1011	2.77	1.88E-08	1.28E-06	WBGene00007083	706	118	-2.58	8.08E-08	4.15E-06	WBGene00001664	55	311	2.5	2.43E-07	1.00E-05
WBGene00010170	8	270	5.06	1.89E-08	1.28E-06	WBGene00043147	158	8	-4.28	8.13E-08	4.16E-06	WBGene00010977	10	125	3.68	2.44E-07	1.00E-05
WBGene00002041	242	963	1.99	1.93E-08	1.30E-06	WBGene00009144	379	1483	1.97	8.44E-08	4.31E-06	WBGene00011559	6291	1980	-1.67	2.53E-07	1.04E-05
WBGene00022055	2357	506	-2.22	1.94E-08	1.30E-06	WBGene00020083	1472	4244	1.53	8.55E-08	4.35E-06	WBGene00016973	160	615	1.94	2.56E-07	1.05E-05
WBGene00012259	23	214	3.23	1.94E-08	1.30E-06	WBGene00009916	28	228	3	8.73E-08	4.42E-06	WBGene00009475	563	1720	1.61	2.63E-07	1.07E-05
WBGene00001795	495	2246	2.18	1.97E-08	1.31E-06	WBGene00044502	111	496	2.16	8.77E-08	4.42E-06	WBGene00009430	8	130	4.02	2.66E-07	1.08E-05
WBGene00003565	77	426	2.48	1.99E-08	1.32E-06	WBGene00021719	7786	2447	-1.67	8.78E-08	4.42E-06	WBGene00006861	1261	3470	1.46	2.72E-07	1.11E-05
WBGene00018099	1322	216	-2.62	2.03E-08	1.34E-06	WBGene00018517	656	1994	1.6	8.78E-08	4.42E-06	WBGene00019346	1080	3201	1.57	2.74E-07	1.11E-05
WBGene00015619	632	2047	1.7	2.04E-08	1.35E-06	WBGene00016044	158	667	2.08	8.90E-08	4.47E-06	WBGene00009299	3345	1015	-1.72	2.76E-07	1.12E-05
WBGene00013960	415	1477	1.83	2.13E-08	1.40E-06	WBGene00002057	1032	3841	1.9	9.00E-08	4.50E-06	WBGene00010225	15	163	3.4	2.77E-07	1.12E-05
WBGene00010111	2556	7463	1.55	2.16E-08	1.41E-06	WBGene00011049	10718	3272	-1.71	9.02E-08	4.50E-06	WBGene00001593	25	178	2.83	2.80E-07	1.13E-05
WBGene00016945	29	227	2.96	2.19E-08	1.42E-06	WBGene00009408	654	1950	1.58	9.07E-08	4.51E-06	WBGene00005715	11	137	3.59	2.81E-07	1.13E-05
WBGene00021089	89	460	2.37	2.19E-08	1.42E-06	WBGene00008478	2	86	5.5	9.25E-08	4.59E-06	WBGene00006747	1237	4985	2.01	2.85E-07	1.14E-05
WBGene00010660	268	1234	2.2	2.24E-08	1.45E-06	WBGene00001594	523	1637	1.65	9.29E-08	4.60E-06	WBGene00008161	3	84	4.95	2.85E-07	1.14E-05
WBGene00019155	32	248	2.94	2.32E-08	1.50E-06	WBGene00012648	858	3778	2.14	9.42E-08	4.65E-06	WBGene00018436	13809	4774	-1.53	2.88E-07	1.15E-05
WBGene00011054	1487	386	-1.95	2.40E-08	1.55E-06	WBGene00011454	276	1363	2.31	9.81E-08	4.83E-06	WBGene00007999	5049	13051	1.37	2.90E-07	1.16E-05
WBGene00019355	38	265	2.79	2.42E-08	1.55E-06	WBGene00019243	3659	1259	-1.54	1.02E-07	4.99E-06	WBGene00016033	2377	8472	1.83	2.92E-07	1.16E-05
WBGene00015504	3053	827	-1.88	2.42E-08	1.55E-06	WBGene00009500	734	2283	1.64	1.09E-07	5.32E-06	WBGene00010442	1423	3943	1.47	3.15E-07	1.25E-05
WBGene00022155	407	1327	1.71	2.47E-08	1.57E-06	WBGene00010274	88	440	2.33	1.09E-07	5.32E-06	WBGene00020903	112	453	2.02	3.15E-07	1.25E-05
WBGene00018416	26925	8393	-1.68	2.55E-08	1.62E-06	WBGene00008900	114	495	2.12	1.10E-07	5.37E-06	WBGene00009558	1465	3900	1.41	3.17E-07	1.25E-05
WBGene00011971	5002	13909	1.48	2.56E-08	1.62E-06	WBGene00021950	2242	6291	1.49	1.12E-07	5.44E-06	WBGene00044078	23	282	3.58	3.17E-07	1.25E-05
WBGene00011392	1579	4641	1.56	2.59E-08	1.63E-06	WBGene00001387	1834	7869	2.1	1.12E-07	5.44E-06	WBGene00013852	4554	11948	1.39	3.19E-07	1.25E-05
WBGene00012429	247	1453	2.56	2.74E-08	1.72E-06	WBGene00019484	204	730	1.84	1.13E-07	5.45E-06	WBGene00016018	765	2183	1.51	3.26E-07	1.28E-05
WBGene00003850	130	771	2.56	2.76E-08	1.73E-06	WBGene00006691	35	238	2.78	1.14E-07	5.51E-06	WBGene00016343	180	648	1.84	3.34E-07	1.31E-05
WBGene00020194	7911	21479	1.44	2.80E-08	1.75E-06	WBGene00008776	2497	7389	1.57	1.15E-07	5.51E-06	WBGene00021054	2572	835	-1.62	3.37E-07	1.32E-05
WBGene00013941	0	62	9.28	2.84E-08	1.76E-06	WBGene00017580	125	524	2.07	1.18E-07	5.64E-06	WBGene00018675	603	1720	1.51	3.38E-07	1.32E-05
WBGene00012255	15475	41434	1.42	2.86E-08	1.77E-06	WBGene00008865	5686	14565	1.36	1.18E-07	5.64E-06	WBGene00017838	199	989	2.31	3.48E-07	1.35E-05
WBGene00022562	746	2482	1.73	2.89E-08	1.78E-06	WBGene00001619	89	406	2.19	1.18E-07	5.64E-06	WBGene00009100	85	511	2.59	3.49E-07	1.36E-05
WBGene00010597	148	608	2.04	3.09E-08	1.90E-06	WBGene00016219	72	508	2.82	1.19E-07	5.67E-06	WBGene00019420	4554	1440	-1.66	3.51E-07	1.36E-05
WBGene00022391	139	773	2.48	3.17E-08	1.95E-06	WBGene00010059	6499	17173	1.4	1.20E-07	5.68E-06	WBGene00044150	292	996	1.77	3.60E-07	1.39E-05
WBGene00012247	2089	579	-1.85	3.23E-08	1.98E-06	WBGene00001819	1574	4422	1.49	1.21E-07	5.72E-06	WBGene00012099	277	995	1.85	3.65E-07	1.41E-05
WBGene00012857	292	1068	1.87	3.27E-08	1.99E-06	WBGene00018349	10732	29848	1.48	1.21E-07	5.72E-06	WBGene00002173	1943	5294	1.45	3.67E-07	1.41E-05
WBGene00006774	736	2288	1.64	3.47E-08	2.11E-06	WBGene00012844	8738	2649	-1.72	1.22E-07	5.72E-06	WBGene00019328	101	441	2.13	3.78E-07	1.45E-05
WBGene00007754	208	1211	2.54	3.51E-08	2.12E-06	WBGene00017156	619	1837	1.57	1.28E-07	6.02E-06	WBGene00020654	192	715	1.89	3.79E-07	1.45E-05
WBGene00019866	699	2344	1.74	3.52E-08	2.12E-06	WBGene00011222	311	1078	1.79	1.29E-07	6.02E-06	WBGene00016450	39	418	3.41	3.85E-07	1.47E-05
WBGene00020114	2355	6883	1.55	3.66E-08	2.20E-06	WBGene00044612	360	1224	1.77	1.30E-07	6.07E-06	WBGene00000953	1285	3576	1.48	3.85E-07	1.47E-05
WBGene00000241	764	2343	1.62	3.68E-08	2.21E-06	WBGene00008977	967	2816	1.54	1.32E-07	6.15E-06	WBGene00012165	462	1396	1.59	3.94E-07	1.50E-05
WBGene00000481	65	351	2.43	3.70E-08	2.21E-06	WBGene00001119	650	1897	1.54	1.35E-07	6.29E-06	WBGene00017013	1811	4688	1.37	4.07E-07	1.55E-05
WBGene00009730	1044	3139	1.59	3.78E-08	2.25E-06	WBGene00009658	8065	2822	-1.51	1.40E-07	6.49E-06	WBGene00044553	843	2414	1.52	4.14E-07	1.57E-05
WBGene00012130	796	2719	1.77	3.82E-08	2.27E-06	WBGene00011315	130	570	2.14	1.45E-07	6.70E-06	WBGene00006055	96	525	2.45	4.25E-07	1.61E-05
WBGene00012118	169	761	2.17	3.85E-08	2.28E-06	WBGene00010209	129	8	-4	1.46E-07	6.72E-06	WBGene00019727	2219	5701	1.36	4.26E-07	1.61E-05
WBGene00022747	39	260	2.74	3.94E-08	2.32E-06	WBGene00004219	15602	41060	1.4	1.47E-07	6.77E-06	WBGene00019405	13	138	3.44	4.37E-07	1.64E-05

WBGene00001669	1138	3256	1.52	3.95E-08	2.32E-06	WBGene00009830	1345	4267	1.67	1.49E-07	6.82E-06	WBGene00014814	2622	894	-1.55	4.46E-07	1.68E-05
WBGene00000402	555	1760	1.67	4.12E-08	2.41E-06	WBGene00004890	2152	5646	1.39	1.51E-07	6.89E-06	WBGene00001544	634	1792	1.5	4.51E-07	1.69E-05
WBGene00009843	324	1136	1.81	4.14E-08	2.42E-06	WBGene00016133	6601	17036	1.37	1.59E-07	7.24E-06	WBGene00013508	49662	16301	-1.61	4.54E-07	1.70E-05
WBGene00006761	1181	3351	1.51	4.19E-08	2.44E-06	WBGene00013610	1738	411	-2.08	1.59E-07	7.25E-06	WBGene00019853	26	193	2.91	4.59E-07	1.71E-05
WBGene00004222	5	111	4.38	4.33E-08	2.51E-06	WBGene00008906	7	112	4.05	1.63E-07	7.38E-06	WBGene00006744	32	289	3.19	4.60E-07	1.71E-05
WBGene00007375	784	2232	1.51	4.37E-08	2.52E-06	WBGene00016237	2073	6056	1.55	1.64E-07	7.40E-06	WBGene00021212	40	267	2.73	4.61E-07	1.72E-05
WBGene00022012	35	292	3.06	4.37E-08	2.52E-06	WBGene00006475	46	279	2.61	1.66E-07	7.48E-06	WBGene00006809	420	1296	1.63	4.63E-07	1.72E-05
WBGene00010344	51	309	2.6	4.45E-08	2.55E-06	WBGene00001136	110	476	2.11	1.67E-07	7.51E-06	WBGene00007097	8	417	5.65	4.64E-07	1.72E-05
WBGene00013024	10948	3525	-1.63	4.46E-08	2.55E-06	WBGene00008515	428	1911	2.16	1.68E-07	7.55E-06	WBGene00007695	262	902	1.79	4.65E-07	1.72E-05
WBGene00001592	102	583	2.51	4.50E-08	2.57E-06	WBGene00006914	4022	15565	1.95	1.70E-07	7.60E-06	WBGene00017437	1173	3434	1.55	4.76E-07	1.75E-05
WBGene00003572	68	419	2.63	4.53E-08	2.57E-06	WBGene00009226	58	588	3.35	1.71E-07	7.65E-06	WBGene00003762	477	1572	1.72	4.77E-07	1.75E-05
WBGene00011678	69	355	2.35	4.62E-08	2.62E-06	WBGene00012841	5475	1739	-1.65	1.72E-07	7.68E-06	WBGene00011520	373	1124	1.59	4.78E-07	1.75E-05
WBGene00013328	725	2137	1.56	4.74E-08	2.68E-06	WBGene00001133	67	428	2.68	1.73E-07	7.68E-06	WBGene00002977	4239	10706	1.34	4.79E-07	1.76E-05
WBGene00015294	211	915	2.11	4.85E-08	2.73E-06	WBGene00004507	780	2458	1.66	1.73E-07	7.68E-06	WBGene00003426	78	1	-6.74	4.86E-07	1.78E-05
WBGene00045253	38	263	2.8	5.11E-08	2.87E-06	WBGene00015376	98	444	2.18	1.74E-07	7.69E-06	WBGene00017555	270	43	-2.66	4.98E-07	1.82E-05
WBGene00013054	1132	185	-2.61	5.16E-08	2.89E-06	WBGene00020260	70	389	2.47	1.75E-07	7.74E-06	WBGene00044743	626	1928	1.62	5.02E-07	1.83E-05
WBGene00006960	185	776	2.06	5.36E-08	2.98E-06	WBGene00000007	16	221	3.76	1.78E-07	7.83E-06	WBGene00002048	4270	11427	1.42	5.10E-07	1.85E-05
WBGene00018590	64	349	2.44	5.36E-08	2.98E-06	WBGene00021008	426	1364	1.68	1.80E-07	7.89E-06	WBGene00019414	4542	1536	-1.56	5.27E-07	1.91E-05
WBGene00004233	2060	5710	1.47	5.51E-08	3.06E-06	WBGene00019166	924	2733	1.56	1.81E-07	7.91E-06	WBGene00008176	22	179	2.99	5.37E-07	1.94E-05
WBGene00021164	39	254	2.72	5.62E-08	3.11E-06	WBGene00018236	3886	1314	-1.56	1.82E-07	7.96E-06	WBGene00018730	63	398	2.67	5.40E-07	1.95E-05
WBGene00022322	1537	394	-1.96	5.78E-08	3.19E-06	WBGene00009060	237	937	1.98	1.84E-07	8.02E-06	WBGene00002018	4280	940	-2.19	5.47E-07	1.97E-05
WBGene00017513	1035	2904	1.49	5.85E-08	3.22E-06	WBGene00010227	4869	1095	-2.15	1.84E-07	8.02E-06	WBGene00017945	439	1312	1.58	5.55E-07	2.00E-05
WBGene00016455	7605	2575	-1.56	6.17E-08	3.38E-06	WBGene00016328	209	715	1.77	1.87E-07	8.10E-06	WBGene00013290	197	6	-4.99	5.56E-07	2.00E-05
WBGene00019908	164	686	2.06	6.23E-08	3.40E-06	WBGene00008167	703	2150	1.61	1.89E-07	8.16E-06	WBGene00018442	3001	957	-1.65	5.57E-07	2.00E-05
WBGene00019682	208	1084	2.38	6.50E-08	3.54E-06	WBGene00016448	287	1060	1.89	1.92E-07	8.28E-06	WBGene00004401	201	1010	2.33	5.62E-07	2.01E-05
WBGene00001044	696	147	-2.24	6.55E-08	3.56E-06	WBGene00011782	0	62	7.67	1.96E-07	8.46E-06	WBGene00011727	36	215	2.58	5.68E-07	2.03E-05
WBGene00001816	4003	1273	-1.65	6.83E-08	3.69E-06	WBGene00050935	447	104	-2.11	1.98E-07	8.51E-06	WBGene00006831	3543	10194	1.52	5.70E-07	2.03E-05
WBGene00009791	548	2356	2.1	6.87E-08	3.71E-06	WBGene00006309	729	2121	1.54	2.00E-07	8.58E-06	WBGene00012668	147	557	1.93	5.72E-07	2.03E-05
WBGene00008698	10	149	3.91	6.92E-08	3.72E-06	WBGene00020340	582	2061	1.82	2.05E-07	8.75E-06	WBGene00077585	332	71	-2.23	5.86E-07	2.08E-05
WBGene00000746	40	276	2.79	7.02E-08	3.77E-06	WBGene00000401	4831	12230	1.34	2.08E-07	8.88E-06	WBGene00050904	6	101	4.04	5.88E-07	2.08E-05
WBGene00011508	8527	25770	1.6	7.12E-08	3.80E-06	WBGene00020897	444	1614	1.86	2.09E-07	8.89E-06	WBGene00000006	508	1930	1.93	5.90E-07	2.09E-05
WBGene00003707	219	785	1.84	7.14E-08	3.80E-06	WBGene00017666	374	1151	1.62	2.16E-07	9.16E-06	WBGene00002974	658	1966	1.58	6.04E-07	2.13E-05
WBGene00018971	146	598	2.03	7.15E-08	3.80E-06	WBGene00013230	5896	1900	-1.63	2.16E-07	9.16E-06	WBGene00009721	3306	1074	-1.62	6.09E-07	2.14E-05
WBGene00019754	77	640	3.06	7.18E-08	3.81E-06	WBGene00021704	519	87	-2.58	2.18E-07	9.19E-06	WBGene00018992	518	1543	1.57	6.17E-07	2.17E-05
WBGene00013842	14	154	3.42	7.28E-08	3.84E-06	WBGene00018217	1662	4324	1.38	2.18E-07	9.20E-06	WBGene00044169	191	1011	2.4	6.20E-07	2.18E-05
WBGene00003175	2289	6788	1.57	7.29E-08	3.84E-06	WBGene00005655	1434	3771	1.39	2.21E-07	9.31E-06	WBGene00008542	1093	2981	1.45	6.31E-07	2.21E-05
WBGene00015035	183	624	1.77	6.33E-07	2.21E-05	WBGene00016217	160	848	2.41	1.30E-06	3.89E-05	WBGene00000727	189	756	2	2.17E-06	5.67E-05
WBGene00007675	2986	1048	-1.51	6.33E-07	2.21E-05	WBGene00001519	1194	2992	1.33	1.30E-06	3.89E-05	WBGene00003983	16457	5809	-1.5	2.17E-06	5.67E-05
WBGene00000673	98	358	1.87	6.36E-07	2.21E-05	WBGene00007502	27	184	2.75	1.30E-06	3.89E-05	WBGene00008784	27419	9620	-1.51	2.21E-06	5.77E-05
WBGene00016453	46842	17315	-1.44	6.41E-07	2.23E-05	WBGene00018133	738	2064	1.48	1.31E-06	3.90E-05	WBGene00022296	12900	4950	-1.38	2.23E-06	5.82E-05
WBGene00017343	5199	1857	-1.49	6.44E-07	2.23E-05	WBGene00007071	8	152	4.29	1.32E-06	3.91E-05	WBGene00004998	1585	4662	1.56	2.26E-06	5.87E-05
WBGene00017344	3614	1136	-1.67	6.52E-07	2.26E-05	WBGene00020390	1061	2890	1.45	1.32E-06	3.92E-05	WBGene00012289	1285	4369	1.77	2.26E-06	5.88E-05
WBGene00002142	495	1469	1.57	6.64E-07	2.29E-05	WBGene00002128	2290	7019	1.62	1.32E-06	3.92E-05	WBGene00016485	4647	1585	-1.55	2.28E-06	5.91E-05
WBGene00011928	65	524	3.01	6.71E-07	2.31E-05	WBGene00016190	104	775	2.9	1.35E-06	3.99E-05	WBGene00020385	14	147	3.43	2.28E-06	5.91E-05
WBGene00015478	1422	3752	1.4	6.71E-07	2.31E-05	WBGene00008199	173	603	1.8	1.40E-06	4.13E-05	WBGene00017337	748	155	-2.27	2.29E-06	5.92E-05
WBGene00016221	37	214	2.54	6.72E-07	2.31E-05	WBGene00007525	13	145	3.46	1.40E-06	4.13E-05	WBGene00004780	33	197	2.59	2.29E-06	5.92E-05
WBGene00000173	5	98	4.21	6.73E-07	2.31E-05	WBGene00021519	261	916	1.81	1.41E-06	4.16E-05	WBGene00018073	5407	19558	1.85	2.30E-06	5.94E-05
WBGene00015112	56089	18578	-1.59	6.75E-07	2.31E-05	WBGene00016106	4571	10998	1.27	1.42E-06	4.17E-05	WBGene00011676	460	1154	1.33	2.32E-06	5.98E-05
WBGene00022848	269	907	1.76	6.82E-07	2.33E-05	WBGene00003597	2981	7231	1.28	1.42E-06	4.17E-05	WBGene00008093	1717	4240	1.3	2.33E-06	5.99E-05
WBGene00044500	1271	3705	1.54	6.83E-07	2.33E-05	WBGene00001059	336	1613	2.26	1.42E-06	4.17E-05	WBGene00004316	349	1843	2.4	2.37E-06	6.08E-05

WBGene00009157	302	988	1.71	6.85E-07	2.33E-05	WBGene00019840	9	113	3.57	1.44E-06	4.21E-05	WBGene00015936	19	159	3.11	2.39E-06	6.15E-05
WBGene00008168	1941	5077	1.39	6.87E-07	2.33E-05	WBGene00018282	756	2838	1.91	1.44E-06	4.21E-05	WBGene00011515	3	83	4.76	2.41E-06	6.18E-05
WBGene00000522	59	308	2.38	6.90E-07	2.34E-05	WBGene00017227	43	207	2.27	1.45E-06	4.21E-05	WBGene00007949	463	1326	1.52	2.42E-06	6.18E-05
WBGene00019485	11	120	3.48	6.98E-07	2.36E-05	WBGene00017306	38	230	2.61	1.45E-06	4.21E-05	WBGene00021224	1145	7	-7.29	2.43E-06	6.22E-05
WBGene00009304	10212	26227	1.36	7.09E-07	2.39E-05	WBGene00012532	1667	4196	1.33	1.45E-06	4.22E-05	WBGene00175034	8	98	3.7	2.44E-06	6.22E-05
WBGene00013019	8426	2487	-1.76	7.09E-07	2.39E-05	WBGene00000633	135	620	2.2	1.46E-06	4.23E-05	WBGene00000441	519	1540	1.57	2.44E-06	6.22E-05
WBGene00017288	3171	1169	-1.44	7.11E-07	2.39E-05	WBGene00016468	166	591	1.83	1.46E-06	4.23E-05	WBGene00000679	186	658	1.82	2.46E-06	6.26E-05
WBGene00021863	15915	5630	-1.5	7.20E-07	2.42E-05	WBGene00015202	21	220	3.4	1.47E-06	4.26E-05	WBGene00007174	1442	5061	1.81	2.47E-06	6.26E-05
WBGene00018538	8	113	3.88	7.30E-07	2.45E-05	WBGene00022396	5340	15102	1.5	1.48E-06	4.27E-05	WBGene00016100	5	89	4.06	2.47E-06	6.27E-05
WBGene00017157	129	528	2.04	7.38E-07	2.47E-05	WBGene00012421	976	2424	1.31	1.49E-06	4.30E-05	WBGene00018690	1746	667	-1.39	2.49E-06	6.31E-05
WBGene00009901	26	189	2.84	7.40E-07	2.47E-05	WBGene00004816	38266	14074	-1.44	1.51E-06	4.35E-05	WBGene00010440	135	520	1.94	2.53E-06	6.41E-05
WBGene00015947	122	404	1.73	7.42E-07	2.47E-05	WBGene00007804	1	62	5.98	1.52E-06	4.36E-05	WBGene00010275	115	807	2.81	2.54E-06	6.42E-05
WBGene00044701	69	682	3.31	7.57E-07	2.51E-05	WBGene00006600	167	601	1.85	1.52E-06	4.38E-05	WBGene00000692	512	2195	2.1	2.55E-06	6.42E-05
WBGene00020317	157	779	2.31	7.57E-07	2.51E-05	WBGene00010248	1259	382	-1.72	1.53E-06	4.38E-05	WBGene00015921	57	284	2.31	2.60E-06	6.54E-05
WBGene00000042	32	256	3.01	7.59E-07	2.52E-05	WBGene00016346	1508	503	-1.58	1.55E-06	4.44E-05	WBGene00008462	232	758	1.71	2.63E-06	6.62E-05
WBGene00010101	5913	1402	-2.08	7.65E-07	2.53E-05	WBGene00019703	22830	7976	-1.52	1.55E-06	4.44E-05	WBGene00009842	129	594	2.21	2.68E-06	6.72E-05
WBGene00016303	8010	2655	-1.59	7.68E-07	2.53E-05	WBGene00013962	10631	25846	1.28	1.56E-06	4.44E-05	WBGene00022419	652	1692	1.38	2.68E-06	6.72E-05
WBGene00018515	363	1220	1.75	7.77E-07	2.56E-05	WBGene00004925	225	734	1.71	1.57E-06	4.46E-05	WBGene00000720	9	111	3.66	2.68E-06	6.72E-05
WBGene00018486	30	235	2.96	7.79E-07	2.56E-05	WBGene00008570	125	786	2.66	1.57E-06	4.46E-05	WBGene00016415	5194	12417	1.26	2.71E-06	6.79E-05
WBGene00010970	20	173	3.15	7.80E-07	2.56E-05	WBGene00010712	12	131	3.44	1.58E-06	4.50E-05	WBGene00001984	679	1882	1.47	2.72E-06	6.80E-05
WBGene00018576	158	603	1.93	7.83E-07	2.56E-05	WBGene00044049	1706	4450	1.38	1.59E-06	4.50E-05	WBGene00000403	12164	27260	1.16	2.72E-06	6.80E-05
WBGene00006200	221	25	-3.12	7.83E-07	2.56E-05	WBGene00013762	11	131	3.52	1.60E-06	4.52E-05	WBGene00015620	2707	6670	1.3	2.74E-06	6.84E-05
WBGene00003977	72914	25359	-1.52	7.88E-07	2.57E-05	WBGene00020605	144	494	1.78	1.60E-06	4.52E-05	WBGene00020191	27	184	2.75	2.76E-06	6.87E-05
WBGene00020266	6	101	3.96	8.30E-07	2.70E-05	WBGene00018885	109	536	2.3	1.61E-06	4.53E-05	WBGene00011317	13	145	3.43	2.79E-06	6.93E-05
WBGene00001691	77	1302	4.09	8.31E-07	2.70E-05	WBGene00002054	7132	19371	1.44	1.62E-06	4.55E-05	WBGene00016447	91	2	-5.22	2.86E-06	7.10E-05
WBGene00010158	73670	25854	-1.51	8.63E-07	2.80E-05	WBGene00001452	260	809	1.64	1.62E-06	4.55E-05	WBGene00014188	34	621	4.2	2.87E-06	7.12E-05
WBGene00015061	11791	29980	1.35	8.71E-07	2.83E-05	WBGene00008270	339	996	1.55	1.62E-06	4.55E-05	WBGene00044404	286	933	1.71	2.88E-06	7.13E-05
WBGene00016314	101	457	2.17	8.90E-07	2.88E-05	WBGene00194682	546	34	-3.99	1.64E-06	4.59E-05	WBGene00016005	585	1660	1.5	2.89E-06	7.13E-05
WBGene00003736	996	5168	2.37	8.90E-07	2.88E-05	WBGene00008582	349	1929	2.47	1.65E-06	4.61E-05	WBGene00000370	1033	2770	1.42	2.92E-06	7.21E-05
WBGene00012201	429	1305	1.6	8.98E-07	2.90E-05	WBGene00045024	5	91	4.34	1.66E-06	4.63E-05	WBGene00019128	358	1154	1.69	2.94E-06	7.25E-05
WBGene00007746	587	2794	2.25	9.03E-07	2.91E-05	WBGene00010066	3812	1150	-1.73	1.66E-06	4.63E-05	WBGene00019536	702	1791	1.35	2.97E-06	7.30E-05
WBGene00009340	3965	10429	1.4	9.14E-07	2.94E-05	WBGene00009826	160	562	1.81	1.66E-06	4.63E-05	WBGene00017798	366	1053	1.52	3.02E-06	7.43E-05
WBGene00021213	1957	4826	1.3	9.27E-07	2.97E-05	WBGene00019204	371	1076	1.54	1.67E-06	4.64E-05	WBGene00017351	72	328	2.19	3.04E-06	7.46E-05
WBGene00011653	19	509	4.78	9.28E-07	2.97E-05	WBGene00016425	7	233	4.99	1.68E-06	4.66E-05	WBGene00007769	1124	320	-1.81	3.07E-06	7.53E-05
WBGene00018823	315	963	1.61	9.51E-07	3.04E-05	WBGene00022645	65	448	2.78	1.68E-06	4.66E-05	WBGene00017620	3737	1207	-1.63	3.09E-06	7.57E-05
WBGene00013518	1963	4828	1.3	9.52E-07	3.04E-05	WBGene00138717	6505	2230	-1.54	1.69E-06	4.67E-05	WBGene00020331	205	699	1.77	3.12E-06	7.63E-05
WBGene00002039	13357	32816	1.3	9.56E-07	3.04E-05	WBGene00010214	80	303	1.91	1.69E-06	4.67E-05	WBGene00011836	560	1962	1.81	3.13E-06	7.64E-05
WBGene00006217	479	1356	1.5	9.64E-07	3.06E-05	WBGene00009090	11	124	3.45	1.70E-06	4.69E-05	WBGene00000225	5777	13350	1.21	3.18E-06	7.74E-05
WBGene00019285	2404	9361	1.96	9.74E-07	3.09E-05	WBGene00077592	77	424	2.45	1.71E-06	4.71E-05	WBGene00138721	5	98	4.26	3.21E-06	7.81E-05
WBGene00008654	153	1016	2.73	9.75E-07	3.09E-05	WBGene00009393	12	148	3.67	1.72E-06	4.72E-05	WBGene00008782	14925	5345	-1.48	3.22E-06	7.82E-05
WBGene00017912	5720	2035	-1.49	9.78E-07	3.09E-05	WBGene00011684	129	518	2.01	1.72E-06	4.73E-05	WBGene00020438	4495	1434	-1.65	3.23E-06	7.84E-05
WBGene00006985	2073	5682	1.45	9.84E-07	3.11E-05	WBGene00006526	125	472	1.92	1.73E-06	4.75E-05	WBGene00000085	49	250	2.36	3.25E-06	7.88E-05
WBGene00021520	5	99	4.27	9.86E-07	3.11E-05	WBGene00000172	830	3083	1.89	1.74E-06	4.75E-05	WBGene00011090	221	711	1.69	3.25E-06	7.88E-05
WBGene00012300	3337	761	-2.13	9.89E-07	3.11E-05	WBGene00006767	1113	3099	1.48	1.74E-06	4.75E-05	WBGene00011182	2356	7045	1.58	3.29E-06	7.94E-05
WBGene00000719	14	142	3.33	1.01E-06	3.17E-05	WBGene00013415	733	1930	1.4	1.76E-06	4.80E-05	WBGene00004223	172	576	1.74	3.30E-06	7.96E-05
WBGene00119203	128	498	1.96	1.04E-06	3.26E-05	WBGene00002053	15186	36112	1.25	1.76E-06	4.81E-05	WBGene00008123	8	107	3.74	3.31E-06	7.98E-05
WBGene00015843	801	153	-2.39	1.04E-06	3.26E-05	WBGene00008987	2347	5632	1.26	1.78E-06	4.84E-05	WBGene00016337	4087	1550	-1.4	3.38E-06	8.13E-05
WBGene00014094	173	977	2.5	1.06E-06	3.31E-05	WBGene00020579	369	2352	2.67	1.78E-06	4.84E-05	WBGene00022010	644	2715	2.08	3.40E-06	8.17E-05
WBGene00010294	169	6	-4.82	1.09E-06	3.39E-05	WBGene00010385	346	1272	1.88	1.79E-06	4.86E-05	WBGene00019156	43	297	2.8	3.45E-06	8.27E-05
WBGene00019230	38	242	2.66	1.10E-06	3.41E-05	WBGene00011335	428	1694	1.98	1.80E-06	4.88E-05	WBGene00012904	8388	3008	-1.48	3.45E-06	8.28E-05

WBGene00018879	27	224	3.03	1.10E-06	3.43E-05	WBGene00004808	27934	6832	-2.03	1.82E-06	4.93E-05	WBGene00019765	65	303	2.23	3.46E-06	8.28E-05
WBGene00008352	35	215	2.62	1.11E-06	3.43E-05	WBGene00022283	6670	16817	1.33	1.84E-06	4.97E-05	WBGene00007420	266	816	1.62	3.49E-06	8.34E-05
WBGene00018706	198	771	1.96	1.11E-06	3.44E-05	WBGene00044021	39	232	2.58	1.84E-06	4.97E-05	WBGene00007339	514	1870	1.86	3.52E-06	8.39E-05
WBGene00001159	2069	5314	1.36	1.12E-06	3.45E-05	WBGene00020543	6217	2321	-1.42	1.89E-06	5.09E-05	WBGene00010202	29	318	3.47	3.52E-06	8.39E-05
WBGene00015762	2	61	5.07	1.12E-06	3.45E-05	WBGene00001621	240	848	1.82	1.93E-06	5.20E-05	WBGene00016705	1665	621	-1.42	3.52E-06	8.39E-05
WBGene00006453	335	1206	1.85	1.12E-06	3.45E-05	WBGene00022824	251	785	1.65	1.97E-06	5.30E-05	WBGene00013699	18962	7462	-1.35	3.53E-06	8.41E-05
WBGene00010109	126	831	2.72	1.15E-06	3.54E-05	WBGene00018438	28655	10535	-1.44	1.98E-06	5.32E-05	WBGene00012041	4532	1770	-1.36	3.56E-06	8.46E-05
WBGene00012163	47	253	2.42	1.15E-06	3.55E-05	WBGene00011075	555	1588	1.52	2.01E-06	5.38E-05	WBGene00013895	415	1250	1.59	3.59E-06	8.52E-05
WBGene00016210	2909	7176	1.3	1.16E-06	3.56E-05	WBGene00044737	171	587	1.78	2.02E-06	5.39E-05	WBGene00001413	5475	2006	-1.45	3.62E-06	8.58E-05
WBGene00004363	4997	12131	1.28	1.16E-06	3.56E-05	WBGene00003892	901	2446	1.44	2.02E-06	5.39E-05	WBGene00000535	90	757	3.07	3.63E-06	8.60E-05
WBGene00017193	679	3096	2.19	1.18E-06	3.61E-05	WBGene00003808	34	234	2.8	2.03E-06	5.40E-05	WBGene00004347	222	662	1.58	3.67E-06	8.67E-05
WBGene00044156	20	209	3.42	1.18E-06	3.61E-05	WBGene00016059	1680	4385	1.38	2.06E-06	5.48E-05	WBGene00000059	120	423	1.82	3.70E-06	8.74E-05
WBGene00002052	719	2991	2.06	1.19E-06	3.63E-05	WBGene00189995	3030	7482	1.3	2.06E-06	5.48E-05	WBGene00004281	955	2493	1.38	3.75E-06	8.82E-05
WBGene00021870	1954	5616	1.52	1.20E-06	3.64E-05	WBGene00003672	64	710	3.46	2.08E-06	5.52E-05	WBGene00017842	1046	3395	1.7	3.75E-06	8.82E-05
WBGene00011077	61	409	2.73	1.21E-06	3.67E-05	WBGene00020766	77	336	2.12	2.10E-06	5.56E-05	WBGene00011762	723	2155	1.58	3.75E-06	8.82E-05
WBGene00003969	696	1923	1.47	1.23E-06	3.72E-05	WBGene00086562	1578	547	-1.53	2.11E-06	5.60E-05	WBGene00021985	8956	3341	-1.42	3.80E-06	8.93E-05
WBGene00019797	3094	1042	-1.57	1.23E-06	3.72E-05	WBGene00011078	62	305	2.3	2.12E-06	5.60E-05	WBGene00005559	5	92	4.29	3.82E-06	8.95E-05
WBGene00019550	50	499	3.31	1.26E-06	3.81E-05	WBGene00006655	1032	2650	1.36	2.15E-06	5.67E-05	WBGene00019370	89	375	2.07	3.82E-06	8.95E-05
WBGene00019313	15167	5465	-1.47	1.27E-06	3.82E-05	WBGene00000510	726	1862	1.36	2.15E-06	5.67E-05	WBGene00000144	2087	491	-2.09	3.83E-06	8.95E-05
WBGene00014144	6830	2414	-1.5	1.27E-06	3.82E-05	WBGene00020571	1586	4537	1.52	2.16E-06	5.67E-05	WBGene00003093	107	399	1.9	3.86E-06	9.01E-05
WBGene00003563	69	317	2.2	1.28E-06	3.86E-05	WBGene00014021	1040	2733	1.39	2.16E-06	5.67E-05	WBGene00017568	725	2105	1.54	3.90E-06	9.08E-05
WBGene00021304	169	799	2.24	1.29E-06	3.86E-05	WBGene00006690	369	1115	1.59	2.17E-06	5.67E-05	WBGene00011314	569	1526	1.42	3.90E-06	9.08E-05
WBGene00004856	140	515	1.88	3.90E-06	9.08E-05	WBGene00010974	962	2418	1.33	5.97E-06	0.000125	WBGene00008278	20	143	2.88	8.54E-06	0.0001626
WBGene00008512	675	2808	2.06	3.94E-06	9.13E-05	WBGene00012593	14	219	3.98	5.98E-06	0.0001252	WBGene00004275	13	129	3.36	8.73E-06	0.000166
WBGene00004910	2977	8477	1.51	3.94E-06	9.13E-05	WBGene00020196	781	2326	1.57	6.00E-06	0.0001253	WBGene00021458	22254	7856	-1.5	8.74E-06	0.0001661
WBGene00019034	1975	739	-1.42	3.94E-06	9.13E-05	WBGene00009546	9228	3442	-1.42	6.03E-06	0.0001259	WBGene00018444	4792	1864	-1.36	8.96E-06	0.0001699
WBGene00000368	3601	8476	1.24	3.95E-06	9.13E-05	WBGene00013319	6174	1807	-1.77	6.05E-06	0.0001261	WBGene00018283	242	733	1.6	8.99E-06	0.0001703
WBGene00002393	2123	5309	1.32	3.95E-06	9.13E-05	WBGene00010099	1046	320	-1.71	6.06E-06	0.0001261	WBGene00004921	244	1936	2.99	9.01E-06	0.0001706
WBGene00011794	1866	4683	1.33	3.97E-06	9.16E-05	WBGene00011432	23639	9554	-1.31	6.07E-06	0.0001261	WBGene00017295	77	332	2.11	9.02E-06	0.0001706
WBGene00043985	41	236	2.52	3.97E-06	9.16E-05	WBGene00018479	43	208	2.26	6.09E-06	0.0001264	WBGene00010722	137	506	1.89	9.05E-06	0.0001709
WBGene00003527	41	339	3.05	3.98E-06	9.17E-05	WBGene00019870	86	339	1.99	6.11E-06	0.0001266	WBGene00007353	485	1300	1.42	9.13E-06	0.0001722
WBGene00008993	116	444	1.93	4.07E-06	9.37E-05	WBGene00003143	4971	11414	1.2	6.14E-06	0.0001271	WBGene00007453	3	89	4.92	9.14E-06	0.0001722
WBGene00010104	2412	865	-1.48	4.08E-06	9.38E-05	WBGene00000631	63	525	3.05	6.14E-06	0.0001271	WBGene00000089	403	1153	1.52	9.15E-06	0.0001722
WBGene00009537	5225	1735	-1.59	4.14E-06	9.51E-05	WBGene00000082	1829	4651	1.35	6.17E-06	0.0001276	WBGene00004246	784	271	-1.53	9.16E-06	0.0001724
WBGene00001569	17151	6269	-1.45	4.18E-06	9.58E-05	WBGene00011587	750	1952	1.38	6.25E-06	0.000129	WBGene00008277	431	2352	2.45	9.22E-06	0.000173
WBGene00019108	721	1847	1.36	4.19E-06	9.60E-05	WBGene00019174	94	402	2.09	6.28E-06	0.0001295	WBGene00010899	2159	4964	1.2	9.22E-06	0.000173
WBGene00006637	1452	3661	1.33	4.20E-06	9.60E-05	WBGene00010185	496	12	-5.4	6.29E-06	0.0001295	WBGene00016307	14692	6219	-1.24	9.23E-06	0.000173
WBGene00016626	587	1530	1.38	4.20E-06	9.60E-05	WBGene00050875	90	474	2.4	6.30E-06	0.0001297	WBGene00021134	10	106	3.45	9.24E-06	0.0001731
WBGene00016308	4365	1797	-1.28	4.22E-06	9.61E-05	WBGene00006476	14083	31077	1.14	6.37E-06	0.0001308	WBGene00019448	329	966	1.55	9.36E-06	0.0001751
WBGene00020231	92	368	2	4.22E-06	9.61E-05	WBGene00006752	1622	9178	2.5	6.39E-06	0.0001312	WBGene00017721	726	2867	1.98	9.42E-06	0.000176
WBGene00021439	177	811	2.2	4.25E-06	9.66E-05	WBGene00016506	133	420	1.66	6.42E-06	0.0001316	WBGene00044206	1	55	6.16	9.49E-06	0.0001773
WBGene00012554	6386	18949	1.57	4.28E-06	9.72E-05	WBGene00007615	3902	1506	-1.37	6.44E-06	0.0001319	WBGene00010519	19673	6901	-1.51	9.54E-06	0.000178
WBGene00001184	3244	7765	1.26	4.29E-06	9.73E-05	WBGene00013715	79	657	3.06	6.45E-06	0.0001319	WBGene00001457	52	252	2.28	9.61E-06	0.0001791
WBGene00018729	39	210	2.43	4.31E-06	9.75E-05	WBGene00010972	559	1890	1.76	6.46E-06	0.0001319	WBGene00007182	5036	1998	-1.33	9.63E-06	0.0001792
WBGene00006670	111	466	2.07	4.31E-06	9.75E-05	WBGene00012921	21	265	3.63	6.52E-06	0.0001331	WBGene00018772	298	835	1.49	9.63E-06	0.0001792
WBGene00005003	214	677	1.66	4.32E-06	9.75E-05	WBGene00011393	6591	15326	1.22	6.56E-06	0.0001338	WBGene00017327	622	1667	1.42	9.64E-06	0.0001792
WBGene00009862	3069	1179	-1.38	4.32E-06	9.75E-05	WBGene00022661	32	211	2.72	6.57E-06	0.0001339	WBGene00010451	3010	1202	-1.32	9.71E-06	0.0001802
WBGene00016108	108	403	1.9	4.34E-06	9.79E-05	WBGene00017467	151	526	1.8	6.63E-06	0.0001349	WBGene00008874	7	90	3.61	9.81E-06	0.0001818
WBGene00019239	3731	1539	-1.28	4.39E-06	9.88E-05	WBGene00012701	7173	2771	-1.37	6.64E-06	0.0001349	WBGene00003775	11	118	3.46	9.86E-06	0.0001826
WBGene00017320	82	320	1.97	4.41E-06	9.91E-05	WBGene00015645	442	1202	1.44	6.65E-06	0.000135	WBGene00018274	575	1360	1.24	9.90E-06	0.0001831

WBGene00016953	100	520	2.38	4.41E-06	9.91E-05	WBGene00195143	1	55	5.92	6.66E-06	0.0001351	WBGene00016309	13489	5463	-1.3	1.01E-05	0.0001864
WBGene00009088	3613	1175	-1.62	4.42E-06	9.91E-05	WBGene00007206	376	1277	1.76	6.68E-06	0.0001352	WBGene00044382	18	170	3.27	1.01E-05	0.0001864
WBGene00010918	1613	3817	1.24	4.42E-06	9.91E-05	WBGene00002024	727	2735	1.91	6.75E-06	0.0001366	WBGene00009609	1	50	6.36	1.02E-05	0.0001888
WBGene00000397	9066	23352	1.36	4.47E-06	1.00E-04	WBGene00007314	42	226	2.42	6.79E-06	0.0001372	WBGene00004220	3533	9144	1.37	1.03E-05	0.0001893
WBGene00010642	1289	3442	1.42	4.48E-06	0.00010017	WBGene00012096	1671	622	-1.43	6.85E-06	0.0001381	WBGene00009811	930	2199	1.24	1.03E-05	0.0001896
WBGene00016160	36	210	2.56	4.49E-06	0.00010017	WBGene00004285	24	162	2.78	6.85E-06	0.0001381	WBGene00011427	1367	4148	1.6	1.03E-05	0.0001896
WBGene00017549	2874	753	-1.93	4.50E-06	0.00010021	WBGene00020367	1168	2765	1.24	6.96E-06	0.0001403	WBGene00001171	950	2699	1.51	1.03E-05	0.0001896
WBGene00013273	546	1409	1.37	4.55E-06	0.00010123	WBGene00020222	32	289	3.18	7.01E-06	0.000141	WBGene00009850	684	1815	1.41	1.03E-05	0.0001896
WBGene00000211	8451	3316	-1.35	4.59E-06	0.00010195	WBGene00009356	45	282	2.64	7.03E-06	0.0001413	WBGene00002017	7915	2073	-1.93	1.04E-05	0.0001898
WBGene00011911	56	0	-7.3	4.61E-06	0.00010227	WBGene00017014	230	666	1.53	7.10E-06	0.0001425	WBGene00004830	6548	15985	1.29	1.04E-05	0.0001904
WBGene00004127	1496	4611	1.62	4.62E-06	0.00010227	WBGene00004854	7296	16749	1.2	7.16E-06	0.0001436	WBGene00003860	195	740	1.92	1.04E-05	0.0001904
WBGene00016533	147	506	1.78	4.62E-06	0.00010227	WBGene00022696	827	2093	1.34	7.22E-06	0.0001445	WBGene00012716	5370	2046	-1.39	1.04E-05	0.0001905
WBGene00019518	234	955	2.03	4.64E-06	0.00010255	WBGene00016266	195	682	1.81	7.22E-06	0.0001445	WBGene00014261	568	1967	1.79	1.05E-05	0.0001918
WBGene00020665	16859	6283	-1.42	4.66E-06	0.00010308	WBGene00014035	24	152	2.68	7.27E-06	0.0001453	WBGene00013425	4655	1828	-1.35	1.05E-05	0.000192
WBGene00007802	121	408	1.75	4.68E-06	0.00010332	WBGene00008194	1101	5018	2.19	7.29E-06	0.0001455	WBGene00013433	2538	840	-1.59	1.05E-05	0.0001922
WBGene00002986	3144	1151	-1.45	4.69E-06	0.00010332	WBGene00013086	14074	4865	-1.53	7.31E-06	0.0001457	WBGene00012066	2722	1058	-1.36	1.06E-05	0.0001925
WBGene00008727	212	1022	2.27	4.69E-06	0.00010332	WBGene00009388	5	90	4.12	7.37E-06	0.0001468	WBGene00000768	3157	8029	1.35	1.06E-05	0.0001927
WBGene00016817	293	851	1.54	4.73E-06	0.00010403	WBGene00019522	2230	943	-1.24	7.38E-06	0.0001469	WBGene00011556	21	128	2.62	1.07E-05	0.0001946
WBGene00008829	725	236	-1.62	4.74E-06	0.00010403	WBGene00010365	10307	3289	-1.65	7.43E-06	0.0001476	WBGene00010904	521	1606	1.62	1.07E-05	0.000195
WBGene00003956	1087	3702	1.77	4.77E-06	0.00010467	WBGene00008558	130	478	1.88	7.44E-06	0.0001476	WBGene00000730	36	203	2.49	1.09E-05	0.0001976
WBGene00017252	5003	1797	-1.48	4.78E-06	0.00010467	WBGene00023486	2	109	5.67	7.48E-06	0.0001483	WBGene00010019	74	314	2.09	1.10E-05	0.0001982
WBGene00005485	43	0	-8.74	4.80E-06	0.00010505	WBGene00013539	125	438	1.81	7.51E-06	0.0001488	WBGene00009797	840	2155	1.36	1.10E-05	0.0001982
WBGene00008547	4182	9781	1.23	4.81E-06	0.00010519	WBGene00020075	340	1063	1.65	7.53E-06	0.0001489	WBGene00000069	137	512	1.9	1.10E-05	0.0001983
WBGene00018174	200	1092	2.45	4.82E-06	0.00010529	WBGene00019579	25	189	2.9	7.56E-06	0.0001492	WBGene00004238	1086	2594	1.26	1.10E-05	0.0001987
WBGene00007883	632	2535	2	4.83E-06	0.00010539	WBGene00016310	53	239	2.16	7.56E-06	0.0001492	WBGene00001559	6123	13979	1.19	1.11E-05	0.0001993
WBGene00009142	257	793	1.63	4.84E-06	0.00010541	WBGene00019417	2496	960	-1.38	7.57E-06	0.0001492	WBGene00000043	18	146	3.01	1.11E-05	0.0001997
WBGene00018266	278	1010	1.86	4.85E-06	0.00010541	WBGene00012254	686	2152	1.65	7.76E-06	0.0001529	WBGene00077495	390	105	-1.89	1.11E-05	0.0002002
WBGene00020484	274	801	1.55	4.92E-06	0.00010679	WBGene00018668	1545	585	-1.4	7.78E-06	0.0001529	WBGene00008144	395	1393	1.82	1.12E-05	0.0002007
WBGene00013458	5776	13473	1.22	4.92E-06	0.00010683	WBGene00009876	15	127	3.12	7.79E-06	0.0001529	WBGene00020450	549	179	-1.61	1.12E-05	0.0002016
WBGene00008375	167	738	2.15	5.07E-06	0.00010985	WBGene00007342	4910	1898	-1.37	7.79E-06	0.0001529	WBGene00017236	63	279	2.15	1.12E-05	0.0002017
WBGene00001104	37703	13830	-1.45	5.13E-06	0.00011099	WBGene00008996	19	137	2.82	7.80E-06	0.0001529	WBGene00195190	2352	836	-1.49	1.12E-05	0.0002017
WBGene00015913	698	2058	1.56	5.18E-06	0.00011204	WBGene00017365	4549	1369	-1.73	7.81E-06	0.0001529	WBGene00015002	100	371	1.89	1.13E-05	0.0002031
WBGene00018874	37	320	3.12	5.23E-06	0.00011283	WBGene00019752	27	184	2.76	7.83E-06	0.0001532	WBGene00021113	125	3	-5.5	1.14E-05	0.0002044
WBGene00011020	35	227	2.72	5.24E-06	0.00011311	WBGene00010742	13312	30580	1.2	7.88E-06	0.000154	WBGene00007170	8258	18777	1.19	1.15E-05	0.0002057
WBGene00044197	6133	2402	-1.35	5.32E-06	0.00011444	WBGene00007552	2189	5581	1.35	7.90E-06	0.0001542	WBGene00007938	614	1882	1.62	1.15E-05	0.0002057
WBGene00044387	530	1704	1.69	5.32E-06	0.00011444	WBGene00009932	482	1447	1.59	7.98E-06	0.0001555	WBGene00008731	738	1848	1.33	1.15E-05	0.0002057
WBGene00020490	1285	3318	1.37	5.33E-06	0.00011444	WBGene00006875	3161	7129	1.17	7.98E-06	0.0001555	WBGene00016234	275	869	1.66	1.16E-05	0.0002072
WBGene00012387	321	934	1.54	5.36E-06	0.00011485	WBGene00013566	946	203	-2.22	8.00E-06	0.0001556	WBGene00012560	2023	608	-1.73	1.17E-05	0.0002074
WBGene00021966	9692	2978	-1.7	5.36E-06	0.00011485	WBGene00006682	102	428	2.07	8.00E-06	0.0001556	WBGene00044314	3209	1270	-1.34	1.17E-05	0.0002074
WBGene00012811	185	613	1.73	5.37E-06	0.00011485	WBGene00021876	3086	8069	1.39	8.02E-06	0.0001558	WBGene00011028	786	1810	1.2	1.17E-05	0.0002075
WBGene00009130	1	87	6.08	5.37E-06	0.00011485	WBGene00020451	1029	260	-1.98	8.03E-06	0.0001559	WBGene00000037	3323	7471	1.17	1.17E-05	0.0002076
WBGene00017253	10897	4343	-1.33	5.40E-06	0.00011527	WBGene00018369	1907	5092	1.42	8.06E-06	0.0001563	WBGene00017904	9997	24194	1.28	1.17E-05	0.0002079
WBGene00004221	911	2430	1.41	5.42E-06	0.00011554	WBGene00006845	350	957	1.45	8.15E-06	0.0001577	WBGene00020849	68	285	2.06	1.17E-05	0.0002079
WBGene00016273	606	2061	1.77	5.42E-06	0.00011554	WBGene00001805	3	68	4.67	8.23E-06	0.0001588	WBGene00009607	0	46	6.94	1.18E-05	0.0002081
WBGene00011723	447	1554	1.8	5.44E-06	0.00011576	WBGene00011959	2361	881	-1.42	8.24E-06	0.0001588	WBGene00017653	486	1390	1.52	1.18E-05	0.0002082
WBGene00000518	906	2323	1.36	5.50E-06	0.00011682	WBGene00006783	259	811	1.65	8.25E-06	0.0001588	WBGene00020256	505	1307	1.37	1.18E-05	0.0002086
WBGene00001074	49	250	2.35	5.53E-06	0.00011752	WBGene00043981	1361	4087	1.59	8.26E-06	0.0001588	WBGene00021723	1400	489	-1.52	1.18E-05	0.0002086
WBGene00007368	647	1796	1.47	5.61E-06	0.00011903	WBGene00195051	21	141	2.74	8.26E-06	0.0001588	WBGene00045362	971	281	-1.79	1.18E-05	0.0002086
WBGene00013899	1305	3476	1.41	5.65E-06	0.00011971	WBGene00010808	44573	17362	-1.36	8.26E-06	0.0001588	WBGene00022319	1709	551	-1.63	1.19E-05	0.000209
WBGene00020590	1011	2485	1.3	5.71E-06	0.00012074	WBGene00044074	68	312	2.19	8.26E-06	0.0001588	WBGene00002011	5410	15707	1.54	1.19E-05	0.0002094

WBGene00010575	105	367	1.8	5.73E-06	0.00012106	WBGene00022389	1196	4042	1.76	8.31E-06	0.0001595	WBGene00015935	3	82	4.85	1.19E-05	0.0002099
WBGene00021586	196	822	2.07	5.73E-06	0.00012106	WBGene00015753	379	2065	2.45	8.36E-06	0.0001603	WBGene00015129	3033	875	-1.79	1.20E-05	0.0002111
WBGene00044630	2070	5121	1.31	5.75E-06	0.00012129	WBGene00011428	53	255	2.26	8.40E-06	0.0001608	WBGene00018272	152	533	1.81	1.22E-05	0.0002134
WBGene00013794	5534	1935	-1.52	5.83E-06	0.00012285	WBGene00010755	3431	7430	1.11	8.40E-06	0.0001608	WBGene00020606	37	178	2.27	1.24E-05	0.0002165
WBGene00001690	563	3180	2.5	5.86E-06	0.00012318	WBGene00018247	1105	354	-1.64	8.43E-06	0.0001609	WBGene00020929	130	417	1.69	1.24E-05	0.0002172
WBGene00017424	26	196	2.94	5.90E-06	0.00012392	WBGene00017969	407	2118	2.38	8.43E-06	0.0001609	WBGene00009410	2036	815	-1.32	1.25E-05	0.0002183
WBGene00019649	39	269	2.8	5.92E-06	0.00012421	WBGene00007739	14	107	2.97	8.51E-06	0.0001622	WBGene00019999	3	67	4.58	1.25E-05	0.0002187
WBGene00044227	70	360	2.37	5.95E-06	0.00012477	WBGene00010592	98	453	2.21	8.54E-06	0.0001626	WBGene00004992	714	1722	1.27	1.26E-05	0.0002197
WBGene00017755	91049	37701	-1.27	1.26E-05	0.0002199	WBGene00012034	8	112	3.8	1.77E-05	0.000284	WBGene00009349	183	684	1.9	2.43E-05	0.0003631
WBGene00019415	11176	4161	-1.43	1.27E-05	0.00022213	WBGene00004821	15314	4995	-1.62	1.77E-05	0.000284	WBGene00008296	321	1257	1.97	2.43E-05	0.0003631
WBGene00008285	152	494	1.7	1.28E-05	0.00022308	WBGene00000224	19829	43811	1.14	1.78E-05	0.0002852	WBGene00018340	375	1009	1.43	2.43E-05	0.0003631
WBGene00020662	27	174	2.71	1.29E-05	0.00022359	WBGene00013825	9	104	3.54	1.78E-05	0.0002865	WBGene00019411	120	557	2.21	2.45E-05	0.0003658
WBGene00001557	19	188	3.31	1.29E-05	0.00022472	WBGene00017254	4182	1728	-1.27	1.79E-05	0.0002867	WBGene00013835	239	697	1.54	2.46E-05	0.0003665
WBGene00006832	300	1537	2.36	1.29E-05	0.00022475	WBGene00021977	544	1322	1.28	1.80E-05	0.0002886	WBGene00007447	5883	2783	-1.08	2.47E-05	0.0003676
WBGene00017251	4884	1908	-1.36	1.30E-05	0.00022621	WBGene00022497	849	4949	2.54	1.83E-05	0.0002928	WBGene00008066	5413	2114	-1.36	2.50E-05	0.0003719
WBGene00003746	204	1365	2.74	1.32E-05	0.00022871	WBGene00016773	2	57	5.06	1.84E-05	0.0002939	WBGene00022252	140	421	1.59	2.50E-05	0.0003719
WBGene00006583	487	2269	2.22	1.32E-05	0.00022871	WBGene00008988	32	174	2.45	1.85E-05	0.0002955	WBGene00003075	452	2019	2.16	2.51E-05	0.000373
WBGene00004814	45236	18763	-1.27	1.32E-05	0.00022897	WBGene00018951	693	2162	1.64	1.86E-05	0.0002974	WBGene00014171	699	1816	1.38	2.52E-05	0.0003738
WBGene00021071	140	591	2.08	1.33E-05	0.00022932	WBGene00009819	210	625	1.57	1.87E-05	0.0002977	WBGene00021299	7997	2977	-1.43	2.52E-05	0.0003738
WBGene00002174	4221	9520	1.17	1.33E-05	0.00022955	WBGene00016722	1768	4816	1.45	1.87E-05	0.0002977	WBGene00077457	509	97	-2.39	2.53E-05	0.000375
WBGene00005005	0	36	8.51	1.33E-05	0.00022955	WBGene00009543	157	472	1.58	1.89E-05	0.0003011	WBGene00009724	398	934	1.23	2.53E-05	0.000375
WBGene00007480	148	483	1.71	1.33E-05	0.00022955	WBGene00008500	230	723	1.65	1.89E-05	0.0003012	WBGene00007981	512	1372	1.42	2.54E-05	0.0003757
WBGene00007779	5262	11102	1.08	1.33E-05	0.00022955	WBGene00008263	1386	3309	1.26	1.90E-05	0.0003021	WBGene00020158	1304	3023	1.21	2.55E-05	0.0003764
WBGene00022610	299	876	1.55	1.34E-05	0.00022955	WBGene00016165	1028	2513	1.29	1.90E-05	0.0003026	WBGene00077664	1558	653	-1.25	2.57E-05	0.0003801
WBGene00017857	28	190	2.77	1.34E-05	0.00023012	WBGene00022557	13199	5447	-1.28	1.91E-05	0.0003034	WBGene00009895	35	186	2.41	2.59E-05	0.0003822
WBGene00006067	598	1497	1.32	1.34E-05	0.00023029	WBGene00000702	134	576	2.11	1.92E-05	0.0003042	WBGene00006641	888	2046	1.2	2.60E-05	0.0003839
WBGene00009885	713	2144	1.59	1.35E-05	0.00023154	WBGene00020788	1437	4518	1.65	1.92E-05	0.0003047	WBGene00000242	718	1828	1.35	2.61E-05	0.000384
WBGene00010539	4385	9459	1.11	1.37E-05	0.00023387	WBGene00022179	425	1113	1.39	1.94E-05	0.0003071	WBGene00021635	423	1114	1.4	2.61E-05	0.000384
WBGene00005643	3262	1408	-1.21	1.37E-05	0.00023442	WBGene00077663	2484	937	-1.41	1.94E-05	0.0003071	WBGene00013666	120	410	1.78	2.62E-05	0.0003854
WBGene00015566	537	1388	1.37	1.37E-05	0.00023489	WBGene00011809	14289	5528	-1.37	1.94E-05	0.0003071	WBGene00008089	482	2090	2.12	2.63E-05	0.0003866
WBGene00012134	653	1763	1.43	1.38E-05	0.00023637	WBGene00008342	7	95	3.68	1.96E-05	0.0003101	WBGene00017063	17	129	2.93	2.64E-05	0.0003876
WBGene00006902	58558	22301	-1.39	1.39E-05	0.00023637	WBGene00006865	62	331	2.43	1.97E-05	0.0003104	WBGene00009061	14	114	3.02	2.65E-05	0.000389
WBGene00016633	417	1057	1.34	1.39E-05	0.00023727	WBGene00019203	544	1367	1.33	2.00E-05	0.0003151	WBGene00022488	17970	6752	-1.41	2.67E-05	0.000391
WBGene00019922	19998	8065	-1.31	1.39E-05	0.00023733	WBGene00018746	9646	3706	-1.38	2.01E-05	0.0003157	WBGene00016585	248	848	1.78	2.67E-05	0.000391
WBGene00001110	2190	850	-1.37	1.40E-05	0.00023754	WBGene00008498	183	555	1.6	2.01E-05	0.0003158	WBGene00016596	89	2832	5	2.69E-05	0.0003929
WBGene00013456	469	1791	1.93	1.41E-05	0.00023898	WBGene00021984	692	2461	1.83	2.01E-05	0.0003163	WBGene00016289	4094	11241	1.46	2.71E-05	0.0003956
WBGene00017262	183	1508	3.04	1.41E-05	0.00024002	WBGene00016586	7355	3031	-1.28	2.01E-05	0.0003163	WBGene00022767	159	498	1.64	2.71E-05	0.0003956
WBGene00020478	1331	3303	1.31	1.42E-05	0.00024055	WBGene00002224	313	979	1.64	2.02E-05	0.0003167	WBGene00017779	86	307	1.84	2.73E-05	0.0003979
WBGene00022797	170	608	1.84	1.42E-05	0.00024117	WBGene00010704	9872	4672	-1.08	2.02E-05	0.0003167	WBGene00007593	4050	8902	1.14	2.74E-05	0.0003994
WBGene00000785	19	334	4.11	1.44E-05	0.0002437	WBGene00010098	3471	1294	-1.42	2.03E-05	0.0003172	WBGene00013875	6112	2426	-1.33	2.74E-05	0.0003998
WBGene00011805	30696	11192	-1.46	1.45E-05	0.00024551	WBGene00002015	7110	2009	-1.82	2.03E-05	0.0003173	WBGene00003886	668	1638	1.29	2.75E-05	0.0004001
WBGene00009796	877	2567	1.55	1.46E-05	0.00024658	WBGene00018446	13933	5759	-1.27	2.03E-05	0.0003173	WBGene00007146	584	1453	1.32	2.76E-05	0.000401
WBGene00011436	2727	6719	1.3	1.47E-05	0.00024762	WBGene00019480	187	529	1.5	2.04E-05	0.0003187	WBGene00044058	529	2021	1.93	2.76E-05	0.000401
WBGene00009617	689	1609	1.22	1.47E-05	0.00024801	WBGene00000553	1954	5939	1.6	2.04E-05	0.0003189	WBGene00001852	137	433	1.66	2.76E-05	0.000401
WBGene00017911	3115	1308	-1.25	1.47E-05	0.00024821	WBGene00011131	766	254	-1.59	2.05E-05	0.0003193	WBGene00006646	3268	7000	1.1	2.76E-05	0.000401
WBGene00017362	40	191	2.27	1.48E-05	0.00024882	WBGene00017229	10	114	3.52	2.05E-05	0.0003198	WBGene00021158	31	168	2.42	2.77E-05	0.000401
WBGene00019640	106	430	2.02	1.48E-05	0.00024882	WBGene00000491	946	2389	1.34	2.07E-05	0.0003223	WBGene00014746	621	197	-1.65	2.77E-05	0.0004014
WBGene00009432	63	367	2.54	1.48E-05	0.00024891	WBGene00019035	8192	2902	-1.5	2.09E-05	0.0003244	WBGene00004993	80	295	1.89	2.78E-05	0.0004028
WBGene00000438	530	1409	1.41	1.49E-05	0.00024957	WBGene00016749	16878	36392	1.11	2.10E-05	0.0003258	WBGene00002991	3492	7619	1.13	2.79E-05	0.0004034
WBGene00011906	5734	13204	1.2	1.49E-05	0.00025003	WBGene00006811	1038	4146	2	2.11E-05	0.0003269	WBGene00006532	225	705	1.65	2.81E-05	0.0004065

WBGene00000054	229	660	1.52	1.50E-05	0.00025125	WBGene00016107	69	283	2.03	2.12E-05	0.0003287	WBGene00011591	349	91	-1.93	2.82E-05	0.0004066
WBGene00001966	1831	528	-1.79	1.50E-05	0.00025135	WBGene00007211	5035	2170	-1.21	2.12E-05	0.0003294	WBGene00017961	142	405	1.51	2.83E-05	0.0004083
WBGene00013155	2494	1047	-1.25	1.50E-05	0.00025135	WBGene00010138	71	300	2.09	2.14E-05	0.0003317	WBGene00006822	183	536	1.55	2.83E-05	0.0004086
WBGene00020100	525	1431	1.45	1.51E-05	0.00025168	WBGene00001548	270	845	1.64	2.15E-05	0.0003334	WBGene00000232	651	1770	1.44	2.84E-05	0.0004094
WBGene00017570	10	104	3.41	1.51E-05	0.00025177	WBGene00001366	3567	7707	1.11	2.16E-05	0.0003339	WBGene00015984	10	98	3.23	2.85E-05	0.0004105
WBGene00021542	11855	4781	-1.31	1.53E-05	0.00025534	WBGene00001129	386	991	1.36	2.16E-05	0.0003342	WBGene00012810	56	254	2.18	2.85E-05	0.0004105
WBGene00019593	54	464	3.09	1.54E-05	0.00025666	WBGene00023355	496	139	-1.84	2.17E-05	0.0003343	WBGene00009306	12650	26337	1.06	2.86E-05	0.0004105
WBGene00015607	5704	2450	-1.22	1.55E-05	0.00025768	WBGene00016354	12569	28925	1.2	2.17E-05	0.0003347	WBGene00012364	9	107	3.58	2.87E-05	0.0004118
WBGene00010632	186	558	1.59	1.56E-05	0.00025975	WBGene00011791	6009	2504	-1.26	2.18E-05	0.0003359	WBGene00020360	3473	7787	1.16	2.87E-05	0.0004118
WBGene00009312	31	234	2.89	1.57E-05	0.00026021	WBGene00001699	65	359	2.46	2.20E-05	0.0003385	WBGene00021877	1739	612	-1.51	2.88E-05	0.0004125
WBGene00015662	177	32	-2.47	1.57E-05	0.00026078	WBGene00007890	3	69	4.51	2.20E-05	0.0003386	WBGene00019227	1922	4498	1.23	2.89E-05	0.0004141
WBGene00010172	29	183	2.66	1.57E-05	0.00026078	WBGene00011784	41	207	2.33	2.21E-05	0.0003389	WBGene00008254	204	1078	2.4	2.90E-05	0.0004153
WBGene00000747	615	1812	1.56	1.58E-05	0.00026163	WBGene00001814	1581	3585	1.18	2.24E-05	0.0003437	WBGene00013759	1714	601	-1.51	2.92E-05	0.0004171
WBGene00000750	115	603	2.39	1.58E-05	0.00026231	WBGene00007247	26	152	2.54	2.24E-05	0.0003443	WBGene00003768	406	1566	1.95	2.92E-05	0.0004171
WBGene00022664	161	579	1.85	1.59E-05	0.00026297	WBGene00017402	21273	5657	-1.91	2.27E-05	0.000348	WBGene00018377	32	146	2.2	2.92E-05	0.0004176
WBGene00021180	2420	939	-1.37	1.59E-05	0.00026344	WBGene00001616	78	671	3.1	2.27E-05	0.000348	WBGene00006372	1280	3014	1.24	2.93E-05	0.0004177
WBGene00008932	623	1497	1.27	1.60E-05	0.0002635	WBGene00003400	7431	15749	1.08	2.28E-05	0.0003482	WBGene00002089	56	309	2.47	2.93E-05	0.0004178
WBGene00014210	139	627	2.17	1.61E-05	0.00026586	WBGene00015622	217	889	2.03	2.28E-05	0.0003485	WBGene00006712	421	1131	1.43	2.94E-05	0.0004185
WBGene00045409	2116	5916	1.48	1.62E-05	0.00026732	WBGene00015741	693	1669	1.27	2.29E-05	0.0003499	WBGene00010200	53	250	2.24	2.94E-05	0.000419
WBGene00003980	1672	4718	1.5	1.63E-05	0.00026861	WBGene00013477	4334	9532	1.14	2.29E-05	0.0003499	WBGene00001705	490	2008	2.04	2.97E-05	0.0004227
WBGene00044452	58	279	2.26	1.64E-05	0.00026934	WBGene00044692	16204	6646	-1.29	2.29E-05	0.0003499	WBGene00004999	234	1293	2.46	2.98E-05	0.0004237
WBGene00000084	70	300	2.09	1.64E-05	0.00027002	WBGene00018367	6649	14673	1.14	2.31E-05	0.0003515	WBGene00011423	1401	3294	1.23	2.98E-05	0.0004238
WBGene00015748	1949	4419	1.18	1.65E-05	0.00027041	WBGene00020073	44716	19354	-1.21	2.32E-05	0.0003539	WBGene00022669	14788	4831	-1.61	3.02E-05	0.000428
WBGene00006468	1778	4575	1.36	1.65E-05	0.00027108	WBGene00017448	3299	7464	1.18	2.33E-05	0.0003551	WBGene00015706	27	158	2.56	3.02E-05	0.0004289
WBGene00011923	38	203	2.4	1.65E-05	0.00027108	WBGene00017041	78	291	1.91	2.36E-05	0.0003582	WBGene00044132	216	793	1.88	3.03E-05	0.0004292
WBGene00013652	5455	2315	-1.24	1.67E-05	0.00027283	WBGene00012433	570	3338	2.55	2.36E-05	0.0003585	WBGene00007261	5055	10826	1.1	3.04E-05	0.0004302
WBGene00007717	64	383	2.58	1.67E-05	0.00027387	WBGene00016753	179	38	-2.22	2.37E-05	0.0003591	WBGene00014132	9	124	3.73	3.04E-05	0.0004307
WBGene00019040	4033	1718	-1.23	1.68E-05	0.00027495	WBGene00044043	34	440	3.67	2.37E-05	0.0003596	WBGene00010646	189	710	1.91	3.05E-05	0.0004311
WBGene00016507	1145	2435	1.09	1.71E-05	0.00027858	WBGene00007396	485	1373	1.5	2.37E-05	0.0003596	WBGene00013028	11	111	3.28	3.06E-05	0.0004321
WBGene00000667	25	235	3.25	1.72E-05	0.00028035	WBGene00044253	739	232	-1.67	2.38E-05	0.0003596	WBGene00021774	8402	3500	-1.26	3.07E-05	0.0004331
WBGene00015320	314	58	-2.45	1.72E-05	0.00028035	WBGene00003578	1687	3859	1.19	2.38E-05	0.0003596	WBGene00004155	17528	45365	1.37	3.08E-05	0.0004337
WBGene00014067	1028	5398	2.39	1.72E-05	0.00028035	WBGene00005153	775	2091	1.43	2.38E-05	0.0003596	WBGene00015869	3	63	4.38	3.08E-05	0.0004345
WBGene00015910	125	782	2.65	1.73E-05	0.00028073	WBGene00010345	2266	6292	1.47	2.38E-05	0.0003596	WBGene00045382	635	152	-2.06	3.09E-05	0.0004351
WBGene00019829	2	61	4.65	1.74E-05	0.0002823	WBGene00004790	1436	3339	1.22	2.39E-05	0.0003605	WBGene00016677	51	374	2.87	3.09E-05	0.0004351
WBGene00006464	44	398	3.19	1.74E-05	0.0002823	WBGene00019458	2889	970	-1.57	2.40E-05	0.0003611	WBGene00016246	74	296	1.99	3.10E-05	0.0004351
WBGene00017576	6771	15237	1.17	1.74E-05	0.00028242	WBGene00012135	20	160	3.02	2.40E-05	0.0003611	WBGene00013080	337	1447	2.1	3.10E-05	0.0004354
WBGene00007229	1028	3403	1.73	1.74E-05	0.00028242	WBGene00012592	272	792	1.54	2.40E-05	0.0003611	WBGene00003091	127	479	1.91	3.12E-05	0.0004384
WBGene00019700	15705	6663	-1.24	1.74E-05	0.00028242	WBGene00006531	199	1100	2.46	2.40E-05	0.0003611	WBGene00015914	1542	571	-1.43	3.14E-05	0.0004398
WBGene00022361	16657	6761	-1.3	1.75E-05	0.00028243	WBGene00014307	3342	11554	1.79	2.41E-05	0.0003611	WBGene00017900	5154	16123	1.65	3.16E-05	0.0004427
WBGene00015055	585	1407	1.27	1.75E-05	0.00028276	WBGene00013746	604	2154	1.84	2.41E-05	0.0003611	WBGene00013410	3467	1431	-1.28	3.18E-05	0.0004448
WBGene00008207	4944	1424	-1.8	1.75E-05	0.00028303	WBGene00009229	196	702	1.84	2.41E-05	0.0003613	WBGene00003890	169	914	2.43	3.22E-05	0.0004498
WBGene00021157	16	235	3.83	1.75E-05	0.00028303	WBGene00044792	243	730	1.59	2.41E-05	0.0003618	WBGene00003567	10571	25314	1.26	3.23E-05	0.0004519
WBGene00020168	3872	1433	-1.43	1.76E-05	0.00028353	WBGene00001588	38	208	2.44	2.43E-05	0.0003631	WBGene00021160	26	156	2.58	3.24E-05	0.0004519
WBGene00013254	9594	2956	-1.7	1.76E-05	0.00028399	WBGene00000951	68	305	2.17	2.43E-05	0.0003631	WBGene00044617	29	167	2.54	3.24E-05	0.0004521
WBGene00010568	20075	7972	-1.33	3.25E-05	0.00045323	WBGene00010901	284	1311	2.21	4.16E-05	0.0005439	WBGene00044694	6587	3038	-1.12	5.28E-05	0.0006492
WBGene00014101	177	568	1.68	3.27E-05	0.0004553	WBGene00022847	196	607	1.63	4.17E-05	0.0005441	WBGene00017060	451	1139	1.34	5.28E-05	0.0006497
WBGene00011756	2585	5737	1.15	3.27E-05	0.0004553	WBGene00009288	4529	10373	1.2	4.17E-05	0.0005441	WBGene00016561	9981	4722	-1.08	5.30E-05	0.0006515
WBGene00003232	133	722	2.44	3.29E-05	0.00045707	WBGene00020862	4	70	4.28	4.17E-05	0.0005441	WBGene00019343	2055	775	-1.41	5.33E-05	0.0006546
WBGene00077757	2	67	4.93	3.29E-05	0.00045707	WBGene00014064	2475	697	-1.83	4.18E-05	0.0005451	WBGene00008571	6680	14789	1.15	5.35E-05	0.0006555
WBGene00014789	887	338	-1.39	3.30E-05	0.00045782	WBGene00016274	7	93	3.65	4.18E-05	0.0005451	WBGene00016294	6483	2848	-1.19	5.35E-05	0.0006555

WBGene00010050	304	927	1.61	3.30E-05	0.00045782	WBGene00010944	743	2902	1.97	4.20E-05	0.0005465	WBGene00000544	666	231	-1.53	5.38E-05	0.000659
WBGene00013816	3900	1439	-1.44	3.30E-05	0.00045782	WBGene00045269	807	1964	1.28	4.20E-05	0.0005466	WBGene00010796	3168	11448	1.85	5.38E-05	0.000659
WBGene00003773	1794	5139	1.52	3.31E-05	0.00045858	WBGene00022611	1044	4617	2.14	4.25E-05	0.0005523	WBGene00013849	3213	6650	1.05	5.39E-05	0.0006595
WBGene00010219	6752	2706	-1.32	3.33E-05	0.00046074	WBGene00004823	4360	1311	-1.73	4.25E-05	0.0005525	WBGene00011908	7845	3253	-1.27	5.39E-05	0.0006595
WBGene00008723	4459	2024	-1.14	3.34E-05	0.00046202	WBGene00013534	42	290	2.78	4.26E-05	0.0005531	WBGene00015300	295	1505	2.35	5.40E-05	0.0006595
WBGene00015859	443	1192	1.43	3.37E-05	0.00046555	WBGene00000759	102	442	2.11	4.29E-05	0.0005563	WBGene00008401	3235	6849	1.08	5.43E-05	0.0006631
WBGene00012178	45	250	2.46	3.37E-05	0.00046587	WBGene00010039	4794	10229	1.09	4.35E-05	0.0005639	WBGene00016023	1804	704	-1.36	5.43E-05	0.0006631
WBGene00011877	78	272	1.81	3.38E-05	0.00046641	WBGene00017076	31	166	2.43	4.37E-05	0.0005654	WBGene00004813	96125	38919	-1.3	5.44E-05	0.0006639
WBGene00017296	1439	3205	1.16	3.38E-05	0.00046657	WBGene00001053	97	342	1.82	4.37E-05	0.0005656	WBGene00007916	685	2922	2.09	5.46E-05	0.0006659
WBGene00007660	8	91	3.58	3.38E-05	0.00046659	WBGene00002976	296	800	1.43	4.37E-05	0.0005656	WBGene00050943	88	319	1.86	5.49E-05	0.0006692
WBGene00008241	582	191	-1.61	3.39E-05	0.00046745	WBGene00012481	6781	2592	-1.39	4.38E-05	0.0005662	WBGene00009476	110	361	1.71	5.55E-05	0.0006756
WBGene00011659	1	52	5.64	3.42E-05	0.00047071	WBGene00013637	54	241	2.16	4.39E-05	0.0005662	WBGene00022558	1179	334	-1.82	5.58E-05	0.0006788
WBGene00016951	321	804	1.32	3.42E-05	0.00047071	WBGene00014516	1529	534	-1.52	4.39E-05	0.0005662	WBGene00023415	129	444	1.79	5.59E-05	0.0006798
WBGene00044245	17	226	3.73	3.42E-05	0.00047071	WBGene00013124	2765	5993	1.12	4.41E-05	0.0005683	WBGene00020294	457	2308	2.34	5.60E-05	0.0006807
WBGene00020254	46	200	2.11	3.43E-05	0.00047085	WBGene00012654	1859	751	-1.31	4.41E-05	0.0005683	WBGene00008802	4434	1864	-1.25	5.62E-05	0.0006819
WBGene00021416	636	1483	1.22	3.44E-05	0.00047179	WBGene00022574	6	101	3.96	4.41E-05	0.0005683	WBGene00018109	10385	3663	-1.5	5.65E-05	0.0006851
WBGene00013896	232	747	1.69	3.44E-05	0.00047213	WBGene00012127	156	476	1.6	4.42E-05	0.0005683	WBGene00013278	5568	2146	-1.38	5.69E-05	0.00069
WBGene00021219	1746	495	-1.82	3.45E-05	0.00047213	WBGene00007140	80	255	1.67	4.43E-05	0.0005699	WBGene00001964	1346	359	-1.91	5.70E-05	0.0006905
WBGene00007868	59	503	3.09	3.46E-05	0.0004741	WBGene00014074	811	2062	1.35	4.44E-05	0.0005703	WBGene00009798	108	339	1.65	5.70E-05	0.0006905
WBGene00012063	3146	1294	-1.28	3.47E-05	0.00047528	WBGene00016332	1366	2916	1.09	4.46E-05	0.0005724	WBGene00006462	1617	3571	1.14	5.72E-05	0.0006914
WBGene00015830	2482	904	-1.46	3.48E-05	0.0004755	WBGene00013137	4738	1929	-1.3	4.48E-05	0.0005743	WBGene00018472	1906	4126	1.11	5.72E-05	0.0006916
WBGene00007932	391	1340	1.78	3.49E-05	0.00047609	WBGene00007850	3958	1589	-1.32	4.48E-05	0.000575	WBGene00003168	59	242	2.03	5.72E-05	0.0006916
WBGene00007629	98	336	1.78	3.49E-05	0.00047639	WBGene00002242	12	98	3.06	4.49E-05	0.0005754	WBGene00022829	40	196	2.29	5.78E-05	0.0006977
WBGene00020863	93	340	1.87	3.49E-05	0.00047639	WBGene00008239	595	1522	1.36	4.50E-05	0.0005757	WBGene00007959	1427	5228	1.87	5.79E-05	0.0006981
WBGene00044758	411	93	-2.15	3.50E-05	0.00047686	WBGene00020345	668	230	-1.54	4.51E-05	0.0005767	WBGene00020586	28	210	2.88	5.79E-05	0.0006981
WBGene00014163	3936	1365	-1.53	3.51E-05	0.00047835	WBGene00022277	11856	4717	-1.33	4.56E-05	0.000583	WBGene00021931	58	454	2.97	5.81E-05	0.0007005
WBGene00044644	28	734	4.7	3.51E-05	0.00047835	WBGene00017794	81	506	2.65	4.57E-05	0.0005845	WBGene00007857	19	240	3.64	5.86E-05	0.0007055
WBGene00011772	16	125	2.94	3.54E-05	0.00048163	WBGene00003097	490	2268	2.21	4.58E-05	0.0005848	WBGene00008611	2441	918	-1.41	5.87E-05	0.0007055
WBGene00008568	142	413	1.55	3.56E-05	0.00048401	WBGene00012038	3287	1107	-1.57	4.58E-05	0.0005849	WBGene00019047	23	140	2.61	5.87E-05	0.0007055
WBGene00015803	3491	11890	1.77	3.57E-05	0.00048523	WBGene00008256	19	130	2.8	4.59E-05	0.0005849	WBGene00010355	19	190	3.34	5.88E-05	0.0007071
WBGene00010503	724	1746	1.27	3.58E-05	0.00048544	WBGene00010134	3481	8074	1.21	4.61E-05	0.000587	WBGene00018245	3055	1185	-1.37	5.89E-05	0.0007078
WBGene00017267	9	112	3.6	3.60E-05	0.00048765	WBGene00017976	577	1395	1.27	4.61E-05	0.000587	WBGene00016544	26	153	2.56	5.91E-05	0.000709
WBGene00005138	94	13	-2.87	3.62E-05	0.00049037	WBGene00012199	805	2516	1.64	4.64E-05	0.0005899	WBGene00005611	4	67	3.99	5.92E-05	0.0007101
WBGene00009270	5441	2237	-1.28	3.63E-05	0.00049081	WBGene00008080	17707	7045	-1.33	4.65E-05	0.0005906	WBGene00023163	674	258	-1.39	5.95E-05	0.0007135
WBGene00017914	269	1044	1.96	3.64E-05	0.00049226	WBGene00020175	1254	488	-1.36	4.66E-05	0.0005925	WBGene00011229	12548	5056	-1.31	5.96E-05	0.0007137
WBGene00195077	2202	810	-1.44	3.66E-05	0.00049417	WBGene00007154	32	170	2.4	4.67E-05	0.0005929	WBGene00007817	13	116	3.15	5.97E-05	0.0007147
WBGene00019896	9	93	3.38	3.67E-05	0.00049515	WBGene00001433	1602	617	-1.38	4.69E-05	0.0005949	WBGene00009257	31	279	3.17	5.99E-05	0.000716
WBGene00003165	459	1441	1.65	3.67E-05	0.00049528	WBGene00020883	800	256	-1.64	4.74E-05	0.0006002	WBGene00023492	8	73	3.26	6.03E-05	0.000721
WBGene00009995	87	585	2.76	3.68E-05	0.00049599	WBGene00019791	29197	13007	-1.17	4.74E-05	0.0006002	WBGene00009415	1937	795	-1.29	6.04E-05	0.0007215
WBGene00019408	2361	5729	1.28	3.69E-05	0.00049674	WBGene00022287	319	1644	2.37	4.74E-05	0.0006005	WBGene00008736	24	140	2.54	6.05E-05	0.0007216
WBGene00006436	15352	32778	1.09	3.74E-05	0.00050326	WBGene00077441	4813	1814	-1.41	4.76E-05	0.0006018	WBGene00017947	246	629	1.36	6.07E-05	0.0007239
WBGene00003515	22205	44753	1.01	3.75E-05	0.00050389	WBGene00017713	9056	3644	-1.31	4.78E-05	0.0006048	WBGene00014182	30	670	4.48	6.11E-05	0.000728
WBGene00001674	547	1338	1.29	3.75E-05	0.00050389	WBGene00020503	26	178	2.79	4.80E-05	0.000606	WBGene00021543	321	1130	1.82	6.14E-05	0.0007308
WBGene00007951	183	572	1.65	3.76E-05	0.00050506	WBGene00010105	3811	1335	-1.51	4.81E-05	0.0006068	WBGene00007887	6732	3154	-1.09	6.14E-05	0.0007308
WBGene00013877	12463	5836	-1.09	3.77E-05	0.00050622	WBGene00021541	16050	6545	-1.29	4.86E-05	0.0006129	WBGene00010716	70	315	2.17	6.16E-05	0.0007332
WBGene00005936	60	280	2.23	3.78E-05	0.00050647	WBGene00018899	359	1214	1.76	4.87E-05	0.0006143	WBGene00003106	349	864	1.31	6.19E-05	0.0007354
WBGene00000075	3984	1656	-1.27	3.78E-05	0.00050647	WBGene00044623	4404	18680	2.08	4.88E-05	0.0006145	WBGene00015523	2801	5789	1.05	6.19E-05	0.0007359
WBGene00194956	370	98	-1.92	3.79E-05	0.00050832	WBGene00009311	252	1101	2.13	4.89E-05	0.0006156	WBGene00008560	66	354	2.42	6.21E-05	0.000737
WBGene00021343	788	2061	1.39	3.80E-05	0.0005086	WBGene00045366	12739	5870	-1.12	4.91E-05	0.0006174	WBGene00000853	2232	10527	2.24	6.22E-05	0.0007377
WBGene00014059	7582	3197	-1.25	3.81E-05	0.00050991	WBGene00006980	235	867	1.89	4.91E-05	0.0006174	WBGene00010509	166	646	1.96	6.22E-05	0.0007379

WBGene00010870	8209	17663	1.11	3.82E-05	0.00050997	WBGene00000484	1033	2329	1.17	4.94E-05	0.0006208	WBGene00016628	91	368	2.01	6.25E-05	0.0007409
WBGene00022503	506	1245	1.3	3.82E-05	0.00051034	WBGene00018510	2001	4467	1.16	4.94E-05	0.0006208	WBGene00003917	14413	5536	-1.38	6.27E-05	0.0007426
WBGene00013891	361	2714	2.91	3.86E-05	0.00051486	WBGene00019825	5712	1875	-1.61	4.95E-05	0.0006209	WBGene00013445	3648	1457	-1.32	6.29E-05	0.0007439
WBGene00045498	9284	3705	-1.33	3.90E-05	0.00052072	WBGene00008634	3	93	4.76	4.96E-05	0.000622	WBGene00016619	735	1809	1.3	6.29E-05	0.0007441
WBGene00009800	3739	8299	1.15	3.91E-05	0.0005208	WBGene00020337	453	112	-2.02	5.00E-05	0.0006253	WBGene00019815	4629	1827	-1.34	6.30E-05	0.0007447
WBGene00012446	529	1220	1.21	3.92E-05	0.00052218	WBGene00014946	2799	1132	-1.31	5.00E-05	0.0006253	WBGene00006812	4527	10466	1.21	6.31E-05	0.0007451
WBGene00013408	5655	2159	-1.39	3.92E-05	0.00052225	WBGene00011600	3276	1245	-1.4	5.00E-05	0.0006253	WBGene00002274	74	358	2.26	6.32E-05	0.0007454
WBGene00011330	3323	8158	1.3	3.98E-05	0.00052875	WBGene00014053	34	143	2.08	5.00E-05	0.0006255	WBGene00022304	531	188	-1.49	6.36E-05	0.0007505
WBGene00018581	189	818	2.12	3.98E-05	0.00052875	WBGene00007863	1184	515	-1.2	5.01E-05	0.000626	WBGene00000866	5735	1999	-1.52	6.38E-05	0.0007521
WBGene00016247	2	60	5.04	4.00E-05	0.00053128	WBGene00001624	49	318	2.69	5.01E-05	0.000626	WBGene00045481	202	645	1.67	6.38E-05	0.0007521
WBGene00009271	199	664	1.73	4.01E-05	0.00053234	WBGene00008607	2752	6641	1.27	5.03E-05	0.0006276	WBGene00000527	3714	8080	1.12	6.43E-05	0.0007568
WBGene00011655	0	35	8.46	4.02E-05	0.00053234	WBGene00010587	1168	2800	1.26	5.04E-05	0.0006276	WBGene00000286	241	1037	2.11	6.43E-05	0.0007569
WBGene00017129	278	896	1.69	4.03E-05	0.00053367	WBGene00015587	6882	2816	-1.29	5.04E-05	0.0006276	WBGene00016625	1722	3737	1.12	6.44E-05	0.0007574
WBGene00010540	2106	4580	1.12	4.03E-05	0.0005338	WBGene00018679	3155	1271	-1.31	5.05E-05	0.0006284	WBGene00004370	5625	12960	1.2	6.48E-05	0.0007617
WBGene00017632	1010	222	-2.18	4.04E-05	0.0005338	WBGene00044260	550	1769	1.69	5.06E-05	0.0006295	WBGene00019520	5310	14191	1.42	6.50E-05	0.0007627
WBGene00007799	2845	9244	1.7	4.05E-05	0.0005352	WBGene00044445	57	449	2.97	5.09E-05	0.0006322	WBGene00020369	2040	4284	1.07	6.50E-05	0.0007627
WBGene00000485	1770	4308	1.28	4.05E-05	0.0005352	WBGene00000602	13	138	3.41	5.09E-05	0.0006328	WBGene00022265	18661	7267	-1.36	6.50E-05	0.0007627
WBGene00000088	47	206	2.14	4.06E-05	0.00053543	WBGene00000039	32443	67274	1.05	5.10E-05	0.000633	WBGene00009108	132	446	1.76	6.51E-05	0.0007631
WBGene00012655	958	251	-1.93	4.06E-05	0.00053571	WBGene00020321	956	2120	1.15	5.13E-05	0.0006361	WBGene00018060	210	829	1.98	6.53E-05	0.000765
WBGene00022559	7401	2921	-1.34	4.07E-05	0.00053677	WBGene00017390	66	209	1.67	5.13E-05	0.0006361	WBGene00045497	30	239	2.97	6.55E-05	0.000766
WBGene00012276	15747	4867	-1.69	4.09E-05	0.00053798	WBGene00012162	102	357	1.8	5.14E-05	0.0006361	WBGene00000266	8512	18645	1.13	6.55E-05	0.000766
WBGene00000009	35	164	2.22	4.09E-05	0.00053798	WBGene00021322	1098	3722	1.76	5.14E-05	0.0006361	WBGene00019497	216	624	1.53	6.55E-05	0.000766
WBGene00013698	18491	7897	-1.23	4.09E-05	0.00053798	WBGene00011326	1021	2505	1.29	5.15E-05	0.0006373	WBGene00194710	285	738	1.37	6.59E-05	0.0007692
WBGene00022472	7	82	3.5	4.10E-05	0.00053847	WBGene00001612	282	1461	2.37	5.18E-05	0.00064	WBGene00044291	127	417	1.72	6.61E-05	0.0007715
WBGene00010047	12100	26099	1.11	4.11E-05	0.00053949	WBGene00020362	6995	3036	-1.2	5.19E-05	0.0006411	WBGene00011104	2108	7622	1.85	6.62E-05	0.0007718
WBGene00018219	363	928	1.35	4.12E-05	0.00054078	WBGene00007116	3466	7441	1.1	5.19E-05	0.0006411	WBGene00001121	1157	2699	1.22	6.63E-05	0.0007726
WBGene00022386	243	742	1.61	4.13E-05	0.00054119	WBGene00009625	141	863	2.61	5.20E-05	0.0006419	WBGene00011999	244	985	2.01	6.64E-05	0.0007733
WBGene00018293	255	953	1.9	4.14E-05	0.00054267	WBGene00021978	328	739	1.17	5.21E-05	0.0006419	WBGene00021442	3672	1484	-1.31	6.64E-05	0.0007733
WBGene00015638	16771	7343	-1.19	4.15E-05	0.00054393	WBGene00007734	42	453	3.42	5.24E-05	0.0006451	WBGene00008521	458	1186	1.37	6.65E-05	0.0007733
WBGene00006445	928	2665	1.52	4.16E-05	0.00054394	WBGene00020336	336	75	-2.16	5.26E-05	0.0006472	WBGene00003179	24	202	3.1	6.65E-05	0.0007733
WBGene00013881	2546	1034	-1.3	6.67E-05	0.00077447	WBGene00017207	3090	1298	-1.25	8.44E-05	0.0009291	WBGene00009328	973	3334	1.78	0.0001035	0.0010827
WBGene00018641	294	1066	1.86	6.67E-05	0.00077447	WBGene00015264	21	132	2.67	8.51E-05	0.0009357	WBGene00001468	191	652	1.77	0.0001038	0.0010843
WBGene00008830	1540	641	-1.26	6.69E-05	0.00077688	WBGene00012016	464	1389	1.58	8.53E-05	0.0009371	WBGene00018021	7691	3346	-1.2	0.000104	0.0010862
WBGene00017909	396	992	1.33	6.71E-05	0.00077866	WBGene00018741	31	161	2.37	8.53E-05	0.0009371	WBGene00018256	7922	16399	1.05	0.0001044	0.0010897
WBGene00001454	87	639	2.88	6.76E-05	0.00078346	WBGene00009337	9863	20253	1.04	8.55E-05	0.0009384	WBGene00003705	113	360	1.68	0.0001045	0.0010899
WBGene00018424	25647	7835	-1.71	6.76E-05	0.00078346	WBGene00016841	5522	11290	1.03	8.56E-05	0.0009392	WBGene00002038	4331	13054	1.59	0.0001047	0.0010916
WBGene00010683	171	1154	2.75	6.80E-05	0.00078724	WBGene00001965	400	110	-1.86	8.64E-05	0.0009479	WBGene00017671	232	1192	2.36	0.0001048	0.0010917
WBGene00189954	2924	1144	-1.35	6.81E-05	0.00078727	WBGene00011879	118	369	1.65	8.65E-05	0.0009479	WBGene00001054	196	1287	2.72	0.0001055	0.0010985
WBGene00015900	17	107	2.66	6.82E-05	0.00078792	WBGene00015605	0	102	7.79	8.66E-05	0.0009484	WBGene00008963	198	1013	2.36	0.0001064	0.0011071
WBGene00022665	1956	8122	2.05	6.83E-05	0.00078923	WBGene00022300	8231	3659	-1.17	8.70E-05	0.0009524	WBGene00013854	111	10	-3.42	0.0001066	0.0011087
WBGene00000497	3555	11815	1.73	6.84E-05	0.00078923	WBGene00008503	5143	2231	-1.2	8.71E-05	0.0009525	WBGene00008929	1600	3538	1.14	0.0001066	0.0011087
WBGene00022518	12214	29949	1.29	6.85E-05	0.00079071	WBGene00008673	159	936	2.56	8.72E-05	0.0009536	WBGene00017757	34129	14412	-1.24	0.0001068	0.0011092
WBGene00009095	41	188	2.2	6.89E-05	0.00079399	WBGene00022465	346	852	1.3	8.74E-05	0.0009552	WBGene00010399	0	38	7.97	0.0001069	0.0011092
WBGene00009008	836	1879	1.17	6.92E-05	0.00079687	WBGene00000285	206	849	2.04	8.76E-05	0.0009561	WBGene00018214	445	1779	2	0.0001069	0.0011092
WBGene00016695	3503	1066	-1.72	7.01E-05	0.00080719	WBGene00001189	787	3023	1.94	8.76E-05	0.0009562	WBGene00004818	28751	11184	-1.36	0.0001069	0.0011092
WBGene00003174	38	170	2.17	7.01E-05	0.00080719	WBGene00015610	39340	17491	-1.17	8.77E-05	0.0009563	WBGene00012019	2652	5741	1.11	0.0001072	0.0011116
WBGene00001372	9181	3494	-1.39	7.04E-05	0.00080961	WBGene00011453	129	411	1.68	8.78E-05	0.0009563	WBGene00009539	6428	2166	-1.57	0.0001076	0.0011145
WBGene00004086	11060	4723	-1.23	7.04E-05	0.00080961	WBGene00000388	11638	4925	-1.24	8.78E-05	0.0009563	WBGene00021711	905	345	-1.39	0.0001078	0.0011154
WBGene00002012	281	875	1.64	7.07E-05	0.00081152	WBGene00045457	1	40	4.96	8.80E-05	0.000958	WBGene00011217	73	433	2.57	0.0001079	0.0011154
WBGene00009152	33	174	2.4	7.07E-05	0.00081152	WBGene00000907	384	1047	1.45	8.81E-05	0.0009581	WBGene00016662	0	38	7.96	0.0001079	0.0011154

WBGene00001812	5257	2416	-1.12	7.08E-05	0.00081162	WBGene00001681	263	1063	2.01	8.85E-05	0.0009616	WBGene00012522	12738	5857	-1.12	0.0001079	0.0011154
WBGene00001968	384	105	-1.88	7.08E-05	0.00081178	WBGene00020045	24	125	2.39	8.85E-05	0.0009616	WBGene00020884	233	1622	2.8	0.0001082	0.0011171
WBGene00008065	23	140	2.6	7.11E-05	0.00081429	WBGene00009789	126	360	1.52	8.85E-05	0.0009616	WBGene00013574	1133	3696	1.71	0.0001082	0.0011171
WBGene00016659	85	1226	3.84	7.11E-05	0.00081429	WBGene00020858	1649	538	-1.62	8.87E-05	0.0009623	WBGene00007070	7322	3383	-1.11	0.0001084	0.0011183
WBGene00000601	34	221	2.7	7.13E-05	0.00081537	WBGene00020753	3	68	4.38	8.87E-05	0.0009625	WBGene00011589	16773	7485	-1.16	0.0001085	0.0011187
WBGene00001555	145	418	1.53	7.20E-05	0.00082255	WBGene00019482	377	967	1.36	8.89E-05	0.0009641	WBGene00008926	297	913	1.62	0.0001089	0.0011225
WBGene00004234	396	1672	2.08	7.21E-05	0.00082255	WBGene00012346	511	2122	2.05	8.91E-05	0.000965	WBGene00016371	10	89	3.18	0.0001097	0.0011304
WBGene00017692	521	1212	1.22	7.22E-05	0.00082255	WBGene00011886	6659	2576	-1.37	8.95E-05	0.0009683	WBGene00019272	17745	36197	1.03	0.0001098	0.0011304
WBGene00014858	622	235	-1.4	7.22E-05	0.00082255	WBGene00007687	838	3803	2.18	8.95E-05	0.0009683	WBGene00002087	5	64	3.63	0.0001105	0.0011366
WBGene00015017	22084	10353	-1.09	7.23E-05	0.00082255	WBGene00019934	84	378	2.17	8.95E-05	0.0009683	WBGene00019418	9211	3958	-1.22	0.0001108	0.001139
WBGene00003166	870	3383	1.96	7.23E-05	0.00082255	WBGene00010756	1488	3788	1.35	9.00E-05	0.0009723	WBGene00008997	257	796	1.63	0.0001111	0.0011412
WBGene00006591	360	927	1.37	7.23E-05	0.00082255	WBGene00044047	3037	1272	-1.26	9.01E-05	0.0009737	WBGene00011407	291	674	1.21	0.0001111	0.0011412
WBGene00010521	10	94	3.17	7.24E-05	0.00082255	WBGene00011689	1029	342	-1.59	9.04E-05	0.0009757	WBGene00021353	2532	6818	1.43	0.0001112	0.0011416
WBGene00007155	290	764	1.4	7.24E-05	0.00082255	WBGene00006547	15936	6669	-1.26	9.13E-05	0.000985	WBGene00016769	264	1421	2.43	0.0001115	0.0011435
WBGene00021730	3809	1129	-1.75	7.24E-05	0.00082255	WBGene00021320	1027	3226	1.65	9.15E-05	0.0009871	WBGene00010192	1683	5448	1.69	0.0001115	0.0011435
WBGene00010135	656	1601	1.29	7.25E-05	0.00082255	WBGene00020457	1740	665	-1.39	9.16E-05	0.0009872	WBGene00008425	32	256	3.02	0.0001117	0.0011451
WBGene00010195	5312	1958	-1.44	7.25E-05	0.00082255	WBGene00018387	779	264	-1.56	9.17E-05	0.0009872	WBGene00001000	32021	64137	1	0.0001121	0.0011477
WBGene00017481	27962	11480	-1.28	7.25E-05	0.00082255	WBGene00001695	142	636	2.16	9.22E-05	0.0009925	WBGene00019360	71	275	1.95	0.0001129	0.0011556
WBGene00019923	11399	5306	-1.1	7.25E-05	0.00082255	WBGene00003998	7178	3185	-1.17	9.23E-05	0.0009925	WBGene00015137	703	1590	1.18	0.0001133	0.0011591
WBGene00019956	16522	7844	-1.07	7.29E-05	0.00082666	WBGene00017232	4	66	3.99	9.24E-05	0.0009932	WBGene00000050	101	353	1.81	0.0001135	0.00116
WBGene00017052	132	964	2.87	7.32E-05	0.00082919	WBGene00020786	130	506	1.96	9.26E-05	0.0009947	WBGene00020458	1037	414	-1.32	0.0001139	0.0011635
WBGene00017135	19081	7765	-1.3	7.34E-05	0.00083037	WBGene00020188	4779	11217	1.23	9.28E-05	0.0009968	WBGene00012958	2144	989	-1.12	0.0001141	0.0011652
WBGene00004033	696	2818	2.02	7.36E-05	0.00083215	WBGene00021362	1334	2800	1.07	9.37E-05	0.0010053	WBGene00008777	851	3414	2	0.0001151	0.001174
WBGene00044138	231	635	1.46	7.39E-05	0.00083513	WBGene00044798	6259	2601	-1.27	9.41E-05	0.0010091	WBGene00022026	1189	2712	1.19	0.0001151	0.001174
WBGene00008311	2560	5764	1.17	7.40E-05	0.00083602	WBGene00194915	461	1092	1.24	9.41E-05	0.0010091	WBGene00007374	99	390	1.98	0.0001156	0.0011784
WBGene00003601	43119	17797	-1.28	7.41E-05	0.0008369	WBGene00010238	12	97	2.99	9.49E-05	0.0010165	WBGene00008033	1697	3469	1.03	0.0001164	0.001186
WBGene00009091	15	244	4.03	7.44E-05	0.00083953	WBGene00022271	136	540	1.99	9.64E-05	0.0010317	WBGene00044662	189	788	2.06	0.0001179	0.0012002
WBGene00022877	10	111	3.45	7.45E-05	0.00083983	WBGene00013898	7346	15359	1.06	9.65E-05	0.0010329	WBGene00008343	4757	1701	-1.48	0.0001194	0.0012156
WBGene00011704	4608	1449	-1.67	7.48E-05	0.00084324	WBGene00000841	79	292	1.88	9.66E-05	0.0010329	WBGene00019868	493	2028	2.04	0.0001198	0.0012188
WBGene00013797	3289	1111	-1.57	7.49E-05	0.00084381	WBGene00020261	38730	15871	-1.29	9.67E-05	0.0010329	WBGene00012540	2055	9189	2.16	0.0001205	0.0012246
WBGene00016424	3	58	4.52	7.50E-05	0.00084464	WBGene00004169	3757	11870	1.66	9.67E-05	0.001033	WBGene00010100	2902	1250	-1.22	0.0001215	0.0012348
WBGene00018678	4745	1981	-1.26	7.53E-05	0.00084711	WBGene00018221	296	822	1.47	9.68E-05	0.0010335	WBGene00020577	158	750	2.25	0.0001217	0.0012354
WBGene00017405	5207	2170	-1.26	7.55E-05	0.00084823	WBGene00021655	2954	1257	-1.23	9.69E-05	0.0010336	WBGene00006779	12819	33000	1.36	0.0001222	0.0012403
WBGene00022360	4780	2139	-1.16	7.57E-05	0.00085029	WBGene00003748	78	548	2.82	9.71E-05	0.0010346	WBGene00015291	7083	2309	-1.62	0.0001224	0.0012412
WBGene00003495	10873	29332	1.43	7.61E-05	0.00085483	WBGene00044248	132	414	1.65	9.71E-05	0.0010346	WBGene00020582	225	1225	2.44	0.0001224	0.0012412
WBGene00019798	2269	912	-1.31	7.64E-05	0.00085719	WBGene00016542	771	2913	1.92	9.76E-05	0.0010391	WBGene00018923	7553	3217	-1.23	0.0001226	0.0012417
WBGene00016513	89	302	1.76	7.69E-05	0.00086179	WBGene00013292	55	386	2.82	9.77E-05	0.0010393	WBGene00009155	1406	2868	1.03	0.0001226	0.0012417
WBGene00021834	8074	16653	1.04	7.78E-05	0.00087152	WBGene00021861	2405	1046	-1.2	9.78E-05	0.0010405	WBGene00003474	16	106	2.75	0.0001227	0.0012417
WBGene00019591	8461	3933	-1.11	7.78E-05	0.00087159	WBGene00019780	1753	4858	1.47	9.82E-05	0.0010435	WBGene00009722	829	1954	1.24	0.0001229	0.0012429
WBGene00013383	15606	6658	-1.23	7.83E-05	0.00087685	WBGene00044760	169	473	1.49	9.83E-05	0.0010444	WBGene00044695	1362	582	-1.23	0.000123	0.0012429
WBGene00006614	211	606	1.52	7.87E-05	0.0008807	WBGene00021528	1334	4716	1.82	9.87E-05	0.0010482	WBGene00007061	906	3396	1.91	0.000123	0.0012429
WBGene00007755	41	330	3.02	7.93E-05	0.00088595	WBGene00010522	228	1136	2.31	9.89E-05	0.0010493	WBGene00012802	6159	2752	-1.16	0.0001231	0.0012434
WBGene00003519	232	807	1.8	7.96E-05	0.00088951	WBGene00017447	9768	20356	1.06	9.90E-05	0.0010494	WBGene00018242	7180	3664	-0.97	0.0001234	0.0012454
WBGene00020572	467	1092	1.23	8.00E-05	0.00089342	WBGene00001518	144	1128	2.97	9.91E-05	0.0010494	WBGene00021963	2002	4821	1.27	0.0001237	0.001248
WBGene00000789	2263	4862	1.1	8.01E-05	0.00089364	WBGene00010205	543	1208	1.15	9.91E-05	0.0010494	WBGene00006672	2478	7222	1.54	0.0001239	0.0012488
WBGene00010793	1397	3651	1.39	8.03E-05	0.00089492	WBGene00009293	555	1381	1.32	9.92E-05	0.0010498	WBGene00002056	663	3549	2.42	0.0001239	0.0012488
WBGene00005642	731	1957	1.42	8.04E-05	0.00089567	WBGene00015052	21	150	2.82	9.92E-05	0.0010498	WBGene00011381	110	327	1.58	0.0001243	0.0012512
WBGene00020855	1311	3540	1.43	8.05E-05	0.0008961	WBGene00010049	386	1907	2.31	9.98E-05	0.0010556	WBGene00019413	5427	2577	-1.07	0.0001249	0.0012565
WBGene00018418	17666	36114	1.03	8.06E-05	0.00089692	WBGene00019704	12181	5208	-1.23	0.0001	0.0010572	WBGene00002177	315	1141	1.86	0.0001249	0.0012565
WBGene00011284	1	42	6.33	8.07E-05	0.00089719	WBGene00015536	37	161	2.12	0.0001003	0.0010593	WBGene00020692	490	1194	1.28	0.000126	0.0012663

WBGene00018350	7450	15249	1.03	8.07E-05	0.00089719	WBGene00012439	104	425	2.03	0.0001004	0.0010593	WBGene00008612	3779	1821	-1.05	0.0001264	0.0012699
WBGene00018500	10	87	3.1	8.10E-05	0.00090004	WBGene00006915	1557	6441	2.05	0.0001004	0.0010593	WBGene00019864	8785	4243	-1.05	0.0001266	0.0012712
WBGene00018828	12193	4778	-1.35	8.11E-05	0.00090004	WBGene00015272	100	15	-2.7	0.0001012	0.0010672	WBGene00017751	1190	456	-1.38	0.0001267	0.0012716
WBGene00016254	248	831	1.75	8.18E-05	0.00090751	WBGene00010106	3219	1432	-1.17	0.0001013	0.0010676	WBGene00011819	4158	1711	-1.28	0.0001271	0.0012746
WBGene00004211	169	456	1.43	8.20E-05	0.00090982	WBGene00015306	2	56	4.53	0.0001019	0.0010727	WBGene00016189	13445	6145	-1.13	0.0001271	0.0012746
WBGene00017848	2332	813	-1.52	8.23E-05	0.00091191	WBGene00010171	7	248	5.11	0.0001019	0.0010727	WBGene00021333	1146	2649	1.21	0.0001276	0.0012786
WBGene00003173	104	725	2.8	8.28E-05	0.00091721	WBGene00021298	1071	438	-1.29	0.000102	0.0010727	WBGene00003516	40032	81234	1.02	0.0001279	0.0012805
WBGene00017708	1879	557	-1.75	8.29E-05	0.00091732	WBGene00000950	775	1714	1.15	0.0001021	0.0010733	WBGene00044649	30	169	2.48	0.0001282	0.0012824
WBGene00013902	565	1752	1.63	8.30E-05	0.00091789	WBGene00045050	41	294	2.84	0.0001022	0.0010733	WBGene00019921	8909	3926	-1.18	0.0001282	0.0012824
WBGene00001553	386	935	1.28	8.32E-05	0.00091973	WBGene00015087	195	516	1.4	0.0001024	0.0010753	WBGene00007903	866	2228	1.36	0.0001296	0.0012955
WBGene00008301	1	52	5.18	8.33E-05	0.00092036	WBGene00008844	7291	2397	-1.6	0.0001026	0.0010768	WBGene00015718	1	41	6.06	0.0001297	0.0012958
WBGene00045277	254	776	1.61	8.34E-05	0.00092036	WBGene00003090	578	3163	2.45	0.0001028	0.0010769	WBGene00019436	39	155	2	0.0001299	0.0012973
WBGene00010672	2	46	4.88	8.34E-05	0.00092036	WBGene00077772	3526	1559	-1.18	0.0001028	0.0010769	WBGene00008365	37	170	2.19	0.0001302	0.0012991
WBGene00020735	2949	6411	1.12	8.37E-05	0.00092251	WBGene00007638	35	189	2.45	0.0001028	0.0010769	WBGene00017507	1370	652	-1.07	0.0001308	0.0013042
WBGene00008384	7154	2345	-1.61	8.37E-05	0.00092251	WBGene00008508	54	1	-5.19	0.000103	0.0010786	WBGene00015293	171	849	2.31	0.0001311	0.0013068
WBGene00018039	22	216	3.27	8.43E-05	0.00092852	WBGene00013799	8423	2432	-1.79	0.0001034	0.0010814	WBGene00000878	671	193	-1.8	0.0001319	0.0013146
WBGene00003943	1074	2387	1.15	0.00013226	0.00131698	WBGene00012124	4587	9169	1	0.0001633	0.0015522	WBGene00007908	102	312	1.62	0.0002007	0.0018247
WBGene00003804	26165	11335	-1.21	0.00013378	0.00133145	WBGene00013846	2348	4751	1.02	0.0001641	0.0015591	WBGene00011672	32	152	2.23	0.0002012	0.0018287
WBGene00014308	2464	5654	1.2	0.0001342	0.00133482	WBGene00044143	46	197	2.11	0.0001643	0.0015598	WBGene00010689	5679	1947	-1.54	0.0002018	0.0018328
WBGene00001055	618	1435	1.21	0.00013438	0.00133596	WBGene00016766	62	215	1.78	0.0001655	0.0015706	WBGene00020765	12354	6035	-1.03	0.0002021	0.0018346
WBGene00009834	31340	10922	-1.52	0.00013565	0.00134782	WBGene00006634	61	754	3.63	0.0001659	0.001573	WBGene00022240	137	659	2.27	0.0002025	0.0018371
WBGene00011310	1480	3023	1.03	0.00013574	0.00134791	WBGene00022262	7223	2803	-1.37	0.0001662	0.0015754	WBGene00014194	0	31	8.27	0.0002028	0.0018394
WBGene00010505	48	437	3.18	0.00013675	0.00135722	WBGene00008877	5016	2216	-1.18	0.0001665	0.0015777	WBGene00020887	95	590	2.63	0.0002034	0.0018432
WBGene00007006	38	221	2.56	0.00013699	0.00135887	WBGene00005898	82	246	1.58	0.0001671	0.0015825	WBGene00020471	110	335	1.61	0.0002035	0.0018432
WBGene00021557	20816	7166	-1.54	0.00013734	0.00136156	WBGene00003375	10219	20993	1.04	0.000168	0.0015903	WBGene00044705	87	343	1.99	0.0002037	0.0018441
WBGene00022312	1318	601	-1.13	0.00013805	0.00136786	WBGene00043992	547	1240	1.18	0.0001692	0.0016004	WBGene00021773	8763	4119	-1.09	0.0002047	0.0018517
WBGene00012098	1321	565	-1.23	0.00013832	0.00136978	WBGene00011984	60	235	1.96	0.0001693	0.0016011	WBGene00003759	105	427	2.02	0.0002047	0.0018517
WBGene00021493	1503	3185	1.08	0.00013881	0.00137386	WBGene00021938	11637	4800	-1.28	0.0001694	0.0016012	WBGene00013077	74	764	3.37	0.0002048	0.0018517
WBGene00020569	10	137	3.75	0.00013896	0.00137424	WBGene00022720	38	274	2.83	0.0001697	0.0016024	WBGene00011763	11042	32442	1.55	0.0002049	0.0018519
WBGene00001863	3259	11565	1.83	0.00013906	0.00137424	WBGene00021147	167	745	2.16	0.0001698	0.0016025	WBGene00001517	76	341	2.17	0.0002052	0.0018528
WBGene00009943	18	112	2.63	0.00013915	0.00137424	WBGene00002210	3655	9281	1.34	0.0001709	0.0016116	WBGene00015107	254	709	1.48	0.0002053	0.0018528
WBGene00004017	1517	5825	1.94	0.00013915	0.00137424	WBGene00011613	665	250	-1.41	0.0001709	0.0016116	WBGene00017640	2849	5694	1	0.0002059	0.0018572
WBGene00007079	497	174	-1.52	0.00013945	0.00137639	WBGene00004100	250	833	1.73	0.0001715	0.0016155	WBGene00009846	1468	599	-1.29	0.0002059	0.0018572
WBGene00043054	58	264	2.19	0.00013999	0.00138098	WBGene00020487	148	429	1.53	0.0001715	0.0016155	WBGene00021081	2	47	4.25	0.0002066	0.0018626
WBGene00009438	417	1722	2.04	0.00014049	0.00138457	WBGene00000799	15175	6943	-1.13	0.0001717	0.001616	WBGene00021709	5363	2666	-1.01	0.0002074	0.0018688
WBGene00008579	565	1237	1.13	0.00014051	0.00138457	WBGene00019788	12528	5333	-1.23	0.0001717	0.001616	WBGene00001764	5350	921	-2.54	0.0002079	0.0018714
WBGene00020201	15	120	3	0.00014059	0.00138466	WBGene00018392	4600	9495	1.05	0.0001724	0.0016215	WBGene00010832	14	94	2.76	0.0002079	0.0018714
WBGene00009019	5248	2471	-1.09	0.00014076	0.00138558	WBGene00019690	2843	1279	-1.15	0.0001732	0.0016282	WBGene00016101	1606	3292	1.04	0.0002083	0.0018739
WBGene00044556	286	771	1.43	0.000141	0.00138715	WBGene00021036	6953	16760	1.27	0.0001734	0.0016295	WBGene00022591	5964	11793	0.98	0.0002087	0.0018766
WBGene00195253	41	173	2.09	0.00014124	0.00138876	WBGene00008594	38	156	2.03	0.0001738	0.001632	WBGene00017039	17	108	2.66	0.0002091	0.0018789
WBGene00000647	662	226	-1.55	0.00014254	0.00140063	WBGene00012670	333	1433	2.11	0.0001744	0.0016367	WBGene00022067	10567	5084	-1.06	0.0002094	0.0018796
WBGene00016891	1467	619	-1.24	0.00014261	0.00140063	WBGene00006830	2336	4941	1.08	0.0001746	0.0016375	WBGene00009291	713	1544	1.12	0.0002094	0.0018796
WBGene00018522	2793	7443	1.41	0.00014336	0.00140727	WBGene00017463	1683	4110	1.29	0.0001748	0.0016385	WBGene00004819	29156	11900	-1.29	0.0002095	0.0018796
WBGene00015132	6946	3029	-1.2	0.00014415	0.00141399	WBGene00007244	3601	1438	-1.32	0.0001753	0.0016425	WBGene00020205	52155	24503	-1.09	0.000211	0.0018922
WBGene00022063	1427	683	-1.06	0.0001442	0.00141399	WBGene00018042	877	2022	1.2	0.0001756	0.0016451	WBGene00008260	2191	6429	1.55	0.0002113	0.0018938
WBGene00020394	1949	535	-1.87	0.00014431	0.00141426	WBGene00019768	4683	1918	-1.29	0.0001758	0.001646	WBGene00019759	3869	8118	1.07	0.0002117	0.0018972
WBGene00013250	1227	536	-1.2	0.0001449	0.00141871	WBGene00013561	9151	4096	-1.16	0.000176	0.0016469	WBGene00014761	40	182	2.17	0.0002122	0.0019003
WBGene00001368	5405	10889	1.01	0.00014492	0.00141871	WBGene00001394	1100	2219	1.01	0.0001762	0.0016481	WBGene00022074	27165	12231	-1.15	0.0002127	0.0019034
WBGene00017835	1729	6332	1.87	0.00014543	0.00142295	WBGene00017426	1090	2252	1.05	0.0001773	0.001657	WBGene00001990	289	1188	2.04	0.0002141	0.0019151
WBGene00017892	1465	5243	1.84	0.00014575	0.00142526	WBGene00019428	154	1024	2.73	0.0001774	0.001657	WBGene00011551	61	257	2.09	0.0002144	0.0019168

WBGene00013180	2031	3964	0.97	0.00014653	0.00143211	WBGene00002126	209	1041	2.32	0.000178	0.0016617	WBGene00011382	130	593	2.19	0.0002158	0.0019282
WBGene00017752	2534	1005	-1.33	0.00014716	0.0014375	WBGene00017009	44	294	2.73	0.0001783	0.001664	WBGene00018462	1121	2380	1.09	0.0002159	0.0019282
WBGene00011833	12232	24865	1.02	0.00014737	0.0014388	WBGene00018567	95	303	1.67	0.0001793	0.0016724	WBGene00010881	27	135	2.3	0.0002161	0.0019298
WBGene00044188	3137	1368	-1.2	0.00014825	0.00144657	WBGene00014252	175	1127	2.68	0.0001806	0.0016834	WBGene00016734	568	1416	1.32	0.0002179	0.0019441
WBGene00017933	858	372	-1.21	0.00014835	0.00144675	WBGene00014124	22069	10593	-1.06	0.0001814	0.0016902	WBGene00007253	200	498	1.31	0.000218	0.0019449
WBGene00007405	2610	5708	1.13	0.00014925	0.0014544	WBGene00019975	205	516	1.33	0.0001828	0.0017022	WBGene00018732	52	360	2.79	0.0002185	0.0019476
WBGene00000836	54145	23572	-1.2	0.00014929	0.0014544	WBGene00010318	517	1182	1.19	0.000183	0.0017031	WBGene00017305	6	129	4.37	0.0002187	0.0019491
WBGene00008964	2768	11121	2.01	0.00014942	0.00145486	WBGene00008746	245	885	1.85	0.0001831	0.0017035	WBGene00019753	19	120	2.69	0.0002189	0.0019491
WBGene00014148	1716	4844	1.5	0.00014994	0.001459	WBGene00001954	118	370	1.65	0.0001834	0.0017057	WBGene00011339	1338	3020	1.17	0.000219	0.0019491
WBGene00017386	186	24	-2.98	0.00015001	0.001459	WBGene00022346	189	498	1.4	0.0001837	0.0017069	WBGene00015402	141	403	1.52	0.0002198	0.0019561
WBGene00009818	7189	14750	1.04	0.00015043	0.00146206	WBGene00015842	1175	305	-1.94	0.0001846	0.0017143	WBGene00000220	30222	59119	0.97	0.0002205	0.0019605
WBGene00020542	4229	1977	-1.1	0.00015049	0.00146206	WBGene00002243	4350	9043	1.06	0.000185	0.0017171	WBGene00017249	5555	2571	-1.11	0.0002211	0.0019652
WBGene00000942	26832	57402	1.1	0.00015064	0.00146272	WBGene00013665	221	559	1.34	0.0001854	0.00172	WBGene00004746	59310	29789	-0.99	0.0002224	0.0019761
WBGene00011388	9322	4475	-1.06	0.00015124	0.00146778	WBGene00022789	1877	7235	1.95	0.0001856	0.0017205	WBGene00004267	1012	4663	2.2	0.0002227	0.0019776
WBGene00018468	1548	6752	2.12	0.000152	0.00147435	WBGene00005652	78	453	2.55	0.0001857	0.0017205	WBGene00020042	40	177	2.13	0.0002231	0.0019804
WBGene00019723	1890	694	-1.44	0.00015242	0.0014763	WBGene00008366	894	1932	1.11	0.0001857	0.0017205	WBGene00020650	26	179	2.76	0.0002235	0.0019826
WBGene00010269	1632	3438	1.08	0.00015242	0.0014763	WBGene00011238	412	996	1.27	0.0001862	0.0017239	WBGene00013558	16518	7365	-1.17	0.0002237	0.0019838
WBGene00014143	3518	1257	-1.48	0.00015245	0.0014763	WBGene00018688	11991	5830	-1.04	0.0001866	0.0017268	WBGene00018376	40	421	3.39	0.0002239	0.0019847
WBGene00013588	6	66	3.55	0.00015267	0.00147771	WBGene00004944	409	1770	2.11	0.0001869	0.0017293	WBGene00021656	626	283	-1.15	0.0002246	0.0019898
WBGene00016550	1773	780	-1.18	0.00015354	0.00148468	WBGene00012581	3208	1395	-1.2	0.0001872	0.0017308	WBGene00020674	32	150	2.24	0.0002253	0.0019944
WBGene00194674	44	179	2.03	0.0001536	0.00148468	WBGene00012111	1791	737	-1.28	0.0001875	0.0017321	WBGene00020962	3205	1500	-1.1	0.0002254	0.0019944
WBGene00012325	17	113	2.74	0.00015367	0.00148468	WBGene00005059	650	228	-1.51	0.0001875	0.0017321	WBGene00005649	15	103	2.74	0.0002258	0.001996
WBGene00009873	1	37	4.69	0.00015373	0.00148468	WBGene00006749	952	4617	2.28	0.0001877	0.0017325	WBGene00022612	3245	7812	1.27	0.0002258	0.001996
WBGene00001957	287	697	1.28	0.00015405	0.00148659	WBGene00009355	855	3995	2.22	0.0001881	0.0017357	WBGene00012478	3813	9661	1.34	0.0002264	0.0020005
WBGene00014918	390	125	-1.64	0.00015409	0.00148659	WBGene00044437	583	1326	1.19	0.0001889	0.0017423	WBGene00013611	148	14	-3.43	0.000227	0.0020046
WBGene00013500	9517	3855	-1.3	0.00015418	0.00148672	WBGene00019772	22	190	3.14	0.0001893	0.0017447	WBGene00015261	1084	393	-1.46	0.0002273	0.0020059
WBGene00044693	4626	1875	-1.3	0.00015448	0.00148789	WBGene00008450	2200	4543	1.05	0.0001896	0.001746	WBGene00012253	288	1564	2.44	0.0002273	0.0020059
WBGene00007925	5455	11222	1.04	0.00015449	0.00148789	WBGene00010872	16337	7833	-1.06	0.0001896	0.001746	WBGene00010191	391	1806	2.21	0.0002275	0.0020065
WBGene00019042	6034	2703	-1.16	0.00015455	0.00148789	WBGene00019364	365	839	1.2	0.0001902	0.0017507	WBGene00000778	6315	12884	1.03	0.000228	0.0020101
WBGene00017473	1444	446	-1.7	0.00015482	0.0014897	WBGene00003417	3193	1327	-1.27	0.0001913	0.0017592	WBGene00014044	524	149	-1.81	0.0002283	0.0020112
WBGene00018002	15	129	3.14	0.00015493	0.00148992	WBGene00044905	1255	562	-1.16	0.0001914	0.0017595	WBGene00006559	1117	426	-1.39	0.0002284	0.0020112
WBGene00009601	11	83	2.93	0.00015582	0.00149762	WBGene00003934	21274	42125	0.99	0.0001917	0.0017611	WBGene00009070	8774	4216	-1.06	0.0002291	0.0020162
WBGene00019233	962	199	-2.27	0.0001559	0.00149763	WBGene00021293	18243	6179	-1.56	0.0001918	0.0017611	WBGene00017018	1149	4645	2.01	0.0002296	0.0020197
WBGene00017562	746	1671	1.16	0.00015614	0.00149917	WBGene00003859	41	234	2.52	0.0001919	0.0017616	WBGene00000047	574	2944	2.36	0.0002306	0.0020281
WBGene00016930	1478	453	-1.71	0.00015658	0.00150257	WBGene00001240	3184	6177	0.96	0.0001925	0.0017666	WBGene00004213	12633	24851	0.98	0.0002313	0.0020327
WBGene00011960	26	138	2.38	0.0001574	0.00150966	WBGene00007694	10189	4739	-1.1	0.0001936	0.0017756	WBGene00015050	5	64	3.59	0.0002325	0.0020424
WBGene00006669	160	464	1.53	0.00015753	0.00151009	WBGene00008732	1604	4838	1.59	0.0001942	0.0017797	WBGene00020077	21	127	2.58	0.0002329	0.0020452
WBGene00021484	349	113	-1.62	0.0001581	0.00151447	WBGene00003739	51	209	2.04	0.0001945	0.0017814	WBGene00013650	10241	4671	-1.13	0.0002333	0.0020477
WBGene00015885	704	210	-1.74	0.00015816	0.00151447	WBGene00001103	9117	3643	-1.32	0.000195	0.0017856	WBGene00003641	18	115	2.63	0.0002339	0.002052
WBGene00007520	3823	12260	1.68	0.00015882	0.00151957	WBGene00013779	2909	1201	-1.28	0.0001962	0.0017951	WBGene00020676	1067	3112	1.54	0.0002346	0.002057
WBGene00011452	7	77	3.55	0.00015886	0.00151957	WBGene00000287	114	351	1.62	0.0001967	0.0017974	WBGene00004173	101	457	2.19	0.0002349	0.0020577
WBGene00018271	5888	12413	1.08	0.00015985	0.00152826	WBGene00044733	3938	1791	-1.14	0.0001967	0.0017974	WBGene00005256	356	106	-1.75	0.0002349	0.0020577
WBGene00010774	351	866	1.3	0.0001602	0.0015308	WBGene00017964	157	471	1.58	0.0001967	0.0017974	WBGene00015103	69	381	2.47	0.0002356	0.0020626
WBGene00018275	2839	5964	1.07	0.00016054	0.00153322	WBGene00013150	15317	5439	-1.49	0.0001969	0.0017983	WBGene00003033	146	600	2.04	0.0002361	0.0020654
WBGene00010142	16326	6411	-1.35	0.00016094	0.00153619	WBGene00008600	209	486	1.22	0.0001974	0.0018019	WBGene00016759	176	694	1.98	0.0002362	0.0020654
WBGene00020712	7	89	3.7	0.00016127	0.00153848	WBGene00002123	4878	12461	1.35	0.0001977	0.0018036	WBGene00044976	3552	1707	-1.06	0.0002369	0.0020708
WBGene00017577	43	189	2.13	0.00016177	0.00154245	WBGene00006556	1732	723	-1.26	0.0001978	0.0018039	WBGene00016135	2896	5904	1.03	0.0002371	0.002072
WBGene00001985	2233	745	-1.58	0.0001621	0.00154478	WBGene00007960	204	43	-2.24	0.0001985	0.0018096	WBGene00021721	3023	1315	-1.2	0.0002376	0.0020748
WBGene00010690	1635	665	-1.3	0.00016248	0.00154764	WBGene00009145	6439	2606	-1.3	0.0001994	0.0018161	WBGene00004988	203	691	1.77	0.0002379	0.0020765
WBGene00016486	662	248	-1.42	0.00016287	0.00155053	WBGene00007495	72	454	2.66	0.0001997	0.0018185	WBGene00010457	902	2006	1.15	0.0002381	0.0020776

WBGene00004969	1379	2795	1.02	0.00016299	0.00155056	WBGene00015148	1228	2574	1.07	0.0002005	0.0018247	WBGene00000176	135	438	1.7	0.0002383	0.0020778
WBGene00013796	7167	2504	-1.52	0.00016305	0.00155056	WBGene00006636	179	498	1.48	0.0002006	0.0018247	WBGene00011475	28471	13398	-1.09	0.0002398	0.0020897
WBGene00003876	148	755	2.35	0.00024004	0.00209119	WBGene00020715	122	4	-5.1	0.0002849	0.0023827	WBGene00006777	1715	6720	1.97	0.0003375	0.0027141
WBGene00019424	264	676	1.35	0.00024282	0.00211386	WBGene00007953	752	1578	1.07	0.0002852	0.0023836	WBGene00007664	147	586	2	0.0003378	0.0027141
WBGene00009350	41	190	2.2	0.00024288	0.00211386	WBGene00017865	191	533	1.48	0.0002853	0.0023836	WBGene00007220	156	443	1.5	0.0003378	0.0027141
WBGene00011981	2791	1094	-1.35	0.00024339	0.00211735	WBGene00011193	3739	1515	-1.3	0.0002856	0.0023852	WBGene00019300	80	434	2.44	0.0003392	0.0027237
WBGene00044551	1	39	5.03	0.00024356	0.00211776	WBGene00008783	1139	2374	1.06	0.0002864	0.0023904	WBGene00010554	55	204	1.89	0.0003396	0.0027261
WBGene00004779	127	480	1.91	0.0002441	0.00212144	WBGene00015735	475	1762	1.89	0.0002865	0.0023904	WBGene00022154	348	1152	1.73	0.0003401	0.0027283
WBGene00007494	71	229	1.69	0.00024432	0.0021223	WBGene00003625	5142	12199	1.25	0.000287	0.0023938	WBGene00016903	2462	4831	0.97	0.0003406	0.0027315
WBGene00018738	2389	4839	1.02	0.00024455	0.00212306	WBGene00022644	130	2155	4.06	0.0002882	0.0024026	WBGene00011479	197	497	1.33	0.0003409	0.0027319
WBGene00004859	4879	9601	0.98	0.00024464	0.00212306	WBGene00019476	10	80	2.99	0.0002889	0.0024068	WBGene00000053	60	246	2.04	0.000341	0.0027319
WBGene00009032	461	1859	2.01	0.00024481	0.00212345	WBGene00050903	7097	3103	-1.19	0.0002896	0.0024117	WBGene00017280	18485	8410	-1.14	0.0003413	0.0027325
WBGene00015332	22	116	2.42	0.00024529	0.0021266	WBGene00003133	38956	19312	-1.01	0.0002901	0.0024152	WBGene00015423	72	247	1.78	0.0003413	0.0027325
WBGene00008644	78	249	1.68	0.00024549	0.0021266	WBGene00001076	####	593975	0.94	0.0002904	0.0024166	WBGene00013845	88	460	2.38	0.0003427	0.0027422
WBGene00015271	992	289	-1.78	0.00024552	0.0021266	WBGene00019148	4052	16243	2	0.0002917	0.0024256	WBGene00017408	2979	1293	-1.2	0.0003437	0.0027493
WBGene00018628	50	286	2.5	0.0002457	0.0021271	WBGene00012220	6185	2479	-1.32	0.000292	0.0024274	WBGene00016329	1294	4267	1.72	0.0003439	0.0027494
WBGene00018358	6457	3227	-1	0.00024607	0.00212809	WBGene00010349	420	1453	1.79	0.0002928	0.0024327	WBGene00011404	907	1984	1.13	0.0003441	0.0027494
WBGene00019687	6468	3294	-0.97	0.00024609	0.00212809	WBGene00021814	115	342	1.58	0.0002932	0.0024349	WBGene00010374	2910	5916	1.02	0.0003449	0.0027549
WBGene00000492	969	2149	1.15	0.00024627	0.00212809	WBGene00013043	37	161	2.14	0.0002933	0.0024349	WBGene00016806	265	1204	2.19	0.0003457	0.0027603
WBGene00012416	4	55	3.65	0.00024629	0.00212809	WBGene00019072	1392	596	-1.22	0.0002942	0.0024413	WBGene00011949	76	526	2.79	0.0003459	0.0027605
WBGene00008718	1233	2540	1.04	0.00024751	0.00213767	WBGene00010320	18	119	2.69	0.0002945	0.0024428	WBGene00017663	318	1662	2.39	0.0003478	0.0027734
WBGene00007044	4573	9037	0.98	0.00024778	0.00213894	WBGene00020541	4302	2065	-1.06	0.0002969	0.0024613	WBGene00007285	324	1022	1.65	0.0003479	0.0027734
WBGene00018965	6568	12751	0.96	0.00024874	0.00214617	WBGene00043050	98	328	1.75	0.0002973	0.002463	WBGene00010989	1813	830	-1.13	0.000348	0.0027734
WBGene00045146	20	118	2.57	0.00024893	0.00214678	WBGene00016860	147	454	1.63	0.0002974	0.002463	WBGene00018598	6776	2407	-1.49	0.0003481	0.0027734
WBGene00001751	176	460	1.38	0.00024937	0.00214957	WBGene00013241	20901	9317	-1.17	0.0002978	0.0024651	WBGene00000493	2563	5320	1.05	0.0003489	0.0027786
WBGene00016132	105	670	2.68	0.00024962	0.00214998	WBGene00001973	10905	4774	-1.19	0.0002983	0.0024686	WBGene00044764	7	71	3.39	0.0003495	0.0027816
WBGene00003450	207	9	-4.45	0.00024966	0.00214998	WBGene00022643	114	565	2.3	0.0002985	0.0024686	WBGene00012217	20	105	2.41	0.000351	0.0027922
WBGene00001608	183	669	1.87	0.00024984	0.00215054	WBGene00012669	114	357	1.64	0.0002986	0.0024688	WBGene00017208	9791	4742	-1.05	0.0003535	0.0028101
WBGene00009904	60	639	3.41	0.00025343	0.00218036	WBGene00008047	133	545	2.03	0.0003003	0.0024816	WBGene00016460	1250	506	-1.31	0.0003535	0.0028101
WBGene00020825	1283	2812	1.13	0.00025422	0.00218608	WBGene00000476	3136	6127	0.97	0.0003007	0.002483	WBGene00021583	337	1627	2.27	0.0003539	0.0028119
WBGene00007197	221	563	1.35	0.00025459	0.00218825	WBGene00001494	1083	2238	1.05	0.0003008	0.002483	WBGene00022564	1361	588	-1.21	0.0003541	0.0028123
WBGene00006788	15184	34012	1.16	0.00025509	0.00219146	WBGene00020657	78	320	2.04	0.0003009	0.002483	WBGene00044605	2658	5369	1.01	0.0003553	0.0028201
WBGene00019983	22162	10449	-1.08	0.00025596	0.00219791	WBGene00003981	168	518	1.62	0.0003014	0.0024853	WBGene00019935	1038	3269	1.65	0.0003558	0.0028232
WBGene00008915	3521	1583	-1.15	0.00025613	0.00219834	WBGene00006363	2461	8815	1.84	0.0003015	0.0024853	WBGene00011878	65	305	2.24	0.0003567	0.002829
WBGene00018429	41	170	2.05	0.00025632	0.00219845	WBGene00001182	3979	9380	1.24	0.0003024	0.0024916	WBGene00011755	4300	8373	0.96	0.0003569	0.002829
WBGene00018560	80	256	1.68	0.00025648	0.00219845	WBGene00017454	200	53	-1.93	0.0003031	0.002496	WBGene00019041	3576	1731	-1.05	0.0003573	0.0028315
WBGene00004346	227	1259	2.47	0.00025651	0.00219845	WBGene00006792	256	1207	2.24	0.0003032	0.002496	WBGene00009237	52	207	1.99	0.0003576	0.0028325
WBGene00003685	1375	2761	1.01	0.00025664	0.0021985	WBGene00018636	5848	2548	-1.2	0.0003038	0.0024997	WBGene00008432	155	433	1.48	0.0003599	0.0028492
WBGene00018824	2090	4067	0.96	0.00025733	0.00220333	WBGene00005241	508	207	-1.29	0.000304	0.0025005	WBGene00000239	507	1147	1.18	0.0003602	0.0028503
WBGene00020315	9388	4257	-1.14	0.00025914	0.0022178	WBGene00008438	1192	2582	1.12	0.0003044	0.0025015	WBGene00007904	31807	16022	-0.99	0.0003606	0.0028506
WBGene00010235	0	58	6.98	0.00025959	0.00222045	WBGene00008226	899	1966	1.13	0.0003044	0.0025015	WBGene00006598	14	103	2.87	0.0003607	0.0028506
WBGene00000666	10	87	3.18	0.0002597	0.00222045	WBGene00004320	68181	24924	-1.45	0.0003045	0.0025015	WBGene00013672	1691	4152	1.3	0.0003609	0.0028506
WBGene00007950	209	564	1.44	0.00025998	0.00222178	WBGene00007541	0	34	7.8	0.0003052	0.0025058	WBGene00021815	6225	3185	-0.97	0.000361	0.0028506
WBGene00001627	1370	2976	1.12	0.00026028	0.0022233	WBGene00018405	2462	7794	1.66	0.0003057	0.0025083	WBGene00010493	5067	2137	-1.25	0.0003611	0.0028506
WBGene00019979	146	902	2.63	0.000261	0.00222843	WBGene00020808	18738	53417	1.51	0.0003074	0.0025216	WBGene00045302	1441	648	-1.15	0.0003612	0.0028506
WBGene00018573	23	273	3.55	0.00026121	0.0022291	WBGene00018483	10770	4906	-1.13	0.0003089	0.0025329	WBGene00002252	149	1207	3.02	0.0003613	0.0028506
WBGene00003640	651	1816	1.48	0.00026133	0.0022291	WBGene00009030	403	928	1.2	0.0003112	0.00255	WBGene00044779	27	141	2.37	0.0003617	0.0028521
WBGene00019737	176	657	1.9	0.00026175	0.00223166	WBGene00016429	689	1469	1.09	0.0003119	0.0025551	WBGene00018736	19	150	2.96	0.000362	0.0028535
WBGene00021165	5256	1779	-1.56	0.00026206	0.00223244	WBGene00006549	458	148	-1.62	0.0003124	0.0025575	WBGene00010449	566	1255	1.15	0.0003622	0.0028535
WBGene00016152	244	619	1.34	0.00026209	0.00223244	WBGene00022227	1176	494	-1.25	0.0003127	0.002558	WBGene00008726	181	427	1.24	0.0003631	0.0028589

WBGene00008146	116	807	2.8	0.00026298	0.00223894	WBGene00017957	277	737	1.41	0.0003127	0.002558	WBGene00018654	338	801	1.25	0.0003632	0.0028589
WBGene00006508	14306	28404	0.99	0.00026403	0.00224685	WBGene00009697	14918	7560	-0.98	0.0003131	0.0025589	WBGene00016566	10382	5224	-0.99	0.000364	0.0028635
WBGene00018445	1489	629	-1.24	0.00026465	0.00224919	WBGene00012018	2337	9673	2.05	0.0003131	0.0025589	WBGene00015595	1066	402	-1.41	0.0003643	0.0028635
WBGene00009318	723	2196	1.6	0.00026465	0.00224919	WBGene00004950	1120	2760	1.3	0.0003135	0.0025607	WBGene00022297	18805	8562	-1.14	0.0003644	0.0028635
WBGene00020134	4160	8063	0.95	0.00026468	0.00224919	WBGene00021939	736	2303	1.65	0.0003138	0.0025627	WBGene00012496	14712	7152	-1.04	0.0003645	0.0028635
WBGene00022047	131	522	1.99	0.00026544	0.00225458	WBGene00001248	3323	6495	0.97	0.0003143	0.0025637	WBGene00019958	177	659	1.89	0.0003646	0.0028635
WBGene00022278	17078	8163	-1.06	0.00026593	0.00225763	WBGene00019918	24230	11400	-1.09	0.0003144	0.0025637	WBGene00004212	2301	7508	1.71	0.0003686	0.0028938
WBGene00044493	2176	1046	-1.06	0.000267	0.00226569	WBGene00008142	21	118	2.5	0.0003144	0.0025637	WBGene00007483	13	88	2.8	0.0003695	0.0028995
WBGene00004924	554	3415	2.62	0.00026776	0.00227101	WBGene00006947	6087	24932	2.03	0.0003145	0.0025637	WBGene00014003	14	88	2.65	0.0003697	0.0029001
WBGene00021914	7035	3238	-1.12	0.0002683	0.00227453	WBGene00195255	30	140	2.22	0.0003149	0.0025655	WBGene00001461	123	556	2.18	0.0003706	0.0029059
WBGene00008220	34	136	2	0.0002685	0.00227514	WBGene00008215	1142	5924	2.38	0.0003155	0.0025677	WBGene00005004	43	169	1.96	0.0003711	0.0029083
WBGene00016865	857	1737	1.02	0.00027006	0.00228729	WBGene00014820	1063	468	-1.18	0.0003155	0.0025677	WBGene00015265	902	333	-1.44	0.0003731	0.0029224
WBGene00008314	906	3187	1.82	0.00027029	0.00228799	WBGene00000447	339	1143	1.75	0.0003159	0.00257	WBGene00019261	484	1532	1.66	0.0003732	0.0029224
WBGene00003167	172	472	1.46	0.0002704	0.00228799	WBGene00019226	33	185	2.5	0.000317	0.0025777	WBGene00019604	13114	4736	-1.47	0.0003748	0.0029334
WBGene00009218	4894	12986	1.41	0.00027084	0.00229068	WBGene00023318	250	86	-1.54	0.0003171	0.0025778	WBGene00012527	7026	3120	-1.17	0.0003752	0.0029354
WBGene00003751	100	662	2.73	0.00027105	0.00229139	WBGene00012368	890	379	-1.23	0.0003185	0.0025877	WBGene00138711	178	524	1.56	0.0003759	0.0029394
WBGene00015136	2027	797	-1.35	0.00027195	0.00229789	WBGene00001711	201	767	1.93	0.0003189	0.0025899	WBGene00043990	264	87	-1.6	0.0003774	0.0029501
WBGene00018754	1981	971	-1.03	0.00027329	0.00230643	WBGene00009804	979	1949	0.99	0.0003204	0.0026012	WBGene00077775	19	229	3.57	0.0003777	0.0029513
WBGene00007075	1263	560	-1.17	0.0002733	0.00230643	WBGene00010838	2090	4326	1.05	0.0003218	0.0026098	WBGene00004264	5934	20194	1.77	0.0003782	0.0029527
WBGene00009647	1448	2936	1.02	0.00027338	0.00230643	WBGene00012234	10118	5155	-0.97	0.0003219	0.0026098	WBGene00002149	38	158	2.06	0.0003782	0.0029527
WBGene00022302	813	278	-1.55	0.00027347	0.00230643	WBGene00005392	179	38	-2.23	0.0003219	0.0026098	WBGene00010161	7724	3861	-1	0.0003797	0.0029618
WBGene00044618	271	661	1.29	0.00027461	0.00231432	WBGene00013841	9	157	4.11	0.0003225	0.0026122	WBGene00003995	105	325	1.62	0.0003798	0.0029618
WBGene00015057	3084	1486	-1.05	0.00027467	0.00231432	WBGene00003861	426	1171	1.46	0.0003225	0.0026122	WBGene00002037	18706	36173	0.95	0.0003799	0.0029618
WBGene00012951	13225	6207	-1.09	0.00027578	0.00232263	WBGene00021529	1193	2476	1.05	0.0003234	0.002618	WBGene00001997	3225	1429	-1.17	0.000382	0.0029771
WBGene00044350	255	671	1.4	0.00027904	0.00234898	WBGene00006582	5052	9992	0.98	0.0003251	0.0026298	WBGene00022228	46	199	2.1	0.0003826	0.0029807
WBGene00019149	30	140	2.24	0.00027948	0.00235052	WBGene00044696	76	504	2.72	0.0003251	0.0026298	WBGene00010594	318	1576	2.31	0.000383	0.0029817
WBGene00012395	16368	7441	-1.14	0.00027949	0.00235052	WBGene00009820	5760	2580	-1.16	0.0003265	0.0026395	WBGene00045300	4194	1727	-1.28	0.0003831	0.0029817
WBGene00011073	180	829	2.2	0.00027973	0.00235143	WBGene00011522	661	2556	1.95	0.0003272	0.0026439	WBGene00000913	54517	26487	-1.04	0.0003836	0.0029847
WBGene00022415	4995	18224	1.87	0.00028015	0.00235366	WBGene00006962	4164	1813	-1.2	0.0003281	0.0026499	WBGene00015135	1564	3403	1.12	0.0003838	0.0029847
WBGene00001445	23	121	2.41	0.00028025	0.00235366	WBGene00007431	88	287	1.7	0.0003314	0.0026759	WBGene00007102	2357	969	-1.28	0.0003845	0.002989
WBGene00020009	1110	4093	1.88	0.00028053	0.00235491	WBGene00007914	9240	4767	-0.95	0.0003334	0.0026909	WBGene00021211	2361	973	-1.28	0.0003853	0.0029937
WBGene00020560	659	3504	2.41	0.00028181	0.0023645	WBGene00020561	180	841	2.22	0.0003347	0.0027002	WBGene00008440	26194	9345	-1.49	0.0003864	0.0030009
WBGene00009700	237	802	1.76	0.000282	0.00236503	WBGene00020729	1720	548	-1.65	0.000335	0.0027006	WBGene00020666	431	150	-1.52	0.0003871	0.003005
WBGene00000524	325	1501	2.21	0.00028216	0.00236525	WBGene00012391	626	1422	1.18	0.0003351	0.0027006	WBGene00009562	91	282	1.63	0.0003886	0.0030152
WBGene00020414	151	24	-2.67	0.00028306	0.0023717	WBGene00008227	292	661	1.18	0.0003355	0.0027026	WBGene00011586	13	85	2.74	0.0003892	0.0030187
WBGene00020838	5503	10353	0.91	0.00028341	0.00237352	WBGene00009049	10250	4631	-1.15	0.0003362	0.0027074	WBGene00022164	868	2525	1.54	0.0003895	0.0030187
WBGene00016397	1168	2651	1.18	0.0002839	0.00237652	WBGene00003885	1637	3361	1.04	0.0003373	0.002714	WBGene00018423	4216	1787	-1.24	0.0003896	0.0030187
WBGene00013897	1139	2640	1.21	0.00028454	0.00238076	WBGene00011313	13	125	3.27	0.0003374	0.002714	WBGene00019183	26	121	2.23	0.0003897	0.0030187
WBGene00000772	8189	3803	-1.11	0.00038993	0.00301928	WBGene00009586	721	1587	1.14	0.0004555	0.0034006	WBGene00011345	9894	18242	0.88	0.0005247	0.0037827
WBGene00021112	7694	3875	-0.99	0.00039022	0.0030202	WBGene00019188	7564	16322	1.11	0.0004583	0.0034168	WBGene00019944	2793	6463	1.21	0.0005252	0.0037846
WBGene00016751	4032	8261	1.03	0.00039066	0.00302235	WBGene00003029	800	1667	1.06	0.0004583	0.0034168	WBGene00000975	2237	795	-1.49	0.0005263	0.0037896
WBGene00012257	17198	47756	1.47	0.00039238	0.00303433	WBGene00013264	265	906	1.77	0.0004584	0.0034168	WBGene00006676	18	104	2.52	0.0005263	0.0037896
WBGene00044372	3789	1399	-1.44	0.00039348	0.00304151	WBGene00012950	8838	4023	-1.14	0.0004584	0.0034168	WBGene00000428	24	120	2.34	0.0005281	0.0038007
WBGene00011283	26103	50321	0.95	0.00039444	0.00304609	WBGene00000284	534	1239	1.22	0.0004587	0.0034178	WBGene00001188	1647	3532	1.1	0.0005283	0.003801
WBGene00001490	2195	7397	1.75	0.00039456	0.00304609	WBGene00018427	3265	1086	-1.59	0.0004608	0.0034322	WBGene00002006	952	422	-1.17	0.0005289	0.0038034
WBGene00012271	1486	3010	1.02	0.00039458	0.00304609	WBGene00019598	3554	1678	-1.08	0.0004629	0.0034463	WBGene00013170	2676	1335	-1	0.0005293	0.003805
WBGene00009063	1245	459	-1.44	0.00039546	0.00305159	WBGene00010795	769	1505	0.97	0.0004638	0.0034516	WBGene00022455	22834	10011	-1.19	0.0005305	0.0038123
WBGene00008157	3819	1672	-1.19	0.00039624	0.0030563	WBGene00006675	106	301	1.5	0.0004647	0.0034564	WBGene00005129	9	79	3.18	0.0005313	0.0038161
WBGene00000797	2772	1242	-1.16	0.00039692	0.00306018	WBGene00017673	84	10	-3.05	0.0004649	0.0034564	WBGene00004748	18	103	2.48	0.0005319	0.003819
WBGene00013103	1770	3851	1.12	0.00039765	0.00306407	WBGene00005248	20	110	2.48	0.0004668	0.0034677	WBGene00007565	60	233	1.96	0.0005326	0.0038228

WBGene00011374	150	1088	2.86	0.00039776	0.00306407	WBGene00020308	47	165	1.81	0.0004668	0.0034677	WBGene00008572	1208	3226	1.42	0.0005331	0.0038241
WBGene00013970	300	863	1.52	0.00039806	0.00306505	WBGene00009799	1047	3313	1.66	0.0004701	0.0034912	WBGene00022803	6977	3075	-1.18	0.0005333	0.0038241
WBGene00021873	11	75	2.76	0.00039901	0.00307107	WBGene00017738	15582	6155	-1.34	0.0004709	0.0034955	WBGene00009621	361	1183	1.71	0.0005337	0.0038261
WBGene00021174	546	221	-1.3	0.00040055	0.00308103	WBGene00195155	1689	727	-1.22	0.0004711	0.0034958	WBGene00003646	1634	3051	0.9	0.0005359	0.0038397
WBGene00006454	12	80	2.78	0.00040112	0.00308103	WBGene00004005	25	124	2.32	0.0004719	0.0035	WBGene00045237	2277	965	-1.24	0.0005364	0.0038422
WBGene00001117	2076	4122	0.99	0.00040115	0.00308103	WBGene00015795	261	616	1.24	0.0004728	0.0035042	WBGene00044724	578	7751	3.74	0.0005387	0.0038571
WBGene00000886	14383	5729	-1.33	0.00040117	0.00308103	WBGene00019198	3080	5821	0.92	0.0004728	0.0035042	WBGene00000215	950	3215	1.76	0.0005394	0.0038603
WBGene00016046	2226	4425	0.99	0.00040127	0.00308103	WBGene00014181	1859	3609	0.96	0.000475	0.0035191	WBGene00007414	819	3320	2.02	0.000542	0.0038776
WBGene00016396	655	2099	1.68	0.00040134	0.00308103	WBGene00021053	5314	2784	-0.93	0.0004754	0.0035205	WBGene00077670	166	28	-2.57	0.0005436	0.0038874
WBGene00003542	24	121	2.35	0.00040329	0.00309438	WBGene00021480	460	1124	1.29	0.0004768	0.003529	WBGene00019603	13	89	2.77	0.0005461	0.003904
WBGene00016085	76	233	1.61	0.00040342	0.00309438	WBGene00018175	3554	7181	1.01	0.0004775	0.0035328	WBGene00020349	697	223	-1.64	0.0005473	0.0039099
WBGene00003469	61	1	-6.76	0.00040382	0.00309521	WBGene00010240	3960	1888	-1.07	0.0004777	0.0035332	WBGene00011267	4254	2084	-1.03	0.0005474	0.0039099
WBGene00016847	12	91	2.92	0.00040387	0.00309521	WBGene00003667	12	87	2.9	0.0004793	0.0035436	WBGene00006668	844	3699	2.13	0.0005503	0.0039293
WBGene00003715	249	617	1.31	0.00040505	0.00310293	WBGene00016933	10	84	3.13	0.0004803	0.0035485	WBGene00009133	2860	8967	1.65	0.000551	0.0039322
WBGene00019887	260	1223	2.23	0.0004053	0.00310352	WBGene00001618	133	378	1.51	0.0004804	0.0035485	WBGene00013327	948	405	-1.23	0.0005513	0.0039329
WBGene00006839	36522	68485	0.91	0.00040586	0.00310646	WBGene00008755	2391	1107	-1.11	0.0004807	0.0035496	WBGene00009865	175	441	1.34	0.0005517	0.0039342
WBGene00011725	2	47	4.63	0.00040759	0.00311841	WBGene00010316	45	195	2.11	0.000481	0.0035498	WBGene00017970	2991	10372	1.79	0.0005577	0.0039758
WBGene00019347	2232	5945	1.41	0.00040828	0.00312234	WBGene00019859	237	1098	2.21	0.0004821	0.003557	WBGene00006778	4293	8169	0.93	0.0005579	0.0039758
WBGene00017704	502	163	-1.62	0.00040874	0.00312454	WBGene00020781	67270	32992	-1.03	0.0004836	0.0035664	WBGene00016293	14	92	2.71	0.0005609	0.003995
WBGene00014006	5	70	3.7	0.00040895	0.00312476	WBGene00016763	131	817	2.64	0.0004861	0.0035831	WBGene00002136	3955	1853	-1.09	0.0005611	0.003995
WBGene00001185	147	381	1.38	0.00040957	0.00312822	WBGene00008785	285	688	1.27	0.000487	0.0035883	WBGene00044807	65	235	1.85	0.0005634	0.0040098
WBGene00077765	953	309	-1.63	0.00041035	0.00313283	WBGene00012664	135	421	1.64	0.0004887	0.0035995	WBGene00000623	122	357	1.55	0.0005637	0.0040105
WBGene00003986	1941	8993	2.21	0.00041109	0.00313717	WBGene00012698	1146	449	-1.35	0.0004892	0.003602	WBGene00019025	46	173	1.91	0.0005646	0.004015
WBGene00017759	17476	7600	-1.2	0.00041284	0.00314825	WBGene00194769	18	110	2.6	0.0004895	0.0036026	WBGene00003714	73	270	1.89	0.0005655	0.0040201
WBGene00011041	61	246	2	0.0004129	0.00314825	WBGene00019237	20906	39408	0.91	0.0004907	0.0036095	WBGene00007551	24	123	2.36	0.0005658	0.0040205
WBGene00015409	1406	527	-1.42	0.00041466	0.00316036	WBGene00010330	717	1572	1.13	0.0004924	0.0036208	WBGene00009950	607	184	-1.72	0.0005662	0.0040208
WBGene00022790	730	1685	1.21	0.00041611	0.00317008	WBGene00018871	38	323	3.09	0.0004933	0.0036258	WBGene00004912	387	2073	2.42	0.0005663	0.0040208
WBGene00020517	19354	8557	-1.18	0.00041699	0.00317543	WBGene00012457	265	638	1.27	0.0004949	0.0036361	WBGene00019789	1181	498	-1.25	0.0005667	0.0040209
WBGene00009059	3079	6192	1.01	0.00041766	0.00317915	WBGene00004510	15698	8429	-0.9	0.0004966	0.003647	WBGene00018964	7005	3516	-0.99	0.0005667	0.0040209
WBGene00003936	12055	29661	1.3	0.00041809	0.00318106	WBGene00004750	18949	8169	-1.21	0.0004971	0.0036484	WBGene00001774	44	345	2.97	0.0005692	0.0040365
WBGene00000274	16651	7999	-1.06	0.00041931	0.00318898	WBGene00013181	65	442	2.76	0.0004972	0.0036484	WBGene00004179	1590	3235	1.03	0.0005696	0.0040382
WBGene00022399	2963	1322	-1.16	0.00041948	0.00318898	WBGene00006978	4131	8327	1.01	0.0004974	0.0036486	WBGene00194657	257	646	1.33	0.0005715	0.004048
WBGene00014821	524	1743	1.73	0.00041967	0.00318909	WBGene00021446	172	469	1.45	0.0004996	0.0036628	WBGene00001204	1737	3342	0.94	0.0005716	0.004048
WBGene00003248	1057	2232	1.08	0.00042016	0.00319143	WBGene00020854	911	4290	2.23	0.0005006	0.0036683	WBGene00008559	322	1349	2.07	0.0005717	0.004048
WBGene00015287	96	317	1.73	0.00042045	0.00319228	WBGene00020544	12361	6103	-1.02	0.0005007	0.0036683	WBGene00002067	3227	10027	1.64	0.0005721	0.0040494
WBGene00022359	2089	984	-1.09	0.00042081	0.00319366	WBGene00020358	118	354	1.58	0.000501	0.0036692	WBGene00018407	2294	4525	0.98	0.0005734	0.0040567
WBGene00019048	163	421	1.37	0.00042102	0.00319389	WBGene00000958	4796	9228	0.94	0.0005019	0.0036738	WBGene00002234	652	1396	1.1	0.0005737	0.0040567
WBGene00044394	274	1621	2.56	0.00042198	0.00319987	WBGene00019039	5634	2285	-1.3	0.0005021	0.003674	WBGene00011038	143389	51359	-1.48	0.000574	0.0040567
WBGene00000503	366812	165148	-1.15	0.00042274	0.00320423	WBGene00013349	5141	1816	-1.5	0.0005038	0.0036838	WBGene00019849	26	131	2.34	0.000574	0.0040567
WBGene00013501	9545	3878	-1.3	0.00042539	0.00322301	WBGene00001137	37615	92449	1.3	0.0005041	0.0036838	WBGene00010149	12387	4271	-1.54	0.0005754	0.0040647
WBGene00011683	2	45	4.51	0.0004261	0.00322703	WBGene00004259	61200	29059	-1.07	0.0005042	0.0036838	WBGene00019925	1758	682	-1.37	0.0005763	0.0040695
WBGene00008172	2668	1003	-1.41	0.00042677	0.00323072	WBGene00012132	552	1510	1.45	0.0005044	0.0036838	WBGene00194921	116	372	1.68	0.0005769	0.004072
WBGene00018458	3099	1472	-1.07	0.00042716	0.00323213	WBGene00008643	194	487	1.33	0.0005046	0.0036838	WBGene00022626	213	565	1.41	0.0005775	0.0040747
WBGene00009280	1190	422	-1.5	0.00042732	0.00323213	WBGene00010968	136	758	2.48	0.0005047	0.0036838	WBGene00016196	13	97	2.87	0.000579	0.0040835
WBGene00012945	58	227	1.97	0.00042773	0.0032339	WBGene00012131	409	959	1.23	0.0005049	0.0036841	WBGene00017990	47165	23887	-0.98	0.00058	0.0040888
WBGene00022107	7371	3435	-1.1	0.00042984	0.00324845	WBGene00000867	11088	5082	-1.13	0.0005052	0.0036847	WBGene00018849	81233	39577	-1.04	0.0005802	0.0040888
WBGene00001156	60	228	1.93	0.00043113	0.00325683	WBGene00009896	4	53	3.56	0.000506	0.0036891	WBGene00003617	711	1421	1	0.0005816	0.0040974
WBGene00020081	18941	8512	-1.15	0.00043183	0.00326081	WBGene00009848	577	1186	1.04	0.0005065	0.0036915	WBGene00001462	309	820	1.41	0.000582	0.0040974
WBGene00009689	4638	2242	-1.05	0.00043228	0.00326282	WBGene00016242	417	2080	2.32	0.000507	0.0036931	WBGene00022191	409	1063	1.38	0.0005821	0.0040974
WBGene00007709	####	83065	-1.44	0.00043277	0.00326514	WBGene00043989	466	199	-1.23	0.0005083	0.003701	WBGene00000770	700	251	-1.48	0.0005827	0.0041003

WBGene00020426	820	2967	1.86	0.00043725	0.00329756	WBGene00000936	465	1038	1.16	0.00051	0.0037125	WBGene00016948	2022	887	-1.19	0.0005833	0.0041027
WBGene00018571	101	279	1.47	0.00043778	0.00330019	WBGene00003161	45300	20000	-1.18	0.0005109	0.0037165	WBGene00077787	396	139	-1.51	0.0005845	0.0041098
WBGene00017923	4092	7757	0.92	0.00043908	0.00330857	WBGene00044259	609	122	-2.32	0.000511	0.0037165	WBGene00014041	719	232	-1.63	0.0005861	0.0041178
WBGene00012185	25	283	3.48	0.0004396	0.00331107	WBGene00014009	74	726	3.3	0.0005121	0.0037227	WBGene00020599	296	702	1.25	0.0005861	0.0041178
WBGene00019672	739	321	-1.2	0.00044018	0.00331407	WBGene00022500	7516	27506	1.87	0.0005127	0.0037256	WBGene00020485	23	115	2.31	0.0005865	0.0041187
WBGene00001988	163	478	1.55	0.00044094	0.00331838	WBGene00019839	6351	24101	1.92	0.0005133	0.0037284	WBGene00000546	9766	4517	-1.11	0.0005892	0.0041362
WBGene00019014	515	1136	1.14	0.00044216	0.00332621	WBGene00007595	217	556	1.35	0.0005138	0.0037307	WBGene00021846	5234	2529	-1.05	0.0005901	0.0041409
WBGene00008117	23602	10916	-1.11	0.00044301	0.00333117	WBGene00001607	29917	12407	-1.27	0.0005142	0.0037318	WBGene00044412	1429	637	-1.17	0.0005909	0.0041449
WBGene00043067	32	129	2.03	0.00044401	0.00333735	WBGene00010002	13420	6093	-1.14	0.0005155	0.0037404	WBGene00017328	28694	13480	-1.09	0.0005911	0.0041449
WBGene00007800	2105	6781	1.69	0.00044436	0.00333856	WBGene00000732	9	74	3.06	0.0005164	0.0037434	WBGene00012225	1599	4934	1.63	0.0005927	0.0041539
WBGene00004124	40	318	2.98	0.00044606	0.00334992	WBGene00012490	2874	956	-1.59	0.0005166	0.0037434	WBGene00020179	270	66	-2.04	0.0005943	0.0041638
WBGene00013173	535	3565	2.74	0.00044645	0.00335148	WBGene00018228	3	54	4.09	0.0005166	0.0037434	WBGene00002058	1700	4487	1.4	0.0005949	0.0041667
WBGene00011757	232	1018	2.13	0.00044689	0.00335306	WBGene00008258	2856	5705	1	0.0005171	0.0037434	WBGene00021570	60	5	-3.52	0.000597	0.0041793
WBGene00006533	45	346	2.93	0.00044704	0.00335306	WBGene00001981	14320	6647	-1.11	0.0005173	0.0037434	WBGene00014848	264	927	1.81	0.0005974	0.0041807
WBGene00009616	17	123	2.88	0.00044777	0.00335716	WBGene00022202	428	2070	2.27	0.0005174	0.0037434	WBGene00020646	26	132	2.37	0.0005981	0.0041838
WBGene00020624	1111	527	-1.08	0.00044831	0.0033598	WBGene00016080	8472	4323	-0.97	0.0005175	0.0037434	WBGene00008372	163	454	1.48	0.0005985	0.0041847
WBGene00020157	74	286	1.96	0.00045015	0.00337149	WBGene00008448	87	274	1.66	0.0005177	0.0037434	WBGene00009177	21983	11022	-1	0.0005989	0.0041862
WBGene00044670	1183	554	-1.09	0.00045025	0.00337149	WBGene00045301	3642	1563	-1.22	0.0005178	0.0037434	WBGene00020475	12401	5396	-1.2	0.0006	0.0041921
WBGene00016522	50	208	2.07	0.00045054	0.00337226	WBGene00021716	1622	792	-1.03	0.0005189	0.0037489	WBGene00006407	3806	14294	1.91	0.0006007	0.0041952
WBGene00020022	1726	3820	1.15	0.0004518	0.00337974	WBGene00016134	788	2611	1.73	0.000519	0.0037489	WBGene00018837	2101	4282	1.03	0.0006009	0.0041952
WBGene00020012	4372	11063	1.34	0.00045191	0.00337974	WBGene00013129	11851	5903	-1.01	0.0005202	0.0037563	WBGene00020847	42	368	3.14	0.0006022	0.0042027
WBGene00044636	216	521	1.27	0.00045294	0.00338602	WBGene00016835	696	195	-1.84	0.0005209	0.0037592	WBGene00021579	103	11	-3.17	0.0006026	0.0042034
WBGene00011835	18500	8958	-1.05	0.00045358	0.00338938	WBGene00004811	0	36	6.88	0.0005216	0.0037631	WBGene00003549	4	71	4.09	0.0006031	0.0042034
WBGene00019306	107	502	2.23	0.0004541	0.00339186	WBGene00006705	1268	2780	1.13	0.0005238	0.0037772	WBGene00001543	203	503	1.31	0.0006031	0.0042034
WBGene00044898	450	1812	2.01	0.00060323	0.00420345	WBGene00019473	1260	483	-1.38	0.0006871	0.0046336	WBGene00003587	56698	21957	-1.37	0.0008044	0.0052548
WBGene00019058	4	53	3.87	0.00060493	0.00421247	WBGene00012175	658	1626	1.3	0.0006877	0.0046353	WBGene00003999	66	272	2.05	0.000805	0.0052564
WBGene00000998	13526	28199	1.06	0.000605	0.00421247	WBGene00044440	4870	2267	-1.1	0.0006904	0.0046485	WBGene00001190	219	558	1.35	0.0008053	0.0052569
WBGene00002132	3322	6383	0.94	0.00060604	0.00421812	WBGene00005724	82	269	1.71	0.0006904	0.0046485	WBGene00001522	9773	4949	-0.98	0.0008059	0.0052585
WBGene00013397	27	122	2.19	0.00060715	0.00422417	WBGene00021831	8806	4543	-0.95	0.0006904	0.0046485	WBGene00010605	809	3700	2.19	0.0008129	0.0053023
WBGene00021412	618	285	-1.12	0.00060771	0.00422647	WBGene00017027	3539	1785	-0.99	0.0006909	0.0046505	WBGene00022196	1334	2667	1	0.0008139	0.0053072
WBGene00021411	19745	10086	-0.97	0.00060874	0.00423194	WBGene00007928	43	167	1.97	0.0006921	0.0046567	WBGene00014136	39	228	2.55	0.0008142	0.0053073
WBGene00000952	88	288	1.72	0.00060908	0.00423272	WBGene00044686	89	634	2.83	0.0006928	0.0046593	WBGene00011726	802	1893	1.24	0.0008164	0.0053196
WBGene00008851	10591	21517	1.02	0.00061174	0.00424951	WBGene00022000	439	143	-1.62	0.0006951	0.0046723	WBGene00010502	16011	8840	-0.86	0.000817	0.0053212
WBGene00013421	43	179	2.07	0.00061308	0.00425716	WBGene00014807	1853	755	-1.3	0.0006952	0.0046723	WBGene00016520	49387	24600	-1.01	0.0008182	0.0053275
WBGene00018744	86	397	2.2	0.00061349	0.00425838	WBGene00019576	1894	840	-1.17	0.0006962	0.0046772	WBGene00012005	3294	7100	1.11	0.0008185	0.0053275
WBGene00017980	4718	9061	0.94	0.00061515	0.00426725	WBGene00009490	17	100	2.59	0.0006977	0.0046852	WBGene00004205	7531	3634	-1.05	0.0008193	0.0053309
WBGene00021326	412	2572	2.64	0.00061524	0.00426725	WBGene00003889	89	347	1.97	0.0006985	0.0046891	WBGene00077763	5	56	3.5	0.0008206	0.0053371
WBGene00020850	90	277	1.62	0.00061583	0.00426967	WBGene00020301	13288	25000	0.91	0.0007009	0.0047036	WBGene00003681	11163	20111	0.85	0.0008213	0.0053396
WBGene00003220	10397	4860	-1.1	0.00061768	0.00428089	WBGene00022413	792	2267	1.52	0.0007018	0.0047074	WBGene00008309	210	759	1.86	0.000822	0.0053422
WBGene00011925	4175	1805	-1.21	0.00061835	0.00428386	WBGene00018841	667	1357	1.03	0.0007024	0.0047101	WBGene00003371	15429	38674	1.33	0.0008228	0.0053455
WBGene00017065	2706	5279	0.96	0.00061866	0.00428434	WBGene00000072	754	1595	1.08	0.0007049	0.0047251	WBGene00001644	341	729	1.1	0.0008245	0.0053548
WBGene00000822	2054	7871	1.94	0.00062064	0.00429488	WBGene00010845	41589	20805	-1	0.0007052	0.0047255	WBGene00017979	2267	5493	1.28	0.0008248	0.0053548
WBGene00008580	3812	1507	-1.34	0.00062066	0.00429488	WBGene00011760	8973	17859	0.99	0.0007067	0.0047334	WBGene00001754	113	383	1.76	0.0008263	0.0053626
WBGene00010120	4706	2339	-1.01	0.00062815	0.00434502	WBGene00000511	1178	480	-1.29	0.0007078	0.0047393	WBGene00010520	19	158	3.07	0.0008272	0.0053664
WBGene00008407	38	146	1.94	0.00062963	0.00435364	WBGene00004380	3470	1582	-1.13	0.0007106	0.0047552	WBGene00007856	1318	2803	1.09	0.0008284	0.0053723
WBGene00004907	19	108	2.52	0.00063048	0.00435779	WBGene00012125	861	1777	1.05	0.0007107	0.0047552	WBGene00007725	236	1032	2.13	0.0008305	0.0053839
WBGene00012112	3179	1559	-1.03	0.00063117	0.00436044	WBGene00017204	48	180	1.91	0.0007127	0.0047665	WBGene00022395	327	118	-1.47	0.000831	0.0053852
WBGene00005648	27685	13183	-1.07	0.00063135	0.00436044	WBGene00014874	786	363	-1.12	0.0007176	0.0047975	WBGene00012767	13202	6571	-1.01	0.0008315	0.0053866
WBGene00022627	128	394	1.62	0.00063181	0.00436194	WBGene00018036	73	454	2.64	0.0007197	0.0048099	WBGene00006743	4677	8715	0.9	0.0008334	0.0053971
WBGene00015479	4326	2144	-1.01	0.00063452	0.00437896	WBGene00009052	9846	4860	-1.02	0.0007209	0.0048159	WBGene00007961	3440	1287	-1.42	0.0008347	0.0054033

WBGene00016163	1111	469	-1.24	0.00063502	0.00438018	WBGene00016114	345	1343	1.96	0.0007236	0.0048321	WBGene00006609	481	1039	1.11	0.0008416	0.0054459
WBGene00009861	7565	3574	-1.08	0.00063518	0.00438018	WBGene00011154	1681	3318	0.98	0.0007241	0.0048333	WBGene00022737	1237	566	-1.13	0.0008419	0.0054464
WBGene00001041	31552	13992	-1.17	0.00063559	0.00438134	WBGene00016172	1205	2511	1.06	0.0007245	0.0048333	WBGene00018683	28	132	2.23	0.0008433	0.0054532
WBGene00013256	21127	10065	-1.07	0.00063679	0.00438791	WBGene00002176	2217	5311	1.26	0.0007246	0.0048333	WBGene00003413	6397	3035	-1.08	0.0008449	0.0054617
WBGene00021502	8243	4088	-1.01	0.00063799	0.00439446	WBGene00010264	2998	1518	-0.98	0.0007251	0.0048351	WBGene00045486	3494	1506	-1.21	0.0008455	0.0054635
WBGene00017625	206	552	1.43	0.00063861	0.00439709	WBGene00003919	11006	5606	-0.97	0.0007259	0.0048386	WBGene00004048	21154	39671	0.91	0.0008462	0.005466
WBGene00007336	81	547	2.75	0.00064128	0.00441374	WBGene00077751	134	35	-1.92	0.0007262	0.0048387	WBGene00004820	56141	22739	-1.3	0.0008477	0.0054739
WBGene00017127	88	258	1.55	0.00064257	0.00442093	WBGene00022311	725	279	-1.38	0.0007281	0.0048495	WBGene00016559	193	515	1.41	0.0008502	0.0054879
WBGene00001680	7085	13565	0.94	0.00064301	0.00442228	WBGene00015131	148	651	2.13	0.0007294	0.0048569	WBGene00011584	1	39	4.76	0.0008512	0.0054924
WBGene00006311	7484	3003	-1.32	0.00064346	0.00442371	WBGene00017140	18380	7496	-1.29	0.0007306	0.0048627	WBGene00019718	325	793	1.29	0.0008585	0.0055376
WBGene00013959	2734	5219	0.93	0.00064466	0.00443024	WBGene00004810	3	45	3.83	0.0007314	0.0048662	WBGene00009131	7893	3785	-1.06	0.0008628	0.0055633
WBGene00019757	9770	4016	-1.28	0.00064526	0.00443265	WBGene00019717	191	627	1.71	0.0007335	0.0048787	WBGene00001824	119204	232203	0.96	0.0008644	0.0055717
WBGene00005018	####	510313	1.1	0.00064609	0.00443666	WBGene00015934	5197	10055	0.95	0.0007349	0.0048849	WBGene00012240	12492	6677	-0.9	0.0008652	0.0055745
WBGene00003134	22588	10736	-1.07	0.00064667	0.00443899	WBGene00044803	146	873	2.58	0.000735	0.0048849	WBGene00020563	4342	2045	-1.09	0.0008657	0.0055762
WBGene00002214	9777	4844	-1.01	0.00064705	0.00443985	WBGene00016567	6636	2990	-1.15	0.0007359	0.0048869	WBGene00006723	12557	5429	-1.21	0.0008668	0.0055812
WBGene00045248	32	284	3.17	0.00064776	0.00444306	WBGene00018466	43	166	1.93	0.0007359	0.0048869	WBGene00044019	162	1168	2.85	0.0008679	0.0055854
WBGene00013583	7751	3031	-1.35	0.00064914	0.00445081	WBGene00006784	2753	5898	1.1	0.0007384	0.0049021	WBGene00000062	21	105	2.32	0.0008681	0.0055854
WBGene00011951	217	433	1	0.00064966	0.00445269	WBGene00007225	####	134737	-1.08	0.0007389	0.0049035	WBGene00004328	329	1171	1.83	0.0008707	0.0056
WBGene00001456	77	347	2.17	0.00065036	0.00445424	WBGene00010329	580	1439	1.31	0.0007396	0.0049066	WBGene00045058	11279	5792	-0.96	0.0008732	0.0056139
WBGene00019769	1736	867	-1	0.00065038	0.00445424	WBGene00007072	1549	709	-1.13	0.0007403	0.0049089	WBGene00002141	697	1986	1.51	0.0008737	0.0056157
WBGene00020743	455	1622	1.83	0.00065102	0.00445689	WBGene00017067	31	172	2.48	0.0007405	0.0049089	WBGene00003756	96	440	2.2	0.0008751	0.0056224
WBGene00011913	40	158	2	0.00065258	0.00446586	WBGene00007691	529	1935	1.87	0.000742	0.0049166	WBGene00021264	557	234	-1.25	0.0008759	0.0056256
WBGene00012529	37	315	3.07	0.0006531	0.00446774	WBGene00018737	2422	10531	2.12	0.0007423	0.0049166	WBGene00013234	7640	3803	-1.01	0.0008768	0.0056292
WBGene00019817	3430	1704	-1.01	0.00065335	0.00446774	WBGene00010159	14652	6775	-1.11	0.0007439	0.0049253	WBGene00007500	42062	21731	-0.95	0.0008774	0.0056311
WBGene00001161	31155	15060	-1.05	0.00065522	0.00447885	WBGene00020588	####	43661	-1.21	0.0007441	0.0049253	WBGene00010334	124	326	1.4	0.0008777	0.0056311
WBGene00012888	20482	9729	-1.07	0.00065624	0.00448277	WBGene00009806	132	1125	3.09	0.0007484	0.0049517	WBGene00020270	61	477	2.98	0.0008788	0.0056345
WBGene00007073	86	246	1.51	0.0006563	0.00448277	WBGene00011786	175	1121	2.68	0.0007488	0.0049528	WBGene00001537	2243	1112	-1.01	0.0008789	0.0056345
WBGene00013542	1537	4949	1.69	0.00065726	0.00448398	WBGene00021702	615	1603	1.38	0.0007522	0.0049736	WBGene00008471	0	28	7.54	0.0008798	0.0056382
WBGene00015100	43	175	2.03	0.00065735	0.00448398	WBGene00021898	1573	827	-0.93	0.0007534	0.0049791	WBGene00019225	2	45	4.32	0.0008809	0.0056434
WBGene00006954	191	2304	3.59	0.00065744	0.00448398	WBGene00011289	62	303	2.29	0.0007603	0.0050233	WBGene00000908	1761	5318	1.59	0.0008824	0.0056474
WBGene00001719	1771	4275	1.27	0.00065747	0.00448398	WBGene00001400	1188	2430	1.03	0.000765	0.0050512	WBGene00008930	9485	4306	-1.14	0.0008824	0.0056474
WBGene00000523	1726	3470	1.01	0.00065793	0.00448408	WBGene00001872	728	314	-1.21	0.0007651	0.0050512	WBGene00194952	3	57	4.06	0.0008825	0.0056474
WBGene00022447	2519	1267	-0.99	0.00065798	0.00448408	WBGene00022246	7	57	2.99	0.0007685	0.0050719	WBGene00012189	2	53	4.91	0.0008839	0.0056549
WBGene00045299	4077	1790	-1.19	0.00066007	0.00449657	WBGene00017389	57	199	1.8	0.0007711	0.0050871	WBGene00010351	4815	2285	-1.07	0.0008845	0.0056564
WBGene00006939	3869	2041	-0.92	0.00066122	0.00450232	WBGene00020341	327	731	1.16	0.0007773	0.005126	WBGene00007957	59	207	1.82	0.0008859	0.0056637
WBGene00006452	7407	13748	0.89	0.00066141	0.00450232	WBGene00001046	2352	1076	-1.13	0.000778	0.0051288	WBGene00000454	22	112	2.32	0.0008918	0.005699
WBGene00007811	19504	9905	-0.98	0.00066184	0.00450354	WBGene00022160	4250	11816	1.48	0.0007788	0.0051307	WBGene00021948	1145	2341	1.03	0.0008933	0.0057069
WBGene00000955	75	364	2.29	0.00066283	0.00450851	WBGene00018900	28456	14732	-0.95	0.0007789	0.0051307	WBGene00009236	1	36	4.81	0.0008949	0.0057147
WBGene00020126	4	118	5.01	0.00066466	0.0045193	WBGene00020722	37	121	1.71	0.0007828	0.0051547	WBGene00013212	2207	1088	-1.02	0.0008959	0.005719
WBGene00008956	852	1957	1.2	0.00066492	0.00451931	WBGene00015768	53	282	2.41	0.0007845	0.0051639	WBGene00010117	2109	7026	1.74	0.0008995	0.0057393
WBGene00013862	6653	3172	-1.07	0.00066654	0.00452866	WBGene00008116	66	322	2.3	0.0007849	0.0051643	WBGene00017556	434	153	-1.5	0.0008998	0.0057393
WBGene00021580	34	297	3.13	0.00066778	0.00453536	WBGene00015580	3873	7442	0.94	0.0007851	0.0051643	WBGene00017950	1025	2547	1.31	0.0009	0.0057393
WBGene00007424	119	409	1.78	0.00067127	0.00455582	WBGene00017949	7895	3554	-1.15	0.0007862	0.0051697	WBGene00018173	325	744	1.2	0.0009007	0.0057418
WBGene00021663	104	14	-2.91	0.00067202	0.00455582	WBGene00019002	12068	5613	-1.1	0.0007868	0.0051716	WBGene00002021	151	391	1.37	0.0009013	0.0057433
WBGene00005036	31	148	2.26	0.00067206	0.00455582	WBGene00021867	1152	486	-1.25	0.0007877	0.0051759	WBGene00020043	2	40	4.38	0.0009019	0.0057456
WBGene00017358	13321	5513	-1.27	0.00067207	0.00455582	WBGene00021713	165	35	-2.25	0.0007888	0.0051794	WBGene00016988	184	448	1.29	0.000903	0.0057503
WBGene00020247	106	309	1.54	0.00067222	0.00455582	WBGene00043988	773	380	-1.02	0.0007888	0.0051794	WBGene00009212	82558	39993	-1.05	0.0009035	0.0057512
WBGene00021060	498	1085	1.12	0.00067232	0.00455582	WBGene00008583	1126	545	-1.05	0.000791	0.0051919	WBGene00015334	144	747	2.38	0.0009074	0.0057739
WBGene00022504	1631	6108	1.9	0.00067334	0.00456087	WBGene00021927	816	1697	1.06	0.0007919	0.0051957	WBGene00000460	22294	10406	-1.1	0.0009078	0.0057745
WBGene00010834	1570	7132	2.18	0.00067357	0.00456087	WBGene00002246	2218	957	-1.21	0.0007938	0.0052061	WBGene00011572	720	2513	1.8	0.0009102	0.0057879

WBGene00019146	32	144	2.16	0.00067396	0.00456178	WBGene00012109	4996	2379	-1.07	0.0007951	0.0052131	WBGene00013612	50	3	-3.99	0.0009127	0.0058016
WBGene00015628	70	229	1.7	0.00067992	0.0046004	WBGene00003630	3626	6771	0.9	0.0007966	0.0052207	WBGene00022560	1646	753	-1.13	0.0009132	0.0058029
WBGene00008526	1254	489	-1.36	0.00068081	0.00460467	WBGene00009434	7	64	3.29	0.0007972	0.0052224	WBGene00017814	8502	15907	0.9	0.0009157	0.0058168
WBGene00001258	36118	17255	-1.07	0.00068197	0.00461081	WBGene00003966	677	2189	1.69	0.0007974	0.0052224	WBGene00000038	249	623	1.32	0.0009167	0.005821
WBGene00013916	146	408	1.48	0.00068319	0.00461732	WBGene00020280	1578	3018	0.94	0.0007995	0.0052342	WBGene00017398	235	526	1.16	0.000918	0.0058274
WBGene00016976	25	175	2.83	0.00068348	0.00461751	WBGene00001784	210	1206	2.52	0.0008001	0.0052345	WBGene00019277	1091	2184	1	0.00092	0.005838
WBGene00009086	1167	532	-1.13	0.00068393	0.00461881	WBGene00010643	80	240	1.58	0.0008002	0.0052345	WBGene00013233	10385	5245	-0.99	0.0009207	0.0058404
WBGene00021463	23456	12557	-0.9	0.00068476	0.00462273	WBGene00013409	2774	1387	-1	0.0008015	0.0052413	WBGene00021124	388	1129	1.54	0.0009225	0.0058496
WBGene00020893	155	588	1.92	0.00068609	0.00462995	WBGene00000035	1173	2970	1.34	0.0008029	0.0052484	WBGene00044663	91	407	2.17	0.0009229	0.0058501
WBGene00020250	398	1809	2.18	0.00068696	0.00463358	WBGene00008589	42	438	3.37	0.0008042	0.0052548	WBGene00015870	0	34	6.8	0.0009236	0.0058522
WBGene00004229	2554	4926	0.95	0.00092429	0.0058547	WBGene00007762	5711	2473	-1.21	0.001019	0.0062645	WBGene00010081	1849	617	-1.58	0.0011946	0.0071335
WBGene00006748	81	869	3.43	0.00092556	0.00586065	WBGene00044294	15485	35557	1.2	0.0010195	0.0062658	WBGene00012266	3	48	4.15	0.0011949	0.0071335
WBGene00019177	65	324	2.33	0.0009259	0.00586079	WBGene00021075	29	151	2.37	0.0010207	0.0062708	WBGene00012763	341	1853	2.44	0.0011958	0.0071366
WBGene00008302	0	24	7.91	0.00092701	0.00586575	WBGene00008838	6611	3017	-1.13	0.0010223	0.0062782	WBGene00012728	32	343	3.44	0.0011975	0.0071443
WBGene00013455	534	1397	1.39	0.00092881	0.0058717	WBGene00004990	848	3514	2.05	0.0010245	0.00629	WBGene00012160	527	214	-1.3	0.0012075	0.0072018
WBGene00021799	162	768	2.25	0.000929	0.0058717	WBGene00007416	161	437	1.44	0.0010256	0.0062942	WBGene00011576	6025	3109	-0.95	0.0012087	0.0072047
WBGene00016014	9528	5014	-0.93	0.0009291	0.0058717	WBGene00018498	113	282	1.32	0.0010261	0.0062957	WBGene00005690	41	175	2.09	0.0012091	0.0072047
WBGene00006666	3528	11098	1.65	0.00092926	0.0058717	WBGene00016918	10368	19015	0.87	0.0010277	0.0063033	WBGene00022845	329	803	1.29	0.0012092	0.0072047
WBGene00022577	942	3067	1.7	0.00093258	0.00588768	WBGene00020672	4963	2808	-0.82	0.0010283	0.0063046	WBGene00017036	184	570	1.63	0.0012121	0.0072196
WBGene00013018	9137	4575	-1	0.00093266	0.00588768	WBGene00012792	736	294	-1.32	0.0010307	0.0063172	WBGene00020537	15026	6587	-1.19	0.0012127	0.0072205
WBGene00007493	12978	6325	-1.04	0.00093277	0.00588768	WBGene00018646	127	478	1.92	0.0010376	0.0063561	WBGene00015179	16	90	2.52	0.0012132	0.0072212
WBGene00000977	3	44	3.7	0.00093443	0.00589604	WBGene00019924	5313	2668	-0.99	0.0010378	0.0063561	WBGene00013848	64	207	1.7	0.0012153	0.0072315
WBGene00003745	105	479	2.2	0.0009366	0.00590765	WBGene00021354	216	477	1.15	0.0010413	0.0063735	WBGene00015471	229	579	1.34	0.0012159	0.0072326
WBGene00003525	146	735	2.33	0.00093878	0.00591937	WBGene00022320	1536	657	-1.22	0.0010413	0.0063735	WBGene00021516	7713	3580	-1.11	0.0012169	0.007236
WBGene00000068	4466	9294	1.06	0.00094056	0.00592852	WBGene00015160	7964	4088	-0.96	0.001042	0.0063754	WBGene00022561	2192	1063	-1.04	0.0012192	0.0072474
WBGene00018299	459	975	1.09	0.00094105	0.00592951	WBGene00021850	2277	4331	0.93	0.0010427	0.0063775	WBGene00012032	2537	10413	2.04	0.0012205	0.0072525
WBGene00009696	16012	8585	-0.9	0.00094163	0.00592962	WBGene00003497	13403	26286	0.97	0.0010459	0.0063949	WBGene00007751	385	1902	2.3	0.0012218	0.0072568
WBGene00006622	6	63	3.31	0.00094173	0.00592962	WBGene00001172	2177	6470	1.57	0.0010473	0.0064	WBGene00010110	1282	3947	1.62	0.001222	0.0072568
WBGene00004815	28744	11467	-1.33	0.00094245	0.00593107	WBGene00016912	13	80	2.63	0.0010474	0.0064	WBGene00019367	16	96	2.56	0.0012232	0.0072616
WBGene00021361	2669	5576	1.06	0.00094262	0.00593107	WBGene00018651	19	104	2.49	0.0010533	0.0064336	WBGene00020322	5383	2528	-1.09	0.00123	0.0072996
WBGene00021884	669	273	-1.29	0.00094434	0.0059389	WBGene00022834	393	884	1.17	0.0010612	0.0064797	WBGene00007650	15009	7957	-0.92	0.001231	0.0073031
WBGene00022734	33600	16113	-1.06	0.00094453	0.0059389	WBGene00003431	114	14	-3.03	0.0010623	0.0064841	WBGene00021518	39	191	2.28	0.0012346	0.007322
WBGene00077536	15	104	2.77	0.0009452	0.00594109	WBGene00010864	10	71	2.79	0.0010645	0.0064954	WBGene00013738	5134	2484	-1.05	0.0012351	0.0073225
WBGene00010361	1395	695	-1	0.00094583	0.00594292	WBGene00004135	495	1602	1.7	0.0010649	0.0064956	WBGene00017250	83	263	1.66	0.0012372	0.0073318
WBGene00007041	314	2093	2.74	0.00094867	0.00595872	WBGene00011422	1426	2907	1.03	0.0010665	0.0065032	WBGene00020365	1106	2116	0.94	0.0012375	0.0073318
WBGene00077683	6	52	3.23	0.00094932	0.00596006	WBGene00009606	4975	2391	-1.06	0.0010675	0.0065064	WBGene00000399	84	202	1.27	0.001239	0.0073386
WBGene00003602	8756	20694	1.24	0.00094955	0.00596006	WBGene00016958	651	1502	1.21	0.0010677	0.0065064	WBGene00018488	3694	6891	0.9	0.0012401	0.0073405
WBGene00020375	28940	14285	-1.02	0.00095009	0.00596138	WBGene00009492	27	101	1.9	0.0010691	0.0065126	WBGene00044059	11	84	2.96	0.0012402	0.0073405
WBGene00018976	4707	8588	0.87	0.00095065	0.00596283	WBGene00021103	6891	3302	-1.06	0.0010719	0.0065276	WBGene00006557	3512	1471	-1.26	0.0012409	0.0073426
WBGene00010332	1933	903	-1.1	0.00095262	0.00597308	WBGene00013946	2270	1148	-0.98	0.0010755	0.0065471	WBGene00014183	74	1116	3.91	0.0012435	0.0073552
WBGene00044680	3	53	4.01	0.00095318	0.00597308	WBGene00011380	1105	2256	1.03	0.0010763	0.0065499	WBGene00006819	2274	8724	1.94	0.0012487	0.0073832
WBGene00004740	181	451	1.32	0.00095347	0.00597308	WBGene00018252	1905	996	-0.94	0.001077	0.0065517	WBGene00014117	49854	18648	-1.42	0.001249	0.0073832
WBGene00019578	780	346	-1.18	0.00095362	0.00597308	WBGene00007128	5318	2507	-1.08	0.0010784	0.0065579	WBGene00008795	13	78	2.58	0.0012506	0.0073901
WBGene00015650	3595	10010	1.48	0.00095599	0.00598584	WBGene00013436	7392	3488	-1.08	0.0010818	0.0065764	WBGene00044702	389	138	-1.5	0.0012523	0.0073973
WBGene00006375	6775	3084	-1.14	0.00095721	0.00599078	WBGene00014826	130	758	2.55	0.0010863	0.0066015	WBGene00003652	5399	8960	0.73	0.0012526	0.0073973
WBGene00008577	77	248	1.68	0.00095745	0.00599078	WBGene00194904	716	1278	0.84	0.001088	0.0066095	WBGene00016094	6	59	3.31	0.0012544	0.0074054
WBGene00009444	15848	7500	-1.08	0.00095855	0.00599561	WBGene00017478	578	2241	1.96	0.0010959	0.0066554	WBGene00020811	27	132	2.29	0.0012557	0.0074079
WBGene00003397	37338	20055	-0.9	0.00095891	0.00599578	WBGene00020374	7928	3465	-1.19	0.001097	0.00666	WBGene00077669	232	539	1.21	0.0012561	0.0074079
WBGene00017120	1145	2228	0.96	0.0009597	0.00599863	WBGene00016798	339	127	-1.42	0.0010977	0.0066618	WBGene00011076	71	506	2.84	0.0012567	0.0074079
WBGene00004230	376	2428	2.69	0.00096194	0.00600968	WBGene00000539	66	197	1.57	0.0010985	0.0066623	WBGene00008246	59	173	1.57	0.0012567	0.0074079

WBGene00003369	16074	46205	1.52	0.00096214	0.00600968	WBGene00016744	1326	2623	0.98	0.0010988	0.0066623	WBGene00015608	1234	2570	1.06	0.0012569	0.0074079
WBGene00016632	11365	5708	-0.99	0.00096346	0.00601421	WBGene00008043	11	77	2.85	0.0010989	0.0066623	WBGene00007474	1294	2481	0.94	0.001258	0.0074107
WBGene00020771	2014	765	-1.4	0.00096353	0.00601421	WBGene00015957	40	189	2.24	0.0010993	0.0066628	WBGene00007212	748	252	-1.57	0.0012582	0.0074107
WBGene00015527	182	439	1.27	0.00096585	0.00602659	WBGene00003062	28676	14317	-1	0.0011009	0.0066701	WBGene00004824	8594	4376	-0.97	0.0012605	0.0074219
WBGene00007076	772	354	-1.13	0.00096643	0.00602767	WBGene00014008	387	784	1.02	0.0011015	0.006671	WBGene00194917	356	737	1.05	0.0012635	0.0074369
WBGene00021445	66	212	1.69	0.0009667	0.00602767	WBGene00017226	19	96	2.31	0.0011018	0.006671	WBGene00012672	4149	1651	-1.33	0.0012661	0.0074499
WBGene00020677	381	1006	1.4	0.00096751	0.0060291	WBGene00044788	1	36	4.64	0.0011033	0.0066777	WBGene00045404	33	125	1.9	0.0012684	0.0074611
WBGene00014140	470	1020	1.12	0.00096763	0.0060291	WBGene00020069	137	708	2.37	0.0011039	0.0066794	WBGene00011856	1192	4117	1.79	0.0012697	0.0074649
WBGene00010150	765	2904	1.92	0.00096793	0.0060291	WBGene00022519	2287	5133	1.17	0.0011064	0.0066921	WBGene00015545	1871	6583	1.81	0.0012699	0.0074649
WBGene00009774	61	221	1.87	0.00096837	0.00602972	WBGene00008499	91	522	2.52	0.0011082	0.0067009	WBGene00007302	523	1105	1.08	0.0012717	0.0074706
WBGene00004773	6751	13583	1.01	0.00096975	0.00603545	WBGene00015822	332	1383	2.06	0.0011103	0.0067114	WBGene00015116	1099	1845	0.75	0.001272	0.0074706
WBGene00010492	16363	6795	-1.27	0.00097024	0.00603545	WBGene00000796	25437	12908	-0.98	0.0011117	0.0067174	WBGene00019779	434	1488	1.78	0.0012721	0.0074706
WBGene00020279	94	443	2.23	0.00097029	0.00603545	WBGene00044455	11	79	2.83	0.0011152	0.006736	WBGene00018366	5243	2057	-1.35	0.0012733	0.0074733
WBGene00010549	3437	1690	-1.02	0.00097198	0.00604386	WBGene00008477	184	1072	2.54	0.0011175	0.0067477	WBGene00011882	46	172	1.89	0.0012734	0.0074733
WBGene00014040	2016	1041	-0.95	0.00097423	0.00605423	WBGene00020023	21	137	2.71	0.0011199	0.0067599	WBGene00008728	717	334	-1.1	0.0012743	0.0074758
WBGene00003402	141	533	1.92	0.00097433	0.00605423	WBGene00019858	261	1061	2.02	0.0011225	0.0067733	WBGene00000979	1625	2927	0.85	0.0012747	0.007476
WBGene00009495	76	251	1.72	0.00097707	0.00606919	WBGene00044191	47	181	1.94	0.001123	0.0067743	WBGene00015390	179	473	1.4	0.0012764	0.0074832
WBGene00013474	65	4	-4.06	0.00097882	0.00607665	WBGene00014871	452	197	-1.2	0.0011278	0.0068008	WBGene00012272	157	426	1.44	0.0012839	0.0075247
WBGene00014242	506	200	-1.34	0.00097913	0.00607665	WBGene00011952	252	1388	2.46	0.001129	0.0068056	WBGene00020506	17	134	2.98	0.0012853	0.0075308
WBGene00044661	459	161	-1.51	0.00097929	0.00607665	WBGene00016699	50	185	1.9	0.0011349	0.0068389	WBGene00011571	330	1979	2.58	0.0012866	0.0075361
WBGene00010703	2735	5133	0.91	0.00098298	0.00609745	WBGene00018337	2526	1054	-1.26	0.0011373	0.0068513	WBGene00013042	1443	3495	1.28	0.001288	0.0075415
WBGene00017616	11	78	2.76	0.00098349	0.0060985	WBGene00003664	66	395	2.58	0.0011408	0.0068703	WBGene00011517	882	1636	0.89	0.001291	0.0075565
WBGene00015797	323	117	-1.46	0.00098416	0.00610051	WBGene00007743	597	1206	1.01	0.001142	0.0068753	WBGene00044221	28	120	2.1	0.0012925	0.0075615
WBGene00015647	10156	25717	1.34	0.00098449	0.00610051	WBGene00000637	7	92	3.8	0.0011502	0.00692	WBGene00022608	9	69	2.95	0.0012927	0.0075615
WBGene00020404	3496	1573	-1.15	0.00098566	0.00610562	WBGene00021040	439	180	-1.29	0.0011502	0.00692	WBGene00050912	379	748	0.98	0.0012978	0.0075892
WBGene00010453	377	814	1.11	0.00098698	0.00610979	WBGene00021244	332	804	1.28	0.001152	0.006928	WBGene00007221	8410	4525	-0.89	0.0013033	0.0076186
WBGene00007290	941	414	-1.18	0.00098701	0.00610979	WBGene00008509	140	497	1.83	0.0011547	0.0069419	WBGene00008040	253	670	1.4	0.0013041	0.0076196
WBGene00012251	24	114	2.24	0.00098764	0.00611162	WBGene00006394	5669	2661	-1.09	0.0011626	0.0069872	WBGene00011768	8474	18300	1.11	0.0013043	0.0076196
WBGene00000501	62	247	1.99	0.00098978	0.00612273	WBGene00010921	2854	1435	-0.99	0.0011632	0.0069884	WBGene00011139	6493	3387	-0.94	0.0013052	0.0076223
WBGene00003716	848	1642	0.95	0.00099263	0.00613824	WBGene00004243	6182	2993	-1.05	0.0011643	0.0069927	WBGene00018346	81	236	1.55	0.001308	0.0076365
WBGene00008868	518	1543	1.57	0.00099591	0.00615642	WBGene00004702	27927	12424	-1.17	0.0011653	0.0069964	WBGene00020449	125	294	1.24	0.0013118	0.0076559
WBGene00021247	2691	5228	0.96	0.00099696	0.00616077	WBGene00010255	421	121	-1.8	0.0011668	0.0070031	WBGene00013037	88	289	1.72	0.0013125	0.0076562
WBGene00012042	34	135	1.99	0.00099868	0.00616926	WBGene00045406	985	419	-1.23	0.0011686	0.0070113	WBGene00004256	531	2570	2.27	0.0013129	0.0076562
WBGene00013833	47	348	2.9	0.00099926	0.00617076	WBGene00021025	2781	5227	0.91	0.0011727	0.0070314	WBGene00016993	2806	1478	-0.92	0.0013131	0.0076562
WBGene00010173	9	91	3.38	0.00100002	0.00617334	WBGene00010760	16	100	2.63	0.001173	0.0070314	WBGene00008548	2615	1389	-0.91	0.0013163	0.0076695
WBGene00020689	376	767	1.03	0.00100065	0.00617508	WBGene00018437	12577	6424	-0.97	0.0011731	0.0070314	WBGene00019812	119	329	1.47	0.0013165	0.0076695
WBGene00012776	500	1052	1.07	0.00100487	0.00619898	WBGene00009173	2445	1211	-1.01	0.0011762	0.0070475	WBGene00007248	407	115	-1.83	0.0013167	0.0076695
WBGene00012989	631	1924	1.61	0.00100619	0.00620502	WBGene00017420	446	2380	2.42	0.0011784	0.0070588	WBGene00003893	62107	113084	0.86	0.0013203	0.0076879
WBGene00019683	1112	508	-1.13	0.00100728	0.00620921	WBGene00019463	226	476	1.07	0.0011793	0.0070615	WBGene00017124	100	563	2.49	0.0013216	0.0076934
WBGene00001552	41	210	2.35	0.00100772	0.00620921	WBGene00021056	9773	4244	-1.2	0.001181	0.0070697	WBGene00009292	5944	17785	1.58	0.0013232	0.0077003
WBGene00021917	1518	3047	1.01	0.00100791	0.00620921	WBGene00015949	248	816	1.72	0.0011818	0.007072	WBGene00021042	7	56	3.09	0.001324	0.0077024
WBGene00007084	209	524	1.33	0.00101046	0.0062228	WBGene00006387	7821	3553	-1.14	0.0011862	0.0070961	WBGene00011741	23320	8861	-1.4	0.0013247	0.0077038
WBGene00000563	26	124	2.27	0.0010135	0.00623825	WBGene00002072	8675	4559	-0.93	0.0011873	0.0070982	WBGene00022827	444	1445	1.7	0.0013264	0.0077112
WBGene00019899	152	389	1.36	0.00101401	0.00623825	WBGene00016892	20822	7974	-1.38	0.0011874	0.0070982	WBGene00012405	5013	1988	-1.33	0.0013273	0.0077141
WBGene00001116	1668	6546	1.97	0.00101401	0.00623825	WBGene00000883	76098	37462	-1.02	0.0011903	0.007113	WBGene00018716	214	521	1.28	0.0013284	0.0077177
WBGene00019400	18180	9516	-0.93	0.0010182	0.00626185	WBGene00009831	1068	2235	1.07	0.0011917	0.0071191	WBGene00003955	157861	73373	-1.11	0.0013311	0.007731
WBGene00000151	11612	5923	-0.97	0.00133243	0.00773616	WBGene00017001	30	177	2.58	0.0014886	0.0084094	WBGene00009503	389	1438	1.89	0.0016529	0.0090914
WBGene00002978	30097	69898	1.22	0.00133517	0.0077496	WBGene00002076	60296	32350	-0.9	0.0014922	0.0084257	WBGene00017441	648	1380	1.09	0.0016534	0.0090914
WBGene00020738	75430	32397	-1.22	0.00133638	0.00775413	WBGene00016058	89	8	-3.45	0.0014925	0.0084257	WBGene00012322	66	208	1.64	0.0016582	0.0091148
WBGene00015455	13	120	3.17	0.00133906	0.00776714	WBGene00003686	525	1036	0.98	0.0014962	0.0084442	WBGene00003002	83666	47572	-0.81	0.0016596	0.0091201

WBGene00007242	3231	6269	0.96	0.00134046	0.00777278
WBGene00020844	50	192	1.95	0.00134176	0.00777776
WBGene00020911	30521	16305	-0.9	0.00134224	0.00777805
WBGene00022688	14	93	2.72	0.00134349	0.00778277
WBGene00006753	12109	24360	1.01	0.00134475	0.00778643
WBGene00001390	77	223	1.53	0.00134498	0.00778643
WBGene00018670	82	4	-4.52	0.00135032	0.00781481
WBGene00011693	14	91	2.7	0.00135253	0.00782411
WBGene00020098	3709	1377	-1.43	0.0013528	0.00782411
WBGene00016000	22	113	2.38	0.00135476	0.00783088
WBGene00001650	4331	8365	0.95	0.00135484	0.00783088
WBGene00000057	42	137	1.7	0.00135644	0.00783758
WBGene00004721	15451	8156	-0.92	0.00135747	0.00784102
WBGene00021396	3388	6239	0.88	0.00135928	0.00784895
WBGene00016979	4026	7507	0.9	0.00136117	0.00785612
WBGene00021791	119	28	-2.08	0.00136182	0.00785612
WBGene00010898	3189	5870	0.88	0.00136183	0.00785612
WBGene00009183	282	652	1.21	0.00136305	0.00786061
WBGene00018348	18	84	2.24	0.00136482	0.00786827
WBGene00018717	3531	1798	-0.97	0.00136548	0.00786957
WBGene00007388	663	1251	0.92	0.00136781	0.00787807
WBGene00044007	19	180	3.27	0.00136783	0.00787807
WBGene00008511	2771	5401	0.96	0.0013702	0.00788922
WBGene00006663	852	2434	1.51	0.00137356	0.00790599
WBGene00019020	85	234	1.47	0.0013741	0.00790658
WBGene00006374	2769	1006	-1.46	0.00137488	0.00790853
WBGene00003991	1912	3428	0.84	0.00137896	0.00792944
WBGene00003841	29	136	2.21	0.00137965	0.00793089
WBGene00023414	106	455	2.1	0.00138661	0.00796833
WBGene00013160	25194	13214	-0.93	0.00138967	0.0079815
WBGene00004225	2175	5524	1.34	0.00138979	0.0079815
WBGene00003155	66876	32616	-1.04	0.00139346	0.00800002
WBGene00016799	3288	1196	-1.46	0.00139572	0.00801047
WBGene00016939	3152	1612	-0.97	0.00139689	0.00801461
WBGene00000288	63	469	2.89	0.00140388	0.00805041
WBGene00020688	7101	3701	-0.94	0.00140403	0.00805041
WBGene00000520	12492	6483	-0.95	0.00140592	0.00805868
WBGene00018302	14943	6766	-1.14	0.00140718	0.00806333
WBGene00019321	19	107	2.53	0.0014094	0.00807348
WBGene00013322	713	1408	0.98	0.00141349	0.00809432
WBGene00001538	1498	2992	1	0.00141553	0.00810155
WBGene00003724	627	1221	0.96	0.00141565	0.00810155
WBGene00014173	26	424	4.04	0.00141755	0.00810985
WBGene00007329	34417	18406	-0.9	0.00141945	0.00811602
WBGene00020155	7	119	4.19	0.00141992	0.00811602
WBGene00004265	312	1504	2.27	0.00141999	0.00811602
WBGene00004150	580	1484	1.36	0.00142277	0.00812933
WBGene00017538	12016	5155	-1.22	0.00142493	0.00813906
WBGene00007609	9086	4097	-1.15	0.00142796	0.00815382
WBGene00017901	211	833	1.98	0.00142992	0.0081615
WBGene00013763	145	523	1.85	0.0014997	0.0084611
WBGene00195183	1928	980	-0.98	0.0015006	0.0084634
WBGene00010012	2738	6675	1.29	0.0015014	0.0084653
WBGene00012021	20976	11281	-0.89	0.0015019	0.0084654
WBGene00017858	78	357	2.19	0.0015031	0.0084697
WBGene00013865	190	708	1.9	0.0015043	0.0084739
WBGene00012107	410	2708	2.72	0.0015049	0.0084744
WBGene00015105	5258	2741	-0.94	0.0015067	0.0084819
WBGene00017628	7	60	3.08	0.0015077	0.0084848
WBGene00012680	85	316	1.9	0.0015081	0.0084849
WBGene00013280	9033	3687	-1.29	0.0015126	0.0085074
WBGene00000526	2906	5758	0.99	0.0015158	0.0085227
WBGene00015310	7643	4152	-0.88	0.0015173	0.0085263
WBGene00008557	99	590	2.58	0.0015174	0.0085263
WBGene00016218	141	843	2.58	0.0015184	0.0085293
WBGene00000779	14424	30148	1.06	0.0015189	0.0085293
WBGene00017269	8227	3994	-1.04	0.0015198	0.0085311
WBGene00013721	16317	5067	-1.69	0.0015201	0.0085311
WBGene00009874	22	136	2.63	0.001523	0.0085442
WBGene00007195	24546	11149	-1.14	0.0015253	0.0085546
WBGene00003690	1614	3082	0.93	0.0015262	0.0085571
WBGene00022843	15	101	2.71	0.0015279	0.0085619
WBGene00000660	51	163	1.67	0.001528	0.0085619
WBGene00009875	3	43	3.79	0.0015307	0.0085742
WBGene00006412	4303	8100	0.91	0.0015344	0.0085921
WBGene00019538	387	1086	1.49	0.0015393	0.0086168
WBGene00020545	319	132	-1.28	0.0015424	0.0086315
WBGene00021913	57604	30419	-0.92	0.0015437	0.0086361
WBGene00019311	20776	12043	-0.79	0.0015442	0.0086366
WBGene00194892	5934	3178	-0.9	0.001547	0.0086492
WBGene00012110	2095	960	-1.13	0.0015478	0.0086509
WBGene00007203	150	344	1.2	0.0015518	0.0086704
WBGene00006592	4610	8341	0.86	0.0015522	0.0086704
WBGene00021342	384	143	-1.43	0.0015542	0.0086785
WBGene00010695	3874	7125	0.88	0.0015546	0.0086785
WBGene00013949	347	741	1.1	0.0015562	0.0086834
WBGene00012947	10	98	3.31	0.0015565	0.0086834
WBGene00011338	31213	17252	-0.86	0.0015612	0.008707
WBGene00012270	15	92	2.6	0.0015644	0.0087224
WBGene00018907	48	155	1.7	0.0015672	0.008735
WBGene00021945	13198	6743	-0.97	0.0015681	0.0087356
WBGene00000086	5014	9365	0.9	0.0015686	0.0087356
WBGene00003891	833	3117	1.9	0.0015687	0.0087356
WBGene00020195	1502	5555	1.89	0.0015699	0.008739
WBGene00010180	175	58	-1.58	0.0015707	0.008739
WBGene00010102	3051	1458	-1.07	0.0015712	0.008739
WBGene00016022	3988	13094	1.72	0.0015713	0.008739
WBGene00000175	4204	10497	1.32	0.0015762	0.0087637
WBGene00000960	50	587	3.55	0.0015811	0.0087875
WBGene00009315	112	510	2.19	0.0015815	0.0087875
WBGene00020489	397	1149	1.53	0.0016613	0.0091265
WBGene00011955	757	3082	2.02	0.0016647	0.0091421
WBGene00021043	17667	41451	1.23	0.0016656	0.0091443
WBGene00002189	4970	15125	1.61	0.0016674	0.0091506
WBGene00000939	40773	21942	-0.89	0.0016677	0.0091506
WBGene00009007	24890	11982	-1.05	0.0016695	0.0091575
WBGene00007753	3129	1797	-0.8	0.0016737	0.0091768
WBGene00010535	46	3	-3.76	0.001674	0.0091768
WBGene00001070	12	167	3.78	0.0016759	0.0091843
WBGene00018406	269	103	-1.38	0.001678	0.0091928
WBGene00006742	9534	17344	0.86	0.0016793	0.0091974
WBGene00021167	576	1181	1.04	0.0016827	0.0092133
WBGene00009969	51	182	1.83	0.0016837	0.0092158
WBGene00003848	38	129	1.76	0.0016874	0.0092333
WBGene00018728	72	236	1.72	0.00169	0.0092448
WBGene00008496	2636	8875	1.75	0.0016954	0.0092711
WBGene00019241	15456	8150	-0.92	0.0016968	0.0092763
WBGene00044903	2386	1380	-0.79	0.0017041	0.0093134
WBGene00012045	5	57	3.4	0.0017152	0.0093711
WBGene00018415	161	389	1.27	0.0017165	0.0093732
WBGene00009813	5229	9265	0.83	0.0017169	0.0093732
WBGene00018727	1075	2119	0.98	0.0017172	0.0093732
WBGene00011736	3202	8260	1.37	0.0017207	0.0093894
WBGene00001613	231	658	1.51	0.0017224	0.009396
WBGene00001571	4554	2300	-0.99	0.0017237	0.0094003
WBGene00000405	58741	30970	-0.92	0.0017251	0.0094051
WBGene00003843	735	1858	1.34	0.0017269	0.0094118
WBGene00022420	16515	7981	-1.05	0.0017281	0.009414
WBGene00019738	38	340	3.14	0.0017283	0.009414
WBGene00011732	864	2876	1.74	0.0017324	0.0094306
WBGene00013481	240	618	1.37	0.0017324	0.0094306
WBGene00008385	7804	4249	-0.88	0.001733	0.0094311
WBGene00012328	28	122	2.12	0.0017343	0.0094352
WBGene00021875	67	214	1.68	0.0017404	0.0094644
WBGene00020107	49022	24988	-0.97	0.0017411	0.0094644
WBGene00012304	12	138	3.54	0.0017413	0.0094644
WBGene00014091	62	255	2.04	0.0017466	0.0094903
WBGene00007344	54	458	3.09	0.0017504	0.0095082
WBGene00009182	374	147	-1.35	0.0017516	0.009512
WBGene00008476	1955	1056	-0.89	0.001755	0.0095276
WBGene00006584	17754	31260	0.82	0.001759	0.0095464
WBGene00013312	3235	6174	0.93	0.0017656	0.0095765
WBGene00014205	3399	1588	-1.1	0.0017656	0.0095765
WBGene00019412	9127	4835	-0.92	0.0017683	0.009588
WBGene00006068	142	782	2.46	0.0017701	0.0095949
WBGene00019814	11382	5182	-1.14	0.0017759	0.0096233
WBGene00005024	2195	1062	-1.05	0.0017776	0.0096299
WBGene00003744	46	308	2.74	0.0017811	0.0096461
WBGene00017212	2539	1195	-1.09	0.001788	0.0096806
WBGene00016840	144	340	1.25	0.0017895	0.0096855

WBGene00010877	20140	10655	-0.92	0.00143022	0.0081615	WBGene00006527	10536	21156	1.01	0.001582	0.0087878	WBGene00018137	18936	9808	-0.95	0.0017917	0.0096945
WBGene00021886	4710	2501	-0.91	0.00143093	0.00816298	WBGene00018412	38	113	1.57	0.0015836	0.0087939	WBGene00018551	238	64	-1.88	0.0017951	0.0097103
WBGene00000036	3227	6266	0.96	0.00143213	0.00816722	WBGene00019957	1363	4999	1.87	0.0015876	0.0088127	WBGene00019320	1744	3101	0.83	0.0017968	0.0097162
WBGene00020648	2461	4610	0.91	0.0014326	0.00816734	WBGene00007736	36471	20013	-0.87	0.001588	0.0088127	WBGene00010753	14	141	3.37	0.0017979	0.0097192
WBGene00010983	2660	1264	-1.07	0.00143324	0.00816774	WBGene00044468	1	31	5.35	0.001589	0.0088154	WBGene00010723	310	1502	2.28	0.001799	0.0097222
WBGene00015394	18	202	3.49	0.00143358	0.00816774	WBGene00015307	2796	1291	-1.11	0.0015909	0.0088234	WBGene00003158	50495	25524	-0.98	0.0018013	0.0097319
WBGene00018027	102	435	2.1	0.00143989	0.00820106	WBGene00000773	21372	11396	-0.91	0.0015935	0.0088351	WBGene00044431	12002	5569	-1.11	0.0018022	0.0097337
WBGene00014125	101	293	1.54	0.00144147	0.00820747	WBGene00018103	10033	5309	-0.92	0.0015983	0.0088588	WBGene00003104	2422	6922	1.52	0.0018112	0.0097795
WBGene00006950	625	3549	2.51	0.0014487	0.00824602	WBGene00019082	6970	3493	-1	0.0016008	0.0088702	WBGene00013434	16033	7416	-1.11	0.0018136	0.0097893
WBGene00021626	3897	2033	-0.94	0.00145297	0.0082677	WBGene00010079	467	908	0.96	0.001602	0.0088737	WBGene00011898	8403	3809	-1.14	0.0018163	0.0097999
WBGene00021279	5233	9560	0.87	0.00145563	0.00828021	WBGene00012666	6330	2932	-1.11	0.0016066	0.008894	WBGene00000718	20	283	3.85	0.0018166	0.0097999
WBGene00016635	260	624	1.26	0.00145628	0.00828129	WBGene00015238	10772	5420	-0.99	0.001607	0.008894	WBGene00018861	2164	4123	0.93	0.0018189	0.0098091
WBGene00003771	1392	5168	1.89	0.00145802	0.00828614	WBGene00015751	203	465	1.19	0.0016073	0.008894	WBGene00014241	29	101	1.81	0.0018202	0.0098131
WBGene00019268	3216	6198	0.95	0.00145805	0.00828614	WBGene00014666	249	1771	2.83	0.0016076	0.008894	WBGene00018074	172	624	1.86	0.0018261	0.0098423
WBGene00008545	158	426	1.43	0.00145898	0.00828732	WBGene00011892	26933	11235	-1.26	0.0016091	0.0088997	WBGene00000558	103	605	2.55	0.0018277	0.0098478
WBGene00016684	44	176	1.99	0.00145918	0.00828732	WBGene00004795	3606	1725	-1.06	0.0016116	0.0089109	WBGene00022048	17100	29398	0.78	0.0018299	0.0098527
WBGene00009079	24	97	1.98	0.00145969	0.00828755	WBGene00004802	893	430	-1.05	0.0016178	0.0089404	WBGene00019236	339	2302	2.76	0.00183	0.0098527
WBGene00015548	7161	13124	0.87	0.00146083	0.00829143	WBGene00010060	29	256	3.14	0.001618	0.0089404	WBGene00007797	3745	1474	-1.34	0.0018302	0.0098527
WBGene00044501	51	155	1.59	0.00146136	0.0082918	WBGene00009921	7787	4033	-0.95	0.0016202	0.0089497	WBGene00000135	52	173	1.73	0.001833	0.0098644
WBGene00004338	16990	8437	-1.01	0.00146463	0.00830565	WBGene00004326	13377	6632	-1.01	0.0016316	0.0090094	WBGene00013167	2594	1288	-1.01	0.0018407	0.0099032
WBGene00007801	2161	4255	0.98	0.00146472	0.00830565	WBGene00015954	355	1072	1.59	0.001632	0.0090094	WBGene00008642	7228	3772	-0.94	0.0018426	0.0099105
WBGene00020813	72	226	1.66	0.00146536	0.00830664	WBGene00012307	219	756	1.79	0.0016332	0.0090136	WBGene00018237	5742	15053	1.39	0.0018439	0.0099142
WBGene00012315	9212	4485	-1.04	0.0014676	0.00831672	WBGene00007978	13251	6737	-0.98	0.0016361	0.0090267	WBGene00009015	1474	668	-1.14	0.0018452	0.0099184
WBGene00019232	3367	597	-2.5	0.00146998	0.00832755	WBGene00020527	672	290	-1.21	0.0016391	0.0090406	WBGene00017726	8	64	2.98	0.0018461	0.00992
WBGene00018514	72	357	2.3	0.00147123	0.00833202	WBGene00000191	5	50	3.22	0.0016408	0.0090473	WBGene00021311	17124	8817	-0.96	0.0018466	0.0099202
WBGene00004161	31887	16083	-0.99	0.00147463	0.00834864	WBGene00018040	514	1164	1.18	0.0016418	0.0090496	WBGene00000238	2003	3832	0.94	0.0018548	0.0099613
WBGene00002268	4227	17392	2.04	0.00147754	0.00836246	WBGene00015857	34	300	3.14	0.0016425	0.0090507	WBGene00044212	26	110	2.08	0.0018559	0.0099624
WBGene00008760	42710	77931	0.87	0.00147937	0.00837022	WBGene00023460	511	1051	1.04	0.0016431	0.0090515	WBGene00019881	7730	3811	-1.02	0.0018565	0.0099624
WBGene00021526	232	523	1.17	0.00148068	0.00837496	WBGene00004242	5269	2543	-1.05	0.001646	0.0090604	WBGene00013856	348	893	1.36	0.0018572	0.0099624
WBGene00011180	151	543	1.85	0.00148595	0.00840214	WBGene00015789	4810	2582	-0.9	0.0016462	0.0090604	WBGene00016984	118	321	1.44	0.0018573	0.0099624
WBGene00022269	8114	4153	-0.97	0.00148722	0.0084044	WBGene00021392	18069	8277	-1.13	0.0016463	0.0090604	WBGene00015327	10907	4607	-1.24	0.0018597	0.0099724
WBGene00014178	224	1198	2.42	0.00148729	0.0084044	WBGene00021981	778	1544	0.99	0.0016474	0.0090639	WBGene00007171	3809	1660	-1.2	0.0018614	0.0099783
WBGene00008049	39	152	1.97	0.00186219	0.00997983	WBGene00019803	704	1456	1.05	0.0019409	0.0103032	WBGene00001436	17100	8164	-1.07	0.0020136	0.0105889
WBGene00009660	2262	4823	1.09	0.00186473	0.00999047	WBGene00000240	3432	6256	0.87	0.0019424	0.010306	WBGene00001437	2704	1298	-1.06	0.0020182	0.0106099
WBGene00009653	37356	63505	0.77	0.0018675	0.01000232	WBGene00006856	27002	12899	-1.07	0.0019428	0.010306	WBGene00195043	245	515	1.07	0.002019	0.0106103
WBGene00017530	503	1099	1.13	0.00186855	0.0100041	WBGene00045405	140	42	-1.73	0.0019431	0.010306	WBGene00018303	23	234	3.34	0.0020194	0.0106103
WBGene00010548	9	66	2.92	0.00186895	0.0100041	WBGene00001311	1215	452	-1.43	0.0019503	0.0103411	WBGene00009624	20	94	2.24	0.0020215	0.0106182
WBGene00012306	11597	36395	1.65	0.00187284	0.01002195	WBGene00009024	21	168	3	0.001952	0.0103468	WBGene00021929	22775	10653	-1.1	0.0020239	0.0106277
WBGene00006558	918	399	-1.2	0.00187741	0.01004123	WBGene00008290	0	26	7.43	0.0019541	0.0103531	WBGene00009787	15	76	2.38	0.002025	0.0106305
WBGene00002179	9672	19905	1.04	0.00187756	0.01004123	WBGene00019368	318	614	0.95	0.0019543	0.0103531	WBGene00019655	76	318	2.06	0.0020256	0.0106305
WBGene00044182	7	62	3.08	0.00188	0.01005127	WBGene00003877	2783	9201	1.73	0.0019583	0.010371	WBGene00019294	3069	5866	0.93	0.0020366	0.0106849
WBGene00007268	20	105	2.42	0.00188132	0.01005534	WBGene00044079	11190	20443	0.87	0.0019608	0.0103813	WBGene00020290	5234	2563	-1.03	0.0020413	0.0107034
WBGene00009261	731	3416	2.23	0.00188314	0.01005728	WBGene00001591	212	586	1.47	0.0019676	0.010409	WBGene00016779	1974	826	-1.26	0.0020413	0.0107034
WBGene00016431	14	138	3.26	0.00188314	0.01005728	WBGene00008418	13138	6537	-1.01	0.0019677	0.010409	WBGene00011231	20425	9645	-1.08	0.0020426	0.0107072
WBGene00016570	22	179	3.04	0.00188336	0.01005728	WBGene00045305	280	981	1.81	0.0019678	0.010409	WBGene00015716	190	707	1.9	0.0020461	0.0107213
WBGene00009716	31	244	2.98	0.00189024	0.01009104	WBGene00015539	1121	2184	0.96	0.0019741	0.0104365	WBGene00011462	11	71	2.75	0.0020465	0.0107213
WBGene00001586	44	154	1.82	0.00189466	0.01010929	WBGene00019495	138	354	1.36	0.0019741	0.0104365	WBGene00022736	286	675	1.24	0.0020529	0.0107518
WBGene00019627	12734	6929	-0.88	0.00189479	0.01010929	WBGene00011524	6781	17353	1.36	0.0019751	0.0104385	WBGene00044466	1605	669	-1.26	0.002056	0.0107587
WBGene00009528	158	808	2.35	0.00189636	0.01011468	WBGene00010785	####	125347	-0.98	0.001977	0.0104426	WBGene00010661	273	748	1.45	0.002056	0.0107587
WBGene00010146	24	238	3.29	0.00189994	0.01012947	WBGene00003003	3010	14965	2.31	0.001977	0.0104426	WBGene00008786	13	234	4.14	0.002056	0.0107587

WBGene00010887	144	314	1.13	0.00190026	0.01012947	WBGene00011765	158	363	1.2	0.0019828	0.0104699	WBGene00015480	4862	9338	0.94	0.0020625	0.0107894
WBGene00008437	386	890	1.2	0.00190129	0.01013195	WBGene00007509	3542	1903	-0.9	0.0019843	0.0104748	WBGene00021194	346	133	-1.38	0.0020725	0.0108385
WBGene00010743	124	338	1.45	0.00190275	0.0101367	WBGene00015180	4417	1719	-1.36	0.0019864	0.0104828	WBGene00004302	186140	82494	-1.17	0.0020758	0.0108527
WBGene00008749	10889	5786	-0.91	0.00190763	0.01015969	WBGene00016016	3	46	3.77	0.001989	0.0104936	WBGene00019948	155	752	2.28	0.0020892	0.0109194
WBGene00011694	680	1202	0.82	0.00191327	0.01018669	WBGene00013224	10805	5519	-0.97	0.0019905	0.0104985	WBGene00011212	20	198	3.29	0.0020914	0.0109279
WBGene00004036	2819	6669	1.24	0.00191607	0.01019859	WBGene00009966	22702	11121	-1.03	0.0019935	0.0105113	WBGene00023245	5026	2692	-0.9	0.0020931	0.0109336
WBGene00022692	469	179	-1.39	0.00191755	0.01020346	WBGene00007935	766	2891	1.92	0.0019945	0.0105126	WBGene00194814	16	112	2.81	0.002098	0.0109521
WBGene00022112	28764	13624	-1.08	0.00192376	0.01023347	WBGene00022038	182	855	2.23	0.001995	0.0105126	WBGene00019636	389	1063	1.45	0.0020981	0.0109521
WBGene00008307	65	188	1.52	0.00192997	0.01026069	WBGene00011445	145	391	1.43	0.0020009	0.010541	WBGene00017149	26	416	3.98	0.0020985	0.0109521
WBGene00006864	35	136	1.94	0.00193002	0.01026069	WBGene00010916	9	62	2.83	0.0020023	0.0105449	WBGene00021443	14097	7435	-0.92	0.002101	0.0109621
WBGene00017841	280	1846	2.72	0.00193436	0.01028073	WBGene00018311	162	405	1.32	0.0020031	0.0105463	WBGene00019284	889	1680	0.92	0.0021018	0.0109631
WBGene00012100	3036	6685	1.14	0.0019384	0.0102971	WBGene00017313	26815	13817	-0.96	0.0020048	0.0105517	WBGene00009099	18	89	2.29	0.0021048	0.0109756
WBGene00009888	5537	14911	1.43	0.00193859	0.0102971	WBGene00013040	7866	4245	-0.89	0.0020053	0.0105517	WBGene00011698	1072	497	-1.11	0.0021092	0.0109953
WBGene00006787	43242	87873	1.02	0.0019399	0.01030104	WBGene00019734	202	485	1.27	0.0020096	0.0105714	WBGene00002240	6098	3151	-0.95	0.0021101	0.0109969

Supplementary Table 2-A. Gene ontology analysis for the genes in embryo sample lacking WDR-5

Gene function classification for upregulated genes that are associated with de novo H3K4me2 and downregulated genes that are associated with depleted H3K4me1/me2/me3, during *wdr-5(-)* embryogenesis.

399 up regulated genes and associated with de novo H3K4me2

Function	Pathway	FDR
Process	single organism signaling	0.00139
Process	cell communication	0.00184
Process	signal transduction	0.00799
Process	regulation of membrane potential	0.0196
Process	detection of abiotic stimulus	0.0256
Process	behavior	0.034
Process	synaptic transmission	0.0399
Component	plasma membrane	0.00000571
Component	neuron part	0.00249
Component	nonmotile primary cilium	0.0184
Component	contractile fiber part	0.0221
Component	extracellular matrix	0.0278
Component	dystrophin-associated glycoprotein complex	0.0376
Component	sarcoplasmic reticulum	0.0376
INTERPRO	Zona pellucida domain	0.0391

399 down regulated genes and associated with WDR-5 depleted methylation

Function	Pathway	FDR
Process	reproduction	0.004
Process	embryo development	0.004
Process	chromo. organization involved in meiosis	0.004
Process	DNA metabolic process	0.009
Process	DNA replication	0.013
Process	positive regulation of cell cycle	0.049
Component	chromosome	0.002
Component	nuclear part	0.006
KEGG pathway	RNA transport	0.005
KEGG pathway	Spliceosome	0.012
PFAM	F-box associated	3.81E-45

Supplementary Table 3. ChIP-seq raw data on average peak value for H3K4me1

Average peak value for H3K4me1 in wild type, *wdr-5(ok1417)* and *rbbp-5(tm3463).* Details on peak position is not shown

Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5
WBGene00022279	73	99	11	WBGene00017116	60	78	12	WBGene00018370	55	77	11	WBGene00020701	91	181	16	WBGene00021724	68	93	14
WBGene00022275	70	113	13	WBGene00001983	60	78	12	WBGene00018371	92	230	14	WBGene00015155	74	105	10	WBGene00015854	47	82	32
WBGene00021678	66	89	15	WBGene00017119	64	133	17	WBGene00018366	92	230	14	WBGene00021061	51	81	14	WBGene00195072	47	82	32
WBGene00000812	59	81	12	WBGene00017120	64	133	17	WBGene00015418	72	167	14	WBGene00015648	51	81	14	WBGene00021721	94	118	19
WBGene00021681	56	102	16	WBGene00017121	64	133	17	WBGene00022505	52	85	9	WBGene00016029	45	111	16	WBGene00000647	94	118	19
WBGene00004274	56	102	16	WBGene00004432	64	133	17	WBGene00015337	63	80	12	WBGene00018363	64	134	12	WBGene00021715	94	118	19
WBGene00004418	55	86	18	WBGene00021202	64	133	17	WBGene00015336	63	80	12	WBGene00004212	64	134	12	WBGene00021714	94	118	19
WBGene00018774	55	86	18	WBGene00021201	76	123	17	WBGene00015747	79	134	17	WBGene00018365	64	134	12	WBGene00044378	86	166	50
WBGene00018773	61	110	11	WBGene00021204	88	113	16	WBGene00000439	79	134	17	WBGene00015173	54	105	10	WBGene00021118	86	166	50
WBGene00000622	77	179	13	WBGene00194835	83	113	14	WBGene00017696	79	134	17	WBGene00019329	78	130	21	WBGene00021117	86	166	50
WBGene00004962	77	179	13	WBGene00021205	83	113	14	WBGene00017694	42	72	52	WBGene00019327	78	130	21	WBGene00000648	86	166	50
WBGene00003229	92	248	14	WBGene00021206	83	113	14	WBGene00017693	42	72	52	WBGene00019331	78	130	21	WBGene00021116	54	79	11
WBGene00018772	92	248	14	WBGene00021200	77	112	11	WBGene00017698	42	72	52	WBGene00019332	67	108	10	WBGene00003367	50	101	21
WBGene00004225	47	95	13	WBGene00020006	64	82	13	WBGene00001443	55	105	45	WBGene00001392	67	108	10	WBGene00014848	63	144	14
WBGene00018958	70	127	15	WBGene00003694	64	82	13	WBGene00019801	46	106	11	WBGene00019326	67	108	10	WBGene00077658	36	58	28
WBGene00021671	80	192	13	WBGene00015330	68	143	12	WBGene00003253	62	113	12	WBGene00021170	91	176	28	WBGene00010910	78	109	13
WBGene00021672	68	163	13	WBGene00015327	72	115	14	WBGene00019800	77	120	13	WBGene00020758	91	176	28	WBGene00219205	58	135	16
WBGene00021675	41	84	11	WBGene00015329	72	115	14	WBGene00019301	77	120	13	WBGene00020759	91	176	28	WBGene00010990	58	135	16
WBGene00016904	78	206	11	WBGene00015328	67	113	11	WBGene00019304	42	104	8	WBGene00020760	91	176	28	WBGene00010991	58	135	16
WBGene00016902	74	117	15	WBGene00014997	84	127	11	WBGene00219329	62	104	13	WBGene00044681	91	176	28	WBGene00010992	98	152	11
WBGene00016906	69	97	25	WBGene00043147	70	87	13	WBGene00018833	71	143	19	WBGene00020762	65	101	16	WBGene00004215	78	139	13
WBGene00002077	69	97	25	WBGene00016053	70	87	13	WBGene00006975	91	223	32	WBGene00020763	65	101	16	WBGene00009356	91	183	35
WBGene00020089	75	141	27	WBGene00021157	38	58	37	WBGene00018834	91	223	32	WBGene00020448	58	90	12	WBGene00000472	91	183	35
WBGene00004143	75	141	27	WBGene00006745	80	130	11	WBGene00018835	91	223	32	WBGene00019912	58	90	12	WBGene00000658	91	183	35
WBGene00006385	75	141	27	WBGene00001411	101	180	15	WBGene00010475	82	151	13	WBGene00019913	67	112	15	WBGene00009352	91	183	35
WBGene00020090	65	124	13	WBGene00001093	101	180	15	WBGene00014033	47	54	32	WBGene00019915	67	112	15	WBGene00009354	70	127	13
WBGene00021733	65	124	13	WBGene00020465	50	66	12	WBGene00011146	73	144	13	WBGene00015268	66	137	14	WBGene00009729	70	127	13
WBGene00021734	43	78	13	WBGene00001439	57	115	13	WBGene00010307	52	88	18	WBGene00006697	77	77	22	WBGene00006788	66	134	12
WBGene00015570	52	81	11	WBGene00004804	68	128	16	WBGene00010308	52	88	18	WBGene00004277	72	64	19	WBGene00004478	71	84	10
WBGene00006593	103	206	20	WBGene00020585	68	128	16	WBGene00010309	52	88	18	WBGene00022357	72	64	19	WBGene00003076	71	84	10
WBGene00021026	73	145	16	WBGene00000247	69	134	10	WBGene00006977	81	121	10	WBGene00003917	72	64	19	WBGene00009575	71	84	10
WBGene00021027	73	145	16	WBGene00044500	69	134	10	WBGene00004269	81	121	10	WBGene00022104	36	38	28	WBGene00009576	71	84	10
WBGene00021025	66	183	15	WBGene00016955	81	158	16	WBGene00010310	77	119	11	WBGene00022103	55	108	14	WBGene00044917	71	84	10
WBGene00235388	66	183	15	WBGene00016667	90	130	12	WBGene00010311	73	117	11	WBGene00003978	61	117	34	WBGene00044916	71	84	10
WBGene00022037	92	149	17	WBGene00016664	51	98	15	WBGene00003518	65	78	11	WBGene00022487	55	130	12	WBGene00000851	76	127	10
WBGene00022038	92	149	17	WBGene00003636	61	121	15	WBGene00011298	65	78	11	WBGene00022486	49	139	11	WBGene00006853	79	134	15
WBGene00022033	90	201	19	WBGene00016291	74	129	13	WBGene00011299	71	102	15	WBGene00001236	67	116	27	WBGene00008164	107	168	16
WBGene00022043	90	201	19	WBGene00015541	67	106	10	WBGene00011300	76	126	18	WBGene00022336	67	116	27	WBGene00008165	107	168	16
WBGene00022042	90	201	19	WBGene00019257	62	111	8	WBGene00000549	76	126	18	WBGene00022348	67	116	27	WBGene00011994	72	121	14
WBGene00007009	38	78	15	WBGene00019255	74	129	16	WBGene00003001	93	170	15	WBGene00022349	71	147	14	WBGene00011995	63	114	13
WBGene00004332	73	96	14	WBGene00019296	74	129	16	WBGene00044406	93	170	15	WBGene00022334	71	147	14	WBGene00011999	46	99	11
WBGene00004028	87	73	14	WBGene00019295	75	141	20	WBGene00008513	93	170	15	WBGene00021245	49	114	44	WBGene00011996	46	99	11
WBGene00044434	101	50	13	WBGene00002129	75	141	20	WBGene00008514	89	138	19	WBGene00021247	49	114	44	WBGene00012201	52	130	29
WBGene00022518	60	149	12	WBGene00004494	76	152	23	WBGene00001609	89	138	19	WBGene00004128	154	322	17	WBGene00004699	52	130	29
WBGene00022388	37	118	8	WBGene00019297	92	180	48	WBGene00013979	62	78	31	WBGene00001063	30	50	42	WBGene00004698	52	130	29
WBGene00022389	85	244	17	WBGene00006780	98	197	16	WBGene00013980	85	132	26	WBGene00021697	84	120	22	WBGene00012202	52	130	29
WBGene00022386	85	244	17	WBGene00019205	63	120	11	WBGene00000863	85	132	26	WBGene00021705	117	164	17	WBGene00000196	56	114	10

WBGene00003238	111	243	18	WBGene00023486	76	155	12	WBGene00013982	92	152	17	WBGene00016527	47	86	12	WBGene00012203	56	114	10
WBGene00018787	86	181	15	WBGene00000535	76	155	12	WBGene00001720	92	152	17	WBGene00016520	47	86	12	WBGene00002227	56	114	10
WBGene00018788	61	118	11	WBGene00002245	94	214	14	WBGene00000425	77	118	14	WBGene00021863	71	103	9	WBGene00006660	51	89	38
WBGene00016932	63	97	13	WBGene00006974	63	68	23	WBGene00013850	61	124	14	WBGene00021864	71	103	9	WBGene00007142	51	89	38
WBGene00021334	87	259	13	WBGene00019751	64	99	18	WBGene00013847	61	124	14	WBGene00206486	71	103	9	WBGene00007149	51	89	38
WBGene00001745	87	259	13	WBGene00001853	54	126	44	WBGene00013849	61	124	14	WBGene00021020	92	173	11	WBGene00007013	78	124	25
WBGene00022837	97	210	15	WBGene00005738	54	126	44	WBGene00004391	90	124	13	WBGene00021019	92	173	11	WBGene00077453	78	124	25
WBGene00021685	76	105	16	WBGene00022251	77	96	13	WBGene00011963	90	124	13	WBGene00021018	92	173	11	WBGene00013387	78	124	25
WBGene00003400	63	110	17	WBGene00003237	77	96	13	WBGene00011962	77	115	14	WBGene00017099	64	96	18	WBGene00010055	84	165	25
WBGene00045052	87	158	15	WBGene00022233	77	96	13	WBGene00011964	63	106	15	WBGene00004884	64	96	18	WBGene00010054	84	165	25
WBGene00045053	87	158	15	WBGene00194832	65	95	10	WBGene00000934	63	91	12	WBGene00021849	84	148	14	WBGene00010053	86	161	12
WBGene00004888	87	158	15	WBGene00004881	65	95	10	WBGene00011365	62	75	9	WBGene00000464	84	137	16	WBGene00001031	86	161	12
WBGene00019673	87	158	15	WBGene00044350	64	83	12	WBGene00001263	62	98	11	WBGene00022191	49	81	9	WBGene00195146	69	181	11
WBGene00018159	59	104	26	WBGene00016610	69	80	43	WBGene00010573	53	105	13	WBGene00019212	46	102	8	WBGene00010057	78	158	23
WBGene00004969	71	116	22	WBGene00006621	69	80	43	WBGene00006576	63	83	13	WBGene00022171	72	44	11	WBGene00010051	86	134	34
WBGene00001773	95	140	15	WBGene00016611	94	123	14	WBGene00008001	63	83	13	WBGene00022185	72	44	11	WBGene00219434	86	134	34
WBGene00005077	33	51	32	WBGene00016612	94	123	14	WBGene00008000	63	83	13	WBGene00022170	72	44	11	WBGene00010050	86	134	34
WBGene00003111	55	106	12	WBGene00018167	62	102	28	WBGene00001689	63	83	13	WBGene00022169	72	44	11	WBGene00010049	86	134	34
WBGene00044348	93	172	13	WBGene00018166	62	102	28	WBGene00206422	66	107	12	WBGene00018990	39	90	10	WBGene00008546	69	136	14
WBGene00006702	68	185	31	WBGene00018165	62	102	28	WBGene00206421	66	107	12	WBGene00020597	81	177	12	WBGene00003791	69	136	14
WBGene00003080	68	185	31	WBGene00018164	62	102	28	WBGene00012061	66	107	12	WBGene00020599	81	177	12	WBGene00008549	70	156	28
WBGene00022153	68	185	31	WBGene00017481	62	102	28	WBGene00012062	66	107	12	WBGene00019994	83	196	11	WBGene00008136	65	129	16
WBGene00022152	63	95	13	WBGene00017480	62	102	28	WBGene00001284	59	111	19	WBGene00019997	55	100	14	WBGene00008137	65	129	16
WBGene00006771	70	133	16	WBGene00001090	55	106	13	WBGene00010035	59	111	19	WBGene00194747	55	100	14	WBGene00008138	61	104	16
WBGene00022148	64	180	14	WBGene00015278	93	123	13	WBGene00010037	59	111	19	WBGene00019157	55	100	14	WBGene00008139	61	104	16
WBGene00022160	64	180	14	WBGene00015280	65	119	19	WBGene00010039	70	107	15	WBGene00021917	52	87	11	WBGene00002184	59	76	12
WBGene00022161	64	180	14	WBGene00001858	65	119	19	WBGene00010040	67	97	15	WBGene00021915	46	98	11	WBGene00008741	43	86	12
WBGene00044746	86	178	20	WBGene00015935	68	103	9	WBGene00010038	59	75	17	WBGene00006725	69	105	17	WBGene00001679	66	135	16
WBGene00016907	86	178	20	WBGene00015934	68	103	9	WBGene00004980	59	75	17	WBGene00019168	69	105	17	WBGene00009691	89	177	19
WBGene00004441	86	178	20	WBGene00006608	47	99	12	WBGene00014222	63	51	14	WBGene00021808	83	162	14	WBGene00009692	89	177	19
WBGene00001196	82	146	18	WBGene00022727	96	214	14	WBGene00014223	63	51	14	WBGene00021803	83	162	14	WBGene00001016	91	168	13
WBGene00001309	66	94	14	WBGene00016085	66	144	14	WBGene00014219	63	51	14	WBGene00001559	46	95	14	WBGene00219294	91	168	13
WBGene00003750	53	73	13	WBGene00015553	58	109	13	WBGene00014221	63	133	13	WBGene00008347	65	99	26	WBGene00009657	106	212	14
WBGene00006461	53	73	13	WBGene00015552	58	109	13	WBGene00014225	63	133	13	WBGene00008348	65	99	26	WBGene00009663	106	212	14
WBGene00004743	94	238	26	WBGene00015551	56	86	15	WBGene00194691	63	133	13	WBGene00007923	91	154	12	WBGene00005013	59	109	12
WBGene00022139	94	238	26	WBGene00021542	78	119	14	WBGene00006755	65	123	14	WBGene00007924	91	154	12	WBGene00009662	59	109	12
WBGene00021764	72	61	17	WBGene00000942	62	126	11	WBGene00014226	67	113	14	WBGene00007928	91	154	12	WBGene00009659	59	109	12
WBGene00021346	71	101	12	WBGene00022619	57	109	11	WBGene00008169	67	113	14	WBGene00010813	75	109	12	WBGene00009660	34	61	26
WBGene00021347	71	101	12	WBGene00022620	51	91	11	WBGene00008170	67	113	14	WBGene00008288	75	109	12	WBGene00009658	34	61	26
WBGene00021348	71	101	12	WBGene00016405	55	66	16	WBGene00008171	67	113	14	WBGene00000248	61	142	19	WBGene00003789	70	121	24
WBGene00021349	71	101	12	WBGene00016400	55	57	12	WBGene00001831	60	133	13	WBGene00044166	61	142	19	WBGene00000659	83	150	17
WBGene00235158	56	88	19	WBGene00000687	55	57	12	WBGene00001955	60	133	13	WBGene00008180	72	115	9	WBGene00010785	64	99	25
WBGene00021009	82	138	12	WBGene00004411	63	61	12	WBGene00001570	55	119	13	WBGene00004213	59	148	14	WBGene00014155	102	152	22
WBGene00000020	65	183	14	WBGene00206380	63	61	12	WBGene00007405	65	141	18	WBGene00004765	103	243	15	WBGene00014156	133	196	25
WBGene00000408	87	169	19	WBGene00004822	63	61	12	WBGene00007403	108	231	27	WBGene00007859	70	171	13	WBGene00014152	133	196	25
WBGene00021469	87	169	19	WBGene00017052	76	132	17	WBGene00007400	108	231	27	WBGene00007860	65	184	13	WBGene00014153	92	137	14
WBGene00021470	81	131	35	WBGene00001241	76	132	17	WBGene00006579	108	231	27	WBGene00008121	62	134	9	WBGene00014154	92	137	14
WBGene00021468	81	131	35	WBGene00236806	66	113	13	WBGene00003571	108	231	27	WBGene00012084	93	141	10	WBGene00014151	92	137	14
WBGene00002047	81	131	35	WBGene00044505	66	113	13	WBGene00011498	86	128	10	WBGene00000885	72	141	27	WBGene00003015	78	147	17
WBGene00021476	59	120	16	WBGene00015534	66	113	13	WBGene00002064	88	148	13	WBGene00003962	72	141	27	WBGene00012222	57	125	50
WBGene00021475	59	120	16	WBGene00015531	69	125	9	WBGene00000405	88	148	13	WBGene00007573	72	141	27	WBGene00012219	57	125	50
WBGene00021466	59	120	16	WBGene00015530	69	125	9	WBGene00011499	88	148	13	WBGene00007574	72	141	27	WBGene00012220	57	125	50
WBGene00021465	59	120	16	WBGene00020444	55	119	11	WBGene00000366	99	194	35	WBGene00006474	72	141	27	WBGene00003228	56	96	20
WBGene00021463	67	105	11	WBGene00020447	60	125	13	WBGene00011216	75	170	27	WBGene00007581	82	131	17	WBGene00012457	56	96	20
WBGene00021460	57	103	40	WBGene00016739	64	130	15	WBGene00005021	75	170	27	WBGene00007577	82	131	17	WBGene00012472	74	118	28
WBGene00017741	92	104	19	WBGene00001187	47	94	14	WBGene00006910	75	170	27	WBGene00009372	59	94	14	WBGene00012471	74	118	28
WBGene00017734	92	104	19	WBGene00015217	87	144	11	WBGene00006911	75	170	27	WBGene00009373	59	94	14	WBGene00012458	74	118	28
WBGene00017735	92	104	19	WBGene00017416	87	144	11	WBGene00011218	75	170	27	WBGene00009374	59	94	14	WBGene00000565	72	104	9
WBGene00017736	92	104	19	WBGene00017417	87	144	11	WBGene00014014	50	64	26	WBGene00000070	74	109	12	WBGene00012468	72	104	9
WBGene00017733	54	87	12	WBGene00018903	81	102	12	WBGene00014020	50	64	26	WBGene00003476	67	118	15	WBGene00013257	61	59	14
WBGene00255457	54	87	12	WBGene00004044	81	102	12	WBGene00000567	70	88	21	WBGene00011974	79	116	15	WBGene00013258	60	76	14

WBGene00017732	54	87	12	WBGene00018902	81	102	12	WBGene00014015	81	107	15	WBGene00006591	79	116	15	WBGene00004167	69	97	16
WBGene00002141	68	103	13	WBGene00018900	64	150	51	WBGene00000189	71	102	13	WBGene00001086	105	172	16	WBGene00013260	69	97	16
WBGene00001404	59	117	17	WBGene00001935	64	150	51	WBGene00003035	71	102	13	WBGene00000137	105	172	16	WBGene00013261	69	97	16
WBGene00004226	59	117	17	WBGene00001936	64	150	51	WBGene00014016	71	102	13	WBGene00004414	115	220	19	WBGene00013255	81	134	18
WBGene00019461	68	174	17	WBGene00001934	64	150	51	WBGene00014017	71	102	13	WBGene00006575	94	155	20	WBGene00013266	81	134	18
WBGene00000832	71	141	19	WBGene00001933	64	150	51	WBGene00014018	71	102	13	WBGene00003930	65	146	14	WBGene00016828	45	103	11
WBGene00021271	73	107	20	WBGene00018899	64	150	51	WBGene00010778	69	101	32	WBGene00014204	65	146	14	WBGene00004945	69	123	15
WBGene00021270	73	107	20	WBGene00001624	69	115	12	WBGene00010784	69	101	32	WBGene00014203	65	146	14	WBGene00206479	81	134	18
WBGene00000800	73	121	14	WBGene00019900	69	115	12	WBGene00014075	74	99	24	WBGene00003423	46	86	12	WBGene00004310	73	127	15
WBGene00018233	43	68	15	WBGene00019899	69	115	12	WBGene00014073	79	96	16	WBGene00007982	76	104	16	WBGene00013273	53	102	17
WBGene00017979	53	114	16	WBGene00004039	69	115	12	WBGene00007010	119	215	19	WBGene00007983	79	133	19	WBGene00043054	61	140	37
WBGene00017980	64	170	15	WBGene00019902	48	88	10	WBGene00011221	119	215	19	WBGene00006537	82	162	22	WBGene00011876	61	140	37
WBGene00000788	59	143	16	WBGene00017991	77	70	29	WBGene00194886	86	161	14	WBGene00011367	82	162	22	WBGene00000660	61	140	37
WBGene00017977	70	151	11	WBGene00017992	77	70	29	WBGene00007319	70	135	12	WBGene00011368	82	162	22	WBGene00011877	61	140	37
WBGene00017976	70	151	11	WBGene00017990	77	70	29	WBGene00007321	95	163	13	WBGene00002038	53	102	11	WBGene00011878	53	120	26
WBGene00017975	55	92	9	WBGene00016378	63	97	26	WBGene00004100	95	163	13	WBGene00185075	74	127	24	WBGene00012894	50	110	14
WBGene00003006	83	165	16	WBGene00004703	63	97	26	WBGene00219314	95	163	13	WBGene00007271	74	127	24	WBGene00044164	60	99	16
WBGene00022128	62	71	15	WBGene00016379	63	97	26	WBGene00011805	44	86	18	WBGene00007269	74	127	24	WBGene00012899	60	99	16
WBGene00004920	62	71	15	WBGene00016380	63	97	26	WBGene00011809	44	86	18	WBGene00004392	74	127	24	WBGene00012900	60	99	16
WBGene00022127	71	99	16	WBGene00015511	63	108	11	WBGene00011806	44	86	18	WBGene00007273	66	120	19	WBGene00012907	98	143	17
WBGene00022126	95	158	19	WBGene00015507	74	114	13	WBGene00011815	75	127	13	WBGene00007270	66	120	19	WBGene00012908	75	127	16
WBGene00022129	119	217	22	WBGene00017644	69	131	13	WBGene00002186	75	127	13	WBGene00006830	42	83	14	WBGene00012909	52	110	14
WBGene00004043	104	241	15	WBGene00017643	69	131	13	WBGene00003519	63	120	10	WBGene00001034	65	140	21	WBGene00010269	40	109	10
WBGene00022130	85	184	15	WBGene00004732	70	146	15	WBGene00077703	78	138	10	WBGene00006959	65	140	21	WBGene00012605	57	97	12
WBGene00004946	76	155	14	WBGene00044508	63	77	11	WBGene00003482	78	138	10	WBGene00011279	65	140	21	WBGene00012606	56	106	13
WBGene00022125	57	98	14	WBGene00021539	59	76	13	WBGene00004255	84	116	11	WBGene00011280	55	84	17	WBGene00004232	143	232	20
WBGene00022131	57	98	14	WBGene00021536	59	76	13	WBGene00011869	84	116	11	WBGene00011281	55	84	17	WBGene00000870	143	232	20
WBGene00004077	95	179	21	WBGene00018360	59	76	13	WBGene00011870	84	116	11	WBGene00011282	55	84	17	WBGene00012608	143	232	20
WBGene00021126	107	242	17	WBGene00004056	55	64	9	WBGene00011874	84	116	11	WBGene00009647	55	84	17	WBGene00012609	143	232	20
WBGene00021125	80	140	12	WBGene00015052	61	115	15	WBGene00010756	61	103	9	WBGene00003401	66	88	12	WBGene00012610	143	232	20
WBGene00022117	76	100	32	WBGene00235296	61	115	15	WBGene00006785	54	88	13	WBGene00011605	106	282	40	WBGene00003860	62	119	10
WBGene00004412	76	100	32	WBGene00003961	78	187	13	WBGene00011558	54	91	13	WBGene00011198	106	282	40	WBGene00008932	61	131	14
WBGene00022114	76	100	32	WBGene00003656	72	141	13	WBGene00006802	54	91	13	WBGene00006331	106	282	40	WBGene00003144	58	114	13
WBGene00022113	76	100	32	WBGene00018069	60	82	10	WBGene00011562	72	139	13	WBGene00011200	106	282	40	WBGene00008929	85	199	16
WBGene00000199	92	191	16	WBGene00001908	75	181	52	WBGene00003589	107	236	13	WBGene00003157	106	282	40	WBGene00009641	53	77	10
WBGene00022112	92	191	16	WBGene00001903	75	181	52	WBGene00044891	81	167	15	WBGene00011206	65	80	14	WBGene00006999	54	124	13
WBGene00022111	92	191	16	WBGene00001904	75	181	52	WBGene00011563	55	97	16	WBGene00011205	65	80	14	WBGene00012372	73	105	11
WBGene00022107	47	85	23	WBGene00001907	75	181	52	WBGene00003225	55	97	16	WBGene00001352	65	80	14	WBGene00001947	73	105	11
WBGene00022122	47	85	23	WBGene00003099	75	181	52	WBGene00000423	55	97	16	WBGene00007135	60	128	11	WBGene00012373	73	105	11
WBGene00003836	47	85	23	WBGene00001905	75	181	52	WBGene00011561	55	94	16	WBGene00007138	69	145	18	WBGene00012374	73	105	11
WBGene00022121	47	85	23	WBGene00001906	75	181	52	WBGene00006546	54	91	15	WBGene00007139	76	152	18	WBGene00012375	76	110	11
WBGene00003654	62	122	12	WBGene00017071	49	63	42	WBGene00006545	73	126	16	WBGene00000511	66	115	28	WBGene00002264	86	211	16
WBGene00019595	64	61	12	WBGene00017074	49	63	42	WBGene00011560	73	126	16	WBGene00000512	48	71	38	WBGene00000274	86	211	16
WBGene00019598	64	61	12	WBGene00017075	49	63	42	WBGene00004986	74	101	14	WBGene00000513	48	71	38	WBGene00008862	74	109	15
WBGene00019594	64	61	12	WBGene00017070	49	63	42	WBGene00011559	74	101	14	WBGene00011109	38	72	21	WBGene00008863	74	109	15
WBGene00003258	108	195	14	WBGene00017069	45	100	23	WBGene00008018	74	149	15	WBGene00011119	38	72	21	WBGene00012989	69	136	13
WBGene00021834	108	195	14	WBGene00019788	61	100	33	WBGene00010838	47	111	12	WBGene00011117	38	72	21	WBGene00012988	71	87	11
WBGene00021552	61	73	25	WBGene00019791	61	100	33	WBGene00010839	47	111	12	WBGene00011116	38	72	21	WBGene00012992	92	146	12
WBGene00020915	61	73	25	WBGene00020825	59	83	26	WBGene00008422	74	137	17	WBGene00007791	42	56	28	WBGene00004116	69	105	17
WBGene00004154	61	73	25	WBGene00020827	59	83	26	WBGene00000231	74	137	17	WBGene00007788	42	56	28	WBGene00008446	64	93	16
WBGene00021549	71	126	14	WBGene00020824	59	83	26	WBGene00008423	74	137	17	WBGene00000463	83	155	24	WBGene00008447	57	103	15
WBGene00021547	71	107	12	WBGene00003034	85	164	11	WBGene00012861	64	92	12	WBGene00003577	69	108	30	WBGene00006404	63	148	33
WBGene00021551	70	88	9	WBGene00195046	85	164	11	WBGene00001997	39	55	28	WBGene00010155	64	95	46	WBGene00007836	63	148	33
WBGene00021643	73	151	14	WBGene00006483	85	164	11	WBGene00012647	65	152	22	WBGene00004132	64	95	46	WBGene00012999	57	113	13
WBGene00021637	73	151	14	WBGene00019228	55	86	8	WBGene00012648	91	249	16	WBGene00004470	64	95	46	WBGene00011056	111	179	17
NoWBGene_ID86	60	127	16	WBGene00009014	58	70	9	WBGene00012649	91	249	16	WBGene00000223	66	128	15	WBGene00003246	111	179	17
WBGene00021633	60	127	16	WBGene00009006	60	53	10	WBGene00194731	91	249	16	WBGene00000380	66	128	15	WBGene00013934	58	128	18
WBGene00044436	60	127	16	WBGene00009007	60	53	10	WBGene00000974	91	249	16	WBGene00009115	83	146	17	WBGene00001890	59	90	31
WBGene00021648	60	127	16	WBGene00194651	56	65	12	WBGene00012650	91	249	16	WBGene00000396	93	138	16	WBGene00001885	59	90	31
WBGene00002143	49	89	9	WBGene00007901	56	65	12	WBGene00000566	88	172	17	WBGene00010907	65	107	12	WBGene00001918	59	90	31
WBGene00021650	51	97	11	WBGene00012118	66	90	12	WBGene00012360	50	89	14	WBGene00010908	77	110	13	WBGene00001889	59	90	31

WBGene00044437	51	97	11	WBGene00045183	66	90	12	WBGene00012359	87	96	27	WBGene00003915	88	113	13	WBGene00001884	59	90	31
WBGene00003040	84	138	15	WBGene00012119	66	90	12	WBGene00010479	87	96	27	WBGene00004760	54	107	11	WBGene00001900	59	90	31
WBGene00001601	84	138	15	WBGene00012120	66	90	12	WBGene00006536	87	96	27	WBGene00003112	60	143	12	WBGene00001888	59	90	31
WBGene00004147	79	162	15	WBGene00000691	66	90	12	WBGene00004361	87	96	27	WBGene00011957	50	84	15	WBGene00001916	57	146	29
WBGene00020466	79	162	15	WBGene00000594	66	90	12	WBGene00002219	78	166	22	WBGene00011953	50	84	15	WBGene00008576	57	146	29
WBGene00021175	74	122	14	WBGene00007492	69	106	16	WBGene00004736	78	166	22	WBGene00011956	91	138	17	WBGene00008577	60	137	26
WBGene00002135	74	122	14	WBGene00007493	69	106	16	WBGene00011269	69	86	14	WBGene00219297	91	138	17	WBGene00002120	62	127	22
WBGene00002134	74	122	14	WBGene00219476	71	131	9	WBGene00011268	69	86	14	WBGene00005170	91	138	17	WBGene00008578	79	160	18
WBGene00016323	81	137	14	WBGene00008363	60	111	23	WBGene00008082	54	90	10	WBGene00011407	48	56	27	WBGene00013093	98	133	14
WBGene00016322	81	137	14	WBGene00008362	48	91	36	WBGene00006843	52	99	11	WBGene00011408	48	56	27	WBGene00012722	60	93	14
WBGene00016321	81	137	14	WBGene00006438	60	86	8	WBGene00000853	68	107	13	WBGene00001259	56	122	15	WBGene00012723	60	93	14
WBGene00004425	81	137	14	WBGene00008113	35	59	40	WBGene00006873	70	109	14	WBGene00000068	55	103	14	WBGene00012724	60	93	14
WBGene00004217	81	137	14	WBGene00045078	59	112	11	WBGene00000668	44	92	15	WBGene00008005	52	92	13	WBGene00000901	70	162	16
WBGene00006751	62	116	10	WBGene00008114	71	93	13	WBGene00000669	44	92	15	WBGene00008006	52	92	13	WBGene00012230	57	49	13
WBGene00016326	61	114	12	WBGene00008110	71	93	13	WBGene00012273	44	92	15	WBGene00008008	115	178	15	WBGene00010719	57	49	13
WBGene00003797	68	107	12	WBGene00012434	79	153	34	WBGene00012973	67	125	12	WBGene00003912	115	178	15	WBGene00012228	57	49	13
WBGene00006833	70	111	14	WBGene00000694	79	153	34	WBGene00012923	70	107	22	WBGene00008007	115	178	15	WBGene00012227	73	80	12
WBGene00018765	70	111	14	WBGene00012435	79	153	34	WBGene00012922	70	107	22	WBGene00000193	115	178	15	WBGene00012978	73	80	12
WBGene00044423	70	111	14	WBGene00077756	79	153	34	WBGene00012936	70	107	22	WBGene00017804	115	178	15	WBGene00012980	62	112	13
WBGene00018764	71	114	15	WBGene00012436	79	153	34	WBGene00006604	83	203	13	WBGene00017803	115	178	15	WBGene00000038	84	178	13
WBGene00018763	86	161	18	WBGene00007505	74	126	11	WBGene00006553	84	145	14	WBGene00016449	74	115	13	WBGene00012982	65	98	12
WBGene00020187	100	208	20	WBGene00007506	60	100	10	WBGene00012929	55	100	11	WBGene00000204	74	115	13	WBGene00001971	73	112	24
WBGene00020188	100	208	20	WBGene00010316	60	94	21	WBGene00012126	60	83	14	WBGene00016439	74	115	13	WBGene00013213	73	112	24
WBGene00020189	66	112	13	WBGene00010317	60	94	21	WBGene00012125	50	106	13	WBGene00017826	75	73	9	WBGene00009180	88	151	25
WBGene00020190	66	112	13	WBGene00009544	61	103	16	WBGene00003975	69	60	15	WBGene00017832	75	73	9	WBGene00009182	86	164	29
WBGene00001832	59	101	16	WBGene00002012	61	112	10	WBGene00012127	69	60	15	WBGene00005011	75	73	9	WBGene00004048	92	176	18
WBGene00020185	51	89	18	WBGene00002013	61	112	10	WBGene00012124	81	191	17	WBGene00004400	75	73	9	WBGene00010550	92	176	18
WBGene00000764	51	89	18	WBGene00006949	42	73	35	WBGene00012123	78	157	31	WBGene00017831	75	73	9	WBGene00010551	92	176	18
WBGene00016839	85	161	15	WBGene00000563	42	73	35	WBGene00006533	74	122	44	WBGene00016139	71	129	14	WBGene00010759	51	74	30
WBGene00001430	85	161	15	WBGene00001403	65	104	9	WBGene00001077	74	122	44	WBGene00016170	47	75	16	WBGene00000972	51	74	30
WBGene00016840	85	161	15	WBGene00003151	70	90	12	WBGene00006683	57	111	17	WBGene00020095	47	75	16	WBGene00007996	45	60	35
WBGene00016841	74	142	16	WBGene00000953	70	90	12	WBGene00012942	57	111	17	WBGene00020098	47	75	16	WBGene00007997	45	60	35
WBGene00003950	63	122	17	WBGene00003627	60	83	10	WBGene00004735	57	111	17	WBGene00020097	99	157	20	WBGene00007478	71	122	13
WBGene00020625	63	122	17	WBGene00003465	95	174	47	WBGene00023404	80	187	18	WBGene00020094	99	157	20	WBGene00007479	58	104	16
WBGene00077599	63	122	17	WBGene00000301	95	174	47	WBGene00012943	67	185	22	WBGene00007015	77	132	20	WBGene00012180	59	89	22
WBGene00020629	54	84	12	WBGene00011747	95	174	47	WBGene00013421	81	141	16	WBGene00020093	55	107	20	WBGene00012181	55	96	17
WBGene00020653	54	84	12	WBGene00001396	56	73	10	WBGene00013422	81	141	16	WBGene00044648	55	107	20	WBGene00012183	51	102	11
WBGene00020652	54	84	12	WBGene00001395	56	73	10	WBGene00013439	88	186	20	WBGene00020092	62	97	26	WBGene00012182	64	114	14
WBGene00003072	72	87	10	WBGene00009323	86	127	14	WBGene00013438	119	275	28	WBGene00220249	68	86	32	WBGene00012179	76	126	17
WBGene00018528	72	87	10	WBGene00000858	69	109	12	WBGene00013437	94	166	20	WBGene00002218	68	86	32	WBGene00004451	76	126	17
WBGene00017908	71	135	32	WBGene00001001	81	135	12	WBGene00013436	69	56	12	WBGene00018802	69	119	18	WBGene00003651	76	126	17
WBGene00006805	74	136	15	WBGene00001204	81	135	12	WBGene00013435	69	56	12	WBGene00001076	69	119	18	WBGene00011044	59	84	13
WBGene00018868	53	101	16	WBGene00004254	68	119	17	WBGene00000793	47	90	15	WBGene00004728	89	160	18	WBGene00000584	70	138	11
WBGene00006820	97	175	15	WBGene00010556	68	119	17	WBGene00004705	82	174	11	WBGene00006543	116	208	17	WBGene00010987	31	81	11
WBGene00017085	80	134	25	WBGene00010557	68	119	17	WBGene00003826	82	174	11	WBGene00021900	122	216	16	WBGene00013176	65	81	13
WBGene00017087	80	134	25	WBGene00010558	76	124	15	WBGene00013232	86	143	19	WBGene00021901	122	216	16	WBGene00013168	65	81	13
WBGene00017088	80	134	25	WBGene00007696	50	85	16	WBGene00013233	86	143	19	WBGene00021899	122	216	16	WBGene00001774	33	75	42
WBGene00017084	80	134	25	WBGene00007697	50	85	16	WBGene00013234	86	143	19	WBGene00019629	84	150	20	WBGene00001775	33	75	42
WBGene00017089	80	134	25	WBGene00003531	50	85	16	WBGene00044233	73	157	15	WBGene00019628	84	150	20	WBGene00001776	33	75	42
WBGene00015974	96	191	14	WBGene00008512	63	95	9	WBGene00013228	73	157	15	WBGene00189952	84	150	20	WBGene00001777	33	75	42
WBGene00015973	96	191	14	WBGene00000910	63	95	9	WBGene00013244	68	93	11	WBGene00019627	59	79	12	WBGene00021597	54	117	13
WBGene00015972	96	191	14	WBGene00044922	57	83	11	WBGene00000201	61	22	9	WBGene00019633	54	62	12	WBGene00021594	76	136	13
WBGene00015976	62	117	17	WBGene00012784	57	83	11	WBGene00013543	92	129	14	WBGene00001262	54	62	12	WBGene00007064	63	138	12
WBGene00016608	73	125	16	WBGene00006568	57	83	11	WBGene00013544	81	142	14	WBGene00022534	63	93	46	WBGene00019182	56	105	12
WBGene00016609	73	125	16	WBGene00004297	57	83	11	WBGene00013563	62	164	29	WBGene00022532	63	93	46	WBGene00019184	56	105	12
WBGene00016603	73	125	16	WBGene00011175	90	140	19	WBGene00001946	62	164	29	WBGene00006946	109	150	18	WBGene00019185	57	105	14
WBGene00021629	74	194	11	WBGene00011174	90	140	19	WBGene00004506	62	164	29	WBGene00000561	109	150	18	WBGene00018795	29	35	27
WBGene00021628	70	109	11	WBGene00006779	49	133	12	WBGene00194981	81	121	13	WBGene00016409	109	150	18	WBGene00018793	29	35	27
WBGene00000140	71	86	13	WBGene00011240	74	124	19	WBGene00013033	60	74	37	WBGene00020530	64	72	38	WBGene00003931	47	67	20
WBGene00020131	60	107	11	WBGene00001669	70	120	9	WBGene00013034	60	74	37	WBGene00004095	68	91	16	WBGene00016222	64	99	12
WBGene00022473	72	107	14	WBGene00008733	82	171	12	WBGene00013038	83	55	13	WBGene00018674	68	91	16	WBGene00016223	64	99	12

WBGene00022474	72	107	14	WBGene00008729	82	171	12	WBGene00013039	83	55	13	WBGene00021312	39	98	14	WBGene00189955	65	133	15
WBGene00000440	48	99	11	WBGene00001163	66	145	14	WBGene00013733	76	110	11	WBGene00020967	67	86	12	WBGene00018246	65	133	15
WBGene00000629	48	99	11	WBGene00008076	66	145	14	WBGene00007030	126	222	17	WBGene00020966	67	86	12	WBGene00018248	65	133	15
WBGene00015010	59	126	10	WBGene00010649	63	90	35	WBGene00013735	105	167	14	WBGene00001042	70	177	11	WBGene00018242	65	133	15
WBGene00015007	85	146	13	WBGene00001328	63	76	31	WBGene00003406	71	74	18	WBGene00020968	94	176	12	WBGene00077531	65	133	15
WBGene00206362	110	165	15	WBGene00003568	57	103	13	WBGene00012550	71	74	18	WBGene00020970	94	176	12	WBGene00001963	58	40	8
WBGene00015006	110	165	15	WBGene00012009	53	70	11	WBGene00012551	71	74	18	WBGene00020779	94	176	12	WBGene00003510	58	40	8
WBGene00006961	92	156	13	WBGene00012007	53	70	11	WBGene00012552	71	74	18	WBGene00018613	81	163	19	WBGene00006715	58	40	8
WBGene00006791	74	147	10	WBGene00012014	56	92	9	WBGene00006804	66	87	10	WBGene00044410	81	163	19	WBGene00018240	58	40	8
WBGene00007053	79	132	36	WBGene00012015	56	92	9	WBGene00012553	69	117	9	WBGene00003901	67	118	15	WBGene00021756	107	189	39
WBGene00021112	85	153	20	WBGene00012016	56	92	9	WBGene00012554	47	102	14	WBGene00018611	67	118	15	WBGene00001561	107	189	39
WBGene00021111	85	153	20	WBGene00011259	88	160	15	WBGene00012555	47	102	14	WBGene00019832	78	177	18	WBGene00019638	67	92	17
WBGene00002694	100	199	14	WBGene00011257	88	160	15	WBGene00012717	89	209	18	WBGene00019838	78	177	18	WBGene00003134	81	100	15
WBGene00019771	88	173	16	WBGene00011258	70	136	12	WBGene00012718	54	111	12	WBGene00019831	78	177	18	WBGene00003770	81	100	15
WBGene00006984	74	142	19	WBGene00011720	70	136	12	WBGene00006985	54	135	12	WBGene00017032	78	177	18	WBGene00006781	30	67	29
WBGene00018798	60	78	11	WBGene00011719	61	100	13	WBGene00000267	61	121	10	WBGene00017033	64	99	15	WBGene00001649	47	102	13
WBGene00018797	60	78	11	WBGene00011722	122	225	18	WBGene00001630	50	95	14	WBGene00017029	85	145	14	WBGene00003967	79	96	16
WBGene00019010	63	109	11	WBGene00008750	122	225	18	WBGene00012796	53	96	28	WBGene00017030	105	191	12	WBGene00001492	52	95	11
WBGene00019009	63	109	11	WBGene00008760	122	225	18	WBGene00185001	57	103	20	WBGene00017028	73	134	12	WBGene00235257	52	95	11
WBGene00017671	69	119	13	WBGene00014003	76	107	14	WBGene00010139	57	103	20	WBGene00017031	79	98	18	WBGene00235262	62	90	8
WBGene00017675	69	119	13	WBGene00004319	76	107	14	WBGene00012802	67	107	14	WBGene00017027	79	98	18	WBGene00015246	90	186	14
WBGene00017676	69	119	13	WBGene00001017	69	122	24	WBGene00003804	62	103	16	WBGene00017300	52	116	17	WBGene00006599	75	142	14
WBGene00017886	87	170	15	WBGene00003081	69	122	24	WBGene00012803	62	103	16	WBGene00003371	52	116	17	WBGene00017929	78	123	14
WBGene00017888	87	170	15	WBGene00002981	69	122	24	WBGene00009950	70	115	11	WBGene00017305	52	116	17	WBGene00017926	60	101	13
WBGene00017885	87	170	15	WBGene00014004	69	122	24	WBGene00009730	81	115	16	WBGene00018968	70	116	11	WBGene00000897	63	116	24
WBGene00021016	104	193	12	WBGene00000109	76	121	19	WBGene00012097	71	119	27	WBGene00006731	70	116	11	WBGene00000674	76	175	49
WBGene00044432	104	193	12	WBGene00009494	76	121	19	WBGene00006509	71	119	27	WBGene00018965	70	116	11	WBGene00021400	146	282	13
WBGene00004900	80	146	12	WBGene00009493	76	121	19	WBGene00012094	71	119	27	WBGene00018964	70	116	11	WBGene00021398	61	100	10
WBGene00021017	82	132	12	WBGene00010882	78	138	21	WBGene00006439	71	119	27	WBGene00018967	68	96	11	WBGene00219750	61	100	10
WBGene00001117	82	132	12	WBGene00002344	78	138	21	WBGene00000407	71	119	27	WBGene00018963	68	96	11	WBGene00077607	60	79	13
WBGene00003221	82	132	12	WBGene00002214	78	138	21	WBGene00002185	71	119	27	WBGene00000420	68	96	11	WBGene00011691	61	115	24
WBGene00016258	68	111	11	WBGene00010886	68	139	13	WBGene00012095	62	110	20	WBGene00015470	63	125	55	WBGene00001878	65	150	33
WBGene00002213	90	168	10	WBGene00011484	68	139	13	WBGene00012096	62	110	20	WBGene00015468	63	125	55	WBGene00001877	65	150	33
WBGene00016259	85	158	12	WBGene00011482	67	124	15	WBGene00012098	63	90	20	WBGene00001514	63	125	55	WBGene00001876	65	150	33
WBGene00022465	85	158	12	WBGene00004474	67	124	15	WBGene00012099	64	70	19	WBGene00015469	63	125	55	WBGene00001875	65	150	33
WBGene00004959	85	158	12	WBGene00011479	66	108	16	WBGene00004075	79	165	15	WBGene00015467	91	176	12	WBGene00050899	65	150	33
WBGene00003792	79	122	14	WBGene00011481	62	97	29	WBGene00013574	79	165	15	WBGene00000900	68	129	14	WBGene00009046	56	91	11
WBGene00018909	79	122	14	WBGene00011480	63	101	25	WBGene00011475	102	176	17	WBGene00000518	62	126	14	WBGene00009049	56	91	11
WBGene00000272	79	122	14	WBGene00004985	63	101	25	WBGene00011474	102	176	17	WBGene00018828	112	194	17	WBGene00012348	63	116	12
WBGene00004771	94	164	14	WBGene00004204	64	104	20	WBGene00011476	102	176	17	WBGene00018829	112	194	17	WBGene00012347	52	78	31
WBGene00016330	52	96	14	WBGene00008503	71	110	24	WBGene00011735	58	118	19	WBGene00003918	112	194	17	WBGene00005745	52	78	31
WBGene00015091	66	111	14	WBGene00008504	71	110	24	WBGene00011736	58	118	19	WBGene00006359	61	86	15	WBGene00002190	68	124	16
WBGene00195057	66	111	14	WBGene00008505	71	110	24	WBGene00011734	58	118	19	WBGene00004435	61	86	15	WBGene00002224	79	151	22
WBGene00015095	66	111	14	WBGene00007443	71	110	24	WBGene00006391	58	118	19	WBGene00015148	70	119	19	WBGene00017718	97	149	32
WBGene00015096	66	111	14	WBGene00007444	71	110	24	WBGene00011733	58	118	19	WBGene00015149	70	119	19	WBGene00002125	97	149	32
WBGene00015312	66	111	14	WBGene00007446	83	170	13	WBGene00011731	63	74	14	WBGene00015143	78	151	23	WBGene00017717	97	149	32
WBGene00015313	68	115	11	WBGene00219217	83	170	13	WBGene00023450	63	74	14	WBGene00000182	78	151	23	WBGene00017716	47	75	14
WBGene00002717	126	191	39	WBGene00007447	83	170	13	WBGene00011730	63	74	14	WBGene00006943	78	151	23	WBGene00015622	47	75	14
WBGene00018596	126	191	39	WBGene00007448	83	170	13	WBGene00011729	69	111	16	WBGene00002048	62	141	10	WBGene00002146	66	123	13
WBGene00018598	126	191	39	WBGene00003657	77	146	13	WBGene00000179	73	128	14	WBGene00015086	55	99	20	WBGene00002023	65	113	12
WBGene00018599	126	191	39	WBGene00001796	64	96	12	WBGene00001118	73	128	14	WBGene00021343	55	99	20	WBGene00003911	76	142	12
WBGene00004131	69	114	10	WBGene00007105	89	146	15	WBGene00000837	54	83	14	WBGene00020964	83	138	11	WBGene00016661	79	127	14
WBGene00016041	69	114	10	WBGene00001020	89	146	15	WBGene00000878	54	83	14	WBGene00000435	83	138	11	WBGene00001602	82	111	15
WBGene00016278	60	141	18	WBGene00007106	89	146	15	WBGene00003048	71	158	17	WBGene00001869	82	157	11	WBGene00004219	82	111	15
WBGene00017855	60	141	18	WBGene00007109	55	67	24	WBGene00012306	37	89	13	WBGene00020021	74	149	11	WBGene00016662	67	177	44
WBGene00017854	60	141	18	WBGene00001939	55	67	24	WBGene00012307	48	98	12	WBGene00004858	74	149	11	WBGene00002007	67	177	44
WBGene00015635	54	46	15	WBGene00001921	55	67	24	WBGene00010661	43	81	11	WBGene00007016	103	202	17	WBGene00015801	67	182	28
WBGene00004431	54	46	15	WBGene00001922	52	55	27	WBGene00010664	79	96	16	WBGene00020020	103	202	17	WBGene00015800	67	187	11
WBGene00015636	54	46	15	WBGene00001920	52	55	27	WBGene00010665	79	96	16	WBGene00021029	103	202	17	WBGene00022202	89	184	13
WBGene00019082	61	89	11	WBGene00001930	52	55	27	WBGene00000875	79	96	16	WBGene00017162	103	202	17	WBGene00016423	104	187	14
WBGene00019713	72	115	13	WBGene00001919	49	43	30	WBGene00044142	83	128	16	WBGene00017166	68	96	12	WBGene00003846	81	168	17

WBGene00000474	72	115	13	WBGene00001929	49	43	30	WBGene00006494	83	128	16	WBGene00003252	68	96	12	WBGene00020786	81	168	17
NoWBGene_ID62	46	90	10	WBGene00235095	49	43	30	WBGene00001148	60	144	18	WBGene00017159	68	96	12	WBGene00015779	65	108	14
WBGene00006776	79	135	17	WBGene00007110	49	43	30	WBGene00007260	56	131	14	WBGene00017158	68	96	12	WBGene00001803	73	174	30
WBGene00020556	64	123	24	WBGene00007111	49	43	30	WBGene00007261	57	122	13	WBGene00016200	80	109	18	WBGene00015781	69	131	13
WBGene00002989	77	161	12	WBGene00001940	44	59	32	WBGene00001130	59	124	13	WBGene00016195	87	120	19	WBGene00015778	69	131	13
WBGene00015442	77	161	12	WBGene00001932	44	59	32	WBGene00010701	69	115	20	WBGene00016194	81	126	17	WBGene00021050	84	214	22
WBGene00044305	77	101	13	WBGene00001931	44	59	32	WBGene00004276	69	126	15	WBGene00016201	74	131	14	WBGene00020331	37	55	33
WBGene00000493	77	101	13	WBGene00002223	44	59	32	WBGene00010700	67	112	18	WBGene00006987	64	99	13	WBGene00002976	43	68	34
WBGene00020693	93	204	13	WBGene00044025	57	72	15	WBGene00010726	64	97	20	WBGene00017146	73	130	48	WBGene00003394	51	100	24
WBGene00001856	93	204	13	WBGene00011338	57	72	15	WBGene00010725	64	97	20	WBGene00006727	73	130	48	WBGene00015373	58	91	35
WBGene00001973	100	191	21	WBGene00010351	69	87	11	WBGene00044143	38	106	9	WBGene00017776	73	130	48	WBGene00015372	61	131	27
WBGene00003601	100	191	21	WBGene00010352	69	87	11	WBGene00010330	36	112	11	WBGene00017777	73	130	48	WBGene00003053	61	131	27
WBGene00016333	100	191	21	WBGene00010353	49	89	39	WBGene00001687	56	118	12	WBGene00017778	67	104	16	WBGene00020130	61	131	27
WBGene00000436	47	74	27	WBGene00010354	52	99	41	WBGene00007284	46	91	12	WBGene00017774	65	109	14	WBGene00020691	54	99	15
WBGene00000631	47	74	27	WBGene00001937	54	109	43	WBGene00003638	78	146	13	WBGene00017773	62	113	11	WBGene00044572	54	99	15
WBGene00018003	47	74	27	WBGene00001938	54	109	43	WBGene00045494	53	111	15	WBGene00003375	51	117	10	WBGene00019619	65	98	10
WBGene00018007	75	126	10	WBGene00007513	45	81	34	WBGene00014040	54	119	15	WBGene00001489	76	132	12	WBGene00019620	65	98	10
WBGene00018008	75	126	10	WBGene00007514	56	86	29	WBGene00023497	55	127	14	WBGene00020211	100	146	13	WBGene00001715	65	98	10
WBGene00016421	75	126	10	WBGene00003148	66	91	23	WBGene00005221	37	61	49	WBGene00020210	100	146	13	WBGene00019621	65	98	10
WBGene00003996	49	78	11	WBGene00010409	66	91	23	WBGene00014068	37	61	49	WBGene00020209	100	146	13	WBGene00003551	65	98	10
WBGene00006823	49	85	12	WBGene00004892	69	119	12	WBGene00010337	58	101	13	WBGene00000874	76	81	12	WBGene00015787	63	91	13
WBGene00016154	61	97	18	WBGene00219458	65	121	12	WBGene00010338	58	101	13	WBGene00006544	76	81	12	WBGene00000393	53	96	12
WBGene00000429	58	124	20	WBGene00006678	67	90	12	WBGene00010010	45	117	11	WBGene00022695	76	81	12	WBGene00001619	42	100	11
WBGene00016157	62	86	12	WBGene00010848	67	90	12	WBGene00009279	54	99	11	WBGene00018254	103	158	28	WBGene00017688	38	99	9
WBGene00016158	62	86	12	WBGene00010847	73	156	33	WBGene00009280	54	99	11	WBGene00006547	103	158	28	WBGene00017687	48	103	10
WBGene00016159	62	86	12	WBGene00001585	73	156	33	WBGene00007486	56	106	11	WBGene00018255	103	158	28	WBGene00017690	57	106	10
WBGene00022750	70	99	22	WBGene00003218	73	156	33	WBGene00044150	47	114	8	WBGene00015477	53	94	11	WBGene00020504	49	105	11
WBGene00001819	82	115	32	WBGene00010846	73	156	33	WBGene00012073	65	100	12	WBGene00015480	67	104	12	WBGene00020884	28	54	32
WBGene00022752	57	81	12	WBGene00010849	50	83	46	WBGene00000760	55	100	10	WBGene00021534	79	173	16	WBGene00044297	67	116	10
WBGene00022748	57	81	12	WBGene00000702	59	91	31	WBGene00007819	67	136	11	WBGene00021535	79	173	16	WBGene00016088	49	109	19
WBGene00022753	57	81	12	WBGene00008722	61	63	11	WBGene00014213	53	115	14	WBGene00021531	74	109	49	WBGene00002233	63	145	17
WBGene00044611	49	84	52	WBGene00004755	97	170	22	WBGene00008622	96	258	24	WBGene00018340	74	109	49	WBGene00016090	85	177	11
WBGene00020842	49	84	52	WBGene00006406	104	193	23	WBGene00008621	94	211	13	WBGene00003593	74	109	49	WBGene00016975	43	88	12
WBGene00020843	49	84	52	WBGene00004360	111	215	24	WBGene00011229	57	90	40	WBGene00015977	84	162	13	WBGene00018175	73	164	12
WBGene00020838	77	122	11	NoWBGene_ID17	111	215	24	WBGene00009069	57	90	40	WBGene00015978	84	162	13	WBGene00018173	73	164	12
WBGene00003878	53	84	60	WBGene00008720	111	215	24	WBGene00044638	57	90	40	WBGene00001972	84	162	13	WBGene00018176	73	164	12
WBGene00018981	53	84	60	WBGene00009589	91	203	21	WBGene00009067	58	84	33	WBGene00018561	84	162	13	WBGene00019657	40	79	10
WBGene00018982	53	84	60	WBGene00009588	71	190	18	WBGene00009068	58	84	33	WBGene00016980	61	108	12	WBGene00019843	72	157	13
WBGene00018978	83	194	49	WBGene00009587	71	190	18	WBGene00006674	23	54	22	WBGene00016979	91	148	11	WBGene00003163	104	235	16
WBGene00045498	83	194	49	WBGene00014080	49	84	12	WBGene00011310	65	157	16	WBGene00016982	55	100	12	WBGene00019844	88	188	14
WBGene00020379	83	194	49	WBGene00002130	49	84	12	WBGene00007523	55	86	14	WBGene00016978	55	100	12	WBGene00002149	71	141	12
WBGene00020380	83	194	49	WBGene00002335	55	90	12	WBGene00006384	55	86	14	WBGene00016977	109	175	16	WBGene00019749	70	135	17
WBGene00020381	70	123	32	WBGene00235132	55	90	12	WBGene00006353	59	91	21	WBGene00016983	109	175	16	WBGene00019748	89	181	24
WBGene00020382	70	123	32	WBGene00014079	55	90	12	WBGene00002280	78	135	17	WBGene00015813	109	175	16	WBGene00016894	52	97	12
WBGene00020378	72	155	14	WBGene00001079	55	90	12	WBGene00017170	49	170	13	WBGene00015484	106	138	17	WBGene00016893	52	97	12
WBGene00020377	72	155	14	WBGene00011910	95	151	13	WBGene00206382	49	170	13	WBGene00015485	106	138	17	WBGene00004370	65	125	13
WBGene00020383	72	155	14	WBGene00010444	95	151	13	WBGene00020770	63	152	13	WBGene00020822	45	136	15	WBGene00003856	40	52	33
WBGene00020347	63	75	36	WBGene00010448	80	104	10	WBGene00018188	46	101	12	WBGene00004781	45	136	15	WBGene00016895	40	52	33
WBGene00020348	63	75	36	WBGene00010447	80	104	10	WBGene00018187	54	128	12	WBGene00020821	55	108	15	WBGene00018280	81	196	14
WBGene00001497	63	75	36	WBGene00001577	80	104	10	WBGene00003555	56	119	21	WBGene00020820	76	99	18	WBGene00006746	81	196	14
WBGene00206356	63	75	36	WBGene00010918	47	100	12	WBGene00020794	68	98	14	WBGene00020823	76	99	18	WBGene00017446	81	196	14
WBGene00020346	63	75	36	WBGene00006415	78	155	14	WBGene00020793	70	125	12	WBGene00001005	76	99	18	WBGene00003987	55	102	21
WBGene00016751	62	103	11	WBGene00009549	78	155	14	WBGene00003933	60	110	12	WBGene00006463	76	99	18	WBGene00017445	55	102	21
WBGene00005000	62	103	11	WBGene00001151	78	155	14	WBGene00003883	59	82	21	WBGene00020819	90	144	19	WBGene00003732	53	101	13
WBGene00000583	62	103	11	WBGene00002363	78	155	14	WBGene00019519	39	52	29	WBGene00007060	104	188	20	WBGene00017449	70	153	15
WBGene00016754	62	103	11	WBGene00007801	77	146	13	WBGene00019518	32	50	28	WBGene00017755	104	188	20	WBGene00017447	70	153	15
WBGene00003059	62	103	11	WBGene00014091	40	39	29	WBGene00004776	61	147	11	WBGene00017754	104	188	20	WBGene00017448	70	153	15
WBGene00015688	99	222	30	WBGene00003736	40	39	29	WBGene00000401	77	137	16	WBGene00002889	79	160	13	WBGene00002123	55	148	13
WBGene00015689	99	222	30	WBGene00006555	55	87	15	WBGene00045272	33	58	32	WBGene00003162	79	160	13	WBGene00020125	40	100	12
WBGene00015687	99	222	30	WBGene00014095	55	87	15	WBGene00019102	55	119	33	WBGene00017647	79	160	13	WBGene00015168	61	172	29
WBGene00015686	99	222	30	WBGene00006566	55	87	15	WBGene00015547	76	180	34	WBGene00017904	58	133	37	WBGene00000116	74	94	27

WBGene00002601	90	123	12	WBGene00014097	70	137	14	WBGene00015546	65	160	18	WBGene00017905	98	198	21	WBGene00016913	80	125	23
WBGene00017815	90	123	12	WBGene00006759	70	137	14	WBGene00015545	54	123	38	WBGene00006498	98	198	21	WBGene00016914	86	155	19
WBGene00019395	60	65	12	WBGene00235284	64	94	13	WBGene00015548	50	108	26	WBGene00020068	58	92	14	WBGene00004004	61	81	13
WBGene00019394	60	65	12	WBGene00011741	64	94	13	WBGene00077591	68	152	11	WBGene00020064	58	92	14	WBGene00044577	84	157	14
WBGene00019399	60	65	12	WBGene00011740	64	94	13	WBGene00018373	56	112	11	WBGene00044312	58	92	14	WBGene00001025	66	111	13
WBGene00022586	60	65	12	WBGene00011737	64	94	13	WBGene00018374	56	112	11	WBGene00019381	58	92	14	WBGene00016939	66	111	13
WBGene00001596	76	113	12	WBGene00011738	80	113	20	WBGene00017726	77	161	14	WBGene00003181	56	75	40	WBGene00022829	97	228	17
WBGene00022593	80	100	11	WBGene00011739	70	104	13	NoWBGene_ID21	67	151	15	WBGene00000265	56	75	40	WBGene00044283	97	228	17
WBGene00020743	51	75	12	WBGene00000270	70	104	13	WBGene00017729	67	151	15	WBGene00019380	56	81	26	WBGene00044068	97	228	17
WBGene00004273	51	75	12	WBGene00005015	70	104	13	WBGene00017730	57	140	16	WBGene00019382	56	75	40	WBGene00018519	84	189	23
WBGene00019432	51	75	12	WBGene00008684	44	102	12	WBGene00017725	67	131	10	WBGene00020315	61	84	13	WBGene00018522	65	141	17
WBGene00019001	94	165	11	WBGene00044329	44	102	12	WBGene00015672	89	148	11	WBGene00020316	65	81	14	WBGene00018520	50	104	13
WBGene00002783	79	139	18	WBGene00008686	44	102	12	WBGene00015676	89	148	11	WBGene00018998	68	110	13	WBGene00018521	54	116	14
WBGene00006624	78	144	24	WBGene00008685	44	102	12	WBGene00020144	64	183	10	WBGene00002083	68	110	13	WBGene00018523	54	116	14
WBGene00020711	59	81	9	WBGene00010890	62	85	29	WBGene00020146	55	137	14	WBGene00017950	90	135	13	WBGene00018518	76	158	14
WBGene00003170	58	77	10	WBGene00010891	62	85	29	WBGene00020142	59	129	14	WBGene00000443	90	135	13	WBGene00001696	76	158	14
WBGene00020931	85	96	30	WBGene00000122	70	116	21	WBGene00003168	69	114	15	WBGene00000872	80	105	26	WBGene00006750	61	135	16
WBGene00020937	85	96	30	WBGene00010892	70	116	21	WBGene00000294	50	119	10	WBGene00023414	80	105	26	WBGene00019351	54	102	15
WBGene00006773	85	96	30	WBGene00003010	65	121	13	WBGene00006067	50	119	10	WBGene00003858	77	86	10	WBGene00006351	60	99	14
WBGene00020935	85	96	30	WBGene00007089	53	94	12	WBGene00018203	48	105	12	WBGene00019401	77	86	10	WBGene00001912	80	147	26
WBGene00020936	66	78	10	WBGene00007091	77	131	12	WBGene00018202	48	105	12	WBGene00019400	65	98	13	WBGene00001914	80	147	26
WBGene00001682	66	78	10	WBGene00009435	87	148	15	WBGene00018204	62	112	15	WBGene00018152	65	98	13	WBGene00004988	80	147	26
WBGene00017240	66	78	10	WBGene00004025	63	108	11	WBGene00018205	59	97	11	WBGene00015159	55	78	10	WBGene00004987	80	147	26
WBGene00004111	66	80	24	WBGene00009438	63	108	11	WBGene00016253	59	123	57	WBGene00015156	56	95	15	WBGene00004912	40	78	14
WBGene00000871	66	80	24	WBGene00016587	64	86	9	WBGene00016252	59	123	57	WBGene00015163	56	95	15	WBGene00020339	40	78	14
WBGene00004110	79	87	33	WBGene00016586	64	86	9	WBGene00016251	59	123	57	WBGene00017275	52	64	12	WBGene00020335	60	85	13
WBGene00020659	58	89	21	WBGene00016585	64	86	9	WBGene00018711	71	150	15	WBGene00017269	52	64	12	NoWBGene_ID1	60	85	13
WBGene00006423	70	113	18	WBGene00004756	62	113	11	WBGene00018712	71	150	15	WBGene00017268	52	64	12	WBGene00016985	66	115	11
WBGene00016742	77	125	15	WBGene00000376	81	135	17	WBGene00018710	57	109	16	WBGene00003378	75	122	15	WBGene00015665	72	109	10
WBGene00020403	60	105	8	WBGene00235129	86	130	14	WBGene00018713	58	101	15	WBGene00020604	75	122	15	WBGene00015664	72	109	10
WBGene00020397	60	105	8	WBGene00013922	91	147	21	WBGene00019347	84	171	12	WBGene00001974	75	122	15	WBGene00045456	85	165	10
WBGene00020404	57	93	11	WBGene00009211	71	136	25	WBGene00004121	62	117	13	WBGene00000479	60	100	16	WBGene00003380	85	165	10
WBGene00016260	53	81	13	WBGene00009212	71	136	25	WBGene00018033	51	95	12	WBGene00015582	60	100	16	WBGene00000523	76	136	13
WBGene00010370	56	107	11	WBGene00008582	51	74	43	WBGene00001537	49	94	8	WBGene00015581	60	100	16	WBGene00000526	76	136	13
WBGene00003964	58	102	17	WBGene00009956	67	86	10	WBGene00016269	50	100	9	WBGene00003024	77	138	14	WBGene00015295	69	105	11
WBGene00008852	86	147	17	WBGene00001820	97	257	26	WBGene00015583	51	74	12	WBGene00000437	67	120	14	WBGene00004949	99	228	18
WBGene00004773	60	136	14	WBGene00014081	94	211	19	WBGene00015586	80	122	14	WBGene00020048	63	97	13	WBGene00000591	83	186	17
WBGene00002198	119	195	18	WBGene00010671	52	91	13	WBGene00015587	80	122	14	WBGene00020047	75	150	21	WBGene00003185	66	144	15
WBGene00009050	119	195	18	WBGene00002002	52	91	13	WBGene00015588	68	128	11	WBGene00020050	75	150	21	WBGene00018608	72	137	16
WBGene00003815	119	195	18	WBGene00002368	52	91	13	WBGene00015589	56	134	8	WBGene00004420	75	150	21	WBGene00001637	78	129	16
WBGene00009051	119	195	18	WBGene00010672	52	91	13	WBGene00019578	82	137	15	WBGene00003063	75	150	21	WBGene00018603	78	129	16
WBGene00004186	119	195	18	WBGene00013223	95	162	14	WBGene00020725	76	131	17	WBGene00020051	75	150	21	WBGene00018604	66	118	12
WBGene00006753	79	153	7	WBGene00000186	95	162	14	WBGene00020726	62	128	13	WBGene00020200	55	88	10	WBGene00018606	66	118	12
WBGene00010738	62	115	17	WBGene00219454	51	88	11	WBGene00007011	62	128	13	WBGene00022816	64	109	39	WBGene00000061	65	127	21
WBGene00010427	65	154	17	WBGene00235112	51	88	11	WBGene00020366	58	179	23	WBGene00022817	64	109	39	WBGene00018607	74	138	21
WBGene00010645	67	192	16	WBGene00006916	59	84	11	WBGene00020812	58	179	23	NoWBGene_ID28	86	158	23	WBGene00018485	63	114	13
WBGene00010641	75	126	12	WBGene00007752	54	94	11	WBGene00004270	41	107	10	WBGene00194729	86	158	23	WBGene00000438	74	152	14
WBGene00006963	75	126	12	WBGene00011939	78	132	12	WBGene00000993	91	180	16	WBGene00015988	70	122	18	WBGene00001069	106	216	16
WBGene00010642	75	126	12	WBGene00011940	69	115	13	WBGene00020811	91	180	16	WBGene00003002	55	104	17	WBGene00018486	106	216	16
WBGene00010873	108	219	26	WBGene00007780	60	95	17	WBGene00020817	91	180	16	WBGene00015386	82	166	23	WBGene00000747	70	119	16
WBGene00010871	108	219	26	WBGene00007779	60	95	17	WBGene00016350	95	178	15	WBGene00015385	109	228	29	WBGene00018484	70	119	16
WBGene00010872	108	219	26	WBGene00004030	79	122	16	WBGene00016346	95	178	15	NoWBGene_ID93	109	228	29	WBGene00019803	61	110	8
WBGene00001949	108	219	26	WBGene00008555	84	160	14	WBGene00004220	55	123	12	WBGene00022660	109	228	29	WBGene00017243	70	144	13
WBGene00000637	108	219	26	WBGene00010829	106	226	16	WBGene00044770	77	121	12	WBGene00003559	109	228	29	WBGene00006063	70	144	13
WBGene00007254	87	214	15	WBGene00010828	75	176	13	WBGene00017339	77	117	10	WBGene00022661	109	228	29	WBGene00007059	70	131	17
WBGene00003622	87	214	15	WBGene00003150	67	128	20	WBGene00017340	77	117	10	WBGene00000395	93	159	11	WBGene00017244	70	131	17
WBGene00001136	68	127	10	WBGene00009889	59	116	37	WBGene00017342	51	105	10	WBGene00003956	93	159	11	WBGene00006827	61	101	13
WBGene00003236	68	127	10	WBGene00006766	96	179	15	WBGene00006886	51	105	10	WBGene00003102	60	102	9	WBGene00017241	61	101	13
WBGene00008768	68	127	10	WBGene00000417	77	141	11	WBGene00000792	75	169	12	WBGene00015591	73	128	12	WBGene00000083	63	161	15
WBGene00009915	68	138	10	WBGene00194643	77	141	11	WBGene00003891	98	200	13	WBGene00001209	65	120	16	WBGene00006671	58	142	15
WBGene00001680	68	138	10	WBGene00013461	24	40	26	WBGene00017375	86	108	23	WBGene00022800	77	109	13	WBGene00017814	65	150	13

WBGene00012136	84	163	30	WBGene00013378	53	70	13	WBGene00016489	86	108	23	WBGene00022798	77	109	13	WBGene00017862	91	219	13
WBGene00012137	71	84	14	WBGene00004278	53	70	13	WBGene00044683	86	108	23	WBGene00022799	77	109	13	WBGene00017863	91	219	13
WBGene00012140	70	100	12	WBGene00044745	53	70	13	WBGene00016490	57	105	14	WBGene00044447	77	109	13	WBGene00206475	77	177	17
WBGene00012141	70	100	12	WBGene00013379	106	177	11	WBGene00003370	57	105	14	WBGene00022796	63	72	13	WBGene00017864	77	177	17
WBGene00007042	80	162	22	WBGene00013382	56	103	17	WBGene00003369	60	121	14	WBGene00022802	63	72	13	WBGene00000992	63	135	20
WBGene00007742	89	224	32	WBGene00013383	56	103	17	WBGene00022647	63	137	13	WBGene00044763	63	72	13	WBGene00017865	63	135	20
WBGene00077553	101	179	16	WBGene00004681	62	79	14	WBGene00022648	63	137	13	WBGene00001628	63	72	13	WBGene00017866	42	74	22
WBGene00007743	101	179	16	WBGene00009943	62	79	14	WBGene00006602	60	124	14	WBGene00016203	66	83	9	WBGene00006757	53	92	18
WBGene00001648	101	179	16	WBGene00219243	79	149	11	WBGene00020085	84	142	17	WBGene00043051	66	83	9	WBGene00016898	63	109	13
WBGene00000938	94	169	15	WBGene00006580	66	105	18	WBGene00206419	84	142	17	WBGene00004042	57	93	55	WBGene00002242	63	109	13
WBGene00012030	61	75	13	WBGene00008122	72	98	12	WBGene00020086	84	142	17	WBGene00015753	50	80	47	WBGene00019583	73	179	14
WBGene00012031	61	75	13	WBGene00044257	58	89	15	WBGene00017939	74	113	13	WBGene00001565	42	67	39	WBGene00044698	73	179	14
WBGene00003071	75	115	14	WBGene00004430	58	89	15	WBGene00015868	62	172	12	WBGene00004433	76	137	15	WBGene00004999	73	179	14
WBGene00009142	42	103	11	WBGene00001635	58	89	15	WBGene00019211	61	118	13	WBGene00016189	54	90	16	WBGene00019584	76	83	13
WBGene00011970	55	88	17	WBGene00001562	90	163	29	WBGene00018924	77	148	16	WBGene00015529	63	75	12	WBGene00019582	84	126	14
WBGene00011971	55	88	17	WBGene00001190	36	37	33	WBGene00001165	99	213	20	WBGene00044579	56	82	12	WBGene00004335	92	168	14
WBGene00009187	109	180	43	WBGene00005810	36	37	33	WBGene00018927	99	213	20	WBGene00017013	64	109	21	WBGene00022668	75	118	33
WBGene00009188	109	180	43	WBGene00012542	36	37	33	WBGene00018925	99	213	20	WBGene00000884	64	109	21	WBGene00000075	75	118	33
WBGene00003818	97	145	10	WBGene00013416	73	171	9	WBGene00015999	63	98	18	WBGene00017012	71	159	16	WBGene00019847	60	96	12
WBGene00000163	76	120	26	WBGene00013453	56	97	13	WBGene00000676	63	98	18	WBGene00017039	35	55	37	WBGene00001169	69	191	31
WBGene00011230	76	120	26	WBGene00013452	56	97	13	WBGene00002140	63	98	18	WBGene00016034	29	75	11	WBGene00006310	69	191	31
WBGene00011231	76	120	26	WBGene00007058	90	146	16	WBGene00015993	65	115	31	WBGene00016033	29	75	11	WBGene00016531	48	70	13
WBGene00011232	76	120	26	WBGene00013306	77	80	15	WBGene00019664	64	112	15	WBGene00018568	75	112	9	WBGene00016532	57	73	8
WBGene00011234	76	120	26	WBGene00194649	77	80	15	WBGene00019660	86	154	13	WBGene00206376	64	106	13	WBGene00016534	61	90	7
WBGene00011235	54	83	11	WBGene00013334	77	80	15	WBGene00044458	86	154	13	WBGene00018565	56	105	33	WBGene00015776	83	163	14
WBGene00010110	72	93	10	WBGene00013307	83	111	14	WBGene00019661	85	154	26	WBGene00044785	65	117	13	WBGene00015777	75	111	14
WBGene00010111	44	110	9	WBGene00001558	89	142	13	WBGene00018256	83	154	38	WBGene00019173	69	142	19	WBGene00004774	88	115	13
WBGene00006790	60	89	13	WBGene00000763	89	142	13	WBGene00044459	63	97	11	WBGene00000100	69	149	20	WBGene00018466	59	115	14
WBGene00010114	60	89	13	WBGene00013308	89	142	13	WBGene00021951	63	97	11	WBGene00016086	56	115	12	WBGene00001945	59	115	14
WBGene00010113	72	141	13	WBGene00013311	58	143	43	WBGene00021948	75	109	12	WBGene00219374	56	115	12	WBGene00018465	90	154	16
WBGene00008991	72	141	13	WBGene00004487	58	143	43	WBGene00021947	66	73	10	WBGene00006887	67	116	12	WBGene00018467	90	154	16
WBGene00003777	77	168	12	WBGene00013312	58	143	43	WBGene00021942	60	45	13	WBGene00015181	60	59	18	WBGene00018463	73	146	11
WBGene00011912	77	168	12	WBGene00004170	33	77	45	WBGene00021944	38	44	32	WBGene00015177	38	85	9	WBGene00018462	58	95	11
WBGene00011913	77	168	12	WBGene00004171	33	77	45	WBGene00021927	51	114	12	WBGene00016006	68	116	14	WBGene00016407	55	123	13
WBGene00011914	61	102	13	WBGene00013530	67	113	15	WBGene00021932	71	119	19	WBGene00007130	53	135	14	WBGene00006962	82	164	13
WBGene00011915	61	102	13	WBGene00013532	67	113	15	WBGene00044462	71	119	19	WBGene00007129	56	128	13	WBGene00001000	72	126	16
WBGene00011916	61	102	13	WBGene00013531	67	113	15	WBGene00016637	71	119	19	WBGene00006538	56	128	13	WBGene00015949	78	125	15
WBGene00011917	61	102	13	WBGene00013632	112	95	17	WBGene00003893	71	119	19	WBGene00014140	53	83	11	WBGene00019491	57	125	16
WBGene00002179	56	111	13	WBGene00185102	50	120	12	WBGene00001104	60	84	19	WBGene00014145	55	89	13	WBGene00194670	57	125	16
WBGene00004318	96	162	21	WBGene00194913	50	120	12	WBGene00001103	60	84	19	WBGene00014141	56	94	14	WBGene00019490	57	125	16
WBGene00011920	96	162	21	WBGene00013643	55	150	10	WBGene00019052	51	113	12	WBGene00014142	56	94	14	WBGene00001953	64	98	15
WBGene00010366	74	69	11	WBGene00013650	29	51	40	WBGene00022423	34	73	44	WBGene00001516	69	153	13	WBGene00219375	64	98	15
WBGene00010367	74	69	11	WBGene00005727	29	51	40	WBGene00022307	61	92	14	WBGene00007407	98	205	18	WBGene00017714	68	95	49
WBGene00008314	55	97	9	WBGene00002175	54	81	7	WBGene00000680	61	92	14	WBGene00003828	53	106	14	WBGene00001854	66	143	50
WBGene00008313	58	124	11	WBGene00001604	47	111	17	WBGene00022313	61	92	14	WBGene00009888	76	171	14	WBGene00017715	63	177	33
WBGene00008312	58	124	11	WBGene00012420	75	168	29	WBGene00004497	59	100	13	WBGene00007516	42	84	9	WBGene00015922	44	117	13
WBGene00008318	80	120	13	WBGene00185101	116	228	39	WBGene00021512	59	100	13	WBGene00007517	42	84	9	WBGene00015926	52	99	12
WBGene00010560	80	120	13	WBGene00013418	116	228	39	WBGene00021524	76	122	17	WBGene00007518	42	84	9	WBGene00019294	69	146	13
WBGene00045192	80	120	13	WBGene00013419	118	249	17	WBGene00021508	60	78	17	WBGene00007522	35	64	35	WBGene00019780	69	146	13
WBGene00010565	85	162	16	WBGene00194949	39	74	15	WBGene00021506	64	93	15	WBGene00009380	70	121	46	WBGene00019779	78	137	10
WBGene00077768	85	162	16	WBGene00004357	85	204	21	WBGene00021509	67	108	12	WBGene00009382	70	121	46	WBGene00019781	78	137	10
WBGene00010566	85	162	16	WBGene00013099	85	204	21	WBGene00021505	67	108	12	WBGene00011763	47	91	13	WBGene00017421	65	106	11
WBGene00000156	85	162	16	WBGene00013100	77	133	25	WBGene00000553	39	96	15	WBGene00008065	81	134	9	WBGene00002239	71	114	15
WBGene00010567	68	82	11	WBGene00194647	81	150	29	WBGene00001173	70	139	14	WBGene00001123	58	105	11	WBGene00002127	53	108	11
WBGene00010568	68	82	11	WBGene00219244	81	150	29	WBGene00001186	106	187	28	WBGene00008865	47	83	10	WBGene00019988	53	108	11
WBGene00008935	68	82	11	WBGene00013115	22	37	30	WBGene00001253	106	187	28	WBGene00001863	43	106	33	WBGene00019986	57	105	11
WBGene00008934	71	108	17	WBGene00012791	30	43	34	WBGene00019875	62	92	10	WBGene00008868	42	135	15	WBGene00019989	57	105	11
WBGene00005009	71	108	17	WBGene00000889	36	69	23	WBGene00077523	66	99	10	WBGene00011642	65	129	14	WBGene00018883	57	105	11
WBGene00002999	82	168	14	WBGene00013809	36	69	23	WBGene00016918	66	99	10	WBGene00011644	65	129	14	WBGene00018281	56	114	27
WBGene00003136	63	83	9	WBGene00006698	36	69	23	WBGene00235274	66	99	10	WBGene00011645	66	112	17	WBGene00018282	47	99	34
WBGene00012113	86	190	28	WBGene00013779	52	109	17	WBGene00235277	87	165	15	WBGene00009482	52	86	14	WBGene00006942	79	164	30

WBGene00012116	86	190	28	WBGene00044244	97	176	14	WBGene00020208	89	167	14	WBGene00009483	44	74	13	WBGene00018283	44	97	11
WBGene00011375	66	89	36	WBGene00006229	97	176	14	WBGene00002990	74	134	13	WBGene00009801	69	112	13	WBGene00017258	74	88	17
WBGene00004966	66	105	26	WBGene00000224	97	176	14	WBGene00006920	85	176	14	WBGene00006881	81	178	14	WBGene00000422	74	88	17
WBGene00013955	62	111	22	WBGene00001606	97	176	14	WBGene00006912	85	176	14	WBGene00002271	81	178	14	WBGene00004998	74	88	17
WBGene00011380	54	124	14	WBGene00009155	97	176	14	WBGene00219413	85	176	14	WBGene00001608	58	112	14	WBGene00006472	63	94	14
WBGene00000433	55	85	11	WBGene00008196	56	69	14	WBGene00021415	85	176	14	WBGene00011083	58	112	14	WBGene00006649	51	100	11
WBGene00044094	55	85	11	WBGene00008197	56	69	14	WBGene00021430	40	99	37	WBGene00011081	58	112	14	WBGene00017257	77	135	10
WBGene00013957	54	89	40	WBGene00008204	56	69	14	WBGene00022078	84	213	12	WBGene00007651	90	167	22	WBGene00017513	74	139	12
WBGene00013959	54	89	40	WBGene00008198	56	69	14	WBGene00003595	62	102	15	WBGene00023491	90	167	22	WBGene00003613	41	87	17
WBGene00013960	105	179	15	WBGene00008200	56	69	14	WBGene00003161	60	116	29	WBGene00219544	73	127	13	WBGene00017048	73	122	12
WBGene00011344	105	179	15	WBGene00015153	69	138	11	WBGene00022075	60	116	29	WBGene00007652	73	127	13	WBGene00044071	73	122	12
WBGene00011345	105	179	15	WBGene00002061	69	138	11	WBGene00004367	60	116	29	WBGene00007653	62	83	15	WBGene00017046	73	122	12
WBGene00009920	58	106	13	WBGene00001177	42	98	11	WBGene00022100	71	127	46	WBGene00013919	66	84	14	WBGene00017571	92	152	16
WBGene00009923	60	107	10	WBGene00021413	24	40	24	WBGene00006705	78	125	12	WBGene00001708	70	155	12	WBGene00019287	33	56	27
WBGene00009921	60	107	10	WBGene00018976	72	136	14	WBGene00022382	78	125	12	WBGene00008951	70	155	12	WBGene00017400	57	114	34
WBGene00003014	69	112	10	WBGene00004496	48	91	12	WBGene00021876	73	139	11	WBGene00013871	69	147	12	WBGene00017401	70	160	38
WBGene00008531	69	112	10	WBGene00021002	82	138	14	WBGene00021877	73	139	11	WBGene00013866	69	147	12	WBGene00004369	67	122	13
WBGene00004117	65	68	15	WBGene00006648	96	161	13	WBGene00219424	73	139	11	WBGene00013869	47	99	15	WBGene00019571	49	73	10
WBGene00008530	65	68	15	WBGene00019814	101	119	23	WBGene00044486	73	139	11	WBGene00013870	69	110	13	WBGene00019729	59	54	8
WBGene00008533	65	68	15	WBGene00019817	101	119	23	WBGene00021875	37	56	30	WBGene00000930	90	121	11	WBGene00019728	59	54	8
WBGene00006844	84	140	12	WBGene00019818	101	119	23	WBGene00044487	45	59	30	WBGene00000749	90	121	11	WBGene00019730	66	142	12
WBGene00008386	70	122	14	WBGene00005256	60	107	11	WBGene00021894	45	59	30	WBGene00012326	62	116	14	WBGene00019731	66	142	12
WBGene00000431	72	124	15	WBGene00005257	60	107	11	WBGene00044488	53	62	30	WBGene00044686	62	116	14	WBGene00022810	41	96	15
WBGene00010496	68	96	15	WBGene00005898	52	86	9	WBGene00021871	84	117	12	WBGene00011552	45	112	49	WBGene00006764	41	96	15
WBGene00010495	68	96	15	WBGene00018622	72	123	11	WBGene00235102	84	117	12	WBGene00003384	64	71	11	WBGene00006477	44	87	20
WBGene00010497	63	95	19	WBGene00018623	72	123	11	WBGene00021883	84	117	12	WBGene00008602	64	71	11	WBGene00019870	46	77	25
WBGene00010500	54	95	36	WBGene00019243	47	118	20	WBGene00021884	84	117	12	WBGene00006839	79	200	36	WBGene00019871	71	154	12
WBGene00006976	54	95	36	WBGene00001564	47	118	20	WBGene00002243	105	183	14	WBGene00008604	58	131	14	WBGene00019872	64	132	12
WBGene00001677	54	95	36	WBGene00019558	66	120	11	WBGene00021890	72	174	13	WBGene00001331	58	131	14	WBGene00019869	51	79	20
WBGene00001651	85	174	13	WBGene00019557	66	120	11	WBGene00021891	82	188	10	WBGene00008603	58	131	14	WBGene00002057	45	48	27
WBGene00011353	85	174	13	WBGene00019563	66	120	11	WBGene00219425	68	133	12	WBGene00008999	62	125	15	WBGene00010397	47	102	13
WBGene00001414	71	122	12	WBGene00019556	66	120	11	WBGene00021892	80	142	11	WBGene00009000	67	143	21	WBGene00019948	83	137	15
WBGene00000468	71	122	12	WBGene00020155	57	92	11	WBGene00021869	80	142	11	WBGene00009674	118	221	26	WBGene00019952	83	137	15
WBGene00000777	71	122	12	WBGene00019972	90	158	22	WBGene00021893	71	140	13	WBGene00004786	118	221	26	WBGene00019956	83	137	15
WBGene00009671	71	122	12	WBGene00019973	90	158	22	WBGene00022073	65	125	13	WBGene00009675	118	221	26	WBGene00019953	89	186	21
WBGene00009672	71	122	12	WBGene00000552	70	181	14	WBGene00022061	51	85	13	WBGene00007591	48	82	10	WBGene00019947	94	234	26
WBGene00007979	94	178	31	WBGene00021736	62	239	17	WBGene00022059	86	143	15	WBGene00006135	51	87	10	WBGene00019946	94	234	26
WBGene00007978	94	178	31	WBGene00195169	62	239	17	WBGene00022060	79	135	18	WBGene00007592	85	107	10	WBGene00019955	89	187	20
WBGene00008440	94	178	31	WBGene00016539	110	228	15	WBGene00020831	79	135	18	WBGene00011107	75	84	14	WBGene00019945	89	187	20
WBGene00006574	94	178	31	NoWBGene_ID49	47	92	8	WBGene00020832	79	135	18	WBGene00011105	67	149	10	WBGene00019954	89	187	20
WBGene00003052	94	178	31	WBGene00022287	45	106	11	WBGene00044469	79	157	17	WBGene00011104	67	149	10	WBGene00019721	81	160	13
WBGene00001960	94	178	31	WBGene00004925	45	106	11	WBGene00020833	103	207	15	WBGene00011108	59	118	14	WBGene00019719	81	160	13
WBGene00006618	94	178	31	WBGene00020017	71	95	15	WBGene00001548	66	131	11	WBGene00004375	73	121	11	WBGene00044481	52	83	10
WBGene00004115	94	178	31	WBGene00001578	71	95	15	WBGene00018328	61	184	26	WBGene00001122	73	121	11	WBGene00022681	52	83	10
WBGene00008439	68	96	9	WBGene00019978	116	203	15	WBGene00001999	61	184	26	WBGene00009793	100	193	16	WBGene00003618	60	83	11
WBGene00006324	54	90	10	WBGene00019977	116	203	15	WBGene00018330	71	139	17	WBGene00003247	62	117	17	WBGene00011791	52	69	18
WBGene00007856	39	69	28	WBGene00004139	116	203	15	WBGene00018323	71	139	17	WBGene00007896	84	162	15	WBGene00011790	50	77	19
WBGene00001843	39	69	28	WBGene00018757	96	201	16	WBGene00015250	80	103	11	WBGene00006870	77	126	14	WBGene00011789	57	99	12
WBGene00001574	62	74	12	WBGene00006794	75	198	16	WBGene00015251	80	103	11	WBGene00008807	77	126	14	WBGene00001952	57	99	12
WBGene00012376	71	84	13	WBGene00018709	45	97	12	WBGene00015248	80	103	11	WBGene00008806	62	101	14	WBGene00011788	67	109	13
WBGene00014115	80	94	13	WBGene00000387	112	257	32	WBGene00015652	54	92	12	WBGene00008805	53	112	15	WBGene00001038	76	119	13
WBGene00014121	74	111	14	WBGene00017509	112	257	32	WBGene00044470	54	92	12	WBGene00010344	52	92	18	WBGene00014249	76	119	13
WBGene00014117	74	111	14	WBGene00017508	112	257	32	WBGene00015651	54	92	12	WBGene00006364	64	151	17	WBGene00001510	70	115	15
WBGene00003209	74	111	14	WBGene00000976	49	83	12	WBGene00015658	42	89	6	WBGene00010345	84	180	21	WBGene00005026	70	115	15
WBGene00009127	71	131	29	NoWBGene_ID23	49	83	12	WBGene00006769	69	141	26	WBGene00010199	82	133	21	WBGene00014250	70	115	15
WBGene00001167	71	131	29	WBGene00018115	49	83	12	WBGene00015037	57	92	17	WBGene00003733	82	133	21	WBGene00014247	70	115	15
WBGene00009126	71	131	29	WBGene00020389	69	93	21	WBGene00015038	57	92	17	WBGene00010200	91	193	18	WBGene00006120	69	89	9
WBGene00009498	64	110	13	WBGene00020392	69	93	21	WBGene00003889	54	100	40	WBGene00004749	91	193	18	WBGene00009154	69	89	9
WBGene00009686	64	110	13	WBGene00020390	69	93	21	WBGene00015035	75	128	9	WBGene00000018	71	137	13	WBGene00005795	69	89	9
WBGene00008779	53	100	45	WBGene00020391	69	93	21	WBGene00021375	75	128	9	WBGene00010902	59	107	10	WBGene00005776	69	89	9
WBGene00008780	53	100	45	WBGene00003676	60	118	12	WBGene00021374	75	128	9	WBGene00000908	41	71	19	WBGene00005475	64	89	31

WBGene00009178	60	68	18	WBGene00021486	60	118	12	WBGene00021376	75	128	9	WBGene00008746	37	56	25	WBGene00000776	64	89	31
WBGene00007533	60	68	18	WBGene00021493	60	118	12	WBGene00022609	81	191	15	WBGene00008745	65	126	10	WBGene00050904	37	64	37
WBGene00008878	97	180	18	WBGene00017720	67	101	16	WBGene00022608	81	191	15	WBGene00008747	66	129	12	WBGene00013490	37	64	37
WBGene00008877	64	58	12	WBGene00017719	67	101	16	WBGene00016987	83	153	14	WBGene00008748	52	74	12	WBGene00012308	37	64	37
WBGene00008876	51	85	12	WBGene00017724	42	112	12	WBGene00021365	79	151	18	WBGene00008749	52	59	12	WBGene00012022	59	118	18
WBGene00007641	78	90	23	WBGene00016685	38	93	11	WBGene00021370	79	151	18	WBGene00006468	45	95	10	WBGene00012021	59	118	18
WBGene00219310	78	90	23	WBGene00016697	38	93	11	WBGene00021371	79	151	18	WBGene00004862	78	150	14	WBGene00012020	59	118	18
WBGene00007642	78	90	23	WBGene00021165	38	93	11	WBGene00021369	69	124	17	WBGene00001495	34	59	31	WBGene00013340	73	75	12
WBGene00219313	78	90	23	WBGene00018760	77	132	12	WBGene00021372	82	139	15	WBGene00003999	65	113	9	WBGene00013350	69	63	12
WBGene00007643	78	90	23	WBGene00018761	77	132	12	WBGene00021373	101	195	16	WBGene00009812	66	98	14	WBGene00013081	41	80	12
WBGene00044236	92	168	15	WBGene00000056	75	109	10	WBGene00021368	101	195	16	WBGene00009818	66	98	14	WBGene00194680	112	109	28
WBGene00003904	92	168	15	WBGene00018758	75	109	10	WBGene00006869	96	208	19	WBGene00009819	78	136	14	WBGene00005522	43	112	11
WBGene00007645	68	142	16	NoWBGene_ID75	75	109	10	WBGene00019726	98	151	11	WBGene00009820	72	116	13	WBGene00008310	43	112	11
WBGene00007646	43	116	16	WBGene00020954	57	98	42	WBGene00017907	111	196	12	WBGene00011882	72	127	14	WBGene00008308	43	112	11
WBGene00007647	75	131	21	WBGene00020953	57	98	42	WBGene00000287	111	196	12	WBGene00000961	75	143	16	WBGene00012670	38	41	28
WBGene00003172	75	131	21	WBGene00002246	78	174	20	WBGene00017906	106	224	14	WBGene00011879	73	160	16	WBGene00012065	60	107	13
WBGene00006681	58	131	17	WBGene00022260	61	127	17	WBGene00006970	82	244	19	WBGene00010715	35	55	46	WBGene00012064	60	107	13
WBGene00004808	58	131	17	WBGene00022259	43	79	13	WBGene00000009	82	244	19	WBGene00003529	35	55	46	WBGene00012063	60	107	13
WBGene00004807	58	131	17	WBGene00235321	43	79	13	WBGene00018145	51	126	16	WBGene00006897	96	178	15	WBGene00219452	95	116	10
WBGene00009260	58	131	17	WBGene00022258	43	79	13	WBGene00018146	51	126	16	WBGene00006896	96	178	15	WBGene00009018	95	116	10
WBGene00002226	80	117	13	WBGene00000168	71	173	15	WBGene00018148	51	126	16	WBGene00001184	62	131	12	WBGene00010105	55	66	15
WBGene00077771	80	117	13	WBGene00020877	66	105	12	WBGene00005433	67	109	13	WBGene00002261	79	174	18	WBGene00044197	55	66	15
WBGene00008061	80	117	13	WBGene00044526	66	105	12	WBGene00018547	67	109	13	WBGene00007483	68	149	23	WBGene00010106	72	103	16
WBGene00008062	80	117	13	WBGene00000478	79	167	16	WBGene00020930	83	176	13	WBGene00007482	64	142	16	WBGene00206500	72	103	16
WBGene00000096	100	132	13	WBGene00021080	73	132	21	WBGene00018066	46	88	10	WBGene00012261	64	142	16	WBGene00010107	88	140	16
WBGene00008063	100	132	13	WBGene00021079	73	132	21	WBGene00003955	61	158	14	WBGene00012255	64	142	16	WBGene00008070	88	140	16
WBGene00008064	123	204	18	WBGene00021078	59	113	16	WBGene00006951	61	158	14	WBGene00012256	64	142	16	WBGene00008071	88	140	16
WBGene00007984	123	204	18	WBGene00003025	56	123	14	NoWBGene_ID76	61	158	14	WBGene00195208	52	64	28	WBGene00008067	67	101	9
WBGene00007985	123	204	18	WBGene00020854	52	128	15	WBGene00020981	61	158	14	WBGene00011139	67	119	18	WBGene00012816	25	83	8
WBGene00004372	75	123	13	WBGene00021482	75	156	14	WBGene00020979	77	113	18	WBGene00044330	80	141	17	WBGene00012814	51	95	11
WBGene00007986	47	75	11	WBGene00000498	75	156	14	WBGene00004157	77	113	18	WBGene00007327	47	104	14	WBGene00012813	57	150	19
WBGene00009646	59	73	13	WBGene00021479	75	156	14	WBGene00020983	77	113	18	WBGene00007326	47	104	14	WBGene00012825	55	132	11
WBGene00002276	70	70	15	WBGene00015906	56	122	8	WBGene00001033	71	94	12	WBGene00007938	53	103	14	WBGene00012826	55	132	11
WBGene00044987	70	70	15	WBGene00015903	56	122	8	WBGene00019535	71	94	12	WBGene00002029	85	154	12	WBGene00012828	40	57	43
WBGene00010608	70	70	15	WBGene00015905	56	122	8	WBGene00017934	84	124	14	WBGene00007939	85	154	12	WBGene00012829	40	57	43
WBGene00010617	70	70	15	WBGene00015899	56	122	8	WBGene00235371	84	124	14	WBGene00007941	85	154	12	WBGene00012830	40	57	43
WBGene00000177	45	80	32	WBGene00015898	56	122	8	WBGene00003668	63	81	13	WBGene00007266	58	108	12	WBGene00012831	40	57	43
WBGene00011494	56	64	11	WBGene00016786	42	118	22	WBGene00017487	63	81	13	WBGene00007267	50	84	11	WBGene00013358	94	214	13
WBGene00000968	56	64	11	WBGene00021557	51	98	12	WBGene00017483	60	68	16	WBGene00009531	67	125	14	WBGene00005388	94	214	13
WBGene00011497	56	64	11	WBGene00021559	67	96	7	WBGene00017482	60	68	16	WBGene00002124	87	186	23	WBGene00005387	94	214	13
WBGene00007620	102	143	15	WBGene00021560	67	96	7	WBGene00021283	96	199	19	WBGene00008586	87	186	23	WBGene00013748	34	89	12
WBGene00001145	113	144	15	WBGene00021561	60	108	18	WBGene00021284	96	199	19	WBGene00008587	87	186	23	WBGene00195241	75	97	10
WBGene00000430	102	143	15	WBGene00003704	60	108	18	WBGene00021285	96	199	19	WBGene00008585	64	137	17	WBGene00005427	75	97	10
WBGene00044607	81	144	12	WBGene00022521	59	120	16	WBGene00021281	96	199	19	WBGene00006922	40	88	11	WBGene00195242	75	97	10
WBGene00006352	81	144	12	WBGene00005405	59	120	16	WBGene00019951	83	137	15	WBGene00008588	40	88	11	WBGene00013756	75	97	10
WBGene00009159	60	94	11	WBGene00017981	69	98	29	WBGene00021147	43	66	50	WBGene00001536	57	100	27	WBGene00004203	37	104	14
WBGene00009161	60	94	11	WBGene00017982	69	98	29	WBGene00021146	43	66	50	WBGene00000040	57	100	27	WBGene00007017	37	104	14
WBGene00009162	60	94	11	WBGene00003159	69	98	29	WBGene00021138	43	66	50	WBGene00003998	83	162	18	WBGene00012614	68	89	13
WBGene00009163	83	138	25	WBGene00017983	81	150	23	WBGene00021139	43	66	50	WBGene00009632	83	162	18	WBGene00010506	68	89	13
WBGene00006528	83	138	25	WBGene00001722	84	170	14	WBGene00017589	64	106	9	WBGene00009633	88	171	20	WBGene00001700	83	138	12
WBGene00000371	83	138	25	WBGene00044530	76	137	11	WBGene00017583	64	106	9	WBGene00006584	93	180	21	WBGene00002118	78	103	12
WBGene00003652	61	96	11	WBGene00021616	51	73	26	WBGene00017407	59	75	11	WBGene00008571	80	130	13	WBGene00010006	78	156	21
WBGene00006978	86	156	13	WBGene00004820	51	73	26	WBGene00017404	77	91	13	WBGene00003970	57	97	14	WBGene00001406	60	142	17
WBGene00010730	109	230	16	WBGene00004813	51	73	26	WBGene00017403	77	91	13	WBGene00009777	58	99	13	WBGene00007124	61	74	16
WBGene00010731	109	230	16	WBGene00021621	51	73	26	WBGene00017402	94	106	15	WBGene00045253	58	101	12	WBGene00007119	61	74	16
WBGene00010732	76	163	10	WBGene00020369	68	166	14	WBGene00044811	94	106	15	WBGene00002037	58	101	12	WBGene00012626	59	110	18
WBGene00003639	76	163	10	WBGene00006796	84	218	16	WBGene00086558	94	106	15	WBGene00164974	50	99	11	WBGene00012627	59	110	18
WBGene00003396	54	90	15	WBGene00020904	97	260	22	WBGene00044693	94	106	15	WBGene00003003	41	101	15	WBGene00012628	59	110	18
WBGene00009937	54	90	15	WBGene00004947	82	161	14	WBGene00020777	64	92	9	WBGene00009259	63	121	19	WBGene00012847	78	172	11
WBGene00009938	75	117	10	WBGene00044586	68	127	8	WBGene00020773	61	94	13	WBGene00004746	63	121	19	WBGene00012184	77	170	11
WBGene00009941	72	105	9	WBGene00022018	49	96	14	WBGene00020778	57	96	16	WBGene00044121	71	136	11	WBGene00012185	67	142	12

WBGene00013696	72	109	13	WBGene00022016	49	96	14	WBGene00020772	60	93	15	WBGene00007955	71	136	11	WBGene00012186	57	114	12
WBGene00013695	72	109	13	WBGene00019353	50	88	14	WBGene00020771	60	93	15	WBGene00003239	71	136	11	WBGene00009999	64	119	14
WBGene00013697	84	134	13	WBGene00019357	50	88	14	WBGene00195077	63	90	14	WBGene00007959	65	98	11	WBGene00009998	64	119	14
WBGene00013694	84	134	13	WBGene00022584	50	88	14	WBGene00021173	63	90	14	WBGene00009930	51	103	17	WBGene00010000	64	119	14
WBGene00011986	89	153	14	WBGene00016511	51	91	10	WBGene00018806	56	80	16	WBGene00001502	81	212	22	WBGene00010001	64	119	14
WBGene00007043	89	153	14	WBGene00005110	48	86	9	WBGene00018804	56	80	16	WBGene00006066	60	106	21	WBGene00077786	42	62	29
WBGene00003397	89	153	14	WBGene00020589	60	68	13	WBGene00018752	68	158	15	WBGene00011446	60	106	21	WBGene00010003	72	128	13
WBGene00006379	101	184	36	WBGene00020592	60	68	13	WBGene00018751	68	158	15	WBGene00011443	71	126	16	WBGene00012850	72	128	13
WBGene00001941	101	184	36	WBGene00020588	60	68	13	WBGene00018750	68	158	15	WBGene00011441	60	103	11	WBGene00012319	86	83	8
WBGene00001942	101	184	36	WBGene00006241	89	153	42	WBGene00018749	68	158	15	WBGene00011442	66	120	11	WBGene00001043	78	103	11
WBGene00011945	101	184	36	WBGene00006523	89	153	42	WBGene00021192	64	83	12	WBGene00011440	73	141	12	WBGene00004013	54	112	16
WBGene00000476	80	133	8	WBGene00017845	89	153	42	WBGene00021191	64	83	12	WBGene00011444	94	179	13	WBGene00001248	70	132	10
WBGene00003803	73	146	13	WBGene00015370	93	208	11	WBGene00004751	81	149	24	WBGene00011447	88	162	12	WBGene00001851	74	79	13
WBGene00008665	62	128	11	WBGene00021613	48	87	12	WBGene00206374	113	166	11	WBGene00011445	79	156	14	WBGene00012852	50	88	13
WBGene00003564	73	146	13	WBGene00015075	84	149	9	WBGene00019641	113	166	11	WBGene00001981	70	150	15	WBGene00012853	50	88	13
WBGene00007054	82	145	14	WBGene00015074	84	149	9	WBGene00019640	83	163	12	WBGene00008088	61	124	17	WBGene00012854	50	88	13
WBGene00007158	108	165	16	WBGene00015682	71	152	14	WBGene00003017	60	157	13	WBGene00008090	52	97	19	WBGene00004748	54	76	10
WBGene00013698	56	124	11	WBGene00015681	71	152	14	WBGene00044381	67	154	14	WBGene00008086	52	97	19	WBGene00077681	58	88	16
WBGene00007706	68	123	13	WBGene00000455	71	152	14	WBGene00019487	87	181	15	WBGene00008085	52	97	19	WBGene00011394	58	88	16
WBGene00007707	68	123	13	WBGene00000454	67	130	15	WBGene00004135	59	99	12	WBGene00008369	41	93	13	WBGene00011393	58	88	16
WBGene00013709	74	118	14	WBGene00015684	67	130	15	WBGene00004467	59	99	12	WBGene00001790	41	93	13	WBGene00001547	58	88	16
WBGene00003000	81	141	10	WBGene00002215	58	105	15	WBGene00021055	60	98	14	WBGene00008367	41	93	13	WBGene00001723	73	117	10
WBGene00007047	74	127	13	WBGene00003927	58	105	15	WBGene00021053	60	95	11	WBGene00008045	47	146	30	WBGene00011392	73	117	10
WBGene00013895	72	116	13	WBGene00044542	58	105	15	WBGene00020007	70	137	18	WBGene00008047	46	121	18	WBGene00003830	71	106	11
WBGene00009743	68	107	14	WBGene00019756	42	87	12	WBGene00020368	88	171	14	WBGene00006654	45	108	13	WBGene00009293	76	142	14
WBGene00003847	55	92	10	WBGene00019755	42	87	12	WBGene00021822	64	129	13	WBGene00004682	76	105	12	WBGene00015430	68	78	16
WBGene00013716	79	138	31	WBGene00004104	48	99	12	WBGene00018969	102	184	13	WBGene00007937	71	119	10	WBGene00015429	49	117	28
WBGene00003902	79	138	31	WBGene00017768	48	99	12	WBGene00019855	102	184	13	WBGene00007935	61	149	11	WBGene00019862	71	139	20
WBGene00004444	79	138	31	WBGene00017766	76	91	9	WBGene00006495	60	100	13	WBGene00195215	44	102	38	WBGene00019863	62	79	16
WBGene00013717	79	138	31	WBGene00018426	57	104	12	WBGene00017949	60	100	13	WBGene00011614	61	98	14	WBGene00002060	62	79	16
WBGene00013718	79	138	31	WBGene00018427	57	104	12	WBGene00206414	60	100	13	WBGene00011615	61	98	14	WBGene00019864	62	79	16
WBGene00009118	77	138	17	WBGene00018428	57	104	12	WBGene00015818	74	99	14	WBGene00008209	75	147	14	WBGene00022861	66	141	16
WBGene00009119	77	138	17	WBGene00018429	57	104	12	WBGene00015817	74	99	14	WBGene00008210	51	115	17	WBGene00018682	78	100	8
WBGene00009120	77	138	17	WBGene00017834	64	159	13	WBGene00015816	74	99	14	WBGene00008211	27	83	19	WBGene00000484	63	115	15
WBGene00009121	78	137	21	WBGene00044544	58	123	13	WBGene00185089	74	99	14	WBGene00004859	52	113	11	WBGene00001185	35	74	40
WBGene00006720	72	115	18	WBGene00003954	55	79	9	WBGene00022743	56	94	13	WBGene00006646	57	105	13	WBGene00015138	63	96	16
WBGene00003926	66	92	14	WBGene00015678	55	79	9	WBGene00020461	80	128	12	WBGene00007116	73	140	12	WBGene00017898	56	83	11
WBGene00004408	66	92	14	WBGene00015677	67	99	12	WBGene00021058	67	73	9	WBGene00007594	99	200	13	WBGene00017899	56	83	11
WBGene00009122	66	92	14	WBGene00001345	51	124	11	WBGene00021057	57	85	10	WBGene00012226	100	231	21	WBGene00017423	70	155	19
WBGene00011906	95	138	12	WBGene00004502	100	164	15	WBGene00021056	57	85	10	WBGene00012225	62	113	24	WBGene00017424	64	136	15
WBGene00003083	75	102	28	WBGene00000159	100	164	15	WBGene00020251	63	105	12	WBGene00000754	68	147	36	WBGene00017422	58	116	10
WBGene00044070	55	66	44	WBGene00017931	100	164	15	WBGene00015135	71	143	11	WBGene00012224	68	147	36	WBGene00017426	58	116	10
WBGene00206474	55	66	44	WBGene00000980	68	113	12	WBGene00001948	97	185	14	WBGene00011354	68	147	36	WBGene00004011	57	99	13
WBGene00011908	68	104	12	WBGene00017933	68	113	12	WBGene00015136	97	185	14	WBGene00011361	47	89	12	WBGene00206478	57	99	13
WBGene00002248	68	104	12	WBGene00017930	84	141	12	WBGene00015134	97	185	14	WBGene00010926	47	89	12	WBGene00002056	38	83	12
WBGene00000912	80	157	16	WBGene00019804	58	96	14	WBGene00005059	79	94	10	WBGene00045481	47	89	12	WBGene00020569	80	124	13
WBGene00018850	67	80	11	WBGene00000534	58	96	14	WBGene00005062	79	94	10	WBGene00010924	54	93	13	WBGene00020575	80	124	13
WBGene00018847	45	45	23	WBGene00019805	58	96	14	WBGene00077490	118	218	14	WBGene00044144	60	97	13	WBGene00021185	80	124	13
WBGene00016461	45	45	23	WBGene00019806	58	96	14	WBGene00000928	118	218	14	WBGene00010925	60	97	13	WBGene00017184	82	203	16
WBGene00016460	45	45	23	WBGene00021392	82	129	37	WBGene00006868	118	218	14	WBGene00010221	71	152	19	WBGene00002150	82	203	16
WBGene00016462	67	78	12	WBGene00021391	82	129	37	WBGene00018047	68	85	12	WBGene00000277	77	223	12	WBGene00001127	55	109	18
WBGene00016459	67	78	12	WBGene00000802	82	129	37	WBGene00018048	68	85	12	WBGene00007692	71	80	10	WBGene00020216	55	109	18
WBGene00016458	64	86	19	WBGene00219449	82	129	37	WBGene00018049	68	85	12	WBGene00007693	69	94	11	WBGene00002071	55	109	18
WBGene00016457	65	110	21	WBGene00004373	58	102	10	WBGene00018050	70	108	12	WBGene00007694	66	108	12	WBGene00020218	55	109	18
WBGene00016456	63	103	13	WBGene00006239	77	205	18	WBGene00004122	72	131	12	WBGene00000461	60	117	18	WBGene00020215	54	110	16
WBGene00000780	50	85	22	WBGene00021068	77	205	18	WBGene00022283	44	124	13	WBGene00008904	60	117	18	WBGene00003534	53	111	14
WBGene00045433	50	85	22	WBGene00019522	60	145	16	WBGene00020223	58	196	23	WBGene00005118	60	117	18	WBGene00020217	54	90	13
WBGene00013129	70	91	15	WBGene00019521	89	122	14	WBGene00001976	58	196	23	WBGene00005126	30	35	36	WBGene00020214	55	69	12
WBGene00206497	75	151	18	WBGene00006437	79	108	10	WBGene00020220	58	196	23	WBGene00005122	30	35	36	WBGene00000899	68	97	9
WBGene00206530	75	151	18	WBGene00017966	79	108	10	WBGene00020221	58	196	23	WBGene00006979	30	35	36	WBGene00018213	59	93	11
WBGene00001980	79	165	17	WBGene00017965	79	108	10	WBGene00004461	67	76	18	WBGene00008961	45	116	40	WBGene00018212	50	89	13

WBGene00013130	61	129	13	WBGene00023432	70	116	11	WBGene00004737	67	76	18	WBGene00008960	45	116	40	WBGene00018215	68	118	18
WBGene00013131	74	145	11	WBGene00019670	70	116	11	WBGene00006817	67	76	18	WBGene00008959	45	116	40	WBGene00018985	83	182	11
WBGene00004706	60	112	18	WBGene00020893	48	99	14	WBGene00017372	67	76	18	WBGene00008958	45	116	40	WBGene00018987	72	175	13
WBGene00005517	62	106	18	WBGene00017430	52	135	10	WBGene00006497	53	83	12	WBGene00002991	49	129	13	WBGene00018984	72	175	13
WBGene00012317	101	179	17	WBGene00020273	63	121	13	WBGene00017373	53	83	12	WBGene00011824	44	116	12	WBGene00022502	64	91	13
WBGene00002119	77	115	16	WBGene00020274	63	121	13	WBGene00018274	53	83	12	WBGene00011823	65	147	16	WBGene00022503	64	91	13
WBGene00206528	77	115	16	WBGene00020275	63	121	13	WBGene00016354	68	126	13	WBGene00011826	65	147	16	WBGene00022504	64	91	13
WBGene00013177	77	115	16	WBGene00000110	63	121	13	WBGene00016355	59	105	12	WBGene00011820	60	124	25	WBGene00003104	56	96	10
WBGene00009318	48	105	45	WBGene00006815	93	187	15	WBGene00016356	59	105	12	WBGene00003854	45	79	35	WBGene00016643	46	75	9
WBGene00001131	73	134	11	WBGene00002273	92	189	15	WBGene00003435	59	105	12	WBGene00003514	58	124	16	WBGene00016644	46	75	9
WBGene00008856	113	158	39	WBGene00006721	58	106	18	WBGene00016359	59	105	12	WBGene00009725	52	105	14	WBGene00018861	53	108	15
WBGene00008857	113	158	39	WBGene00001073	58	106	18	WBGene00001027	44	71	9	WBGene00000222	46	85	12	WBGene00018854	58	121	15
WBGene00008858	113	158	39	WBGene00018491	58	106	18	WBGene00017385	44	71	9	WBGene00009728	113	181	32	WBGene00018855	69	140	7
WBGene00004963	113	158	39	WBGene00018490	58	106	18	WBGene00001754	51	97	9	WBGene00004739	113	181	32	WBGene00019364	74	144	12
WBGene00007639	113	158	39	WBGene00235332	44	63	32	WBGene00001755	51	97	9	WBGene00006493	56	133	15	WBGene00002988	49	107	12
WBGene00006807	73	130	25	WBGene00019376	44	63	32	WBGene00001756	51	97	9	WBGene00010423	81	140	12	WBGene00003991	58	103	10
WBGene00007640	72	81	19	WBGene00006665	44	63	32	WBGene00019895	72	102	9	WBGene00010424	52	149	17	WBGene00019365	55	106	17
WBGene00007637	72	81	19	WBGene00235317	44	63	32	WBGene00003429	72	102	9	WBGene00007259	50	104	30	WBGene00004377	52	120	12
WBGene00012267	73	125	12	WBGene00004897	49	90	10	WBGene00022766	59	105	33	WBGene00045386	50	82	36	WBGene00002062	52	120	12
WBGene00006876	96	238	16	WBGene00004062	49	90	10	WBGene00022760	59	105	33	WBGene00003616	61	86	28	WBGene00015473	54	99	12
WBGene00011384	108	261	15	WBGene00019653	96	202	16	WBGene00195246	59	105	33	WBGene00000082	84	174	18	WBGene00015472	72	121	14
WBGene00011385	66	123	18	WBGene00019652	96	202	16	WBGene00007012	59	105	33	WBGene00011564	102	204	21	WBGene00015474	89	143	15
WBGene00086562	60	132	15	WBGene00001210	96	202	16	WBGene00022765	59	105	33	WBGene00008260	60	110	34	WBGene00015476	89	143	15
WBGene00011390	60	132	15	WBGene00019655	96	202	16	WBGene00020867	114	233	22	WBGene00008261	60	110	34	WBGene00015471	42	109	11
WBGene00000415	94	195	18	WBGene00022603	64	131	13	WBGene00206517	114	233	22	WBGene00000482	81	182	27	WBGene00004927	42	109	11
WBGene00001045	94	195	18	WBGene00022601	64	131	13	WBGene00019084	70	93	11	WBGene00011770	66	115	16	WBGene00020490	51	97	11
WBGene00006958	68	48	18	WBGene00022606	64	131	13	WBGene00003822	51	76	48	WBGene00011771	50	100	13	WBGene00020489	70	132	10
WBGene00011059	68	88	15	WBGene00020586	59	135	16	WBGene00018014	51	76	48	WBGene00011772	50	100	13	WBGene00020491	74	125	10
WBGene00013135	67	124	28	WBGene00006803	59	135	16	WBGene00018015	51	76	48	WBGene00001149	71	153	16	WBGene00020488	69	123	11
WBGene00010245	86	137	13	WBGene00019643	55	114	18	WBGene00018016	51	76	48	WBGene00004108	37	78	12	WBGene00020492	69	123	11
WBGene00010244	86	137	13	WBGene00019642	67	139	27	WBGene00018017	102	152	17	WBGene00007934	57	118	12	WBGene00016725	82	126	11
WBGene00002240	66	101	41	WBGene00003844	67	139	27	WBGene00044666	102	152	17	WBGene00004089	67	99	12	WBGene00016726	82	126	11
WBGene00002000	66	101	41	WBGene00006801	67	139	27	WBGene00018018	78	111	28	WBGene00195214	67	99	12	WBGene00006635	69	136	12
WBGene00010242	66	101	41	WBGene00003849	61	107	7	WBGene00002068	53	70	38	WBGene00195213	67	99	12	WBGene00016109	69	136	12
WBGene00012958	69	114	10	WBGene00015744	44	90	12	WBGene00004434	53	70	38	WBGene00008693	67	99	12	WBGene00019272	55	135	11
WBGene00012959	69	114	10	WBGene00015745	44	90	12	WBGene00206373	53	70	38	WBGene00008692	50	92	10	WBGene00044558	24	53	27
WBGene00012960	69	114	10	WBGene00015742	46	93	13	WBGene00016152	53	70	38	WBGene00008691	61	97	11	WBGene00022730	50	88	10
WBGene00005529	71	97	11	WBGene00015746	46	93	13	WBGene00001102	91	121	22	WBGene00008690	61	97	11	WBGene00022729	50	88	10
WBGene00005528	71	97	11	WBGene00015741	48	96	14	WBGene00015454	91	121	22	WBGene00045495	61	97	11	WBGene00022728	50	88	10
WBGene00011029	48	73	12	WBGene00001428	48	96	14	WBGene00004040	91	121	22	WBGene00008694	88	159	15	WBGene00000025	50	88	10
WBGene00011030	48	73	12	WBGene00001563	48	96	14	WBGene00015458	61	64	49	WBGene00003623	104	215	17	WBGene00021044	81	161	13
WBGene00007600	56	98	25	WBGene00044551	110	210	19	WBGene00015459	61	64	49	WBGene00008278	79	133	12	WBGene00016997	81	161	13
WBGene00007601	62	111	17	WBGene00022410	110	210	19	WBGene00003402	61	64	49	WBGene00008279	31	48	23	WBGene00016995	66	120	12
WBGene00007602	62	111	17	WBGene00016901	72	139	15	WBGene00016162	118	213	11	WBGene00010999	49	112	13	WBGene00016998	66	120	12
WBGene00007603	63	121	16	WBGene00044342	110	210	19	WBGene00001101	76	111	13	WBGene00008925	49	112	13	WBGene00000988	66	120	12
WBGene00008782	63	121	16	WBGene00005661	102	192	16	WBGene00017148	99	140	14	WBGene00008927	52	103	51	WBGene00017295	76	145	13
WBGene00008783	52	102	20	WBGene00005660	102	192	16	WBGene00017147	99	140	14	WBGene00008599	55	124	12	WBGene00017296	86	170	13
WBGene00008784	71	156	26	WBGene00020245	102	192	16	WBGene00004020	65	102	23	WBGene00045245	68	137	16	WBGene00017297	86	170	13
WBGene00008787	71	156	26	WBGene00022812	49	140	12	WBGene00004023	31	64	32	WBGene00008600	58	125	13	WBGene00017298	64	140	14
WBGene00012103	92	153	18	WBGene00002078	51	115	15	WBGene00001806	48	85	54	WBGene00008601	74	138	14	WBGene00006955	53	94	11
WBGene00012216	54	123	16	WBGene00022813	53	90	18	WBGene00044667	48	85	54	WBGene00001668	40	77	10	WBGene00019188	74	160	15
WBGene00001008	77	186	14	WBGene00022814	53	90	18	WBGene00022782	48	85	54	WBGene00011255	96	131	15	WBGene00206378	67	85	10
WBGene00077769	77	186	14	WBGene00003242	74	138	18	WBGene00022780	48	85	54	WBGene00000217	88	166	15	WBGene00000444	60	94	34
WBGene00009362	81	138	18	NoWBGene_ID65	59	99	12	WBGene00006923	85	124	18	WBGene00004826	88	166	15	WBGene00194679	60	94	34
WBGene00009361	81	138	18	WBGene00016497	59	99	12	WBGene00017282	114	198	15	WBGene00004825	88	166	15	WBGene00000460	65	100	40
WBGene00011581	60	90	11	WBGene00002632	89	123	17	WBGene00006434	114	198	15	WBGene00004827	80	200	14	WBGene00044563	70	106	45
WBGene00010420	57	112	13	WBGene00017818	89	123	17	WBGene00004034	114	198	15	WBGene00010694	80	200	14	WBGene00021990	28	27	42
WBGene00003921	33	85	15	WBGene00022394	89	123	17	WBGene00017142	63	99	17	WBGene00010689	77	141	19	WBGene00022508	67	116	10
WBGene00003578	45	94	13	WBGene00022393	89	123	17	WBGene00017134	63	99	17	WBGene00010690	77	141	19	WBGene00004352	67	116	10
WBGene00012193	64	131	17	WBGene00018398	59	54	11	WBGene00017133	63	99	17	WBGene00010691	77	141	19	WBGene00022512	67	116	10
WBGene00012194	64	131	17	WBGene00001152	59	54	11	WBGene00017143	63	99	17	WBGene00010692	77	141	19	WBGene00021485	80	135	19

WBGene00006700	64	131	17	WBGene00018399	59	54	11	WBGene00017132	63	99	17	WBGene00001995	90	114	10	WBGene00021483	80	135	19
WBGene00012476	86	158	18	WBGene00022629	45	98	10	WBGene00017219	78	80	11	WBGene00010693	90	114	10	WBGene00022416	60	89	10
WBGene00012477	86	158	18	WBGene00022628	50	101	10	WBGene00017220	78	80	11	WBGene00003626	90	114	10	WBGene00022417	75	134	15
WBGene00001433	57	117	15	WBGene00019478	53	89	17	WBGene00017217	78	80	11	WBGene00164968	51	82	16	WBGene00022418	83	157	17
WBGene00001427	57	117	15	WBGene00019477	53	89	17	WBGene00000935	87	134	17	WBGene00010704	42	67	26	WBGene00022411	107	179	22
WBGene00003989	57	117	15	WBGene00019481	53	87	12	WBGene00000548	87	134	17	WBGene00010705	33	52	35	WBGene00044753	59	89	14
WBGene00012274	64	134	10	WBGene00000098	53	87	12	WBGene00006554	66	94	16	WBGene00010706	33	52	35	WBGene00018657	62	92	13
WBGene00003675	44	98	13	WBGene00003937	53	87	12	WBGene00022669	66	94	16	WBGene00010708	73	78	9	WBGene00018656	62	94	12
WBGene00009063	79	156	32	WBGene00019482	53	87	12	WBGene00002121	66	94	16	WBGene00011009	73	78	9	WBGene00018653	68	128	18
WBGene00009064	79	156	32	WBGene00003395	53	92	22	WBGene00002096	53	102	11	WBGene00005121	33	68	42	WBGene00003087	68	128	18
WBGene00009065	79	156	32	WBGene00018181	53	92	22	WBGene00015894	53	102	11	WBGene00011013	33	68	42	WBGene00000737	68	128	18
WBGene00009695	82	155	25	WBGene00018692	78	117	12	WBGene00020803	49	97	19	WBGene00004238	63	129	17	WBGene00018736	58	116	13
WBGene00009698	82	155	25	WBGene00018698	78	117	12	WBGene00020804	49	97	19	WBGene00003511	63	129	17	WBGene00018735	58	116	13
WBGene00009696	82	155	25	WBGene00004078	78	117	12	WBGene00015917	72	127	16	WBGene00008213	83	155	15	WBGene00018737	58	116	13
WBGene00006595	52	69	24	WBGene00018700	49	94	13	WBGene00003097	72	127	16	WBGene00007810	23	41	31	WBGene00020765	52	108	9
WBGene00010808	52	69	24	WBGene00004256	32	45	32	WBGene00000383	61	104	16	WBGene00007811	43	88	23	WBGene00020766	74	172	13
WBGene00011432	63	92	29	WBGene00022842	36	48	33	WBGene00015916	50	81	16	WBGene00007812	62	134	15	WBGene00003968	95	235	16
WBGene00011435	63	92	29	WBGene00018478	41	68	33	WBGene00006402	81	149	25	WBGene00001435	62	134	15	WBGene00020509	91	195	30
WBGene00011433	66	102	22	WBGene00001882	41	68	33	WBGene00016121	81	149	25	WBGene00007813	48	85	12	WBGene00003018	86	169	22
WBGene00001555	54	101	33	WBGene00001881	41	68	33	WBGene00016115	81	149	25	WBGene00010368	45	72	42	WBGene00020508	81	142	14
WBGene00011434	62	121	29	WBGene00001880	41	68	33	WBGene00044391	81	149	25	WBGene00000758	45	72	42	WBGene00020507	60	112	10
WBGene00012343	62	121	29	WBGene00001879	38	69	31	WBGene00016119	55	83	12	WBGene00008939	81	232	28	WBGene00004423	60	112	10
WBGene00012735	79	179	16	WBGene00001913	38	69	31	WBGene00016111	55	83	12	WBGene00003903	81	232	28	WBGene00014998	60	112	10
WBGene00007213	90	145	14	WBGene00007055	56	120	12	WBGene00015942	100	119	13	WBGene00008940	81	232	28	WBGene00000797	85	125	10
WBGene00012290	90	145	14	WBGene00018285	84	135	14	WBGene00015943	100	119	13	WBGene00010034	112	142	20	WBGene00014999	85	125	10
WBGene00219206	90	145	14	WBGene00018291	84	135	14	WBGene00015944	101	182	15	WBGene00010033	112	142	20	WBGene00044701	58	120	9
WBGene00003585	69	97	12	WBGene00017881	54	102	7	WBGene00044668	101	182	15	WBGene00006816	112	142	20	WBGene00020427	78	96	10
WBGene00012351	65	106	11	WBGene00022538	91	194	16	WBGene00001958	101	182	15	WBGene00010028	66	98	13	WBGene00020426	49	121	16
WBGene00006793	65	106	11	WBGene00022539	91	194	16	WBGene00044296	101	182	15	WBGene00000262	66	98	13	WBGene00002039	58	121	12
WBGene00194660	57	45	15	WBGene00015219	106	244	20	WBGene00002053	63	116	18	WBGene00010030	66	98	13	WBGene00020135	71	151	14
WBGene00012234	57	45	15	WBGene00015218	106	244	20	WBGene00017326	79	143	29	WBGene00006412	45	102	10	WBGene00020134	64	123	10
WBGene00012371	61	107	12	WBGene00015275	106	244	20	WBGene00017324	71	116	20	WBGene00008037	54	106	34	WBGene00020136	64	123	10
WBGene00012369	61	107	12	WBGene00006342	106	244	20	WBGene00019408	62	141	17	WBGene00007285	40	66	40	WBGene00020767	74	129	14
WBGene00012236	96	146	18	WBGene00006467	69	143	11	WBGene00018873	75	128	12	WBGene00007288	40	66	40	WBGene00020769	82	141	15
WBGene00012237	96	146	18	WBGene00015276	69	143	11	WBGene00018870	75	128	12	WBGene00007286	57	114	29	WBGene00018578	71	116	9
WBGene00012239	96	146	18	WBGene00001891	38	55	32	WBGene00018869	45	84	11	WBGene00007287	73	162	18	WBGene00001551	103	196	15
WBGene00012238	96	171	18	WBGene00001892	38	55	32	WBGene00001208	84	154	14	WBGene00000074	68	94	9	WBGene00020301	103	196	15
WBGene00012240	96	171	18	WBGene00019448	38	55	32	WBGene00000403	59	108	10	WBGene00010505	55	119	23	WBGene00001484	76	178	20
WBGene00195155	95	196	17	WBGene00020554	53	86	10	WBGene00044394	48	102	9	WBGene00010773	55	119	23	WBGene00019866	61	102	13
WBGene00012241	95	196	17	WBGene00001526	65	152	13	WBGene00015004	66	104	9	WBGene00010774	55	119	23	WBGene00019867	61	102	13
WBGene00013506	70	67	17	WBGene00020861	67	104	13	WBGene00015002	66	104	9	WBGene00010776	31	66	28	WBGene00019868	61	102	13
WBGene00004475	70	67	17	WBGene00017659	56	102	13	WBGene00044395	55	81	14	WBGene00003661	62	112	22	WBGene00019319	61	102	13
WBGene00045058	70	125	14	WBGene00017658	56	102	13	WBGene00020025	55	81	14	WBGene00011904	61	115	15	WBGene00019318	39	76	12
WBGene00013511	92	145	13	WBGene00044077	85	179	12	WBGene00020026	55	81	14	NoWBGene_ID59	90	188	15	WBGene00001844	59	133	12
WBGene00013509	65	112	15	WBGene00001695	85	179	12	WBGene00004306	55	81	14	WBGene00005063	90	188	15	WBGene00019317	78	189	12
WBGene00013865	45	109	8	WBGene00017195	61	103	11	WBGene00001402	73	93	15	WBGene00012513	87	148	11	WBGene00006541	65	115	15
WBGene00002111	45	109	8	WBGene00000003	64	106	11	WBGene00044287	73	93	15	WBGene00012512	87	148	11	WBGene00021397	56	102	13
WBGene00045396	72	76	13	WBGene00006152	64	106	11	WBGene00017686	73	93	15	WBGene00010493	61	119	13	WBGene00021396	69	125	13
WBGene00002107	72	76	13	WBGene00004211	64	106	11	WBGene00016236	77	163	13	WBGene00001251	77	163	19	WBGene00006561	80	147	16
WBGene00002113	72	76	13	WBGene00022789	63	125	14	WBGene00016237	64	131	11	WBGene00000105	92	198	23	WBGene00021395	92	134	18
WBGene00009825	63	161	14	WBGene00022790	63	125	14	WBGene00016235	50	99	9	WBGene00006372	60	142	10	WBGene00021394	82	62	11
WBGene00009824	58	119	21	WBGene00018406	58	105	13	WBGene00002030	52	89	8	WBGene00009849	91	204	19	WBGene00019300	64	94	10
WBGene00009823	69	136	19	WBGene00006499	58	105	13	WBGene00018251	52	89	8	WBGene00004126	91	204	19	WBGene00019299	64	94	10
WBGene00013408	80	153	17	WBGene00019465	58	105	13	WBGene00018250	52	89	8	WBGene00009850	67	107	15	WBGene00001099	64	94	10
WBGene00013409	80	153	17	WBGene00000766	44	93	24	WBGene00018252	73	137	11	WBGene00009851	67	107	15	WBGene00017574	41	123	12
WBGene00013404	80	153	17	NoWBGene_ID35	49	110	34	WBGene00001440	73	137	11	WBGene00009852	67	107	15	WBGene00017576	72	151	12
WBGene00013403	80	153	17	WBGene00019466	54	126	43	WBGene00020784	69	100	11	WBGene00009853	67	107	15	WBGene00022048	56	77	14
WBGene00002181	103	225	19	WBGene00019467	54	126	43	WBGene00020783	66	108	37	WBGene00007847	78	111	13	WBGene00004981	63	71	13
WBGene00014700	55	120	15	WBGene00017096	71	156	14	WBGene00020782	66	108	37	WBGene00007848	78	111	13	WBGene00019544	65	92	21
WBGene00014699	55	120	15	WBGene00017097	71	156	14	WBGene00020781	66	108	37	WBGene00007849	66	105	12	WBGene00017532	66	105	13
WBGene00007990	55	120	15	WBGene00002036	71	125	14	WBGene00016316	58	110	19	WBGene00007295	57	109	8	WBGene00000428	51	96	13

WBGene00004202	63	130	11	WBGene00018090	80	156	18	WBGene00016310	58	110	19	WBGene00001116	48	67	28	WBGene00003635	59	98	15
WBGene00014100	73	139	13	WBGene00018091	80	156	18	WBGene00002980	67	124	28	WBGene00007903	48	67	28	WBGene00206361	49	111	13
WBGene00014101	82	148	14	WBGene00019237	59	114	12	WBGene00016317	67	124	28	WBGene00008880	84	104	14	WBGene00019346	49	111	13
WBGene00001377	128	228	13	WBGene00003160	87	154	42	WBGene00019063	81	135	13	WBGene00008881	84	104	14	WBGene00002044	68	133	14
WBGene00008190	128	228	13	WBGene00001909	87	154	42	WBGene00020800	67	120	13	WBGene00008882	84	104	14	WBGene00000176	75	128	14
WBGene00008191	53	86	9	WBGene00001915	87	154	42	WBGene00020802	52	104	13	WBGene00008884	39	61	56	WBGene00019344	67	110	17
WBGene00008188	53	86	9	WBGene00001910	87	154	42	WBGene00004996	97	181	15	WBGene00009235	39	61	56	WBGene00001032	63	97	17
WBGene00008612	89	119	13	WBGene00001911	87	154	42	WBGene00020801	97	181	15	WBGene00009234	39	61	56	WBGene00018878	57	93	20
WBGene00009862	89	119	13	WBGene00008237	87	154	42	WBGene00019426	72	140	15	WBGene00009232	49	69	19	WBGene00004438	57	93	20
WBGene00009861	89	119	13	WBGene00009098	87	154	42	WBGene00019425	65	118	13	WBGene00009231	59	71	12	WBGene00018879	57	93	20
WBGene00086555	90	159	15	WBGene00004320	61	108	15	WBGene00003621	57	96	10	WBGene00010995	70	97	10	WBGene00018877	92	190	16
WBGene00009863	90	159	15	WBGene00013966	61	108	15	WBGene00019427	57	96	10	WBGene00010994	70	97	10	WBGene00003056	87	175	16
WBGene00005078	89	130	13	WBGene00013967	66	105	14	WBGene00020895	77	180	15	WBGene00006369	45	89	15	WBGene00016537	82	160	16
WBGene00013683	79	107	12	WBGene00001842	71	101	12	WBGene00004916	77	180	15	WBGene00007993	45	89	15	WBGene00003377	97	144	16
WBGene00002978	61	128	17	WBGene00009583	71	87	11	WBGene00004702	77	180	15	WBGene00007994	45	89	15	WBGene00003807	91	136	15
WBGene00013692	62	64	15	WBGene00009584	71	87	11	WBGene00020899	77	180	15	WBGene00007995	65	112	14	WBGene00018376	43	98	23
WBGene00013689	62	64	15	WBGene00009585	71	87	11	WBGene00020894	77	180	15	WBGene00000457	65	112	14	WBGene00018375	82	217	15
WBGene00013197	47	79	12	WBGene00006778	72	156	13	WBGene00019904	77	180	15	WBGene00000458	80	125	13	WBGene00003245	82	217	15
WBGene00013198	47	79	12	WBGene00045419	58	85	10	WBGene00016971	65	106	25	WBGene00010607	57	81	13	WBGene00019960	90	160	15
WBGene00010585	74	167	14	WBGene00006777	56	104	44	WBGene00016970	65	106	25	WBGene00010606	57	81	13	WBGene00019959	72	143	13
WBGene00010584	74	167	14	WBGene00011543	52	84	11	WBGene00016972	65	106	25	WBGene00005193	51	129	13	WBGene00000072	55	79	15
WBGene00010581	74	167	14	WBGene00011544	74	120	13	WBGene00016974	84	155	13	WBGene00005194	60	154	12	WBGene00006640	91	185	13
WBGene00001030	68	101	21	WBGene00010177	74	120	13	NoWBGene_ID64	84	155	13	WBGene00010552	66	126	12	WBGene00020323	93	183	12
WBGene00043308	68	101	21	WBGene00007534	64	105	30	WBGene00006944	88	127	51	WBGene00010553	61	83	11	WBGene00020321	48	121	14
WBGene00004495	68	101	21	WBGene00007537	64	105	30	WBGene00017563	88	127	51	WBGene00010554	59	93	9	WBGene00020324	48	121	14
WBGene00009558	88	150	16	WBGene00000102	52	102	9	WBGene00017559	88	127	51	WBGene00004191	54	115	14	WBGene00019403	51	113	11
WBGene00009557	108	199	10	WBGene00007103	46	80	9	WBGene00017560	88	127	51	WBGene00023500	46	89	15	WBGene00006475	81	209	27
WBGene00006349	86	164	13	WBGene00009059	65	68	9	WBGene00017562	88	127	51	WBGene00007531	61	141	13	WBGene00019758	81	209	27
WBGene00009554	86	164	13	WBGene00001178	55	76	9	WBGene00016964	54	126	13	WBGene00004764	59	131	14	WBGene00000066	88	177	23
WBGene00006730	86	164	13	WBGene00006667	60	168	11	WBGene00002045	54	126	13	WBGene00010570	56	120	14	WBGene00019759	82	180	20
WBGene00009553	86	164	13	WBGene00000445	60	168	11	WBGene00016961	54	126	13	WBGene00044136	52	122	20	WBGene00019760	83	165	17
WBGene00010767	114	210	15	WBGene00001747	70	163	10	WBGene00016965	54	126	13	WBGene00044147	99	141	19	WBGene00022501	69	153	16
WBGene00004889	114	210	15	WBGene00012117	110	274	21	WBGene00016966	54	126	13	WBGene00001583	98	179	36	WBGene00022500	64	145	18
WBGene00009304	100	177	15	WBGene00010012	75	154	12	WBGene00003480	43	80	12	WBGene00010940	97	217	52	WBGene00022499	73	129	15
WBGene00044245	100	177	15	WBGene00008922	78	102	18	WBGene00018840	43	80	12	WBGene00001898	97	217	52	WBGene00195189	39	83	17
WBGene00009305	94	150	19	NoWBGene_ID20	78	102	18	WBGene00020581	62	130	11	WBGene00010936	76	159	16	WBGene00022613	43	74	25
WBGene00009306	87	123	23	WBGene00077761	78	102	18	WBGene00020582	62	130	11	WBGene00010935	102	217	19	WBGene00022612	44	78	21
WBGene00000088	87	123	23	WBGene00008914	77	126	13	WBGene00001072	58	99	11	WBGene00008355	76	114	15	WBGene00022611	47	76	23
WBGene00008695	66	116	9	WBGene00000726	77	126	13	WBGene00001064	69	113	11	WBGene00004301	92	183	14	WBGene00022614	48	86	13
WBGene00001488	46	129	10	WBGene00008915	77	126	13	WBGene00020501	80	126	10	WBGene00003602	92	183	14	WBGene00022615	46	123	13
WBGene00002189	58	127	13	WBGene00008916	77	126	13	WBGene00006636	80	126	10	WBGene00008094	50	103	13	WBGene00022024	54	149	15
WBGene00014148	68	133	15	WBGene00008918	58	107	13	WBGene00020502	80	126	10	WBGene00008093	55	105	13	WBGene00016067	47	87	9
WBGene00014149	93	181	18	WBGene00008919	58	107	13	WBGene00018304	69	132	10	WBGene00002282	67	118	13	WBGene00006861	62	121	10
WBGene00000469	93	181	18	WBGene00008921	57	95	18	WBGene00020480	69	132	10	WBGene00006524	41	100	13	WBGene00016600	53	123	18
WBGene00013969	60	80	12	WBGene00008920	57	95	18	WBGene00020482	55	103	16	WBGene00001325	60	104	12	WBGene00006862	43	125	25
WBGene00009371	65	89	19	WBGene00219325	55	83	22	WBGene00020481	55	103	16	WBGene00004313	60	104	12	WBGene00000149	75	151	17
WBGene00009367	65	89	19	WBGene00009968	55	83	22	WBGene00020478	65	96	29	WBGene00010059	76	195	13	WBGene00016292	45	110	10
WBGene00009284	66	110	25	WBGene00000063	56	122	15	WBGene00017954	98	155	29	WBGene00010060	67	154	13	WBGene00020196	48	90	13
WBGene00000881	67	130	31	WBGene00000065	56	122	15	WBGene00006380	98	155	29	WBGene00007750	77	139	16	WBGene00020199	48	90	13
WBGene00009285	67	130	31	WBGene00000064	61	127	16	WBGene00017955	98	155	29	WBGene00007751	64	114	13	WBGene00005711	48	90	13
WBGene00015285	69	124	15	WBGene00011839	65	91	14	WBGene00017953	134	243	18	WBGene00004854	47	110	10	WBGene00004145	50	168	17
WBGene00005017	69	124	15	WBGene00001663	65	91	14	WBGene00001194	108	203	15	WBGene00000822	77	156	14	WBGene00019250	62	184	18
WBGene00015291	69	124	15	WBGene00010742	95	158	12	WBGene00015410	52	79	49	WBGene00004950	77	156	14	WBGene00019249	74	200	19
WBGene00017745	68	105	13	WBGene00010743	98	175	14	WBGene00206529	52	79	49	WBGene00001828	77	156	14	WBGene00003477	67	106	10
WBGene00017746	66	85	10	WBGene00010744	86	145	13	WBGene00001023	62	91	31	WBGene00009573	65	125	18	WBGene00021323	67	106	10
WBGene00016021	49	79	16	WBGene00011830	81	138	14	WBGene00016625	72	117	16	WBGene00009574	61	117	14	WBGene00021320	41	92	12
WBGene00016020	49	79	16	WBGene00004152	50	83	13	WBGene00016626	71	132	18	WBGene00006432	53	101	8	WBGene00021324	74	88	10
WBGene00006611	49	79	16	WBGene00007282	63	134	12	WBGene00015087	79	175	11	WBGene00050939	64	175	11	WBGene00002031	74	88	10
WBGene00016018	70	97	13	WBGene00001645	63	134	12	WBGene00017700	79	175	11	WBGene00007348	64	175	11	WBGene00000092	80	86	14
WBGene00001193	70	97	13	WBGene00011404	42	70	37	WBGene00017699	93	186	15	WBGene00007350	67	135	16	WBGene00017973	80	86	14
WBGene00016022	44	91	12	WBGene00009830	42	70	37	WBGene00017702	91	175	20	WBGene00007351	67	135	16	WBGene00006064	41	69	33

WBGene00016809	46	99	11	WBGene00044203	91	185	17	WBGene00000198	64	90	18	WBGene00012445	67	133	14	WBGene00016132	64	106	18
WBGene00016812	46	99	11	WBGene00011383	91	185	17	WBGene00004930	64	90	18	WBGene00006743	70	156	12	WBGene00016136	64	106	18
WBGene00020797	78	150	15	WBGene00001716	91	185	17	WBGene00015797	64	90	18	WBGene00009628	80	126	11	WBGene00016131	64	106	18
WBGene00020796	78	150	15	WBGene00011381	91	185	17	WBGene00006831	39	69	30	WBGene00009629	38	95	24	WBGene00006371	81	176	15
WBGene00001340	78	150	15	WBGene00010192	58	139	11	WBGene00016889	57	94	12	WBGene00011426	72	149	19	WBGene00003990	81	176	15
WBGene00018585	83	176	24	WBGene00003248	58	139	11	WBGene00016890	57	94	12	WBGene00001329	72	149	19	WBGene00018037	78	164	17
WBGene00018586	83	176	24	WBGene00011713	36	79	15	WBGene00016888	68	122	13	WBGene00003149	72	149	19	WBGene00015390	42	65	36
WBGene00021545	83	176	24	WBGene00008339	62	93	9	WBGene00022856	55	80	9	WBGene00001055	62	86	8	WBGene00016559	42	70	23
WBGene00019281	59	95	18	WBGene00008331	62	93	9	WBGene00022849	55	80	9	WBGene00007772	70	123	12	WBGene00016558	61	107	12
WBGene00019280	59	95	18	WBGene00009532	73	157	14	WBGene00206521	81	146	16	WBGene00007776	79	166	13	WBGene00016106	74	131	15
WBGene00000645	59	95	18	WBGene00004064	66	81	8	WBGene00020170	63	127	17	WBGene00007773	79	166	13	WBGene00016104	78	155	10
WBGene00019279	54	153	9	WBGene00003691	66	81	8	WBGene00020318	63	108	24	WBGene00044138	91	145	9	WBGene00016103	79	124	10
WBGene00019282	54	153	9	WBGene00003658	66	81	8	WBGene00016173	63	108	24	WBGene00019321	78	189	12	WBGene00001006	72	185	33
WBGene00019278	54	153	9	WBGene00000449	74	134	13	WBGene00016172	63	108	24	WBGene00006365	63	156	16	WBGene00016102	72	185	33
WBGene00019283	54	153	9	WBGene00009791	74	134	13	WBGene00003966	59	100	41	WBGene00044061	87	157	23	WBGene00020736	64	136	13
WBGene00086561	54	153	9	WBGene00009790	69	122	12	WBGene00016175	59	100	41	WBGene00018715	55	146	12	WBGene00020737	67	121	15
WBGene00001391	68	91	9	WBGene00000146	77	160	15	WBGene00003620	68	116	12	WBGene00018716	70	191	31	WBGene00020738	67	121	15
WBGene00019284	68	91	9	WBGene00000453	94	170	12	WBGene00002008	66	101	20	WBGene00000004	85	236	49	WBGene00016934	60	103	12
WBGene00019277	54	87	10	WBGene00006609	94	170	12	WBGene00001812	66	101	20	WBGene00019143	51	131	11	WBGene00002983	65	140	12
WBGene00019285	54	87	10	WBGene00010079	54	72	36	WBGene00018397	67	74	20	WBGene00019144	51	131	11	WBGene00016933	73	157	13
WBGene00015406	49	92	13	WBGene00010082	54	72	36	WBGene00018395	67	74	20	WBGene00003630	67	149	10	WBGene00016935	65	130	13
WBGene00206366	49	92	13	WBGene00010080	54	72	36	WBGene00018391	67	74	20	WBGene00020195	39	78	37	WBGene00016518	42	74	11
WBGene00235333	49	79	10	WBGene00011261	73	100	15	WBGene00018390	67	74	20	WBGene00004780	41	126	12	WBGene00003166	53	111	13
WBGene00044639	76	128	13	WBGene00001978	68	107	13	WBGene00044673	49	78	16	WBGene00020158	89	215	22	WBGene00006826	61	139	13
WBGene00016072	76	128	13	WBGene00005967	77	143	19	WBGene00015569	49	78	16	WBGene00020160	89	215	22	WBGene00017464	61	139	13
WBGene00021130	78	86	12	WBGene00010792	77	143	19	WBGene00015568	43	113	9	WBGene00006742	71	154	16	WBGene00020674	52	94	15
WBGene00021129	78	86	12	WBGene00004855	77	143	19	WBGene00015567	74	171	10	WBGene00018888	40	117	11	WBGene00001182	82	165	15
WBGene00185079	78	86	12	WBGene00011270	56	84	9	WBGene00017022	59	92	15	WBGene00006496	65	141	14	WBGene00020920	84	128	14
WBGene00021073	61	50	14	WBGene00003886	56	84	9	WBGene00017023	59	92	15	WBGene00015748	63	99	13	WBGene00020918	100	170	39
WBGene00021076	61	50	14	WBGene00010289	109	201	16	WBGene00017024	59	92	15	WBGene00015750	63	99	13	WBGene00020921	116	211	64
WBGene00005324	61	86	10	WBGene00010288	88	165	15	WBGene00017021	59	92	15	WBGene00022201	55	75	10	WBGene00000295	116	211	64
WBGene00005512	60	96	10	WBGene00010290	88	165	15	WBGene00005641	59	92	15	WBGene00002210	92	136	13	WBGene00004349	79	178	12
WBGene00020834	100	108	12	WBGene00000876	62	90	14	WBGene00022892	99	211	16	WBGene00018740	128	196	16	WBGene00016937	64	154	18
WBGene00020835	100	108	12	WBGene00008259	62	90	14	WBGene00022886	99	211	16	WBGene00018741	65	132	13	WBGene00016938	61	134	16
WBGene00020207	75	104	18	WBGene00001553	75	92	20	WBGene00018041	99	211	16	WBGene00018744	65	132	13	WBGene00006368	62	140	15
WBGene00020205	75	104	18	WBGene00010204	75	92	20	WBGene00018040	99	211	16	WBGene00018742	65	132	13	WBGene00004788	62	140	15
WBGene00020204	75	104	18	WBGene00010205	75	92	20	WBGene00006363	51	99	13	WBGene00018743	75	190	17	WBGene00018516	62	140	15
WBGene00020171	77	164	13	WBGene00004032	116	217	17	WBGene00019941	57	119	13	WBGene00015171	72	178	21	WBGene00018514	49	126	19
WBGene00021578	67	108	28	WBGene00002241	116	217	17	WBGene00019940	57	119	13	WBGene00044304	58	109	12	WBGene00018517	49	126	19
WBGene00021576	67	108	28	WBGene00008645	116	217	17	WBGene00019943	76	155	10	WBGene00015170	53	90	10	WBGene00017428	41	100	12
WBGene00000106	78	83	35	WBGene00000533	82	120	22	WBGene00043050	76	155	10	WBGene00003776	87	178	17	WBGene00001824	71	163	21
WBGene00019927	62	81	14	WBGene00004138	82	120	22	WBGene00000390	76	155	10	WBGene00044303	97	193	16	WBGene00017427	54	114	24
WBGene00019926	62	81	14	WBGene00011088	82	120	22	WBGene00019944	54	120	12	WBGene00022200	53	110	14	WBGene00021060	80	120	14
WBGene00019925	66	88	15	WBGene00011089	82	120	22	WBGene00020114	52	171	12	WBGene00022199	53	110	14	WBGene00004245	60	122	14
WBGene00019924	69	94	15	WBGene00003726	71	123	8	WBGene00017547	87	134	15	WBGene00044901	53	110	14	WBGene00021059	40	123	14
WBGene00019923	69	94	15	WBGene00007548	71	123	8	WBGene00017548	87	134	15	WBGene00003885	71	121	9	WBGene00001984	64	143	12
WBGene00045302	69	94	15	WBGene00007756	73	137	10	WBGene00017546	87	134	15	WBGene00019736	38	41	32	WBGene00006424	45	128	12
WBGene00019928	70	120	18	WBGene00001088	57	122	13	WBGene00003045	106	196	16	NoWBGene_ID40	38	41	32	WBGene00018641	47	133	9
WBGene00019922	70	120	18	WBGene00004384	57	122	13	WBGene00003044	125	257	17	WBGene00016344	69	148	10	WBGene00018640	44	121	14
WBGene00019929	68	99	16	WBGene00014098	79	143	12	WBGene00003012	125	257	17	WBGene00000451	87	193	13	WBGene00019935	82	126	17
WBGene00019930	66	77	14	WBGene00006874	73	132	14	WBGene00015063	34	50	30	WBGene00000452	87	193	13	WBGene00003749	65	98	7
WBGene00019921	66	77	14	WBGene00010096	58	90	11	WBGene00015059	34	50	30	WBGene00006670	67	93	11	WBGene00194906	79	131	13
WBGene00019920	86	97	13	WBGene00010097	58	90	11	WBGene00015064	34	50	30	WBGene00018702	64	126	14	WBGene00013145	79	131	13
WBGene00019919	105	116	12	WBGene00005241	67	108	15	WBGene00015065	34	50	30	WBGene00018701	64	126	14	WBGene00014262	58	92	52
WBGene00019917	59	88	18	WBGene00001493	59	100	35	WBGene00001615	81	134	17	WBGene00006948	64	126	14	WBGene00011678	58	92	52
WBGene00016303	59	88	18	WBGene00006668	25	52	33	WBGene00015514	81	134	17	WBGene00018703	75	160	16	WBGene00013147	56	91	11
WBGene00016302	75	144	17	WBGene00005018	56	96	11	WBGene00000516	109	204	32	WBGene00018704	75	160	16	WBGene00014158	56	91	11
WBGene00016309	80	159	19	WBGene00009094	56	96	11	WBGene00000517	109	204	32	WBGene00019611	75	160	16	WBGene00014160	56	91	11
WBGene00235351	80	159	19	WBGene00001179	78	143	13	WBGene00011458	109	204	32	WBGene00019612	75	160	16	WBGene00014161	58	103	15
WBGene00016306	80	159	19	WBGene00009201	74	132	11	WBGene00002216	50	110	13	WBGene00001685	85	176	20	WBGene00014159	58	103	15
WBGene00016300	80	159	19	WBGene00000228	70	121	8	WBGene00000046	53	92	13	WBGene00001684	85	176	20	WBGene00014163	58	103	15

WBGene00016308	50	99	10	WBGene00012242	71	85	13	WBGene00011634	53	92	13	WBGene00003124	85	176	20	WBGene00007464	71	117	30
WBGene00016298	50	99	10	WBGene00002133	71	85	13	WBGene00007014	53	92	13	WBGene00004951	77	154	23	WBGene00007463	71	117	30
WBGene00044419	58	94	12	WBGene00009721	46	84	16	WBGene00011635	53	92	13	WBGene00019609	56	97	14	WBGene00086566	71	117	30
WBGene00016297	65	88	13	WBGene00009722	46	101	11	WBGene00011641	72	115	13	WBGene00001400	59	133	11	WBGene00001207	105	181	14
WBGene00016296	65	88	13	WBGene00007587	42	58	26	WBGene00011637	72	115	13	WBGene00017890	65	121	13	WBGene00011272	105	181	14
WBGene00005479	65	88	13	WBGene00007586	42	58	26	WBGene00002994	72	115	13	WBGene00017891	51	124	10	WBGene00011273	105	181	14
WBGene00016295	58	86	14	WBGene00007588	42	58	26	WBGene00006913	74	103	17	WBGene00017892	63	114	13	WBGene00007670	78	122	38
WBGene00018456	58	86	14	WBGene00010174	74	101	9	WBGene00011351	74	103	17	WBGene00004124	62	118	11	WBGene00000995	78	122	38
WBGene00019702	72	116	18	WBGene00001670	74	101	9	WBGene00011350	71	102	15	WBGene00006535	71	133	17	WBGene00004017	88	152	17
WBGene00019703	72	116	18	WBGene00189948	89	211	15	WBGene00004208	50	116	15	WBGene00002255	79	147	22	WBGene00009192	88	152	17
WBGene00019705	72	116	18	WBGene00001671	89	211	15	WBGene00008436	78	93	18	WBGene00002253	79	147	22	WBGene00009193	88	152	17
WBGene00006195	80	121	15	WBGene00003011	89	211	15	WBGene00006996	78	93	18	WBGene00002254	79	147	22	WBGene00003939	88	152	17
WBGene00019704	87	126	11	WBGene00013902	53	89	36	WBGene00001835	78	93	18	WBGene00006308	68	100	11	WBGene00044028	76	152	14
WBGene00004076	61	97	12	WBGene00013907	53	89	36	WBGene00007433	59	158	16	WBGene00019553	68	100	11	WBGene00000914	69	135	13
WBGene00018734	54	87	13	WBGene00013897	76	141	10	WBGene00003813	65	121	16	WBGene00019552	68	100	11	WBGene00001686	66	109	14
WBGene00018572	100	279	19	WBGene00013898	76	141	10	WBGene00004723	70	83	15	WBGene00019554	49	88	12	WBGene00009364	70	101	16
WBGene00000112	62	81	11	WBGene00013899	75	150	9	WBGene00007434	70	83	15	WBGene00019550	49	88	12	WBGene00009365	71	98	14
WBGene00018974	73	118	17	WBGene00013900	74	158	8	WBGene00007436	70	83	15	WBGene00019549	75	133	17	WBGene00005079	71	94	11
WBGene00006924	84	155	23	WBGene00011283	67	130	14	WBGene00000151	65	118	23	WBGene00019548	75	133	17	WBGene00005080	39	71	14
WBGene00019209	77	109	12	WBGene00011284	67	130	14	WBGene00011508	65	118	23	WBGene00043980	100	202	16	WBGene00000389	39	71	14
WBGene00019207	77	109	12	WBGene00011285	74	154	13	WBGene00011509	65	118	23	WBGene00017381	90	182	15	WBGene00011041	39	71	14
WBGene00022558	72	115	18	WBGene00011286	74	154	13	WBGene00006734	63	62	25	WBGene00017383	90	182	15	WBGene00011039	64	115	12
WBGene00022559	72	115	18	WBGene00003738	80	177	12	WBGene00011510	63	62	25	WBGene00017380	62	119	17	WBGene00011040	64	115	12
WBGene00022560	72	115	18	WBGene00001388	46	99	9	WBGene00011511	68	89	20	WBGene00022826	47	87	23	WBGene00011331	67	131	14
WBGene00022557	72	115	18	WBGene00008848	45	91	19	WBGene00010501	76	124	28	WBGene00022827	47	87	23	WBGene00004334	87	163	17
WBGene00022561	72	115	18	WBGene00008850	83	147	16	WBGene00010503	76	124	28	WBGene00022767	56	87	31	WBGene00007417	67	91	13
WBGene00022555	72	115	18	WBGene00001475	83	147	16	WBGene00003089	64	111	12	WBGene00000524	56	87	31	WBGene00011661	52	96	15
WBGene00022562	72	115	18	WBGene00007907	61	108	10	WBGene00005150	67	137	14	WBGene00022769	54	84	14	WBGene00011662	56	95	13
WBGene00022563	52	100	13	WBGene00003143	55	73	9	WBGene00044049	56	104	23	WBGene00006865	72	142	33	NoWBGene_ID50	68	134	15
WBGene00022564	52	100	13	WBGene00007150	49	108	12	WBGene00008050	44	71	32	WBGene00000503	72	142	33	WBGene00010318	66	127	14
WBGene00022554	52	100	13	WBGene00001137	90	151	13	WBGene00008054	44	71	32	WBGene00006929	70	137	22	WBGene00010319	63	120	13
WBGene00022553	52	100	13	WBGene00219208	90	151	13	WBGene00008051	44	71	32	WBGene00006810	59	110	12	WBGene00004185	116	309	44
WBGene00019034	78	85	18	WBGene00007154	92	202	16	WBGene00002147	104	254	18	WBGene00000990	59	110	12	WBGene00011304	116	309	44
WBGene00019039	78	85	18	NoWBGene_ID33	92	202	16	WBGene00006832	104	254	18	WBGene00195081	50	91	13	WBGene00007352	86	204	36
WBGene00019040	78	85	18	WBGene00011647	87	176	15	WBGene00006739	104	254	18	WBGene00004729	99	205	21	WBGene00007356	55	98	27
WBGene00019041	78	85	18	WBGene00009337	52	95	11	WBGene00008052	104	254	18	WBGene00006863	62	130	12	WBGene00044235	55	98	27
WBGene00019042	78	85	18	WBGene00235322	44	82	9	WBGene00010913	64	99	26	WBGene00004350	74	145	15	WBGene00007562	91	147	14
WBGene00019043	78	85	18	WBGene00007747	68	108	12	WBGene00002066	73	121	23	WBGene00006928	65	147	15	WBGene00007563	91	147	14
WBGene00019044	78	85	18	WBGene00008221	61	93	10	WBGene00000894	82	143	19	WBGene00020844	47	128	12	WBGene00010893	91	147	14
WBGene00018443	61	72	19	WBGene00008222	61	93	10	WBGene00004304	61	102	39	WBGene00015954	48	87	10	WBGene00010897	81	118	18
WBGene00018438	61	72	19	WBGene00006072	61	93	10	WBGene00007744	61	102	39	WBGene00015955	48	87	10	WBGene00010896	81	118	18
WBGene00018444	61	72	19	WBGene00010868	60	140	11	WBGene00001840	61	102	39	WBGene00015956	48	87	10	WBGene00004704	81	118	18
WBGene00018445	69	96	20	WBGene00044200	74	153	15	WBGene00007745	61	102	39	WBGene00004727	47	79	10	WBGene00008433	81	118	18
WBGene00018437	69	96	20	WBGene00010425	72	146	17	WBGene00001159	70	119	12	WBGene00020011	47	87	10	WBGene00206538	55	92	10
WBGene00018436	69	96	20	WBGene00010279	69	138	19	WBGene00006719	93	201	17	WBGene00044725	47	95	9	WBGene00007490	55	92	10
WBGene00018435	69	96	20	WBGene00011326	75	118	10	WBGene00005039	93	201	17	WBGene00020010	47	95	9	WBGene00003404	44	83	14
WBGene00018105	67	120	18	WBGene00011328	75	118	10	WBGene00009899	93	201	17	WBGene00006431	61	94	10	WBGene00002297	65	132	25
WBGene00206519	67	120	18	WBGene00011327	75	118	10	WBGene00008799	93	201	17	WBGene00006643	61	94	10	WBGene00000411	65	132	25
WBGene00018106	68	119	16	WBGene00009973	77	142	16	WBGene00009042	43	104	11	WBGene00015357	89	130	20	WBGene00011072	65	132	25
WBGene00018107	68	119	16	WBGene00009974	77	142	16	WBGene00009043	43	104	11	WBGene00015358	65	118	30	WBGene00011067	65	132	25
WBGene00018109	71	128	18	WBGene00009975	98	177	17	WBGene00009044	43	104	11	WBGene00006454	70	157	14	WBGene00011069	44	99	10
WBGene00018108	74	133	18	WBGene00009977	72	95	11	WBGene00010878	50	77	11	WBGene00006408	70	157	14	WBGene00015755	76	137	15
WBGene00018104	76	120	17	WBGene00010088	66	88	15	WBGene00010879	50	77	11	WBGene00001434	86	177	14	WBGene00015752	76	146	18
WBGene00018103	76	120	17	WBGene00004767	66	88	15	WBGene00001523	50	77	11	WBGene00018532	75	171	12	WBGene00017045	59	57	15
WBGene00018102	73	92	12	WBGene00010089	66	88	15	WBGene00011755	60	139	13	WBGene00018026	75	171	12	WBGene00086546	59	57	15
WBGene00015609	73	131	26	WBGene00010259	60	129	14	WBGene00011759	76	100	13	WBGene00018027	81	165	11	WBGene00016803	59	57	15
WBGene00044417	73	131	26	WBGene00010260	62	115	29	WBGene00011760	76	100	13	WBGene00001335	38	99	9	WBGene00006818	87	143	10
WBGene00015613	73	131	26	WBGene00000097	62	115	29	WBGene00012175	76	100	13	WBGene00018025	38	99	9	WBGene00206533	87	143	10
WBGene00015610	73	131	26	WBGene00003916	59	119	15	WBGene00004155	44	68	32	WBGene00018024	70	180	16	WBGene00016239	87	143	10
WBGene00015607	73	131	26	WBGene00007085	62	125	16	WBGene00012177	44	68	32	WBGene00001441	54	156	14	WBGene00016238	50	92	11
WBGene00020362	58	107	13	WBGene00010510	60	95	15	WBGene00012178	44	68	32	WBGene00019359	54	156	14	WBGene00004342	50	92	11

WBGene00020363	58	107	13	WBGene00013024	67	88	16	WBGene00010045	64	91	15	WBGene00000441	34	94	10	WBGene00015350	50	92	11
WBGene00020361	68	116	12	WBGene00013025	67	88	16	WBGene00009202	64	91	15	WBGene00002987	65	145	12	WBGene00015352	75	144	13
WBGene00017207	62	76	11	WBGene00013026	67	88	16	WBGene00011924	57	92	15	WBGene00018569	56	133	11	WBGene00003952	75	144	13
WBGene00219315	62	76	11	WBGene00006775	80	125	12	WBGene00011925	57	92	15	WBGene00018570	53	133	12	WBGene00015347	75	144	13
WBGene00004149	62	106	15	WBGene00003922	96	198	14	WBGene00011926	57	92	15	WBGene00018571	58	132	10	WBGene00015346	75	144	13
WBGene00020537	62	106	15	WBGene00007616	96	198	14	WBGene00011927	57	92	15	WBGene00006321	53	166	14	WBGene00017322	67	128	8
WBGene00020533	62	106	15	WBGene00007617	96	198	14	WBGene00006875	43	104	9	WBGene00020670	61	131	30	WBGene00003243	77	143	12
WBGene00020073	64	82	11	WBGene00009079	96	198	14	WBGene00008432	47	77	15	WBGene00020667	61	131	30	WBGene00017358	75	158	15
WBGene00016548	67	122	13	WBGene00001170	96	198	14	WBGene00004259	49	67	24	WBGene00003007	47	113	14	WBGene00022579	89	63	13
WBGene00016553	67	122	13	WBGene00009081	96	198	14	WBGene00008427	40	59	26	WBGene00015822	75	150	29	WBGene00022581	89	63	13
WBGene00016547	67	122	13	WBGene00235335	120	262	18	WBGene00008431	40	59	26	WBGene00015823	102	187	44	WBGene00044801	89	63	13
WBGene00016546	67	122	13	WBGene00010976	120	262	18	WBGene00007917	59	107	8	WBGene00015824	102	187	44	WBGene00044802	89	63	13
WBGene00016549	42	95	11	WBGene00077577	120	262	18	WBGene00007918	59	107	8	WBGene00019828	66	151	13	WBGene00006840	80	132	15
WBGene00016545	42	95	11	WBGene00010979	120	262	18	WBGene00000432	59	107	8	WBGene00019830	66	151	13	WBGene00019881	80	132	15
WBGene00016544	56	122	8	WBGene00004337	52	96	10	WBGene00010681	127	199	16	WBGene00019827	66	151	13	WBGene00007008	80	132	15
WBGene00016342	56	95	13	WBGene00004060	52	96	10	WBGene00000220	100	157	13	WBGene00019826	43	99	13	WBGene00019882	76	111	12
WBGene00016334	56	95	13	WBGene00008143	71	74	39	WBGene00010683	100	157	13	WBGene00044021	43	99	13	WBGene00019878	76	111	12
WBGene00021985	56	95	13	WBGene00000915	71	74	39	WBGene00001505	72	114	10	WBGene00017308	73	153	13	WBGene00019877	76	111	12
WBGene00019593	48	88	10	WBGene00044180	71	74	39	WBGene00000240	72	137	13	WBGene00017309	73	153	13	WBGene00019883	76	111	12
WBGene00235164	48	88	10	WBGene00008144	77	86	30	WBGene00010682	72	137	13	WBGene00022745	68	155	14	WBGene00022697	93	150	11
WBGene00019590	48	88	10	WBGene00006836	83	98	21	WBGene00002295	72	137	13	WBGene00022746	68	155	14	WBGene00022704	93	150	11
WBGene00006882	70	151	15	WBGene00008145	83	98	21	WBGene00004790	74	162	26	WBGene00006410	78	171	16	WBGene00023405	76	121	14
WBGene00004129	70	151	15	WBGene00006795	58	101	13	WBGene00008563	74	162	26	WBGene00003412	62	96	14	WBGene00000414	53	88	14
WBGene00005559	86	122	16	WBGene00013048	58	101	13	WBGene00008557	74	162	26	WBGene00006921	77	122	20	WBGene00022862	41	76	17
WBGene00001546	86	122	16	WBGene00013049	58	101	13	WBGene00008559	59	104	11	WBGene00017628	77	122	20	WBGene00004460	59	96	12
WBGene00017712	68	112	16	WBGene00008183	86	184	14	WBGene00008560	59	104	11	WBGene00001994	92	213	24	WBGene00016249	59	96	12
WBGene00018021	68	112	16	WBGene00012293	88	189	20	WBGene00011580	115	251	22	WBGene00020922	92	213	24	WBGene00018369	55	77	11
WBGene00018022	68	112	16	WBGene00004336	75	151	16	WBGene00002251	115	251	22	WBGene00005716	56	128	20	WBGene00001451	60	125	9
WBGene00020231	41	108	13	WBGene00013883	54	86	24	WBGene00000378	62	115	12	WBGene00006393	56	128	20	WBGene00003411	45	97	8
WBGene00044367	41	108	13	WBGene00013886	35	44	26	WBGene00011883	62	115	12	WBGene00005717	56	128	20	WBGene00003909	71	170	14
WBGene00017912	66	84	12	WBGene00050943	35	44	26	WBGene00011884	62	115	12	WBGene00016867	97	178	16	WBGene00009720	103	229	17
WBGene00017911	66	84	12	WBGene00013887	35	44	26	WBGene00011885	62	115	12	WBGene00016866	97	178	16	WBGene00004353	103	229	17
WBGene00017249	66	84	12	WBGene00044272	35	44	26	WBGene00009717	67	127	12	WBGene00003179	97	178	16	WBGene00004354	103	229	17
WBGene00017250	60	79	15	WBGene00010379	35	44	26	WBGene00009504	70	153	18	WBGene00000510	70	121	12	WBGene00008973	53	146	18
WBGene00017251	53	73	17	WBGene00013889	35	44	26	WBGene00011980	67	105	16	WBGene00003907	70	121	12	WBGene00008974	62	133	23
WBGene00017252	68	96	17	WBGene00004308	57	152	9	WBGene00011976	67	105	16	WBGene00016868	70	121	12	WBGene00008975	71	119	27
WBGene00017253	68	96	17	WBGene00007719	57	152	9	WBGene00004446	67	105	16	WBGene00004106	62	130	13	NoWBGene_ID67	71	119	27
WBGene00017254	68	96	17	WBGene00007718	57	152	9	WBGene00011977	112	206	25	WBGene00017472	58	121	12	WBGene00008978	52	110	11
WBGene00019691	68	93	9	WBGene00007720	64	144	12	WBGene00011978	86	155	19	WBGene00017471	58	121	12	WBGene00008606	74	116	12
WBGene00003678	94	126	19	WBGene00001021	70	135	14	WBGene00011979	106	179	19	WBGene00017474	55	83	12	WBGene00008605	74	116	12
WBGene00019513	80	141	17	WBGene00006808	70	135	14	WBGene00001950	106	179	19	WBGene00219368	62	95	11	WBGene00007526	67	170	14
WBGene00019512	80	141	17	WBGene00005278	28	33	27	WBGene00007421	106	179	19	WBGene00017475	62	95	11	WBGene00011679	60	124	28
WBGene00019511	69	131	24	WBGene00006110	28	33	27	WBGene00012002	62	95	9	WBGene00020120	62	95	11	WBGene00000618	60	124	28
WBGene00016576	69	131	24	WBGene00013568	61	50	12	WBGene00012005	61	96	10	WBGene00219369	69	106	9	WBGene00011680	60	124	28
WBGene00016575	69	131	24	WBGene00000883	61	50	12	WBGene00007633	55	93	9	WBGene00020121	69	106	9	WBGene00011681	89	139	13
WBGene00016574	69	131	24	WBGene00013569	55	67	19	WBGene00006367	50	106	13	WBGene00003084	52	113	12	WBGene00011683	89	139	13
WBGene00016573	69	131	24	WBGene00000879	55	67	19	WBGene00006659	60	102	11	WBGene00017476	48	63	42	WBGene00010356	47	104	13
WBGene00044370	69	131	24	WBGene00013573	55	67	19	WBGene00002299	64	103	11	WBGene00017794	48	63	42	WBGene00009552	49	93	20
WBGene00016578	69	131	24	WBGene00004037	49	83	25	WBGene00000170	90	207	27	WBGene00023460	53	142	16	WBGene00009789	60	149	9
WBGene00005543	110	240	16	WBGene00045402	49	83	25	WBGene00007224	90	207	27	WBGene00000959	57	126	14	WBGene00002203	95	240	16
WBGene00015200	110	240	16	WBGene00011948	47	97	40	WBGene00007225	76	144	18	WBGene00004356	65	158	21	WBGene00004777	51	84	38
WBGene00002997	92	174	18	WBGene00004153	47	97	40	WBGene00007226	76	144	18	WBGene00005008	80	187	29	WBGene00003681	68	154	14
WBGene00021293	74	107	19	WBGene00005428	81	113	14	WBGene00007227	61	80	8	WBGene00015561	95	215	36	WBGene00012441	68	154	14
WBGene00021294	74	107	19	WBGene00005429	81	113	14	WBGene00006510	54	104	14	WBGene00003963	95	215	36	WBGene00012442	51	76	12
WBGene00195073	80	157	17	WBGene00007372	81	113	14	WBGene00007229	73	139	26	WBGene00003628	81	161	10	WBGene00012443	47	83	11
WBGene00017181	80	157	17	WBGene00008997	35	91	17	WBGene00000289	73	132	17	WBGene00015560	103	248	14	WBGene00012444	87	198	18
WBGene00017182	80	157	17	WBGene00008993	35	91	17	WBGene00008403	70	130	12	WBGene00206364	103	248	14	WBGene00007877	59	125	13
WBGene00005575	64	103	13	WBGene00008995	76	147	51	WBGene00008402	68	114	12	WBGene00001821	103	248	14	WBGene00007878	57	132	13
WBGene00044375	64	103	13	WBGene00000057	76	147	51	WBGene00004286	66	98	11	WBGene00000133	62	155	12	WBGene00006462	57	132	13
WBGene00018201	76	167	13	WBGene00009978	55	88	13	WBGene00006520	66	98	11	WBGene00015494	62	155	12	WBGene00009560	91	179	9
WBGene00018198	69	157	10	WBGene00006122	35	59	45	WBGene00001134	66	98	11	WBGene00020496	61	99	18	WBGene00004123	91	179	9

WBGene00021729	46	89	11	WBGene00006121	35	59	45	WBGene00006433	97	178	10	WBGene00004148	82	146	21	WBGene00017900	42	104	9
WBGene00021730	46	89	11	WBGene00003692	35	59	45	WBGene00009627	97	178	10	WBGene00016706	41	87	12	WBGene00017923	61	113	13
WBGene00021727	46	89	11	WBGene00003674	35	59	45	WBGene00003196	97	178	10	WBGene00016705	55	112	13	WBGene00004205	67	113	19
WBGene00021726	68	93	14	WBGene00011688	60	79	13	WBGene00011849	90	125	12	WBGene00016704	69	136	13	WBGene00000685	67	113	19
WBGene00021725	68	93	14	WBGene00011689	60	79	13	WBGene00001368	72	119	11	WBGene00044567	80	113	12	WBGene00017924	67	113	19
WBGene00017925	67	113	19	WBGene00017920	65	121	13	WBGene00017919	63	129	7	WBGene00044482	63	115	10	WBGene00019543	65	92	21
WBGene00013677	65	92	21																

Supplementary Table 4. ChIP-seq raw data on average peak value for H3K4me2

Average peak value for H3K4me2 in wild type, *wdr-5(ok1417)* and *rbbp-5(tm3463).* Details on peak position is not shown

Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5
WBGene00022277	75	38	6	WBGene00219239	75	66	20	WBGene00002202	129	71	11	WBGene00004822	126	58	14	WBGene00004997	79	55	7
WBGene00022276	117	28	12	WBGene00019412	67	50	13	WBGene00185075	132	119	18	WBGene00006251	126	58	14	WBGene00002260	79	55	7
WBGene00022278	110	26	9	WBGene00019420	67	50	13	WBGene00007271	132	119	18	WBGene00017052	150	246	13	WBGene00011932	79	55	7
WBGene00022279	82	52	6	WBGene00019421	67	50	13	WBGene00007269	135	167	24	WBGene00001241	150	246	13	WBGene00007360	72	91	7
WBGene00022275	98	69	9	WBGene00022556	127	118	37	WBGene00004392	135	167	24	WBGene00015531	60	127	9	WBGene00007364	72	91	7
WBGene00044345	121	39	9	WBGene00194714	127	118	37	WBGene00007273	135	167	24	WBGene00015530	60	127	9	WBGene00007363	72	91	7
WBGene00021677	121	39	9	WBGene00022558	127	118	37	WBGene00007270	135	167	24	WBGene00001713	109	42	12	WBGene00007365	72	91	7
WBGene00000812	117	151	8	WBGene00022559	127	118	37	WBGene00007631	69	29	10	WBGene00004477	109	42	12	WBGene00011192	107	60	8
WBGene00021676	82	34	6	WBGene00022560	127	118	37	WBGene00007630	69	29	10	WBGene00018349	76	79	11	NoWBGene_ID32	107	60	8
WBGene00189949	82	34	6	WBGene00022557	127	118	37	WBGene00006448	69	29	10	WBGene00018350	43	115	9	WBGene00011194	107	60	8
WBGene00021681	123	56	11	WBGene00022561	127	118	37	WBGene00007627	96	34	10	WBGene00020444	133	171	6	WBGene00011195	107	60	8
WBGene00004274	164	77	16	WBGene00022555	127	118	37	WBGene00007626	96	34	10	WBGene00020447	106	163	7	WBGene00010259	59	121	11
WBGene00004418	164	77	16	WBGene00022562	127	118	37	WBGene00007625	96	34	10	WBGene00016739	78	155	8	WBGene00010260	151	98	49
WBGene00018774	164	77	16	WBGene00022563	149	147	8	WBGene00007624	96	34	10	WBGene00001187	43	85	8	WBGene00000097	151	98	49
WBGene00018773	164	77	16	WBGene00022564	149	147	8	WBGene00003073	68	29	6	WBGene00015217	71	143	7	WBGene00001311	151	98	49
WBGene00000622	164	77	16	WBGene00022554	149	147	8	WBGene00011278	82	48	6	WBGene00017416	71	143	7	WBGene00011625	88	23	5
WBGene00004962	137	196	9	WBGene00022553	149	147	8	WBGene00206525	82	48	6	WBGene00018902	91	49	13	WBGene00010249	88	23	5
WBGene00003229	137	196	9	WBGene00005844	149	147	8	WBGene00001034	129	93	18	WBGene00018901	91	49	13	WBGene00045405	55	43	27
WBGene00018772	137	196	9	WBGene00003734	48	58	25	WBGene00006959	129	93	18	WBGene00018904	91	49	13	WBGene00045406	55	43	27
WBGene00018958	101	95	8	WBGene00019037	48	58	25	WBGene00011279	117	75	19	WBGene00018900	103	135	78	WBGene00008392	55	43	27
WBGene00018957	109	68	8	WBGene00019038	48	58	25	WBGene00011280	71	31	8	WBGene00001935	114	221	143	WBGene00001864	55	43	27
WBGene00018955	109	68	8	WBGene00019036	59	56	17	WBGene00011281	71	31	8	WBGene00001936	114	221	143	WBGene00003916	69	132	7
WBGene00000227	103	43	7	WBGene00019035	70	54	9	WBGene00011282	71	31	8	WBGene00001934	114	221	143	WBGene00007085	82	141	8
WBGene00021671	84	134	11	WBGene00019034	84	72	13	WBGene00003401	101	172	8	WBGene00001933	114	221	143	WBGene00007082	53	92	6
WBGene00021672	88	123	10	WBGene00019039	84	72	13	WBGene00023423	100	161	9	WBGene00018899	114	221	143	WBGene00013873	89	23	5
WBGene00016904	83	167	6	WBGene00019040	97	90	17	WBGene00011604	22	30	25	WBGene00001624	85	72	9	WBGene00006613	89	23	5
WBGene00016903	89	34	7	WBGene00019041	97	90	17	WBGene00011605	233	262	78	WBGene00019900	85	72	9	WBGene00013877	84	60	7
WBGene00016905	89	34	7	WBGene00019042	97	90	17	WBGene00011198	233	262	78	WBGene00019899	85	72	9	WBGene00013878	78	97	9
WBGene00016902	86	76	9	WBGene00019043	97	90	17	WBGene00006331	233	262	78	WBGene00004039	85	68	10	WBGene00010510	46	126	25
WBGene00016906	136	81	18	WBGene00019044	97	90	17	WBGene00011200	173	152	46	WBGene00019898	84	64	10	WBGene00013024	122	107	14
WBGene00002077	136	81	18	WBGene00018439	103	87	39	WBGene00003157	113	42	13	WBGene00019901	84	64	10	WBGene00013025	103	71	11
WBGene00002079	152	38	10	WBGene00018443	103	87	39	WBGene00011201	113	42	13	WBGene00019902	51	100	6	WBGene00013026	83	35	8
WBGene00021660	152	38	10	WBGene00018438	96	80	27	WBGene00011202	113	42	13	WBGene00003914	92	99	27	WBGene00000877	83	35	8
WBGene00020089	160	121	33	WBGene00018444	96	80	27	WBGene00011206	112	69	9	WBGene00018636	92	99	27	WBGene00013027	83	35	8
WBGene00004143	160	121	33	WBGene00018445	96	92	24	WBGene00011205	112	69	9	WBGene00000996	92	99	27	WBGene00006775	85	118	9
WBGene00006385	160	121	33	WBGene00018437	104	112	33	WBGene00001352	118	73	18	WBGene00018637	108	78	18	WBGene00007614	115	68	10
WBGene00020090	137	158	7	WBGene00018436	104	112	33	WBGene00010428	124	77	27	WBGene00018638	108	78	18	WBGene00003834	115	68	10
WBGene00021733	137	158	7	WBGene00018435	104	112	33	WBGene00006478	124	77	27	WBGene00018635	108	78	18	WBGene00007619	115	68	10
WBGene00015570	39	81	10	WBGene00018433	112	105	10	WBGene00044911	124	77	27	WBGene00002074	124	57	9	WBGene00003835	115	68	10
WBGene00006593	114	131	16	WBGene00018446	112	105	10	WBGene00007135	118	29	8	WBGene00017991	140	66	33	WBGene00007615	115	68	10
WBGene00021026	77	34	9	WBGene00018447	112	105	10	WBGene00007136	121	31	8	WBGene00017992	125	57	31	WBGene00000985	98	177	11
WBGene00021027	77	34	9	WBGene00018432	112	105	10	WBGene00007137	121	31	8	WBGene00017990	125	57	31	WBGene00003922	98	177	11
WBGene00021025	68	124	8	WBGene00018105	133	138	16	WBGene00002003	121	31	8	WBGene00017993	125	57	31	WBGene00007616	98	177	11
WBGene00021028	101	25	4	WBGene00206519	133	138	16	WBGene00007138	77	109	27	WBGene00017989	110	47	29	WBGene00007617	98	177	11

WBGene00021024	101	25	4	WBGene00018106	136	143	15	WBGene00007139	102	151	27	WBGene00018471	90	59	8	WBGene00009079	98	177	11
WBGene00001814	101	25	4	WBGene00018107	136	143	15	WBGene00000511	89	140	32	WBGene00004046	90	59	8	WBGene00001170	98	177	11
WBGene00022037	171	195	10	WBGene00018109	136	143	15	WBGene00000512	52	86	36	WBGene00000190	90	59	8	WBGene00009081	92	110	10
WBGene00022038	171	195	10	WBGene00018108	138	148	13	WBGene00000513	52	86	36	WBGene00018472	90	59	8	WBGene00009082	85	42	9
WBGene00022033	159	209	41	WBGene00018104	123	113	11	WBGene00007131	89	72	10	WBGene00001584	76	53	9	WBGene00006465	85	42	9
WBGene00022043	159	209	41	WBGene00018103	123	113	11	WBGene00007133	89	72	10	WBGene00018473	76	53	9	WBGene00009084	85	42	9
WBGene00022042	159	209	41	WBGene00018102	108	77	8	WBGene00007132	89	72	10	WBGene00017996	86	22	5	WBGene00000257	103	39	16
WBGene00007009	159	209	41	WBGene00015609	160	196	23	WBGene00011120	110	30	11	WBGene00017997	86	22	5	WBGene00000592	103	39	16
WBGene00002040	80	80	9	WBGene00044417	160	196	23	WBGene00011121	110	30	11	WBGene00017999	86	22	5	WBGene00235335	183	288	16
WBGene00022029	104	50	24	WBGene00015613	160	196	23	WBGene00011111	110	30	11	WBGene00023487	86	22	5	WBGene00010976	183	288	16
WBGene00022027	104	50	24	WBGene00015610	160	196	23	WBGene00004387	110	30	11	WBGene00003607	86	22	5	WBGene00077577	183	288	16
WBGene00022026	93	37	15	WBGene00015607	160	196	23	WBGene00011110	110	30	11	WBGene00001827	96	27	9	WBGene00010979	183	288	16
WBGene00022025	81	24	6	WBGene00020362	119	123	9	WBGene00011109	81	40	20	WBGene00016374	96	27	9	WBGene00194706	99	59	27
WBGene00022031	101	27	7	WBGene00020363	119	123	9	WBGene00011119	51	49	28	WBGene00016373	96	27	9	WBGene00008263	99	59	27
WBGene00022032	101	27	7	WBGene00020361	115	139	8	WBGene00011117	51	49	28	WBGene00044325	64	34	7	WBGene00008262	99	59	27
WBGene00021209	141	121	7	WBGene00020360	115	139	8	WBGene00011116	68	40	19	WBGene00044326	64	34	7	WBGene00001834	99	59	27
WBGene00004332	148	102	8	WBGene00015830	100	41	9	WBGene00011115	85	30	10	WBGene00016378	97	64	18	WBGene00003982	99	35	8
WBGene00004028	148	102	8	WBGene00044359	92	51	9	WBGene00000520	85	30	10	WBGene00004703	130	94	29	WBGene00011250	99	35	8
WBGene00021213	57	140	6	WBGene00018669	79	25	7	WBGene00007791	58	76	59	WBGene00016379	130	94	29	WBGene00011251	99	35	8
WBGene00021212	57	140	6	WBGene00018670	79	25	7	WBGene00007788	58	76	59	WBGene00016380	118	62	20	WBGene00011252	98	24	11
WBGene00022518	62	115	9	WBGene00018671	79	25	7	WBGene00000463	107	160	30	WBGene00016381	105	30	10	WBGene00011253	98	24	11
WBGene00022388	100	131	12	WBGene00017209	96	64	10	WBGene00003577	113	122	59	WBGene00016384	61	95	7	WBGene00009650	98	24	11
WBGene00022389	81	194	10	WBGene00017208	96	64	10	WBGene00010155	132	138	111	WBGene00004363	61	95	7	WBGene00004337	114	114	11
WBGene00022386	81	194	10	WBGene00017210	116	47	9	WBGene00004132	132	138	111	WBGene00015509	95	69	9	WBGene00004060	78	101	10
WBGene00003238	130	173	12	WBGene00017211	119	56	8	WBGene00004470	132	138	111	WBGene00015508	95	69	9	WBGene00008142	136	96	62
WBGene00018787	102	129	9	WBGene00017207	92	78	8	WBGene00002100	132	138	111	WBGene00015510	90	93	8	WBGene00008143	136	96	62
WBGene00018788	96	94	6	WBGene00219315	80	72	7	WBGene00000223	144	212	16	WBGene00015511	70	106	7	WBGene00000915	136	96	62
WBGene00021327	151	42	15	WBGene00004149	129	146	20	WBGene00000380	144	212	16	WBGene00015507	121	138	10	WBGene00044180	136	96	62
WBGene00004952	151	42	15	WBGene00020537	129	146	20	WBGene00009115	161	224	15	WBGene00016957	103	111	9	WBGene00008144	136	96	62
WBGene00021329	151	42	15	WBGene00020533	129	146	20	WBGene00000396	142	197	13	WBGene00016793	103	111	9	WBGene00006836	155	168	38
WBGene00021332	151	42	15	WBGene00020080	52	41	28	WBGene00010904	75	27	8	WBGene00016792	118	103	11	WBGene00008145	174	240	13
WBGene00021334	142	215	10	WBGene00020073	104	78	30	WBGene00010905	75	27	8	WBGene00016794	133	94	13	WBGene00003861	87	53	6
WBGene00021328	142	215	10	WBGene00016548	124	132	20	WBGene00010909	75	27	8	WBGene00003827	133	94	13	WBGene00006795	68	84	7
WBGene00001745	142	215	10	WBGene00016553	144	185	9	WBGene00010906	75	27	8	WBGene00002080	97	69	15	WBGene00013048	68	84	7
WBGene00022837	67	126	9	WBGene00016547	144	185	9	WBGene00010908	141	215	7	WBGene00219436	97	69	15	WBGene00013049	49	114	8
WBGene00021689	78	78	11	WBGene00016546	134	183	11	WBGene00003915	141	215	7	WBGene00016790	97	69	15	WBGene00001817	41	87	5
WBGene00000165	121	47	15	WBGene00016549	124	180	13	WBGene00009439	101	33	7	WBGene00004471	97	69	15	WBGene00008183	98	171	10
WBGene00004429	121	47	15	WBGene00016545	124	180	13	WBGene00009440	101	33	7	WBGene00016795	97	69	15	WBGene00012293	167	232	29
WBGene00021687	121	47	15	WBGene00016550	124	180	13	WBGene00004762	86	28	7	WBGene00001535	97	69	15	WBGene00012294	167	232	29
WBGene00001816	145	31	8	WBGene00016342	101	158	9	WBGene00009441	86	28	7	WBGene00017645	87	132	10	WBGene00004336	135	181	19
WBGene00004880	145	31	8	WBGene00016334	101	158	9	WBGene00009445	86	28	7	WBGene00017644	87	132	10	WBGene00013883	77	103	33
WBGene00021685	93	110	8	WBGene00021985	107	88	8	WBGene00009442	130	31	14	WBGene00017643	99	64	8	WBGene00013886	33	65	33
WBGene00021691	98	107	11	WBGene00021986	114	46	10	WBGene00009443	130	31	14	WBGene00249815	106	30	7	WBGene00050943	33	65	33
WBGene00021694	61	87	6	WBGene00018783	114	46	10	WBGene00004874	130	31	14	WBGene00017642	106	30	7	WBGene00013887	33	65	33
WBGene00003400	44	105	7	WBGene00018785	196	26	10	WBGene00004760	80	114	8	WBGene00006761	82	55	16	WBGene00044272	33	65	33
WBGene00019674	163	140	22	WBGene00018782	147	25	9	WBGene00003112	50	78	11	WBGene00000183	82	55	16	WBGene00010379	33	65	33
WBGene00045052	163	140	22	WBGene00019591	91	73	8	WBGene00011957	127	152	8	WBGene00003178	82	55	16	WBGene00013889	33	65	33
WBGene00045053	163	140	22	WBGene00015111	84	72	22	WBGene00011953	127	152	8	WBGene00004371	149	233	13	WBGene00010380	86	107	12
WBGene00004888	163	140	22	WBGene00015112	77	70	36	WBGene00011956	160	210	9	WBGene00021541	149	233	13	WBGene00010381	86	107	12
WBGene00019673	163	140	22	WBGene00015113	77	70	36	WBGene00219297	160	210	9	WBGene00016130	149	233	13	WBGene00010383	73	99	8
WBGene00022367	139	95	9	WBGene00018386	112	101	8	WBGene00011407	64	55	32	WBGene00016129	149	233	13	WBGene00010382	73	99	8
WBGene00022372	139	95	9	WBGene00018383	112	101	8	WBGene00011408	64	55	32	WBGene00016128	115	149	10	WBGene00010386	60	90	4
WBGene00022371	138	21	9	WBGene00018381	77	48	6	WBGene00011410	82	29	11	WBGene00016124	115	149	10	WBGene00010385	60	90	4
WBGene00022368	138	21	9	WBGene00018387	77	48	6	WBGene00011409	82	29	11	WBGene00016125	81	64	7	WBGene00011318	83	41	10
WBGene00022369	105	27	9	WBGene00018380	77	48	6	WBGene00000543	82	27	5	WBGene00004732	82	141	9	WBGene00011319	83	41	10
WBGene00022373	109	50	7	WBGene00018379	77	48	6	WBGene00011412	74	43	7	WBGene00021539	105	109	11	WBGene00011320	83	41	10

WBGene00018159	119	65	8	WBGene00018355	99	88	4	WBGene00007045	74	43	7	WBGene00021536	105	109	11	WBGene00011321	83	41	10
WBGene00004969	92	95	23	WBGene00006882	122	135	21	WBGene00011414	66	59	8	WBGene00018360	90	85	9	WBGene00011322	144	79	40
WBGene00001773	89	107	6	WBGene00004129	161	179	30	WBGene00119203	66	59	8	WBGene00018359	75	60	7	WBGene00011325	144	79	40
WBGene00022361	115	23	8	WBGene00018769	144	21	7	WBGene00001259	76	122	7	WBGene00249817	92	36	9	WBGene00004485	144	79	40
WBGene00022360	115	23	8	WBGene00018768	144	21	7	WBGene00000068	76	122	7	WBGene00018361	92	36	9	WBGene00001423	144	79	40
WBGene00005077	54	55	58	WBGene00018767	113	58	6	WBGene00004469	126	42	16	WBGene00018357	84	57	9	WBGene00011323	144	79	40
WBGene00022269	105	17	6	WBGene00018766	81	95	5	WBGene00007167	117	49	15	WBGene00004979	97	61	9	WBGene00011324	144	79	40
WBGene00022273	140	22	8	WBGene00019130	80	40	7	WBGene00007168	117	49	15	WBGene00002162	99	74	9	WBGene00003775	39	75	50
WBGene00044440	140	22	8	WBGene00019343	126	17	7	WBGene00007169	108	56	13	WBGene00018356	123	70	8	WBGene00008832	48	96	29
WBGene00000269	99	41	6	WBGene00017280	126	17	7	WBGene00008003	91	33	13	WBGene00004056	87	109	6	WBGene00008833	56	116	7
WBGene00022268	99	41	6	WBGene00005559	132	161	10	WBGene00003210	91	33	13	WBGene00004055	87	109	6	WBGene00004747	75	72	6
WBGene00003111	120	107	8	WBGene00001546	132	161	10	WBGene00008005	114	136	10	WBGene00015052	81	122	8	WBGene00007716	75	72	6
WBGene00022156	120	107	8	WBGene00017712	116	118	14	WBGene00008006	112	161	13	WBGene00235296	81	122	8	WBGene00007717	89	44	13
WBGene00044348	200	232	46	WBGene00018021	116	118	14	WBGene00008008	109	185	16	WBGene00003961	119	182	9	WBGene00050940	89	44	13
WBGene00006702	200	232	46	WBGene00018022	116	118	14	WBGene00003912	109	185	16	WBGene00006957	53	81	8	WBGene00003155	89	44	13
WBGene00003080	200	232	46	WBGene00006318	116	118	14	WBGene00008007	109	185	16	WBGene00044608	66	74	6	WBGene00007722	89	44	13
WBGene00022153	200	232	46	WBGene00020231	56	55	18	WBGene00000193	109	185	16	WBGene00004101	66	55	6	WBGene00004308	140	130	11
WBGene00022152	135	144	13	WBGene00044367	56	55	18	WBGene00017804	109	185	16	WBGene00006620	65	35	5	WBGene00007719	190	215	9
WBGene00006771	135	144	13	WBGene00020232	56	55	18	WBGene00017803	109	185	16	WBGene00020373	81	29	10	WBGene00007718	174	204	11
WBGene00022159	146	28	8	WBGene00017914	95	38	9	WBGene00017811	108	52	6	WBGene00020374	78	89	9	WBGene00007720	174	204	11
WBGene00022150	146	28	8	WBGene00017916	95	38	9	WBGene00017812	108	52	6	WBGene00003656	73	106	9	WBGene00001021	174	204	11
WBGene00022149	111	28	7	WBGene00017913	95	38	9	WBGene00017801	108	52	6	WBGene00235275	65	96	6	WBGene00006808	131	114	11
WBGene00022148	73	96	8	WBGene00017917	92	54	7	WBGene00000418	108	52	6	WBGene00020372	65	96	6	WBGene00007237	94	34	9
WBGene00022160	78	117	8	WBGene00017918	92	54	7	WBGene00016444	86	42	11	WBGene00019507	38	40	40	WBGene00007236	94	34	9
WBGene00022161	78	117	8	WBGene00017912	88	63	9	WBGene00016443	86	42	11	WBGene00019509	146	68	17	WBGene00007235	94	34	9
WBGene00022147	68	74	8	WBGene00017911	84	72	11	WBGene00016446	86	42	11	WBGene00019510	146	68	17	WBGene00007234	94	34	9
WBGene00022146	68	74	8	WBGene00017249	84	72	11	WBGene00016442	86	42	11	WBGene00000923	146	68	17	WBGene00007240	85	32	8
WBGene00044347	114	26	10	WBGene00017250	100	97	18	WBGene00000767	86	42	11	WBGene00019504	146	68	17	WBGene00007233	85	32	8
WBGene00022141	114	26	10	WBGene00017251	100	97	18	WBGene00016449	135	139	7	WBGene00018068	44	89	52	WBGene00077583	85	32	8
WBGene00044746	151	190	22	WBGene00017252	115	121	24	WBGene00000204	135	139	7	WBGene00001908	95	171	96	WBGene00005278	41	55	36
WBGene00016907	151	190	22	WBGene00017253	115	121	24	WBGene00016439	135	139	7	WBGene00001903	95	171	96	WBGene00006110	41	55	36
WBGene00004441	151	190	22	WBGene00017254	115	121	24	WBGene00016450	135	139	7	WBGene00001904	95	171	96	WBGene00013567	104	74	65
WBGene00001196	151	190	22	WBGene00017255	141	26	9	WBGene00003598	127	76	10	WBGene00001907	95	171	96	WBGene00013568	104	74	65
WBGene00001309	116	146	16	WBGene00017245	141	26	9	WBGene00017826	133	115	9	WBGene00003099	95	171	96	WBGene00000883	104	74	65
WBGene00003750	116	146	16	WBGene00019691	73	105	9	WBGene00017832	133	115	9	WBGene00001905	145	252	140	WBGene00013569	104	74	65
WBGene00006461	116	146	16	WBGene00019683	77	99	12	WBGene00005011	139	154	8	WBGene00001906	90	163	95	WBGene00000879	104	74	65
WBGene00004743	217	166	8	WBGene00019690	77	99	12	WBGene00004400	139	154	8	WBGene00000690	91	55	9	WBGene00013573	104	74	65
WBGene00022139	150	117	8	WBGene00001507	77	99	12	WBGene00017831	109	91	9	WBGene00044953	91	55	9	WBGene00004037	104	74	65
WBGene00022140	82	26	10	WBGene00019688	92	130	15	WBGene00017829	78	28	9	WBGene00017072	91	55	9	WBGene00045402	104	74	65
WBGene00022138	82	26	10	WBGene00019686	92	130	15	WBGene00005012	78	28	9	WBGene00005019	91	55	9	WBGene00006157	95	22	10
WBGene00021771	107	15	11	WBGene00019687	96	103	12	WBGene00017825	78	28	9	WBGene00017071	52	111	84	WBGene00005386	95	22	10
WBGene00044438	107	15	11	WBGene00022441	99	76	8	WBGene00004679	83	34	11	WBGene00017074	52	111	84	WBGene00011538	126	47	17
WBGene00021763	89	30	8	WBGene00022442	49	74	29	WBGene00017830	87	40	12	WBGene00017075	52	111	84	WBGene00000868	126	47	17
WBGene00021238	86	103	6	WBGene00022447	183	23	10	WBGene00006735	87	40	12	WBGene00017069	68	86	23	WBGene00005931	126	47	17
WBGene00021346	143	68	9	WBGene00022448	183	23	10	WBGene00016144	87	40	12	WBGene00019788	76	101	45	WBGene00044759	126	47	17
WBGene00021347	143	68	9	WBGene00005020	183	23	10	WBGene00004782	97	44	12	WBGene00019791	76	101	45	WBGene00011948	51	86	64
WBGene00021348	143	68	9	WBGene00022453	159	100	9	WBGene00016145	106	37	8	WBGene00020825	119	129	27	WBGene00004153	51	86	64
WBGene00021349	128	64	18	WBGene00022452	159	100	9	WBGene00016143	106	37	8	WBGene00020827	119	129	27	WBGene00007368	33	57	21
WBGene00004409	128	64	18	WBGene00022712	159	100	9	WBGene00016142	95	30	7	WBGene00020824	119	129	27	WBGene00007367	33	57	21
WBGene00021350	113	60	27	WBGene00003678	131	141	15	WBGene00001499	95	30	7	WBGene00016182	67	30	10	WBGene00005428	110	132	11
WBGene00004014	113	60	27	WBGene00019513	134	166	14	WBGene00016139	116	160	10	WBGene00001566	67	30	10	WBGene00005429	110	132	11
WBGene00021351	114	77	17	WBGene00019512	134	166	14	WBGene00016166	67	31	7	WBGene00016178	67	30	10	WBGene00007372	79	93	22
WBGene00021352	101	65	7	WBGene00019511	136	190	12	WBGene00016167	67	31	7	WBGene00006450	125	53	21	WBGene00004452	67	35	13
WBGene00021353	87	35	8	WBGene00016576	119	155	13	WBGene00043156	67	31	7	WBGene00003224	125	53	21	WBGene00008997	53	42	19
WBGene00003799	104	40	8	WBGene00016575	119	155	13	WBGene00003558	67	31	7	WBGene00044001	125	53	21	WBGene00008993	39	48	25
WBGene00235158	139	138	19	WBGene00016574	102	119	14	WBGene00016169	93	24	7	WBGene00001051	125	53	21	WBGene00008995	89	112	63

WBGene00021009	93	165	10	WBGene00016573	102	119	14	WBGene00016171	93	24	7	WBGene00015650	54	90	9	WBGene00000057	89	112	63
WBGene00021458	87	55	28	WBGene00044370	102	119	14	WBGene00016165	93	24	7	WBGene00002043	54	90	9	WBGene00009221	78	30	7
WBGene00000408	129	89	21	WBGene00016578	102	119	14	WBGene00016170	114	118	12	WBGene00022011	69	66	6	WBGene00003079	78	30	7
WBGene00021469	155	153	38	WBGene00005543	144	219	13	WBGene00020095	114	118	12	WBGene00044511	69	66	6	WBGene00009222	78	30	7
WBGene00021470	155	153	38	WBGene00015200	144	219	13	WBGene00020098	114	118	12	WBGene00022012	69	66	6	WBGene00009223	90	21	7
WBGene00021468	139	183	63	WBGene00002997	126	151	23	WBGene00020097	174	227	17	WBGene00018336	84	99	10	WBGene00006446	90	21	7
WBGene00002047	139	183	63	WBGene00021293	107	83	33	WBGene00020094	174	227	17	WBGene00018332	84	99	10	WBGene00044188	90	21	7
WBGene00021476	140	93	11	WBGene00021294	94	52	20	WBGene00007015	151	174	25	WBGene00018337	84	99	10	WBGene00009224	90	21	7
WBGene00021475	140	93	11	WBGene00021295	133	24	8	WBGene00020093	127	121	33	WBGene00003034	89	133	9	WBGene00007162	80	130	5
WBGene00021466	140	93	11	WBGene00021292	184	28	8	WBGene00044648	127	121	33	WBGene00195046	93	167	8	WBGene00006080	80	130	5
WBGene00021465	147	65	12	WBGene00021290	97	87	18	WBGene00020092	108	131	32	WBGene00006483	93	167	8	WBGene00006289	80	130	5
WBGene00003156	153	37	13	WBGene00021296	97	87	18	WBGene00220249	108	131	32	WBGene00016770	38	94	8	WBGene00009978	90	84	6
WBGene00219275	153	37	13	WBGene00021289	97	87	18	WBGene00002218	108	131	32	WBGene00017237	85	32	19	WBGene00001813	64	37	10
WBGene00021471	153	37	13	WBGene00005562	41	28	21	WBGene00016684	92	102	7	WBGene00017238	85	32	19	WBGene00010184	64	37	10
WBGene00021463	147	148	9	WBGene00044371	41	28	21	WBGene00044409	92	102	7	WBGene00002028	75	24	13	WBGene00003650	50	80	8
WBGene00021474	100	47	8	WBGene00044372	41	28	21	WBGene00016678	92	102	7	WBGene00000994	64	16	6	WBGene00010186	50	80	8
WBGene00021460	91	60	34	WBGene00022570	41	28	21	WBGene00016676	92	102	7	WBGene00019228	59	97	6	WBGene00006122	62	115	100
WBGene00017741	123	66	11	WBGene00195073	41	65	53	WBGene00050919	92	102	7	WBGene00009014	69	65	9	WBGene00006121	62	115	100
WBGene00017734	123	66	11	WBGene00017181	97	145	11	WBGene00016682	93	48	13	WBGene00009006	69	65	9	WBGene00003692	62	115	100
WBGene00017735	123	66	11	WBGene00017182	97	145	11	WBGene00016674	93	48	13	WBGene00009007	78	32	11	WBGene00003674	62	115	100
WBGene00017736	123	66	11	WBGene00005575	92	152	8	WBGene00016683	93	48	13	WBGene00009008	67	60	9	WBGene00011520	28	100	6
WBGene00017737	141	34	8	WBGene00044375	92	152	8	WBGene00000107	79	44	21	WBGene00009010	67	60	9	WBGene00006124	28	100	6
WBGene00017738	141	34	8	WBGene00018201	130	186	9	WBGene00006519	79	44	21	WBGene00009009	67	60	9	WBGene00011521	28	100	6
WBGene00017733	127	69	8	WBGene00018198	130	178	10	WBGene00000279	79	44	21	WBGene00009013	67	60	9	WBGene00005935	89	47	12
WBGene00255457	127	69	8	WBGene00021727	128	130	10	WBGene00018802	81	90	40	WBGene00009011	81	44	11	WBGene00011687	89	47	12
WBGene00017732	112	104	7	WBGene00021726	128	130	10	WBGene00001076	81	90	40	WBGene00009012	95	27	12	WBGene00011688	89	47	12
WBGene00022281	111	34	9	WBGene00021725	128	130	10	WBGene00004728	79	130	22	WBGene00008972	95	27	12	WBGene00011691	90	152	64
WBGene00022282	111	34	9	WBGene00021724	92	88	14	WBGene00006543	116	226	18	NoWBGene_ID47	95	27	12	WBGene00001878	105	208	117
WBGene00001232	111	34	9	WBGene00020290	56	46	18	WBGene00021900	143	269	17	WBGene00194651	102	170	7	WBGene00001877	105	208	117
WBGene00021277	111	34	9	WBGene00015841	52	121	62	WBGene00021901	120	151	12	WBGene00007901	100	135	8	WBGene00001876	105	208	117
WBGene00001404	130	179	11	WBGene00015854	52	121	62	WBGene00021899	120	151	12	WBGene00044239	100	135	8	WBGene00001875	105	208	117
WBGene00004226	130	179	11	WBGene00195072	52	121	62	WBGene00021902	97	32	7	WBGene00012118	131	187	10	WBGene00050899	105	208	117
WBGene00019461	113	144	12	WBGene00021717	93	63	9	WBGene00001744	82	32	7	WBGene00045183	131	187	10	WBGene00009046	82	135	9
WBGene00000832	113	144	12	WBGene00021719	93	63	9	WBGene00020422	82	32	7	WBGene00012119	131	187	10	WBGene00009049	82	135	9
WBGene00021271	92	39	7	WBGene00021720	121	44	8	WBGene00006736	129	33	11	WBGene00012120	131	187	10	WBGene00006075	82	135	9
WBGene00021270	92	39	7	WBGene00004896	148	25	6	WBGene00020423	129	33	11	WBGene00000691	113	119	9	WBGene00012348	127	148	10
WBGene00021269	92	39	7	WBGene00021721	153	62	9	WBGene00019631	129	33	11	WBGene00000594	113	119	9	WBGene00012347	75	94	58
WBGene00000800	141	124	9	WBGene00000647	153	62	9	WBGene00019630	129	33	11	WBGene00012121	99	69	10	WBGene00005745	75	94	58
WBGene00018231	93	20	9	WBGene00021715	153	62	9	WBGene00019629	142	125	12	WBGene00206515	103	87	12	WBGene00008727	132	73	14
WBGene00018230	91	21	7	WBGene00021714	153	62	9	WBGene00019628	116	122	9	WBGene00011706	103	87	12	WBGene00008728	132	73	14
WBGene00018232	88	21	5	WBGene00021118	105	140	58	WBGene00189952	116	122	9	WBGene00011707	77	83	9	WBGene00045357	132	73	14
WBGene00000788	102	84	22	WBGene00021117	105	140	58	WBGene00019627	80	49	8	WBGene00000692	51	79	6	WBGene00006375	132	73	14
WBGene00003006	147	194	12	WBGene00000648	105	140	58	WBGene00019633	81	60	10	WBGene00007492	64	111	7	WBGene00009154	75	79	8
WBGene00022128	134	125	9	WBGene00000162	133	124	8	WBGene00001262	83	46	10	WBGene00007493	71	69	8	WBGene00005795	75	79	8
WBGene00004920	134	125	9	WBGene00021148	96	21	8	WBGene00022531	92	117	44	WBGene00007494	78	27	9	WBGene00005776	75	79	8
WBGene00022127	134	125	9	WBGene00021149	96	21	8	WBGene00022534	102	156	77	WBGene00007495	104	56	7	WBGene00005353	66	59	5
WBGene00022126	145	184	18	WBGene00021147	50	98	73	WBGene00022532	102	156	77	WBGene00003864	104	56	7	WBGene00009469	66	59	5
WBGene00022129	156	242	27	WBGene00021146	50	98	73	WBGene00003588	124	59	15	WBGene00005007	107	52	9	WBGene00202504	118	22	10
WBGene00004043	131	187	19	WBGene00021138	50	98	73	WBGene00016411	124	59	15	WBGene00007760	107	52	9	WBGene00012521	118	22	10
WBGene00022130	105	131	11	WBGene00021139	50	98	73	WBGene00000229	124	59	15	WBGene00007761	107	52	9	WBGene00012522	118	22	10
WBGene00004946	115	96	11	WBGene00019793	69	57	20	WBGene00016408	124	59	15	WBGene00004307	132	169	12	WBGene00005475	39	99	45
WBGene00022125	125	61	11	WBGene00019798	69	57	20	WBGene00006946	106	182	22	WBGene00219476	132	169	12	WBGene00000776	39	99	45
WBGene00022131	125	61	11	WBGene00044314	69	57	20	WBGene00000561	106	182	22	WBGene00008363	117	135	37	WBGene00050904	54	90	57
WBGene00044796	171	230	35	WBGene00017587	57	119	7	WBGene00016409	100	104	15	WBGene00008362	101	101	61	WBGene00013490	54	90	57
WBGene00020986	171	230	35	WBGene00017586	57	119	7	WBGene00001660	94	25	8	WBGene00008273	88	51	6	WBGene00012308	54	90	57
WBGene00004077	171	230	35	WBGene00005989	68	71	34	WBGene00022598	116	34	10	WBGene00008274	88	51	6	WBGene00005824	22	28	24

WBGene00021126	171	230	35	WBGene00004750	79	72	23	WBGene00022599	116	34	10	WBGene00006852	65	96	7	WBGene00086565	22	28	24
WBGene00021125	132	182	9	WBGene00017584	79	72	23	WBGene00006590	116	34	10	WBGene00044241	65	96	7	WBGene00012311	22	28	24
WBGene00022115	82	60	11	WBGene00017589	98	101	13	WBGene00000536	116	34	10	WBGene00003066	106	31	8	WBGene00012312	22	28	24
WBGene00022117	133	66	26	WBGene00017583	107	129	14	WBGene00020530	71	125	71	WBGene00002046	106	31	8	WBGene00219308	22	28	24
WBGene00004412	183	72	40	WBGene00017406	44	38	17	WBGene00018675	70	53	21	WBGene00007223	106	31	8	WBGene00012022	154	176	32
WBGene00022114	183	72	40	WBGene00017405	44	38	17	WBGene00003391	110	61	12	WBGene00007221	106	31	8	WBGene00012021	154	176	32
WBGene00022113	183	72	40	WBGene00017407	76	90	9	WBGene00004095	105	62	21	WBGene00007222	106	31	8	WBGene00012020	154	176	32
WBGene00022118	183	72	40	WBGene00017404	74	95	17	WBGene00018674	100	62	30	WBGene00219207	88	58	8	WBGene00012019	53	92	9
WBGene00000199	151	134	14	WBGene00017403	74	95	17	WBGene00021312	55	109	4	WBGene00001413	90	73	21	WBGene00012315	118	35	10
WBGene00022112	194	228	19	WBGene00017402	71	100	24	WBGene00021313	66	67	6	WBGene00000120	92	88	34	WBGene00004248	118	35	10
WBGene00022111	194	228	19	WBGene00044811	71	100	24	WBGene00021314	76	25	8	WBGene00006438	71	123	9	WBGene00012316	108	31	10
WBGene00022119	116	38	11	WBGene00086558	82	88	23	WBGene00021315	76	25	8	WBGene00000906	71	29	8	WBGene00013606	97	27	10
WBGene00001791	124	36	12	WBGene00044693	92	76	22	WBGene00021316	88	50	9	WBGene00001444	71	29	8	WBGene00001161	110	27	6
WBGene00022110	124	36	12	WBGene00044694	92	76	22	WBGene00020967	88	50	9	WBGene00009078	71	29	8	WBGene00013623	110	27	6
NoWBGene_ID45	94	18	7	WBGene00044692	92	76	22	WBGene00020966	88	50	9	WBGene00000121	71	29	8	WBGene00009299	85	40	10
WBGene00022107	118	36	19	WBGene00017408	92	76	22	WBGene00001042	79	173	12	WBGene00008113	52	118	98	WBGene00009298	61	38	16
WBGene00022122	142	54	31	WBGene00020774	92	76	22	WBGene00020968	109	205	14	WBGene00045078	137	200	8	WBGene00009296	39	44	21
WBGene00003836	142	54	31	WBGene00020773	55	80	10	WBGene00020970	101	118	12	WBGene00006941	137	200	8	WBGene00009297	39	44	21
WBGene00022121	99	55	48	WBGene00020778	55	80	10	WBGene00020779	101	118	12	WBGene00008114	115	168	8	WBGene00005201	39	44	21
WBGene00022124	105	23	5	WBGene00020772	62	84	12	WBGene00018612	121	64	10	WBGene00008110	115	168	8	WBGene00009840	65	67	39
WBGene00001046	92	23	8	WBGene00020771	69	88	14	WBGene00018613	150	98	11	WBGene00012434	153	200	62	WBGene00004811	65	67	39
WBGene00021839	79	23	10	WBGene00195077	69	88	14	WBGene00044410	150	98	11	WBGene00000694	153	200	62	WBGene00009834	65	67	39
WBGene00003186	130	31	9	WBGene00021173	69	88	14	WBGene00003901	121	81	11	WBGene00012435	153	200	62	WBGene00009841	65	67	39
WBGene00021837	130	31	9	WBGene00018805	74	86	13	WBGene00018611	121	81	11	WBGene00077756	153	200	62	WBGene00007675	91	56	7
WBGene00021843	130	31	9	WBGene00018806	74	86	13	WBGene00019836	92	23	7	WBGene00012436	153	200	62	WBGene00014679	68	50	18
WBGene00021842	112	30	10	WBGene00018804	74	86	13	WBGene00019833	92	23	7	WBGene00009877	92	35	18	WBGene00008017	50	39	22
WBGene00021844	112	30	10	WBGene00004821	68	81	38	WBGene00019832	163	236	13	WBGene00009878	92	35	18	WBGene00008016	50	39	22
WBGene00021845	112	30	10	WBGene00018809	68	81	38	WBGene00019838	163	236	13	WBGene00004463	92	35	18	WBGene00050974	50	57	22
WBGene00021841	112	30	10	WBGene00018752	82	148	8	WBGene00019831	163	236	13	WBGene00009879	86	36	14	WBGene00012405	50	57	22
WBGene00003387	112	30	10	WBGene00018751	82	148	8	WBGene00017032	163	236	13	WBGene00009880	86	36	14	WBGene00010212	90	16	6
WBGene00021846	134	33	5	WBGene00018750	82	148	8	WBGene00017029	146	250	9	WBGene00009881	80	36	10	WBGene00013340	74	91	7
WBGene00021840	125	38	8	WBGene00018749	82	148	8	WBGene00017030	146	250	9	WBGene00009882	80	36	10	WBGene00000813	122	62	8
WBGene00000205	115	42	10	WBGene00018747	82	57	32	WBGene00017028	146	250	9	WBGene00009883	80	36	10	WBGene00013339	169	32	8
WBGene00019697	115	42	10	WBGene00018754	82	57	32	WBGene00017031	178	187	9	WBGene00009884	80	36	10	WBGene00044795	123	26	12
WBGene00019698	70	74	5	WBGene00018746	82	57	32	WBGene00017027	178	187	9	WBGene00011857	99	48	7	WBGene00008442	98	19	9
WBGene00003654	138	188	7	WBGene00018755	82	57	32	WBGene00017302	94	88	15	WBGene00011858	99	48	7	WBGene00008441	72	11	5
WBGene00003062	127	23	9	WBGene00018756	105	124	5	WBGene00017303	94	88	15	WBGene00011859	99	41	8	WBGene00001080	160	64	11
WBGene00019595	127	23	9	WBGene00021192	118	96	6	WBGene00017304	94	88	15	WBGene00006931	99	34	9	WBGene00013356	160	64	11
WBGene00019598	127	23	9	WBGene00021191	118	96	6	WBGene00017301	94	88	15	WBGene00011860	99	34	9	WBGene00013355	160	64	11
WBGene00006888	139	44	15	WBGene00206374	135	238	10	WBGene00017300	70	94	12	WBGene00007505	83	94	8	WBGene00013354	174	23	9
WBGene00021829	139	44	15	WBGene00019641	135	238	10	WBGene00003371	46	99	8	WBGene00007506	116	147	12	WBGene00013343	130	108	8
WBGene00021828	139	44	15	WBGene00019640	135	238	10	WBGene00017305	46	99	8	WBGene00010148	88	23	9	WBGene00013347	179	130	18
WBGene00021830	127	22	7	WBGene00003017	55	128	11	WBGene00018964	110	112	13	WBGene00010150	67	34	18	WBGene00013348	157	77	13
WBGene00021831	113	22	7	WBGene00044381	55	128	11	WBGene00018967	110	112	13	WBGene00010149	45	45	26	WBGene00013349	134	23	7
WBGene00021832	98	22	7	WBGene00019487	103	185	9	WBGene00018963	110	112	13	WBGene00010316	125	145	43	WBGene00013350	104	36	6
WBGene00000413	150	34	10	WBGene00004135	107	31	11	WBGene00000420	110	112	13	WBGene00010317	125	145	43	WBGene00012562	102	94	5
WBGene00021826	150	34	10	WBGene00004467	107	31	11	WBGene00015470	136	128	45	WBGene00009544	107	115	28	WBGene00007182	49	28	18
WBGene00003258	111	210	11	WBGene00019483	107	31	11	WBGene00015468	162	144	77	WBGene00002012	107	115	28	WBGene00013075	92	15	6
WBGene00021834	111	210	11	WBGene00021053	67	80	8	WBGene00001514	162	144	77	WBGene00002013	88	85	12	WBGene00013081	84	117	10
WBGene00021553	144	45	12	WBGene00021054	67	80	8	WBGene00015467	140	208	7	WBGene00009541	88	31	12	WBGene00013082	84	117	10
WBGene00021552	144	45	12	WBGene00020007	92	163	23	WBGene00000900	140	208	7	WBGene00009542	88	31	12	WBGene00006714	130	18	6
WBGene00020915	144	45	12	WBGene00006476	44	83	8	WBGene00000518	101	166	17	WBGene00006949	55	113	66	WBGene00013482	130	18	6
WBGene00004154	144	45	12	WBGene00020368	70	154	8	WBGene00018828	163	240	27	WBGene00000563	55	113	66	WBGene00012455	112	90	20
WBGene00021549	153	221	7	WBGene00021822	51	99	8	WBGene00018829	163	240	27	WBGene00007888	98	100	5	WBGene00194680	112	90	20
WBGene00021547	153	221	7	WBGene00018969	119	220	7	WBGene00003918	143	153	19	WBGene00007886	98	100	5	WBGene00012456	175	126	15
WBGene00021551	128	128	9	WBGene00019855	119	220	7	WBGene00018831	123	65	10	WBGene00007883	94	106	6	WBGene00005522	104	137	3

WBGene00021039	103	34	11	WBGene00019854	68	102	13	WBGene00018830	123	65	10	WBGene00007882	94	106	6	WBGene00008310	104	137	3
WBGene00019362	99	85	8	WBGene00006495	68	102	13	WBGene00004481	123	65	10	WBGene00007880	98	52	6	WBGene00008308	104	137	3
WBGene00004775	123	35	9	WBGene00045297	76	20	7	WBGene00018827	123	65	10	WBGene00001239	98	52	6	WBGene00001258	116	16	7
WBGene00006440	123	35	9	WBGene00015819	76	20	7	NoWBGene_ID52	123	65	10	WBGene00010176	98	52	6	WBGene00013584	116	16	7
WBGene00021639	123	35	9	WBGene00015815	76	20	7	WBGene00015146	88	70	8	WBGene00001403	47	83	5	WBGene00012701	143	22	8
WBGene00021640	107	27	6	WBGene00015298	100	31	13	WBGene00015145	101	37	10	WBGene00001249	85	117	23	WBGene00012700	143	22	8
WBGene00004978	107	27	6	WBGene00015297	100	31	13	WBGene00015150	101	37	10	WBGene00185095	69	110	36	WBGene00012698	99	18	6
WBGene00021638	106	36	12	WBGene00015296	100	31	13	WBGene00015147	101	41	9	WBGene00003151	104	125	9	WBGene00012697	99	18	6
WBGene00000794	106	36	12	WBGene00021795	129	28	13	WBGene00002982	101	44	8	WBGene00000953	104	125	9	WBGene00012696	111	30	8
WBGene00021643	110	179	9	WBGene00021794	129	28	13	WBGene00004348	101	44	8	WBGene00010272	96	111	7	WBGene00012695	91	30	9
WBGene00021637	110	179	9	WBGene00019221	129	28	13	WBGene00006359	115	70	16	WBGene00010273	96	111	7	WBGene00012694	111	29	10
WBGene00021636	114	32	10	WBGene00003390	129	28	13	WBGene00004435	115	70	16	WBGene00003627	70	110	6	WBGene00006567	150	27	10
WBGene00004389	107	24	7	WBGene00019220	129	28	13	WBGene00015148	142	155	22	WBGene00002091	61	89	6	WBGene00012693	150	27	10
WBGene00021634	107	24	7	WBGene00015116	137	119	12	WBGene00015149	142	155	22	WBGene00014243	75	20	6	WBGene00012692	150	27	10
NoWBGene_ID86	115	104	16	WBGene00003825	137	119	12	WBGene00015143	169	240	28	WBGene00010484	75	20	6	WBGene00012676	124	24	8
WBGene00021633	115	104	16	WBGene00015115	137	119	12	WBGene00000182	169	240	28	WBGene00010485	75	20	6	WBGene00012675	124	24	8
WBGene00044436	115	104	16	WBGene00001438	137	119	12	WBGene00006943	169	240	28	WBGene00010486	36	69	8	WBGene00012674	114	59	11
WBGene00021648	142	173	25	WBGene00022743	71	61	18	WBGene00015086	39	103	33	WBGene00003465	136	212	124	WBGene00012673	103	94	14
WBGene00021649	142	173	25	WBGene00022741	65	62	18	WBGene00021343	39	103	33	WBGene00000301	136	212	124	WBGene00012670	42	45	49
WBGene00002144	142	173	25	WBGene00007036	96	86	11	WBGene00021344	94	51	6	WBGene00011747	105	120	66	WBGene00195240	72	129	6
WBGene00002143	46	94	8	WBGene00044063	95	61	11	WBGene00021345	94	51	6	WBGene00011746	74	28	7	WBGene00006639	72	129	6
WBGene00021650	46	94	8	WBGene00022742	95	61	11	WBGene00020964	88	98	9	WBGene00004031	95	44	11	WBGene00001987	117	31	8
WBGene00044437	46	94	8	WBGene00022739	93	36	10	WBGene00000435	93	80	10	WBGene00011743	95	44	11	WBGene00012666	117	31	8
WBGene00020902	69	50	17	WBGene00020461	70	29	7	WBGene00001869	90	74	8	WBGene00001396	83	79	11	WBGene00012665	117	31	8
WBGene00020901	69	50	17	WBGene00021058	68	51	7	WBGene00020019	99	49	7	WBGene00001395	71	113	11	WBGene00012068	102	51	15
WBGene00020900	61	65	27	WBGene00021057	55	87	7	WBGene00020018	83	63	5	WBGene00012340	71	113	11	WBGene00006140	102	51	15
WBGene00001501	97	124	17	WBGene00021056	55	87	7	WBGene00020021	77	98	8	WBGene00012341	64	51	7	WBGene00012067	97	70	10
WBGene00004272	97	124	17	WBGene00020251	64	99	5	WBGene00004858	77	98	8	WBGene00000697	64	51	7	WBGene00012066	97	70	10
WBGene00017025	97	124	17	WBGene00015135	76	153	17	WBGene00007016	90	130	23	WBGene00012342	64	51	7	WBGene00012065	113	110	15
WBGene00017651	77	55	7	WBGene00001948	76	153	17	WBGene00020020	90	130	23	WBGene00010637	78	30	10	WBGene00012064	113	110	15
WBGene00017650	77	55	7	WBGene00015136	76	153	17	WBGene00021029	131	189	13	WBGene00003787	78	30	10	WBGene00012063	113	110	15
WBGene00003040	149	200	9	WBGene00015134	76	153	17	WBGene00017162	121	128	21	WBGene00003603	92	27	7	WBGene00219452	116	121	14
WBGene00001601	149	200	9	WBGene00005059	74	103	5	WBGene00000381	110	67	28	WBGene00009320	92	27	7	WBGene00009018	116	121	14
WBGene00020467	64	58	17	WBGene00005062	74	103	5	WBGene00000115	110	67	28	WBGene00009319	92	27	7	WBGene00010099	82	94	10
WBGene00004147	113	120	16	WBGene00077490	148	266	31	WBGene00001057	110	67	28	WBGene00009324	92	27	7	WBGene00010100	87	87	9
WBGene00020466	161	182	14	WBGene00000928	148	266	31	WBGene00017163	112	35	10	WBGene00009322	85	60	7	WBGene00010101	87	87	9
WBGene00021175	78	110	10	WBGene00006868	99	168	28	WBGene00017161	112	35	10	WBGene00009323	81	52	7	WBGene00010102	91	80	8
WBGene00002135	78	110	10	WBGene00019747	81	61	16	WBGene00017164	112	35	10	WBGene00008149	76	45	8	WBGene00010103	113	78	14
WBGene00002134	78	110	10	WBGene00018046	111	53	7	WBGene00017169	79	28	7	WBGene00008148	81	38	9	WBGene00010104	113	78	14
WBGene00004368	92	57	9	WBGene00018045	111	53	7	WBGene00017165	79	28	7	WBGene00008147	86	31	10	WBGene00077663	113	78	14
WBGene00016323	117	102	14	WBGene00022283	55	131	7	WBGene00017160	79	28	7	WBGene00005663	64	62	8	WBGene00010105	113	78	14
WBGene00016322	117	102	14	WBGene00020223	174	175	53	WBGene00017166	94	40	14	WBGene00008156	64	62	8	WBGene00044197	113	78	14
WBGene00016321	142	146	18	WBGene00001976	174	175	53	WBGene00003252	109	52	21	WBGene00009678	41	93	6	WBGene00010106	127	95	14
WBGene00004425	142	146	18	WBGene00020220	174	175	53	WBGene00017159	109	52	21	WBGene00000858	91	124	9	WBGene00206500	127	95	14
WBGene00004217	142	146	18	WBGene00020221	174	175	53	WBGene00017158	109	52	21	WBGene00012174	93	25	7	WBGene00010107	140	112	13
WBGene00006751	87	125	8	WBGene00017369	107	50	19	WBGene00017168	109	52	21	WBGene00000593	93	25	7	WBGene00008070	140	112	13
WBGene00016326	110	92	14	WBGene00004461	107	50	19	WBGene00016200	123	115	9	WBGene00003576	93	25	7	WBGene00008071	140	112	13
WBGene00003797	117	89	14	WBGene00004737	107	50	19	WBGene00016195	122	90	11	WBGene00007304	93	25	7	WBGene00008067	50	76	7
WBGene00006833	125	102	10	WBGene00006817	124	54	24	WBGene00016194	93	93	11	WBGene00007306	80	23	7	WBGene00008066	85	76	8
WBGene00018765	125	102	10	WBGene00017372	124	54	24	WBGene00016201	63	95	10	WBGene00003432	80	23	7	WBGene00007583	72	89	8
WBGene00044423	125	102	10	WBGene00006626	141	58	29	WBGene00006987	50	83	11	WBGene00001001	79	97	7	WBGene00007723	42	66	8
WBGene00018764	148	85	11	WBGene00006497	97	81	19	WBGene00017146	126	225	119	WBGene00010676	91	41	12	WBGene00005832	42	66	8
WBGene00018763	149	155	18	WBGene00017373	52	103	8	WBGene00006727	126	225	119	WBGene00010677	91	41	12	WBGene00012814	105	163	13
WBGene00020187	149	225	24	WBGene00018274	52	103	8	WBGene00017776	102	151	66	WBGene00010678	91	41	12	WBGene00012813	134	183	11
WBGene00020188	149	225	24	WBGene00018271	68	22	9	WBGene00017777	102	151	66	WBGene00001621	91	41	12	WBGene00012825	86	155	12
WBGene00020189	130	137	17	WBGene00018270	68	22	9	WBGene00017775	78	76	13	WBGene00011776	115	81	12	WBGene00012826	86	155	12

WBGene00020190	130	137	17	WBGene00018269	68	22	9	WBGene00017778	137	79	19	WBGene00006638	115	81	12	WBGene00012828	182	146	113
WBGene00001832	130	137	17	WBGene00017837	77	24	8	WBGene00017774	100	86	15	WBGene00011775	115	81	12	WBGene00012829	182	146	113
WBGene00020185	130	137	17	WBGene00016354	66	134	7	WBGene00017773	63	92	11	WBGene00004254	133	137	13	WBGene00012830	182	146	113
WBGene00000764	130	137	17	WBGene00016355	82	101	9	WBGene00003375	45	107	10	WBGene00010556	112	121	11	WBGene00012831	182	146	113
WBGene00020191	106	34	12	WBGene00016356	92	110	8	WBGene00001489	89	161	10	WBGene00010557	112	121	11	WBGene00012837	49	77	8
WBGene00020184	106	34	12	WBGene00003435	92	110	8	WBGene00020211	132	215	10	WBGene00001794	91	105	8	WBGene00012838	49	77	8
WBGene00020193	106	34	12	WBGene00016359	101	119	6	WBGene00020210	132	215	10	WBGene00010558	96	168	12	WBGene00013361	91	15	6
WBGene00016837	106	34	12	WBGene00016352	101	119	6	WBGene00020209	132	215	10	WBGene00001653	69	33	7	WBGene00000499	77	20	7
WBGene00016839	108	178	22	WBGene00044767	75	58	7	WBGene00022694	79	41	10	WBGene00007698	114	130	8	WBGene00013365	64	30	9
WBGene00001430	108	178	22	WBGene00001027	88	83	8	WBGene00001166	79	41	10	WBGene00007696	114	130	8	WBGene00000987	87	27	10
WBGene00016840	108	178	22	WBGene00017385	100	107	8	WBGene00003796	124	54	17	WBGene00007697	114	130	8	WBGene00013360	87	27	10
WBGene00016841	100	157	19	WBGene00001754	62	123	11	WBGene00000874	124	54	17	WBGene00003531	114	130	8	WBGene00013359	99	25	9
WBGene00003950	91	135	15	WBGene00001755	62	123	11	WBGene00006544	72	103	7	WBGene00001157	96	119	24	WBGene00013358	164	272	8
WBGene00020625	91	135	15	WBGene00001756	62	123	11	WBGene00022695	72	103	7	WBGene00008510	96	119	24	WBGene00005388	164	272	8
WBGene00077599	91	135	15	WBGene00003430	132	112	18	WBGene00018254	101	141	36	WBGene00008506	96	119	24	WBGene00005387	164	272	8
WBGene00020626	91	135	15	WBGene00019892	132	112	18	WBGene00006547	101	141	36	WBGene00008512	110	161	16	WBGene00006786	97	128	7
WBGene00020628	117	91	9	WBGene00019893	132	112	18	WBGene00018255	101	141	36	WBGene00000910	123	202	8	WBGene00013367	97	128	7
WBGene00020629	117	91	9	WBGene00019888	132	112	18	WBGene00015478	79	104	6	WBGene00008511	123	202	8	WBGene00006652	105	187	7
WBGene00020653	117	91	9	WBGene00019894	132	112	18	WBGene00015477	104	154	7	WBGene00012784	89	152	9	WBGene00001485	101	67	8
WBGene00020652	117	91	9	WBGene00019895	80	118	7	WBGene00015480	67	114	8	WBGene00006568	93	135	8	WBGene00000940	134	34	12
WBGene00003072	119	155	8	WBGene00003429	80	118	7	WBGene00020549	89	42	9	WBGene00004297	93	135	8	WBGene00004754	134	34	12
WBGene00018528	119	155	8	WBGene00003470	82	31	6	WBGene00002201	89	42	9	WBGene00004140	97	117	7	WBGene00013752	134	34	12
WBGene00018529	119	155	8	WBGene00001778	82	31	6	WBGene00021534	86	123	13	WBGene00011175	93	158	11	WBGene00195241	69	90	8
WBGene00000197	98	64	8	WBGene00022762	82	31	6	WBGene00021535	61	102	12	WBGene00011174	93	158	11	WBGene00005427	69	90	8
WBGene00000779	77	68	9	WBGene00022761	92	89	33	WBGene00021533	48	73	9	WBGene00006779	55	146	9	WBGene00195242	69	90	8
WBGene00017908	147	162	85	WBGene00022766	101	146	59	WBGene00021532	48	73	9	WBGene00011238	102	29	11	WBGene00013756	69	90	8
WBGene00006805	112	155	28	WBGene00022760	101	146	59	WBGene00018340	83	170	84	WBGene00004800	102	29	11	WBGene00013757	70	79	11
WBGene00018868	59	104	9	WBGene00195246	101	146	59	WBGene00003593	83	170	84	WBGene00011239	102	29	11	WBGene00013759	70	79	11
WBGene00006820	151	222	9	WBGene00007012	123	105	37	WBGene00023489	97	44	10	WBGene00002152	88	31	9	WBGene00013760	70	79	11
WBGene00002696	107	48	22	WBGene00022765	123	105	37	WBGene00018341	97	44	10	WBGene00011241	73	32	6	WBGene00004203	152	70	16
WBGene00017085	133	106	22	WBGene00022759	145	63	14	WBGene00018339	97	44	10	WBGene00011240	111	82	8	WBGene00007017	163	70	13
WBGene00017087	133	106	22	WBGene00006619	145	63	14	WBGene00016014	111	36	14	WBGene00001669	68	137	6	WBGene00013766	132	46	11
WBGene00017088	159	163	22	WBGene00006997	145	63	14	WBGene00004459	111	36	14	WBGene00008733	147	202	9	WBGene00013765	132	46	11
WBGene00017084	159	163	22	WBGene00006737	92	42	10	WBGene00016015	125	43	11	WBGene00008729	109	128	8	WBGene00012614	74	97	13
WBGene00017089	159	163	22	WBGene00020867	118	186	13	WBGene00004472	125	43	11	WBGene00008730	71	54	7	WBGene00010506	86	118	19
WBGene00020035	98	53	26	WBGene00206517	109	136	13	WBGene00016011	125	43	11	WBGene00001189	71	23	7	WBGene00001700	118	113	11
WBGene00020036	98	53	26	WBGene00020868	88	50	6	WBGene00016010	125	43	11	WBGene00008488	71	23	7	WBGene00002118	109	121	5
WBGene00020037	98	53	26	WBGene00194986	88	50	6	WBGene00020441	137	45	15	WBGene00000419	71	23	7	WBGene00010507	78	106	14
WBGene00004464	100	54	17	WBGene00020866	88	50	6	WBGene00020442	137	45	15	WBGene00006527	48	147	9	WBGene00185118	78	106	14
WBGene00020038	100	54	17	WBGene00004382	89	42	7	WBGene00020437	137	45	15	WBGene00011597	49	46	34	WBGene00010508	78	106	14
WBGene00020031	100	54	17	WBGene00044664	90	33	8	WBGene00020436	137	45	15	WBGene00001163	78	160	11	WBGene00010005	64	51	30
WBGene00015974	176	212	11	WBGene00019087	90	33	8	WBGene00005166	137	45	15	WBGene00008076	78	160	11	WBGene00010006	127	134	36
WBGene00015973	176	212	11	WBGene00019084	110	153	9	WBGene00015977	133	199	14	WBGene00001476	82	105	46	WBGene00001406	146	190	10
WBGene00015972	176	212	11	WBGene00003822	59	120	79	WBGene00015978	133	199	14	WBGene00010649	82	105	46	WBGene00005147	81	130	7
WBGene00001985	106	31	6	WBGene00018014	59	120	79	WBGene00001972	133	199	14	WBGene00001328	82	105	46	WBGene00206505	81	130	7
WBGene00015971	106	31	6	WBGene00018015	59	120	79	WBGene00018561	114	147	10	WBGene00010647	82	105	46	WBGene00007124	156	78	13
WBGene00015970	97	41	7	WBGene00018016	59	120	79	WBGene00018562	66	87	8	WBGene00011291	94	101	9	WBGene00007119	156	78	13
WBGene00015976	75	66	8	WBGene00018017	157	235	13	WBGene00018564	84	73	9	WBGene00011292	94	101	9	WBGene00004413	156	78	13
WBGene00016606	94	30	10	WBGene00044666	157	235	13	WBGene00016980	76	136	10	WBGene00077714	94	101	9	WBGene00007126	156	78	13
WBGene00007001	94	30	10	WBGene00018018	128	161	40	WBGene00016979	76	136	10	WBGene00011293	94	101	9	WBGene00007123	94	26	10
WBGene00016608	109	77	16	WBGene00002068	99	86	67	WBGene00002891	77	57	9	WBGene00011296	95	144	6	WBGene00007122	94	26	10
WBGene00016609	124	123	21	WBGene00004434	99	86	67	WBGene00016981	77	57	9	WBGene00003568	90	127	8	WBGene00012626	65	102	6
WBGene00016603	79	79	20	WBGene00206373	99	86	67	WBGene00016982	95	73	8	WBGene00013857	114	63	14	WBGene00012627	65	102	6
WBGene00016607	99	25	9	WBGene00016152	93	56	38	WBGene00016978	112	89	7	WBGene00000865	114	63	14	WBGene00012628	74	114	6
WBGene00000382	99	25	9	WBGene00016151	87	26	8	WBGene00016977	108	98	18	WBGene00001730	114	63	14	WBGene00012629	82	125	6
WBGene00016601	99	25	9	WBGene00001102	142	143	25	WBGene00016983	108	98	18	WBGene00013858	114	63	14	WBGene00009171	94	78	8

WBGene00021629	146	214	8	WBGene00015454	142	143	25	WBGene00015813	111	91	25	WBGene00012009	62	115	6	WBGene00023504	94	78	8
WBGene00021628	92	133	10	WBGene00004040	105	121	17	WBGene00004482	119	78	41	WBGene00012007	62	115	6	WBGene00009172	94	78	8
WBGene00000140	99	160	7	WBGene00015453	68	98	8	WBGene00007048	105	60	25	WBGene00012013	127	95	7	WBGene00012847	80	150	6
WBGene00022834	114	32	7	WBGene00077489	68	98	8	WBGene00015811	84	37	9	WBGene00044990	127	95	7	WBGene00012184	133	220	10
WBGene00022832	114	32	7	WBGene00015458	67	160	121	WBGene00015810	84	37	9	WBGene00044991	127	95	7	WBGene00012185	68	129	12
WBGene00022835	114	32	7	WBGene00015459	67	160	121	WBGene00015809	84	37	9	WBGene00012014	127	95	7	WBGene00012186	57	90	17
WBGene00022831	101	32	9	WBGene00003402	67	160	121	WBGene00002850	77	32	9	WBGene00012015	67	78	13	WBGene00009999	67	93	18
WBGene00022836	101	32	9	WBGene00044389	146	217	9	WBGene00003523	149	243	23	WBGene00012016	86	97	10	WBGene00009998	67	93	18
WBGene00022830	101	32	9	WBGene00016162	146	217	9	WBGene00015484	149	243	23	WBGene00007384	30	39	19	WBGene00010000	67	93	18
WBGene00016562	67	48	10	WBGene00001101	150	201	9	WBGene00015485	149	243	23	WBGene00011259	158	226	16	WBGene00010001	49	75	32
WBGene00001231	96	28	13	WBGene00017148	150	201	9	WBGene00015486	89	33	7	WBGene00011720	89	40	4	WBGene00077786	31	56	46
WBGene00000787	90	23	10	WBGene00017147	150	201	9	WBGene00015487	89	33	7	WBGene00011719	50	114	6	WBGene00010002	80	37	7
WBGene00016567	84	17	6	WBGene00004020	96	137	25	NoWBGene_ID63	89	33	7	WBGene00011718	50	114	6	WBGene00010003	124	182	8
WBGene00016564	84	17	6	WBGene00004023	41	73	41	WBGene00006516	89	33	7	WBGene00011717	79	38	7	WBGene00012850	124	182	8
WBGene00016566	84	17	6	WBGene00001806	54	114	87	WBGene00015481	96	95	9	WBGene00002001	79	38	7	WBGene00012319	56	71	16
WBGene00020131	51	84	9	WBGene00044667	54	114	87	WBGene00003214	96	95	9	WBGene00011722	124	156	10	WBGene00012851	39	46	24
WBGene00022470	86	23	7	WBGene00022782	54	114	87	WBGene00015488	96	95	9	WBGene00008750	169	274	13	WBGene00001043	89	132	8
WBGene00022471	78	53	8	WBGene00022780	54	114	87	WBGene00002855	83	90	9	WBGene00008760	169	274	13	WBGene00004013	76	117	19
WBGene00022472	70	83	9	WBGene00001538	48	89	6	WBGene00020822	108	111	14	WBGene00014003	154	129	9	WBGene00001248	71	140	27
WBGene00022473	177	173	10	WBGene00006923	117	165	9	WBGene00004781	147	137	20	WBGene00004319	154	129	9	WBGene00009528	130	149	8
WBGene00022474	177	173	10	WBGene00017286	59	35	14	WBGene00020821	122	118	16	WBGene00001017	145	229	17	WBGene00001851	130	149	8
WBGene00022467	85	83	7	WBGene00017285	59	35	14	WBGene00020820	111	113	12	WBGene00003081	145	229	17	WBGene00004748	55	76	7
WBGene00022475	85	83	7	WBGene00005226	70	41	16	WBGene00020823	111	113	12	WBGene00002981	145	229	17	WBGene00011394	59	106	8
WBGene00017010	85	83	7	WBGene00017289	110	33	10	WBGene00001005	111	113	12	WBGene00014004	145	229	17	WBGene00011393	59	106	8
WBGene00017003	124	52	14	WBGene00017293	110	33	10	WBGene00006463	111	113	12	WBGene00008775	115	70	9	WBGene00001547	59	106	8
WBGene00004479	124	52	14	WBGene00017284	98	32	9	WBGene00020819	111	113	12	WBGene00044784	115	70	9	WBGene00001723	94	121	8
WBGene00004436	124	52	14	WBGene00000094	85	31	8	WBGene00007060	136	198	25	WBGene00000109	110	97	25	WBGene00011392	94	121	8
WBGene00017007	124	52	14	WBGene00017283	99	95	8	WBGene00017755	136	198	25	WBGene00009494	105	123	41	WBGene00003830	104	87	8
WBGene00045048	124	52	14	WBGene00017282	99	95	8	WBGene00017754	105	112	17	WBGene00009493	105	123	41	WBGene00011391	101	22	6
WBGene00017006	124	52	14	WBGene00006434	113	159	7	WBGene00004503	74	26	8	WBGene00001426	98	81	8	WBGene00009289	101	22	6
WBGene00017004	84	33	11	WBGene00004034	113	159	7	WBGene00005076	74	26	8	WBGene00006490	98	81	8	WBGene00009290	125	42	11
WBGene00017011	84	33	11	WBGene00017136	131	53	17	WBGene00015638	75	75	6	WBGene00012385	126	92	15	WBGene00001431	125	42	11
WBGene00017005	84	33	11	WBGene00004701	131	53	17	WBGene00015639	75	75	6	WBGene00010882	126	92	15	WBGene00009291	96	38	9
WBGene00016654	84	33	11	WBGene00003583	131	53	17	WBGene00015641	126	92	6	WBGene00002344	126	92	15	WBGene00009294	66	33	6
WBGene00016650	91	56	14	WBGene00017144	131	53	17	WBGene00015642	126	92	6	WBGene00002214	126	92	15	WBGene00009292	66	33	6
WBGene00016653	91	56	14	WBGene00017138	91	52	10	WBGene00002889	141	201	13	WBGene00010886	138	167	10	WBGene00009293	71	133	5
WBGene00016655	91	56	14	WBGene00003393	65	42	14	WBGene00003162	141	201	13	WBGene00011484	138	167	10	WBGene00022203	148	45	8
WBGene00016652	91	56	14	WBGene00017139	39	32	18	WBGene00017647	141	201	13	WBGene00011482	128	111	11	WBGene00022221	148	45	8
WBGene00022466	118	58	14	WBGene00017140	39	32	18	WBGene00005263	141	201	13	WBGene00004474	128	111	11	WBGene00011606	96	19	7
WBGene00015008	118	58	14	WBGene00017142	138	175	17	WBGene00015733	75	28	8	WBGene00011479	131	117	34	WBGene00011612	64	21	5
WBGene00004415	118	58	14	WBGene00017134	138	175	17	WBGene00015734	75	28	8	WBGene00011481	144	178	55	WBGene00015430	105	99	7
WBGene00015011	152	71	19	WBGene00017133	138	175	17	WBGene00002169	86	37	11	WBGene00011480	140	169	36	WBGene00015429	121	146	31
WBGene00015009	168	141	17	WBGene00017143	138	175	17	WBGene00018136	86	37	11	WBGene00004985	140	169	36	WBGene00019862	136	173	24
WBGene00015010	183	210	14	WBGene00017132	122	151	14	WBGene00018135	86	37	11	WBGene00004204	135	160	16	WBGene00019863	127	121	16
WBGene00015007	134	166	11	WBGene00017219	122	151	14	WBGene00018133	89	26	8	WBGene00008503	140	118	16	WBGene00002060	118	68	7
WBGene00206362	85	121	8	WBGene00017220	122	151	14	WBGene00018137	89	26	8	WBGene00008504	140	118	16	WBGene00019864	118	68	7
WBGene00015006	85	121	8	WBGene00017217	97	80	9	WBGene00018132	89	26	8	WBGene00008505	140	118	16	WBGene00044281	102	135	8
WBGene00006961	104	134	10	WBGene00017216	88	34	7	WBGene00018131	89	26	8	WBGene00007443	140	118	16	WBGene00019865	102	135	8
WBGene00006791	103	120	11	WBGene00006005	88	34	7	WBGene00017904	51	86	35	WBGene00007444	140	118	16	WBGene00022861	71	139	21
WBGene00020212	84	93	10	WBGene00023407	33	87	6	WBGene00017905	150	219	19	WBGene00007446	99	147	10	WBGene00004127	67	78	7
WBGene00007053	178	212	51	WBGene00000969	33	87	6	WBGene00006498	150	219	19	WBGene00219217	99	147	10	WBGene00018682	64	91	7
WBGene00021112	178	212	51	WBGene00000935	103	180	8	WBGene00006971	62	101	7	WBGene00007447	99	147	10	WBGene00000484	66	127	7
WBGene00021111	178	212	51	WBGene00000548	97	107	8	WBGene00020067	62	101	7	WBGene00007448	99	147	10	WBGene00001185	43	90	61
WBGene00002694	149	199	8	WBGene00018961	90	33	8	WBGene00020065	62	101	7	WBGene00003657	80	112	10	WBGene00015137	43	90	61
WBGene00019769	103	42	8	WBGene00018960	90	33	8	WBGene00020068	113	153	11	WBGene00004309	103	66	9	WBGene00015138	69	93	15
WBGene00019768	120	71	13	WBGene00077704	90	37	7	WBGene00020064	113	153	11	WBGene00007449	103	66	9	WBGene00017898	121	173	7

WBGene00019767	136	100	18	WBGene00017397	90	37	7	WBGene00044312	113	153	11	WBGene00011122	103	66	9	WBGene00017899	121	173	7
WBGene00019770	136	100	18	WBGene00001511	90	37	7	WBGene00019381	113	153	11	WBGene00004199	103	66	9	WBGene00003408	59	112	5
WBGene00019771	117	141	14	WBGene00000375	90	37	7	WBGene00003181	112	104	82	WBGene00235134	27	25	31	WBGene00003407	59	112	5
WBGene00006984	142	176	32	WBGene00006554	84	105	17	WBGene00000265	112	104	82	WBGene00011129	107	77	15	WBGene00017423	131	209	31
WBGene00018798	80	107	8	WBGene00022669	84	105	17	WBGene00019380	102	104	46	WBGene00011128	107	77	15	WBGene00017424	127	197	20
WBGene00018797	80	107	8	WBGene00002121	84	105	17	WBGene00019382	112	104	82	WBGene00011130	107	77	15	WBGene00017422	122	185	8
WBGene00002034	67	35	7	WBGene00015892	84	105	17	WBGene00020315	83	83	8	WBGene00001796	47	95	9	WBGene00017426	122	185	8
WBGene00019011	67	35	7	WBGene00002096	50	61	7	WBGene00020316	83	83	8	WBGene00007114	97	45	11	WBGene00004011	35	87	7
WBGene00017671	112	146	9	WBGene00015894	50	61	7	WBGene00020314	74	63	5	WBGene00007113	97	45	11	WBGene00206478	35	87	7
WBGene00017675	112	146	9	WBGene00015891	50	61	7	WBGene00018998	147	173	27	WBGene00001019	97	45	11	WBGene00002056	31	77	6
WBGene00017676	112	146	9	WBGene00015887	34	92	21	WBGene00002083	147	173	27	WBGene00007105	95	42	8	WBGene00020569	118	166	9
WBGene00002075	89	37	8	WBGene00020803	34	92	21	WBGene00000276	147	173	27	WBGene00001020	95	42	8	WBGene00020575	118	166	9
WBGene00017886	89	37	8	WBGene00020804	34	92	21	WBGene00018999	147	173	27	WBGene00007106	95	42	8	WBGene00021185	118	166	9
WBGene00017888	133	156	9	WBGene00015917	64	89	11	WBGene00004133	83	31	6	WBGene00007107	95	42	8	WBGene00017184	120	235	14
WBGene00017885	176	274	9	WBGene00003097	64	89	11	WBGene00002845	108	42	11	WBGene00007108	81	72	57	WBGene00002150	120	235	14
WBGene00001860	85	27	6	WBGene00000383	92	131	18	WBGene00004462	100	50	9	WBGene00044290	67	102	106	WBGene00004829	116	162	7
WBGene00044431	85	27	6	WBGene00015916	119	173	24	WBGene00018996	100	50	9	WBGene00007109	67	102	106	WBGene00015364	116	162	7
WBGene00021015	85	27	6	WBGene00015915	119	173	24	WBGene00017951	115	91	34	WBGene00001939	67	102	106	WBGene00000086	38	84	3
WBGene00021016	128	219	8	WBGene00000970	72	50	9	WBGene00219317	130	131	58	WBGene00001921	67	102	106	WBGene00001127	113	124	32
WBGene00044432	128	219	8	WBGene00015920	72	50	9	WBGene00001168	130	131	58	WBGene00001922	61	104	96	WBGene00020216	113	124	32
WBGene00004900	128	219	8	WBGene00019124	137	54	11	WBGene00004340	130	131	58	WBGene00001920	61	104	96	WBGene00002071	98	108	20
WBGene00001117	105	122	7	WBGene00019125	137	54	11	WBGene00017950	144	178	12	WBGene00001930	61	104	96	WBGene00020218	98	108	20
WBGene00003221	105	122	7	WBGene00019126	137	54	11	WBGene00000443	144	178	12	WBGene00001919	55	106	86	WBGene00020215	73	99	9
WBGene00016258	80	156	9	WBGene00006988	137	54	11	WBGene00017952	144	178	12	WBGene00001929	55	106	86	WBGene00003534	62	106	10
WBGene00002213	112	189	8	WBGene00000252	137	54	11	WBGene00000872	91	116	57	WBGene00235095	55	106	86	WBGene00020217	74	98	9
WBGene00004959	114	34	10	WBGene00006402	135	135	28	WBGene00019813	86	86	9	WBGene00007110	55	106	86	WBGene00020214	85	90	7
WBGene00000502	114	34	10	WBGene00016121	135	135	28	WBGene00006713	86	86	9	WBGene00007111	79	93	72	WBGene00000899	117	184	7
WBGene00003924	114	34	10	WBGene00016115	135	135	28	WBGene00045190	86	86	9	WBGene00010061	92	87	65	WBGene00018213	117	184	7
WBGene00022460	114	34	10	WBGene00044391	101	106	23	WBGene00022733	86	86	9	WBGene00001940	71	133	100	WBGene00018215	105	153	9
WBGene00000001	109	41	8	WBGene00044392	66	76	17	WBGene00003022	86	86	9	WBGene00001932	71	133	100	WBGene00018985	105	153	9
WBGene00045212	104	47	5	WBGene00016116	66	76	17	WBGene00022737	98	32	13	WBGene00001931	58	128	89	WBGene00018986	60	74	48
WBGene00022462	104	47	5	WBGene00194642	66	76	17	WBGene00022738	98	32	13	WBGene00002223	58	128	89	WBGene00018987	102	151	28
WBGene00022463	83	59	7	WBGene00016117	66	76	17	WBGene00044353	98	32	13	WBGene00044025	89	123	15	WBGene00018984	116	166	8
WBGene00022459	83	59	7	WBGene00016120	115	31	7	WBGene00003609	72	131	8	WBGene00011338	91	90	12	WBGene00022502	64	88	7
WBGene00003132	121	60	9	WBGene00016118	115	31	7	WBGene00015104	93	24	9	WBGene00010351	104	96	9	WBGene00022503	38	71	5
WBGene00022458	93	73	11	WBGene00016113	115	31	7	WBGene00015101	93	24	9	WBGene00010352	115	136	8	WBGene00022504	38	71	5
WBGene00022457	93	73	11	WBGene00016112	136	31	8	WBGene00015100	93	24	9	WBGene00001108	68	111	84	WBGene00003104	62	89	9
WBGene00022456	65	85	13	WBGene00016111	62	122	7	WBGene00015107	70	19	9	WBGene00010353	79	150	104	WBGene00018078	81	124	7
WBGene00004094	111	35	8	WBGene00015942	102	44	21	WBGene00015105	70	19	9	WBGene00010354	90	188	124	WBGene00004769	81	124	7
WBGene00002804	111	35	8	WBGene00015943	102	44	21	WBGene00015099	70	19	9	WBGene00001937	90	188	124	WBGene00018077	81	124	7
WBGene00001833	111	35	8	WBGene00015945	102	44	21	WBGene00044674	70	19	9	WBGene00001938	90	188	124	WBGene00004893	95	137	8
WBGene00004955	102	33	9	WBGene00015946	102	44	21	WBGene00015106	70	19	9	WBGene00002192	83	61	7	WBGene00000195	91	124	8
WBGene00003792	102	33	9	WBGene00015941	102	44	21	WBGene00003858	124	184	7	WBGene00007513	56	110	62	WBGene00000164	91	124	8
WBGene00018909	75	127	9	WBGene00015940	102	44	21	WBGene00019401	120	140	9	WBGene00007514	97	98	38	WBGene00016642	87	111	8
WBGene00000272	75	127	9	WBGene00015944	92	185	26	WBGene00004390	115	96	10	WBGene00003148	138	85	14	WBGene00016643	88	96	8
WBGene00018908	75	127	9	WBGene00044668	92	185	26	WBGene00019402	115	96	10	WBGene00010409	138	85	14	WBGene00016644	88	109	9
WBGene00004771	92	184	10	WBGene00001958	92	185	26	WBGene00019400	115	96	10	WBGene00004892	92	112	9	WBGene00016641	88	122	9
WBGene00016330	64	82	8	WBGene00044296	83	158	19	WBGene00018152	115	96	10	WBGene00219458	58	104	8	WBGene00000958	101	152	6
WBGene00015095	85	113	10	WBGene00002053	55	123	26	WBGene00005072	118	60	16	WBGene00010847	147	148	47	WBGene00018861	62	111	12
WBGene00015096	85	113	10	WBGene00017326	55	123	26	WBGene00004483	118	60	16	WBGene00001585	147	148	47	WBGene00018854	64	113	10
WBGene00015312	85	113	10	WBGene00017324	53	116	26	WBGene00004450	118	60	16	WBGene00003218	147	148	47	WBGene00018855	61	122	6
WBGene00000540	85	113	10	WBGene00019408	81	134	27	WBGene00018151	118	60	16	WBGene00010846	147	148	47	WBGene00018857	88	99	11
WBGene00001333	96	36	8	WBGene00019407	81	81	7	WBGene00018150	118	60	16	WBGene00010849	69	130	77	WBGene00018853	88	99	11
WBGene00015313	127	178	26	WBGene00022875	71	39	9	WBGene00018149	112	45	13	WBGene00000702	62	113	46	WBGene00018859	88	99	11
WBGene00002717	193	260	44	WBGene00001224	71	39	9	WBGene00018155	118	60	16	WBGene00008722	98	93	13	WBGene00019364	70	138	5
WBGene00018596	193	260	44	WBGene00001509	81	24	8	WBGene00018153	106	30	9	WBGene00004755	182	264	29	WBGene00019365	56	85	26

WBGene00018598	193	260	44	WBGene00022883	81	24	8	WBGene00194742	106	30	9	WBGene00006406	157	229	29	WBGene00018634	85	107	8
WBGene00018599	193	260	44	WBGene00022885	81	24	8	WBGene00004490	106	30	9	WBGene00004360	157	229	29	WBGene00004377	100	109	9
WBGene00018595	193	260	44	WBGene00018872	94	70	7	WBGene00003176	106	30	9	NoWBGene_ID17	132	193	29	WBGene00002062	121	161	9
WBGene00018865	90	82	10	WBGene00018873	96	122	7	WBGene00006592	95	40	21	WBGene00008720	132	193	29	WBGene00015473	71	129	7
WBGene00000150	90	82	10	WBGene00018870	97	174	7	WBGene00004417	95	40	21	WBGene00009589	158	232	29	WBGene00015472	107	148	9
WBGene00018864	90	82	10	WBGene00018869	70	135	8	WBGene00020107	95	40	21	WBGene00009588	183	270	29	WBGene00015474	143	167	10
WBGene00000966	96	56	7	WBGene00019128	76	26	7	WBGene00000080	75	25	7	WBGene00009587	143	157	25	WBGene00015476	143	167	10
WBGene00004087	96	56	7	WBGene00006644	76	26	7	WBGene00020636	75	25	7	WBGene00004480	92	44	14	WBGene00015471	111	111	9
WBGene00004131	76	111	7	WBGene00019129	76	26	7	WBGene00015159	59	134	6	WBGene00012497	92	44	14	WBGene00004927	111	111	9
WBGene00016041	76	111	7	WBGene00006933	76	26	7	WBGene00015162	63	34	7	WBGene00012496	92	44	14	WBGene00020128	111	111	9
WBGene00001491	77	70	9	WBGene00019127	81	32	12	WBGene00015156	63	34	7	WBGene00003415	92	37	9	WBGene00020490	64	77	9
WBGene00000761	77	70	9	WBGene00001486	81	32	12	WBGene00018951	35	77	8	WBGene00010232	82	65	22	WBGene00020489	51	118	8
WBGene00016278	106	163	30	WBGene00004214	79	30	10	WBGene00018952	44	87	8	WBGene00010233	82	65	22	WBGene00020491	90	152	8
WBGene00017855	105	103	19	WBGene00017895	76	27	7	WBGene00018953	125	129	19	WBGene00010234	72	93	34	WBGene00020488	128	186	7
WBGene00017854	106	163	30	WBGene00001208	94	189	7	WBGene00001748	125	129	19	WBGene00014085	72	93	34	WBGene00020492	128	186	7
WBGene00017853	105	103	19	WBGene00044394	69	109	8	WBGene00002182	125	129	19	WBGene00006491	94	26	8	WBGene00016725	137	182	7
WBGene00000230	103	42	7	WBGene00015004	47	111	7	WBGene00017274	93	31	5	WBGene00014086	94	26	8	WBGene00016726	137	182	7
WBGene00017852	103	42	7	WBGene00015002	47	111	7	WBGene00017275	95	51	7	WBGene00001320	82	23	9	WBGene00006635	123	194	7
WBGene00001067	103	42	7	WBGene00002085	47	97	11	WBGene00017269	97	71	8	WBGene00014087	70	20	9	WBGene00016109	123	194	7
WBGene00015635	101	41	14	WBGene00002086	47	97	11	WBGene00017268	97	71	8	WBGene00014076	97	60	5	WBGene00016107	69	102	6
WBGene00004431	101	41	14	WBGene00044395	56	124	6	WBGene00003378	132	166	9	WBGene00194934	97	60	5	WBGene00016871	62	97	5
WBGene00015636	101	41	14	WBGene00020025	56	124	6	WBGene00020604	120	101	9	WBGene00002335	141	140	7	WBGene00003965	116	170	7
WBGene00206357	101	41	14	WBGene00020026	60	76	7	WBGene00001974	120	101	9	WBGene00235132	141	140	7	WBGene00017667	85	112	6
WBGene00015634	101	41	14	WBGene00004306	60	76	7	WBGene00020601	107	36	9	WBGene00014079	141	140	7	WBGene00044558	30	43	55
WBGene00019076	90	25	6	WBGene00020022	63	28	7	WBGene00006542	107	36	9	WBGene00001079	141	140	7	WBGene00021046	66	50	20
WBGene00019077	90	25	6	WBGene00017686	82	31	7	WBGene00000118	41	37	23	WBGene00011910	118	196	13	WBGene00021047	90	95	24
WBGene00019078	90	25	6	WBGene00017683	82	31	7	WBGene00022102	41	37	23	WBGene00010444	118	196	13	WBGene00021044	79	119	10
WBGene00019079	90	25	6	WBGene00004346	82	31	7	WBGene00003376	83	32	9	WBGene00010448	143	245	11	WBGene00016997	79	119	10
WBGene00194697	64	108	6	WBGene00016236	74	132	10	WBGene00044449	83	32	9	WBGene00010447	143	245	11	WBGene00016996	82	182	10
WBGene00019080	64	108	6	WBGene00016237	89	117	8	WBGene00019196	83	32	9	WBGene00001577	143	245	11	WBGene00016995	87	158	7
WBGene00019074	64	108	6	WBGene00016235	104	102	6	WBGene00001503	83	32	9	WBGene00010918	131	111	16	WBGene00016998	87	158	7
WBGene00019082	68	70	16	WBGene00004680	104	102	6	WBGene00000479	98	129	18	WBGene00003920	131	111	16	WBGene00000988	87	158	7
WBGene00019083	56	80	7	WBGene00002030	60	132	7	WBGene00015582	98	129	18	WBGene00010919	131	111	16	WBGene00017295	79	147	9
WBGene00006594	78	56	8	WBGene00018251	60	132	7	WBGene00015581	98	129	18	WBGene00044253	88	68	9	WBGene00017296	71	136	10
WBGene00019693	99	31	8	WBGene00018250	60	132	7	WBGene00000537	87	26	7	WBGene00010920	88	68	9	WBGene00017297	71	136	10
WBGene00019713	67	106	8	WBGene00018252	111	130	9	WBGene00000854	87	26	7	WBGene00009546	96	78	9	WBGene00017294	59	109	8
WBGene00000474	67	106	8	WBGene00001440	111	130	9	WBGene00015579	87	26	7	WBGene00006415	147	130	12	WBGene00017298	65	133	8
NoWBGene_ID24	91	35	9	WBGene00000771	80	28	8	WBGene00002986	87	26	7	WBGene00009549	147	130	12	WBGene00019437	40	83	7
WBGene00006726	91	35	9	WBGene00016245	80	28	8	WBGene00003024	79	118	11	WBGene00001151	147	130	12	WBGene00006955	49	82	24
WBGene00006919	91	35	9	WBGene00016244	80	28	8	WBGene00000437	84	133	24	WBGene00002363	147	130	12	WBGene00019188	69	139	8
WBGene00018512	91	35	9	WBGene00077732	80	28	8	WBGene00020048	84	133	24	WBGene00009551	97	116	10	WBGene00017224	71	114	8
WBGene00018513	73	83	5	WBGene00020784	68	67	9	WBGene00020047	140	203	13	WBGene00007801	71	142	8	WBGene00017225	71	114	8
WBGene00018511	73	83	5	WBGene00020783	83	74	41	WBGene00020050	140	203	13	WBGene00007802	52	85	10	WBGene00206378	91	120	8
WBGene00018508	73	83	5	WBGene00020782	83	74	41	WBGene00004420	140	203	13	WBGene00002827	52	85	10	WBGene00020828	46	59	54
WBGene00018892	89	38	7	WBGene00020781	91	63	31	WBGene00003063	140	203	13	WBGene00014089	88	94	15	WBGene00020829	46	59	54
NoWBGene_ID68	89	38	7	WBGene00004015	107	41	11	WBGene00020051	140	203	13	WBGene00014090	88	94	15	WBGene00020830	56	72	32
WBGene00018894	89	38	7	WBGene00017438	107	41	11	WBGene00020052	90	31	8	WBGene00044009	88	94	15	WBGene00000462	89	113	30
WBGene00018895	89	38	7	WBGene00017443	49	97	10	WBGene00000846	90	31	8	WBGene00014091	73	76	32	WBGene00000444	112	141	50
WBGene00018897	94	39	8	WBGene00017437	49	97	10	WBGene00194726	90	31	8	WBGene00003736	58	57	48	WBGene00194679	112	141	50
WBGene00020558	94	39	8	WBGene00017444	49	97	10	WBGene00020200	48	75	7	WBGene00014097	136	174	10	WBGene00000460	112	141	50
WBGene00001039	94	39	8	WBGene00017435	66	27	8	WBGene00022816	62	102	40	WBGene00006759	136	174	10	WBGene00044563	112	141	50
WBGene00006776	103	164	18	WBGene00017440	52	84	7	WBGene00022817	76	128	73	WBGene00011742	153	143	13	WBGene00021990	65	105	96
WBGene00003793	95	148	13	WBGene00016212	52	84	7	WBGene00022819	76	128	73	WBGene00235284	153	143	13	WBGene00022508	60	93	7
WBGene00020556	62	92	54	WBGene00003403	52	84	7	NoWBGene_ID28	142	192	24	WBGene00011741	153	143	13	WBGene00004352	60	93	7
WBGene00002989	81	149	12	WBGene00016311	83	27	9	WBGene00194729	142	192	24	WBGene00011740	153	143	13	WBGene00022512	60	93	7
WBGene00015442	81	149	12	WBGene00016312	83	27	9	WBGene00015988	142	192	24	WBGene00011737	153	143	13	WBGene00022511	28	52	36

WBGene00018993	74	36	10	WBGene00016313	111	103	10	WBGene00003002	141	72	12	WBGene00011738	125	163	35	WBGene00021987	28	52	36
WBGene00004505	74	36	10	WBGene00016314	111	103	10	WBGene00015386	116	112	11	WBGene00011739	105	95	22	WBGene00018684	28	52	36
WBGene00044305	71	72	8	WBGene00016315	68	111	12	WBGene00015385	90	151	9	WBGene00000270	105	95	22	WBGene00018689	96	137	6
WBGene00000493	71	72	8	WBGene00016316	93	143	35	NoWBGene_ID93	165	270	28	WBGene00005015	85	26	8	WBGene00018687	68	57	12
WBGene00020694	60	105	9	WBGene00016310	93	143	35	WBGene00022660	165	270	28	WBGene00045036	96	44	10	WBGene00018688	68	57	12
WBGene00020693	70	114	12	WBGene00002980	117	174	57	WBGene00003559	165	270	28	WBGene00010670	96	44	10	WBGene00219451	68	57	12
WBGene00001856	80	123	14	WBGene00016317	117	174	57	WBGene00022661	165	270	28	WBGene00008682	75	56	23	WBGene00021485	150	189	24
WBGene00015176	109	48	8	WBGene00016318	90	35	7	WBGene00000395	90	175	10	WBGene00008683	54	67	36	WBGene00021483	150	189	24
WBGene00003020	109	48	8	WBGene00016319	92	35	9	WBGene00003956	90	175	10	WBGene00008688	95	56	22	WBGene00022416	76	100	6
WBGene00016332	109	48	8	WBGene00019607	93	34	10	WBGene00022516	78	34	6	WBGene00008687	95	56	22	WBGene00022417	102	158	15
WBGene00001973	134	211	39	WBGene00019608	93	34	10	WBGene00022792	78	34	6	WBGene00008684	124	94	9	WBGene00022418	127	215	24
WBGene00003601	134	211	39	WBGene00019605	132	91	6	WBGene00022795	84	35	11	WBGene00044329	113	143	10	WBGene00022411	127	215	24
WBGene00016333	134	211	39	WBGene00003009	132	91	6	WBGene00022793	83	36	10	WBGene00008686	113	143	10	WBGene00018657	120	145	8
WBGene00016331	94	109	12	WBGene00019063	64	146	12	WBGene00022794	83	36	10	WBGene00008685	113	143	10	WBGene00018656	120	145	8
WBGene00000436	42	37	34	WBGene00020800	64	146	12	WBGene00044799	85	37	13	WBGene00010890	102	69	39	WBGene00018655	39	85	7
WBGene00000631	42	37	34	WBGene00004996	152	247	20	WBGene00022791	80	39	9	WBGene00010891	102	69	39	WBGene00018654	39	85	7
WBGene00018003	42	37	34	WBGene00020801	152	247	20	WBGene00003102	50	81	8	WBGene00000122	102	69	39	WBGene00018653	95	110	8
WBGene00018009	75	97	7	WBGene00019426	101	156	9	WBGene00015591	54	104	9	WBGene00010892	91	110	24	WBGene00003087	150	135	9
WBGene00018007	107	134	9	WBGene00019425	77	135	9	WBGene00001209	88	74	12	WBGene00003010	65	115	7	WBGene00000737	150	135	9
WBGene00018008	107	134	9	WBGene00003621	52	113	8	WBGene00022785	103	27	11	WBGene00007089	49	79	6	WBGene00018736	119	83	7
WBGene00016421	116	129	30	WBGene00019427	64	85	7	WBGene00004449	99	39	9	WBGene00007090	76	46	7	WBGene00018735	119	83	7
WBGene00016422	116	129	30	WBGene00019424	76	57	6	WBGene00022787	99	39	9	WBGene00007088	76	46	7	WBGene00018737	119	83	7
WBGene00003996	72	95	6	WBGene00020895	144	218	15	WBGene00000765	99	39	9	WBGene00007087	76	46	7	WBGene00044565	69	111	5
WBGene00016419	81	72	6	WBGene00004916	144	218	15	WBGene00044324	83	38	9	WBGene00007092	131	158	9	WBGene00001065	54	86	25
WBGene00004109	81	72	6	WBGene00004702	144	218	15	WBGene00022783	83	38	9	WBGene00007091	131	158	9	WBGene00018591	54	86	25
WBGene00016418	81	72	6	WBGene00020899	144	218	15	WBGene00000835	83	38	9	WBGene00009435	88	114	8	WBGene00001515	33	67	8
WBGene00015028	85	36	11	WBGene00020894	144	218	15	WBGene00004918	80	39	9	WBGene00009436	92	67	8	WBGene00020765	51	76	15
WBGene00015029	85	36	11	WBGene00019904	144	218	15	WBGene00015333	80	39	9	WBGene00009437	92	67	8	WBGene00020764	51	76	15
WBGene00000099	85	36	11	WBGene00043984	154	207	29	WBGene00022800	119	139	7	WBGene00004025	101	118	9	WBGene00020766	74	140	15
WBGene00015504	83	25	5	WBGene00016971	154	207	29	WBGene00022798	119	139	7	WBGene00009438	110	169	9	WBGene00003968	97	204	14
WBGene00015501	83	25	5	WBGene00016970	154	207	29	WBGene00022799	119	139	7	WBGene00001044	15	35	34	WBGene00020509	114	167	57
WBGene00006823	83	82	5	WBGene00016972	154	207	29	WBGene00044447	119	139	7	WBGene00012710	15	35	34	WBGene00003018	114	167	57
WBGene00004380	96	24	8	WBGene00016973	154	207	29	WBGene00022797	89	71	8	WBGene00016580	106	41	13	WBGene00020508	105	121	33
WBGene00015499	99	52	8	WBGene00006522	76	31	6	WBGene00022801	89	71	8	WBGene00004448	106	41	13	WBGene00020507	100	75	11
WBGene00000814	101	79	8	NoWBGene_ID10	76	31	6	WBGene00022796	92	87	8	WBGene00016581	106	41	13	WBGene00004423	104	75	13
WBGene00194700	101	79	8	WBGene00016974	74	160	10	WBGene00022802	94	103	8	WBGene00016582	112	52	11	WBGene00014998	104	75	13
WBGene00016154	51	94	11	NoWBGene_ID64	74	160	10	WBGene00044763	94	103	8	WBGene00016583	117	63	8	WBGene00000797	123	148	11
WBGene00000429	59	108	24	WBGene00006944	151	192	98	WBGene00001628	94	103	8	WBGene00016591	117	63	8	WBGene00014999	123	148	11
WBGene00016156	64	48	10	WBGene00017563	151	192	98	WBGene00016203	110	124	7	WBGene00016589	117	63	8	WBGene00020427	123	175	8
WBGene00016157	82	49	10	WBGene00017559	151	192	98	WBGene00043051	106	77	7	WBGene00008949	85	32	7	WBGene00002039	63	117	9
WBGene00016158	89	49	9	WBGene00017560	151	192	98	WBGene00003801	106	77	7	WBGene00006733	85	32	7	WBGene00020135	63	117	9
WBGene00016159	101	50	9	WBGene00017562	151	192	98	WBGene00016207	85	29	11	WBGene00008948	85	32	7	WBGene00020134	103	163	7
WBGene00023409	102	50	8	WBGene00016964	127	182	10	WBGene00016209	85	29	11	WBGene00004756	143	142	12	WBGene00020769	158	205	18
WBGene00022749	105	104	15	WBGene00002045	127	182	10	WBGene00016202	85	29	11	WBGene00000376	117	118	11	WBGene00018578	126	176	9
WBGene00022750	137	180	59	WBGene00016961	127	182	10	WBGene00000665	123	70	11	WBGene00235129	143	142	12	WBGene00016620	113	146	8
WBGene00001819	168	255	102	WBGene00016965	127	182	10	WBGene00002879	123	70	11	WBGene00013922	143	142	12	WBGene00016617	113	146	8
WBGene00022752	103	92	12	WBGene00016966	127	182	10	WBGene00045246	123	89	9	WBGene00009211	104	125	21	WBGene00001551	132	196	28
WBGene00022748	103	92	12	WBGene00016967	85	35	9	WBGene00045247	93	83	9	WBGene00009212	104	125	21	WBGene00020301	105	167	18
WBGene00022753	103	92	12	WBGene00016960	85	35	9	WBGene00044633	93	83	9	NoWBGene_ID44	92	46	14	WBGene00020302	78	138	8
WBGene00044611	52	126	106	WBGene00016968	82	39	9	WBGene00018845	93	83	9	WBGene00004492	92	46	14	WBGene00001484	151	240	14
WBGene00020842	66	80	57	WBGene00020581	38	103	6	WBGene00018846	93	83	9	WBGene00009219	92	46	14	WBGene00019866	88	84	6
WBGene00020843	66	80	57	WBGene00020582	41	115	5	WBGene00000041	78	80	17	WBGene00009218	92	46	14	WBGene00019867	88	84	6
WBGene00020839	80	33	7	WBGene00016005	95	71	8	WBGene00015558	62	77	24	WBGene00001580	87	40	10	WBGene00019868	88	84	6
WBGene00020838	68	109	9	WBGene00016002	95	71	8	WBGene00000542	68	83	15	WBGene00008582	60	104	60	WBGene00019320	58	134	7
WBGene00003878	62	125	76	WBGene00001072	50	93	21	WBGene00015557	74	89	6	WBGene00001085	109	27	7	WBGene00019318	74	118	10
WBGene00018981	62	125	76	WBGene00001064	59	119	15	WBGene00000507	116	57	24	WBGene00007732	109	27	7	WBGene00001844	113	174	10

WBGene00018982	62	125	76	WBGene00020501	59	119	15	WBGene00000508	116	57	24	WBGene00007736	113	111	23	WBGene00019317	136	246	7
WBGene00018978	162	212	74	WBGene00006636	48	91	22	WBGene00018408	116	57	24	WBGene00011418	113	111	23	WBGene00019321	136	246	7
WBGene00045498	162	212	74	WBGene00020502	48	91	22	WBGene00003021	111	88	9	WBGene00005689	76	22	7	WBGene00006365	96	172	7
WBGene00020379	162	212	74	WBGene00020503	60	81	4	WBGene00018407	111	88	9	WBGene00001865	76	22	7	WBGene00044061	74	128	16
WBGene00020380	162	212	74	WBGene00020498	69	23	6	WBGene00004125	86	27	8	WBGene00009956	131	224	38	WBGene00018715	47	100	8
WBGene00020381	90	126	26	WBGene00018305	69	23	6	WBGene00018409	86	27	8	WBGene00001820	131	224	38	WBGene00018716	98	174	37
WBGene00020382	90	126	26	WBGene00018302	69	23	6	WBGene00018410	86	27	8	WBGene00014081	131	224	38	WBGene00000004	149	247	65
WBGene00020378	97	135	21	WBGene00002098	69	23	6	WBGene00018411	86	27	8	WBGene00010671	134	123	10	WBGene00018719	102	80	12
WBGene00020377	104	143	15	WBGene00018304	78	96	7	WBGene00000448	37	72	26	WBGene00002002	134	123	10	WBGene00018714	102	80	12
WBGene00020383	95	85	11	WBGene00020480	78	96	7	WBGene00000939	95	28	7	WBGene00002368	134	123	10	WBGene00019143	119	135	8
WBGene00000500	86	27	7	WBGene00020482	88	72	9	WBGene00000143	95	28	7	WBGene00010674	40	69	9	WBGene00019144	119	135	8
WBGene00020376	86	27	7	WBGene00020481	102	115	11	WBGene00019455	111	44	10	WBGene00010675	40	69	9	WBGene00003630	70	178	6
WBGene00020375	86	27	7	WBGene00020478	70	111	41	WBGene00004042	83	94	49	WBGene00000841	40	69	9	WBGene00020194	44	78	78
WBGene00000632	55	66	36	WBGene00017954	95	171	41	WBGene00015753	50	109	69	WBGene00003995	41	51	17	WBGene00020195	44	78	78
WBGene00020261	55	66	36	WBGene00006380	95	171	41	WBGene00001565	45	74	50	WBGene00013223	148	182	11	WBGene00015621	60	93	4
WBGene00020258	56	59	30	WBGene00017955	95	171	41	WBGene00004433	124	116	14	WBGene00000186	148	182	11	WBGene00020511	105	103	9
WBGene00020347	64	75	39	WBGene00017953	240	322	29	WBGene00015755	124	116	14	WBGene00219454	70	122	8	WBGene00020510	105	103	9
WBGene00020348	64	75	39	WBGene00001194	240	322	29	WBGene00015752	107	113	20	WBGene00235112	70	122	8	WBGene00020158	148	211	27
WBGene00001497	84	65	34	WBGene00015410	160	236	58	WBGene00015754	73	28	8	WBGene00006916	105	175	6	WBGene00020160	148	211	27
WBGene00206356	84	65	34	WBGene00206529	79	149	86	WBGene00017044	73	28	8	WBGene00007752	97	107	7	WBGene00006742	101	149	13
WBGene00020346	89	64	30	WBGene00001023	107	173	49	WBGene00017041	106	93	11	WBGene00011939	123	187	8	WBGene00006496	104	179	10
WBGene00004486	100	62	21	WBGene00016625	98	156	11	WBGene00017045	106	93	11	WBGene00011940	82	125	8	WBGene00015748	64	176	9
WBGene00020349	100	62	21	WBGene00016626	62	116	11	WBGene00086546	118	85	13	WBGene00004030	74	137	9	WBGene00015750	64	176	9
WBGene00016751	45	83	7	WBGene00016631	103	89	56	WBGene00016803	118	85	13	WBGene00008555	116	182	9	WBGene00022201	97	114	5
WBGene00005000	52	89	7	WBGene00016624	103	89	56	WBGene00004187	129	76	14	WBGene00010829	124	219	11	WBGene00002210	156	198	11
WBGene00000583	52	89	7	WBGene00000211	77	29	12	WBGene00006818	75	147	9	WBGene00010828	137	212	7	WBGene00018740	154	177	17
WBGene00016754	52	89	7	WBGene00000886	77	29	12	WBGene00206533	75	147	9	WBGene00010827	54	100	8	WBGene00018741	92	72	16
WBGene00015688	172	270	78	WBGene00015087	200	256	17	WBGene00016239	79	89	8	WBGene00005153	117	132	8	WBGene00018743	134	186	14
WBGene00015689	172	270	78	WBGene00017700	200	256	17	WBGene00016238	67	70	7	WBGene00014139	117	132	8	WBGene00015171	149	190	24
WBGene00015687	172	270	78	WBGene00017699	183	248	19	WBGene00004342	67	70	7	WBGene00003150	94	161	17	WBGene00015172	149	190	24
WBGene00015686	172	270	78	WBGene00017702	132	144	14	WBGene00015350	51	110	7	WBGene00009889	193	298	39	WBGene00044304	101	143	9
WBGene00002073	126	107	13	WBGene00000459	99	48	7	WBGene00015352	102	116	10	WBGene00000706	116	32	13	WBGene00015170	56	82	7
WBGene00017816	126	107	13	WBGene00006605	70	43	11	WBGene00003952	102	116	10	WBGene00008034	116	32	13	WBGene00003776	141	207	10
WBGene00002601	98	125	11	WBGene00004090	70	43	11	WBGene00015347	102	116	10	WBGene00008035	116	32	13	WBGene00044303	135	211	9
WBGene00017815	69	142	8	WBGene00015796	87	57	14	WBGene00015346	102	116	10	WBGene00004339	106	31	11	WBGene00022200	68	124	9
WBGene00000254	66	25	10	WBGene00000198	87	57	14	WBGene00003562	84	28	7	WBGene00001007	106	31	11	WBGene00022199	68	124	9
WBGene00003499	66	25	10	WBGene00004930	104	71	17	WBGene00000666	84	28	7	WBGene00044083	95	29	8	WBGene00000175	39	74	7
WBGene00019396	66	25	10	WBGene00015797	104	71	17	WBGene00017319	80	40	6	WBGene00007201	95	29	8	WBGene00019738	43	71	49
WBGene00019395	81	36	10	WBGene00015795	63	49	23	WBGene00017321	80	40	6	WBGene00007207	95	29	8	WBGene00019736	43	71	49
WBGene00019394	95	47	9	WBGene00006831	84	95	63	WBGene00007056	80	40	6	WBGene00006766	77	142	9	NoWBGene_ID40	43	71	49
WBGene00019399	95	47	9	WBGene00016889	100	62	7	WBGene00017323	75	51	5	WBGene00008624	84	59	9	WBGene00016344	92	182	8
WBGene00022586	95	47	9	WBGene00016890	100	62	7	WBGene00044444	75	51	5	WBGene00003421	84	59	9	WBGene00000451	92	182	8
WBGene00001596	60	123	7	WBGene00016888	107	101	10	WBGene00003243	97	143	10	WBGene00002974	57	64	7	WBGene00000452	92	182	8
WBGene00022593	59	113	7	WBGene00022855	135	38	10	WBGene00017358	115	124	11	WBGene00044978	57	64	7	WBGene00006670	91	151	9
WBGene00019993	97	21	8	WBGene00022852	135	38	10	WBGene00017357	79	44	8	WBGene00008177	90	76	8	WBGene00018702	127	200	12
WBGene00018156	97	21	8	WBGene00022857	135	38	10	WBGene00017356	79	44	8	WBGene00000417	115	108	9	WBGene00018701	127	200	12
WBGene00020742	97	37	11	WBGene00195239	135	38	10	WBGene00017355	81	59	8	WBGene00194643	140	139	10	WBGene00006948	127	200	12
WBGene00003798	97	37	11	WBGene00022851	135	38	10	WBGene00017354	81	59	8	WBGene00008178	75	32	9	WBGene00018703	134	180	11
WBGene00020743	116	99	17	WBGene00022856	67	96	7	WBGene00004726	114	98	10	WBGene00010435	106	54	18	WBGene00018704	140	159	10
WBGene00004273	116	99	17	WBGene00022849	67	96	7	WBGene00017360	114	98	10	WBGene00006466	136	76	26	WBGene00019611	140	159	10
WBGene00019432	116	99	17	WBGene00001872	108	33	8	WBGene00017359	114	98	10	WBGene00004424	136	76	26	WBGene00019612	140	159	10
WBGene00019433	116	99	17	WBGene00002238	108	33	8	WBGene00022580	104	25	7	WBGene00003037	136	76	26	WBGene00001685	111	166	12
WBGene00000937	76	22	7	WBGene00002183	108	33	8	WBGene00022583	104	25	7	WBGene00010436	136	76	26	WBGene00001684	111	166	12
WBGene00007018	76	22	7	WBGene00020166	108	33	8	WBGene00022579	104	25	7	WBGene00013465	91	28	12	WBGene00003124	111	166	12
WBGene00016944	76	22	7	WBGene00206521	159	196	14	WBGene00022581	104	25	7	WBGene00013461	91	33	21	WBGene00004951	98	139	20
WBGene00020416	117	66	6	WBGene00020170	140	182	16	WBGene00006840	161	212	12	WBGene00013462	134	34	29	WBGene00019609	93	106	8

WBGene00020417	117	66	6	WBGene00020163	140	182	16	WBGene00019881	161	212	12	WBGene00013463	134	34	29	WBGene00015791	45	62	8
WBGene00020413	96	50	6	WBGene00017349	105	42	11	WBGene00007008	161	212	12	WBGene00000818	134	34	29	NoWBGene_ID38	88	62	7
WBGene00020418	74	33	5	WBGene00004447	105	42	11	WBGene00019882	132	142	9	WBGene00012190	34	41	19	WBGene00001400	69	150	7
WBGene00020412	74	33	5	WBGene00017350	89	44	9	WBGene00019878	132	142	9	WBGene00044280	34	41	19	WBGene00017890	69	150	7
WBGene00020411	74	33	5	WBGene00017347	72	46	7	WBGene00019877	132	142	9	WBGene00004333	34	41	19	WBGene00017893	52	122	9
WBGene00019005	92	59	11	WBGene00017348	72	46	7	WBGene00019883	132	142	9	WBGene00013375	114	41	13	WBGene00017891	55	115	9
WBGene00019006	92	59	11	WBGene00017351	72	46	7	WBGene00022702	114	45	9	WBGene00000093	114	41	13	WBGene00017892	105	200	10
WBGene00019007	92	59	11	WBGene00006893	79	45	6	WBGene00022703	114	45	9	WBGene00004410	114	41	13	WBGene00018237	89	90	6
WBGene00000896	92	59	11	WBGene00017352	79	45	6	WBGene00022697	121	124	9	WBGene00013373	114	41	13	WBGene00018238	89	90	6
WBGene00006607	92	59	11	WBGene00017344	87	72	8	WBGene00022704	128	203	8	WBGene00013376	114	41	13	WBGene00004124	89	90	6
WBGene00019004	86	31	8	WBGene00017345	87	72	8	WBGene00023405	125	186	11	WBGene00013378	114	101	10	WBGene00006535	113	193	62
WBGene00019003	86	31	8	WBGene00017343	94	99	10	WBGene00000414	126	174	7	WBGene00004278	114	101	10	WBGene00002255	113	193	62
WBGene00000236	86	31	8	WBGene00020320	84	42	9	WBGene00022862	103	102	7	WBGene00044745	114	101	10	WBGene00002253	113	193	62
WBGene00003184	86	31	8	WBGene00001597	84	42	9	WBGene00022864	80	30	6	WBGene00014938	114	101	10	WBGene00002254	98	133	36
WBGene00019002	86	31	8	WBGene00020318	119	77	38	WBGene00044588	80	30	6	WBGene00003077	114	101	10	WBGene00018236	98	133	36
WBGene00019001	156	225	26	WBGene00016173	119	77	38	WBGene00022865	121	42	15	WBGene00013379	132	155	10	WBGene00006308	59	110	5
WBGene00002783	156	225	26	WBGene00016172	119	77	38	WBGene00016250	121	42	15	WBGene00013382	102	159	18	WBGene00019553	59	110	5
WBGene00006624	156	225	26	WBGene00001594	35	68	11	WBGene00004460	121	42	15	WBGene00013383	102	159	18	WBGene00019552	59	110	5
WBGene00017066	66	138	9	WBGene00003966	76	151	100	WBGene00016249	121	42	15	WBGene00004029	102	159	18	WBGene00019549	85	91	16
WBGene00017065	93	86	8	WBGene00016175	76	151	100	WBGene00018369	68	107	10	WBGene00010713	101	57	9	WBGene00019548	85	91	16
WBGene00000050	83	34	6	WBGene00017124	81	106	33	WBGene00018370	68	107	10	WBGene00012640	101	57	9	WBGene00043980	134	254	13
WBGene00017064	83	34	6	WBGene00017125	81	106	33	WBGene00018367	82	146	10	WBGene00012868	108	44	16	WBGene00017381	107	207	11
WBGene00044610	83	34	6	WBGene00017123	70	87	38	WBGene00018371	96	185	10	WBGene00003755	99	77	16	WBGene00017383	79	160	8
WBGene00020711	102	165	10	WBGene00017126	70	87	38	WBGene00018366	96	185	10	WBGene00012867	76	89	10	WBGene00017380	74	140	24
WBGene00020710	96	109	10	WBGene00017122	58	67	42	WBGene00015418	78	150	9	WBGene00012866	76	89	10	WBGene00022826	65	112	32
WBGene00020709	89	53	9	WBGene00005134	58	67	42	WBGene00043097	54	97	7	WBGene00004239	76	89	10	WBGene00022827	65	112	32
WBGene00020933	89	53	9	WBGene00017968	84	83	8	WBGene00015337	54	97	7	WBGene00003582	75	18	6	WBGene00022767	41	87	30
WBGene00003170	129	130	7	WBGene00004198	84	83	8	WBGene00015336	62	116	7	WBGene00004681	84	50	7	WBGene00000524	41	87	30
WBGene00004883	82	35	8	WBGene00003078	84	83	8	WBGene00015518	108	137	17	WBGene00009943	93	81	7	WBGene00022769	49	70	7
WBGene00020932	91	68	19	WBGene00017967	84	83	8	WBGene00015524	108	137	17	WBGene00219243	124	173	9	WBGene00044355	66	69	6
WBGene00020931	101	102	31	WBGene00017971	84	83	8	WBGene00015747	60	102	9	WBGene00006580	107	182	55	WBGene00006865	117	187	63
WBGene00020937	101	102	31	WBGene00016273	86	43	7	WBGene00000439	84	66	9	WBGene00008122	89	120	8	WBGene00000503	117	187	63
WBGene00006773	101	102	31	WBGene00000839	86	43	7	WBGene00017696	84	66	9	WBGene00012883	140	67	13	WBGene00006929	117	187	63
WBGene00020935	116	134	35	WBGene00000271	103	85	11	WBGene00001688	96	24	8	WBGene00044257	140	67	13	WBGene00006810	87	137	9
WBGene00020936	117	100	15	WBGene00018475	103	85	11	WBGene00001028	96	24	8	WBGene00004430	140	67	13	WBGene00000990	87	137	9
WBGene00001682	96	60	11	WBGene00018474	103	85	11	WBGene00006662	25	34	21	WBGene00001635	116	49	10	WBGene00195081	70	131	7
WBGene00017240	96	60	11	WBGene00018476	103	85	11	WBGene00017694	60	105	80	WBGene00012890	112	43	11	WBGene00004729	192	274	15
WBGene00017239	75	19	6	WBGene00003620	95	148	12	WBGene00017693	60	105	80	WBGene00012885	98	31	10	WBGene00006863	101	142	10
WBGene00006819	75	19	6	WBGene00002008	124	137	22	WBGene00017698	60	105	80	WBGene00012889	98	31	10	WBGene00004350	136	181	12
WBGene00004111	107	134	38	WBGene00001812	76	89	11	WBGene00001078	72	97	6	WBGene00012888	98	31	10	WBGene00006928	117	166	11
WBGene00000871	107	134	38	WBGene00018396	52	65	6	WBGene00017692	72	97	6	WBGene00012887	104	31	12	WBGene00015954	96	108	6
WBGene00016491	137	66	24	WBGene00018392	41	83	7	WBGene00003993	72	97	6	WBGene00007196	94	40	15	WBGene00015955	96	108	6
WBGene00016492	137	66	24	WBGene00018397	86	46	14	WBGene00002212	72	97	6	WBGene00004443	94	40	15	WBGene00015956	96	108	6
WBGene00016493	137	66	24	WBGene00018395	86	46	14	WBGene00001443	74	76	31	WBGene00007195	94	40	15	WBGene00004727	90	82	10
WBGene00004110	130	56	27	WBGene00018391	86	46	14	WBGene00015124	101	76	13	WBGene00001562	161	170	43	WBGene00020011	97	100	9
WBGene00016494	122	45	29	WBGene00018390	86	46	14	WBGene00015125	101	76	13	WBGene00045063	89	133	8	WBGene00044725	104	117	7
WBGene00017098	122	45	29	WBGene00044673	139	138	15	WBGene00015126	102	82	16	WBGene00044989	79	120	7	WBGene00006431	124	156	12
NoWBGene_ID70	110	33	7	WBGene00015569	139	138	15	WBGene00015128	81	69	11	WBGene00001575	79	120	7	WBGene00006643	124	156	12
WBGene00019323	94	64	22	WBGene00015567	116	180	9	WBGene00015129	81	69	11	WBGene00006598	79	120	7	WBGene00015357	131	196	11
WBGene00019322	78	95	36	WBGene00017022	83	105	5	WBGene00015132	65	72	19	WBGene00001190	49	98	81	WBGene00015358	90	152	45
WBGene00001056	63	72	34	WBGene00017023	83	105	5	WBGene00015133	65	72	19	WBGene00005810	49	98	81	WBGene00006454	72	114	8
WBGene00001075	47	49	32	WBGene00017024	83	105	5	WBGene00022717	80	94	12	WBGene00012542	49	98	81	WBGene00006408	72	114	8
WBGene00019248	47	49	32	WBGene00017021	83	105	5	WBGene00022718	92	163	8	WBGene00003086	149	97	35	WBGene00001434	125	196	17
WBGene00019247	47	49	32	WBGene00005641	83	105	5	WBGene00022719	82	39	7	NoWBGene_ID39	149	97	35	WBGene00018537	122	169	6
WBGene00020659	94	151	15	WBGene00000101	106	43	11	WBGene00022720	82	39	7	WBGene00009924	103	59	18	WBGene00018533	122	169	6
WBGene00006423	94	151	15	WBGene00006703	106	43	11	WBGene00004856	71	25	7	WBGene00009925	80	53	8	WBGene00018532	100	164	13

WBGene00016742	91	157	11	WBGene00000280	106	43	11	WBGene00022722	71	25	7	WBGene00009926	66	91	34	WBGene00018026	66	111	23
WBGene00004879	92	42	8	WBGene00022893	118	43	9	WBGene00019801	61	58	8	WBGene00000707	66	91	34	WBGene00018027	32	58	33
WBGene00016741	92	42	8	WBGene00003592	118	43	9	WBGene00003253	79	106	8	WBGene00009927	57	62	11	WBGene00001335	89	87	5
WBGene00016740	92	42	8	WBGene00022892	135	231	11	WBGene00019800	106	122	7	WBGene00002117	57	62	11	WBGene00018025	89	87	5
WBGene00016744	97	49	9	WBGene00022886	135	231	11	WBGene00019301	106	122	7	WBGene00012543	57	62	11	WBGene00001441	72	130	9
WBGene00016746	102	55	9	WBGene00018041	135	231	11	WBGene00019302	106	122	7	WBGene00194920	116	151	5	WBGene00019359	72	130	9
WBGene00016745	102	55	9	WBGene00018040	135	231	11	WBGene00019303	106	122	7	WBGene00010388	116	151	5	WBGene00000441	30	69	6
WBGene00020399	102	55	9	WBGene00006363	74	81	10	WBGene00018833	181	271	49	WBGene00008538	20	26	25	WBGene00002987	78	142	6
WBGene00020403	99	81	9	WBGene00019941	74	81	10	WBGene00006975	181	271	49	WBGene00008540	20	26	25	WBGene00018569	51	104	9
WBGene00020397	99	81	9	WBGene00019940	74	81	10	WBGene00018834	181	271	49	WBGene00013416	108	157	7	WBGene00018570	37	91	8
WBGene00020404	76	79	8	WBGene00019943	143	147	13	WBGene00018835	137	173	28	WBGene00013453	80	69	10	WBGene00018571	65	117	10
WBGene00016260	53	76	7	WBGene00043050	143	147	13	WBGene00004201	137	173	28	WBGene00013452	80	69	10	WBGene00006321	67	126	13
WBGene00010370	77	86	5	WBGene00000390	143	147	13	WBGene00018836	74	33	7	WBGene00010793	99	29	9	WBGene00020670	51	87	38
WBGene00010369	97	45	22	WBGene00019944	95	140	11	WBGene00018417	74	33	7	WBGene00010794	99	29	9	WBGene00020667	51	87	38
WBGene00003964	119	66	20	WBGene00017547	173	161	10	WBGene00018423	74	33	7	WBGene00013289	55	129	9	WBGene00020665	34	45	24
WBGene00008852	134	152	13	WBGene00017548	173	161	10	WBGene00018419	64	32	10	WBGene00013295	34	101	8	WBGene00020567	34	45	24
WBGene00004773	63	109	10	WBGene00017546	173	161	10	WBGene00018420	68	28	8	WBGene00013296	30	47	23	WBGene00003007	42	78	11
WBGene00044988	52	67	11	WBGene00003045	176	209	37	WBGene00018421	68	28	8	WBGene00013297	30	47	23	WBGene00015822	88	154	46
WBGene00012164	52	67	11	WBGene00003044	176	209	37	WBGene00018422	68	28	8	WBGene00255522	30	47	23	WBGene00015823	133	229	80
NoWBGene_ID41	52	67	11	WBGene00003012	178	256	63	WBGene00004041	96	24	7	WBGene00045061	30	47	23	WBGene00015824	133	229	80
WBGene00002198	183	246	21	WBGene00017545	178	256	63	WBGene00010475	101	168	10	WBGene00013299	30	47	23	WBGene00019828	139	210	7
WBGene00009050	183	246	21	WBGene00015204	100	34	8	WBGene00014022	95	32	8	WBGene00007058	120	136	13	WBGene00019830	139	210	7
WBGene00003815	183	246	21	WBGene00015205	100	34	8	WBGene00014031	95	32	8	WBGene00013323	87	27	9	WBGene00019827	88	152	8
WBGene00009051	183	246	21	WBGene00015203	100	34	8	NoWBGene_ID66	95	32	8	WBGene00013326	94	73	7	WBGene00017309	117	208	8
WBGene00004186	131	135	14	WBGene00015206	92	42	9	WBGene00002998	149	91	13	WBGene00013304	79	112	10	WBGene00022745	97	160	7
WBGene00009052	78	24	7	WBGene00015207	84	49	9	WBGene00006768	149	91	13	WBGene00013303	82	70	10	WBGene00022746	97	160	7
WBGene00006753	132	179	8	WBGene00015208	84	49	9	WBGene00014027	36	52	30	WBGene00013302	82	70	10	WBGene00006410	161	243	10
WBGene00006394	132	179	8	WBGene00005149	84	49	9	WBGene00014028	36	52	30	WBGene00013324	84	28	9	WBGene00003412	55	80	9
WBGene00010738	69	86	16	WBGene00007044	34	84	5	WBGene00000388	36	52	30	WBGene00013301	84	28	9	WBGene00006921	111	166	18
WBGene00010427	115	148	12	WBGene00015061	80	118	61	WBGene00014033	49	89	72	WBGene00013332	84	28	9	WBGene00017628	111	166	18
WBGene00010645	161	210	7	WBGene00015062	80	118	61	WBGene00014035	112	33	10	WBGene00013333	84	28	9	WBGene00001994	161	217	17
WBGene00010641	101	148	11	WBGene00015063	80	118	61	WBGene00014036	112	33	10	WBGene00013325	84	28	9	WBGene00020922	161	217	17
WBGene00006963	101	148	11	WBGene00015059	80	118	61	WBGene00014034	112	33	10	WBGene00013306	110	86	25	WBGene00018602	52	70	9
WBGene00010642	101	148	11	WBGene00015064	80	118	61	WBGene00014037	112	33	10	WBGene00194649	110	86	25	WBGene00001957	52	70	9
WBGene00010644	49	108	8	WBGene00015065	80	118	61	WBGene00011143	103	36	11	WBGene00013334	110	86	25	WBGene00005716	155	90	32
WBGene00010870	49	108	8	WBGene00015517	63	99	35	WBGene00001227	103	36	11	WBGene00013307	110	86	25	WBGene00006393	155	90	32
WBGene00194654	49	108	8	WBGene00015516	63	99	35	WBGene00011144	103	36	11	WBGene00001558	139	122	18	WBGene00005717	118	66	19
WBGene00010869	49	108	8	WBGene00015512	63	99	35	WBGene00011145	103	36	11	WBGene00000763	168	158	11	WBGene00016867	94	129	7
WBGene00010873	181	246	30	WBGene00015513	90	71	23	WBGene00011146	112	213	7	WBGene00013308	168	158	11	WBGene00016866	107	216	7
WBGene00010871	181	246	30	WBGene00015515	117	42	11	WBGene00011147	42	41	17	WBGene00000192	168	158	11	WBGene00003179	107	216	7
WBGene00010872	181	246	30	WBGene00004823	117	42	11	WBGene00010307	74	84	18	WBGene00013310	168	158	11	WBGene00000510	83	143	8
WBGene00001949	181	246	30	WBGene00001615	104	84	25	WBGene00010308	74	84	18	WBGene00013311	139	164	90	WBGene00003907	83	143	8
WBGene00000637	181	246	30	WBGene00015514	90	125	38	WBGene00010309	106	127	18	WBGene00004487	139	164	90	WBGene00016868	83	143	8
WBGene00007254	139	194	14	WBGene00000516	156	274	70	WBGene00006977	63	136	11	WBGene00013312	139	164	90	WBGene00004106	103	119	9
WBGene00003622	139	194	14	WBGene00000517	156	274	70	WBGene00004269	63	136	11	WBGene00013317	100	79	22	WBGene00003084	55	85	6
WBGene00007255	70	42	11	WBGene00011458	156	274	70	WBGene00010310	78	153	10	WBGene00013313	100	79	22	WBGene00001082	89	83	7
WBGene00007256	70	42	11	WBGene00002216	49	109	8	WBGene00010311	93	170	9	WBGene00013327	76	106	6	WBGene00017476	47	123	90
WBGene00007257	70	42	11	WBGene00000046	62	91	9	WBGene00003518	65	65	9	WBGene00001330	67	150	8	WBGene00017794	47	123	90
WBGene00007258	81	34	6	WBGene00011633	62	91	9	WBGene00011298	65	65	9	WBGene00013319	34	35	20	WBGene00017177	79	50	21
WBGene00011062	81	34	6	WBGene00011634	62	91	9	WBGene00011299	103	118	11	WBGene00045146	135	64	8	WBGene00000157	116	69	10
WBGene00011061	81	34	6	WBGene00007014	73	60	10	WBGene00011300	141	171	12	WBGene00012762	135	64	8	WBGene00017178	101	54	9
WBGene00011064	122	43	19	WBGene00011635	73	60	10	WBGene00000549	141	171	12	WBGene00001336	91	44	8	WBGene00017176	112	48	8
WBGene00003041	122	43	19	WBGene00011636	83	29	11	WBGene00001749	37	44	18	WBGene00012765	97	41	9	WBGene00000207	112	48	8
WBGene00000275	122	43	19	WBGene00011641	111	77	11	WBGene00003001	73	86	15	WBGene00012767	113	36	12	WBGene00023460	47	79	8
WBGene00011066	122	43	19	WBGene00011637	111	77	11	WBGene00044406	109	127	12	WBGene00012766	109	30	9	WBGene00000959	89	131	8
WBGene00009001	36	40	21	WBGene00002994	111	70	11	WBGene00008513	109	127	12	WBGene00012768	121	48	19	WBGene00004356	123	133	20

WBGene00077548	36	40	21	WBGene00011638	111	55	12	WBGene00008514	101	122	9	WBGene00012769	121	48	19	WBGene00005008	153	192	61
WBGene00009002	36	40	21	WBGene00011639	111	55	12	WBGene00001609	101	122	9	WBGene00004035	47	59	34	WBGene00015561	153	192	61
WBGene00004324	36	40	21	WBGene00011349	102	61	6	WBGene00013979	54	85	44	WBGene00013517	47	59	34	WBGene00003963	182	250	102
WBGene00008765	83	33	7	WBGene00011348	86	49	8	WBGene00013980	115	163	35	WBGene00004170	53	104	79	WBGene00003628	173	204	11
WBGene00008766	83	33	7	WBGene00006913	69	36	9	WBGene00000863	115	163	35	WBGene00004171	53	104	79	WBGene00015560	143	231	12
WBGene00008767	83	33	7	WBGene00011351	69	36	9	WBGene00013982	176	240	26	WBGene00013530	112	55	22	WBGene00206364	143	231	12
WBGene00008769	83	33	7	WBGene00011350	74	72	9	WBGene00001720	176	240	26	WBGene00013532	119	91	36	WBGene00001821	143	231	12
WBGene00001136	109	142	9	WBGene00004208	47	103	7	WBGene00000425	154	196	18	WBGene00013531	119	91	36	WBGene00000133	148	208	7
WBGene00003236	109	142	9	WBGene00008436	114	101	12	WBGene00013985	132	152	9	WBGene00013538	135	50	11	WBGene00015494	148	208	7
WBGene00008768	109	142	9	WBGene00006996	114	101	12	WBGene00013983	90	42	7	WBGene00013637	108	133	9	WBGene00020496	90	134	12
WBGene00009915	109	142	9	WBGene00007433	155	196	16	WBGene00013989	90	42	7	WBGene00185102	108	133	9	WBGene00004148	139	156	34
WBGene00001680	92	124	7	WBGene00003813	155	196	16	WBGene00013984	90	42	7	WBGene00194913	108	133	9	WBGene00016706	59	124	6
WBGene00009916	75	105	5	WBGene00004723	83	44	10	WBGene00013987	90	42	7	WBGene00013639	19	29	20	WBGene00016705	107	149	11
WBGene00009917	65	38	6	WBGene00007434	83	44	10	WBGene00003597	90	42	7	WBGene00194931	19	39	24	WBGene00016704	107	149	11
WBGene00009918	65	38	6	WBGene00007436	83	44	10	WBGene00002081	114	178	7	WBGene00013650	59	100	91	WBGene00044567	111	166	11
WBGene00009919	65	38	6	WBGene00006724	83	44	10	WBGene00006526	114	178	7	WBGene00005727	59	100	91	WBGene00017532	111	166	11
WBGene00002136	65	38	6	WBGene00007435	83	44	10	WBGene00013850	135	170	11	WBGene00013651	49	52	32	WBGene00003635	105	156	7
WBGene00013994	87	32	6	WBGene00011507	105	103	26	WBGene00013847	135	170	11	WBGene00004816	49	52	32	WBGene00206361	43	87	6
WBGene00012136	153	181	42	WBGene00000151	127	162	42	WBGene00013849	135	170	11	WBGene00013653	49	52	31	WBGene00019346	43	87	6
WBGene00012137	93	117	5	WBGene00011508	127	162	42	WBGene00004391	111	119	32	WBGene00013658	52	91	10	WBGene00002044	104	155	7
WBGene00012140	134	156	9	WBGene00011509	127	162	42	WBGene00011963	111	119	32	WBGene00002175	86	151	6	WBGene00000176	140	166	8
WBGene00012141	134	156	9	WBGene00011512	99	67	28	WBGene00011962	118	161	22	WBGene00001604	57	112	42	WBGene00019344	126	148	9
WBGene00007042	165	173	20	WBGene00006734	99	67	28	WBGene00011964	125	202	11	WBGene00009539	39	32	18	WBGene00001032	107	108	9
WBGene00007742	196	190	30	WBGene00011510	99	67	28	WBGene00000934	120	181	10	WBGene00009537	39	32	18	WBGene00018878	97	111	11
WBGene00077553	195	257	15	WBGene00011511	75	104	30	WBGene00011365	86	117	7	WBGene00009538	39	32	18	WBGene00004438	97	111	11
WBGene00007743	195	257	15	WBGene00010501	80	121	55	WBGene00011366	57	73	5	WBGene00012420	195	247	74	WBGene00018877	108	188	15
WBGene00001648	195	257	15	WBGene00010503	80	121	55	WBGene00010796	26	70	7	WBGene00185101	161	252	90	WBGene00003056	120	194	12
WBGene00000938	145	193	11	WBGene00003089	116	181	10	WBGene00008039	76	26	5	WBGene00013418	161	252	90	WBGene00016537	131	199	9
WBGene00012029	91	40	7	WBGene00005150	116	181	10	WBGene00008040	76	26	5	WBGene00013419	161	252	90	WBGene00003377	89	161	9
WBGene00000496	87	35	7	WBGene00044049	80	124	26	WBGene00008041	76	26	5	WBGene00194949	161	252	90	WBGene00003807	78	138	9
WBGene00012030	93	91	8	WBGene00008050	43	67	42	WBGene00001242	76	26	5	WBGene00004357	196	266	26	WBGene00018376	59	84	68
WBGene00012031	104	152	8	WBGene00008054	43	67	42	WBGene00001263	63	111	7	WBGene00013099	196	266	26	WBGene00018375	134	212	9
WBGene00008411	79	38	11	WBGene00008051	43	67	42	WBGene00010573	55	101	10	WBGene00013100	137	105	39	WBGene00003245	134	212	9
WBGene00008418	81	120	8	WBGene00002147	168	255	21	WBGene00001689	115	28	11	WBGene00194647	137	105	39	WBGene00019960	122	192	10
WBGene00008419	81	120	8	WBGene00006832	168	255	21	WBGene00004343	115	28	11	WBGene00219244	137	105	39	WBGene00019959	110	171	11
WBGene00000084	73	83	7	WBGene00006739	168	255	21	WBGene00012059	92	33	6	WBGene00013106	125	46	26	WBGene00018193	72	96	5
WBGene00003071	73	83	7	WBGene00008052	153	169	23	WBGene00001284	114	106	16	WBGene00013109	125	46	26	WBGene00000072	57	94	6
WBGene00009254	91	28	8	WBGene00008053	124	70	20	WBGene00010035	114	106	16	WBGene00013111	29	37	30	WBGene00006640	120	226	8
WBGene00009140	91	28	8	WBGene00008642	124	70	20	WBGene00010037	114	106	16	WBGene00013115	39	61	67	WBGene00020323	107	155	7
WBGene00009141	91	28	8	WBGene00004421	109	56	15	WBGene00010039	85	126	12	WBGene00012791	58	72	53	WBGene00020322	84	66	7
WBGene00004508	96	28	7	WBGene00008639	109	56	15	WBGene00010040	100	115	8	WBGene00003130	78	19	11	WBGene00020324	47	110	7
WBGene00001214	31	89	9	WBGene00008641	97	29	8	WBGene00010038	134	86	9	WBGene00020284	123	37	12	WBGene00019403	148	199	8
WBGene00009142	31	89	9	WBGene00001281	97	29	8	WBGene00004980	134	86	9	WBGene00020287	167	54	13	WBGene00006475	125	271	68
WBGene00009145	112	24	8	WBGene00004510	97	29	8	WBGene00007186	125	47	22	WBGene00020286	167	54	13	WBGene00019758	125	271	68
WBGene00011975	112	24	8	WBGene00011469	119	30	9	WBGene00007188	125	47	22	WBGene00235300	167	54	13	WBGene00000066	125	271	68
WBGene00011972	112	24	8	WBGene00003241	119	30	9	WBGene00000235	125	47	22	WBGene00219547	167	54	13	WBGene00019759	146	248	43
WBGene00011973	87	51	9	WBGene00000377	119	30	9	WBGene00007187	125	47	22	WBGene00013789	140	24	11	WBGene00019760	167	225	18
WBGene00001647	87	51	9	WBGene00011471	119	30	9	WBGene00007185	91	30	10	WBGene00000184	140	24	11	WBGene00022501	105	151	12
WBGene00077728	87	51	9	WBGene00195142	125	140	47	WBGene00001094	91	30	10	WBGene00013792	140	24	11	WBGene00022500	53	102	9
WBGene00011968	87	51	9	WBGene00010913	125	140	47	WBGene00007184	91	30	10	WBGene00004403	119	29	6	WBGene00022499	94	126	8
WBGene00009187	135	166	26	WBGene00002066	125	140	47	WBGene00010130	114	52	7	WBGene00013794	37	39	21	WBGene00195189	113	100	10
WBGene00009188	182	281	42	WBGene00000894	125	140	47	WBGene00000550	105	33	13	WBGene00013796	37	37	22	WBGene00022613	90	98	35
WBGene00009191	84	24	6	WBGene00001571	67	25	8	WBGene00014218	105	33	13	WBGene00013797	37	37	22	WBGene00022612	80	93	25
WBGene00009189	84	24	6	WBGene00010459	67	25	8	WBGene00014224	105	33	13	WBGene00013803	140	29	11	WBGene00022611	63	90	33
WBGene00006518	79	27	7	WBGene00010458	67	25	8	WBGene00014222	100	32	11	WBGene00004914	140	29	11	WBGene00022614	59	84	6
WBGene00077543	73	29	7	WBGene00010460	84	27	9	WBGene00014223	94	30	8	WBGene00013814	140	29	11	WBGene00022615	46	123	7

WBGene00009190	73	29	7	WBGene00003821	100	29	9	WBGene00014219	94	30	8	WBGene00013804	140	29	11	WBGene00022024	50	151	7
WBGene00003818	95	104	16	WBGene00000379	100	29	9	WBGene00014220	90	41	9	WBGene00000889	187	95	53	WBGene00016069	98	126	7
WBGene00000079	113	54	24	WBGene00004304	141	117	70	WBGene00003504	91	34	10	WBGene00013809	187	95	53	WBGene00016068	98	126	7
WBGene00008397	113	54	24	WBGene00007744	141	117	70	WBGene00014221	135	148	9	WBGene00006698	187	95	53	WBGene00016067	67	127	10
WBGene00003746	32	92	5	WBGene00001840	141	117	70	WBGene00014225	135	148	9	WBGene00006405	187	95	53	WBGene00006861	77	150	7
WBGene00008398	85	20	7	WBGene00007745	141	117	70	WBGene00194691	135	148	9	WBGene00004819	45	56	31	WBGene00016600	92	159	47
WBGene00008399	85	20	7	WBGene00001159	47	82	9	WBGene00006755	178	269	7	WBGene00004815	50	56	29	WBGene00006862	107	168	86
WBGene00009270	72	34	11	WBGene00007746	30	74	6	WBGene00000421	88	41	7	WBGene00004814	51	59	27	WBGene00000149	95	146	8
WBGene00009272	72	34	11	WBGene00006719	152	221	16	WBGene00008168	88	41	7	WBGene00004818	51	59	27	WBGene00016292	81	162	6
WBGene00009276	72	34	11	WBGene00005039	152	221	16	WBGene00043992	115	43	16	WBGene00016879	80	123	6	WBGene00017150	87	101	7
WBGene00009277	87	103	12	WBGene00009899	152	221	16	WBGene00004180	115	43	16	WBGene00013779	93	109	17	WBGene00020197	87	101	7
WBGene00009274	87	103	12	WBGene00008799	152	221	16	WBGene00010229	115	43	16	WBGene00013996	96	22	7	WBGene00020196	98	79	7
WBGene00006386	87	103	12	WBGene00008800	99	64	8	WBGene00001831	83	76	13	WBGene00013997	96	22	7	WBGene00020199	98	79	7
WBGene00000163	112	141	59	WBGene00008802	99	64	8	WBGene00001955	51	108	10	WBGene00044244	118	192	11	WBGene00005711	98	79	7
WBGene00011230	112	141	59	WBGene00008803	86	52	16	WBGene00006540	83	35	8	WBGene00006229	118	192	11	WBGene00004145	135	114	17
WBGene00011231	112	141	59	WBGene00001230	86	52	16	WBGene00010230	83	35	8	WBGene00000224	118	192	11	WBGene00019250	120	155	21
WBGene00011232	81	98	40	WBGene00001358	86	52	16	WBGene00006704	83	35	8	WBGene00001606	118	192	11	WBGene00019249	105	195	25
WBGene00011234	81	98	40	WBGene00009041	86	52	16	WBGene00001570	66	62	11	WBGene00009155	127	115	31	WBGene00019251	105	195	25
WBGene00011235	49	55	21	WBGene00009042	44	79	7	WBGene00007405	114	193	10	WBGene00009156	127	115	31	WBGene00003477	134	210	8
WBGene00010110	63	102	6	WBGene00009043	94	75	8	WBGene00007403	184	295	22	WBGene00002005	127	115	31	WBGene00021323	134	210	8
WBGene00010113	53	101	8	WBGene00009044	143	70	9	WBGene00007400	184	295	22	WBGene00012128	127	115	31	WBGene00021320	45	93	7
WBGene00008991	53	101	8	WBGene00006994	113	50	9	WBGene00006579	184	295	22	WBGene00008195	99	46	10	WBGene00021324	82	120	11
WBGene00008990	68	65	8	WBGene00001498	82	30	9	WBGene00003571	184	295	22	WBGene00008196	99	46	10	WBGene00002031	83	92	9
WBGene00003777	133	67	8	WBGene00009045	82	30	9	WBGene00011498	108	176	10	WBGene00008197	99	46	10	WBGene00021319	84	64	6
WBGene00011912	162	128	9	WBGene00010877	54	78	8	WBGene00002064	108	176	10	WBGene00008204	99	46	10	WBGene00000092	86	123	9
WBGene00011913	162	128	9	WBGene00010878	73	89	10	WBGene00000405	108	176	10	WBGene00008198	99	46	10	WBGene00017973	86	123	9
WBGene00011914	162	128	9	WBGene00010879	73	89	10	WBGene00011499	108	176	10	WBGene00008200	99	46	10	WBGene00006064	37	68	38
WBGene00011915	140	151	10	WBGene00001523	92	99	11	WBGene00011500	108	176	10	WBGene00007823	75	140	8	WBGene00016135	79	159	6
WBGene00011916	140	151	10	WBGene00011755	62	100	7	WBGene00011503	151	114	49	WBGene00001811	77	83	7	WBGene00016133	79	159	6
WBGene00011917	140	151	10	WBGene00011756	61	38	8	WBGene00011501	151	114	49	WBGene00007826	79	25	6	WBGene00016132	90	143	7
WBGene00002179	57	133	9	WBGene00004383	61	38	8	WBGene00000366	132	113	30	WBGene00007824	79	25	6	WBGene00016136	100	126	8
WBGene00011919	86	21	6	WBGene00011761	61	38	8	WBGene00011216	142	137	20	WBGene00007825	79	25	6	WBGene00016131	100	126	8
WBGene00011921	86	21	6	WBGene00011757	82	41	9	WBGene00005021	142	137	20	WBGene00007357	44	76	5	WBGene00006371	105	156	12
WBGene00004318	114	114	12	WBGene00011758	82	41	9	WBGene00006910	171	163	29	WBGene00007358	44	76	5	WBGene00003990	105	156	12
WBGene00011920	141	206	18	WBGene00011759	81	98	9	WBGene00006911	171	163	29	WBGene00008710	79	53	16	WBGene00018037	108	178	10
WBGene00008314	52	90	6	WBGene00011760	81	98	9	WBGene00011218	171	163	29	WBGene00008713	79	53	16	WBGene00015390	59	105	77
WBGene00008313	46	77	5	WBGene00012175	80	154	9	WBGene00011220	118	47	12	WBGene00008709	39	87	8	WBGene00016559	59	105	77
WBGene00008317	103	42	9	WBGene00012176	42	98	6	WBGene00003158	118	47	12	WBGene00001240	39	87	8	WBGene00016558	77	125	8
WBGene00000869	103	42	9	WBGene00004155	45	107	35	WBGene00011219	118	47	12	WBGene00008708	39	87	8	WBGene00016106	71	144	9
WBGene00008318	106	65	8	WBGene00012177	48	115	63	WBGene00014011	94	53	10	WBGene00008707	39	87	8	WBGene00016104	67	112	7
WBGene00010560	106	65	8	WBGene00012178	48	115	63	WBGene00014012	95	53	9	WBGene00015153	109	141	10	WBGene00016103	106	164	28
WBGene00045192	109	88	7	WBGene00002065	82	51	12	WBGene00014013	95	53	9	WBGene00002061	109	141	10	WBGene00001006	129	216	48
WBGene00010564	93	32	7	WBGene00175035	83	39	10	WBGene00014014	119	109	22	WBGene00021413	33	75	62	WBGene00016102	129	216	48
WBGene00010569	143	151	13	WBGene00006059	83	39	10	WBGene00014020	142	166	36	WBGene00004496	111	60	15	WBGene00020736	105	163	7
WBGene00010565	143	151	13	WBGene00010041	97	43	14	WBGene00000567	142	166	36	WBGene00018975	111	60	15	WBGene00020737	146	198	9
WBGene00077768	192	269	18	WBGene00000615	97	43	14	WBGene00014015	131	124	24	NoWBGene_ID83	111	60	15	WBGene00020738	146	198	9
WBGene00010566	192	269	18	WBGene00004416	110	59	20	WBGene00000189	119	81	11	WBGene00000480	152	29	9	WBGene00016934	121	156	9
WBGene00000156	192	269	18	WBGene00010042	110	59	20	WBGene00003035	119	81	11	WBGene00020999	152	29	9	WBGene00002983	84	132	9
WBGene00010567	83	76	32	WBGene00010043	99	66	14	WBGene00014016	119	81	11	WBGene00021000	152	29	9	WBGene00016933	71	151	8
WBGene00010568	83	76	32	WBGene00004241	88	72	8	WBGene00014017	119	81	11	WBGene00021004	152	29	9	WBGene00003166	180	263	8
WBGene00008935	83	76	32	WBGene00010044	88	72	8	WBGene00014018	119	81	11	WBGene00021002	125	127	8	WBGene00006826	180	263	8
WBGene00000485	91	57	20	WBGene00010045	59	102	9	WBGene00014019	119	81	11	WBGene00006648	149	160	8	WBGene00017464	180	263	8
WBGene00004378	98	37	8	WBGene00009202	53	77	15	WBGene00010782	109	69	35	WBGene00000838	119	30	10	WBGene00044570	100	127	9
WBGene00008934	95	128	14	WBGene00009203	47	51	21	WBGene00010779	109	69	35	WBGene00044689	108	33	9	WBGene00020673	100	127	9
WBGene00005009	95	128	14	WBGene00009205	122	63	11	WBGene00010783	109	69	35	WBGene00017083	68	75	24	WBGene00005718	100	127	9
WBGene00002999	96	144	9	WBGene00000773	122	63	11	WBGene00010780	73	49	27	WBGene00019814	96	105	26	WBGene00020674	47	77	8

WBGene00003136	122	132	9	WBGene00004440	122	63	11	WBGene00010778	56	63	45	WBGene00019817	96	105	26	WBGene00001182	60	133	13
WBGene00012113	142	206	43	WBGene00006307	122	63	11	WBGene00010784	75	98	72	WBGene00019818	89	100	20	WBGene00020920	101	197	10
WBGene00012116	142	206	43	WBGene00009207	122	63	11	WBGene00014075	81	101	41	WBGene00019815	82	95	13	WBGene00020918	124	207	46
WBGene00011375	126	135	77	WBGene00011924	76	96	11	WBGene00014073	87	103	10	WBGene00006419	82	95	13	WBGene00020921	146	216	81
WBGene00004966	99	119	44	WBGene00011925	76	96	11	WBGene00009594	68	92	8	WBGene00018013	95	35	13	WBGene00000295	146	216	81
WBGene00013955	99	119	44	WBGene00011926	76	96	11	WBGene00043995	68	92	8	WBGene00020707	134	102	13	WBGene00017108	28	34	17
WBGene00011380	72	102	10	WBGene00006875	35	84	7	WBGene00009595	68	92	8	WBGene00020706	103	70	13	WBGene00004349	58	151	9
WBGene00044094	88	34	10	WBGene00008432	53	89	21	WBGene00001603	92	24	6	WBGene00020705	72	37	12	WBGene00016937	137	171	15
WBGene00013958	88	34	10	WBGene00004259	82	58	24	WBGene00010542	80	38	6	WBGene00021450	65	86	7	WBGene00016938	137	171	15
WBGene00013957	83	98	53	WBGene00008427	82	58	24	WBGene00044903	80	38	6	WBGene00021449	65	86	7	WBGene00006368	113	133	10
WBGene00013959	77	161	96	WBGene00008431	82	58	24	WBGene00010546	68	52	6	WBGene00005256	94	108	7	WBGene00004788	146	182	12
WBGene00013960	75	145	8	WBGene00008428	93	23	13	WBGene00003389	81	51	7	WBGene00005257	94	108	7	WBGene00018516	146	182	12
WBGene00011344	97	118	11	WBGene00008429	93	23	13	WBGene00007010	111	122	15	WBGene00003688	60	113	4	WBGene00018514	52	123	30
WBGene00011345	115	213	13	WBGene00008430	42	88	10	WBGene00011221	127	195	22	WBGene00019743	60	113	4	WBGene00018517	52	123	30
WBGene00002196	96	57	11	WBGene00007915	78	98	8	WBGene00194886	119	179	10	WBGene00019742	51	78	4	WBGene00017428	52	123	30
WBGene00003788	96	57	11	WBGene00194940	114	108	6	WBGene00007319	119	179	10	WBGene00019741	51	78	4	WBGene00001824	139	232	36
WBGene00003183	90	59	9	WBGene00007917	98	109	8	WBGene00007321	119	179	10	WBGene00019745	51	78	4	WBGene00017427	139	232	36
WBGene00009920	80	92	8	WBGene00007918	98	109	8	WBGene00004100	119	179	10	WBGene00003720	57	112	6	WBGene00021060	149	216	15
WBGene00009923	75	88	8	WBGene00000432	98	109	8	WBGene00219314	119	179	10	WBGene00020153	57	112	6	WBGene00004245	92	151	11
WBGene00009921	80	72	9	WBGene00004194	98	109	8	WBGene00004344	56	109	9	WBGene00020152	57	112	6	WBGene00021059	35	86	6
WBGene00000467	100	55	14	WBGene00004279	65	46	6	WBGene00044222	69	97	21	WBGene00020013	50	142	7	WBGene00006424	46	133	8
WBGene00004439	100	55	14	WBGene00000887	65	46	6	WBGene00011805	77	91	23	WBGene00003648	50	142	7	WBGene00016716	67	94	6
WBGene00007911	86	40	11	WBGene00206502	65	46	6	WBGene00011809	81	69	17	WBGene00003722	50	142	7	WBGene00003254	67	94	6
WBGene00007914	86	40	11	WBGene00011311	65	46	6	WBGene00011806	87	56	16	WBGene00015759	50	142	7	WBGene00019938	77	32	5
WBGene00011827	86	111	8	WBGene00010681	143	251	11	WBGene00011814	148	185	8	WBGene00018622	97	140	6	WBGene00019937	77	32	5
WBGene00003596	86	111	8	WBGene00000220	94	167	9	WBGene00011815	148	185	8	WBGene00018623	97	140	6	WBGene00002190	74	142	9
WBGene00008529	69	30	8	WBGene00010683	94	167	9	WBGene00002186	148	185	8	WBGene00021709	74	80	5	WBGene00002224	140	190	32
WBGene00008528	88	91	9	WBGene00001505	44	83	7	WBGene00011817	111	26	10	WBGene00005896	74	80	5	WBGene00017718	185	221	54
WBGene00003014	88	91	9	WBGene00000240	126	164	15	WBGene00014234	111	26	10	WBGene00019243	95	152	33	WBGene00002125	185	221	54
WBGene00008531	94	93	9	WBGene00010682	126	164	15	WBGene00014227	111	26	10	WBGene00001564	95	152	33	WBGene00017717	185	221	54
WBGene00004117	91	57	8	WBGene00002295	126	164	15	WBGene00014228	111	26	10	WBGene00005228	95	152	33	WBGene00015623	78	95	9
WBGene00008530	102	81	8	WBGene00004790	133	150	33	WBGene00014229	100	28	11	WBGene00005613	95	152	33	WBGene00015624	78	95	9
WBGene00008533	102	81	8	WBGene00008563	133	150	33	WBGene00014230	89	30	11	WBGene00206359	78	32	7	WBGene00002146	64	90	7
WBGene00008532	79	48	10	WBGene00008557	133	150	33	WBGene00044072	89	30	11	WBGene00015491	78	32	7	WBGene00002023	59	95	7
WBGene00004931	68	31	11	WBGene00008558	133	150	33	WBGene00003519	58	119	8	WBGene00005643	78	32	7	WBGene00003911	85	135	8
WBGene00008648	68	31	11	WBGene00009781	69	62	10	WBGene00077703	76	136	8	WBGene00006266	136	34	13	WBGene00016661	114	182	10
WBGene00008649	69	27	8	WBGene00011767	69	62	10	WBGene00003482	76	136	8	WBGene00019983	136	34	13	WBGene00001602	111	194	11
WBGene00006844	63	97	13	WBGene00011768	69	62	10	WBGene00004255	89	123	11	WBGene00019982	136	34	13	WBGene00004219	111	194	11
WBGene00008385	85	36	9	WBGene00044062	41	110	8	WBGene00011869	89	123	11	WBGene00044514	136	34	13	WBGene00016658	151	226	88
WBGene00008386	73	84	8	WBGene00011578	41	110	8	WBGene00011870	89	123	11	WBGene00019558	57	80	11	WBGene00016662	151	226	88
WBGene00000431	60	122	7	WBGene00004355	102	75	11	WBGene00011874	94	84	10	WBGene00019557	57	80	11	WBGene00002007	151	226	88
WBGene00010496	88	115	10	WBGene00045407	102	75	11	WBGene00011873	98	44	9	WBGene00019563	57	80	11	WBGene00015801	125	187	49
WBGene00010495	117	117	12	WBGene00011580	143	170	17	WBGene00011867	100	41	8	WBGene00019556	51	61	20	WBGene00015800	99	147	10
WBGene00010497	117	117	12	WBGene00002251	183	265	23	WBGene00011871	101	38	7	NoWBGene_ID36	44	41	28	WBGene00003778	36	91	7
WBGene00010500	86	108	65	WBGene00000378	76	112	7	WBGene00011872	101	38	7	WBGene00020155	38	61	10	WBGene00015803	36	91	7
WBGene00006976	86	108	65	WBGene00011883	76	112	7	WBGene00011868	108	85	13	WBGene00001480	99	51	9	WBGene00022202	60	128	7
WBGene00001677	86	108	65	WBGene00011884	84	78	8	WBGene00000833	115	131	19	WBGene00019241	92	71	8	WBGene00016423	162	266	11
WBGene00001651	113	184	6	WBGene00011885	80	63	8	WBGene00004326	115	131	19	WBGene00019240	78	86	8	WBGene00003846	66	131	10
WBGene00011353	113	184	6	WBGene00011887	74	34	7	WBGene00011875	115	131	19	WBGene00019239	72	80	8	WBGene00020786	66	131	10
WBGene00004305	106	72	12	WBGene00011886	74	34	7	WBGene00001002	113	69	11	WBGene00005024	89	105	9	WBGene00020785	60	73	7
WBGene00011033	106	72	12	WBGene00011888	74	34	7	WBGene00000768	113	69	11	WBGene00006770	83	66	9	WBGene00077592	60	73	7
WBGene00011037	106	72	12	WBGene00007690	76	26	11	WBGene00010975	79	21	7	WBGene00021749	118	39	7	WBGene00194983	60	73	7
WBGene00011034	81	21	7	WBGene00007684	76	26	11	WBGene00000564	79	36	6	WBGene00015344	82	35	10	WBGene00020484	60	73	7
WBGene00011032	81	21	7	WBGene00007683	84	34	11	WBGene00010756	79	131	9	WBGene00019625	82	35	10	WBGene00015779	76	140	30
WBGene00011035	81	21	7	WBGene00004105	84	34	11	WBGene00006785	154	89	9	WBGene00006255	69	86	5	WBGene00001803	108	165	54
WBGene00011036	81	21	7	WBGene00007685	92	41	10	WBGene00011558	154	89	9	WBGene00019624	69	86	5	WBGene00015781	93	124	9

WBGene00009673	123	84	7	WBGene00009711	88	46	8	WBGene00006802	154	89	9	WBGene00006129	69	86	5	WBGene00015778	93	124	9
WBGene00009664	123	84	7	WBGene00009712	88	46	8	WBGene00011562	151	142	9	WBGene00000552	156	216	12	WBGene00021050	142	213	26
WBGene00009665	123	84	7	WBGene00009713	88	46	8	WBGene00003589	147	194	9	WBGene00020664	156	216	12	WBGene00021051	120	116	13
WBGene00009667	102	64	8	WBGene00006514	88	46	8	WBGene00044891	147	194	9	WBGene00021738	131	23	7	WBGene00021049	120	116	13
WBGene00009666	80	43	8	WBGene00009714	88	46	8	WBGene00011563	147	194	9	WBGene00021736	131	23	7	WBGene00020331	38	80	52
WBGene00009668	80	43	8	WBGene00009717	74	142	10	WBGene00003225	147	194	9	WBGene00195169	131	23	7	WBGene00002976	62	118	57
WBGene00219282	80	43	8	WBGene00009504	78	154	11	WBGene00000423	147	194	9	WBGene00021739	108	19	8	WBGene00003394	85	155	61
WBGene00009670	80	43	8	WBGene00011980	177	267	55	WBGene00011561	147	194	9	WBGene00021735	76	51	7	WBGene00015378	67	79	7
WBGene00001414	77	130	9	WBGene00011976	177	267	55	WBGene00006546	84	100	11	WBGene00235315	43	82	6	WBGene00015373	70	135	70
WBGene00000468	74	127	7	WBGene00004446	177	267	55	WBGene00006545	78	92	12	WBGene00016539	95	149	10	WBGene00015372	101	146	58
WBGene00000777	74	127	7	WBGene00011977	177	267	55	WBGene00011560	77	61	10	WBGene00016538	110	56	10	WBGene00003053	132	157	45
WBGene00009671	74	91	7	WBGene00011978	110	182	34	WBGene00004986	77	61	10	WBGene00004266	110	56	10	WBGene00020130	132	157	45
WBGene00009672	72	72	6	WBGene00011979	127	188	30	WBGene00011559	81	39	7	WBGene00016540	110	56	10	WBGene00020691	41	95	7
WBGene00010622	96	39	6	WBGene00001950	127	188	30	WBGene00008018	78	144	6	NoWBGene_ID49	63	86	9	WBGene00044572	41	95	7
WBGene00010624	96	39	6	WBGene00007421	127	188	30	WBGene00008019	39	102	7	WBGene00001171	63	86	9	WBGene00019619	131	144	13
WBGene00000209	101	37	7	WBGene00000532	116	46	26	WBGene00010839	153	84	13	WBGene00022286	117	46	8	WBGene00019620	131	144	13
WBGene00010623	101	37	7	WBGene00012000	116	46	26	WBGene00044069	153	84	13	WBGene00022287	86	73	10	WBGene00001715	131	144	13
WBGene00003953	101	37	7	WBGene00012003	116	46	26	WBGene00010840	153	84	13	WBGene00004925	86	73	10	WBGene00019621	131	144	13
WBGene00009565	106	35	8	WBGene00012004	81	72	11	WBGene00010845	85	36	23	WBGene00018757	203	264	15	WBGene00003551	131	144	13
WBGene00006577	99	32	11	WBGene00001041	81	72	11	WBGene00010362	113	27	7	WBGene00006794	203	264	15	WBGene00000393	92	148	5
WBGene00000409	91	28	13	WBGene00012002	77	97	9	WBGene00194861	113	27	7	WBGene00018709	111	167	6	WBGene00001619	92	148	5
WBGene00003925	80	35	8	WBGene00012005	58	112	7	WBGene00010365	60	37	16	WBGene00000387	201	254	33	WBGene00020504	78	150	6
WBGene00007971	80	35	8	WBGene00007633	43	102	7	WBGene00008422	111	78	14	WBGene00017509	201	254	33	WBGene00020884	55	87	62
WBGene00044614	80	35	8	WBGene00011966	104	32	13	WBGene00000231	147	115	15	WBGene00017508	201	254	33	WBGene00044297	102	136	23
WBGene00044120	80	35	8	WBGene00011965	104	32	13	WBGene00008423	131	113	48	WBGene00017512	59	77	5	WBGene00016088	136	172	38
WBGene00007973	83	20	8	WBGene00001061	104	32	13	WBGene00000836	131	113	48	WBGene00003707	59	77	5	WBGene00002233	136	172	38
WBGene00007972	83	20	8	WBGene00004752	94	35	13	WBGene00008426	131	113	48	WBGene00021610	55	106	4	WBGene00016090	136	172	38
WBGene00007974	83	20	8	WBGene00011967	83	38	13	WBGene00004283	102	33	8	WBGene00021611	55	106	4	WBGene00003710	39	77	10
WBGene00007975	83	20	8	WBGene00006367	76	82	11	WBGene00006395	102	33	8	WBGene00021604	58	94	10	WBGene00016976	73	141	9
WBGene00007976	70	62	8	WBGene00006659	67	117	7	WBGene00185048	102	33	8	WBGene00021605	58	94	10	WBGene00016975	73	141	9
WBGene00007977	72	48	8	WBGene00002299	64	108	5	WBGene00004798	102	33	8	WBGene00021607	58	94	10	WBGene00018175	71	160	10
WBGene00007979	72	48	8	WBGene00014210	37	36	32	WBGene00009654	102	33	8	WBGene00022807	73	97	7	WBGene00018173	71	160	10
WBGene00007978	169	211	27	WBGene00014208	37	36	32	WBGene00012859	141	130	9	WBGene00022805	73	97	7	WBGene00018176	71	160	10
WBGene00008440	169	211	27	WBGene00000170	129	207	58	WBGene00004282	141	130	9	WBGene00000976	96	64	8	WBGene00019657	102	170	7
WBGene00006574	169	211	27	WBGene00007224	129	207	58	WBGene00012861	41	75	7	NoWBGene_ID23	96	64	8	WBGene00019843	121	180	14
WBGene00003052	169	211	27	WBGene00007225	129	207	58	WBGene00012862	62	119	9	WBGene00018115	96	64	8	WBGene00003163	206	290	27
WBGene00001960	169	211	27	WBGene00007226	129	207	58	WBGene00012643	128	97	9	WBGene00001632	92	37	9	WBGene00019844	144	204	17
WBGene00006618	169	211	27	WBGene00007227	125	175	36	WBGene00012641	128	97	9	WBGene00044344	92	37	9	WBGene00002149	81	117	6
WBGene00008439	95	151	7	WBGene00006510	120	142	14	WBGene00012642	128	97	9	WBGene00021309	92	37	9	WBGene00019749	121	185	19
WBGene00006324	116	157	7	WBGene00007229	131	188	30	WBGene00012645	97	92	9	WBGene00020389	151	53	13	WBGene00019748	176	267	29
WBGene00009452	100	35	10	WBGene00000289	131	188	30	WBGene00012646	97	92	9	WBGene00020392	151	53	13	WBGene00000991	176	267	29
WBGene00009451	100	35	10	WBGene00008403	104	101	8	WBGene00001997	79	89	22	WBGene00020390	151	53	13	WBGene00001617	84	31	5
WBGene00009455	92	36	13	WBGene00008402	98	102	8	WBGene00012647	70	88	28	WBGene00020391	151	53	13	WBGene00000210	84	31	5
WBGene00006682	89	37	10	WBGene00004286	105	74	8	WBGene00012648	85	126	10	NoWBGene_ID43	151	53	13	WBGene00016894	50	89	7
WBGene00009454	88	36	14	WBGene00006520	86	105	9	WBGene00012649	80	138	10	WBGene00003676	121	155	15	WBGene00016893	50	89	7
WBGene00004484	88	36	14	WBGene00001134	86	105	9	WBGene00194731	80	138	10	WBGene00021486	121	155	15	WBGene00004370	60	129	8
WBGene00009456	99	34	19	WBGene00006433	159	246	9	WBGene00000974	135	43	11	WBGene00021493	121	155	15	WBGene00003856	48	92	52
WBGene00009457	99	34	19	WBGene00009627	159	246	9	WBGene00012650	135	43	11	WBGene00017720	123	163	12	WBGene00016895	48	92	52
WBGene00009460	96	60	7	WBGene00003196	159	246	9	WBGene00012651	130	90	10	WBGene00017719	123	163	12	WBGene00018276	48	92	52
WBGene00009250	96	60	7	WBGene00013085	46	48	31	WBGene00012652	130	90	10	WBGene00017724	49	81	11	WBGene00018280	90	171	8
WBGene00009251	96	60	7	WBGene00013086	46	48	31	WBGene00000566	109	141	13	WBGene00021164	53	113	8	WBGene00006746	90	171	8
WBGene00219283	68	97	6	WBGene00006429	80	30	6	WBGene00012658	103	56	7	WBGene00003723	53	113	8	WBGene00017446	90	171	8
WBGene00010133	68	97	6	WBGene00010941	80	30	6	WBGene00012659	103	56	7	WBGene00018415	53	113	8	WBGene00003987	64	100	37
WBGene00011631	73	38	7	WBGene00010942	80	30	6	WBGene00012361	99	66	7	WBGene00000027	47	127	7	WBGene00017445	64	100	37
WBGene00011629	73	38	7	WBGene00011849	163	193	15	WBGene00012363	99	66	7	WBGene00003649	47	127	7	WBGene00003732	72	188	8
WBGene00009958	37	71	6	WBGene00001530	41	88	10	WBGene00012362	113	96	9	WBGene00020853	47	127	7	WBGene00017449	78	152	9

WBGene00043049	88	37	7	WBGene00009447	71	21	8	WBGene00012360	102	106	10	WBGene00020850	45	75	5	WBGene00017447	78	152	9
WBGene00001568	88	37	7	WBGene00009448	71	21	8	WBGene00012359	148	63	25	WBGene00235117	45	75	5	WBGene00017448	78	152	9
WBGene00007026	90	29	9	WBGene00009449	71	21	8	WBGene00010479	148	63	25	WBGene00018762	94	33	7	WBGene00002123	40	93	13
WBGene00004953	90	29	9	WBGene00001368	64	128	11	WBGene00006536	148	63	25	WBGene00018759	94	33	7	WBGene00017154	44	85	9
WBGene00009346	90	29	9	WBGene00008456	86	23	8	WBGene00004361	142	58	19	WBGene00000056	106	134	8	WBGene00006642	44	85	9
WBGene00009341	90	29	9	WBGene00008455	86	23	8	WBGene00004302	136	53	12	WBGene00018758	106	134	8	WBGene00017157	44	85	9
WBGene00050880	71	59	31	WBGene00006473	86	23	8	WBGene00010478	136	53	12	NoWBGene_ID75	106	134	8	WBGene00015168	137	184	67
WBGene00009342	52	88	53	NoWBGene_ID46	86	23	8	WBGene00010477	136	53	12	WBGene00194896	128	30	11	WBGene00016469	102	100	8
WBGene00009345	52	88	53	WBGene00003618	49	85	20	WBGene00001996	144	56	13	WBGene00020957	128	30	11	WBGene00016466	102	100	8
WBGene00009477	85	82	8	WBGene00011791	49	85	20	WBGene00010476	151	59	13	WBGene00003579	48	61	25	WBGene00044576	54	99	7
WBGene00009481	85	82	8	WBGene00011790	44	58	33	WBGene00010481	151	59	13	WBGene00020954	77	109	55	WBGene00002163	54	99	7
WBGene00009476	85	82	8	WBGene00011789	44	58	33	WBGene00010480	151	59	13	WBGene00020953	105	157	85	WBGene00000116	158	244	39
WBGene00007858	110	116	14	WBGene00011788	77	127	13	WBGene00001087	151	59	13	WBGene00021564	131	35	9	WBGene00016913	158	244	39
WBGene00007855	110	116	14	WBGene00001038	79	79	11	WBGene00004233	49	99	6	WBGene00021563	131	35	9	WBGene00016914	158	244	39
WBGene00007857	110	116	14	WBGene00014249	79	79	11	WBGene00002219	132	179	23	WBGene00021562	131	35	9	WBGene00004004	81	104	11
WBGene00007856	51	70	51	WBGene00014248	147	194	29	WBGene00004736	152	184	29	WBGene00022264	34	29	22	WBGene00044577	78	131	20
WBGene00001843	51	70	51	WBGene00001510	147	194	29	WBGene00011268	96	44	8	WBGene00022265	36	37	24	WBGene00206379	102	103	7
WBGene00012298	82	40	8	WBGene00005026	147	194	29	WBGene00011267	103	37	12	WBGene00022262	39	42	25	WBGene00001025	86	109	8
WBGene00006503	82	40	8	WBGene00014250	147	194	29	WBGene00012663	103	37	12	WBGene00022261	40	54	28	WBGene00016939	69	115	9
WBGene00004298	82	40	8	WBGene00014247	147	194	29	WBGene00003898	122	71	19	WBGene00022266	40	54	28	WBGene00022829	124	218	16
WBGene00011531	89	71	7	WBGene00014255	90	66	9	WBGene00000475	122	71	19	WBGene00002246	81	120	11	WBGene00044283	124	218	16
WBGene00011532	96	56	7	WBGene00014259	90	66	9	NoWBGene_ID72	122	71	19	WBGene00022260	86	123	10	WBGene00044068	124	218	16
WBGene00077558	47	69	8	WBGene00006390	90	66	9	WBGene00008079	106	65	20	WBGene00022259	90	126	8	WBGene00018519	140	216	22
WBGene00003182	72	98	9	WBGene00014256	90	66	9	WBGene00008080	106	65	20	WBGene00235321	90	126	8	WBGene00018522	92	144	16
WBGene00001574	91	63	8	WBGene00006940	100	44	24	WBGene00008081	94	45	14	WBGene00022258	90	126	8	WBGene00018520	83	102	9
WBGene00012376	120	103	9	WBGene00013141	100	44	24	WBGene00043996	81	24	8	WBGene00044525	90	126	8	WBGene00018521	122	132	8
WBGene00014115	149	142	9	WBGene00194906	105	88	17	WBGene00008082	105	61	10	WBGene00019525	90	126	8	WBGene00018518	147	172	12
WBGene00014121	92	125	9	WBGene00013145	110	131	10	WBGene00006843	129	98	11	WBGene00000168	102	166	10	WBGene00001696	147	172	12
WBGene00014117	92	125	9	WBGene00013143	102	45	15	WBGene00000853	56	87	13	WBGene00020877	108	145	7	WBGene00006750	55	116	8
WBGene00003209	92	125	9	WBGene00003785	102	45	15	WBGene00006873	59	94	10	WBGene00044526	108	145	7	WBGene00019351	85	118	9
WBGene00014118	92	125	9	WBGene00013146	102	45	15	WBGene00010922	134	50	8	WBGene00020878	108	145	7	WBGene00006351	100	158	15
WBGene00014119	105	44	8	WBGene00014261	63	45	9	WBGene00043057	134	50	8	WBGene00000478	114	237	27	WBGene00001912	110	174	48
WBGene00014120	105	44	8	WBGene00000178	63	45	9	WBGene00012965	116	37	11	WBGene00020696	95	67	15	WBGene00001914	110	174	48
WBGene00010421	100	68	8	WBGene00014262	65	88	60	WBGene00012964	116	37	11	WBGene00004422	133	56	13	WBGene00004988	110	174	48
WBGene00009129	90	87	7	WBGene00011678	67	130	111	WBGene00012966	116	37	11	WBGene00020695	133	56	13	WBGene00044442	54	99	20
WBGene00077773	90	87	7	WBGene00013147	47	109	8	WBGene00012970	114	52	8	WBGene00044705	133	56	13	WBGene00004912	42	65	10
WBGene00009128	90	87	7	WBGene00014158	47	109	8	WBGene00012971	91	43	10	WBGene00021080	98	138	10	WBGene00020339	42	65	10
WBGene00009127	110	103	22	WBGene00014160	47	109	8	WBGene00012973	108	32	10	WBGene00021079	98	138	10	WBGene00020335	101	175	9
WBGene00001167	129	118	37	WBGene00014161	103	123	11	WBGene00012972	107	44	18	WBGene00021078	157	176	14	NoWBGene_ID1	101	175	9
WBGene00009126	83	84	41	WBGene00014159	103	123	11	WBGene00012356	65	57	26	WBGene00003025	184	157	20	WBGene00015665	58	107	8
WBGene00009130	37	50	45	WBGene00014163	103	123	11	WBGene00012358	80	63	7	WBGene00003479	93	28	5	WBGene00015664	58	107	8
WBGene00008107	88	26	9	WBGene00007464	113	140	64	WBGene00001815	80	63	7	WBGene00021482	126	111	11	WBGene00045456	72	174	6
WBGene00001590	88	26	9	WBGene00007463	113	140	64	WBGene00164986	91	23	7	WBGene00000498	126	111	11	WBGene00003380	72	174	6
WBGene00044008	88	26	9	WBGene00086566	113	140	64	WBGene00012976	126	31	8	WBGene00021479	126	111	11	WBGene00000523	106	173	8
WBGene00009498	66	79	6	WBGene00009146	113	140	64	WBGene00012977	122	54	7	WBGene00016786	190	205	21	WBGene00000526	81	133	7
WBGene00009686	76	61	7	WBGene00007328	93	122	7	WBGene00219394	104	61	7	WBGene00044528	80	44	4	WBGene00015294	56	92	5
WBGene00044247	86	43	7	WBGene00007329	83	75	8	WBGene00004010	118	105	7	WBGene00021554	80	44	4	WBGene00015295	80	136	7
WBGene00194653	86	43	7	WBGene00007334	92	48	7	WBGene00012923	155	121	11	WBGene00021557	92	87	11	WBGene00000591	110	152	8
WBGene00008779	74	120	84	WBGene00007332	92	48	7	WBGene00012922	155	121	11	WBGene00043666	92	87	11	WBGene00003185	122	209	9
WBGene00008780	60	92	46	WBGene00007333	92	48	7	WBGene00012936	155	121	11	WBGene00021556	120	93	7	WBGene00018608	119	175	8
WBGene00008781	89	31	9	WBGene00001207	107	173	10	WBGene00006604	88	129	9	WBGene00021559	120	93	7	WBGene00001637	116	141	7
WBGene00009173	89	31	9	WBGene00011272	101	127	11	WBGene00006553	57	96	10	WBGene00021560	120	93	7	WBGene00018603	116	141	7
WBGene00009174	65	79	7	WBGene00011273	114	120	10	WBGene00206461	104	35	9	WBGene00021555	73	27	8	WBGene00018604	114	137	9
WBGene00009176	90	74	11	WBGene00011275	90	35	12	WBGene00012927	104	35	9	WBGene00021561	92	63	8	WBGene00018606	114	137	9
WBGene00004268	90	74	11	WBGene00011274	90	35	12	WBGene00012928	104	35	9	WBGene00003704	110	99	8	WBGene00000061	89	113	21
WBGene00006732	88	85	11	WBGene00011276	68	65	9	WBGene00012929	136	150	5	WBGene00019276	110	99	8	WBGene00018607	90	134	21

WBGene00009177	85	96	11	WBGene00011277	46	94	6	WBGene00012931	83	53	7	WBGene00022521	76	132	23	WBGene00018485	117	179	10
WBGene00009178	66	87	15	WBGene00002497	56	70	6	WBGene00012932	83	53	7	WBGene00005405	76	132	23	WBGene00000438	82	138	25
WBGene00007533	52	73	19	WBGene00009946	71	69	7	WBGene00012934	101	36	9	WBGene00044529	81	26	7	WBGene00001069	82	138	25
WBGene00008878	142	163	26	WBGene00009945	85	68	7	WBGene00012933	123	32	9	WBGene00017062	81	26	7	WBGene00018486	82	138	25
WBGene00008877	97	32	8	WBGene00007670	126	159	59	WBGene00004873	123	32	9	WBGene00017981	111	64	33	WBGene00019803	150	186	15
WBGene00008876	81	70	6	WBGene00007669	126	159	59	WBGene00006563	103	26	8	WBGene00017982	140	101	58	WBGene00017243	150	186	15
WBGene00007641	118	143	39	WBGene00000995	126	159	59	WBGene00012935	103	26	8	WBGene00003159	140	101	58	WBGene00006063	150	186	15
WBGene00219310	118	143	39	WBGene00014164	91	32	9	WBGene00012126	96	22	8	WBGene00017983	110	118	34	WBGene00007059	125	132	12
WBGene00007642	118	143	39	WBGene00003928	91	32	9	WBGene00012125	96	22	8	WBGene00001722	87	109	10	WBGene00017244	125	132	12
WBGene00219313	118	143	39	WBGene00014165	91	32	9	WBGene00003975	96	22	8	WBGene00044530	94	84	10	WBGene00006827	106	129	10
WBGene00007643	113	150	29	WBGene00014166	91	32	9	WBGene00012127	96	22	8	WBGene00017984	100	41	11	WBGene00017241	106	129	10
WBGene00007644	107	157	19	WBGene00009192	90	131	15	WBGene00012124	81	155	62	WBGene00017988	100	41	11	WBGene00000083	63	114	10
WBGene00044236	107	157	19	WBGene00009193	90	131	15	WBGene00012123	104	180	119	WBGene00017985	100	41	11	WBGene00017814	67	114	12
WBGene00003904	107	157	19	WBGene00003939	90	131	15	WBGene00006533	104	180	119	WBGene00021619	94	90	43	WBGene00017862	79	162	9
WBGene00007645	107	157	19	WBGene00000914	102	145	13	WBGene00001077	112	156	63	WBGene00021620	94	90	43	WBGene00017863	79	162	9
WBGene00007646	90	129	14	WBGene00001686	128	135	13	WBGene00012939	120	132	7	WBGene00021616	94	90	43	WBGene00206475	106	174	17
WBGene00007647	101	141	18	WBGene00009364	128	135	13	WBGene00006683	67	108	12	WBGene00004820	94	90	43	WBGene00017864	106	174	17
WBGene00003172	130	181	27	WBGene00009365	134	84	11	WBGene00012942	67	108	12	WBGene00004813	94	90	43	WBGene00000992	133	186	24
WBGene00006681	107	105	11	WBGene00011038	78	146	9	WBGene00004735	63	106	9	WBGene00021621	94	90	43	WBGene00017865	133	186	24
WBGene00004808	107	105	11	WBGene00011039	78	146	9	WBGene00023404	133	176	16	WBGene00021622	94	90	43	WBGene00017866	84	91	29
WBGene00004807	89	96	10	WBGene00011040	78	146	9	WBGene00012943	95	164	15	WBGene00021626	105	31	8	WBGene00006757	84	91	29
WBGene00009260	89	96	10	WBGene00011331	83	134	17	WBGene00013421	207	215	9	WBGene00019224	105	31	8	WBGene00019583	115	193	7
WBGene00045473	71	86	8	WBGene00004334	88	122	24	WBGene00006573	126	40	8	WBGene00020369	131	198	13	WBGene00044698	70	150	8
WBGene00009268	71	86	8	WBGene00004038	88	122	24	WBGene00013446	126	40	8	WBGene00006796	130	197	14	WBGene00019584	82	91	8
WBGene00009263	81	38	10	WBGene00011333	87	42	7	WBGene00004960	105	37	8	WBGene00020904	128	195	14	WBGene00019582	86	122	11
WBGene00006061	81	38	10	WBGene00010015	87	42	7	WBGene00013445	83	33	8	WBGene00004947	124	187	12	WBGene00004335	90	153	13
WBGene00009264	81	38	10	WBGene00010013	81	30	7	WBGene00013443	79	27	8	WBGene00044586	116	153	12	WBGene00000950	44	77	22
WBGene00006062	80	68	7	WBGene00014172	83	44	20	WBGene00013442	93	24	7	WBGene00022018	50	83	6	WBGene00003171	44	77	22
WBGene00009266	84	28	6	WBGene00007022	83	44	20	WBGene00013441	93	24	7	WBGene00022016	50	83	6	WBGene00022667	96	83	18
WBGene00009267	93	36	9	WBGene00006918	83	44	20	WBGene00013439	210	281	55	WBGene00022019	104	28	12	WBGene00022668	105	93	31
WBGene00004887	102	44	11	WBGene00001531	83	44	20	WBGene00013438	210	281	55	WBGene00022015	104	28	12	WBGene00000075	113	103	44
WBGene00002226	110	99	11	WBGene00007412	86	48	9	WBGene00013437	171	159	34	WBGene00022020	104	28	12	WBGene00019847	98	163	11
WBGene00077771	110	99	11	WBGene00007419	86	48	9	WBGene00013436	131	37	13	WBGene00022021	110	27	7	WBGene00001169	119	184	78
WBGene00008061	118	154	10	WBGene00007418	86	48	9	WBGene00013435	131	37	13	WBGene00018814	110	27	7	WBGene00006310	119	184	78
WBGene00008062	91	150	10	WBGene00007417	88	147	7	WBGene00013434	72	22	5	WBGene00018812	110	27	7	WBGene00016531	44	77	10
WBGene00000096	63	145	9	WBGene00011661	79	88	9	WBGene00013433	72	22	5	WBGene00005965	52	75	8	WBGene00016532	49	97	5
WBGene00008063	63	145	9	WBGene00011662	84	74	7	WBGene00013432	72	22	5	WBGene00005964	52	75	8	WBGene00043983	34	61	32
WBGene00008064	105	148	32	WBGene00008480	109	36	8	WBGene00013431	72	22	5	WBGene00019355	105	34	8	WBGene00016529	34	61	32
WBGene00007984	105	148	32	WBGene00008481	109	36	8	WBGene00013424	83	33	6	WBGene00006392	105	34	8	WBGene00016534	70	107	20
WBGene00004372	71	113	7	WBGene00014057	114	102	5	WBGene00013425	83	33	6	WBGene00019354	105	34	8	WBGene00015776	157	210	11
WBGene00002276	112	68	9	WBGene00014058	112	75	7	WBGene00012750	100	34	5	WBGene00019353	108	61	9	WBGene00015777	164	217	11
WBGene00044987	112	68	9	WBGene00003038	109	48	8	WBGene00000793	100	34	5	WBGene00019357	110	87	10	WBGene00004774	170	224	10
WBGene00010608	112	68	9	WBGene00014060	109	48	8	WBGene00012756	139	66	9	WBGene00022584	110	87	10	WBGene00018466	79	94	14
WBGene00010617	112	68	9	NoWBGene_ID50	147	231	11	WBGene00001235	139	66	9	WBGene00018207	56	102	8	WBGene00001945	79	94	14
WBGene00010609	83	33	7	WBGene00010318	102	173	10	WBGene00012757	139	66	9	WBGene00018206	56	102	8	WBGene00018465	91	169	9
WBGene00010610	83	33	7	WBGene00010319	56	114	9	WBGene00003417	84	43	6	WBGene00019842	72	39	7	WBGene00018467	91	169	9
WBGene00010611	83	33	7	WBGene00011303	83	46	10	WBGene00007703	122	17	8	WBGene00016509	72	39	7	WBGene00018463	91	169	9
WBGene00010612	83	33	7	WBGene00004185	139	168	26	WBGene00007021	122	17	8	WBGene00002010	121	46	10	WBGene00018462	82	138	8
WBGene00000177	91	69	29	WBGene00011304	139	168	26	WBGene00007704	122	17	8	WBGene00016508	121	46	10	WBGene00016407	49	119	8
WBGene00010619	117	50	9	WBGene00007352	195	289	41	WBGene00007679	60	92	10	WBGene00016511	72	160	7	WBGene00016406	98	92	5
WBGene00002070	117	50	9	WBGene00007356	195	289	41	WBGene00007680	100	44	12	WBGene00005110	72	160	7	WBGene00015951	115	164	50
WBGene00010615	120	47	13	WBGene00044235	195	289	41	WBGene00007681	102	49	14	WBGene00020589	93	80	33	WBGene00006962	115	164	50
WBGene00010616	123	44	16	WBGene00006397	65	41	6	WBGene00004705	93	48	14	WBGene00020592	93	80	33	WBGene00001000	85	130	9
WBGene00004312	123	44	16	WBGene00007561	65	41	6	WBGene00003826	110	69	10	WBGene00020588	93	80	33	WBGene00015949	113	145	6
WBGene00003036	123	44	16	WBGene00007562	128	183	7	WBGene00003234	165	33	9	WBGene00020593	93	80	33	WBGene00000929	94	76	9
WBGene00011488	123	44	16	WBGene00007563	128	183	7	WBGene00013225	165	33	9	WBGene00006241	147	284	66	WBGene00006890	94	76	9

WBGene00011489	114	42	13	WBGene00010893	128	183	7	WBGene00006396	89	81	5	WBGene00006523	147	284	66	WBGene00019493	94	76	9
WBGene00004488	104	39	10	WBGene00010897	146	93	15	WBGene00013227	89	81	5	WBGene00017845	147	284	66	WBGene00019491	117	100	9
WBGene00002027	104	39	10	WBGene00010896	146	93	15	WBGene00013230	86	62	9	WBGene00005655	47	109	6	WBGene00194670	154	120	10
WBGene00011494	60	72	6	WBGene00004704	123	64	14	WBGene00013232	124	104	33	WBGene00019644	47	109	6	WBGene00019490	154	120	10
WBGene00000968	60	72	6	WBGene00008433	123	64	14	WBGene00013233	124	104	33	WBGene00019645	52	76	7	WBGene00015324	100	122	7
WBGene00011497	60	72	6	WBGene00008434	123	64	14	WBGene00013234	124	104	33	WBGene00044535	52	76	7	WBGene00015325	100	122	7
WBGene00011495	92	92	12	WBGene00002297	139	215	39	WBGene00013235	149	79	29	WBGene00019646	52	76	7	WBGene00015322	100	122	7
WBGene00007278	92	92	12	WBGene00000411	139	215	39	WBGene00013237	174	54	25	WBGene00019647	60	104	5	WBGene00015320	55	43	26
WBGene00007277	92	92	12	WBGene00011072	139	215	39	WBGene00003802	174	54	25	WBGene00019650	60	104	5	WBGene00017714	91	132	78
WBGene00219796	92	92	12	WBGene00011067	139	215	39	WBGene00013236	174	54	25	WBGene00019648	60	104	5	WBGene00001854	127	221	129
WBGene00003800	95	68	10	WBGene00011068	93	26	12	WBGene00000369	174	54	25	WBGene00004136	135	147	9	WBGene00017715	127	221	129
WBGene00000466	91	33	8	WBGene00003805	93	26	12	WBGene00013238	174	54	25	WBGene00019651	135	147	9	WBGene00015926	66	105	7
WBGene00007275	85	22	7	WBGene00011069	62	96	9	WBGene00013239	174	54	25	WBGene00003374	46	122	10	WBGene00000391	59	94	7
WBGene00004437	85	22	7	WBGene00011071	160	68	13	WBGene00003594	174	54	25	WBGene00021975	46	122	10	WBGene00019294	75	150	9
WBGene00002069	81	39	14	WBGene00001153	130	51	11	WBGene00044233	70	132	24	WBGene00015451	80	22	9	WBGene00019780	59	125	9
WBGene00004426	81	39	14	WBGene00023418	130	51	11	WBGene00013228	88	106	15	WBGene00004795	80	22	9	WBGene00019779	62	158	8
WBGene00007299	81	39	14	WBGene00003367	78	48	37	WBGene00006596	106	80	5	WBGene00015370	84	119	7	WBGene00019781	62	158	8
WBGene00007620	142	175	8	WBGene00014848	99	33	8	WBGene00013240	104	30	8	WBGene00021614	49	102	8	WBGene00017421	75	123	7
WBGene00001145	149	157	9	WBGene00077658	56	62	65	WBGene00013241	104	30	8	WBGene00021613	57	73	7	WBGene00002239	113	165	8
WBGene00000430	126	181	9	WBGene00010910	113	140	7	WBGene00013242	104	30	8	WBGene00016863	80	91	12	WBGene00001425	118	75	9
WBGene00044607	127	105	9	WBGene00010911	94	74	10	WBGene00013243	74	34	6	WBGene00016864	80	91	12	WBGene00017420	118	75	9
WBGene00006352	127	105	9	WBGene00010912	102	59	10	WBGene00006937	74	34	6	WBGene00044537	80	91	12	WBGene00017419	118	75	9
WBGene00009160	110	126	8	WBGene00000293	102	34	8	WBGene00013244	85	97	10	WBGene00015067	80	91	12	WBGene00002127	48	86	7
WBGene00009159	110	126	8	WBGene00000880	102	34	8	WBGene00013580	100	20	9	WBGene00015076	114	123	10	WBGene00019988	41	77	7
WBGene00009161	110	126	8	WBGene00010333	94	23	6	WBGene00000201	118	46	9	WBGene00015075	114	123	10	WBGene00019986	86	125	8
WBGene00009162	96	92	8	WBGene00003882	94	23	6	WBGene00006993	135	72	8	WBGene00015074	99	79	9	WBGene00019989	86	125	8
WBGene00009165	82	57	8	WBGene00012489	61	80	15	WBGene00003779	54	58	13	WBGene00015073	84	35	8	WBGene00018883	86	125	8
WBGene00009163	115	119	14	WBGene00012490	61	80	15	WBGene00013544	123	181	8	WBGene00015682	59	128	11	WBGene00018226	86	159	11
WBGene00006528	147	180	19	WBGene00010988	61	80	15	WBGene00001636	83	123	4	WBGene00015681	59	128	11	WBGene00018281	62	111	37
WBGene00000371	147	180	19	WBGene00219205	83	108	11	WBGene00013547	83	123	4	WBGene00000455	59	128	11	WBGene00018282	49	95	52
WBGene00009164	147	180	19	WBGene00010990	83	108	11	WBGene00013550	107	21	8	WBGene00000454	66	117	9	WBGene00006942	85	146	40
WBGene00003652	53	113	7	WBGene00010991	83	108	11	WBGene00013551	131	24	10	WBGene00015684	54	101	18	WBGene00018283	62	97	18
WBGene00006978	128	189	9	WBGene00010992	86	129	9	WBGene00013552	155	27	11	WBGene00005183	36	96	28	WBGene00017258	110	157	18
WBGene00010730	201	276	10	WBGene00004215	178	256	10	WBGene00013553	155	27	11	WBGene00020254	105	38	18	WBGene00000422	110	157	18
WBGene00010731	201	276	10	WBGene00009356	155	210	60	WBGene00013554	155	27	11	WBGene00001037	105	38	18	WBGene00004998	110	157	18
WBGene00010732	116	188	11	WBGene00000472	155	210	60	WBGene00006571	125	28	9	WBGene00003637	105	38	18	WBGene00006472	136	197	15
WBGene00003639	116	188	11	WBGene00000658	155	210	60	WBGene00013556	125	28	9	WBGene00001710	70	26	8	WBGene00006649	161	236	12
WBGene00003396	148	199	27	WBGene00009352	131	121	33	WBGene00013557	131	25	8	WBGene00016062	70	26	8	WBGene00017257	161	236	12
WBGene00009937	148	199	27	WBGene00009353	106	32	5	WBGene00013558	136	22	7	WBGene00006376	70	26	8	WBGene00017513	56	156	11
WBGene00009939	148	199	27	WBGene00009354	97	71	7	WBGene00006986	49	80	10	WBGene00000477	70	26	8	WBGene00003613	40	101	11
WBGene00009938	113	161	17	WBGene00009729	97	71	7	WBGene00004085	100	33	11	WBGene00015966	93	125	9	WBGene00015391	94	71	6
WBGene00009941	78	123	7	WBGene00006788	71	120	8	WBGene00013561	100	33	11	WBGene00015964	93	125	9	WBGene00017048	107	114	8
WBGene00009942	76	54	7	WBGene00007504	100	37	8	WBGene00013562	100	33	11	WBGene00002215	101	138	9	WBGene00044071	121	128	11
WBGene00009940	107	71	11	NoWBGene_ID53	100	37	8	WBGene00013563	142	144	61	WBGene00003927	101	138	9	WBGene00017046	119	147	10
WBGene00013696	107	71	11	WBGene00003831	100	37	8	WBGene00001946	142	144	61	WBGene00044542	101	138	9	WBGene00017571	116	184	8
WBGene00013695	107	71	11	WBGene00043120	99	61	8	WBGene00004506	142	144	61	WBGene00016991	90	30	8	WBGene00017568	71	57	11
WBGene00013697	144	143	13	WBGene00007499	99	61	8	WBGene00013029	142	144	61	WBGene00016990	77	33	10	WBGene00019266	71	57	11
WBGene00013694	144	143	13	WBGene00007503	105	58	9	WBGene00004086	112	85	34	WBGene00016989	77	33	10	WBGene00019265	71	57	11
WBGene00011986	139	142	11	WBGene00007500	112	32	9	WBGene00013030	81	26	7	WBGene00000795	77	33	10	WBGene00019287	50	64	48
WBGene00007043	139	142	11	WBGene00007501	112	32	9	WBGene00194981	92	96	5	WBGene00016992	77	33	10	WBGene00017400	52	75	60
WBGene00003397	139	142	11	WBGene00007502	112	32	9	WBGene00013033	63	114	77	WBGene00019756	39	79	9	WBGene00017401	64	89	79
WBGene00001226	170	205	82	WBGene00004478	100	67	14	WBGene00013034	73	88	44	WBGene00019755	39	79	9	WBGene00004369	91	151	9
WBGene00006379	170	205	82	WBGene00003076	100	67	14	WBGene00004027	95	37	9	WBGene00015768	38	97	7	WBGene00019571	74	131	8
WBGene00001941	170	205	82	WBGene00009575	100	67	14	WBGene00004919	95	37	9	WBGene00015765	84	89	16	WBGene00019572	78	126	8
WBGene00001942	170	205	82	WBGene00009576	100	67	14	WBGene00013035	95	37	9	WBGene00015769	84	89	16	WBGene00019729	87	90	15
WBGene00011945	170	205	82	WBGene00044917	100	67	14	WBGene00013038	140	49	18	WBGene00004104	59	106	8	WBGene00019728	87	90	15

WBGene00008663	82	44	9	WBGene00044916	100	67	14	WBGene00013039	140	49	18	WBGene00017768	78	67	9	WBGene00019730	97	151	12
WBGene00003803	84	101	10	WBGene00004227	48	80	50	WBGene00013040	140	49	18	WBGene00017769	97	28	9	WBGene00019731	97	151	12
WBGene00008665	62	124	9	WBGene00009511	93	44	9	WBGene00013728	113	32	9	WBGene00017767	97	28	9	WBGene00006477	42	75	52
WBGene00003564	86	158	10	WBGene00009512	98	130	6	WBGene00013729	113	32	9	WBGene00017770	97	28	9	WBGene00019870	42	75	52
WBGene00008666	30	67	5	WBGene00003046	98	130	6	WBGene00013730	103	29	9	WBGene00017766	99	138	6	WBGene00019872	118	168	12
WBGene00007156	99	139	9	WBGene00009513	98	130	6	WBGene00013744	92	25	9	WBGene00018426	93	39	11	WBGene00019869	84	128	26
WBGene00007159	99	139	9	WBGene00011523	116	44	8	WBGene00013733	95	156	11	WBGene00018427	93	39	11	WBGene00002057	50	87	39
WBGene00007155	77	29	7	WBGene00011526	116	44	8	WBGene00013734	133	53	24	WBGene00022577	28	71	10	WBGene00006718	37	49	23
WBGene00003508	77	29	7	WBGene00011527	110	39	9	WBGene00007030	178	161	30	WBGene00000893	28	71	10	WBGene00219376	37	49	23
WBGene00007054	70	121	9	WBGene00011528	110	39	9	WBGene00013735	154	171	22	WBGene00002637	112	63	34	WBGene00016189	63	80	18
WBGene00007158	88	158	8	WBGene00004465	110	39	9	WBGene00013736	125	26	10	WBGene00005297	112	63	34	WBGene00015529	91	113	12
WBGene00013698	83	86	41	WBGene00011529	104	34	9	WBGene00004161	125	26	10	WBGene00017834	97	158	10	WBGene00044579	94	116	11
WBGene00013699	83	86	41	WBGene00011530	104	34	9	WBGene00013737	129	105	7	WBGene00044544	97	158	10	WBGene00002092	94	116	11
WBGene00013700	83	86	41	WBGene00000851	90	133	10	WBGene00006389	105	21	8	WBGene00017836	33	86	8	WBGene00015527	31	37	23
WBGene00013701	83	86	41	WBGene00006853	95	167	13	WBGene00013738	133	58	32	WBGene00017835	33	86	8	WBGene00015528	36	62	15
WBGene00013702	104	26	8	WBGene00008164	97	103	12	WBGene00004700	160	95	56	WBGene00189957	82	25	8	WBGene00017013	72	109	32
WBGene00013703	104	26	8	WBGene00008165	97	103	12	WBGene00013739	160	95	56	WBGene00019762	82	25	8	WBGene00000884	72	109	32
WBGene00044243	74	52	30	WBGene00044161	95	38	10	WBGene00013742	133	41	11	WBGene00003954	111	212	8	WBGene00017012	46	65	13
WBGene00006447	74	52	30	WBGene00008166	90	37	10	WBGene00013740	133	41	11	WBGene00015678	111	212	8	WBGene00017014	28	32	17
WBGene00007705	74	52	30	WBGene00011994	126	200	10	WBGene00007027	133	41	11	WBGene00000069	28	89	6	WBGene00017039	41	83	67
WBGene00001442	74	52	30	WBGene00011995	126	200	10	WBGene00007212	109	22	5	WBGene00000979	28	89	6	WBGene00016034	32	82	8
WBGene00007706	92	144	12	WBGene00005016	55	94	30	WBGene00000203	109	22	5	WBGene00001508	59	115	7	WBGene00016033	32	82	8
WBGene00007707	94	99	14	WBGene00007191	67	26	10	WBGene00012560	109	22	5	WBGene00015677	56	110	6	WBGene00020792	24	40	41
WBGene00007708	94	99	14	WBGene00007192	74	39	10	WBGene00012544	109	22	5	WBGene00001345	139	216	11	WBGene00018568	126	183	7
WBGene00077526	95	53	16	WBGene00007193	74	39	10	WBGene00003406	164	45	12	WBGene00004502	139	216	11	WBGene00206376	126	183	7
WBGene00002153	95	53	16	WBGene00007189	74	39	10	WBGene00012550	164	45	12	WBGene00000159	139	216	11	WBGene00018565	111	192	99
WBGene00000931	108	45	13	WBGene00007194	81	51	10	WBGene00012551	164	45	12	WBGene00017931	139	216	11	WBGene00044785	86	167	55
WBGene00007711	108	45	13	WBGene00006915	94	134	9	WBGene00012552	164	45	12	WBGene00000980	117	146	10	WBGene00019173	86	169	21
WBGene00007712	108	45	13	WBGene00012155	94	134	9	WBGene00006804	117	114	8	WBGene00017933	117	146	10	WBGene00000100	97	197	14
WBGene00000095	97	81	10	WBGene00012156	94	134	9	WBGene00012553	136	114	11	WBGene00017930	117	146	10	WBGene00016087	52	100	8
WBGene00007713	86	116	7	WBGene00012201	131	121	42	WBGene00012554	58	105	8	WBGene00019804	124	154	11	WBGene00016086	52	100	8
WBGene00013705	86	116	7	WBGene00004699	131	121	42	WBGene00012555	95	68	9	WBGene00000534	131	162	11	WBGene00219374	52	100	8
WBGene00013709	131	144	9	WBGene00004698	131	121	42	WBGene00012556	132	30	10	WBGene00019805	131	162	11	WBGene00044743	77	100	7
WBGene00003000	51	127	6	WBGene00012202	131	121	42	WBGene00012558	122	35	9	WBGene00019806	131	162	11	WBGene00016438	77	100	7
WBGene00013860	43	110	6	WBGene00000196	160	203	7	WBGene00012557	122	35	9	WBGene00019807	133	79	10	WBGene00006887	112	181	6
WBGene00007047	100	135	10	WBGene00012203	160	203	7	WBGene00012559	112	40	7	WBGene00019808	133	79	10	WBGene00000748	112	181	6
WBGene00011864	111	154	9	WBGene00002227	160	203	7	WBGene00012712	79	78	9	WBGene00005098	133	79	10	WBGene00017580	37	77	28
WBGene00011866	111	154	9	WBGene00012204	99	66	9	WBGene00012713	80	52	8	WBGene00021392	115	101	58	WBGene00015181	114	76	13
WBGene00013711	98	36	14	WBGene00012205	99	66	9	WBGene00014176	132	47	11	WBGene00021391	115	101	58	WBGene00206482	114	76	13
WBGene00013710	98	36	14	WBGene00012206	99	66	9	WBGene00006728	132	47	11	WBGene00000802	115	101	58	WBGene00020595	83	94	8
WBGene00004476	98	36	14	WBGene00195148	99	66	9	WBGene00014177	132	47	11	WBGene00219449	148	177	108	WBGene00000161	83	94	8
WBGene00013892	98	36	14	WBGene00012207	99	66	9	WBGene00014178	132	47	11	WBGene00017535	109	120	12	WBGene00004033	44	68	55
WBGene00220261	98	36	14	WBGene00006660	71	126	94	WBGene00014181	78	125	8	WBGene00017534	109	120	12	WBGene00016006	73	127	8
WBGene00013891	96	39	12	WBGene00007142	71	126	94	WBGene00164985	78	125	8	WBGene00017536	109	120	12	WBGene00007130	111	130	10
WBGene00001337	93	41	10	WBGene00007149	71	126	94	WBGene00000673	26	32	25	WBGene00017537	109	120	12	WBGene00007129	84	115	8
WBGene00000148	93	41	10	WBGene00007143	96	45	7	WBGene00012717	174	211	22	WBGene00017538	32	39	17	WBGene00006538	84	115	8
WBGene00013895	69	103	12	WBGene00003868	96	45	7	WBGene00012718	114	117	10	WBGene00006436	32	39	17	WBGene00007128	89	104	5
WBGene00009743	81	79	19	WBGene00007144	96	45	7	WBGene00006985	60	104	8	WBGene00004373	97	152	12	WBGene00014140	67	124	9
WBGene00003587	92	54	26	WBGene00195248	96	45	7	WBGene00000267	64	124	6	WBGene00006239	149	219	22	WBGene00014145	69	126	10
WBGene00009744	92	54	26	WBGene00007145	96	45	7	WBGene00012719	123	23	9	WBGene00021068	149	219	22	WBGene00014141	70	128	10
WBGene00000843	94	113	10	WBGene00219293	96	45	7	WBGene00012714	123	23	9	WBGene00019522	149	219	22	WBGene00014142	70	128	10
WBGene00009112	94	113	10	WBGene00007013	187	196	66	WBGene00012715	74	24	7	WBGene00019521	93	190	12	WBGene00006534	70	128	10
WBGene00013716	144	155	78	WBGene00077453	187	196	66	WBGene00012716	74	24	7	WBGene00006437	121	173	7	WBGene00014144	40	56	27
WBGene00003902	144	155	78	WBGene00013387	187	196	66	WBGene00001630	69	73	9	WBGene00017966	121	173	7	WBGene00001516	91	157	9
WBGene00004444	144	155	78	WBGene00010055	171	169	43	WBGene00012796	73	122	72	WBGene00017965	121	173	7	WBGene00195209	74	125	11
WBGene00013717	144	155	78	WBGene00010054	171	169	43	WBGene00010138	88	67	6	WBGene00023432	60	89	5	WBGene00003828	61	101	9

WBGene00013718	117	92	44	WBGene00010053	154	142	20	WBGene00185001	118	134	14	WBGene00019670	60	89	5	WBGene00009888	45	98	25
WBGene00013719	90	28	9	WBGene00001031	154	142	20	WBGene00010139	118	134	14	WBGene00017430	39	83	7	WBGene00009885	29	49	41
WBGene00004753	66	41	19	WBGene00010052	154	142	20	WBGene00010140	132	150	16	WBGene00020273	135	201	13	WBGene00007522	33	56	50
WBGene00013720	42	54	28	WBGene00195146	134	173	12	WBGene00010141	117	98	9	WBGene00020274	135	201	13	WBGene00009380	132	233	61
WBGene00013721	32	41	24	WBGene00010057	131	205	33	WBGene00000774	117	98	9	WBGene00020275	135	201	13	WBGene00009382	132	233	61
WBGene00013723	82	21	6	WBGene00010051	128	237	54	WBGene00006798	138	62	32	WBGene00000110	135	201	13	WBGene00011763	49	92	7
WBGene00013724	82	21	6	WBGene00219434	128	237	54	WBGene00012802	138	62	32	WBGene00001513	113	36	12	WBGene00008065	69	142	8
WBGene00013725	82	21	6	WBGene00010050	128	237	54	WBGene00010142	138	62	32	WBGene00020269	113	36	12	WBGene00001123	62	128	8
WBGene00013726	104	50	8	WBGene00010049	128	237	54	WBGene00003804	125	114	11	WBGene00020268	113	36	12	WBGene00008865	55	113	8
WBGene00009508	104	50	8	WBGene00003960	92	43	10	WBGene00012803	125	114	11	WBGene00020265	85	82	5	WBGene00001863	51	120	51
WBGene00009507	98	68	10	WBGene00010056	92	43	10	WBGene00012804	80	26	10	WBGene00020264	85	82	5	WBGene00008868	44	114	10
WBGene00009509	84	63	11	WBGene00008546	101	162	17	WBGene00012807	104	29	10	WBGene00022646	61	77	7	WBGene00011642	101	151	9
WBGene00009510	77	68	15	WBGene00003791	101	115	13	WBGene00012806	104	29	10	WBGene00006815	131	214	11	WBGene00011644	101	151	9
WBGene00000492	84	39	10	WBGene00008549	139	188	25	WBGene00194870	128	31	9	WBGene00002273	104	179	11	WBGene00011645	105	78	11
WBGene00206464	84	39	10	WBGene00013925	99	46	13	WBGene00009951	112	81	8	WBGene00020911	61	57	9	WBGene00009482	59	85	8
WBGene00003742	84	39	10	WBGene00013924	76	46	16	WBGene00003829	109	83	15	WBGene00020910	61	57	9	WBGene00009483	70	85	6
WBGene00010325	84	39	10	WBGene00004468	76	46	16	WBGene00001092	109	83	15	WBGene00006723	115	147	17	WBGene00009484	70	85	6
WBGene00010326	84	39	10	WBGene00013926	76	46	16	WBGene00002059	109	83	15	WBGene00006722	115	147	17	WBGene00001081	114	117	11
WBGene00044251	84	39	10	WBGene00007028	120	32	11	WBGene00009952	106	85	21	WBGene00006721	115	147	17	WBGene00009800	114	117	11
WBGene00044792	32	28	21	WBGene00008136	125	94	13	WBGene00003478	106	85	21	WBGene00001073	115	147	17	WBGene00009801	63	77	7
WBGene00006578	81	86	7	WBGene00008137	125	94	13	WBGene00009953	59	96	6	WBGene00018491	115	147	17	WBGene00006881	107	174	10
WBGene00009117	129	98	23	WBGene00008138	130	155	14	WBGene00011399	75	35	12	WBGene00018490	115	147	17	WBGene00002271	107	174	10
WBGene00009118	129	98	23	WBGene00008139	104	142	11	WBGene00001035	75	35	12	WBGene00235332	40	72	23	WBGene00001608	47	87	12
WBGene00009119	129	98	23	WBGene00002184	107	104	9	WBGene00011398	75	35	12	WBGene00019376	40	72	23	WBGene00011083	47	87	12
WBGene00009120	136	128	30	WBGene00006617	136	79	10	WBGene00008714	75	35	12	WBGene00006665	35	66	39	WBGene00011081	47	87	12
WBGene00009121	142	157	37	WBGene00008140	136	79	10	WBGene00009730	100	66	8	WBGene00235317	35	66	39	WBGene00009023	38	69	6
WBGene00006720	142	157	37	WBGene00012148	136	79	10	WBGene00009731	98	24	10	WBGene00044779	110	45	7	WBGene00009024	57	107	6
WBGene00003926	142	157	37	WBGene00008744	85	43	9	WBGene00009732	98	24	10	WBGene00020425	110	45	7	WBGene00009025	75	144	5
WBGene00004408	142	157	37	WBGene00008739	95	78	10	WBGene00000255	98	24	10	WBGene00004897	110	45	7	WBGene00007651	151	217	19
WBGene00009122	142	157	37	WBGene00002262	105	112	10	WBGene00012097	131	95	31	WBGene00019652	98	184	22	WBGene00023491	121	188	13
WBGene00009123	142	157	37	WBGene00008740	105	112	10	WBGene00006509	131	95	31	WBGene00001210	98	184	22	WBGene00219544	91	158	7
WBGene00009124	142	157	37	WBGene00008741	55	93	6	WBGene00012094	131	95	31	WBGene00019655	98	184	22	WBGene00007652	91	158	7
WBGene00009243	144	219	10	WBGene00001679	171	226	12	WBGene00006439	131	95	31	WBGene00020949	115	30	12	WBGene00007653	103	134	8
WBGene00011906	144	219	10	WBGene00009691	40	45	15	WBGene00000407	131	95	31	WBGene00020950	115	30	12	WBGene00013919	103	134	8
WBGene00003083	122	141	25	WBGene00009692	40	45	15	WBGene00002185	131	95	31	WBGene00020951	115	30	12	WBGene00008954	70	125	12
WBGene00044070	122	141	25	WBGene00009690	77	79	8	WBGene00012095	76	70	24	WBGene00194910	75	22	5	WBGene00001708	117	190	11
WBGene00206474	99	63	40	WBGene00009689	77	79	8	WBGene00012096	76	70	24	WBGene00004984	75	22	5	WBGene00008951	163	254	9
WBGene00011909	99	63	40	WBGene00206377	110	39	17	WBGene00012098	76	70	24	WBGene00004975	75	22	5	WBGene00003368	75	170	7
WBGene00011908	83	140	10	WBGene00009688	110	39	17	WBGene00004075	138	142	10	WBGene00043952	75	22	5	WBGene00013871	77	107	14
WBGene00002248	91	86	9	WBGene00009661	110	39	17	WBGene00013574	138	142	10	WBGene00022601	105	134	5	WBGene00013866	77	107	14
WBGene00016622	99	32	8	WBGene00001016	99	83	14	WBGene00013576	75	48	6	WBGene00022606	105	134	5	WBGene00013870	99	133	9
WBGene00016621	99	32	8	WBGene00219294	87	126	11	WBGene00013577	75	48	6	WBGene00020586	127	239	13	WBGene00000930	72	115	9
WBGene00015232	99	32	8	WBGene00009657	104	194	13	WBGene00013578	75	48	6	WBGene00006803	93	163	26	WBGene00000749	72	115	9
WBGene00015231	71	27	10	WBGene00009663	104	194	13	WBGene00011475	139	112	17	WBGene00019643	93	147	38	WBGene00012326	119	159	8
WBGene00015233	71	27	10	WBGene00009659	52	127	43	WBGene00011474	111	91	13	WBGene00019642	93	147	38	WBGene00006792	36	46	22
WBGene00015238	71	27	10	WBGene00009660	52	127	43	WBGene00011476	82	70	8	WBGene00003844	93	147	38	WBGene00011553	36	46	22
WBGene00044321	76	38	11	WBGene00009658	52	127	43	WBGene00012017	22	32	31	WBGene00006801	93	147	38	WBGene00011552	73	129	105
WBGene00015235	76	38	11	WBGene00012396	64	92	34	WBGene00011735	157	164	12	WBGene00016364	55	95	5	WBGene00003384	62	98	7
WBGene00001228	76	38	11	WBGene00012395	76	57	24	WBGene00011736	157	164	12	WBGene00016368	55	95	5	WBGene00008602	62	98	7
WBGene00219234	76	38	11	WBGene00003979	52	65	18	WBGene00011734	157	164	12	WBGene00003697	49	84	6	WBGene00006839	120	198	53
WBGene00015230	76	38	11	WBGene00012086	52	65	18	WBGene00006391	157	164	12	WBGene00003632	49	84	6	WBGene00008604	124	169	14
WBGene00015237	95	86	7	WBGene00003789	136	119	66	WBGene00011733	157	164	12	WBGene00021957	118	43	8	WBGene00001331	124	169	14
WBGene00001432	95	86	7	WBGene00000659	136	119	66	WBGene00011732	157	164	12	WBGene00003164	118	43	8	WBGene00008603	124	169	14
WBGene00016391	86	36	8	WBGene00010785	136	119	66	WBGene00011731	180	61	17	WBGene00021959	118	43	8	WBGene00008999	114	176	11
WBGene00016395	100	50	11	WBGene00014155	149	171	63	WBGene00023450	180	61	17	WBGene00021956	118	43	8	WBGene00009000	154	263	15
WBGene00016392	100	50	11	WBGene00014156	162	222	59	WBGene00011730	180	61	17	WBGene00021960	118	43	8	WBGene00009674	163	228	50

WBGene00016393	100	50	11	WBGene00014152	162	222	59	WBGene00011729	154	121	14	WBGene00044612	118	43	8	WBGene00004786	163	228	50
WBGene00016387	113	63	14	WBGene00014153	94	148	11	WBGene00000179	117	165	6	WBGene00044699	59	90	7	WBGene00007591	53	110	8
WBGene00016386	113	63	14	WBGene00014154	94	148	11	WBGene00001118	105	101	6	WBGene00003725	59	90	7	WBGene00006135	57	137	7
WBGene00015017	82	23	7	WBGene00014151	118	79	10	WBGene00000837	87	58	9	WBGene00003849	74	102	5	WBGene00007592	68	129	11
WBGene00015023	103	34	10	WBGene00014157	118	79	10	WBGene00000878	80	79	12	WBGene00017316	121	111	17	WBGene00011106	101	125	5
WBGene00044646	67	30	10	WBGene00001977	118	79	10	WBGene00003048	121	178	11	WBGene00017317	121	111	17	WBGene00011105	106	164	6
WBGene00044644	67	30	10	WBGene00003015	96	89	10	WBGene00012306	46	115	6	WBGene00017311	101	58	26	WBGene00011104	111	202	6
WBGene00015022	67	30	10	WBGene00012222	80	153	105	WBGene00012307	49	114	7	WBGene00017310	101	58	26	WBGene00011108	37	98	8
WBGene00044413	85	30	10	WBGene00012219	80	153	105	WBGene00010664	120	153	16	WBGene00015744	100	113	16	WBGene00044949	113	125	8
WBGene00004466	85	30	10	WBGene00012220	99	111	59	WBGene00010665	120	153	16	WBGene00015745	100	113	16	WBGene00004375	115	133	8
WBGene00015025	85	30	10	WBGene00004271	117	69	12	WBGene00000875	120	153	16	WBGene00015742	134	144	24	WBGene00001122	116	140	7
WBGene00002191	102	29	9	WBGene00012221	117	69	12	WBGene00003967	120	153	16	WBGene00015746	134	144	24	WBGene00009793	188	266	19
WBGene00015021	102	29	9	WBGene00003228	117	69	12	WBGene00007025	120	153	16	WBGene00015741	134	144	24	WBGene00003247	57	97	8
WBGene00000912	132	226	9	WBGene00012457	209	111	41	WBGene00001492	122	170	8	WBGene00001428	134	144	24	WBGene00008023	123	183	11
WBGene00018850	70	81	7	WBGene00012472	209	111	41	WBGene00235257	122	170	8	WBGene00001563	113	87	16	WBGene00008024	123	183	11
WBGene00018852	104	52	13	WBGene00012471	209	111	41	WBGene00235258	62	87	5	WBGene00015461	91	29	8	WBGene00007896	95	170	9
WBGene00018849	104	52	13	WBGene00012458	209	111	41	WBGene00235262	61	106	5	WBGene00015462	93	27	8	WBGene00006870	68	119	9
WBGene00018848	80	35	6	WBGene00003154	128	40	14	WBGene00015246	115	140	9	WBGene00015463	95	24	7	WBGene00008807	54	94	9
WBGene00018847	63	47	24	WBGene00012461	118	36	12	WBGene00006599	102	120	8	WBGene00015466	95	24	7	WBGene00008806	82	105	9
WBGene00016461	45	59	42	WBGene00012465	108	31	10	WBGene00017929	161	125	10	WBGene00015460	95	24	7	WBGene00008805	115	105	8
WBGene00016460	45	59	42	WBGene00012462	108	31	10	WBGene00017926	161	125	10	WBGene00005437	26	36	18	WBGene00006364	137	145	8
WBGene00016462	132	142	10	WBGene00000892	127	105	9	WBGene00000897	161	125	10	WBGene00006097	26	36	18	WBGene00010345	167	185	33
WBGene00016459	132	142	10	WBGene00006601	127	105	9	WBGene00000674	98	117	87	WBGene00017601	34	36	19	WBGene00010199	140	176	35
WBGene00016458	142	142	39	WBGene00012466	127	105	9	WBGene00021400	149	242	8	WBGene00017602	34	36	19	WBGene00003733	140	176	35
WBGene00016457	120	132	41	WBGene00012463	70	74	6	WBGene00021398	149	242	8	WBGene00017605	86	24	10	WBGene00010200	187	271	16
WBGene00016456	87	122	13	WBGene00000565	98	160	8	WBGene00021396	139	218	10	WBGene00017608	90	24	9	WBGene00004749	187	271	16
WBGene00016454	68	56	42	WBGene00012468	98	160	8	WBGene00006561	102	160	11	WBGene00017606	90	24	9	WBGene00000018	99	167	8
WBGene00016463	68	56	42	WBGene00012469	129	30	8	WBGene00021395	84	65	11	WBGene00017607	93	24	8	WBGene00010902	122	192	8
WBGene00016453	68	56	42	WBGene00012470	129	30	8	WBGene00021402	103	27	10	WBGene00044551	139	232	37	WBGene00000908	62	142	31
WBGene00021384	68	56	42	WBGene00013256	103	27	8	WBGene00000815	103	27	10	WBGene00022410	139	232	37	WBGene00008746	86	150	32
WBGene00000780	47	46	34	WBGene00013257	113	54	10	WBGene00195063	84	139	10	WBGene00016901	113	130	17	WBGene00008745	125	193	12
WBGene00045433	78	40	22	WBGene00013258	122	80	11	WBGene00021394	84	139	10	WBGene00044342	112	141	22	WBGene00008747	125	193	12
WBGene00018632	109	33	9	WBGene00004167	141	153	16	WBGene00019822	103	33	9	WBGene00020246	84	50	6	WBGene00008748	65	74	5
WBGene00235254	109	33	9	WBGene00013260	141	153	16	WBGene00019823	103	33	9	WBGene00005661	84	50	6	WBGene00008749	83	61	5
WBGene00018625	109	33	9	WBGene00013261	141	153	16	WBGene00019820	103	33	9	WBGene00005660	134	225	15	WBGene00006468	46	83	7
WBGene00013122	79	16	5	WBGene00013264	60	61	25	WBGene00019824	90	25	7	WBGene00020245	134	225	15	WBGene00001202	29	44	26
WBGene00013123	79	16	5	WBGene00013254	60	61	25	WBGene00019825	90	25	7	WBGene00016149	115	52	17	WBGene00004862	155	253	14
WBGene00219422	68	84	9	WBGene00013255	118	177	15	WBGene00001071	87	26	7	WBGene00001719	115	52	17	WBGene00001495	52	113	67
WBGene00077539	68	84	9	WBGene00013266	118	177	15	WBGene00020647	80	62	7	WBGene00004453	115	52	17	WBGene00007317	143	241	11
WBGene00013125	68	84	9	WBGene00013268	102	31	10	WBGene00003932	80	62	7	WBGene00004499	115	52	17	WBGene00003999	143	241	11
NoWBGene_ID14	113	17	7	WBGene00013269	102	31	10	WBGene00020651	76	97	8	WBGene00016148	115	52	17	WBGene00009813	131	138	26
WBGene00013129	113	17	7	WBGene00002063	88	32	8	WBGene00020649	65	108	8	WBGene00022812	141	131	12	WBGene00009812	131	138	26
WBGene00206497	102	124	9	WBGene00013270	68	40	11	WBGene00206487	65	108	8	WBGene00002078	108	110	13	WBGene00009818	131	138	26
WBGene00206530	113	121	7	WBGene00016828	63	96	11	WBGene00019300	59	95	8	WBGene00022813	75	89	13	WBGene00009819	131	138	26
WBGene00001980	109	168	12	WBGene00004945	63	96	11	WBGene00019299	59	95	8	WBGene00022814	75	89	13	WBGene00009820	75	99	10
WBGene00013130	103	160	7	WBGene00004310	81	129	10	WBGene00001099	60	90	21	WBGene00045277	75	89	13	WBGene00011882	116	167	21
WBGene00013131	160	177	7	WBGene00013273	58	89	28	WBGene00001735	60	85	34	WBGene00002256	105	161	32	WBGene00000961	156	235	31
WBGene00009220	133	58	17	WBGene00013277	38	35	20	WBGene00017578	60	85	34	WBGene00003242	105	161	32	WBGene00011879	156	235	31
WBGene00004706	133	58	17	WBGene00013278	38	35	20	WBGene00000675	60	85	34	WBGene00016499	105	161	32	WBGene00010715	63	127	101
WBGene00005517	160	58	22	WBGene00013279	38	35	20	WBGene00017576	86	190	9	NoWBGene_ID65	108	125	10	WBGene00003529	63	127	101
WBGene00012317	158	169	20	WBGene00010217	72	61	9	WBGene00022048	67	97	8	WBGene00016497	108	125	10	WBGene00010716	63	127	101
WBGene00002119	158	169	20	WBGene00010219	72	61	9	WBGene00004981	82	60	14	WBGene00016501	120	104	14	WBGene00006897	146	238	15
WBGene00206528	102	110	9	WBGene00013280	81	61	10	WBGene00020295	111	45	20	WBGene00016496	120	104	14	WBGene00006896	146	238	15
WBGene00013177	120	80	9	WBGene00044047	81	61	10	WBGene00004493	111	45	20	WBGene00016495	120	104	14	WBGene00001184	125	204	9
WBGene00013178	138	49	8	WBGene00013281	89	61	10	WBGene00044789	108	36	15	WBGene00002632	130	210	12	WBGene00002261	165	250	11
WBGene00043056	138	49	8	WBGene00008837	85	50	8	WBGene00020300	108	36	15	WBGene00017818	124	140	10	WBGene00007482	73	138	23

WBGene00009461	71	115	3	WBGene00044323	85	50	8	WBGene00001338	104	40	13	WBGene00022394	124	140	10	WBGene00012261	73	138	23
WBGene00009462	71	115	3	WBGene00044322	85	50	8	WBGene00020298	100	37	10	WBGene00022393	118	69	8	WBGene00012255	73	138	23
WBGene00010416	163	25	8	WBGene00008838	85	50	8	WBGene00045249	100	37	10	WBGene00022392	118	69	8	WBGene00012256	73	138	23
WBGene00000410	121	23	7	WBGene00008839	92	72	10	WBGene00020297	96	48	10	WBGene00022397	37	120	8	WBGene00012257	73	138	23
WBGene00010158	80	64	29	WBGene00008843	77	78	5	WBGene00020296	96	48	10	WBGene00022396	37	120	8	WBGene00000166	81	42	9
WBGene00003977	80	64	29	WBGene00008847	80	71	6	WBGene00002187	66	104	10	WBGene00044552	93	52	9	WBGene00012258	81	42	9
WBGene00010161	138	20	11	WBGene00008844	80	71	6	WBGene00000913	105	40	12	WBGene00022398	93	52	9	WBGene00044151	81	42	9
WBGene00010159	138	20	11	WBGene00043054	76	146	52	WBGene00022046	105	40	12	WBGene00022399	93	52	9	WBGene00195208	44	92	33
WBGene00001215	108	17	11	WBGene00011876	76	146	52	WBGene00022047	105	40	12	WBGene00022402	92	42	9	WBGene00044330	66	119	7
WBGene00013186	144	17	13	WBGene00000660	76	146	52	WBGene00002041	105	40	12	WBGene00022400	90	32	8	WBGene00002029	94	126	9
WBGene00009318	76	102	52	WBGene00011877	76	146	52	WBGene00022045	93	26	7	WBGene00022401	90	32	8	WBGene00007939	94	126	9
WBGene00009316	107	33	8	WBGene00011878	76	146	52	WBGene00022044	93	26	7	WBGene00018398	66	38	9	WBGene00007941	101	140	10
WBGene00009314	107	33	8	WBGene00009867	32	44	28	WBGene00021012	117	31	6	WBGene00001152	66	38	9	WBGene00007942	102	73	9
WBGene00009315	107	33	8	WBGene00044031	32	44	28	WBGene00000213	117	31	6	WBGene00018399	66	38	9	WBGene00007943	93	63	9
WBGene00001131	128	175	8	WBGene00012584	103	133	8	WBGene00018924	78	98	9	WBGene00018400	81	39	8	WBGene00007266	85	146	7
WBGene00008856	141	90	63	WBGene00012585	103	133	8	WBGene00001165	181	269	22	WBGene00003865	81	39	8	WBGene00007267	84	118	6
WBGene00008857	141	90	63	WBGene00012586	103	133	8	WBGene00018927	181	269	22	WBGene00006935	81	39	8	WBGene00009530	100	119	16
WBGene00008858	135	134	67	WBGene00012600	126	60	47	WBGene00018925	136	161	15	WBGene00022629	69	95	28	WBGene00009531	100	119	16
WBGene00004963	135	134	67	WBGene00012602	126	60	47	WBGene00001579	90	53	7	WBGene00022628	69	95	28	WBGene00002124	188	205	42
WBGene00007639	129	178	70	WBGene00012895	126	60	47	WBGene00015993	58	106	58	WBGene00017018	107	69	8	WBGene00008586	188	205	42
WBGene00006807	129	178	70	WBGene00012894	67	113	10	WBGene00019665	116	96	18	WBGene00005006	107	69	8	WBGene00008587	188	205	42
WBGene00007640	118	54	15	WBGene00012896	135	55	12	WBGene00019658	116	96	18	WBGene00017016	107	69	8	WBGene00008585	148	157	24
WBGene00007637	161	58	18	WBGene00012897	135	55	12	WBGene00004427	116	96	18	WBGene00017640	62	129	9	WBGene00006922	85	111	6
WBGene00012267	55	100	4	WBGene00044164	141	139	13	WBGene00019664	116	96	18	WBGene00019478	62	129	9	WBGene00008588	85	111	6
WBGene00002232	76	96	12	WBGene00012899	141	139	13	WBGene00019660	75	113	14	WBGene00019477	62	129	9	WBGene00044135	63	113	5
WBGene00011934	72	95	8	WBGene00012900	141	139	13	WBGene00044458	75	113	14	WBGene00019481	89	83	10	WBGene00001536	101	115	34
WBGene00005523	72	95	8	WBGene00012901	122	28	10	WBGene00019661	89	165	50	WBGene00000098	89	83	10	WBGene00000040	101	115	34
WBGene00006876	137	201	10	WBGene00012903	122	28	10	WBGene00018256	102	217	85	WBGene00003937	89	83	10	WBGene00003998	131	206	13
WBGene00011384	176	234	9	WBGene00012904	122	28	10	WBGene00021950	45	94	4	WBGene00019482	89	83	10	WBGene00009632	131	206	13
WBGene00011385	92	135	32	WBGene00012907	177	188	21	WBGene00044459	114	112	8	WBGene00004395	37	53	34	WBGene00006584	74	136	6
WBGene00011386	91	85	10	WBGene00012908	182	170	16	WBGene00021951	114	112	8	WBGene00015860	25	37	22	WBGene00008571	76	157	8
WBGene00011388	91	85	10	WBGene00012909	187	152	11	WBGene00021948	62	99	8	WBGene00015861	25	37	22	WBGene00003970	102	155	7
WBGene00011389	91	85	10	WBGene00003983	38	45	24	WBGene00021947	71	88	7	WBGene00015862	72	119	6	WBGene00009777	102	155	7
WBGene00086562	94	134	9	WBGene00012916	35	44	29	WBGene00018928	83	28	6	WBGene00020941	100	34	7	WBGene00003003	39	102	9
WBGene00011390	94	134	9	WBGene00012605	67	91	5	WBGene00018929	120	29	6	WBGene00020942	100	34	7	WBGene00009259	147	241	17
WBGene00000415	154	178	9	WBGene00012606	56	88	7	WBGene00018933	120	29	6	WBGene00004766	100	34	7	WBGene00004746	147	241	17
WBGene00001045	154	178	9	WBGene00004232	183	257	32	WBGene00018932	156	29	6	WBGene00020946	100	34	7	WBGene00044121	132	181	8
WBGene00012950	99	35	7	WBGene00000870	183	257	32	WBGene00004824	116	28	7	WBGene00020943	100	34	7	WBGene00007955	132	181	8
WBGene00012951	99	35	7	WBGene00012608	183	257	32	WBGene00018935	116	28	7	WBGene00003395	74	88	24	WBGene00003239	88	151	8
WBGene00012955	99	35	7	WBGene00003860	61	120	8	WBGene00018934	116	28	7	WBGene00018181	74	88	24	WBGene00007959	43	121	8
WBGene00012952	99	35	7	WBGene00008932	101	172	7	WBGene00001154	116	28	7	WBGene00018179	74	88	24	WBGene00002975	75	49	6
WBGene00001372	153	70	28	WBGene00003144	97	140	9	WBGene00021936	32	25	22	WBGene00018700	71	108	9	WBGene00007956	75	49	6
WBGene00011155	153	70	28	WBGene00008929	138	126	9	WBGene00021942	119	87	6	WBGene00020720	57	91	8	WBGene00009930	66	118	7
WBGene00011156	153	70	28	WBGene00008930	87	30	6	WBGene00021944	53	70	77	WBGene00020721	76	49	7	WBGene00001502	135	177	26
WBGene00006707	153	70	28	WBGene00009641	49	97	8	WBGene00021945	123	27	9	WBGene00001040	76	49	7	WBGene00006066	85	128	30
WBGene00003123	153	70	28	WBGene00195150	89	33	8	WBGene00044757	123	27	9	WBGene00020719	76	49	7	WBGene00011446	85	128	30
WBGene00001836	153	70	28	WBGene00013591	89	33	8	WBGene00021939	89	26	9	WBGene00004256	35	51	41	WBGene00011443	80	136	20
WBGene00011058	127	60	32	WBGene00009245	81	21	7	WBGene00021938	89	26	9	WBGene00022842	35	54	48	WBGene00011441	84	109	8
WBGene00006958	127	60	32	WBGene00009246	81	21	7	WBGene00007007	70	36	6	WBGene00018482	84	37	14	WBGene00011442	116	149	9
WBGene00011059	93	95	19	WBGene00001998	101	26	6	WBGene00004047	95	148	6	WBGene00018483	84	37	14	WBGene00011440	138	222	10
WBGene00002004	131	44	8	WBGene00009307	101	26	6	WBGene00043705	101	27	10	WBGene00018480	84	37	14	WBGene00011444	114	196	12
NoWBGene_ID89	131	44	8	WBGene00012372	78	56	6	WBGene00021924	101	27	10	WBGene00018478	75	160	107	WBGene00011447	90	169	13
WBGene00013135	74	146	56	WBGene00001947	78	56	6	WBGene00021925	157	48	21	WBGene00001882	75	160	107	WBGene00011445	87	152	14
WBGene00013136	94	23	9	WBGene00012373	96	83	7	WBGene00021926	157	48	21	WBGene00001881	75	160	107	WBGene00001981	84	135	14
WBGene00013137	94	23	9	WBGene00012374	96	83	7	WBGene00021922	157	48	21	WBGene00001880	75	160	107	WBGene00008088	84	135	14
WBGene00010245	169	115	19	WBGene00012375	96	83	7	WBGene00021921	157	48	21	WBGene00001879	75	160	107	WBGene00008090	81	61	8

WBGene00010244	169	115	19	WBGene00002264	106	138	12	WBGene00021927	79	123	7	WBGene00001913	75	160	107	WBGene00008086	81	61	8
WBGene00010248	139	70	15	WBGene00000274	106	138	12	WBGene00219399	118	33	11	WBGene00018477	75	160	107	WBGene00008085	81	61	8
WBGene00002240	132	63	33	WBGene00012989	131	208	12	WBGene00021929	118	33	11	WBGene00017800	86	32	10	WBGene00008369	41	80	8
WBGene00002000	155	100	55	WBGene00012990	140	120	11	WBGene00021930	118	33	11	WBGene00017797	86	32	10	WBGene00001790	41	80	8
WBGene00010242	155	100	55	WBGene00012992	190	206	10	WBGene00021920	118	33	11	WBGene00007055	99	160	6	WBGene00008367	41	80	8
WBGene00012958	78	69	7	WBGene00012993	190	206	10	WBGene00021931	118	33	11	WBGene00044554	135	125	18	WBGene00008368	41	80	8
WBGene00012959	78	69	7	WBGene00012998	121	28	9	WBGene00021934	161	32	9	WBGene00018286	135	125	18	WBGene00008045	40	95	58
WBGene00012960	72	138	7	WBGene00008444	69	26	9	WBGene00021933	161	32	9	WBGene00018290	135	125	18	WBGene00008047	39	84	32
WBGene00012961	72	138	7	WBGene00004116	110	80	11	WBGene00021932	120	76	10	WBGene00018285	135	125	18	WBGene00006654	37	72	6
WBGene00011029	108	116	8	WBGene00008446	123	120	17	WBGene00044462	78	119	10	WBGene00018291	135	125	18	WBGene00004682	96	126	8
WBGene00011030	108	116	8	WBGene00008447	95	106	21	WBGene00016637	78	119	10	WBGene00018293	82	70	27	WBGene00007935	43	102	5
WBGene00007600	140	56	16	WBGene00000113	97	31	9	WBGene00003893	78	119	10	WBGene00018294	82	70	27	WBGene00044079	64	97	5
WBGene00007601	140	56	16	WBGene00009739	97	31	9	WBGene00016796	140	25	8	WBGene00018295	82	70	27	WBGene00006388	64	97	5
WBGene00007602	140	56	16	WBGene00009740	97	31	9	WBGene00022426	140	25	8	WBGene00022538	107	214	26	WBGene00010068	74	107	8
WBGene00007603	114	120	29	WBGene00009741	97	31	9	WBGene00022427	94	72	30	WBGene00022539	107	214	26	WBGene00003219	74	107	8
WBGene00008782	114	120	29	WBGene00013004	137	27	13	WBGene00001104	94	72	30	WBGene00015219	143	240	30	WBGene00010067	32	46	31
WBGene00008783	114	120	29	WBGene00013006	137	27	13	WBGene00001103	94	72	30	WBGene00015218	143	240	30	WBGene00010120	67	80	21
WBGene00008784	99	123	46	WBGene00013008	134	38	8	WBGene00009521	98	20	6	WBGene00015275	143	240	30	WBGene00195215	54	75	58
WBGene00008787	99	123	46	WBGene00013009	134	38	8	WBGene00044908	98	20	6	WBGene00006342	143	240	30	WBGene00011614	105	100	11
WBGene00008475	88	58	8	WBGene00000804	134	38	8	WBGene00009515	98	87	8	WBGene00006467	115	184	10	WBGene00011615	105	100	11
WBGene00008476	88	58	8	WBGene00001768	77	112	10	WBGene00007476	98	87	8	WBGene00015276	115	184	10	WBGene00008209	109	163	9
WBGene00001640	13	37	35	WBGene00001772	77	112	10	WBGene00018776	150	24	11	WBGene00001891	55	110	74	WBGene00008210	73	112	13
WBGene00077508	73	81	15	WBGene00001763	77	112	10	WBGene00018778	139	24	9	WBGene00001892	55	110	74	WBGene00008211	36	61	17
WBGene00012103	93	108	11	WBGene00001766	77	93	5	WBGene00018777	127	24	6	WBGene00019448	55	110	74	WBGene00004859	51	119	8
WBGene00012104	119	34	11	WBGene00006404	100	117	32	WBGene00019053	130	25	6	WBGene00019202	45	85	9	WBGene00012295	80	54	10
WBGene00004190	119	34	11	WBGene00007836	123	141	58	WBGene00004338	130	25	6	WBGene00006760	45	85	9	WBGene00012158	80	54	10
WBGene00012105	93	68	10	WBGene00007837	106	113	34	WBGene00022423	73	96	43	WBGene00020554	45	85	9	WBGene00006646	39	81	5
WBGene00012106	93	68	10	WBGene00007838	88	85	9	WBGene00022310	132	35	10	WBGene00001526	111	135	8	WBGene00007116	79	182	9
WBGene00012107	93	68	10	WBGene00012999	108	43	11	WBGene00002180	132	35	10	WBGene00020553	80	107	8	WBGene00007594	79	182	9
WBGene00010769	173	123	9	WBGene00044084	164	44	11	WBGene00022311	132	35	10	WBGene00003634	65	116	9	WBGene00012226	120	223	10
WBGene00006829	173	123	9	WBGene00013208	164	44	11	WBGene00022312	82	85	9	WBGene00020555	60	117	8	WBGene00012225	53	92	23
WBGene00004181	131	56	9	WBGene00013210	164	44	11	WBGene00235267	82	85	9	WBGene00019114	55	118	7	WBGene00000754	51	87	41
WBGene00012208	131	56	9	WBGene00013209	164	44	11	WBGene00000546	82	85	9	WBGene00019115	55	118	7	WBGene00012224	51	87	41
WBGene00012209	131	56	9	WBGene00011056	195	225	11	WBGene00000547	92	80	6	WBGene00019116	55	118	7	WBGene00011354	51	87	41
WBGene00012216	49	122	9	WBGene00003246	195	225	11	WBGene00022308	92	80	6	WBGene00020861	98	144	11	WBGene00010221	184	239	39
WBGene00001008	99	186	9	WBGene00013934	73	130	34	WBGene00022307	60	80	5	WBGene00017659	130	211	10	WBGene00000277	108	181	9
WBGene00077769	99	186	9	WBGene00001890	74	161	87	WBGene00022313	50	79	9	WBGene00017658	130	211	10	WBGene00007692	104	130	9
WBGene00009362	138	186	16	WBGene00001885	74	161	87	WBGene00003806	133	58	11	WBGene00015057	61	30	5	WBGene00007693	90	122	8
WBGene00009361	138	186	16	WBGene00001918	74	161	87	WBGene00022306	133	58	11	WBGene00004107	61	30	5	WBGene00007694	76	113	7
WBGene00011581	59	80	22	WBGene00001889	74	161	87	WBGene00019368	68	71	54	WBGene00016045	61	30	5	WBGene00008451	100	174	7
WBGene00010420	126	66	19	WBGene00001888	74	161	87	WBGene00044719	68	71	54	WBGene00004216	61	30	5	WBGene00006966	99	164	29
WBGene00010419	126	66	19	WBGene00001884	74	161	87	WBGene00003794	100	44	11	WBGene00002132	55	78	11	WBGene00000461	99	164	29
WBGene00012040	115	68	24	WBGene00001900	74	161	87	WBGene00021516	72	62	15	WBGene00007023	55	78	11	WBGene00008904	99	164	29
WBGene00012041	104	70	29	WBGene00001916	90	134	40	WBGene00000416	109	22	8	WBGene00044077	107	154	8	WBGene00005118	99	164	29
WBGene00012039	104	70	29	WBGene00008576	90	134	40	WBGene00021515	90	18	8	WBGene00001695	107	154	8	WBGene00005126	44	58	57
WBGene00012038	104	70	29	WBGene00008577	94	99	29	WBGene00004497	135	120	11	WBGene00017195	65	123	7	WBGene00005122	44	58	57
WBGene00012037	104	70	29	WBGene00002120	98	63	18	WBGene00021512	135	120	11	WBGene00000003	86	149	6	WBGene00006979	44	58	57
WBGene00003921	76	85	18	WBGene00008578	120	125	16	WBGene00019538	121	80	10	WBGene00006152	86	149	6	WBGene00044140	60	104	21
WBGene00003578	82	153	10	WBGene00013093	136	83	12	WBGene00003947	121	80	10	WBGene00004211	86	149	6	WBGene00194795	60	104	21
WBGene00006889	80	27	8	WBGene00013094	162	51	12	WBGene00019537	121	80	10	WBGene00022789	39	96	10	WBGene00009635	60	104	21
WBGene00012192	80	27	8	WBGene00013095	162	51	12	WBGene00019536	121	80	10	WBGene00022790	39	96	10	WBGene00009636	85	150	7
WBGene00012193	121	98	11	WBGene00001838	165	38	16	WBGene00021507	93	40	10	WBGene00018405	27	70	8	WBGene00008959	51	101	69
WBGene00012194	162	170	14	WBGene00013096	165	38	16	WBGene00021508	122	44	9	WBGene00018406	98	100	10	WBGene00008958	51	101	69
WBGene00006700	162	170	14	WBGene00012198	88	43	10	WBGene00021506	131	81	8	WBGene00006499	98	100	10	WBGene00008956	79	122	8
WBGene00007094	88	22	6	WBGene00012722	118	94	16	WBGene00021509	112	115	7	WBGene00019465	96	88	10	WBGene00008924	79	122	8
WBGene00012474	152	18	8	WBGene00012723	118	94	16	WBGene00021505	112	115	7	WBGene00019464	94	76	10	WBGene00011824	32	86	9

WBGene00012475	179	81	11	WBGene00012724	118	94	16	WBGene00019462	90	25	4	WBGene00006729	94	76	10	WBGene00011823	66	103	9
WBGene00012476	179	81	11	WBGene00000901	157	224	12	WBGene00001173	80	73	6	WBGene00000766	75	90	31	WBGene00011826	83	111	9
WBGene00012477	206	143	13	WBGene00012187	180	49	17	WBGene00001186	134	174	38	NoWBGene_ID35	84	146	68	WBGene00011820	78	100	26
WBGene00001746	206	143	13	WBGene00012188	180	49	17	WBGene00001253	123	101	23	WBGene00019466	112	187	83	WBGene00003854	45	82	44
WBGene00012479	77	20	5	WBGene00002275	180	49	17	WBGene00018681	112	28	7	WBGene00019467	112	187	83	WBGene00009725	95	141	6
WBGene00012480	77	20	5	WBGene00012730	180	49	17	WBGene00018680	114	36	13	WBGene00006623	112	187	83	WBGene00000222	95	141	6
WBGene00003905	94	40	7	WBGene00012230	146	33	9	WBGene00018679	114	36	13	WBGene00017096	140	174	10	WBGene00009728	200	272	35
WBGene00012483	110	28	9	WBGene00010719	146	33	9	WBGene00022298	121	23	7	WBGene00017097	140	174	10	WBGene00004739	200	272	35
WBGene00012484	110	28	9	WBGene00012228	146	33	9	WBGene00022297	121	23	7	WBGene00002036	105	145	10	WBGene00006493	50	108	6
WBGene00001433	118	95	9	WBGene00012227	122	57	23	WBGene00022302	165	38	10	WBGene00018089	31	53	29	WBGene00000755	110	65	8
WBGene00001427	118	95	9	WBGene00012978	122	57	23	WBGene00022300	129	28	9	WBGene00018090	142	211	8	WBGene00010423	68	132	10
WBGene00003989	118	95	9	WBGene00004456	122	57	23	WBGene00022296	93	17	8	WBGene00018091	142	211	8	WBGene00007259	48	84	52
WBGene00008130	158	99	32	WBGene00006964	122	57	23	WBGene00022301	133	21	8	WBGene00019237	75	142	12	WBGene00045386	46	82	57
WBGene00008131	158	99	32	WBGene00012980	94	138	9	WBGene00022303	133	21	8	WBGene00008670	71	23	8	WBGene00003616	77	131	35
WBGene00006529	158	99	32	WBGene00000038	76	127	10	WBGene00044467	56	100	6	WBGene00008238	126	189	93	WBGene00000082	96	152	38
WBGene00003948	158	99	32	WBGene00012983	155	41	13	WBGene00077523	99	154	6	WBGene00003160	126	189	93	WBGene00011564	146	227	66
WBGene00001234	158	99	32	WBGene00012982	143	73	11	WBGene00016918	99	154	6	WBGene00001909	126	189	93	WBGene00011568	146	227	66
WBGene00004196	158	99	32	WBGene00001971	192	250	98	WBGene00235274	99	154	6	WBGene00001915	126	189	93	WBGene00008260	71	138	69
WBGene00003753	90	20	8	WBGene00013213	192	250	98	WBGene00016917	148	74	12	WBGene00001910	126	189	93	WBGene00008261	71	138	69
WBGene00004895	90	20	8	WBGene00013215	73	105	7	WBGene00022134	148	74	12	WBGene00001911	126	189	93	WBGene00000482	102	176	51
WBGene00012274	53	124	9	WBGene00013216	73	105	7	WBGene00235277	172	198	10	WBGene00008237	126	189	93	WBGene00011770	91	131	9
WBGene00003675	54	85	7	WBGene00000831	73	105	7	WBGene00020208	172	198	10	WBGene00009098	126	189	93	WBGene00011771	94	141	7
WBGene00009063	156	185	69	WBGene00002996	117	35	13	WBGene00002990	87	128	7	WBGene00009099	77	78	9	WBGene00011772	94	141	7
WBGene00009064	156	185	69	WBGene00185067	117	35	13	WBGene00006920	128	153	10	WBGene00009103	88	46	12	WBGene00007934	63	103	12
WBGene00009065	156	185	69	WBGene00013219	117	35	13	WBGene00006912	128	153	10	WBGene00010727	88	46	12	WBGene00007344	49	72	17
WBGene00044786	145	171	16	WBGene00011050	118	41	12	WBGene00219413	128	153	10	WBGene00000226	96	20	7	WBGene00007343	35	40	22
WBGene00014201	145	171	16	WBGene00011051	119	47	10	WBGene00021415	128	153	10	WBGene00001830	111	25	8	WBGene00004089	105	115	8
WBGene00014199	145	171	16	WBGene00011047	111	39	11	WBGene00021425	128	21	9	WBGene00007141	40	105	9	WBGene00195214	105	115	8
WBGene00009695	143	164	34	WBGene00002076	103	30	11	WBGene00021423	128	21	9	WBGene00013962	40	105	9	WBGene00195213	105	115	8
WBGene00009698	143	164	34	WBGene00011049	91	71	30	WBGene00021421	160	82	32	WBGene00004320	94	85	19	WBGene00008693	105	115	8
WBGene00009696	143	164	34	WBGene00003220	92	48	16	WBGene00021427	160	82	32	WBGene00013966	94	85	19	WBGene00008692	130	113	9
WBGene00006902	74	76	53	WBGene00195149	93	37	10	WBGene00021420	160	82	32	WBGene00013967	75	82	13	WBGene00008691	130	113	9
WBGene00010804	74	76	53	WBGene00009179	93	37	10	WBGene00021419	160	82	32	WBGene00001842	81	120	7	WBGene00008690	130	113	9
WBGene00010806	108	60	15	WBGene00009180	159	111	21	WBGene00021430	58	105	96	WBGene00009580	106	162	7	WBGene00045495	130	113	9
WBGene00010807	108	60	15	WBGene00009182	148	128	24	WBGene00016671	39	48	21	WBGene00006470	106	162	7	WBGene00008694	134	161	12
WBGene00006595	97	69	35	WBGene00194892	84	35	10	WBGene00000402	39	48	21	WBGene00009582	83	150	8	WBGene00003623	137	209	14
WBGene00010808	85	77	54	WBGene00001371	84	35	10	WBGene00022090	149	31	11	WBGene00009583	105	151	10	WBGene00008278	137	209	14
WBGene00011431	92	87	51	WBGene00004048	161	255	15	WBGene00022092	149	31	11	WBGene00009584	127	151	11	WBGene00008279	60	70	37
WBGene00011432	82	92	55	WBGene00010550	161	255	15	WBGene00022089	149	31	11	WBGene00009585	127	151	11	WBGene00010519	74	77	24
WBGene00011435	82	92	55	WBGene00010551	161	255	15	WBGene00022087	149	31	11	WBGene00010256	37	92	7	WBGene00045497	74	77	24
WBGene00011433	82	92	55	WBGene00007545	35	38	30	WBGene00235294	158	202	15	WBGene00010258	37	92	7	WBGene00010999	120	176	11
WBGene00001555	124	98	34	WBGene00006856	115	42	9	WBGene00022078	158	202	15	WBGene00006778	67	130	8	WBGene00008925	120	176	11
WBGene00011434	153	155	40	WBGene00010758	115	42	9	WBGene00022077	160	32	10	WBGene00009771	94	43	9	WBGene00008927	108	139	88
WBGene00012343	158	102	28	WBGene00010759	74	92	57	WBGene00022101	160	32	10	WBGene00009772	94	43	9	WBGene00008599	145	223	32
WBGene00012345	162	49	15	WBGene00000972	74	92	57	WBGene00022099	160	32	10	WBGene00009773	94	43	9	WBGene00045245	145	223	32
WBGene00004915	162	49	15	WBGene00010760	74	92	57	WBGene00022076	160	32	10	WBGene00045419	117	125	9	WBGene00008600	103	65	10
WBGene00012344	131	35	12	WBGene00010196	99	38	10	WBGene00003595	74	96	6	WBGene00011577	71	20	6	WBGene00008601	106	142	9
WBGene00012732	89	52	8	WBGene00010197	99	38	10	WBGene00003161	137	116	26	WBGene00011576	71	20	6	WBGene00011255	122	186	17
WBGene00012733	86	63	8	WBGene00010198	99	38	10	WBGene00022075	191	138	42	WBGene00044204	71	20	6	WBGene00000217	138	177	15
WBGene00012734	80	85	8	WBGene00007249	77	59	14	WBGene00004367	191	138	42	WBGene00006777	60	105	65	WBGene00004826	138	177	15
WBGene00012735	134	170	9	WBGene00007250	77	59	14	WBGene00022100	91	86	36	WBGene00007784	117	36	9	WBGene00004825	138	177	15
WBGene00007218	85	39	10	WBGene00007251	77	59	14	WBGene00022074	104	55	13	WBGene00007785	117	36	9	WBGene00004827	153	167	12
WBGene00007217	85	39	10	WBGene00007244	77	59	14	WBGene00022377	137	38	10	WBGene00077500	117	36	9	WBGene00010694	102	104	19
WBGene00007215	85	39	10	WBGene00008964	33	54	25	WBGene00022376	170	20	7	WBGene00004323	70	22	4	WBGene00010689	51	41	26
WBGene00007213	128	143	8	WBGene00007996	65	103	60	WBGene00022378	111	23	7	WBGene00010699	70	22	4	WBGene00010690	90	146	24
WBGene00012290	128	143	8	WBGene00007997	65	103	60	WBGene00006705	121	108	6	WBGene00010698	70	22	4	WBGene00010691	90	146	24

WBGene00219206	128	143	8	WBGene00000225	67	154	9	WBGene00022382	131	193	5	WBGene00077491	85	88	10	WBGene00010692	90	146	24
WBGene00012289	122	116	9	WBGene00006787	67	154	9	WBGene00022381	160	23	11	WBGene00010697	85	88	10	WBGene00001995	120	65	6
WBGene00044066	122	116	9	WBGene00013851	36	75	7	WBGene00021876	119	160	12	WBGene00011543	68	81	5	WBGene00010693	137	139	6
WBGene00012739	108	71	10	WBGene00010491	100	132	33	WBGene00021877	103	112	8	WBGene00011544	100	178	10	WBGene00003626	153	213	6
WBGene00012740	106	28	12	WBGene00007478	100	132	33	WBGene00219424	119	160	12	WBGene00010177	100	178	10	WBGene00010704	56	72	45
WBGene00012738	118	30	14	WBGene00007479	100	132	33	WBGene00044486	93	95	10	NoWBGene_ID27	100	178	10	WBGene00010705	56	72	45
WBGene00005010	118	30	14	WBGene00013195	110	48	16	WBGene00021868	123	145	6	WBGene00010178	67	24	7	WBGene00010706	56	72	45
WBGene00013021	90	31	10	WBGene00001225	110	48	16	WBGene00021875	53	71	43	WBGene00006169	67	24	7	WBGene00005121	34	76	65
WBGene00013020	103	22	6	WBGene00013196	110	48	16	WBGene00044487	60	83	64	WBGene00007428	91	41	9	WBGene00011013	34	76	65
WBGene00013019	108	34	7	WBGene00012180	106	91	33	WBGene00021894	60	83	64	WBGene00007429	91	41	9	WBGene00009796	34	76	65
WBGene00013018	108	34	7	WBGene00012181	108	134	32	WBGene00044488	59	73	53	WBGene00000840	89	34	8	WBGene00009797	56	76	7
WBGene00013603	108	30	7	WBGene00012183	114	133	14	WBGene00235268	50	52	21	WBGene00014108	88	70	11	WBGene00004801	56	76	7
WBGene00003585	98	146	7	WBGene00012182	114	133	14	WBGene00021882	141	65	11	WBGene00014109	88	70	11	WBGene00004238	58	93	10
WBGene00044260	137	31	8	WBGene00012179	114	133	14	WBGene00021871	141	65	11	WBGene00014112	88	70	11	WBGene00003511	58	93	10
WBGene00013604	137	31	8	WBGene00004451	114	133	14	WBGene00235102	141	65	11	WBGene00050936	88	70	11	WBGene00008213	51	127	7
WBGene00013593	111	66	7	WBGene00003651	114	133	14	WBGene00021883	141	65	11	WBGene00014111	88	70	11	WBGene00007810	48	91	69
WBGene00219288	84	101	5	WBGene00011046	110	29	8	WBGene00021884	141	65	11	WBGene00014114	88	70	11	WBGene00007811	89	144	45
WBGene00044261	84	101	5	WBGene00011043	110	29	8	WBGene00021887	88	24	8	WBGene00007534	108	82	36	WBGene00007812	130	197	21
WBGene00013595	128	59	6	WBGene00000584	57	117	6	WBGene00006708	118	30	11	WBGene00007537	108	82	36	WBGene00001435	130	197	21
WBGene00000089	128	59	6	WBGene00001247	37	76	10	WBGene00021888	147	36	14	WBGene00195157	108	82	36	WBGene00001436	40	44	20
NoWBGene_ID71	79	31	6	WBGene00013150	76	50	11	WBGene00002243	85	111	7	WBGene00000102	62	81	7	WBGene00206389	50	55	21
WBGene00013602	79	31	6	WBGene00013151	76	50	11	WBGene00021890	105	160	9	WBGene00007100	93	31	9	WBGene00007813	29	39	21
WBGene00000891	129	24	5	WBGene00044720	76	50	11	WBGene00021891	127	213	9	WBGene00007101	93	31	9	WBGene00008527	28	50	28
WBGene00013596	147	42	7	WBGene00013156	167	35	12	WBGene00219425	127	213	9	WBGene00001646	93	31	9	WBGene00008526	26	61	35
WBGene00013597	165	59	9	WBGene00013158	167	35	12	WBGene00021892	71	96	9	WBGene00007102	93	31	9	WBGene00010368	42	86	72
WBGene00013598	115	31	7	WBGene00194905	167	35	12	WBGene00021869	71	96	9	WBGene00007103	75	59	9	WBGene00000758	42	86	72
WBGene00013599	115	31	7	WBGene00013159	129	28	8	WBGene00021893	100	96	8	WBGene00010625	84	39	4	WBGene00000406	110	164	7
WBGene00012386	160	138	8	WBGene00013160	129	28	8	WBGene00022069	130	44	15	WBGene00050947	84	39	4	WBGene00008939	138	181	20
WBGene00012351	160	138	8	WBGene00013165	131	29	13	WBGene00022067	130	35	11	WBGene00010626	84	39	4	WBGene00003903	166	198	32
WBGene00006793	160	138	8	WBGene00013166	95	36	6	WBGene00003153	100	42	9	WBGene00010632	97	46	12	WBGene00008940	166	198	32
WBGene00004445	137	69	13	WBGene00013167	95	36	6	WBGene00022061	60	83	8	WBGene00010627	97	46	12	WBGene00010034	175	221	17
WBGene00012353	142	60	13	WBGene00013168	119	85	8	WBGene00019766	121	43	11	WBGene00010629	97	46	12	WBGene00010033	175	221	17
WBGene00012354	146	51	13	WBGene00013169	119	85	8	WBGene00022059	147	151	26	WBGene00010630	83	39	10	WBGene00006816	175	221	17
WBGene00194660	137	40	11	WBGene00001774	37	97	68	WBGene00022060	65	106	9	WBGene00010631	83	39	10	WBGene00010027	84	110	9
WBGene00012234	128	28	9	WBGene00001775	37	97	68	WBGene00020831	65	106	9	WBGene00012527	92	46	6	WBGene00010028	84	110	9
WBGene00012390	113	24	8	WBGene00001776	37	97	68	WBGene00044469	169	257	17	WBGene00004909	92	46	6	WBGene00000262	84	110	9
WBGene00012389	113	24	8	WBGene00001777	37	97	68	WBGene00020833	169	257	17	WBGene00012528	92	46	6	WBGene00010030	84	110	9
WBGene00012370	128	17	8	WBGene00021597	90	84	9	WBGene00021089	135	43	16	WBGene00009060	118	176	5	WBGene00006412	42	70	9
WBGene00044065	128	17	8	WBGene00021596	127	32	9	WBGene00021088	135	43	16	WBGene00009059	118	176	5	WBGene00008037	86	147	80
WBGene00012366	158	83	10	WBGene00021595	127	32	9	WBGene00021082	66	65	9	WBGene00001178	86	162	6	WBGene00007285	73	125	76
WBGene00012371	158	83	10	WBGene00021594	89	166	9	WBGene00018328	153	145	60	WBGene00012532	53	148	6	WBGene00007288	60	103	71
WBGene00012369	126	56	10	WBGene00007064	141	185	12	WBGene00001999	153	145	60	WBGene00012531	53	148	6	WBGene00007286	95	146	41
WBGene00012365	104	32	11	WBGene00019185	98	122	5	WBGene00018330	113	184	14	WBGene00007952	79	32	6	WBGene00007287	130	189	10
WBGene00012236	140	125	20	WBGene00018794	177	48	34	WBGene00018323	75	115	29	WBGene00007953	79	32	6	WBGene00000074	123	200	15
WBGene00012237	166	215	27	WBGene00018795	177	48	34	WBGene00021953	130	39	10	WBGene00009108	79	32	6	WBGene00010505	58	104	35
WBGene00012239	166	215	27	WBGene00018793	177	48	34	WBGene00021952	130	39	10	WBGene00009107	87	82	13	WBGene00010773	58	104	35
WBGene00012238	152	179	21	WBGene00003931	156	124	22	WBGene00015249	64	26	7	WBGene00006460	87	82	13	WBGene00010774	58	104	35
WBGene00012240	152	179	21	WBGene00016222	135	200	10	WBGene00015250	120	67	11	WBGene00195256	87	82	13	WBGene00010775	58	104	35
WBGene00195155	138	143	14	WBGene00016223	135	200	10	WBGene00015251	175	107	14	WBGene00006934	62	18	6	WBGene00077679	76	94	7
WBGene00012241	138	143	14	WBGene00020540	72	79	30	WBGene00015248	175	107	14	WBGene00011890	62	18	6	WBGene00010776	57	81	22
WBGene00013506	128	39	14	WBGene00020541	72	79	30	WBGene00015252	175	107	14	WBGene00011892	62	18	6	WBGene00003661	82	108	9
WBGene00004475	147	63	16	WBGene00020542	72	79	30	WBGene00001119	113	30	9	WBGene00003065	62	18	6	WBGene00014215	78	118	7
WBGene00013508	63	52	26	WBGene00020543	72	79	30	WBGene00015413	113	30	9	WBGene00011898	75	21	6	WBGene00010834	89	139	11
WBGene00045058	89	99	7	WBGene00020548	72	79	30	WBGene00015652	65	118	14	WBGene00011897	75	21	6	WBGene00010836	89	139	11
WBGene00013511	104	171	7	WBGene00020544	72	79	30	WBGene00044470	65	118	14	WBGene00006667	62	133	9	WBGene00010835	89	139	11
WBGene00013509	91	145	9	WBGene00006895	72	79	30	WBGene00015651	65	118	14	WBGene00000445	62	133	9	NoWBGene_ID59	118	175	11

WBGene00013865	38	87	8	WBGene00018245	84	69	11	WBGene00015658	193	214	62	WBGene00001747	164	213	9	WBGene00005063	118	175	11
WBGene00002111	38	87	8	WBGene00018247	84	69	11	WBGene00006769	193	214	62	WBGene00012117	219	332	33	WBGene00012512	94	106	9
WBGene00045396	92	124	6	WBGene00189955	119	146	11	WBGene00019778	131	122	34	WBGene00008380	67	33	8	WBGene00010493	115	166	10
WBGene00002107	92	124	6	WBGene00018246	119	146	11	WBGene00019777	72	33	6	WBGene00006481	67	33	8	WBGene00001251	60	101	9
WBGene00002113	92	124	6	WBGene00018248	119	146	11	WBGene00015037	74	35	7	WBGene00206498	98	33	10	WBGene00000105	160	203	18
WBGene00009825	129	195	10	WBGene00018242	153	222	11	WBGene00003889	49	73	40	WBGene00007797	98	33	10	WBGene00006372	60	107	5
WBGene00009824	147	206	12	WBGene00077531	153	222	11	WBGene00015035	93	101	8	WBGene00002985	98	33	10	WBGene00004126	176	230	9
WBGene00009823	136	176	14	WBGene00018241	144	124	10	WBGene00021375	93	101	8	WBGene00010012	50	120	14	WBGene00009850	80	120	8
WBGene00013408	125	145	16	WBGene00001963	135	25	8	WBGene00021374	93	101	8	WBGene00009329	74	35	11	WBGene00009851	80	120	8
WBGene00013409	125	145	16	WBGene00003510	135	25	8	WBGene00021376	93	101	8	WBGene00009336	75	54	22	WBGene00009852	103	116	8
WBGene00013404	125	145	16	WBGene00006715	135	25	8	WBGene00021377	149	27	7	WBGene00009330	75	54	22	WBGene00009853	103	116	8
WBGene00013403	129	122	13	WBGene00018240	135	25	8	WBGene00021378	149	27	7	WBGene00009335	75	54	22	WBGene00007846	98	32	7
WBGene00013405	145	76	12	WBGene00018239	135	25	8	WBGene00021379	149	27	7	WBGene00001303	75	54	22	WBGene00007847	107	75	8
WBGene00006565	159	44	12	WBGene00002230	85	94	7	WBGene00022609	95	151	7	WBGene00009331	75	72	33	WBGene00007848	116	117	9
WBGene00001047	159	44	12	WBGene00021755	149	21	10	WBGene00022608	95	151	7	WBGene00008923	127	205	12	WBGene00007849	116	117	9
WBGene00013406	161	35	10	WBGene00021754	94	18	10	WBGene00016987	94	112	10	WBGene00008922	127	205	12	WBGene00007295	120	182	9
WBGene00013407	161	35	10	WBGene00021753	71	15	9	WBGene00021363	160	36	12	NoWBGene_ID20	127	205	12	WBGene00001116	61	99	50
WBGene00002181	155	210	19	WBGene00021751	102	114	8	WBGene00021359	160	36	12	WBGene00077761	127	205	12	WBGene00007903	61	99	50
WBGene00014700	69	96	5	WBGene00021756	242	214	43	WBGene00021358	160	36	12	WBGene00008914	79	129	9	WBGene00008880	89	109	9
WBGene00014699	69	96	5	WBGene00001561	242	214	43	WBGene00021367	104	61	7	WBGene00000726	79	129	9	WBGene00008881	99	85	13
WBGene00007988	114	75	39	WBGene00021913	115	111	13	WBGene00021366	104	61	7	WBGene00008915	79	129	9	WBGene00008882	99	85	13
WBGene00007991	114	75	39	WBGene00021912	114	149	9	WBGene00021365	128	90	11	WBGene00008916	79	129	9	WBGene00008884	64	115	82
WBGene00004202	83	146	8	WBGene00021914	109	26	9	WBGene00021370	116	140	12	WBGene00008918	69	110	14	WBGene00009235	64	115	82
WBGene00014100	83	146	8	WBGene00017328	109	26	9	WBGene00021371	116	140	12	WBGene00008919	69	110	14	WBGene00009234	77	104	47
WBGene00001377	197	276	11	WBGene00003134	104	143	7	WBGene00021369	114	136	12	WBGene00008921	94	87	20	WBGene00009233	62	70	22
WBGene00008190	197	276	11	WBGene00003770	104	143	7	WBGene00021372	119	157	9	WBGene00008920	118	63	25	WBGene00044137	34	47	32
WBGene00008191	65	85	5	WBGene00044288	81	23	9	WBGene00021373	123	178	6	WBGene00219325	118	63	25	WBGene00009232	53	82	24
WBGene00008188	65	85	5	WBGene00006781	60	51	32	WBGene00021368	161	252	11	WBGene00007554	102	33	8	WBGene00009231	67	100	9
WBGene00008613	106	77	14	WBGene00020701	70	118	7	WBGene00006869	161	252	11	WBGene00006443	96	52	8	WBGene00000103	73	92	7
WBGene00008611	106	77	14	WBGene00015155	165	224	10	WBGene00003884	118	28	6	WBGene00185117	96	52	8	WBGene00010995	63	86	3
WBGene00008612	117	101	12	WBGene00021906	116	89	9	NoWBGene_ID31	118	28	6	WBGene00077699	96	52	8	WBGene00010994	63	86	3
WBGene00009862	128	124	10	WBGene00002269	147	108	11	WBGene00019724	118	28	6	WBGene00008106	96	52	8	WBGene00006369	80	105	10
WBGene00009861	128	124	10	WBGene00020563	69	117	7	WBGene00019723	118	28	6	WBGene00000063	136	119	15	WBGene00007993	97	89	8
WBGene00009863	133	162	12	WBGene00001412	96	36	10	WBGene00044690	118	28	6	WBGene00000065	136	119	15	WBGene00007994	114	72	6
WBGene00005078	111	155	8	WBGene00020565	96	36	10	WBGene00019726	150	228	8	WBGene00000064	136	119	15	WBGene00007995	70	95	11
WBGene00013667	133	24	7	WBGene00021063	116	36	9	WBGene00017907	135	229	18	WBGene00010405	89	34	10	WBGene00000457	70	95	11
WBGene00013668	133	24	7	WBGene00044319	135	35	7	WBGene00000287	135	229	18	WBGene00010406	89	34	10	WBGene00000458	76	127	12
WBGene00013669	137	26	10	WBGene00044318	135	35	7	WBGene00017906	119	230	27	WBGene00010408	92	39	8	WBGene00010607	68	82	9
WBGene00000158	137	26	10	WBGene00021061	115	70	8	WBGene00006970	119	230	27	WBGene00007385	92	39	8	WBGene00010606	54	67	17
WBGene00013674	173	49	18	WBGene00015648	68	97	8	WBGene00000009	119	230	27	WBGene00007390	92	39	8	WBGene00005193	39	52	24
WBGene00004489	173	49	18	WBGene00015647	41	89	8	WBGene00018145	49	89	14	WBGene00007386	92	39	8	WBGene00010552	115	132	6
WBGene00013676	173	49	18	WBGene00016029	63	144	7	WBGene00018146	49	89	14	WBGene00011839	43	73	29	WBGene00010553	120	156	6
WBGene00013678	138	44	7	WBGene00018363	53	94	13	WBGene00005433	87	169	13	WBGene00001663	43	73	29	WBGene00010554	120	156	6
WBGene00013685	138	44	7	WBGene00004212	52	74	20	WBGene00018547	87	169	13	WBGene00010742	75	166	9	WBGene00006517	106	157	11
WBGene00013679	138	44	7	WBGene00018365	52	74	20	WBGene00020930	109	139	10	WBGene00010743	100	192	14	WBGene00007532	106	157	11
WBGene00001365	73	65	8	WBGene00000882	50	54	26	WBGene00018066	154	39	8	WBGene00010744	86	159	14	WBGene00007530	106	157	11
WBGene00013683	98	100	7	WBGene00000117	50	54	26	WBGene00018065	154	39	8	WBGene00011830	81	126	18	WBGene00007529	79	99	7
WBGene00013682	100	35	7	WBGene00018364	107	20	9	WBGene00018064	150	82	13	WBGene00011831	59	67	20	WBGene00004191	69	97	8
WBGene00002978	92	129	11	WBGene00018362	107	20	9	WBGene00003955	146	125	18	WBGene00011832	77	65	17	WBGene00023500	58	95	9
WBGene00013687	65	21	8	WBGene00004922	108	32	16	WBGene00006951	146	125	18	WBGene00004152	95	62	13	WBGene00007531	70	98	7
WBGene00013692	109	30	10	WBGene00004498	109	43	22	NoWBGene_ID76	146	125	18	WBGene00011833	81	37	6	WBGene00004764	63	117	8
WBGene00013689	153	39	11	WBGene00015173	109	43	22	WBGene00020981	116	91	13	WBGene00011834	81	37	6	WBGene00010570	56	135	9
WBGene00013688	153	39	11	WBGene00019329	164	178	19	WBGene00020982	85	57	8	WBGene00002072	81	37	6	WBGene00013370	21	25	20
WBGene00013690	121	76	8	WBGene00019327	164	178	19	WBGene00006173	94	76	11	WBGene00011835	81	37	6	WBGene00009088	83	125	7
WBGene00013691	121	76	8	WBGene00019331	164	178	19	WBGene00020979	94	76	11	WBGene00007282	142	250	9	WBGene00009089	83	125	7
WBGene00001334	121	76	8	WBGene00019332	131	177	10	WBGene00004157	112	103	13	WBGene00001645	142	250	9	WBGene00044147	126	137	12

WBGene00013197	74	109	7	WBGene00001392	131	177	10	WBGene00020983	112	103	13	WBGene00004910	43	76	10	WBGene00001583	145	212	74
WBGene00013198	74	109	7	WBGene00019326	128	108	12	WBGene00016435	118	42	5	WBGene00011404	59	120	72	WBGene00010940	164	286	135
WBGene00003790	153	47	17	WBGene00019333	125	39	14	WBGene00016432	103	56	8	WBGene00009830	59	120	72	WBGene00001898	164	286	135
WBGene00013200	139	44	12	WBGene00004388	125	39	14	WBGene00019529	139	31	12	WBGene00009829	78	27	4	WBGene00010936	134	227	16
WBGene00013201	139	44	12	WBGene00006430	125	39	14	WBGene00195048	139	31	12	WBGene00009833	78	27	4	WBGene00010935	134	227	16
WBGene00013202	139	44	12	WBGene00019334	99	49	11	WBGene00004385	139	31	12	WBGene00044203	114	194	20	WBGene00008355	87	90	9
WBGene00013203	111	37	13	WBGene00000202	73	58	8	WBGene00004386	126	44	10	WBGene00011383	114	194	20	WBGene00008354	81	38	9
WBGene00003951	111	37	13	WBGene00021170	140	156	24	WBGene00001033	113	57	7	WBGene00001716	114	194	20	WBGene00004301	89	228	10
WBGene00010579	111	37	13	WBGene00020758	206	254	39	WBGene00019535	113	57	7	WBGene00000554	65	87	5	WBGene00003602	89	228	10
WBGene00010587	111	37	13	WBGene00020759	206	254	39	WBGene00000611	144	61	25	WBGene00010192	59	123	4	WBGene00008094	82	123	16
WBGene00010585	126	184	11	WBGene00020760	206	254	39	WBGene00018086	144	61	25	WBGene00003248	59	123	4	WBGene00008093	74	124	11
WBGene00010584	126	184	11	WBGene00044681	206	254	39	WBGene00018085	144	61	25	WBGene00011712	65	82	12	WBGene00002282	93	138	25
WBGene00010581	123	113	11	WBGene00020762	147	163	11	WBGene00000123	97	53	22	WBGene00000982	65	82	12	WBGene00006366	79	130	35
WBGene00010583	119	42	10	WBGene00020763	136	104	9	WBGene00017483	83	57	7	WBGene00194712	65	82	12	WBGene00006524	101	116	9
WBGene00001979	119	42	10	WBGene00017758	102	44	8	WBGene00017482	83	57	7	WBGene00044019	105	120	11	WBGene00001325	98	152	8
WBGene00010580	151	57	16	WBGene00017759	80	44	9	WBGene00020978	113	29	15	WBGene00008330	105	120	11	WBGene00004313	109	151	7
WBGene00009559	151	57	16	WBGene00017760	96	41	8	WBGene00005662	113	29	15	WBGene00008339	105	120	11	WBGene00010059	116	214	9
WBGene00001030	151	57	16	WBGene00017763	112	38	7	WBGene00050916	113	29	15	WBGene00008331	105	120	11	WBGene00010060	116	214	9
WBGene00043308	151	57	16	WBGene00000263	112	38	7	WBGene00018898	113	29	15	WBGene00009532	51	118	6	WBGene00007750	83	154	13
WBGene00004495	151	57	16	WBGene00017757	112	38	7	WBGene00021286	99	96	46	WBGene00077536	80	124	5	WBGene00007751	68	115	15
WBGene00009558	149	134	13	WBGene00017761	112	38	7	WBGene00004419	99	96	46	WBGene00189933	80	124	5	WBGene00000822	33	95	8
WBGene00009557	147	211	9	WBGene00020448	98	123	9	WBGene00021282	85	63	26	WBGene00009534	80	124	5	WBGene00004950	43	100	13
WBGene00006349	127	138	13	WBGene00019912	98	123	9	WBGene00021283	207	242	10	WBGene00004064	57	103	10	WBGene00001828	69	118	13
WBGene00009554	127	138	13	WBGene00019913	139	162	12	WBGene00021284	207	242	10	WBGene00003691	57	103	10	WBGene00009573	85	130	9
WBGene00006730	127	138	13	WBGene00019915	139	162	12	WBGene00021285	207	242	10	WBGene00003658	57	103	10	WBGene00009574	106	136	10
WBGene00009553	127	138	13	WBGene00015267	105	28	6	WBGene00021281	207	242	10	WBGene00009384	98	31	6	WBGene00006432	119	144	9
WBGene00004889	172	278	10	WBGene00015266	105	28	6	WBGene00019948	113	116	15	WBGene00009385	98	31	6	WBGene00050939	56	89	12
WBGene00013204	93	38	7	WBGene00015268	110	157	10	WBGene00019952	113	116	15	WBGene00009386	98	31	6	WBGene00007348	82	114	11
WBGene00002324	93	38	7	WBGene00006697	226	39	14	WBGene00019956	171	196	34	WBGene00000249	93	42	13	WBGene00007349	107	138	9
WBGene00006711	93	38	7	WBGene00004277	226	39	14	WBGene00019953	171	196	34	WBGene00004806	93	42	13	WBGene00007350	89	130	10
WBGene00009304	84	193	8	WBGene00022357	226	39	14	WBGene00019947	229	276	53	WBGene00000449	82	176	14	WBGene00007351	89	130	10
WBGene00044245	84	193	8	WBGene00003917	226	39	14	WBGene00019946	229	276	53	WBGene00009791	82	176	14	WBGene00012445	71	122	11
WBGene00009305	98	202	9	WBGene00022104	96	53	33	WBGene00019955	193	246	32	WBGene00009790	115	197	13	WBGene00006743	75	141	10
WBGene00009306	112	210	9	WBGene00004891	148	19	13	WBGene00019945	193	246	32	WBGene00000146	148	218	12	WBGene00009628	82	119	12
WBGene00006789	78	113	7	WBGene00022103	62	102	22	WBGene00019954	193	246	32	WBGene00000453	104	181	28	WBGene00009629	41	67	59
WBGene00008695	78	113	7	WBGene00022492	165	32	10	WBGene00019721	98	143	14	WBGene00006609	104	181	28	WBGene00044139	55	101	34
WBGene00001488	95	95	9	WBGene00022493	165	32	10	WBGene00019719	98	143	14	WBGene00007118	93	27	5	WBGene00000221	69	135	8
WBGene00002189	105	206	10	WBGene00022489	165	32	10	WBGene00022677	82	49	8	WBGene00007117	93	27	5	WBGene00011426	107	167	20
WBGene00014148	126	221	12	WBGene00022488	165	32	10	WBGene00195011	82	49	8	WBGene00077538	108	46	7	WBGene00001329	144	199	31
WBGene00014149	126	221	12	WBGene00003978	77	115	70	WBGene00022678	82	49	8	WBGene00011439	108	46	7	WBGene00003149	124	149	21
WBGene00000469	126	221	12	WBGene00022487	97	137	15	WBGene00022679	90	48	10	WBGene00010075	108	46	7	WBGene00001055	115	156	7
WBGene00013969	61	90	7	WBGene00022347	130	54	19	WBGene00044481	60	83	8	WBGene00006373	108	46	7	WBGene00007772	115	156	7
WBGene00009368	108	24	8	WBGene00001236	130	54	19	WBGene00022681	60	83	8	WBGene00004768	108	46	7	WBGene00007775	113	65	9
WBGene00009369	108	24	8	WBGene00022336	179	85	27	WBGene00017900	74	169	12	WBGene00010079	65	93	72	WBGene00007771	113	65	9
WBGene00001049	126	27	6	WBGene00022348	119	82	30	WBGene00044302	78	73	8	WBGene00010082	65	93	72	WBGene00007774	113	65	9
WBGene00009366	112	32	8	WBGene00022349	116	118	19	WBGene00017596	78	73	8	WBGene00010080	65	93	72	WBGene00007776	59	112	8
WBGene00009370	97	37	9	WBGene00022334	159	195	22	WBGene00017595	78	73	8	WBGene00008408	91	36	11	WBGene00007773	59	112	8
WBGene00009371	107	57	28	WBGene00022351	119	29	6	WBGene00017593	78	73	8	WBGene00008409	91	36	11	WBGene00044138	56	106	8
WBGene00009367	107	57	28	WBGene00044341	119	29	6	WBGene00017592	78	73	8	WBGene00008410	91	36	11	WBGene00001451	58	117	6
WBGene00009284	136	122	54	WBGene00019715	119	29	6	WBGene00017923	95	57	10	WBGene00000731	91	36	11	WBGene00003411	109	179	10
WBGene00000881	154	167	61	WBGene00004905	116	33	8	WBGene00017922	129	36	7	WBGene00011261	124	205	9	WBGene00003909	100	188	9
WBGene00009285	129	102	36	WBGene00022054	121	31	8	WBGene00006706	129	36	7	WBGene00001978	102	179	10	WBGene00009720	100	188	9
WBGene00009286	103	36	11	WBGene00022055	126	28	8	WBGene00017921	129	36	7	WBGene00005967	105	136	33	WBGene00004353	100	188	9
WBGene00009287	103	36	11	WBGene00022053	126	28	8	WBGene00004205	127	66	8	WBGene00010792	105	136	33	WBGene00004354	100	188	9
WBGene00009288	103	36	11	WBGene00022057	157	28	10	WBGene00000685	124	95	8	WBGene00004855	105	136	33	WBGene00008973	136	125	13
WBGene00015285	88	93	7	WBGene00022052	157	28	10	WBGene00017924	124	95	8	WBGene00011270	76	122	21	WBGene00008974	121	142	17

WBGene00005017	83	54	9	WBGene00021245	92	139	61	WBGene00017925	124	95	8	WBGene00003886	46	107	9	WBGene00008975	105	158	20
WBGene00015291	83	54	9	WBGene00021247	92	150	85	WBGene00017920	124	95	8	WBGene00010284	69	50	10	NoWBGene_ID67	105	158	20
WBGene00017745	76	76	8	WBGene00021248	173	49	15	WBGene00044482	45	99	10	WBGene00010286	69	50	10	WBGene00008976	111	79	9
WBGene00017746	70	59	7	WBGene00002025	173	49	15	WBGene00019543	119	60	11	WBGene00138720	69	50	10	WBGene00004317	111	79	9
WBGene00017744	71	21	6	WBGene00021261	53	115	8	WBGene00013677	118	55	9	WBGene00010289	122	212	24	WBGene00008978	58	90	10
WBGene00017743	71	21	6	WBGene00044798	79	58	8	WBGene00019544	118	55	9	WBGene00010288	122	212	24	WBGene00008979	86	47	7
WBGene00017750	93	30	6	WBGene00021442	106	25	9	WBGene00019541	90	46	6	WBGene00010290	122	212	24	WBGene00007668	86	47	7
WBGene00004504	93	30	6	WBGene00021441	106	25	9	WBGene00017116	91	105	8	WBGene00000781	88	32	8	WBGene00007666	92	158	9
WBGene00017742	93	30	6	WBGene00004249	98	18	7	WBGene00001983	91	65	10	WBGene00003235	88	32	8	WBGene00007667	92	130	8
WBGene00017749	93	30	6	WBGene00021443	98	18	7	WBGene00017119	106	93	13	WBGene00004917	93	33	10	WBGene00010434	44	71	14
WBGene00016021	95	153	7	WBGene00004163	57	39	25	WBGene00017120	106	93	13	WBGene00004501	93	33	10	WBGene00014793	44	71	14
WBGene00016020	95	153	7	WBGene00021446	106	31	7	WBGene00017121	106	93	13	WBGene00008258	97	34	12	WBGene00010433	89	45	9
WBGene00006611	95	153	7	WBGene00021445	106	31	7	WBGene00004432	120	161	14	WBGene00000876	96	95	11	WBGene00008609	89	45	9
WBGene00016018	133	233	7	WBGene00000941	106	31	7	WBGene00021202	120	161	14	WBGene00008259	96	95	11	WBGene00001468	38	95	7
WBGene00001193	133	233	7	WBGene00021444	106	31	7	WBGene00021201	117	157	13	WBGene00001553	89	124	14	WBGene00195212	38	95	7
WBGene00016022	40	84	8	WBGene00015245	163	25	7	WBGene00021204	113	152	11	WBGene00194785	96	95	11	WBGene00008607	68	134	8
WBGene00016810	112	45	8	WBGene00004128	195	190	12	WBGene00194835	113	152	11	WBGene00010204	81	152	17	WBGene00008606	97	172	8
WBGene00016811	112	45	8	WBGene00018721	144	55	15	WBGene00021205	113	152	11	WBGene00010205	81	152	17	WBGene00008605	97	172	8
WBGene00016808	112	45	8	WBGene00004491	144	55	15	WBGene00021206	115	119	11	WBGene00004032	113	196	12	WBGene00011101	72	103	7
WBGene00044420	112	45	8	WBGene00018723	144	55	15	WBGene00021200	115	119	11	WBGene00008644	59	125	9	WBGene00007526	43	100	7
WBGene00019615	69	166	6	WBGene00020115	131	45	13	WBGene00021199	117	86	11	WBGene00002241	167	267	14	WBGene00011679	111	115	24
WBGene00019616	69	166	6	WBGene00020116	117	35	11	WBGene00021198	117	86	11	WBGene00008645	167	267	14	WBGene00000618	111	115	24
WBGene00020798	111	64	7	WBGene00001063	40	81	71	WBGene00020006	123	124	7	WBGene00000533	153	158	24	WBGene00011680	111	115	24
WBGene00020797	144	198	10	WBGene00021702	153	144	8	WBGene00003694	123	124	7	WBGene00004138	153	158	24	WBGene00011681	66	164	8
WBGene00020796	144	198	10	WBGene00004088	153	144	8	WBGene00001324	94	22	8	WBGene00011088	153	158	24	WBGene00011683	66	164	8
WBGene00001340	144	198	10	WBGene00021698	94	50	8	WBGene00001060	94	22	8	WBGene00011089	107	118	17	WBGene00010356	50	102	8
NoWBGene_ID26	37	74	9	WBGene00021697	147	106	22	WBGene00044483	93	35	12	WBGene00011090	60	78	10	WBGene00009552	70	101	20
WBGene00000497	37	74	9	WBGene00021705	238	249	11	WBGene00019163	93	35	12	WBGene00011092	61	53	10	WBGene00009789	65	105	7
WBGene00018585	203	127	29	WBGene00016527	129	186	13	WBGene00019162	93	35	12	WBGene00011094	61	53	10	WBGene00002203	158	276	12
WBGene00018586	203	127	29	WBGene00016520	129	186	13	WBGene00005842	93	35	12	WBGene00011100	39	69	7	WBGene00007262	158	276	12
WBGene00021545	203	127	29	WBGene00016528	129	186	13	WBGene00006217	22	34	23	WBGene00007547	39	69	7	WBGene00004777	57	143	81
WBGene00004166	140	38	8	WBGene00021863	126	131	10	WBGene00006216	22	34	23	WBGene00007546	46	112	5	WBGene00003681	96	157	10
WBGene00000296	140	38	8	WBGene00021864	126	131	10	WBGene00006211	32	41	27	WBGene00003726	83	150	7	WBGene00012441	96	157	10
WBGene00015188	37	86	5	WBGene00206486	126	131	10	WBGene00020351	33	42	25	WBGene00007548	83	150	7	WBGene00012444	102	167	12
WBGene00015189	37	86	5	WBGene00021857	154	26	22	WBGene00020354	33	43	22	WBGene00007549	119	188	9	WBGene00007877	91	159	8
WBGene00015190	147	65	11	WBGene00021866	136	24	8	WBGene00020356	33	43	22	WBGene00007756	73	122	7	WBGene00007878	95	143	8
WBGene00015191	147	65	11	WBGene00021867	136	24	8	WBGene00015626	45	75	55	WBGene00001088	119	67	10	WBGene00006462	64	99	9
WBGene00015186	114	44	9	WBGene00021856	136	24	8	WBGene00044484	45	75	55	WBGene00004384	87	81	10	WBGene00009560	81	157	10
WBGene00015185	114	44	9	WBGene00004016	89	43	7	WBGene00015330	137	179	18	WBGene00014098	84	106	9	WBGene00004123	81	157	10
WBGene00015184	81	23	7	WBGene00001589	89	43	7	WBGene00015326	111	107	18	WBGene00014099	87	81	10	WBGene00010981	82	69	6
WBGene00015192	81	23	7	WBGene00019199	113	28	6	WBGene00015327	111	107	18	WBGene00003057	55	95	9	WBGene00010983	76	46	10
WBGene00015183	83	100	12	WBGene00000506	92	53	6	WBGene00015329	111	107	18	WBGene00006874	80	128	12	WBGene00010984	76	46	10
WBGene00019281	83	100	12	WBGene00019198	92	53	6	WBGene00015328	86	121	10	WBGene00003515	32	45	18	WBGene00008116	47	84	9
WBGene00019280	83	100	12	WBGene00021022	117	41	7	WBGene00014997	74	142	7	WBGene00011449	73	63	7	WBGene00001556	47	84	9
WBGene00000645	83	100	12	WBGene00021020	124	110	9	WBGene00006428	74	142	7	WBGene00004296	73	63	7	WBGene00010396	87	79	4
WBGene00019279	119	169	9	WBGene00021019	130	178	10	WBGene00016057	87	60	8	WBGene00006677	85	29	8	WBGene00001649	75	80	7
WBGene00019282	119	169	9	WBGene00021018	130	178	10	WBGene00016055	87	60	8	WBGene00010094	85	29	8	WBGene00010397	63	81	9
WBGene00019278	119	169	9	WBGene00017099	88	111	11	WBGene00016058	87	60	8	WBGene00010093	85	29	8	WBGene00006541	86	115	12
WBGene00019283	119	169	9	WBGene00004884	103	55	11	WBGene00016053	98	156	31	WBGene00010096	93	110	8	WBGene00044142	109	148	14
WBGene00086561	119	169	9	WBGene00021847	120	21	7	WBGene00002247	91	119	22	WBGene00010097	93	110	8	WBGene00006494	109	148	14
WBGene00001391	67	111	7	WBGene00021852	63	96	7	WBGene00020994	91	119	22	WBGene00005241	115	158	12	WBGene00001148	89	96	11
WBGene00019284	67	111	7	WBGene00021850	63	96	7	WBGene00020995	84	82	12	WBGene00001493	102	126	80	WBGene00007260	76	102	8
WBGene00019277	69	97	7	WBGene00004314	138	22	10	WBGene00006586	100	26	6	WBGene00011016	102	31	10	WBGene00007261	62	76	6
WBGene00019285	71	82	6	WBGene00021849	143	71	9	WBGene00195093	100	26	6	WBGene00011017	102	31	10	WBGene00001130	124	209	8
WBGene00017037	88	42	8	WBGene00000464	143	71	9	WBGene00043064	100	26	6	WBGene00011015	102	31	10	WBGene00194849	114	164	16
WBGene00017038	88	42	8	WBGene00021854	107	59	6	WBGene00021994	100	26	6	WBGene00006668	71	52	31	WBGene00010701	122	165	14

WBGene00015406	100	88	10	WBGene00022197	107	59	6	WBGene00021157	43	89	54	WBGene00005018	43	68	26	WBGene00004276	129	165	11
WBGene00206366	100	88	10	WBGene00000160	120	65	11	WBGene00021161	106	114	15	WBGene00001179	190	221	8	WBGene00010700	113	125	13
WBGene00015407	103	46	6	WBGene00007019	120	65	11	WBGene00021155	106	114	15	WBGene00009201	129	174	8	WBGene00010726	96	84	14
WBGene00015405	103	46	6	WBGene00022195	91	49	7	WBGene00018319	93	68	12	WBGene00012242	53	96	7	WBGene00010725	70	77	20
WBGene00015404	103	46	6	WBGene00022194	91	49	7	WBGene00018318	80	22	9	WBGene00002133	53	96	7	WBGene00044143	26	77	6
WBGene00016074	127	24	10	WBGene00022193	91	49	7	WBGene00018317	87	55	10	WBGene00012244	103	33	16	WBGene00010330	76	129	7
WBGene00016073	127	24	10	WBGene00022174	73	26	8	WBGene00018321	87	55	10	WBGene00012243	103	33	16	WBGene00001687	100	134	7
WBGene00016075	109	98	10	WBGene00022173	73	26	8	WBGene00018316	93	88	10	WBGene00012245	103	33	16	WBGene00007284	124	139	7
WBGene00016077	109	98	10	WBGene00022175	29	25	20	WBGene00022775	105	31	10	WBGene00009721	59	96	21	WBGene00003638	172	256	7
WBGene00235333	128	146	14	WBGene00022176	108	31	8	WBGene00022776	105	31	10	WBGene00009722	40	72	9	WBGene00045494	92	89	8
WBGene00044639	85	103	8	WBGene00022172	108	31	8	WBGene00022774	105	31	10	WBGene00007587	79	44	26	WBGene00014040	101	96	11
WBGene00016072	98	94	9	WBGene00022182	129	26	8	WBGene00022773	105	31	10	WBGene00007586	79	44	26	WBGene00023497	82	74	19
WBGene00016071	110	84	9	WBGene00002244	137	39	9	WBGene00022772	105	31	10	WBGene00007588	93	27	7	WBGene00023498	54	45	24
WBGene00021130	93	58	7	WBGene00022171	139	47	13	WBGene00006745	96	146	8	WBGene00010174	114	186	9	WBGene00005221	62	94	75
WBGene00021129	93	58	7	WBGene00022185	139	47	13	WBGene00001411	98	164	9	WBGene00001670	114	186	9	WBGene00014068	62	94	75
WBGene00185079	93	58	7	WBGene00022170	132	43	15	WBGene00001093	98	164	9	WBGene00189948	140	195	7	WBGene00010336	91	141	21
WBGene00021131	89	33	8	WBGene00022169	132	43	15	WBGene00020463	88	69	9	WBGene00001671	140	195	7	WBGene00010337	91	141	21
WBGene00021132	91	18	6	WBGene00044609	132	43	15	WBGene00020462	88	69	9	WBGene00003011	140	195	7	WBGene00010338	91	141	21
WBGene00021133	91	18	6	WBGene00044760	98	140	10	WBGene00020465	51	94	11	WBGene00012278	56	91	6	WBGene00010010	44	102	7
WBGene00021073	105	26	7	WBGene00022168	98	140	10	WBGene00001439	93	160	8	WBGene00012279	56	91	6	WBGene00007175	71	97	10
WBGene00021076	118	33	8	WBGene00007000	190	65	12	WBGene00000817	67	25	6	WBGene00045336	83	36	10	WBGene00007817	31	73	8
WBGene00021074	101	24	7	WBGene00022167	190	65	12	WBGene00004804	101	112	8	WBGene00045517	83	36	10	WBGene00014213	128	154	8
WBGene00004188	101	24	7	WBGene00018990	51	79	5	WBGene00020585	135	199	9	WBGene00004442	83	36	10	WBGene00008622	193	250	22
WBGene00005324	77	97	7	WBGene00020597	80	137	8	WBGene00000247	138	152	9	WBGene00011247	83	36	10	WBGene00008621	82	129	8
WBGene00005512	83	105	8	WBGene00020599	80	137	8	WBGene00044500	140	105	8	WBGene00011248	83	36	10	WBGene00011226	73	92	5
WBGene00003106	88	112	8	WBGene00019994	83	167	7	WBGene00016955	66	123	11	WBGene00007609	63	47	4	WBGene00011229	79	92	53
WBGene00020836	144	126	8	WBGene00019997	196	169	7	WBGene00019263	62	38	5	WBGene00007606	63	47	4	WBGene00009069	79	92	53
WBGene00020834	144	126	8	WBGene00194747	196	169	7	WBGene00019264	62	38	5	WBGene00007607	63	47	4	WBGene00044638	79	92	53
WBGene00020835	144	126	8	WBGene00019157	196	169	7	WBGene00016664	120	192	13	WBGene00007608	63	47	4	WBGene00009067	65	85	36
WBGene00015646	62	87	9	WBGene00019158	77	38	7	WBGene00003636	120	192	13	WBGene00219330	113	45	10	WBGene00009068	65	85	36
WBGene00021096	121	38	11	WBGene00019159	77	38	7	WBGene00016291	52	103	9	WBGene00006512	113	45	10	WBGene00009070	91	99	13
WBGene00021097	121	38	11	WBGene00021917	78	119	7	WBGene00015540	66	41	8	WBGene00004738	113	45	10	WBGene00002051	34	61	30
WBGene00021093	110	65	9	WBGene00021915	78	119	7	WBGene00015538	66	41	8	WBGene00013902	47	97	38	WBGene00004745	97	109	8
WBGene00021098	110	65	9	WBGene00019170	144	68	17	WBGene00015541	71	105	8	WBGene00013907	47	97	38	WBGene00006674	37	93	31
WBGene00021101	110	65	9	WBGene00006725	144	68	17	WBGene00019257	45	81	5	WBGene00013896	29	68	6	WBGene00007523	109	171	9
WBGene00044733	98	83	7	WBGene00019168	144	68	17	WBGene00003019	31	83	9	WBGene00013897	62	123	7	WBGene00006384	109	171	9
WBGene00021092	98	83	7	WBGene00021820	112	129	7	WBGene00019255	141	156	16	WBGene00013898	62	123	7	WBGene00006353	66	88	27
WBGene00021099	96	74	7	WBGene00021817	112	129	7	WBGene00019296	141	156	16	WBGene00013899	81	153	8	WBGene00002280	66	88	27
WBGene00003599	71	101	6	WBGene00003175	43	76	9	WBGene00019295	124	132	16	WBGene00013900	67	129	8	WBGene00206382	52	108	12
WBGene00021031	71	101	6	WBGene00016634	43	76	9	WBGene00002129	124	132	16	WBGene00011592	91	34	4	WBGene00020770	83	128	11
WBGene00206416	71	101	6	WBGene00020103	110	36	13	WBGene00004494	106	108	16	WBGene00011589	91	34	4	WBGene00018187	161	233	8
WBGene00206417	71	101	6	WBGene00020102	110	36	13	WBGene00019297	183	263	83	WBGene00011283	80	175	13	WBGene00003555	74	102	19
WBGene00020207	110	127	26	WBGene00021800	102	30	29	WBGene00006780	183	263	83	WBGene00011284	61	134	8	WBGene00019422	40	60	30
WBGene00020205	102	105	17	WBGene00050917	102	30	29	WBGene00019205	72	110	6	WBGene00011285	62	140	9	WBGene00020795	40	60	30
WBGene00020204	102	105	17	WBGene00021801	102	30	29	WBGene00023486	146	239	9	WBGene00011286	62	140	9	WBGene00020794	57	84	5
WBGene00020181	126	30	9	WBGene00021808	153	163	13	WBGene00000535	146	239	9	WBGene00003738	63	146	10	WBGene00020793	85	122	14
WBGene00020172	126	30	9	WBGene00021803	153	163	13	WBGene00002245	131	209	9	WBGene00011802	104	94	10	WBGene00003933	58	94	14
WBGene00020171	125	187	7	WBGene00021815	150	29	8	WBGene00006974	110	48	14	WBGene00194787	104	94	10	WBGene00003883	50	70	47
WBGene00017874	75	89	4	WBGene00021813	150	29	8	WBGene00019751	82	92	12	WBGene00219337	104	94	10	WBGene00019519	55	65	78
WBGene00017873	75	89	4	WBGene00021812	150	29	8	WBGene00015701	82	31	10	WBGene00004151	104	94	10	WBGene00019518	35	61	56
WBGene00021578	136	200	23	WBGene00021811	138	175	8	WBGene00015703	82	31	10	WBGene00001233	104	94	10	WBGene00000401	53	91	16
WBGene00021576	131	182	24	WBGene00021816	173	50	18	WBGene00015702	82	31	10	WBGene00011307	104	94	10	WBGene00045272	38	60	35
WBGene00000106	131	182	24	WBGene00021810	173	50	18	WBGene00006809	82	31	10	WBGene00005113	85	44	9	WBGene00019102	78	105	30
WBGene00019927	90	115	7	WBGene00001559	39	84	8	WBGene00001853	121	177	116	WBGene00011306	85	44	9	WBGene00015547	124	172	30
WBGene00019926	94	104	10	WBGene00008347	94	136	47	WBGene00005738	121	177	116	WBGene00011309	85	44	9	WBGene00015546	87	147	38
WBGene00019925	94	104	10	WBGene00008348	123	109	31	WBGene00022250	114	67	31	WBGene00003031	78	38	9	WBGene00015545	58	68	36

WBGene00019924	98	93	12	WBGene00003372	152	81	14	WBGene00022235	108	65	30	WBGene00011308	71	31	9	WBGene00015548	33	112	7
WBGene00019923	98	93	12	WBGene00010303	152	81	14	WBGene00003082	108	65	30	WBGene00004793	71	31	9	WBGene00018373	111	176	8
WBGene00045302	98	93	12	WBGene00010304	152	81	14	WBGene00004783	101	62	28	WBGene00008851	44	78	6	WBGene00018374	111	176	8
WBGene00019928	108	111	26	WBGene00003795	149	55	12	WBGene00022251	87	90	19	WBGene00138724	44	78	6	WBGene00017726	66	111	11
WBGene00019922	108	111	26	WBGene00010305	145	29	10	WBGene00003237	87	90	19	WBGene00001109	44	78	6	NoWBGene_ID21	66	111	11
WBGene00019929	109	122	16	WBGene00010302	145	29	10	WBGene00022233	72	117	9	WBGene00001389	44	78	6	WBGene00017729	66	111	11
WBGene00019930	110	133	6	WBGene00010306	30	31	18	WBGene00004881	101	31	9	WBGene00001388	62	134	7	WBGene00017725	99	125	6
WBGene00019921	110	133	6	WBGene00010450	30	31	18	WBGene00022253	101	31	9	WBGene00008848	53	99	24	WBGene00001837	56	100	7
WBGene00019920	127	132	8	WBGene00010449	30	31	18	WBGene00000256	101	31	9	WBGene00045418	59	129	7	WBGene00015672	143	198	11
WBGene00019919	121	102	10	WBGene00007920	119	15	7	WBGene00022240	101	31	9	WBGene00008849	59	129	7	WBGene00015676	143	198	11
WBGene00019918	98	73	10	WBGene00007921	130	28	9	WBGene00022255	73	122	7	WBGene00008850	90	185	9	WBGene00020144	52	133	9
WBGene00019917	77	69	15	WBGene00007927	141	41	10	WBGene00022248	70	115	7	WBGene00001475	90	185	9	WBGene00020146	53	114	7
WBGene00016303	56	65	20	WBGene00007922	143	85	9	WBGene00022231	32	34	27	WBGene00012337	99	76	8	WBGene00020142	95	135	8
WBGene00016302	148	172	10	WBGene00007923	145	128	7	WBGene00044350	56	109	6	WBGene00002250	99	76	8	WBGene00000294	109	158	9
WBGene00016309	161	200	10	WBGene00007924	145	128	7	WBGene00015311	87	38	20	WBGene00007907	76	143	8	WBGene00006067	109	158	9
WBGene00235351	161	200	10	WBGene00007928	145	128	7	WBGene00015308	87	38	20	WBGene00007909	76	143	8	WBGene00020633	92	135	9
WBGene00016306	161	200	10	WBGene00010814	103	48	19	WBGene00015307	87	38	20	WBGene00003143	44	103	9	WBGene00020630	92	135	9
WBGene00016300	125	129	12	WBGene00004428	103	48	19	WBGene00016610	107	135	69	WBGene00007150	52	119	11	WBGene00018204	99	178	20
WBGene00016307	88	58	14	WBGene00010809	103	48	19	WBGene00006621	107	135	69	WBGene00001137	78	216	11	WBGene00016253	97	151	94
WBGene00016299	112	81	11	WBGene00010810	100	39	15	WBGene00016611	136	210	6	WBGene00219208	78	216	11	WBGene00016252	97	151	94
WBGene00016308	135	104	7	WBGene00010812	97	29	11	WBGene00016612	136	210	6	WBGene00007152	78	216	11	WBGene00016251	97	151	94
WBGene00016298	135	104	7	WBGene00010811	97	29	11	WBGene00018160	113	121	8	WBGene00007154	140	197	9	WBGene00018712	68	70	18
WBGene00044419	107	91	7	WBGene00010813	124	149	8	WBGene00018161	89	32	9	NoWBGene_ID33	140	197	9	WBGene00018710	144	220	10
WBGene00016297	78	78	7	WBGene00008288	110	153	8	WBGene00001029	89	32	9	WBGene00011647	109	137	9	WBGene00018713	50	128	11
WBGene00016296	78	78	7	WBGene00000248	96	156	8	WBGene00002274	89	32	9	WBGene00001874	81	45	8	WBGene00019347	72	99	7
WBGene00016295	130	97	9	WBGene00044166	96	156	8	WBGene00018167	117	126	35	WBGene00009337	51	117	7	WBGene00004121	76	122	9
WBGene00018456	130	97	9	WBGene00008180	92	201	8	WBGene00018166	117	126	35	WBGene00007747	75	156	7	WBGene00018033	51	92	8
WBGene00018455	130	97	9	WBGene00004213	65	99	8	WBGene00018165	117	126	35	WBGene00008218	81	27	8	WBGene00015583	78	93	10
WBGene00018457	96	70	7	WBGene00004765	176	240	9	WBGene00018164	117	126	35	WBGene00008219	81	27	8	WBGene00015586	80	129	14
WBGene00018458	96	70	7	WBGene00007859	144	199	10	WBGene00017481	117	126	35	WBGene00003719	78	114	9	WBGene00015587	80	129	14
WBGene00018452	96	70	7	WBGene00007860	111	158	10	WBGene00017480	90	113	22	WBGene00008221	78	114	9	WBGene00015588	93	104	12
WBGene00018459	96	70	7	WBGene00006822	100	62	7	WBGene00001090	52	85	9	WBGene00008222	78	114	9	WBGene00015589	105	78	9
WBGene00018461	96	70	7	WBGene00008118	94	45	8	WBGene00015278	68	118	8	WBGene00006072	78	114	9	WBGene00019576	67	75	6
WBGene00018460	96	70	7	WBGene00008117	94	45	8	WBGene00015280	91	182	36	WBGene00006016	76	132	10	WBGene00019577	67	75	6
WBGene00018448	81	39	15	WBGene00008120	94	45	8	WBGene00001858	91	182	36	WBGene00010867	76	132	10	WBGene00019578	113	132	24
WBGene00019700	81	39	15	WBGene00008119	97	41	8	WBGene00003030	73	47	5	WBGene00010868	106	181	21	WBGene00020725	97	121	19
WBGene00019699	81	39	15	WBGene00008121	71	97	11	WBGene00019259	128	98	8	WBGene00009979	106	181	21	WBGene00020726	120	153	13
WBGene00019702	150	115	15	WBGene00012084	94	146	8	WBGene00015928	105	50	12	WBGene00003222	118	31	7	WBGene00007011	120	153	13
WBGene00019703	150	115	15	WBGene00000885	164	162	34	WBGene00006917	105	50	12	WBGene00009136	82	48	9	WBGene00015121	86	94	9
WBGene00019705	150	115	15	WBGene00003962	164	162	34	WBGene00015929	105	50	12	WBGene00009135	82	48	9	WBGene00015119	86	94	9
WBGene00006195	131	103	15	WBGene00007573	164	162	34	WBGene00015935	75	138	8	WBGene00009137	82	48	9	WBGene00002207	84	140	9
WBGene00019704	112	90	14	WBGene00007574	122	101	23	WBGene00015934	75	138	8	WBGene00001496	75	19	4	WBGene00020365	49	85	7
WBGene00019311	82	88	20	WBGene00006474	122	101	23	WBGene00020234	91	52	19	WBGene00009138	75	19	4	WBGene00020366	100	113	16
WBGene00019313	82	88	20	WBGene00007576	122	101	23	WBGene00020235	91	52	19	WBGene00009139	75	19	4	WBGene00020812	151	140	25
WBGene00020475	109	26	9	WBGene00007581	82	59	10	WBGene00004458	108	35	12	WBGene00011692	75	19	4	WBGene00004270	99	148	9
WBGene00021103	109	26	9	WBGene00007577	89	44	10	WBGene00020683	108	35	12	WBGene00011696	77	57	8	WBGene00020813	99	148	9
WBGene00006387	153	126	9	WBGene00007579	92	28	11	WBGene00020682	99	33	10	WBGene00001808	77	57	8	WBGene00000993	115	202	15
WBGene00021104	153	126	9	WBGene00007578	79	28	11	WBGene00020687	90	30	8	WBGene00000233	77	57	8	WBGene00020811	115	202	15
WBGene00004076	112	109	9	WBGene00009372	130	119	9	WBGene00195051	90	30	8	WBGene00001726	74	36	11	WBGene00020817	115	202	15
WBGene00018734	63	74	7	WBGene00009377	130	119	9	WBGene00020681	90	30	8	WBGene00008224	76	28	11	WBGene00219274	59	72	21
WBGene00018572	175	249	23	WBGene00009373	130	119	9	WBGene00022727	120	214	9	WBGene00008225	76	28	11	WBGene00021500	41	45	21
WBGene00021970	78	72	9	WBGene00009374	130	119	9	WBGene00016085	59	117	8	WBGene00000250	76	28	11	WBGene00016350	121	127	10
WBGene00021966	60	58	18	WBGene00000070	67	87	7	WBGene00016083	79	66	8	WBGene00009993	88	31	8	WBGene00016346	100	88	8
WBGene00021965	42	44	26	WBGene00003476	115	174	10	WBGene00016082	79	66	8	WBGene00009992	88	31	8	WBGene00016345	78	49	6
WBGene00021973	147	80	8	WBGene00011974	115	174	10	WBGene00015553	113	125	8	WBGene00009994	88	31	8	WBGene00004220	83	127	9
WBGene00000112	147	80	8	WBGene00006591	115	174	10	WBGene00015552	147	184	7	WBGene00009996	88	31	8	WBGene00044770	66	157	10

WBGene00018974	169	93	16	WBGene00001086	138	166	21	WBGene00015551	121	183	6	WBGene00044200	119	152	23	WBGene00016900	95	115	7
WBGene00006924	191	105	24	WBGene00000137	138	166	21	WBGene00015555	77	28	9	WBGene00010425	96	161	20	WBGene00016899	95	115	7
WBGene00018816	154	29	10	WBGene00011260	108	118	27	WBGene00015549	77	28	9	WBGene00010279	93	139	14	WBGene00017339	118	173	8
WBGene00018815	154	29	10	WBGene00007970	108	118	27	WBGene00000585	77	28	9	WBGene00010280	113	107	10	WBGene00017340	118	173	8
WBGene00021786	154	29	10	WBGene00007963	108	118	27	WBGene00002228	77	28	9	WBGene00010282	92	30	7	WBGene00017342	90	128	12
WBGene00021785	154	29	10	WBGene00000264	92	54	11	WBGene00006572	72	108	6	WBGene00006442	92	30	7	WBGene00006886	90	128	12
WBGene00021784	154	29	10	WBGene00007969	147	160	20	WBGene00003695	72	108	6	WBGene00010283	92	30	7	WBGene00017376	36	51	20
WBGene00021789	90	24	8	WBGene00004414	202	266	29	WBGene00021542	118	124	16	WBGene00011326	88	149	5	WBGene00017379	36	51	20
WBGene00021781	90	24	8	WBGene00006575	202	266	29	WBGene00021543	112	81	27	WBGene00011328	88	149	5	WBGene00017378	36	51	20
WBGene00021790	90	24	8	WBGene00003930	149	180	12	WBGene00021544	112	81	27	WBGene00011327	88	149	5	WBGene00000792	78	111	13
WBGene00019209	157	153	10	WBGene00014204	149	180	12	WBGene00004473	112	81	27	WBGene00008986	85	126	9	WBGene00003891	78	131	8
WBGene00019207	157	153	10	WBGene00014203	149	180	12	WBGene00000942	76	102	17	WBGene00009973	132	162	12	WBGene00017375	118	112	20
WBGene00021776	81	84	33	WBGene00007980	106	93	8	WBGene00022619	40	122	7	WBGene00009974	132	162	12	WBGene00016489	118	112	20
WBGene00021774	81	84	33	WBGene00007982	107	151	8	WBGene00022620	60	78	7	WBGene00009975	157	226	11	WBGene00044683	118	112	20
WBGene00021773	81	84	33	WBGene00007983	140	176	16	WBGene00022618	79	33	7	WBGene00009976	152	209	13	WBGene00016490	76	90	5
WBGene00019416	81	84	33	WBGene00006537	172	142	23	WBGene00016403	92	36	8	WBGene00009977	152	209	13	WBGene00003369	72	83	7
WBGene00044697	75	74	29	WBGene00011367	172	142	23	WBGene00000888	92	36	8	WBGene00010088	132	116	8	WBGene00022647	72	83	7
WBGene00019415	68	63	24	WBGene00011368	172	142	23	WBGene00016404	92	36	8	WBGene00004767	132	116	8	WBGene00022648	72	83	7
WBGene00045486	68	63	24	WBGene00002038	47	90	7	WBGene00016405	94	38	9	WBGene00010089	124	123	8	WBGene00006602	86	94	8
WBGene00019417	73	63	21	WBGene00004322	71	25	8	WBGene00016400	91	53	6	WBGene00003812	115	129	7	WBGene00020085	169	267	9
WBGene00019414	78	63	17	WBGene00001943	71	25	8	WBGene00000687	91	53	6	WBGene00011929	61	51	11	WBGene00206419	169	267	9
WBGene00019418	80	68	29	WBGene00001944	71	25	8	WBGene00004411	126	58	14	WBGene00002259	61	51	11	WBGene00020086	169	267	9
WBGene00019413	80	68	29	WBGene00006811	129	71	11	WBGene00206380	126	58	14	WBGene00011930	61	51	11	WBGene00017939	127	179	7
WBGene00015868	112	150	57	WBGene00019211	119	195	6												

Supplementary Table 5. ChIP-seq raw data on average peak value for H3K4me3

Average peak value for H3K4me3 in wild type, *wdr-5(ok1417)* and *rbbp-5(tm3463).* Details on peak position is not shown

Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5	Gene ID	N2	WDR5	RBBP5
WBGene00022277	139	21	8	WBGene00016307	141	29	16	WBGene00016527	227	52	15	WBGene00050916	215	21	15	WBGene00002985	192	21	14
WBGene00022276	189	22	12	WBGene00016299	134	35	14	WBGene00016520	227	52	15	WBGene00018898	215	21	15	WBGene00009329	265	41	24
WBGene00022278	155	19	12	WBGene00016308	127	40	12	WBGene00016528	227	52	15	WBGene00021286	243	86	66	WBGene00009336	265	41	24
WBGene00022279	160	21	12	WBGene00016298	127	40	12	WBGene00021863	98	36	11	WBGene00004419	243	86	66	WBGene00009330	265	41	24
WBGene00022275	235	17	10	WBGene00044419	127	40	12	WBGene00021864	98	36	11	WBGene00021282	243	86	66	WBGene00009335	265	41	24
WBGene00044345	235	17	10	WBGene00016295	148	31	9	WBGene00021857	260	21	15	WBGene00021285	243	82	15	WBGene00001303	265	41	24
WBGene00021677	235	17	10	WBGene00018456	148	31	9	WBGene00021866	258	20	12	WBGene00021281	243	82	15	WBGene00009331	265	41	24
WBGene00000812	169	57	8	WBGene00018455	148	31	9	WBGene00021867	258	20	12	WBGene00019948	343	113	63	WBGene00008922	208	83	13
WBGene00021681	306	31	18	WBGene00018457	120	28	14	WBGene00021856	258	20	12	WBGene00019952	343	113	63	NoWBGene_ID20	208	83	13
WBGene00004274	306	31	18	WBGene00018458	120	28	14	WBGene00019199	238	16	10	WBGene00019956	343	113	63	WBGene00077761	208	83	13
WBGene00004418	306	31	18	WBGene00018452	120	28	14	WBGene00000506	215	27	10	WBGene00019953	343	113	63	WBGene00008921	272	40	24
WBGene00018774	306	31	18	WBGene00018459	120	28	14	WBGene00019198	215	27	10	WBGene00019947	343	113	63	WBGene00008920	272	40	24
WBGene00018773	306	31	18	WBGene00018461	120	28	14	WBGene00021022	240	22	14	WBGene00019946	343	113	63	WBGene00219325	272	40	24
WBGene00000622	306	31	18	WBGene00018460	120	28	14	WBGene00021020	156	33	12	WBGene00019955	226	86	39	WBGene00009969	161	17	12
WBGene00003229	86	48	11	WBGene00018448	127	27	17	WBGene00021019	72	44	10	WBGene00019945	226	86	39	WBGene00009966	161	17	12
WBGene00018957	153	29	10	WBGene00019700	127	27	17	WBGene00021018	72	44	10	WBGene00019954	108	58	15	WBGene00009967	161	17	12
WBGene00018955	153	29	10	WBGene00019699	127	27	17	WBGene00017099	119	35	15	WBGene00022677	226	21	14	WBGene00007554	231	19	11
WBGene00000227	212	24	13	WBGene00019702	238	45	22	WBGene00004884	169	26	14	WBGene00195011	226	21	14	WBGene00006443	158	20	10
WBGene00016903	219	23	14	WBGene00019703	238	45	22	WBGene00021847	285	16	10	WBGene00022678	226	21	14	WBGene00185117	158	20	10
WBGene00016905	219	23	14	WBGene00019705	238	45	22	WBGene00004314	263	20	15	WBGene00022679	226	21	14	WBGene00077699	158	20	10
WBGene00016902	131	36	13	WBGene00006195	209	40	19	WBGene00021849	203	28	14	WBGene00044302	99	31	11	WBGene00008106	158	20	10
WBGene00016906	285	32	26	WBGene00019704	180	34	16	WBGene00000464	203	28	14	WBGene00017596	99	31	11	WBGene00000063	49	46	11
WBGene00002077	285	32	26	WBGene00019311	132	37	20	WBGene00021854	189	23	10	WBGene00017595	99	31	11	WBGene00000065	49	46	11
WBGene00002079	283	27	22	WBGene00019313	132	37	20	WBGene00022197	189	23	10	WBGene00017593	99	31	11	WBGene00000064	313	53	18
WBGene00021660	280	22	17	WBGene00019316	85	16	7	WBGene00000160	248	20	12	WBGene00017592	99	31	11	WBGene00012780	226	20	15
WBGene00020089	288	46	37	WBGene00019309	85	16	7	WBGene00007019	248	20	12	WBGene00017923	252	23	16	WBGene00010405	226	20	15
WBGene00004143	288	46	37	WBGene00020475	251	21	12	WBGene00022195	194	23	12	WBGene00017922	252	23	16	WBGene00010406	226	20	15
WBGene00006385	288	46	37	WBGene00021103	251	21	12	WBGene00022194	194	23	12	WBGene00006706	252	23	16	WBGene00010408	221	26	14
WBGene00020090	146	50	11	WBGene00006387	199	55	10	WBGene00022193	194	23	12	WBGene00017921	252	23	16	WBGene00007385	221	26	14
WBGene00021733	176	39	11	WBGene00021104	199	55	10	WBGene00022174	80	20	10	WBGene00004205	252	23	16	WBGene00007390	221	26	14
WBGene00006593	116	43	14	WBGene00004076	199	55	10	WBGene00022173	80	20	10	WBGene00000685	257	21	14	WBGene00007386	221	26	14
WBGene00021026	127	22	15	WBGene00018572	105	80	18	WBGene00022176	139	19	13	WBGene00017924	257	21	14	WBGene00010742	51	50	11
WBGene00021027	127	22	15	WBGene00021966	65	27	22	WBGene00022172	139	19	13	WBGene00017925	257	21	14	WBGene00010743	51	50	11
WBGene00021025	52	38	13	WBGene00021965	65	27	22	WBGene00022182	264	15	10	WBGene00017920	257	21	14	WBGene00010744	86	63	18
WBGene00021028	174	16	12	WBGene00000112	221	28	10	WBGene00002244	258	22	12	WBGene00019543	269	28	17	WBGene00011830	71	47	38
WBGene00021024	174	16	12	WBGene00018974	246	36	18	WBGene00022171	251	26	14	WBGene00013677	269	28	17	WBGene00011831	71	47	38
WBGene00001814	174	16	12	WBGene00006924	270	43	25	WBGene00022185	251	26	14	WBGene00019544	251	23	15	WBGene00011832	159	37	28
WBGene00022037	221	63	13	WBGene00018816	243	22	13	WBGene00022170	249	22	14	WBGene00019541	136	14	12	WBGene00004152	247	27	17
WBGene00022038	221	63	13	WBGene00018815	243	22	13	WBGene00022169	249	22	14	WBGene00017116	128	37	13	WBGene00011833	152	17	15
WBGene00022033	290	98	67	WBGene00021786	243	22	13	WBGene00044609	249	22	14	WBGene00001983	177	26	12	WBGene00011834	152	17	15
WBGene00022043	290	98	67	WBGene00021785	243	22	13	WBGene00044760	192	39	10	WBGene00017119	227	33	15	WBGene00002072	152	17	15
WBGene00022042	290	98	67	WBGene00021784	243	22	13	WBGene00022168	192	39	10	WBGene00017120	227	33	15	WBGene00011835	152	17	15
WBGene00007009	290	98	67	WBGene00021789	172	22	11	WBGene00007000	264	22	14	WBGene00017121	227	33	15	WBGene00007282	193	78	11
WBGene00022029	302	33	31	WBGene00021781	172	22	11	WBGene00022167	264	22	14	WBGene00004432	222	45	17	WBGene00001645	193	78	11
WBGene00022027	302	33	31	WBGene00021790	172	22	11	WBGene00019994	65	45	11	WBGene00021202	222	45	17	WBGene00011404	56	80	65
WBGene00022026	251	27	21	WBGene00019209	247	62	14	WBGene00194747	250	63	12	WBGene00021201	200	42	16	WBGene00009830	56	80	65
WBGene00022025	199	20	11	WBGene00019207	153	54	12	WBGene00019157	250	63	12	WBGene00021204	178	39	15	WBGene00009829	206	23	11
WBGene00021209	149	35	11	WBGene00021776	141	48	38	WBGene00019158	92	19	10	WBGene00194835	178	39	15	WBGene00009833	206	23	11
WBGene00004332	188	29	11	WBGene00021774	141	48	38	WBGene00019159	92	19	10	WBGene00021205	178	39	15	WBGene00044203	159	64	24
WBGene00004028	226	23	11	WBGene00021773	141	48	38	WBGene00021916	92	19	10	WBGene00021206	167	32	16	WBGene00011383	159	64	24
WBGene00022518	46	47	13	WBGene00019416	141	48	38	WBGene00021917	29	37	8	WBGene00021200	167	32	16	WBGene00001716	159	64	24
WBGene00022388	191	39	15	WBGene00044697	114	50	41	WBGene00006725	243	51	19	WBGene00021199	155	24	16	WBGene00005227	104	21	15
WBGene00003238	89	67	11	WBGene00019415	86	51	44	WBGene00019168	243	51	19	WBGene00021198	155	24	16	WBGene00011712	104	21	15
WBGene00021327	272	29	20	WBGene00045486	86	51	44	WBGene00021820	116	40	11	WBGene00020006	104	28	9	WBGene00000982	104	21	15
WBGene00004952	272	29	20	WBGene00019417	98	41	29	WBGene00021817	116	40	11	WBGene00001324	218	23	11	WBGene00194712	104	21	15

WBGene00021329	208	25	17	WBGene00019414	109	30	13	WBGene00020103	247	25	18	WBGene00001060	218	23	11	WBGene00044019	188	20	11
WBGene00021332	144	20	13	WBGene00019418	132	46	39	WBGene00020102	247	25	18	WBGene00044483	198	24	12	WBGene00008330	188	20	11
WBGene00021334	217	48	20	WBGene00019413	132	46	39	WBGene00021800	231	40	39	WBGene00019163	198	24	12	WBGene00008339	143	25	11
WBGene00021328	217	48	20	WBGene00219239	132	46	39	WBGene00050917	231	40	39	WBGene00019162	198	24	12	WBGene00008331	98	30	11
WBGene00001745	217	48	20	WBGene00019419	82	37	35	WBGene00021801	231	40	39	WBGene00005842	198	24	12	WBGene00008336	205	16	8
WBGene00021689	298	31	14	WBGene00019412	82	37	35	WBGene00021808	123	47	12	WBGene00020354	42	46	34	WBGene00008340	205	16	8
WBGene00000165	298	31	14	WBGene00019420	82	37	35	WBGene00021803	123	47	12	WBGene00020356	42	46	34	WBGene00008338	205	16	8
WBGene00004429	298	31	14	WBGene00019421	82	37	35	WBGene00021815	268	23	14	WBGene00015626	58	76	87	WBGene00189933	97	50	10
WBGene00021687	298	31	14	WBGene00022556	177	50	37	WBGene00021813	268	23	14	WBGene00044484	58	76	87	WBGene00009534	97	50	10
WBGene00001816	213	28	12	WBGene00194714	177	50	37	WBGene00021812	268	23	14	WBGene00015330	210	63	16	WBGene00004064	118	20	12
WBGene00004880	213	28	12	WBGene00022558	177	50	37	WBGene00021811	170	50	12	WBGene00015326	247	28	23	WBGene00003691	118	20	12
WBGene00021685	125	35	10	WBGene00022559	177	50	37	WBGene00021816	335	31	20	WBGene00015327	247	28	23	WBGene00009384	223	22	13
WBGene00021691	125	35	10	WBGene00022560	177	50	37	WBGene00021810	335	31	20	WBGene00015329	247	28	23	WBGene00009385	223	22	13
WBGene00019674	327	52	28	WBGene00022557	177	50	37	WBGene00008347	83	54	46	WBGene00015328	247	28	23	WBGene00009386	223	22	13
WBGene00045052	327	52	28	WBGene00022561	177	50	37	WBGene00008348	189	43	31	WBGene00235380	178	22	12	WBGene00000249	205	21	9
WBGene00045053	327	52	28	WBGene00022555	177	50	37	WBGene00003372	294	32	15	WBGene00016057	178	22	12	WBGene00004806	205	21	9
WBGene00004888	327	52	28	WBGene00022562	177	50	37	WBGene00010303	294	32	15	WBGene00016055	178	22	12	WBGene00000449	68	45	13
WBGene00019673	327	52	28	WBGene00022563	200	54	15	WBGene00010304	294	32	15	WBGene00016058	178	22	12	WBGene00009791	89	39	14
WBGene00022367	223	27	11	WBGene00022564	200	54	15	WBGene00003795	280	30	15	WBGene00016053	153	43	20	WBGene00009790	165	60	13
WBGene00022372	223	27	11	WBGene00022554	200	54	15	WBGene00010305	265	27	14	WBGene00002247	112	31	21	WBGene00000146	165	60	13
WBGene00022371	241	15	13	WBGene00022553	200	54	15	WBGene00010302	265	27	14	WBGene00020994	213	19	13	WBGene00000453	84	42	27
WBGene00022368	241	15	13	WBGene00005844	200	54	15	WBGene00007920	200	15	11	WBGene00020995	144	22	15	WBGene00006609	46	58	10
WBGene00022369	241	15	13	WBGene00003734	71	48	36	WBGene00007921	242	21	13	WBGene00020993	144	22	15	WBGene00007118	177	21	13
WBGene00022373	206	25	10	WBGene00019037	71	48	36	WBGene00007927	283	27	15	WBGene00020997	75	24	17	WBGene00007117	177	21	13
WBGene00018159	204	34	10	WBGene00019038	71	48	36	WBGene00007922	176	29	12	WBGene00006586	245	20	12	WBGene00077538	220	25	15
WBGene00004969	137	45	30	WBGene00019036	83	36	24	WBGene00007923	108	40	13	WBGene00195093	245	20	12	WBGene00011439	220	25	15
WBGene00022361	243	15	9	WBGene00019035	95	23	12	WBGene00007924	146	49	17	WBGene00043064	245	20	12	WBGene00010075	220	25	15
WBGene00022360	243	15	9	WBGene00019034	102	26	15	WBGene00007928	146	49	17	WBGene00021994	245	20	12	WBGene00006373	220	25	15
WBGene00005077	38	84	80	WBGene00019039	102	26	15	WBGene00010814	264	37	22	WBGene00021157	48	58	36	WBGene00004768	220	25	15
WBGene00022269	194	19	13	WBGene00019040	109	28	18	WBGene00004428	264	37	22	WBGene00021161	211	33	16	WBGene00010079	42	78	73
WBGene00022273	235	17	12	WBGene00019041	109	28	18	WBGene00010809	264	37	22	WBGene00021155	211	33	16	WBGene00010082	42	78	73
WBGene00044440	235	17	12	WBGene00019042	109	28	18	WBGene00010810	236	28	19	WBGene00018319	206	24	13	WBGene00010080	42	78	73
WBGene00000269	179	14	10	WBGene00019043	109	28	18	WBGene00010812	208	18	15	WBGene00018318	200	15	10	WBGene00008408	140	20	8
WBGene00022268	179	14	10	WBGene00019044	109	28	18	WBGene00010811	208	18	15	WBGene00018317	222	22	10	WBGene00008409	140	20	8
WBGene00003111	192	52	14	WBGene00018443	155	52	55	WBGene00008288	149	24	11	WBGene00018321	222	22	10	WBGene00008410	140	20	8
WBGene00022156	192	52	14	WBGene00018438	126	38	36	WBGene00000248	149	24	11	WBGene00018316	244	29	10	WBGene00000731	140	20	8
WBGene00044348	317	78	55	WBGene00018444	126	38	36	WBGene00004765	178	78	16	WBGene00002032	237	23	16	WBGene00011261	151	63	10
WBGene00006702	317	78	55	WBGene00018445	122	41	38	WBGene00007859	212	30	13	WBGene00022775	237	23	16	WBGene00001978	151	63	10
WBGene00003080	317	78	55	WBGene00018437	147	59	58	WBGene00006822	87	25	12	WBGene00022776	237	23	16	WBGene00010792	125	43	12
WBGene00022153	317	78	55	WBGene00018436	147	59	58	WBGene00008118	100	24	13	WBGene00022774	237	23	16	WBGene00004855	85	49	25
WBGene00022152	185	46	13	WBGene00018435	147	59	58	WBGene00008117	100	24	13	WBGene00022773	237	23	16	WBGene00010284	146	23	11
WBGene00006771	185	46	13	WBGene00018433	113	35	25	WBGene00008120	100	24	13	WBGene00022772	237	23	16	WBGene00010286	146	23	11
WBGene00022159	240	21	11	WBGene00018446	113	35	25	WBGene00008119	183	24	11	WBGene00006745	118	53	12	WBGene00138720	146	23	11
WBGene00022150	240	21	11	WBGene00018447	113	35	25	WBGene00000885	294	39	36	WBGene00001411	217	24	11	WBGene00010289	56	57	13
WBGene00022149	240	21	11	WBGene00018432	113	35	25	WBGene00003962	294	39	36	WBGene00001093	217	24	11	WBGene00010288	113	47	24
WBGene00022147	98	34	10	WBGene00018105	212	44	17	WBGene00007573	294	39	36	WBGene00020463	150	23	9	WBGene00010290	113	47	24
WBGene00022146	98	34	10	WBGene00206519	212	44	17	WBGene00007574	294	39	36	WBGene00020462	150	23	9	WBGene00000781	226	21	19
WBGene00044347	265	22	17	WBGene00018106	187	46	18	WBGene00006474	294	39	36	WBGene00001439	65	62	13	WBGene00003235	226	21	19
WBGene00022141	265	22	17	WBGene00018107	187	46	18	WBGene00007576	294	39	36	WBGene00000817	135	20	11	WBGene00004917	226	21	19
WBGene00044746	302	65	17	WBGene00018109	187	46	18	WBGene00007577	162	22	12	WBGene00004804	132	40	12	WBGene00004501	226	21	19
WBGene00016907	302	65	17	WBGene00018108	161	47	19	WBGene00007579	162	22	12	WBGene00020585	129	59	13	WBGene00008258	226	21	19
WBGene00004441	302	65	17	WBGene00018104	144	41	16	WBGene00007578	155	24	12	WBGene00000247	140	26	13	WBGene00000876	242	22	9
WBGene00001196	302	65	17	WBGene00018103	144	41	16	WBGene00009372	201	27	13	WBGene00044500	140	26	13	WBGene00008259	242	22	9
WBGene00001309	302	65	17	WBGene00018102	126	34	12	WBGene00009377	201	27	13	WBGene00019263	158	17	12	WBGene00001553	242	22	9
WBGene00003750	302	65	17	WBGene00015609	254	75	25	WBGene00009373	201	27	13	WBGene00019264	158	17	12	WBGene00194785	242	22	9
WBGene00006461	302	65	17	WBGene00044417	254	75	25	WBGene00009374	201	27	13	WBGene00016664	109	37	20	WBGene00002241	148	70	16
WBGene00004743	279	51	15	WBGene00015613	254	75	25	WBGene00003476	196	51	13	WBGene00003636	130	59	15	WBGene00008645	246	101	19
WBGene00022139	279	51	15	WBGene00015610	254	75	25	WBGene00011974	196	51	13	WBGene00015540	215	17	11	WBGene00000533	265	54	20
WBGene00022140	147	22	13	WBGene00015607	254	75	25	WBGene00001086	184	58	22	WBGene00015538	215	17	11	WBGene00004138	265	54	20
WBGene00022138	147	22	13	WBGene00020362	167	55	16	WBGene00000137	184	58	22	WBGene00015541	215	17	11	WBGene00011088	265	54	20
WBGene00021771	211	15	10	WBGene00020363	167	55	16	WBGene00011260	151	51	32	WBGene00019255	184	42	18	WBGene00011089	265	54	20
WBGene00044438	211	15	10	WBGene00020361	191	61	18	WBGene00007970	151	51	32	WBGene00019296	184	42	18	WBGene00003726	128	63	8
WBGene00021763	134	24	11	WBGene00020360	191	61	18	WBGene00007963	151	51	32	WBGene00019295	216	39	21	WBGene00007548	128	63	8
WBGene00021238	71	32	8	WBGene00016885	77	34	19	WBGene00000264	202	27	12	WBGene00002129	216	39	21	WBGene00014123	139	17	10
WBGene00044435	140	18	13	WBGene00016886	77	34	19	WBGene00007969	234	58	28	WBGene00004494	247	35	23	WBGene00014124	139	17	10

WBGene00021346	268	24	18	WBGene00016882	99	30	16	WBGene00004414	266	89	43	WBGene00019297	144	122	16	WBGene00005082	139	17	10
WBGene00021347	268	24	18	WBGene00016881	99	30	16	WBGene00006575	266	89	43	WBGene00006780	116	63	12	WBGene00014125	139	17	10
WBGene00021348	268	24	18	WBGene00016880	120	25	12	WBGene00003930	229	66	17	WBGene00000535	123	32	13	WBGene00001088	249	28	17
WBGene00021349	267	39	26	WBGene00015830	170	27	17	WBGene00014204	229	66	17	WBGene00002245	128	70	14	WBGene00004384	249	28	17
WBGene00004409	266	53	33	WBGene00044359	170	27	17	WBGene00014203	154	45	14	WBGene00006974	262	28	20	WBGene00014098	249	28	17
WBGene00021350	266	53	33	WBGene00015829	170	27	17	WBGene00014205	78	23	11	WBGene00019751	262	28	20	WBGene00014099	249	28	17
WBGene00004014	266	53	33	WBGene00018669	125	27	12	WBGene00014206	78	23	11	WBGene00015701	151	25	15	WBGene00006874	92	58	11
WBGene00021351	186	39	21	WBGene00018670	125	27	12	WBGene00014207	78	23	11	WBGene00015703	151	25	15	WBGene00011449	171	25	10
WBGene00021352	128	23	11	WBGene00018671	125	27	12	WBGene00007980	215	28	11	WBGene00015702	151	25	15	WBGene00004296	171	25	10
WBGene00021353	151	22	13	WBGene00017209	152	24	11	WBGene00007982	215	28	11	WBGene00006809	151	25	15	WBGene00006677	175	21	12
WBGene00003799	218	24	15	WBGene00017208	152	24	11	WBGene00007983	295	44	26	WBGene00016761	139	20	9	WBGene00010094	175	21	12
WBGene00235158	134	56	22	WBGene00017210	195	20	13	WBGene00006537	295	44	26	WBGene00016764	139	20	9	WBGene00010093	175	21	12
WBGene00021009	69	52	8	WBGene00017211	174	22	13	WBGene00011367	295	44	26	WBGene00016762	139	20	9	WBGene00010098	40	31	25
WBGene00021458	122	45	53	WBGene00017207	110	27	11	WBGene00011368	295	44	26	WBGene00001853	226	198	152	WBGene00010096	123	28	19
WBGene00000408	198	44	38	WBGene00004149	167	56	23	WBGene00004322	135	18	12	WBGene00005738	226	198	152	WBGene00010097	205	24	13
WBGene00021469	272	86	64	WBGene00020537	167	56	23	WBGene00001943	135	18	12	WBGene00022250	245	40	38	WBGene00005241	157	36	12
WBGene00021470	272	86	64	WBGene00020533	167	56	23	WBGene00001944	135	18	12	WBGene00022235	199	43	36	WBGene00001493	105	64	51
WBGene00021468	271	129	105	WBGene00020080	49	37	25	WBGene00006811	314	23	13	WBGene00003082	199	43	36	WBGene00011016	226	19	15
WBGene00002047	271	129	105	WBGene00020073	135	42	43	WBGene00002202	314	23	13	WBGene00004783	152	46	34	WBGene00011017	226	19	15
WBGene00021467	271	129	105	WBGene00016548	193	61	31	WBGene00185075	314	23	13	WBGene00022251	152	46	34	WBGene00011015	226	19	15
WBGene00021476	258	82	60	WBGene00016553	251	79	18	WBGene00007271	314	23	13	WBGene00003237	152	46	34	WBGene00006668	135	42	36
WBGene00021475	244	34	15	WBGene00016547	251	79	18	WBGene00007269	239	51	32	WBGene00235289	93	20	9	WBGene00009092	154	21	14
WBGene00021466	244	34	15	WBGene00016546	216	70	17	WBGene00004392	239	51	32	WBGene00004881	203	21	14	WBGene00004898	154	21	14
WBGene00021465	255	31	16	WBGene00016549	181	60	15	WBGene00007273	239	51	32	WBGene00022253	203	21	14	WBGene00009093	154	21	14
WBGene00003156	265	28	17	WBGene00016545	181	60	15	WBGene00007270	239	51	32	WBGene00000256	203	21	14	WBGene00005018	67	88	73
WBGene00219275	265	28	17	WBGene00016550	181	60	15	WBGene00007631	219	22	13	WBGene00022240	203	21	14	WBGene00010464	132	24	11
WBGene00021471	265	28	17	WBGene00016336	89	24	12	WBGene00007630	219	22	13	WBGene00022254	130	22	13	WBGene00010465	132	24	11
WBGene00021463	164	38	10	WBGene00016337	89	24	12	WBGene00006448	219	22	13	WBGene00022232	130	22	13	WBGene00010466	132	24	11
WBGene00021474	164	20	11	WBGene00219322	89	24	12	WBGene00007627	230	19	11	WBGene00022243	130	22	13	WBGene00010467	132	24	11
WBGene00021460	145	44	44	WBGene00016342	68	61	11	WBGene00007626	230	19	11	WBGene00022244	130	22	13	WBGene00008303	176	17	8
WBGene00017741	257	28	13	WBGene00016334	68	61	11	WBGene00007625	230	19	11	WBGene00022255	66	41	7	WBGene00008304	176	17	8
WBGene00017734	257	28	13	WBGene00021985	207	17	9	WBGene00007624	230	19	11	WBGene00022248	84	42	7	WBGene00009200	176	17	8
WBGene00017735	257	28	13	WBGene00021986	256	25	20	WBGene00003073	150	15	8	WBGene00015309	169	36	31	WBGene00001179	148	63	10
WBGene00017736	257	28	13	WBGene00018783	256	25	20	WBGene00011278	145	20	9	WBGene00015311	169	36	31	WBGene00012244	210	21	20
WBGene00017737	245	23	18	WBGene00018784	256	25	20	WBGene00206525	145	20	9	WBGene00015308	169	36	31	WBGene00012243	210	21	20
WBGene00017738	245	23	18	WBGene00018785	300	26	15	WBGene00001034	215	50	25	WBGene00015307	169	36	31	WBGene00012245	210	21	20
WBGene00017733	179	26	14	WBGene00018782	182	25	12	WBGene00006959	215	50	25	WBGene00004179	169	36	31	WBGene00009721	41	38	24
WBGene00255457	179	26	14	WBGene00019591	98	32	12	WBGene00011279	222	47	27	WBGene00235291	122	17	9	WBGene00004759	156	16	11
WBGene00017732	112	29	10	WBGene00015111	139	39	24	WBGene00011280	154	17	12	WBGene00015310	122	17	9	WBGene00008452	156	16	11
WBGene00022281	278	20	11	WBGene00015112	179	46	35	WBGene00011281	154	17	12	WBGene00016610	138	82	63	WBGene00007587	190	46	35
WBGene00022282	278	20	11	WBGene00015113	179	46	35	WBGene00011282	154	17	12	WBGene00006621	138	82	63	WBGene00007586	190	46	35
WBGene00001232	278	20	11	WBGene00018386	209	44	13	WBGene00003401	86	48	8	WBGene00016612	84	67	10	WBGene00007588	190	46	35
WBGene00021277	278	20	11	WBGene00018383	209	44	13	WBGene00011605	326	102	81	WBGene00018160	208	21	11	WBGene00010174	130	79	10
WBGene00001404	109	58	15	WBGene00018381	72	23	9	WBGene00011198	326	102	81	WBGene00018161	208	21	11	WBGene00001670	130	79	10
WBGene00004226	109	58	15	WBGene00018387	72	23	9	WBGene00006331	326	102	81	WBGene00001029	208	21	11	WBGene00189948	89	53	13
WBGene00019461	96	44	10	WBGene00018380	72	23	9	WBGene00011200	274	62	47	WBGene00002274	208	21	11	WBGene00001671	88	36	10
WBGene00000832	96	44	10	WBGene00018379	72	23	9	WBGene00003157	221	22	13	WBGene00018167	173	73	58	WBGene00003011	86	29	11
WBGene00021271	172	18	13	WBGene00018355	116	28	11	WBGene00011201	221	22	13	WBGene00018166	173	73	58	WBGene00195166	83	15	12
WBGene00021270	172	18	13	WBGene00006882	255	66	32	WBGene00011202	221	22	13	WBGene00018165	173	73	58	WBGene00012277	83	15	12
WBGene00021269	172	18	13	WBGene00004129	255	66	32	WBGene00011206	195	28	15	WBGene00018164	173	73	58	WBGene00012276	83	15	12
WBGene00000800	169	37	13	WBGene00018769	239	20	11	WBGene00011205	195	28	15	WBGene00017481	173	73	58	WBGene00012278	83	15	12
WBGene00018231	116	19	10	WBGene00018768	239	20	11	WBGene00001352	205	33	24	WBGene00017480	173	73	58	WBGene00010734	163	18	18
WBGene00018230	134	17	8	WBGene00018767	166	24	11	WBGene00010428	215	38	32	WBGene00015279	150	24	14	WBGene00010737	163	18	18
WBGene00018232	151	15	6	WBGene00018766	92	27	11	WBGene00006478	215	38	32	WBGene00015283	150	24	14	WBGene00010736	163	18	18
WBGene00000788	82	42	30	WBGene00019130	140	20	9	WBGene00007135	240	23	10	WBGene00015282	150	24	14	WBGene00045336	198	26	15
WBGene00003006	112	49	13	WBGene00019343	205	16	10	WBGene00007136	261	23	11	WBGene00015280	146	127	40	WBGene00045517	198	26	15
WBGene00022128	223	33	14	WBGene00017280	205	16	10	WBGene00007137	261	23	11	WBGene00001858	146	127	40	WBGene00004442	198	26	15
WBGene00004920	223	33	14	WBGene00005559	123	58	21	WBGene00002003	261	23	11	WBGene00003030	187	19	11	WBGene00011247	198	26	15
WBGene00022127	223	33	14	WBGene00001546	123	58	21	WBGene00007138	112	37	16	WBGene00019259	170	31	16	WBGene00011248	198	26	15
WBGene00022126	211	61	23	WBGene00017703	134	53	22	WBGene00007139	104	58	20	WBGene00015928	206	25	11	WBGene00007609	128	22	9
WBGene00022129	199	88	31	WBGene00017712	134	53	22	WBGene00000511	95	79	23	WBGene00006917	206	25	11	WBGene00007606	128	22	9
WBGene00004043	199	88	31	WBGene00018021	134	53	22	WBGene00007131	150	22	15	WBGene00015929	206	25	11	WBGene00007607	128	22	9
WBGene00004946	244	26	12	WBGene00018022	134	53	22	WBGene00007133	150	22	15	WBGene00015935	69	56	8	WBGene00007608	128	22	9
WBGene00022125	244	26	12	WBGene00017914	253	26	15	WBGene00007132	150	22	15	WBGene00015934	69	56	8	WBGene00219330	233	26	14
WBGene00022131	244	26	12	WBGene00017916	253	26	15	WBGene00011120	248	26	12	WBGene00020234	169	27	21	WBGene00006512	233	26	14

WBGene00044796	65	39	31	WBGene00017913	253	26	15	WBGene00011121	248	26	12	WBGene00020235	169	27	21	WBGene00004738	233	26	14
WBGene00020986	65	39	31	WBGene00017917	180	23	12	WBGene00011111	248	26	12	WBGene00004458	250	29	21	WBGene00013898	93	49	9
WBGene00004077	139	50	27	WBGene00017918	107	19	9	WBGene00004387	248	26	12	WBGene00020683	250	29	21	WBGene00011592	171	22	9
WBGene00021126	286	67	19	WBGene00017912	116	24	13	WBGene00011110	248	26	12	WBGene00020682	239	25	15	WBGene00011589	171	22	9
WBGene00021125	97	59	11	WBGene00017911	125	29	16	WBGene00011109	248	26	12	WBGene00020687	228	21	9	WBGene00011283	76	64	11
WBGene00022117	311	62	36	WBGene00017249	125	29	16	WBGene00011116	225	20	10	WBGene00195051	228	21	9	WBGene00011286	80	41	8
WBGene00004412	311	62	36	WBGene00017250	136	39	28	WBGene00011115	225	20	10	WBGene00020681	228	21	9	WBGene00003738	80	41	8
WBGene00022114	311	62	36	WBGene00017251	147	48	39	WBGene00000520	225	20	10	WBGene00022727	69	71	13	WBGene00011802	187	19	12
WBGene00022113	311	62	36	WBGene00017252	147	48	39	WBGene00007791	49	59	57	WBGene00016083	77	24	11	WBGene00194787	187	19	12
WBGene00022118	311	62	36	WBGene00017253	147	48	39	WBGene00007788	49	59	57	WBGene00016082	77	24	11	WBGene00219337	187	19	12
WBGene00000199	220	50	18	WBGene00017254	147	48	39	WBGene00000463	153	52	41	WBGene00015553	111	43	12	WBGene00004151	187	19	12
WBGene00022112	269	79	18	WBGene00017255	291	24	14	WBGene00010155	199	78	75	WBGene00015552	145	62	13	WBGene00001233	187	19	12
WBGene00022111	269	79	18	WBGene00017245	291	24	14	WBGene00004132	199	78	75	WBGene00015551	105	66	10	WBGene00011307	187	19	12
WBGene00022119	204	19	15	WBGene00019688	155	67	14	WBGene00004470	313	39	27	WBGene00015555	184	20	11	WBGene00005113	201	18	11
WBGene00001791	238	18	13	WBGene00019686	155	67	14	WBGene00002100	313	39	27	WBGene00015549	184	20	11	WBGene00011306	201	18	11
WBGene00022110	238	18	13	WBGene00019687	138	50	12	WBGene00000223	267	68	15	WBGene00000585	184	20	11	WBGene00011309	201	18	11
NoWBGene_ID45	156	14	11	WBGene00022441	120	32	9	WBGene00000380	267	68	15	WBGene00002228	153	22	13	WBGene00003031	191	20	15
WBGene00022107	214	31	25	WBGene00022448	292	19	13	WBGene00009115	227	76	14	WBGene00006572	122	23	15	WBGene00011308	180	22	18
WBGene00022122	272	47	38	WBGene00005020	292	19	13	WBGene00000396	123	66	17	WBGene00021542	153	47	17	WBGene00004793	180	22	18
WBGene00003836	272	47	38	WBGene00022453	192	29	16	WBGene00010904	177	21	14	WBGene00021543	263	64	41	WBGene00008848	45	38	39
WBGene00022121	160	40	36	WBGene00022452	192	29	16	WBGene00010905	177	21	14	WBGene00021544	263	64	41	WBGene00045418	45	49	9
WBGene00022124	125	20	10	WBGene00022712	192	29	16	WBGene00010909	177	21	14	WBGene00004473	263	64	41	WBGene00008849	45	49	9
WBGene00001046	125	20	10	WBGene00003678	142	39	14	WBGene00010906	177	21	14	WBGene00000942	263	64	41	WBGene00008850	80	56	11
WBGene00003186	275	19	13	WBGene00019513	142	39	14	WBGene00010908	174	71	12	WBGene00022620	190	22	13	WBGene00001475	62	51	11
WBGene00021837	275	19	13	WBGene00019512	137	72	18	WBGene00003915	175	45	13	WBGene00022618	190	22	13	WBGene00012337	220	28	11
WBGene00021843	275	19	13	WBGene00019511	124	58	20	WBGene00009439	175	19	14	WBGene00016403	174	20	16	WBGene00002250	220	28	11
WBGene00021842	264	21	14	WBGene00016576	137	46	23	WBGene00009440	175	19	14	WBGene00000888	174	20	16	WBGene00001137	87	52	13
WBGene00021844	264	21	14	WBGene00016575	137	46	23	WBGene00004762	200	19	14	WBGene00016404	174	20	16	WBGene00219208	87	52	13
WBGene00021845	264	21	14	WBGene00016574	162	48	25	WBGene00009441	200	19	14	WBGene00016405	173	22	15	WBGene00007154	142	32	12
WBGene00021841	264	21	14	WBGene00016573	162	48	25	WBGene00009445	200	19	14	WBGene00016400	203	21	12	NoWBGene_ID33	102	39	11
WBGene00003387	264	21	14	WBGene00044370	162	48	25	WBGene00009442	287	28	20	WBGene00000687	203	21	12	WBGene00011647	97	42	12
WBGene00021846	216	19	8	WBGene00016578	162	48	25	WBGene00009443	287	28	20	WBGene00004411	198	24	11	WBGene00001874	181	19	15
WBGene00021840	225	20	9	WBGene00005543	132	65	24	WBGene00004874	287	28	20	WBGene00206380	198	24	11	WBGene00008218	173	22	11
WBGene00000205	233	21	9	WBGene00015200	132	65	24	WBGene00004760	149	35	13	WBGene00004822	198	24	11	WBGene00008219	173	22	11
WBGene00019697	233	21	9	WBGene00002997	122	68	36	WBGene00011957	184	44	12	WBGene00006251	198	24	11	WBGene00010868	127	54	11
WBGene00003654	151	87	15	WBGene00021293	112	70	47	WBGene00011953	184	44	12	WBGene00044504	193	19	11	WBGene00009979	87	27	8
WBGene00003062	227	18	11	WBGene00021294	112	70	47	WBGene00011956	167	68	12	WBGene00017053	193	19	11	WBGene00009980	87	27	8
WBGene00019595	227	18	11	WBGene00021295	312	25	15	WBGene00219297	167	68	12	WBGene00000292	193	19	11	WBGene00009981	87	27	8
WBGene00019598	227	18	11	WBGene00021292	312	25	15	WBGene00011407	120	37	31	WBGene00017052	193	55	14	WBGene00003222	197	20	9
WBGene00006888	255	27	16	WBGene00021290	129	34	22	WBGene00011408	120	37	31	WBGene00001241	192	91	16	WBGene00009134	130	20	10
WBGene00021829	255	27	16	WBGene00021296	129	34	22	WBGene00011410	199	18	13	WBGene00015531	31	45	9	WBGene00009136	130	20	10
WBGene00021828	255	27	16	WBGene00021289	129	34	22	WBGene00011409	199	18	13	WBGene00001713	202	32	18	WBGene00009135	130	20	10
WBGene00021830	198	17	18	WBGene00021288	111	23	11	WBGene00000543	160	20	13	WBGene00004477	202	32	18	WBGene00009137	130	20	10
WBGene00021831	186	16	14	WBGene00020409	111	23	11	WBGene00011412	160	20	13	WBGene00018349	202	32	18	WBGene00001496	169	17	8
WBGene00021832	174	15	10	WBGene00020408	111	23	11	WBGene00007045	160	20	13	WBGene00020444	126	65	9	WBGene00009138	169	17	8
WBGene00000413	261	26	16	WBGene00005562	54	39	36	WBGene00011414	160	20	13	WBGene00020447	96	53	11	WBGene00009139	169	17	8
WBGene00021826	261	26	16	WBGene00044371	54	39	36	WBGene00001259	235	27	15	WBGene00016739	62	46	10	WBGene00011692	169	17	8
WBGene00003258	106	71	13	WBGene00044372	54	39	36	WBGene00000068	235	27	15	WBGene00018902	106	24	21	WBGene00011696	227	26	10
WBGene00021834	106	71	13	WBGene00022570	54	39	36	WBGene00004469	238	27	17	WBGene00018901	106	24	21	WBGene00001808	227	26	10
WBGene00021553	245	32	18	WBGene00022569	54	39	36	WBGene00007167	254	26	18	WBGene00018904	106	24	21	WBGene00000233	227	26	10
WBGene00021552	245	32	18	WBGene00195073	31	52	38	WBGene00007168	254	26	18	WBGene00018900	170	144	125	WBGene00008343	146	14	9
WBGene00020915	245	32	18	WBGene00005575	187	58	10	WBGene00007169	269	25	18	WBGene00001935	233	264	229	WBGene00008344	146	14	9
WBGene00004154	245	32	18	WBGene00044375	187	58	10	WBGene00008003	183	27	11	WBGene00001936	233	264	229	WBGene00008345	140	20	9
WBGene00021547	168	67	10	WBGene00018201	124	92	16	WBGene00003210	183	27	11	WBGene00001934	233	264	229	WBGene00000302	133	26	8
WBGene00021551	209	44	10	WBGene00018198	102	81	11	WBGene00008005	174	44	12	WBGene00001933	233	264	229	WBGene00001726	129	18	15
WBGene00021039	250	21	10	WBGene00021727	175	41	13	WBGene00008006	174	44	12	WBGene00018899	233	264	229	WBGene00008224	150	18	12
WBGene00019362	93	24	9	WBGene00021726	175	41	13	WBGene00008008	76	50	18	WBGene00001624	137	29	15	WBGene00008225	150	18	12
WBGene00004775	233	21	16	WBGene00021725	128	38	21	WBGene00003912	76	50	18	WBGene00019900	137	29	15	WBGene00000250	150	18	12
WBGene00006440	233	21	16	WBGene00021724	128	38	21	WBGene00008007	76	50	18	WBGene00019899	137	29	15	WBGene00009986	156	19	6
WBGene00021639	233	21	16	WBGene00020290	81	34	28	WBGene00017811	205	24	10	WBGene00004039	174	27	15	WBGene00077569	156	19	6
WBGene00021640	205	18	10	WBGene00015854	55	71	45	WBGene00017812	205	24	10	WBGene00019898	210	24	15	WBGene00009987	156	19	6
WBGene00004978	205	18	10	WBGene00195072	55	71	45	WBGene00017801	205	24	10	WBGene00019901	210	24	15	WBGene00009988	156	19	6
WBGene00021638	209	24	15	WBGene00021717	126	33	14	WBGene00000418	205	24	10	WBGene00003914	119	44	28	WBGene00009993	248	19	14
WBGene00000794	209	24	15	WBGene00021719	126	33	14	WBGene00016444	166	23	12	WBGene00018636	119	44	28	WBGene00009992	248	19	14
WBGene00021643	69	53	9	WBGene00021720	197	28	11	WBGene00016443	166	23	12	WBGene00000996	119	44	28	WBGene00009994	248	19	14

WBGene00021637	69	53	9	WBGene00004896	267	22	8	WBGene00016446	166	23	12	WBGene00018637	166	36	21	WBGene00009996	248	19	14
WBGene00021636	213	20	10	WBGene00021721	276	27	22	WBGene00016442	166	23	12	WBGene00018638	166	36	21	WBGene00044200	112	59	38
WBGene00004389	230	16	12	WBGene00000647	276	27	22	WBGene00000767	166	23	12	WBGene00018635	187	34	20	WBGene00010425	91	54	24
WBGene00021634	230	16	12	WBGene00021715	276	27	22	WBGene00016449	235	54	10	WBGene00002074	222	29	16	WBGene00010279	148	28	14
NoWBGene_ID86	239	52	15	WBGene00021714	276	27	22	WBGene00000204	235	54	10	WBGene00043068	230	30	18	WBGene00010280	140	33	19
WBGene00021633	239	52	15	WBGene00021118	138	75	53	WBGene00016439	235	54	10	WBGene00017991	274	79	75	WBGene00010282	206	16	10
WBGene00044436	239	52	15	WBGene00021117	138	75	53	WBGene00016450	235	54	10	WBGene00017992	261	52	52	WBGene00006442	206	16	10
WBGene00021648	239	52	15	WBGene00000648	138	75	53	WBGene00003598	239	25	12	WBGene00017990	261	52	52	WBGene00010283	206	16	10
WBGene00021649	239	52	15	WBGene00000162	122	32	9	WBGene00017826	233	37	15	WBGene00017993	261	52	52	WBGene00005987	187	20	14
WBGene00002144	239	52	15	WBGene00021148	221	16	10	WBGene00017832	227	49	17	WBGene00017989	248	24	28	WBGene00011329	187	20	14
WBGene00020902	115	28	27	WBGene00021149	221	16	10	WBGene00005011	227	49	17	WBGene00018471	227	21	10	WBGene00011330	187	20	14
WBGene00020901	115	28	27	WBGene00021147	52	92	83	WBGene00004400	227	49	17	WBGene00004046	227	21	10	WBGene00008986	77	44	8
WBGene00020900	115	28	27	WBGene00021146	52	92	83	WBGene00017831	204	36	16	WBGene00000190	227	21	10	WBGene00009973	160	36	17
WBGene00001501	203	59	36	WBGene00021138	52	92	83	WBGene00017829	180	22	14	WBGene00018472	227	21	10	WBGene00009974	167	58	16
WBGene00004272	203	59	36	WBGene00021139	52	92	83	WBGene00005012	180	22	14	WBGene00001584	138	29	13	WBGene00009975	173	80	14
WBGene00017025	203	59	36	WBGene00019797	45	24	26	WBGene00017825	180	22	14	WBGene00018473	138	29	13	WBGene00009977	195	62	15
WBGene00003040	256	54	11	WBGene00019793	63	28	24	WBGene00004679	173	25	14	WBGene00017996	181	16	9	WBGene00010088	238	34	13
WBGene00020467	87	26	18	WBGene00019798	81	32	21	WBGene00017830	165	28	14	WBGene00017997	181	16	9	WBGene00004767	238	34	13
WBGene00004147	167	35	15	WBGene00044314	81	32	21	WBGene00006735	165	28	14	WBGene00017999	181	16	9	WBGene00010089	150	33	11
WBGene00020466	247	43	12	WBGene00005989	111	61	40	WBGene00016144	165	28	14	WBGene00023487	181	16	9	WBGene00003812	150	33	11
WBGene00004368	181	20	11	WBGene00004750	111	61	40	WBGene00004782	168	25	15	WBGene00003607	181	16	9	WBGene00002260	122	26	9
WBGene00016323	236	35	14	WBGene00017584	111	61	40	WBGene00016145	210	24	13	WBGene00016845	118	18	10	WBGene00011932	122	26	9
WBGene00016322	236	35	14	WBGene00017589	116	39	23	WBGene00016143	210	24	13	WBGene00016844	118	18	10	WBGene00011192	195	25	13
WBGene00016321	290	49	17	WBGene00017583	116	39	23	WBGene00016142	159	23	13	WBGene00016847	118	18	10	NoWBGene_ID32	195	25	13
WBGene00004425	290	49	17	WBGene00017406	70	38	32	WBGene00001499	159	23	13	WBGene00001827	218	22	16	WBGene00011194	195	25	13
WBGene00004217	290	49	17	WBGene00017405	70	38	32	WBGene00016140	116	22	14	WBGene00016374	218	22	16	WBGene00011195	195	25	13
WBGene00016326	249	36	24	WBGene00017403	91	37	31	WBGene00016139	129	45	13	WBGene00016373	218	22	16	WBGene00010260	300	65	47
WBGene00003797	249	36	24	WBGene00017402	91	37	31	WBGene00016166	194	18	10	WBGene00044325	167	25	11	WBGene00000097	300	65	47
WBGene00006833	176	36	12	WBGene00044811	91	37	31	WBGene00016167	194	18	10	WBGene00044326	167	25	11	WBGene00001311	300	65	47
WBGene00018765	202	29	12	WBGene00086558	106	40	31	WBGene00043156	194	18	10	WBGene00016378	247	30	22	WBGene00011625	147	17	6
WBGene00044423	228	21	11	WBGene00044693	120	42	30	WBGene00003558	194	18	10	WBGene00004703	326	34	32	WBGene00010249	147	17	6
WBGene00018764	228	21	11	WBGene00044694	120	42	30	WBGene00016169	201	19	12	WBGene00016379	326	34	32	WBGene00045405	86	31	41
WBGene00018763	128	95	22	WBGene00044692	120	42	30	WBGene00016171	201	19	12	WBGene00016380	265	28	22	WBGene00045406	86	31	41
WBGene00020187	128	95	22	WBGene00017408	120	42	30	WBGene00016165	201	19	12	WBGene00016381	204	22	12	WBGene00008392	86	31	41
WBGene00020188	128	95	22	WBGene00020774	120	42	30	WBGene00016170	234	46	16	WBGene00016384	108	28	9	WBGene00001864	86	31	41
WBGene00020189	223	36	29	WBGene00018805	184	23	15	WBGene00020095	234	46	16	WBGene00004363	108	28	9	WBGene00003916	102	45	11
WBGene00020190	223	36	29	WBGene00018806	184	23	15	WBGene00020098	234	46	16	WBGene00015509	190	26	11	WBGene00007085	166	51	15
WBGene00001832	223	36	29	WBGene00004821	109	81	69	WBGene00020097	225	71	16	WBGene00015508	190	26	11	WBGene00013873	193	17	13
WBGene00020185	223	36	29	WBGene00018809	109	81	69	WBGene00020094	225	71	16	WBGene00015510	152	32	11	WBGene00006613	193	17	13
WBGene00000764	223	36	29	WBGene00018747	108	52	44	WBGene00007015	257	61	30	WBGene00015511	113	37	10	WBGene00013877	159	22	11
WBGene00020191	189	26	17	WBGene00018754	108	52	44	WBGene00020093	288	51	43	WBGene00015507	176	58	16	WBGene00013878	124	27	8
WBGene00020184	189	26	17	WBGene00018746	108	52	44	WBGene00044648	288	51	43	WBGene00016957	217	37	12	WBGene00009811	121	16	12
WBGene00020193	189	26	17	WBGene00018755	108	52	44	WBGene00020092	288	51	43	WBGene00016793	217	37	12	WBGene00006057	121	16	12
WBGene00016837	189	26	17	WBGene00021192	170	36	11	WBGene00220249	288	51	43	WBGene00016792	236	39	15	WBGene00013024	144	21	13
WBGene00016839	128	64	28	WBGene00021191	227	27	12	WBGene00002218	288	51	43	WBGene00016794	254	40	18	WBGene00013025	186	24	15
WBGene00001430	128	64	28	WBGene00004751	141	80	62	WBGene00044409	133	33	10	WBGene00003827	254	40	18	WBGene00013026	186	24	15
WBGene00016840	128	64	28	WBGene00206374	75	73	11	WBGene00016678	133	33	10	WBGene00002080	196	46	22	WBGene00000877	206	21	16
WBGene00016841	128	64	28	WBGene00019641	75	73	11	WBGene00016676	133	33	10	WBGene00219436	196	46	22	WBGene00013027	206	21	16
WBGene00003950	230	40	13	WBGene00019640	75	73	11	WBGene00050919	133	33	10	WBGene00016790	196	46	22	WBGene00007614	238	24	16
WBGene00020625	230	40	13	WBGene00019487	52	66	10	WBGene00016682	172	24	13	WBGene00004471	196	46	22	WBGene00003834	238	24	16
WBGene00077599	230	40	13	WBGene00004135	238	24	21	WBGene00016674	172	24	13	WBGene00016795	196	46	22	WBGene00007619	238	24	16
WBGene00020626	230	40	13	WBGene00004467	238	24	21	WBGene00016683	172	24	13	WBGene00001535	196	46	22	WBGene00003835	238	24	16
WBGene00020629	153	31	15	WBGene00019483	238	24	21	WBGene00000107	239	30	13	WBGene00017645	84	40	8	WBGene00007615	238	24	16
WBGene00020653	153	31	15	WBGene00020007	64	51	11	WBGene00006519	239	30	13	WBGene00017644	84	40	8	WBGene00000985	216	33	14
WBGene00020652	153	31	15	WBGene00020368	52	50	13	WBGene00000279	239	30	13	WBGene00017643	154	32	12	WBGene00003922	216	33	14
WBGene00018528	97	63	9	WBGene00019855	95	62	16	WBGene00018802	133	64	53	WBGene00249815	223	24	15	WBGene00007616	216	33	14
WBGene00000197	121	35	18	WBGene00019854	90	25	16	WBGene00001076	113	106	94	WBGene00017642	223	24	15	WBGene00007617	127	39	13
WBGene00000779	77	41	21	WBGene00045297	96	15	13	WBGene00004728	83	79	54	WBGene00006761	214	27	21	WBGene00009079	37	44	12
WBGene00017908	273	104	105	WBGene00015819	96	15	13	WBGene00021900	93	81	15	WBGene00000183	214	27	21	WBGene00009081	222	25	12
WBGene00006805	237	92	58	WBGene00015815	96	15	13	WBGene00021901	184	21	11	WBGene00003178	214	27	21	WBGene00009082	222	25	12
WBGene00006820	200	80	10	WBGene00015298	244	19	15	WBGene00021899	184	21	11	WBGene00004371	174	74	14	WBGene00006465	222	25	12
WBGene00003029	247	32	24	WBGene00015297	244	19	15	WBGene00021902	184	21	11	WBGene00021541	128	68	17	WBGene00009084	206	28	17
WBGene00002696	247	32	24	WBGene00015296	244	19	15	WBGene00001744	116	21	13	WBGene00016130	82	62	19	WBGene00000257	190	31	22
WBGene00017085	277	35	22	WBGene00021795	266	22	11	WBGene00020422	116	21	13	WBGene00016129	118	44	15	WBGene00000592	190	31	22
WBGene00017087	277	35	22	WBGene00021794	266	22	11	WBGene00006736	263	22	14	WBGene00016128	118	44	15	WBGene00235335	208	122	18

WBGene00017088	306	38	19	WBGene00019221	266	22	11	WBGene00020423	263	22	14	WBGene00016124	118	44	15	WBGene00010976	208	122	18
WBGene00017084	306	38	19	WBGene00003390	266	22	11	WBGene00019631	263	22	14	WBGene00016125	154	25	11	WBGene00077577	208	122	18
WBGene00017089	306	38	19	WBGene00015116	274	36	15	WBGene00019630	263	22	14	WBGene00004732	51	60	12	WBGene00194707	230	46	31
WBGene00020036	230	29	18	WBGene00003825	274	36	15	WBGene00019629	230	42	13	WBGene00021539	214	28	12	WBGene00194706	230	46	31
WBGene00020037	230	29	18	WBGene00015115	274	36	15	WBGene00019628	169	39	11	WBGene00021536	214	28	12	WBGene00008263	230	46	31
WBGene00004464	230	29	18	WBGene00001438	274	36	15	WBGene00189952	140	15	10	WBGene00018360	214	28	12	WBGene00008262	230	46	31
WBGene00020038	230	29	18	WBGene00022743	80	22	21	WBGene00019627	124	20	13	WBGene00249817	173	19	14	WBGene00001834	230	46	31
WBGene00020031	230	29	18	WBGene00022741	74	30	25	WBGene00019633	107	24	16	WBGene00018361	173	19	14	WBGene00008265	151	22	15
WBGene00015974	167	70	14	WBGene00007036	123	35	9	WBGene00001262	99	25	13	WBGene00018357	138	24	13	WBGene00008266	151	22	15
WBGene00015973	167	70	14	WBGene00044063	159	27	11	WBGene00022531	134	62	42	WBGene00004979	170	24	13	WBGene00008270	151	22	15
WBGene00015972	195	45	14	WBGene00022742	159	27	11	WBGene00022534	177	97	73	WBGene00002162	169	27	12	WBGene00003982	190	22	12
WBGene00001985	223	20	13	WBGene00022739	195	19	12	WBGene00022532	177	97	73	WBGene00018356	235	25	13	WBGene00011250	190	22	12
WBGene00015971	223	20	13	WBGene00020461	85	23	9	WBGene00003588	274	33	21	WBGene00004056	131	38	9	WBGene00011251	190	22	12
WBGene00015970	181	20	13	WBGene00021058	85	23	9	WBGene00016411	274	33	21	WBGene00004055	131	38	9	WBGene00011252	212	17	12
WBGene00015976	138	20	12	WBGene00015135	90	44	20	WBGene00000229	274	33	21	WBGene00003961	136	54	11	WBGene00011253	212	17	12
WBGene00003516	38	38	22	WBGene00001948	90	44	20	WBGene00016408	200	25	17	WBGene00004101	132	18	8	WBGene00009650	212	17	12
WBGene00016605	38	38	22	WBGene00015136	90	44	20	WBGene00016412	125	16	13	WBGene00006620	132	18	8	WBGene00004337	150	36	8
WBGene00016606	205	21	12	WBGene00015134	90	44	20	WBGene00006946	64	35	20	WBGene00020373	167	21	13	WBGene00004060	150	36	8
WBGene00007001	205	21	12	WBGene00077490	60	62	52	WBGene00000561	58	47	16	WBGene00020374	167	21	13	WBGene00008142	285	55	44
WBGene00016608	226	31	19	WBGene00000928	60	62	52	WBGene00016409	160	19	8	WBGene00003656	104	34	13	WBGene00008143	285	55	44
WBGene00016609	246	41	26	WBGene00006868	105	78	13	WBGene00001660	160	19	8	WBGene00019507	34	35	38	WBGene00000915	285	55	44
WBGene00016603	246	41	26	WBGene00019747	226	23	10	WBGene00022598	279	23	15	WBGene00019509	288	36	25	WBGene00044180	285	55	44
WBGene00016602	246	23	16	WBGene00018046	226	23	10	WBGene00022599	279	23	15	WBGene00019510	288	36	25	WBGene00008144	285	55	44
WBGene00016607	246	23	16	WBGene00018045	226	23	10	WBGene00006590	279	23	15	WBGene00000923	288	36	25	WBGene00006836	213	81	18
WBGene00000382	246	23	16	WBGene00022283	47	48	11	WBGene00000536	279	23	15	WBGene00019504	288	36	25	WBGene00008145	213	81	18
WBGene00016601	246	23	16	WBGene00020223	316	70	68	WBGene00020530	62	58	57	WBGene00018069	61	105	94	WBGene00003861	265	20	10
WBGene00021631	246	23	16	WBGene00001976	316	70	68	WBGene00018675	148	30	25	WBGene00018068	61	105	94	WBGene00006795	265	20	10
WBGene00021629	224	72	13	WBGene00020220	316	70	68	WBGene00003391	249	32	14	WBGene00001908	159	184	159	WBGene00013048	265	20	10
WBGene00000140	61	48	10	WBGene00020221	316	70	68	WBGene00004095	192	40	28	WBGene00001903	159	184	159	WBGene00008183	62	56	10
WBGene00022834	188	23	9	WBGene00017369	245	35	28	WBGene00018674	134	48	42	WBGene00001904	159	184	159	WBGene00012293	281	78	25
WBGene00022832	197	23	12	WBGene00004461	245	35	28	WBGene00021311	180	16	14	WBGene00001907	159	184	159	WBGene00012294	281	78	25
WBGene00022835	197	23	12	WBGene00004737	245	35	28	WBGene00000973	86	31	15	WBGene00003099	159	184	159	WBGene00004336	191	56	20
WBGene00003061	205	22	14	WBGene00006817	263	37	27	WBGene00021312	86	31	15	WBGene00001905	257	263	223	WBGene00013883	47	41	50
WBGene00022831	217	21	14	WBGene00017372	263	37	27	WBGene00021313	134	17	8	WBGene00001906	153	179	153	WBGene00013886	27	36	39
WBGene00022836	228	20	13	WBGene00006626	280	38	26	WBGene00021314	134	17	8	WBGene00017544	48	95	83	WBGene00050943	27	36	39
WBGene00022830	228	20	13	WBGene00006497	280	38	26	WBGene00021315	134	17	8	WBGene00000690	131	22	12	WBGene00013887	27	36	39
WBGene00016562	199	20	11	WBGene00018271	168	19	10	WBGene00021316	92	25	10	WBGene00044953	131	22	12	WBGene00044272	27	36	39
WBGene00001231	199	20	11	WBGene00018270	168	19	10	WBGene00020967	92	25	10	WBGene00017072	131	22	12	WBGene00011318	194	26	20
WBGene00000787	186	19	10	WBGene00018269	168	19	10	WBGene00020966	92	25	10	WBGene00005019	131	22	12	WBGene00011319	194	26	20
WBGene00016567	173	17	9	WBGene00017837	144	24	9	WBGene00020968	56	54	14	WBGene00017079	131	22	12	WBGene00011320	194	26	20
WBGene00016564	173	17	9	WBGene00016355	73	26	10	WBGene00020970	124	50	14	WBGene00017071	62	83	91	WBGene00011321	194	26	20
WBGene00016566	152	19	9	WBGene00016356	125	32	12	WBGene00020779	235	25	13	WBGene00017074	148	60	55	WBGene00011322	304	64	43
WBGene00016561	130	21	9	WBGene00003435	176	37	14	WBGene00018612	219	28	16	WBGene00017075	148	60	55	WBGene00011325	304	64	43
WBGene00016565	130	21	9	WBGene00016359	176	37	14	WBGene00018613	219	28	16	WBGene00017070	233	36	19	WBGene00004485	304	64	43
WBGene00020131	184	15	12	WBGene00016352	176	37	14	WBGene00044410	203	31	18	WBGene00017076	233	36	19	WBGene00001423	304	64	43
WBGene00022470	184	15	12	WBGene00044767	135	30	12	WBGene00003901	203	31	18	WBGene00019788	79	33	40	WBGene00011323	304	64	43
WBGene00022471	150	21	10	WBGene00001027	135	30	12	WBGene00018611	203	31	18	WBGene00019791	79	33	40	WBGene00011324	304	64	43
WBGene00022472	115	27	8	WBGene00003430	170	28	12	WBGene00019836	196	19	10	WBGene00020825	276	50	32	WBGene00003775	47	47	50
WBGene00022473	261	55	12	WBGene00019892	170	28	12	WBGene00019833	196	19	10	WBGene00020827	276	50	32	WBGene00008832	47	47	50
WBGene00022474	261	55	12	WBGene00019893	170	28	12	WBGene00019832	178	71	20	WBGene00020824	276	50	32	WBGene00004747	73	38	11
WBGene00022467	96	28	7	WBGene00019888	170	28	12	WBGene00019838	178	71	20	WBGene00016182	193	24	15	WBGene00007716	73	38	11
WBGene00022475	96	28	7	WBGene00003470	160	20	15	WBGene00019831	178	71	20	WBGene00001566	193	24	15	WBGene00007717	170	27	16
WBGene00017010	96	28	7	WBGene00001778	160	20	15	WBGene00017032	178	71	20	WBGene00016178	193	24	15	WBGene00050940	170	27	16
WBGene00017003	258	32	17	WBGene00022762	160	20	15	WBGene00017030	91	80	13	WBGene00016177	193	24	15	WBGene00003155	170	27	16
WBGene00004479	258	32	17	WBGene00022761	160	20	15	WBGene00017028	91	80	13	WBGene00006450	252	29	26	WBGene00007722	170	27	16
WBGene00004436	258	32	17	WBGene00022766	139	84	60	WBGene00017031	190	53	11	WBGene00003224	252	29	26	WBGene00004308	217	35	15
WBGene00017007	258	32	17	WBGene00022760	117	147	104	WBGene00017027	190	53	11	WBGene00044001	252	29	26	WBGene00007719	263	42	13
WBGene00045048	258	32	17	WBGene00195246	117	147	104	WBGene00017302	225	32	16	WBGene00001051	252	29	26	WBGene00007718	263	42	13
WBGene00017006	258	32	17	WBGene00007012	187	91	58	WBGene00017303	225	32	16	WBGene00022011	101	30	10	WBGene00007720	263	42	13
WBGene00017004	208	22	13	WBGene00022765	187	91	58	WBGene00017304	225	32	16	WBGene00044511	101	30	10	WBGene00001021	230	50	11
WBGene00017011	208	22	13	WBGene00022759	257	34	12	WBGene00017301	225	32	16	WBGene00022012	101	30	10	WBGene00006808	216	38	11
WBGene00017005	208	22	13	WBGene00006619	257	34	12	WBGene00017300	225	32	16	WBGene00018336	108	30	13	WBGene00007237	235	18	14
WBGene00016654	208	22	13	WBGene00006997	216	29	16	WBGene00006731	152	17	15	WBGene00018332	108	30	13	WBGene00007236	235	18	14
WBGene00016650	208	29	16	WBGene00003580	174	23	19	WBGene00018965	152	17	15	WBGene00018337	108	30	13	WBGene00007235	235	18	14
WBGene00016653	208	29	16	WBGene00003949	174	23	19	WBGene00018964	207	22	15	WBGene00003034	85	40	11	WBGene00007234	235	18	14

WBGene00016655	208	29	16	WBGene00006737	214	25	16	WBGene00018967	207	22	15	WBGene00195046	62	50	8	WBGene00007240	235	18	14
WBGene00016652	208	29	16	WBGene00020867	89	67	17	WBGene00018963	262	26	15	WBGene00000397	130	18	10	WBGene00007233	235	18	14
WBGene00022466	289	44	20	WBGene00206517	230	21	12	WBGene00015470	232	125	112	WBGene00017237	220	30	30	WBGene00077583	235	18	14
WBGene00015008	289	44	20	WBGene00020868	230	21	12	WBGene00015468	232	125	112	WBGene00017238	220	30	30	WBGene00010685	174	20	12
WBGene00004415	289	44	20	WBGene00194986	230	21	12	WBGene00001514	232	125	112	WBGene00002028	169	24	21	WBGene00010684	174	20	12
WBGene00015011	289	44	20	WBGene00020866	230	21	12	WBGene00000518	88	57	31	WBGene00000994	117	18	12	WBGene00010686	138	22	10
WBGene00015009	196	37	17	WBGene00004382	228	22	12	WBGene00018828	88	57	31	WBGene00009014	158	20	16	WBGene00010687	138	22	10
WBGene00015010	149	43	16	WBGene00044664	225	23	12	WBGene00018829	135	76	18	WBGene00009006	158	20	16	WBGene00202514	138	22	10
WBGene00015007	149	43	16	WBGene00019087	225	23	12	WBGene00003918	171	59	15	WBGene00009007	158	20	16	WBGene00011670	279	60	56
WBGene00006961	153	47	13	WBGene00019084	165	55	12	WBGene00018831	251	24	16	WBGene00009008	76	23	11	WBGene00013567	279	60	56
WBGene00006791	143	39	13	WBGene00018014	56	76	65	WBGene00018830	251	24	16	WBGene00009010	76	23	11	WBGene00013568	279	60	56
WBGene00020212	123	24	13	WBGene00018015	56	76	65	WBGene00004481	251	24	16	WBGene00009009	76	23	11	WBGene00000883	279	60	56
WBGene00007053	232	65	65	WBGene00018016	56	76	65	WBGene00018827	251	24	16	WBGene00009013	76	23	11	WBGene00013569	279	60	56
WBGene00021112	232	65	65	WBGene00018017	252	24	12	NoWBGene_ID52	251	24	16	WBGene00009011	139	23	12	WBGene00000879	279	60	56
WBGene00021111	232	65	65	WBGene00044666	252	24	12	WBGene00015146	226	16	20	WBGene00009012	202	22	12	WBGene00013573	279	60	56
WBGene00002694	192	63	11	WBGene00018018	183	62	46	WBGene00015145	226	16	20	WBGene00008972	202	22	12	WBGene00004037	279	60	56
WBGene00019769	215	16	9	WBGene00002068	237	62	80	WBGene00015150	226	16	20	NoWBGene_ID47	202	22	12	WBGene00045402	279	60	56
WBGene00019768	222	23	16	WBGene00004434	237	62	80	WBGene00015147	199	16	17	WBGene00194651	182	57	11	WBGene00011538	267	29	20
WBGene00019767	171	26	17	WBGene00206373	237	62	80	WBGene00002982	171	16	13	WBGene00007901	155	36	12	WBGene00000868	267	29	20
WBGene00019770	171	26	17	WBGene00016152	212	41	45	WBGene00004348	171	16	13	WBGene00044239	155	36	12	WBGene00005931	267	29	20
WBGene00019771	114	22	10	WBGene00016151	187	19	10	WBGene00006359	296	30	14	WBGene00012118	134	57	14	WBGene00044759	267	29	20
WBGene00006984	291	64	48	WBGene00001102	228	39	17	WBGene00004435	296	30	14	WBGene00045183	134	57	14	WBGene00011948	33	70	75
WBGene00018798	133	37	9	WBGene00015454	228	39	17	WBGene00015148	198	32	16	WBGene00012119	134	57	14	WBGene00004153	33	70	75
WBGene00018797	133	37	9	WBGene00004040	228	39	17	WBGene00015149	198	32	16	WBGene00012120	134	57	14	WBGene00005428	124	39	10
WBGene00002034	146	20	11	WBGene00015459	91	120	139	WBGene00015143	201	61	23	WBGene00000691	139	37	13	WBGene00005429	124	39	10
WBGene00019011	146	20	11	WBGene00003402	91	120	139	WBGene00000182	302	88	28	WBGene00000594	139	37	13	WBGene00007372	125	39	24
WBGene00017675	255	48	10	WBGene00016162	230	88	14	WBGene00006943	302	88	28	WBGene00012121	135	24	13	WBGene00004452	197	22	16
WBGene00017676	255	48	10	WBGene00001101	120	67	10	WBGene00021344	181	27	12	WBGene00206515	125	30	15	WBGene00008997	197	22	16
WBGene00002075	195	23	11	WBGene00017148	120	67	10	WBGene00021345	181	27	12	WBGene00011706	125	30	15	WBGene00000057	45	58	47
WBGene00017886	195	23	11	WBGene00017147	120	67	10	WBGene00020964	232	21	15	WBGene00011707	125	30	15	WBGene00009221	170	21	11
WBGene00017888	227	67	11	WBGene00004020	44	67	48	WBGene00000435	232	21	15	WBGene00007493	164	21	14	WBGene00003079	170	21	11
WBGene00017885	178	82	10	WBGene00004023	44	67	48	WBGene00001869	208	23	13	WBGene00007494	164	21	14	WBGene00009222	170	21	11
WBGene00001860	205	17	11	WBGene00001806	59	76	76	WBGene00020019	208	23	13	WBGene00007495	172	26	18	WBGene00009225	170	21	11
WBGene00044431	205	17	11	WBGene00044667	59	76	76	WBGene00020018	184	24	11	WBGene00003864	172	26	18	WBGene00009223	184	18	11
WBGene00021015	205	17	11	WBGene00022782	59	76	76	WBGene00007016	92	52	24	WBGene00005007	183	27	15	WBGene00006446	184	18	11
WBGene00021014	95	20	11	WBGene00022780	59	76	76	WBGene00020020	92	52	24	WBGene00007760	183	27	15	WBGene00044188	184	18	11
WBGene00000155	95	20	11	WBGene00006923	81	56	10	WBGene00021029	119	66	15	WBGene00007761	183	27	15	WBGene00009224	184	18	11
WBGene00021016	95	20	11	WBGene00017286	127	34	21	WBGene00017162	228	42	35	WBGene00219476	167	52	35	WBGene00007162	127	40	11
WBGene00044432	90	64	12	WBGene00017285	127	34	21	WBGene00000381	228	42	35	WBGene00008363	167	52	35	WBGene00006080	127	40	11
WBGene00001117	122	40	16	WBGene00005226	160	34	23	WBGene00000115	228	42	35	WBGene00008362	188	56	59	WBGene00001813	157	21	15
WBGene00003221	122	40	16	WBGene00017289	274	19	11	WBGene00001057	223	31	23	WBGene00008366	107	10	6	WBGene00010184	157	21	15
WBGene00016258	242	25	14	WBGene00017293	274	19	11	WBGene00017163	217	19	11	WBGene00008273	231	23	7	WBGene00006122	46	79	84
WBGene00002213	100	54	13	WBGene00017284	218	21	11	WBGene00017161	217	19	11	WBGene00008274	231	23	7	WBGene00006121	46	79	84
WBGene00004959	258	21	12	WBGene00000094	162	22	10	WBGene00017164	217	19	11	WBGene00008280	109	21	10	WBGene00003692	46	79	84
WBGene00000502	258	21	12	WBGene00017283	151	32	15	WBGene00017169	120	21	14	WBGene00008281	109	21	10	WBGene00003674	46	79	84
WBGene00003924	258	21	12	WBGene00017282	151	32	15	WBGene00017165	120	21	14	WBGene00003610	97	16	8	WBGene00005934	219	25	16
WBGene00022460	191	23	10	WBGene00006434	139	41	19	WBGene00017160	120	21	14	WBGene00013880	97	16	8	WBGene00005935	219	25	16
WBGene00000001	191	23	10	WBGene00004034	139	41	19	WBGene00017166	149	27	20	WBGene00013881	97	16	8	WBGene00011687	219	25	16
WBGene00045212	124	24	7	WBGene00017136	252	28	22	WBGene00003252	178	32	26	WBGene00003066	253	22	12	WBGene00011688	219	25	16
WBGene00022462	124	24	7	WBGene00004701	252	28	22	WBGene00017159	178	32	26	WBGene00002046	253	22	12	WBGene00011691	219	218	188
WBGene00022463	228	22	12	WBGene00003583	252	28	22	WBGene00017158	178	32	26	WBGene00007223	253	22	12	WBGene00001878	219	218	188
WBGene00022459	228	22	12	WBGene00017144	252	28	22	WBGene00017168	178	32	26	WBGene00007221	253	22	12	WBGene00001877	219	218	188
WBGene00003132	313	20	15	WBGene00017137	252	28	22	WBGene00016196	178	32	26	WBGene00007222	253	22	12	WBGene00001876	219	218	188
WBGene00022458	313	20	15	WBGene00017138	163	21	9	WBGene00016200	270	32	16	WBGene00219207	121	24	12	WBGene00001875	219	218	188
WBGene00022457	313	20	15	WBGene00003393	121	36	24	WBGene00016195	270	32	16	WBGene00001413	166	52	33	WBGene00050899	219	218	188
WBGene00003475	129	20	10	WBGene00017139	78	51	39	WBGene00016194	270	32	16	WBGene00000120	211	79	54	WBGene00009049	66	47	9
WBGene00022455	129	20	10	WBGene00017140	78	51	39	WBGene00016193	162	16	9	WBGene00006438	69	42	9	WBGene00012348	216	45	12
WBGene00004094	243	31	18	WBGene00017135	78	51	39	WBGene00001018	162	16	9	WBGene00000906	206	17	17	WBGene00012347	83	70	57
WBGene00002804	243	31	18	WBGene00017141	78	51	39	NoWBGene_ID4	162	16	9	WBGene00001444	206	17	17	WBGene00005745	83	70	57
WBGene00001833	243	31	18	WBGene00194696	78	51	39	WBGene00006987	162	16	9	WBGene00009078	206	17	17	WBGene00008727	170	26	19
WBGene00004955	195	30	16	WBGene00017142	155	54	29	WBGene00017146	291	181	154	WBGene00000121	206	17	17	WBGene00008728	170	26	19
WBGene00003792	195	30	16	WBGene00017134	231	57	18	WBGene00006727	291	181	154	WBGene00008113	72	108	123	WBGene00045357	170	26	19
WBGene00016330	163	24	8	WBGene00017133	231	57	18	WBGene00017776	234	105	83	WBGene00045078	221	66	14	WBGene00006375	170	26	19
WBGene00015092	163	24	8	WBGene00017143	231	57	18	WBGene00017777	234	105	83	WBGene00008114	173	72	13	WBGene00005353	101	23	13
WBGene00002583	163	24	8	WBGene00017132	219	42	15	WBGene00017775	177	29	11	WBGene00008110	173	72	13	WBGene00009469	101	23	13

WBGene00000965	134	19	8	WBGene00017219	219	42	15	WBGene00017778	278	31	22	WBGene00012434	286	72	89	WBGene00202504	207	23	10
WBGene00001022	134	19	8	WBGene00017220	219	42	15	WBGene00017774	278	31	22	WBGene00000694	286	72	89	WBGene00012521	207	23	10
WBGene00001333	155	21	9	WBGene00017217	237	25	12	WBGene00001489	73	63	13	WBGene00012435	286	72	89	WBGene00012522	207	23	10
WBGene00002717	163	67	40	WBGene00017216	266	24	12	WBGene00020211	66	51	9	WBGene00077756	269	60	58	WBGene00005475	48	55	39
WBGene00018596	241	83	30	WBGene00006005	266	24	12	WBGene00020210	109	37	12	WBGene00012436	251	48	26	WBGene00000776	48	55	39
WBGene00018598	185	51	22	WBGene00000548	143	39	11	WBGene00022694	233	31	12	WBGene00009877	257	24	25	WBGene00050904	41	64	68
WBGene00018599	185	51	22	WBGene00018961	185	17	11	WBGene00001166	233	31	12	WBGene00009878	257	24	25	WBGene00013490	41	64	68
WBGene00018595	129	19	13	WBGene00018960	185	17	11	WBGene00003796	252	34	24	WBGene00004463	221	25	18	WBGene00012308	41	64	68
WBGene00018865	146	26	16	WBGene00077704	200	20	13	WBGene00000874	252	34	24	WBGene00009879	221	25	18	WBGene00012022	221	72	40
WBGene00000150	146	26	16	WBGene00017397	200	20	13	WBGene00018254	118	66	52	WBGene00009880	221	25	18	WBGene00012021	221	72	40
WBGene00018864	146	26	16	WBGene00001511	137	20	11	WBGene00006547	118	66	52	WBGene00009881	221	25	18	WBGene00012020	221	72	40
WBGene00018866	160	27	11	WBGene00000375	137	20	11	WBGene00018255	118	66	52	WBGene00009882	185	25	11	WBGene00012019	221	72	40
WBGene00000966	144	26	12	WBGene00022672	74	19	9	WBGene00015477	111	59	11	WBGene00009883	185	25	11	WBGene00012315	280	23	15
WBGene00004087	127	25	13	WBGene00022669	49	46	29	WBGene00020549	221	28	15	WBGene00009884	185	25	11	WBGene00004248	280	23	15
WBGene00016278	167	53	35	WBGene00002121	49	46	29	WBGene00002201	221	28	15	WBGene00011857	121	23	12	WBGene00012316	210	22	13
WBGene00017855	215	39	24	WBGene00015892	49	46	29	WBGene00021535	62	48	7	WBGene00011858	121	23	12	WBGene00013606	140	20	11
WBGene00017854	167	53	35	WBGene00000383	236	48	19	WBGene00018340	76	78	86	WBGene00011859	140	22	13	WBGene00001161	245	16	11
WBGene00017853	215	39	24	WBGene00015916	236	48	19	WBGene00003593	76	78	86	WBGene00006931	158	20	14	WBGene00013623	245	16	11
WBGene00000230	263	25	13	WBGene00015915	236	48	19	WBGene00023489	235	23	19	WBGene00011860	158	20	14	WBGene00009299	96	21	10
WBGene00017852	263	25	13	WBGene00000970	75	26	13	WBGene00018341	235	23	19	WBGene00007505	125	31	13	WBGene00009298	65	25	20
WBGene00001067	263	25	13	WBGene00015920	75	26	13	WBGene00018339	235	23	19	WBGene00007511	170	17	11	WBGene00009296	61	45	33
WBGene00015635	265	31	15	WBGene00019124	272	23	14	WBGene00018342	235	23	19	WBGene00000911	170	17	11	WBGene00009297	61	45	33
WBGene00004431	265	31	15	WBGene00019125	272	23	14	WBGene00016014	256	27	19	WBGene00010148	246	19	14	WBGene00005201	61	45	33
WBGene00015636	265	31	15	WBGene00019126	272	23	14	WBGene00004459	256	27	19	WBGene00010150	157	32	24	WBGene00009840	119	88	65
WBGene00206357	265	31	15	WBGene00006988	272	23	14	WBGene00016015	251	32	18	WBGene00010149	67	45	34	WBGene00004811	119	88	65
WBGene00015634	265	31	15	WBGene00000252	272	23	14	WBGene00004472	245	36	16	WBGene00010316	198	49	52	WBGene00009834	119	88	65
WBGene00019076	180	20	10	WBGene00019118	244	50	28	WBGene00016011	245	36	16	WBGene00010317	198	49	52	WBGene00009841	119	88	65
WBGene00019077	180	20	10	WBGene00006402	244	50	28	WBGene00016010	245	36	16	WBGene00009544	177	42	34	WBGene00007675	132	23	14
WBGene00019078	180	20	10	WBGene00016121	244	50	28	WBGene00020439	47	36	28	WBGene00002012	156	34	15	WBGene00014679	84	32	31
WBGene00019079	180	20	10	WBGene00016115	244	50	28	WBGene00020438	47	36	28	WBGene00002013	156	34	15	WBGene00008017	66	30	40
WBGene00019074	33	29	23	WBGene00044391	244	50	28	WBGene00020440	47	36	28	WBGene00009541	202	25	12	WBGene00008016	66	30	40
WBGene00019082	48	30	23	WBGene00016120	228	22	12	WBGene00020441	158	32	23	WBGene00009542	202	25	12	WBGene00050974	96	54	45
WBGene00006594	218	23	12	WBGene00016118	228	22	12	WBGene00020442	268	28	18	WBGene00006949	58	88	74	WBGene00012405	96	54	45
WBGene00019693	218	23	12	WBGene00016113	228	22	12	WBGene00020437	268	28	18	WBGene00000563	58	88	74	WBGene00010212	177	23	9
WBGene00019712	132	24	15	WBGene00016112	281	25	11	WBGene00020436	268	28	18	WBGene00007883	157	32	12	WBGene00000813	270	21	12
WBGene00002225	132	24	15	WBGene00015942	269	30	25	WBGene00005166	268	28	18	WBGene00007882	157	32	12	WBGene00013339	270	21	12
WBGene00019711	132	24	15	WBGene00015943	269	30	25	WBGene00015977	251	75	13	WBGene00007880	210	27	12	WBGene00044795	241	27	9
WBGene00019710	132	24	15	WBGene00015945	269	30	25	WBGene00015978	251	75	13	WBGene00001239	210	27	12	WBGene00008442	180	22	9
NoWBGene_ID24	211	19	16	WBGene00015946	269	30	25	WBGene00001972	251	75	13	WBGene00010176	210	27	12	WBGene00008441	119	17	8
WBGene00006726	211	19	16	WBGene00015941	269	30	25	WBGene00018561	189	51	12	WBGene00001249	123	60	39	WBGene00001080	192	28	11
WBGene00006919	211	19	16	WBGene00015940	269	30	25	WBGene00018562	126	27	10	WBGene00185095	123	60	39	WBGene00013356	192	28	11
WBGene00018512	211	19	16	WBGene00001958	81	62	23	WBGene00018564	104	23	8	WBGene00003151	126	41	16	WBGene00013355	192	28	11
WBGene00018891	138	26	16	WBGene00002053	59	54	28	WBGene00002891	165	31	16	WBGene00000953	126	41	16	WBGene00013354	264	22	9
WBGene00018892	139	21	14	WBGene00017326	59	54	28	WBGene00016981	165	31	16	WBGene00010272	124	28	14	WBGene00013343	246	41	12
NoWBGene_ID68	139	21	14	WBGene00017324	59	54	28	WBGene00016982	147	33	14	WBGene00010273	124	28	14	WBGene00013347	273	49	15
WBGene00018894	139	16	11	WBGene00019408	55	56	37	WBGene00016978	128	34	12	WBGene00003627	60	38	10	WBGene00013348	254	34	14
WBGene00018895	139	16	11	WBGene00044393	123	19	13	WBGene00016977	101	37	21	WBGene00014243	174	15	11	WBGene00013349	235	19	12
WBGene00018897	221	22	12	WBGene00022875	123	19	13	WBGene00016983	122	33	25	WBGene00010484	174	15	11	WBGene00013350	235	19	12
WBGene00020558	221	22	12	WBGene00001224	123	19	13	WBGene00015813	180	48	35	WBGene00010485	174	15	11	WBGene00012562	134	31	9
WBGene00001039	221	22	12	WBGene00022882	169	19	11	WBGene00004482	296	77	57	WBGene00003465	313	224	194	WBGene00007182	80	36	31
WBGene00006776	171	38	12	WBGene00001509	169	19	11	WBGene00007048	253	50	35	WBGene00000301	313	224	194	WBGene00194695	80	36	31
WBGene00003793	279	28	13	WBGene00022883	165	19	12	WBGene00015811	223	41	28	WBGene00011747	246	121	105	WBGene00005417	30	30	36
WBGene00020556	36	48	59	WBGene00022885	165	19	12	WBGene00015810	186	23	14	WBGene00011746	178	18	15	WBGene00013949	30	30	36
WBGene00002989	44	47	10	WBGene00002268	161	18	13	WBGene00015809	186	23	14	WBGene00004031	206	26	20	WBGene00013950	30	30	36
WBGene00018993	201	19	12	WBGene00022874	161	18	13	WBGene00002850	162	23	15	WBGene00011743	206	26	20	WBGene00013075	152	14	9
WBGene00004505	201	19	12	WBGene00018872	202	32	10	WBGene00003523	193	111	41	WBGene00001396	206	26	20	WBGene00006714	237	17	13
WBGene00044305	201	19	12	WBGene00018873	154	51	10	WBGene00015484	193	111	41	WBGene00012341	143	18	8	WBGene00013482	237	17	13
WBGene00000493	201	19	12	WBGene00018870	105	69	9	WBGene00015485	193	111	41	WBGene00000697	143	18	8	WBGene00005522	127	60	8
WBGene00020694	43	46	11	WBGene00019128	144	24	12	WBGene00015486	261	17	12	WBGene00012342	143	18	8	WBGene00008310	127	60	8
WBGene00020693	43	46	11	WBGene00006644	144	24	12	WBGene00015487	261	17	12	WBGene00010637	240	21	12	WBGene00008308	127	60	8
WBGene00015176	237	24	13	WBGene00019129	144	24	12	NoWBGene_ID63	261	17	12	WBGene00003787	240	21	12	WBGene00001258	227	18	11
WBGene00003020	237	24	13	WBGene00006933	144	24	12	WBGene00006516	261	17	12	WBGene00003603	219	20	14	WBGene00013584	227	18	11
WBGene00016332	237	24	13	WBGene00019127	216	24	11	WBGene00015481	110	31	22	WBGene00009320	219	20	14	WBGene00012701	241	18	8
WBGene00001973	178	73	51	WBGene00001486	216	24	11	WBGene00003214	110	31	22	WBGene00009319	219	20	14	WBGene00012700	241	18	8
WBGene00003601	178	73	51	WBGene00004214	175	22	11	WBGene00015488	104	30	17	WBGene00009324	219	20	14	WBGene00012698	265	15	12

WBGene00016333	178	73	51	WBGene00017895	134	20	10	WBGene00002855	104	30	17	WBGene00009322	123	27	10	WBGene00012697	265	15	12
WBGene00016331	76	30	13	WBGene00001208	111	56	12	WBGene00020822	181	36	16	WBGene00009323	83	27	7	WBGene00012696	238	21	13
WBGene00018007	223	42	15	WBGene00020025	120	30	13	WBGene00004781	264	44	20	WBGene00009131	151	19	10	WBGene00012695	238	21	13
WBGene00018008	223	42	15	WBGene00020026	120	30	13	WBGene00020821	264	44	20	WBGene00009132	151	19	10	WBGene00012694	241	19	13
WBGene00016421	169	58	38	WBGene00004306	120	30	13	WBGene00020820	127	42	17	WBGene00004974	151	19	10	WBGene00006567	241	19	13
WBGene00016422	169	58	38	WBGene00020022	137	20	13	WBGene00020823	127	42	17	WBGene00001650	151	19	10	WBGene00012693	241	19	13
WBGene00016419	156	27	13	WBGene00020027	82	17	10	WBGene00001005	127	42	17	WBGene00000964	172	24	12	WBGene00012692	241	19	13
WBGene00004109	156	27	13	WBGene00020028	104	18	11	WBGene00006463	127	42	17	WBGene00008151	172	24	12	WBGene00012676	232	20	11
WBGene00016418	156	27	13	WBGene00019190	125	19	12	WBGene00007060	161	67	23	WBGene00008150	172	24	12	WBGene00012675	232	20	11
WBGene00015028	175	21	11	WBGene00017686	195	27	13	WBGene00017755	161	67	23	WBGene00008149	128	23	11	WBGene00012674	175	24	14
WBGene00015029	175	21	11	WBGene00017683	195	27	13	WBGene00017754	165	45	18	WBGene00008148	160	22	12	WBGene00012673	117	27	17
WBGene00000099	175	21	11	WBGene00004346	195	27	13	WBGene00004503	169	23	12	WBGene00008147	191	20	13	WBGene00012670	40	55	43
WBGene00015504	219	19	13	WBGene00016237	34	45	12	WBGene00005076	169	23	12	WBGene00005663	191	20	13	WBGene00195240	62	52	18
WBGene00015501	219	19	13	WBGene00016235	148	28	10	WBGene00044455	48	37	27	WBGene00008156	191	20	13	WBGene00006639	62	52	18
WBGene00006823	73	23	9	WBGene00004680	148	28	10	WBGene00017752	48	37	27	WBGene00012174	180	19	10	WBGene00001987	258	22	16
WBGene00015505	203	20	18	WBGene00018252	104	36	15	WBGene00017751	48	37	27	WBGene00000593	180	19	10	WBGene00012666	258	22	16
WBGene00004380	203	20	18	WBGene00001440	104	36	15	WBGene00015638	89	21	13	WBGene00003576	180	19	10	WBGene00012665	258	22	16
WBGene00015499	161	22	15	WBGene00000771	211	18	11	WBGene00015639	89	21	13	WBGene00007304	180	19	10	WBGene00012068	186	30	22
WBGene00000814	118	23	11	WBGene00016245	211	18	11	WBGene00015641	131	23	9	WBGene00007306	193	19	9	WBGene00006140	186	30	22
WBGene00194700	118	23	11	WBGene00016244	211	18	11	WBGene00015642	131	23	9	WBGene00003432	193	19	9	WBGene00012067	143	28	10
WBGene00016155	125	23	15	WBGene00077732	211	18	11	WBGene00002889	160	83	16	WBGene00001001	118	34	9	WBGene00012066	131	27	12
NoWBGene_ID61	125	23	15	WBGene00020784	139	17	11	WBGene00003162	160	83	16	WBGene00010676	255	31	19	WBGene00012065	131	27	12
WBGene00000429	46	69	69	WBGene00020783	111	38	39	WBGene00017647	160	83	16	WBGene00010677	255	31	19	WBGene00012064	171	36	18
WBGene00016157	151	23	9	WBGene00020782	111	38	39	WBGene00005263	160	83	16	WBGene00010678	255	31	19	WBGene00012063	171	36	18
WBGene00016158	192	23	11	WBGene00020781	146	33	30	WBGene00021503	136	18	10	WBGene00001621	255	31	19	WBGene00219452	135	46	21
WBGene00016159	192	23	11	WBGene00004015	217	24	14	WBGene00021502	136	18	10	WBGene00011776	224	25	17	WBGene00009018	135	46	21
WBGene00023409	232	22	13	WBGene00017438	217	24	14	WBGene00015733	200	23	12	WBGene00006638	224	25	17	WBGene00009016	86	21	11
WBGene00022749	107	36	12	WBGene00017441	158	25	13	WBGene00015734	200	23	12	WBGene00011775	224	25	17	WBGene00009015	86	21	11
WBGene00022750	117	63	12	WBGene00017435	158	25	13	WBGene00002169	206	19	11	WBGene00004254	256	45	17	WBGene00010100	93	30	16
WBGene00001819	111	95	60	WBGene00000259	107	26	10	WBGene00018136	206	19	11	WBGene00010556	180	41	14	WBGene00010101	93	30	16
WBGene00022752	169	30	15	WBGene00017442	107	26	10	WBGene00018135	206	19	11	WBGene00010557	180	41	14	WBGene00010102	93	30	16
WBGene00022748	169	30	15	WBGene00016311	210	23	13	WBGene00018133	180	17	15	WBGene00001794	104	37	11	WBGene00010103	120	43	16
WBGene00022753	169	30	15	WBGene00016312	210	23	13	WBGene00018137	180	17	15	WBGene00010558	61	51	13	WBGene00010104	120	43	16
WBGene00044611	70	131	145	WBGene00016313	225	26	10	WBGene00018132	180	17	15	WBGene00001653	138	23	10	WBGene00077663	120	43	16
WBGene00020842	110	77	79	WBGene00016314	225	26	10	WBGene00018131	180	17	15	WBGene00007698	209	37	11	WBGene00010105	120	43	16
WBGene00020843	110	77	79	WBGene00016316	279	84	75	WBGene00044452	162	23	11	WBGene00007696	209	37	11	WBGene00044197	120	43	16
WBGene00020839	149	22	13	WBGene00016310	279	84	75	WBGene00003851	162	23	11	WBGene00007697	209	37	11	WBGene00010106	160	42	17
WBGene00003878	68	77	85	WBGene00002980	279	84	75	WBGene00022421	162	23	11	WBGene00003531	209	37	11	WBGene00206500	160	42	17
WBGene00018981	68	77	85	WBGene00016317	279	84	75	WBGene00000998	105	19	7	WBGene00001157	93	40	33	WBGene00010107	200	40	18
WBGene00018982	68	77	85	WBGene00016318	202	21	13	WBGene00019907	105	19	7	WBGene00008510	93	40	33	WBGene00008070	200	40	18
WBGene00018978	274	88	75	WBGene00016319	200	23	13	WBGene00017904	44	42	36	WBGene00008506	93	40	33	WBGene00008071	200	40	18
WBGene00045498	274	88	75	WBGene00019607	198	24	13	WBGene00006498	73	52	14	WBGene00008512	115	58	21	WBGene00008066	103	31	11
WBGene00020379	274	88	75	WBGene00019608	198	24	13	WBGene00020068	231	61	13	WBGene00000910	137	75	8	WBGene00007583	103	31	11
WBGene00020380	274	88	75	WBGene00019605	206	22	10	WBGene00020064	231	61	13	WBGene00012784	89	40	11	WBGene00012814	230	83	15
WBGene00020381	119	47	28	WBGene00003009	206	22	10	WBGene00044312	231	61	13	WBGene00006568	125	44	11	WBGene00012813	230	83	15
WBGene00020382	119	47	28	WBGene00019061	235	18	13	WBGene00019381	231	61	13	WBGene00004297	125	44	11	WBGene00012825	70	55	10
WBGene00020378	119	47	28	WBGene00004996	160	69	16	WBGene00000265	232	85	68	WBGene00004140	160	47	11	WBGene00012828	326	115	122
WBGene00020377	125	60	17	WBGene00020801	160	69	16	WBGene00019380	232	85	68	WBGene00011175	56	49	8	WBGene00012829	326	115	122
WBGene00020383	152	31	13	WBGene00019427	162	21	7	WBGene00019382	232	85	68	WBGene00011238	192	23	11	WBGene00012830	326	115	122
WBGene00000500	165	17	11	WBGene00019424	162	21	7	WBGene00020315	108	27	11	WBGene00004800	192	23	11	WBGene00012831	326	115	122
WBGene00020376	247	19	13	WBGene00020895	261	68	20	WBGene00020316	108	27	11	WBGene00011239	192	23	11	WBGene00013361	178	21	10
WBGene00020375	247	19	13	WBGene00004916	261	68	20	WBGene00020314	138	20	12	WBGene00002152	190	20	11	WBGene00000499	178	21	10
WBGene00000632	82	72	52	WBGene00004702	261	68	20	WBGene00018998	248	52	36	WBGene00011241	187	16	10	WBGene00000987	216	19	9
WBGene00020261	82	72	52	WBGene00020899	261	68	20	WBGene00002083	248	52	36	WBGene00011240	208	25	13	WBGene00013360	216	19	9
WBGene00020258	83	50	36	WBGene00020894	261	68	20	WBGene00000276	248	52	36	WBGene00008733	178	56	12	WBGene00013359	216	19	9
WBGene00020347	149	39	34	WBGene00019904	261	68	20	WBGene00018999	248	52	36	WBGene00008729	169	39	11	WBGene00005388	152	109	22
WBGene00020348	149	39	34	WBGene00043984	200	27	16	WBGene00004133	151	23	13	WBGene00008730	160	22	9	WBGene00005387	152	109	22
WBGene00001497	149	39	34	WBGene00016971	200	27	16	WBGene00002845	196	28	15	WBGene00001189	142	18	12	WBGene00006786	170	37	14
WBGene00206356	214	51	48	WBGene00016970	176	76	42	WBGene00004462	217	26	14	WBGene00008488	142	18	12	WBGene00013367	170	37	14
WBGene00020346	209	48	39	WBGene00016972	176	76	42	WBGene00018996	217	26	14	WBGene00000419	142	18	12	WBGene00001485	278	24	14
WBGene00004486	204	44	30	WBGene00006522	135	20	13	WBGene00017951	233	68	47	WBGene00011597	153	13	9	WBGene00000940	278	24	14
WBGene00020349	204	44	30	NoWBGene_ID10	135	20	13	WBGene00219317	249	109	79	WBGene00011599	153	13	9	WBGene00004754	278	24	14
WBGene00000583	181	15	8	WBGene00006944	180	103	95	WBGene00001168	249	109	79	WBGene00011600	153	13	9	WBGene00013752	278	24	14
WBGene00016754	181	15	8	WBGene00017563	180	103	95	WBGene00004340	249	109	79	WBGene00011601	91	15	10	WBGene00004203	265	30	23
WBGene00003059	181	15	8	WBGene00017559	180	103	95	WBGene00017950	231	83	49	WBGene00001867	91	15	10	WBGene00007017	277	28	21

WBGene00016750	181	15	8	WBGene00017560	180	103	95	WBGene00000443	213	57	19	WBGene00001163	47	52	11	WBGene00013766	289	25	18
WBGene00015687	289	131	87	WBGene00017562	180	103	95	WBGene00017952	213	57	19	WBGene00001476	156	50	46	WBGene00013765	289	25	18
WBGene00015686	289	131	87	WBGene00016964	272	48	19	WBGene00017389	107	17	10	WBGene00010649	156	50	46	WBGene00012614	105	37	14
WBGene00002073	259	32	19	WBGene00002045	272	48	19	WBGene00000597	107	17	10	WBGene00001328	99	39	36	WBGene00010506	105	37	14
WBGene00017816	259	32	19	WBGene00016961	272	48	19	WBGene00004341	107	17	10	WBGene00010647	41	27	26	WBGene00010507	108	32	10
WBGene00002601	259	32	19	WBGene00016965	272	48	19	WBGene00000872	121	40	33	WBGene00011291	161	34	13	WBGene00185118	91	33	12
WBGene00000254	136	22	14	WBGene00016966	272	48	19	WBGene00019813	170	28	11	WBGene00011292	161	34	13	WBGene00010508	91	33	12
WBGene00003499	180	23	14	WBGene00016967	151	23	10	WBGene00006713	170	28	11	WBGene00077714	161	34	13	WBGene00010006	143	45	32
WBGene00019396	180	23	14	WBGene00016960	151	23	10	WBGene00045190	170	28	11	WBGene00011293	161	34	13	WBGene00001406	232	78	13
WBGene00019395	204	25	16	WBGene00016968	157	23	11	WBGene00022733	173	24	13	WBGene00003568	70	46	9	WBGene00007124	290	26	12
WBGene00019394	228	27	17	WBGene00016005	182	25	12	WBGene00003022	173	24	13	WBGene00013857	247	27	19	WBGene00007119	290	26	12
WBGene00019399	228	27	17	WBGene00016002	182	25	12	WBGene00022734	176	19	14	WBGene00000865	247	27	19	WBGene00004413	290	26	12
WBGene00022586	228	27	17	WBGene00001072	49	48	11	WBGene00220259	176	19	14	WBGene00001730	247	27	19	WBGene00007126	290	26	12
WBGene00022591	148	19	8	WBGene00001064	49	48	11	WBGene00022735	176	19	14	WBGene00013858	247	27	19	WBGene00007123	199	22	9
WBGene00022594	148	19	8	WBGene00006636	23	40	28	WBGene00022737	196	23	12	WBGene00012009	32	43	10	WBGene00007122	199	22	9
WBGene00004721	148	19	8	WBGene00020502	23	40	28	WBGene00022738	196	23	12	WBGene00012013	158	35	16	WBGene00023504	171	21	11
WBGene00022593	148	19	8	WBGene00020503	134	22	6	WBGene00044353	196	23	12	WBGene00044990	158	35	16	WBGene00009172	171	21	11
WBGene00019993	238	20	11	WBGene00020500	134	22	6	WBGene00003609	121	41	9	WBGene00044991	158	35	16	WBGene00012847	44	38	7
WBGene00018156	238	20	11	WBGene00020499	134	22	6	WBGene00015104	225	23	13	WBGene00012014	158	35	16	WBGene00012184	75	82	12
WBGene00020742	233	24	18	WBGene00020498	145	22	8	WBGene00015101	225	23	13	WBGene00012015	99	37	21	WBGene00012186	43	39	30
WBGene00003798	233	24	18	WBGene00018305	156	21	9	WBGene00015100	225	23	13	WBGene00012016	158	35	16	WBGene00010001	39	44	51
WBGene00020743	251	35	18	WBGene00018302	156	21	9	WBGene00015107	197	21	11	WBGene00007384	39	39	26	WBGene00077786	39	44	51
WBGene00004273	251	35	18	WBGene00002098	156	21	9	WBGene00015105	197	21	11	WBGene00011259	225	62	14	WBGene00010002	194	19	13
WBGene00019432	251	35	18	WBGene00018304	160	20	8	WBGene00015099	197	21	11	WBGene00011720	169	20	13	WBGene00010003	125	52	10
WBGene00019433	251	35	18	WBGene00020480	160	20	8	WBGene00044674	197	21	11	WBGene00011717	196	20	11	WBGene00012850	125	52	10
WBGene00000937	174	16	11	WBGene00020482	177	25	9	WBGene00015106	197	21	11	WBGene00002001	196	20	11	WBGene00012319	62	53	35
WBGene00007018	174	16	11	WBGene00020481	194	29	10	WBGene00003858	118	45	14	WBGene00011722	196	20	11	WBGene00012851	62	53	35
WBGene00016944	174	16	11	WBGene00020478	91	40	29	WBGene00019401	192	37	17	WBGene00008750	149	113	15	WBGene00001043	158	58	13
WBGene00020416	177	27	13	WBGene00017954	142	45	10	WBGene00004390	265	28	19	WBGene00008760	149	113	15	WBGene00004013	71	48	19
WBGene00020417	177	27	13	WBGene00006380	142	45	10	WBGene00019402	265	28	19	WBGene00014003	212	32	14	WBGene00001851	153	65	9
WBGene00020413	178	22	13	WBGene00017953	182	151	17	WBGene00019400	265	28	19	WBGene00004319	212	32	14	WBGene00003830	212	39	11
WBGene00020418	179	17	13	WBGene00001194	167	118	20	WBGene00018152	265	28	19	WBGene00001017	227	85	15	WBGene00009290	293	25	16
WBGene00020412	179	17	13	WBGene00015410	155	116	56	WBGene00005072	270	32	16	WBGene00003081	227	85	15	WBGene00001431	293	25	16
WBGene00020411	179	17	13	WBGene00206529	82	118	82	WBGene00004483	270	32	16	WBGene00002981	227	85	15	WBGene00009291	255	24	14
WBGene00019005	201	30	16	WBGene00001023	137	97	48	WBGene00004450	270	32	16	WBGene00014004	227	85	15	WBGene00009294	217	22	11
WBGene00019006	201	30	16	WBGene00016625	192	75	13	WBGene00018151	270	32	16	WBGene00008775	234	27	14	WBGene00009292	217	22	11
WBGene00019007	201	30	16	WBGene00016631	159	65	62	WBGene00018150	270	32	16	WBGene00044784	234	27	14	WBGene00022203	201	17	10
WBGene00000896	201	30	16	WBGene00016624	159	65	62	WBGene00018149	239	27	14	WBGene00000109	206	42	25	WBGene00022221	201	17	10
WBGene00006607	201	30	16	WBGene00000211	183	26	13	WBGene00018155	270	32	16	WBGene00009494	178	57	35	WBGene00011606	189	18	10
WBGene00019004	177	21	12	WBGene00000886	183	26	13	WBGene00018153	207	21	11	WBGene00009493	178	57	35	WBGene00023458	129	9	3
WBGene00019003	177	21	12	WBGene00044615	183	26	13	WBGene00194742	207	21	11	WBGene00001426	257	30	12	WBGene00019733	147	16	7
WBGene00000236	177	21	12	WBGene00015087	280	84	11	WBGene00004490	207	21	11	WBGene00006490	257	30	12	WBGene00015429	141	37	14
WBGene00003184	177	21	12	WBGene00017700	280	84	11	WBGene00003176	207	21	11	WBGene00012385	248	36	25	WBGene00019862	216	45	32
WBGene00019002	177	21	12	WBGene00017699	194	82	16	WBGene00018154	141	17	10	WBGene00010882	248	36	25	WBGene00019863	215	36	23
WBGene00019001	82	50	9	WBGene00017702	169	48	19	WBGene00020112	141	17	10	WBGene00002344	248	36	25	WBGene00002060	214	26	14
WBGene00002783	161	81	34	WBGene00000459	177	25	13	WBGene00006592	209	31	19	WBGene00002214	248	36	25	WBGene00019864	164	22	13
WBGene00006624	161	81	34	WBGene00006605	175	25	13	WBGene00004417	209	31	19	WBGene00011484	206	75	14	WBGene00195183	113	18	11
WBGene00017065	108	22	12	WBGene00004090	173	25	13	WBGene00020107	209	31	19	WBGene00011482	208	56	15	WBGene00044281	111	31	11
WBGene00000050	196	18	15	WBGene00015796	182	29	19	WBGene00000080	224	21	10	WBGene00004474	208	56	15	WBGene00019865	108	43	11
WBGene00017064	196	18	15	WBGene00000198	182	29	19	WBGene00020636	224	21	10	WBGene00011479	226	64	41	WBGene00022861	54	41	13
WBGene00044610	196	18	15	WBGene00004930	191	32	24	WBGene00015159	98	19	13	WBGene00011481	242	91	66	WBGene00018682	73	30	14
WBGene00020711	95	55	12	WBGene00015797	191	32	24	WBGene00015160	98	19	13	WBGene00011480	266	74	48	WBGene00001185	43	95	119
WBGene00020710	84	39	14	WBGene00015795	103	34	30	WBGene00015165	125	18	12	WBGene00004985	266	74	48	WBGene00015137	43	95	119
WBGene00020709	73	23	16	WBGene00006831	92	30	33	WBGene00015157	152	16	11	WBGene00004204	290	56	29	WBGene00015138	38	27	23
WBGene00020933	101	18	12	WBGene00016889	184	22	11	WBGene00015161	152	16	11	WBGene00008502	122	23	11	WBGene00017898	171	56	12
WBGene00003170	138	26	11	WBGene00016890	184	22	11	WBGene00015162	81	15	9	WBGene00008503	195	31	14	WBGene00017899	171	56	12
WBGene00004883	138	23	14	WBGene00016888	93	41	12	WBGene00015156	81	15	9	WBGene00008504	268	38	17	WBGene00017423	320	86	40
WBGene00020932	172	56	44	WBGene00022855	249	23	11	WBGene00018953	287	32	26	WBGene00008505	268	38	17	WBGene00017424	208	76	26
WBGene00020931	172	56	44	WBGene00022852	249	23	11	WBGene00001748	287	32	26	WBGene00007443	268	38	17	WBGene00017422	95	65	11
WBGene00020937	172	56	44	WBGene00022857	249	23	11	WBGene00002182	287	32	26	WBGene00007444	268	38	17	WBGene00020569	63	52	12
WBGene00006773	172	56	44	WBGene00195239	249	23	11	WBGene00017274	114	17	10	WBGene00007446	117	33	15	WBGene00020575	63	52	12
WBGene00020935	213	62	52	WBGene00022851	249	23	11	WBGene00017275	146	20	11	WBGene00219217	117	33	15	WBGene00017184	127	70	13
WBGene00020936	221	35	29	WBGene00001872	241	29	15	WBGene00017269	178	23	12	WBGene00007447	117	33	15	WBGene00004829	160	68	9
WBGene00001682	205	25	20	WBGene00002238	241	29	15	WBGene00017268	178	23	12	WBGene00007448	77	40	13	WBGene00015364	160	68	9
WBGene00017240	205	25	20	WBGene00002183	241	29	15	WBGene00003378	122	44	13	WBGene00004309	195	28	15	WBGene00001127	233	54	35

WBGene00017239	205	25	20	WBGene00020166	241	29	15	WBGene00020604	185	31	13	WBGene00007449	195	28	15	WBGene00020216	233	54	35
WBGene00006819	188	15	10	WBGene00206521	220	69	12	WBGene00001974	185	31	13	WBGene00011122	195	28	15	WBGene00002071	233	54	35
WBGene00004111	152	38	19	WBGene00020170	198	45	13	WBGene00020601	247	18	12	WBGene00004199	195	28	15	WBGene00020218	233	54	35
WBGene00000871	152	38	19	WBGene00020163	198	45	13	WBGene00006542	247	18	12	WBGene00235134	32	35	43	WBGene00000899	75	41	12
WBGene00016491	304	44	38	WBGene00017349	225	23	13	WBGene00003376	145	19	9	WBGene00011129	249	47	16	WBGene00018213	69	29	7
WBGene00016492	304	44	38	WBGene00004447	225	23	13	WBGene00044449	145	19	9	WBGene00011128	249	47	16	WBGene00018212	69	29	7
WBGene00016493	304	44	38	WBGene00017350	209	23	14	WBGene00019196	145	19	9	WBGene00011130	249	47	16	WBGene00018215	87	50	10
WBGene00004110	289	45	41	WBGene00017347	193	23	14	WBGene00001503	145	19	9	WBGene00007114	157	26	15	WBGene00018985	44	46	16
WBGene00016494	289	45	41	WBGene00017348	193	23	14	WBGene00000479	223	34	17	WBGene00007113	157	26	15	WBGene00018986	51	47	49
WBGene00017098	273	46	44	WBGene00017351	193	23	14	WBGene00015582	223	34	17	WBGene00001019	157	26	15	WBGene00018987	102	63	31
NoWBGene_ID70	223	24	9	WBGene00006893	81	19	12	WBGene00015581	223	34	17	WBGene00007105	194	31	18	WBGene00018984	147	53	11
WBGene00019323	156	52	27	WBGene00017352	81	19	12	WBGene00000537	194	20	10	WBGene00001020	194	31	18	WBGene00022502	141	27	9
WBGene00019322	88	79	44	WBGene00017344	88	29	12	WBGene00000854	194	20	10	WBGene00007106	194	31	18	WBGene00018078	236	28	12
WBGene00001056	88	87	68	WBGene00017345	88	29	12	WBGene00015579	194	20	10	WBGene00007107	186	27	18	WBGene00004769	236	28	12
WBGene00001075	87	94	91	WBGene00017343	94	39	12	WBGene00002986	194	20	10	WBGene00007108	143	93	79	WBGene00018077	236	28	12
WBGene00019248	133	57	52	WBGene00020320	184	17	14	WBGene00000437	67	41	20	WBGene00044290	100	158	140	WBGene00018076	94	33	11
WBGene00019247	133	57	52	WBGene00001597	184	17	14	WBGene00020047	266	61	13	WBGene00007109	100	158	140	WBGene00018075	94	33	11
WBGene00019246	178	20	13	WBGene00020318	282	59	66	WBGene00020050	266	61	13	WBGene00001939	100	158	140	WBGene00004893	161	53	9
WBGene00019245	178	20	13	WBGene00016173	282	59	66	WBGene00004420	266	61	13	WBGene00001921	100	158	140	WBGene00000195	168	46	11
WBGene00006423	75	48	13	WBGene00016172	282	59	66	WBGene00003063	266	61	13	WBGene00001922	125	165	152	WBGene00000164	174	38	12
WBGene00016742	80	50	12	WBGene00003966	82	112	127	WBGene00020051	266	61	13	WBGene00001920	125	165	152	WBGene00016642	174	38	12
WBGene00004879	246	19	13	WBGene00016175	82	112	127	WBGene00020052	155	15	11	WBGene00001930	125	165	152	WBGene00016643	119	19	10
WBGene00016741	246	19	13	WBGene00017124	95	40	15	WBGene00000846	155	15	11	WBGene00001919	150	172	163	WBGene00016644	100	32	11
WBGene00016740	246	19	13	WBGene00017125	75	39	25	WBGene00194726	155	15	11	WBGene00001929	150	172	163	WBGene00016641	81	44	12
WBGene00016744	218	20	14	WBGene00017123	75	39	25	WBGene00022816	66	94	93	WBGene00235095	150	172	163	WBGene00018861	57	43	27
WBGene00016746	190	21	15	WBGene00017126	75	39	25	WBGene00022817	66	94	93	WBGene00007110	150	172	163	WBGene00018854	57	43	27
WBGene00016745	190	21	15	WBGene00017968	218	23	12	NoWBGene_ID28	190	47	24	WBGene00007111	150	172	163	WBGene00018857	224	26	15
WBGene00020399	190	21	15	WBGene00004198	218	23	12	WBGene00194729	190	47	24	WBGene00010061	150	172	163	WBGene00018853	224	26	15
WBGene00020403	98	22	14	WBGene00003078	218	23	12	WBGene00015988	190	47	24	WBGene00001940	132	181	177	WBGene00018859	224	26	15
WBGene00020397	98	22	14	WBGene00017967	218	23	12	WBGene00003002	209	33	15	WBGene00001932	132	181	177	WBGene00018860	55	29	25
WBGene00020404	98	22	14	WBGene00016273	189	24	12	WBGene00015386	209	33	15	WBGene00001931	113	190	190	WBGene00019365	47	52	27
WBGene00016261	97	18	9	WBGene00000839	189	24	12	NoWBGene_ID93	188	94	23	WBGene00002223	113	190	190	WBGene00018634	117	41	11
WBGene00016262	97	18	9	WBGene00000271	228	26	12	WBGene00022660	188	94	23	WBGene00044025	127	33	14	WBGene00004377	156	38	11
WBGene00016263	97	18	9	WBGene00018475	228	26	12	WBGene00003559	188	94	23	WBGene00011338	140	31	15	WBGene00002062	154	53	11
WBGene00010369	235	32	19	WBGene00018474	228	26	12	WBGene00022661	188	94	23	WBGene00010351	121	36	14	WBGene00015473	55	42	10
WBGene00003964	269	34	19	WBGene00018476	228	26	12	WBGene00000395	64	55	11	WBGene00010352	90	43	12	WBGene00015472	112	49	10
WBGene00008852	185	51	14	WBGene00003620	125	45	20	WBGene00022516	173	21	11	WBGene00001108	133	137	125	WBGene00015474	169	55	10
WBGene00012165	193	23	11	WBGene00002008	178	38	32	WBGene00022792	173	21	11	WBGene00010353	151	172	163	WBGene00015476	169	55	10
WBGene00012166	193	23	11	WBGene00001812	153	29	21	WBGene00022795	200	25	13	WBGene00010354	168	206	201	WBGene00015471	195	33	20
WBGene00012167	193	23	11	WBGene00018396	128	19	10	WBGene00022793	200	25	13	WBGene00001937	168	206	201	WBGene00004927	195	33	20
WBGene00012168	193	23	11	WBGene00018397	158	30	25	WBGene00022794	200	25	13	WBGene00001938	168	206	201	WBGene00020128	195	33	20
WBGene00002198	318	91	23	WBGene00018395	158	30	25	WBGene00044799	226	29	15	WBGene00002192	140	22	14	WBGene00020491	89	76	11
WBGene00009050	318	91	23	WBGene00018391	158	30	25	WBGene00022791	226	29	15	WBGene00007513	63	76	80	WBGene00020488	89	76	11
WBGene00003815	318	91	23	WBGene00018390	158	30	25	WBGene00001209	238	21	18	WBGene00007514	138	51	49	WBGene00020492	89	76	11
WBGene00009051	318	91	23	WBGene00044673	191	39	12	WBGene00022785	238	21	18	WBGene00003148	213	25	17	WBGene00016725	177	71	10
WBGene00004186	240	54	18	WBGene00015569	191	39	12	WBGene00004449	182	23	14	WBGene00010409	213	25	17	WBGene00016726	177	71	10
WBGene00009052	125	20	11	WBGene00015567	166	41	10	WBGene00022787	182	23	14	WBGene00004892	158	40	16	WBGene00006635	121	61	12
WBGene00043279	88	22	9	WBGene00017022	87	45	16	WBGene00000765	191	23	13	WBGene00010847	309	60	61	WBGene00016109	121	61	12
WBGene00009054	88	22	9	WBGene00017023	87	45	16	WBGene00044324	184	20	11	WBGene00001585	309	60	61	WBGene00016871	98	23	7
WBGene00009056	88	22	9	WBGene00017024	87	45	16	WBGene00022783	184	20	11	WBGene00003218	309	60	61	WBGene00003965	109	43	10
WBGene00006753	143	43	13	WBGene00017021	87	45	16	WBGene00000835	184	20	11	WBGene00010846	309	60	61	WBGene00044558	30	53	40
WBGene00010427	168	59	11	WBGene00000101	199	20	10	WBGene00004918	209	23	10	WBGene00010849	72	101	89	WBGene00021046	69	41	38
WBGene00010645	168	59	11	WBGene00006703	199	20	10	WBGene00015333	209	23	10	WBGene00000702	72	101	89	WBGene00021047	175	49	34
WBGene00010641	117	44	14	WBGene00000280	199	20	10	WBGene00022800	136	33	10	WBGene00008722	97	31	15	WBGene00021044	109	21	14
WBGene00006963	117	44	14	WBGene00006947	95	40	17	WBGene00022798	136	33	10	WBGene00004755	201	53	22	WBGene00016997	109	21	14
WBGene00010642	117	44	14	WBGene00006956	95	40	17	WBGene00022799	136	33	10	WBGene00006406	184	55	29	WBGene00016995	81	43	14
WBGene00010870	40	45	10	WBGene00022893	153	30	15	WBGene00022801	123	35	10	WBGene00004360	130	43	29	WBGene00016998	81	43	14
WBGene00194654	45	43	10	WBGene00003592	210	19	12	WBGene00022796	114	34	10	NoWBGene_ID17	206	54	34	WBGene00000988	81	43	14
WBGene00010869	49	40	10	WBGene00022892	61	71	12	WBGene00022802	105	33	10	WBGene00008720	206	54	34	WBGene00017295	81	43	14
WBGene00010871	224	84	35	WBGene00022886	61	71	12	WBGene00044763	105	33	10	WBGene00009589	250	95	29	WBGene00017298	34	46	12
WBGene00010872	224	84	35	WBGene00018041	114	74	13	WBGene00016203	83	40	7	WBGene00009588	294	136	23	WBGene00006955	30	48	40
WBGene00001949	224	84	35	WBGene00018040	114	74	13	WBGene00043051	154	30	9	WBGene00009587	251	85	21	WBGene00206378	136	30	12
WBGene00003622	114	62	12	WBGene00019941	200	24	11	WBGene00003801	154	30	9	WBGene00004480	208	33	19	WBGene00020828	64	109	90
WBGene00007255	177	24	15	WBGene00019940	200	24	11	WBGene00016207	254	20	14	WBGene00012497	208	33	19	WBGene00020829	64	109	90
WBGene00007256	177	24	15	WBGene00019943	220	44	11	WBGene00016209	254	20	14	WBGene00012496	208	33	19	WBGene00020830	64	109	90

WBGene00007257	177	24	15	WBGene00043050	220	44	11	WBGene00016202	254	20	14	WBGene00003415	172	28	14	WBGene00000462	247	92	96
WBGene00007258	158	21	14	WBGene00000390	220	44	11	WBGene00000665	151	31	13	WBGene00010232	126	61	39	WBGene00000444	247	92	96
WBGene00011062	158	21	14	WBGene00019944	220	44	11	WBGene00002879	151	31	13	WBGene00010233	126	61	39	WBGene00194679	247	92	96
WBGene00011061	158	21	14	WBGene00017547	190	45	18	WBGene00045246	125	25	12	WBGene00010234	79	93	64	WBGene00000460	247	92	96
WBGene00011064	271	33	28	WBGene00017548	190	45	18	WBGene00045247	192	33	19	WBGene00014085	79	93	64	WBGene00044563	66	64	32
WBGene00003041	271	33	28	WBGene00017546	190	45	18	WBGene00044633	192	33	19	WBGene00006491	227	19	10	WBGene00021990	45	78	75
WBGene00000275	271	33	28	WBGene00003045	190	45	18	WBGene00018845	192	33	19	WBGene00014086	206	20	10	WBGene00022511	27	36	41
WBGene00011066	271	33	28	WBGene00003044	163	67	54	WBGene00018846	192	33	19	WBGene00001320	206	20	10	WBGene00021987	27	36	41
WBGene00004324	111	16	10	WBGene00003012	135	88	89	WBGene00000041	192	33	19	WBGene00014087	185	21	9	WBGene00018684	27	36	41
WBGene00009004	111	16	10	WBGene00017545	135	88	89	WBGene00000507	313	38	32	WBGene00014076	126	19	9	WBGene00018689	77	51	7
WBGene00009005	111	16	10	WBGene00015204	185	21	10	WBGene00000508	313	38	32	WBGene00194934	126	19	9	WBGene00018687	94	27	17
WBGene00008765	205	21	10	WBGene00015205	185	21	10	WBGene00018408	313	38	32	WBGene00002335	226	30	16	WBGene00018688	94	27	17
WBGene00008766	205	21	10	WBGene00015203	185	21	10	WBGene00003021	282	42	15	WBGene00235132	226	30	16	WBGene00219451	94	27	17
WBGene00008767	205	21	10	WBGene00015206	198	20	14	WBGene00018407	282	42	15	WBGene00014079	226	30	16	WBGene00021485	136	81	15
WBGene00008769	205	21	10	WBGene00015207	211	18	17	WBGene00004125	195	18	15	WBGene00001079	226	30	16	WBGene00021483	136	81	15
WBGene00001136	209	37	13	WBGene00015208	211	18	17	WBGene00018409	195	18	15	WBGene00010444	96	53	11	WBGene00022417	226	72	28
WBGene00003236	209	37	13	WBGene00005149	211	18	17	WBGene00018410	195	18	15	WBGene00010448	180	98	15	WBGene00022418	226	72	28
WBGene00008768	209	37	13	WBGene00015061	120	25	17	WBGene00018411	195	18	15	WBGene00010447	180	98	15	WBGene00022411	50	46	12
WBGene00009915	209	37	13	WBGene00015062	120	25	17	WBGene00019681	159	21	8	WBGene00001577	180	98	15	WBGene00018657	166	47	10
WBGene00001680	161	37	11	WBGene00015063	84	37	34	WBGene00019680	159	21	8	WBGene00010918	287	31	19	WBGene00018656	166	47	10
WBGene00009916	112	36	8	WBGene00015059	84	37	34	WBGene00019679	159	21	8	WBGene00003920	287	31	19	WBGene00018653	245	37	14
WBGene00009917	143	23	11	WBGene00015064	84	37	34	WBGene00019678	159	21	8	WBGene00010919	287	31	19	WBGene00003087	245	37	14
WBGene00009918	143	23	11	WBGene00015065	48	48	51	WBGene00000448	41	50	35	WBGene00044253	132	15	9	WBGene00000737	245	37	14
WBGene00009919	143	23	11	WBGene00015517	49	38	35	WBGene00000939	156	18	9	WBGene00010920	122	17	8	WBGene00018736	223	27	10
WBGene00002136	143	23	11	WBGene00015516	49	38	35	WBGene00000143	153	19	10	WBGene00009546	123	25	12	WBGene00018735	223	27	10
WBGene00013994	132	18	15	WBGene00015512	49	38	35	WBGene00019458	153	19	10	WBGene00006415	292	36	21	WBGene00018737	223	27	10
WBGene00012136	302	62	36	WBGene00015513	264	26	14	WBGene00001743	150	19	11	WBGene00009549	292	36	21	WBGene00001065	54	61	43
WBGene00012137	94	43	7	WBGene00015515	264	26	14	WBGene00019457	116	20	11	WBGene00001151	292	36	21	WBGene00018591	54	61	43
WBGene00012140	252	29	21	WBGene00004823	264	26	14	WBGene00019460	82	21	11	WBGene00002363	292	36	21	WBGene00018589	109	21	12
WBGene00012141	252	29	21	WBGene00001615	185	44	32	WBGene00019456	82	21	11	WBGene00009551	292	36	21	WBGene00018593	109	21	12
WBGene00007042	273	39	32	WBGene00015514	106	61	50	WBGene00019459	266	24	23	WBGene00007801	77	57	9	WBGene00003968	72	61	18
WBGene00007742	293	49	43	WBGene00000516	227	147	72	WBGene00019455	266	24	23	WBGene00014089	73	40	13	WBGene00020509	49	62	41
WBGene00007743	251	79	16	WBGene00000517	227	147	72	WBGene00004042	166	61	61	WBGene00014090	73	40	13	WBGene00003018	49	62	41
WBGene00001648	251	79	16	WBGene00011458	227	147	72	WBGene00015753	52	81	75	WBGene00044009	73	40	13	WBGene00020508	219	27	20
WBGene00000938	165	51	13	WBGene00002216	117	22	12	WBGene00001565	38	64	52	WBGene00014091	66	38	29	WBGene00020507	216	35	24
WBGene00012029	138	24	14	WBGene00000046	117	22	12	WBGene00004433	182	38	15	WBGene00003736	58	36	45	WBGene00004423	216	35	24
WBGene00000496	159	26	13	WBGene00011633	117	22	12	WBGene00015755	195	29	16	WBGene00006566	150	27	10	WBGene00014998	213	42	27
WBGene00012030	127	39	12	WBGene00007014	152	20	11	WBGene00015752	195	29	16	WBGene00014096	150	27	10	WBGene00014999	91	26	11
WBGene00012031	74	50	11	WBGene00011635	152	20	11	WBGene00015754	171	18	12	WBGene00005591	150	27	10	WBGene00044701	91	26	11
WBGene00008411	175	20	11	WBGene00011636	152	20	11	WBGene00017044	171	18	12	WBGene00014097	118	68	13	WBGene00020427	169	61	10
WBGene00008413	207	20	11	WBGene00011641	170	31	15	WBGene00017041	223	35	14	WBGene00006759	118	68	13	WBGene00020134	43	54	8
WBGene00008414	207	20	11	WBGene00011637	170	31	15	WBGene00017045	223	35	14	WBGene00011742	225	40	17	WBGene00020769	232	61	31
WBGene00008415	207	20	11	WBGene00002994	198	30	14	WBGene00086546	245	30	18	WBGene00235284	225	40	17	WBGene00018578	185	40	11
WBGene00008421	207	20	11	WBGene00011638	255	30	14	WBGene00016803	245	30	18	WBGene00011741	225	40	17	WBGene00016620	169	40	14
WBGene00004178	143	16	12	WBGene00011639	255	30	14	WBGene00004187	266	24	21	WBGene00011740	225	40	17	WBGene00016617	169	40	14
WBGene00008417	143	16	12	WBGene00011349	183	23	14	WBGene00016239	193	21	9	WBGene00011737	225	40	17	WBGene00001551	51	45	10
WBGene00008420	143	16	12	WBGene00011348	197	26	13	WBGene00016238	193	21	9	WBGene00011738	143	59	40	WBGene00020301	73	57	16
WBGene00008418	126	25	12	WBGene00006913	210	28	12	WBGene00004342	193	21	9	WBGene00011739	145	41	24	WBGene00001484	262	78	18
WBGene00008419	108	34	11	WBGene00011351	210	28	12	WBGene00015352	218	30	12	WBGene00000270	145	41	24	WBGene00019866	108	36	9
WBGene00009254	173	20	9	WBGene00011350	210	28	12	WBGene00003952	218	30	12	WBGene00005015	202	27	16	WBGene00019867	108	36	9
WBGene00009140	196	20	12	WBGene00004208	36	46	9	WBGene00015347	218	30	12	WBGene00045036	181	25	14	WBGene00019868	108	36	9
WBGene00009141	196	20	12	WBGene00014053	107	16	12	WBGene00015346	218	30	12	WBGene00010670	181	25	14	WBGene00019318	167	41	13
WBGene00004508	219	19	14	WBGene00014054	107	16	12	WBGene00015353	214	28	15	WBGene00008682	121	29	22	WBGene00001844	154	51	16
WBGene00009145	184	19	9	WBGene00014055	107	16	12	WBGene00015351	209	26	17	WBGene00008683	60	33	29	WBGene00019317	141	61	18
WBGene00011975	184	19	9	WBGene00008436	190	34	14	WBGene00015345	209	26	17	WBGene00008688	120	27	20	WBGene00044061	67	64	15
WBGene00011972	184	19	9	WBGene00006996	190	34	14	WBGene00002231	209	26	17	WBGene00008687	120	27	20	WBGene00018716	72	87	86
WBGene00011973	172	27	12	WBGene00001835	190	34	14	WBGene00003562	216	21	13	WBGene00008684	180	30	12	WBGene00000004	179	73	29
WBGene00001647	172	27	12	WBGene00007433	305	48	19	WBGene00000666	216	21	13	WBGene00044329	180	40	13	WBGene00018719	158	18	12
WBGene00077728	172	27	12	WBGene00003813	305	48	19	WBGene00017319	152	19	13	WBGene00008686	180	40	13	WBGene00018714	158	18	12
WBGene00011968	172	27	12	WBGene00007434	216	23	16	WBGene00017321	152	19	13	WBGene00008685	180	40	13	WBGene00019143	103	50	8
WBGene00009187	192	71	28	WBGene00007436	216	23	16	WBGene00007056	152	19	13	WBGene00010890	276	89	72	WBGene00019144	103	50	8
WBGene00009188	211	115	43	WBGene00006724	216	23	16	WBGene00017323	88	16	12	WBGene00010891	276	89	72	WBGene00020195	36	83	77
WBGene00009191	227	20	10	WBGene00007435	216	23	16	WBGene00003243	107	52	11	WBGene00000122	276	89	72	WBGene00020511	160	30	13
WBGene00009189	227	20	10	WBGene00011507	216	23	16	WBGene00017358	145	23	11	WBGene00010892	276	89	72	WBGene00020510	160	30	13
WBGene00006518	175	19	10	WBGene00011508	193	53	55	WBGene00017357	144	22	13	WBGene00003010	46	52	17	WBGene00020158	273	81	25

WBGene00077543	123	17	9	WBGene00011509	193	53	55	WBGene00017356	144	22	13	WBGene00007090	110	20	12	WBGene00020160	273	81	25
WBGene00009190	123	17	9	WBGene00011512	222	53	33	WBGene00017355	142	20	14	WBGene00007088	110	20	12	WBGene00006742	52	43	8
WBGene00003818	287	36	28	WBGene00006734	222	53	33	WBGene00017354	142	20	14	WBGene00007087	110	20	12	WBGene00006496	113	71	12
WBGene00000079	287	36	28	WBGene00011510	222	53	33	WBGene00004726	200	29	10	WBGene00007092	213	53	10	WBGene00015748	47	65	11
WBGene00008397	287	36	28	WBGene00011511	139	55	40	WBGene00017360	200	29	10	WBGene00007091	213	53	10	WBGene00015750	85	44	9
WBGene00008398	159	18	8	WBGene00010501	55	57	47	WBGene00017359	200	29	10	WBGene00009435	142	31	11	WBGene00050944	123	23	7
WBGene00008399	159	18	8	WBGene00010502	131	18	11	WBGene00022580	231	23	12	WBGene00009436	142	31	11	WBGene00015751	123	23	7
WBGene00009270	104	19	12	WBGene00003089	131	18	11	WBGene00022583	231	23	12	WBGene00009437	142	31	11	WBGene00002210	128	94	15
WBGene00009272	104	19	12	WBGene00005150	106	61	11	WBGene00022579	231	23	12	WBGene00004025	115	42	14	WBGene00018740	168	60	17
WBGene00009276	104	19	12	WBGene00044049	42	31	36	WBGene00022581	231	23	12	WBGene00012710	65	32	25	WBGene00018741	207	25	18
WBGene00009277	111	24	12	WBGene00008050	42	31	36	WBGene00006840	229	76	15	WBGene00016579	104	30	10	WBGene00018743	198	56	14
WBGene00009274	111	24	12	WBGene00008054	42	31	36	WBGene00019881	229	76	15	WBGene00016580	243	24	13	WBGene00015171	201	60	18
WBGene00006386	111	24	12	WBGene00008051	42	31	36	WBGene00007008	229	76	15	WBGene00004448	243	24	13	WBGene00003776	89	66	13
WBGene00000163	169	93	83	WBGene00002147	189	84	19	WBGene00019882	175	40	11	WBGene00016581	243	24	13	WBGene00044303	89	66	13
WBGene00011230	169	93	83	WBGene00006832	189	84	19	WBGene00019877	175	40	11	WBGene00016582	212	28	13	WBGene00019736	34	58	36
WBGene00011231	169	93	83	WBGene00006739	189	84	19	WBGene00022702	221	18	10	WBGene00016583	180	31	12	NoWBGene_ID40	34	58	36
WBGene00011232	146	67	48	WBGene00008052	210	38	34	WBGene00022703	221	18	10	WBGene00016591	173	26	13	WBGene00000451	42	44	9
WBGene00011234	122	40	13	WBGene00008053	196	36	27	WBGene00022697	141	43	11	WBGene00016589	173	26	13	WBGene00018702	183	65	20
WBGene00008990	165	20	12	WBGene00008642	196	36	27	WBGene00022704	61	67	12	WBGene00016590	166	20	14	WBGene00018701	183	65	20
WBGene00003777	216	23	13	WBGene00004421	181	33	19	WBGene00023405	171	60	12	WBGene00016588	166	20	14	WBGene00006948	183	65	20
WBGene00011912	220	34	13	WBGene00008639	181	33	19	WBGene00000414	137	60	12	WBGene00008949	143	19	9	WBGene00018703	173	45	12
WBGene00011913	220	34	13	WBGene00006655	103	17	9	WBGene00022862	198	25	11	WBGene00006733	143	19	9	WBGene00018704	173	45	12
WBGene00011914	220	34	13	WBGene00008643	103	17	9	WBGene00022864	198	25	11	WBGene00008948	143	19	9	WBGene00019611	145	36	14
WBGene00011915	173	43	12	WBGene00008641	155	20	12	WBGene00044588	198	25	11	WBGene00004756	236	28	12	WBGene00019612	116	27	15
WBGene00011916	173	43	12	WBGene00001281	155	20	12	WBGene00022865	273	37	18	WBGene00000376	231	39	22	WBGene00001685	136	50	12
WBGene00011917	173	43	12	WBGene00004510	206	22	14	WBGene00016250	273	37	18	WBGene00235129	236	28	12	WBGene00001684	136	50	12
WBGene00002179	59	51	12	WBGene00011469	249	31	19	WBGene00004460	273	37	18	WBGene00009211	226	50	31	WBGene00003124	136	50	12
WBGene00011919	144	19	17	WBGene00003241	249	31	19	WBGene00016249	273	37	18	WBGene00009212	226	50	31	WBGene00004951	196	62	16
WBGene00011921	144	19	17	WBGene00000377	249	31	19	WBGene00018367	144	48	13	NoWBGene_ID44	243	31	15	NoWBGene_ID38	171	22	11
WBGene00004318	163	38	20	WBGene00011471	249	31	19	WBGene00018371	144	48	13	WBGene00004492	243	31	15	WBGene00001400	31	49	10
WBGene00011920	182	56	22	WBGene00195142	234	103	90	WBGene00018366	144	48	13	WBGene00009219	243	31	15	WBGene00017892	80	69	13
WBGene00008317	177	23	13	WBGene00010913	234	103	90	WBGene00015418	87	54	11	WBGene00009218	243	31	15	WBGene00018237	161	21	13
WBGene00000869	177	23	13	WBGene00002066	234	103	90	WBGene00015518	218	33	13	WBGene00001580	239	20	10	WBGene00018238	161	21	13
WBGene00008318	192	26	13	WBGene00000894	234	103	90	WBGene00015524	218	33	13	WBGene00008582	47	73	68	WBGene00004124	161	21	13
WBGene00010560	192	26	13	WBGene00006562	110	17	10	WBGene00015525	160	22	12	WBGene00001085	209	26	13	WBGene00006535	200	79	80
WBGene00045192	207	29	12	WBGene00001571	110	17	10	WBGene00015526	160	22	12	WBGene00007732	209	26	13	WBGene00002255	200	79	80
WBGene00010564	182	21	13	WBGene00010459	110	17	10	WBGene00015747	160	22	12	WBGene00007736	183	35	33	WBGene00002253	200	79	80
WBGene00010569	182	21	13	WBGene00010458	110	17	10	WBGene00000439	217	21	10	WBGene00011418	183	35	33	WBGene00002254	150	54	46
WBGene00010565	192	60	13	WBGene00010460	170	21	13	WBGene00017696	173	18	9	WBGene00005689	104	16	11	WBGene00018236	99	28	12
WBGene00077768	192	60	13	WBGene00003821	229	24	15	WBGene00001688	173	18	9	WBGene00001865	104	16	11	WBGene00017381	108	91	13
WBGene00010566	202	98	12	WBGene00000379	229	24	15	WBGene00001028	173	18	9	WBGene00001820	189	78	44	WBGene00017380	61	74	76
WBGene00000156	202	98	12	WBGene00004304	318	94	76	WBGene00017694	53	72	74	WBGene00014081	125	63	28	WBGene00022826	61	74	76
WBGene00010567	143	42	38	WBGene00007744	318	94	76	WBGene00017693	51	59	57	WBGene00014082	146	26	11	WBGene00022827	61	74	76
WBGene00010568	143	42	38	WBGene00001840	318	94	76	WBGene00017698	51	59	57	WBGene00014083	146	26	11	WBGene00022767	47	50	46
WBGene00008935	143	42	38	WBGene00007745	318	94	76	WBGene00001443	197	25	10	WBGene00010671	178	29	14	WBGene00000524	47	50	46
WBGene00000485	169	30	24	WBGene00005039	190	74	19	WBGene00015124	171	28	15	WBGene00002002	178	29	14	WBGene00022769	208	29	8
WBGene00004378	195	18	9	WBGene00009899	190	74	19	WBGene00015125	171	28	15	WBGene00002368	178	29	14	WBGene00044355	208	29	8
WBGene00008934	84	38	19	WBGene00008799	190	74	19	WBGene00015126	145	31	20	WBGene00013224	160	17	10	WBGene00006865	209	99	85
WBGene00005009	84	38	19	WBGene00008800	189	22	11	WBGene00015128	98	21	11	WBGene00013223	147	34	12	WBGene00000503	209	99	85
WBGene00002999	55	54	20	WBGene00008802	189	22	11	WBGene00015129	98	21	11	WBGene00006916	76	56	14	WBGene00006810	122	38	10
WBGene00003136	144	29	14	WBGene00008803	171	21	13	WBGene00015130	78	15	11	WBGene00007752	134	37	12	WBGene00000990	122	38	10
WBGene00012113	197	97	50	WBGene00001230	171	21	13	WBGene00015131	78	15	11	WBGene00011939	260	55	10	WBGene00195081	82	42	11
WBGene00012116	197	97	50	WBGene00001358	171	21	13	WBGene00015132	171	52	40	WBGene00011940	260	55	10	WBGene00004729	239	103	16
WBGene00011375	192	123	119	WBGene00009041	171	21	13	WBGene00015133	171	52	40	WBGene00011950	203	25	13	WBGene00006863	203	65	12
WBGene00004966	192	123	119	WBGene00009043	202	28	17	WBGene00022717	171	52	40	WBGene00011951	203	25	13	WBGene00004350	145	57	14
WBGene00013955	192	123	119	WBGene00009044	202	28	17	WBGene00022719	155	22	9	WBGene00004315	203	25	13	WBGene00015954	194	26	11
WBGene00044094	240	21	7	WBGene00006994	188	26	16	WBGene00022720	155	22	9	WBGene00004030	52	41	9	WBGene00015955	194	26	11
WBGene00013958	240	21	7	WBGene00001498	174	23	15	WBGene00004856	121	20	12	WBGene00008555	89	60	12	WBGene00015956	194	26	11
WBGene00013957	156	70	56	WBGene00009045	174	23	15	WBGene00022722	121	20	12	WBGene00010829	84	71	15	WBGene00004727	137	29	10
WBGene00013959	72	118	105	WBGene00010878	107	30	15	WBGene00019801	121	20	12	WBGene00010828	94	70	11	WBGene00020011	142	36	12
WBGene00011344	134	40	14	WBGene00010879	107	30	15	WBGene00003253	180	38	14	WBGene00005153	130	42	8	WBGene00044725	146	42	14
WBGene00011345	66	58	16	WBGene00001523	107	30	15	WBGene00019800	180	38	14	WBGene00014139	130	42	8	WBGene00006431	153	44	11
WBGene00002196	204	25	13	WBGene00011756	149	19	10	WBGene00019301	136	28	12	WBGene00003150	296	120	44	WBGene00006643	153	44	11
WBGene00003788	204	25	13	WBGene00004383	149	19	10	WBGene00019302	136	28	12	WBGene00009889	296	120	44	WBGene00015357	95	54	10
WBGene00003183	207	30	14	WBGene00011761	149	19	10	WBGene00019303	136	28	12	WBGene00000706	256	28	19	WBGene00015358	72	54	39

WBGene00009920	207	30	14	WBGene00011757	178	18	14	WBGene00018833	290	103	46	WBGene00008034	256	28	19	WBGene00001434	87	60	22
WBGene00009923	88	29	11	WBGene00011758	178	18	14	WBGene00006975	290	103	46	WBGene00008035	256	28	19	WBGene00018537	236	45	11
WBGene00009921	88	29	11	WBGene00011759	178	18	14	WBGene00018834	290	103	46	WBGene00004339	201	24	18	WBGene00018533	236	45	11
WBGene00000467	174	26	14	WBGene00011760	111	32	11	WBGene00018835	229	70	29	WBGene00001007	201	24	18	WBGene00018026	29	37	31
WBGene00004439	174	26	14	WBGene00012175	43	46	8	WBGene00004201	167	36	11	WBGene00044083	145	19	16	WBGene00018027	29	37	31
WBGene00007911	158	25	14	WBGene00004155	76	91	94	WBGene00018836	178	21	9	WBGene00007201	145	19	16	WBGene00001335	146	26	15
WBGene00007914	141	24	13	WBGene00012177	76	91	94	WBGene00018417	178	21	9	WBGene00007207	145	19	16	WBGene00018025	146	26	15
WBGene00008887	189	27	10	WBGene00012178	76	91	94	WBGene00018423	178	21	9	WBGene00006766	50	49	13	WBGene00001441	28	50	8
WBGene00011827	220	43	9	WBGene00002065	216	28	16	WBGene00018419	145	20	10	WBGene00008624	139	19	11	WBGene00019359	28	50	8
WBGene00003596	220	43	9	WBGene00175035	200	26	15	WBGene00018420	158	19	10	WBGene00003421	139	19	11	WBGene00002987	42	44	12
WBGene00011829	155	20	9	WBGene00006059	214	32	16	WBGene00018421	159	19	11	WBGene00044978	66	26	11	WBGene00006321	92	47	14
WBGene00008529	155	20	9	WBGene00010041	214	34	17	WBGene00018422	159	19	11	WBGene00008177	129	25	10	WBGene00020665	44	55	43
WBGene00008528	150	36	11	WBGene00000615	214	34	17	WBGene00004041	166	18	11	WBGene00000417	159	32	12	WBGene00020567	44	55	43
WBGene00003014	150	36	11	WBGene00004416	243	45	20	WBGene00010475	179	62	10	WBGene00194643	189	39	14	WBGene00015822	94	73	71
WBGene00008531	135	35	13	WBGene00010042	243	45	20	WBGene00014021	183	22	15	WBGene00008178	171	20	10	WBGene00015823	94	73	71
WBGene00004117	145	22	13	WBGene00010043	198	36	18	WBGene00014022	183	22	15	WBGene00010435	236	36	16	WBGene00015824	94	73	71
WBGene00008530	163	25	12	WBGene00004241	153	26	16	WBGene00014031	183	22	15	WBGene00006466	301	52	21	WBGene00019830	169	64	16
WBGene00008533	163	25	12	WBGene00010044	153	26	16	NoWBGene_ID66	142	20	13	WBGene00004424	301	52	21	WBGene00019827	169	64	16
WBGene00008532	169	23	12	WBGene00009202	73	70	48	WBGene00014024	101	18	11	WBGene00003037	301	52	21	WBGene00017309	65	66	14
WBGene00004931	169	23	12	WBGene00009203	73	70	48	WBGene00014025	101	18	11	WBGene00010436	301	52	21	WBGene00022745	185	90	20
WBGene00008648	169	23	12	WBGene00009204	256	31	19	WBGene00002998	240	25	16	WBGene00010437	301	52	21	WBGene00006410	163	69	16
WBGene00008649	137	20	12	WBGene00009205	256	31	19	WBGene00006768	240	25	16	WBGene00013465	228	22	13	WBGene00006921	218	48	23
WBGene00008385	163	22	15	WBGene00000773	256	31	19	WBGene00014027	65	56	44	WBGene00013461	270	26	22	WBGene00017628	218	48	23
WBGene00008386	163	22	15	WBGene00004440	256	31	19	WBGene00014028	65	56	44	WBGene00013462	311	29	31	WBGene00001994	232	45	19
WBGene00010496	222	39	13	WBGene00006307	256	31	19	WBGene00000388	65	56	44	WBGene00013463	311	29	31	WBGene00020922	187	53	15
WBGene00010495	222	39	13	WBGene00009207	256	31	19	WBGene00014032	65	56	44	WBGene00000818	311	29	31	WBGene00018602	38	40	13
WBGene00010497	222	39	13	WBGene00011924	104	30	12	WBGene00014033	55	61	60	WBGene00013375	257	26	15	WBGene00001957	38	40	13
WBGene00010500	94	71	50	WBGene00011925	104	30	12	WBGene00014035	233	24	13	WBGene00000093	257	26	15	WBGene00005716	233	64	45
WBGene00006976	91	46	30	WBGene00011926	104	30	12	WBGene00014036	233	24	13	WBGene00004410	257	26	15	WBGene00006393	233	64	45
WBGene00001677	91	46	30	WBGene00008432	90	66	59	WBGene00014034	233	24	13	WBGene00013373	257	26	15	WBGene00005717	201	42	28
WBGene00001651	59	56	11	WBGene00004259	150	46	34	WBGene00014037	233	24	13	WBGene00013376	257	26	15	WBGene00016867	168	19	11
WBGene00004305	199	29	11	WBGene00008427	150	46	34	WBGene00001734	182	26	14	WBGene00013378	258	29	12	WBGene00004106	237	38	13
WBGene00011033	199	29	11	WBGene00008431	150	46	34	WBGene00011142	182	26	14	WBGene00004278	258	29	12	WBGene00001082	192	25	16
WBGene00011037	199	29	11	WBGene00008428	150	46	34	WBGene00011143	192	24	14	WBGene00044745	258	29	12	WBGene00017476	55	89	95
WBGene00011034	142	22	14	WBGene00008429	209	26	9	WBGene00001227	192	24	14	WBGene00014938	258	29	12	WBGene00017794	55	89	95
WBGene00011032	142	22	14	WBGene00007915	202	33	12	WBGene00011144	202	21	13	WBGene00003077	258	29	12	WBGene00017177	119	27	18
WBGene00011035	142	22	14	WBGene00194940	202	33	12	WBGene00011145	202	21	13	WBGene00013379	178	43	12	WBGene00000157	204	23	10
WBGene00011036	142	22	14	WBGene00007917	113	40	11	WBGene00011146	159	79	11	WBGene00013382	107	47	28	WBGene00017178	168	22	10
WBGene00009673	180	26	10	WBGene00007918	113	40	11	WBGene00011147	116	38	26	WBGene00013383	107	47	28	WBGene00017176	168	21	12
WBGene00009664	180	26	10	WBGene00000432	113	40	11	WBGene00010307	116	38	26	WBGene00004029	107	47	28	WBGene00000207	168	21	12
WBGene00009665	180	26	10	WBGene00004279	168	18	12	WBGene00010308	116	38	26	WBGene00010713	198	20	12	WBGene00003561	168	21	12
WBGene00009667	170	23	10	WBGene00000887	168	18	12	WBGene00010309	116	38	26	WBGene00012640	198	20	12	WBGene00000959	132	52	13
WBGene00009666	160	19	10	WBGene00206502	168	18	12	WBGene00010310	101	48	9	WBGene00012868	171	24	14	WBGene00004356	191	33	30
WBGene00009668	160	19	10	WBGene00011311	168	18	12	WBGene00010311	101	48	9	WBGene00003755	236	32	15	WBGene00005008	191	33	30
WBGene00219282	160	19	10	WBGene00010681	114	93	11	WBGene00011299	261	54	21	WBGene00003582	121	16	7	WBGene00015561	263	119	100
WBGene00009670	160	19	10	WBGene00000220	114	93	11	WBGene00011300	261	54	21	WBGene00004681	101	21	9	WBGene00003963	335	205	170
WBGene00009671	194	20	11	WBGene00000240	161	46	10	WBGene00000549	261	54	21	WBGene00009943	78	27	11	WBGene00003628	158	73	17
WBGene00009672	194	20	11	WBGene00010682	161	46	10	WBGene00003001	89	37	13	WBGene00219243	60	52	12	WBGene00206364	75	64	10
WBGene00010622	216	20	11	WBGene00002295	161	46	10	WBGene00044406	89	37	13	WBGene00006580	105	69	37	WBGene00001821	84	78	16
WBGene00010624	216	20	11	WBGene00008563	289	62	30	WBGene00008513	89	37	13	WBGene00008122	48	51	10	WBGene00000133	165	56	5
WBGene00000209	220	20	11	WBGene00008557	289	62	30	WBGene00001385	42	58	26	WBGene00012883	287	27	19	WBGene00015494	165	56	5
WBGene00010623	220	20	11	WBGene00008558	289	62	30	WBGene00001386	42	58	26	WBGene00044257	287	27	19	WBGene00015496	150	19	9
WBGene00003953	220	20	11	WBGene00008561	181	22	8	WBGene00008514	147	34	15	WBGene00004430	287	27	19	WBGene00015493	150	19	9
WBGene00009565	223	19	11	WBGene00009784	181	22	8	WBGene00001609	147	34	15	WBGene00001635	216	23	15	WBGene00015492	150	19	9
WBGene00006577	227	22	13	WBGene00009783	181	22	8	WBGene00013979	72	70	61	WBGene00012890	231	22	15	WBGene00001455	150	19	9
WBGene00000409	231	25	15	WBGene00009781	116	26	14	WBGene00013980	167	76	42	WBGene00012885	203	19	13	WBGene00020496	181	45	14
WBGene00003925	231	22	13	WBGene00011767	116	26	14	WBGene00000863	167	76	42	WBGene00012889	203	19	13	WBGene00004148	282	58	40
WBGene00007971	231	22	13	WBGene00011768	116	26	14	WBGene00013982	169	71	16	WBGene00012888	203	19	13	WBGene00016705	138	44	13
WBGene00044614	231	22	13	WBGene00004355	184	28	15	WBGene00001720	124	66	13	WBGene00012887	262	19	14	WBGene00016704	138	44	13
WBGene00044120	231	22	13	WBGene00045407	184	28	15	WBGene00000425	172	58	11	WBGene00007196	226	28	14	WBGene00044567	152	44	12
WBGene00007973	178	20	10	WBGene00011580	128	38	14	WBGene00013985	213	47	11	WBGene00004443	226	28	14	WBGene00017532	152	44	12
WBGene00007972	178	20	10	WBGene00002251	184	90	23	WBGene00013983	170	19	11	WBGene00007195	226	28	14	WBGene00003635	74	51	12
WBGene00007974	178	20	10	WBGene00007178	198	20	12	WBGene00013989	170	19	11	WBGene00001562	297	50	38	WBGene00002044	227	82	15
WBGene00007975	178	20	10	WBGene00000378	198	20	12	WBGene00013984	170	19	11	WBGene00045063	88	55	9	WBGene00000176	226	59	13
WBGene00007976	103	34	8	WBGene00011883	198	20	12	WBGene00013987	170	19	11	WBGene00044989	145	28	11	WBGene00019344	217	35	14

WBGene00007977	101	25	10	WBGene00011884	167	20	15	WBGene00003597	170	19	11	WBGene00001575	145	28	11	WBGene00001032	217	35	14
WBGene00007979	99	15	11	WBGene00011885	147	21	15	WBGene00002081	143	69	15	WBGene00006598	145	28	11	WBGene00018878	209	35	17
WBGene00007978	194	66	30	WBGene00011887	157	22	12	WBGene00013850	139	53	11	WBGene00001190	34	57	52	WBGene00004438	209	35	17
WBGene00008440	194	66	30	WBGene00011886	157	22	12	WBGene00013847	139	53	11	WBGene00005810	34	57	52	WBGene00003056	133	58	11
WBGene00006574	194	66	30	WBGene00011888	157	22	12	WBGene00013849	139	53	11	WBGene00012542	34	57	52	WBGene00003377	56	49	10
WBGene00003052	194	66	30	WBGene00007690	240	17	9	WBGene00004391	220	48	36	WBGene00003086	290	56	43	WBGene00018376	39	50	61
WBGene00001960	194	66	30	WBGene00007684	240	17	9	WBGene00011963	220	48	36	NoWBGene_ID39	290	56	43	WBGene00018375	117	62	15
WBGene00006618	194	66	30	WBGene00007683	213	19	11	WBGene00011962	189	63	23	WBGene00009924	185	39	32	WBGene00003245	117	62	15
WBGene00008439	61	53	11	WBGene00004105	213	19	11	WBGene00011964	158	77	10	WBGene00009926	78	48	35	WBGene00019960	122	47	14
WBGene00006324	142	49	8	WBGene00007685	164	22	12	WBGene00000934	141	66	10	WBGene00000707	67	66	48	WBGene00019959	144	25	11
WBGene00009452	256	21	14	WBGene00007686	164	22	12	WBGene00011365	124	54	9	WBGene00013416	60	53	10	WBGene00018193	182	35	12
WBGene00009451	256	21	14	WBGene00003870	138	16	12	WBGene00008039	146	19	9	WBGene00013453	137	25	9	WBGene00000072	182	35	12
WBGene00009455	237	26	16	WBGene00009711	176	17	15	WBGene00008040	146	19	9	WBGene00010793	216	24	17	WBGene00006640	64	60	12
WBGene00006682	237	26	16	WBGene00009712	213	18	18	WBGene00008041	146	19	9	WBGene00010794	216	24	17	WBGene00020323	90	35	11
WBGene00009454	217	31	18	WBGene00009713	213	18	18	WBGene00001242	146	19	9	WBGene00007058	119	43	15	WBGene00020322	124	22	9
WBGene00004484	217	31	18	WBGene00006514	213	18	18	WBGene00010573	44	69	19	WBGene00013323	187	20	12	WBGene00019758	230	112	57
WBGene00009456	217	31	18	WBGene00009714	213	18	18	WBGene00001689	250	19	12	WBGene00013326	187	20	12	WBGene00000066	230	112	57
WBGene00009457	217	31	18	WBGene00009715	213	18	18	WBGene00004343	215	20	14	WBGene00013303	227	24	12	WBGene00019759	256	99	41
WBGene00009460	170	25	15	WBGene00011980	326	106	58	WBGene00012059	180	20	15	WBGene00013302	227	24	12	WBGene00019760	282	86	25
WBGene00009250	170	25	15	WBGene00011976	326	106	58	WBGene00001284	349	31	16	WBGene00013324	227	24	12	WBGene00022501	212	59	18
WBGene00009251	170	25	15	WBGene00004446	326	106	58	WBGene00010035	349	31	16	WBGene00013301	227	24	12	WBGene00022499	142	31	11
WBGene00011631	98	18	10	WBGene00011977	326	106	58	WBGene00010037	349	31	16	WBGene00013332	165	26	14	WBGene00195189	225	28	12
WBGene00011629	98	18	10	WBGene00011978	326	106	58	WBGene00010039	349	31	16	WBGene00013333	165	26	14	WBGene00022613	141	40	38
WBGene00043049	211	23	12	WBGene00011979	112	72	36	WBGene00010040	261	29	13	WBGene00013325	165	26	14	WBGene00022612	141	40	38
WBGene00001568	149	24	14	WBGene00001950	112	72	36	WBGene00010038	261	29	13	WBGene00044258	103	28	15	WBGene00022611	56	51	63
WBGene00007026	136	23	13	WBGene00007421	112	72	36	WBGene00004980	261	30	19	WBGene00194649	161	36	29	WBGene00016600	76	99	76
WBGene00004953	136	23	13	WBGene00000532	271	45	51	WBGene00007186	261	31	24	WBGene00013334	161	36	29	WBGene00006862	76	99	76
WBGene00009346	184	21	11	WBGene00012000	271	45	51	WBGene00007188	261	31	24	WBGene00013307	161	36	29	WBGene00016292	54	55	7
WBGene00009341	136	60	48	WBGene00012003	228	37	31	WBGene00000235	261	31	24	WBGene00001558	223	39	22	WBGene00017150	124	35	10
WBGene00050880	136	60	48	WBGene00012004	184	28	11	WBGene00007187	261	31	24	WBGene00000763	284	42	15	WBGene00020197	124	35	10
WBGene00009342	87	99	85	WBGene00001041	184	28	11	WBGene00000268	261	31	24	WBGene00013308	284	42	15	WBGene00020196	214	23	12
WBGene00009345	87	99	85	WBGene00012002	184	28	11	WBGene00007185	251	21	12	WBGene00000192	284	42	15	WBGene00020199	214	23	12
WBGene00009480	118	15	7	WBGene00011966	229	23	15	WBGene00001094	251	21	12	WBGene00013310	284	42	15	WBGene00005711	214	23	12
WBGene00009478	118	15	7	WBGene00011965	229	23	15	WBGene00007184	251	21	12	WBGene00013311	328	118	104	WBGene00004145	286	38	26
WBGene00009479	118	15	7	WBGene00001061	229	23	15	WBGene00010130	232	28	13	WBGene00004487	328	118	104	WBGene00019250	156	50	23
WBGene00009477	231	26	7	WBGene00004752	221	21	15	WBGene00000550	262	26	15	WBGene00013312	328	118	104	WBGene00019249	98	54	28
WBGene00009481	231	26	7	WBGene00011967	212	19	14	WBGene00014218	262	26	15	WBGene00013319	56	41	35	WBGene00003477	174	76	9
WBGene00009476	231	26	7	WBGene00006367	212	19	14	WBGene00014224	262	26	15	WBGene00219443	33	19	29	WBGene00021323	174	76	9
WBGene00007858	193	37	15	WBGene00012033	207	18	9	WBGene00014222	223	22	14	WBGene00014926	33	19	29	WBGene00021324	168	26	11
WBGene00007855	193	37	15	WBGene00012035	207	18	9	WBGene00014223	184	18	13	WBGene00045146	183	21	11	WBGene00002031	171	23	11
WBGene00007857	193	37	15	WBGene00000170	212	103	82	WBGene00014219	184	18	13	WBGene00012762	183	21	11	WBGene00021319	173	20	10
WBGene00007856	54	49	53	WBGene00007224	212	103	82	WBGene00014220	115	24	13	WBGene00001336	203	22	14	WBGene00000092	171	25	12
WBGene00001843	54	49	53	WBGene00007225	163	72	47	WBGene00003504	139	22	11	WBGene00012765	190	22	15	WBGene00017973	171	25	12
WBGene00012298	167	25	9	WBGene00007226	163	72	47	WBGene00014221	218	59	11	WBGene00012767	227	24	18	WBGene00016135	55	61	12
WBGene00006503	167	25	9	WBGene00007227	139	58	13	WBGene00014225	218	59	11	WBGene00012766	182	19	15	WBGene00016133	55	61	12
WBGene00004298	167	25	9	WBGene00006510	165	75	13	WBGene00194691	218	59	11	WBGene00012768	318	36	23	WBGene00016132	171	32	11
WBGene00011531	144	24	11	WBGene00007229	104	46	29	WBGene00006755	274	97	12	WBGene00012769	318	36	23	WBGene00016136	171	32	11
WBGene00011532	157	20	12	WBGene00000289	140	58	21	WBGene00000421	170	23	9	WBGene00004035	52	41	35	WBGene00016131	171	32	11
WBGene00001574	99	20	14	WBGene00008403	150	34	12	WBGene00008168	170	23	9	WBGene00013517	52	41	35	WBGene00018037	93	68	12
WBGene00012376	143	21	13	WBGene00008402	209	23	13	WBGene00043992	254	35	16	WBGene00004170	44	57	73	WBGene00015390	71	91	83
WBGene00014115	153	51	11	WBGene00004286	209	23	13	WBGene00004180	254	35	16	WBGene00004171	44	57	73	WBGene00016559	71	91	83
WBGene00014117	95	39	10	WBGene00006520	196	24	11	WBGene00010229	254	35	16	WBGene00013530	228	27	11	WBGene00016558	41	47	11
WBGene00003209	137	33	12	WBGene00001134	196	24	11	WBGene00001831	254	35	16	WBGene00013532	228	27	11	WBGene00016106	41	47	11
WBGene00014118	137	33	12	WBGene00006433	178	51	16	WBGene00006540	155	21	12	WBGene00013531	152	42	35	WBGene00016104	60	41	10
WBGene00014119	147	21	12	WBGene00009627	178	51	16	WBGene00010230	155	21	12	WBGene00013538	218	28	15	WBGene00016103	118	58	48
WBGene00014120	147	21	12	WBGene00003196	117	84	14	WBGene00006704	155	21	12	WBGene00185102	157	39	13	WBGene00001006	157	77	84
WBGene00010421	167	25	12	WBGene00005271	46	29	23	WBGene00001570	155	21	12	WBGene00194913	157	39	13	WBGene00016102	157	77	84
WBGene00009129	149	30	11	WBGene00007377	46	29	23	WBGene00007405	100	62	13	WBGene00013650	66	119	112	WBGene00018876	157	77	84
WBGene00077773	149	30	11	WBGene00007378	46	29	23	WBGene00007403	218	102	29	WBGene00005727	66	119	112	WBGene00020738	144	75	8
WBGene00009128	149	30	11	WBGene00013085	80	48	38	WBGene00007400	218	102	29	WBGene00013651	95	71	62	WBGene00016934	144	75	8
WBGene00009127	196	46	27	WBGene00013086	80	48	38	WBGene00006579	218	102	29	WBGene00004816	95	71	62	WBGene00002983	37	51	8
WBGene00001167	243	61	43	WBGene00006429	189	19	13	WBGene00003571	218	102	29	WBGene00013653	95	71	62	WBGene00003166	176	109	13
WBGene00009126	145	49	42	WBGene00010941	189	19	13	WBGene00011498	251	55	22	WBGene00002175	57	56	7	WBGene00006826	176	109	13
WBGene00009130	46	36	41	WBGene00010942	189	19	13	WBGene00002064	251	55	22	WBGene00001604	99	89	62	WBGene00017464	176	109	13
WBGene00008107	209	24	16	WBGene00011849	222	69	14	WBGene00000405	251	55	22	WBGene00009539	38	32	29	WBGene00044570	150	34	10

WBGene00001590	209	24	16	WBGene00009447	173	19	11	WBGene00011499	251	55	22	WBGene00009537	38	32	29	WBGene00020673	150	34	10
WBGene00044008	209	24	16	WBGene00009448	173	19	11	WBGene00011500	251	55	22	WBGene00009538	38	32	29	WBGene00005718	145	53	13
WBGene00009686	179	17	8	WBGene00009449	173	19	11	WBGene00011503	311	67	59	WBGene00007961	31	35	25	WBGene00020920	112	58	11
WBGene00044247	179	17	8	WBGene00008456	194	21	13	WBGene00011501	311	67	59	WBGene00012420	156	72	62	WBGene00020918	103	71	13
WBGene00194653	179	17	8	WBGene00008455	194	21	13	WBGene00000366	229	48	37	WBGene00013418	179	159	98	WBGene00020921	103	71	13
WBGene00008779	54	50	46	WBGene00006473	194	21	13	WBGene00011216	223	45	22	WBGene00013419	151	37	14	WBGene00000295	86	94	89
WBGene00008780	60	65	57	NoWBGene_ID46	194	21	13	WBGene00005021	223	45	22	WBGene00194949	246	26	15	WBGene00016937	232	56	18
WBGene00008781	131	19	14	WBGene00003618	75	63	55	WBGene00006910	299	61	30	WBGene00004357	282	104	21	WBGene00016938	232	56	18
WBGene00009173	131	19	14	WBGene00011791	75	63	55	WBGene00006911	299	61	30	WBGene00013099	282	104	21	WBGene00006368	171	45	14
WBGene00009176	213	23	12	WBGene00011790	75	63	55	WBGene00011218	299	61	30	WBGene00013100	148	41	30	WBGene00004788	238	57	17
WBGene00004268	213	23	12	WBGene00011789	75	63	55	WBGene00011220	158	20	12	WBGene00194647	148	41	30	WBGene00018516	238	57	17
WBGene00006732	155	25	13	WBGene00001038	187	18	12	WBGene00003158	158	20	12	WBGene00219244	148	41	30	WBGene00001824	122	83	39
WBGene00009177	96	26	13	WBGene00014249	187	18	12	WBGene00011219	158	20	12	WBGene00013106	297	27	20	WBGene00021060	219	67	16
WBGene00009178	96	26	13	WBGene00001510	166	74	30	WBGene00014011	173	25	15	WBGene00013109	297	27	20	WBGene00004245	219	67	16
WBGene00007533	76	50	34	WBGene00005026	166	74	30	WBGene00014012	138	24	13	WBGene00013115	33	67	79	WBGene00006424	41	47	12
WBGene00008878	197	63	38	WBGene00014250	166	74	30	WBGene00014013	138	24	13	WBGene00012791	44	38	43	WBGene00019938	201	17	9
WBGene00008877	133	21	10	WBGene00014247	166	74	30	WBGene00014014	209	41	29	WBGene00003130	64	21	14	WBGene00019937	201	17	9
WBGene00008876	106	23	11	WBGene00014255	144	30	10	WBGene00014020	314	59	47	WBGene00020284	165	24	14	WBGene00002190	103	22	7
WBGene00007641	221	48	35	WBGene00014259	144	30	10	WBGene00000567	314	59	47	WBGene00020287	265	27	13	WBGene00002224	293	83	64
WBGene00219310	221	48	35	WBGene00006390	144	30	10	WBGene00014015	259	42	31	WBGene00020286	265	27	13	WBGene00017718	293	83	64
WBGene00007642	221	48	35	WBGene00014256	144	30	10	WBGene00000189	203	24	15	WBGene00235300	265	27	13	WBGene00002125	293	83	64
WBGene00219313	221	48	35	WBGene00013140	142	18	7	WBGene00003035	203	24	15	WBGene00219547	265	27	13	WBGene00017717	293	83	64
WBGene00007643	203	45	26	WBGene00175030	142	18	7	WBGene00014016	203	24	15	WBGene00013789	301	20	11	WBGene00015623	121	37	13
WBGene00007644	184	42	17	WBGene00013139	142	18	7	WBGene00014017	203	24	15	WBGene00000184	301	20	11	WBGene00015624	121	37	13
WBGene00044236	184	42	17	WBGene00001623	142	18	7	WBGene00014018	203	24	15	WBGene00013792	301	20	11	WBGene00003911	198	56	13
WBGene00003904	184	42	17	WBGene00006940	218	25	18	WBGene00014019	203	24	15	WBGene00004403	225	13	11	WBGene00016661	150	60	14
WBGene00007645	184	42	17	WBGene00013141	218	25	18	WBGene00010782	139	35	26	WBGene00013794	46	42	36	WBGene00001602	101	63	14
WBGene00007647	152	68	31	WBGene00194906	218	25	18	WBGene00010779	139	35	26	WBGene00013796	44	47	29	WBGene00004219	101	63	14
WBGene00003172	152	68	31	WBGene00013144	232	26	28	WBGene00010783	139	35	26	WBGene00013797	44	47	29	WBGene00016658	316	172	132
WBGene00006681	227	29	12	WBGene00013143	232	26	28	WBGene00010780	139	35	26	WBGene00013803	247	25	17	WBGene00016662	316	172	132
WBGene00004808	227	29	12	WBGene00003785	232	26	28	WBGene00010778	90	48	41	WBGene00004914	247	25	17	WBGene00002007	316	172	132
WBGene00004807	156	29	11	WBGene00014261	113	23	13	WBGene00010784	92	58	69	WBGene00013814	247	25	17	WBGene00015801	248	110	73
WBGene00009260	156	29	11	WBGene00000178	113	23	13	WBGene00014075	129	45	41	WBGene00013804	247	25	17	WBGene00015800	179	48	13
WBGene00045473	85	28	9	WBGene00014262	93	65	65	WBGene00014073	165	31	12	WBGene00000889	283	93	80	WBGene00016423	64	56	12
WBGene00009268	85	28	9	WBGene00011678	72	106	116	WBGene00009594	79	35	11	WBGene00013809	283	93	80	WBGene00077690	116	22	15
WBGene00009263	187	21	12	WBGene00014161	100	36	13	WBGene00043995	79	35	11	WBGene00006698	283	93	80	WBGene00020486	116	22	15
WBGene00006061	187	21	12	WBGene00014159	100	36	13	WBGene00009595	79	35	11	WBGene00006405	283	93	80	WBGene00015782	116	22	15
WBGene00009264	187	21	12	WBGene00014163	100	36	13	WBGene00001603	201	19	11	WBGene00004819	101	82	71	WBGene00015779	116	22	15
WBGene00006062	188	24	16	WBGene00007464	217	50	54	WBGene00010542	152	21	10	WBGene00004815	101	82	71	WBGene00001803	99	49	13
WBGene00009266	188	24	16	WBGene00007463	217	50	54	WBGene00044903	152	21	10	WBGene00004814	101	82	71	WBGene00021050	200	66	29
WBGene00009267	154	25	16	WBGene00086566	217	50	54	WBGene00010546	103	22	9	WBGene00004818	101	82	71	WBGene00021051	241	34	17
WBGene00004887	120	26	15	WBGene00009146	217	50	54	WBGene00003389	148	22	11	WBGene00013779	93	56	40	WBGene00021049	241	34	17
WBGene00002226	134	34	16	WBGene00007328	99	28	10	WBGene00007010	161	43	18	WBGene00013996	178	21	14	WBGene00020331	44	55	46
WBGene00077771	134	34	16	WBGene00007329	96	24	14	WBGene00011221	129	65	23	WBGene00013997	178	21	14	WBGene00002976	60	62	44
WBGene00008061	148	42	16	WBGene00007334	204	31	24	WBGene00007319	79	54	12	WBGene00006229	69	69	15	WBGene00003394	75	69	41
WBGene00007984	126	64	25	WBGene00007332	204	31	24	WBGene00007321	84	50	14	WBGene00000224	69	69	15	WBGene00015373	45	68	49
WBGene00007985	64	62	15	WBGene00007333	204	31	24	WBGene00004100	84	50	14	WBGene00001606	69	69	15	WBGene00015372	231	70	63
WBGene00009646	137	25	12	WBGene00001207	75	65	17	WBGene00219314	84	50	14	WBGene00009155	212	74	45	WBGene00003053	231	70	63
WBGene00002276	137	25	12	WBGene00011272	134	47	14	WBGene00044222	94	44	26	WBGene00009156	212	74	45	WBGene00020130	231	70	63
WBGene00044987	137	25	12	WBGene00011273	134	47	14	WBGene00011805	92	39	23	WBGene00002005	212	74	45	WBGene00019619	148	52	21
WBGene00010608	137	25	12	WBGene00011275	192	29	11	WBGene00011809	139	33	19	WBGene00012128	212	74	45	WBGene00019620	148	52	21
WBGene00010617	137	25	12	WBGene00011274	192	29	11	WBGene00011806	162	27	16	WBGene00008194	136	24	10	WBGene00001715	148	52	21
WBGene00010609	195	21	12	WBGene00011276	192	29	11	WBGene00011814	189	50	13	WBGene00008195	140	23	10	WBGene00019621	148	52	21
WBGene00010610	195	21	12	WBGene00009947	208	12	12	WBGene00011815	189	50	13	WBGene00008196	140	23	10	WBGene00003551	148	52	21
WBGene00010611	195	21	12	WBGene00009944	208	12	12	WBGene00002186	189	50	13	WBGene00008197	145	22	10	WBGene00000393	167	38	9
WBGene00010612	195	21	12	WBGene00002497	208	12	12	WBGene00011817	215	22	11	WBGene00008204	145	22	10	WBGene00001619	167	38	9
WBGene00000177	151	37	42	WBGene00009946	145	23	13	WBGene00014234	215	22	11	WBGene00008198	147	22	11	WBGene00020884	34	50	46
WBGene00010619	235	23	20	WBGene00009945	145	23	13	WBGene00014227	215	22	11	WBGene00008200	147	22	11	WBGene00044297	238	47	47
WBGene00002070	235	23	20	WBGene00007670	174	81	82	WBGene00014228	215	22	11	WBGene00001811	164	19	13	WBGene00016088	238	47	47
WBGene00010615	256	28	24	WBGene00007669	174	81	82	WBGene00014229	194	21	11	WBGene00007826	164	19	13	WBGene00002233	238	47	47
WBGene00010616	276	32	27	WBGene00000995	174	81	82	WBGene00014230	173	19	11	WBGene00007824	164	19	13	WBGene00016090	238	47	47
WBGene00004312	276	32	27	WBGene00014164	201	24	13	WBGene00044072	173	19	11	WBGene00007825	164	19	13	WBGene00016976	45	49	11
WBGene00003036	276	32	27	WBGene00003928	201	24	13	WBGene00003482	41	44	11	WBGene00044238	164	19	13	WBGene00016975	45	49	11
WBGene00011488	276	32	27	WBGene00014165	201	24	13	WBGene00004255	98	37	13	WBGene00008710	215	30	21	WBGene00018175	54	45	13
WBGene00011489	273	31	21	WBGene00014166	201	24	13	WBGene00011869	98	37	13	WBGene00008713	215	30	21	WBGene00019657	197	63	9

WBGene00004488	269	30	15	WBGene00000914	137	46	9	WBGene00011870	98	37	13	WBGene00015153	146	40	12	WBGene00019843	197	63	9
WBGene00002027	269	30	15	WBGene00001686	164	39	12	WBGene00011874	165	32	13	WBGene00002061	146	40	12	WBGene00003163	131	111	31
WBGene00000968	90	23	8	WBGene00009364	191	32	14	WBGene00011873	231	26	12	WBGene00021413	47	63	59	WBGene00019844	131	111	31
WBGene00011497	90	23	8	WBGene00009365	191	32	14	WBGene00011867	199	22	12	WBGene00004496	247	32	13	WBGene00019749	50	38	11
WBGene00011495	140	28	11	WBGene00011038	167	32	17	WBGene00011871	166	18	12	WBGene00018975	247	32	13	WBGene00019748	171	109	35
WBGene00007278	190	32	13	WBGene00011039	167	32	17	WBGene00011872	166	18	12	NoWBGene_ID83	247	32	13	WBGene00001617	163	18	10
WBGene00007277	190	32	13	WBGene00011040	108	36	16	WBGene00011868	178	35	15	WBGene00000480	249	23	15	WBGene00000210	163	18	10
WBGene00219796	190	32	13	WBGene00004334	84	47	32	WBGene00000833	190	52	17	WBGene00020999	249	23	15	WBGene00003856	45	66	52
WBGene00003800	232	26	13	WBGene00011333	197	28	12	WBGene00004326	190	52	17	WBGene00021000	249	23	15	WBGene00016895	45	66	52
WBGene00000466	258	19	13	WBGene00010015	197	28	12	WBGene00011875	190	52	17	WBGene00021004	249	23	15	WBGene00006746	49	50	12
WBGene00007275	241	17	14	WBGene00010013	197	28	12	WBGene00001002	260	26	15	WBGene00021002	156	44	11	WBGene00003987	31	66	47
WBGene00004437	241	17	14	WBGene00014172	181	42	30	WBGene00000768	260	26	15	WBGene00006648	221	55	11	WBGene00017445	31	66	47
WBGene00002069	213	34	12	WBGene00007022	181	42	30	WBGene00010975	151	18	10	WBGene00000838	202	25	13	WBGene00003732	53	56	7
WBGene00004426	213	34	12	WBGene00006918	181	42	30	WBGene00000564	205	21	10	WBGene00044689	140	22	11	WBGene00017447	32	42	15
WBGene00007299	213	34	12	WBGene00001531	181	42	30	WBGene00006785	279	32	12	WBGene00017083	77	41	30	WBGene00017448	32	42	15
WBGene00007620	170	44	13	WBGene00007412	171	29	11	WBGene00011558	279	32	12	WBGene00019814	99	50	32	WBGene00015168	239	96	80
WBGene00001145	170	44	13	WBGene00007419	171	29	11	WBGene00006802	279	32	12	WBGene00019817	99	50	32	WBGene00016469	197	34	11
WBGene00000430	155	46	14	WBGene00007418	171	29	11	WBGene00011562	279	32	12	WBGene00019818	95	42	26	WBGene00016466	197	34	11
WBGene00044607	259	27	11	WBGene00007417	88	35	14	WBGene00003589	77	74	14	WBGene00019815	91	33	20	WBGene00000116	204	90	47
WBGene00006352	259	27	11	WBGene00011661	207	33	10	WBGene00044891	194	53	15	WBGene00006419	91	33	20	WBGene00016913	204	90	47
WBGene00009160	266	41	17	WBGene00011662	170	26	11	WBGene00011563	311	32	16	WBGene00018013	260	23	12	WBGene00016914	204	90	47
WBGene00009159	266	41	17	WBGene00001683	133	18	12	WBGene00003225	311	32	16	WBGene00020707	247	29	12	WBGene00206379	190	41	14
WBGene00009161	266	41	17	WBGene00011663	133	18	12	WBGene00000423	311	32	16	WBGene00020706	196	28	16	WBGene00001025	190	41	14
WBGene00009162	174	30	16	WBGene00011664	133	18	12	WBGene00011561	187	33	19	WBGene00020013	39	45	5	WBGene00044283	61	48	10
WBGene00009165	81	18	14	WBGene00008480	221	21	11	WBGene00006546	63	34	21	WBGene00003648	39	45	5	WBGene00044068	108	56	18
WBGene00009163	197	34	20	WBGene00008481	221	21	11	WBGene00011560	82	26	19	WBGene00003722	39	45	5	WBGene00018519	118	60	27
WBGene00006528	313	50	25	WBGene00014057	154	31	10	WBGene00004986	82	26	19	WBGene00019243	112	127	63	WBGene00018520	236	38	10
WBGene00000371	313	50	25	WBGene00014058	157	23	10	WBGene00011559	82	26	19	WBGene00001564	112	127	63	WBGene00018521	236	38	10
WBGene00009164	313	50	25	WBGene00003038	159	19	10	WBGene00008018	44	54	12	WBGene00206359	84	17	8	WBGene00018518	204	50	17
WBGene00010730	221	82	12	WBGene00014060	159	19	10	WBGene00010839	280	31	15	WBGene00015491	84	17	8	WBGene00001696	204	50	17
WBGene00010731	221	82	12	NoWBGene_ID50	133	76	15	WBGene00044069	280	31	15	WBGene00005643	84	17	8	WBGene00019351	108	30	15
WBGene00010732	168	66	11	WBGene00011302	158	19	9	WBGene00010840	280	31	15	WBGene00006266	242	22	14	WBGene00006351	86	48	13
WBGene00003639	168	66	11	WBGene00011303	177	22	11	WBGene00010845	235	15	15	WBGene00019983	242	22	14	WBGene00001912	103	82	66
WBGene00003396	106	28	11	WBGene00004185	177	22	11	WBGene00010362	235	15	15	WBGene00019982	242	22	14	WBGene00001914	103	82	66
WBGene00009937	139	48	23	WBGene00011304	215	70	24	WBGene00194861	235	15	15	WBGene00044514	242	22	14	WBGene00020335	183	52	11
WBGene00009939	172	67	34	WBGene00007352	251	67	53	WBGene00010365	91	24	16	WBGene00001480	208	20	11	NoWBGene_ID1	183	52	11
WBGene00009938	57	48	10	WBGene00007356	251	67	53	WBGene00008422	172	29	15	WBGene00019241	144	20	9	WBGene00000523	57	68	13
WBGene00009942	108	24	13	WBGene00044235	251	67	53	WBGene00000231	252	34	14	WBGene00019240	79	23	9	WBGene00000526	57	68	13
WBGene00009940	175	25	15	WBGene00007354	180	32	21	WBGene00008423	188	97	76	WBGene00019239	78	27	10	WBGene00015295	71	61	11
WBGene00013696	175	25	15	WBGene00007355	180	32	21	WBGene00000836	188	97	76	WBGene00005024	144	16	9	WBGene00004949	81	48	15
WBGene00013695	175	25	15	WBGene00007555	180	32	21	WBGene00008426	188	97	76	WBGene00021749	210	21	11	WBGene00000591	112	44	14
WBGene00013697	208	30	14	WBGene00000933	180	32	21	WBGene00004283	227	22	13	WBGene00015344	168	22	11	WBGene00003185	197	49	16
WBGene00013694	177	37	14	WBGene00006397	148	24	10	WBGene00006395	227	22	13	WBGene00019625	168	22	11	WBGene00018608	197	49	16
WBGene00011985	182	21	11	WBGene00007561	148	24	10	WBGene00185048	227	22	13	WBGene00006255	113	26	23	WBGene00018604	188	39	16
WBGene00011988	182	21	11	WBGene00007563	69	64	8	WBGene00004798	227	22	13	WBGene00019624	113	26	23	WBGene00018606	188	39	16
WBGene00011986	191	29	13	WBGene00010893	69	64	8	WBGene00009654	227	22	13	WBGene00006129	113	26	23	WBGene00000061	125	45	25
WBGene00007043	200	37	14	WBGene00010897	279	30	16	WBGene00012859	121	39	10	WBGene00000552	158	81	13	WBGene00018607	62	51	34
WBGene00003397	200	37	14	WBGene00010896	279	30	16	WBGene00004282	121	39	10	WBGene00020664	158	81	13	WBGene00018485	113	69	12
WBGene00011944	193	30	19	WBGene00004704	228	26	18	WBGene00012643	226	46	12	WBGene00021738	231	25	10	WBGene00001069	68	64	40
WBGene00001226	193	30	19	WBGene00008433	228	26	18	WBGene00012641	226	46	12	WBGene00021736	231	25	10	WBGene00018486	68	64	40
WBGene00006379	241	76	59	WBGene00008434	228	26	18	WBGene00012642	226	46	12	WBGene00195169	231	25	10	WBGene00017243	246	57	15
WBGene00001941	288	121	99	WBGene00007488	122	14	9	WBGene00012645	150	34	11	WBGene00021739	237	21	9	WBGene00006063	246	57	15
WBGene00001942	288	121	99	WBGene00000251	122	14	9	WBGene00012646	150	34	11	WBGene00021735	237	21	9	WBGene00007059	210	47	15
WBGene00011945	288	121	99	WBGene00007489	122	14	9	WBGene00001997	95	40	39	WBGene00016539	78	57	12	WBGene00017244	210	47	15
WBGene00008663	173	20	11	WBGene00007490	27	31	26	WBGene00012647	39	46	67	WBGene00016538	276	22	14	WBGene00006827	173	37	14
WBGene00003803	173	20	11	WBGene00002297	263	110	35	WBGene00000974	226	29	19	WBGene00004266	276	22	14	WBGene00017241	166	50	12
WBGene00008665	147	20	10	WBGene00000411	263	110	35	WBGene00012650	226	29	19	WBGene00016540	276	22	14	WBGene00017862	50	50	11
WBGene00008664	147	20	10	WBGene00011072	263	110	35	WBGene00012651	182	32	14	WBGene00022286	214	22	16	WBGene00017863	50	50	11
WBGene00008667	147	20	10	WBGene00011067	263	110	35	WBGene00012652	182	32	14	WBGene00022287	160	21	10	WBGene00206475	244	62	20
WBGene00007156	89	50	11	WBGene00011068	183	18	15	WBGene00000566	161	67	14	WBGene00004925	160	21	10	WBGene00017864	244	62	20
WBGene00007159	89	50	11	WBGene00003805	183	18	15	WBGene00012658	231	21	13	WBGene00019977	142	28	17	WBGene00000992	244	62	20
WBGene00007155	157	23	12	WBGene00011071	198	31	18	WBGene00012659	231	21	13	WBGene00004139	142	28	17	WBGene00017866	165	50	41
WBGene00003508	157	23	12	WBGene00001153	208	28	17	WBGene00012361	154	27	12	WBGene00018757	207	69	16	WBGene00006757	165	50	41
WBGene00007054	55	48	10	WBGene00023418	208	28	17	WBGene00012363	154	27	12	WBGene00006794	271	110	14	WBGene00019583	112	58	9
WBGene00007158	55	48	10	WBGene00003367	148	37	26	WBGene00012362	77	32	11	WBGene00018709	125	53	10	WBGene00019584	98	32	10

WBGene00013698	130	57	47	WBGene00014848	217	24	15	WBGene00012360	210	45	13	WBGene00000387	176	91	34	WBGene00019582	39	45	9
WBGene00013699	130	57	47	WBGene00077658	28	55	46	WBGene00012359	326	45	34	WBGene00017509	176	91	34	WBGene00004335	59	44	13
WBGene00013700	130	57	47	WBGene00010910	130	34	13	WBGene00010479	326	45	34	WBGene00017508	176	91	34	WBGene00000950	32	43	25
WBGene00013701	130	57	47	WBGene00010911	107	25	10	WBGene00006536	326	45	34	WBGene00022807	80	32	14	WBGene00003171	32	43	25
WBGene00013702	256	23	10	WBGene00010912	215	20	15	WBGene00004361	326	45	34	WBGene00022805	80	32	14	WBGene00022667	180	32	25
WBGene00013703	256	23	10	WBGene00000293	221	24	15	WBGene00004302	326	45	34	WBGene00000976	198	18	12	WBGene00022668	152	44	38
WBGene00044243	211	37	30	WBGene00000880	221	24	15	WBGene00010478	326	45	34	NoWBGene_ID23	198	18	12	WBGene00000075	111	38	31
WBGene00006447	211	37	30	WBGene00010333	227	27	14	WBGene00010477	326	45	34	WBGene00018115	198	18	12	WBGene00019846	97	19	11
WBGene00007705	211	37	30	WBGene00003882	227	27	14	WBGene00001996	310	36	24	WBGene00001632	259	21	10	WBGene00019845	97	19	11
WBGene00001442	211	37	30	WBGene00012489	92	45	25	WBGene00010476	294	26	13	WBGene00044344	259	21	10	WBGene00019847	157	56	12
WBGene00007706	239	45	13	WBGene00012490	92	45	25	WBGene00010481	294	26	13	WBGene00021309	259	21	10	WBGene00001169	249	130	106
WBGene00007707	232	38	13	WBGene00010988	92	45	25	WBGene00010480	294	26	13	WBGene00020389	314	29	17	WBGene00006310	249	130	106
WBGene00007708	224	30	12	WBGene00219205	112	44	10	WBGene00001087	294	26	13	WBGene00020392	314	29	17	WBGene00043983	34	43	30
WBGene00077526	224	30	12	WBGene00010990	112	44	10	WBGene00002219	187	54	24	WBGene00020390	314	29	17	WBGene00016529	34	43	30
WBGene00002153	202	27	12	WBGene00010991	112	44	10	WBGene00004736	233	58	30	WBGene00020391	314	29	17	WBGene00016534	42	49	18
WBGene00007709	180	23	11	WBGene00010992	39	47	8	WBGene00011268	140	18	15	NoWBGene_ID43	314	29	17	WBGene00015776	171	75	12
WBGene00007710	180	23	11	WBGene00004215	279	94	16	WBGene00011267	197	22	18	WBGene00003676	176	37	16	WBGene00015777	199	66	13
WBGene00000931	207	25	11	WBGene00002957	201	26	16	WBGene00012663	253	26	21	WBGene00021486	176	37	16	WBGene00004774	189	62	15
WBGene00007711	233	27	11	WBGene00009355	201	26	16	WBGene00003898	257	31	23	WBGene00021493	176	37	16	WBGene00018466	103	37	10
WBGene00007712	233	27	11	WBGene00009356	283	75	54	WBGene00000475	257	31	23	WBGene00017720	244	51	20	WBGene00001945	103	37	10
WBGene00000095	181	35	9	WBGene00000472	283	75	54	NoWBGene_ID72	257	31	23	WBGene00017719	244	51	20	WBGene00016407	26	56	6
WBGene00007713	129	43	7	WBGene00000658	283	75	54	WBGene00008079	160	30	27	WBGene00016697	38	42	25	WBGene00016406	112	25	8
WBGene00013705	129	43	7	WBGene00009352	257	51	33	WBGene00008080	160	30	27	WBGene00021165	38	42	25	WBGene00015951	45	39	44
WBGene00013709	180	42	11	WBGene00009353	230	26	11	WBGene00008081	135	23	19	WBGene00021166	38	42	25	WBGene00006962	73	47	13
WBGene00007047	111	47	13	WBGene00009354	230	26	11	WBGene00043996	109	16	10	WBGene00003649	34	48	4	WBGene00001000	87	42	11
WBGene00011864	138	55	12	WBGene00009729	230	26	11	WBGene00008082	109	16	10	WBGene00020853	34	48	4	WBGene00015949	87	42	11
WBGene00011866	138	55	12	WBGene00006788	56	49	10	WBGene00006843	129	24	12	WBGene00018762	213	20	9	WBGene00000929	116	28	18
WBGene00013711	208	27	19	WBGene00007504	214	26	14	WBGene00010922	239	21	9	WBGene00018759	213	20	9	WBGene00006890	116	28	18
WBGene00013710	208	27	19	NoWBGene_ID53	214	26	14	WBGene00043057	239	21	9	WBGene00000056	96	56	12	WBGene00019493	104	27	18
WBGene00004476	208	27	19	WBGene00003831	214	26	14	WBGene00012965	257	24	14	WBGene00018758	96	56	12	WBGene00019491	170	25	14
WBGene00013892	208	27	19	WBGene00043120	183	25	13	WBGene00012964	257	24	14	NoWBGene_ID75	96	56	12	WBGene00194670	228	28	16
WBGene00220261	208	27	19	WBGene00007499	183	25	13	WBGene00012966	257	24	14	WBGene00194896	247	24	14	WBGene00019490	228	28	16
WBGene00013891	208	27	19	WBGene00007503	194	23	12	WBGene00012970	126	21	13	WBGene00020957	247	24	14	WBGene00015324	145	31	14
WBGene00001337	182	25	15	WBGene00007500	236	21	12	WBGene00012971	126	21	13	WBGene00020955	74	15	6	WBGene00015325	145	31	14
WBGene00000148	155	23	11	WBGene00007501	236	21	12	WBGene00012973	281	22	16	WBGene00003579	48	48	33	WBGene00015320	51	21	37
WBGene00009743	194	60	44	WBGene00007502	236	21	12	WBGene00012972	174	26	24	WBGene00020954	93	87	74	WBGene00017714	40	24	38
WBGene00003587	194	60	44	WBGene00004478	239	33	19	WBGene00012356	67	30	32	WBGene00020953	137	126	115	WBGene00001854	187	191	163
WBGene00009744	194	60	44	WBGene00003076	239	33	19	WBGene00012358	80	25	7	WBGene00021564	294	21	11	WBGene00017715	251	205	167
WBGene00000843	268	36	17	WBGene00009575	239	33	19	WBGene00001815	80	25	7	WBGene00021563	294	21	11	WBGene00015922	96	29	11
WBGene00009112	268	36	17	WBGene00009576	213	29	16	WBGene00164986	115	23	11	WBGene00021562	294	21	11	WBGene00015926	82	45	10
WBGene00013716	299	174	145	WBGene00044917	213	29	16	WBGene00012976	168	24	15	WBGene00018138	133	19	10	WBGene00002239	134	50	14
WBGene00003902	299	174	145	WBGene00044916	213	29	16	WBGene00012977	244	23	20	WBGene00018140	133	19	10	WBGene00001425	259	28	16
WBGene00004444	299	174	145	WBGene00009578	187	24	13	WBGene00219394	182	38	8	WBGene00006104	133	19	10	WBGene00017420	259	28	16
WBGene00013717	299	174	145	WBGene00004227	48	48	51	WBGene00004010	182	38	8	WBGene00006130	51	38	32	WBGene00017419	259	28	16
WBGene00013718	269	98	80	WBGene00009511	166	22	12	WBGene00012923	279	44	15	WBGene00022264	51	38	32	WBGene00018226	123	45	9
WBGene00013719	238	22	14	WBGene00011526	233	26	15	WBGene00012922	279	44	15	WBGene00022265	63	43	39	WBGene00018281	46	52	25
WBGene00004753	152	37	41	WBGene00011527	233	26	15	WBGene00012936	279	44	15	WBGene00022262	63	43	39	WBGene00018282	44	64	45
WBGene00013720	65	51	67	WBGene00011528	233	26	15	WBGene00206461	252	22	14	WBGene00022261	75	47	45	WBGene00006942	57	70	38
WBGene00013721	52	50	46	WBGene00004465	233	26	15	WBGene00012927	252	22	14	WBGene00022266	75	47	45	WBGene00017258	163	53	12
WBGene00013723	198	19	14	WBGene00011529	233	26	15	WBGene00012928	252	22	14	WBGene00022260	110	41	11	WBGene00000422	163	53	12
WBGene00013724	198	19	14	WBGene00011530	233	26	15	WBGene00012929	142	43	9	WBGene00022259	110	41	11	WBGene00004998	163	53	12
WBGene00013725	198	19	14	WBGene00006853	65	43	13	WBGene00012931	150	27	9	WBGene00235321	110	41	11	WBGene00006472	165	56	12
WBGene00013726	165	23	13	WBGene00008164	137	23	12	WBGene00012932	150	27	9	WBGene00022258	110	41	11	WBGene00006649	166	58	12
WBGene00009508	165	23	13	WBGene00008165	137	23	12	WBGene00012934	166	21	13	WBGene00044525	110	41	11	WBGene00017257	135	81	12
WBGene00009507	132	26	12	WBGene00044161	196	22	11	WBGene00012933	201	21	14	WBGene00019525	110	41	11	WBGene00015391	222	24	10
WBGene00009509	89	26	20	WBGene00008166	255	21	10	WBGene00004873	272	23	16	WBGene00000168	56	44	10	WBGene00017048	222	24	10
WBGene00009510	89	26	20	WBGene00011994	129	65	13	WBGene00006563	235	20	12	WBGene00020877	86	49	10	WBGene00044071	164	33	14
WBGene00000492	214	21	14	WBGene00011995	129	65	13	WBGene00012935	235	20	12	WBGene00044526	86	49	10	WBGene00017046	233	23	15
WBGene00206464	214	21	14	WBGene00005016	57	45	39	WBGene00012126	254	15	10	WBGene00020878	86	49	10	WBGene00017571	135	69	9
WBGene00003742	214	21	14	WBGene00007191	153	24	13	WBGene00012125	254	15	10	WBGene00000478	132	57	39	WBGene00017568	180	16	17
WBGene00010325	214	21	14	WBGene00007192	154	21	14	WBGene00003975	254	15	10	WBGene00005533	113	20	12	WBGene00019266	180	16	17
WBGene00010326	214	21	14	WBGene00007193	154	21	14	WBGene00012127	254	15	10	WBGene00001737	113	20	12	WBGene00019265	180	16	17
WBGene00044251	214	21	14	WBGene00007189	154	21	14	WBGene00006533	125	196	182	WBGene00020756	113	20	12	WBGene00019287	48	58	48
WBGene00044792	59	30	28	WBGene00007194	154	18	14	WBGene00001077	103	123	95	WBGene00001738	113	20	12	WBGene00017400	40	40	53
WBGene00010328	59	30	28	WBGene00007341	53	34	31	WBGene00012939	81	50	8	WBGene00020696	185	25	15	WBGene00017401	62	57	49

WBGene00006578	99	30	7	WBGene00007342	53	34	31	WBGene00023404	86	46	16	WBGene00004422	185	25	15	WBGene00004369	62	51	9
WBGene00009117	278	38	25	WBGene00006915	152	35	21	WBGene00013421	207	88	15	WBGene00020695	185	25	15	WBGene00019571	49	41	8
WBGene00009118	278	38	25	WBGene00012155	251	35	10	WBGene00006573	223	24	17	WBGene00044705	185	25	15	WBGene00019729	166	23	19
WBGene00009119	278	38	25	WBGene00012156	175	32	13	WBGene00013446	223	24	17	WBGene00021080	94	41	9	WBGene00019728	166	23	19
WBGene00009120	278	38	25	WBGene00012157	99	29	16	WBGene00004960	161	31	16	WBGene00021078	144	47	18	WBGene00006764	210	24	13
WBGene00009121	242	68	46	WBGene00043534	219	48	45	WBGene00013445	98	38	15	WBGene00003025	193	52	26	WBGene00006477	133	47	42
WBGene00006720	242	68	46	WBGene00012201	338	66	73	WBGene00013443	98	38	15	WBGene00003479	163	17	11	WBGene00019870	55	70	70
WBGene00003926	242	68	46	WBGene00004699	338	66	73	WBGene00013442	162	13	6	WBGene00021482	243	33	12	WBGene00019872	233	48	13
WBGene00004408	242	68	46	WBGene00004698	338	66	73	WBGene00013441	162	13	6	WBGene00000498	243	33	12	WBGene00019869	146	54	32
WBGene00009122	242	68	46	WBGene00012202	338	66	73	WBGene00013438	279	109	51	WBGene00021479	243	33	12	WBGene00002057	59	59	51
WBGene00009123	242	68	46	WBGene00000196	178	59	12	WBGene00013437	252	66	33	WBGene00016786	108	100	9	WBGene00016188	166	24	13
WBGene00009124	242	68	46	WBGene00012203	178	59	12	WBGene00013436	224	23	15	WBGene00044528	126	19	11	WBGene00016187	166	24	13
WBGene00011906	156	69	13	WBGene00002227	178	59	12	WBGene00013435	224	23	15	WBGene00021554	126	19	11	WBGene00016189	85	36	12
WBGene00003083	159	60	31	WBGene00012204	202	25	12	WBGene00013434	92	15	12	WBGene00021557	142	29	13	WBGene00015529	154	42	14
WBGene00044070	162	50	49	WBGene00012205	202	25	12	WBGene00013433	92	15	12	WBGene00043666	142	29	13	WBGene00044579	154	42	14
WBGene00206474	162	50	49	WBGene00012206	202	25	12	WBGene00013432	92	15	12	WBGene00021556	182	28	14	WBGene00017013	167	60	52
WBGene00011909	155	33	30	WBGene00195148	202	25	12	WBGene00013431	92	15	12	WBGene00021559	182	28	14	WBGene00000884	167	60	52
WBGene00011908	125	30	12	WBGene00012207	202	25	12	WBGene00013424	70	17	9	WBGene00021560	182	28	14	WBGene00017039	37	59	59
WBGene00002248	132	31	13	WBGene00006660	57	96	87	WBGene00013425	70	17	9	WBGene00021561	214	32	10	WBGene00020792	24	32	30
WBGene00016622	160	18	11	WBGene00007142	57	96	87	WBGene00012750	141	15	9	WBGene00019276	214	32	10	WBGene00018568	109	65	9
WBGene00016621	160	18	11	WBGene00007143	220	26	12	WBGene00000793	118	14	11	WBGene00022521	90	47	17	WBGene00206376	109	65	9
WBGene00015232	160	18	11	WBGene00003868	220	26	12	WBGene00012756	274	24	12	WBGene00005405	90	47	17	WBGene00018565	81	127	90
WBGene00015231	171	15	9	WBGene00007144	220	26	12	WBGene00001235	274	24	12	WBGene00044529	107	23	13	WBGene00044785	47	39	9
WBGene00015233	171	15	9	WBGene00195248	220	26	12	WBGene00012757	274	24	12	WBGene00017062	107	23	13	WBGene00019173	73	51	31
WBGene00015238	171	15	9	WBGene00007145	220	26	12	WBGene00003417	140	21	14	WBGene00017981	202	64	48	WBGene00000100	58	69	16
WBGene00044321	191	26	17	WBGene00219293	220	26	12	WBGene00007703	247	15	16	WBGene00017982	296	105	82	WBGene00006479	102	16	7
WBGene00015235	191	26	17	WBGene00007013	286	83	78	WBGene00007021	247	15	16	WBGene00003159	296	105	82	WBGene00015264	102	16	7
WBGene00001228	191	26	17	WBGene00077453	286	83	78	WBGene00007704	247	15	16	WBGene00017983	175	75	46	WBGene00044743	96	36	10
WBGene00219234	191	26	17	WBGene00013387	286	83	78	WBGene00007701	38	26	27	WBGene00017984	248	25	14	WBGene00016438	96	36	10
WBGene00015230	191	26	17	WBGene00010055	266	61	49	WBGene00006557	38	26	27	WBGene00017988	248	25	14	WBGene00006887	84	59	13
WBGene00015237	239	31	19	WBGene00010054	266	61	49	WBGene00007680	221	25	21	WBGene00017985	248	25	14	WBGene00015181	231	28	26
WBGene00001432	239	31	19	WBGene00010053	266	61	49	WBGene00007681	221	25	21	WBGene00017986	248	25	14	WBGene00206482	231	28	26
WBGene00016391	219	28	14	WBGene00001031	246	39	19	WBGene00004705	112	25	22	WBGene00021619	162	93	73	WBGene00020595	164	30	12
WBGene00016395	219	28	14	WBGene00010052	246	39	19	WBGene00003826	115	24	20	WBGene00021620	162	93	73	WBGene00000161	164	30	12
WBGene00016392	219	28	14	WBGene00195146	153	48	18	WBGene00003234	228	22	14	WBGene00021616	162	93	73	WBGene00020596	113	19	14
WBGene00016393	219	28	14	WBGene00010057	203	64	34	WBGene00013225	228	22	14	WBGene00004820	162	93	73	WBGene00001463	113	19	14
WBGene00016387	219	28	14	WBGene00010051	252	79	50	WBGene00006396	145	24	12	WBGene00004813	162	93	73	WBGene00004033	43	76	65
WBGene00016386	219	28	14	WBGene00219434	252	79	50	WBGene00013227	145	24	12	WBGene00021621	162	93	73	WBGene00016006	66	59	14
WBGene00015017	176	19	9	WBGene00010050	252	79	50	WBGene00013230	102	27	12	WBGene00021622	162	93	73	WBGene00007130	161	41	15
WBGene00015023	176	19	9	WBGene00003960	181	27	12	WBGene00013232	165	46	39	WBGene00021626	198	18	10	WBGene00007129	161	41	15
WBGene00044646	159	18	13	WBGene00010056	181	27	12	WBGene00013233	165	46	39	WBGene00019224	198	18	10	WBGene00007128	157	36	8
WBGene00044644	159	18	13	WBGene00008546	157	43	16	WBGene00013234	165	46	39	WBGene00020369	129	54	14	WBGene00014145	99	57	13
WBGene00015022	159	18	13	WBGene00003791	157	43	16	WBGene00013235	227	41	33	WBGene00006796	122	61	19	WBGene00014141	99	57	13
WBGene00044413	213	21	13	WBGene00008549	182	74	31	WBGene00013237	288	35	27	WBGene00004947	103	59	13	WBGene00014142	99	57	13
WBGene00004466	213	21	13	WBGene00013925	219	39	18	WBGene00003802	288	35	27	WBGene00022019	221	19	11	WBGene00014144	50	53	39
WBGene00015025	213	21	13	WBGene00013924	219	39	18	WBGene00013236	288	35	27	WBGene00022015	221	19	11	WBGene00001516	208	69	13
WBGene00002191	267	24	13	WBGene00004468	219	39	18	WBGene00000369	288	35	27	WBGene00022020	221	19	11	WBGene00003828	81	37	15
WBGene00015021	267	24	13	WBGene00013926	149	35	24	WBGene00013238	288	35	27	WBGene00022021	229	26	13	WBGene00009888	32	45	28
WBGene00000912	91	79	13	WBGene00007028	278	21	20	WBGene00013239	288	35	27	WBGene00018814	229	26	13	WBGene00009885	23	47	42
WBGene00018850	79	24	10	WBGene00008136	251	36	18	WBGene00003594	288	35	27	WBGene00018812	229	26	13	WBGene00007522	29	39	36
WBGene00018852	203	27	15	WBGene00008137	251	36	18	WBGene00044233	91	60	22	WBGene00019355	215	19	14	WBGene00009380	144	102	62
WBGene00018849	203	27	15	WBGene00008138	224	50	15	WBGene00013228	151	43	16	WBGene00006392	215	19	14	WBGene00009382	144	102	62
WBGene00018847	40	73	54	WBGene00008139	224	50	15	WBGene00006596	211	26	10	WBGene00019354	215	19	14	WBGene00001863	53	97	83
WBGene00016461	40	73	54	WBGene00002184	238	26	12	WBGene00013240	175	19	10	WBGene00019353	174	29	14	WBGene00011642	115	41	12
WBGene00016460	40	73	54	WBGene00006617	238	26	12	WBGene00013241	175	19	10	WBGene00019357	132	39	13	WBGene00011644	115	41	12
WBGene00016462	141	38	17	WBGene00008140	238	26	12	WBGene00013242	175	19	10	WBGene00022584	132	39	13	WBGene00011645	262	28	18
WBGene00016459	141	38	17	WBGene00008744	91	24	13	WBGene00013244	84	30	16	WBGene00006570	158	28	12	WBGene00001081	141	32	9
WBGene00016458	141	38	17	WBGene00008739	112	33	13	WBGene00000201	180	23	10	WBGene00018208	158	28	12	WBGene00009800	141	32	9
WBGene00016457	148	79	61	WBGene00002262	122	40	17	WBGene00006993	272	22	10	WBGene00019839	41	59	21	WBGene00006881	76	53	12
WBGene00016456	85	35	15	WBGene00008740	122	40	17	WBGene00003779	90	29	16	WBGene00019841	41	59	21	WBGene00002271	76	53	12
WBGene00016454	89	86	74	WBGene00000114	110	37	21	WBGene00013544	216	23	12	WBGene00016509	256	34	18	WBGene00009024	89	39	7
WBGene00016463	89	86	74	WBGene00008742	110	37	21	WBGene00001636	51	43	7	WBGene00002010	256	34	18	WBGene00009025	89	39	7
WBGene00016453	89	86	74	WBGene00001679	257	71	14	WBGene00013549	175	20	12	WBGene00016508	256	34	18	WBGene00009027	144	17	11
WBGene00021384	89	86	74	WBGene00009690	89	30	15	WBGene00013550	175	20	12	WBGene00020592	153	88	62	WBGene00007648	144	17	11
WBGene00045433	262	21	13	WBGene00009689	89	30	15	WBGene00013551	198	20	13	WBGene00020588	153	88	62	WBGene00007651	263	64	18

WBGene00018632	262	21	13	WBGene00206377	269	31	19	WBGene00013552	221	20	13	WBGene00020593	153	88	62	WBGene00023491	263	64	18
WBGene00235254	262	21	13	WBGene00009688	269	31	19	WBGene00013553	221	20	13	WBGene00006241	243	119	64	WBGene00219544	64	57	11
WBGene00018625	262	21	13	WBGene00009661	269	31	19	WBGene00013554	221	20	13	WBGene00006523	243	119	64	WBGene00007652	64	57	11
WBGene00013122	190	21	11	WBGene00001016	269	31	19	WBGene00006571	250	28	13	WBGene00004136	220	49	16	WBGene00013919	206	37	10
WBGene00013123	190	21	11	WBGene00219294	269	31	19	WBGene00013556	250	28	13	WBGene00019651	220	49	16	WBGene00001708	222	82	12
WBGene00219422	97	30	11	WBGene00009657	81	45	15	WBGene00013557	239	24	12	WBGene00015451	98	19	7	WBGene00008951	222	82	12
WBGene00077539	97	30	11	WBGene00009660	104	99	70	WBGene00013558	227	19	10	WBGene00004795	98	19	7	WBGene00013871	67	40	11
WBGene00013125	97	30	11	WBGene00009658	104	99	70	WBGene00004085	239	26	13	WBGene00021613	125	22	12	WBGene00013866	67	40	11
NoWBGene_ID14	213	14	11	WBGene00012396	101	73	52	WBGene00013561	239	26	13	WBGene00016863	76	35	12	WBGene00013870	119	46	12
WBGene00013129	213	14	11	WBGene00012395	98	47	34	WBGene00013562	239	26	13	WBGene00016864	76	35	12	WBGene00000930	119	46	12
WBGene00206497	118	34	11	WBGene00003979	77	39	36	WBGene00013563	328	94	76	WBGene00044537	76	35	12	WBGene00012326	111	51	11
WBGene00206530	118	34	11	WBGene00012086	77	39	36	WBGene00001946	328	94	76	WBGene00015067	76	35	12	WBGene00011552	78	126	105
WBGene00001980	120	71	15	WBGene00003789	274	125	105	WBGene00004506	328	94	76	WBGene00015076	273	22	15	WBGene00006839	134	70	54
WBGene00013130	55	57	16	WBGene00000659	274	125	105	WBGene00013029	328	94	76	WBGene00015075	273	22	15	WBGene00008604	257	42	10
WBGene00013131	180	50	11	WBGene00010785	274	125	105	WBGene00004086	171	21	11	WBGene00015074	161	29	12	WBGene00001331	257	42	10
WBGene00009220	247	35	48	WBGene00014155	292	102	83	WBGene00013030	171	21	11	WBGene00015073	161	29	12	WBGene00008603	257	42	10
WBGene00004706	247	35	48	WBGene00014156	309	79	60	WBGene00013033	51	80	83	WBGene00017264	139	12	10	WBGene00008999	312	91	14
WBGene00005517	247	35	48	WBGene00014152	309	79	60	WBGene00013034	51	80	83	WBGene00017261	139	12	10	WBGene00009000	312	91	14
WBGene00012317	174	49	18	WBGene00014153	74	52	13	WBGene00004027	233	25	14	WBGene00005223	144	19	11	WBGene00009674	261	82	65
WBGene00002119	174	49	18	WBGene00014151	216	40	19	WBGene00004919	233	25	14	WBGene00020254	242	28	23	WBGene00004786	261	82	65
WBGene00206528	91	27	10	WBGene00014157	216	40	19	WBGene00013035	233	25	14	WBGene00001037	242	28	23	WBGene00007591	52	46	6
WBGene00013177	163	27	13	WBGene00001977	216	40	19	WBGene00013038	292	28	26	WBGene00003637	242	28	23	WBGene00006135	52	46	6
WBGene00013178	234	27	15	WBGene00003015	216	40	19	WBGene00013039	292	28	26	WBGene00001710	206	20	13	WBGene00007592	85	42	9
WBGene00043056	234	27	15	WBGene00012222	100	116	120	WBGene00013040	292	28	26	WBGene00016062	206	20	13	WBGene00011106	96	31	13
WBGene00010416	220	19	13	WBGene00012219	100	116	120	WBGene00013728	152	19	13	WBGene00006376	206	20	13	WBGene00011105	68	74	10
WBGene00000410	152	22	13	WBGene00012220	198	71	69	WBGene00013729	152	19	13	WBGene00000477	206	20	13	WBGene00011104	68	74	10
WBGene00014807	84	24	13	WBGene00004271	296	26	17	WBGene00013730	179	19	12	WBGene00015966	90	48	11	WBGene00044949	168	42	9
WBGene00010158	98	63	46	WBGene00012221	296	26	17	WBGene00013744	206	19	11	WBGene00015964	90	48	11	WBGene00004375	141	40	10
WBGene00003977	98	63	46	WBGene00003228	296	26	17	WBGene00013733	123	56	10	WBGene00002215	179	34	12	WBGene00001122	114	37	10
WBGene00044250	100	38	31	WBGene00012472	347	52	31	WBGene00013734	290	44	25	WBGene00003927	179	34	12	WBGene00009793	233	103	18
WBGene00010161	232	19	11	WBGene00012471	347	52	31	WBGene00007030	339	73	29	WBGene00044542	209	29	15	WBGene00000047	143	24	15
WBGene00010159	232	19	11	WBGene00012458	347	52	31	WBGene00013735	387	102	33	WBGene00016991	220	22	11	WBGene00013917	143	24	15
WBGene00001215	209	23	12	WBGene00003154	200	26	18	WBGene00013736	198	19	12	WBGene00016990	196	23	13	WBGene00003247	143	24	15
WBGene00013186	209	23	12	WBGene00012461	206	21	15	WBGene00004161	198	19	12	WBGene00016989	196	23	13	WBGene00006870	56	47	11
WBGene00009318	52	57	37	WBGene00012465	212	16	11	WBGene00006389	165	18	12	WBGene00000795	196	23	13	WBGene00008806	225	29	8
WBGene00009316	240	23	12	WBGene00012462	212	16	11	WBGene00013738	254	55	44	WBGene00016992	196	23	13	WBGene00008805	225	29	8
WBGene00009314	240	23	12	WBGene00000892	227	23	15	WBGene00004700	342	91	75	WBGene00016993	172	24	14	WBGene00045480	225	29	8
WBGene00009315	240	23	12	WBGene00006601	227	23	15	WBGene00013739	342	91	75	WBGene00015765	95	35	24	WBGene00006364	141	39	14
WBGene00008856	275	54	62	WBGene00012466	227	23	15	WBGene00013742	268	25	13	WBGene00015769	95	35	24	WBGene00010345	269	77	63
WBGene00008857	275	54	62	WBGene00000565	77	46	10	WBGene00013740	268	25	13	WBGene00017768	225	28	13	WBGene00010199	269	77	63
WBGene00008858	170	64	65	WBGene00012468	107	23	9	WBGene00007027	268	25	13	WBGene00017769	153	22	11	WBGene00003733	269	77	63
WBGene00004963	170	64	65	WBGene00012469	199	24	13	WBGene00007212	229	17	8	WBGene00017767	153	22	11	WBGene00010200	226	108	16
WBGene00007639	68	69	39	WBGene00012470	161	26	23	WBGene00000203	229	17	8	WBGene00017770	153	22	11	WBGene00004749	226	108	16
WBGene00006807	73	30	13	WBGene00012844	32	27	29	WBGene00012560	168	18	10	WBGene00017766	104	26	11	WBGene00000018	136	72	7
WBGene00007640	252	24	19	WBGene00012841	32	27	29	WBGene00012544	168	18	10	WBGene00017765	98	21	13	WBGene00010902	118	57	9
WBGene00007637	252	24	19	WBGene00012845	32	27	29	WBGene00012545	85	27	23	WBGene00044539	98	21	13	WBGene00000908	53	58	60
WBGene00006876	97	58	13	WBGene00013256	147	20	14	WBGene00012546	85	27	23	WBGene00016891	80	20	12	WBGene00008746	105	68	36
WBGene00011385	68	42	23	WBGene00013257	116	28	16	WBGene00003406	298	28	14	WBGene00016892	80	20	12	WBGene00008745	156	77	11
WBGene00011386	110	32	14	WBGene00013258	112	34	18	WBGene00012550	298	28	14	WBGene00018426	157	21	15	WBGene00008747	120	51	11
WBGene00011388	110	32	14	WBGene00004167	318	41	25	WBGene00012551	298	28	14	WBGene00018427	157	21	15	WBGene00008748	147	19	10
WBGene00011389	110	32	14	WBGene00013260	318	41	25	WBGene00012552	298	28	14	WBGene00018428	96	21	15	WBGene00008749	147	19	10
WBGene00086562	112	36	13	WBGene00013261	318	41	25	WBGene00006804	114	36	10	WBGene00018430	176	21	13	WBGene00004862	208	97	11
WBGene00011390	114	39	11	WBGene00013263	92	25	11	WBGene00012553	301	31	12	WBGene00195249	176	21	13	WBGene00001495	64	106	88
WBGene00000415	141	56	14	WBGene00013264	88	34	26	WBGene00012555	239	16	12	WBGene00018431	176	21	13	WBGene00007317	155	80	14
WBGene00001045	141	56	14	WBGene00013254	83	43	41	WBGene00012556	239	16	12	WBGene00022576	176	21	13	WBGene00003999	74	57	10
WBGene00012950	200	20	11	WBGene00013255	167	50	25	WBGene00012558	236	19	16	WBGene00002637	202	40	35	WBGene00009813	202	48	32
WBGene00012951	200	20	11	WBGene00013266	167	50	25	WBGene00012557	236	19	16	WBGene00005297	202	40	35	WBGene00009812	202	48	32
WBGene00012955	200	20	11	WBGene00013268	217	22	17	WBGene00012559	232	21	19	WBGene00017834	120	55	7	WBGene00009818	202	48	32
WBGene00012952	229	21	11	WBGene00013269	217	22	17	WBGene00012712	96	24	11	WBGene00015425	118	27	10	WBGene00011882	152	83	35
WBGene00001372	312	45	32	WBGene00016828	107	35	24	WBGene00012713	96	22	11	WBGene00015420	118	27	10	WBGene00000961	152	83	35
WBGene00011155	312	45	32	WBGene00004945	107	35	24	WBGene00014176	287	32	16	WBGene00189957	217	18	12	WBGene00010715	53	82	87
WBGene00011156	312	45	32	WBGene00206479	107	35	24	WBGene00006728	287	32	16	WBGene00019762	217	18	12	WBGene00003529	53	82	87
WBGene00006707	312	45	32	WBGene00004310	76	39	17	WBGene00014177	287	32	16	WBGene00003954	136	66	8	WBGene00006897	148	87	16
WBGene00003123	312	45	32	WBGene00013273	64	60	60	WBGene00014178	287	32	16	WBGene00015678	136	66	8	WBGene00006896	148	87	16
WBGene00001836	312	45	32	WBGene00013277	49	48	31	WBGene00012717	212	89	30	WBGene00001345	255	67	16	WBGene00001184	228	68	10

WBGene00011058	248	41	35	WBGene00013278	49	48	31	WBGene00012718	145	60	12	WBGene00004502	255	67	16	WBGene00002261	214	99	13
WBGene00006958	248	41	35	WBGene00013279	49	48	31	WBGene00006985	42	38	10	WBGene00000159	255	67	16	WBGene00007482	111	54	34
WBGene00011059	248	41	35	WBGene00044048	49	48	31	WBGene00012719	225	22	8	WBGene00017931	255	67	16	WBGene00012261	111	54	34
WBGene00002004	256	20	11	WBGene00010217	93	22	13	WBGene00012714	225	22	8	WBGene00017930	44	46	23	WBGene00012255	111	54	34
NoWBGene_ID89	256	20	11	WBGene00010219	96	23	13	WBGene00012715	79	17	10	WBGene00019804	117	52	20	WBGene00000166	198	23	10
WBGene00013135	70	88	61	WBGene00013280	92	22	13	WBGene00012716	79	17	10	WBGene00000534	189	57	17	WBGene00012258	198	23	10
WBGene00013136	126	19	11	WBGene00044047	92	22	14	WBGene00001630	132	20	13	WBGene00019805	189	57	17	WBGene00044151	198	23	10
WBGene00013137	126	19	11	WBGene00013281	85	20	15	WBGene00012796	78	75	90	WBGene00019806	189	57	17	WBGene00011139	133	16	9
WBGene00010245	243	31	21	WBGene00008837	168	23	17	WBGene00010138	87	27	8	WBGene00019807	206	25	12	WBGene00044330	102	29	10
WBGene00010244	243	31	21	WBGene00044323	168	23	17	WBGene00185001	147	55	13	WBGene00019808	206	25	12	WBGene00007945	203	20	13
WBGene00010248	177	26	14	WBGene00044322	168	23	17	WBGene00010139	147	55	13	WBGene00005098	206	25	12	WBGene00002029	203	20	13
WBGene00002240	212	52	34	WBGene00008838	168	23	17	WBGene00010140	221	54	16	WBGene00021392	244	97	83	WBGene00007939	154	39	13
WBGene00002000	313	83	61	WBGene00008839	173	25	16	WBGene00010141	236	26	14	WBGene00021391	244	97	83	WBGene00007941	133	43	14
WBGene00010242	313	83	61	WBGene00008843	104	27	8	WBGene00000774	236	26	14	WBGene00000802	244	97	83	WBGene00007942	160	27	14
WBGene00012958	76	24	11	WBGene00008847	104	27	8	WBGene00006798	104	70	44	WBGene00219449	322	173	149	WBGene00007943	170	25	13
WBGene00012959	76	24	11	WBGene00008844	104	27	8	WBGene00012802	173	45	31	WBGene00017535	171	45	15	WBGene00007266	78	38	8
WBGene00011029	166	37	11	WBGene00043054	67	51	36	WBGene00010142	173	45	31	WBGene00017534	171	45	15	WBGene00007267	97	26	9
WBGene00011030	166	37	11	WBGene00011876	67	51	36	WBGene00003804	238	29	15	WBGene00017536	171	45	15	WBGene00009531	184	37	13
WBGene00007600	249	32	21	WBGene00000660	67	51	36	WBGene00012803	254	31	18	WBGene00017537	171	45	15	WBGene00002124	306	67	48
WBGene00007601	249	32	21	WBGene00011877	67	51	36	WBGene00002229	269	32	20	WBGene00017538	44	33	27	WBGene00008586	306	67	48
WBGene00007602	249	32	21	WBGene00009867	34	42	39	WBGene00012804	230	26	16	WBGene00004373	127	47	11	WBGene00008587	306	67	48
WBGene00007603	179	46	32	WBGene00044031	34	42	39	WBGene00012807	176	20	14	WBGene00021068	233	80	22	WBGene00008585	251	54	30
WBGene00008782	109	60	42	WBGene00012580	51	41	28	WBGene00012806	176	20	14	WBGene00019522	92	43	9	WBGene00006922	195	41	12
WBGene00008783	109	60	42	WBGene00012581	51	41	28	WBGene00194870	161	21	16	WBGene00019521	60	47	12	WBGene00008588	195	41	12
WBGene00008784	146	52	25	WBGene00012582	51	41	28	WBGene00009951	137	27	10	WBGene00006437	197	55	13	WBGene00001536	207	40	32
WBGene00008787	146	52	25	WBGene00012584	166	43	11	WBGene00003829	126	33	15	WBGene00017966	124	52	12	WBGene00000040	207	40	32
WBGene00008475	138	20	9	WBGene00012585	166	43	11	WBGene00001092	126	33	15	WBGene00017965	124	52	12	WBGene00003998	116	62	11
WBGene00008476	138	20	9	WBGene00012586	166	43	11	WBGene00002059	126	33	15	WBGene00020273	232	75	16	WBGene00009632	116	62	11
WBGene00012104	243	22	13	WBGene00012600	227	36	42	WBGene00009952	114	39	20	WBGene00020274	232	75	16	WBGene00003970	198	59	11
WBGene00004190	243	22	13	WBGene00012602	227	36	42	WBGene00003478	114	39	20	WBGene00020275	232	75	16	WBGene00009777	198	59	11
WBGene00010769	267	27	14	WBGene00012895	227	36	42	WBGene00011400	94	35	25	WBGene00000110	243	52	15	WBGene00164974	50	51	20
WBGene00006829	267	27	14	WBGene00012896	279	30	23	WBGene00011399	107	29	19	WBGene00001513	254	28	14	WBGene00009259	186	87	25
WBGene00004181	234	29	17	WBGene00012897	279	30	23	WBGene00001035	107	29	19	WBGene00020269	254	28	14	WBGene00004746	186	87	25
WBGene00012208	234	29	17	WBGene00044164	191	37	17	WBGene00011398	120	23	13	WBGene00020268	254	28	14	WBGene00044121	191	66	14
WBGene00012209	234	29	17	WBGene00012899	191	37	17	WBGene00008714	120	23	13	WBGene00020265	173	26	10	WBGene00007955	191	66	14
WBGene00077769	78	72	13	WBGene00012900	191	37	17	WBGene00009730	206	20	15	WBGene00020264	173	26	10	WBGene00003239	191	66	14
WBGene00009362	199	53	17	WBGene00012901	213	19	11	WBGene00009731	206	20	15	WBGene00022646	173	26	10	WBGene00002975	122	24	17
WBGene00009361	199	53	17	WBGene00012903	213	19	11	WBGene00009732	206	20	15	WBGene00006815	79	63	11	WBGene00007956	122	24	17
WBGene00011581	45	35	31	WBGene00012904	213	19	11	WBGene00000255	206	20	15	WBGene00020911	99	30	14	WBGene00001502	250	65	25
WBGene00010420	317	43	24	WBGene00012907	266	61	18	WBGene00009735	108	15	12	WBGene00020910	99	30	14	WBGene00006066	35	41	34
WBGene00010419	317	43	24	WBGene00012908	275	50	16	WBGene00009736	108	15	12	WBGene00006723	104	22	10	WBGene00011446	35	41	34
WBGene00012040	286	46	31	WBGene00012909	284	38	13	WBGene00000834	108	15	12	WBGene00006722	104	22	10	WBGene00011443	46	43	7
WBGene00012041	255	49	38	WBGene00003983	73	60	50	WBGene00012097	275	70	36	WBGene00006721	132	38	11	WBGene00011441	101	33	12
WBGene00012039	255	49	38	WBGene00012916	71	64	41	WBGene00006509	275	70	36	WBGene00001073	154	37	15	WBGene00011442	162	33	13
WBGene00012038	255	49	38	WBGene00009400	67	21	13	WBGene00012094	275	70	36	WBGene00018491	179	45	18	WBGene00011440	168	43	10
WBGene00012037	255	49	38	WBGene00010264	93	21	12	WBGene00006439	275	70	36	WBGene00018490	198	35	24	WBGene00011444	89	85	11
WBGene00003578	37	59	10	WBGene00010263	118	20	11	WBGene00000407	275	70	36	WBGene00235332	35	41	38	WBGene00008090	114	24	10
WBGene00006889	132	20	10	WBGene00004232	76	54	13	WBGene00002185	275	70	36	WBGene00019376	35	41	38	WBGene00008086	114	24	10
WBGene00012192	132	20	10	WBGene00000870	240	102	24	WBGene00012095	94	56	42	WBGene00006665	35	41	38	WBGene00008085	114	24	10
WBGene00012193	195	31	15	WBGene00012608	240	102	24	WBGene00012096	94	56	42	WBGene00235317	35	41	38	WBGene00008045	28	37	36
WBGene00012194	316	44	19	WBGene00008932	54	50	11	WBGene00012098	94	56	42	WBGene00022843	233	22	20	WBGene00008047	28	37	36
WBGene00006700	316	44	19	WBGene00008929	193	50	13	WBGene00004075	246	39	16	WBGene00001829	233	22	20	WBGene00004682	171	36	8
WBGene00007094	122	15	14	WBGene00008930	162	24	13	WBGene00013574	246	39	16	WBGene00002148	139	23	12	WBGene00010067	31	38	40
WBGene00012474	204	21	10	WBGene00195150	175	26	13	WBGene00011475	183	33	18	WBGene00044779	212	22	12	WBGene00010120	72	26	8
WBGene00012475	200	31	13	WBGene00013591	175	26	13	WBGene00011474	183	33	18	WBGene00020425	212	22	12	WBGene00195215	37	54	65
WBGene00012476	200	31	13	WBGene00009245	123	21	12	WBGene00011476	183	33	18	WBGene00004897	212	22	12	WBGene00011614	183	33	12
WBGene00012477	195	40	16	WBGene00009246	123	21	12	WBGene00000067	47	43	16	WBGene00019652	92	67	23	WBGene00011615	183	33	12
WBGene00001746	195	40	16	WBGene00001998	198	17	12	WBGene00012017	47	43	16	WBGene00001210	84	58	17	WBGene00044148	183	33	12
WBGene00012479	133	13	13	WBGene00009307	198	17	12	WBGene00011735	269	54	16	WBGene00019655	75	48	11	WBGene00008209	47	51	8
WBGene00012480	133	13	13	WBGene00012372	147	22	12	WBGene00011736	269	54	16	WBGene00020949	230	30	13	WBGene00008210	47	51	8
WBGene00003905	187	29	14	WBGene00001947	147	22	12	WBGene00011734	269	54	16	WBGene00020950	230	30	13	WBGene00012295	156	20	15
WBGene00012483	264	29	15	WBGene00012373	189	28	13	WBGene00006391	269	54	16	WBGene00020951	230	30	13	WBGene00012158	156	20	15
WBGene00012484	264	29	15	WBGene00012374	189	28	13	WBGene00011733	269	54	16	WBGene00194910	152	19	13	WBGene00012226	122	63	14
WBGene00001433	293	31	16	WBGene00012375	231	33	14	WBGene00011732	269	54	16	WBGene00004984	152	19	13	WBGene00010221	215	100	30
WBGene00001427	293	31	16	WBGene00002264	99	39	11	WBGene00011731	309	26	19	WBGene00004975	152	19	13	WBGene00000277	84	51	12

WBGene00003989	293	31	16	WBGene00000274	96	33	10	WBGene00023450	309	26	19	WBGene00043952	152	19	13	WBGene00007692	57	40	9
WBGene00008131	327	52	35	WBGene00001459	131	19	10	WBGene00011730	309	26	19	WBGene00022601	126	51	11	WBGene00007693	57	40	9
WBGene00006529	327	52	35	WBGene00008860	131	19	10	WBGene00011729	201	38	15	WBGene00022606	126	51	11	WBGene00007292	85	25	15
WBGene00003948	327	52	35	WBGene00008861	131	19	10	WBGene00000179	97	43	12	WBGene00000716	103	17	7	WBGene00012299	85	25	15
WBGene00001234	327	52	35	WBGene00012989	107	59	12	WBGene00001118	134	30	14	WBGene00020527	103	17	7	WBGene00012300	85	25	15
WBGene00004196	327	52	35	WBGene00012990	256	68	13	WBGene00000837	171	17	15	WBGene00020517	103	17	7	WBGene00006966	172	49	26
WBGene00003753	188	24	13	WBGene00012992	255	44	11	WBGene00003048	210	81	17	WBGene00020528	103	17	7	WBGene00000461	172	49	26
WBGene00004895	188	24	13	WBGene00012993	254	19	9	WBGene00012306	34	62	10	WBGene00006803	157	61	29	WBGene00008904	172	49	26
WBGene00009064	252	102	81	WBGene00012998	205	14	9	WBGene00012307	33	56	9	WBGene00019643	94	82	72	WBGene00005118	172	49	26
WBGene00009065	252	102	81	WBGene00008444	113	17	10	WBGene00010664	102	53	11	WBGene00019642	94	82	72	WBGene00005126	37	43	59
WBGene00044786	264	64	17	WBGene00004116	169	32	12	WBGene00010665	190	44	15	WBGene00003844	94	82	72	WBGene00005122	37	43	59
WBGene00014201	264	64	17	WBGene00008446	179	60	30	WBGene00000875	277	34	19	WBGene00006801	94	82	72	WBGene00006979	37	43	59
WBGene00014199	264	64	17	WBGene00008447	133	73	46	WBGene00003967	277	34	19	WBGene00021957	267	26	12	WBGene00044140	56	43	28
WBGene00009695	259	78	52	WBGene00000113	216	26	11	WBGene00007025	277	34	19	WBGene00003164	267	26	12	WBGene00194795	56	43	28
WBGene00009698	259	78	52	WBGene00009739	216	26	11	WBGene00001492	165	42	13	WBGene00021959	267	26	12	WBGene00009635	56	43	28
WBGene00009696	259	78	52	WBGene00009740	216	26	11	WBGene00235257	165	42	13	WBGene00021956	267	26	12	WBGene00009636	78	46	7
WBGene00006902	142	121	71	WBGene00009741	216	26	11	WBGene00017928	289	31	16	WBGene00021960	267	26	12	WBGene00008959	48	71	84
WBGene00010804	142	121	71	WBGene00013004	240	20	11	WBGene00017929	289	31	16	WBGene00044612	267	26	12	WBGene00008958	48	71	84
WBGene00010806	309	27	21	WBGene00013006	240	20	11	WBGene00017926	289	31	16	WBGene00007029	172	18	8	WBGene00008956	141	38	9
WBGene00010807	309	27	21	WBGene00013009	226	22	16	WBGene00000897	289	31	16	WBGene00020908	172	18	8	WBGene00008924	141	38	9
WBGene00006595	219	62	50	WBGene00000804	226	22	16	WBGene00000674	72	57	36	WBGene00017314	145	18	11	WBGene00011826	188	25	12
WBGene00010808	129	97	78	WBGene00006404	185	90	81	WBGene00021400	74	64	13	WBGene00017313	145	18	11	WBGene00011820	113	34	31
WBGene00011431	121	85	68	WBGene00007836	185	90	81	WBGene00006561	140	66	12	WBGene00017316	181	41	20	WBGene00003854	37	43	49
WBGene00011432	88	76	65	WBGene00007837	136	59	49	WBGene00021395	230	21	12	WBGene00017317	181	41	20	WBGene00000222	164	41	12
WBGene00011435	88	76	65	WBGene00007838	87	28	16	WBGene00021402	230	21	12	WBGene00017311	246	40	27	WBGene00004739	181	94	36
WBGene00011433	88	76	65	WBGene00012999	242	27	16	WBGene00000815	230	21	12	WBGene00017310	246	40	27	WBGene00000755	127	20	11
WBGene00001555	170	50	41	WBGene00044084	304	27	15	WBGene00021394	94	33	8	WBGene00015744	258	43	39	WBGene00007259	35	41	39
WBGene00011434	237	66	42	WBGene00013208	304	27	15	WBGene00019822	226	21	16	WBGene00015745	258	43	39	WBGene00045386	35	45	43
WBGene00012343	233	47	32	WBGene00013210	304	27	15	WBGene00019823	226	21	16	WBGene00015742	258	43	39	WBGene00003616	70	53	28
WBGene00012345	228	28	21	WBGene00013209	304	27	15	WBGene00019820	226	21	16	WBGene00015746	258	43	39	WBGene00000082	138	161	83
WBGene00004915	228	28	21	WBGene00013211	304	27	15	WBGene00001728	198	16	13	WBGene00015741	258	43	39	WBGene00011564	138	161	83
WBGene00012344	207	26	17	WBGene00011056	193	72	15	WBGene00019824	198	16	13	WBGene00001428	258	43	39	WBGene00011568	138	161	83
WBGene00012732	185	23	13	WBGene00003246	193	72	15	WBGene00019825	198	16	13	WBGene00001563	235	21	11	WBGene00008260	54	86	76
WBGene00012733	185	23	13	WBGene00013934	158	193	178	WBGene00001071	183	17	13	WBGene00015461	235	21	11	WBGene00008261	54	86	76
WBGene00012735	115	22	11	WBGene00001890	158	193	178	WBGene00020647	130	27	13	WBGene00015462	234	20	11	WBGene00000482	245	77	36
WBGene00007218	236	22	14	WBGene00001885	158	193	178	WBGene00003932	130	27	13	WBGene00015463	232	19	11	WBGene00011770	131	33	10
WBGene00007217	236	22	14	WBGene00001918	158	193	178	WBGene00020651	92	35	13	WBGene00015466	232	19	11	WBGene00011771	188	32	10
WBGene00007215	236	22	14	WBGene00001889	158	193	178	WBGene00001099	39	54	46	WBGene00015460	232	19	11	WBGene00011772	188	32	10
WBGene00007213	180	52	13	WBGene00001888	158	193	178	WBGene00001735	39	54	46	WBGene00005983	70	36	27	WBGene00004089	107	28	9
WBGene00012290	180	52	13	WBGene00001884	158	193	178	WBGene00017578	39	54	46	WBGene00017365	70	36	27	WBGene00195214	107	28	9
WBGene00219206	180	52	13	WBGene00001900	158	193	178	WBGene00017576	45	58	14	WBGene00017364	70	36	27	WBGene00195213	107	28	9
WBGene00012289	214	30	12	WBGene00001916	147	85	66	WBGene00004981	231	41	24	WBGene00017601	39	39	34	WBGene00008693	107	28	9
WBGene00044066	214	30	12	WBGene00008576	130	61	51	WBGene00020295	231	41	24	WBGene00017602	39	39	34	WBGene00008691	190	31	10
WBGene00012739	222	26	12	WBGene00008577	130	61	51	WBGene00004493	231	41	24	WBGene00017605	225	19	14	WBGene00008690	190	31	10
WBGene00012740	223	22	11	WBGene00002120	113	37	36	WBGene00044789	213	30	18	WBGene00017608	201	19	15	WBGene00045495	190	31	10
WBGene00012738	155	21	14	WBGene00008578	116	45	28	WBGene00020300	213	30	18	WBGene00017606	201	19	15	WBGene00008694	190	31	10
WBGene00005010	155	21	14	WBGene00013093	353	23	16	WBGene00001338	219	26	17	WBGene00017607	154	19	14	WBGene00003623	125	61	17
WBGene00013021	221	21	12	WBGene00013094	353	23	16	WBGene00020298	214	19	13	WBGene00016816	131	18	12	WBGene00008279	90	41	45
WBGene00013020	160	22	10	WBGene00013095	353	23	16	WBGene00045249	214	19	13	WBGene00016817	131	18	12	WBGene00010519	90	41	45
WBGene00013019	119	22	9	WBGene00001838	265	25	16	WBGene00020297	233	20	15	WBGene00044551	102	72	13	WBGene00045497	90	41	45
WBGene00013018	130	22	9	WBGene00013096	265	25	16	WBGene00020296	233	20	15	WBGene00022410	67	53	27	WBGene00010999	177	51	10
WBGene00013603	113	22	10	WBGene00012198	223	29	18	WBGene00000913	234	27	15	WBGene00016901	164	39	20	WBGene00008925	177	51	10
WBGene00003585	114	49	11	WBGene00012722	209	26	18	WBGene00022046	234	27	15	WBGene00044342	138	32	25	WBGene00008927	170	102	98
WBGene00044260	236	17	13	WBGene00012723	209	26	18	WBGene00022047	234	27	15	WBGene00020246	243	29	10	WBGene00008600	209	26	15
WBGene00013604	236	17	13	WBGene00012724	209	26	18	WBGene00002041	234	27	15	WBGene00005661	243	29	10	WBGene00008601	116	43	11
WBGene00013593	236	17	13	WBGene00012187	259	29	14	WBGene00022045	223	17	13	WBGene00005660	127	65	18	WBGene00011255	136	57	17
WBGene00013595	220	21	12	WBGene00012188	259	29	14	WBGene00022044	223	17	13	WBGene00020245	127	65	18	WBGene00000217	136	57	17
WBGene00000089	220	21	12	WBGene00002275	259	29	14	WBGene00021012	205	19	16	WBGene00016149	292	33	19	WBGene00004826	202	57	14
NoWBGene_ID71	166	15	11	WBGene00012730	102	18	15	WBGene00000213	205	19	16	WBGene00001719	292	33	19	WBGene00004825	202	57	14
WBGene00013602	166	15	11	WBGene00012230	272	22	12	WBGene00001165	184	104	24	WBGene00004453	292	33	19	WBGene00004827	267	57	10
WBGene00000891	251	21	13	WBGene00010719	272	22	12	WBGene00018927	184	104	24	WBGene00004499	292	33	19	WBGene00010694	267	57	10
WBGene00013596	250	25	14	WBGene00012228	272	22	12	WBGene00018925	189	62	18	WBGene00016148	292	33	19	WBGene00010690	116	39	20
WBGene00013597	249	28	14	WBGene00012227	283	38	22	WBGene00001579	194	20	11	WBGene00022812	272	23	15	WBGene00010691	116	39	20
WBGene00013598	245	17	11	WBGene00012978	283	38	22	WBGene00019665	263	36	18	WBGene00002078	272	23	15	WBGene00010692	116	39	20
WBGene00013599	245	17	11	WBGene00004456	283	38	22	WBGene00019658	263	36	18	WBGene00002256	114	25	11	WBGene00001995	223	24	11

WBGene00012386	280	39	17	WBGene00006964	283	38	22	WBGene00004427	263	36	18	WBGene00003242	82	59	38	WBGene00010693	223	24	11
WBGene00012351	280	39	17	WBGene00012980	156	66	14	WBGene00019664	184	31	16	NoWBGene_ID65	96	39	15	WBGene00003626	95	58	8
WBGene00006793	280	39	17	WBGene00012983	188	25	15	WBGene00019661	74	84	66	WBGene00016497	96	39	15	WBGene00164968	66	23	11
WBGene00004445	252	58	18	WBGene00012982	180	29	16	WBGene00018256	74	84	66	WBGene00016501	220	40	18	WBGene00010704	53	33	36
WBGene00012353	280	43	17	WBGene00001971	328	165	133	WBGene00018928	127	21	9	WBGene00016496	220	40	18	WBGene00010705	53	33	36
WBGene00012354	307	28	15	WBGene00013213	328	165	133	WBGene00018929	173	20	9	WBGene00016495	220	40	18	WBGene00005121	30	41	53
WBGene00194660	264	23	13	WBGene00002996	211	31	19	WBGene00018933	173	20	9	WBGene00002632	191	72	15	WBGene00011013	30	41	53
WBGene00012234	220	17	10	WBGene00185067	211	31	19	WBGene00018932	218	19	8	WBGene00017818	206	50	16	WBGene00009796	30	41	53
WBGene00012390	223	19	12	WBGene00013219	211	31	19	WBGene00004824	205	17	14	WBGene00022394	206	50	16	WBGene00008213	48	61	8
WBGene00012389	223	19	12	WBGene00011050	223	30	17	WBGene00018935	205	17	14	WBGene00022393	221	28	16	WBGene00008518	111	22	8
WBGene00012370	149	19	12	WBGene00011051	234	29	14	WBGene00018934	205	17	14	WBGene00022392	221	28	16	WBGene00008517	111	22	8
WBGene00044065	149	19	12	WBGene00011047	222	26	17	WBGene00001154	205	17	14	WBGene00022397	34	55	12	WBGene00008516	111	22	8
WBGene00012366	255	29	13	WBGene00002076	209	22	20	WBGene00021942	151	25	11	WBGene00022396	34	55	12	WBGene00007810	42	67	81
WBGene00012371	255	29	13	WBGene00011049	143	48	34	WBGene00021944	42	68	72	WBGene00044552	139	18	12	WBGene00007811	97	62	54
WBGene00012369	167	24	13	WBGene00003220	210	36	27	WBGene00021945	279	19	10	WBGene00022398	139	18	12	WBGene00007812	151	57	27
WBGene00012365	143	20	12	WBGene00195149	276	24	20	WBGene00044757	279	19	10	WBGene00022399	139	18	12	WBGene00001435	151	57	27
WBGene00012236	230	63	18	WBGene00009179	276	24	20	WBGene00021939	121	18	10	WBGene00022402	164	22	13	WBGene00001436	35	47	34
WBGene00012237	252	104	23	WBGene00009180	269	51	28	WBGene00021938	121	18	10	WBGene00022400	188	25	13	WBGene00008527	19	30	36
WBGene00012239	252	104	23	WBGene00009182	179	60	27	WBGene00007007	145	13	11	WBGene00022401	188	25	13	WBGene00008526	19	30	36
WBGene00012238	252	104	23	WBGene00194892	94	26	13	WBGene00004047	89	32	15	WBGene00018398	104	19	9	WBGene00010368	43	63	63
WBGene00012240	269	74	23	WBGene00001371	94	26	13	WBGene00043705	224	24	13	WBGene00001152	112	18	10	WBGene00000758	43	63	63
WBGene00195155	285	44	23	WBGene00004048	50	45	19	WBGene00021924	224	24	13	WBGene00018399	112	18	10	WBGene00000406	178	51	9
WBGene00012241	285	44	23	WBGene00010550	302	86	16	WBGene00021926	340	27	21	WBGene00018400	148	18	16	WBGene00008939	229	53	18
WBGene00013506	193	35	19	WBGene00010551	239	52	14	WBGene00021922	340	27	21	WBGene00003865	176	20	20	WBGene00003903	280	55	26
WBGene00004475	299	53	25	WBGene00006856	220	22	16	WBGene00021921	340	27	21	WBGene00006935	176	20	20	WBGene00008940	280	55	26
WBGene00013508	139	58	46	WBGene00010758	220	22	16	WBGene00021929	251	30	15	WBGene00022629	91	73	73	WBGene00010034	270	71	24
WBGene00045058	100	25	15	WBGene00010759	53	64	54	WBGene00021930	251	30	15	WBGene00017018	213	23	12	WBGene00010033	270	71	24
WBGene00013509	140	91	18	WBGene00000972	53	64	54	WBGene00021920	251	30	15	WBGene00005006	213	23	12	WBGene00006816	270	71	24
WBGene00009825	92	53	15	WBGene00010196	124	19	11	WBGene00021931	251	30	15	WBGene00017016	213	23	12	WBGene00010027	131	22	7
WBGene00009823	141	41	16	WBGene00010197	124	19	11	WBGene00021934	294	24	16	WBGene00017017	213	23	12	WBGene00010028	142	28	9
WBGene00013408	141	41	16	WBGene00010198	124	19	11	WBGene00021933	294	24	16	WBGene00005648	116	15	8	WBGene00000262	142	28	9
WBGene00013409	121	37	14	WBGene00003392	213	26	12	WBGene00021932	169	31	14	WBGene00019478	71	46	10	WBGene00010030	152	34	11
WBGene00013404	121	37	14	WBGene00007996	54	74	72	WBGene00044462	44	37	12	WBGene00019477	71	46	10	WBGene00008037	76	99	93
WBGene00013403	158	35	13	WBGene00007997	54	74	72	WBGene00016637	44	37	12	WBGene00019481	214	26	15	WBGene00007288	37	49	44
WBGene00013405	249	38	15	WBGene00000225	47	44	14	WBGene00003893	44	37	12	WBGene00000098	214	26	15	WBGene00007286	86	45	29
WBGene00006565	281	38	16	WBGene00006787	47	44	14	WBGene00016796	277	24	11	WBGene00003937	214	26	15	WBGene00007287	126	46	12
WBGene00001047	296	31	16	WBGene00010491	130	45	8	WBGene00022426	277	24	11	WBGene00004395	29	34	43	WBGene00000074	140	58	9
WBGene00013406	311	24	15	WBGene00007478	130	45	8	WBGene00022427	110	61	50	WBGene00020941	193	25	16	WBGene00010773	36	35	26
WBGene00013407	311	24	15	WBGene00007479	85	49	29	WBGene00001104	110	61	50	WBGene00020942	193	25	16	WBGene00010774	31	40	27
WBGene00002181	130	62	14	WBGene00013188	136	35	17	WBGene00001103	110	61	50	WBGene00004766	193	25	16	WBGene00010775	31	40	27
WBGene00007988	133	35	38	WBGene00006381	136	35	17	WBGene00009521	223	17	9	WBGene00020946	193	25	16	WBGene00077679	126	35	12
WBGene00007991	133	35	38	WBGene00013189	136	35	17	WBGene00044908	223	17	9	WBGene00020943	193	25	16	WBGene00010776	82	38	22
WBGene00001377	106	73	14	WBGene00013190	136	35	17	WBGene00009515	140	30	9	WBGene00003395	106	49	34	WBGene00003661	107	44	11
WBGene00008613	108	28	19	WBGene00013195	255	28	16	WBGene00007476	140	30	9	WBGene00018181	106	49	34	WBGene00010834	138	43	12
WBGene00008611	108	28	19	WBGene00001225	255	28	16	WBGene00018776	293	27	11	WBGene00018179	106	49	34	WBGene00010836	138	43	12
WBGene00008612	127	34	15	WBGene00013196	255	28	16	WBGene00018778	262	23	11	WBGene00020721	200	27	13	WBGene00010835	138	43	12
WBGene00009862	146	40	11	WBGene00012180	216	42	25	WBGene00018777	230	19	11	WBGene00001040	200	27	13	NoWBGene_ID59	69	48	13
WBGene00009861	146	40	11	WBGene00012181	176	56	34	WBGene00019053	252	19	10	WBGene00020719	200	27	13	WBGene00005063	123	59	14
WBGene00009863	92	49	13	WBGene00012183	79	43	12	WBGene00004338	252	19	10	WBGene00004256	34	37	33	WBGene00010493	102	50	11
WBGene00013667	227	21	12	WBGene00012182	140	40	13	WBGene00022423	67	111	109	WBGene00022842	36	34	25	WBGene00000105	167	61	23
WBGene00013668	227	21	12	WBGene00012179	200	37	14	WBGene00022310	268	22	16	WBGene00018482	163	21	14	WBGene00006372	34	37	14
WBGene00013669	267	25	12	WBGene00004451	200	37	14	WBGene00002180	268	22	16	WBGene00018483	163	21	14	WBGene00004126	222	73	9
WBGene00000158	267	25	12	WBGene00003651	200	37	14	WBGene00022311	268	22	16	WBGene00018480	163	21	14	WBGene00009850	203	29	14
WBGene00013674	285	23	15	WBGene00011046	181	24	13	WBGene00235267	110	35	9	WBGene00018478	133	196	186	WBGene00009851	203	29	14
WBGene00004489	285	23	15	WBGene00011043	181	24	13	WBGene00000546	110	35	9	WBGene00001882	133	196	186	WBGene00009852	203	29	14
WBGene00013676	285	23	15	WBGene00013150	232	26	10	WBGene00003806	247	26	10	WBGene00001881	133	196	186	WBGene00009853	203	29	14
WBGene00013678	225	17	11	WBGene00013151	232	26	10	WBGene00022306	247	26	10	WBGene00001880	133	196	186	WBGene00007846	168	21	10
WBGene00013685	225	17	11	WBGene00044720	232	26	10	WBGene00019368	60	61	64	WBGene00001879	133	196	186	WBGene00007847	144	30	10
WBGene00013679	225	17	11	WBGene00044726	91	23	11	WBGene00044719	60	61	64	WBGene00001913	133	196	186	WBGene00007848	119	38	10
WBGene00013683	149	20	9	WBGene00013156	285	26	20	WBGene00003794	188	23	14	WBGene00018477	133	196	186	WBGene00007849	119	38	10
WBGene00013682	107	21	11	WBGene00013158	285	26	20	WBGene00021516	95	26	15	WBGene00017800	211	26	17	WBGene00007295	67	37	11
WBGene00013687	178	14	8	WBGene00194905	285	26	20	WBGene00000416	193	17	13	WBGene00017797	211	26	17	WBGene00001116	33	54	37
WBGene00013692	209	20	10	WBGene00013159	196	17	14	WBGene00021515	106	15	14	WBGene00007055	81	42	10	WBGene00007903	33	54	37
WBGene00013689	217	22	13	WBGene00013160	196	17	14	WBGene00004497	284	37	14	WBGene00044554	245	31	17	WBGene00008880	129	35	10
WBGene00013688	195	19	14	WBGene00013165	165	18	13	WBGene00021512	284	37	14	WBGene00018286	245	31	17	WBGene00008881	192	31	17

WBGene00013690	145	25	12	WBGene00013166	190	18	13	WBGene00019538	308	33	17	WBGene00018290	245	31	17	WBGene00008882	254	27	23
WBGene00013691	145	25	12	WBGene00013167	190	18	13	WBGene00003947	308	33	17	WBGene00018285	245	31	17	WBGene00008884	49	67	84
WBGene00001334	145	25	12	WBGene00013168	231	23	11	WBGene00019537	308	33	17	WBGene00018291	245	31	17	WBGene00009235	49	67	84
WBGene00003790	271	27	18	WBGene00219491	84	24	13	WBGene00019536	308	33	17	WBGene00018293	169	36	31	WBGene00009234	114	36	34
WBGene00013200	242	24	17	WBGene00013170	84	24	13	WBGene00021507	163	23	13	WBGene00018294	169	36	31	WBGene00009233	106	28	23
WBGene00013201	242	24	17	WBGene00001774	42	68	72	WBGene00021508	195	23	13	WBGene00018295	169	36	31	WBGene00044137	27	42	51
WBGene00013202	242	24	17	WBGene00001775	42	68	72	WBGene00021506	170	30	13	WBGene00022538	50	57	30	WBGene00009232	40	51	42
WBGene00013203	152	23	14	WBGene00001776	42	68	72	WBGene00021509	143	34	13	WBGene00022539	50	57	30	WBGene00006369	190	33	10
WBGene00003951	152	23	14	WBGene00001777	42	68	72	WBGene00021505	143	34	13	WBGene00015275	172	66	33	WBGene00007993	171	31	11
WBGene00010579	152	23	14	WBGene00021597	104	32	11	WBGene00021410	79	19	11	WBGene00006342	172	66	33	WBGene00007994	151	29	12
WBGene00010587	215	26	17	WBGene00021596	255	25	14	WBGene00004913	79	19	11	WBGene00006467	94	65	11	WBGene00000457	88	30	15
WBGene00010585	228	50	14	WBGene00021595	255	25	14	WBGene00019462	163	15	9	WBGene00015276	94	65	11	WBGene00000458	74	35	9
WBGene00010584	228	50	14	WBGene00018794	256	29	18	WBGene00001173	163	15	9	WBGene00001891	96	172	165	WBGene00010552	140	38	9
WBGene00010581	268	27	16	WBGene00018795	153	30	29	WBGene00001186	136	97	67	WBGene00001892	96	172	165	WBGene00010553	131	51	8
WBGene00010583	268	27	16	WBGene00018793	153	30	29	WBGene00001253	166	59	39	WBGene00019448	96	172	165	WBGene00010554	131	51	8
WBGene00001979	268	27	16	WBGene00003931	145	41	23	WBGene00018681	196	21	11	WBGene00019445	96	172	165	WBGene00006517	205	37	16
WBGene00010580	293	29	22	WBGene00016222	130	65	11	WBGene00018680	194	27	10	WBGene00001526	185	43	16	WBGene00007532	205	37	16
WBGene00009559	293	29	22	WBGene00016223	130	65	11	WBGene00018679	194	27	10	WBGene00020553	127	34	18	WBGene00007530	205	37	16
WBGene00001030	293	29	22	WBGene00016227	97	19	12	WBGene00022298	195	22	11	WBGene00020861	179	75	16	WBGene00007529	142	32	9
WBGene00043308	293	29	22	WBGene00016217	97	19	12	WBGene00022297	195	22	11	WBGene00017659	179	75	16	WBGene00004191	142	32	9
WBGene00004495	293	29	22	WBGene00016216	97	19	12	WBGene00022302	256	18	12	WBGene00017658	179	75	16	WBGene00010571	109	18	10
WBGene00009558	197	39	18	WBGene00020540	114	30	23	WBGene00022300	168	19	12	WBGene00015057	142	21	11	WBGene00010572	109	18	10
WBGene00009557	100	49	13	WBGene00020541	131	41	33	WBGene00022296	80	19	12	WBGene00004107	142	21	11	WBGene00013370	28	30	24
WBGene00006349	289	42	17	WBGene00020542	131	41	33	WBGene00022301	231	18	13	WBGene00016045	142	21	11	WBGene00009088	95	36	10
WBGene00009554	289	42	17	WBGene00020543	131	41	33	WBGene00022303	231	18	13	WBGene00004216	142	21	11	WBGene00009089	95	36	10
WBGene00006730	289	42	17	WBGene00020548	131	41	33	WBGene00077523	67	49	7	WBGene00007023	115	20	11	WBGene00044147	236	36	16
WBGene00009553	289	42	17	WBGene00020544	131	41	33	WBGene00016918	67	49	7	WBGene00044077	134	35	13	WBGene00001583	274	147	111
WBGene00004889	106	91	11	WBGene00006895	131	41	33	WBGene00235274	67	49	7	WBGene00001695	153	50	14	WBGene00010940	311	258	206
WBGene00013204	222	24	10	WBGene00189954	77	34	22	WBGene00016917	270	23	17	WBGene00000003	72	50	9	WBGene00001898	311	258	206
WBGene00002324	222	24	10	WBGene00018245	77	34	22	WBGene00022134	270	23	17	WBGene00006152	72	50	9	WBGene00010935	174	76	19
WBGene00006711	222	24	10	WBGene00018247	77	34	22	WBGene00235277	151	86	20	WBGene00018406	95	27	12	WBGene00008355	144	38	12
WBGene00009304	59	57	11	WBGene00189955	152	65	21	WBGene00020208	151	86	20	WBGene00006499	95	27	12	WBGene00008354	214	18	10
WBGene00044245	132	17	11	WBGene00018246	152	65	21	WBGene00019787	141	13	8	WBGene00019465	153	26	13	WBGene00011982	39	27	32
WBGene00009305	109	53	16	WBGene00018248	226	96	19	WBGene00002990	141	13	8	WBGene00019464	211	24	13	WBGene00011981	39	27	32
WBGene00009306	85	89	21	WBGene00018242	226	96	19	WBGene00006920	222	29	13	WBGene00006729	211	24	13	WBGene00004301	56	48	15
WBGene00001488	157	22	9	WBGene00077531	226	96	19	WBGene00006912	136	39	12	WBGene00000766	150	50	34	WBGene00003602	63	63	14
WBGene00002189	74	59	10	WBGene00018241	226	96	19	WBGene00219413	136	39	12	NoWBGene_ID35	205	118	89	WBGene00008094	168	39	30
WBGene00014148	66	47	11	WBGene00001963	260	27	13	WBGene00021425	216	19	11	WBGene00019466	321	161	124	WBGene00008093	104	49	46
WBGene00014149	66	47	11	WBGene00003510	260	27	13	WBGene00021423	216	19	11	WBGene00019467	321	161	124	WBGene00002282	104	49	46
WBGene00000469	127	81	12	WBGene00006715	260	27	13	WBGene00021421	329	35	24	WBGene00006623	321	161	124	WBGene00006366	104	49	46
WBGene00009368	217	23	13	WBGene00018240	260	27	13	WBGene00021427	329	35	24	WBGene00005938	321	161	124	WBGene00006524	231	28	14
WBGene00009369	217	23	13	WBGene00018239	260	27	13	WBGene00021420	329	35	24	WBGene00017097	96	47	13	WBGene00001325	178	52	9
WBGene00001049	246	22	12	WBGene00021755	330	20	13	WBGene00021419	329	35	24	WBGene00002036	106	30	13	WBGene00004313	153	56	10
WBGene00009366	214	25	12	WBGene00021754	330	20	13	WBGene00021430	74	128	134	WBGene00018088	115	12	13	WBGene00010059	63	65	9
WBGene00009370	182	27	11	WBGene00021751	87	33	11	WBGene00022090	270	23	13	WBGene00018089	115	12	13	WBGene00007750	83	56	11
WBGene00009371	238	68	46	WBGene00021756	342	62	48	WBGene00022092	270	23	13	WBGene00018090	181	55	13	WBGene00001828	68	33	13
WBGene00009367	293	108	81	WBGene00001561	342	62	48	WBGene00022089	270	23	13	WBGene00018091	181	55	13	WBGene00009573	68	33	13
WBGene00009284	285	84	72	WBGene00021913	147	38	14	WBGene00022087	270	23	13	WBGene00019237	44	45	11	WBGene00009574	207	41	12
WBGene00000881	276	60	63	WBGene00021912	127	46	10	WBGene00235294	125	57	13	WBGene00008670	160	23	14	WBGene00006432	194	44	11
WBGene00009285	258	40	38	WBGene00021914	212	23	10	WBGene00022078	125	57	13	WBGene00008230	124	23	12	WBGene00007348	100	22	9
WBGene00009286	240	20	13	WBGene00017328	212	23	10	WBGene00022077	208	27	13	WBGene00008231	124	23	12	WBGene00007349	152	36	14
WBGene00009287	240	20	13	WBGene00044288	149	18	9	WBGene00022101	208	27	13	WBGene00008232	124	23	12	WBGene00007350	152	36	14
WBGene00009288	240	20	13	WBGene00006781	95	42	33	WBGene00022099	208	27	13	WBGene00008236	124	23	12	WBGene00007351	152	36	14
WBGene00015285	169	23	11	WBGene00017937	53	65	24	WBGene00022076	208	27	13	WBGene00008238	212	155	120	WBGene00009629	30	49	56
WBGene00005017	202	21	11	WBGene00015155	138	91	11	WBGene00003161	293	56	23	WBGene00003160	212	155	120	WBGene00044139	61	47	34
WBGene00015291	202	21	11	WBGene00021906	179	35	8	WBGene00022075	293	56	23	WBGene00001909	212	155	120	WBGene00000221	92	45	11
WBGene00017745	202	21	11	WBGene00002269	179	35	8	WBGene00004367	293	56	23	WBGene00001915	212	155	120	WBGene00011426	193	52	19
WBGene00017746	133	23	15	WBGene00020564	240	24	15	WBGene00022100	128	50	40	WBGene00001910	212	155	120	WBGene00001329	293	59	27
WBGene00017744	133	23	15	WBGene00001412	240	24	15	WBGene00022074	146	27	13	WBGene00001911	212	155	120	WBGene00003149	212	40	19
WBGene00017743	133	23	15	WBGene00020565	240	24	15	WBGene00022377	177	19	13	WBGene00008237	212	155	120	WBGene00007775	206	24	15
WBGene00017750	243	26	14	WBGene00021063	242	22	15	WBGene00022376	237	20	13	WBGene00009098	212	155	120	WBGene00007771	206	24	15
WBGene00004504	243	26	14	WBGene00044319	244	19	15	WBGene00022378	255	20	10	WBGene00009099	181	24	15	WBGene00007774	206	24	15
WBGene00017742	243	26	14	WBGene00044318	244	19	15	WBGene00006705	183	35	10	WBGene00009103	181	24	15	WBGene00003411	205	52	8
WBGene00017749	243	26	14	WBGene00021061	244	19	15	WBGene00022382	111	50	9	WBGene00010727	181	24	15	WBGene00009720	41	56	12
WBGene00016021	85	46	11	WBGene00016029	37	49	11	WBGene00022381	255	25	10	WBGene00000226	171	18	14	WBGene00008973	251	42	13

WBGene00016020	85	46	11	WBGene00004212	68	50	41	WBGene00021877	166	40	9	WBGene00001830	214	20	17	WBGene00008974	198	39	18
WBGene00006611	85	46	11	WBGene00018365	68	50	41	WBGene00021875	38	32	35	WBGene00004320	186	33	28	WBGene00008975	145	35	22
WBGene00016018	122	90	12	WBGene00000882	68	50	41	WBGene00044487	51	54	57	WBGene00013966	186	33	28	WBGene00008976	230	24	13
WBGene00001193	122	90	12	WBGene00000117	68	50	41	WBGene00021894	51	54	57	WBGene00013967	186	33	28	WBGene00004317	230	24	13
WBGene00016810	265	25	10	WBGene00018364	265	20	13	WBGene00044488	64	75	79	WBGene00009580	142	37	13	WBGene00008979	162	22	12
WBGene00016811	265	25	10	WBGene00018362	265	20	13	WBGene00021871	273	35	14	WBGene00006470	142	37	13	WBGene00007668	162	22	12
WBGene00016808	265	25	10	WBGene00004922	290	26	17	WBGene00235102	273	35	14	WBGene00009583	186	47	15	WBGene00007666	192	35	11
WBGene00044420	265	25	10	WBGene00004498	314	31	20	WBGene00021883	273	35	14	WBGene00009584	186	47	15	WBGene00007667	147	33	11
WBGene00019615	77	52	8	WBGene00015173	314	31	20	WBGene00021884	196	28	12	WBGene00009585	186	47	15	WBGene00010433	198	26	13
WBGene00019616	77	52	8	WBGene00019329	263	56	22	WBGene00006708	255	21	17	WBGene00006778	39	42	11	WBGene00008609	198	26	13
WBGene00020798	177	28	10	WBGene00019327	263	56	22	WBGene00021888	255	21	17	WBGene00009771	236	20	13	WBGene00008607	100	68	9
WBGene00020797	237	22	13	WBGene00019331	263	56	22	WBGene00021870	255	21	17	WBGene00009772	236	20	13	WBGene00008606	100	68	9
WBGene00020796	237	22	13	WBGene00001392	119	57	10	WBGene00021891	89	69	15	WBGene00009773	236	20	13	WBGene00008605	100	68	9
WBGene00001340	227	63	13	WBGene00019326	119	57	10	WBGene00219425	89	69	15	WBGene00045419	193	36	13	WBGene00003840	183	17	10
WBGene00018585	311	40	35	WBGene00019333	240	26	16	WBGene00021869	51	37	8	WBGene00011577	175	20	14	WBGene00011679	196	33	23
WBGene00018586	311	40	35	WBGene00004388	240	26	16	WBGene00022069	274	30	17	WBGene00008246	175	20	14	WBGene00000618	196	33	23
WBGene00021545	311	40	35	WBGene00006430	240	26	16	WBGene00022067	213	27	16	WBGene00011576	175	20	14	WBGene00011680	208	48	36
WBGene00004166	312	24	10	WBGene00019334	189	23	13	WBGene00003153	74	28	11	WBGene00044204	175	20	14	WBGene00011681	44	59	8
WBGene00000296	312	24	10	WBGene00000202	137	20	9	WBGene00019766	218	23	14	WBGene00006777	51	64	55	WBGene00009552	71	43	28
WBGene00015194	229	24	12	WBGene00021170	191	71	25	WBGene00022059	187	79	40	WBGene00007784	225	22	12	WBGene00002203	102	90	17
WBGene00015190	229	24	12	WBGene00020758	245	121	40	WBGene00020833	105	38	12	WBGene00007785	159	31	23	WBGene00004777	74	82	80
WBGene00015191	229	24	12	WBGene00020759	245	121	40	WBGene00021089	232	30	18	WBGene00077500	159	31	23	WBGene00012444	105	37	15
WBGene00015186	179	20	12	WBGene00020760	245	121	40	WBGene00021088	232	30	18	WBGene00007786	92	40	34	WBGene00007877	101	56	9
WBGene00015185	179	20	12	WBGene00020762	227	46	14	WBGene00021087	232	30	18	WBGene00007787	92	40	34	WBGene00007878	149	67	8
WBGene00015184	129	15	12	WBGene00020763	222	35	14	WBGene00018328	330	113	90	WBGene00004323	180	15	10	WBGene00010981	182	20	13
WBGene00015192	129	15	12	WBGene00017758	186	25	16	WBGene00001999	330	113	90	WBGene00010699	180	15	10	WBGene00010983	141	20	14
WBGene00015183	70	41	15	WBGene00017759	154	25	18	WBGene00018324	330	113	90	WBGene00010698	180	15	10	WBGene00010984	141	20	14
WBGene00019281	70	41	15	WBGene00017760	189	25	16	WBGene00018330	99	55	16	WBGene00077491	156	40	10	WBGene00010396	111	28	8
WBGene00019280	70	41	15	WBGene00017763	224	24	14	WBGene00018323	48	45	52	WBGene00010697	156	40	10	WBGene00001649	111	28	8
WBGene00000645	70	41	15	WBGene00000263	224	24	14	WBGene00021953	277	22	11	WBGene00011543	132	29	13	WBGene00006541	243	48	17
WBGene00019279	186	65	15	WBGene00017757	224	24	14	WBGene00021952	277	22	11	WBGene00011544	177	53	9	WBGene00044142	243	48	17
WBGene00019282	186	65	15	WBGene00017761	224	24	14	WBGene00015250	291	26	15	WBGene00010177	177	53	9	WBGene00006494	155	46	14
WBGene00019278	186	65	15	WBGene00020459	85	17	11	WBGene00015251	291	26	15	WBGene00010178	168	17	15	WBGene00001130	142	75	11
WBGene00019283	186	65	15	WBGene00020457	85	17	11	WBGene00015248	291	26	15	WBGene00006169	168	17	15	WBGene00001520	162	20	9
WBGene00086561	186	65	15	WBGene00020451	85	17	11	WBGene00015252	291	26	15	WBGene00007428	193	24	15	WBGene00010702	162	20	9
WBGene00017037	217	20	14	WBGene00020450	85	17	11	WBGene00219410	219	26	11	WBGene00007429	193	24	15	WBGene00010701	229	49	18
WBGene00017038	217	20	14	WBGene00020448	90	45	12	WBGene00001119	219	26	11	WBGene00000840	145	18	9	WBGene00004276	256	47	14
WBGene00015407	205	22	14	WBGene00019912	90	45	12	WBGene00015413	219	26	11	WBGene00014108	147	24	15	WBGene00010700	222	40	15
WBGene00015405	205	22	14	WBGene00019913	121	53	10	WBGene00015658	232	42	14	WBGene00014109	147	24	15	WBGene00010726	203	33	17
WBGene00015404	205	22	14	WBGene00019915	121	53	10	WBGene00006769	247	61	39	WBGene00014112	147	24	15	WBGene00010725	203	33	17
WBGene00016074	261	27	13	WBGene00015267	204	20	14	WBGene00019778	100	15	10	WBGene00050936	147	24	15	WBGene00001687	143	66	9
WBGene00016073	261	27	13	WBGene00015266	204	20	14	WBGene00019777	101	16	12	WBGene00014111	147	24	15	WBGene00007284	143	66	9
WBGene00016075	128	40	13	WBGene00006697	277	24	14	WBGene00015037	102	17	13	WBGene00014114	135	25	13	WBGene00003638	160	82	10
WBGene00016077	128	40	13	WBGene00004277	277	24	14	WBGene00003889	45	49	54	WBGene00006489	123	25	11	WBGene00014040	177	32	31
WBGene00235333	188	43	12	WBGene00022357	277	24	14	WBGene00015035	135	31	10	WBGene00014113	123	25	11	WBGene00023497	177	32	31
WBGene00016072	133	22	9	WBGene00003917	277	24	14	WBGene00021375	135	31	10	WBGene00007534	236	50	58	WBGene00023498	177	32	31
WBGene00016071	117	22	11	WBGene00022104	156	48	36	WBGene00021374	135	31	10	WBGene00007537	236	50	58	WBGene00005221	53	59	90
WBGene00021130	135	22	9	WBGene00004891	266	23	12	WBGene00021376	135	31	10	WBGene00195157	236	50	58	WBGene00014068	53	59	90
WBGene00021129	135	22	9	WBGene00022103	55	44	38	WBGene00021377	261	19	14	WBGene00000721	236	50	58	WBGene00010337	232	49	31
WBGene00185079	140	24	12	WBGene00022493	320	21	15	WBGene00021378	261	19	14	WBGene00007100	210	21	15	WBGene00010338	191	37	22
WBGene00021131	140	24	12	WBGene00022489	290	23	15	WBGene00021379	261	19	14	WBGene00007101	210	21	15	WBGene00010339	150	24	12
WBGene00021132	96	19	11	WBGene00022488	259	25	14	WBGene00016987	94	37	13	WBGene00001646	210	21	15	WBGene00000803	85	19	10
WBGene00021133	96	19	11	WBGene00003978	54	63	61	WBGene00021363	317	23	14	WBGene00007102	210	21	15	WBGene00010009	85	19	10
WBGene00021073	182	22	12	WBGene00022321	63	22	10	WBGene00021359	317	23	14	WBGene00007103	210	21	15	WBGene00008622	235	87	24
WBGene00021076	268	25	13	WBGene00022320	63	22	10	WBGene00021358	317	23	14	WBGene00000200	195	19	9	WBGene00011226	105	29	9
WBGene00021074	237	18	13	WBGene00022319	63	22	10	WBGene00021367	181	20	11	WBGene00010625	163	20	12	WBGene00011229	107	52	42
WBGene00004188	237	18	13	WBGene00022347	364	62	40	WBGene00021366	181	20	11	WBGene00050947	130	20	14	WBGene00009069	107	52	42
WBGene00020836	181	44	12	WBGene00001236	364	62	40	WBGene00021365	200	32	13	WBGene00010626	130	20	14	WBGene00044638	107	52	42
WBGene00020834	181	44	12	WBGene00022336	364	62	40	WBGene00021370	126	40	14	WBGene00010632	254	28	17	WBGene00009067	66	50	50
WBGene00020835	181	44	12	WBGene00022348	172	51	42	WBGene00021371	154	44	13	WBGene00010627	213	26	15	WBGene00009068	66	50	50
WBGene00021096	303	29	14	WBGene00022349	240	68	19	WBGene00021369	182	47	12	WBGene00010629	213	26	15	WBGene00009070	187	40	15
WBGene00021097	303	29	14	WBGene00022334	240	68	19	WBGene00006869	115	90	14	WBGene00010628	213	26	15	WBGene00002051	32	41	42
WBGene00021093	213	25	13	WBGene00022351	204	17	10	WBGene00003884	215	21	10	WBGene00010630	207	25	14	WBGene00004745	131	37	9
WBGene00021098	213	25	13	WBGene00044341	204	17	10	NoWBGene_ID31	215	21	10	WBGene00010631	241	26	15	WBGene00006674	25	36	46
WBGene00021101	213	25	13	WBGene00019715	204	17	10	WBGene00019724	215	21	10	WBGene00012527	164	20	10	WBGene00007523	125	63	10

WBGene00044733	123	20	12	WBGene00004905	193	26	15	WBGene00019723	215	21	10	WBGene00004909	164	20	10	WBGene00006384	125	63	10
WBGene00021092	123	20	12	WBGene00022054	232	25	13	WBGene00044690	215	21	10	WBGene00012528	164	20	10	WBGene00006353	125	17	12
WBGene00020207	185	37	32	WBGene00022055	270	23	11	WBGene00017907	123	65	10	WBGene00009059	126	58	9	WBGene00020770	116	39	11
WBGene00020205	161	31	22	WBGene00022053	270	23	11	WBGene00017906	61	64	13	WBGene00001178	126	58	9	WBGene00018187	180	79	13
WBGene00020204	161	31	22	WBGene00022057	287	23	11	WBGene00006970	93	62	24	WBGene00007952	213	20	12	WBGene00003555	41	35	31
WBGene00020181	256	20	10	WBGene00022052	287	23	11	WBGene00000009	93	62	24	WBGene00007953	213	20	12	WBGene00019422	27	40	41
WBGene00020172	256	20	10	WBGene00021245	63	84	62	WBGene00018547	66	58	11	WBGene00009108	213	20	12	WBGene00020795	27	40	41
WBGene00020171	61	51	11	WBGene00021247	63	84	62	WBGene00020930	134	78	14	WBGene00006460	151	25	8	WBGene00003883	49	53	85
WBGene00021578	286	73	23	WBGene00021248	327	30	17	WBGene00018066	283	25	21	WBGene00195256	151	25	8	WBGene00019519	49	53	85
WBGene00021576	275	65	28	WBGene00002025	327	30	17	WBGene00018065	283	25	21	WBGene00006934	165	19	10	WBGene00019518	35	56	65
WBGene00000106	275	65	28	WBGene00021442	224	21	14	WBGene00018064	289	25	20	WBGene00011890	165	19	10	WBGene00045272	41	67	58
WBGene00020304	105	37	16	WBGene00021441	224	21	14	WBGene00003955	295	24	18	WBGene00011892	165	19	10	WBGene00019102	152	65	43
WBGene00019927	105	37	16	WBGene00004249	210	21	12	WBGene00006951	295	24	18	WBGene00003065	165	19	10	WBGene00015547	149	48	27
WBGene00019926	117	38	18	WBGene00021443	210	21	12	WBGene00020981	84	24	13	WBGene00011893	165	19	10	WBGene00018373	65	47	6
WBGene00019925	117	38	18	WBGene00004163	70	37	31	WBGene00020982	84	24	13	WBGene00011898	121	18	12	WBGene00018374	65	47	6
WBGene00019924	129	39	19	WBGene00021446	233	28	12	WBGene00006173	69	20	16	WBGene00011897	121	18	12	WBGene00017725	140	35	12
WBGene00019923	129	39	19	WBGene00021445	233	28	12	WBGene00020979	105	30	18	WBGene00009255	184	17	8	WBGene00015676	170	58	14
WBGene00045302	129	39	19	WBGene00000941	233	28	12	WBGene00004157	140	39	20	WBGene00009256	145	21	9	WBGene00020142	185	47	11
WBGene00019928	129	44	35	WBGene00021444	233	28	12	WBGene00020983	140	39	20	WBGene00005022	145	21	9	WBGene00000294	196	50	10
WBGene00019922	129	44	35	WBGene00015245	277	21	11	WBGene00016435	211	30	14	WBGene00001747	257	62	14	WBGene00006067	196	50	10
WBGene00019929	129	44	35	WBGene00004128	231	94	14	WBGene00016432	211	30	14	WBGene00012117	236	137	27	WBGene00020630	184	39	11
WBGene00019930	92	42	17	WBGene00018721	281	31	18	WBGene00019529	273	17	20	WBGene00003405	178	18	13	WBGene00018204	86	66	21
WBGene00019921	92	42	17	WBGene00004491	281	31	18	WBGene00195048	273	17	20	WBGene00013862	178	18	13	WBGene00016253	267	66	84
WBGene00019920	99	42	14	WBGene00018723	281	31	18	WBGene00004385	273	17	20	WBGene00013863	178	18	13	WBGene00016252	267	66	84
WBGene00019919	123	36	12	WBGene00020115	263	32	15	WBGene00004386	273	17	20	WBGene00003838	173	21	12	WBGene00016251	267	66	84
WBGene00019918	141	30	13	WBGene00020116	244	32	11	WBGene00001033	129	20	13	WBGene00008370	173	21	12	WBGene00018712	53	52	38
WBGene00019917	105	41	22	WBGene00001063	47	61	67	WBGene00019535	129	20	13	WBGene00003923	173	21	12	WBGene00018710	181	87	8
WBGene00016303	68	51	30	WBGene00021703	40	28	27	WBGene00000611	269	32	35	WBGene00008371	173	21	12	WBGene00004121	165	43	14
WBGene00016302	162	46	16	WBGene00021702	192	39	12	WBGene00018086	269	32	35	WBGene00008372	173	21	12	WBGene00015586	105	27	13
WBGene00016309	175	58	19	WBGene00004088	192	39	12	WBGene00018085	269	32	35	WBGene00008380	163	25	9	WBGene00015587	95	31	15
WBGene00235351	175	58	19	WBGene00021698	217	24	10	WBGene00000123	269	32	35	WBGene00006481	163	25	9	WBGene00015588	85	34	17
WBGene00016306	175	58	19	WBGene00021697	184	60	33	WBGene00020978	215	21	15	WBGene00206498	192	21	14	WBGene00019578	68	47	29
WBGene00016300	158	44	18	WBGene00021705	174	90	15	WBGene00005662	215	21	15	WBGene00007797	192	21	14	WBGene00020725	68	47	29
WBGene00006602	90	33	8	WBGene00017342	161	28	7	WBGene00021500	56	46	42	WBGene00004270	260	38	8	WBGene00020726	175	38	13
WBGene00020085	161	119	10	WBGene00006886	161	28	7	WBGene00016350	132	23	14	WBGene00020813	260	38	8	WBGene00007011	175	38	13
WBGene00206419	161	119	10	WBGene00000792	68	52	11	WBGene00016346	136	22	14	WBGene00000993	117	67	26	WBGene00015121	92	35	12
WBGene00020086	161	119	10	WBGene00017375	235	38	27	WBGene00016345	139	21	13	WBGene00020811	117	67	26	WBGene00015119	92	35	12
WBGene00017939	104	63	10	WBGene00016489	235	38	27	WBGene00044770	37	50	14	WBGene00020817	117	67	26	WBGene00002207	107	40	14
WBGene00015868	138	68	54	WBGene00044683	235	38	27	WBGene00017339	92	56	13	WBGene00219274	44	40	27	WBGene00020366	225	47	27
WBGene00019211	85	51	13	WBGene00016490	137	26	9	WBGene00017340	92	56	13	WBGene00020810	44	40	27	WBGene00020812	225	47	27
WBGene00007069	114	24	15	WBGene00007068	114	24	15												

Chapter 8 : References

Acker, J. et al., 1997. Interactions between the Human RNA Polymerase II Subunits. Journal of Biological Chemistry, 272(27), pp.16815–16821

Ahn, S.H., Kim, M. & Buratowski, S., 2004. Phosphorylation of serine 2 within the RNA polymerase II C-terminal domain couples transcription and 3' end processing. Molecular cell, 13(1), pp.67–76.

Alberts, B. et al., 2002. Molecular biology of the cell, Garland Science.

Alicea-Velázquez, N.L. et al., 2016. Targeted Disruption of the Interaction between WD-40 Repeat Protein 5 (WDR5) and Mixed Lineage Leukemia (MLL)/SET1 Family Proteins Specifically Inhibits MLL1 and SETd1A Methyltransferase Complexes. The Journal of biological chemistry, 291(43), pp.22357–22372.

Allfrey, V.G., Faulkner, R. & Mirsky, A.E., 1964. Acetylation and methylation of histones and their possible role in the regulation of rna synthesis. Proceedings of the National Academy of Sciences of the United States of America, 51, pp.786–94.

Allis, C.D. et al., 2007. New Nomenclature for Chromatin-Modifying Enzymes. Cell, 131(4), pp.633–636.

Allison, L.A. et al., 1985. Extensive homology among the largest subunits of eukaryotic and prokaryotic RNA polymerases. Cell, 42(2), pp.599–610.

Ambler, R.P. & Rees, M.W., 1959. ε-N-Methyl-lysine in Bacterial Flagellar Protein. Nature, 184(4679), pp.56–57. Ambros, V., 2000. Control of developmental timing in *Caenorhabditis elegans*. Current opinion in genetics & development, 10(4), pp.428–33.

Anand, R. & Marmorstein, R., 2007. Structure and mechanism of lysine-specific demethylase enzymes. The Journal of biological chemistry, 282(49), pp.35425–9.

Anders, S., Pyl, P.T. & Huber, W., 2015. HTSeq--a Python framework to work with high-throughput sequencing data. Bioinformatics (Oxford, England), 31(2), pp.166–9.

Ang, Y.-S. et al., 2011. Wdr5 mediates self-renewal and reprogramming via the embryonic stem cell core transcriptional network. Cell, 145(2), pp.183–97.

Annunziato A.T., 2008. DNA packaging: Nucleosomes and chromatin. Nature Education, 1(1):26.

Anway, M.D. et al., 2005. Epigenetic Transgenerational Actions of Endocrine Disruptors and Male Fertility. Science, 308(5727), pp.1466–1469.

Arents, G. & Moudrianakis, E.N., 1995. The histone fold: a ubiquitous architectural motif utilized in DNA compaction and protein dimerization. Proceedings of the National Academy of Sciences of the United States of America, 92(24), pp.11170–4.

Arico, J.K. et al., 2011. Epigenetic patterns maintained in early *Caenorhabditis elegans* embryos can be established by gene activity in the parental germ cells. J. T. Lee, ed. PLoS genetics, 7(6), p.e1001391.

Avdic, V. et al., 2011. Structural and Biochemical Insights into MLL1 Core Complex Assembly. Structure, 19(1), pp.101–108.

Bannister, A.J. et al., 2001. Selective recognition of methylated lysine 9 on histone H3 by the HP1 chromo domain. Nature, 410(6824), pp.120–124.

Barski, A. et al., 2007. High-Resolution Profiling of Histone Methylations in the Human Genome. Cell, 129(4), pp.823–837.

Barth, T.K. & Imhof, A., 2010. Fast signals and slow marks: the dynamics of histone modifications. Trends in Biochemical Sciences, 35(11), pp.618–626.

Bartkowiak, B. et al., 2010. CDK12 is a transcription elongation-associated CTD kinase, the metazoan ortholog of yeast Ctk1. Genes & Development, 24(20), pp.2303–2316.

Batta, K. et al., 2011. Genome-wide function of H2B ubiquitylation in promoter and genic regions. Genes & Development, 25(21), pp.2254–2265.

Bell, S.P. & Dutta, A., 2002. DNA Replication in Eukaryotic Cells. Annual Review of Biochemistry, 71(1), pp.333–374.

Belmont, A.S. & Bruce, K., 1994. Visualization of G1 chromosomes: a folded, twisted, supercoiled chromonema model of interphase chromatid structure. The Journal of cell biology, 127(2), pp.287–302.

Belmont, A.S. et al., 1989. Large-scale chromatin structural domains within mitotic and interphase chromosomes in vivo and in vitro. Chromosoma, 98(2), pp.129–43.

Benayoun, B.A. & Brunet, A., 2012. Epigenetic memory of longevity in *Caenorhabditis elegans*. Worm, 1(1), pp.77–81.

Benayoun, B.A. et al., 2014. H3K4me3 breadth is linked to cell identity and transcriptional consistency. Cell, 158(3), pp.673–88.

Berger, S.L., 2007. The complex language of chromatin regulation during transcription. Nature, 447(7143), pp.407–412.

Bernstein, B.E. et al., 2006. A Bivalent Chromatin Structure Marks Key Developmental Genes in Embryonic Stem Cells. Cell, 125(2), pp.315–326.

Birnby, D. A., Link, E. M., Vowels, J., Tian, H., Colacurcio, PL., & Thomas, J. H., 2000. A transmembrane guanylyl cyclase (DAF-11) and Hsp90 (DAF-21) regulate a common set of chemosensory behaviors in *Caenorhabditis elegans*. Genetics, 155, 85-104

Bolger, A.M., Lohse, M. & Usadel, B., 2014. Trimmomatic: a flexible trimmer for Illumina sequence data. Bioinformatics (Oxford, England), 30(15), pp.2114–20.

Borun, T.W., Pearson, D. & Paik, W.K., 1972. Studies of histone methylation during the HeLa S-3 cell cycle. The Journal of biological chemistry, 247(13), pp.4288–98.

Brenner, S., 1974. The genetics of *Caenorhabditis elegans*. Genetics, 77(1), pp.71–94.

Brès, V., Yoh, S.M. & Jones, K.A., 2008. The multi-tasking P-TEFb complex. Current Opinion in Cell Biology, 20(3), pp.334–340.

Briggs, S.D. et al., 2001. Histone H3 lysine 4 methylation is mediated by Set1 and required for cell growth and rDNA silencing in *Saccharomyces cerevisiae*. Genes & development, 15(24), pp.3286–95.

Brookes, E. & Pombo, A., 2009. Modifications of RNA polymerase II are pivotal in regulating gene expression states. EMBO reports, 10(11), pp.1213–1219.

Brookes, E. et al., 2012. Polycomb Associates Genome-wide with a Specific RNA Polymerase II Variant, and Regulates Metabolic Genes in ESCs. Cell Stem Cell, 10(2), pp.157–170.

Bucher, E.A. & Seydoux, G., 1994. Gastrulation in the nematode *Caenorhabditis elegans*. Seminars in Developmental Biology, 5(2), pp.121–130.

Buescher JL, Musselman LP, Wilson CA, Lang T, Keleher M, Baranski TJ, Duncan JG., 2013. Evidence for transgenerational metabolic programming in *Drosophila*. Dis Model Mech. 6:1123–32.

Burlingame, R.W. et al., 1985. Crystallographic structure of the octameric histone core of the nucleosome at a resolution of 3.3 A. Science, 228, pp.546–554.

Byvoet, P. et al., 1972. The distribution and turnover of labeled methyl groups in histone fractions of cultured mammalian cells. Archives of biochemistry and biophysics, 148(2), pp.558–67.

C. elegans Sequencing Consortium, 1998. Genome sequence of the nematode *C. elegans*: a platform for investigating biology. Science (New York, N.Y.), 282(5396), pp.2012–8.

Calvanese, V. et al., 2009. The role of epigenetics in aging and age-related diseases. Ageing Research Reviews, 8(4), pp.268–276.

Carlone, D.L. et al., 2005. Reduced Genomic Cytosine Methylation and Defective Cellular Differentiation in Embryonic Stem Cells Lacking CpG Binding Protein. Molecular and Cellular Biology, 25(12), pp.4881–4891.

Carnes, B.A., 2011. What is lifespan regulation and why does it exist? Biogerontology, 12(4), pp.367–374.

Cassada, R.C. & Russell, R.L., 1975. The dauerlarva, a post-embryonic developmental variant of the nematode *Caenorhabditis elegans*. Developmental Biology, 46(2), pp.326–342.

Chasnov, J.R., & Chow, K.L., 2002. Why are there males in hermaphroditic species *Caenorhabditis elegans*? Genetics, 160:983-994.

Chen, F. et al., 2013. Structural insight into substrate recognition by histone demethylase LSD2/KDM1b. Cell Research, 23(2), pp.306–309.

Chen, K. et al., 2015. Broad H3K4me3 is associated with increased transcription elongation and enhancer activity at tumor-suppressor genes. Nature genetics, 47(10), pp.1149–57.

Chen, R.A.-J. et al., 2014. Extreme HOT regions are CpG-dense promoters in *C. elegans* and humans. Genome research, 24(7), pp.1138–46.

Chen, Y. et al., 2011. Crystal structure of the N-terminal region of human Ash2L shows a winged-helix motif involved in DNA binding. EMBO reports, 12(8), pp.797–803.

Cheng, J. et al., 2014. A role for H3K4 monomethylation in gene repression and partitioning of chromatin readers. Molecular cell, 53(6), pp.979–92.

Cheung, P., Allis, C.D. & Sassone-Corsi, P., 2000. Signaling to Chromatin through Histone Modifications. Cell, 103(2), pp.263–271.

Cho, Y.-W. et al., 2007. PTIP associates with MLL3- and MLL4-containing histone H3 lysine 4 methyltransferase complex. The Journal of biological chemistry, 282(28), pp.20395–406.

Chong, S. et al., 2007. Modifiers of epigenetic reprogramming show paternal effects in the mouse. Nature Genetics, 39(5), pp.614–622.

Christensen, J. et al., 2007. RBP2 Belongs to a Family of Demethylases, Specific for Tri-and Dimethylated Lysine 4 on Histone 3. Cell, 128(6), pp.1063–1076.

Ciccone, D.N. et al., 2009. KDM1B is a histone H3K4 demethylase required to establish maternal genomic imprints. Nature, 461(7262), pp.415–418.

Cloos, P.A.C. et al., 2008. Erasing the methyl mark: histone demethylases at the center of cellular differentiation and disease. Genes & Development, 22(9), pp.1115–1140.

Coin, F. et al., 1999. Mutations in XPB and XPD helicases found in xeroderma pigmentosum patients impair the transcription function of TFIIH. The EMBO Journal, 18(5), pp.1357–1366.

Collins, R.E. et al., 2008. The ankyrin repeats of G9a and GLP histone methyltransferases are mono- and dimethyllysine binding modules. Nature Structural & Molecular Biology, 15(3), pp.245–250.

Corden, J.L. et al., 1985. A unique structure at the carboxyl terminus of the largest subunit of eukaryotic RNA polymerase II. Proceedings of the National Academy of Sciences of the United States of America, 82(23), pp.7934–8.

Corden, J.L., 2013. RNA Polymerase II C-Terminal Domain: Tethering Transcription to Transcript and Template. Chemical Reviews, 113(11), pp.8423–8455.

Couture, J.-F., Collazo, E. & Trievel, R.C., 2006. Molecular recognition of histone H3 by the WD40 protein WDR5. Nature structural & molecular biology, 13(8), pp.698–703.

Cowan, A.E. & McIntosh, J.R., 1985. Mapping the distribution of differentiation potential for intestine, muscle, and hypodermis during early development in *Caenorhabditis elegans*. Cell, 41(3), pp.923–32.

Cramer, P., 2001. Structural Basis of Transcription: RNA Polymerase II at 2.8 Angstrom Resolution. Science, 292(5523), pp.1863–1876.

Creyghton, M.P. et al., 2010. Histone H3K27ac separates active from poised enhancers and predicts developmental state. Proceedings of the National Academy of Sciences, 107(50), pp.21931–21936.

Csordas, A., 1990. On the biological role of histone acetylation. Biochem. J, 265, pp.23–38.

D'Cruz, A.A. et al., 2013. Structure and function of the SPRY/B30.2 domain proteins involved in innate immunity. Protein Science, 22(1), pp.1–10.

Dawes, H.E. et al., 1999. Dosage compensation proteins targeted to X chromosomes by a determinant of hermaphrodite fate. Science (New York, N.Y.), 284(5421), pp.1800–4.

Daxinger, L. & Whitelaw, E., 2012. Understanding transgenerational epigenetic inheritance via the gametes in mammals. Nature Reviews Genetics, 13(3), p.153.

Dehé, P.-M. et al., 2005. Histone H3 Lysine 4 Mono-methylation does not Require Ubiquitination of Histone H2B. Journal of Molecular Biology, 353(3), pp.477–484.

Delange, R.J., Hooper, J.A. & Smith, E.L., 1972. Complete Amino-Acid Sequence of Calf-Thymus Histone III. , 69(4), pp.82–884.

Dernburg, A.F. et al., 1998. Meiotic recombination in *C. elegans* initiates by a conserved mechanism and is dispensable for homologous chromosome synapsis. Cell, 94(3), pp.387–98.

Dharmarajan, V. et al., 2012. Structural basis for WDR5 interaction (Win) motif recognition in human SET1 family histone methyltransferases. The Journal of biological chemistry, 287(33), pp.27275–89.

Dillon, S.C. et al., 2005. The SET-domain protein superfamily: protein lysine methyltransferases. Genome biology, 6(8), p.227.

Dimitrova, E., Turberfield, A.H. & Klose, R.J., 2015. Histone demethylases in chromatin biology and beyond. EMBO reports, 16(12), pp.1620–1639.

Dorota, L., ˙ek, M.R. & Holecová, M., 2005. C-banding karyotype and NORs analyse in eight species of Bary- peithes Duval from Central Europe (Coleoptera, Curculionidae, Entiminae). CARYOLOGIA, 58(3), pp.274–280.

Dou, Y. et al., 2006. Regulation of MLL1 H3K4 methyltransferase activity by its core components. Nature structural & molecular biology, 13(8), pp.713–9.

Dunham, I. et al., 2012. An integrated encyclopedia of DNA elements in the human genome. Nature, 489(7414), pp.57–74.

Dunn, G.A. & Bale, T.L., 2011. Maternal High-Fat Diet Effects on Third-Generation Female Body Size via the Paternal Lineage. Endocrinology, 152(6), pp.2228–2236.

Edgar, L.G., Wolf, N. & Wood, W.B., 1994. Early transcription in *Caenorhabditis elegans* embryos. Development (Cambridge, England), 120(2), pp.443–51.

Edwards, A.M. et al., 1991. Two dissociable subunits of yeast RNA polymerase II stimulate the initiation of transcription at a promoter in vitro. The Journal of biological chemistry, 266(1), pp.71–5.

Egloff, S. et al., 2007. Serine-7 of the RNA Polymerase II CTD Is Specifically Required for snRNA Gene Expression. Science, 318(5857), pp.1777–1779.

Eissenberg, J.C. & Shilatifard, A., 2010. Histone H3 lysine 4 (H3K4) methylation in development and differentiation. Developmental biology, 339(2), pp.240–9.

Eissenberg, J.C. et al., 2014. Heterochromatin and Euchromatin. In Essential for Life Science. Chichester, UK: John Wiley & Sons, Ltd.

Epigenetics, W. is, 2013. Histone Modifications. What is Epigenetics.

Ercan, S., Whittle, C. & Lieb, J., 2007. Chromatin immunoprecipitation from *C. elegans* embryos. Protocol Exchange.

Ernst, P. & Vakoc, C.R., 2012. WRAD: enabler of the SET1-family of H3K4 methyltransferases. Briefings in Functional Genomics, 11(3), pp.217–226.

Fagerberg, L. et al., 2014. Analysis of the human tissue-specific expression by genome-wide integration of transcriptomics and antibody-based proteomics. Molecular & cellular proteomics : MCP, 13(2), pp.397–406.

Fang, R. et al., 2010. Human LSD2/KDM1b/AOF1 Regulates Gene Transcription by Modulating Intragenic H3K4me2 Methylation. Molecular Cell, 39(2), pp.222–233.

Finch, J.T. & Klug, A., 1976. Solenoidal model for superstructure in chromatin. Proceedings of the National Academy of Sciences of the United States of America, 73(6), pp.1897–901.

Fischle, W. et al., 2008. Specificity of the Chromodomain Y Chromosome Family of Chromodomains for Lysine-methylated ARK(S/T) Motifs. Journal of Biological Chemistry, 283(28), pp.19626–19635.

Fisher, K. et al., 2010. Methylation and demethylation activities of a *C. elegans* MLL-like complex attenuate RAS signalling. Developmental biology, 341(1), pp.142–53.

Flanagan, J.F. et al., 2005. Double chromodomains cooperate to recognize the methylated histone H3 tail. Nature, 438(7071), pp.1181–5.

Fleming, A.B. et al., 2008. H2B Ubiquitylation Plays a Role in Nucleosome Dynamics during Transcription Elongation. Molecular Cell, 31(1), pp.57–66.

Francis, N.J., Kingston, R.E. & Woodcock, C.L., 2004. Chromatin Compaction by a Polycomb Group Protein Complex. Science, 306(5701), pp.1574–1577.

Gaydos, L.J., Wang, W. & Strome, S., 2014. Gene repression. H3K27me and PRC2 transmit a memory of repression across generations and during development. Science (New York, N.Y.), 345(6203), pp.1515–8.

Geisler, S.J. & Paro, R., 2015. Trithorax and Polycomb group-dependent regulation: a tale of opposing activities. Development, (142), pp.2876–2887.

Gershey, E.L. et al., 1969. Chemical studies of histone methylation. Evidence for the occurrence of 3-methylhistidine in avian erythrocyte histone fractions. The Journal of biological chemistry, 244(18), pp.4871–7.

Gerstein, M.B. et al., 2010. Integrative analysis of the *Caenorhabditis* elegans genome by the modENCODE project. Science (New York, N.Y.), 330(6012), pp.1775–87.

Gönczy, P. & Rose, L.S., 2005. Asymmetric cell division and axis formation in the embryo. WormBook, ed. The *C. elegans* Research Community, WormBook,

Goodrich, J.A. & Tjian, R., 2010. Unexpected roles for core promoter recognition factors in cell-type-specific transcription and gene regulation. Nature Reviews Genetics, 11(8), p.549.

Goyanes, V.J., 1980. Sequential staining of euchromatic and heterochromatic regions of the human Y chromosome. Journal of medical genetics, 17(6), pp.468–71.

Grau, D.J. et al., 2011. Compaction of chromatin by diverse Polycomb group proteins requires localized regions of high charge. Genes & Development, 25(20), pp.2210–2221.

Green, G.R. & Poccia, D.L., 1985. Phosphorylation of sea urchin sperm H1 and H2B histones precedes chromatin decondensation and H1 exchange during pronuclear formation. Developmental biology, 108(1), pp.235–45.

Greer, E.L. & Shi, Y., 2012. Histone methylation: a dynamic mark in health, disease and inheritance. Nature Reviews Genetics, 13(5), pp.343–357.

Greer, E.L. et al., 2010. Members of the H3K4 trimethylation complex regulate lifespan in a germline-dependent manner in *C. elegans*. Nature, 466(7304), pp.383–7.

Greer, E.L. et al., 2011. Transgenerational epigenetic inheritance of longevity in *Caenorhabditis elegans*. Nature, 479(7373), pp.365–71.

Greer, E.L. et al., 2014. A Histone Methylation Network Regulates Transgenerational Epigenetic Memory in *C. elegans*. Cell Reports, 7(1), pp.113–126.

Greer, E.L. et al., 2016. Mutation of *C. elegans* demethylase spr-5 extends transgenerational longevity. Cell Research, 26(2), pp.229–238.

Grewal, S.I.S. & Jia, S., 2007. Heterochromatin revisited. Nature Reviews Genetics, 8(1), pp.35–46. Gu, B. & Lee, M.G., 2013. Histone H3 lysine 4 methyltransferases and demethylases in self-renewal and differentiation of stem cells. Cell & bioscience, 3(1), p.39.

Guccione, E. et al., 2007. Methylation of histone H3R2 by PRMT6 and H3K4 by an MLL complex are mutually exclusive. Nature, 449(7164), pp.933–7.

Guenther, M.G. et al., 2007. A Chromatin Landmark and Transcription Initiation at Most Promoters in Human Cells. Cell, 130(1), pp.77–88.

Guillemette, B. et al., 2011. H3 lysine 4 is acetylated at active gene promoters and is regulated by H3 lysine 4 methylation. H. D. Madhani, ed. PLoS genetics, 7(3), p.e1001354.

Hajnal, A., Whitfield, C.W. & Kim, S.K., 1997. Inhibition of *Caenorhabditis elegans* vulval induction by gap-1 and by let-23 receptor tyrosine kinase. Genes & development, 11(20), pp.2715–28.

Han, S. & Brunet, A., 2012. Histone methylation makes its mark on longevity. Trends in cell biology, 22(1), pp.42–9.

Han, Z. et al., 2007. Structural Basis of EZH2 Recognition by EED. Structure, 15(10), pp.1306–1315.

Heard, E. & Martienssen, R.A., 2014. Transgenerational epigenetic inheritance: myths and mechanisms. Cell, 157(1), pp.95–109.

Heintzman, N.D. et al., 2007. Distinct and predictive chromatin signatures of transcriptional promoters and enhancers in the human genome. Nature Genetics, 39(3), pp.311–318.

Hempel, K., Lange, H.W. & Birkofer, L., 1968. [Epsilon-N-trimethyllysine, a new amino acid in histones]. Die Naturwissenschaften, 55(1), p.37.

Herz, H.-M. et al., 2012. Enhancer-associated H3K4 monomethylation by Trithorax-related, the *Drosophila* homolog of mammalian Mll3/Mll4. Genes & development, 26(23), pp.2604–20.

Herz, H.-M., Garruss, A. & Shilatifard, A., 2013. SET for life: biochemical activities and biological functions of SET domain-containing proteins. Trends in Biochemical Sciences, 38(12), pp.621–639.

Hill, R.J. & Sternberg, P.W., 1992. The gene lin-3 encodes an inductive signal for vulval development in *C. elegans.* Nature, 358(6386), pp.470–476.

Hirsh, D., Oppenheim, D. & Klass, M., 1976. Development of the reproductive system of *Caenorhabditis elegans*. Developmental biology, 49(1), pp.200–19.

Ho, C.K. & Shuman, S., 1999. Distinct roles for CTD Ser-2 and Ser-5 phosphorylation in the recruitment and allosteric activation of mammalian mRNA capping enzyme. Molecular cell, 3(3), pp.405–11.

Hodgkin, J., Plasterk, R.H.A. & Waterston, R.H., 1995. The Nematode *Caenorhabditis elegans* and Its Genome. Science, 270(5235).

Hodgkin J., Horvitz, H.R., Brenner, S., 1979. Nondisjunction mutants of the nematode *Caenorhabditis elegans.* Genetics, 91: 67-94.

Holstege, F.C.P., Fiedler, U. & Timmers, H.T., 1997. Three transitions in the RNA polymerase II transcription complex during initiation. The EMBO Journal, 16(24), pp.7468–7480.

Hong, L. et al., 1993. Studies of the DNA binding properties of histone H4 amino terminus. Thermal denaturation studies reveal that acetylation markedly reduces the binding constant of the H4 “tail” to DNA. J. Biol. Chem., 268(1), pp.305–314.

Hong, S. et al., 2007. Identification of JmjC domain-containing UTX and JMJD3 as histone H3 lysine 27 demethylases. Proceedings of the National Academy of Sciences of the United States of America, 104(47), pp.18439–44.

Horton, J.R. et al., 2010. Enzymatic and structural insights for substrate specificity of a family of jumonji histone lysine demethylases. Nature Structural & Molecular Biology, 17(1), pp.38–43.

Hsin, J.-P. & Manley, J.L., 2012. The RNA polymerase II CTD coordinates transcription and RNA processing. Genes & development, 26(19), pp.2119–37.

Hsu, D.R., Chuang, P.T. & Meyer, B.J., 1995. DPY-30, a nuclear protein essential early in embryogenesis for *Caenorhabditis elegans* dosage compensation. Development (Cambridge, England), 121(10), pp.3323–34.

Hu, D. et al., 2013. The MLL3/MLL4 Branches of the COMPASS Family Function as Major Histone H3K4 Monomethylases at Enhancers. Molecular and Cellular Biology, 33(23), pp.4745–4754.

Huang, J. et al., 2010. G9a and Glp Methylate Lysine 373 in the Tumor Suppressor p53. Journal of Biological Chemistry, 285(13), pp.9636–9641.

Hubbard, E.J.A., 2007. *Caenorhabditis elegans* germ line: a model for stem cell biology. Developmental dynamics : an official publication of the American Association of Anatomists, 236(12), pp.3343–57.

Hublitz, P. et al., 2009. Mechanisms of transcriptional repression by histone lysine methylation. The International Journal of Developmental Biology, 53(2–3), pp.335–354.

Huff, J.T. et al., 2010. Reciprocal intronic and exonic histone modification regions in humans. Nature Structural & Molecular Biology, 17(12), pp.1495–1499.

Hung, T. et al., 2009. ING4 Mediates Crosstalk between Histone H3 K4 Trimethylation and H3 Acetylation to Attenuate Cellular Transformation. Molecular Cell, 33(2), pp.248–256.

Ioshikhes, I.P. et al., 2006. Nucleosome positions predicted through comparative genomics. Nature Genetics, 38(10), pp.1210–1215.

Izzo, A. & Schneider, R., 2010. Chatting histone modifications in mammals. Briefings in Functional Genomics, 9(5–6), pp.429–443.

Jenuwein, T., 2001. Re-SET-ting heterochromatin by histone methyltransferases. Trends in cell biology, 11(6), pp.266–73.

Ji, Y. et al., 2010. The In Vivo Pattern of Binding of RAG1 and RAG2 to Antigen Receptor Loci. Cell, 141(3), pp.419–431.

Jiang, H. et al., 2011. Role for Dpy-30 in ES cell-fate specification by regulation of H3K4 methylation within bivalent domains. Cell, 144(4), pp.513–25.

Jiang, Y., Yan, M. & Gralla, J.D., 1995. Abortive initiation and first bond formation at an activated adenovirus E4 promoter. The Journal of biological chemistry, 270(45), pp.27332–8.

Johnson, T.E. et al., 1984. Arresting development arrests aging in the nematode *Caenorhabditis elegans.* Mechanisms of ageing and development, 28(1), pp.23–40.

Johnston, W. L., Krizus, A., & Dennis, J. W., 2006. The eggshell is required for meiotic fidelity, polar-body extrusion and polarization of the *C. elegans* embryo. BMC Biol, 4, 35

Jones, P.A. & Baylin, S.B., 2007. The Epigenomics of Cancer. Cell, 128(4), pp.683–692.

Juven-Gershon, T. et al., 2008. The RNA polymerase II core promoter - the gateway to transcription. Current opinion in cell biology, 20(3), pp.253–9.

Kaelin, W.G. & McKnight, S.L., 2013. Influence of metabolism on epigenetics and disease. Cell, 153(1), pp.56–69.

Kaikkonen, M.U. et al., 2013. Remodeling of the enhancer landscape during macrophage activation is coupled to enhancer transcription. Molecular cell, 51(3), pp.310–25.

Kamath, R.S. et al., 2003. Systematic functional analysis of the *Caenorhabditis elegans* genome using RNAi. Nature, 421(6920), pp.231–237.

Kaplan, N. et al., 2009. The DNA-encoded nucleosome organization of a eukaryotic genome. Nature, 458(7236), pp.362–6.

Käser-Pébernard, S., Müller, F. & Wicky, C., 2014. LET-418/Mi2 and SPR-5/LSD1 Cooperatively Prevent Somatic Reprogramming of *C. elegans* Germline Stem Cells. Stem Cell Reports, 2(4), pp.547–559.

Katz, D.J. et al., 2009. A *C. elegans* LSD1 Demethylase Contributes to Germline Immortality by Reprogramming Epigenetic Memory. Cell, 137(2), pp.308–320.

Kelly, W.G. et al., 2002. X-chromosome silencing in the germline of *C. elegans*. Development (Cambridge, England), 129(2), pp.479–92.

Kemphues, K.J. et al., 1988. Identification of genes required for cytoplasmic localization in early *C. elegans* embryos. Cell, 52(3), pp.311–20.

Kerr, S.C. et al., 2014. SPR-5 and MET-2 function cooperatively to reestablish an epigenetic ground state during passage through the germ line. Proceedings of the National Academy of Sciences of the United States of America, 111(26), pp.9509–14.

Kim, D. et al., 2013. TopHat2: accurate alignment of transcriptomes in the presence of insertions, deletions and gene fusions. Genome biology, 14(4), p.R36.

Kim, M. et al., 2009. Phosphorylation of the yeast Rpb1 C-terminal domain at serines 2, 5, and 7. The Journal of biological chemistry, 284(39), pp.26421–6.

Kim, S. & Paik, W.K., 1965. Studies on the origin of epsilon-N-methyl-L-lysine in protein. The Journal of biological chemistry, 240(12), pp.4629–34.

Kim, T. & Buratowski, S., 2009. Dimethylation of H3K4 by Set1 Recruits the Set3 Histone Deacetylase Complex to 5′ Transcribed Regions. Cell, 137(2), pp.259–272.

Kimble, J. & Hirsh, D., 1979. The postembryonic cell lineages of the hermaphrodite and male gonads in *Caenorhabditis elegans*. Developmental Biology, 70(2), pp.396–417.

Kimble, J., 1981. Alterations in cell lineage following laser ablation of cells in the somatic gonad of *Caenorhabditis elegans*. Developmental Biology, 87(2), pp.286–300.

Kimura, H., 2013. Histone modifications for human epigenome analysis. Journal of Human Genetics, 58(7), pp.439–445.

Kipreos, E. T., & Pagano, M., 2000. The F-box protein family. Genome Biol, 1, REVIEWS3002

Kirkwood, T.B.L. & Holliday, R., 1979. The Evolution of Ageing and Longevity. Proceedings of the Royal Society of London B: Biological Sciences, 205(1161).

Kirmizis, A. et al., 2007. Arginine methylation at histone H3R2 controls deposition of H3K4 trimethylation. Nature, 449(7164), pp.928–932.

Kishimoto, S. et al., 2017. Environmental stresses induce transgenerationally inheritable survival advantages via germline-to-soma communication in *Caenorhabditis elegans*. Nature Communications, 8, p.14031.

Kizer, K.O. et al., 2005. A novel domain in Set2 mediates RNA polymerase II interaction and couples histone H3 K36 methylation with transcript elongation. Molecular and cellular biology, 25(8), pp.3305–16.

Klosin, A. & Lehner, B., 2016. Mechanisms, timescales and principles of trans-generational epigenetic inheritance in animals. Current opinion in genetics & development, 36, pp.41–9.

Kolasinska-Zwierz, P. et al., 2009. Differential chromatin marking of introns and expressed exons by H3K36me3. Nature Genetics, 41(3), pp.376–381.

Kornberg, R.D., 1974. Chromatin structure: a repeating unit of histones and DNA. Science (New York, N.Y.), 184(4139), pp.868–71.

Koutelou, E., Hirsch, C.L. & Dent, S.Y.R., 2010. Multiple faces of the SAGA complex. Current opinion in cell biology, 22(3), pp.374–82.

Kramer, M. et al., 2015. Developmental Dynamics of X-Chromosome Dosage Compensation by the DCC and H4K20me1 in *C. elegans* E. Larschan, ed. PLOS Genetics, 11(12), p.e1005698.

Kreiling, J.A. et al., 2011. Age-associated increase in heterochromatic marks in murine and primate tissues. Aging Cell, 10(2), pp.292–304.

Kungulovski, G. et al., 2016. Application of recombinant TAF3 PHD domain instead of anti-H3K4me3 antibody. Epigenetics & chromatin, 9, p.11.

Kusch, T. et al., 2004. Acetylation by Tip60 Is Required for Selective Histone Variant Exchange at DNA Lesions. Science, 306(5704), pp.2084–2087.

L'Hernault, S.., 2006. Spermatogenesis *. WormBook, ed. The *C. elegans* Research Community, WormBook.

Lachner, M. et al., 2001. Methylation of histone H3 lysine 9 creates a binding site for HP1 proteins. Nature, 410(6824), pp.116–120.

Laemmli, U.K. et al., 1978. Metaphase chromosome structure: the role of nonhistone proteins. Cold Spring Harbor symposia on quantitative biology, 42 Pt 1, pp.351–60.

Lagisz, M. et al., 2014. Transgenerational effects of caloric restriction on appetite: a meta-analysis. Obesity Reviews, 15(4), pp.294–309.

Lalonde, M.-E. et al., 2013. Exchange of associated factors directs a switch in HBO1 acetyltransferase histone tail specificity. Genes & development, 27(18), pp.2009–24.

Lalonde, M.-E., Cheng, X. & Cote, J., 2014. Histone target selection within chromatin: an exemplary case of teamwork. Genes & Development, 28(10), pp.1029–1041.

Laribee, R.N. et al., 2005. BUR Kinase Selectively Regulates H3 K4 Trimethylation and H2B Ubiquitylation through Recruitment of the PAF Elongation Complex. Current Biology, 15(16), pp.1487–1493.

Lauberth, S.M. et al., 2013. H3K4me3 Interactions with TAF3 Regulate Preinitiation Complex Assembly and Selective Gene Activation. Cell, 152(5), pp.1021–1036.

Laufer, J.S., Bazzicalupo, P. & Wood, W.B., 1980. Segregation of developmental potential in early embryos of *Caenorhabditis elegans*. Cell, 19(3), pp.569–77.

Lee, J.-H. et al., 2007. Identification and Characterization of the Human Set1B Histone H3-Lys4 Methyltransferase Complex. Journal of Biological Chemistry, 282(18), pp.13419–13428.

Lee, J.M. & Greenleaf, A.L., 1991. CTD kinase large subunit is encoded by CTK1, a gene required for normal growth of *Saccharomyces cerevisiae*. Gene expression, 1(2), pp.149–67.

Lee, J.-S. et al., 2012. Codependency of H2B monoubiquitination and nucleosome reassembly on Chd1. Genes & Development, 26(9), pp.914–919.

Li, B., Carey, M. & Workman, J.L., 2007. The Role of Chromatin during Transcription. Cell, 128(4), pp.707–719.

Li, S. & Shogren-Knaak, M.A., 2009. The Gcn5 Bromodomain of the SAGA Complex Facilitates Cooperative and Cross-tail Acetylation of Nucleosomes. Journal of Biological Chemistry, 284(14), pp.9411–9417.

Li, T. & Kelly, W.G., 2011. A role for Set1/MLL-related components in epigenetic regulation of the *Caenorhabditis elegans* germ line. PLoS genetics, 7(3), p.e1001349.

Li, Y. et al., 2016. Structural basis for activity regulation of MLL family methyltransferases. Nature, 530(7591), pp.447–52.

Li, Y. et al., 2016. Structural basis for activity regulation of MLL family methyltransferases. Nature, 530(7591), pp.447–52.

Lints, R. & Hall, D.H., 2009. Male introduction. WormAtlas.

Liu, T. et al., 2011. Broad chromosomal domains of histone modification patterns in *C. elegans*. Genome research, 21(2), pp.227–36.

Livak, K.J. & Schmittgen, T.D., 2001. Analysis of Relative Gene Expression Data Using Real-Time Quantitative PCR and the 2−ΔΔCT Method. Methods, 25(4), pp.402–408.

Love, M.I., Huber, W. & Anders, S., 2014. Moderated estimation of fold change and dispersion for RNA-seq data with DESeq2. Genome biology, 15(12), p.550.

Luco, R.F. et al., 2010. Regulation of Alternative Splicing by Histone Modifications. Science, 327(5968), pp.996–1000.

Luger, K. et al., 1997. Crystal structure of the nucleosome core particle at 2.8 A resolution. Nature, 389(6648), pp.251–60.

Luse, D.S. & Jacob, G.A., 1987. Abortive initiation by RNA polymerase II in vitro at the adenovirus 2 major late promoter. The Journal of biological chemistry, 262(31), pp.14990–7.

Luse, D.S., 2013. Promoter clearance by RNA polymerase II. Biochimica et biophysica acta, 1829(1), pp.63–8.

MacQueen, A.J. et al., 2002. Synapsis-dependent and -independent mechanisms stabilize homolog pairing during meiotic prophase in *C. elegans.* Genes & Development, 16(18), pp.2428–2442.

Malik, S. & Bhaumik, S.R., 2010. Mixed lineage leukemia: histone H3 lysine 4 methyltransferases from yeast to human. The FEBS journal, 277(8), pp.1805–21.

Mallette, F.A. et al., 2012. RNF8- and RNF168-dependent degradation of KDM4A/JMJD2A triggers 53BP1 recruitment to DNA damage sites. The EMBO Journal, 31(8), pp.1865–1878.

Mallette, F.A. et al., 2012. RNF8- and RNF168-dependent degradation of KDM4A/JMJD2A triggers 53BP1 recruitment to DNA damage sites. The EMBO Journal, 31(8), pp.1865–1878.

Manikkam, M. et al., 2012. Transgenerational Actions of Environmental Compounds on Reproductive Disease and Identification of Epigenetic Biomarkers of Ancestral Exposures T. Shioda, ed. PLoS ONE, 7(2), p.e31901.

Marsden, M.P. & Laemmli, U.K., 1979. Metaphase chromosome structure: evidence for a radial loop model. Cell, 17(4), pp.849–58.

Max, T., Sogaard, M. & Svejstrup, J.Q., 2007. Hyperphosphorylation of the C-terminal Repeat Domain of RNA Polymerase II Facilitates Dissociation of Its Complex with Mediator. Journal of Biological Chemistry, 282(19), pp.14113–14120.

McGhee, J.D. & Felsenfeld, G., 1980. Nucleosome Structure. Annual Review of Biochemistry, 49(1), pp.1115–1156.

Meeks, J.J. & Shilatifard, A., 2017. Multiple Roles for the MLL/COMPASS Family in the Epigenetic Regulation of Gene Expression and in Cancer. Annual Review of Cancer Biology, 1(1), pp.425–446.

Messerschmidt, D.M., Knowles, B.B. & Solter, D., 2014. DNA methylation dynamics during epigenetic reprogramming in the germline and preimplantation embryos. Genes & Development, 28(8), pp.812–828..

Meyer, B.J. & Casson, L.P., 1986. *Caenorhabditis elegans* compensates for the difference in X chromosome dosage between the sexes by regulating transcript levels. Cell, 47(6), pp.871–881.

Meyer, B.J., 2010. Targeting X chromosomes for repression. Current opinion in genetics & development, 20(2), pp.179–89.

Migliori, V. et al., 2012. Symmetric dimethylation of H3R2 is a newly identified histone mark that supports euchromatin maintenance. Nature Structural & Molecular Biology, 19(2), pp.136–144.

Miller, T. et al., 2001. COMPASS: a complex of proteins associated with a trithorax-related SET domain protein. Proceedings of the National Academy of Sciences of the United States of America, 98(23), pp.12902–7.

Milne, T.A. et al., 2005. From The Cover: MLL associates specifically with a subset of transcriptionally active target genes. Proceedings of the National Academy of Sciences, 102(41), pp.14765–14770.

Mishra, B.P., Ansari, K.I. & Mandal, S.S., 2009. Dynamic association of MLL1, H3K4 trimethylation with chromatin and Hox gene expression during the cell cycle. FEBS Journal, 276(6), pp.1629–1640.

Mohan, M. et al., 2011. The COMPASS family of H3K4 methylases in *Drosophila*. Molecular and cellular biology, 31(21), pp.4310–8.

Mohibullah, N. & Hahn, S., 2008. Site-specific cross-linking of TBP in vivo and in vitro reveals a direct functional interaction with the SAGA subunit Spt3. Genes & Development, 22(21), pp.2994–3006.

Moyal, L. et al., 2011. Requirement of ATM-Dependent Monoubiquitylation of Histone H2B for Timely Repair of DNA Double-Strand Breaks. Molecular Cell, 41(5), pp.529–542.

Mozzetta, C. et al., 2015. Sound of silence: the properties and functions of repressive Lys methyltransferases. Nature Reviews Molecular Cell Biology, 16(8), pp.499–513.

Muntean, A.G. & Hess, J.L., 2012. The pathogenesis of mixed-lineage leukemia. Annual review of pathology, 7, pp.283–301.

Muramoto, T. et al., 2010. Methylation of H3K4 Is required for inheritance of active transcriptional states. Current biology : CB, 20(5), pp.397–406.

Murray, K., 1964. The occurrence of epsilon-N-methyl lysine in histones. Biochemistry, 3, pp.10–5.

Musselman, C.A. & Kutateladze, T.G., 2009. PHD fingers: epigenetic effectors and potential drug targets. Molecular interventions, 9(6), pp.314–23.

Musselman, C.A. et al., 2012. Perceiving the epigenetic landscape through histone readers. Nature structural & molecular biology, 19(12), pp.1218–27.

Mylona, A. et al., 2006. Structure of the tau60/Delta tau91 subcomplex of yeast transcription factor IIIC: insights into preinitiation complex assembly. Molecular cell, 24(2), pp.221–32.

Nagy, P.L. et al., 2002. A trithorax-group complex purified from *Saccharomyces cerevisiae* is required for methylation of histone H3. Proceedings of the National Academy of Sciences of the United States of America, 99(1), pp.90–4.

Nagy, Z. & Tora, L., 2007. Distinct GCN5/PCAF-containing complexes function as co-activators and are involved in transcription factor and global histone acetylation. Oncogene, 26(37), pp.5341–5357.

Nakayama, J. et al., 2001. Role of Histone H3 Lysine 9 Methylation in Epigenetic Control of Heterochromatin Assembly. Science, 292(5514).

NCBI, N.C. for B.I., 2017. WDR5 WD repeat domain 5 [*Homo sapiens* (human)] Gene ID: 11091. National Center for Biotechnology Information (NCBI).

Ng, H.H. et al., 2003. Targeted recruitment of Set1 histone methylase by elongating Pol II provides a localized mark and memory of recent transcriptional activity. Molecular cell, 11(3), pp.709–19.

Nishibuchi, G. et al., 2014. Physical and functional interactions between the histone H3K4 demethylase KDM5A and the nucleosome remodeling and deacetylase (NuRD) complex. The Journal of biological chemistry, 289(42), pp.28956–70.

Nishibuchi, G. et al., 2014. Physical and functional interactions between the histone H3K4 demethylase KDM5A and the nucleosome remodeling and deacetylase (NuRD) complex. The Journal of biological chemistry, 289(42), pp.28956–70.

Nislow, C., Ray, E. & Pillus, L., 1997. SET1, a yeast member of the trithorax family, functions in transcriptional silencing and diverse cellular processes. Molecular biology of the cell, 8(12), pp.2421–36.

Nodelman, I.M. & Bowman, G.D., 2013. Nucleosome sliding by Chd1 does not require rigid coupling between DNA-binding and ATPase domains. EMBO reports, 14(12), pp.1098–103.

Nottke, A.C. et al., 2011. SPR-5 is a histone H3K4 demethylase with a role in meiotic double-strand break repair. Proceedings of the National Academy of Sciences, 108(31), pp.12805–12810.

Nowak, R.P. et al., 2016. Advances and challenges in understanding histone demethylase biology. Current Opinion in Chemical Biology, 33, pp.151–159.

O'Neill, L.P. et al., 2003. X-linked genes in female embryonic stem cells carry an epigenetic mark prior to the onset of X inactivation. Human Molecular Genetics, 12(15), pp.1783–1790.

Oberdoerffer, P. & Sinclair, D.A., 2007. The role of nuclear architecture in genomic instability and ageing. Nature Reviews Molecular Cell Biology, 8(9), pp.692–702.

Odho, Z., Southall, S.M. & Wilson, J.R., 2010. Characterization of a novel WDR5-binding site that recruits RbBP5 through a conserved motif to enhance methylation of histone H3 lysine 4 by mixed lineage leukemia protein-1. The Journal of biological chemistry, 285(43), pp.32967–76.

Oegema, K. & Hyman, A.A., 2006. Cell division. The *C. elegans* Research Community, WormBook, 1(72), p.1.

Ohe, Y. & Iwai, K., 1981. Human Spleen Histone H3. Isolation and Amino Acid Sequence. J. Biochem, 90, pp.1205–1211.

Olins, A.L. & Olins, D.E., 1974. Spheroid Chromatin Units (v Bodies). Science, 183(4122).

Ostuni, R. et al., 2013. Latent Enhancers Activated by Stimulation in Differentiated Cells. Cell, 152(1–2), pp.157–171.

Owen, D.J. et al., 2000. The structural basis for the recognition of acetylated histone H4 by the bromodomain of histone acetyltransferase Gcn5p. The EMBO Journal, 19(22), pp.6141–6149.

Paik, W.K. & Kim, S., 1967. E-N-dimethyllysine in histones. Biochemical and Biophysical Research Communications, 27(4), pp.479–483.

Painter RC, Osmond C, Gluckman P, Hanson M, Phillips DI, Roseboom TJ., 2008. Transgenerational effects of prenatal exposure to the Dutch famine on neonatal adiposity and health in later life. BJOG. 115:1243–9

Pan, G. et al., 2007. Whole-Genome Analysis of Histone H3 Lysine 4 and Lysine 27 Methylation in Human Embryonic Stem Cells. Cell Stem Cell, 1(3), pp.299–312.

Patel, A. et al., 2009. On the mechanism of multiple lysine methylation by the human mixed lineage leukemia protein-1 (MLL1) core complex. The Journal of biological chemistry, 284(36), pp.24242–56.

Paull, T.T. et al., 2000. A critical role for histone H2AX in recruitment of repair factors to nuclear foci after DNA damage. Current biology : CB, 10(15), pp.886–95.

Paulson, J.R. & Laemmli, U.K., 1977. The structure of histone-depleted metaphase chromosomes. Cell, 12(3), pp.817–28.

Petty, E., Laughlin, E. & Csankovszki, G., 2011. Regulation of DCC Localization by HTZ-1/H2A.Z and DPY-30 Does not Correlate with H3K4 Methylation Levels B. P. Chadwick, ed. PLoS ONE, 6(10), p.e25973.

Pferdehirt, R.R., Kruesi, W.S. & Meyer, B.J., 2011. An MLL/COMPASS subunit functions in the *C. elegans* dosage compensation complex to target X chromosomes for transcriptional regulation of gene expression. Genes & Development, 25(5), pp.499–515.

Phillips, D.M., 1963. The presence of acetyl groups of histones. The Biochemical journal, 87, pp.258–63.

Piano F., Schetter A.J., Mangone M., Stein L., Kemphues K.J., 2000. RNAi analysis of genes expressed in the ovary of *Caenorhabditis elegans*. Curr. Biol, 14-28;10(24):1619-22.

Piunti, A. & Shilatifard, A., 2016. Epigenetic balance of gene expression by Polycomb and COMPASS families. Science, 352(6290), p.aad9780.

Pradeepa, M.M. et al., 2012. Psip1/Ledgf p52 Binds Methylated Histone H3K36 and Splicing Factors and Contributes to the Regulation of Alternative Splicing W. Reik, ed. PLoS Genetics, 8(5), p.e1002717.

Pray-Grant, M.G. et al., 2005. Chd1 chromodomain links histone H3 methylation with SAGA- and SLIK-dependent acetylation. Nature, 433(7024), pp.434–438.

Qian, C. & Zhou, M.-M., 2006. SET domain protein lysine methyltransferases: Structure, specificity and catalysis. Cellular and Molecular Life Sciences, 63(23), pp.2755–2763.

Rada-Iglesias, A. et al., 2011. A unique chromatin signature uncovers early developmental enhancers in humans. Nature, 470(7333), pp.279–283.

Radman-Livaja, M. et al., 2012. A Key Role for Chd1 in Histone H3 Dynamics at the 3′ Ends of Long Genes in Yeast J. D. Lieb, ed. PLoS Genetics, 8(7), p.e1002811.

Ramakrishnan, V., 1994. Histone structure. Current Opinion in Structural Biology, 4(1), pp.44–50.

Ramon-Maiques, S. et al., 2007. The plant homeodomain finger of RAG2 recognizes histone H3 methylated at both lysine-4 and arginine-2. Proceedings of the National Academy of Sciences, 104(48), pp.18993–18998.

Reinke, A. W., Mak, R., Troemel, E. R., & Bennett, E. J., 2017. In vivo mapping of tissue- and subcellular-specific proteomes in *Caenorhabditis elegans*. Sci Adv, 3, e1602426

Rice, J.C. & Allis, C.D., 2001. Histone methylation versus histone acetylation: new insights into epigenetic regulation. Current opinion in cell biology, 13(3), pp.263–73.

Riddle D., 1988. The nematode *C. elegans*. Cold Spring Harbor Laboratory Press, New York., pp.393–412.

Robert, V.J. et al., 2014. The SET-2/SET1 Histone H3K4 Methyltransferase Maintains Pluripotency in the *Caenorhabditis elegans* Germline,

Rodriguez, C.R. et al., 2000. Kin28, the TFIIH-associated carboxy-terminal domain kinase, facilitates the recruitment of mRNA processing machinery to RNA polymerase II. Molecular and cellular biology, 20(1), pp.104–12.

Rodríguez-Navarro, S., 2009. Insights into SAGA function during gene expression. EMBO reports, 10(8), pp.843–850.

Roguev, A. et al., 2001. The *Saccharomyces cerevisiae* Set1 complex includes an Ash2 homologue and methylates histone 3 lysine 4. The EMBO journal, 20(24), pp.7137–48.

Rose, L.S. & Kemphues, K.J., 1998. Early patterning of the *C. elegans* embryo. Annual review of genetics, 32, pp.521–45.

Ruthenburg, A.J. et al., 2011. Recognition of a mononucleosomal histone modification pattern by BPTF via multivalent interactions. Cell, 145(5), pp.692–706.

Ruthenburg, A.J., Allis, C.D. & Wysocka, J., 2007. Methylation of lysine 4 on histone H3: intricacy of writing and reading a single epigenetic mark. Molecular cell, 25(1), pp.15–30.

Saksouk, N. et al., 2015. Constitutive heterochromatin formation and transcription in mammals. Epigenetics & Chromatin, 8(1), p.3.

Santos-Rosa, H. et al., 2002. Active genes are tri-methylated at K4 of histone H3. Nature, 419(6905), pp.407–11.

Sarvan, S. et al., 2011. Crystal structure of the trithorax group protein ASH2L reveals a forkhead-like DNA binding domain. Nature structural & molecular biology, 18(7), pp.857–9.

Schaner, C.E. et al., 2003. A conserved chromatin architecture marks and maintains the restricted germ cell lineage in worms and flies. Developmental cell, 5(5), pp.747–57.

Schapira, M., 2011. Structural Chemistry of Human SET Domain Protein Methyltransferases. Current chemical genomics, 5(Suppl 1), pp.85–94.

Schmitges, F.W. et al., 2011. Histone Methylation by PRC2 Is Inhibited by Active Chromatin Marks. Molecular Cell, 42(3), pp.330–341.

Schneider, J. et al., 2005. Molecular Regulation of Histone H3 Trimethylation by COMPASS and the Regulation of Gene Expression. Molecular Cell, 19(6), pp.849–856.

Schroeder, S.C. et al., 2000. Dynamic association of capping enzymes with transcribing RNA polymerase II. Genes & development, 14(19), pp.2435–40.

Schuetz, A. et al., 2006. Structural basis for molecular recognition and presentation of histone H3 By WDR5. The EMBO Journal, 25, pp.4245–4252.

Sedat, J. & Manuelidis, L., 1978. A direct approach to the structure of eukaryotic chromosomes. Cold Spring Harbor symposia on quantitative biology, 42 Pt 1, pp.331–50.

Segal, E. & Widom, J., 2009. What controls nucleosome positions? Trends in Genetics, 25(8), pp.335–343.

Shameer PM, Sowmithra K, Harini BP, Chaubey RC, Jha SK, Shetty NJ., 2015. Does exposure of male *Drosophila melanogaster* to acute gamma radiation influence egg to adult development time and longevity of F1–F3 offspring? Entomol Sci. 18:368–76.

Shi, X. et al., 2006. ING2 PHD domain links histone H3 lysine 4 methylation to active gene repression. Nature, 442(7098), p.96.

Shi, Y. et al., 2004. Histone Demethylation Mediated by the Nuclear Amine Oxidase Homolog LSD1. Cell, 119(7), pp.941–953.

Shilatifard, A., 2008. Molecular implementation and physiological roles for histone H3 lysine 4 (H3K4) methylation. Current Opinion in Cell Biology, 20(3), pp.341–348.

Shilatifard, A., 2012. The COMPASS family of histone H3K4 methylases: mechanisms of regulation in development and disease pathogenesis. Annual review of biochemistry, 81, pp.65–95.

Shinsky, S.A. & Cosgrove, M.S., 2015. Unique Role of the WD-40 Repeat Protein 5 (WDR5) Subunit within the Mixed Lineage Leukemia 3 (MLL3) Histone Methyltransferase Complex. The Journal of biological chemistry, 290(43), pp.25819–33.

Simic, R. et al., 2003. Chromatin remodeling protein Chd1 interacts with transcription elongation factors and localizes to transcribed genes. The EMBO journal, 22(8), pp.1846–56.

Simonet, T. et al., 2007. Antagonistic functions of SET-2/SET1 and HPL/HP1 proteins in *C. elegans* development. Developmental biology, 312(1), pp.367–83.

Sims, R.J. et al., 2005. Human but not yeast CHD1 binds directly and selectively to histone H3 methylated at lysine 4 via its tandem chromodomains. The Journal of biological chemistry, 280(51), pp.41789–92.

Skinner MK, Manikkam M, Tracey R, Guerrero-Bosagna C, Haque M, Nilsson EE., 2013. Ancestral dichlorodiphenyltrichloroethane (DDT) exposure promotes epigenetic transgenerational inheritance of obesity. BMC Med. 11:228

Smith, B.C. & Denu, J.M., 2009. Chemical mechanisms of histone lysine and arginine modifications. Biochimica et biophysica acta, 1789(1), pp.45–57.

Smith, E., Lin, C. & Shilatifard, A., 2011. The super elongation complex (SEC) and MLL in development and disease. Genes & development, 25(7), pp.661–72.

Southall, S.M. et al., 2009. Structural Basis for the Requirement of Additional Factors for MLL1 SET Domain Activity and Recognition of Epigenetic Marks. Molecular Cell, 33(2), pp.181–191.

Spies, N. et al., 2009. Biased Chromatin Signatures around Polyadenylation Sites and Exons. Molecular Cell, 36(2), pp.245–254.

Stirnimann, C.U. et al., 2010. WD40 proteins propel cellular networks. Trends in biochemical sciences, 35(10), pp.565–74.

Stock, J.K. et al., 2007. Ring1-mediated ubiquitination of H2A restrains poised RNA polymerase II at bivalent genes in mouse ES cells. Nature Cell Biology, 9(12), pp.1428–1435.

Strome, S. & Wood, W.B., 1983. Generation of asymmetry and segregation of germ-line granules in early *C. elegans* embryos. Cell, 35(1), pp.15–25.

Strome, S. et al., 2014. Regulation of the X chromosomes in *Caenorhabditis elegans*. Cold Spring Harbor perspectives in biology, 6(3), pp.a018366–a018366.

Sulston, J.. et al., 1983. The Embryonic Cell Lineage of the Nematode *Caenorhabditis elegans*. Developmental Biology, pp.64–119.

Sundaram, M. V, 2005. The love-hate relationship between Ras and Notch. Genes & development, 19(16), pp.1825–39.

Swigut, T. & Wysocka, J., 2007. H3K27 Demethylases, at Long Last. Cell, 131(1), pp.29–32.

Takahashi, Y. et al., 2011. Structural analysis of the core COMPASS family of histone H3K4 methylases from yeast to human. Proceedings of the National Academy of Sciences of the United States of America, 108(51), pp.20526–31.

Talbert, P.B. & Henikoff, S., 2006. Spreading of silent chromatin: inaction at a distance. Nature Reviews Genetics, 7(10), pp.793–803.

Talbert, P.B. et al., 2012. A unified phylogeny-based nomenclature for histone variants. Epigenetics & Chromatin, 5(1), p.7.

Tan W., Zolotukhin A.S., Bear J., Patenaude D.J., Felber B.K., 2000. The mRNA export in *Caenorhabditis elegans* is mediated by Ce-NXF-1, an ortholog of human TAP/NXF and *Saccharomyces cerevisiae* Mex67p. RNA, 6(12):1762-72.

Taverna, S.D. et al., 2006. Yng1 PHD Finger Binding to H3 Trimethylated at K4 Promotes NuA3 HAT Activity at K14 of H3 and Transcription at a Subset of Targeted ORFs. Molecular Cell, 24(5), pp.785–796.

Taverna, S.D. et al., 2006. Yng1 PHD Finger Binding to H3 Trimethylated at K4 Promotes NuA3 HAT Activity at K14 of H3 and Transcription at a Subset of Targeted ORFs. Molecular Cell, 24(5), pp.785–796.

Teperek, M. et al., 2016. Sperm is epigenetically programmed to regulate gene transcription in embryos. Genome research, 26(8), pp.1034–46.

Thoemke, K. et al., 2005. Genome-wide analysis of sex-enriched gene expression during *C. elegans* larval development. Developmental biology, 284(2), pp.500–8.

Thomas, M.C. & Chiang, C.-M., 2006. The General Transcription Machinery and General Cofactors. Critical Reviews in Biochemistry and Molecular Biology, 41(3), pp.105–178.

Tirode, F. et al., 1999. Reconstitution of the transcription factor TFIIH: assignment of functions for the three enzymatic subunits, XPB, XPD, and cdk7. Molecular cell, 3(1), pp.87–95.

Tsukada, Y. et al., 2005. Histone demethylation by a family of JmjC domain-containing proteins. Nature, 439(7078), pp.811–816.

Upadhyay, A.K. & Cheng, X., 2011. Dynamics of histone lysine methylation: structures of methyl writers and erasers. Progress in drug research. Fortschritte der Arzneimittelforschung. Progres des recherches pharmaceutiques, 67, pp.107–24.

van der Voorn, L. & Ploegh, H.L., 1992. The WD-40 repeat. FEBS Letters, 307(2), pp.131–134.

van Holde, K. & Zlatanova, J., 2007. Chromatin fiber structure: Where is the problem now? Seminars in Cell & Developmental Biology, 18(5), pp.651–658.

Vandamme, J. et al., 2012. The *C. elegans* H3K27 demethylase UTX-1 is essential for normal development, independent of its enzymatic activity. PLoS genetics, 8(5), p.e1002647.

Venkatesh, S. & Workman, J.L., 2015. Histone exchange, chromatin structure and the regulation of transcription. Nature Reviews Molecular Cell Biology, 16(3), pp.178–189.

Venter, J.C. et al., 2001. The Sequence of the Human Genome. Science, 291(5507).

Vermeulen, M. et al., 2007. Selective anchoring of TFIID to nucleosomes by trimethylation of histone H3 lysine 4. Cell, 131(1), pp.58–69.

Vermeulen, M. et al., 2010. Quantitative interaction proteomics and genome-wide profiling of epigenetic histone marks and their readers. Cell, 142(6), pp.967–80.

Viladevall, L. et al., 2009. TFIIH and P-TEFb Coordinate Transcription with Capping Enzyme Recruitment at Specific Genes in Fission Yeast. Molecular Cell, 33(6), pp.738–751.

Villeneuve, A.M., 1994. A cis-acting locus that promotes crossing over between X chromosomes in *Caenorhabditis elegans*. Genetics, 136(3), pp.887–902.

von Ehrenstein G. & Schierenberg E., 1980. Nematodes as Biological Models. Academic Press, New York , 1, pp.2–68.

von Holt, C. et al., 1989. [23] Isolation and characterization of histones. In pp. 431–523.

Wang, J.K. et al., 2010. The histone demethylase UTX enables RB-dependent cell fate control. Genes & development, 24(4), pp.327–32.

Wang, K.C. et al., 2011. A long noncoding RNA maintains active chromatin to coordinate homeotic gene expression. Nature, 472(7341), pp.120–124.

Wang, S., 2015. Deposition of methyl marks on H3K4 (histone 3 lysine 4) and their significance during *Caenorhabditis elegans* embryogenesis. The University of Manchester, Manchester eScholar Services.

Wang, S., Fisher, K. & Poulin, G.B., 2011. Lineage specific trimethylation of H3 on lysine 4 during *C. elegans* early embryogenesis. Developmental biology, 355(2), pp.227–38.

Waterborg, J.H., 2002. Dynamics of histone acetylation in vivo. A function for acetylation turnover? Biochemistry and cell biology, 80(3), pp.363–78

Weismann, A., 1892. Das Keimplasma 1. Auflage. Jena: Fischer.

Wen, H. et al., 2010. Recognition of histone H3K4 trimethylation by the plant homeodomain of PHF2 modulates histone demethylation. The Journal of biological chemistry, 285(13), pp.9322–6.

Wen, Y. & Shatkin, A.J., 1999. Transcription elongation factor hSPT5 stimulates mRNA capping. Genes & development, 13(14), pp.1774–9.

Wilkins, B.J. et al., 2014. A Cascade of Histone Modifications Induces Chromatin Condensation in Mitosis. Science, 343(6166).

Wilkins, E., 2016. Expanding the network of enzymes affecting methylation at H3K4 (histone 3 lysine 4) during *Caenorhabditis elegans* embryogenesis. The University of Manchester, Manchester eScholar Services.

Wong, P.-P. et al., 2012. Histone demethylase KDM5B collaborates with TFAP2C and Myc to repress the cell cycle inhibitor p21(cip) (CDKN1A). Molecular and cellular biology, 32(9), pp.1633–44.

Wood, J.G. et al., 2010. Chromatin remodeling in the aging genome of *Drosophila*. Aging cell, 9(6), pp.971–8.

Woodcock, C., 1973. Ultrastructure of inactive chromatin. Journal of Cell Biology.

Wong, R.R.; Lee, S.H.; Nathan, S., 2014. UGT-29 protein expression and localization during bacterial infection in *Caenorhabditis elegans*. AIP Conference Proceedings, Volume 1614, Issue 1, p.509-512.

Wu, H. et al., 2010. Structural Biology of Human H3K9 Methyltransferases N. Gay, ed. PLoS ONE, 5(1), p.e8570.

Wu, R.S. et al., 1986. Histones and Their Modification. Critical Reviews in Biochemistry, 20(2), pp.201–263.

Wyce, A. et al., 2007. H2B Ubiquitylation Acts as a Barrier to Ctk1 Nucleosomal Recruitment Prior to Removal by Ubp8 within a SAGA-Related Complex. Molecular Cell, 27(2), pp.275–288.

Xiao, B. et al., 2003. Structure and catalytic mechanism of the human histone methyltransferase SET7/9. Nature, 421(6923), pp.652–656.

Xiao, Y. et al., 2011. *Caenorhabditis elegans* chromatin-associated proteins SET-2 and ASH-2 are differentially required for histone H3 Lys 4 methylation in embryos and adult germ cells. Proceedings of the National Academy of Sciences of the United States of America, 108(20), pp.8305–10.

Xu, Z. et al., 2012. Synergistic effect of SRY and its direct target, WDR5, on Sox9 expression. PloS one, 7(4), p.e34327.

Yang, Z. et al., 2010. AOF1 is a histone H3K4 demethylase possessing demethylase activity-independent repression function. Cell research, 20(3), pp.276–87.

Yao, Y. et al., 2014. Ancestral exposure to stress epigenetically programs preterm birth risk and adverse maternal and newborn outcomes. BMC Medicine, 12(1), p.121.

Yuan, C.-C. et al., 2012. Histone H3R2 symmetric dimethylation and histone H3K4 trimethylation are tightly correlated in eukaryotic genomes. Cell reports, 1(2), pp.83–90.

Yuan, W. et al., 2012. Dense Chromatin Activates Polycomb Repressive Complex 2 to Regulate H3 Lysine 27 Methylation. Science, 337(6097), pp.971–975.

Yun, M. et al., 2011. Readers of histone modifications. Cell Research, 21(4), pp.564–578.

Zentner, G.E. & Henikoff, S., 2013. Regulation of nucleosome dynamics by histone modifications. Nature Structural & Molecular Biology, 20(3), pp.259–266.

Zhang, P. et al., 2015. A phosphorylation switch on RbBP5 regulates histone H3 Lys4 methylation. Genes & development, 29(2), pp.123–8.

Zhang, X. et al., 2003. Structural basis for the product specificity of histone lysine methyltransferases. Molecular cell, 12(1), pp.177–85.

Zhang, Y. & Reinberg, D., 2001. Transcription regulation by histone methylation: interplay between different covalent modifications of the core histone tails. Genes & development, 15(18), pp.2343–60.

Zhang, Y. et al., 2008. Model-based analysis of ChIP-Seq (MACS). Genome biology, 9(9), p.R137.

Zhang, Y. et al., 2014. The PHD1 finger of KDM5B recognizes unmodified H3K4 during the demethylation of histone H3K4me2/3 by KDM5B. Protein & Cell, 5(11), pp.837–850.

Zhang, Y. et al., 2015. Evolving Catalytic Properties of the MLL Family SET Domain. Structure, 23(10), pp.1921–1933.

Zhao, X.D. et al., 2007. Whole-Genome Mapping of Histone H3 Lys4 and 27 Trimethylations Reveals Distinct Genomic Compartments in Human Embryonic Stem Cells. Cell Stem Cell, 1(3), pp.286–298.

Zhou, W. et al., 2008. Histone H2A Monoubiquitination Represses Transcription by Inhibiting RNA Polymerase II Transcriptional Elongation. Molecular Cell, 29(1), pp.69–80.

Zuryn, S. et al., 2014. Sequential histone-modifying activities determine the robustness of transdifferentiation. Science, 345(6198).