Supplementary Materials

Genome sequencing and transcriptome analyses of the Siberian hamster hypothalamus identify novel mechanisms for seasonal energy balance

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Materials and Methods

Experiment 1 - Genome and hypothalamic transcriptome sequencing

Animals

Adult male Siberian hamsters (*Phodopus sungorus*; n=18) were randomly selected from a breeding colony maintained at the University of Chicago. Hamsters were housed in polypropylene cages illuminated for 15 h per day (LD; lights off at 17:00 h CST). Food (Harlan, Teklad) and filtered tap water were provided ad libitum. All procedures were approved by the Animal Care and Use Committee at the University of Chicago and conformed with the *Guide for the Care and Use of Laboratory Animals*.

De novo genome assembly and annotation

The pipeline for genome assembly and annotation is outlined in Figure S1. Briefly, raw sequencing reads were assessed for quality using FastQC (v0.10.1). Reads were pre-processed by cutadapt (v1.1) and PRINSEQ (v0.20.2) to [1] clip adapters at 3' and primers at 5' ends, [2] trim bases with quality score < 20 from 3' and 5' ends, [3] remove reads with average base quality score < 20, [4] remove ambiguous reads (those containing N bases), [5] remove low-complexity reads (as calculated by the DUST algorithm), and [6] remove duplicate reads (those with identical sequences). Clean reads were further processed for sequencing error correction using ErrorCorrectReads utility from ALLPATHS-LG (release 01/2013). Genome sequence was assembled using SOAPdenovo2 at k-mer size ranging from 33 to 49 (step size 2) to build and merge contigs followed by scaffold reconstruction and gap closure using the paired-end information. Assembly metrics was collected by curtain (v0.2.1), achieving a contig N50-length of 2.23 kb and a scaffold N50-length of 4.84 kb. The longest scaffold reconstructed is 61.1 kb in length. The assembled genomic scaffolds were annotated for putative gene models using

MAKER (v2.31.8) with the guidance of the *de novo* assembled transcript sequences from the *Phodopus sungorus* transcriptome as well as RefSeq protein sequences of *Mus musculus* (mm10) and *Rattus norvegicus* (rn6).

Seasonal hypothalamic transcriptome

Adult male hamsters (3-8 months old) were kept on long days (LD 15L:9D; n=8) or transferred to a short-day photoperiod (SD 9L:15D; n=8) for 12 weeks. Testes mass and body weight were measured at baseline and after 6, 9 and 12 weeks of photoperiod exposure. SD hamsters exhibited gonadal involution (Figure 1B) and body weight loss (Figure 1C). At the termination of the experiment, the hypothalamus (containing attached infundibulum and pars tuberalis) was dissected as previously described *(1)*. Briefly, the whole hypothalamus, including the infundibulum (i.e., containing the pars tuberalis, but excluding the pars distalis and the pars nervosa) was extracted via a ventral approach and upon removal was frozen in powdered dry ice. The anatomical boundaries for hypothalamus dissection were: the optic chiasm at the anterior border, the mammillary bodies at the posterior border, and laterally at the hypothalamic sulci. Extracted tissue was cut dorsally 3-4 mm from the ventral surface. Testes were weighed to the nearest 0.1 mg. Hypothalamic RNA was extracted using QIAGEN RNeasy (Catalog #74104); quantity was assessed using Nanodrop. Paired-end (PE) libraries were prepared and sequenced on an Illumina HiSeq-2000 instrument at The University of Chicago Genomic Facility. A total of 2.7 billion 100 bp PE reads were generated.

De novo transcriptome assembly and annotation

The pipeline for genome assembly and annotation is outlined in Figure S1. Raw sequencing reads were pre-processed as described in the *de novo* genome assembly pipeline; poly-A and ploy-T sequences were then clipped from the end of each read. Transcriptomes were reconstructed using Trinity *de novo* assembly pipeline (v2013-02-25) (*2*). Gene homologs of each assembled transcript sequence were identified by BLATX searches against the annotated RefSeq protein and RNA databases of *Rattus norvegicus* (rn5), *Mus musculus* (mm10) and *Homo sapiens* (hg38). Target sequences were filtered by e-value < 1E-5, alignment length ≥ 30 amino acids, and identity ≥ 25%. Those that passed all filters were used for reverse TBLASTN searches against the database of assembled hamster transcript sequences. Blast matches that passed all filters and returned as the top hit in both BLASTX and reverse TBLASTN searches were assigned as the gene homolog for each assembled transcript sequence. A total of 476,208 transcripts derived from 285,581 genes were assembled at 300bp or longer. Among those, 33,711 genes (11.8%) have annotated homologs in RefSeq databases of human, mouse or rat. The average transcript length was 750 bp, with the longest transcript (24,382 bp, 8,178 aa) as the homolog of *Syne2* gene (spectrin repeat containing nuclear envelope protein 2) with 100% ORF coverage comparing to rat, mouse or human proteins.

<u>Quantification and identification of differentially expressed genes and isoforms</u>

For identification of differentially expressed transcripts between conditions, raw RNA-sequencing reads of each sample were pre-processed to clip adapters from the 3' end and then mapped back onto the assembled transcript sequences using bowtie (v0.12.8). The abundance of transcripts was estimated by the RSEM (RNA-Seq by Expectation Maximization) algorithm followed by TMM (trimmed mean of M-values normalization method) normalization across all samples. Transcripts differentially expressed between groups were identified at both gene and isoform level using the Bioconductor package edgeR (*3*), with samples from the same photoperiod treatment group as biological replicates within the group. See text and Table S2 for expression fold change (FC) and FDR-corrected P-values.

Quantification of photoperiodic regulation of RNA expression

RNA-seq data were independently verified using qPCR using two RNAs that have not been investigated in a photoperiodic context: GTPase, very large interferon inducible-1 (*gvin1*) and small nucleolar RNA C/D box 15a (*snord15a*). RNA samples extracted for transcriptomic analyses were used in the PCR reactions. cDNA was synthesized using Superscript III (Invitrogen) and cDNA was stored at -20ºC until qPCR was performed. All cDNA tissue samples were run in triplicate. qPCRs were performed using a BIORAD CFX96 system using the following steps [1] initial denaturation at 95°C for 30 s, then 39 cycles of [2] 95°C for 10 s, [3] annealing at temperature dependent on target mRNA (Table S5) for 30 s, and [4] extension at 72°C for 30 s. Relative gene expression was log transformed to fit ANOVA assumptions. A melting curve analysis was added to determine the quality and specificity of each reaction, and sample specificity was confirmed by resolving select PCR products in 2.5% agarose gel. Quantification of mRNA expression levels was accomplished with iQ Sybr Green Supermix (BIORAD). PCR Reaction efficiencies (E) and cycle thresholds (CTs) were calculated using PCR Miner (*4*). Samples with E values below 0.8 or above 1.2 were excluded from analyses (*5*). The expression of each target gene of interest was measured in relation the average cycling time (CT) for two reference targets: glyceraldehyde 3-phosphate dehydrogenase (*gapdh*) and Beta-actin (*βactin*) and calculated using $2^{-(\text{delta-deltaCt})}$. Confirming RNA-seq relative quantifications, *gvin1* expression was greater in LD compared to SD, and *snord15a* expression was higher in SD than LD ($P<0.05$; Figure S2).

In situ hybridization of select photoperiodic genes

mRNA distribution of select photoperiodic genes (*tshβ, dio2, dio3*, *pomc*) was qualitatively examined in coronal hypothalamic sections by radioactive *in situ* hybridization.

Sections of hypothalamus were cut and mounted onto poly-L-lysine coated slides. Riboprobes were generated from cloned polymerase chain reaction (PCR)-generated fragments as previously described (*6*). *In situ* hybridization was carried out as previously described (*7*). Briefly, sections were fixed in 4% paraformaldehyde in 0.1M phosphate buffer (PB), washed in 0.1M PB, acetylated in 0.25% acetic anhydrate in 0.1M triethanolamine, and washed again in PB. After dehydration in graded ethanol, radioactive probes were applied to the slides in 70 µl hybridization mixture (0.3M NaCl, 10mM Tris-HCL (pH 8), 1 mM EDTA, 0.05% transfer RNA, 10 mM dithiothreitol, 0.02% Ficoll, 0.02% polyvinylpyrrolidone, 0.02% BSA, and 10% dextran sulphate) and hybridized overnight at 58°C. On the following day, slides were rinsed in 4× SSC (1× SSC = 0.15M sodium chloride, 15mM trisodium citrate pH 7.0), and treated with 20 µg/µL ribonuclease A at 37°C for 30 min, then washed in decreasing concentrations of SSC with a final wash in 0.1% SSC, at 60°C, and dehydration using graded ethanol. Finally, slides were dried and exposed to Kodak Biomax MR film. After exposure and developing, autoradiographic films were digitized on an Epson scanner.

Experiment 2 – Photoperiod and T_3 regulation of *pomc*

Animals

Adult male hamsters (n=31; 3-6 month-old) were randomly selected from a colony maintained at the University of Aberdeen. Hamsters were housed in polypropylene cages illuminated for 15 h/day (15L:9D). Food and water were provided *ad libitum*, and cotton nesting material was available in the cage at all times. All procedures were approved by the Animal Welfare and Ethics Review Board at the University of Aberdeen and conducted under Home Office license (70/7917).

Photoperiod and injection treatments

To evaluate the effects of T_3 on body weight and hypothalamic gene expression in different photoperiods, hamsters were group housed in LD (n=15) or were transferred to SD (9L: 15D; n=16). After 8 weeks of adaptation to LD and SD treatments, hamsters within each photoperiod were randomly assigned to receive either T_3 (LD+T3, n=6; SD+T3, n=8; 5 µg T_3/hamster, in a volume of 0.1 ml; Sigma-Aldrich Catalog #T2877) or a saline control treatment (LD+S, n=9; SD+S, n=8; 0.1 ml vehicle), daily for the next 2 weeks. T_3, rather than T_4, was used to upregulate thyroid hormone signaling because it facilitates greater experimental control over thyroid hormone treatments. Siberian hamsters do not exhibit robust DIO2 responses to changes in day length (*1, 8, 9*) and thus we cannot reliably infer the patterns of $T_4 \rightarrow T_3$ conversion that would occur in all tissues. T_3 treatment also permits bypassing DIO3 catabolism of T_4 into rT_3 (*10*). This ensured that the biologically active hormone was available to induce transcription *in vivo*. Moreover, similar daily T_3 injection regimens have been shown sufficient to elicit downstream changes in reproductive (*11,12*) and immune (*11,13*) function in Siberian hamsters. Body masses (±0.1g) were obtained prior to, and again after 4 and 8 weeks of photoperiod exposure. After 2 weeks of treatment, hamsters were euthanized under surgical anesthesia (4% isoflurane gas); brains were rapidly dissected and frozen as described above.

Quantification of hypothalamic RNA expression

The whole hypothalamus and infundibulum (containing the pars tuberalis, but neither the pars distalis nor the pars nervosa) was extracted and frozen in powdered dry ice, as described in Experiment 1 (above). Whole hypothalamic dissection reliably permits the quantification of of thyrotrophin-stimulating hormone subunit β, deiodinase Type II, and deiodinase Type III and thus confirmation of molecular photoperiodic responses. Moreover, these genes are also involved in the homeostatic regulation of thyroid hormone production and catabolism, and afforded confirmation that T_3 injections affect RNA expression in the hypothalamus. Transcripts examined were associated with first-order energy balance: *pomc*, neuropeptide Y (*npy*), cocaine- and amphetamine-related transcript (*cart*), and agouti-related peptide (*agrp*).

Hypothalamic RNA was extracted from tissues using Trizol (ThermoFisher Scientific), and nucleic acid concentration was determined by spectrophotometer. cDNA was synthesized using Superscript III (Invitrogen) and cDNA was stored at -20ºC until quantitative PCR was performed. All cDNA tissue samples were run in triplicates. qPCRs for mRNA expression in hypothalamic tissue were performed using a BIORAD CFX96 according to the same cycle protocol described in Experiment 1, as were post-PCR statistical analyses of E and CT data. Expression levels of target RNAs were determined using the average CT of glyceraldehyde 3-phosphate dehydrogenase (*gapdh*) and hypoxanthine phosphoribosyltransferase (*hprt*) as reference genes and calculated using $2^{-(\text{delta-deltaCt})}$.

Luciferase assay to assess *in vitro* T_3 regulation of *pomc* promoter

In order to determine the sufficiency of T_3 to drive *pomc* expression in hamsters and the functional significance of the inverted TRE, the *pomc* promoter sequence for Siberian hamsters and mice were generated and ligated into pUC57-Kan vectors using *EcoR1* (5') and *HindIII* (3') restriction enzymes (Genewiz). Following ligation, DNA constructs were amplified in 10-beta competent *E. coli* cells (NEB). DNA for transfection was prepared from bacterial cultures and isolated using wizard plus SV minipreps DNA purification system kit (Promega).

GH3 cells (EATCC) were grown in suspension in 10mm cell culture dishes (Cellstar, Greiner bio-one) and were maintained in Nutrient mixture F-10 Ham (Sigma) supplemented with 17.5% (v/v) Horse serum (Gibco), 2.5% (v/v) foetal bovine serum (Sigma), 100 IU penicillin, 0.25µg amphotericin B and 100µg streptomycin (Sigma). Cells were fed every 2 - 3 days and were passaged every 7 days, at 1 in 4.

For transfection experiments 12-well plates (Cellstar, Greiner bio-one) were first coated with 0.01% poly-L-lysine (Sigma) according to manufacturer's instructions. Wells were seeded with GH3 cells (passage 4-9) at 0.5x106 cells/well and were left for 24 hours to reach ~80% confluence. Cells were then either non-transfected or transfected with Lipofectamine 2000 reagent (Invitrogen), according to manufacturer's instructions with vector containing either no insert (empty), hamster or mouse promoter regions. The transfection mix contained 8µl Lipofectamine and 4ng vector and was made up to a final volume of 200µl in 1x OptiMEM (Gibco). Cells were then left for an additional 24 h, washed 3 times with 1x PBS (Sigma) and then incubated for 4 h in 1x OptiMEM (Gibco). After 4 h the media was then changed with 1x OptiMEM containing either 1 µg/ml T_3 (T2877; Sigma) or an equivalent volume of saline. The T3 was prepared as a 1 mg/ml stock by suspending the T_3 in saline which was then subsequently dissolved by the addition of 1N NaOH. Cells were then incubated for 24 h, 900µl of media was removed, centrifuged at 16100xg for 5 s and the top 800 µl of supernatant was stored at -20°C. Luciferase and phosphatase activity in the media was determined, according to manufacturer's instructions, using a Secrete-Pair Dual Luminescence assay kit (Genecopeia) with absorbencies being measured with a Spark 10M (Tecan). The luciferase activity (under the influence of the inserts) and phosphatase activity (used as a marker of transfection efficiency) for each sample was corrected for background activity by subtracting the average activity observed in non-transfected cell samples. Luciferase activity was then expressed as a percentage of phosphatase activity.

Experiment 3 – *in silico* analyses of *pomc* proximal promoter

Our Siberian hamster genome sequencing efforts resulted in 779 bp region upstream from the transcriptional start site of the *pomc* gene (locus MCBN010997604). We used PROMO, an online bioinformatic software for the identification of transcription factor binding sites in DNA sequences (*14,15*). Search parameters included only human T3R1b and selected a maximum matrix dissimilarity rate of 15 for the Siberian hamster *pomc* proximal promoter. T3R1b binding sites were identified in two locations that were -90bp to -82bp (*tcctggtga*) and -11bp to -3bp (*tcacctgga*) upstream from the *pomc* TSS (Table S4). There is a diversity in T_3 receptor DNA response elements with a core consensus half-site sequence of (A/G)GGT(C/A/G)A (*16*). The thyroid hormone responses elements (TRE) are classified into either 1) everted repeat, 2) direct repeat or 3) inverted repeats; these data indicate that the Siberian hamster sequence may contain an inverted TRE (*16*). Next, we isolated the proximal promoter sequence (i.e. 2 kb upstream transcription start site) for all mammalian, avian, fish, reptilian and coelacanth species identified in the NCBI database. The evolutionary history was inferred using the Neighbor-Joining method (*17*). The optimal tree with the sum of branch length = 13.79930791 is shown in Fig. 2C. The percentage of replicate trees in which the associated taxa are based on Felsenstein (1985) (*18*) and clustered together in the bootstrap test (500 replicates), shown next to the branches. The tree is drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic tree. The evolutionary distances were computed using the Maximum Composite Likelihood method (*19*) and are expressed in units of the number of base substitutions per site. All ambiguous positions were removed for each sequence pair. There was a total of 3007 positions in the final dataset. Evolutionary analyses and phylogenetic tree construction were conducted in MEGA7 (*20*).

Experiment 4 – Food restriction and *pomc* expression

Animals

Adult (~6 months of age) Siberian hamsters were pseudorandomly selected from colonies previously maintained at the University of Aberdeen and University of Nottingham. Male (n=10) and female (n=13) adult hamsters were randomly assigned to treatment conditions. No sex differences were identified (P>0.05), and the factor of sex was removed from subsequent analyses. Hamsters were housed from birth in 16 h light/day (long days; LD; lights off at 11:00 GMT) in the Biomedical Services Unit at the University of Nottingham, at 21°C and 40% relative humidity. Food (Teklad 2019, Harlan, UK) and water were provided *ad libitum*; with standard environmental enrichment (sizzle, chew stick and a cardboard tunnel). All procedures were approved by the Animal Welfare and Ethics Review Board at the University of Nottingham and carried out in accordance with the UK Animals (Scientific Procedures) Act of 1986 (project license PPL: 40/3604).

Hamsters were either maintained in LD (n=12) or were transferred to short days (8 h light/day; SD; lights off at 11:00 GMT), and remained in these respective photoperiods for 12 weeks. Body weights were obtained shortly before lights out prior to photoperiod treatments (week 0) and again at 2-week intervals. On the last day of the experiment, a subset of LD and SD hamsters (LD: n=7; SD: n=6) was subjected to total food deprivation (i.e. food restriction; “FR”) beginning at the onset of darkness; controls (LD: n=5; SD: n=5) were kept on *ad libitum* food. During the following light phase, body weights were determined, and hamsters were euthanized with sodium pentobarbitone (Euthatal, Rhone Merieux, Harlow, UK). Brains were rapidly dissected and frozen on dry ice. Hypothalamus dissection, RNA isolation, cDNA synthesis, and qPCR were performed as described above for *Experiment 2*.

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Supplementary Figure Legends

Supplementary Figure S1. Flowchart depicting steps (bioinformatic pipeline) used to generate, quality control and annotate the Siberian hamster genome (left) and transcriptome (right) assemblies.

Supplementary Figure S2. Mean ±SEM relative expression levels of (A) thyrotropin stimulating hormone beta subunit (*tshβ*), (B) neuropeptide VF precursor (*npvf*; also known as RF amide related peptide-3; *rfrp3*), (C) iodothyronine deiodinase type 3 (*dio3*) and (D) G protein coupled receptor 50 (*gpr50*) in hypothalamic dissections of male Siberian hamsters following adaptation to LD (red) and SD (blue) photoperiods in *Experiment 2*. *tshβ*, expressed only in thyrotropes of the pars tuberalis (which was included in the hypothalamic dissection), was upregulated in LD relative to SD. *npvf*, which is regulated by photoperiod in the hypothalamic dorsomedial and arcuate nuclei, was upregulated in LD. *dio3*, expressed by tanycytes in the ependymal cell layer surrounding the third ventricle, was upregulated in SD. *gpr50*, a putative melatonin receptor also expressed in the hypothalamic ependymal cell layer, was reduced in SD. Two transcripts from the RNA-seq assembly were selected for qPCR quantification to independently confirm RNA-seq data: GTPase very large interferon inducible 1 (*gvin1*) and small nucleolar RNA C/D box 15A (*snord15a*). SD adaptation upregulated and downregulated *gvin1* and *snord15a* mRNAs, respectively, consistent with results of the RNA-seq analysis (Table S2).

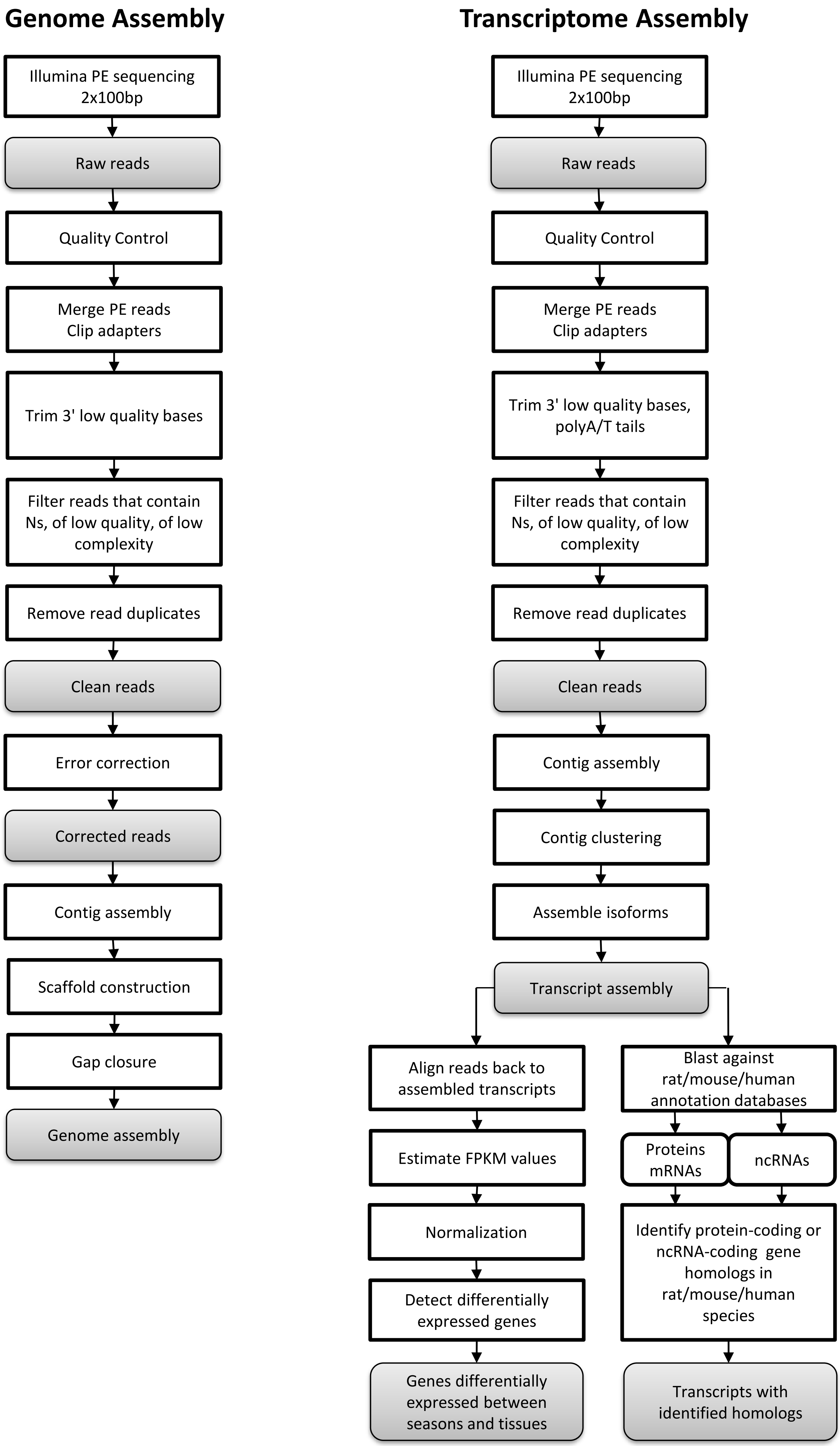
Supplementary Figure S3. Gene Ontology (GO) enrichment is showing biological process terms enriched by a change (increase or decrease) in photoperiod. Top 20 terms are shown (FDR-corrected $P<0.05$). The gene ratio is indicated by position on the abscissa, count is indicated by dot size and the significance by the color of the dot, as indicated in the legends. GO procedures and statistical analyses are described in the *Supplementary Materials*.

Supplementary Figure S4. KEGG pathway enrichment involves hormone activity, transcription regulator activity and neuropeptide signaling. Shown is neuroactive ligand-receptor interaction (KEGG pathway ID mmu04080) (FDR-corrected $P<0.05$), with green and red color denoting genes down-regulated and up-regulated in the hypothalamus of LD relative to SD hamsters, respectively.

Supplementary Figure S5. Mean ±SEM (A) body weight and (B-G) hypothalamic mRNA expression levels of adult male Siberian hamsters following 8 weeks of exposure to LD or SD photoperiods. (A) SD hamsters weighed less than LD hamsters on week 8 (***$P<0.001$). (B) Among control (saline-treated; SAL) hamsters, *tshβ* expression was greater in LD relative to SD hamsters (***$P<0.001$ vs. SD value); two weeks of daily T_3 treatment reduced *tshβ* expression (**$P<0.01$ vs. SAL controls), indicating that T_3 was sufficient to exert negative feedback inhibition of the hypothalamo-pituitary-thyroid axis. (C) *dio3* expression was greater in SD than LD (***$P<0.001$ vs. LD value), and T_3 increased *dio3* expression (#$P<0.05$ vs. SAL value). (D) Photoperiod and T_3 did not significantly affect *dio2* ($P>0.41$ for both). (E) T_3 significantly increased expression of cocaine and amphetamine related transcript (*cart*), but only in SD hamsters (**$P<0.01$). (F,G) There was no significant effect of photoperiod or T_3 on neuropeptide-y (*npy*) or agouti-related peptide (*agrp*) ($P>0.0.17$ for all analyses). Blue bars indicate long-day and red bars indicate short-day treatment groups.

Supplementary Figure S6. Mean ±SEM expression efficiency of GH3 cells transfected with the pomc promoter TRE sequence of the Siberian hamster or mouse or no additional sequence (i.e. empty), following *in vitro* incubation for 24 h with 1 μg/ml T_3 or a hormone-free control medium (VEH). Efficiency is indicated as the ratio of luciferase activity (specific to each TRE insert) to phosphatase activity (indicator of transfection efficiency) corrected for background activity. T_3 treatment was no more effective than saline vehicle at inducing luciferase activity ($P>0.39$).

Supplementary Figure S7. Mean ±SEM (A) body weight of adult male and female Siberian hamsters over 12 weeks of exposure to LD or SD photoperiods, and (B-F) hypothalamic mRNA expression levels of LD and SD hamsters following either acute (24 h) food deprivation (FD) or an *ad libitum* (AL) food manipulation control. (A) SD hamsters weighed less than LD hamsters beginning on week 6 and continuing thereafter (***$P<0.001$). (B) *tshβ* expression was greater in LD than SD hamsters irrespective of food manipulations (***$P<0.001$). (C) SD photoperiod increased *dio3* expression (**$P<0.01$), but there was no impact of food restriction ($P>0.10$). Acute food deprivation upregulated *cart* (D), *npy* (E) and *agrp* (F) expression in both LD and SD ($P<0.05$). Blue bars indicate long-day and red bars indicate short-day treatment groups.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Transcripts with identified homologs

Figure S1

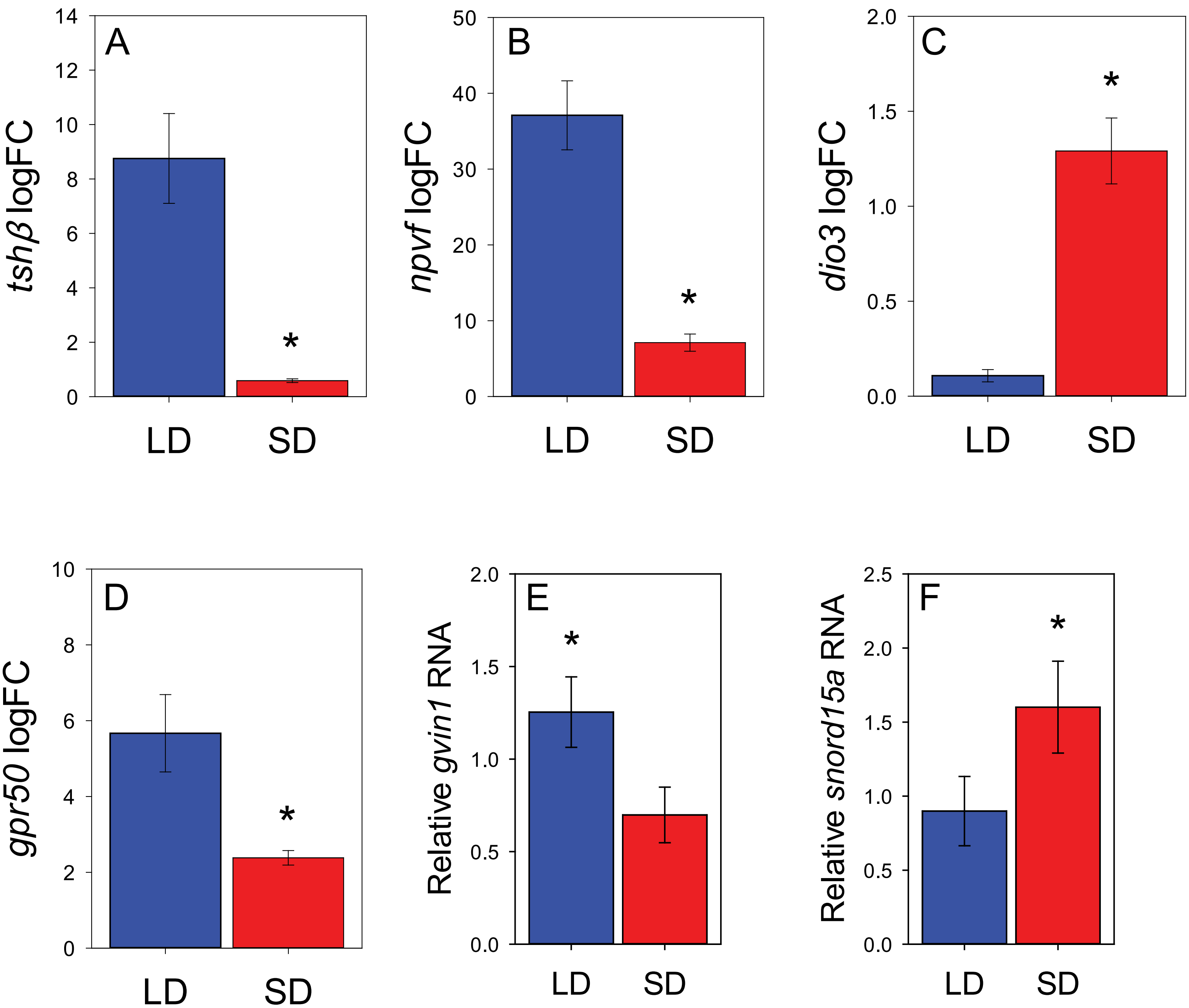
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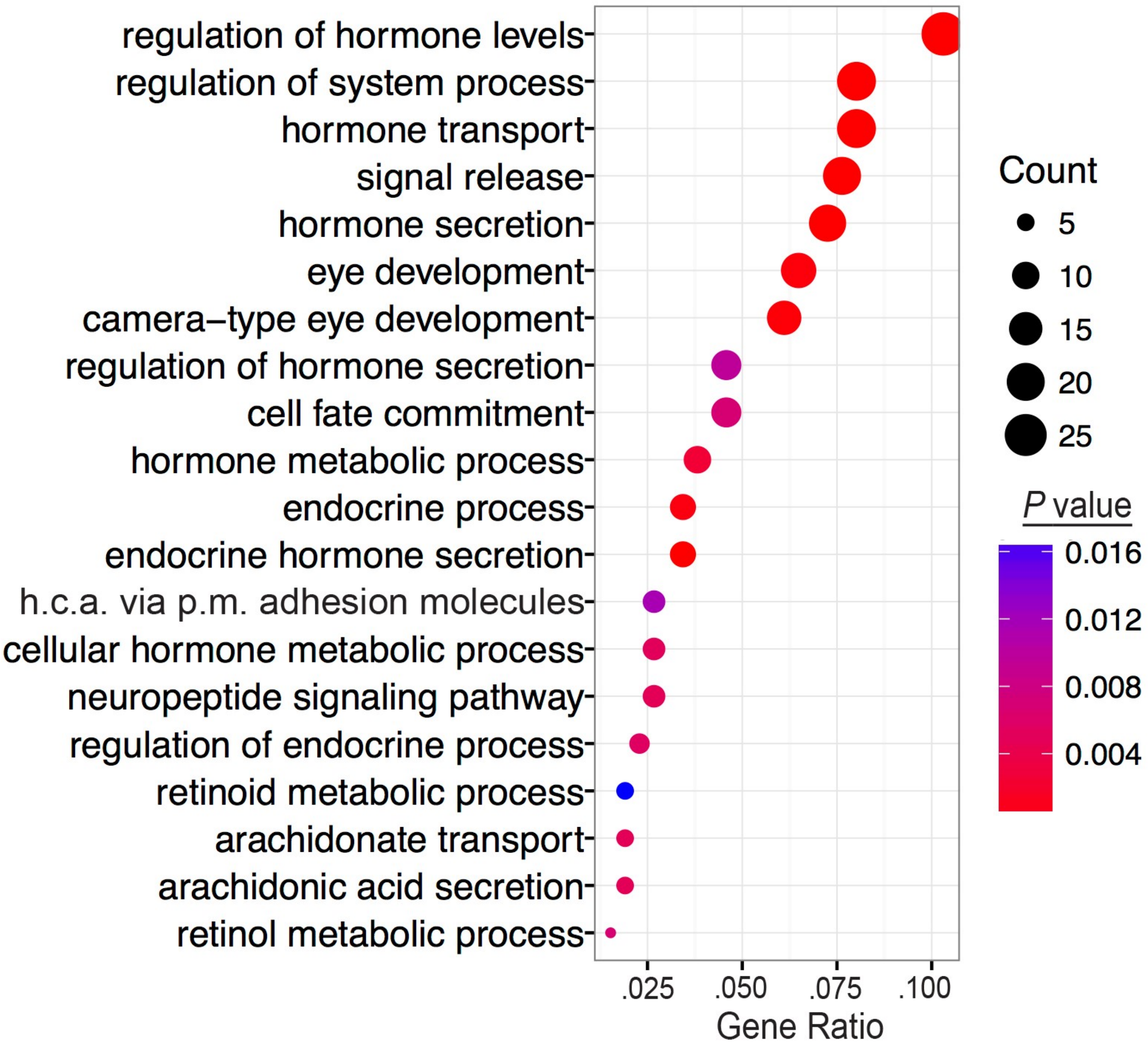
Figure S2



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eye development
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regulation of hormone secretion
cell fate commitment
hormone metabolic process
endocrine process
endocrine hormone secretion
h.c.a. via p.m. adhesion molecules
cellular hormone metabolic process
neuropeptide signaling pathway
regulation of endocrine process
retinoid metabolic process
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Figure S3

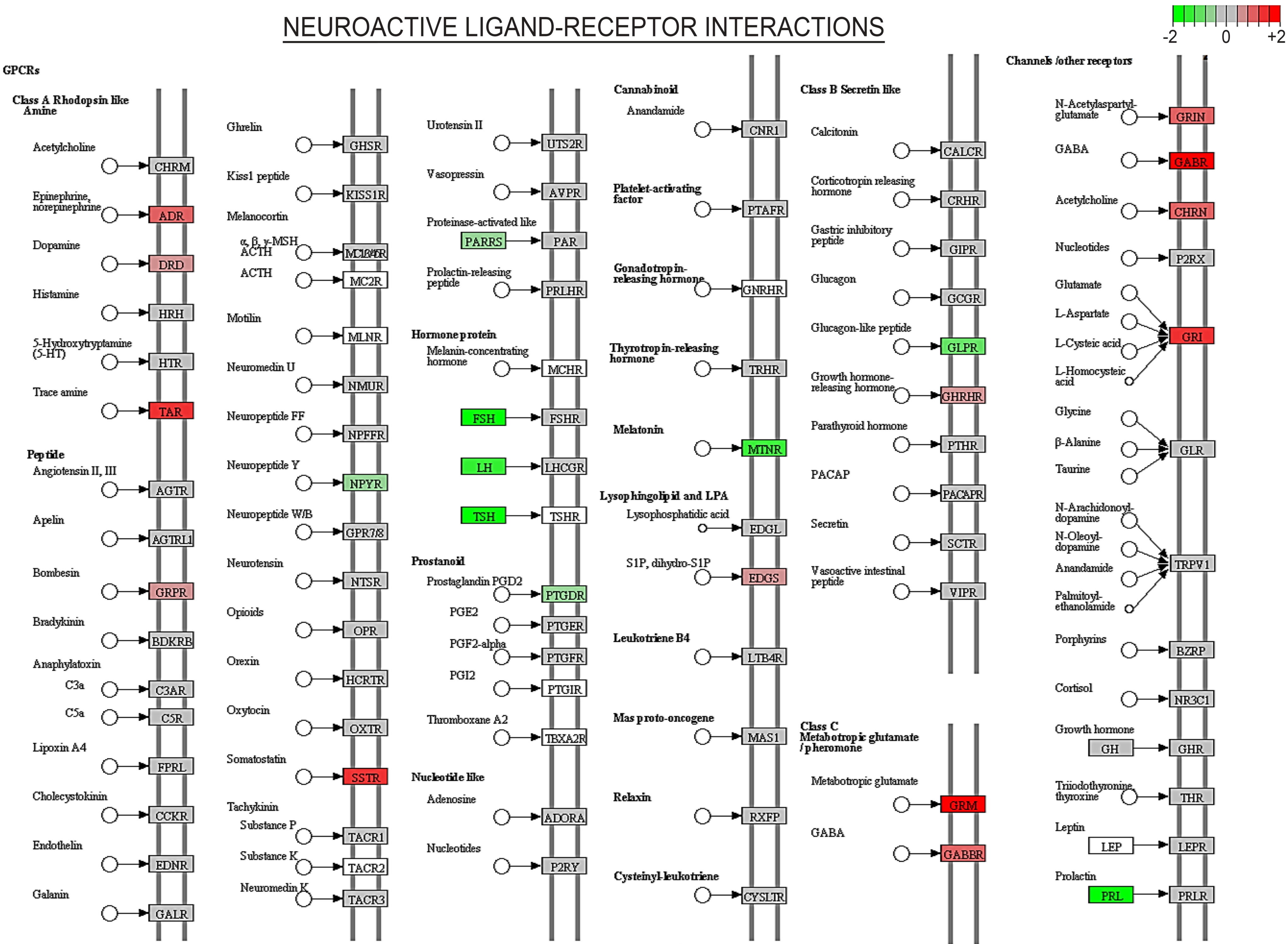

NEUROACTIVE LIGAND-RECEPTOR INTERACTIONS
-2
0
+2
GPCRs
Class A Rhodopsin like
Amine
Acetylcholine
CHRM
Epinephrine, norepinephrine
ADR
Dopamine
DRD
Histamine
HRH
5-Hydroxytryptamine (5-HT)
HTR
Trace amine
TAR
Peptide
Angiotensin II, III
AGTR
Apelin
AGTRL1
Bombesin
GRPR
Bradykinin
BDKRB
Anaphylatoxin
C3a
C3AR
C5a
C5R
Lipoxin A4
FPRL
Cholecystokinin
CCKR
Endothelin
EDNR
Galanin
GALR
Ghrelin
GHSR
Kiss1 peptide
KISS1R
Melanocortin
α, β, γ-MSH
ACTH
ACTH
MC2R
Motilin
MLNR
Neuromedin U
NMUR
Neuropeptide FF
NPFFR
Neuropeptide Y
NPYR
Neuropeptide W/B
GPR7/8
Neurotensin
NTSR
Opioids
OPR
Orexin
HCRTR
Oxytocin
OXTR
Somatostatin
SSTR
Tachykinin
Substance P
TACR1
Substance K
TACR2
Neuromedin K
TACR3
Urotensin II
UTS2R
Vasopressin
AVPR
Proteinase-activated like
PARRS
PAR
Prolactin-releasing peptide
PRLHR
Hormone protein
Melanin-concentrating hormone
MCHR
FSH
FSHR
LH
LHCGR
TSH
TSHR
Prostanoid
Prostaglandin PGD2
PTGDR
PGE2
PTGER
PGF2-alpha
PTGFR
PGI2
PTGIR
Thromboxane A2
TBXA2R
Nucleotide like
Adenosine
ADORA
Nucleotides
P2RY
Cannabinoid
Anandamide
CNR1
Platelet-activating factor
PTAFR
Gonadotropin-releasing hormone
GNRHR
Thyrotropin-releasing hormone
TRHR
Melatonin
MTNR
Lysophingolipid and LPA
Lysophosphatidic acid
EDGL
S1P, dihydro-S1P
EDGS
Leukotriene B4
LTB4R
Mas proto-oncogene
MAS1
Relaxin
RXFP
Cysteinyl-leukotriene
CYSLTR
Class B Secretin like
Calcitonin
CALCR
Corticotropin releasing hormone
CRHR
Gastric inhibitory peptide
GIPR
Glucagon
GCGR
Glucagon-like peptide
GLPR
Growth hormone-releasing hormone
GHRHR
Parathyroid hormone
PTHR
PACAP
PACAPR
Secretin
SCTR
Vasoactive intestinal peptide
VIPR
Class C
Metabotropic glutamate /pheromone
Metabotropic glutamate
GRM
GABA
GABBR
Channels /other receptors
N-Acetylaspartyl-glutamate
GRIN
GABA
GABR
Acetylcholine
CHRN
Nucleotides
P2RX
Glutamate
L-Aspartate
L-Cysteic acid
L-Homocysteic acid
GRI
Glycine
β-Alanine
Taurine
GLR
N-Arachidonoyl-dopamine
N-Oleoyl-dopamine
Anandamide
Palmitoyl-ethanolamide
TRPV1
Porphyrins
BZRP
Cortisol
NR3C1
Growth hormone
GH
GHR
Triiodothyronine thyroxine
THR
Leptin
LEP
LEPR
Prolactin
PRL
PRLR

Figure S4

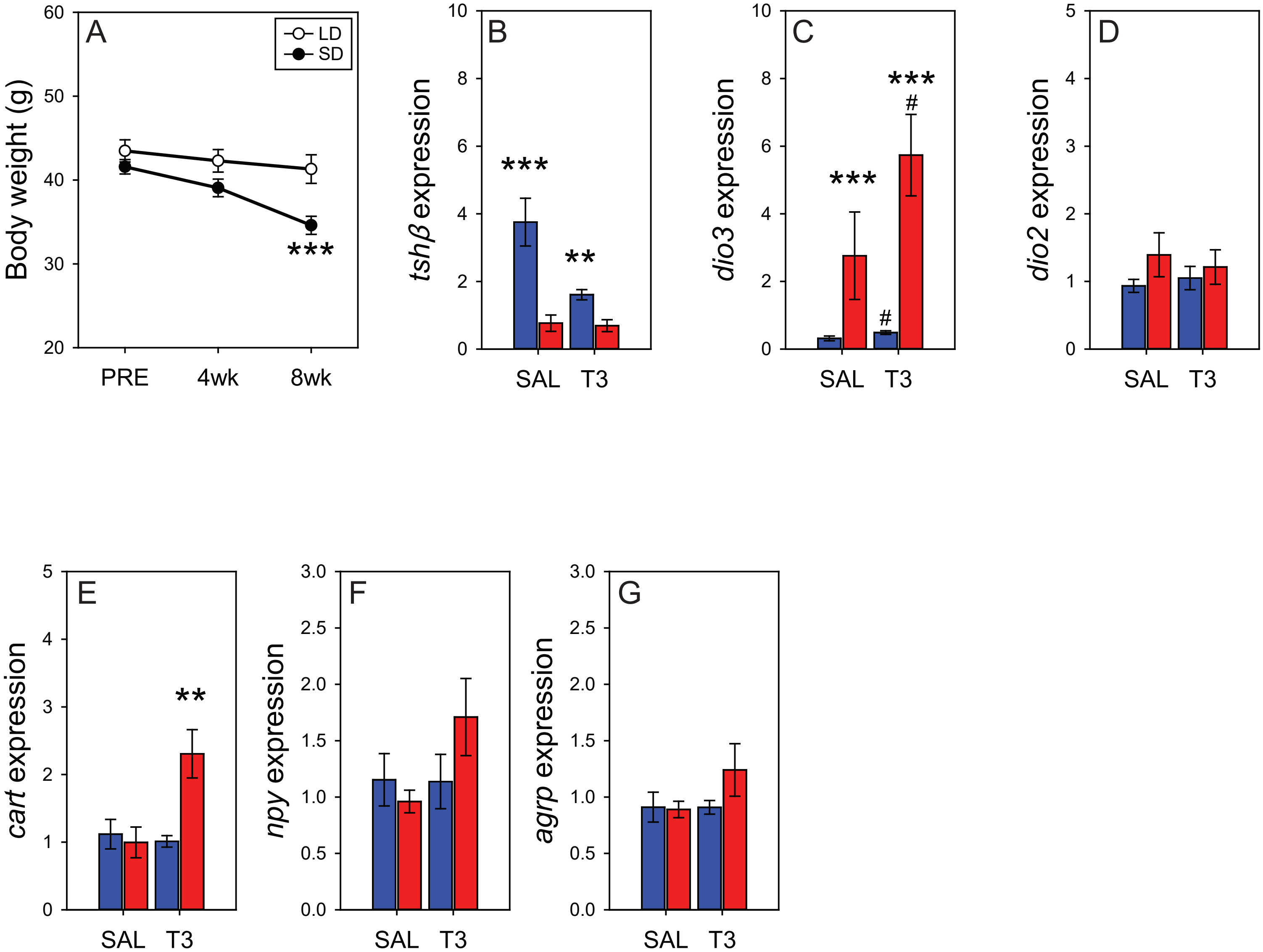
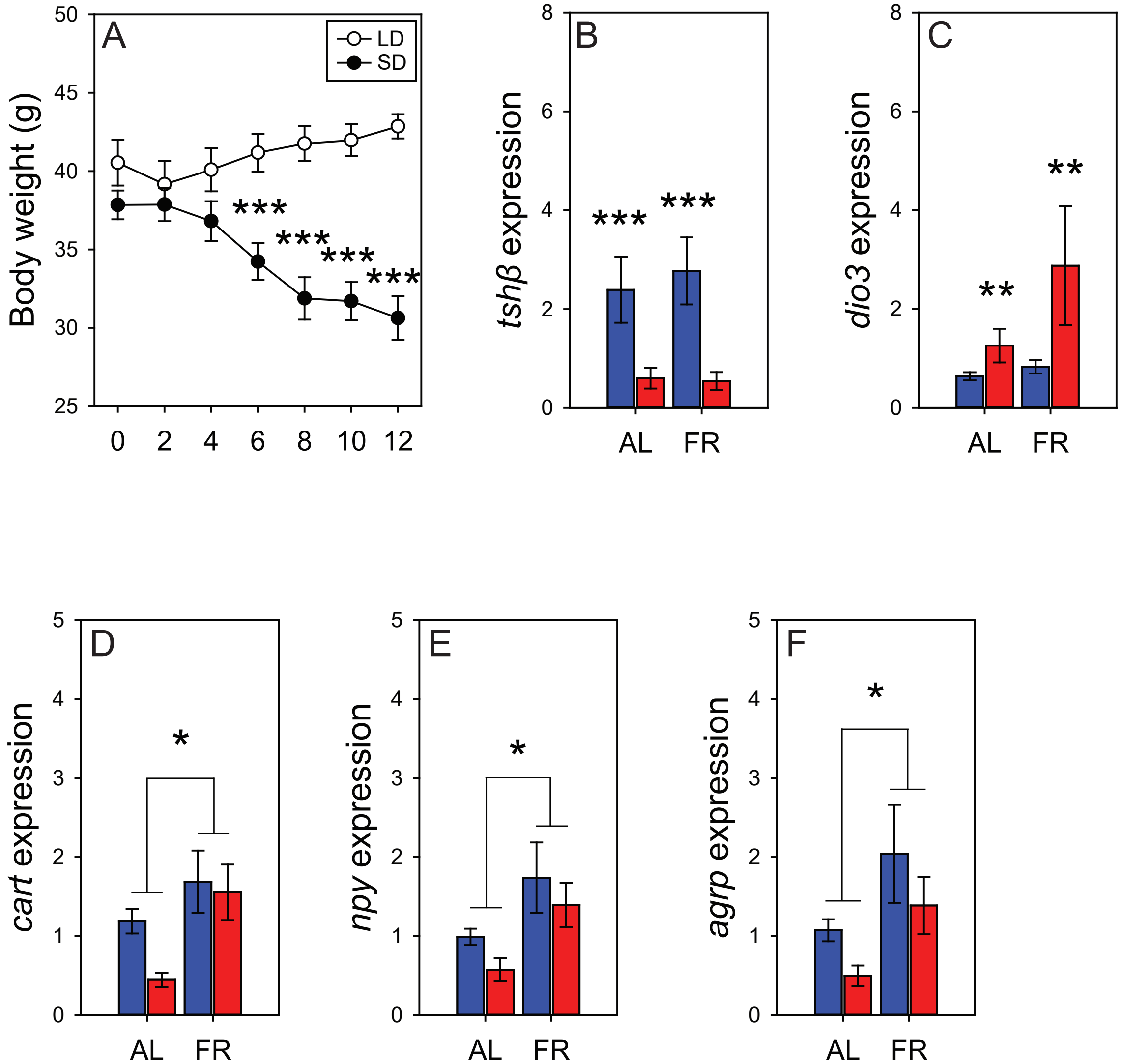

A
LD
SD
Body weight (g)
60
50
40
30
20
***
PRE
4wk
8wk
B
tshβ expression
10
8
6
4
2
0
***
**
SAL
T3
C
dio3 expression
10
8
6
4
2
0
***
***
#
#
SAL
T3
D
dio2 expression
5
4
3
2
1
0
SAL
T3
E
cart expression
5
4
3
2
1
0
**
SAL
T3
F
npy expression
3.0
2.5
2.0
1.5
1.0
0.5
0.0
SAL
T3
G
agrp expression
3.0
2.5
2.0
1.5
1.0
0.5
0.0
SAL
T3

Figure S5

6
5
4
3
2
1
0
Fold difference
Luciferase/Phosphatase
Empty
Mouse
Hamster
Saline
T3

Figure S6



A
LD
SD
Body weight (g)
50
45
40
35
30
25
0
2
4
6
8
10
12
***
***
***
***
B
tshβ expression
8
6
4
2
0
***
***
AL
FR
C
dio3 expression
8
6
4
2
0
**
**
AL
FR
D
cart expression
5
4
3
2
1
0
*
AL
FR
E
npy expression
5
4
3
2
1
0
*
AL
FR
F
agrp expression
5
4
3
2
1
0
*
AL
FR

Figure S7

Table S1 - Genome Assembly Statistics

Assembly Stats	
Total assembled genome sequence length	2,117,039,224
Total assembly gap length	4,678,279
Number of contigs	1,134,012
Longest contig	61,104
Contig N50	4,845
Contig L50	125,969
GC%	41.3

Table S2 - Transcriptome analyses

GeneSymbol	RNAhomolog	HamsterGenes	logFC	logCPM	PValue	FDR
Tshb	NM_001165940	comp189604_c0	-3.891	1.270	0.000	0.000
Npvf	NM_021892	comp89260_c0	-2.419	4.054	0.000	0.000
Dio3	NM_172119	comp91668_c0	3.550	0.319	0.000	0.000
Dhrs7c	NM_001013013	comp95897_c0	2.378	0.356	0.000	0.000
Tal2	NM_009317	comp196378_c3	1.639	-1.222	0.000	0.000
Cish	NM_009895	comp206780_c6	-0.708	1.252	0.000	0.000
Spert	NM_001164139	comp196898_c0	1.873	-1.821	0.000	0.000
Cga	NM_009889	comp216371_c0	-1.430	4.206	0.000	0.000
Gpr50	NM_010340	comp125576_c0	-1.270	3.468	0.000	0.000
Frem1	NM_177863	comp211857_c0	-0.804	1.520	0.000	0.000
Lrat	NM_023624	comp209340_c10	-1.229	1.007	0.000	0.000
Hspb7	NM_013868	comp188792_c2	1.071	0.233	0.000	0.001
Ucma	NM_001113558	comp75795_c0	-3.903	-1.150	0.000	0.001
3632454L22Rik	NR_040282	comp211106_c1	-0.572	2.923	0.000	0.002
Gvin1	NM_001039160	comp211487_c0	-0.954	1.646	0.000	0.004
Fshb	NM_008045	comp2175124_c0	-3.386	-2.896	0.000	0.007
Nmb	NM_026523	comp208362_c5	0.693	0.372	0.000	0.008
Cryab	NM_009964	comp216260_c0	0.634	4.272	0.000	0.009
Snord15a	NR_002172	comp200437_c0	1.879	-0.830	0.000	0.010
Nmu	NM_019515	comp174795_c0	-1.540	-1.243	0.000	0.016
Wdr63	NM_172864	comp195976_c0	0.508	5.272	0.000	0.017
Cbln3	NM_019820	comp187097_c2	4.072	2.278	0.000	0.019
Nr5a2	NM_001159769	comp206048_c28	-1.060	-0.557	0.000	0.019
Rax	NM_013833	comp199921_c0	-0.985	0.833	0.000	0.019
Pou4f1	NM_011143	comp201488_c1	1.019	0.606	0.000	0.030
Prl	NM_011164	comp1052205_c0	-4.183	-2.367	0.000	0.033
Trpv6	NM_022413	comp208008_c0	-0.942	-0.754	0.000	0.033
4922501C03Rik	NM_199316	comp207274_c0	-0.334	3.729	0.000	0.041
Pou4f1	NM_011143	comp201488_c0	1.383	-1.334	0.000	0.046
Vgf	NM_001039385	comp88666_c0	0.374	6.365	0.000	0.046
Greb1	NM_001252071	comp211399_c7	-0.774	2.446	0.000	0.046
Fat2	NM_001029988	comp209317_c1	3.554	2.323	0.000	0.049
Pgr	NM_008829	comp200242_c3	-0.465	4.349	0.000	0.080
Crabp1	NM_013496	comp91587_c0	-0.636	2.616	0.000	0.080
Pgr	NM_008829	comp200242_c0	-0.494	2.340	0.000	0.083
Ccdc122	NM_175369	comp198939_c1	-1.244	-1.976	0.000	0.089
Cyp4a32	NM_001100181	comp210397_c2	-1.263	-1.437	0.000	0.089
Stard5	NM_023377	comp207973_c0	0.329	3.073	0.000	0.104
Maml3	NM_001004176	comp207321_c7	0.394	2.348	0.000	0.107
Chrnb4	NM_148944	comp210142_c13	0.558	3.398	0.000	0.107
3110039I08Rik	NR_040725	comp204032_c4	0.779	-0.423	0.000	0.135
Gabra6	NM_001099641	comp134139_c1	5.067	0.861	0.000	0.135
Serpina3n	NM_009252	comp211245_c0	-0.748	1.138	0.000	0.136
Nlrc5	NM_001033207	comp211695_c2	-0.458	1.692	0.000	0.136
Nr5a2	NM_001159769	comp206048_c7	-0.789	-0.328	0.000	0.137
Baat	NM_007519	comp1245149_c0	1.350	-2.071	0.000	0.137
Iqcj	NM_177585	comp201305_c1	0.610	-0.477	0.000	0.156
Pou4f1	NM_011143	comp121624_c0	0.973	-0.712	0.000	0.162

PGR	NM_001271162	comp210656_c11	-0.511	3.507	0.000	0.165
Gabra6	NM_001099641	comp134139_c2	4.684	-1.296	0.000	0.165
Vgf	NM_001039385	comp163414_c0	0.320	7.235	0.001	0.209
Klhl25	NM_182782	comp206516_c0	0.299	3.688	0.001	0.216
Pax2	NM_011037	comp204614_c1	0.812	-0.722	0.001	0.218
Padi2	NM_008812	comp211767_c12	0.408	6.448	0.001	0.234
Il21r	NM_021887	comp206617_c0	1.271	-2.614	0.001	0.272
Igf1r	NM_010513	comp147797_c1	0.369	2.385	0.001	0.297
Cep192	NM_027556	comp210065_c0	-0.248	4.832	0.001	0.297
Echdc2	NM_001254754	comp206012_c2	0.380	2.318	0.001	0.297
Il18rap	NM_010553	comp211680_c3	1.753	-3.407	0.001	0.297
Gabra6	NM_001099641	comp134139_c0	4.533	0.157	0.001	0.297
Neurod1	NM_010894	comp180457_c2	1.701	1.316	0.001	0.329
Fosb	NM_008036	comp117732_c0	0.661	0.419	0.001	0.334
Nfat5	NM_133957	comp211751_c4	-0.250	3.979	0.001	0.390
Crtam	NM_019465	comp199753_c1	2.252	-1.820	0.001	0.390
Sit1	NM_019436	comp192921_c0	1.578	-3.073	0.001	0.392
P4ha1	NM_011030	comp211569_c15	0.314	5.020	0.001	0.405
LOC200726	NM_001102659	comp196589_c1	-0.855	1.422	0.001	0.414
Ntrk1	NM_001033124	comp92849_c0	0.687	0.130	0.001	0.414
Xlr4c	NM_183094	comp163899_c0	0.674	0.752	0.001	0.440
Lrguk	NM_028886	comp182385_c1	-1.423	-2.686	0.001	0.445
Cldn2	NM_016675	comp103170_c0	-0.794	-0.062	0.001	0.445
Ces1d	NM_053200	comp209915_c4	-0.467	3.235	0.002	0.445
Kazald1	NM_178929	comp203037_c0	0.725	2.899	0.002	0.445
Lamb3	NM_001277928	comp210366_c0	-0.541	-0.095	0.002	0.445
Chrnb4	NM_148944	comp210142_c15	0.481	2.027	0.002	0.445
Ccdc122	NM_175369	comp198939_c0	-0.582	-0.115	0.002	0.447
Cd177	NM_026862	comp203296_c1	0.890	1.107	0.002	0.453
DPP10	NM_020868	comp130394_c0	-0.782	-1.676	0.002	0.455
Cdh15	NM_007662	comp210540_c0	1.488	0.217	0.002	0.456
Itga2	NM_008396	comp211859_c14	0.249	3.267	0.002	0.464
1700029H14Rik	NM_001080781	comp192331_c1	-0.530	0.636	0.002	0.464
Prrc2c	NM_001081290	comp210195_c12	-0.198	7.576	0.002	0.468
Fkbp5	NM_010220	comp193060_c1	-0.550	2.120	0.002	0.468
Nfat5	NM_018823	comp211751_c3	-0.323	3.862	0.002	0.485
Etv4	NM_008815	comp207696_c13	0.481	0.707	0.002	0.485
Etv5	NM_023794	comp211375_c11	0.306	4.551	0.002	0.485
Heatr5a	NM_177171	comp195253_c1	-0.224	4.248	0.002	0.485
Slc35g1	NM_175507	comp190823_c0	-0.493	0.568	0.002	0.495
March4	NM_001045533	comp209238_c1	0.448	0.261	0.002	0.495
1110007C09Rik	NM_026738	comp204263_c0	0.290	2.880	0.002	0.510
Capn8	NM_130890	comp208315_c11	-0.857	-1.875	0.002	0.519
Il17d	NM_145837	comp208784_c4	0.646	-0.306	0.002	0.519
Myh13	NM_001081250	comp210368_c1	0.735	-0.379	0.002	0.520
Cldn2	NM_016675	comp161268_c0	-0.922	-0.752	0.002	0.520
Nes	NM_016701	comp138071_c0	-0.456	1.159	0.002	0.520
Mov10l1	NM_031260	comp208565_c0	0.638	-0.600	0.002	0.520
Irgm1	NM_008326	comp210558_c0	-0.509	3.532	0.002	0.520
Aatf	NM_019816	comp178689_c0	0.221	4.308	0.002	0.520

Brwd3	NM_001081477	comp164752_c0	-0.273	2.110	0.002	0.520
Ints8	NM_001159595	comp206314_c5	0.198	5.031	0.003	0.535
Pcdhb18	NM_053143	comp132496_c0	2.562	-3.776	0.003	0.536
Prkcdbp	NM_028444	comp88477_c0	0.390	3.044	0.003	0.536
Mylk3	NM_175441	comp124852_c0	2.293	-3.694	0.003	0.536
Ttr	NM_013697	comp88562_c0	-2.765	4.601	0.003	0.539
Hipk3	NM_031787	comp1286620_c0	-1.689	-3.611	0.003	0.545
Npl	NM_028749	comp209681_c10	0.286	3.156	0.003	0.545
Atg16l2	NM_001111111	comp210229_c10	0.219	5.420	0.003	0.546
Vmn2r115	NM_001104579	comp211474_c6	-0.878	1.047	0.003	0.555
KCNJ13	NM_002242	comp208366_c8	-0.676	0.428	0.003	0.563
Myoz1	NM_021508	comp199531_c1	0.689	0.999	0.003	0.578
Myh11	NM_013607	comp210797_c4	-0.539	0.870	0.003	0.592
Dnah17	NM_001167746	comp151748_c3	2.936	-3.888	0.003	0.592
Iqgap2	NM_027711	comp210122_c0	-0.385	2.749	0.003	0.592
Hfm1	NM_177873	comp206525_c1	1.140	-1.092	0.003	0.592
Slc2a4	NM_009204	comp197523_c1	-0.698	-0.054	0.003	0.592
Espn	NM_207687	comp193075_c1	0.768	-1.327	0.003	0.605
Coasy	NM_027896	comp205185_c0	0.181	4.752	0.003	0.605
LCOR	NM_032440	comp203627_c1	-0.351	2.093	0.003	0.605
Stip1	NM_016737	comp203383_c6	0.232	7.957	0.003	0.605
4933425L06Rik	NM_025751	comp198820_c0	0.858	-1.921	0.004	0.622
Kcnj12	NM_001267593	comp143379_c0	0.569	0.003	0.004	0.622
Cep350	NM_001039184	comp210732_c1	-0.237	4.378	0.004	0.639
Calr	NM_007591	comp211696_c37	0.227	8.678	0.004	0.681
Cfb	NM_008198	comp187465_c0	-0.689	2.485	0.004	0.681
Inhba	NM_008380	comp194190_c2	0.490	1.000	0.004	0.699
Ntrk1	NM_001033124	comp92849_c1	0.718	0.595	0.004	0.709
Dspp	NM_010080	comp194549_c0	0.433	2.552	0.004	0.722
Hspb1	NM_013560	comp92756_c0	0.487	2.683	0.004	0.722
Nphs1	NM_019459	comp190489_c0	-0.560	-0.823	0.004	0.722
Masp1	NM_008555	comp206891_c6	0.262	2.786	0.004	0.722
Crem	NM_001110852	comp206851_c2	0.276	3.026	0.005	0.722
Birc6	NM_007566	comp209923_c0	-0.188	7.213	0.005	0.722
5430435G22Rik	NM_145509	comp206243_c7	-0.863	-2.013	0.005	0.722
Mafa	NM_194350	comp124688_c0	1.213	-3.169	0.005	0.722
Irx5	NM_018826	comp211940_c0	-0.556	3.017	0.005	0.722
Qrich2	NM_001033267	comp209140_c1	0.195	3.637	0.005	0.722
Col8a2	NM_199473	comp209451_c0	-0.533	2.755	0.005	0.722
Ppp1r10	NM_001163818	comp166522_c0	0.205	5.727	0.005	0.722
Evx1	NM_007966	comp4635_c1	3.738	-4.007	0.005	0.722
Plbd1	NM_025806	comp181269_c0	-0.634	-0.431	0.005	0.724
Inppl1	NM_010567	comp102387_c0	1.581	-3.301	0.005	0.724
Mir133b	NR_029902	comp183767_c2	1.670	-3.011	0.005	0.724
Nes	NM_016701	comp201365_c0	-0.385	3.015	0.005	0.724
5033411D12Rik	NM_138654	comp190088_c0	0.515	0.962	0.005	0.724
Pomc	NM_008895	comp165155_c0	-0.518	5.135	0.005	0.733
Best3	NM_001007583	comp197702_c0	0.292	2.084	0.005	0.741
Hfe	NM_010424	comp210121_c10	-0.457	1.544	0.005	0.756
SUPT3H	NM_001261823	comp121742_c0	0.230	2.221	0.005	0.756

Golgb1	NM_030035	comp211510_c2	-0.178	6.628	0.005	0.756
Pde1c	NM_001025568	comp208763_c0	0.366	1.992	0.005	0.756
Zfp219	NM_001253695	comp211632_c2	0.161	7.203	0.005	0.756
Dcun1d3	NM_001163703	comp165090_c0	-0.323	1.425	0.005	0.756
Galp	NM_178028	comp167383_c0	-1.140	-2.913	0.005	0.756
Sytl1	NM_031393	comp206034_c1	-0.405	1.293	0.005	0.756
Il11ra1	NM_001163401	comp203874_c5	0.245	4.905	0.006	0.756
Ankrd33b	NM_001164441	comp210307_c1	-0.539	2.075	0.006	0.768
Adamts17	NM_001033877	comp208878_c7	-0.357	0.684	0.006	0.778
Sympk	NM_026605	comp163567_c0	0.176	6.135	0.006	0.782
Gm8773	NR_033499	comp169608_c0	-1.165	-2.126	0.006	0.782
Olig2	NM_016967	comp170075_c0	0.295	4.837	0.006	0.795
Stat4	NM_011487	comp199933_c0	-0.578	-0.385	0.006	0.795
Pla2g12b	NM_023530	comp126063_c0	1.493	-3.424	0.006	0.795
Tnik	NM_001163009	comp209149_c13	-0.276	2.054	0.006	0.795
Tfap2b	NM_009334	comp184700_c1	1.249	-1.367	0.006	0.795
Gpr123	NM_177469	comp205597_c1	0.257	3.639	0.006	0.795
Grin2d	NM_008172	comp206340_c1	0.607	-1.230	0.006	0.795
F12	NM_021489	comp199747_c1	-1.368	-2.350	0.006	0.795
Atp10d	NR_003966	comp207927_c18	-0.274	2.741	0.006	0.798
Slc22a2	NM_013667	comp186367_c0	-0.625	1.042	0.006	0.801
Agr3	NM_207531	comp173170_c0	-0.635	-0.885	0.006	0.801
Itln1	NM_010584	comp207120_c1	0.541	-0.818	0.007	0.801
ZMYM2	NM_001190965	comp194942_c0	2.249	-3.717	0.007	0.801
Adamts13	NM_001001322	comp209584_c5	0.357	0.943	0.007	0.801
Icmt	NM_133788	comp202723_c0	0.245	4.288	0.007	0.801
Csmd1	NM_053171	comp209648_c3	-0.189	5.017	0.007	0.801
Zfp385c	NM_177790	comp201952_c5	1.351	-1.579	0.007	0.802
Dpf2	NM_011262	comp210754_c14	0.156	5.671	0.007	0.812
Kcnh6	NM_001037712	comp1353028_c0	-2.104	-3.827	0.007	0.812
Atad2	NM_027435	comp209472_c7	-0.644	-1.354	0.007	0.812
Rnase13	NM_001011687	comp211186_c1	0.563	-0.358	0.007	0.812
Pou4f1	NM_011143	comp128875_c0	1.222	-2.926	0.007	0.813
Batf2	NM_028967	comp201826_c0	-0.558	-1.150	0.007	0.813
Setx	NM_198033	comp211513_c5	-0.204	6.212	0.007	0.847
Cacna1s	NM_001081023	comp207412_c3	-0.373	1.488	0.007	0.849
Ano8	NM_001164679	comp204336_c2	0.189	5.204	0.007	0.849
Nr2c2	NM_011630	comp316174_c0	-2.097	-3.827	0.008	0.849
Lad1	NM_133664	comp201807_c0	1.059	-1.038	0.008	0.849
Neurod1	NM_010894	comp180457_c0	1.621	-1.015	0.008	0.849
Siah3	NM_001128093	comp162296_c1	0.261	2.723	0.008	0.849
Arhgef33	NM_001145452	comp210192_c4	0.499	1.715	0.008	0.849
Rax	NM_013833	comp199921_c1	-0.816	-0.790	0.008	0.849
Irf3	NM_016849	comp208370_c2	0.195	4.805	0.008	0.849
Foxl2os	NR_003248	comp209065_c3	-0.470	0.006	0.008	0.849
Kcnk18	NM_207261	comp199596_c0	-0.803	-1.189	0.008	0.849
Olfr1342	NM_146713	comp211777_c1	-0.795	1.250	0.008	0.849
Hjurp	NM_198652	comp32600_c0	1.464	-3.268	0.008	0.849
Arid1b	NM_001085355	comp404027_c0	1.154	-3.138	0.008	0.849
SLC9C2	NM_178527	comp9893_c1	-1.687	-3.826	0.008	0.849

Mms19	NM_028152	comp210704_c1	0.146	4.653	0.008	0.849
Fbxw17	NM_175401	comp208126_c7	0.234	4.543	0.008	0.849
ASTN2	NM_001184735	comp209051_c2	-0.470	-0.190	0.008	0.849
Mras	NM_008624	comp204726_c0	0.252	6.547	0.008	0.849
Ikbkg	NM_001161421	comp208960_c12	-0.198	3.210	0.008	0.849
Pdlim3	NM_016798	comp160314_c0	0.494	2.036	0.008	0.849
Cd226	NM_001039149	comp206730_c15	-0.305	1.129	0.008	0.849
Rsph6a	NM_031255	comp197728_c0	-0.615	-1.166	0.009	0.849
Zfp385c	NM_177790	comp201952_c1	0.893	-0.528	0.009	0.849
Nfat5	NM_133957	comp211751_c5	-0.249	2.650	0.009	0.849
Col8a1	NM_007739	comp199227_c0	-0.387	2.575	0.009	0.849
Adprhl1	NM_172750	comp201495_c0	0.484	1.471	0.009	0.849
Hspa1b	NM_010478	comp199578_c1	0.278	7.411	0.009	0.849
LOC494224	NM_001009505	comp276398_c0	0.809	-0.703	0.009	0.849
Hnrnpm	NM_029804	comp130536_c0	0.207	6.477	0.009	0.849
Thbs1	NM_011580	comp210860_c4	-0.321	1.614	0.009	0.849
Lrp1b	NM_053011	comp211703_c0	-0.256	5.860	0.009	0.849
Tmem80	NM_027797	comp210488_c3	0.180	3.831	0.009	0.849
Pitx1	NM_011097	comp140567_c1	-1.090	-2.229	0.009	0.849
Kcne1l	NM_021487	comp503330_c0	0.512	-0.864	0.009	0.849
F830016B08Rik	NM_001101475	comp208795_c2	-1.012	-0.417	0.009	0.849
Vps13a	NM_173028	comp211750_c3	-0.167	6.247	0.009	0.849
Slc6a20b	NM_011731	comp199552_c0	-1.303	-2.650	0.009	0.849
Hist2h2aa2	NM_178212	comp206608_c12	0.412	1.633	0.009	0.849
Fam221a	NM_172727	comp187451_c0	-0.302	1.030	0.009	0.849
Paqr7	NM_027995	comp168727_c0	0.223	5.810	0.009	0.849
Cyp4a12b	NM_172306	comp210397_c1	-1.576	-2.354	0.009	0.849
Scara5	NM_028903	comp199930_c0	-0.464	2.428	0.009	0.849
Lmod2	NM_053098	comp8337_c0	-1.872	-3.766	0.009	0.849
Galr2	NM_010254	comp190948_c2	0.642	-0.831	0.009	0.849
Trim9	NM_001110202	comp211615_c12	0.190	4.669	0.009	0.849
Lama1	NM_008480	comp208018_c0	-0.407	3.298	0.009	0.853
Smg9	NM_028047	comp208525_c10	0.211	4.423	0.009	0.862
Maff	NM_010755	comp207530_c7	0.382	1.349	0.009	0.862
Susd1	NM_001163288	comp211519_c0	0.444	1.794	0.010	0.876
Klhl30	NM_027551	comp107084_c0	0.939	-2.413	0.010	0.876
Sdf2l1	NM_022324	comp219058_c0	0.244	2.361	0.010	0.877
Ngfr	NM_033217	comp208025_c1	0.471	2.785	0.010	0.877
Tfap2b	NM_001025305	comp202334_c5	2.522	-4.011	0.010	0.877
Insrr	NM_011832	comp103711_c0	1.049	-2.684	0.010	0.877
Nbeal1	NM_173444	comp210421_c16	-0.185	4.554	0.010	0.877
Mkx	NM_177595	comp210467_c0	-0.253	2.668	0.010	0.877
Ahnak	NM_009643	comp165945_c1	-0.422	0.167	0.010	0.886
Zdhhc23	NM_001007460	comp204190_c4	-0.211	3.545	0.010	0.886
Il33	NM_133775	comp178796_c0	-0.645	-1.156	0.010	0.898
Ogn	NM_008760	comp199272_c0	-0.543	5.494	0.010	0.910
Mbnl3	NM_134163	comp208607_c6	-0.551	1.443	0.011	0.955
Prlr	NM_011169	comp205501_c2	-0.327	2.913	0.011	0.956
Grm6	NM_173372	comp158511_c1	1.550	-3.593	0.011	0.958
Ascc1	NM_026937	comp208649_c1	0.184	6.807	0.011	0.958

Gpr81	NM_175520	comp209103_c2	-0.529	1.745	0.011	0.958
Pcdha5	NM_009959	comp200213_c0	-0.531	-0.514	0.011	0.958
Irs3	NM_010571	comp179366_c0	0.875	-2.266	0.011	0.958
Trim9	NM_130420	comp211615_c7	0.184	4.495	0.012	0.958
Pkhd1l1	NM_138674	comp211782_c2	-0.340	2.484	0.012	0.958
Pla2g5	NM_011110	comp191995_c0	-0.629	-0.873	0.012	0.958
Fam229b	NM_183254	comp140652_c0	0.778	1.000	0.012	0.958
Nps	NM_001163611	comp982373_c0	0.947	-2.579	0.012	0.958
Phldb2	NM_001252442	comp209565_c18	-0.201	3.177	0.012	0.958
SCHIP1	NM_001197107	comp53795_c0	-1.866	-3.538	0.012	0.958
Myh4	NM_010855	comp3358123_c0	2.379	-4.046	0.012	0.958
Nmrk2	NM_027120	comp92156_c0	-1.207	0.432	0.012	0.958
Cxcl12	NM_001012477	comp206295_c2	0.314	3.240	0.012	0.958
Brwd3	NM_001081477	comp164752_c2	-0.310	0.753	0.012	0.958
Hsph1	NM_013559	comp202841_c0	0.187	7.749	0.012	0.958
Timm44	NM_011592	comp162776_c0	0.178	3.823	0.012	0.958
Tcea3	NM_011542	comp206026_c21	0.556	-0.391	0.012	0.958
Gm4952	NM_001167907	comp209470_c7	0.517	-0.546	0.012	0.958
Hepacam2	NM_178899	comp205100_c1	0.866	-1.689	0.012	0.958
BC048562	NM_001004192	comp203370_c3	-0.468	-0.674	0.012	0.981
Samd1	NM_001081415	comp92600_c0	0.243	3.521	0.012	0.982
Marveld2	NM_001038602	comp207436_c1	0.845	1.022	0.013	0.982
Cyp1b1	NM_009994	comp210351_c2	-0.565	2.228	0.013	0.982
Hif3a	NM_016868	comp209807_c1	-0.330	0.815	0.013	0.982
Dcun1d3	NM_173408	comp165090_c3	-0.354	0.015	0.013	0.982
Hist3h2a	NM_178218	comp210806_c7	0.590	-1.298	0.013	0.982
Neurod6	NM_009717	comp163028_c0	-0.735	2.077	0.013	0.982
Nadsyn1	NM_030221	comp208592_c8	0.188	3.562	0.013	0.982
Zfp185	NM_001109043	comp201772_c0	-0.490	1.083	0.013	0.982
Slc47a1	NM_026183	comp188207_c0	-0.556	2.920	0.013	0.982
Tram2	NM_177409	comp210673_c4	-0.327	0.937	0.013	0.982
Kctd1	NM_134112	comp433196_c0	-2.091	-3.975	0.013	0.982
Neurod1	NM_010894	comp180457_c1	1.282	-0.922	0.013	0.982
Shroom4	NM_001040459	comp211622_c3	-0.247	1.465	0.013	0.982
Tnfaip8l1	NM_025566	comp195496_c1	0.524	-1.042	0.013	0.982
Fam89a	NM_001081120	comp224671_c0	0.230	3.430	0.013	0.983
Hist1h1c	NM_015786	comp88593_c0	0.494	1.711	0.013	0.983
Slc26a7	NM_145947	comp207398_c13	-0.369	2.993	0.013	0.983
Hpse2	NM_001081257	comp177168_c0	0.481	-0.927	0.013	0.983
Socs2	NM_001168655	comp207586_c3	-0.326	1.062	0.013	0.983
Ascl4	NM_001163614	comp209984_c0	-0.421	0.095	0.013	0.983
Chd8	NM_201637	comp201810_c0	-0.211	3.422	0.013	0.984
Chat	NM_009891	comp174228_c0	0.819	1.768	0.013	0.984
Cmya5	NM_023821	comp192550_c1	-0.614	-1.546	0.013	0.984
Plxnb2	NM_001108106	comp187325_c1	-0.946	-2.710	0.014	0.991
Serpine3	NM_001199945	comp208087_c18	-0.361	0.611	0.014	0.991
Loxl2	NM_033325	comp206403_c0	-0.436	1.290	0.014	1.000
Cd79a	NM_007655	comp210238_c4	0.618	-1.236	0.014	1.000
Tmcc2	NM_178874	comp204517_c0	0.211	6.617	0.014	1.000
Ryr2	NM_023868	comp209173_c12	-0.220	6.476	0.014	1.000

Cst7	NM_009977	comp228241_c0	0.955	-2.084	0.014	1.000
Asxl2	NM_001270988	comp210110_c6	-0.167	4.482	0.014	1.000
Idnk	NM_001048060	comp208515_c0	0.187	3.600	0.014	1.000
Grhl2	NM_026496	comp1621584_c0	1.675	-3.766	0.014	1.000
Zcchc5	NM_199468	comp115663_c0	-0.708	-1.415	0.014	1.000
Brwd3	NM_001081477	comp164752_c1	-0.258	1.638	0.014	1.000
Mfap5	NM_015776	comp201652_c0	-0.612	0.191	0.015	1.000
En2	NM_010134	comp211229_c12	0.912	-0.641	0.015	1.000
Hspg2	NM_008305	comp203843_c0	-0.338	3.622	0.015	1.000
Foxc2	NM_013519	comp93133_c0	-0.627	0.409	0.015	1.000
1700067K01Rik	NM_183097	comp197852_c0	0.229	2.732	0.015	1.000
Tgtp2	NM_001145164	comp183848_c3	-1.119	-2.580	0.015	1.000
Mrps27	NM_173757	comp210230_c20	0.358	4.457	0.015	1.000
Arhgef19	NM_172520	comp198634_c0	0.324	1.384	0.015	1.000
Abca6	NM_147218	comp210255_c6	-0.451	3.122	0.015	1.000
Mgea5	NM_023799	comp209318_c7	0.215	7.251	0.015	1.000
Atxn1	NM_001199304	comp211631_c1	0.310	2.599	0.015	1.000
Scgn	NM_145399	comp171845_c0	0.456	-0.130	0.015	1.000
Ptk6	NM_009184	comp163408_c0	1.041	-2.542	0.015	1.000
Skor2	NM_001109743	comp167752_c0	1.189	-2.537	0.015	1.000
Pcolce	NM_008788	comp149038_c0	-0.469	2.351	0.015	1.000
Pld2	NM_008876	comp208851_c11	0.186	6.266	0.015	1.000
Skor1	NM_172446	comp170088_c0	0.728	-1.383	0.015	1.000
Lcn8	NM_001128183	comp153745_c0	-1.157	-3.219	0.016	1.000
Trrap	NM_001081362	comp210682_c0	-0.155	6.700	0.016	1.000
Pla2g1b	NM_011107	comp208770_c15	1.103	-1.918	0.016	1.000
Trim14	NM_029077	comp210421_c4	0.333	0.207	0.016	1.000
B4galnt3	NM_198884	comp165327_c1	-1.201	-3.207	0.016	1.000
Cdh3	NM_007665	comp198375_c2	-0.685	-0.750	0.016	1.000
Fzd7	NM_008057	comp208648_c7	0.393	-0.128	0.016	1.000
Timm50	NM_025616	comp88597_c0	0.219	4.754	0.016	1.000
Slc25a19	NM_026071	comp194276_c0	0.159	4.191	0.016	1.000
Gli2	NM_001081125	comp209032_c2	0.409	-0.424	0.016	1.000
Pdzrn4	NM_001164593	comp88108_c0	0.397	-0.328	0.016	1.000
Vegfb	NM_011697	comp209648_c19	0.196	5.064	0.016	1.000
Bmp4	NM_007554	comp197292_c0	-0.304	1.848	0.016	1.000
Ranbp2	NM_011240	comp197221_c1	-0.158	6.640	0.016	1.000
Pdlim3	NM_053650	comp169921_c0	-1.862	-3.770	0.016	1.000
Gm15408	NR_040429	comp210360_c4	0.333	0.277	0.016	1.000
Calr3	NM_028500	comp208804_c2	0.588	-1.124	0.017	1.000
Oit1	NM_146050	comp192961_c0	0.694	-1.752	0.017	1.000
Igf1r	NM_010513	comp198663_c0	0.213	4.067	0.017	1.000
Clec4a2	NM_011999	comp209610_c0	-0.638	-1.639	0.017	1.000
Rbm14	NM_019869	comp208991_c0	0.146	4.623	0.017	1.000
C1qtnf3	NM_001204134	comp190365_c0	-0.529	4.031	0.017	1.000
0610040J01Rik	NM_029554	comp205397_c0	0.458	-0.050	0.017	1.000
Gbp5	NM_153564	comp209322_c1	-0.692	-1.012	0.017	1.000
Klhl38	NM_177755	comp184404_c1	-0.965	-2.707	0.017	1.000
Timm10	NM_013899	comp138203_c0	0.277	4.061	0.017	1.000
Myh11	NM_013607	comp210797_c7	-0.363	2.997	0.017	1.000

Socs2	NM_001168657	comp207586_c0	-0.279	1.617	0.017	1.000
Xkr6	NM_173393	comp195856_c2	0.462	-0.852	0.018	1.000
Dhx58	NM_030150	comp209209_c14	0.403	2.176	0.018	1.000
Ccdc82	NM_025534	comp206967_c21	-0.515	0.229	0.018	1.000
Lpar4	NM_175271	comp172410_c0	-0.459	0.816	0.018	1.000
Cyb561d2	NM_019720	comp204787_c0	0.141	5.334	0.018	1.000
Pax2	NM_011037	comp171683_c0	0.715	-1.444	0.018	1.000
Tox	NM_145711	comp207225_c2	0.202	2.681	0.018	1.000
Hspa5	NM_001163434	comp182520_c0	0.212	8.585	0.018	1.000
Plec	NM_201394	comp210928_c3	-0.221	3.624	0.018	1.000
Chst8	NM_175140	comp201289_c0	0.217	3.489	0.018	1.000
Cacna1c	NM_001256002	comp208652_c0	-0.705	-1.157	0.018	1.000
Tbkbp1	NM_198100	comp162912_c0	0.184	5.639	0.018	1.000
Fam135b	NM_177819	comp210042_c16	-0.193	4.379	0.018	1.000
Slc6a20a	NM_139142	comp203174_c1	-0.742	-1.521	0.018	1.000
Colec12	NM_130449	comp88520_c0	-0.361	4.350	0.018	1.000
Mapre2	NM_153058	comp209329_c0	0.183	3.742	0.018	1.000
Mir1188	NR_035419	comp135452_c0	-1.267	-3.261	0.018	1.000
Ly6i	NM_020498	comp207262_c4	-0.514	-0.242	0.018	1.000
Gpr3	NM_008154	comp116674_c0	0.364	1.376	0.019	1.000
Fam107a	NM_183187	comp206376_c1	0.266	5.216	0.019	1.000
Apln	NM_013912	comp219350_c0	0.261	4.637	0.019	1.000
Trip4	NM_001170907	comp208820_c9	0.276	1.613	0.019	1.000
Srxn1	NM_029688	comp208185_c0	0.223	6.534	0.019	1.000
Slc12a7	NM_011390	comp206781_c12	-0.258	3.007	0.019	1.000
Pramef8	NM_172877	comp210655_c7	0.481	0.367	0.019	1.000
Olig1	NM_016968	comp211513_c1	0.259	3.968	0.019	1.000
Tspan17	NM_028841	comp210621_c7	0.187	4.764	0.019	1.000
Fmo4	NM_144878	comp190085_c0	-0.587	-0.584	0.019	1.000
Birc7	NM_001163247	comp207295_c0	0.289	2.913	0.019	1.000
Fancc	NM_007985	comp211571_c2	0.220	2.881	0.019	1.000
Usp34	NM_001190401	comp206489_c2	-0.194	5.285	0.019	1.000
1700101I11Rik	NR_045270	comp197571_c0	0.647	-1.854	0.019	1.000
Eml5	NM_001081191	comp210811_c12	-0.198	2.376	0.019	1.000
Best1	NM_011913	comp208857_c9	0.385	0.285	0.019	1.000
Pm20d1	NM_178079	comp200577_c1	-0.483	0.796	0.019	1.000
Ddx41	NM_134059	comp206480_c1	0.188	5.026	0.019	1.000
Scd1	NM_009127	comp217231_c0	-0.395	2.580	0.019	1.000
Svs5	NM_009301	comp167792_c0	0.830	-1.929	0.019	1.000
Ccl2	NM_011333	comp157963_c0	-1.028	-2.247	0.019	1.000
Myh14	NM_028021	comp195725_c4	0.303	4.486	0.020	1.000
Rtn4rl2	NM_199223	comp187408_c0	-0.531	0.543	0.020	1.000
Slc25a18	NM_001081048	comp209471_c12	0.223	7.343	0.020	1.000
Ccdc105	NM_027630	comp209718_c7	0.389	3.051	0.020	1.000
Asb16	NM_148953	comp157396_c0	0.960	-2.655	0.020	1.000
Dmxl1	NM_001081371	comp196905_c0	-0.209	4.700	0.020	1.000
HEATR4	NM_203309	comp202170_c0	-0.524	-0.910	0.020	1.000
Cdh1	NM_009864	comp211403_c25	-0.551	2.210	0.020	1.000
Rbm25	NM_027349	comp198596_c0	-0.147	6.826	0.020	1.000
Kiss1	NM_178260	comp198773_c0	0.917	-1.628	0.020	1.000

Sst	NM_009215	comp211433_c4	0.387	6.170	0.020	1.000
Serpinf1	NM_011340	comp166485_c0	-0.369	2.082	0.020	1.000
Tcf15	NM_009328	comp258444_c0	0.399	0.221	0.020	1.000
Pth2	NM_053256	comp154826_c1	1.530	-3.096	0.020	1.000
Nol6	NM_139236	comp207470_c3	0.536	1.326	0.020	1.000
Mdga1	NM_001081160	comp196006_c2	0.258	1.260	0.020	1.000
Kif14	NM_001081258	comp210143_c0	0.278	0.843	0.020	1.000
Thsd4	NM_001040426	comp186916_c0	-0.370	0.114	0.021	1.000
Kcnj13	NM_001110227	comp208366_c12	-0.461	1.798	0.021	1.000
Paxip1	NM_018878	comp184733_c2	-0.273	1.414	0.021	1.000
Dusp5	NM_133578	comp92019_c0	0.914	-0.328	0.021	1.000
Afap1l1	NM_178928	comp207919_c4	0.259	3.084	0.021	1.000
Cdc14b	NM_001122989	comp170771_c1	-0.920	-3.064	0.021	1.000
Nmbr	NM_008703	comp133731_c0	0.315	1.125	0.021	1.000
Bbs1	NM_001033128	comp202757_c2	0.152	5.350	0.021	1.000
Prrc2c	NM_001081290	comp210195_c8	-0.169	6.199	0.021	1.000
Gm13375	NR_033225	comp211027_c1	0.252	3.783	0.021	1.000
Rbp1	NM_011254	comp207140_c1	-0.590	2.819	0.021	1.000
Dcun1d1	NM_001205362	comp203810_c4	-0.483	-0.767	0.021	1.000
EN1	NM_001426	comp163752_c0	0.574	-0.973	0.022	1.000
Tnik	NM_001163008	comp209149_c5	-0.162	6.612	0.022	1.000
Il2rb	NM_008368	comp209674_c1	-0.750	-2.150	0.022	1.000
CAMTA1	NM_001195563	comp1856056_c0	1.356	-3.564	0.022	1.000
Mpzl2	NM_007962	comp164291_c1	-0.443	1.265	0.022	1.000
Gm20554	NR_030701	comp210520_c8	-0.389	2.767	0.022	1.000
Chrna4	NM_015730	comp204540_c12	0.318	7.046	0.022	1.000
Kcnc3	NM_008422	comp211196_c7	0.521	-1.112	0.022	1.000
Sec14l5	NM_001127725	comp195208_c5	0.251	3.439	0.022	1.000
Mdga1	NM_001081160	comp196006_c3	0.199	3.857	0.022	1.000
POU2F2	NM_001207025	comp89220_c0	0.358	0.195	0.022	1.000
Fgf8	NM_001166361	comp165200_c0	1.039	-3.128	0.022	1.000
Rbak	NM_001045482	comp205846_c1	-0.399	-0.368	0.022	1.000
Cryaa	NM_013501	comp105464_c1	0.964	-2.811	0.022	1.000
Nr5a2	NM_001159769	comp206048_c10	-0.913	-2.783	0.022	1.000
Mir212	NR_029794	comp198202_c3	0.630	-1.759	0.022	1.000
Cdk2ap2	NM_026373	comp163956_c0	0.230	3.993	0.022	1.000
Pax2	NM_011037	comp171683_c1	0.712	-1.281	0.023	1.000
Gm11541	NM_001007584	comp3445301_c0	1.910	-3.981	0.023	1.000
Hrk	NM_007545	comp38343_c0	2.025	-3.948	0.023	1.000
Btbd17	NM_028055	comp159490_c0	0.272	3.564	0.023	1.000
Lpl	NM_008509	comp188379_c3	-0.489	2.058	0.023	1.000
Olfm3	NM_153458	comp196411_c0	0.354	3.540	0.023	1.000
Slc8a3	NM_080440	comp192259_c0	-0.879	-2.071	0.023	1.000
Slc16a12	NM_172838	comp205983_c0	-0.348	2.586	0.023	1.000
Nkx3-1	NM_010921	comp164974_c0	0.879	-2.135	0.023	1.000
Slc22a8	NM_001164634	comp195177_c0	-0.471	3.982	0.023	1.000
Fam89a	NM_001081120	comp658815_c0	1.296	-3.278	0.023	1.000
Arrb1	NM_178220	comp211137_c0	0.245	6.146	0.023	1.000
Phf1	NM_009343	comp202869_c0	0.171	6.015	0.023	1.000
Fah	NM_010176	comp195971_c0	0.267	3.684	0.023	1.000

Slc6a13	NM_144512	comp209776_c0	-0.521	2.557	0.023	1.000
Thbs2	NM_011581	comp202364_c0	-0.386	2.308	0.023	1.000
Ubqln4	NM_033526	comp88580_c1	0.186	4.115	0.023	1.000
3110021A11Rik	NR_030776	comp207195_c0	0.643	1.636	0.024	1.000
Fra10ac1	NM_001081075	comp207512_c7	0.385	2.856	0.024	1.000
Mettl3	NM_019721	comp211068_c2	0.134	4.544	0.024	1.000
Gbp2	NM_010260	comp209853_c0	-0.456	1.833	0.024	1.000
Cyp2b10	NM_009999	comp210498_c0	-0.775	-1.908	0.024	1.000
Hes7	NM_033041	comp207624_c3	0.308	0.798	0.024	1.000
Kctd2	NM_183285	comp206415_c3	0.191	6.633	0.024	1.000
LOC100130557	NR_024567	comp154101_c1	0.506	-1.239	0.024	1.000
Xaf1	NM_001037713	comp211329_c2	-0.321	0.645	0.024	1.000
Sf1	NM_011750	comp211569_c14	0.128	7.165	0.024	1.000
Iigp1	NM_001146275	comp209638_c1	-0.626	2.780	0.024	1.000
Bhlhe22	NM_021560	comp825656_c0	1.408	-3.470	0.024	1.000
Nxf2	NM_031259	comp103338_c0	1.084	-3.224	0.024	1.000
Maml3	NM_001004176	comp207321_c3	0.374	0.013	0.024	1.000
Nipsnap3b	NM_025623	comp211714_c0	0.253	2.049	0.024	1.000
Fn1	NM_001276412	comp210249_c6	-0.272	6.503	0.024	1.000
Brwd1	NM_145125	comp205835_c0	-0.971	-2.945	0.025	1.000
Tbx2	NM_009324	comp93034_c0	0.329	0.459	0.025	1.000
4921530L18Rik	NR_038162	comp204017_c1	0.409	-0.520	0.025	1.000
Klhl30	NM_027551	comp104938_c0	0.934	-2.780	0.025	1.000
Cgnl1	NM_026599	comp209086_c2	-0.260	4.502	0.025	1.000
Grcc10	NM_013535	comp210507_c2	0.218	5.803	0.025	1.000
E130008D07Rik	NR_045153	comp209486_c0	0.283	0.813	0.026	1.000
Cdkn1a	NM_007669	comp184683_c0	0.301	3.047	0.026	1.000
Cd74	NM_001042605	comp182605_c2	-0.492	3.177	0.026	1.000
Mybpc3	NM_008653	comp210944_c1	-0.695	-1.220	0.026	1.000
Myh2	NM_001039545	comp211894_c0	0.235	2.069	0.026	1.000
C1ql4	NM_001024702	comp165420_c0	0.492	1.715	0.026	1.000
A630019I02Rik	NR_046182	comp2853923_c0	-1.683	-3.822	0.026	1.000
Lyst	NM_010748	comp210189_c3	-0.122	5.706	0.026	1.000
Trib1	NM_144549	comp199075_c2	0.336	2.170	0.026	1.000
Cryba2	NM_021541	comp158106_c0	0.556	-1.260	0.026	1.000
Ubr5	NM_001081359	comp208898_c1	-0.136	7.709	0.026	1.000
Elf5	NM_010125	comp1851255_c0	1.712	-3.887	0.026	1.000
Eva1a	NM_145570	comp192732_c1	0.256	3.181	0.026	1.000
Grm1	NM_001114333	comp207049_c1	0.250	2.181	0.026	1.000
Pax3	NM_008781	comp1415224_c0	1.836	-3.596	0.026	1.000
Slc9a3	NM_001081060	comp208869_c0	0.408	0.009	0.026	1.000
H2-Aa	NM_010378	comp204839_c0	-0.457	1.803	0.027	1.000
Pde2a	NM_001243758	comp186680_c0	-0.598	-1.428	0.027	1.000
Mpz	NM_008623	comp89238_c0	0.348	3.015	0.027	1.000
Kcnq5	NM_001160139	comp183468_c0	-0.310	2.263	0.027	1.000
Prox2	NM_175198	comp97534_c0	1.401	-3.746	0.027	1.000
Notum	NM_175263	comp250821_c0	0.322	1.516	0.027	1.000
Cpz	NM_153107	comp226034_c0	-0.539	3.367	0.027	1.000
Tiam1	NM_009384	comp160358_c0	2.809	-3.945	0.027	1.000
Pdia6	NM_027959	comp182639_c0	0.200	7.289	0.027	1.000

Manea	NM_172865	comp210975_c17	-0.196	1.841	0.027	1.000
Nkx1-2	NM_009123	comp190981_c1	-0.567	-1.237	0.027	1.000
Pfkfb3	NM_133232	comp206019_c2	0.154	3.956	0.027	1.000
Sfxn2	NM_053196	comp209391_c6	0.153	6.935	0.027	1.000
Acaa1a	NM_130864	comp211647_c5	0.143	4.861	0.027	1.000
Kmt2d	NM_001033276	comp181940_c1	-0.234	2.866	0.027	1.000
Gtpbp8	NM_025332	comp191385_c0	0.212	3.612	0.027	1.000
Slfn2	NM_011408	comp210093_c12	-0.265	2.608	0.027	1.000
Gm10789	NR_033476	comp174721_c0	-0.839	-2.154	0.027	1.000
Dab2	NM_001008702	comp145871_c0	-0.682	-2.296	0.027	1.000
Dnah17	NM_001167746	comp211772_c4	0.846	-2.515	0.027	1.000
Sytl4	NM_013757	comp157829_c0	-0.371	3.326	0.027	1.000
ADARB2	NM_018702	comp210797_c0	0.367	1.859	0.028	1.000
Plod1	NM_011122	comp184499_c0	0.183	4.048	0.028	1.000
Rgs8	NM_026380	comp208589_c11	0.323	5.342	0.028	1.000
Cyp2c70	NM_145499	comp198576_c1	-1.023	-2.970	0.028	1.000
Fblim1	NM_001163256	comp205281_c0	-0.387	0.365	0.028	1.000
Rpl10l	NM_001162933	comp110158_c0	0.901	-2.542	0.028	1.000
Cxcr7	NM_007722	comp210039_c10	0.144	5.017	0.028	1.000
Frmd4a	NM_001177843	comp88459_c1	0.140	4.150	0.028	1.000
Pla2g6	NM_001199023	comp202679_c0	0.157	4.032	0.028	1.000
Abi3	NM_001163464	comp193621_c0	1.100	-3.102	0.028	1.000
Zfp839	NM_001199785	comp201229_c2	-0.356	-0.300	0.028	1.000
Crybb3	NM_001159650	comp210871_c2	0.866	-1.581	0.028	1.000
P2rx3	NM_145526	comp204997_c23	0.387	0.631	0.028	1.000
Sv2c	NM_029210	comp211604_c16	0.331	4.213	0.028	1.000
Mirlet7c-2	NR_029729	comp208551_c5	0.309	2.209	0.028	1.000
Gjd3	NM_178596	comp199352_c2	0.460	-0.754	0.028	1.000
Dpp4	NM_010074	comp203988_c0	-0.548	2.576	0.028	1.000
Far1	NM_001011933	comp186112_c0	-0.520	-0.361	0.028	1.000
Cftr	NM_021050	comp181178_c0	-0.371	0.086	0.028	1.000
Engase	NM_172573	comp211477_c0	0.155	4.113	0.029	1.000
En2	NM_010134	comp208913_c2	0.876	-0.609	0.029	1.000
Olig1	NM_016968	comp209777_c1	0.237	5.774	0.029	1.000
Prlhr	NM_201615	comp205183_c2	0.337	2.759	0.029	1.000
Mast2	NM_001042743	comp112173_c0	1.108	-2.982	0.029	1.000
Phip	NM_001081216	comp207842_c0	-0.143	5.231	0.029	1.000
H2-DMb1	NM_010387	comp207337_c10	0.285	2.456	0.029	1.000
Ahnak	NM_009643	comp165945_c2	-0.364	-0.016	0.029	1.000
Akap9	NM_194462	comp210190_c0	-0.121	7.354	0.029	1.000
Gpr88	NM_022427	comp164892_c0	-0.760	1.694	0.029	1.000
Prss12	NM_008939	comp191186_c2	0.207	4.442	0.029	1.000
Prkci	NM_008857	comp192799_c2	0.315	0.032	0.029	1.000
Usp18	NM_011909	comp208115_c1	-0.561	-0.452	0.029	1.000
Dvl1	NM_010091	comp208492_c0	0.118	6.042	0.029	1.000
Pkd1l3	NM_001039700	comp186219_c0	-1.429	-3.286	0.029	1.000
Lsmem1	NM_001033437	comp137980_c1	1.340	-3.491	0.029	1.000
Smoc2	NM_022315	comp209374_c1	0.355	2.991	0.030	1.000
Kcnip3	NM_019789	comp183175_c1	0.239	5.101	0.030	1.000
Fat3	NM_001080814	comp204153_c2	-0.245	3.807	0.030	1.000

Sfrp1	NM_013834	comp206641_c6	-0.373	2.662	0.030	1.000
Smg1	NM_001031814	comp209092_c7	-0.172	6.673	0.030	1.000
Prdm1	NM_007548	comp208194_c0	-0.814	-2.575	0.030	1.000
Krt1	NM_008473	comp123226_c0	0.288	2.149	0.030	1.000
H2-Oa	NM_008206	comp210825_c5	0.266	4.487	0.030	1.000
Cyb5r2	NM_177216	comp207632_c3	-0.519	0.042	0.030	1.000
Ankrd1	NM_013468	comp140876_c0	2.618	-3.792	0.030	1.000
Angptl2	NM_011923	comp208905_c2	-0.411	3.188	0.030	1.000
D630039A03Rik	NM_178727	comp183859_c1	-1.170	-3.336	0.030	1.000
Pex6	NM_145488	comp204984_c2	0.154	5.022	0.030	1.000
Neb	NM_010889	comp210693_c0	0.741	1.252	0.030	1.000
CELF5	NM_001172673	comp201960_c2	0.248	2.264	0.030	1.000
Inhbe	NM_008382	comp130515_c0	-0.533	-1.552	0.030	1.000
BC030476	NM_173421	comp89373_c0	0.223	1.632	0.031	1.000
Filip1	NM_001081243	comp210381_c0	-0.366	1.711	0.031	1.000
Creld2	NM_029720	comp181187_c0	0.220	3.792	0.031	1.000
Vapb	NM_019806	comp198941_c0	0.202	5.133	0.031	1.000
Spata24	NM_027733	comp208573_c7	-0.246	1.597	0.031	1.000
Cep350	NM_001039184	comp210732_c0	-0.135	6.174	0.031	1.000
G0s2	NM_008059	comp104346_c0	0.266	1.251	0.031	1.000
Sebox	NM_008759	comp2128212_c0	1.218	-3.457	0.031	1.000
Cmya5	NM_023821	comp192550_c0	-0.853	-2.695	0.032	1.000
Cdk2ap1	NM_013812	comp236143_c0	0.354	-0.313	0.032	1.000
Fbl	NM_007991	comp164778_c0	0.141	4.036	0.032	1.000
Phc3	NM_001165955	comp207621_c3	-0.158	4.734	0.032	1.000
Ces1a	NM_001013764	comp146289_c2	-1.684	-3.828	0.032	1.000
Lect1	NM_010701	comp208358_c6	-0.604	0.542	0.032	1.000
Cyp2b10	NM_009999	comp156487_c1	-2.102	-3.976	0.032	1.000
Nov	NM_010930	comp93797_c0	-0.302	4.786	0.032	1.000
Dusp10	NM_022019	comp201123_c0	0.272	3.006	0.032	1.000
Glipr1l2	NM_026223	comp199046_c0	0.423	3.790	0.032	1.000
Gpr52	NM_001146330	comp204459_c0	-0.261	2.490	0.032	1.000
Manea	NM_172865	comp211762_c10	-0.188	2.459	0.032	1.000
Fzd5	NM_001042659	comp208707_c11	-0.417	2.284	0.032	1.000
Htt	NM_010414	comp209985_c2	-0.148	6.791	0.032	1.000
Ccbe1	NM_178793	comp125828_c0	-0.694	-2.055	0.032	1.000
Gm711	NM_198628	comp208881_c5	-0.220	2.013	0.032	1.000
Myh14	NM_028021	comp195725_c0	0.359	0.756	0.032	1.000
Syt4	NM_009308	comp88662_c0	0.169	8.326	0.033	1.000
Zc3h7b	NM_001081016	comp211555_c20	0.174	4.573	0.033	1.000
Plekhh2	NM_177606	comp206985_c0	-0.248	2.834	0.033	1.000
Slco3a1	NM_023908	comp210281_c0	0.208	5.327	0.033	1.000
A930018P22Rik	NM_026634	comp85961_c0	0.860	-2.476	0.033	1.000
Dusp5	NM_001085390	comp92019_c1	0.904	-1.004	0.033	1.000
Olah	NM_145921	comp76152_c0	0.475	-0.942	0.033	1.000
Pde1c	NM_001025568	comp208366_c2	0.439	-0.767	0.033	1.000
Atn1	NM_007881	comp211543_c7	0.136	7.174	0.033	1.000
R3hdm4	NM_001173974	comp204953_c46	0.201	2.072	0.033	1.000
Foxd2	NM_008593	comp188828_c0	0.761	-1.076	0.033	1.000
S100z	NM_001081159	comp187227_c1	-1.591	-3.556	0.033	1.000

Nfat5	NM_133957	comp211751_c2	-0.255	5.173	0.034	1.000
Cep72	NM_028959	comp206808_c0	0.260	0.783	0.034	1.000
Pla2g2d	NM_011109	comp148072_c0	-0.738	-1.518	0.034	1.000
Gm94	NM_001033280	comp205877_c0	-0.382	0.976	0.034	1.000
USP37	NM_020935	comp206499_c0	0.192	2.108	0.034	1.000
Mcoln3	NM_134160	comp205569_c1	0.351	1.543	0.034	1.000
Pcx	NM_001162946	comp207730_c8	0.157	7.522	0.034	1.000
Srsf2	NM_011358	comp210310_c1	0.220	2.903	0.035	1.000
Ptgdr	NM_008962	comp198543_c0	-0.585	1.296	0.035	1.000
Ncaph	NM_144818	comp207796_c9	-0.316	1.466	0.035	1.000
Slc24a1	NM_144813	comp107328_c0	1.337	-3.667	0.035	1.000
Insrr	NM_011832	comp162911_c0	0.995	-2.503	0.035	1.000
Nlrp1a	NM_001004142	comp211369_c3	-0.431	-1.104	0.035	1.000
Ahnak	NM_009643	comp191169_c0	-0.422	-0.029	0.035	1.000
Wdr65	NM_026789	comp209346_c18	1.605	-3.918	0.035	1.000
Aoc3	NM_009675	comp211350_c10	-0.494	-1.219	0.035	1.000
2310030G06Rik	NM_025865	comp172797_c0	0.551	-1.736	0.035	1.000
Cers3	NM_001164201	comp198892_c1	-0.579	-0.607	0.035	1.000
BMP8A	NM_181809	comp209122_c4	0.393	0.083	0.035	1.000
Slc1a3	NM_148938	comp211480_c5	0.199	6.178	0.035	1.000
Crebbp	NM_001025432	comp162979_c1	-0.180	4.819	0.036	1.000
Krt10	NM_010660	comp195583_c0	0.173	2.474	0.036	1.000
Syt12	NM_134164	comp183070_c0	0.229	6.529	0.036	1.000
Pdia4	NM_009787	comp207857_c4	0.193	6.060	0.036	1.000
Gpr123	NM_177469	comp205597_c0	0.222	6.169	0.036	1.000
Zfhx3	NM_007496	comp183588_c4	-0.208	1.999	0.036	1.000
Tmem139	NM_175408	comp195003_c0	0.577	-1.607	0.036	1.000
Thsd4	NM_172444	comp210742_c9	-0.459	2.638	0.036	1.000
Shf	NM_001013829	comp190916_c0	0.262	4.145	0.036	1.000
Serpina7	NM_177920	comp162587_c1	-0.918	-2.839	0.036	1.000
AI606473	NR_040387	comp211097_c0	0.858	1.232	0.036	1.000
Nek8	NM_080849	comp209721_c3	0.176	3.361	0.036	1.000
Nkain4	NM_021426	comp209765_c7	0.250	4.782	0.036	1.000
Csmd3	NM_001081391	comp209658_c1	-0.150	5.907	0.036	1.000
Cyp2d13	NR_003552	comp209053_c1	0.474	6.004	0.036	1.000
Gnl1	NM_008136	comp182619_c0	0.167	6.913	0.036	1.000
Id2	NM_010496	comp208856_c45	0.207	4.815	0.036	1.000
Chd9	NM_177224	comp210330_c2	-0.202	4.279	0.037	1.000
Pnoc	NM_001205075	comp181333_c0	0.254	3.836	0.037	1.000
Slc5a7	NM_022025	comp207651_c0	0.472	3.101	0.037	1.000
Ugcg	NM_011673	comp205551_c1	0.279	3.037	0.037	1.000
Trank1	NM_001164659	comp203949_c1	-0.130	6.279	0.037	1.000
Chac2	NM_026527	comp89134_c0	0.242	2.563	0.037	1.000
Scrt1	NM_130893	comp301388_c0	1.009	-2.791	0.037	1.000
Ramp1	NM_016894	comp176647_c1	1.200	-2.770	0.037	1.000
Stra6	NM_001162479	comp208580_c0	-0.284	1.294	0.037	1.000
Plcb2	NM_177568	comp209708_c3	0.227	2.322	0.037	1.000
Ttc12	NM_172770	comp2447519_c0	0.885	-2.990	0.037	1.000
Begain	NM_001163175	comp195493_c0	0.159	7.728	0.037	1.000
Mcm8	NM_025676	comp206941_c2	-0.244	1.275	0.037	1.000

Epb4.1l1	NM_001003815	comp211111_c3	0.163	4.868	0.038	1.000
Afp	NM_007423	comp4010638_c0	-1.897	-3.882	0.038	1.000
Lhx8	NM_010713	comp203146_c0	0.770	1.221	0.038	1.000
Heatr6	NM_145432	comp210976_c3	0.176	3.031	0.038	1.000
Znrf1	NM_001168622	comp208322_c9	0.140	5.486	0.038	1.000
Gpr174	NM_001033251	comp200402_c0	1.236	-2.576	0.038	1.000
Eml5	NM_001081191	comp1230440_c0	1.178	-3.469	0.038	1.000
Ngfr	NM_033217	comp208025_c3	0.371	0.678	0.038	1.000
Slc4a7	NM_001033270	comp209663_c5	0.213	1.407	0.038	1.000
Tenm2	NM_011856	comp204193_c7	-0.174	5.666	0.038	1.000
Rbm15	NM_001045807	comp205788_c1	-0.185	4.093	0.038	1.000
Dmrta1	NM_175647	comp211738_c1	0.223	1.615	0.038	1.000
Procr	NM_011171	comp121124_c0	-0.349	0.616	0.038	1.000
Alkbh8	NM_026303	comp200592_c0	-0.224	1.735	0.039	1.000
Vwa7	NM_138582	comp201594_c0	0.246	2.674	0.039	1.000
Cckar	NM_009827	comp163416_c0	0.197	2.397	0.039	1.000
Upp2	NM_029692	comp179392_c0	-1.308	-3.432	0.039	1.000
Rps4y2	NR_003634	comp87977_c0	0.494	1.607	0.039	1.000
Ercc2	NM_007949	comp205108_c0	0.149	5.512	0.039	1.000
Kcnc3	NM_008422	comp211196_c6	0.436	3.081	0.039	1.000
Ubald2	NM_176902	comp195369_c0	0.168	4.143	0.039	1.000
Trip4	NM_001170907	comp190368_c0	0.316	-0.313	0.039	1.000
TRIOBP	NM_138632	comp191691_c1	0.932	-3.119	0.039	1.000
Fam5b	NM_207583	comp196507_c0	-0.157	5.749	0.039	1.000
Npr3	NM_001039181	comp209572_c16	-0.274	1.553	0.040	1.000
1700055N04Rik	NM_028545	comp179094_c1	-1.728	-3.710	0.040	1.000
Asun	NM_138757	comp208725_c9	0.141	4.957	0.040	1.000
Pax9	NM_011041	comp1462966_c0	-0.885	-2.366	0.040	1.000
Col17a1	NM_007732	comp184047_c0	-0.496	-0.017	0.040	1.000
Ppp1r37	NM_199149	comp164190_c0	0.179	6.292	0.040	1.000
Rad21l	NM_001276400	comp175142_c0	0.852	-2.907	0.040	1.000
Tspan9	NM_175414	comp196115_c0	0.264	5.421	0.040	1.000
Star	NM_011485	comp209758_c19	0.213	1.535	0.040	1.000
B3gnt7	NM_145222	comp203459_c1	0.174	3.588	0.040	1.000
Sv2c	NM_029210	comp211604_c25	0.366	3.049	0.040	1.000
Fabp7	NM_021272	comp89324_c0	-0.398	2.250	0.040	1.000
Tubb1	NM_001080971	comp200798_c0	0.829	-2.556	0.040	1.000
Gcat	NM_013847	comp156639_c0	0.185	3.908	0.040	1.000
Pamr1	NM_001107755	comp141629_c0	1.786	-4.012	0.040	1.000
Slc4a1	NM_011403	comp208218_c1	1.573	-3.799	0.040	1.000
Nphp3	NM_028721	comp535124_c0	-0.847	-3.041	0.041	1.000
Nfasc	NM_001160315	comp498761_c0	-1.029	-3.219	0.041	1.000
Siae	NM_001108759	comp207275_c11	0.216	3.113	0.041	1.000
Gprin1	NM_012014	comp87837_c0	0.394	-0.507	0.041	1.000
Tmem206	NM_025864	comp206271_c1	0.152	5.959	0.041	1.000
Calhm2	NM_133746	comp209560_c15	-0.260	1.400	0.041	1.000
Prkcb	NM_008855	comp208405_c3	-0.193	4.438	0.041	1.000
Kmt2a	NM_001081049	comp211696_c4	-0.174	7.043	0.041	1.000
Sh3pxd2a	NM_001164717	comp201898_c0	-0.233	3.304	0.041	1.000
Kcnk5	NM_021542	comp204994_c3	-0.529	-0.726	0.041	1.000

Rbm47	NM_001127382	comp159328_c1	-0.632	-1.929	0.041	1.000
Klhl5	NM_175174	comp164002_c0	0.163	6.508	0.041	1.000
Rad18	NM_021385	comp211396_c14	-0.212	3.874	0.041	1.000
Wnk1	NM_001199083	comp205961_c0	-0.536	-0.700	0.041	1.000
Kcnq5	NM_001160139	comp186226_c1	-0.379	-0.049	0.041	1.000
Gdf6	NM_013526	comp129360_c0	-1.423	-3.794	0.042	1.000
Zfp800	NM_001081678	comp183568_c0	-0.164	3.435	0.042	1.000
Kmt2c	NM_001081383	comp208993_c2	-0.204	5.120	0.042	1.000
Thnsl1	NM_177588	comp205561_c0	0.151	5.116	0.042	1.000
Drd2	NM_010077	comp199636_c0	0.234	5.160	0.042	1.000
Krt14	NM_016958	comp205599_c1	0.314	0.953	0.042	1.000
Alad	NM_008525	comp200341_c1	0.256	4.314	0.042	1.000
Ubqln4	NM_033526	comp88580_c0	0.154	6.462	0.042	1.000
Etv5	NM_023794	comp211375_c12	0.262	1.572	0.042	1.000
MAPK9	NM_001135044	comp188788_c0	-0.581	-0.142	0.042	1.000
Srrm3	NM_021403	comp211532_c8	0.189	2.599	0.042	1.000
Scly	NM_016717	comp201517_c0	0.170	3.211	0.042	1.000
Ccdc63	NM_183307	comp3621578_c0	2.149	-3.919	0.042	1.000
Ep300	NM_177821	comp163033_c1	-0.148	6.321	0.043	1.000
Zfp930	NM_001013379	comp210743_c0	0.193	2.661	0.043	1.000
Tcfl5	NM_178254	comp174140_c0	-0.663	-2.033	0.043	1.000
Alad	NM_008525	comp207792_c16	0.222	1.361	0.043	1.000
Ky	NM_024291	comp210658_c0	-0.203	2.245	0.043	1.000
Chp2	NM_027363	comp186865_c0	-0.382	1.876	0.043	1.000
Exoc7	NM_016857	comp209196_c0	0.112	7.047	0.043	1.000
Sdf2l1	NM_001109433	comp204828_c11	-0.255	0.995	0.043	1.000
Tbx15	NM_009323	comp200933_c2	-0.648	-1.933	0.043	1.000
Cdk5r2	NM_009872	comp213940_c0	0.189	6.573	0.043	1.000
H2-Ea-ps	NM_010381	comp196113_c0	-0.429	1.790	0.044	1.000
Sorbs1	NM_001034964	comp210503_c21	0.181	7.176	0.044	1.000
Dio2	NM_031720	comp205055_c1	0.758	-2.567	0.044	1.000
Cyp2d22	NM_019823	comp205413_c13	1.574	-3.802	0.044	1.000
Bgn	NM_007542	comp162820_c2	-0.439	2.737	0.044	1.000
Ccdc121	NM_207280	comp124083_c0	-0.358	0.470	0.044	1.000
Sox11	NM_009234	comp262603_c0	-0.677	-2.518	0.044	1.000
Olfr93	NM_001011813	comp210717_c7	0.285	3.558	0.044	1.000
Doc2g	NM_021791	comp208669_c1	0.307	1.673	0.044	1.000
Gpr179	NM_001081220	comp102947_c0	0.720	-1.404	0.044	1.000
Tmprss5	NM_030709	comp197506_c0	0.327	2.372	0.044	1.000
Gmnc	NM_001013761	comp152347_c0	-0.471	-1.123	0.044	1.000
Kcnj10	NM_001039484	comp197951_c0	0.196	7.584	0.044	1.000
Cutc	NM_001113562	comp177297_c2	0.214	2.744	0.045	1.000
Bhmt2	NM_022884	comp198287_c0	-0.517	-1.537	0.045	1.000
Rgcc	NM_025427	comp89044_c0	0.230	3.495	0.045	1.000
Xrra1	NM_001164258	comp207801_c4	0.329	-0.006	0.045	1.000
Cacng5	NM_001199301	comp210103_c18	0.171	4.161	0.045	1.000
Il18r1	NM_008365	comp210312_c4	0.390	-0.485	0.045	1.000
Zzef1	NM_001045536	comp199912_c0	-0.142	5.612	0.045	1.000
Fibin	NM_026271	comp163310_c0	-0.317	2.347	0.045	1.000
Cables2	NM_145851	comp425374_c0	0.917	-3.022	0.045	1.000

Zfp568	NM_001033355	comp211301_c5	-0.341	-0.138	0.045	1.000
Ints3	NM_145540	comp207293_c19	0.153	6.439	0.045	1.000
Mgp	NM_008597	comp215584_c0	-0.415	4.421	0.045	1.000
Bgn	NM_007542	comp162820_c0	-0.439	3.457	0.046	1.000
Foxr2	NM_001034894	comp184760_c2	-0.451	-1.252	0.046	1.000
Dmgdh	NM_028772	comp206510_c1	0.337	0.330	0.046	1.000
Aqp1	NM_007472	comp184064_c0	-0.571	2.506	0.046	1.000
Adcy8	NM_009623	comp203620_c1	0.235	3.228	0.046	1.000
Sp2	NM_001080964	comp206971_c11	0.121	4.831	0.046	1.000
Ropn1	NM_030744	comp48965_c0	1.272	-3.687	0.046	1.000
Tnfrsf11a	NM_009399	comp210406_c11	0.342	2.210	0.046	1.000
Morc4	NM_001193309	comp211888_c3	-0.244	3.941	0.046	1.000
Pclo	NM_011995	comp206515_c0	-0.261	2.080	0.046	1.000
Sema3b	NM_009153	comp205953_c2	-0.354	1.610	0.046	1.000
Slc39a13	NM_026721	comp210594_c0	0.156	4.492	0.046	1.000
Rasl11a	NM_026864	comp206341_c0	0.319	1.134	0.046	1.000
Otud4	NM_001081164	comp184455_c0	-0.119	5.452	0.046	1.000
Kcnh7	NM_133207	comp206720_c5	-0.243	4.061	0.046	1.000
Hk2	NM_013820	comp193782_c3	0.283	0.703	0.046	1.000
Satb1	NM_001163632	comp206880_c1	-0.334	0.781	0.047	1.000
Crlf1	NM_018827	comp92039_c0	0.428	1.055	0.047	1.000
Nobox	NM_130869	comp207942_c3	0.155	2.676	0.047	1.000
Pycr2	NM_133705	comp199155_c0	0.197	5.285	0.047	1.000
Dync2h1	NM_029851	comp210606_c3	-0.155	5.858	0.047	1.000
Tnn	NM_177839	comp182499_c0	1.355	-3.571	0.047	1.000
Trrap	NM_001081362	comp185229_c0	-0.168	3.442	0.047	1.000
Tnfrsf4	NM_011659	comp193433_c2	1.690	-3.892	0.047	1.000
Sv2c	NM_029210	comp211604_c9	0.343	3.940	0.047	1.000
Zbtb7a	NM_010731	comp209346_c49	0.820	-2.752	0.047	1.000
Zfp831	NM_001099328	comp207674_c4	-0.372	0.704	0.047	1.000
Rph3a	NM_011286	comp207137_c0	0.184	7.945	0.047	1.000
Slc39a14	NM_001135151	comp221904_c0	0.191	1.763	0.047	1.000
Cox4i2	NM_053091	comp248662_c0	0.295	0.553	0.047	1.000
Rad21l	NM_001276400	comp198963_c3	-0.219	1.596	0.047	1.000
Pdzd8	NM_001033222	comp83974_c0	1.390	-3.469	0.047	1.000
Ifitm3	NM_025378	comp207221_c0	-0.283	3.942	0.047	1.000
Gbx1	NM_015739	comp204074_c0	0.610	0.002	0.047	1.000
Grlf1	NM_172739	comp210408_c1	0.382	-0.891	0.047	1.000
Sox11	NM_009234	comp207567_c4	-0.436	-0.836	0.047	1.000
Slc31a2	NM_025286	comp204950_c0	-0.170	2.622	0.047	1.000
Dnah11	NM_010060	comp209600_c2	-0.320	0.720	0.047	1.000
Wnk4	NM_175638	comp207629_c0	-0.201	2.654	0.048	1.000
Pclo	NM_011995	comp205139_c0	-0.264	6.135	0.048	1.000
Elavl2	NM_207685	comp187152_c0	0.677	-2.356	0.048	1.000
Itm2a	NM_008409	comp208943_c13	-0.383	7.082	0.048	1.000
Sptbn4	NM_001199235	comp557084_c0	-0.993	-2.949	0.048	1.000
Zfp521	NM_145492	comp202589_c0	0.364	-0.547	0.048	1.000
Sycp1	NM_011516	comp163219_c0	-1.309	-3.426	0.048	1.000
Scfd2	NM_001114660	comp159839_c0	0.205	4.896	0.048	1.000
Skor1	NM_001163755	comp209939_c1	0.382	0.259	0.048	1.000

Arhgef33	NM_001145452	comp202743_c1	0.410	2.409	0.048	1.000
Prdm5	NM_027547	comp204989_c3	0.189	3.133	0.048	1.000
Fat3	NM_001080814	comp204153_c0	-0.164	6.243	0.048	1.000
Xdh	NM_011723	comp191733_c0	-0.217	4.537	0.048	1.000
Fbln5	NM_011812	comp164716_c0	0.410	4.418	0.048	1.000
Vill	NM_001164567	comp210996_c2	0.152	3.679	0.048	1.000
Lmx1a	NM_033652	comp206928_c3	0.327	0.689	0.049	1.000
Wnt8b	NM_011720	comp163632_c1	1.184	-3.544	0.049	1.000
Arsi	NM_001038499	comp177830_c1	-0.552	-1.415	0.049	1.000
Crat	NM_007760	comp206819_c19	0.170	5.235	0.049	1.000
Stil	NM_009185	comp201708_c0	-0.508	-0.620	0.049	1.000
Bace2	NM_019517	comp190536_c0	-0.247	3.430	0.049	1.000
Itgb6	NM_021359	comp208889_c3	-1.632	-3.976	0.049	1.000
Lrrc8a	NM_177725	comp210943_c0	0.158	4.834	0.049	1.000
Nxph4	NM_183297	comp162503_c0	0.314	3.891	0.049	1.000
Dirc2	NM_153550	comp207255_c11	-1.676	-3.831	0.049	1.000
Tsta3	NM_031201	comp208022_c2	0.144	6.227	0.049	1.000
Tbx3	NM_198052	comp204163_c1	-0.398	2.830	0.049	1.000
Zfp358	NM_080461	comp206561_c4	0.164	5.968	0.050	1.000
DUSP4	NM_057158	comp210086_c1	0.380	3.359	0.050	1.000
Folh1	NM_016770	comp192435_c0	0.182	4.926	0.050	1.000
Akr1c14	NM_134072	comp9508_c0	1.783	-4.010	0.050	1.000
TUBA1A	NM_006009	comp208952_c18	0.215	2.227	0.050	1.000
Rab7l1	NM_133590	comp209673_c11	-0.418	-1.106	0.050	1.000
Ctif	NM_201354	comp191536_c0	0.130	5.459	0.050	1.000
Slc4a7	NM_001033270	comp209663_c13	0.170	3.121	0.050	1.000
Col25a1	NM_001244952	comp207577_c0	-0.165	6.502	0.050	1.000

Table S3 - Significant Gene Ontology Terms

ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
GO:0010817	regulation of hormone levels	27/262	467/23262	4.13E-12	1.11E-08	9.65E-09	Dio3/Tiam	27
GO:0009914	hormone transport	21/262	337/23262	2.87E-10	3.84E-07	3.35E-07	Tiam1/Neu	21
GO:0046879	hormone secretion	19/262	329/23262	7.23E-09	6.45E-06	5.63E-06	Tiam1/Neu	19
GO:0060986	endocrine hormone secretion	9/262	58/23262	1.67E-08	1.12E-05	9.77E-06	Kiss1/Nkx3	9
GO:0023061	signal release	20/262	438/23262	1.42E-07	6.91E-05	6.03E-05	Tiam1/Neu	20
GO:0044057	regulation of system process	21/262	483/23262	1.55E-07	6.91E-05	6.03E-05	Neurod1/K	21
GO:0043010	camera-type eye development	16/262	324/23262	9.36E-07	0.000358	0.000312	Grhl2/Neu	16
GO:0001654	eye development	17/262	372/23262	1.24E-06	0.000415	0.000362	Grhl2/Neu	17
GO:0050886	endocrine process	9/262	99/23262	1.82E-06	0.000541	0.000472	Kiss1/Nkx3	9
GO:0042445	hormone metabolic process	10/262	152/23262	9.14E-06	0.002445	0.002134	Dio3/Dio2/	10
GO:0007218	neuropeptide signaling pathway	7/262	75/23262	2.19E-05	0.004802	0.004191	Pth2/Nps/	7
GO:0050482	arachidonic acid secretion	5/262	31/23262	2.33E-05	0.004802	0.004191	Pla2g12b/	5
GO:1903963	arachidonate transport	5/262	31/23262	2.33E-05	0.004802	0.004191	Pla2g12b/	5
GO:0034754	cellular hormone metabolic process	7/262	77/23262	2.61E-05	0.004983	0.004349	Cyp1b1/Rb	7
GO:0044060	regulation of endocrine process	6/262	54/23262	3.17E-05	0.005647	0.004929	Kiss1/Nkx3	6
GO:0045165	cell fate commitment	12/262	260/23262	4.23E-05	0.00669	0.005839	Evx1/Pax3/	12
GO:0042572	retinol metabolic process	4/262	18/23262	4.25E-05	0.00669	0.005839	Cyp1b1/Rb	4
GO:0046883	regulation of hormone secretion	12/262	272/23262	6.54E-05	0.009718	0.008482	Tiam1/Tfap	12
GO:0007156	homophilic cell adhesion via plasma membrane adhesion molecule	7/262	92/23262	8.23E-05	0.01159	0.010117	Fat2/Pcdh	7
GO:0001523	retinoid metabolic process	5/262	44/23262	0.000132	0.016995	0.014834	Cyp1b1/Rb	5
GO:0034308	primary alcohol metabolic process	4/262	24/23262	0.00014	0.016995	0.014834	Cyp1b1/Rb	4
GO:0042692	muscle cell differentiation	14/262	390/23262	0.000149	0.016995	0.014834	Ankrd1/My	14
GO:0071214	cellular response to abiotic stimulus	10/262	213/23262	0.00016	0.016995	0.014834	Ankrd1/Ins	10
GO:0016101	diterpenoid metabolic process	5/262	46/23262	0.000164	0.016995	0.014834	Cyp1b1/Rb	5
GO:0032309	icosanoid secretion	5/262	46/23262	0.000164	0.016995	0.014834	Pla2g12b/	5
GO:0071260	cellular response to mechanical stimulus	4/262	25/23262	0.000165	0.016995	0.014834	Ankrd1/Pa	4
GO:0003205	cardiac chamber development	9/262	176/23262	0.00018	0.01784	0.015572	Grhl2/Fgf8	9
GO:0042551	neuron maturation	5/262	48/23262	0.000201	0.019222	0.016778	Mir133b/N	5
GO:0098742	cell-cell adhesion via plasma-membrane adhesion molecules	8/262	145/23262	0.000246	0.022448	0.019594	Fat2/Pcdh	8
GO:0006721	terpenoid metabolic process	5/262	51/23262	0.000268	0.022448	0.019594	Cyp1b1/Rb	5
GO:0015909	long-chain fatty acid transport	5/262	51/23262	0.000268	0.022448	0.019594	Pla2g12b/	5

GO:0071715	icosanoid transport	5/262	51/23262	0.000268	0.022448	0.019594	Pla2g12b/I	5
GO:0060561	apoptotic process involved in morphogenesis	4/262	29/23262	0.000299	0.024267	0.021182	Pax2/Cryab	4
GO:0007270	neuron-neuron synaptic transmission	8/262	154/23262	0.000369	0.029034	0.025343	Gabra6/Gr	8
GO:0007626	locomotory behavior	10/262	240/23262	0.000416	0.03179	0.027748	Grm6/Chat	10
GO:0030239	myofibril assembly	5/262	57/23262	0.000453	0.033669	0.029389	Mylk3/Neb	5
GO:0035904	aorta development	5/262	58/23262	0.000491	0.035047	0.030591	Tfap2b/Fgf	5
GO:1902742	apoptotic process involved in development	4/262	33/23262	0.000498	0.035047	0.030591	Pax2/Cryab	4
GO:0021953	central nervous system neuron differentiation	9/262	203/23262	0.000515	0.035315	0.030825	Evx1/Pax3,	9
GO:0060840	artery development	6/262	91/23262	0.000578	0.038638	0.033726	Tfap2b/Fgf	6
GO:0048593	camera-type eye morphogenesis	7/262	127/23262	0.000602	0.038696	0.033777	Pax2/Cryaa	7
GO:0048592	eye morphogenesis	8/262	166/23262	0.000607	0.038696	0.033777	Pax2/Cryaa	8
GO:0071542	dopaminergic neuron differentiation	4/262	37/23262	0.000775	0.048256	0.042121	Tiam1/Fgf8	4
GO:0071345	cellular response to cytokine stimulus	14/262	461/23262	0.000794	0.048319	0.042176	Ankrd1/My	14
GO:1901615	organic hydroxy compound metabolic process	12/262	359/23262	0.000822	0.048893	0.042677	Dio3/Inppl	12
GO:0032274	gonadotropin secretion	3/262	17/23262	0.000855	0.04891	0.042692	Kiss1/Cga/	3
GO:0045214	sarcomere organization	4/262	38/23262	0.000859	0.04891	0.042692	Mylk3/Neb	4
GO:0042542	response to hydrogen peroxide	6/262	99/23262	0.000901	0.049131	0.042885	Pax2/Cryab	6
GO:0048738	cardiac muscle tissue development	9/262	220/23262	0.000913	0.049131	0.042885	Ankrd1/My	9
GO:0003231	cardiac ventricle development	7/262	137/23262	0.000942	0.049131	0.042885	Grhl2/Pou	7
GO:0035458	cellular response to interferon-beta	4/262	39/23262	0.000949	0.049131	0.042885	F830016B0	4
GO:0033500	carbohydrate homeostasis	9/262	222/23262	0.000973	0.049131	0.042885	Tiam1/Neu	9
GO:0042593	glucose homeostasis	9/262	222/23262	0.000973	0.049131	0.042885	Tiam1/Neu	9

Table S4 – Phylogenetic comparison of the *pomc* promoter

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-100                                                                                            -1-M-
AAGTCCTTCCTGGTGACTAGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCCTCTGCAGAACCTCGGCCTGTCACCTGGAAGATG Siberian hamster
AAGTCCTTCCTGGTGACTAGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCCTCTGCAGAGCCTTAACCTGTCACCTGGAAGATG Chinese hamster
AGGTCCTTCCTGGTGACTAGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCCTCTGCAGAGCCGCAGCCTGTCACCTGGAAGATG Deer mouse
AAGTCCTTCCTGGTGACCAGCCAGCATTGTTCTGCTCCTCACAGGGGTCCCACTGATCTTGTTTGCCTCTACAGAACTTCAGCCTGTCACCTGGAAGATG Prairie vole
CAGTCCTTCCTGGTGACTAGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCCTCTGTAGAGTCTCAGCCTGTCACCTGGAAGATG Golden hamster

CAGTCCTTCCTGGTGAGTGTCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCCTCTGCAGAGCCTCAGCCTGCCACCCGGAAGATG Naked mole rat
CAGTCCTTCCTGGTGAGTGTCCAACATTGTTCTGCTCCTTGCAGGGGTTCCACCAATCTTGTTTGCCTCTGCAGAGTCTCAGCCTGCCACCTGGAAGATG Degu
CAGTCCTTCCTGGTGAGTGTCCAACATTGTTCTGCGCCTCGCAGGGGACCCACCGAGCTTGTTTGCCTCCGCAGAGCCTCAGCCTGCCACCTGGAAGATG Guinea pig
GAGTTCTTCCTGATGACTAGCCAACATTGTTCTTCTCCTTGCAGGAGTCCCACCGATCTCGTTTGCCTCTGCAGAGCCTCAGCCTGCCACCTGGAAGATG Gerbil
ATGTCCTTCCTGGTGACTGGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCTCCAATCTTGTTTGCCTCTGCAGAGACTAGGCCTGACACGTGGAAGATG mouse
AGGTCCTTCCTGGTGAGTGGCCAACATTGTTTTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCTTCTGCAGAGCCTCAGCCTG---CCTGGAAGATG human
AGGTCCTTCCTGGTGAGTGGCCAACATTGTTTTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCTTCTGCAGAGCCTCAGCCTG---CCTGGAAGATG Pygmy chimpanzee
TGGTCCTTCCTGATGAGTGGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACTCATCTTGTTTGCCTCTGCAGAGCCTCAGCCTG---CCTGGAAGATG Sheep
TGGTCCTTCCTGATGAGTGGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACTCATCTTGTTTGCCTCTGCAGAGCCTCAGCCTG---CCTGGAAGATG Goat
CAGTCCTTCCTGGTCAGTGGCCAACATTGTTCTGCTCCTTGTAGGGGTCCCACCAATCTTATTTGCCTCTGCAGAGCCTCAGCCTG---CCTGGAAGATG Cat
CAGTCCTTCCTGGTCAGTGGCCAACATTGTTCTGCTCCTCGCAGGGGTCCCACCAATCTTGTTTGCCTCTGCAGAGCCTCAGCCCG---CCTGGAAGATG Dog
AGTTCCTTTCTGGTGAGTGGCCAACATTGTTCTGCTCCTTGCAGGGGTCACACCAATCTTGTTTGTCTCTTCAGAACTGCAGCCTG---CCTGGAAGATG Cape Golden Mole
CAGTCCTTCCTGGTGAGTGGCCAACATTGTTCTGCTCCTTGCAGGGGTCCCACCAATCTTGTTTGCTTCTGCAGAGTCCCAGCCTT---CTCAGAAGATG Chinese Tree Shrew
AGTCCTTCCTTGCAGTCCAGCCAATATTGTTCTGCCCCTTGCAGGGGTCCTACCAAGCGTGTTTGTTCTCTGCAGAGCTGCAGCCTG--CCTGGAAGATG Cape Golden Shrew
AGTCCTTTCCTGGTCACTGGCCAGCATTGTTCTGCTCCTTGCAGGGGTCCCTCCAATCTTGTTTGCCTCTGCAGAGCCTCAGC----CACCTGGAAGATG rat
GGTTCTTCCCGGGGACTGGCCAACATTGTTCTAGTCACTGCAGGGGTTCCACCAACTTGTTTGCTTCTGCAGAACTTCAGCCTGC--CACCTGGAAGATG Kangaroo rat
AGCAGAGATCCAGCCCCCTTTCCGGGCACTTCTGCTCTGGCGCTTAGCCCCTACCTGGAACCCCCCCTCCTGCGTCCCACGGCCCCCCTTCCTATGGATG Pig

CCCTGAACCACCCTTGCTCTCAATAGGACCGCAGAACGGACCTCCCAATCCCGCAGACCTTAGAGCGCAGGGCAGCAGCAGCAGCCCGTAGGAGGCGATG Cattle
TCCGGGGGCAGAGATCCAGCCCCCTTTCCGTGCACGTCTGCCCTTGCGCTCAGCTCCTACGTGGAAACCCCCCTCCACATGGCCCCCCTTCCCATGGATG Horse
ATAAGAAAGCTCTGTGCTGGAATCAGGGGTACTTCACTTTACCTTATCTCTCTTGAGCTTTATTTTTTTCCATCTGTCAAGTGAGGGGCCAGACCAGATG Ground squirrel
GAAGCAGCAGCCCCAAATTTGGGCAAATAGTTGTTATTTTTTTCCTTTTTTTCCCATAGCTCCTCCACAGTTTGGGTGCCCACCCCTCGCCAGTAGGATG Chicken
GCCCTGAATTTGGGCAAATAGTTGTTATTTTTTTTAACTATTTCTTTGTTTCCATAGCGCTCCTCTGCAGTTTGGGGACCCATCCTTGGCTGGTACCATG Quail
GCAGCCCCATATTTAGGCAAATAGTTATTATTTTTTCTTTTTTCTTTTTTTTCGGTTAGCTCCTCTGCAGTTTGGGTGCCCATCCCTTGCCGGTAGGATG Turkey
CCTGTAACTCACGGTCTTAGCCTCTTCACACTCTCGTGCCCTTAATATGGTGTCCAACTCTTCTGTTTTGCAGGGCCCCCGTGCTTTCCCCCCGAAGATG Green anole
AAAAATATGTCAAATCAAAAACGAAACAAAAAAAAATGTATACATGAGGGGTTTTTACATTCTGTCTGTGCTTTTCTCTGATTGGTCAACAGGAGGATG Tilapia
ACTGTTCTTTCAACTGTAGTGTGCAAACAAATGTGTTTTGAGAGTCTACAATATGAATTTAACATGCTTAAATGTGAATTGTATTGTGTTCTCAGAGATG Zebrafish
AAAACCAGGTAAATAAATTCTACTTGTTCTTTTCCCCTTTCTTTTTTCTTCCCTGAAAACATGAAGAAGTTGGAAGATTTCCAGTGCAAGTCTGGAGATG Coelacanth
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-M- depicts initiation codon
Red text indicates T3Rb binding motif
Yellow box indicates mismatched nucleotides

Table S5 qPCR parameters

Gene	Primer	Size	Temp	Melt
Photoperiodic Genes				
tsh β	GCCCTCTCCCAGGATGTTTG	190	60°C	82°C
	GTGGCTTGGTGCAGTAGTTG			
dio2	ACCACCACCTTCCTTTGCAA	464	58°C	80°C
	GCGGAAGGCTGGCAGTT			
dio3	CATGCTCCGCTCCCTGCTGCTTCA	251	62°C	85°C
	CAGGGTGCACAGACGGTTGTC			
Energy Balance Genes				
pomc	TGGAGAGCAGACAGTGTCAGGAC	132	60˚C	86°C
	TCTCGGTCAACGTCTGGTCGTC			
cart	AGCTCCCGCCTGCGGCTGCT	299	61˚C	88°C
	CAGTCACACAGCTTCCCGATCC			
npy	CCAGGCAGAGATACGGCAAGAGATC	119	60˚C	81°C
	CCATCACCACATGGAAGGGTCC			
agrp	TGTTCCCAGAGTTCCCAGGTC	229	58˚C	87°C
	GCATTGAAGAAGCGGCAGTAG CAC			
Reference Genes				
gapdh	TTCTTGTGCAGTGCCAGCCTCG	207	60˚C	85˚C
	CTGTGCCGTTGAACTTGCCGTG			
β-actin	CTGGAACGGTGAAGGTGACA	20	60˚C	84˚C
	AAGGGACTTCCTGTAACAATGCA			
hrpt	AGTCCCAGCGTCGTGATTAGTGATG	141	62˚C	76˚C
	CGAGCAAGTCTTTCAGTCCTGTCCA			
RNA-seq confirmation				
snord15a	TCGATGAAGAGGTGATGACGAG	103	59C	85˚C
	TTTGACCACAGTGCTTTCAGC			
gvin1	AGGACTTCGAGCTCCAGAAC	264	60C	82˚C
	TCCAGTCTCCTCCGTCCTTC			