

Using human genetics to understand the disease impacts of testosterone in men and women

Katherine S Ruth^{1*}, Felix R Day^{2*}, Jessica Tyrrell^{1*}, Deborah J Thompson^{3*}, Andrew R Wood¹, Anubha Mahajan⁴, Robin N Beaumont¹, Laura Wittemans^{2,4}, Susan Martin¹, Alexander S. Busch^{2,5,6}, A. Mesut Erzurumluoglu², Benjamin Hollis², Tracy A. O'Mara⁷, The Endometrial Cancer Association Consortium, Mark I McCarthy^{4,8,9§}, Claudia Langenberg¹, Douglas F Easton³, Nicholas J Wareham², Stephen Burgess¹⁰, Anna Murray^{1*}, Ken K Ong^{2,11*}, Timothy M Frayling^{1*#} and John R.B. Perry^{2*#}

Affiliations

1. Genetics of Complex Traits, University of Exeter Medical School, University of Exeter, Exeter, UK.
2. Medical Research Council (MRC) Epidemiology Unit, Institute of Metabolic Science, University of Cambridge, Cambridge, UK.
3. Centre for Cancer Genetic Epidemiology, Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK.
4. Wellcome Centre for Human Genetics, University of Oxford, Roosevelt Drive, Oxford, OX3 7BN, UK.
5. International Center for Research and Research Training in Endocrine Disruption of Male Reproduction and Child Health, Rigshospitalet, University of Copenhagen, 2100 Copenhagen O, Denmark
6. Department of Growth and Reproduction, Rigshospitalet, University of Copenhagen 2100 Copenhagen O, Denmark
7. Department of Genetics, QIMR Berghofer Medical Research Institute, Brisbane, Queensland, Australia
8. Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Churchill Hospital, Old Road, Headington, Oxford, OX3 7LJ, UK
9. Oxford NIHR Biomedical Research Centre, Oxford University Hospitals NHS Foundation Trust, John Radcliffe Hospital, Oxford OX3 9DU
10. MRC Biostatistics Unit, University of Cambridge, Cambridge, UK
11. Department of Paediatrics, University of Cambridge, Cambridge, UK.

* denotes equal contribution

§ current address: Genentech, 1 DNA Way, South San Francisco, CA 94080

Correspondence to Timothy M Frayling (T.M.Frayling@exeter.ac.uk) and John R.B. Perry (john.perry@mrc-epid.cam.ac.uk)

Abstract

Testosterone supplementation is commonly used for its effects on sexual function, bone health and body composition, yet its effects on disease outcomes are unknown. To better understand this, we identified genetic determinants of testosterone levels and related sex hormone traits in 425,097 UK Biobank study participants. Using 2,571 genome-wide significant associations, we demonstrate the genetic determinants of testosterone levels are substantially different between sexes, and that genetically higher testosterone is harmful for metabolic diseases in women but beneficial in men. For example, a genetically determined 1-standard deviation higher testosterone increases the risks of Type 2 diabetes (T2D) (OR=1.37 [1.22–1.53]) and polycystic ovary syndrome (OR=1.51 [1.33–1.72]) in women, but reduces T2D risk in men (OR=0.86 [0.76–0.98]). We also show adverse effects of higher testosterone on breast and endometrial cancers in women, and prostate cancer in men. Our findings provide insights into the disease impacts of testosterone and highlight the importance of sex-specific genetic analyses.

Introduction

The role of testosterone in disease is largely unknown, despite its strong epidemiological correlations with many health conditions and the widespread use of testosterone supplements. Previous studies have shown protective effects of testosterone on T2D and related metabolic traits in men, but harmful effects in women^{1,2}. However, such phenotypic observations are prone to confounding due to the substantial effects of ageing and adiposity on circulating testosterone concentrations³.

More than 3% of US men aged 30 years or older received a prescription for testosterone in 2013, just prior to a US Food and Drug Administration safety communication on its possible cardiovascular risks⁴, and rates of prescribing are even higher in Canada⁵. Testosterone therapy has established positive effects in randomised controlled trials on sexual function, lean mass, muscle strength and bone mineral density, and reductions in whole body and intra-abdominal fat⁶. These body composition changes should predict benefits of testosterone on T2D and cardio-metabolic disease. Conversely, testosterone is known to promote growth and metastasis of prostate cancers and observational studies have shown that testosterone replacement therapy might increase susceptibility to future prostate cancer^{7–9}. However, even the largest trials of testosterone have too few cases of incident T2D, cardio-vascular disease (CVD) or

prostate cancer to provide informative data on these risks¹⁰. Furthermore, experimental studies of testosterone therapy in men, with or without T2D, surprisingly report no or modest improvements in insulin sensitivity and no change in glycaemic control^{11,12}. Similarly, in women, experimental evidence of testosterone administration is insufficient to confirm the apparently metabolically harmful associations in observational studies between testosterone and higher adiposity, risk of polycystic ovary syndrome (PCOS) and other CVD risk markers^{13,14}.

Mendelian randomisation is a genetic approach to understand the causal effects of putative risk factors on disease. Given alleles are both randomly assigned and fixed at conception, genetic risk can be used as an epidemiological exposure to reduce the effects of confounding and reverse causality. Previous studies have used this approach to test the role of sex hormones in disease, but were largely limited to *cis* variants in the sex-hormone binding globulin (SHBG) protein-coding gene. Such studies reported that SHBG-raising alleles were associated with lower risk of T2D, but did not test effects separately in men and women^{15,16}. Furthermore, because higher SHBG reduces levels of bioavailable testosterone, separation of the apparent effects of testosterone from those of SHBG on disease is a major challenge.

To identify additional genetic variants that can be used to test the effects of testosterone, large genome wide association studies (GWAS) are needed. Previous GWAS for sex hormone levels in men and women were small^{17–20}, identifying only a handful of associated loci. This study substantially advances our understanding of the genetic regulation of sex hormone levels, increasing the number of known genetic determinants by two orders of magnitude. We use these genetic variants to demonstrate likely causal associations with metabolic disease and cancer outcomes, with many divergent effects of testosterone between men and women.

RESULTS

After extensive quality control (**Methods**), serum levels of SHBG, total testosterone and estradiol were available in up to 425,097 individuals with genetic data in UK Biobank (UKBB) (**Table S1**). We additionally estimated bioavailable (free/unbound) testosterone in 382,988 individuals (**Methods**). Genetic association testing was performed in European ancestry individuals and within each sex for the four traits, using a linear mixed model to control for relatedness and population structure. We identified a heritable component for all traits except estradiol levels in women ($h^2_g=1.6\%$ (s.e 1%) (**Table 1**). As the majority (78%) of women had estradiol levels below the limit of detection (as expected, given most women in UKBB are post-menopausal), analysis of this trait was limited by low sample numbers and a bias towards detecting age at menopause-associated loci. Therefore, assessment of estradiol levels in women was not considered further.

To identify independent genetic determinants for sex hormone measures, we next performed distance-based clumping and approximate conditional analysis (**Methods**). In total, we

identified 2,571 genome-wide significant trait-signal pairs (**Tables S2-S11**). These trait-signal pairs ranged from 22 signals for estradiol in men, to 658 for SHBG in a sex-combined analysis. To validate these findings, we performed replication using three available datasets (**Methods**) - a previously published GWAS meta-analysis of SHBG levels in 21,791 individuals¹⁹, 9,138 individuals with testosterone measurements from the EPIC-Norfolk study and published data on 2,913 individuals from the Twins UK study with nine sex hormones measured²⁰. Whilst these studies were substantially smaller than UK Biobank, we found strong directional consistency with our results. Assessment of our SHBG-associated loci in the published meta-analysis (**Figure ED1**) demonstrated 236/278 (85%, binomial $P=6.1 \times 10^{-34}$) of the captured male SHBG signals had consistent direction of effect (77 with $P<0.05$), compared to 241/283 in women (85%, binomial $P=4.2 \times 10^{-35}$, 60 at $P<0.05$). In Twins UK, all identified genome-wide significant variants in aggregate were significantly associated and directionally concordant for the respective sex hormone traits (**Table S12**). Finally, in the EPIC-Norfolk study we estimated the magnitude of effect a genetic risk score for SHBG and testosterone had on the respective trait levels (**Figure ED2**). Men with the 5% highest genetic risk have 0.69 [0.53-0.85 95%CI] and 1.27 [1.12-1.41] standard deviation (equivalent to 2.55 nmol/L and 21.34 nmol/L) higher total testosterone and SHBG respectively than men with the 5% lowest scores; the equivalent difference in women is 0.45 [0.26-0.64] SDs (0.28 nmol/L) and 1.29 [1.12-1.45] (35.91 nmol/L) respectively.

To putatively map each identified variant to its effector gene, we first identified any non-synonymous variant highly correlated ($r^2>0.7$) with a lead index variant. This implicated one or more genes at 482/2571 (19%) SNP-trait pairs, highlighting 291 unique genes (**Tables S2-S11**). To identify the likely tissue(s) and cell type(s) of action for sex hormone-associated loci, we integrated our data with gene expression data across 53 tissues available from the GTEx consortium using LD score regression (**Methods**). In both sexes, liver was the most enriched tissue (**Figure ED3**), consistent with its established role as the site of SHBG production. Skeletal muscle in men and adrenal gland in women were the next strongest enriched tissues. In contrast to findings for other reproductive traits, we found no evidence for enrichment of gene expression in any brain cell type (**Figure ED3**). Within the three prioritised tissue types (liver, skeletal muscle and adrenal gland), we identified 161 unique eQTL-linked genes mapping within 300kb to 200/2571 SNP-trait pairs (**Methods, Tables S2-S11**). We note that further evidence from experimental studies is needed to confirm our putative genes, but the current findings should help to guide such work.

Distinct genetic architectures of testosterone regulation between sexes

Despite similar heritability estimates (**Table 1**), the genetic component to variation in circulating testosterone levels was very different between sexes, as indicated by null genome-wide correlations between sexes (**Table 1**) and limited overlap of genome-wide significant signals between sexes (**Tables S13-14**). This discordance was partly due to opposing effects between sexes at several individual loci, rather than solely null associations in one sex. For example, of the 254 signals for total testosterone in women, 72 were also at least nominally associated

($P < 0.05$) with total testosterone in men; however, of these, 33 (46%) showed directionally-opposing effects between sexes (**Table S7**). Notably, several variants had genome-wide significant but directionally-opposing effects on testosterone in men and women (**Table S5**), including the missense variants: rs56196860 in *FKBP4* which encodes a regulator of androgen receptor transactivation activity²¹; and rs28929474 in *SERPINA1* which encodes one of a family of proteins which are reported to regulate steroidogenesis in testicular Leydig cells²².

Several other signals showed sex-specific effects (**Table S5**). Notably, 7 of 9 X-chromosome signals for total testosterone in men and women combined altered levels only in men, including five variants located in/near genes associated with androgen insensitivity (*AR*), hypogonadotropic hypogonadism (*ANOS1*), failure of sex steroid 11 beta-hydroxylation (*HPRT1*), disrupted steroidogenesis (*STARD8*), and hypospadias (*DGKK*) (**Table S5**). Notable autosomal male-specific testosterone signals were located at key regulators of puberty timing (e.g. *LIN28B*-rs7759938; *TACR3*-rs528845403 and *KISS1*-rs201416723) and androgen secretion (*NROB2*-rs182050989 or biosynthesis (*SRD5A2*-rs113017476) (**Table S5**).

Among many signals with apparent female-specific effects on testosterone were five signals in/near to genes encoding enzymes in the cytochrome P450 family with reported roles in testosterone hydroxylation (*CYP3A7*-rs45446698, *CYP2D6*-rs5751229, *CYP2C8/CYP2C9*-rs11572082, *CYP11B2*-rs6471583 and *POR*-rs17853284) (**Table S5**). Other signals with female-specific effects on testosterone included: reported PCOS susceptibility loci at *FSHB* (rs12294104) and *THADA* (rs58839393); *CYP17A1* (rs11441374) encoding 17,20-lyase, the decisive step in androgen synthesis, and its critical cofactor *CYP5A*-rs17089026/rs79384925); and also near genes encoding luteinizing hormone subunit beta (*LHB*-rs78248023) and hormone receptors for glucocorticoids (*NR3C1*-rs34632394) and prolactin (*PRLR*-rs112694713) (**Table S5**).

In contrast to testosterone traits, the genetic architecture of SHBG levels was highly concordant between men and women (r_g 0.84 [0.81-0.87], $P < 1 \times 10^{-100}$) (**Table 1**); 315 (88%) of the 359 genome-wide significant variants in women were also at least nominally associated ($P < 0.05$) with SHBG in men (**Table S4**).

Genetic overlap between sex hormone traits within sexes.

Among men, we found partially overlapping genetic determinants between the different sex hormone traits. This was reflected by positive genetic correlations between all four sex hormone measures (**Table 1**, r_g 0.19-0.73), with the exception of a weak negative correlation between SHBG and bioavailable testosterone (r_g -0.048 (SE 0.024), $P = 0.04$). These genetic correlations were very similar to the observed phenotypic correlations (**Table S15**). In contrast to men, among women, there was a weak negative genetic correlation between total testosterone and SHBG ($r_g = -0.06$ in women; 0.73 in men), a strong negative correlation between bioavailable testosterone and SHBG (-0.74 in women; -0.05 in men) and a similar

positive correlation between total and bioavailable testosterone (0.65 in women; 0.60 in men), again closely reflecting the observed phenotypic correlations (**Table 1, Table S15**).

Cluster analysis identifies loci with primary SHBG or testosterone effects

Testosterone levels are dependent on SHBG levels but genetic variants may allow us to separate distinct components of variation in sex hormone levels. To identify signals with primary effects on individual sex hormone traits, we performed a cluster analysis of all 525 signals that reached genome-wide significance for one or more sex hormone measure in men, identifying 3 clusters (**Figure 1, Table S16**). The largest cluster (362 signals) was characterised by loci with relatively strong positive associations with SHBG; in combination, SNPs in this cluster also increased total testosterone, reduced bioavailable testosterone and increased estradiol in men (**Table S17**). Hence, this cluster (termed “*male SHBG cluster*”, **Methods**) represents a genetic instrument with primary SHBG-increasing effects, and secondary divergent effects on total (higher) and bioavailable testosterone (lower) that are consistent with the known hormone-regulatory role of SHBG.

Among men, the second identified cluster (122 loci) was consistently associated with higher total and bioavailable testosterone levels in a dose-response manner. In combination, SNPs in this cluster also increased estradiol levels, but had no effect on SHBG ($P=0.66$) (**Table S17**). Hence, this cluster (termed “*male specific testosterone cluster*”) represents a genetic instrument with primary (total and bioavailable) testosterone-increasing effects, with secondary estradiol-increasing effects (consistent with the physiological conversion of androgens to estrogens), but independent of SHBG.

Among men, a third small cluster (14 signals) strongly increased estradiol, but not other sex hormone measures (**Table S17**). The most prominent signal in this cluster (rs781858752) was uniquely associated with estradiol in men ($P=7.6\times 10^{-15}$) but not with any other sex hormone measure in men or women (all $P>0.05$), and influenced expression of *IGHV3-9* and *IGHV1-8* in the liver (**Table S11**).

In addition to separating testosterone from SHBG effects, defining such clusters is an important step for downstream analyses to minimise the pleiotropic effects of SNPs that may have much stronger effects on other sex hormones. For example, the apparent strong male estradiol association ($P=1.5\times 10^{-35}$) at the X-chromosome rs111386834 locus, ~200kb from *KAL1*, is clearly secondary to a primary effect of this signal on bioavailable ($P=3\times 10^{-670}$) and total testosterone ($P=1.5\times 10^{-372}$), consistent with the known role of this gene on the hypothalamic-pituitary reproductive axis.

As in men, in women, cluster analysis of all 614 signals for any of the three sex hormone measures in women (**Figure 2**) identified two main clusters, representing genetic instruments with i) primary SHBG effects and secondary directionally-opposing effects on total and bioavailable testosterone (“*female SHBG cluster*”, 373 signals) and ii) consistent testosterone

effects but no aggregate effect on SHBG (“female specific testosterone cluster”, 241 signals) (**Table S18**). Hence, in both men and women, cluster analyses resulted in genetic instruments that allowed us to test specific testosterone-increasing effects, independent of SHBG.

Understanding the impact of sex hormone measures on disease outcomes

Having identified over 2500 associations between genetic variants and sex hormone measures, we designed a set of Mendelian randomization (MR) analyses (**Methods**) to inform the causal effects of sex hormones on two broad categories of disease outcomes – a) Type 2 diabetes (T2D), insulin resistance, body composition and related metabolic disease risk factors, and b) hormone sensitive cancers. Given the lack of overlap between men and women in sex hormone associated variants (**Table 1, Tables S13-14**), and the possible different metabolic effects of these hormones between sexes, we focused analyses on sex-specific disease outcomes. As exposures, we tested total and bioavailable testosterone and SHBG in both men and women, and also estradiol in men. For each outcome trait, we identified the largest published sex-specific GWAS meta-analysis with publicly available data (**Table S19**). We then performed a series of MR analyses using two-sample inverse variance-weighted (IVW), Egger and weighted median models (**Methods**). We additionally modelled different genetic risk scores by i) Steiger filtering to exclude variants with larger effects on metabolic traits than the tested sex hormone, ii) cluster filtering using variants in the above defined clusters representing primary effects on SHBG or testosterone independent of SHBG. To further inform the role of SHBG, we additionally tested the 2 *cis* variants in *SHBG* as an instrument for SHBG.

Using these genetic instruments, in men and women separately, we could infer causal positive effects of testosterone levels on lean body mass and number of lifetime sexual partners (**Tables S20-S22, Figure ED4**). These findings are consistent with the established positive effects of testosterone on these traits in randomised controlled trials⁶ and therefore support the validity of our genetic instrument analyses.

Mendelian randomization analyses in men

In men, we found evidence of beneficial effects of higher testosterone on metabolic traits (**Figure 3, Figure ED4-5, Tables S20 and S23**). For T2D and related traits, the evidence of a protective effect of testosterone was most consistent when using the cluster-specific genetic instrument representing a primary (total and bioavailable) testosterone-increasing effect independent of SHBG. Using data from 34,990 men with T2D and 150,760 male controls²³, and 67,506 non diabetic men with fasting glucose levels available²⁴, exposure to higher testosterone, independent of SHBG, conferred lower T2D risk and lower fasting glucose: each 1-SD higher testosterone level (approximately 3.7 nmol/L) was associated with a 15% lower T2D risk in men (total testosterone odds ratio (OR): 0.85; 95% CI: 0.77, 0.95; cluster-specific testosterone OR: 0.86; 95% CI 0.76,0.98). These metabolically beneficial associations were directionally consistent, but did not reach nominal significance ($p < 0.05$), in all sensitivity analyses (**Tables S20, S24; Figure ED5**).

In contrast to these apparent beneficial metabolic effects, MR analyses indicated that testosterone increases prostate cancer risk in men: each 1-SD higher bioavailable testosterone level increased prostate cancer risk by 23% (OR: 1.23; 95%CI 1.13-1.33), with consistent findings across all testosterone genetic instruments (unfiltered, Steiger-filtered and cluster-filtered) (**Figure 4, Table S25, Figure ED6**).

We found no compelling evidence for an effect of estradiol in men on any metabolic or body composition trait, however, confidence intervals were wide (**Tables S20, S23 and S25**).

Mendelian randomization analyses in women.

Despite evidence for a positive effect of total testosterone on lean body mass in women as well as men, testosterone was associated with several adverse metabolic outcomes in women (**Table S21**).

We found consistent evidence supporting a causal effect of testosterone on higher PCOS risk in women. These effects were most consistent with bioavailable testosterone, with positive findings across all MR models and all instruments (unfiltered, Steiger-filtered and cluster-filtered) (**Figure ED7-8, Table S21**). These effects equated to an odds ratio of 1.51 (95%CI 1.33-1.72) per 1-SD higher bioavailable testosterone.

MR analyses also showed a causal effect of bioavailable testosterone on higher T2D risk and higher fasting insulin in women (using unfiltered and Steiger-filtered instruments) (**Table S21, Figures ED4 and ED9**). Risk of T2D was increased by 37% (OR: 1.37; 95% CI 1.22, 1.53) per 1-SD higher bioavailable testosterone. We also found evidence for protective effects of SHBG on T2D across all MR models using Steiger-filtered and cluster-filtered instruments, and apparent protective effects of SHBG on fasting insulin levels, and central fat measures, android and visceral, but not total body fat, (consistently across unfiltered, Steiger-filtered and cluster-filtered instruments) (**Tables S21 and S26, Figures ED4 and ED9**). These effects equated to an odds ratio for T2D of 0.65 (95%CI: 0.58-0.72) per 1-SD (approximately 30.3 nmol/L) higher SHBG. The lack of association with the testosterone-specific cluster (representing higher testosterone independent of SHBG) on T2D or fasting insulin (**Table S21**), indicates that the above associations with bioavailable testosterone and SHBG in women might be driven by direct effects of SHBG, however, we did not have a genetic instrument that was specific to SHBG.

We found evidence that testosterone increased the risk of estrogen receptor (ER)+ but not ER- breast cancer, with consistent findings across all MR models and instruments (**Figure ED6, Table S27**). Furthermore, testosterone increased the risk of endometrial cancer but reduced the risk of ovarian cancer, again with consistent findings across sensitivity models (**Figure ED6, Table S27**). There was also evidence for a protective effect of SHBG on risk of endometrial cancer in women, which was consistent across all models, but a risk-increasing effect of SHBG on ER- breast cancer.

cis variants in the *SHBG* gene provide a confirmatory test of higher circulating SHBG levels, independent of potential confounding by adiposity and insulin resistance, but including effects of reciprocally lower bioavailable testosterone. Results using two *cis* variants were generally consistent with our main analyses (**Table S24**), with consistent associations with the low frequency missense *SHBG* variant on PCOS and T2D in women, and directionally-consistent but smaller effects of the common non-coding variant.

Discussion

We identify >2500 genetic variant sex-hormone associations and provide insights into the genetic architecture of sex hormone regulation and its relevance to disease. We see limited overlap between the genetic variants identified in men and women for all sex hormone traits except SHBG, and even overlapping signals often showed divergent effects. Cluster analyses across all identified variants distinguished, in each sex, groups of variants with testosterone-increasing effects either dependent or independent of SHBG. These clusters helped inform genetic causal inference analyses by showing primary metabolic effects of testosterone that were beneficial in men (lower fasting glucose and lower T2D risk) but harmful in women (higher PCOS risk). In contrast, associations that are seen only with bioavailable testosterone and SHBG (e.g. T2D in women) could be driven by effects of SHBG, directly or in combination with testosterone.

Testosterone Trials in men, the largest RCTs of testosterone administration to date, found clear benefits of testosterone on sexual function and body composition in men, but insufficient data on disease outcomes due to sparse numbers of such outcomes even in the largest trials. While RCT evidence remains the gold standard, genetic instrumental variable analyses provide a more robust evidence base than phenotypic observational study designs, as they are less prone to confounding and reverse causality. For example, while adverse effects of testosterone on prostate cancer risk might be expected, given the established role of testosterone-reducing agents in the treatment of prostate cancer, the evidence from observational studies is remarkably diverse: out of 45 papers, 18 reported positive associations between testosterone and prostate cancer, 17 reported negative associations and 10 reported no association⁸. Furthermore, in a recent analysis of 20 prospective studies, low bioavailable testosterone predicted lower risk of low-grade prostate cancers but higher risk of high-grade cancers⁹. Therefore, our findings advance our understanding of the risks and benefits of this widely used therapy in men.

Our findings that higher testosterone increases the risk of PCOS in women is important in demonstrating the aetiological role of testosterone in this common disorder, rather than simply being a consequence of upstream defects in ovarian dysfunction and insulin signalling. Androgen-blocking agents are widely used to treat symptoms of hyperandrogenism in women with PCOS, but evidence is lacking for the role of androgens in the aetiology and prevention of

this condition²⁵. Similarly, experimental evidence of the effects of testosterone administration in women arises from several RCTs, albeit using substantially lower doses than in men and often topical routes of administration, which substantiate the positive effects of testosterone on the primary outcome, sexual function. However, even in combination, these RCTs include insufficient disease events to inform about its potential effects on cardio-metabolic traits and cancer risks²⁶.

Our findings positively link testosterone to number of sexual partners and lean body mass in men and women, which provide reassurance about the validity of our approach. However, some limitations need to be acknowledged. While we could distinguish a cluster-specific genetic instrument for testosterone that was independent of SHBG, the effects of this, and our other testosterone instruments, might be mediated at least in part by downstream conversion of testosterone to estradiol. This has been hypothesized to explain the observed phenotypic associations between testosterone and higher risk of ER-positive breast cancer. However, regardless of downstream mechanisms, our findings provide evidence to inform the consequences of real-world differences in testosterone on health outcomes. Similarly, while our SHBG-related clusters in men and women were not independent of testosterone, and therefore cannot inform the debate about SHBG-specific metabolic effects, they reflect the actual downstream biological effects of SHBG on (higher) total testosterone and (lower) bioavailable testosterone. A second limitation, common to all MR analyses, is that genetic instruments represent lifelong exposures to the risk factor, and so may have different effects to short-medium term pharmacological interventions even if they achieve the same difference in circulating concentrations. A third limitation is that the discovery of genetic variants was performed in a single large study that is known to be enriched for healthier and older individuals, potentially influencing (likely underestimating) the effect size of associated variants. Finally, the MR approach depends on some key assumptions which we attempted to assess using a range of sensitivity analyses. Associations across these sensitivity analyses were generally directionally consistent, but did not always reach $p < 0.05$. We note that our findings do not preclude an additional bi-directional effect of disease status on testosterone or suggest that other factors are not important causal determinants of the tested outcomes.

Our study highlights three important methodological considerations. First, in light of the substantial overlap between genetic determinants of testosterone and SHBG within each sex, our cluster-based analyses allowed us to identify subsets of variants that alter testosterone independent of SHBG. This effectively removes potential direct biological effects of SHBG and its confounding effects on adiposity and insulin resistance²⁷. Second, we used Steiger filtering of our genetic instruments, to exclude variants with stronger effects on metabolic traits compared to their effects on sex hormones. This approach helped reduce the possibility of reverse causality, an issue that is increasingly important in large-scale GWAS²⁸.

Finally, our findings show the importance of sex-specific analyses, both in the discovery of genetic variants for sex hormone traits and in the analyses of downstream traits. The

apparently sex-divergent effects of testosterone on T2D were obfuscated by sex-combined data. Available large-scale sex-specific data on T2D was invaluable for our study - unfortunately similar sex-specific data for cardiovascular disease are not yet available, which will be critically important to understand the wider cardio-metabolic impact of testosterone. Hence, while the findings relating to adverse metabolic effects of testosterone in women may inform clinical practice, it is premature to infer wider beneficial metabolic effects in men.

In conclusion, our findings provide unique insights into the disease impacts of testosterone and highlight the importance of sex-specific analyses of disease risk.

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Data availability statement

All data used in discovery analyses is available from UK Biobank upon request (<https://www.ukbiobank.ac.uk>).

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Tables and Figures

Table 1. Heritability of and genetic correlations between sex hormone traits included in the genome-wide association analyses.

	Heritability (%), s.e	SHBG (Men)	Testosterone (Men)	Bioavailable T (Men)	Estradiol (Men)
Same sex genetic correlations					
SHBG (Men)	21 (1.2)	-			
Testosterone (Men)	17 (1)	0.73	-		
Bioavailable T (Men)	12 (0.7)	-0.05	0.60	-	
Estradiol (Men)	2 (0.4)	0.19	0.32	0.19	-
Opposite sex genetic correlations					
SHBG (Women)	20 (0.01)	0.83			
Testosterone (Women)	13 (0.8)	-0.02	0		
Bioavailable T (Women)	14 (0.8)	-0.59	-0.49	-0.03	
Estradiol (Women)	1.6 (1)	0.29	0.4	0.21	0.07

Figure 1 | Cluster analysis of male identified sex hormone signals. All Z-score effects are aligned to the male total testosterone increasing allele.

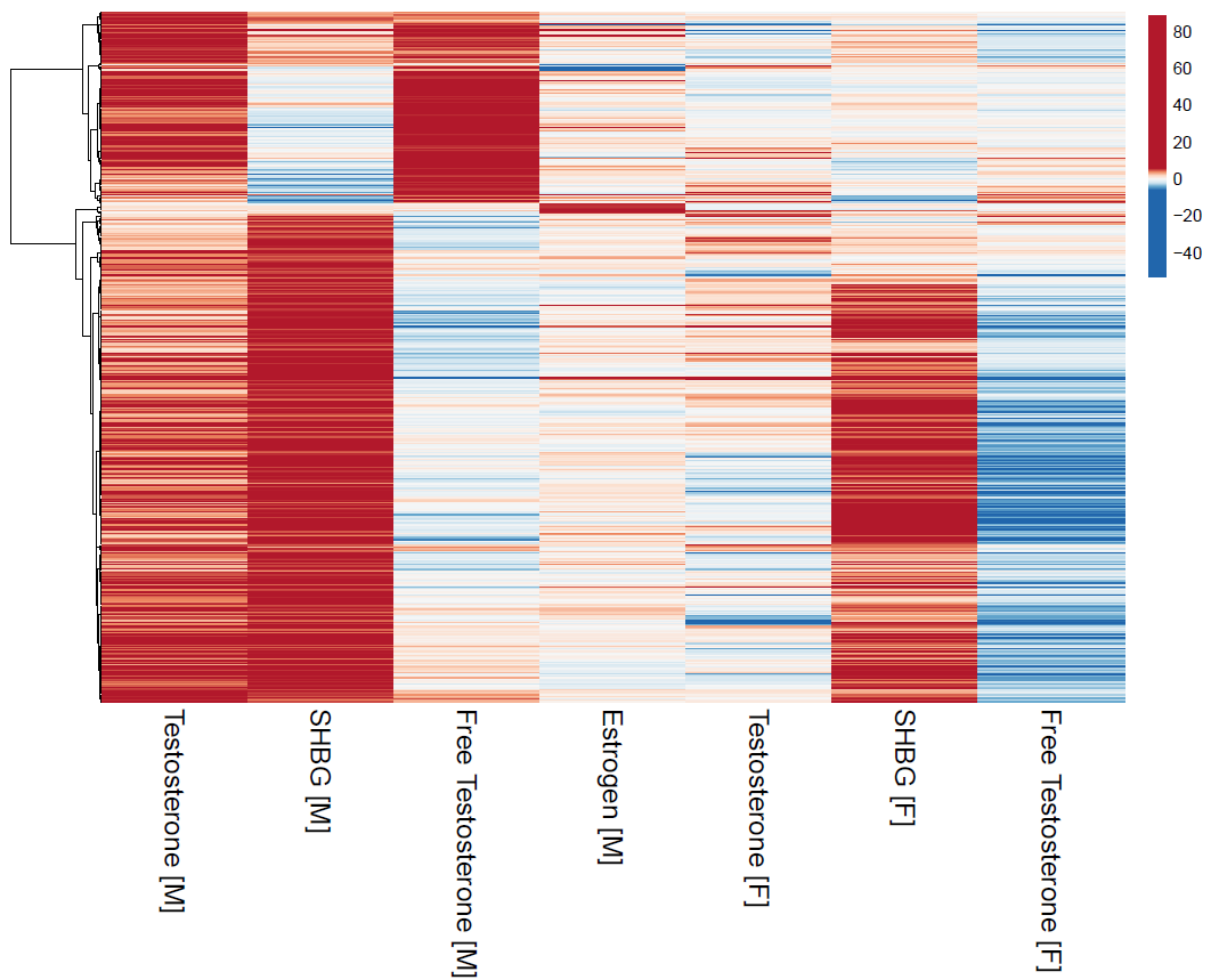


Figure 2 | Cluster analysis of female identified sex hormone signals. All Z-score effects are aligned to the female bioavailable testosterone increasing allele.

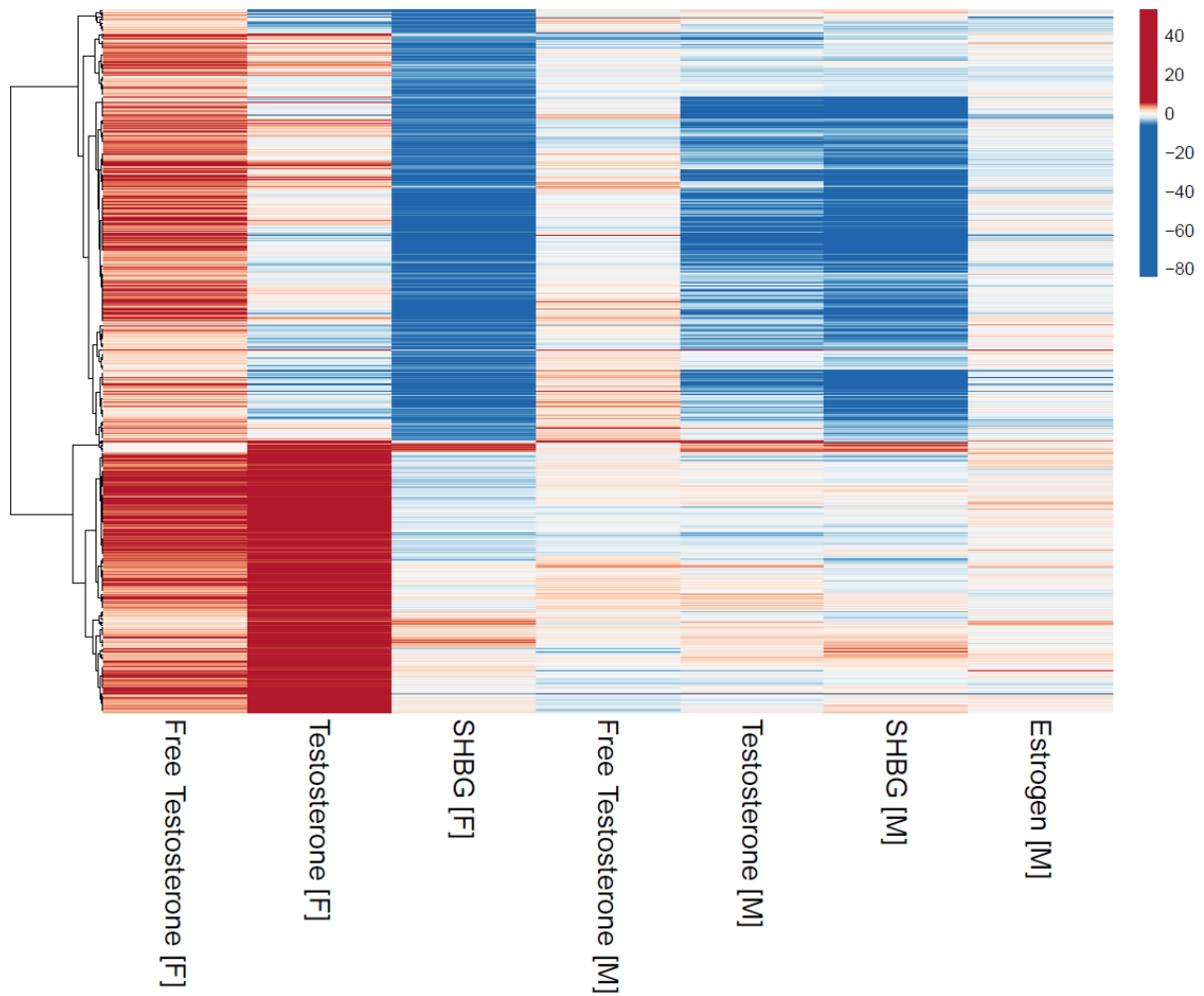


Figure 3. Plots showing the odds of T2D and PCOS per unit higher testosterone and SHBG using genetic instruments in Mendelian Randomization analyses.

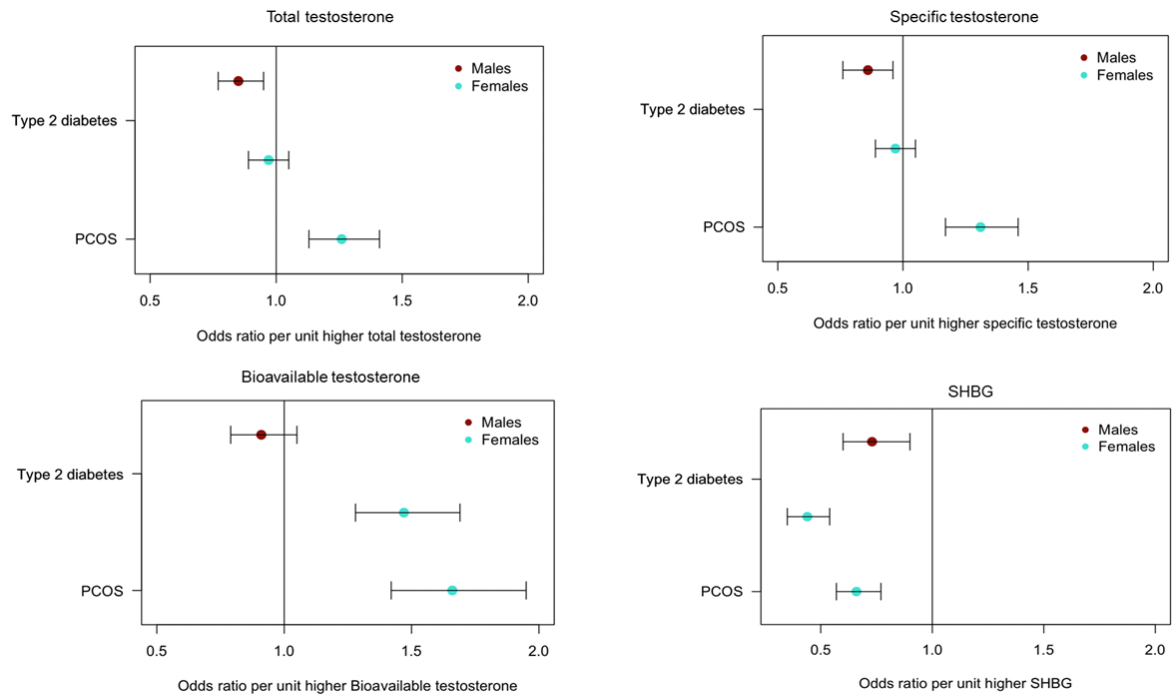
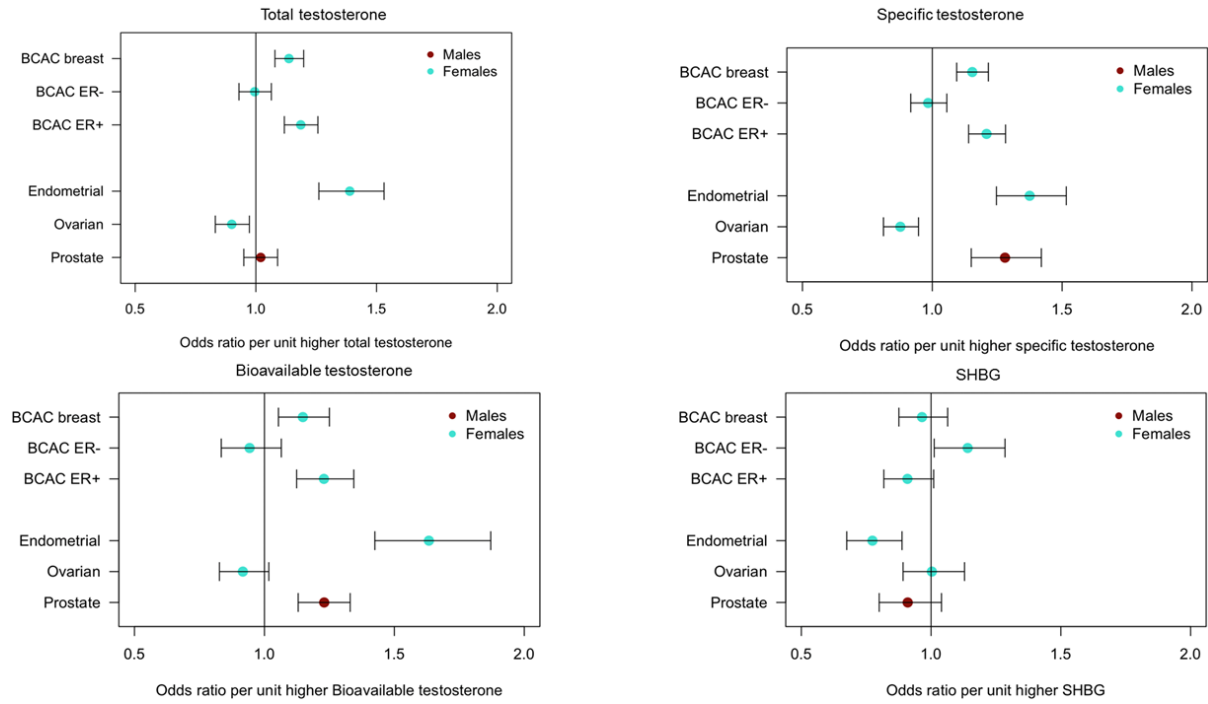


Figure 4. Plot showing the odds of cancer per unit higher testosterone and SHBG using genetic instruments in Mendelian Randomization analyses.



BCAC breast = breast cancer; BCAC ER- = Breast cancer, ER negative subtype; BCAC ER+ = Breast cancer, ER positive subtype

Online Methods

Phenotype preparation in UK Biobank

Discovery analyses were performed in the full UK Biobank study which has been described extensively elsewhere²⁹. All UK Biobank participants provided written informed consent, the study was approved by the National Research Ethics Service Committee North West–Haydock and all study procedures were performed in accordance with the World Medical Association Declaration of Helsinki ethical principles for medical research. At baseline a panel of 34 biomarkers were measured across the full ~500,000 study participants. We selected three sex hormone traits - SHBG, testosterone and estradiol - and additionally calculated a measure of bioavailable testosterone using the Vermeulen equation^{30,31}. Individual trait transformations and exclusion criteria are detailed in **Supplementary Table S1**.

Genetic discovery analysis

We used genetic data from the “v3” release of UK Biobank²⁹, containing the full set of HRC and 1000G imputed variants. In addition to the quality control metrics performed centrally by UK Biobank, we defined a subset of “white European” ancestry samples using a K-means clustering approach applied to the first four principal components calculated from genome-wide SNP genotypes. Individuals clustered into this group who self-identified by questionnaire as being of an ancestry other than white European were excluded. After application of QC criteria, a maximum of 425,097 UK Biobank participants were available for analysis with genotype and phenotype data. Association testing was performed using a linear mixed models implemented in BOLT-LMM³² to account for cryptic population structure and relatedness. Only autosomal genetic variants which were common (MAF>1%), passed QC in all 106 batches and were present on both genotyping arrays were included in the genetic relationship matrix (GRM).

Across each of the four sex hormone traits we performed GWAS discovery analyses both within and across sexes, with the exception of estradiol where analyses were performed only in men. To help improve reproducibility of results, analyses were conducted independently at two sites and compared for consistency, with any discrepancies investigated. A decision on which dataset to use for each discovery GWAS was made based on strength of association of the previously reported *SHBG* gene locus variants¹⁹.

Genotyping chip, age at baseline and 10 genetically derived principal components were included as covariates in all models, in addition to specific covariates used for individual traits detailed in **Supplementary Table S1**. For SHBG we included body mass index as a covariate which was previously demonstrated to increase statistical power by reducing trait variance. To avoid any effects which may be attributed to collider bias³³, we compared BMI adjusted estimates to BMI unadjusted estimates across all identified genome-wide significant SHBG signals. We discarded from further consideration any loci which changed effect direction

between models and/or had large changes in effect estimate and statistical significance. For downstream analyses, genetic loci from the BMI adjusted analyses were used with corresponding effect estimates from the BMI unadjusted analyses.

Replication was performed using three independent datasets. Firstly, a previously published CHARGE consortium meta-analysis of SHBG (age and BMI adjusted) in 21,791 individuals (9,390 women, 12,401 men)¹⁹. Given these data used HapMap 2 imputation, we found proxy HapMap 2 variants with a minimum $r^2 > 0.5$ to align (**Supplementary Table S28**). Secondly, a previously published GWAS of 2,913 individuals from the Twins UK resource²⁰ with measured dehydroepiandrosterone (DHEAS), total testosterone, follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol, progesterone, prolactin and SHBG and calculated free androgen index. Finally, replication of the genetic scores was attempted with measurements of total testosterone (5,334 men and 3,804 women) and of SHBG (5,694 men and 5,476 women) from the EPIC Norfolk study³⁴. Here, regression models were conducted on ventiles of the score, and were controlled for 10 genetic principal components, and additionally menopausal status in women (**Figure ED2**). Given the relatively small sizes of these replication studies, we used these data to validate genetic instruments in aggregate rather than as individual loci (**Supplementary Table S28**).

Signal selection and genetic instrument generation

We defined statistically independent signals (described as lead or index variants) using 1Mb distanced-based clumping across all imputed variants with $P < 5 \times 10^{-8}$, an imputation quality score > 0.5 and MAF $> 0.1\%$. Although several studies have suggested other p-value thresholds for genome-wide significance more stringent (e.g $P < 6 \times 10^{-9}$) than the currently accepted community standard ($P < 5 \times 10^{-8}$), as our primary focus of this paper was the production of genetic risk scores (rather than focus on individual genetic variants), we felt the more liberal threshold was acceptable to help maximise variance explained. We note that multiple trait correction would likely be over-conservative given the correlation structure between traits.

Genome-wide significant lead variants that shared any correlation with each other due to long range linkage disequilibrium ($r^2 > 0.05$) were excluded from further consideration. These loci were additionally augmented using approximate conditional analyses implemented in GCTA³⁵. Here, secondary signals were only considered if they were a) uncorrelated ($r^2 < 0.05$) with a previously identified index variant b) genome-wide significant pre and post conditional analysis, c) had an effect estimate which did not change by more than 10% between models.

For downstream analyses we produced genetic instruments using two approaches. Firstly, we considered only SNPs that were genome-wide significant (and defined using clumping method above) for a given trait and sex to derive 7 genetic instruments:

- 1) "SHBG-Men" (N=357) - Individually genome-wide significant SNPs for SHBG in men, discovered using BMI adjusted analysis but using weights from a BMI unadjusted analysis
- 2) "SHBG-Women" (N=359) - As above, but in women.
- 3) "Total T-Men" (N=231) - Individually genome-wide significant SNPs for total testosterone in men, weighted by individual SNP beta estimate for total testosterone
- 4) "Total T-Women" (N=254) - As above, but in women.
- 5) "Bioavailable T - Men" (N=125) - Individually genome-wide significant SNPs for bioavailable testosterone in men, weighted by individual SNP beta estimate for bioavailable testosterone
- 6) "Bioavailable T - Women" (N=180) - As above, but in women
- 7) "Estradiol-Men" (N=22) - Individually genome-wide significant SNPs for estradiol in men, weighted by individual SNP beta estimates for estradiol

Secondly, given the genetic overlap between traits, we observed that some signals were shared between sex hormone traits but appeared to have much stronger effects in one versus others. To help derive additional genetic risk scores that reflected this, we took all genome-wide significant signals within each sex but across traits, and performed ward-based hierarchical clustering³⁶ on individual variant Z-scores. We used the observed clusters from these analyses to produce give additional genetic instruments (**Supplementary Table S16**):

- 8) A "Male SHBG cluster" (N=362), formed from SNPs with dominant effects on SHBG in men. Each SNP in this genetic instrument is weighted by its effect from the BMI unadjusted SHBG analysis.
- 9) A "Male testosterone cluster" (N=122), formed from SNPs with dominant effects on both total and bioavailable testosterone in men. Each SNP in this genetic instrument is weighted by its effect on total testosterone.
- 10) A "Male estradiol cluster" (N=14), formed from SNPs with dominant effects on estradiol in men.
- 11) A "Female SHBG cluster" (N=373), formed from SNPs with dominant effects on SHBG in women. Each SNP in this genetic instrument is weighted by its effect from the BMI unadjusted SHBG analysis.
- 12) A "Female testosterone cluster" (N=241), formed from SNPs with dominant effects on both total and bioavailable testosterone in women. Each SNP in this genetic instrument is weighted by its effect on total testosterone.

Gene prioritization

We used the SMR software package³⁷ to systematically map associated genetic variants to genes via expression effects (eQTLs). For all analyses we included expression data from liver, in addition to skeletal muscle in men and adrenal gland in women. All expression data was generated by the GTEx consortium (v7), made available from the SMR website resource section (<https://cnsgenomics.com/software/smr/#DataResource>). Only genes passing multiple test

correction and exhibiting no statistically significant evidence of coincidental eQTL overlap (assessed by the SMR HEIDI metric) were considered. The same data was additionally used to perform global tissue enrichment using LDSC-SEG³⁸.

Mendelian randomization analyses

For outcome traits, we limited analyses to traits that i) were previously reported as associated with circulating sex hormone levels, ii) have sex specific associations with sex hormones, and iii) where sex-specific GWAS data was available in large non-UK Biobank studies (see **Supplementary Table S19**). Given the potential for bias in MR studies when a large proportion of genetic variants are discovered in the same sample as the outcome is measured, we used non UK Biobank GWAS data as the primary outcome data. This resulted in us considering as an outcome six diseases: type 2 diabetes, PCOS, prostate cancer, breast cancer, ovarian cancer and endometrial cancer; two glycaemic traits: fasting insulin as a measure of insulin resistance and fasting glucose; and four main measures of body composition: BMI, waist hip ratio adjusted for BMI, and, using DEXA measures, total body fat and total lean mass. Where we observed positive associations for total fat or lean mass, we tested 6 more specific measures of body composition; android fat, gynoid fat, android lean mass, gynoid lean mass, subcutaneous and visceral fat from DEXA data.

Each of the 12 genetic instruments described above was used as an exposure instrumental variable in our subsequent Mendelian Randomization analyses. Where a signal was not present in the outcome GWAS, we identified a 1000 Genomes or HapMap proxy with $r^2 > 0.5$ within 250kb either side of the signal and their relevant weight was included in our genetic instrument (**Supplementary Table S28**).

In each MR test we assessed a number of widely used methods - inverse variance weighted (IVW), weighted median, and MR-Egger^{39,40}. Mendelian randomisation relies on some key assumptions. These assumptions include 1) that alleles are randomly assigned among people; and 2) that alleles that influence exposure do not influence the outcome via any other pathway other than through the exposure. The use of the most robust models available (linear mixed models), as implemented in BOLT-LMM, to ensure alleles are not stratified within the UK Biobank provides reassurances that the first assumption holds. To address the second assumption, we performed several additional analyses. We used two additional MR methods (MR-Egger and Median MR) both of which are more robust to pleiotropy – directionally consistent results strengthened our causal inference. We used the MR-Egger intercept, with a p value of $p < 0.05$, to provide evidence that pleiotropy could be affecting the MR results. Furthermore, we implemented an approach known as “Steiger filtering”. In this test, we excluded variants with larger effects on outcome traits or traits known to be closely associated to outcome traits compared to their effects on the sex hormone exposure trait⁴¹. Given the strong association between SHBG and adiposity and insulin resistance, and the large discovery sample size, it was possible that many variants could be associated with sex hormone levels via an outcome trait, rather than having direct effects on sex hormones, so invalidating the MR

assumptions. We excluded between 2 and 40 % of variants (depending on the sex hormone) trait if they had larger effects (based on an absolute standardized beta) on any one of 11 metabolic traits available in the UK Biobank (fasting glucose, T2D, coronary artery disease, HDL-C, LDL-C, triglycerides, total-cholesterol, diastolic and systolic blood pressure, BMI and Waist hip ratio adjusted for BMI). A full table of which variants were excluded and why is given in **Supplementary Table S29**).

Secondly, we considered only cis variants at the *SHBG* gene locus (**Supplementary Table S24**). Here we used two variants in low linkage disequilibrium as more specific but less powerful genetic instruments. Variants in *cis* with a gene likely represent the most specific test of the causal role of a circulating protein encoded by that gene. One of these variants (rs1799941) is common and has been used in several previous MR studies of SHBG^{16,19}, whilst the other (rs6258) is rare (~1% MAF) and alters SHBG's binding affinity for testosterone.

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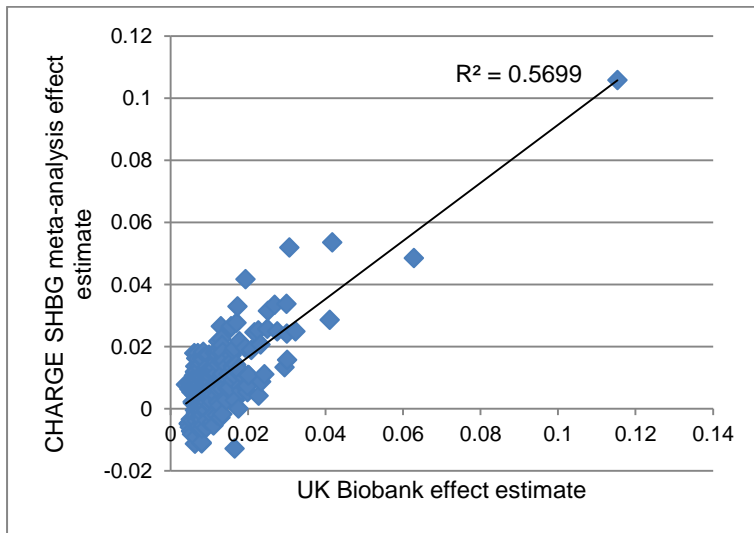
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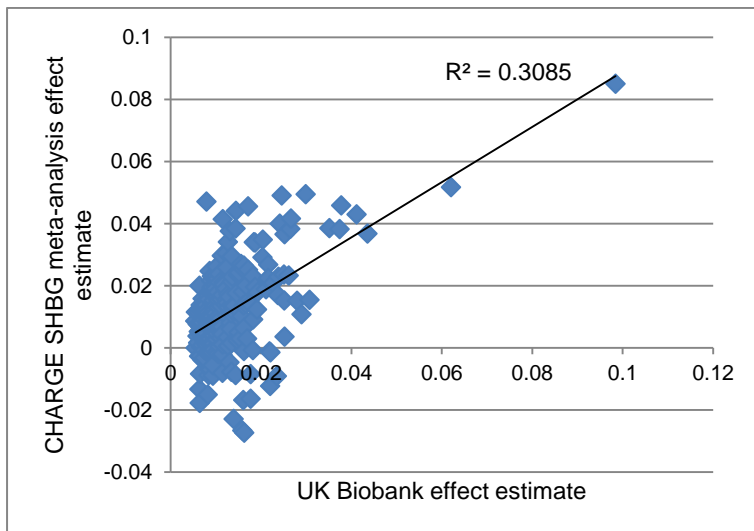
Extended Data Fig. 1: Replication of identified SHBG signals in CHARGE meta-analysis.

a) Effect size comparison performed against published estimates from the CHARGE male SHBG meta-analysis (N=12,401). **b)** Effect size comparison performed against published estimates from the CHARGE female SHBG meta-analysis (N=9,390). The SHBG *cis* locus (which had a concordant effect direction) has been excluded to maintain an appropriate scale.

a)

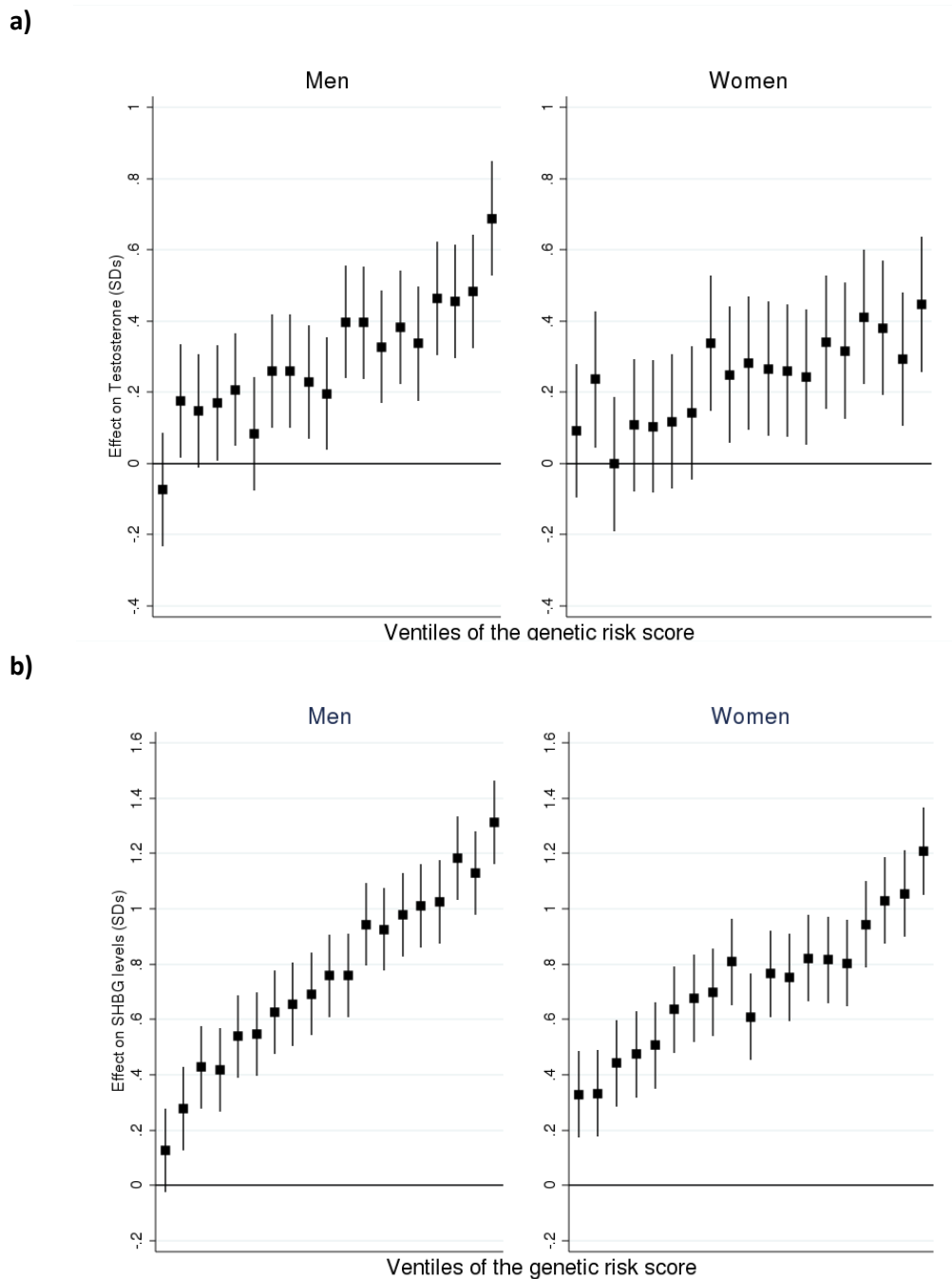


b)



Extended Data Fig. 2. Relationship between measured sex hormone levels in the EPIC-Norfolk study and polygenic score for increased sex hormone level.

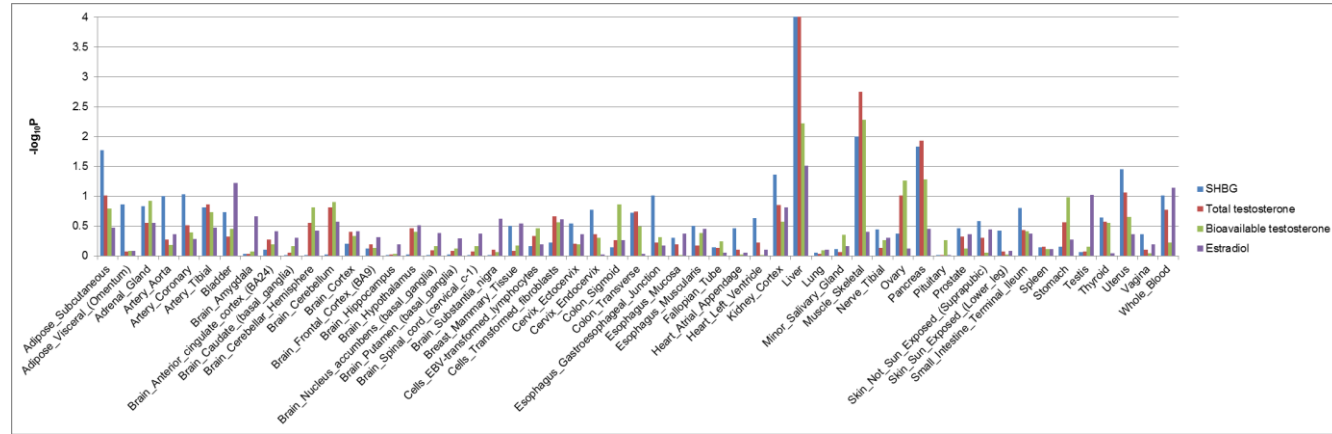
a) Total testosterone levels in the EPIC-Norfolk study by polygenic score for increased total testosterone. **b)** SHBG levels in the EPIC-Norfolk study by polygenic score for increased SHBG. Bars around the point estimate effect denote the standard error. Effect on hormone is given in standard deviations (SDs). SHBG=sex hormone binding globulin.



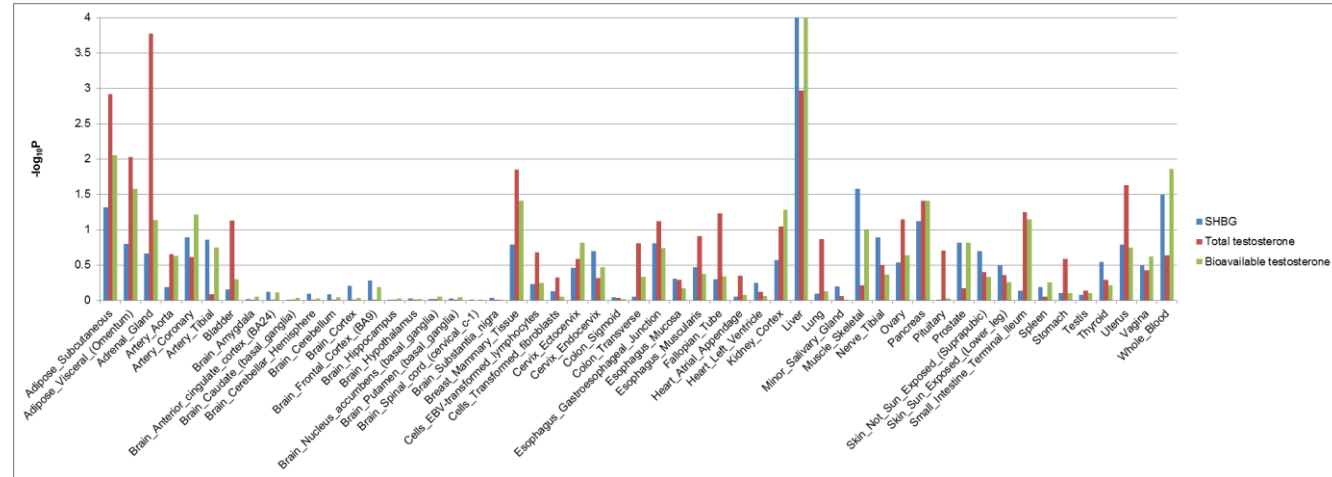
Extended Data Fig. 3: LD score regression analysis of enrichment of sex hormone signals in 53 GTEx tissues and cell types.

a) Analysis in men. b) Analysis in women.

a)

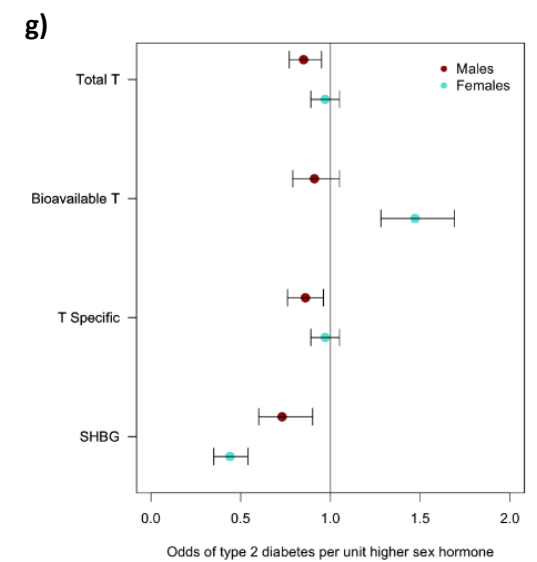
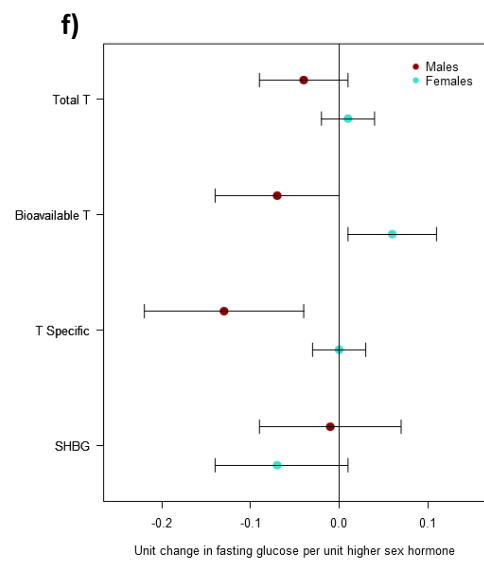
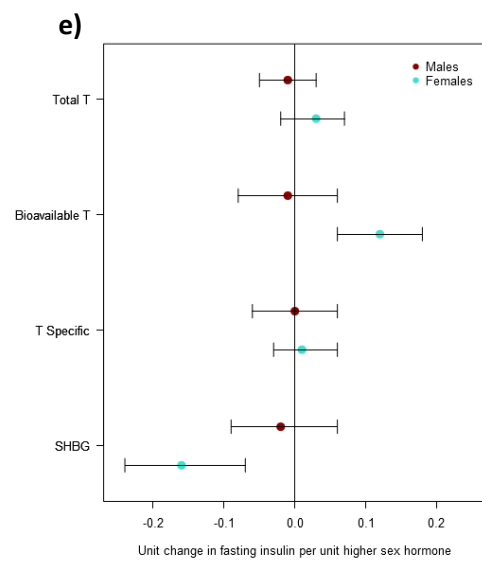
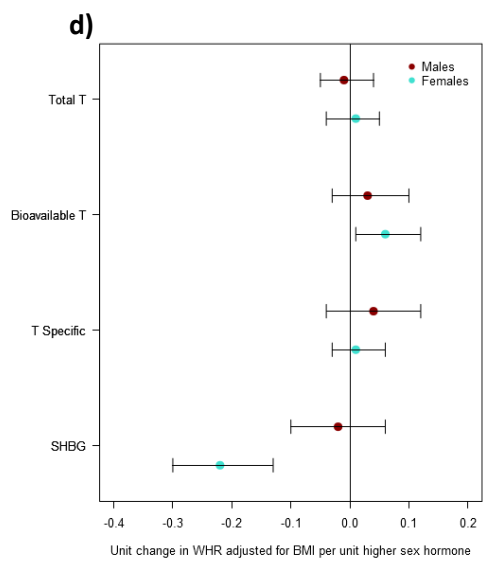
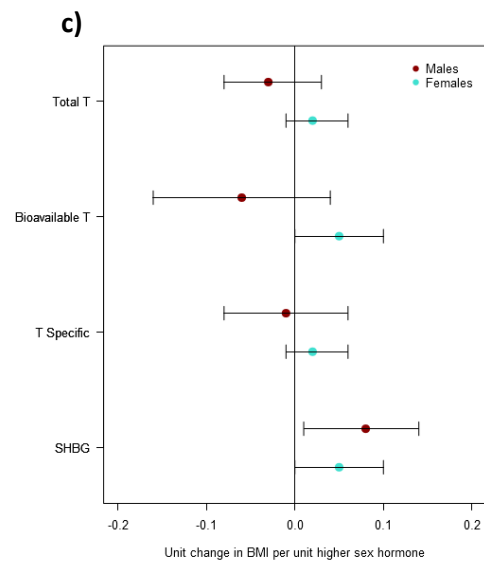
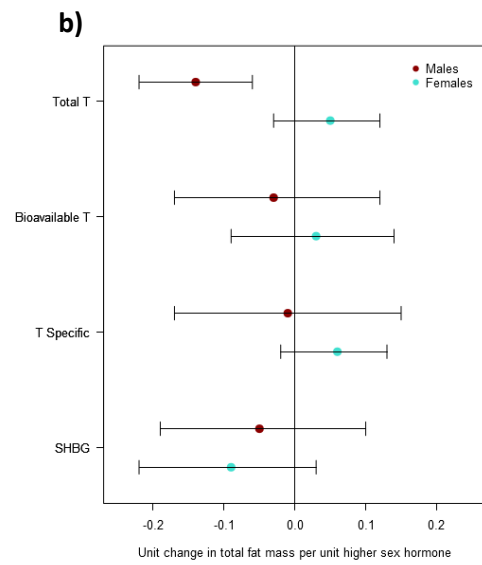
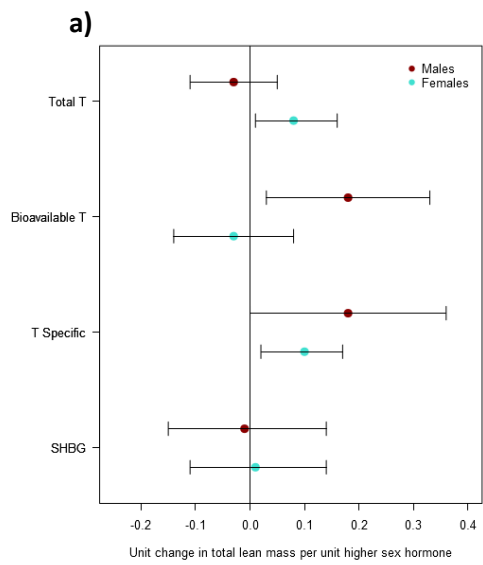


b)



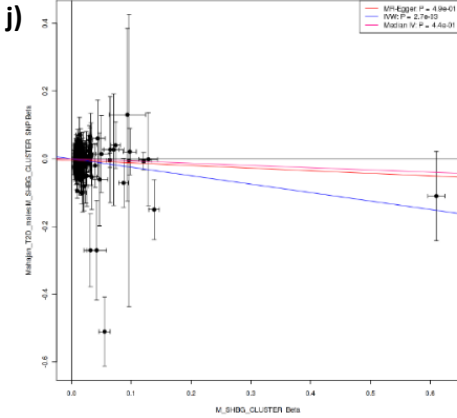
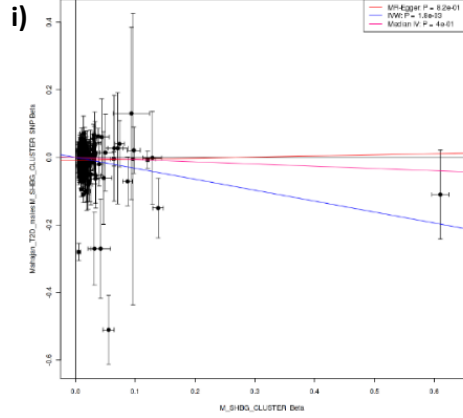
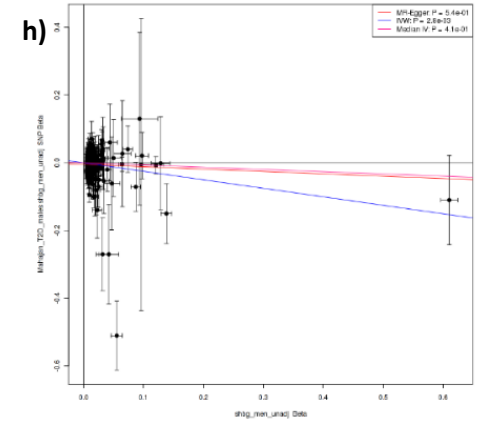
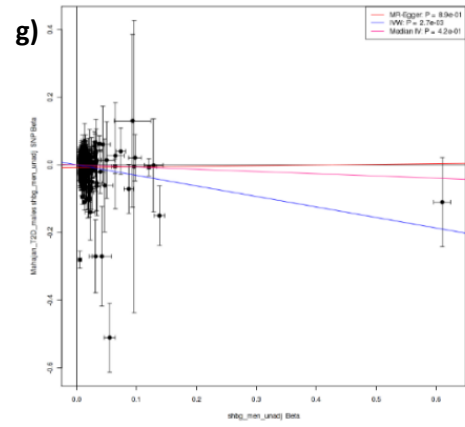
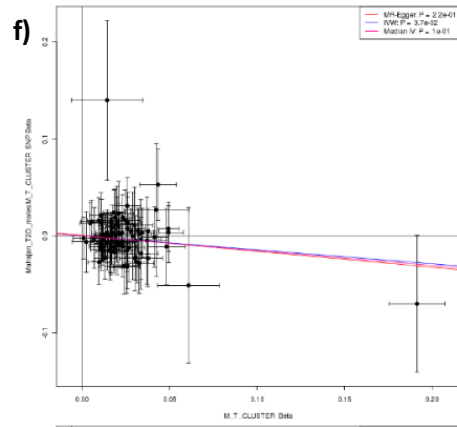
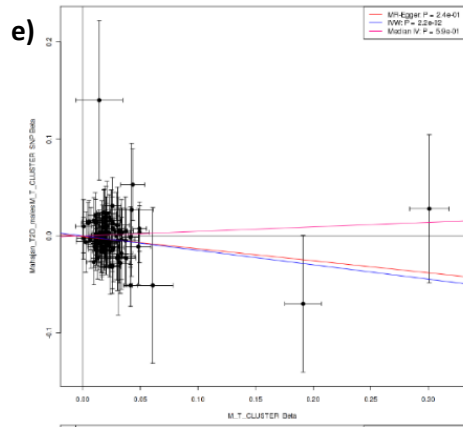
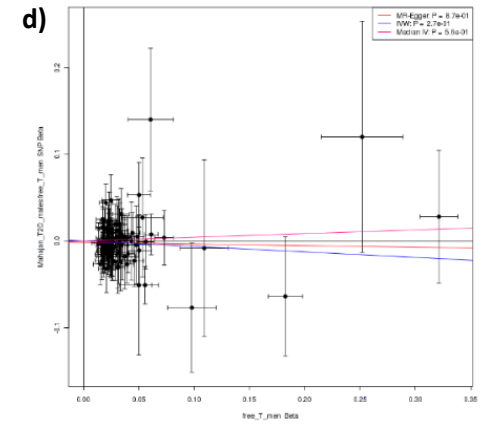
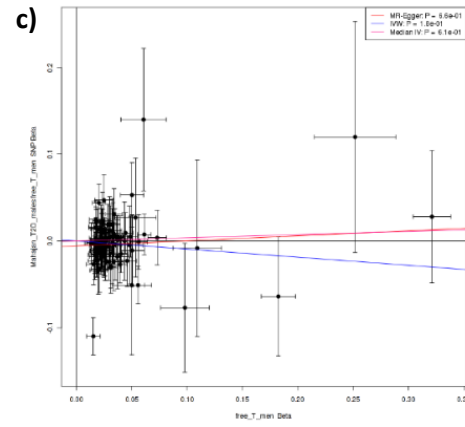
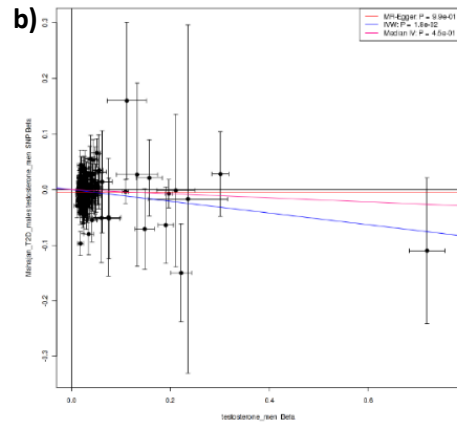
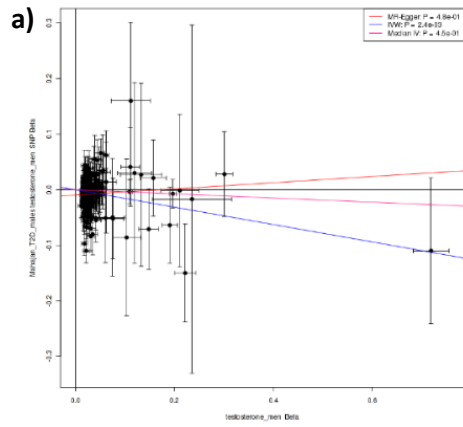
Extended Data Fig. 4: Results of inverse-variance weighted Mendelian randomization analysis of sex hormone genetic instruments on metabolic traits and body composition outcomes.

Dot plots representing the change in the following metabolic outcomes and body composition traits in males and females per unit higher sex hormone: **a)** Total lean mass. **b)** Total fat mass. **c)** BMI. **d)** Waist-hip ratio adjusted for BMI. **e)** Fasting insulin. **f)** Fasting glucose. **g)** Type 2 diabetes. Bars indicate 95% confidence interval around point estimate. BMI=body mass index; SHBG=sex hormone binding globulin; T=testosterone; T Specific=testosterone cluster; WHR=waist-hip ratio.



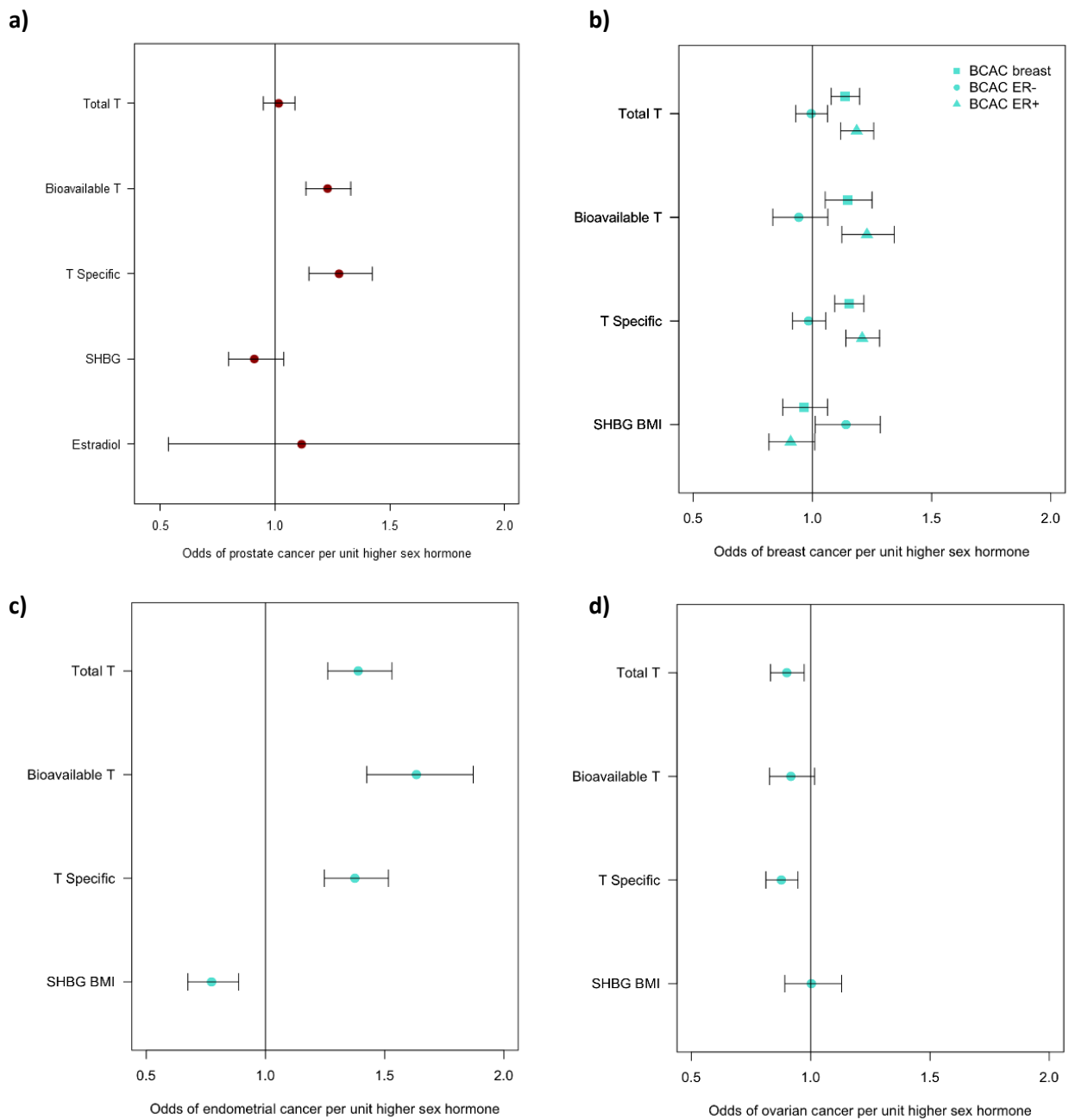
Extended Data Fig. 5. Results of Mendelian randomization analysis in men of genetic instruments for testosterone and SHBG on the outcome of Type 2 diabetes.

Plots show effect on $\ln(\text{odds})$ of Type 2 diabetes (y axes) in men of the following sex hormone genetic instruments (x axes; effect size in units). **a)** Total testosterone. **b)** Steiger filtered total testosterone. **c)** Bioavailable testosterone. **d)** Steiger filtered bioavailable testosterone. **e)** Testosterone specific cluster. **f)** Steiger filtered testosterone specific cluster. **g)** SHBG. **h)** Steiger filtered SHBG. **i)** SHBG specific cluster. **j)** Steiger filtered SHBG specific cluster. Lines indicate the effect size estimates from two-sample Mendelian randomization analyses: Egger pink, IVW blue, median IV red. Bars indicate 95% confidence intervals around the point estimates. SHBG=sex hormone binding globulin.



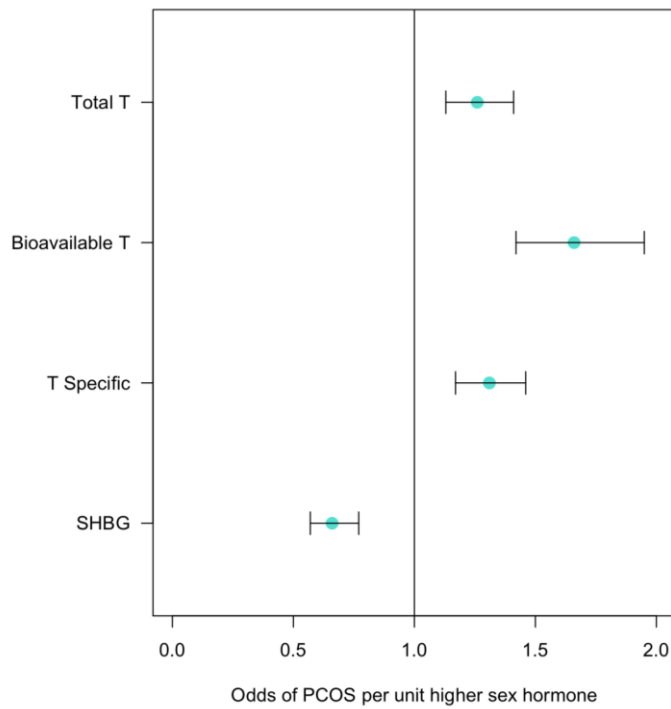
Extended Data Fig. 6. Results of inverse-variance weighted Mendelian randomization analysis of sex hormone genetic instruments on cancer outcomes.

Dot plots representing the change in the odds of the following cancers per unit higher sex hormone in males or females, as appropriate. **a)** Prostate cancer in males. **b)** Breast cancer (all types) and estrogen receptor positive (ER+) and negative (ER-) subtypes in females. **c)** Endometrial cancer in females. **d)** Ovarian cancer in females. Bars indicate 95% confidence interval around point estimates. SHBG=sex hormone binding globulin; T=testosterone; T Specific=testosterone cluster.



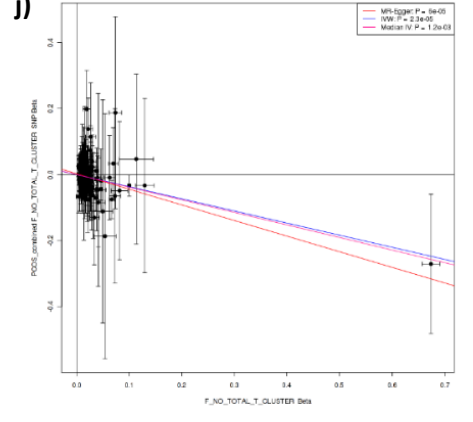
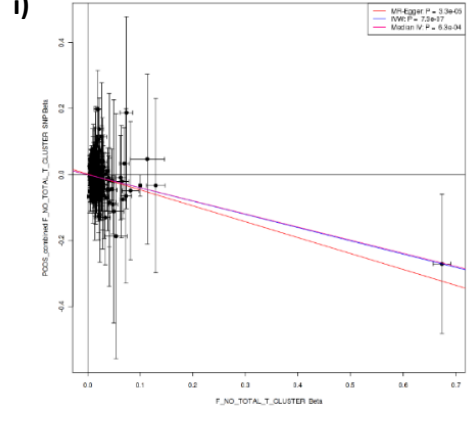
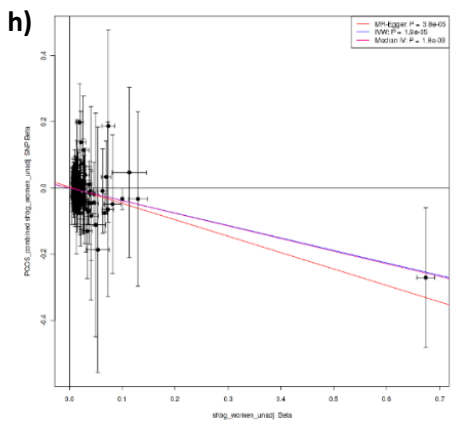
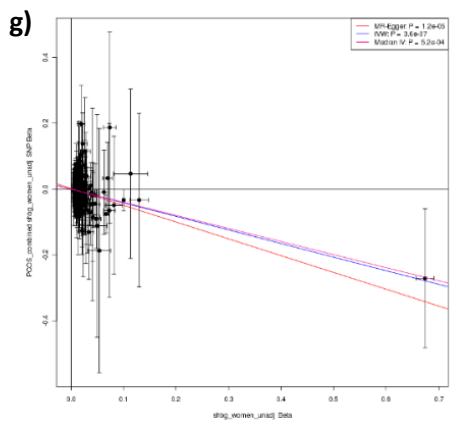
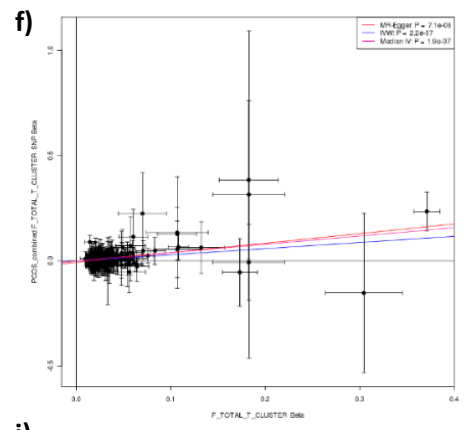
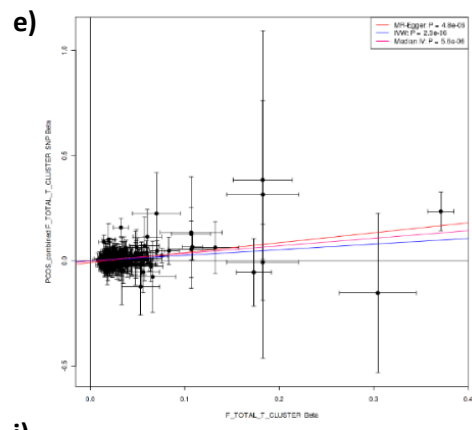
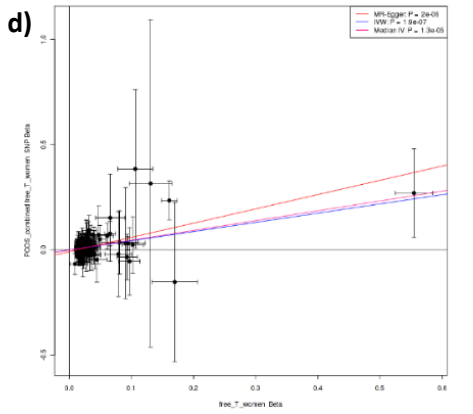
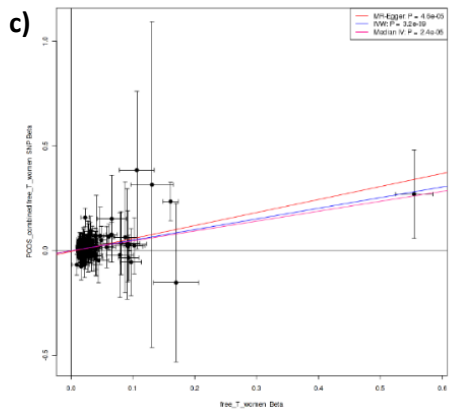
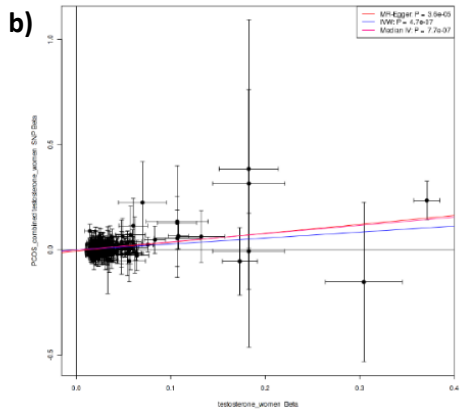
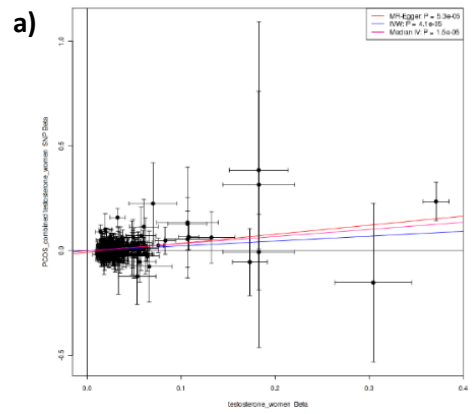
Extended Data Fig. 7. Results of inverse-variance weighted Mendelian randomization analysis in females of sex hormone genetic instruments on PCOS.

Dot plot represents the odds of PCOS per unit higher sex hormone. PCOS=polycystic ovary syndrome; SHBG=sex hormone binding globulin; T=testosterone; T Specific=testosterone cluster



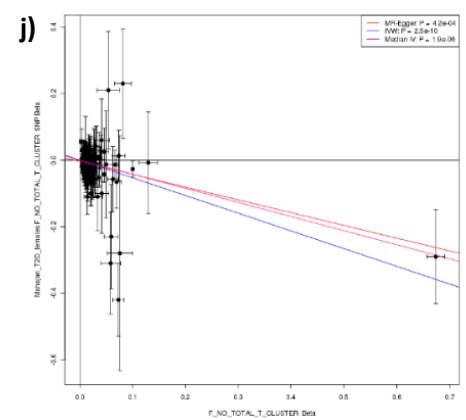
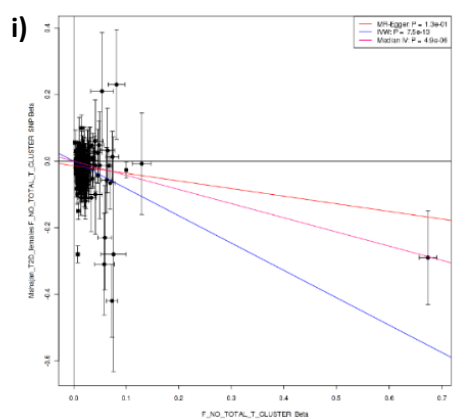
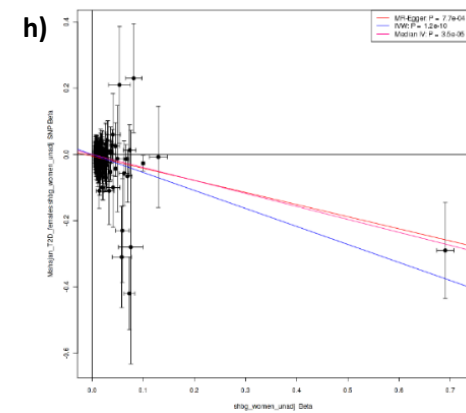
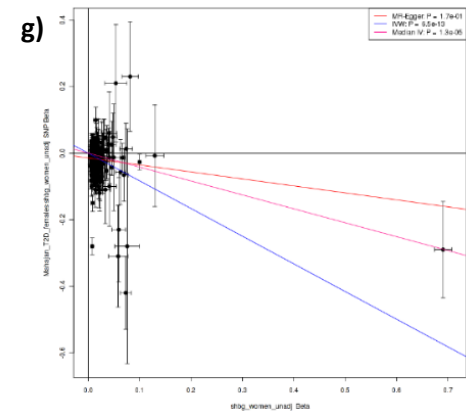
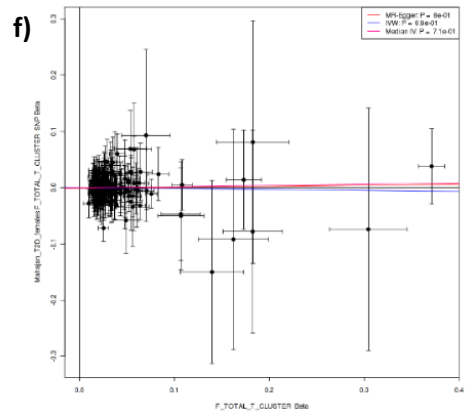
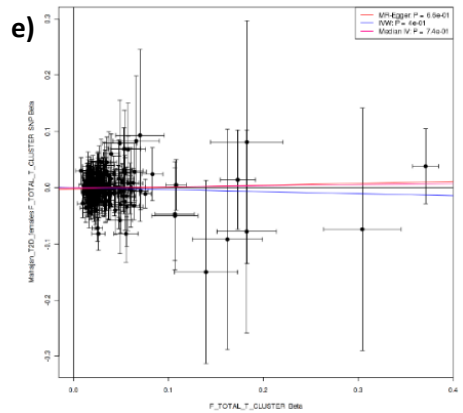
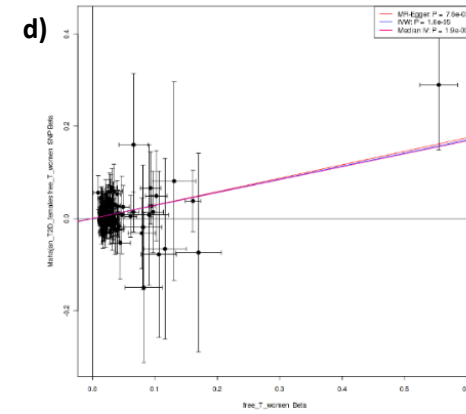
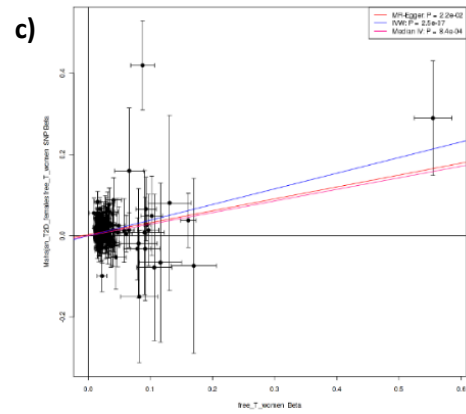
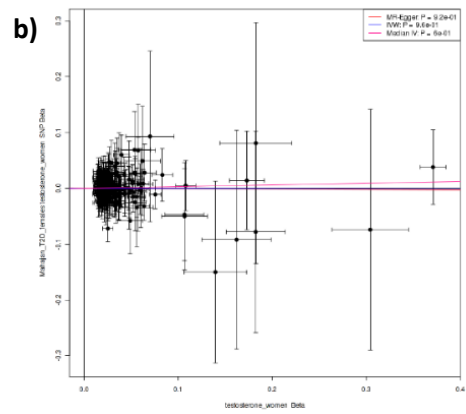
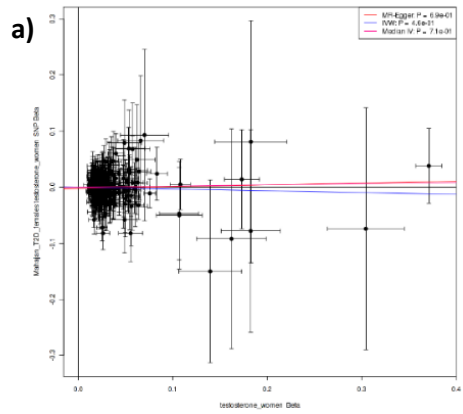
Extended Data Fig. 8. Results of Mendelian randomization analysis in women of genetic instruments for testosterone and SHBG on the outcome of PCOS.

Plots show effect on $\ln(\text{odds})$ of PCOS (y axes) of the following sex hormone genetic instruments in women (x axes; effect size in units). **a)** Total testosterone. **b)** Steiger filtered total testosterone. **c)** Bioavailable testosterone. **d)** Steiger filtered bioavailable testosterone. **e)** Testosterone specific cluster. **f)** Steiger filtered testosterone specific cluster. **g)** SHBG. **h)** Steiger filtered SHBG. **i)** SHBG specific cluster. **j)** Steiger filtered SHBG specific cluster. Lines indicate the effect size estimates from two-sample Mendelian randomization analyses: Egger pink, IVW blue, median IV red. Bars indicate 95% confidence intervals around the point estimates. PCOS=polycystic ovary syndrome; SHBG=sex hormone binding globulin.



Extended Data Fig. 9. Results of Mendelian randomization analysis in women of genetic instruments for testosterone and SHBG on the outcome of Type 2 diabetes.

Plots show effect on $\ln(\text{odds})$ of Type 2 diabetes in women (y axes) of the following sex hormone genetic instruments in women (x axes; effect size in units). **a)** Total testosterone. **b)** Steiger filtered total testosterone. **c)** Bioavailable testosterone. **d)** Steiger filtered bioavailable testosterone. **e)** Testosterone specific cluster. **f)** Steiger filtered testosterone specific cluster. **g)** SHBG. **h)** Steiger filtered SHBG. **i)** SHBG specific cluster. **j)** Steiger filtered SHBG specific cluster. Lines indicate the effect size estimates from two-sample Mendelian randomization analyses: Egger pink, IVW blue, median IV red. Bars indicate 95% confidence intervals around the point estimates. SHBG=sex hormone binding globulin.



Supplementary Table S1: Description of sex hormone phenotypes included in the genome-wide analyses.

Phenotype	Sex	Description of phenotype	Usage	Units (of measured or calculated sex hormone measure)	Details of UK Biobank assay	Inclusions/exclusions	Transformation	Covariates	N	Team conducting GWAS
Total testosterone in men	Males	Testosterone (UK Biobank variable 30850).	Signal identification	nmol/L	From blood sample collected at initial visit. Measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Non-missing values only so excluded participants with testosterone below lower limit of detection. Included white Europeans only.	Inverse normal transformation of rank	Fasting time, age, centre, chip/release of genetic data	194,453	Exeter
Bioavailable testosterone in men	Males	Bioavailable testosterone, calculated from testosterone (UK Biobank variable 30850), accounting for concentration of SHBG (UK Biobank variable 30830) and albumin (UK Biobank variable 30600) using Vermeulen equation	Signal identification	nmol/L	From blood sample collected at initial visit. Testosterone measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800. SHBG measured in nmol/L by two step sandwich immunoassay analysis on a Beckman Coulter Unicel Dxl 800. Albumin measured in g/L by BCG analysis on a Beckman Coulter AU5800.	Non-missing values only so excluded participants with testosterone below lower limit of detection. Included white Europeans only.	Inverse normal transformation of rank	Fasting time, age, centre, chip/release of genetic data	178,782	Exeter
SHBG in men	Males	SHBG (UK Biobank variable 30830).	Effect sizes used in Mendelian randomization analysis.	nmol/L	From blood sample collected at initial visit. Measured by two step sandwich immunoassay analysis on a Beckman Coulter Unicel Dxl 800	Men who self-reported taking hormone based medication (UK Biobank variables 30850 and 20003). Included white Europeans only.	Natural log	Age, dilution, batch, mins since blood draw, time of blood draw, menopause, operation status. Includes individuals at lower limit.	180,726	Cambridge
SHBG adjusted for BMI in men	Males	SHBG (UK Biobank variable 30830). Adjusted for BMI.	Signal identification	nmol/L	From blood sample collected at initial visit. Measured by two step sandwich immunoassay analysis on a Beckman Coulter Unicel Dxl 800	Men who self-reported taking hormone based medication (UK Biobank variables 30850 and 20003). Included white Europeans only.	Natural log	Age, BMI, batch, dilution	180,094	Cambridge
Estradiol in men	Males	Binary phenotype based on an indication of measurable estradiol (UK Biobank variable 30800) compared with those indicated as below lower limit (UK Biobank variable 30806-4 or 2).	Signal identification	Binary	From blood sample collected at initial visit. Measured by two step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Men who self-reported taking hormone based medication (UK Biobank variables 30850 and 20003). Included white Europeans only.	NA	Dichotomous - men at lower limit vs others. Age covariate	206,927	Cambridge
Total testosterone in women	Females	Testosterone (UK Biobank variable 30850) including people where testosterone was not reportable as below lower limit (UK Biobank variable 30856-4).	Signal identification	nmol/L	From blood sample collected at initial visit. Measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Participants with missing values that were not reportable at assay as too low were set to 0.3, a value below the lower limit of detection. Included white Europeans only.	Inverse normal transformation of rank	Fasting time, age, centre, chip/release of genetic data	230,454	Exeter
Bioavailable testosterone in women	Females	Bioavailable testosterone, calculated from testosterone (UK Biobank variable 30850), accounting for concentration of SHBG (UK Biobank variable 30830) and albumin (UK Biobank variable 30600) using Vermeulen equation	Signal identification	nmol/L	From blood sample collected at initial visit. Testosterone measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800. SHBG measured in nmol/L by two step sandwich immunoassay analysis on a Beckman Coulter Unicel Dxl 800. Albumin measured in g/L by BCG analysis on a Beckman Coulter AU5800. Further details: http://biobank.ndph.ox.ac.uk/showcase/	Women who self-reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank variables 30850 and 20003). Included white Europeans only.	Natural log	Age, dilution, batch, mins since blood draw, time of blood draw, menopause, operation status. Includes individuals at lower limit.	188,507	Cambridge
SHBG in women	Females	SHBG (UK Biobank variable 30830).	Effect sizes used in Mendelian randomization analysis.	nmol/L	From blood sample collected at initial visit. Measured by two step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Women who self-reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank variables 30850 and 20003). Included white Europeans only.	Inverse normal transformation of rank	Age, dilution, batch, mins since blood draw, time of blood draw, menopause, operation status. Includes individuals at lower limit.	189,473	Cambridge
SHBG adjusted for BMI in women	Females	SHBG (UK Biobank variable 30830). Adjusted for BMI.	Signal identification	nmol/L	From blood sample collected at initial visit. Measured by two step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Women who self reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank fields 30850 and 20003). Included white Europeans only.	Natural log	Age, BMI, batch, dilution, menopause status, operation status, BMI.	188,908	Cambridge
Total testosterone in men and women combined	Males and females	Testosterone (UK Biobank variable 30850) including people where testosterone was not reportable as below lower limit (UK Biobank variable 30856-4).	Signal identification	nmol/L	From blood sample collected at initial visit. Measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Participants with missing values that were not reportable at assay as too low were set to 0.3, a value below the lower limit of detection. Included white Europeans only.	Inverse normal transformation of rank	Fasting time, age, centre, chip/release of genetic data	425,097	Exeter
Bioavailable testosterone in men and women combined	Males and females	Bioavailable testosterone, calculated from testosterone (UK Biobank variable 30850), accounting for concentration of SHBG (UK Biobank variable 30830) and albumin (UK Biobank variable 30600) using Vermeulen equation	Signal identification	nmol/L	From blood sample collected at initial visit. Testosterone measured in nmol/L by one step competitive analysis on a Beckman Coulter Unicel Dxl 800. SHBG measured in nmol/L by two step sandwich immunoassay analysis on a Beckman Coulter Unicel Dxl 800. Albumin measured in g/L by BCG analysis on a Beckman Coulter AU5800.	Women or men who self-reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank variables 30850 and 20003). Included white Europeans only.	Sex-specific inverse normal transformation of rank	Age, dilution, batch, mins since blood draw, time of blood draw, menopause, operation status, exclude HRT and other drugs. Includes individuals at lower limit.	382,988	Cambridge
SHBG in men and women combined	Males and females	SHBG (UK Biobank variable 30830).	Signal identification	nmol/L	From blood sample collected at initial visit. Measured by two step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Women or men who self-reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank variables 30850 and 20003). Included white Europeans only.	Natural log	Men: Age, dilution, batch, mins since blood draw, time of blood draw. Women: Age, dilution, batch, mins since blood draw, time of blood draw, menopause, operation status. Includes individuals at lower limit.	370,125	Cambridge
SHBG adjusted for BMI in men and women combined	Males and females	SHBG (UK Biobank variable 30830). Adjusted for BMI.	Signal identification	nmol/L	From blood sample collected at initial visit. Measured by two step competitive analysis on a Beckman Coulter Unicel Dxl 800.	Women or men who self-reported taking hormone based medication including HRT and oral contraception at the time of the initial visit (UK Biobank variables 30850 and 20003). Included white Europeans only.	Residualised natural log calculated separately in men and women	Men: Age, batch, BMI, dilution. Women: Age, BMI, batch, dilution, menopause status, operation status, BMI.	368,929	Cambridge

BMI = body mass index
SHBG = sex hormone binding globulin

Supplementary Table S8: GWAS significant results for bioavailable testosterone in men and women combined.

Table with 42 columns: Lead SNP, Chr, BP, Effct, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, Genes, Gene annotation, Gene Count, Number, Name. It contains GWAS results for bioavailable testosterone across various chromosomes and gene regions.

GT14RUGT1AJUGT14RUGT14RUGT14R

44

4418

7

44

Supplementary Table S11: GWAS significant results for estradiol in men.

Stratified by men		Total testosterone-men				Reassessable testosterone-men				Total testosterone-women				Reassessable testosterone-women				Gene annotation														
Chr	BP	Effect	Allele	Other	Allele	Effect	Allele	Other	Allele	P	BOLT	Matched	LD	P	BOLT	Matched	LD	P	BOLT	Matched	LD	P	BOLT	Matched	LD	Gene	Lead SNP	Gene	Lead SNP	Gene	Lead SNP	
1	27,722,947	T	0.409	1.000	0.006	0.001	9.60-11	0.038	0.001	9.30-10	0.013	0.003	1.70-11	0.029	0.001	1.10-01	0.014	0.001	9.00-10	0.027	0.001	4.70-10	0.023	0.001	8.00-08	0	-	-	-	SLC39A5 (27)	GG5A	
1	11,825,974	T	0.440	0.993	0.006	0.001	5.78-11	0.004	0.001	1.78-01	0.023	0.003	6.36-12	0.017	0.001	1.99-01	0.001	0.001	6.76-01	0.013	0.003	2.18-01	0.008	0.001	1.18-01	0	-	-	-	KDM1A (11)	SH2B2 (9)	
1	11,382,811	G	0.239	0.981	0.025	0.002	5.68-10	0.033	0.003	1.68-12	0.190	0.008	6.21-10	0.182	0.008	1.81-11	0.025	0.004	1.68-02	0.006	0.007	4.98-01	0.002	0.007	8.18-01	0	-	-	-	SH2B2 (9)	MIR4295 (113)	
4	69,954,680	GA	0.488	0.972	0.007	0.001	2.58-18	0.006	0.001	6.66-07	0.021	0.001	1.56-11	0.012	0.001	7.88-01	0.000	0.001	9.48-01	0.003	0.001	1.38-11	0.013	0.001	3.48-07	UTZ8B7	0	-	-	-	UTZ8B7 (458)	
5	50,981,281	C	0.341	0.987	0.008	0.001	9.88-11	0.003	0.002	1.56-02	0.001	0.004	4.18-01	0.000	0.004	2.68-01	0.002	0.003	1.18-01	0.004	0.004	2.78-01	0.002	0.004	2.88-01	UTZ8A1	0	-	-	-	SPTF2 (181)	
7	71,912,161	G	0.001	0.643	0.075	0.010	1.29-08	0.020	0.014	1.88-01	0.046	0.014	1.88-01	0.017	0.014	1.08-01	0.014	0.017	6.78-01	0.011	0.013	8.18-01	0.002	0.019	8.88-01	0	-	-	-	NR4A1 (23)		
8	11,167,889	A	0.002	0.928	0.052	0.010	4.78-08	0.019	0.014	2.18-01	0.017	0.014	4.18-02	0.013	0.014	3.18-01	0.013	0.016	4.48-01	0.028	0.013	6.08-01	0.007	0.029	8.88-01	0	-	-	-	KCNV1 (81)		
11	116,119,285	C	0.611	1.000	0.008	0.001	5.58-21	0.001	0.001	6.58-01	0.009	0.001	6.48-01	0.008	0.001	7.08-01	0.007	0.002	1.78-01	0.017	0.002	1.38-01	0.002	0.001	1.98-01	0	-	-	-	GF1B (272)		
12	2,308,139	A	0.021	1.000	0.021	0.002	2.68-18	0.022	0.004	6.68-11	0.161	0.009	5.12-16	0.121	0.009	5.40-10	0.018	0.004	2.18-01	0.028	0.008	3.37-11	0.048	0.007	1.48-01	0	-	-	-	CACNA1C (11)		
14	108,424,289	T	0.365	0.613	0.028	0.001	7.68-11	0.002	0.002	1.98-01	0.000	0.004	8.88-01	0.002	0.004	7.68-01	0.001	0.002	7.88-01	0.001	0.004	5.48-01	0.001	0.001	5.08-01	2	GMV9 (1128)	USH1B (1118)	-	-	-	ADAM10 (128)
15	108,521,000	A	0.564	0.976	0.012	0.001	6.98-11	0.002	0.001	1.28-01	0.001	0.003	1.58-01	0.001	0.001	1.08-01	0.001	0.001	4.18-01	0.001	0.001	4.18-01	0.001	0.001	5.18-01	2	GMV9 (1128)	USH1B (1118)	-	-	-	ADAM10 (128)
15	11,131,738	T	0.649	0.997	0.016	0.001	3.48-12	0.003	0.002	2.98-02	0.028	0.001	4.28-11	0.040	0.001	4.18-11	0.001	0.001	1.18-01	0.022	0.001	9.58-01	0.005	0.001	1.18-01	0	-	-	-	AP1E1 (119)		
15	10,208,710	A	0.167	1.000	0.088	0.001	6.68-12	0.002	0.002	1.09-01	0.017	0.004	1.18-01	0.012	0.004	1.18-01	0.001	0.007	4.88-01	0.001	0.004	1.18-01	0.001	0.001	6.18-01	0	-	-	-	TSPAN3 (7)		
17	7,517,792	T	0.157	1.000	0.006	0.001	1.88-11	0.008	0.004	4.88-10	0.113	0.003	8.08-11	0.011	0.003	1.11-24	0.100	0.001	1.11-11	0.019	0.003	9.48-11	0.095	0.001	0.98-01	0	-	-	-	ACAP1 (248)		
18	20,285,199	T	0.911	0.980	0.010	0.002	8.78-09	0.002	0.002	9.28-01	0.003	0.006	7.28-01	0.002	0.006	9.68-01	0.001	0.001	1.28-01	0.007	0.006	9.58-01	0.004	0.009	4.88-01	0	-	-	-	LOC101925		
18	27,320,799	T	0.475	0.710	0.008	0.001	1.88-08	0.001	0.002	7.28-01	0.002	0.004	8.28-01	0.003	0.004	4.18-01	0.003	0.002	1.08-01	0.001	0.004	7.58-01	0.001	0.001	5.88-01	0	-	-	-	0		
18	48,984,448	T	0.165	1.000	0.008	0.001	2.78-11	0.001	0.002	8.98-01	0.001	0.004	9.68-01	0.001	0.004	1.18-01	0.001	0.002	1.18-01	0.008	0.004	7.48-01	0.007	0.001	2.98-01	1	CTD-SPO8B1.2 (174)	-	-	-	GLIS2 (12)	
22	46,770,761	T	0.254	0.919	0.024	0.002	2.78-08	0.004	0.004	1.58-01	0.002	0.009	8.18-01	0.020	0.009	1.68-01	0.003	0.004	1.68-01	0.011	0.008	1.48-01	0.000	0.007	1.78-01	0	-	-	-	MIR170-19		
23	8,880,880	G	0.278	0.997	0.009	0.001	2.68-17	0.007	0.001	1.48-11	0.004	0.002	2.48-10	0.128	0.002	1.18-04	0.001	0.002	1.18-01	0.001	0.001	2.48-01	0.004	0.001	1.28-01	0	-	-	-	FAAH1 (118)		
23	68,882,279	C	0.810	0.990	0.001	0.001	4.68-11	0.001	0.001	1.78-01	0.461	0.001	1.88-01	0.640	0.001	4.68-01	0.006	0.002	1.38-01	0.001	0.004	4.88-01	0.011	0.001	1.98-01	0	-	-	-	IRX4B1 (1)		
23	68,920,179	T	0.001	0.501	0.076	0.010	7.18-14	0.013	0.015	2.48-01	0.114	0.006	1.58-11	0.648	0.007	1.88-11	0.025	0.023	1.58-01	0.027	0.006	6.08-01	0.030	0.041	1.28-01	0	-	-	-	JARID1		

Supplementary Table S12: Results of two sample Mendelian randomization analysis of sex hormone genetic instruments on sex hormone outcomes in the Twins UK GWAS.

Exposure genetic instrument	Exposure sex	Outcome	Primary analysis												Steiger filtered analysis																
			Inverse variance weighted				Egger				Weighted median				N variants				Inverse variance weighted				Egger				Weighted median				N variants
			Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Weighted median	P	N variants	Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Weighted median	P	N variants													
Total testosterone	Females	DHEAS	0.5 (0.42,0.57)	3.0E-28	0.7 (0.56,0.85)	1.0E-18	9.2E-04	0.56 (0.44,0.68)	5.2E-20	231	0.51 (0.42,0.59)	1.6E-23	0.67 (0.51,0.83)	1.5E-14	0.02	0.56 (0.43,0.69)	3.3E-17	179													
Total testosterone	Females	FSH	-0.4 (0.27,0.53)	5.6E-09	0.4 (0.15,0.65)	0.002	0.98	0.33 (0.13,0.53)	1.4E-08	231	0.41 (0.27,0.55)	3.4E-08	0.37 (0.1,0.63)	6.8E-03	0.72	0.3 (0.03,0.52)	5.7E-03	179													
Total testosterone	Females	SHBG	-0.05 (-0.23,0.11)	0.61	-0.03 (-0.33,0.27)	0.83	0.33	0.13 (-0.30,0.19)	0.50	231	-0.04 (-0.23,0.15)	0.59	0.1 (-0.29,0.29)	0.99	0.75	-0.1 (-0.42,0.1)	0.50	179													
Total testosterone	Females	LH	-0.04 (-0.18,0.1)	0.61	-0.05 (-0.32,0.22)	0.73	0.93	-0.01 (-0.26,0.24)	0.93	231	-0.04 (-0.18,0.11)	0.59	-0.08 (-0.36,0.19)	0.56	0.72	-0.01 (-0.29,0.27)	0.96	179													
Total testosterone	Females	Estradiol	0.12 (0.02,0.23)	0.02	0.04 (-0.16,0.25)	0.67	0.37	0.21 (0.01,0.41)	0.04	231	0.12 (0.01,0.24)	0.04	0.1 (-0.2,0.32)	0.36	0.81	0.2 (0.0,0.41)	0.05	179													
Total testosterone	Females	Progesterone	0.53 (0.43,0.63)	2.4E-21	0.72 (0.53,0.91)	2.4E-27	0.03	0.58 (0.42,0.73)	3.5E-13	231	0.55 (0.44,0.66)	1.7E-18	0.73 (0.52,0.93)	9.3E-11	0.05	0.58 (0.47,0.76)	4.0E-11	179													
Total testosterone	Females	Prolactin	0.21 (-0.19,0.61)	0.28	0.21 (-0.29,0.71)	0.43	0.18	0.05 (0.05,0.08)	0.43	231	0.16 (-0.18,0.50)	0.42	0.05 (0.17,0.27)	0.37	0.91	0.11 (0.17,0.05)	0.51	179													
Total testosterone	Females	SHBG	0.05 (-0.03,0.13)	0.24	0.14 (-0.02,0.3)	0.08	0.18	0.05 (-0.06,0.17)	0.37	231	0.04 (-0.05,0.13)	0.36	0.13 (-0.03,0.3)	0.11	0.18	0.05 (0.07,0.07)	0.42	179													
Total testosterone	Females	Testosterone	0.45 (0.36,0.53)	4.3E-21	0.53 (0.36,0.69)	1.2E-09	0.27	0.46 (0.32,0.6)	4.4E-11	230	0.44 (0.35,0.53)	2.3E-17	0.51 (0.34,0.69)	2.6E-08	0.32	0.45 (0.27,0.57)	1.4E-10	178													
Bioavailable testosterone	Females	DHEAS	0.48 (0.35,0.61)	2.1E-11	0.29 (0.06,0.52)	0.01	0.04	0.21 (0.04,0.37)	0.01	160	0.51 (0.36,0.65)	5.5E-10	0.3 (0.05,0.54)	0.02	0.03	0.21 (0.02,0.4)	0.03	122													
Bioavailable testosterone	Females	FSH	-0.2 (0.16,0.39)	2.3E-16	0.75 (0.46,1.04)	1.2E-06	0.69	0.71 (0.47,0.96)	2.0E-07	160	0.17 (0.03,0.31)	0.55	0.19 (0.01,0.38)	0.56	0.67	0.1 (0.43,0.52)	2.4E-07	122													
Bioavailable testosterone	Females	LH	-0.2 (-0.41,0.02)	0.07	-0.11 (-0.49,0.27)	0.56	0.68	-0.02 (-0.27,0.16)	0.28	160	-0.16 (-0.38,0.06)	0.15	-0.09 (-0.47,0.28)	0.62	0.66	-0.15 (-0.48,0.19)	0.38	122													
Bioavailable testosterone	Females	LH	-0.01 (-0.21,0.19)	0.91	0.01 (-0.34,0.36)	0.97	0.90	0.02 (-0.27,0.32)	0.88	160	-0.05 (-0.24,0.15)	0.63	0.01 (-0.32,0.33)	0.97	0.69	0.2 (-0.29,0.34)	0.88	122													
Bioavailable testosterone	Females	Estradiol	0.1 (-0.05,0.24)	0.19	0.23 (-0.03,0.49)	0.08	0.22	0.2 (-0.05,0.45)	0.12	160	0.12 (-0.05,0.28)	0.17	0.24 (-0.04,0.52)	0.09	0.28	0.2 (0.07,0.47)	0.14	122													
Bioavailable testosterone	Females	Progesterone	0.42 (0.26,0.58)	4.0E-07	0.4 (0.12,0.68)	5.7E-03	0.83	0.11 (-0.13,0.35)	0.38	160	0.43 (0.26,0.61)	4.2E-06	0.41 (0.11,0.71)	8.3E-03	0.84	0.09 (-0.16,0.34)	0.47	122													
Bioavailable testosterone	Females	Prolactin	0.04 (-0.21,0.11)	0.80	0.12 (-0.24,0.27)	0.13	0.10	0.08 (-0.08,0.23)	0.32	160	0.01 (-0.08,0.11)	0.83	0.1 (-0.06,0.25)	0.22	0.17	0.07 (-0.09,0.24)	0.39	122													
Bioavailable testosterone	Females	LH	-0.1 (-0.05,0.24)	0.19	0.23 (-0.03,0.49)	0.08	0.22	0.2 (-0.05,0.45)	0.12	160	0.12 (-0.05,0.28)	0.17	0.24 (-0.04,0.52)	0.09	0.28	0.2 (0.07,0.47)	0.14	122													
Bioavailable testosterone	Females	Testosterone	0.45 (0.36,0.53)	4.3E-21	0.53 (0.36,0.69)	1.2E-09	0.27	0.46 (0.32,0.6)	4.4E-11	230	0.44 (0.35,0.53)	2.3E-17	0.51 (0.34,0.69)	2.6E-08	0.32	0.45 (0.27,0.57)	1.4E-10	178													
Bioavailable testosterone	Females	DHEAS	0.48 (0.35,0.61)	2.1E-11	0.29 (0.06,0.52)	0.01	0.04	0.21 (0.04,0.37)	0.01	160	0.51 (0.36,0.65)	5.5E-10	0.3 (0.05,0.54)	0.02	0.03	0.21 (0.02,0.4)	0.03	122													
Bioavailable testosterone	Females	FSH	-0.2 (0.16,0.39)	2.3E-16	0.75 (0.46,1.04)	1.2E-06	0.69	0.71 (0.47,0.96)	2.0E-07	160	0.17 (0.03,0.31)	0.55	0.19 (0.01,0.38)	0.56	0.67	0.1 (0.43,0.52)	2.4E-07	122													
Bioavailable testosterone	Females	LH	-0.2 (-0.41,0.02)	0.07	-0.11 (-0.49,0.27)	0.56	0.68	-0.02 (-0.27,0.16)	0.28	160	-0.16 (-0.38,0.06)	0.15	-0.09 (-0.47,0.28)	0.62	0.66	-0.15 (-0.48,0.19)	0.38	122													
Bioavailable testosterone	Females	LH	-0.01 (-0.21,0.19)	0.91	0.01 (-0.34,0.36)	0.97	0.90	0.02 (-0.27,0.32)	0.88	160	-0.05 (-0.24,0.15)	0.63	0.01 (-0.32,0.33)	0.97	0.69	0.2 (-0.29,0.34)	0.88	122													
Bioavailable testosterone	Females	Estradiol	0.1 (-0.05,0.24)	0.19	0.23 (-0.03,0.49)	0.08	0.22	0.2 (-0.05,0.45)	0.12	160	0.12 (-0.05,0.28)	0.17	0.24 (-0.04,0.52)	0.09	0.28	0.2 (0.07,0.47)	0.14	122													
Bioavailable testosterone	Females	Progesterone	0.42 (0.26,0.58)	4.0E-07	0.4 (0.12,0.68)	5.7E-03	0.83	0.11 (-0.13,0.35)	0.38	160	0.43 (0.26,0.61)	4.2E-06	0.41 (0.11,0.71)	8.3E-03	0.84	0.09 (-0.16,0.34)	0.47	122													
Bioavailable testosterone	Females	Prolactin	0.04 (-0.21,0.11)	0.80	0.12 (-0.24,0.27)	0.13	0.10	0.08 (-0.08,0.23)	0.32	160	0.01 (-0.08,0.11)	0.83	0.1 (-0.06,0.25)	0.22	0.17	0.07 (-0.09,0.24)	0.39	122													
Bioavailable testosterone	Females	SHBG	0.45 (0.36,0.53)	4.3E-21	0.53 (0.36,0.69)	1.2E-09	0.27	0.46 (0.32,0.6)	4.4E-11	230	0.44 (0.35,0.53)	2.3E-17	0.51 (0.34,0.69)	2.6E-08	0.32	0.45 (0.27,0.57)	1.4E-10	178													
Bioavailable testosterone	Females	Testosterone	0.45 (0.36,0.53)	4.3E-21	0.53 (0.36,0.69)	1.2E-09	0.27	0.46 (0.32,0.6)	4.4E-11	230	0.44 (0.35,0.53)	2.3E-17	0.51 (0.34,0.69)	2.6E-08	0.32	0.45 (0.27,0.57)	1.4E-10	178													
Testosterone cluster	Females	DHEAS	0.27 (0.12,0.41)	3.2E-04	0.15 (0.1,0.24)	0.25	0.27	0.14 (-0.07,0.34)	0.20	160	0.28 (0.12,0.44)	5.7E-04	0.18 (-0.08,0.45)	0.17	0.37	0.15 (0.07,0.37)	0.18	122													
Testosterone cluster	Females	DHEAS	0.49 (0.41,0.56)	3.6E-28	0.68 (0.55,0.82)	4.1E-19	1.1E-03	0.55 (0.42,0.67)	1.3E-18	219	0.49 (0.4,0.57)	5.7E-23	0.66 (0.51,0.81)	1.9E-15	6.9E-03	0.54 (0.42,0.67)	4.1E-17	176													
Testosterone cluster	Females	FSH	-0.39 (0.27,0.52)	7.7E-09	-0.37 (0.13,0.62)	2.7E-03	0.85	-0.31 (0.09,0.52)	4.6E-03	219	0.39 (0.25,0.52)	4.3E-08	0.32 (0.07,0.57)	0.01	0.55	0.28 (0.06,0.49)	0.01	176													
Testosterone cluster	Females	SHBG	0.04 (-0.11,0.11)	0.61	-0.07 (-0.36,0.22)	0.62	0.85	-0.1 (-0.38,0.18)	0.48	219	-0.05 (-0.2,0.1)	0.51	-0.08 (-0.36,0.19)	0.54	0.76	-0.2 (0.09,0.29)	0.96	176													
Testosterone cluster	Females	LH	-0.03 (-0.17,0.12)	0.71	-0.09 (-0.36,0.18)	0.51	0.59	-0.01 (-0.27,0.25)	0.94	219	-0.05 (-0.2,0.1)	0.51	-0.08 (-0.36,0.19)	0.54	0.76	-0.2 (0.09,0.29)	0.96	176													
Testosterone cluster	Females	Estradiol	0.09 (-0.02,0.2)	0.09	0.02 (-0.18,0.22)	0.83	0.42	0.17 (-0.03,0.36)	0.09	219	0.09 (-0.02,0.21)	0.12	0.08 (-0.14,0.28)	0.48	0.87	0.2 (0.0,0.4)	0.05	176													
Testosterone cluster	Females	Progesterone	0.53 (0.43,0.64)	7.2E-20	0.72 (0.52,0.9)	7.6E-22	0.03	0.58 (0.42,0.74)	1.7E-12	219	0.53 (0.42,0.65)	6.0E-17	0.69 (0.49,0.9)	4.0E-10	0.07	0.58 (0.47,0.75)	1.9E-11	176													
Testosterone cluster	Females	Prolactin	0.05 (0.04,0.08)	0.37	0.02 (-0.09,0.14)	0.71	0.94	0.05 (-0.15,0.07)	0.44	219	0.03 (0.04,0.09)	0.45	0.07 (0.1,0.13)	0.87	0.67	0.11 (0.03,0.2)	0.55	176													
Testosterone cluster	Females	SHBG	0.03 (0.04,0.1)	0.41	0.11 (-0.02,0.25)	0.11	0.16	0.05 (-0.06,0.17)	0.37	219	0.03 (-0.05,0.11)	0.43	0.15 (0.01,0.2)	0.04	0.06	0.05 (0.07,0.07)	0.19	176													
Testosterone cluster	Females	Testosterone	0.43 (0.34,0.52)	2.2E-19	0.49 (0.33,0.65)	5.6E-09	0.35	0.39 (0.25,0.53)	6.3E-08	218	0.42 (0.33,0.51)	9.5E-17	0.5 (0.33,0.66)	2.6E-08	0.30	0.38 (0.23,0.53)	1.3E-10	175													
SHBG	Females	DHEAS	-0.07 (-0.18,0.04)	0.23	-0.02 (-0.14,0.1)	0.83	0.13	-0.03 (-0.22,0.16)	0.77	327	-0.03 (-0.15,0.09)	0.62	-0.02 (-0.14,0.18)	0.82	0.37	-0.03 (-0.23,0.17)	0.77	200													
SHBG	Females	FSH	-0.73 (-0.91,-0.55)	2.0E-14	-0.66 (-0.91,-0.41)	5.4E-07	0.44	-0.66 (-0.91,-0.38)	1.6E-05	327	-0.69 (-0.95,-0.43)	4.5E-11	-0.69 (-0.95,-0.43)	5.4E-07	0.98	-0.66 (-0.97,-0.35)	2.6E-05	200													
SHBG	Females	LH	0.04 (0.19,0.27)	0.64	0.04 (0.19,0.27)	0.62	0.99	0.02 (0.15,0.28)	0.97	327	0.02 (0.15,0.28)	0.98	0.02 (0.15,0.28)	0.99	0.74	0.02 (0.15,0.28)	0.99	200													
SHBG	Females	SHBG	-0.12 (-0.32,0.08)	0.24	-0.09 (-0.37,0.19)	0.52	0.79	-0.03 (-0.36,0.3)	0.86	327	-0.15 (-0.36,0.07)	0.18	-0.08 (-0.36,0.21)	0.59	0.48	-0.03 (-0.38,0.32)	0.87	200													
SHBG	Females	Estradiol	0.01 (-0.14,0.17)	0.86	-0.02 (-0.24,0.2)	0.85	0.63	-0.14 (-0.41,0.12)	0.28	327	-0.03 (-0.2,0.14)	0.71	-0.07 (-0.33,0.16)	0.57	0.64	-0.15 (-0.44,0.14)	0.31	200													
SHBG	Females	Progesterone	0.02 (-0.13,0.17)	0.78	-0.04 (-0.25,0.17)	0.71	0.42	-0.04 (-0.3,0.22)	0.76	327	0.05 (-0.12,0.21)	0.58	-0.02 (-0.2,0.12)	0.87	0.39	-0.03 (-0.28,0.22)	0.84	200													
SHBG	Females	Prolactin	0.05 (0.19,0.09)	0.85	-0.06 (-0.19,0.06)	0.81	0.42	-0.02 (-0.14,0.08)	0.50	327	0.01 (0.14,0.09)	0.94	-0.07 (-0.24,0.1)	0.85	0.45	-0.07 (-0.24,0.1)	0.85	200													
SHBG	Females	SHBG	0.85 (0.75,0.95)	8.2E-44	0.82 (0.68,0.97)	6.8E-25	0.62	0.85 (0.69,1.01)	6.9E-26	327	0.83 (0.68,0.91)	2.8E-31	0.83 (0.68,0.98)	9.3E-22	0.56	0.75 (0.57,0.94)	1.1E-15	200													
SHBG	Females	Testosterone	0.22 (0.09,0.35)	1.3E-03	0.2 (0.01,																										

Supplementary Table S13: Two sample Mendelian randomization results of male sex hormone genetic instruments on the same sex hormone in females as outcome.

Exposure genetic instrument	Exposure sex	Outcome sex	Inverse variance weighted		Egger			Weighted median		
			Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Beta (95% CI)	P	N variants
Bioavailable testosterone	Male	Female	0.05 (-0.02,0.12)	0.19	0.03 (-0.09,0.15)	0.58	0.77	-0.02 (-0.05,0.01)	0.14	125
SHBG	Male	Female	0.87 (0.84,0.9)	2.3E-178	0.9 (0.86,0.95)	3.5E-140	0.02	0.83 (0.8,0.86)	0.0E+00	357
Total testosterone	Male	Female	0.07 (0.03,0.1)	1.1E-03	0.08 (0.02,0.14)	0.01	0.63	0.12 (0.09,0.15)	1.1E-14	231

Note: P values < 0.05 are in bold.

Supplementary Table S14: Two sample Mendelian randomization results of female sex hormone genetic instruments on the same sex hormone in males as outcome.

Exposure genetic instrument	Exposure sex	Outcome sex	Inverse variance weighted		Egger			Weighted median		
			Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Beta (95% CI)	P	N variants
Bioavailable testosterone	Female	Male	0.09 (0.02,0.16)	0.02	0.16 (0.02,0.29)	0.02	0.23	0.09 (0.05,0.13)	8.5E-06	180
SHBG	Female	Male	0.86 (0.83,0.9)	1.6E-165	0.97 (0.92,1.01)	4.2E-139	1.4E-09	0.9 (0.87,0.93)	0.0E+00	359
Total testosterone	Female	Male	0.06 (-0.02,0.15)	0.13	-0.02 (-0.17,0.13)	0.80	0.20	-0.01 (-0.04,0.02)	0.52	254

Note: P values < 0.05 are in bold.

Supplementary Table S15: Pairwise correlations between raw sex hormone measures within the same sex in UK Biobank.

Sex	Hormone	Total testosterone	Bioavailable testosterone	SHBG	Estradiol	
Males	Total testosterone	1.000				
	Bioavailable testosterone	0.672	1.000			
	SHBG	0.557	-0.196	1.000		
	Estradiol	-0.014	0.001	0.012	1.000	
Females	Total testosterone	1.000				
	Bioavailable testosterone	0.851	1.000			
	SHBG	-0.022	-0.414	1.000		
	Estradiol	0.076	-0.031	0.186	1.000	

Supplementary Table S16: Allocation of GWAS signals to clusters used as genetic instruments with relevant weights and proxy variables.

Cluster	Signal	Trait-raising	Other_allele	Weight	SE_weight	1KG_proxy	1KG_Trait-raising	Other_allele	1KG_Weight	1KG_SE_weight	HM_proxy	HM_Trait-raising	HM_Other_allele	HM_Weight	HM_SE_weight
Female SBHG cluster	1221048577_TGA_T	T	TGA	0.009	0.002	r572353756		TGA	0.009	0.002	No HM proxy				
Female SBHG cluster	123747996_GA_G	G	GA	0.011	0.002	r11340914	G	GA	0.011	0.002	rs2077066	T	C	0.009	0.002
Female SBHG cluster	157170378_AAAC_A	A	AATC	0.011	0.002	rs5774298	A	AATC	0.011	0.002	rs2746347	T	C	0.011	0.002
Female SBHG cluster	193787087_TA_T	T	TA	0.009	0.002	r113348816	T	TA	0.009	0.002	rs2391251	T	C	0.009	0.002
Female SBHG cluster	1065158772_AAAG_A	A	AAAG	0.047	0.001	rs150036478	A	AAAG	0.047	0.001	rs7912893	A	T	0.046	0.001
Female SBHG cluster	12103483327_AT_A	AT	A	0.026	0.001	rs5800562	AT	A	0.026	0.001	rs10745954	A	G	0.026	0.001
Female SBHG cluster	1212527402_GT_G	G	GT	0.010	0.002	rs2680462	G	GT	0.010	0.002	rs268513	G	C	0.009	0.002
Female SBHG cluster	1226614614_CAT_C	C	CAT	0.010	0.002	rs10599348	C	CAT	0.010	0.002	rs1795011	T	C	0.010	0.002
Female SBHG cluster	1350565104_ACT_A	A	ACT	0.038	0.005	rs201736780	A	ACT	0.038	0.005	rs2812208	C	G	0.037	0.005
Female SBHG cluster	1543025006_CT_C	CT	C	0.117	0.018	No 1KG proxy					No HM proxy				
Female SBHG cluster	1543674414_AAAAAAG_A	A	AAAAAAG	0.011	0.003	rs535287577	A	AAAAAAG	0.011	0.003	rs3213990	C	A	0.004	0.002
Female SBHG cluster	1551052455_CT_C	C	CT	0.008	0.002	rs10717809	C	CT	0.008	0.002	rs12593469	T	C	0.008	0.001
Female SBHG cluster	1553093795_TTTTG_T	TTTTG	T	0.028	0.002	rs2702049	TTTTG	T	0.028	0.002	rs2025128	C	T	0.027	0.002
Female SBHG cluster	1748627860_CCT_C	C	CCT	0.009	0.002	rs10586811	C	CCT	0.009	0.002	rs1132414	G	A	0.009	0.002
Female SBHG cluster	197223973_TTTG_T	TTTG	T	0.018	0.001	rs4804414	C	T	0.018	0.001	rs4804416	T	G	0.018	0.001
Female SBHG cluster	2191559843_GT_G	GT	G	0.011	0.002	rs34400883	GT	G	0.011	0.002	rs10220868	T	C	0.010	0.002
Female SBHG cluster	22084669213_ATCTT_A	ATCTT	A	0.012	0.002	rs34171849	ATCTT	A	NA	NA	rs2551928	A	G	0.012	0.002
Female SBHG cluster	3122361173_TTTTC_T	TTTTTC	T	0.010	0.002	rs2668335	C	T	0.010	0.002	rs2668332	C	T	0.009	0.002
Female SBHG cluster	4103879371_TA_T	T	TA	0.009	0.001	rs59514802	T	TA	0.009	0.001	rs2974604	C	T	0.009	0.001
Female SBHG cluster	469468698_ATAGAGGAGCCGCA	ATAGAGGAGCCGCA	A	0.006	0.002	rs146290882	ATAGAGGAGCCGCA	A	0.006	0.002	rs4860985	T	C	0.004	0.002
Female SBHG cluster	6130386212_GGAGA_G	GGAGA	G	0.009	0.002	rs17822536	GGAGA	G	0.009	0.002	rs9375703	T	G	0.009	0.002
Female SBHG cluster	7130438531_CTTTTT_C	C	CTTTTT	0.010	0.001	rs559324308	C	CTTTTT	0.010	0.001	rs13241538	C	G	0.009	0.001
Female SBHG cluster	859415339_TTG_T	T	TTG	0.011	0.001	rs201812242	T	TTG	0.011	0.001	rs18192870	G	T	0.010	0.001
Female SBHG cluster	834547499_CA_C	C	CA	0.026	0.002	rs200988859	C	CA	0.026	0.002	rs440837	G	A	0.026	0.002
Female SBHG cluster	9127474886_CA_C	CA	C	0.007	0.001	rs5909623	CA	C	0.007	0.001	rs722477	A	G	0.006	0.001
Female SBHG cluster	rs1005421	C	T	0.009	0.001	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs10095380	G	C	0.010	0.002	Signal in 1KG					rs10110651	T	C	0.010	0.002
Female SBHG cluster	rs10095930	C	T	0.011	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10108150	A	G	0.008	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10153315	T	C	0.009	0.001	Signal in 1KG					rs7342974	T	C	0.009	0.001
Female SBHG cluster	rs10189479	A	C	0.007	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10238028	G	A	0.019	0.003	Signal in 1KG					rs98564	T	C	0.018	0.003
Female SBHG cluster	rs1033667	T	C	0.011	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs1037169	T	C	0.015	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10461018	T	C	0.010	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs1047891	A	C	0.014	0.002	Signal in 1KG					rs7422339	NA	NA	NA	NA
Female SBHG cluster	rs10487632	A	G	0.007	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10489206	C	T	0.009	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10511002	A	C	0.008	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10622246	ATTTT	A	0.010	0.001	Signal in 1KG					rs849142	C	T	0.009	0.001
Female SBHG cluster	rs10757893	G	A	0.005	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10774095	A	G	0.007	0.002	Signal in 1KG					rs933420	T	C	0.007	0.002
Female SBHG cluster	rs1081576	G	A	0.009	0.002	Signal in 1KG					rs10758706	G	C	0.008	0.001
Female SBHG cluster	rs10857228	T	C	0.008	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10880868	C	T	0.008	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10883451	C	T	0.009	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10893876	C	T	0.009	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs10939934	A	G	0.007	0.001	Signal in 1KG					rs4700486	A	G	0.007	0.001
Female SBHG cluster	rs10961205	A	G	0.007	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11021212	T	C	0.013	0.002	Signal in 1KG					rs1723326	T	C	0.010	0.001
Female SBHG cluster	rs11047237	A	T	0.030	0.004	Signal in 1KG					rs9634098	C	T	0.028	0.004
Female SBHG cluster	rs11054861	A	G	0.022	0.004	rs1388046179	A	G	0.022	0.004	rs11054604	A	G	0.022	0.005
Female SBHG cluster	rs11078597	C	T	0.017	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11079685	A	G	0.008	0.001	Signal in 1KG					rs9303516	G	A	0.007	0.001
Female SBHG cluster	rs11103377	G	A	0.008	0.001	Signal in 1KG					rs3780190	G	A	0.007	0.001
Female SBHG cluster	rs11127937	CGTGT	T	0.002	0.009	Signal in 1KG					rs1141165	T	C	0.008	0.002
Female SBHG cluster	rs111288118	C	CTT	0.013	0.002	Signal in 1KG					rs11666281	C	T	0.013	0.002
Female SBHG cluster	rs11130982	T	G	0.007	0.002	Signal in 1KG					rs4504165	C	T	0.006	0.002
Female SBHG cluster	rs111475133	TA	T	0.008	0.002	Signal in 1KG					rs7163907	C	T	0.006	0.002
Female SBHG cluster	rs11186719	A	C	0.012	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11188601	C	T	0.010	0.001	Signal in 1KG					rs11188604	G	T	0.010	0.001
Female SBHG cluster	rs11213988	A	A	0.008	0.002	Signal in 1KG					rs1723326	T	C	0.008	0.002
Female SBHG cluster	rs1126161	G	A	0.007	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs1128249	T	G	0.017	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs112966033	TACACAC	T	0.016	0.001	Signal in 1KG					rs11656665	A	G	0.014	0.001
Female SBHG cluster	rs113347955	A	G	0.011	0.005	Signal in 1KG					rs6468492	C	G	0.006	0.004
Female SBHG cluster	rs113408476	A	ACTTTTT	0.012	0.002	Signal in 1KG					rs1221184	T	C	0.011	0.002
Female SBHG cluster	rs11372678	AC	A	0.008	0.002	Signal in 1KG					rs194742	T	C	0.007	0.002
Female SBHG cluster	rs114165349	G	C	0.070	0.005	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs114303452	G	A	0.064	0.007	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs114816312	T	C	0.082	0.008	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs114949263	C	T	0.015	0.002	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs115209326	T	C	0.076	0.012	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs11529938	C	T	0.009	0.001	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs11556924	C	C	0.012	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11601507	A	C	0.016	0.003	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11621792	C	T	0.025	0.001	Signal in 1KG					rs2332328	C	T	0.021	0.001
Female SBHG cluster	rs116279971	C	T	0.041	0.007	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs11641834	C	T	0.011	0.001	Signal in 1KG					rs11641548	A	C	0.011	0.001
Female SBHG cluster	rs11648106	T	A	0.006	0.002	Signal in 1KG					rs38106068	C	T	0.006	0.001
Female SBHG cluster	rs11662645	T	A	0.017	0.003	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11668201	G	A	0.009	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11688682	C	G	0.009	0.002	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs11720108	T	C	0.007	0.002	Signal in 1KG					rs7613951	T	C	0.007	0.002
Female SBHG cluster	rs11738093	A	G	0.012	0.002	Signal in 1KG					rs12654393	G	T	0.012	0.002
Female SBHG cluster	rs117522510	A	G	0.050	0.010	Signal in 1KG					No HM proxy				
Female SBHG cluster	rs117747210	C	T	0.006	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11780978	A	G	0.008	0.001	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11791747	G	A	0.011	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs11830764	C	G	0.040	0.003	Signal in 1KG					rs7314285	G	T	0.040	0.003
Female SBHG cluster	rs11967262	C	G	0.009	0.001	Signal in 1KG					rs998584	C	A	0.009	0.001
Female SBHG cluster	rs12012896	A	G	0.025	0.001	Signal in 1KG					rs5985281	C	T	0.025	0.001
Female SBHG cluster	rs1215478	A	G	0.009	0.002	Signal in 1KG					rs12142033	G	A	0.008	0.001
Female SBHG cluster	rs12138803	C	T	0.008	0.002	Signal in 1KG					rs17369123	C	T	0.008	0.002
Female SBHG cluster	rs1223796	G	C	0.013	0.002	Signal in 1KG					rs1223792	T	C	0.013	0.002
Female SBHG cluster	rs12280075	G	T	0.008	0.002	Signal in 1KG					Signal in HM				
Female SBHG cluster	rs1229498	T	G	0.011	0.002	Signal									

Female SHBG cluster	rs1699526	C	T	0.017	0.003	Signal in 1KG									rs6091237	C	A			0.017	0.003	
Female SHBG cluster	rs1728091	G	G	0.012	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs1730211	G	A	0.008	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs1730862	G	A	0.021	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs1738386	C	T	0.009	0.001	Signal in 1KG									rs851972	A	G			0.008	0.001	
Female SHBG cluster	rs1741344	T	C	0.007	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs174537	G	T	0.014	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs17492269	G	A	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs17580	A	T	0.223	0.003	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs17583875	A	G	0.027	0.005	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs17616365	G	A	0.026	0.004	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs17669311	G	A	0.009	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs1782652	T	A	0.012	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs17887160	C	T	0.009	0.002	Signal in 1KG									rs1882551	G				0.009	0.002	
Female SHBG cluster	rs1801282	G	C	0.020	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs18302541	G	A	0.029	0.005	Signal in 1KG									rs1205192	C	T			0.028	0.006	
Female SHBG cluster	rs18504454	T	G	0.021	0.005	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs1870927	A	T	0.008	0.001	Signal in 1KG									rs2615799	T	C			0.007	0.002	
Female SHBG cluster	rs1872992	A	G	0.006	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs191591035	G	C	0.113	0.017	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs1962883	C	T	0.006	0.001	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs1983292	C	T	0.006	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs199607859	T	G	0.010	0.001	Signal in 1KG									rs668459	T	C			0.010	0.001	
Female SHBG cluster	rs199746610	A	C	0.026	0.004	Signal in 1KG									rs16889714	T	A			0.024	0.004	
Female SHBG cluster	rs2009310	T	G	0.006	0.001	Signal in 1KG									rs1767719	C	G			0.004	0.001	
Female SHBG cluster	rs201468966	C	CA	0.016	0.002	Signal in 1KG									rs466808	C	T			0.016	0.002	
Female SHBG cluster	rs2018159	C	T	0.019	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs201874554	A	ACC	0.015	0.003	rs202895656	A		ACC	0.015	0.015	0.003	rs2829746	C	T							
Female SHBG cluster	rs202021413	TA	ACC	0.010	0.001	rs15377352	TA		T	0.010	0.001	rs11240358	G	A							0.010	0.001
Female SHBG cluster	rs202200760	C	G	0.079	0.004	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs2057655	A	G	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2064074	A	G	0.008	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2068888	A	G	0.011	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2176040	A	G	0.015	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2207132	G	A	0.023	0.004	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2229222	G	A	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2246223	T	C	0.007	0.001	Signal in 1KG									rs2251188	G	A			0.007	0.001	
Female SHBG cluster	rs2228248	C	T	0.004	0.002	Signal in 1KG									rs10857859	G	C			0.004	0.002	
Female SHBG cluster	rs2288926	A	G	0.005	0.002	Signal in 1KG									rs10416529	C	T			0.005	0.002	
Female SHBG cluster	rs2295955	A	G	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2364717	T	C	0.007	0.001	Signal in 1KG									rs6726395	G	A			0.007	0.001	
Female SHBG cluster	rs2438109	C	T	0.008	0.002	Signal in 1KG									rs710628	C	A			0.008	0.001	
Female SHBG cluster	rs2498786	C	G	0.013	0.001	Signal in 1KG									rs4983559	G	A			0.011	0.001	
Female SHBG cluster	rs2525570	G	A	0.009	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2587507	T	C	0.003	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2608652	C	T	0.004	0.001	Signal in 1KG									rs2608659	T	G			0.005	0.001	
Female SHBG cluster	rs2671731	A	G	0.014	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2723555	T	A	0.006	0.001	Signal in 1KG									rs2723572	T	C			0.006	0.001	
Female SHBG cluster	rs275177	C	T	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs28360642	A	C	0.020	0.002	Signal in 1KG									rs6916515	G	A			0.020	0.002	
Female SHBG cluster	rs28459049	C	T	0.007	0.002	Signal in 1KG									rs17444574	T	C			0.006	0.002	
Female SHBG cluster	rs28638815	G	A	0.011	0.001	Signal in 1KG									rs1946959	A	G			0.011	0.001	
Female SHBG cluster	rs2870917	G	A	0.010	0.001	Signal in 1KG									rs134907	C	T			0.010	0.002	
Female SHBG cluster	rs28925904	C	T	0.028	0.005	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs28929470	A	G	0.054	0.011	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs28929474	T	C	0.063	0.005	Signal in 1KG									No HM proxy							
Female SHBG cluster	rs2915023	G	A	0.010	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2924808	C	G	0.007	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2930979	C	T	0.013	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2954111	T	C	0.005	0.001	Signal in 1KG									rs2466145	C	T			0.004	0.001	
Female SHBG cluster	rs2970871	T	C	0.008	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs2986669	A	G	0.009	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3001032	C	T	0.012	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3018695	A	C	0.008	0.001	Signal in 1KG									rs3019748	G	A			0.006	0.001	
Female SHBG cluster	rs30254818	A	CA	0.001	0.001	Signal in 1KG									rs276936	A	C			0.009	0.001	
Female SHBG cluster	rs34184867	C	G	0.008	0.001	rs7147511	C		T	0.008	0.001	rs1289738	C	T							0.007	0.001
Female SHBG cluster	rs34255979	T	C	0.027	0.002	Signal in 1KG									rs17651629	T	C			0.024	0.002	
Female SHBG cluster	rs34311866	T	C	0.010	0.002	Signal in 1KG									rs11248059	C	G			0.010	0.002	
Female SHBG cluster	rs34331968	T	C	0.012	0.001	Signal in 1KG									rs10922096	T	C			0.012	0.001	
Female SHBG cluster	rs34341	A	T	0.011	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs34350891	AT	T	0.008	0.001	Signal in 1KG									rs7240325	C	T			0.008	0.001	
Female SHBG cluster	rs34499031	T	TAA	0.009	0.002	Signal in 1KG									rs7756992	A	G			0.009	0.002	
Female SHBG cluster	rs34651	T	C	0.009	0.003	Signal in 1KG									rs2759992	A	G			0.009	0.002	
Female SHBG cluster	rs35143646	T	C	0.008	0.002	Signal in 1KG									rs5982926	G	A			0.007	0.001	
Female SHBG cluster	rs35198068	T	C	0.008	0.002	Signal in 1KG									rs7903146	C	T			0.008	0.002	
Female SHBG cluster	rs35233014	C	A	0.014	0.002	Signal in 1KG									rs10881583	C	T			0.014	0.002	
Female SHBG cluster	rs35476771	CAT	C	0.008	0.002	Signal in 1KG									rs3114652	C	T			0.009	0.001	
Female SHBG cluster	rs35568851	CT	C	0.008	0.001	Signal in 1KG									rs873308	A	G			0.007	0.001	
Female SHBG cluster	rs35569875	TCA	T	0.011	0.002	Signal in 1KG									rs2394529	C	G			0.010	0.002	
Female SHBG cluster	rs3733321	T	G	0.007	0.001	Signal in 1KG									rs7661888	G	A			0.007	0.001	
Female SHBG cluster	rs3747207	A	G	0.019	0.002	Signal in 1KG									rs738408	T	C			0.019	0.002	
Female SHBG cluster	rs3747367	A	C	0.007	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3769228	C	G	0.013	0.003	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3751229	A	G	0.010	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3768420	C	T	0.008	0.002	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs3782735	A	G	0.011	0.001	Signal in 1KG									Signal in HM							
Female SHBG cluster	rs390408	A	G	0.015	0.002	rs131658	G		C	0.014	0.002	rs140489	A									

Female SHBG cluster	rs6531735	G	A	0.006	0.001	Signal in 1KG										rs7676961	T	C	0.006	0.001
Female SHBG cluster	rs6538437	A	T	0.007	0.002	Signal in 1KG										rs11107124	G	C	0.007	0.002
Female SHBG cluster	rs6540966	A	G	0.028	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs6706	T	C	0.018	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs6736913	A	G	0.034	0.005	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs67651018	A	G	0.008	0.002	Signal in 1KG										rs4316741	G	A	0.008	0.002
Female SHBG cluster	rs67890964	C	T	0.009	0.001	Signal in 1KG										rs4782568	G	C	0.009	0.001
Female SHBG cluster	rs6792725	G	A	0.017	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs67952556	G	T	0.006	0.001	rs5974638	A	G	0.005	0.001	No HM proxy					rs16835135	G	A	0.015	0.003
Female SHBG cluster	rs6800251	G	A	0.013	0.002	Signal in 1KG										rs13085868	A	G	0.004	0.002
Female SHBG cluster	rs6803518	T	C	0.007	0.002	Signal in 1KG										rs2602856	C	A	0.008	0.001
Female SHBG cluster	rs6831257	G	A	0.008	0.001	Signal in 1KG										rs17764730	T	C	0.011	0.002
Female SHBG cluster	rs6860245	C	G	0.011	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs687339	C	T	0.036	0.002	Signal in 1KG										rs6885410	A	C	0.007	0.002
Female SHBG cluster	rs6879874	T	A	0.008	0.002	Signal in 1KG										rs2780103	T	C	0.025	0.002
Female SHBG cluster	rs696825	T	C	0.025	0.002	Signal in 1KG										rs7953249	A	G	0.013	0.001
Female SHBG cluster	rs7139079	A	G	0.013	0.001	Signal in 1KG										rs11231698	A	T	0.011	0.003
Female SHBG cluster	rs71468663	A	AC	0.017	0.003	Signal in 1KG										rs2718167	C	T	0.009	0.001
Female SHBG cluster	rs71531849	CT	C	0.011	0.002	Signal in 1KG										rs731839	A	G	0.009	0.002
Female SHBG cluster	rs7250869	C	T	0.010	0.002	Signal in 1KG										rs10421262	T	G	0.006	0.001
Female SHBG cluster	rs7252372	G	C	0.007	0.001	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs7301534	T	A	0.005	0.002	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs72681869	C	G	0.059	0.007	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs72766607	T	G	0.027	0.005	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs72782727	G	T	0.009	0.002	Signal in 1KG										rs12599036	A	G	0.009	0.002
Female SHBG cluster	rs72844546	C	T	0.010	0.001	Signal in 1KG										rs11665624	G	A	0.009	0.001
Female SHBG cluster	rs7298820	T	A	0.014	0.002	Signal in 1KG										rs11045237	C	A	0.013	0.002
Female SHBG cluster	rs7301534	G	A	0.002	0.009	Signal in 1KG										rs7964231	C	T	0.002	0.002
Female SHBG cluster	rs73036519	G	C	0.012	0.002	Signal in 1KG										rs17356664	C	T	0.011	0.002
Female SHBG cluster	rs7321688	C	A	0.007	0.002	Signal in 1KG										rs7324744	A	G	0.007	0.002
Female SHBG cluster	rs73519353	A	T	0.075	0.013	No 1KG proxy										No HM proxy				
Female SHBG cluster	rs73670309	C	A	0.011	0.002	Signal in 1KG										rs4266553	C	G	0.009	0.002
Female SHBG cluster	rs738409	G	C	0.019	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs7405216	C	C	0.009	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs740893	G	C	0.009	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs74090351	A	G	0.016	0.003	Signal in 1KG										rs17377267	G	T	0.016	0.003
Female SHBG cluster	rs7475279	A	C	0.021	0.002	Signal in 1KG										rs7908297	G	A	0.021	0.002
Female SHBG cluster	rs7481219	A	G	0.009	0.002	Signal in 1KG										rs1058900	T	C	0.007	0.001
Female SHBG cluster	rs7484541	T	A	0.014	0.002	Signal in 1KG										rs11614506	C	T	0.014	0.002
Female SHBG cluster	rs7507113	C	A	0.010	0.002	Signal in 1KG										rs10345129	C	G	0.006	0.002
Female SHBG cluster	rs75130744	G	C	0.026	0.003	Signal in 1KG										rs12320328	A	G	0.022	0.005
Female SHBG cluster	rs7567544	C	G	0.008	0.001	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs764029425	TG	T	0.038	0.002	rs77032872	TG	T	0.038	0.002	rs779196	C	T	0.038	0.002	rs7993976	T	G	0.014	0.002
Female SHBG cluster	rs76491020	C	G	0.011	0.003	Signal in 1KG										rs7993976	C	T	0.014	0.002
Female SHBG cluster	rs76767219	A	C	0.047	0.004	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs768159759	A	AG	0.014	0.003	rs113165924	A	AG	0.014	0.003	No HM proxy					No HM proxy				
Female SHBG cluster	rs76859593	G	T	0.073	0.005	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs7696472	A	G	0.006	0.001	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs770971500	C	TTTT	0.010	0.002	rs140871704	G	TTTT	NA	NA	rs12786104	G	T	0.009	0.002	rs12786104	G	T	0.009	0.002
Female SHBG cluster	rs77193934	AGGCATCGCCAAA	A	0.010	0.002	rs139153780	AGGCATCGCCAAA	A	0.010	0.002	No HM proxy					rs14014154	C	A	0.001	0.001
Female SHBG cluster	rs775181992	A	AGCCCT	0.014	0.002	rs76976306	A	AGCCCT	0.014	0.002	No HM proxy					rs76976306	C	A	0.009	0.002
Female SHBG cluster	rs778571122	GTGTTTTTTTTTT	G	0.011	0.001	rs67805125	GTGTTTTTTTTTT	G	0.011	0.001	No HM proxy					rs778571122	C	A	0.011	0.001
Female SHBG cluster	rs78043940	T	C	0.009	0.002	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs78058190	G	A	0.023	0.004	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs781996653	TTATTTTATG	T	0.009	0.001	rs199649980	TTATTTTATG	T	0.009	0.001	rs7801259	A	T	0.008	0.001	rs1274963	A	T	0.008	0.001
Female SHBG cluster	rs784504	G	T	0.010	0.002	Signal in 1KG										rs1274963	G	A	0.008	0.002
Female SHBG cluster	rs78890745	A	G	0.022	0.002	Signal in 1KG										rs17288007	G	A	0.018	0.003
Female SHBG cluster	rs79237700	T	C	0.019	0.004	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs79281798	G	C	0.028	0.004	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs79391862	A	C	0.074	0.006	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs799157	T	C	0.021	0.003	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs80126506	A	G	0.008	0.001	Signal in 1KG										rs7870251	G	A	0.008	0.001
Female SHBG cluster	rs80235628	G	A	0.021	0.003	Signal in 1KG										rs2130779	G	T	0.017	0.003
Female SHBG cluster	rs8027064	A	G	0.026	0.004	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs8070967	G	A	0.010	0.001	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs8176741	G	A	0.016	0.003	Signal in 1KG										rs8176743	C	T	0.016	0.003
Female SHBG cluster	rs8178824	C	T	0.042	0.004	Signal in 1KG										rs1801689	A	C	0.041	0.004
Female SHBG cluster	rs820504	G	A	0.013	0.002	Signal in 1KG										rs820506	G	A	0.011	0.002
Female SHBG cluster	rs848476	G	A	0.007	0.002	Signal in 1KG										rs848487	C	T	0.007	0.002
Female SHBG cluster	rs858519	C	T	0.100	0.001	Signal in 1KG										rs727428	C	T	0.100	0.001
Female SHBG cluster	rs859655	C	A	0.008	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs8756	C	A	0.009	0.001	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs879619	A	G	0.008	0.002	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs892225	G	A	0.007	0.001	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs898865	T	C	0.006	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs921153	A	G	0.009	0.002	Signal in 1KG										rs1700789	C	T	0.008	0.002
Female SHBG cluster	rs925098	G	A	0.010	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs9386291	C	G	0.008	0.001	Signal in 1KG										rs10945313	T	C	0.007	0.001
Female SHBG cluster	rs9379084	G	A	0.015	0.002	Signal in 1KG										No HM proxy				
Female SHBG cluster	rs9426829	C	T	0.014	0.001	Signal in 1KG										rs7531982	A	A	0.014	0.001
Female SHBG cluster	rs9461793	A	C	0.009	0.002	Signal in 1KG										rs2858312	G	C	0.008	0.002
Female SHBG cluster	rs9556403	G	A	0.007	0.001	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs9597210	G	A	0.016	0.002	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs9836503	A	C	0.008	0.001	Signal in 1KG										Signal in HM				
Female SHBG cluster	rs9872754	C	T	0.009	0.002	Signal in 1KG										rs9864898	C	T	0.009	0.002
Female SHBG cluster	rs9887289	G	A	0.022	0.002	Signal in 1KG										Signal in HM				
Female testosterone cluster:1:150186390_AG_A	A	AG	0.017	0.003	rs11303226	A	AG	0.017	0.003	rs6665499	C	T	0.016	0.003						
Female testosterone cluster:1:155867257_CAA_C	C	CAA	0.015	0.003	rs66756214	C	CAA	0.015	0.003	rs12563627	C	T	0.							

Female testosterone cluster rs117913411	T	A	0.048	0.008	Signal in 1KG				0.017	0.003
Female testosterone cluster rs11892043	A	G	0.022	0.003	Signal in 1KG					
Female testosterone cluster rs11943389	T	C	0.017	0.003	Signal in 1KG					
Female testosterone cluster rs12078363	T	C	0.028	0.003	Signal in 1KG				0.027	0.003
Female testosterone cluster rs1214759	G	A	0.031	0.003	Signal in 1KG					
Female testosterone cluster rs1214761	G	A	0.031	0.003	Signal in 1KG				0.031	0.003
Female testosterone cluster rs12185851	C	T	0.021	0.003	Signal in 1KG					
Female testosterone cluster rs1229984	C	T	0.049	0.009	Signal in 1KG				0.020	0.003
Female testosterone cluster rs1242518	T	C	0.020	0.003	Signal in 1KG				0.020	0.003
Female testosterone cluster rs12456785	C	T	0.030	0.003	Signal in 1KG				0.030	0.003
Female testosterone cluster rs12564492	A	G	0.020	0.003	Signal in 1KG					
Female testosterone cluster rs12628709	G	A	0.026	0.005	Signal in 1KG				0.026	0.005
Female testosterone cluster rs12658172	G	C	0.052	0.004	Signal in 1KG					
Female testosterone cluster rs12683780	A	C	0.031	0.003	Signal in 1KG					
Female testosterone cluster rs12708515	G	C	0.021	0.003	Signal in 1KG				0.021	0.003
Female testosterone cluster rs12837203	G	A	0.019	0.003	Signal in 1KG				0.019	0.003
Female testosterone cluster rs12893790	G	C	0.021	0.004	Signal in 1KG				0.021	0.004
Female testosterone cluster rs12900736	C	T	0.040	0.004	Signal in 1KG					
Female testosterone cluster rs13094915	G	C	0.016	0.003	Signal in 1KG				0.016	0.003
Female testosterone cluster rs1314911	A	G	0.026	0.004	Signal in 1KG					
Female testosterone cluster rs13153019	C	T	0.024	0.003	Signal in 1KG				0.023	0.003
Female testosterone cluster rs13183570	T	C	0.025	0.003	Signal in 1KG				0.025	0.003
Female testosterone cluster rs13229619	A	G	0.054	0.004	Signal in 1KG				0.054	0.004
Female testosterone cluster rs138983180	A	G	0.162	0.019	Signal in 1KG					
Female testosterone cluster rs1547308	C	T	0.032	0.004	Signal in 1KG					
Female testosterone cluster rs1660322	T	C	0.023	0.003	Signal in 1KG					
Female testosterone cluster rs167096	T	G	0.017	0.003	Signal in 1KG					
Female testosterone cluster rs17043570	T	G	0.025	0.003	Signal in 1KG					
Female testosterone cluster rs17053931	A	G	0.021	0.004	Signal in 1KG					
Female testosterone cluster rs171021	C	T	0.038	0.003	Signal in 1KG					
Female testosterone cluster rs17201704	T	C	0.043	0.004	Signal in 1KG					
Female testosterone cluster rs17245822	C	A	0.028	0.003	Signal in 1KG				0.043	0.004
Female testosterone cluster rs17362923	G	C	0.023	0.004	Signal in 1KG				0.028	0.003
Female testosterone cluster rs17764057	G	A	0.021	0.003	Signal in 1KG					
Female testosterone cluster rs17853284	G	T	0.304	0.021	Signal in 1KG					
Female testosterone cluster rs184265581	C	G	0.132	0.013	Signal in 1KG					
Female testosterone cluster rs1870940	G	A	0.025	0.003	Signal in 1KG				0.024	0.003
Female testosterone cluster rs1872930	T	C	0.051	0.003	Signal in 1KG				0.051	0.003
Female testosterone cluster rs187370584	A	G	0.066	0.012	Signal in 1KG					
Female testosterone cluster rs1933769	A	C	0.083	0.006	Signal in 1KG					
Female testosterone cluster rs200457494	CA	C	0.025	0.004	Signal in 1KG				0.022	0.003
Female testosterone cluster rs2011425	T	G	0.033	0.005	Signal in 1KG				0.032	0.005
Female testosterone cluster rs2026479	C	G	0.016	0.003	Signal in 1KG				0.015	0.003
Female testosterone cluster rs2074585	A	G	0.016	0.003	Signal in 1KG					
Female testosterone cluster rs2113944	T	C	0.027	0.003	Signal in 1KG					
Female testosterone cluster rs2147419	T	G	0.018	0.003	Signal in 1KG				0.018	0.003
Female testosterone cluster rs2186945	C	T	0.025	0.004	Signal in 1KG					
Female testosterone cluster rs2270445	G	A	0.017	0.003	Signal in 1KG					
Female testosterone cluster rs232159	C	T	0.018	0.003	Signal in 1KG				0.017	0.003
Female testosterone cluster rs2344744	G	T	0.018	0.003	Signal in 1KG				0.017	0.003
Female testosterone cluster rs2374456	G	C	0.024	0.003	Signal in 1KG				0.023	0.003
Female testosterone cluster rs2473140	C	T	0.029	0.005	Signal in 1KG					
Female testosterone cluster rs2476592	T	T	0.028	0.003	Signal in 1KG				0.024	0.003
Female testosterone cluster rs267190	G	T	0.015	0.003	Signal in 1KG					
Female testosterone cluster rs2824138	C	T	0.026	0.004	Signal in 1KG				0.026	0.004
Female testosterone cluster rs28421540	A	C	0.031	0.003	Signal in 1KG				0.032	0.003
Female testosterone cluster rs28484580	G	A	0.021	0.004	rs2272676	T	G	0.015	0.003	0.003
Female testosterone cluster rs28612846	G	A	0.016	0.003	Signal in 1KG				0.015	0.003
Female testosterone cluster rs2879284	A	G	0.019	0.003	Signal in 1KG				0.019	0.003
Female testosterone cluster rs2879910	C	T	0.016	0.003	Signal in 1KG				0.014	0.003
Female testosterone cluster rs2903385	A	G	0.025	0.003	Signal in 1KG				0.024	0.003
Female testosterone cluster rs2980858	C	T	0.013	0.003	Signal in 1KG				0.013	0.003
Female testosterone cluster rs312023	G	A	0.028	0.003	Signal in 1KG					
Female testosterone cluster rs3136354	C	T	0.024	0.003	Signal in 1KG				0.023	0.003
Female testosterone cluster rs33953948	G	GA	0.018	0.003	Signal in 1KG				0.018	0.003
Female testosterone cluster rs34163044	A	C	0.017	0.003	Signal in 1KG				0.016	0.003
Female testosterone cluster rs34269793	C	T	0.064	0.006	Signal in 1KG				0.065	0.006
Female testosterone cluster rs34557412	A	G	0.107	0.017	Signal in 1KG					
Female testosterone cluster rs34584018	G	GT	0.016	0.003	Signal in 1KG				0.015	0.003
Female testosterone cluster rs34632394	CAT	C	0.017	0.003	Signal in 1KG				0.016	0.003
Female testosterone cluster rs34931250	C	T	0.054	0.006	Signal in 1KG					
Female testosterone cluster rs35008345	C	T	0.183	0.019	Signal in 1KG					
Female testosterone cluster rs35249079	T	G	0.022	0.003	Signal in 1KG				0.022	0.003
Female testosterone cluster rs35397738	TA	T	0.020	0.003	Signal in 1KG				0.018	0.003
Female testosterone cluster rs35427	T	G	0.017	0.003	Signal in 1KG				0.016	0.003
Female testosterone cluster rs35801460	G	A	0.020	0.003	Signal in 1KG				0.020	0.003
Female testosterone cluster rs36032941	C	A	0.063	0.003	Signal in 1KG				0.060	0.003
Female testosterone cluster rs3608830	T	T	0.028	0.004	Signal in 1KG				0.026	0.005
Female testosterone cluster rs371162363	G	A	0.039	0.005	Signal in 1KG				0.033	0.005
Female testosterone cluster rs3771243	A	G	0.029	0.003	Signal in 1KG				0.029	0.003
Female testosterone cluster rs3776299	G	A	0.017	0.003	Signal in 1KG					
Female testosterone cluster rs3849653	A	T	0.019	0.003	Signal in 1KG					
Female testosterone cluster rs4867	G	A	0.024	0.004	Signal in 1KG				0.024	0.004
Female testosterone cluster rs425930	G	A	0.025	0.003	Signal in 1KG				0.024	0.003
Female testosterone cluster rs4294422	G	A	0.019	0.003	Signal in 1KG					
Female testosterone cluster rs4327143	A	G	0.018	0.003	Signal in 1KG					
Female testosterone cluster rs437115	T	C	0.028	0.003	Signal in 1KG					
Female testosterone cluster rs440150	G	A	0.026	0.005	Signal in 1KG				0.026	0.005
Female testosterone cluster rs4431325	T	C	0.050	0.006	Signal in 1KG				0.049	0.006
Female testosterone cluster rs4450227	G	T	0.023	0.003	Signal in 1KG					
Female testosterone cluster rs4464040	C	T	0.045	0.004	Signal in 1KG					
Female testosterone cluster rs45446698	T	G	0.371	0.007	Signal in 1KG					
Female testosterone cluster rs4586943	A	C	0.018	0.003	Signal in 1KG				0.018	0.003
Female testosterone cluster rs4632729	A	G	0.028	0.003	Signal in 1KG				0.027	0.003
Female testosterone cluster rs4736359	T	G	0.037	0.003	Signal in 1KG					
Female testosterone cluster rs4804669	A	G	0.037	0.003	Signal in 1KG					
Female testosterone cluster rs4820829	C	T	0.058	0.009	Signal in 1KG				0.034	0.003
Female testosterone cluster rs487624	C	A	0.019	0.003	Signal in 1KG					
Female testosterone cluster rs4943729	A	C	0.015	0.003	Signal in 1KG					
Female testosterone cluster rs4961485	T	C	0.039	0.006	Signal in 1KG					
Female testosterone cluster rs505237	G	A	0.016	0.003	Signal in 1KG				0.015	0.003
Female testosterone cluster rs53221332	GC	C	0.016	0.003	Signal in 1KG					
Female testosterone cluster rs534141419	A	AT	0.018	0.003	Signal in 1KG	A	G	0.016	0.003	0.003
Female testosterone cluster rs534645300	AT	A	0.021	0.003	Signal in 1KG				0.015	0.003
Female testosterone cluster rs56109436	G	C	0.026	0.005	Signal in 1KG				0.021	0.004
Female testosterone cluster rs56196860	C	A	0.058	0.008	Signal in 1KG					
Female testosterone cluster rs569421885	CA	C	0.055	0.003	Signal in 1KG				0.055	0.003
Female testosterone cluster rs5712929	A	T	0.025	0.003	Signal in 1KG					
Female testosterone cluster rs57721086	T	C	0.055	0.007	Signal in 1KG					
Female testosterone cluster rs58072681	C	T	0.108	0.006	Signal in 1KG				0.109	0.006
Female testosterone cluster rs58175144	CA	C	0.021	0.003	Signal in 1KG				0.019	0.003
Female testosterone cluster rs5855544	T	GT	0.033	0.003	Signal in 1KG					
Female testosterone cluster rs58723250	T	C	0.035	0.004	Signal in 1KG				0.033	0.003
Female testosterone cluster rs590997	G	T	0.061	0.003	Signal in 1KG				0.057	0.003
Female testosterone cluster rs59397130	G	A	0.056	0.009	Signal in 1KG				0.055	0.009
Female testosterone cluster rs59741822	G	A	0.033	0.005	Signal in 1KG				0.032	0.005
Female testosterone cluster rs6008259	G	A	0.034	0.004	Signal in 1KG					
Female testosterone cluster rs6020423	C	T	0.040	0.003	Signal in 1KG					
Female testosterone cluster rs6100174	C	T	0.020	0.003	Signal in 1KG				0.014	0.003
Female testosterone cluster rs61237993	A	G	0.040	0.004	Signal in 1KG				0.024	0.004
Female testosterone cluster rs6127099	A	T	0.018	0.003	Signal in 1KG				0.019	0.004
Female testosterone cluster rs61661087	C	T	0.028	0.003	Signal in 1KG				0.028	0.003
Female testosterone cluster rs61987429	C	T	0.017	0.003	Signal in 1KG				0.017	0.003
Female testosterone cluster rs62162863	G	T	0.023	0.003	Signal in 1KG				0.018	0.003
Female testosterone cluster rs62231822	G	T	0.049	0.005	Signal in 1KG				0.036	0.005
Female testosterone cluster rs62621812	A	G	0.053	0.010	Signal in 1KG					
Female testosterone cluster rs6460238	T	T	0.015	0.003	Signal in 1KG					
Female testosterone cluster rs6684361	C	T	0.076	0.003	Signal in 1KG				0.076	0.003
Female testosterone cluster rs674486	C	T	0.018	0.003	Signal in 1KG					
Female testosterone cluster rs67596711	T	G	0.039	0.003	Signal in 1KG				0.039	0.003
Female testosterone cluster rs6904345	T	C	0.017	0.003	Signal in 1KG					
Female testosterone cluster rs6997799	C	A	0.024	0.003	Signal in 1KG				0.023	0.003
Female testosterone cluster rs71620437	G	GT	0.036	0.005	Signal in 1KG				0.035	0.005
Female testosterone cluster rs7236564	C	T	0.071	0.004	Signal in 1KG				0.073	0.004
Female testosterone cluster rs7256920	G	A	0.019	0.003	Signal in 1KG				0.019	0.003
Female testosterone cluster rs72660136	T	C	0.060	0.008	Signal in 1KG					
Female testosterone cluster rs72693130	A	G	0.031	0.006	Signal in 1KG					
Female testosterone cluster rs72738949	T	A	0.019	0.003	Signal in 1KG				0.019	0.003
Female testosterone cluster rs74884346	C	G	0.044	0.005	Signal in 1KG				0.041	0.005
Female testosterone cluster rs7482537	C									

Female testosterone cluster rs75287599	T	C	0.043	0.005	Signal in 1KG				rs1800447	G	A		0.042	0.005	
Female testosterone cluster rs7529520	C	G	0.018	0.003	Signal in 1KG				rs7535757	A	T		0.018	0.003	
Female testosterone cluster rs7530117	T	C	0.019	0.003	Signal in 1KG				No HM proxy						
Female testosterone cluster rs7573187	A	T	0.019	0.003	Signal in 1KG				rs10202783	A	T		0.019	0.003	
Female testosterone cluster rs7575635	C	T	0.038	0.004	Signal in 1KG				rs7580013	G	A		0.037	0.004	
Female testosterone cluster rs75848431	T	C	0.032	0.004	Signal in 1KG				rs12788072	G	A		0.029	0.004	
Female testosterone cluster rs7618363	C	G	0.037	0.004	Signal in 1KG				rs6442176	T	C		0.034	0.004	
Female testosterone cluster rs76299412	A	G	0.035	0.004	Signal in 1KG				rs11605437	C	T		0.035	0.004	
Female testosterone cluster rs7633673	G	A	0.026	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs74234295	G	C	0.019	0.003	Signal in 1KG	A	T	0.017	rs944171	A	T		0.017	0.003	
Female testosterone cluster rs77432559	G	C	0.037	0.006	Signal in 1KG				rs17646414	T	C		0.020	0.005	
Female testosterone cluster rs776074878	CA	C	0.021	0.003	rs199508240	CA	C	0.021	0.003	rs2249225	T	C		0.019	0.003
Female testosterone cluster rs77822621	T	C	0.048	0.007	Signal in 1KG				No HM proxy						
Female testosterone cluster rs79080104	AAAAACAGATAC	A	0.024	0.003	rs79280477	AAAAACAGATAC	A	0.024	0.003	rs7758037	G	C		0.024	0.003
Female testosterone cluster rs784420	G	A	0.039	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs797247	T	T	0.018	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs8044588	C	G	0.028	0.005	Signal in 1KG				Signal in HM						
Female testosterone cluster rs8045779	T	C	0.026	0.004	Signal in 1KG				Signal in HM						
Female testosterone cluster rs8111359	C	T	0.060	0.005	Signal in 1KG				rs11673632	C	T		0.050	0.005	
Female testosterone cluster rs8126001	T	C	0.020	0.003	Signal in 1KG				rs8121509	C	T		0.017	0.003	
Female testosterone cluster rs8184986	A	T	0.023	0.004	Signal in 1KG				rs2236141	C	T		0.021	0.004	
Female testosterone cluster rs825597	G	A	0.016	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs873779	C	T	0.016	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs881613	A	G	0.017	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs9319895	A	G	0.023	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs9457466	A	T	0.017	0.003	Signal in 1KG				rs1327194	A	C		0.016	0.003	
Female testosterone cluster rs9506725	T	C	0.052	0.003	Signal in 1KG				rs629445	G	A		0.051	0.003	
Female testosterone cluster rs952597	G	A	0.035	0.004	Signal in 1KG				Signal in HM						
Female testosterone cluster rs959996	T	G	0.017	0.003	Signal in 1KG				rs10507808	G	A		0.013	0.003	
Female testosterone cluster rs9611014	C	T	0.023	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs9636441	C	T	0.020	0.003	Signal in 1KG				rs4671416	A	G		0.021	0.003	
Female testosterone cluster rs9638084	G	A	0.021	0.003	Signal in 1KG				rs7808966	C	A		0.019	0.003	
Female testosterone cluster rs9644032	G	T	0.015	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs987946	G	A	0.026	0.004	Signal in 1KG				Signal in HM						
Female testosterone cluster rs9832502	A	G	0.017	0.003	Signal in 1KG				rs9870681	T	C		0.017	0.003	
Female testosterone cluster rs9850919	C	T	0.020	0.003	Signal in 1KG				Signal in HM						
Female testosterone cluster rs9898480	T	C	0.018	0.003	Signal in 1KG				Signal in HM						
Male estradiol cluster 4:69958680_GA_C	GA	G	0.007	0.001	rs7058697	GA	G	0.007	0.001	rs4587017	T	G		0.007	0.001
Male estradiol cluster 5:35983283_CA_C	C	CA	0.008	0.001	rs78247641	C	CA	0.008	0.001	rs4869450	A	T		0.007	0.001
Male estradiol cluster rs1332650	C	T	0.008	0.001	Signal in 1KG				rs247221	G	A		0.008	0.001	
Male estradiol cluster rs113047993	C	T	0.010	0.002	Signal in 1KG				rs11082219	G	A		0.006	0.001	
Male estradiol cluster rs117826558	T	C	0.014	0.002	Signal in 1KG				No HM proxy						
Male estradiol cluster rs188982745	A	G	0.055	0.010	No 1KG proxy				No HM proxy						
Male estradiol cluster rs201687269	T	A	0.006	0.001	Signal in 1KG				No HM proxy						
Male estradiol cluster rs34019140	G	A	0.012	0.001	Signal in 1KG				No HM proxy						
Male estradiol cluster rs7515591	G	A	0.008	0.001	Signal in 1KG				Signal in HM						
Male estradiol cluster rs45446608	C	E	0.015	0.002	Signal in 1KG				No HM proxy						
Male estradiol cluster rs570754094	G	A	0.052	0.010	Signal in 1KG				No HM proxy						
Male estradiol cluster rs657152	C	A	0.008	0.001	Signal in 1KG				Signal in HM						
Male estradiol cluster rs7173595	T	C	0.016	0.001	Signal in 1KG				rs727479	A	C		0.016	0.001	
Male estradiol cluster rs781858752	TG	T	0.008	0.001	rs147250649	TG	T	0.008	0.001	No HM proxy	C	T		0.007	0.001
Male SHBG cluster 1:1510035_GGC_G	G	GGC	0.010	0.001	rs150737039	G	GGC	0.010	0.001	rs7520996	C	T		0.009	0.001
Male SHBG cluster 1:16522935_TGTGTGAGAGT	T	GTGTGTGAGAGT	0.018	0.002	rs76526560	T	GTGTGTGAGAGT	0.018	0.002	rs20847	G	A		0.006	0.001
Male SHBG cluster 1:196914907_AGT_A	AGT	A	0.010	0.001	rs201838824	AGT	A	0.010	0.001	rs4085749	C	T		0.010	0.001
Male SHBG cluster 1:23747996_GA_G	GA	GA	0.008	0.001	rs11340914	G	GA	0.008	0.001	rs2077066	T	C		0.006	0.001
Male SHBG cluster 1:25827633_CT_C	CT	C	0.011	0.001	rs36046328	CT	C	0.011	0.001	rs873308	A	G		0.010	0.001
Male SHBG cluster 1:35734986_AAGTGCATCTT	CTT	AAGTGCATCTT	0.010	0.002	rs72327179	A	AAGTGCATCTT	0.010	0.002	rs645886	G	A		0.010	0.002
Male SHBG cluster 1:93033928_CT_C	C	CT	0.013	0.001	rs10708162	C	CT	0.013	0.001	rs1565652	T	G		0.013	0.001
Male SHBG cluster 1:116532916_CAAA_C	CAAA	C	0.009	0.001	rs6035133	CAAA	C	0.009	0.001	rs1626521	A	G		0.007	0.001
Male SHBG cluster 1:239632423_CA_C	CA	C	0.012	0.002	rs37308981	CA	C	0.012	0.002	rs17790453	G	C		0.012	0.002
Male SHBG cluster 1:3115013423_TTCTC_T	TTCTC	T	0.009	0.001	rs71666677	TTCTC	T	0.009	0.001	rs11617448	G	A		0.009	0.001
Male SHBG cluster 1:425948829_AAC_A	AAC	A	0.012	0.001	rs71960108	AAC	A	0.012	0.001	rs10132280	A	C		0.011	0.001
Male SHBG cluster 1:61786202_TGTGTGACCATCT	TGTTGTGACCATCT	A	0.009	0.002	rs111208278	A	G	0.009	0.002	rs11248888	G	C		0.009	0.002
Male SHBG cluster 1:716062400_TA_T	T	TA	0.006	0.001	rs35251798	T	TA	0.006	0.001	rs6416868	G	A		0.006	0.001
Male SHBG cluster 1:73758011_CT_C	C	CT	0.015	0.002	Signal in 1KG				rs10315738	C	A		0.008	0.001	
Male SHBG cluster 1:78567107_CA_C	CA	C	0.043	0.008	rs145235154	CA	C	0.043	0.008	No HM proxy					
Male SHBG cluster 1:93555222_GTC_G	G	GTC	0.019	0.002	rs10577478	G	GTC	0.019	0.002	No HM proxy					
Male SHBG cluster 1:97223973_TTTG_T	TTTG	T	0.011	0.001	rs4804414	C	T	0.011	0.001	rs4804416	T	G		0.011	0.001
Male SHBG cluster 2:111925731_CTTATGTT_C	CTTATGTT	C	0.016	0.003	rs3833441	CTTATGTT	C	0.016	0.003	rs3761706	G	A		0.016	0.003
Male SHBG cluster 2:191559443_GT_G	GT	G	0.010	0.001	rs34400883	GT	G	0.010	0.001	rs10202868	T	C		0.010	0.001
Male SHBG cluster 3:40692592_CT_C	CT	C	0.001	0.001	rs39693058	CT	C	0.001	0.001	rs1330202	T	C		0.001	0.001
Male SHBG cluster 4:128987952_ATT_A	A	ATT	0.006	0.001	rs369613185	A	ATT	0.006	0.001	rs1975878	C	T		0.006	0.001
Male SHBG cluster 4:69447407_GT_G	GT	G	0.031	0.001	rs61573189	GT	G	0.031	0.001	No HM proxy					
Male SHBG cluster 5:36206855_GAT_G	G	GAT	0.020	0.004	rs200108309	G	GAT	0.020	0.004	No HM proxy					
Male SHBG cluster 6:27223966_CTCCTA_C	CTCCTA	C	0.013	0.002	rs35237909	C	CTCCTA	0.013	0.002	rs13194491	T	C		0.012	0.002
Male SHBG cluster 7:74293843_TGAGA_T	T	TGAGA	0.008	0.001	rs370429728	T	TGAGA	0.008	0.001	rs2529273	C	T		0.006	0.001
Male SHBG cluster 8:81457459_AT_A	A	AT	0.022	0.002	rs169972150	A	AT	0.022	0.002	rs16997708	A	G		0.016	0.002
Male SHBG cluster 8:81457459_CA_C	C	CA	0.014	0.002	rs20898859	C	CA	0.014	0.002	rs408937	G	A		0.014	0.002
Male SHBG cluster 9:112204335_AT_A	AT	A	0.010	0.002	rs143574276	AT	A	0.010	0.002	No HM proxy					
Male SHBG cluster 9:12378056_AAAGAAAG_AAAGAAAGG	G	AAAGAAAG	0.008	0.001	rs451538591	G	AAAGAAAG	0.008	0.001	rs7033790	T	C		0.006	0.001
Male SHBG cluster 9:125949547_TA_T	TA	T	0.016	0.004	rs5900565	TA	T	0.016	0.004	rs10985915	G	A		0.009	0.002
Male SHBG cluster 9:19084633_CT_C	C	CT	0.009	0.001	rs7860122	G	A	0.009	0.001	rs7860122	G	A		0.009	0.001
Male SHBG cluster 9:19082775	G	C	0.013	0.001	Signal in 1KG				rs7860122	G	A		0.012	0.001	
Male SHBG cluster 9:19082775	C	T	0.006	0.001	Signal in 1KG				rs12503526	A	G		0.006	0.001	
Male SHBG cluster rs1005421	C	T	0.006	0.001	Signal in 1KG				No HM proxy						
Male SHBG cluster rs10069690	C	T	0.007	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs10083137	A	G	0.020	0.003	Signal in 1KG				rs16927028	C	A		0.019	0.003	
Male SHBG cluster rs10107182	T	C	0.012	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs10116426	C	A	0.009	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs10153890	A	C	0.007	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs1033667	T	C	0.016	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs1037169	T	C	0.012	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs10411958	C	T	0.007	0.001	Signal in 1KG				rs10413329	G	A		0.007	0.001	
Male SHBG cluster rs10421262	T	C	0.011	0.001	Signal in 1KG				Signal in HM						
Male SHBG cluster rs1058319	T	C	0.009	0.002	Signal in 1KG				Signal in HM						
Male SHBG cluster rs10649697	T	TAGA	0.019	0.009	Signal in 1KG				rs2409110	A	T		0.009	0.001	
Male SHBG cluster rs10657979	C	CCTT	0.016	0.001	Signal in 1KG				rs2160348	T	C		0.016	0.001	
Male SHBG cluster rs10822153	A	C	0.064	0.001	Signal in 1KG				rs12355784	A	C		0.064	0.001	
Male SHBG cluster rs10864086	C	A	0.015	0.001	Signal in 1KG				Signal in HM						

Male SHBG cluster	rs12950562	T	C	0.011	0.001	Signal in 1KG						rs12943914	A	G	0.011	0.001
Male SHBG cluster	rs13042148	C	T	0.012	0.002	Signal in 1KG						rs1074683	C	G	0.005	0.001
Male SHBG cluster	rs13048818	A	G	0.023	0.001	Signal in 1KG						rs5818397	T	G	0.014	0.001
Male SHBG cluster	rs13280055	G	A	0.008	0.002	Signal in 1KG						rs11786272	A	C	0.004	0.002
Male SHBG cluster	rs13315174	G	A	0.007	0.001	Signal in 1KG						rs3772537	C	G	0.007	0.001
Male SHBG cluster	rs13379043	C	T	0.008	0.001	Signal in 1KG						rs2159176	G	T	0.006	0.002
Male SHBG cluster	rs13389219	T	C	0.011	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1349852	C	A	0.020	0.001	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs1351394	T	C	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs13997473	T	C	0.074	0.004	Signal in 1KG						rs451837	C	T	0.040	0.003
Male SHBG cluster	rs140386498	T	A	0.032	0.005	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs140584594	A	G	0.012	0.001	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs141811210	GTA	G	0.007	0.001	Signal in 1KG						rs12094601	A	T	0.006	0.001
Male SHBG cluster	rs1418334	G	A	0.040	0.001	Signal in 1KG						rs5942974	A	G	0.040	0.001
Male SHBG cluster	rs142627977	C	CAAGT	0.022	0.001	Signal in 1KG						rs12452315	A	C	0.012	0.001
Male SHBG cluster	rs142740991	C	CA	0.008	0.001	Signal in 1KG						rs40972356	A	G	0.008	0.001
Male SHBG cluster	rs143709973	A	C	0.014	0.003	Signal in 1KG	G					rs17511686	A	T	0.013	0.003
Male SHBG cluster	rs144647926	A	G	0.012	0.002	Signal in 1KG						rs1320527	A	G	0.029	0.002
Male SHBG cluster	rs144794875	G	A	0.010	0.002	Signal in 1KG						rs12979519	T	A	0.008	0.002
Male SHBG cluster	rs145602600	T	C	0.071	0.009	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs148062013	G	C	0.054	0.010	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs148427769	G	C	0.014	0.003	Signal in 1KG						rs7051449	T	C	0.012	0.003
Male SHBG cluster	rs148911629	G	C	0.044	0.006	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs149624078	C	T	0.098	0.005	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs149636366	T	C	0.047	0.007	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs149675684	G	A	0.079	0.013	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs1567353	C	G	0.006	0.001	Signal in 1KG						rs7856320	C	T	0.006	0.001
Male SHBG cluster	rs1570356	T	C	0.006	0.001	Signal in 1KG						rs10513272	C	T	0.006	0.001
Male SHBG cluster	rs157935	G	T	0.012	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1640267	C	T	0.017	0.001	Signal in 1KG						rs2537855	G	A	0.017	0.001
Male SHBG cluster	rs17036326	G	A	0.017	0.002	Signal in 1KG						rs17036328	C	T	0.017	0.002
Male SHBG cluster	rs17050272	A	G	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs17145750	T	C	0.011	0.002	Signal in 1KG						rs11974409	G	A	0.010	0.002
Male SHBG cluster	rs1715526	T	C	0.005	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1730865	G	C	0.026	0.001	Signal in 1KG						rs1720864	C	T	0.026	0.001
Male SHBG cluster	rs174528	T	C	0.008	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs17580	A	T	0.030	0.003	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs17583875	A	G	0.024	0.004	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs17669311	G	A	0.010	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1774784	T	C	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1782652	T	A	0.013	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1788641	A	G	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1799831	C	T	0.009	0.002	Signal in 1KG						rs2268572	G	A	0.008	0.002
Male SHBG cluster	rs1799941	A	G	0.121	0.001	Signal in 1KG						rs12150660	G	G	0.116	0.001
Male SHBG cluster	rs1801689	G	A	0.033	0.004	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1805960	G	A	0.013	0.002	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs184940919	G	A	0.096	0.019	No 1KG proxy						No HM proxy				
Male SHBG cluster	rs185073832	C	A	0.106	0.017	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs1859690	G	A	0.015	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs186915841	C	T	0.094	0.015	No 1KG proxy						No HM proxy				
Male SHBG cluster	rs1870927	A	T	0.006	0.001	Signal in 1KG						rs2615799	T	C	0.005	0.001
Male SHBG cluster	rs1871395	A	G	0.033	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs18724956	A	A	0.007	0.005	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs187437	G	A	0.008	0.001	Signal in 1KG						rs41746	A	T	0.008	0.001
Male SHBG cluster	rs1883783	T	G	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1890426	C	T	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs19071692	A	G	0.014	0.003	Signal in 1KG						rs7254892	A	G	0.014	0.004
Male SHBG cluster	rs191591035	G	C	0.102	0.014	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs192954222	C	C	0.130	0.015	No 1KG proxy						No HM proxy				
Male SHBG cluster	rs198384	C	G	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs1991401	G	A	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs199910997	A	G	0.010	0.001	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs200883214	G	GT	0.006	0.001	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs201764793	TTTC	T	0.009	0.001	Signal in 1KG						rs1983639	A	G	0.009	0.001
Male SHBG cluster	rs202125111	C	TGT	0.013	0.001	Signal in 1KG						rs1817269	C	T	0.012	0.001
Male SHBG cluster	rs202200760	C	G	0.071	0.003	Signal in 1KG	C					No HM proxy				
Male SHBG cluster	rs2106854	T	C	0.008	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs211644	C	C	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2197771	G	T	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2216707	C	T	0.008	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2222343	C	A	0.013	0.001	Signal in 1KG						rs2972144	A	G	0.013	0.001
Male SHBG cluster	rs2234694	C	C	0.013	0.003	Signal in 1KG						rs16988435	C	T	0.013	0.003
Male SHBG cluster	rs2238799	G	A	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2239222	G	A	0.011	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2247213	G	A	0.014	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2259305	G	A	0.012	0.001	Signal in 1KG						rs172182	G	C	0.012	0.001
Male SHBG cluster	rs2259560	G	A	0.007	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2272783	C	A	0.008	0.001	Signal in 1KG						rs3891012	G	A	0.009	0.001
Male SHBG cluster	rs2283760	C	T	0.005	0.001	Signal in 1KG						rs5987245	G	A	0.005	0.001
Male SHBG cluster	rs2287322	G	A	0.019	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2288004	G	C	0.007	0.001	Signal in 1KG						rs2303222	T	C	0.007	0.001
Male SHBG cluster	rs234051	A	G	0.008	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs234752	A	G	0.010	0.002	Signal in 1KG						rs2922884	T	C	0.010	0.002
Male SHBG cluster	rs244192	G	G	0.009	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2540945	G	A	0.006	0.001	Signal in 1KG						rs2249105	G	A	0.006	0.001
Male SHBG cluster	rs2564923	A	G	0.008	0.001	Signal in 1KG						rs2564940	G	A	0.008	0.001
Male SHBG cluster	rs267733	A	G	0.011	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2721195	T	C	0.011	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs2820441	C	A	0.007	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs28507491	A	G	0.014	0.001	Signal in 1KG						rs1246959	A	G	0.014	0.001
Male SHBG cluster	rs28562483	G	T	0.011	0.002	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs28650012	G	C	0.007	0.001	Signal in 1KG						rs4581712	A	C	0.007	0.001
Male SHBG cluster	rs28929474	T	C	0.138	0.004	Signal in 1KG						No HM proxy				
Male SHBG cluster	rs2905801	T	C	0.014	0.001	Signal in 1KG						rs2952993	A	G	0.014	0.001
Male SHBG cluster	rs29681	T	C	0.009	0.002	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs306593	C	G	0.008	0.001	Signal in 1KG						rs2934649	G	T	0.007	0.001
Male SHBG cluster	rs329122	G	A	0.006	0.001	Signal in 1KG						Signal in HM				
Male SHBG cluster	rs34006916	G	A	0.017	0.003	Signal in 1KG						rs1106583	C	T	0.018	0.003
Male SHBG cluster	rs34255979	T	C	0.027	0.002	Signal in 1KG						rs17651629	T	C	0.024	0.002
Male SHBG cluster	rs34372369	A	G	0.022	0.003	Signal in 1KG						rs6954724	A	G	0.016	0.002
Male SHBG cluster	rs34390319	C	T	0.015	0.002	Signal in 1KG						rs12769216	T	A	0.015	0.002
Male SHBG cluster	rs34936520	CA	C	0.010	0.009	Signal in 1KG						rs3806661	G	A	0.009	0.001
Male SHBG cluster	rs34651	T	C	0.010	0.002	Signal in 1KG						Signal in HM				

Male SHBG cluster	rs501470	G	T	0.015	0.001	Signal in 1KG			rs505870	A	C		0.015	0.001	
Male SHBG cluster	rs52835911	C	G	0.042	0.008	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs540739	T	C	0.018	0.001	Signal in 1KG			rs1160766	T	C		0.018	0.001	
Male SHBG cluster	rs54967748	A	G	0.100	0.018	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs550628400	G	A	0.075	0.008	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs5546464	G	T	0.007	0.001	Signal in 1KG			rs7705502	G	A		0.006	0.001	
Male SHBG cluster	rs55855238	C	T	0.009	0.001	Signal in 1KG			rs4092465	G	A		0.009	0.001	
Male SHBG cluster	rs55962409	C	A	0.008	0.001	Signal in 1KG			rs12599288	T	C		0.008	0.001	
Male SHBG cluster	rs56187480	G	A	0.023	0.001	Signal in 1KG			rs11630468	A	A		0.012	0.001	
Male SHBG cluster	rs56257452	C	A	0.007	0.002	Signal in 1KG			rs12380094	G	C		0.007	0.002	
Male SHBG cluster	rs562609617	GT	A	0.011	0.001	Signal in 1KG			rs17767348	A	G		0.010	0.001	
Male SHBG cluster	rs56332871	A	C	0.030	0.001	Signal in 1KG			rs8023580	C	T		0.029	0.001	
Male SHBG cluster	rs565471584	T	C	0.078	0.012	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs565728741	C	CA	0.012	0.002	Signal in 1KG			rs1732847	C	G		0.011	0.002	
Male SHBG cluster	rs56853305	G	A	0.011	0.002	Signal in 1KG			rs1850512	C	T		0.009	0.002	
Male SHBG cluster	rs57490282	T	A	0.009	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs576009056	G	GA	0.007	0.001	Signal in 1KG			rs17696392	A	T		0.007	0.001	
Male SHBG cluster	rs58321169	C	T	0.008	0.001	Signal in 1KG			rs4273712	A	G		0.008	0.001	
Male SHBG cluster	rs591939	A	G	0.009	0.001	Signal in 1KG			rs646123	G	A		0.008	0.001	
Male SHBG cluster	rs59194935	A	G	0.007	0.001	Signal in 1KG			rs1523327	T	A		0.005	0.001	
Male SHBG cluster	rs59708846	A	G	0.019	0.002	Signal in 1KG			rs9970076	G	A		0.020	0.002	
Male SHBG cluster	rs60003923	G	GA	0.008	0.002	Signal in 1KG			rs4927912	C	A		0.007	0.002	
Male SHBG cluster	rs60018147	G	A	0.013	0.002	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs6005840	A	G	0.017	0.001	Signal in 1KG			rs1547014	T	C		0.017	0.001	
Male SHBG cluster	rs61755050	T	C	0.129	0.008	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs61922185	T	G	0.010	0.001	Signal in 1KG			rs6487172	T	C		0.010	0.001	
Male SHBG cluster	rs61929307	G	T	0.007	0.001	Signal in 1KG			rs12367370	G	A		0.004	0.001	
Male SHBG cluster	rs62012358	G	A	0.007	0.001	Signal in 1KG			rs6494130	C	G		0.007	0.001	
Male SHBG cluster	rs62134282	G	C	0.007	0.001	Signal in 1KG			rs2301741	T	C		0.007	0.001	
Male SHBG cluster	rs62182125	G	A	0.006	0.001	Signal in 1KG			rs7607369	A	G		0.006	0.001	
Male SHBG cluster	rs62195072	C	T	0.008	0.001	Signal in 1KG			rs1550532	C	G		0.008	0.001	
Male SHBG cluster	rs62394490	T	A	0.011	0.001	Signal in 1KG			rs9461224	T	C		0.011	0.001	
Male SHBG cluster	rs62442919	A	G	0.007	0.001	Signal in 1KG			rs10267825	G	C		0.006	0.001	
Male SHBG cluster	rs626258	C	A	0.010	0.007	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs62580766	T	C	0.010	0.002	Signal in 1KG			rs17805053	G	A		0.009	0.002	
Male SHBG cluster	rs62618693	T	C	0.019	0.003	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs631695	T	G	0.017	0.001	Signal in 1KG			rs3740643	C	A		0.016	0.001	
Male SHBG cluster	rs6480299	C	G	0.011	0.001	Signal in 1KG			rs6480297	G	A		0.011	0.001	
Male SHBG cluster	rs6595447	T	C	0.008	0.002	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs659893	A	C	0.006	0.001	Signal in 1KG			rs6929176	C	T		0.006	0.001	
Male SHBG cluster	rs655731	A	C	0.007	0.002	Signal in 1KG			rs586486	C	G		0.004	0.002	
Male SHBG cluster	rs6736913	A	G	0.033	0.004	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs6750410	A	G	0.018	0.002	Signal in 1KG			rs7568216	C	T		0.018	0.002	
Male SHBG cluster	rs67527887	T	C	0.007	0.001	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs6792725	G	A	0.012	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs687739	C	T	0.028	0.001	Signal in 1KG			rs7451021	T	C		0.009	0.001	
Male SHBG cluster	rs6900243	A	G	0.009	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs6939861	G	A	0.011	0.001	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs6950023	G	T	0.032	0.002	Signal in 1KG			rs3779196	C	T		0.031	0.002	
Male SHBG cluster	rs6965401	G	A	0.014	0.003	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs7096937	T	C	0.009	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs71115649	A	AC	0.008	0.001	Signal in 1KG			rs937862	C	G		0.006	0.001	
Male SHBG cluster	rs71584764	TA	A	0.010	0.002	Signal in 1KG			rs3748665	C	C		0.010	0.002	
Male SHBG cluster	rs71586627	TATCTC	T	0.010	0.001	Signal in 1KG			rs6699729	T	A		0.010	0.001	
Male SHBG cluster	rs7175361	A	G	0.009	0.002	Signal in 1KG			rs2304580	C	T		0.009	0.002	
Male SHBG cluster	rs7210574	C	T	0.010	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs7254776	C	T	0.005	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs72663907	T	G	0.012	0.002	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs72693923	C	T	0.034	0.004	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs72708162	T	G	0.016	0.002	Signal in 1KG			rs1683630	C	G		0.015	0.002	
Male SHBG cluster	rs72729610	A	G	0.010	0.002	Signal in 1KG			rs17369400	A	G		0.010	0.002	
Male SHBG cluster	rs72753908	C	T	0.011	0.002	Signal in 1KG			rs3914699	A	G		0.007	0.002	
Male SHBG cluster	rs7286550	G	A	0.008	0.001	Signal in 1KG			rs5995498	T	G		0.008	0.001	
Male SHBG cluster	rs72948115	C	T	0.012	0.002	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs73294940	T	T	0.014	0.002	Signal in 1KG			rs7730348	T	C		0.011	0.002	
Male SHBG cluster	rs7314285	G	T	0.030	0.002	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs73266316	T	C	0.013	0.002	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs73547906	C	T	0.006	0.001	Signal in 1KG			rs6648534	T	C		0.005	0.001	
Male SHBG cluster	rs738409	G	C	0.031	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs73909848	G	A	0.014	0.002	Signal in 1KG			rs606186	C	T		0.014	0.002	
Male SHBG cluster	rs74368988	C	T	0.071	0.002	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs749751903	A	AT	0.008	0.001	rs34783163	A	AT	0.008	0.001	rs1890000	T	G	0.007	0.001
Male SHBG cluster	rs75130744	G	C	0.030	0.002	Signal in 1KG			rs12320328	A	G		0.025	0.002	
Male SHBG cluster	rs75170914	T	C	0.012	0.001	Signal in 1KG			rs17128091	C	G		0.012	0.001	
Male SHBG cluster	rs75349541	C	T	0.009	0.002	Signal in 1KG			rs7817760	C	T		0.008	0.002	
Male SHBG cluster	rs753645751	G	GA	0.009	0.002	rs71148383	G	GA	0.009	0.002	rs4176099	A	G	0.009	0.002
Male SHBG cluster	rs7540115	C	A	0.009	0.001	Signal in 1KG			rs2153278	T	C		0.008	0.001	
Male SHBG cluster	rs75725387	T	TC	0.008	0.001	rs71470961	T	TC	0.008	0.001	rs12279328	T	G	0.007	0.001
Male SHBG cluster	rs7623513	C	A	0.009	0.002	Signal in 1KG			rs11709758	C	T		0.009	0.002	
Male SHBG cluster	rs762450647	CT	C	0.007	0.001	rs5848822	CT	C	0.007	0.001	rs9311403	T	C	0.005	0.001
Male SHBG cluster	rs7631981	G	A	0.007	0.001	Signal in 1KG			rs7374856	A	C		0.005	0.001	
Male SHBG cluster	rs7655064	T	C	0.008	0.002	Signal in 1KG			rs1511021	T	G		0.008	0.002	
Male SHBG cluster	rs76615959	A	AG	0.013	0.002	rs11315924	A	AG	0.013	0.002	No HM proxy				
Male SHBG cluster	rs768651403	GT	G	0.008	0.001	rs56239344	GT	G	0.008	0.001	rs11264422	A	T	0.006	0.001
Male SHBG cluster	rs76895963	G	T	0.055	0.005	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs7694379	G	A	0.021	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs769447487	T	TTA	0.011	0.001	rs35842744	T	TTA	0.011	0.001	rs2298058	T	C	0.011	0.001
Male SHBG cluster	rs77044968	C	T	0.016	0.001	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs771193934	AGGCATGCTGCAAA	A	0.006	0.001	rs139153780	AGGCATGCTGCAAA	G	0.006	0.001	No HM proxy				
Male SHBG cluster	rs773435780	G	GGA	0.012	0.001	rs16952172	G	GGA	0.012	0.001	rs6628912	G	A	0.011	0.001
Male SHBG cluster	rs7735249	C	G	0.018	0.002	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs773816354	T	TAAACGAGGTTAAAT	0.012	0.001	rs71464658	T	TAAACGAGGTTAAAT	0.012	0.001	rs12882639	T	C	0.011	0.001
Male SHBG cluster	rs775181992	A	AGCCCT	0.010	0.001	rs76976306	A	AGCCCT	0.010	0.001	No HM proxy				
Male SHBG cluster	rs7780562	C	A	0.008	0.002	Signal in 1KG			rs2391211	C	T		0.007	0.002	
Male SHBG cluster	rs78039846	AAAAAAC	A	0.005	0.001	rs200092173	AAAAAAC	A	0.005	0.001	rs5942429	C	G	0.005	0.001
Male SHBG cluster	rs7808613	C	G	0.008	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs7828742	A	G	0.007	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs78319058	T	C	0.025	0.004	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs78444298	G	A	0.026	0.004	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs78890745	A	G	0.014	0.001	Signal in 1KG			rs17288007	G	A		0.013	0.003	
Male SHBG cluster	rs7892835	G	A	0.008	0.001	Signal in 1KG			Signal in HM						
Male SHBG cluster	rs79287178	G	A	0.040	0.004	Signal in 1KG			No HM proxy						
Male SHBG cluster	rs79354983	A	G	0.016	0.002	Signal in 1KG			rs12657064	G	A		0.016	0.002	
Male SHBG cluster	rs79717793	G	A	0.025	0.002	Signal in 1KG			rs17134608	G	A		0.024	0.002	

Male testosterone cluster	rs11703376	T	C	0.034	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs11751920	G	C	0.014	0.010	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs12470971	A	G	0.017	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs12795488	C	A	0.041	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs12810788	G	A	0.025	0.004	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs12907068	G	A	0.021	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs12910403	G	C	0.018	0.003	Signal in 1KG				rs12900045	T	C	0.018						0.003	
Male testosterone cluster	rs1349359	A	C	0.017	0.003	Signal in 1KG				rs1631380	A	C	0.016							0.003
Male testosterone cluster	rs138271349	T	C	0.025	0.005	Signal in 1KG				rs4830450	T	C	0.026							0.005
Male testosterone cluster	rs138520990	A	C	0.191	0.008	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs140218129	T	TAA	0.025	0.005	Signal in 1KG				rs767602	G	T	0.026							0.005
Male testosterone cluster	rs140498714	C	T	0.046	0.010	No 1KG proxy				No HM proxy										
Male testosterone cluster	rs141509569	G	GTA	0.020	0.003	Signal in 1KG				rs7516840	C	G	0.021							0.003
Male testosterone cluster	rs1454836	T	A	0.013	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs14647930	C	T	0.071	0.009	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs147676232	C	C	0.055	0.010	No 1KG proxy				No HM proxy										
Male testosterone cluster	rs148262335	TTA	T	0.026	0.003	Signal in 1KG				rs912202	C	G	0.026							0.003
Male testosterone cluster	rs1611581	C	T	0.011	0.003	Signal in 1KG				rs9260599	C	A	0.007							0.003
Male testosterone cluster	rs1812755	T	C	0.026	0.004	Signal in 1KG				rs10484012	T	C	0.020							0.003
Male testosterone cluster	rs190930099	G	A	0.073	0.021	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs1933801	T	C	0.058	0.013	Signal in 1KG				rs7759938	T	C	0.038							0.003
Male testosterone cluster	rs1994721	G	A	0.049	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs200138078	C	T	0.042	0.003	Signal in 1KG				rs1575775	G	A	0.041							0.003
Male testosterone cluster	rs2012736	C	A	0.048	0.006	Signal in 1KG				rs3892170	G	C	0.047							0.003
Male testosterone cluster	rs2038695	C	A	0.021	0.003	Signal in 1KG				rs7338818	C	T	0.021							0.005
Male testosterone cluster	rs204995	A	G	0.023	0.003	Signal in 1KG				rs204994	C	T	0.023							0.003
Male testosterone cluster	rs2090409	C	A	0.026	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs2156805	A	G	0.001	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs2327121	C	G	0.015	0.003	Signal in 1KG				rs1047381	C	T	0.014							0.003
Male testosterone cluster	rs243466	C	G	0.011	0.002	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs2438086	G	A	0.014	0.003	Signal in 1KG				rs6758290	C	T	0.014							0.003
Male testosterone cluster	rs2594948	T	C	0.016	0.003	Signal in 1KG				rs12693096	C	G	0.016							0.003
Male testosterone cluster	rs2668776	C	T	0.023	0.003	Signal in 1KG				rs1398217	G	C	0.021							0.003
Male testosterone cluster	rs2764772	A	T	0.032	0.003	Signal in 1KG				rs12931939	T	C	0.024							0.004
Male testosterone cluster	rs28892005	A	AAG	0.028	0.003	Signal in 1KG				rs4775935	T	C	0.028							0.003
Male testosterone cluster	rs34040779	T	C	0.034	0.006	Signal in 1KG				rs664595	T	C	0.017							0.004
Male testosterone cluster	rs34138930	C	CA	0.023	0.005	Signal in 1KG				rs11832487	A	C	0.002							0.004
Male testosterone cluster	rs34192788	T	A	0.011	0.003	Signal in 1KG				rs17379883	G	A	0.011							0.003
Male testosterone cluster	rs34702488	A	T	0.026	0.004	Signal in 1KG				rs12740128	C	A	0.025							0.004
Male testosterone cluster	rs3527316	T	C	0.036	0.004	Signal in 1KG				rs4951318	C	G	0.036							0.004
Male testosterone cluster	rs3733897	A	G	0.020	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs3742223	T	C	0.030	0.005	Signal in 1KG				rs6577061	C	T	0.021							0.005
Male testosterone cluster	rs3751591	A	G	0.007	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs375286460	ATAT	A	0.016	0.003	Signal in 1KG				rs6836994	C	A	0.016							0.003
Male testosterone cluster	rs3808869	C	A	0.017	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs3821866	G	C	0.014	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs3941946	C	CA	0.033	0.004	Signal in 1KG				rs1106895	T	C	0.033							0.004
Male testosterone cluster	rs41306249	T	C	0.026	0.005	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs4333851	G	A	0.003	0.004	Signal in 1KG				rs7528979	C	T	0.002							0.004
Male testosterone cluster	rs4483209	T	G	0.005	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs4503095	G	A	0.020	0.005	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs4544698	G	T	0.031	0.008	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs4923210	G	A	0.012	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs4919686	A	C	0.011	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs503542	G	A	0.011	0.003	Signal in 1KG				rs625735	A	G	0.011							0.003
Male testosterone cluster	rs528845403	A	AATGTGT	0.199	0.016	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs532320857	C	T	0.114	0.029	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs539017487	GT	G	0.022	0.003	Signal in 1KG				rs2844702	A	G	0.019							0.003
Male testosterone cluster	rs53979858	C	T	0.015	0.003	Signal in 1KG				rs2688335	C	T	0.013							0.003
Male testosterone cluster	rs55867305	G	A	0.033	0.003	Signal in 1KG				rs4278125	G	A	0.032							0.003
Male testosterone cluster	rs55869022	C	G	0.027	0.005	Signal in 1KG				rs7649178	G	A	0.026							0.005
Male testosterone cluster	rs56196860	A	C	0.301	0.009	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs565931739	C	CA	0.039	0.004	Signal in 1KG				rs10019555	G	A	0.037							0.004
Male testosterone cluster	rs57339813	CT	C	0.018	0.003	Signal in 1KG				rs3752210	T	A	0.016							0.003
Male testosterone cluster	rs5915287	G	T	0.008	0.002	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs61762319	G	A	0.061	0.009	Signal in 1KG				No HM proxy										
Male testosterone cluster	rs618888	T	G	0.023	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs61932784	C	A	0.016	0.004	Signal in 1KG				rs11612012	C	T	0.012							0.004
Male testosterone cluster	rs62041532	G	T	0.014	0.004	Signal in 1KG				rs1973619	A	C	0.008							0.004
Male testosterone cluster	rs6486542	C	T	0.021	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs6516174	G	A	0.010	0.002	Signal in 1KG				rs12043046	C	T	0.010							0.002
Male testosterone cluster	rs66956368	T	A	0.030	0.004	rs112765699	A	G	0.075	0.013	rs3821866	G	C	0.014						0.003
Male testosterone cluster	rs6729954	T	A	0.011	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs6766859	T	C	0.031	0.003	Signal in 1KG				rs4678408	G	A	0.031							0.003
Male testosterone cluster	rs7065171	G	C	0.018	0.002	Signal in 1KG				rs757309	A	G	0.018							0.002
Male testosterone cluster	rs7265992	G	A	0.019	0.004	Signal in 1KG				rs17092148	G	T	0.018							0.004
Male testosterone cluster	rs7264935	C	T	0.016	0.003	Signal in 1KG				rs2184202	A	C	0.016							0.003
Male testosterone cluster	rs73631501	C	T	0.010	0.004	Signal in 1KG				rs5933745	G	C	0.011							0.004
Male testosterone cluster	rs745486	C	T	0.015	0.003	Signal in 1KG				rs901992	G	C	0.014							0.003
Male testosterone cluster	rs754959778	C	CGT	0.001	0.003	rs139427260	C	CGT	0.001	0.003	rs12946718	C	A	0.001						0.004
Male testosterone cluster	rs7610366	T	C	0.021	0.003	Signal in 1KG				rs7621942	C	T	0.021							0.003
Male testosterone cluster	rs7679843	G	C	0.043	0.005	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs776715248	C	T	0.534	0.036	No 1KG proxy				No HM proxy										
Male testosterone cluster	rs7773995	C	T	0.024	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs778239811	TAC	T	0.018	0.002	Signal in 1KG				rs2473057	T	C	0.019							0.002
Male testosterone cluster	rs7835492	C	T	0.025	0.004	Signal in 1KG				rs10101710	A	T	0.039							0.036
Male testosterone cluster	rs7844586	C	T	0.020	0.004	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs7872329	A	T	0.009	0.003	Signal in 1KG				Signal in HM										
Male testosterone cluster	rs7912521	C	T	0.049	0.003	Signal in 1KG				rs7908228	G	T	0.049							0.003
Male testosterone cluster	rs7915430	T	G	0.025	0.004	Signal in 1KG				Signal in HM	</									

Supplementary Table S17: Two sample Mendelian randomization results of sex hormone genetic instruments in men identified from clustering analysis on hormone outcomes in men.

Exposure genetic instrument	Outcome	Inverse variance weighted		Egger			Weighted median		
		Beta/OR [†] (95% CI)	P	Beta/OR [†] (95% CI)	P	Intercept P	Beta/OR [†] (95% CI)	P	N variants
Estradiol cluster	Bioavailable testosterone	-0.87 (-1.79,0.06)	0.06	-2.39 (-4.88,0.11)	0.06	0.18	-0.66 (-1.26,-0.06)	0.02	14
Estradiol cluster	Estradiol	2.72 (2.54,2.9)	7.0E-14	2.72 (2.26,3.27)	6.5E-08	1.00	2.72 (2.41,3.07)	1.4E-70	14
Estradiol cluster	SHBG	0.2 (0.06,0.34)	0.01	0.16 (-0.25,0.58)	0.41	0.85	0.17 (0.04,0.31)	4.9E-03	14
Estradiol cluster	Total testosterone	-0.35 (-1.18,0.49)	0.39	-1.87 (-4.08,0.35)	0.09	0.14	0.08 (-0.44,0.6)	0.74	14
SHBG cluster	Bioavailable testosterone	-0.2 (-0.24,-0.17)	9.4E-24	-0.25 (-0.3,-0.2)	3.7E-19	0.02	-0.27 (-0.32,-0.22)	1.1E-24	362
SHBG cluster	Estradiol	1.06 (1.05,1.06)	1.2E-36	1.05 (1.04,1.06)	8.4E-19	0.26	1.05 (1.04,1.06)	5.3E-17	362
SHBG cluster	SHBG	1 (0.99,1.01)	0.0E+00	1 (0.99,1.01)	0.0E+00	3.0E-31	1 (0.98,1.02)	0.0E+00	362
SHBG cluster	Total testosterone	1.54 (1.51,1.58)	6.2E-255	1.49 (1.45,1.54)	4.7E-202	1.2E-03	1.63 (1.57,1.68)	0.0E+00	362
Testosterone cluster	Bioavailable testosterone	1.23 (1.18,1.27)	1.3E-86	1.12 (1.06,1.18)	1.1E-66	4.0E-06	1.22 (1.15,1.29)	9.3E-269	122
Testosterone cluster	Estradiol	1.06 (1.05,1.08)	1.0E-12	1.09 (1.07,1.12)	2.4E-12	3.0E-03	1.08 (1.06,1.09)	1.1E-40	122
Testosterone cluster	SHBG	0 (-0.03,0.02)	0.66	0.04 (0.02,0.07)	2.7E-03	1.0E-05	-0.01 (-0.03,0.02)	0.58	122
Testosterone cluster	Total testosterone	1 (0.98,1.02)	8.3E-114	1 (0.97,1.03)	2.5E-93	1.2E-50	1 (0.96,1.04)	0.0E+00	122

[†]All effects are betas except for estradiol which is presented as an odds ratio.

Note: P values < 0.05 are in bold.

Supplementary Table S18: Two sample Mendelian randomization results of sex hormone genetic instruments in women identified from clustering analysis on hormone outcomes in women.

Exposure genetic instrument	Outcome	Inverse variance weighted		Egger			Weighted median		
		Beta/OR [†] (95% CI)	P	Beta/OR [†] (95% CI)	P	Intercept P	Beta/OR [†] (95% CI)	P	N variants
SHBG cluster	Bioavailable testosterone	-0.93 (-0.96,-0.9)	4.2E-182	-0.86 (-0.9,-0.81)	1.5E-124	3.2E-05	-0.92 (-0.96,-0.87)	0.0E+00	373
SHBG cluster	SHBG	1 (0.99,1.01)	0.0E+00	1 (0.98,1.02)	9.1E-310	4.9E-54	1 (0.98,1.02)	0.0E+00	373
SHBG cluster	Total testosterone	0.15 (0.1,0.2)	3.9E-08	0.24 (0.16,0.31)	5.2E-10	8.1E-04	0.19 (0.15,0.23)	3.1E-23	373
Testosterone cluster	Bioavailable testosterone	0.52 (0.5,0.54)	1.5E-143	0.51 (0.48,0.54)	2.3E-88	0.43	0.52 (0.5,0.55)	0.0E+00	241
Testosterone cluster	SHBG	-0.01 (-0.02,0.01)	0.26	-0.01 (-0.04,0.01)	0.27	0.58	-0.01 (-0.02,0.01)	0.48	241
Testosterone cluster	Total testosterone	1 (0.99,1.01)	4.6E-235	1 (0.98,1.02)	1.0E-175	6.8E-25	1 (0.96,1.04)	0.0E+00	241

Note: P values < 0.05 are in bold.

Supplementary Table S19: Study details for outcome traits included in Mendelian Randomization analyses.

Trait type	Outcome	Phenotype details (transformation and units)	GWAS consortium	Male N	Female N	UKB included	Notes	Ref/DOI
Metabolic outcome	BMI	Inverse normal transformed so effect size is in standard deviations	GIANT		152,893	171,977	No	European; Part of multi-ancestry meta-analysis Locke AE, Kahali B, Berndt SJ, Justice AE, Pers TH, Day FR, Powell C, Vedantam S, Buchkovich ML, Yang J, et al. Genetic studies of body mass index yield new insights for obesity biology. <i>Nature</i> [Internet]. 2015;518(7538):197–206. doi: 10.1038/nature14177
Metabolic outcome	Fasting glucose	Measured in mmol/L. Untransformed.	MAGIC		67,506	73,089	No	European Fasting glucose and insulin variability: sex-dimorphic genetic effects and novel loci. Vasiliki Lagou, Reedik Mägi, Jouke-Jan J Hotteenga, et al. (2019) IN PREPARATION. Data on glycaemic traits have been contributed by MAGIC investigators and have been downloaded from www.magicinvestigators.org
Metabolic outcome	Fasting insulin	Measured in pmol/L. In transformed.	MAGIC		47,806	50,404	No	European Fasting glucose and insulin variability: sex-dimorphic genetic effects and novel loci. Vasiliki Lagou, Reedik Mägi, Jouke-Jan J Hotteenga, et al. (2019) IN PREPARATION. Data on glycaemic traits have been contributed by MAGIC investigators and have been downloaded from www.magicinvestigators.org
Metabolic outcome	PCOS	Diagnosis by NIH or Rotterdam criteria or self-reported.		NA	10,074 cases/ 103,164 controls	No	European Day F, Karaderi T, Jones MR, Meun C, He C, Drong A, Kraft P, Lin N, Huang H, Broer L, et al. Large-scale genome-wide meta-analysis of polycystic ovary syndrome suggests shared genetic architecture for different diagnosis criteria. <i>Cotapas C, editor. PLOS Genet</i> [Internet]. <i>PLOS Genetics</i> . 2018 Dec 19 [cited 2019 May 24];14(12):e1007813. Available from: http://dx.doi.org/10.1371/journal.pgen.1007813	
Metabolic outcome	PCOS	Self-reported PCOS		NA	5,184 cases/ 82,759 controls	No	European Day FR, Hinds DA, Tung JY, Stolk L, Strykarsdottir U, Saxena R, Bjornes A, Broer L, Dunger DB, Halldorsson B V, et al. Causal mechanisms and balancing selection inferred from genetic associations with polycystic ovary syndrome. <i>Nat Commun</i> [Internet]. Nature Publishing Group, a division of Macmillan Publishers Limited. All Rights Reserved. 2015;6:8464. Available from: http://dx.doi.org/10.1038/ncomms9464	
Metabolic outcome	T2D	NA	DIAGRAM	34,990 cases / 150,760 controls	17,790 cases / 243,645 controls	No	European; Provided sex-specific betas from analyses excluding UK Biobank. Mahajan A, Taliun D, Thurner M, Robertson NR, Torres JM, Rayner NW, Payne AJ, Steinthorsdottir V, Scott RA, Grarup N, et al. Fine-mapping type 2 diabetes loci to single-variant resolution using high-density imputation and islet-specific epigenome maps. <i>Nat Genet</i> . 2018;50(11):1505–1513. doi: 10.1038/s41588-018-0241-6	
Metabolic outcome	WHR adjusted for BMI	Inverse normal transformed so effect size is in standard deviations	GIANT UK Biobank, Fenland, EPIC- Norfolk	93,480	116,742	No	European Shungin D, Wilkink T, Cristeau-Chonka DC, Ferreira T, Locke AE, Mägi M, Strawbridge RJ, Pers TH, Fischer K, Justice AE, et al. New genetic loci link adipose and insulin biology to body fat distribution. <i>Nature</i> . 2015;518(7538):187–196. doi: 10.1038/nature14132	
Body composition	Android fat	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Body composition	Android lean	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Body composition	Gynoid fat	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Body composition	Gynoid lean	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Body composition	Subcutaneous fat	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Body composition	Visceral fat	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Metabolic outcome	Total fat	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Metabolic outcome	Total lean	Log transformed, adjusted for age and up to 10 PCs; residuals rank-based inverse normal transformed	UK Biobank, Fenland, EPIC- Norfolk	9,102	10,406	Yes		
Female cancer	Breast cancer	Breast cancer risks obtained from meta-GWAS of case-control and cohort studies.	BCAC		105,974 / 122,977	No	European ancestries PMID: 29059683 Michailidou et al	
Female cancer	Breast cancer, ER positive subtype	Breast cancer risks obtained from meta-GWAS of case-control and cohort studies, with cases restricted to estrogen receptor positive histological subtype.	BCAC	69,501 / 95,039		No	European ancestries PMID: 29059683 Michailidou et al	
Female cancer	Breast cancer, ER negative subtype	Breast cancer risks obtained from meta-GWAS of case-control and cohort studies, with cases restricted to estrogen receptor negative histological subtype.	BCAC ECAC		21,468 / 100,594	No	European ancestries PMID: 29059683 Michailidou et al	
Female cancer	Endometrial cancer	Endometrial cancer risks obtained from meta-GWAS of case-control studies. Endometrial cancer risks obtained from meta-GWAS of case-control studies, with cases restricted to those with endometrioid histology.	(Supplementary Information) ECAC	12,270 / 46,126		No	European ancestries PMID: 30093612 O'Mara et al	
Female cancer	Endometrial cancer - endometrioid subtype	Endometrial cancer risks obtained from meta-GWAS of case-control studies, with cases restricted to those known to have non-endometrioid histology.	(Supplementary Information)	8,758 / 46,126		No	European ancestries PMID: 30093612 O'Mara et al	
Female cancer	Endometrial cancer - non-endometrioid subtype	Ovarian cancer risks obtained from meta-GWAS of case-control studies.	OCAC	1,230 / 38,224		No	European ancestries PMID: 30093612 O'Mara et al	
Female cancer	Ovarian cancer	Ovarian cancer risks obtained from meta-GWAS of case-control studies.	OCAC	67,158 /	25,509 / 40,941	No	European ancestries PMID: 28346442 Phelan et al	
Male cancer	Prostate cancer	Prostate cancer risks obtained from meta-GWAS of case-control studies.	PRACTICAL	48,350		No	European ancestries PMID: 29892016 Schumacher et al	

Supplementary Table S20: Results of two sample Mendelian randomization analysis in men of sex hormone genetic instruments on metabolic outcomes.

Exposure genetic instrument	Outcome	Primary analysis								Steiger filtered analysis									
		Inverse variance weighted				Egger				Inverse variance weighted				Egger					
		Beta/OR	(95% CI)	P	Intercept P	Beta/OR	(95% CI)	P	Intercept P	Beta/OR	(95% CI)	P	Intercept P	Beta/OR	(95% CI)	P	N variants		
Total testosterone	BMI	-0.03	(-0.08,0.03)	0.33	0.02	(0.06,0.1)	0.70	0.18	0	(-0.05,0.05)	0.99	183	-0.02	(-0.06,0.01)	0.19	-0.01	(-0.05,0.05)	0.99	156
Total testosterone	Fasting glucose	-0.04	(-0.09,0.01)	0.08	0.01	(-0.10,1.2)	0.83	0.28	-0.02	(-0.07,0.03)	0.42	109	-0.04	(-0.08,-0.01)	0.02	-0.05	(-0.14,0.03)	0.19	0.75
Total testosterone	Fasting insulin	-0.01	(-0.05,0.03)	0.47	0.02	(-0.05,0.09)	0.65	0.26	-0.01	(-0.06,0.04)	0.58	109	-0.01	(-0.04,0.02)	0.51	-0.03	(-0.08,0.03)	0.37	0.53
Total testosterone	T2D	0.85	(0.77,0.95)	2.4E-03	1.06	(0.91,1.23)	0.48	5.7E-04	0.96	(0.87,1.06)	0.45	206	0.9	(0.82,0.98)	0.02	1	(0.88,1.14)	0.99	0.04
Total testosterone	Total fat	-0.14	(-0.22,-0.06)	8.9E-04	-0.07	(-0.20,0.06)	0.27	0.17	-0.11	(-0.24,0.01)	0.08	210	-0.13	(-0.21,-0.05)	2.2E-03	-0.11	(-0.23,0.02)	0.09	0.66
Total testosterone	Total lean	-0.03	(-0.11,0.05)	0.45	0.02	(-0.11,0.14)	0.81	0.34	-0.1	(-0.23,0.03)	0.13	210	-0.03	(-0.11,0.05)	0.51	-0.02	(-0.15,0.1)	0.71	0.94
Total testosterone	WHR adjusted for BMI	-0.01	(-0.05,0.04)	0.82	-0.01	(-0.09,0.08)	0.85	0.94	-0.01	(-0.09,0.08)	0.32	159	-0.01	(-0.08,0.03)	0.53	0.01	(-0.08,0.09)	0.88	0.56
Bioavailable testosterone	BMI	-0.06	(-0.16,0.04)	0.22	0.09	(-0.14,0.33)	0.42	0.14	0	(-0.07,0.06)	0.92	94	-0.03	(-0.09,0.03)	0.33	-0.02	(-0.16,0.13)	0.79	0.87
Bioavailable testosterone	Fasting glucose	-0.07	(-0.14,0)	0.05	-0.17	(-0.37,0.03)	0.10	0.31	-0.09	(-0.29,0.03)	0.36	53	-0.06	(-0.13,0.01)	0.08	-0.21	(-0.41,-0.01)	0.04	0.13
Bioavailable testosterone	Fasting insulin	-0.01	(-0.08,0.06)	0.86	0.03	(-0.16,0.22)	0.74	0.67	0	(-0.07,0.08)	0.97	53	0.01	(-0.04,0.07)	0.59	-0.06	(-0.21,0.09)	0.44	0.30
Bioavailable testosterone	T2D	0.91	(0.79,1.05)	0.18	1.06	(0.81,1.38)	0.66	0.18	1.04	(0.9,1.2)	0.61	99	0.94	(0.84,1.05)	0.27	0.98	(0.79,1.22)	0.87	0.63
Bioavailable testosterone	Total fat	-0.03	(-0.17,0.12)	0.72	0.04	(-0.21,0.29)	0.74	0.52	0.06	(-0.13,0.25)	0.53	102	-0.02	(-0.15,0.12)	0.81	0.03	(-0.21,0.27)	0.82	0.65
Bioavailable testosterone	Total lean	0.18	(0.03,0.33)	0.02	0.19	(-0.07,0.46)	0.15	0.94	0.16	(-0.05,0.37)	0.12	102	0.2	(0.05,0.35)	8.8E-03	0.17	(-0.09,0.43)	0.20	0.79
Bioavailable testosterone	WHR adjusted for BMI	0.03	(-0.03,0.1)	0.31	-0.01	(-0.18,0.16)	0.93	0.62	0.02	(-0.07,0.11)	0.66	85	0.03	(-0.04,0.09)	0.43	0	(-0.18,0.17)	0.97	0.72
Testosterone cluster	BMI	-0.01	(-0.08,0.06)	0.79	-0.01	(-0.16,0.14)	0.90	0.99	0.04	(-0.05,0.14)	0.33	89	-0.09	(-0.1,0.04)	0.44	-0.03	(-0.19,0.12)	0.69	0.95
Testosterone cluster	Fasting glucose	-0.13	(-0.22,-0.04)	7.3E-03	-0.35	(-0.56,-0.14)	1.3E-03	0.02	-0.09	(-0.18,0)	0.03	47	-0.05	(-0.11,0.01)	0.10	-0.15	(-0.3,-0.01)	0.03	0.11
Testosterone cluster	Fasting insulin	0	(-0.06,0.06)	0.96	-0.08	(-0.22,0.05)	0.23	0.15	-0.02	(-0.11,0.08)	0.73	50	0.01	(-0.05,0.08)	0.66	-0.05	(-0.2,0.09)	0.46	0.27
Testosterone cluster	T2D	0.86	(0.76,0.98)	0.02	0.88	(0.72,1.09)	0.24	0.77	1.05	(0.88,1.25)	0.59	94	0.87	(0.76,0.99)	0.04	0.85	(0.65,1.1)	0.22	0.86
Testosterone cluster	Total fat	-0.01	(-0.17,0.15)	0.90	0.03	(-0.22,0.29)	0.79	0.66	0.13	(-0.12,0.37)	0.32	97	-0.08	(-0.27,0.12)	0.44	-0.14	(-0.55,0.27)	0.49	0.71
Testosterone cluster	Total lean	0.18	(0.03,0.36)	0.05	0.19	(-0.09,0.47)	0.18	0.91	0.18	(-0.07,0.43)	0.16	97	0.14	(-0.07,0.36)	0.19	0.14	(-0.31,0.59)	0.54	0.99
Testosterone cluster	WHR adjusted for BMI	0.04	(-0.04,0.12)	0.31	-0.05	(-0.21,0.13)	0.60	0.26	-0.02	(-0.14,0.11)	0.81	80	0.04	(-0.04,0.13)	0.33	-0.07	(-0.26,0.12)	0.49	0.20
SHBG	BMI	0.08	(0.01,0.14)	0.01	-0.01	(-0.08,0.07)	0.84	7.4E-04	0	(-0.06,0.06)	0.99	283	0.04	(0.02,0.1)	0.17	-0.01	(-0.08,0.07)	0.85	0.04
SHBG	Fasting glucose	-0.01	(-0.09,0.07)	0.87	0.13	(-0.01,0.28)	0.08	0.03	0	(-0.1,0.1)	0.97	160	-0.05	(-0.12,0.02)	0.16	-0.01	(-0.14,0.12)	0.83	0.51
SHBG	Fasting insulin	-0.02	(-0.09,0.06)	0.65	0.06	(-0.06,0.17)	0.35	0.11	-0.02	(-0.12,0.07)	0.64	164	-0.01	(-0.08,0.06)	0.72	0	(-0.11,0.1)	0.95	0.82
SHBG	T2D	0.73	(0.6,0.9)	2.7E-03	1.02	(0.78,1.34)	0.89	6.2E-04	0.94	(0.8,1.1)	0.42	319	0.78	(0.66,0.92)	2.8E-03	0.93	(0.75,1.16)	0.54	0.02
SHBG	Total fat	-0.05	(-0.19,0.1)	0.53	-0.16	(-0.36,0.03)	0.10	0.10	-0.22	(-0.46,0.03)	0.09	324	-0.07	(-0.22,0.07)	0.35	-0.17	(-0.36,0.02)	0.08	0.12
SHBG	Total lean	-0.01	(-0.15,0.14)	0.94	-0.01	(-0.21,0.2)	0.96	0.99	-0.18	(-0.41,0.04)	0.11	324	-0.03	(-0.17,0.12)	0.71	0.01	(-0.19,0.21)	0.91	0.58
SHBG	WHR adjusted for BMI	-0.02	(-0.1,0.06)	0.65	0.07	(-0.06,0.2)	0.32	0.10	0.04	(-0.07,0.16)	0.43	250	-0.03	(-0.11,0.06)	0.53	0.07	(-0.06,0.19)	0.28	0.05
SHBG cluster	BMI	0.07	(0.01,0.13)	0.03	0	(-0.08,0.08)	0.95	5.4E-03	0	(-0.06,0.06)	0.99	289	0.04	(0.02,0.1)	0.20	-0.01	(-0.08,0.07)	0.88	0.06
SHBG cluster	Fasting glucose	-0.01	(-0.08,0.07)	0.88	0.12	(-0.02,0.27)	0.09	0.05	0	(-0.1,0.1)	0.97	167	-0.05	(-0.12,0.02)	0.18	-0.02	(-0.15,0.1)	0.74	0.64
SHBG cluster	Fasting insulin	-0.02	(-0.09,0.06)	0.67	0.06	(-0.06,0.18)	0.31	0.10	-0.02	(-0.12,0.07)	0.63	166	-0.01	(-0.08,0.06)	0.83	-0.01	(-0.11,0.1)	0.92	0.96
SHBG cluster	T2D	0.72	(0.59,0.89)	1.8E-03	1.03	(0.79,1.36)	0.82	2.5E-04	0.94	(0.82,1.09)	0.40	324	0.78	(0.66,0.92)	2.7E-03	0.93	(0.74,1.15)	0.49	0.02
SHBG cluster	Total fat	-0.08	(-0.22,0.06)	0.28	-0.16	(-0.37,0.04)	0.11	0.23	-0.22	(-0.45,0.02)	0.07	330	-0.09	(-0.23,0.05)	0.19	-0.18	(-0.37,0.02)	0.07	0.23
SHBG cluster	Total lean	-0.02	(-0.16,0.13)	0.81	0.01	(-0.2,0.21)	0.95	0.74	-0.18	(-0.41,0.04)	0.11	330	-0.04	(-0.18,0.11)	0.64	0.02	(-0.19,0.22)	0.87	0.47
SHBG cluster	WHR adjusted for BMI	-0.01	(-0.11,0.07)	0.73	0.06	(-0.07,0.19)	0.39	0.16	0.04	(-0.07,0.16)	0.43	255	-0.02	(-0.1,0.06)	0.61	0.06	(-0.07,0.18)	0.67	0.11
Estradiol	BMI	0.4	(0.3,1.1)	0.23	-0.63	(-2.47,1.21)	0.46	0.21	0.2	(-0.43,0.83)	0.47	10	0.04	(-0.6,0.68)	0.88	0.35	(-1.31,2)	0.62	0.53
Estradiol	Fasting glucose	0.58	(-2.27,3.43)	0.60	-1.05	(-2.23,0.12)	0.07	0.06	-0.31	(-1.23,0.6)	0.34	5	-0.12	(-0.78,5.55)	0.84	NA	NA	NA	NA
Estradiol	Fasting insulin	0.12	(-0.95,1.19)	0.80	-1.71	(-3.91,0.48)	0.11	0.08	-0.39	(-1.05,0.28)	0.16	7	-0.12	(-1.4,1.16)	0.78	-1.23	(-3.82,1.35)	0.27	0.27
Estradiol	T2D	1.56	(0.21,1.73)	0.64	0.16	(0.12,1)	0.38	0.22	1.02	(0.24,3.7)	0.98	15	2.17	(0.24,15.2)	0.43	0.07	(0.1,1.7)	0.10	0.03
Estradiol	Total fat	-0.26	(-1.5,0.99)	0.67	0.35	(-2.65,3.35)	0.81	0.64	-0.61	(-2.18,0.96)	0.41	18	-0.38	(-1.9,1.14)	0.59	-2.01	(-5.65,1.62)	0.25	0.30
Estradiol	Total lean	0.18	(-0.96,1.32)	0.74	0	(-2.77,2.76)	1.00	0.88	1.03	(-0.53,2.59)	0.16	18	-0.02	(-1.54,1.5)	0.98	-0.37	(-2.22,1.49)	0.32	0.11
Estradiol	WHR adjusted for BMI	-1.11	(-1.77,-0.45)	4.1E-03	-2.09	(-3.84,-0.34)	0.03	0.21	-1.33	(-2.14,-0.51)	2.5E-04	10	-0.88	(-1.84,0.09)	0.07	-2.47	(-4.6,-0.35)	0.04	0.05
Estradiol cluster	BMI	0.1	(-0.46,0.65)	0.69	0.35	(-1.32,0.6)	0.63	0.63	0.17	(-0.3,0.85)	0.53	7	0.06	(-0.67,0.78)	0.84	0.38	(-1.64,2.4)	0.64	0.63
Estradiol cluster	Fasting glucose	-0.25	(-1.13,0.63)	0.43	-1.71	(-1.104,7.62)	0.62	0.57	-0.41	(-1.44,0.63)	0.21	4	-0.12	(-0.78,5.55)	0.84	NA	NA	NA	NA
Estradiol cluster	Fasting insulin	-0.25	(-0.88,0.39)	0.34	-0.72	(-2.57,1.12)	0.36	0.48	-0.39	(-1.22,0.4)	0.13	5	-0.29	(-1.75,1.17)	0.49	-0.85	(-5.89,4.19)	0.60	0.70
Estradiol cluster	T2D	1.3	(1.16,1.53)	0.78	0.46	(0.15,1.59)	0.77	0.67	1.02	(0.22,1.78)	0.57	10	2.85	(0.24,33.22)	0.32	0.13	(0.20,2.3)	0.36	0.16
Estradiol cluster	Total fat	0.08	(-1.21,1.39)	0.89	0.14	(-3.88,4.15)	0.94	0.98	-0.5	(-2.21,1.21)	0.93	13	-0.06	(-1.7,1.59)	0.94	-0.67	(-5.52,4.18)	0.76	0.76
Estradiol cluster	Total lean	0.01	(-1.49,1.51)	0.99	-0.73	(-5.32,3.86)	0.74	0.72	1.12	(-0.72,2.96)	0.18	13	-0.13	(-1.94,1.67)	0.87	0.34	(-4.99,5.68)	0.89	0.83
Estradiol cluster	WHR adjusted for BMI	-1.2	(-2.09,-0.3)	0.02	-2.29	(-4.99,0.4)	0.09	0.34	-1.39	(-2.3,-0.49)	1.7E-04	7	-0.96	(-2.1,0.18)	0.08	-2.66	(-5.26,-0.06)	0.07	0.10

* All effects are betas except for T2D which is presented as an odds ratio.
Note: P values < 0.05 are in bold.

Supplementary Table S21: Results of two sample Mendelian randomization analysis in women of sex hormone genetic instruments on metabolic outcomes.

Exposure genetic instrument	Outcome	Primary analysis								Steiger filtered analysis									
		Inverse variance weighted			Egger			Intercept P	Weighted median			Inverse variance weighted			Egger			Weighted median	N variants
		Beta/OR [*] (95% CI)	P		Beta/OR [*] (95% CI)	P			Beta/OR [*] (95% CI)	P		Beta/OR [*] (95% CI)	P		Beta/OR [*] (95% CI)	P			
Total testosterone	BMI	0.02 (-0.01,0.06)	0.16	0.02 (-0.06,0.09)	0.67	0.84	0.02 (-0.02,0.06)	0.34	214	0.02 (-0.01,0.06)	0.12	0.02 (-0.06,0.09)	0.67	0.78	0.02 (-0.02,0.07)	0.32	166		
Total testosterone	Fasting glucose	0.01 (-0.03,0.04)	0.58	0.04 (-0.04,0.13)	0.28	0.35	0 (-0.04,0.04)	0.99	116	0 (-0.03,0.03)	0.86	0.02 (-0.05,0.09)	0.64	0.55	0 (-0.04,0.05)	0.89	86		
Total testosterone	Fasting insulin	0.03 (-0.02,0.07)	0.23	0.04 (-0.08,0.16)	0.54	0.85	0.04 (-0.02,0.1)	0.19	120	0.02 (-0.03,0.06)	0.45	-0.03 (-0.15,0.1)	0.67	0.45	0.02 (-0.03,0.08)	0.45	84		
Total testosterone	PCOS	1.26 (1.13,1.41)	4.1E-05	1.54 (1.25,1.9)	5.3E-05	0.03	1.41 (1.1,1.64)	1.5E-05	245	1.33 (1.19,1.48)	4.7E-07	1.53 (1.25,1.86)	3.6E-05	0.10	1.48 (1.26,1.73)	7.7E-07	191		
Total testosterone	T2D	0.97 (0.89,1.05)	0.46	1.03 (0.88,1.21)	0.69	0.35	1.02 (0.91,1.14)	0.71	241	1 (0.92,1.08)	0.96	0.99 (0.86,1.15)	0.92	0.93	1.03 (0.92,1.15)	0.60	187		
Total testosterone	Total fat	0.05 (-0.03,0.12)	0.21	0.08 (-0.06,0.21)	0.27	0.61	0.13 (-0.01,0.27)	0.06	240	0.06 (-0.02,0.14)	0.12	0.04 (-0.1,0.18)	0.57	0.68	0.13 (-0.02,0.29)	0.09	187		
Total testosterone	Total lean	0.08 (0.01,0.16)	0.03	0.14 (0.01,0.28)	0.03	0.25	0.16 (0.03,0.29)	0.01	241	0.09 (0.01,0.17)	0.03	0.13 (-0.01,0.27)	0.06	0.49	0.2 (0.06,0.34)	5.8E-03	188		
Total testosterone	WHR adjusted for BMI	0.01 (-0.04,0.05)	0.82	-0.04 (-0.14,0.07)	0.52	0.41	0.04 (-0.01,0.09)	0.13	212	0.03 (-0.01,0.06)	0.17	0.01 (-0.08,0.09)	0.85	0.65	0.04 (-0.01,0.1)	0.11	165		
Bioavailable testosterone	BMI	0.05 (0.0,1)	0.04	-0.04 (-0.12,0.04)	0.35	4.8E-03	-0.02 (-0.08,0.05)	0.61	152	0.04 (0.0,0.09)	0.07	0.04 (-0.11,0.03)	0.21	1.6E-03	0.02 (-0.06,0.04)	0.57	117		
Bioavailable testosterone	Fasting glucose	0.06 (0.01,0.11)	0.03	0.05 (-0.1,0.2)	0.51	0.93	0.04 (-0.02,0.11)	0.16	88	0.02 (-0.03,0.07)	0.41	-0.02 (-0.16,0.12)	0.76	0.53	0.02 (-0.05,0.09)	0.53	64		
Bioavailable testosterone	Fasting insulin	0.12 (0.06,0.18)	1.5E-04	0.05 (-0.15,0.24)	0.64	0.42	0.11 (0.04,0.19)	2.0E-03	92	0.09 (0.03,0.15)	4.9E-03	-0.01 (-0.18,0.17)	0.94	0.26	0.11 (0.03,0.19)	7.7E-03	66		
Bioavailable testosterone	PCOS	1.66 (1.42,1.95)	3.2E-09	1.86 (1.39,2.5)	4.6E-05	0.36	1.61 (1.29,2)	2.4E-05	174	1.55 (1.32,1.82)	1.9E-07	1.97 (1.51,2.59)	2.0E-06	0.03	1.59 (1.29,1.97)	1.3E-05	133		
Bioavailable testosterone	T2D	1.47 (1.28,1.69)	2.5E-07	1.34 (1.04,1.72)	0.02	0.38	1.33 (1.12,1.58)	8.4E-04	173	1.33 (1.17,1.51)	1.6E-05	1.34 (1.08,1.66)	7.6E-03	0.92	1.32 (1.11,1.58)	1.9E-03	133		
Bioavailable testosterone	Total fat	0.03 (-0.09,0.15)	0.64	0.02 (-0.15,0.23)	0.87	0.90	-0.02 (-0.22,0.18)	0.84	171	0.02 (-0.1,0.14)	0.76	0.01 (-0.2,0.22)	0.93	0.92	-0.03 (-0.24,0.18)	0.78	133		
Bioavailable testosterone	Total lean	-0.03 (-0.14,0.08)	0.61	-0.05 (-0.25,0.14)	0.61	0.79	-0.19 (-0.39,0.01)	0.07	170	-0.03 (-0.14,0.09)	0.65	-0.03 (-0.23,0.17)	0.77	0.97	-0.2 (-0.4,0.01)	0.06	132		
Bioavailable testosterone	WHR adjusted for BMI	0.06 (0.01,0.12)	0.02	0 (-0.09,0.08)	0.94	0.05	0 (-0.06,0.06)	0.97	152	0.04 (-0.01,0.09)	0.09	0.02 (-0.06,0.09)	0.65	0.39	-0.02 (-0.08,0.05)	0.59	117		
Testosterone cluster	BMI	0.02 (-0.01,0.06)	0.15	0.02 (-0.05,0.09)	0.59	0.90	0.02 (-0.02,0.06)	0.38	203	0.02 (-0.01,0.06)	0.16	0.01 (-0.06,0.08)	0.85	0.62	0.02 (-0.03,0.06)	0.41	164		
Testosterone cluster	Fasting glucose	0 (-0.03,0.03)	0.97	0.03 (-0.04,0.09)	0.41	0.35	0 (-0.04,0.04)	0.96	110	0 (-0.03,0.03)	0.89	0.03 (-0.04,0.09)	0.44	0.36	0 (-0.04,0.05)	0.92	86		
Testosterone cluster	Fasting insulin	0.01 (-0.05,0.06)	0.90	0.02 (-0.1,0.13)	0.76	0.96	0.02 (-0.04,0.07)	0.51	109	0.02 (-0.03,0.06)	0.50	-0.02 (-0.14,0.1)	0.78	0.57	0.01 (-0.05,0.07)	0.80	96		
Testosterone cluster	PCOS	1.31 (1.17,1.46)	2.3E-06	1.61 (1.32,1.96)	4.8E-06	0.02	1.43 (1.23,1.68)	5.6E-06	232	1.34 (1.21,1.49)	2.2E-07	1.58 (1.31,1.92)	7.1E-06	0.05	1.49 (1.28,1.73)	1.9E-07	188		
Testosterone cluster	T2D	0.97 (0.89,1.05)	0.40	1.03 (0.89,1.21)	0.66	0.28	1.02 (0.92,1.13)	0.74	229	0.98 (0.91,1.07)	0.69	1.02 (0.88,1.18)	0.80	0.56	1.01 (0.91,1.14)	0.71	184		
Testosterone cluster	Total fat	0.06 (-0.02,0.13)	0.16	0.08 (-0.05,0.21)	0.22	0.59	0.14 (0.01,0.28)	0.04	228	0.06 (-0.02,0.14)	0.15	0.05 (-0.08,0.19)	0.45	0.90	0.13 (-0.01,0.28)	0.08	184		
Testosterone cluster	Total lean	0.1 (0.02,0.17)	0.01	0.15 (0.02,0.28)	0.02	0.29	0.2 (0.06,0.34)	4.6E-03	229	0.1 (0.02,0.18)	0.02	0.14 (0.01,0.28)	0.04	0.41	0.2 (0.06,0.34)	6.3E-03	185		
Testosterone cluster	WHR adjusted for BMI	0.01 (-0.09,0.06)	0.61	0.01 (-0.09,0.11)	0.86	0.96	0.04 (-0.01,0.09)	0.11	201	0.03 (-0.01,0.07)	0.13	0.02 (-0.14,0.1)	0.56	0.91	0.04 (-0.01,0.1)	0.14	163		
SHBG	BMI	0.05 (0,1)	0.03	-0.02 (-0.08,0.05)	0.62	2.3E-04	0.02 (-0.04,0.07)	0.51	291	0 (-0.05,0.05)	1.00	0 (-0.06,0.06)	0.93	0.87	0.02 (-0.04,0.07)	0.54	178		
SHBG	Fasting glucose	-0.07 (-0.14,0.01)	0.09	0.16 (0.02,0.31)	0.02	2.3E-04	-0.1 (-0.18,-0.03)	8.4E-03	168	-0.06 (-0.12,0)	0.04	0.01 (-0.09,0.12)	0.82	0.10	-0.09 (-0.17,0)	0.04	94		
SHBG	Fasting insulin	-0.16 (-0.24,-0.07)	3.3E-04	-0.07 (-0.23,0.1)	0.44	0.19	-0.18 (-0.28,-0.08)	2.2E-04	178	-0.11 (-0.19,-0.03)	6.6E-03	-0.1 (-0.24,0.05)	0.18	0.84	-0.13 (-0.23,-0.03)	0.01	99		
SHBG	PCOS	0.66 (0.57,0.77)	3.6E-07	0.6 (0.48,0.75)	1.2E-05	0.24	0.67 (0.54,0.84)	5.4E-04	348	0.69 (0.58,0.81)	1.9E-05	0.61 (0.48,0.77)	3.8E-05	0.14	0.68 (0.54,0.87)	1.8E-03	214		
SHBG	T2D	0.44 (0.35,0.54)	6.5E-13	0.81 (0.6,1.09)	0.17	1.8E-08	0.66 (0.54,0.79)	1.3E-05	341	0.58 (0.5,0.68)	1.2E-10	0.69 (0.56,0.86)	7.7E-04	0.01	0.68 (0.56,0.81)	3.5E-05	210		
SHBG	Total fat	-0.09 (-0.22,0.03)	0.14	-0.01 (-0.2,0.17)	0.87	0.25	0.02 (-0.19,0.23)	0.87	339	-0.13 (-0.27,0)	0.05	-0.06 (-0.25,0.12)	0.50	0.29	0.02 (-0.21,0.24)	0.88	210		
SHBG	Total lean	0.01 (-0.11,0.14)	0.85	-0.11 (-0.07,0.3)	0.23	0.15	0.16 (-0.05,0.37)	0.13	340	0.04 (-0.1,0.17)	0.59	0.08 (-0.11,0.28)	0.40	0.51	0.17 (0.05,0.38)	0.13	211		
SHBG	WHR adjusted for BMI	-0.22 (-0.3,-0.13)	1.0E-06	0.01 (-0.09,0.12)	0.81	3.1E-11	0.03 (-0.03,0.09)	0.38	291	-0.08 (-0.14,-0.03)	3.7E-03	-0.02 (-0.08,0.05)	0.63	9.5E-04	0.02 (-0.04,0.09)	0.46	178		
SHBG cluster	BMI	0.04 (-0.01,0.09)	0.11	-0.01 (-0.07,0.06)	0.83	0.02	0.02 (-0.04,0.07)	0.52	302	-0.01 (-0.06,0.04)	0.80	0 (-0.06,0.06)	0.96	0.67	0.02 (-0.04,0.07)	0.56	189		
SHBG cluster	Fasting glucose	-0.07 (-0.14,0.01)	0.09	0.15 (0.01,0.28)	0.04	4.6E-04	-0.11 (-0.18,-0.03)	4.4E-03	173	-0.06 (-0.12,0)	0.04	0 (-0.1,0.1)	0.99	0.15	-0.1 (-0.18,-0.01)	0.02	99		
SHBG cluster	Fasting insulin	-0.15 (-0.24,-0.07)	2.3E-04	-0.07 (-0.23,0.08)	0.37	0.20	-0.17 (-0.27,-0.07)	6.4E-04	189	0.11 (0.19,0.04)	3.9E-03	0.09 (-0.23,0.05)	0.20	0.65	-0.15 (-0.25,0.06)	1.7E-03	108		
SHBG cluster	PCOS	0.67 (0.57,0.78)	7.3E-07	0.62 (0.49,0.77)	3.3E-05	0.33	0.67 (0.54,0.84)	6.3E-04	361	0.69 (0.59,0.82)	2.3E-05	0.62 (0.5,0.78)	6.0E-05	0.18	0.68 (0.54,0.86)	1.2E-03	226		
SHBG cluster	T2D	0.44 (0.35,0.55)	7.5E-13	0.8 (0.59,1.07)	0.13	5.3E-08	0.65 (0.54,0.78)	4.9E-06	354	0.59 (0.5,0.69)	2.5E-10	0.68 (0.55,0.84)	4.2E-04	0.04	0.65 (0.55,0.78)	1.9E-06	222		
SHBG cluster	Total fat	-0.06 (-0.19,0.06)	0.33	0 (-0.18,0.18)	0.97	0.33	0.02 (-0.18,0.22)	0.83	350	-0.11 (-0.24,0.02)	0.10	-0.04 (-0.23,0.14)	0.64	0.30	0.02 (-0.19,0.23)	0.85	221		
SHBG cluster	Total lean	0.03 (-0.1,0.15)	0.69	0.11 (-0.07,0.29)	0.26	0.22	0.19 (-0.02,0.39)	0.07	350	0.05 (-0.08,0.18)	0.47	0.08 (-0.1,0.26)	0.39	0.62	0.19 (-0.03,0.41)	0.09	221		
SHBG cluster	WHR adjusted for BMI	-0.21 (-0.29,-0.13)	1.1E-06	0 (-0.1,0.1)	0.94	2.3E-10	-0.03 (-0.03,0.09)	0.38	302	-0.08 (-0.13,-0.03)	3.7E-03	-0.02 (-0.09,0.04)	0.47	3.8E-03	0.02 (-0.04,0.09)	0.46	189		

* All effects are betas except for T2D and PCOS which are presented as odds ratios.
Note: P values < 0.05 are in bold.

Supplementary Table S22: Results of two sample Mendelian randomization analysis of sex hormone genetic instrument on number of sexual partners.

Exposure genetic instrument	Exposure sex	Outcome sex	Primary analysis						Steiger filtered analysis									
			Inverse variance weighted		Egger		Weighted median		Inverse variance weighted		Egger		Weighted median					
			Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Beta (95% CI)	P	N variants	Beta (95% CI)	P	Intercept	Beta (95% CI)	P	N variants		
Total testosterone	Female	Female	0.02 (-0.1,0.13)	0.77	0 (-0.22,0.21)	0.97	0.81	0.16 (-0.01,0.33)	0.06	254	1.17 (1.05,1.31)	3.8E-03	0.12	0.99	1.04 (0.86,1.25)	0.70	194	
Bioavailable testosterone	Female	Female	0.05 (-0.1,0.2)	0.53	0.13 (-0.14,0.41)	0.35	0.48	0.15 (-0.08,0.38)	0.19	180	1.01 (0.85,1.19)	0.92	0.97 (0.69,1.35)	0.85	0.78	1.02 (0.76,1.36)	0.92	134
Testosterone cluster	Female	Female	0.03 (-0.08,0.14)	0.59	0 (-0.2,0.21)	0.96	0.76	0.15 (-0.02,0.32)	0.07	241	0.04 (-0.08,0.15)	0.56	0.03 (-0.18,0.24)	0.76	0.97	0.16 (-0.01,0.33)	0.06	196
SHBG adjusted for BMI	Female	Female	-0.09 (-0.26,0.08)	0.30	-0.06 (-0.31,0.19)	0.64	0.74	-0.13 (-0.38,0.13)	0.32	359	1.1 (0.88,1.38)	0.41	1.12 (0.78,1.6)	0.53	0.89	0.96 (0.68,1.36)	0.82	216
SHBG	Female	Female	-0.09 (-0.26,0.08)	0.32	-0.05 (-0.3,0.19)	0.68	0.70	-0.13 (-0.37,0.11)	0.30	359	1.1 (0.88,1.38)	0.39	1.13 (0.81,1.6)	0.49	0.86	0.96 (0.68,1.36)	0.83	216
SHBG cluster	Female	Female	-0.09 (-0.26,0.08)	0.28	-0.05 (-0.29,0.2)	0.70	0.60	-0.15 (-0.39,0.09)	0.22	373	-0.07 (-0.25,0.12)	0.49	-0.04 (-0.3,0.21)	0.74	0.79	-0.15 (-0.4,0.1)	0.23	234
Total testosterone	Male	Male	0.3 (0.09,0.51)	5.0E-03	0.45 (0.12,0.78)	7.7E-03	0.25	0.38 (0.08,0.68)	0.01	231	0.1 (-0.08,0.27)	0.27	-0.19 (-0.47,0.09)	0.19	0.01	-0.01 (-0.21,0.18)	0.89	163
Bioavailable testosterone	Male	Male	0.46 (0.16,0.77)	3.2E-03	0.63 (0.14,1.11)	0.01	0.41	0.45 (0.07,0.83)	0.02	125	0.25 (-0.06,0.55)	0.11	0.03 (-0.61,0.67)	0.93	0.44	0.44 (0.17,0.71)	1.2E-03	88
Testosterone cluster	Male	Male	0.5 (0.13,0.87)	8.4E-03	0.63 (0.08,1.17)	0.02	0.53	0.56 (0.11,0.92)	0.02	122	0.49 (0.08,0.91)	0.02	0.71 (0.05,1.37)	0.03	0.40	0.61 (0.09,1.13)	0.02	116
SHBG adjusted for BMI	Male	Male	0.19 (-0.15,0.53)	0.28	0.37 (-0.11,0.84)	0.13	0.29	0.57 (0.07,1.08)	0.03	357	-0.03 (-0.29,0.23)	0.81	-0.19 (-0.59,0.2)	0.33	0.27	-0.24 (-0.61,0.13)	0.19	235
SHBG	Male	Male	0.19 (-0.15,0.53)	0.28	0.36 (-0.12,0.83)	0.14	0.31	0.56 (0.02,1.11)	0.04	357	-0.03 (-0.3,0.23)	0.80	-0.19 (-0.58,0.19)	0.33	0.27	-0.24 (-0.58,0.1)	0.16	235
SHBG cluster	Male	Male	0.16 (-0.17,0.49)	0.34	0.31 (-0.15,0.78)	0.18	0.35	0.56 (0.02,1.11)	0.04	362	0.17 (-0.18,0.51)	0.35	0.28 (-0.2,0.76)	0.25	0.49	0.56 (0.24,1.16)	0.07	297
Estradiol	Male	Male	2.48 (0.08,4.88)	0.04	0.75 (-4.68,6.18)	0.78	0.47	3.07 (-0.52,6.67)	0.08	22	-2.32 (-9.4,7.5)	0.45	-10.96 (-26.4,7.4)	0.14	0.19	-1.03 (-3.91,1.84)	0.38	7
Estradiol cluster	Male	Male	0.49 (-2.44,3.42)	0.72	-0.31 (-8.54,7.92)	0.94	0.80	1.37 (-2.84,5.77)	0.48	14	0.85 (-2.7,4.4)	0.59	-2.35 (-12.14,7.45)	0.60	0.42	1.75 (-2.98,6.49)	0.39	9
Total testosterone	Female	Male	0.14 (-0.07,0.35)	0.20	0.2 (-0.19,0.59)	0.31	0.70	0.14 (-0.25,0.52)	0.48	254	-0.01 (-0.14,0.12)	0.89	-0.03 (-0.27,0.2)	0.77	0.80	-0.06 (-0.28,0.16)	0.59	169
Bioavailable testosterone	Female	Male	-0.06 (-0.34,0.23)	0.69	0.26 (-0.25,0.77)	0.31	0.14	0.16 (-0.27,0.59)	0.47	180	0.13 (-0.07,0.32)	0.21	-0.01 (-0.4,0.37)	0.95	0.41	0.14 (-0.15,0.43)	0.35	119
Testosterone cluster	Female	Male	0.09 (-0.12,0.29)	0.41	0.18 (-0.19,0.55)	0.33	0.53	0.14 (-0.25,0.53)	0.49	241	0.08 (-0.13,0.3)	0.44	0.14 (-0.24,0.52)	0.47	0.73	0.14 (-0.26,0.53)	0.49	196
SHBG adjusted for BMI	Female	Male	0.15 (-0.19,0.49)	0.37	0.33 (-0.18,0.83)	0.20	0.36	-0.07 (-0.57,0.44)	0.80	359	0.04 (-0.2,0.28)	0.74	0 (-0.37,0.38)	0.98	0.80	-0.15 (-0.48,0.18)	0.37	188
SHBG	Female	Male	0.16 (-0.18,0.5)	0.37	0.32 (-0.17,0.81)	0.20	0.37	-0.07 (-0.56,0.43)	0.80	359	0.03 (-0.22,0.29)	0.80	-0.02 (-0.42,0.39)	0.94	0.76	-0.1 (-0.45,0.25)	0.57	188
SHBG cluster	Female	Male	0.17 (-0.17,0.51)	0.33	0.28 (-0.21,0.77)	0.27	0.55	-0.06 (-0.59,0.47)	0.82	373	0.22 (-0.18,0.62)	0.28	0.2 (-0.35,0.75)	0.48	0.91	-0.07 (-0.59,0.45)	0.79	234
Total testosterone	Male	Female	-0.05 (-0.14,0.04)	0.25	-0.06 (-0.2,0.08)	0.41	0.90	-0.06 (-0.19,0.07)	0.36	231	0.94 (0.85,1.05)	0.29	0.81 (0.67,0.96)	0.02	0.03	0.78 (0.66,0.92)	2.9E-03	193
Bioavailable testosterone	Male	Female	0.03 (-0.11,0.16)	0.70	0.1 (-0.12,0.32)	0.36	0.39	0.07 (-0.1,0.24)	0.42	125	0.97 (0.83,1.13)	0.66	0.84 (0.62,1.14)	0.26	0.29	1.1 (0.89,1.36)	0.38	116
Testosterone cluster	Male	Female	0.02 (-0.13,0.18)	0.77	0.13 (-0.11,0.36)	0.28	0.24	0.09 (-0.14,0.32)	0.45	122	0.04 (-0.14,0.22)	0.65	0.21 (-0.08,0.51)	0.16	0.16	0.1 (-0.17,0.37)	0.47	116
SHBG adjusted for BMI	Male	Female	-0.15 (-0.33,0.02)	0.09	-0.16 (-0.41,0.08)	0.19	0.89	-0.17 (-0.42,0.09)	0.19	357	0.89 (0.72,1.08)	0.24	0.82 (0.61,1.11)	0.19	0.48	0.65 (0.49,0.87)	3.3E-03	279
SHBG	Male	Female	-0.15 (-0.32,0.02)	0.09	-0.16 (-0.4,0.09)	0.20	0.93	-0.17 (-0.41,0.08)	0.18	357	0.89 (0.73,1.09)	0.26	0.83 (0.61,1.12)	0.22	0.52	0.65 (0.49,0.87)	3.2E-03	279
SHBG cluster	Male	Female	-0.17 (-0.34,0.01)	0.06	-0.16 (-0.41,0.08)	0.19	0.97	-0.17 (-0.41,0.07)	0.17	362	-0.08 (-0.26,0.1)	0.37	-0.17 (-0.42,0.07)	0.17	0.36	-0.16 (-0.42,0.09)	0.20	297
Estradiol	Male	Female	0.39 (-1.1,7.8)	0.57	2.2 (-0.88,5.28)	0.15	0.19	0.57 (-1.13,2.7)	0.48	22	1.37 (0.15,2.16)	0.75	0.45 (0.13,0)	0.76	0.64	2.45 (0.24,5.11)	0.39	10
Estradiol cluster	Male	Female	1.07 (-0.47,2.6)	0.16	1.73 (-2.72,6.19)	0.42	0.74	0.66 (-1.49,2.81)	0.51	14	1.22 (-0.93,3.37)	0.23	1.54 (-4.8,7.87)	0.59	0.90	0.73 (-1.76,3.23)	0.50	9

Supplementary Table S23: Results of two sample Mendelian randomization analysis in men of sex hormone genetic instruments on body composition outcomes.

Exposure genetic instrument	Outcome	Primary analysis						Steiger-filtered analysis									
		Inverse variance weighted		Egger		Weighted median		Inverse variance weighted		Egger		Weighted median					
		Beta (95% CI)	P	Beta (95% CI)	P	Intercept P	Beta (95% CI)	P	N variants	Beta (95% CI)	P	Intercept P	Beta (95% CI)	P	N variants		
Total testosterone	Android fat	-0.13 (-0.21, 0.04)	2.9E-03	-0.08 (-0.21, 0.05)	0.21	0.37	-0.17 (-0.3, -0.04)	7.6E-03	210	-0.11 (-0.19, -0.02)	0.01	-0.11 (-0.24, 0.02)	0.08	0.93	-0.17 (-0.31, -0.03)	0.02	180
Total testosterone	Android lean	-0.03 (-0.11, 0.05)	0.51	-0.01 (-0.14, 0.11)	0.84	0.77	-0.14 (-0.27, -0.01)	0.04	210	-0.02 (-0.11, 0.06)	0.61	-0.05 (-0.18, 0.08)	0.46	0.59	-0.14 (-0.28, -0.01)	0.04	180
Total testosterone	Gynoid fat	-0.13 (-0.21, 0.05)	2.2E-03	-0.06 (-0.19, 0.07)	0.38	0.19	-0.1 (-0.23, 0.02)	0.11	210	-0.13 (-0.21, -0.04)	3.0E-03	-0.09 (-0.22, 0.03)	0.15	0.50	-0.11 (-0.25, 0.02)	0.10	180
Total testosterone	Gynoid lean	-0.04 (-0.12, 0.04)	0.35	0.01 (-0.12, 0.14)	0.88	0.33	-0.04 (-0.17, 0.09)	0.51	210	-0.04 (-0.13, 0.04)	0.30	-0.02 (-0.16, 0.11)	0.66	0.76	-0.04 (-0.18, 0.09)	0.51	180
Total testosterone	Subcutaneous fat	-0.07 (-0.15, 0.01)	0.10	0 (-0.12, 0.13)	0.95	0.15	-0.04 (-0.18, 0.09)	0.54	209	-0.09 (-0.17, -0.01)	0.03	-0.06 (-0.18, 0.06)	0.32	0.59	-0.07 (-0.19, 0.06)	0.31	179
Total testosterone	Visceral fat	-0.13 (-0.21, 0.05)	1.4E-03	-0.1 (-0.23, 0.03)	0.12	0.50	-0.15 (-0.28, -0.02)	0.02	208	-0.1 (-0.18, -0.02)	0.02	-0.11 (-0.24, 0.02)	0.09	0.84	-0.14 (-0.28, -0.01)	0.04	178
Bioavailable testosterone	Android fat	0.03 (-0.11, 0.17)	0.67	0.03 (-0.22, 0.28)	0.81	0.99	0.06 (-0.16, 0.28)	0.60	102	0.04 (-0.09, 0.17)	0.55	0.01 (-0.22, 0.25)	0.91	0.79	0.06 (-0.16, 0.27)	0.59	98
Bioavailable testosterone	Android lean	0.22 (0.07, 0.36)	3.5E-03	0.25 (-0.01, 0.5)	0.06	0.79	0.24 (0.04, 0.44)	0.02	102	0.23 (0.08, 0.37)	2.3E-03	0.23 (-0.03, 0.48)	0.08	0.99	0.25 (0.05, 0.45)	0.01	98
Bioavailable testosterone	Gynoid fat	-0.07 (-0.22, 0.08)	0.35	0.1 (-0.15, 0.36)	0.43	0.11	-0.06 (-0.26, 0.15)	0.57	102	-0.06 (-0.2, 0.09)	0.42	0.09 (-0.16, 0.34)	0.47	0.15	-0.05 (-0.25, 0.14)	0.59	98
Bioavailable testosterone	Gynoid lean	0.17 (0.03, 0.32)	0.02	0.17 (-0.1, 0.43)	0.21	0.95	0.16 (-0.04, 0.36)	0.12	102	0.19 (0.04, 0.34)	0.01	0.15 (-0.12, 0.41)	0.27	0.71	0.16 (-0.05, 0.36)	0.13	98
Bioavailable testosterone	Subcutaneous fat	-0.07 (-0.21, 0.07)	0.31	0.1 (-0.14, 0.34)	0.42	0.09	-0.04 (-0.23, 0.15)	0.68	100	-0.06 (-0.2, 0.07)	0.34	0.09 (-0.14, 0.32)	0.46	0.12	-0.04 (-0.23, 0.14)	0.64	96
Bioavailable testosterone	Visceral fat	0.09 (-0.05, 0.22)	0.21	0 (-0.24, 0.23)	0.98	0.37	-0.02 (-0.22, 0.18)	0.85	101	0.1 (-0.03, 0.23)	0.14	-0.02 (-0.24, 0.2)	0.86	0.21	-0.02 (-0.23, 0.19)	0.86	97
Testosterone cluster	Android fat	0.04 (-0.12, 0.2)	0.59	0 (-0.25, 0.25)	0.99	0.68	0.06 (-0.19, 0.31)	0.61	97	0.05 (-0.14, 0.24)	0.60	-0.01 (-0.42, 0.39)	0.95	0.72	0.07 (-0.21, 0.36)	0.61	92
Testosterone cluster	Android lean	0.23 (0.05, 0.4)	0.01	0.28 (0.05, 0.56)	0.05	0.64	0.13 (-0.12, 0.38)	0.30	97	0.23 (0.01, 0.44)	0.04	0.41 (-0.04, 0.85)	0.07	0.36	0.39 (0.1, 0.67)	7.1E-03	92
Testosterone cluster	Gynoid fat	-0.05 (-0.22, 0.12)	0.57	0.1 (-0.17, 0.38)	0.45	0.15	0.16 (-0.07, 0.38)	0.17	97	-0.18 (-0.39, 0.02)	0.08	-0.2 (-0.62, 0.23)	0.36	0.94	-0.18 (-0.48, 0.12)	0.23	92
Testosterone cluster	Gynoid lean	0.16 (-0.02, 0.34)	0.07	0.18 (-0.11, 0.46)	0.23	0.91	0.17 (-0.1, 0.43)	0.20	97	0.12 (-0.1, 0.34)	0.28	0.08 (-0.38, 0.54)	0.72	0.85	0.13 (-0.14, 0.41)	0.35	92
Testosterone cluster	Subcutaneous fat	-0.04 (-0.2, 0.12)	0.60	0.11 (-0.14, 0.36)	0.37	0.12	0.15 (-0.07, 0.37)	0.17	95	-0.15 (-0.34, 0.05)	0.13	-0.07 (-0.47, 0.33)	0.72	0.67	-0.14 (-0.41, 0.14)	0.32	90
Testosterone cluster	Visceral fat	0.09 (-0.07, 0.24)	0.27	-0.05 (-0.3, 0.19)	0.66	0.14	-0.02 (-0.28, 0.24)	0.88	96	0.15 (-0.04, 0.34)	0.11	0.01 (-0.38, 0.4)	0.95	0.42	0.18 (-0.11, 0.46)	0.22	91
SHBG	Android fat	-0.08 (-0.22, 0.06)	0.28	-0.16 (-0.36, 0.03)	0.11	0.23	-0.3 (-0.52, -0.07)	9.6E-03	324	-0.08 (-0.22, 0.05)	0.24	-0.16 (-0.35, 0.03)	0.10	0.25	-0.3 (-0.54, -0.06)	0.01	267
SHBG	Android lean	-0.03 (-0.17, 0.11)	0.67	-0.08 (-0.28, 0.12)	0.41	0.46	-0.23 (-0.47, 0)	0.05	324	-0.05 (-0.19, 0.1)	0.52	-0.06 (-0.26, 0.14)	0.55	0.84	-0.24 (-0.48, -0.01)	0.04	267
SHBG	Gynoid fat	0 (-0.15, 0.15)	1.00	-0.17 (-0.38, 0.04)	0.11	0.02	-0.15 (-0.39, 0.09)	0.23	323	-0.04 (-0.18, 0.1)	0.59	-0.18 (-0.38, 0.02)	0.07	0.04	-0.16 (-0.39, 0.08)	0.20	266
SHBG	Gynoid lean	-0.02 (-0.16, 0.13)	0.82	0 (-0.21, 0.2)	0.97	0.86	-0.05 (-0.29, 0.18)	0.65	324	-0.05 (-0.2, 0.09)	0.46	0.01 (-0.19, 0.21)	0.91	0.35	-0.09 (-0.34, 0.16)	0.48	267
SHBG	Subcutaneous fat	0.09 (-0.06, 0.24)	0.24	-0.03 (-0.25, 0.18)	0.75	0.10	-0.08 (-0.33, 0.16)	0.49	324	0.05 (-0.09, 0.2)	0.48	-0.08 (-0.28, 0.11)	0.41	0.05	-0.09 (-0.33, 0.15)	0.46	267
SHBG	Visceral fat	-0.15 (-0.29, -0.01)	0.03	-0.18 (-0.38, 0.01)	0.07	0.66	-0.25 (-0.48, -0.02)	0.03	323	-0.14 (-0.28, 0)	0.05	-0.16 (-0.35, 0.04)	0.11	0.82	-0.25 (-0.49, -0.01)	0.04	267
SHBG cluster	Android fat	-0.11 (-0.25, 0.04)	0.14	-0.16 (-0.36, 0.04)	0.11	0.49	-0.3 (-0.53, -0.07)	0.01	330	-0.11 (-0.25, 0.03)	0.12	-0.17 (-0.36, 0.03)	0.09	0.41	-0.3 (-0.53, -0.07)	0.01	274
SHBG cluster	Android lean	-0.04 (-0.18, 0.1)	0.58	-0.07 (-0.27, 0.13)	0.48	0.65	-0.24 (-0.47, -0.01)	0.04	330	-0.05 (-0.2, 0.09)	0.48	-0.06 (-0.26, 0.15)	0.59	0.98	-0.25 (-0.48, -0.01)	0.04	274
SHBG cluster	Gynoid fat	-0.03 (-0.18, 0.12)	0.67	-0.18 (-0.39, 0.03)	0.09	0.05	-0.15 (-0.38, 0.08)	0.21	329	-0.07 (-0.21, 0.08)	0.38	-0.19 (-0.39, 0.01)	0.06	0.07	-0.16 (-0.4, 0.07)	0.17	273
SHBG cluster	Gynoid lean	-0.02 (-0.17, 0.12)	0.74	0 (-0.21, 0.2)	0.72	0.17	-0.06 (-0.3, 0.19)	0.66	330	-0.06 (-0.2, 0.08)	0.42	0.01 (-0.19, 0.21)	0.92	0.32	-0.09 (-0.32, 0.14)	0.45	274
SHBG cluster	Subcutaneous fat	0.06 (-0.09, 0.21)	0.40	-0.04 (-0.25, 0.17)	0.72	0.17	-0.09 (-0.32, 0.15)	0.47	330	0.03 (-0.11, 0.18)	0.65	-0.09 (-0.29, 0.1)	0.36	0.07	-0.09 (-0.32, 0.14)	0.45	274
SHBG cluster	Visceral fat	-0.18 (-0.32, -0.04)	0.01	-0.18 (-0.38, 0.02)	0.08	0.97	-0.25 (-0.49, -0.01)	0.04	329	-0.17 (-0.31, -0.03)	0.02	-0.16 (-0.36, 0.03)	0.10	0.96	-0.25 (-0.5, 0)	0.05	274
Estradiol	Android fat	-0.52 (-1.87, 0.83)	0.42	0.6 (-2.65, 3.85)	0.70	0.43	-0.7 (-2.33, 0.82)	0.33	17	-0.47 (-2.21, 1.3)	0.57	-1.63 (-6.25, 2.98)	0.45	0.55	-0.84 (-2.68, 0.99)	0.30	10
Estradiol	Android lean	0.13 (-1.05, 1.3)	0.82	0.28 (-2.56, 3.12)	0.84	0.90	0.51 (-0.92, 0.1)	0.47	18	0.11 (-1.46, 1.69)	0.87	0.37 (-3.64, 4.37)	0.84	0.88	0.52 (-1.25, 2.28)	0.51	11
Estradiol	Gynoid fat	0.4 (-1.82, 1.62)	0.50	0.73 (-2.21, 3.67)	0.61	0.80	0.02 (-1.49, 1.53)	0.98	18	0.1 (-1.35, 1.55)	0.88	-1.81 (-5.15, 1.54)	0.26	0.20	-0.45 (-1.89, 1.74)	0.95	11
Estradiol	Gynoid lean	0.16 (-1.04, 1.35)	0.79	0.03 (-2.87, 2.92)	0.98	0.92	0.66 (-0.95, 2.8)	0.39	18	-0.06 (-1.42, 1.29)	0.92	-0.15 (-3.43, 3.12)	0.92	0.94	0.44 (-1.37, 2.25)	0.59	11
Estradiol	Subcutaneous fat	0.22 (-1.38, 1.82)	0.78	-0.46 (-4.32, 3.39)	0.80	0.69	-0.02 (-1.67, 1.63)	0.98	18	0 (-1.78, 1.79)	1.00	-1.94 (-6.21, 2.33)	0.34	0.29	-0.24 (-1.57, 1.67)	0.78	11
Estradiol	Visceral fat	-0.75 (-1.99, 0.48)	0.22	0.53 (-2.37, 3.42)	0.71	0.32	-0.73 (-2.26, 0.79)	0.31	18	-0.62 (-2.12, 0.87)	0.37	-1.43 (-5.17, 2.31)	0.42	0.61	-1.12 (-2.88, 0.65)	0.16	11
Estradiol cluster	Android fat	-0.04 (-1.51, 1.43)	0.95	0.28 (-4.23, 4.8)	0.89	0.87	-0.6 (-2.51, 1.4)	0.45	13	-0.15 (-2.06, 1.75)	0.86	-0.57 (-6.22, 5.08)	0.82	0.86	-0.59 (-2.1, 1.54)	0.46	9
Estradiol cluster	Android lean	-0.08 (-1.64, 1.48)	0.91	-0.31 (-5.11, 4.49)	0.89	0.91	0.28 (-1.54, 2.09)	0.74	13	-0.07 (-1.95, 1.81)	0.93	1.03 (-4.47, 6.53)	0.68	0.64	0.28 (-1.73, 2.29)	0.75	9
Estradiol cluster	Gynoid fat	0.6 (-0.69, 1.88)	0.33	-0.03 (-3.83, 3.77)	0.99	0.71	0.08 (-1.69, 1.86)	0.92	13	0.41 (-1.15, 1.98)	0.56	-0.71 (-5.24, 2.82)	0.73	0.56	0 (-1.9, 1.9)	1.00	9
Estradiol cluster	Gynoid lean	0.02 (-1.58, 1.5)	0.98	-1.62 (-6.36, 3.11)	0.47	0.44	0.74 (-1.08, 2.56)	0.37	13	-0.18 (-1.71, 1.34)	0.79	-0.17 (-4.6, 2.7)	0.93	0.99	0.22 (-1.89, 2.33)	0.81	9
Estradiol cluster	Subcutaneous fat	0.33 (-1.29, 1.94)	0.67	0.14 (-4.83, 5.11)	0.95	0.93	-0.02 (-1.79, 1.76)	0.98	13	0.51 (-1.37, 2.4)	0.55	-0.55 (-6.04, 4.95)	0.82	0.65	-0.07 (-2.03, 1.89)	0.93	9
Estradiol cluster	Visceral fat	-0.25 (-1.67, 1.16)	0.70	-0.27 (-4.62, 4.09)	0.90	0.99	-0.66 (-2.43, 1.12)	0.42	13	-0.52 (-2.37, 1.32)	0.53	-1.11 (-6.55, 4.34)	0.65	0.80	-0.82 (-2.81, 1.16)	0.34	9

Note: P values < 0.05 are in bold.

Supplementary Table S24: Results of lookup using the two *cis* variants in SHBG as an instrument for SHBG. Effects on metabolic, body composition and cancer traits are shown for the rare allele of rs6258 and the common allele of rs1799941, which lower total testosterone and SHBG and raise bioavailable testosterone in males and females.

Notes:

rs12150660, a proxy for the common *cis*-variant rs1799941, was used where rs1799941 was not available.
rs6258 was not available for fasting glucose and fasting insulin; and rs1799941/rs12150660 was not available for fasting glucose.

Trait type	Trait	Variant	Variant type	Effect	Other a	Females			Males		
						Beta/OR (95% CI)	SE	P	Beta/OR (95% CI)	SE	P
Sex hormone measure	Bioavailable testosterone	rs1799941	Common <i>cis</i> -variant	G	A	0.09 (0.08,0.1)	0.003	1.8E-219	0.03 (0.03,0.04)	0.003	7.7E-23
Sex hormone measure	Bioavailable testosterone	rs6258	Rare <i>cis</i> -variant	T	C	0.55 (0.52,0.58)	0.015	7E-286	0.25 (0.21,0.29)	0.019	5.0E-43
Sex hormone measure	Estradiol	rs1799941	Common <i>cis</i> -variant	G	A	NA	NA	NA	-0.01 (-0.01,0)	0.001	2.7E-10
Sex hormone measure	Estradiol	rs6258	Rare <i>cis</i> -variant	T	C	NA	NA	NA	-0.02 (-0.04,-0.01)	0.005	1.2E-06
Sex hormone measure	SHBG	rs1799941	Common <i>cis</i> -variant	G	A	-0.1 (-0.1,-0.1)	0.002	2.2E-898	-0.12 (-0.12,-0.12)	0.001	4.1E-1795
Sex hormone measure	SHBG	rs6258	Rare <i>cis</i> -variant	T	C	-0.67 (-0.69,-0.66)	0.008	1.2E-1422	-0.61 (-0.62,-0.6)	0.007	4.6E-1586
Sex hormone measure	SHBG adjusted for BMI	rs1799941	Common <i>cis</i> -variant	G	A	-0.1 (-0.1,-0.1)	0.001	1.5E-1208	-0.12 (-0.12,-0.12)	0.001	9.2E-2048
Sex hormone measure	SHBG adjusted for BMI	rs6258	Rare <i>cis</i> -variant	T	C	-0.66 (-0.68,-0.65)	0.007	7.0E-1863	-0.61 (-0.62,-0.59)	0.007	1.2E-1823
Sex hormone measure	Total testosterone	rs1799941	Common <i>cis</i> -variant	G	A	-0.03 (-0.04,-0.03)	0.003	1.2E-23	-0.2 (-0.2,-0.19)	0.003	9.1E-742
Sex hormone measure	Total testosterone	rs6258	Rare <i>cis</i> -variant	T	C	-0.15 (-0.18,-0.11)	0.017	1.1E-18	-0.72 (-0.75,-0.68)	0.018	6.4E-347
Metabolic	BMI	rs12150660	Common <i>cis</i> -variant proxy	G	T	-0.01 (-0.02,0)	0.006	0.16	-0.01 (-0.02,0)	0.006	0.07
Metabolic	BMI	rs6258	Rare <i>cis</i> -variant	T	C	-0.01 (-0.05,0.02)	0.018	0.54	0 (-0.04,0.04)	0.020	0.98
Metabolic	Fasting insulin	rs12150660	Common <i>cis</i> -variant proxy	G	T	0 (-0.01,0.01)	0.005	0.42	0 (-0.01,0.01)	0.006	0.64
Metabolic	PCOS	rs1799941	Common <i>cis</i> -variant	G	A	1.03 (0.99,1.07)	0.019	0.15	NA	NA	NA
Metabolic	PCOS	rs6258	Rare <i>cis</i> -variant	T	C	1.31 (1.06,1.62)	0.108	0.02	NA	NA	NA
Metabolic	T2D	rs1799941	Common <i>cis</i> -variant	G	A	1 (0.97,1.03)	0.014	0.93	1.01 (0.98,1.03)	0.013	0.57
Metabolic	T2D	rs6258	Rare <i>cis</i> -variant	T	C	1.34 (1.16,1.54)	0.072	4.9E-05	1.12 (0.98,1.27)	0.067	0.09
Metabolic	Total fat	rs1799941	Common <i>cis</i> -variant	G	A	-0.01 (-0.05,0.02)	0.016	0.41	0.04 (0.01,0.08)	0.017	0.01
Metabolic	Total fat	rs6258	Rare <i>cis</i> -variant	T	C	-0.02 (-0.25,0.22)	0.119	0.89	-0.01 (-0.26,0.23)	0.123	0.91
Metabolic	Total lean	rs1799941	Common <i>cis</i> -variant	G	A	-0.01 (-0.04,0.02)	0.016	0.47	0.03 (0.0,0.07)	0.017	0.06
Metabolic	Total lean	rs6258	Rare <i>cis</i> -variant	T	C	-0.13 (-0.36,0.1)	0.118	0.27	0.04 (-0.2,0.28)	0.123	0.72
Metabolic	WHR adjusted for BMI	rs12150660	Common <i>cis</i> -variant proxy	G	T	0 (-0.01,0.02)	0.006	0.46	-0.01 (-0.02,0.01)	0.008	0.49
Metabolic	WHR adjusted for BMI	rs6258	Rare <i>cis</i> -variant	T	C	-0.02 (-0.06,0.02)	0.021	0.34	NA	NA	NA
Body composition	Android fat	rs1799941	Common <i>cis</i> -variant	G	A	-0.02 (-0.05,0.01)	0.016	0.25	0.04 (0.0,0.07)	0.017	0.03
Body composition	Android fat	rs6258	Rare <i>cis</i> -variant	T	C	0.08 (-0.15,0.32)	0.120	0.50	-0.02 (-0.26,0.23)	0.123	0.90
Body composition	Android lean	rs1799941	Common <i>cis</i> -variant	G	A	-0.02 (-0.05,0.01)	0.016	0.22	0.04 (0.0,0.07)	0.017	0.04
Body composition	Android lean	rs6258	Rare <i>cis</i> -variant	T	C	0.01 (-0.23,0.24)	0.119	0.95	0.11 (-0.13,0.35)	0.123	0.37
Body composition	Gynoid fat	rs1799941	Common <i>cis</i> -variant	G	A	-0.02 (-0.05,0.02)	0.016	0.35	0.04 (0.01,0.07)	0.017	0.02
Body composition	Gynoid fat	rs6258	Rare <i>cis</i> -variant	T	C	0 (-0.24,0.23)	0.119	0.97	0.01 (-0.23,0.25)	0.123	0.95
Body composition	Gynoid lean	rs1799941	Common <i>cis</i> -variant	G	A	-0.02 (-0.05,0.01)	0.016	0.27	0.04 (0.0,0.07)	0.017	0.04
Body composition	Gynoid lean	rs6258	Rare <i>cis</i> -variant	T	C	-0.03 (-0.27,0.2)	0.119	0.78	0.03 (-0.21,0.27)	0.123	0.80
Body composition	Subcutaneous fat	rs1799941	Common <i>cis</i> -variant	G	A	-0.01 (-0.04,0.02)	0.016	0.64	0.03 (0.0,0.06)	0.017	0.09
Body composition	Subcutaneous fat	rs6258	Rare <i>cis</i> -variant	T	C	0.05 (-0.18,0.28)	0.119	0.69	-0.02 (-0.26,0.22)	0.123	0.86
Body composition	Visceral fat	rs1799941	Common <i>cis</i> -variant	G	A	0 (-0.03,0.03)	0.016	0.97	0.03 (0.0,0.06)	0.017	0.08
Body composition	Visceral fat	rs6258	Rare <i>cis</i> -variant	T	C	0.04 (-0.19,0.27)	0.120	0.74	-0.03 (-0.27,0.22)	0.123	0.83
Cancer	Breast cancer	rs1799941	Common <i>cis</i> -variant	G	A	1.01 (0.99,1.02)	0.007	0.32	NA	NA	NA
Cancer	Breast cancer	rs6258	Rare <i>cis</i> -variant	T	C	0.97 (0.9,1.04)	0.038	0.40	NA	NA	NA
Cancer	Breast cancer, ER negative	rs1799941	Common <i>cis</i> -variant	G	A	1 (0.97,1.03)	0.013	0.99	NA	NA	NA
Cancer	Breast cancer, ER negative	rs6258	Rare <i>cis</i> -variant	T	C	0.89 (0.77,1.04)	0.075	0.13	NA	NA	NA
Cancer	Breast cancer, ER positive	rs1799941	Common <i>cis</i> -variant	G	A	1 (0.99,1.02)	0.009	0.62	NA	NA	NA
Cancer	Breast cancer, ER positive	rs6258	Rare <i>cis</i> -variant	T	C	1 (0.92,1.09)	0.043	0.95	NA	NA	NA
Cancer	Breast cancer, ER negative inc. BRCA1	rs1799941	Common <i>cis</i> -variant	G	A	1 (0.98,1.02)	0.011	0.84	NA	NA	NA
Cancer	Breast cancer, ER negative inc. BRCA1	rs6258	Rare <i>cis</i> -variant	T	C	0.95 (0.84,1.07)	0.062	0.36	NA	NA	NA
Cancer	Endometrial cancer	rs1799941	Common <i>cis</i> -variant	G	A	1.04 (1,1.08)	0.018	0.04	NA	NA	NA
Cancer	Endometrial cancer	rs6258	Rare <i>cis</i> -variant	T	C	1.17 (0.98,1.39)	0.089	0.08	NA	NA	NA
Cancer	Endometrial cancer - Non-Endometrioid	rs1799941	Common <i>cis</i> -variant	G	A	1.09 (0.98,1.2)	0.050	0.10	NA	NA	NA
Cancer	Endometrial cancer - Non-Endometrioid	rs6258	Rare <i>cis</i> -variant	T	C	1.28 (0.73,2.24)	0.285	0.39	NA	NA	NA
Cancer	Endometrial cancer - Endometrioid	rs1799941	Common <i>cis</i> -variant	G	A	1.04 (1,1.09)	0.021	0.04	NA	NA	NA
Cancer	Endometrial cancer - Endometrioid	rs6258	Rare <i>cis</i> -variant	T	C	1.15 (0.95,1.39)	0.098	0.16	NA	NA	NA
Cancer	Ovarian cancer	rs1799941	Common <i>cis</i> -variant	G	A	0.99 (0.96,1.02)	0.015	0.39	NA	NA	NA
Cancer	Ovarian cancer	rs6258	Rare <i>cis</i> -variant	T	C	1.1 (0.95,1.29)	0.078	0.21	NA	NA	NA
Cancer	Prostate cancer	rs1799941	Common <i>cis</i> -variant	G	A	NA	NA	NA	1 (0.98,1.02)	0.010	0.69
Cancer	Prostate cancer	rs6258	Rare <i>cis</i> -variant	T	C	NA	NA	NA	1.07 (0.97,1.18)	0.052	0.19

NA = not available

ER positive = estrogen receptor positive subtype

ER negative = estrogen receptor negative subtype

ER negative inc. BRCA1 = estrogen receptor negative subtype including BRCA1 mutation carriers

Supplementary Table S25: Results of two sample Mendelian randomization analysis in men of sex hormone genetic instruments on cancer outcomes.

Exposure genetic instrument	Cancer outcome	Primary analysis					Steiger filtered analysis										
		Inverse variance weighted OR (95% CI)	P	Egger OR (95% CI)	P	Intercept P	Weighted median OR (95% CI)	P	N variants	Inverse variance weighted OR (95% CI)	P	Egger OR (95% CI)	P	Intercept P	Weighted median OR (95% CI)	P	N variants
Total testosterone	Prostate	1.02 (0.95,1.09)	0.66	1.04 (0.94,1.16)	0.44	0.53	1.02 (0.95,1.1)	0.60	225	1.03 (0.96,1.1)	0.44	1.04 (0.94,1.16)	0.45	0.73	1.02 (0.95,1.1)	0.58	195
Bioavailable testosterone	Prostate	1.23 (1.13,1.33)	3.7E-07	1.12 (0.98,1.28)	0.09	0.09	1.15 (1.05,1.27)	2.7E-03	123	1.22 (1.13,1.32)	9.8E-07	1.13 (0.99,1.29)	0.08	0.15	1.15 (1.05,1.27)	2.8E-03	119
Testosterone cluster	Prostate	1.28 (1.15,1.42)	7.2E-06	1.05 (0.91,1.24)	0.52	2.1E-03	1.19 (1.06,1.35)	4.3E-03	118	1.28 (1.15,1.43)	8.2E-06	1.06 (0.91,1.24)	0.51	2.2E-03	1.2 (1.06,1.36)	4.1E-03	117
SHBG	Prostate	0.91 (0.81,1.04)	0.16	0.98 (0.81,1.16)	0.70	0.37	0.97 (0.85,1.1)	0.61	347	0.91 (0.79,1.05)	0.20	1 (0.83,1.22)	0.98	0.15	0.97 (0.86,1.09)	0.59	283
SHBG cluster	Prostate	0.91 (0.81,1.04)	0.18	0.95 (0.79,1.14)	0.59	0.52	0.97 (0.85,1.1)	0.61	353	0.92 (0.81,1.06)	0.24	0.98 (0.81,1.19)	0.87	0.30	0.97 (0.86,1.09)	0.59	294
Estradiol	Prostate	1.12 (0.54,2.33)	0.77	1.06 (0.17,6.49)	0.95	0.95	0.98 (0.42,2.25)	0.95	20	1.1 (0.49,2.47)	0.82	0.75 (0.09,6.36)	0.79	0.70	0.98 (0.39,2.45)	0.97	11
Estradiol cluster	Prostate	0.78 (0.4,1.52)	0.47	2.61 (0.4,17.06)	0.32	0.18	0.93 (0.37,2.35)	0.88	13	0.78 (0.34,1.8)	0.57	1.78 (0.17,18.43)	0.63	0.46	0.95 (0.36,2.52)	0.91	8

Note: P values < 0.05 are in bold.

Supplementary Table S26: Results of two sample Mendelian randomization analysis in women of sex hormone genetic instruments on body composition outcomes

Exposure genetic instrument	Outcome	Primary analysis						Steiger filtered analysis									
		Inverse variance weighted		Egger		Intercept P	Weighted median		Inverse variance weighted		Egger		Weighted median				
		Beta (95% CI)	P	Beta (95% CI)	P		Beta (95% CI)	P	N variants	Beta (95% CI)	P	Beta (95% CI)	P	Intercept	Beta (95% CI)	P	N variants
Total testosterone	Android fat	0.06 (-0.01,0.14)	0.11	0.08 (-0.05,0.22)	0.22	0.68	0.16 (0.03,0.3)	0.02	240	0.07 (-0.01,0.15)	0.10	0.06 (-0.08,0.2)	0.40	0.87	0.17 (0.03,0.3)	0.02	187
Total testosterone	Android lean	0.08 (0.0,0.15)	0.04	0.17 (0.04,0.31)	0.01	0.07	0.1 (-0.02,0.23)	0.10	241	0.09 (0.01,0.17)	0.03	0.17 (0.03,0.3)	0.02	0.15	0.11 (-0.03,0.25)	0.11	188
Total testosterone	Gynoid fat	0.08 (0.0,0.15)	0.05	0.09 (-0.04,0.22)	0.18	0.79	0.19 (0.05,0.32)	6.1E-03	240	0.08 (0.0,0.16)	0.04	0.06 (-0.08,0.19)	0.42	0.63	0.19 (0.05,0.33)	8.8E-03	187
Total testosterone	Gynoid lean	0.09 (0.02,0.17)	0.01	0.19 (0.05,0.32)	6.3E-03	0.10	0.16 (0.03,0.3)	0.02	241	0.1 (0.02,0.18)	0.01	0.17 (0.03,0.31)	0.01	0.24	0.18 (0.04,0.31)	9.8E-03	188
Total testosterone	Subcutaneous fat	0.06 (-0.02,0.13)	0.12	0.05 (-0.08,0.18)	0.45	0.88	0.13 (-0.01,0.27)	0.06	240	0.07 (-0.01,0.15)	0.08	0.03 (-0.11,0.17)	0.64	0.47	0.13 (-0.02,0.28)	0.08	187
Total testosterone	Visceral fat	0.02 (-0.06,0.09)	0.62	0.09 (-0.04,0.22)	0.19	0.21	0.13 (-0.02,0.28)	0.10	240	0.03 (-0.05,0.11)	0.47	0.07 (-0.07,0.2)	0.35	0.53	0.13 (-0.03,0.28)	0.10	187
Bioavailable testosterone	Android fat	0.07 (-0.05,0.2)	0.24	0.1 (-0.12,0.32)	0.36	0.75	0.14 (-0.05,0.34)	0.15	171	0.06 (-0.07,0.19)	0.39	0.11 (-0.11,0.33)	0.34	0.57	0.12 (-0.08,0.32)	0.23	133
Bioavailable testosterone	Android lean	-0.01 (-0.12,0.09)	0.81	0.03 (-0.17,0.22)	0.79	0.61	0 (-0.18,0.18)	0.99	171	-0.01 (-0.13,0.1)	0.83	0.03 (-0.17,0.23)	0.75	0.56	-0.01 (-0.21,0.19)	0.95	133
Bioavailable testosterone	Gynoid fat	0.03 (-0.08,0.15)	0.59	0.01 (-0.2,0.22)	0.92	0.81	-0.04 (-0.23,0.16)	0.72	171	0.04 (-0.08,0.15)	0.55	0.01 (-0.19,0.21)	0.93	0.75	-0.03 (-0.24,0.18)	0.80	133
Bioavailable testosterone	Gynoid lean	0 (-0.11,0.11)	0.99	0.04 (-0.16,0.24)	0.70	0.64	-0.06 (-0.25,0.13)	0.53	171	0 (-0.11,0.12)	0.95	0.06 (-0.14,0.26)	0.55	0.49	-0.07 (-0.27,0.13)	0.50	133
Bioavailable testosterone	Subcutaneous fat	0.05 (-0.07,0.17)	0.43	0.03 (-0.19,0.25)	0.79	0.83	0.09 (-0.09,0.27)	0.34	171	0.05 (-0.08,0.18)	0.44	0.03 (-0.19,0.25)	0.79	0.81	0.09 (-0.11,0.28)	0.39	133
Bioavailable testosterone	Visceral fat	0.12 (0.0,0.24)	0.05	0.19 (-0.03,0.41)	0.09	0.47	0.1 (-1.0,0.31)	0.31	171	0.09 (-0.04,0.22)	0.16	0.18 (-0.04,0.41)	0.11	0.33	0.1 (-1.0,0.31)	0.32	133
Testosterone cluster	Android fat	0.06 (-0.01,0.14)	0.16	0.09 (-0.04,0.22)	0.17	0.59	0.17 (0.02,0.31)	0.02	228	0.06 (-0.02,0.14)	0.13	0.07 (-0.07,0.21)	0.33	0.92	0.17 (0.02,0.31)	0.02	184
Testosterone cluster	Android lean	0.1 (0.02,0.17)	0.01	0.17 (0.03,0.3)	0.01	0.16	0.11 (-0.02,0.25)	0.10	229	0.09 (0.01,0.17)	0.02	0.16 (0.03,0.3)	0.02	0.18	0.1 (-0.04,0.24)	0.14	185
Testosterone cluster	Gynoid fat	0.08 (0.0,0.15)	0.05	0.09 (-0.04,0.22)	0.17	0.76	0.19 (0.04,0.33)	9.9E-03	228	0.07 (-0.01,0.15)	0.08	0.07 (-0.07,0.21)	0.34	0.94	0.19 (0.05,0.33)	8.5E-03	184
Testosterone cluster	Gynoid lean	0.11 (0.03,0.19)	5.3E-03	0.19 (0.06,0.33)	4.0E-03	0.11	0.18 (0.04,0.32)	0.01	229	0.11 (0.03,0.19)	7.6E-03	0.19 (0.05,0.33)	6.9E-03	0.16	0.18 (0.05,0.31)	8.0E-03	185
Testosterone cluster	Subcutaneous fat	0.06 (-0.02,0.14)	0.13	0.06 (-0.07,0.19)	0.38	0.99	0.13 (-0.01,0.28)	0.07	228	0.06 (-0.02,0.14)	0.14	0.04 (-0.1,0.18)	0.57	0.71	0.13 (-0.02,0.29)	0.09	184
Testosterone cluster	Visceral fat	-0.03 (-0.04,0.11)	0.41	0.1 (-0.04,0.23)	0.15	0.24	0.13 (-0.02,0.27)	0.09	228	0.04 (-0.04,0.12)	0.36	0.07 (-0.07,0.21)	0.30	0.53	0.13 (-0.03,0.28)	0.11	184
SHBG	Android fat	-0.17 (-0.29,-0.05)	6.9E-03	-0.08 (-0.26,0.1)	0.40	0.16	-0.12 (-0.33,0.09)	0.25	339	-0.18 (-0.32,-0.05)	7.2E-03	-0.1 (-0.28,0.09)	0.30	0.19	-0.11 (-0.33,0.11)	0.32	210
SHBG	Android lean	-0.02 (-0.15,0.12)	0.82	0.04 (-0.15,0.23)	0.70	0.46	-0.04 (-0.25,0.17)	0.69	340	0.03 (-0.11,0.18)	0.63	0.01 (-0.19,0.2)	0.96	0.67	-0.02 (-0.24,0.2)	0.87	211
SHBG	Gynoid fat	-0.04 (-0.17,0.09)	0.52	-0.02 (-0.2,0.17)	0.86	0.72	0.01 (-0.21,0.23)	0.92	339	-0.1 (-0.24,0.04)	0.16	-0.06 (-0.26,0.13)	0.51	0.62	0.01 (-0.21,0.23)	0.93	210
SHBG	Gynoid lean	-0.01 (-0.14,0.12)	0.92	0.04 (-0.15,0.23)	0.67	0.50	-0.01 (-0.21,0.2)	0.96	340	0.02 (-0.12,0.16)	0.80	0.01 (-0.18,0.21)	0.89	0.95	-0.01 (-0.21,0.2)	0.96	211
SHBG	Subcutaneous fat	-0.01 (-0.22,0.2)	0.14	-0.03 (-0.22,0.15)	0.74	0.35	-0.08 (-0.28,0.12)	0.45	339	-0.12 (-0.26,0.01)	0.07	-0.06 (-0.25,0.12)	0.50	0.37	-0.08 (-0.31,0.15)	0.50	210
SHBG	Visceral fat	-0.27 (-0.4,-0.15)	1.8E-05	-0.14 (-0.32,0.04)	0.13	0.05	-0.11 (-0.32,0.1)	0.29	339	-0.24 (-0.37,-0.1)	5.9E-04	-0.16 (-0.34,0.03)	0.10	0.21	-0.11 (-0.33,0.11)	0.32	210
SHBG cluster	Android fat	-0.13 (-0.26,-0.01)	0.04	-0.07 (-0.25,0.11)	0.47	0.34	-0.11 (-0.31,0.09)	0.30	350	-0.15 (-0.29,-0.02)	0.02	-0.08 (-0.27,0.1)	0.39	0.26	-0.1 (-0.31,0.12)	0.38	221
SHBG cluster	Android lean	-0.01 (-0.14,0.13)	0.93	0.04 (-0.16,0.23)	0.71	0.55	-0.01 (-0.23,0.21)	0.93	351	0.05 (-0.09,0.19)	0.51	0.01 (-0.18,0.21)	0.90	0.62	-0.01 (-0.23,0.21)	0.93	222
SHBG cluster	Gynoid fat	-0.02 (-0.15,0.11)	0.79	-0.02 (-0.21,0.17)	0.83	0.96	0.01 (-0.19,0.22)	0.90	350	-0.08 (-0.21,0.06)	0.27	-0.06 (-0.25,0.14)	0.57	0.75	0.01 (-0.2,0.22)	0.91	221
SHBG cluster	Gynoid lean	0.01 (-0.12,0.14)	0.92	0.03 (-0.16,0.22)	0.74	0.71	0.06 (-0.15,0.26)	0.57	351	0.03 (-0.1,0.17)	0.62	0.01 (-0.18,0.2)	0.93	0.70	0.06 (-0.15,0.27)	0.57	222
SHBG cluster	Subcutaneous fat	-0.07 (-0.2,0.06)	0.28	-0.02 (-0.21,0.17)	0.84	0.46	-0.07 (-0.27,0.14)	0.54	350	-0.1 (-0.24,0.03)	0.13	-0.04 (-0.23,0.14)	0.65	0.35	-0.06 (-0.28,0.15)	0.56	221
SHBG cluster	Visceral fat	-0.24 (-0.36,-0.12)	1.7E-04	-0.12 (-0.3,0.06)	0.18	0.08	-0.11 (-0.32,0.1)	0.29	350	-0.21 (-0.35,-0.08)	1.9E-03	-0.13 (-0.31,0.06)	0.17	0.19	-0.11 (-0.32,0.1)	0.30	221

Note: P values < 0.05 are in bold.

Supplementary Table S27: Results of two sample Mendelian randomization analysis in women of sex hormone genetic instruments on cancer outcomes.

Exposure genetic instrument	Cancer outcome	Primary analysis					Steiger filtered analysis										
		Inverse variance weighted OR (95% CI)	P	Egger OR (95% CI)	P	Intercept P	Weighted median OR (95% CI)	P	N variants	Inverse variance weighted OR (95% CI)	P	Egger OR (95% CI)	P	Intercept P	Weighted median OR (95% CI)	P	N variants
Total testosterone	Breast cancer	1.14 (1.08,1.2)	1.6E-06	1.19 (1.08,1.31)	4.6E-04	0.27	1.12 (1.05,1.2)	4.6E-04	245	1.14 (1.08,1.21)	2.8E-06	1.17 (1.06,1.29)	2.5E-03	0.61	1.12 (1.05,1.2)	5.0E-04	191
Total testosterone	Breast cancer, ER positive	1.19 (1.12,1.26)	1.2E-08	1.29 (1.16,1.44)	4.0E-06	0.07	1.18 (1.09,1.28)	5.9E-05	245	1.19 (1.12,1.26)	7.0E-08	1.27 (1.13,1.42)	3.6E-05	0.17	1.18 (1.09,1.28)	8.5E-05	191
Total testosterone	Breast cancer, ER negative	0.99 (0.93,1.06)	0.88	0.99 (0.88,1.13)	0.92	0.98	0.99 (0.89,1.11)	0.91	245	1 (0.93,1.08)	0.95	0.98 (0.86,1.12)	0.78	0.71	0.99 (0.88,1.1)	0.81	191
Total testosterone	Endometrial cancer	1.39 (1.26,1.53)	3.4E-11	1.68 (1.42,2.02)	2.4E-08	0.02	1.57 (1.35,1.82)	6.5E-09	248	1.43 (1.28,1.58)	3.2E-11	1.64 (1.36,1.98)	3.9E-07	0.09	1.56 (1.33,1.84)	5.8E-08	196
Total testosterone	Endometrial cancer - Endometrioid	1.39 (1.24,1.55)	1.2E-08	1.62 (1.31,2.01)	9.6E-06	0.09	1.65 (1.38,1.97)	5.6E-08	248	1.43 (1.27,1.62)	6.7E-09	1.56 (1.24,1.95)	1.1E-04	0.38	1.64 (1.36,1.99)	3.8E-07	196
Total testosterone	Endometrial cancer - Non-Endometrioid	1.26 (0.99,1.61)	0.06	1.13 (0.73,1.76)	0.58	0.57	1 (0.68,1.47)	0.99	224	1.24 (0.96,1.59)	0.10	1.25 (0.84,1.96)	0.33	0.95	0.99 (0.66,1.49)	0.97	177
Total testosterone	Ovarian cancer	0.9 (0.83,0.97)	7.9E-03	0.95 (0.82,1.1)	0.48	0.38	0.93 (0.8,1.07)	0.31	245	0.89 (0.83,0.97)	6.6E-03	0.95 (0.82,1.1)	0.48	0.33	0.93 (0.8,1.08)	0.33	191
Bioavailable testosterone	Breast cancer	1.15 (1.05,1.25)	1.6E-03	1.12 (0.97,1.31)	0.13	0.75	1.09 (1.1,1.19)	0.04	176	1.15 (1.05,1.26)	2.4E-03	1.11 (0.96,1.3)	0.17	0.62	1.03 (0.94,1.13)	0.50	196
Bioavailable testosterone	Breast cancer, ER positive	1.23 (1.12,1.34)	6.1E-06	1.19 (1.02,1.4)	0.03	0.66	1.13 (1.03,1.24)	0.01	176	1.22 (1.11,1.34)	3.5E-05	1.18 (1.03,1.39)	0.04	0.65	1.1 (0.99,1.21)	0.08	136
Bioavailable testosterone	Breast cancer, ER negative	0.94 (0.83,1.07)	0.34	0.99 (0.79,1.23)	0.90	0.63	0.99 (0.86,1.14)	0.89	176	0.97 (0.85,1.1)	0.61	0.95 (0.76,1.19)	0.64	0.83	1.01 (0.87,1.17)	0.93	136
Bioavailable testosterone	Endometrial cancer	1.63 (1.43,1.87)	1.5E-12	1.64 (1.28,2.08)	6.4E-05	0.99	1.51 (1.22,1.87)	1.3E-04	176	1.65 (1.42,1.92)	4.1E-11	1.65 (1.28,2.12)	1.2E-04	0.97	1.51 (1.17,1.89)	2.9E-04	135
Bioavailable testosterone	Endometrial cancer - Endometrioid	1.62 (1.39,1.88)	3.9E-10	1.56 (1.19,2.03)	1.1E-03	0.73	1.43 (1.12,1.83)	3.8E-03	176	1.63 (1.38,1.93)	1.3E-08	1.55 (1.17,2.06)	2.4E-03	0.68	1.44 (1.11,1.86)	5.8E-03	135
Bioavailable testosterone	Endometrial cancer - Non-Endometrioid	1.46 (1.05,2.02)	0.02	1.43 (0.81,2.54)	0.22	0.94	1.57 (0.81,2.74)	0.11	155	1.62 (1.13,2.33)	8.6E-03	1.37 (0.75,2.52)	0.31	0.50	1.68 (0.95,2.97)	0.07	117
Bioavailable testosterone	Ovarian cancer	0.92 (0.83,1.02)	0.16	1.02 (0.85,1.22)	0.85	0.18	0.97 (0.81,1.16)	0.74	176	0.9 (0.81,1.01)	0.07	1.02 (0.85,1.24)	0.82	0.11	0.97 (0.8,1.18)	0.77	136
Testosterone cluster	Breast cancer	1.15 (1.09,1.22)	1.2E-07	1.18 (1.07,1.3)	5.9E-04	0.54	1.12 (1.06,1.2)	2.2E-04	231	1.15 (1.09,1.22)	5.4E-07	1.16 (1.05,1.28)	2.5E-03	0.82	1.12 (1.06,1.2)	2.5E-04	192
Testosterone cluster	Breast cancer, ER positive	1.21 (1.14,1.28)	3.0E-10	1.28 (1.15,1.42)	5.8E-06	0.22	1.18 (1.09,1.27)	2.6E-05	231	1.2 (1.13,1.28)	7.1E-09	1.26 (1.13,1.41)	3.1E-05	0.28	1.18 (1.09,1.28)	4.7E-05	192
Testosterone cluster	Breast cancer, ER negative	0.98 (0.92,1.06)	0.66	0.99 (0.87,1.12)	0.83	0.97	0.97 (0.87,1.09)	0.61	231	0.99 (0.92,1.07)	0.84	0.98 (0.86,1.12)	0.78	0.83	0.97 (0.87,1.09)	0.61	192
Testosterone cluster	Endometrial cancer	1.37 (1.25,1.52)	1.9E-10	1.58 (1.32,1.89)	5.7E-07	0.07	1.53 (1.32,1.79)	4.1E-08	235	1.39 (1.26,1.55)	3.7E-10	1.57 (1.31,1.9)	2.1E-06	0.13	1.53 (1.31,1.9)	1.7E-07	197
Testosterone cluster	Endometrial cancer - Endometrioid	1.4 (1.25,1.56)	7.2E-09	1.5 (1.22,1.85)	1.4E-04	0.42	1.64 (1.37,1.97)	9.1E-08	235	1.42 (1.26,1.6)	4.9E-09	1.47 (1.19,1.82)	4.6E-04	0.73	1.64 (1.36,1.98)	2.7E-07	197
Testosterone cluster	Endometrial cancer - Non-Endometrioid	1.25 (0.98,1.59)	0.07	1.16 (0.76,1.77)	0.50	0.67	1 (0.68,1.48)	0.98	211	1.22 (0.95,1.56)	0.12	1.29 (0.84,1.98)	0.25	0.77	1 (0.67,1.49)	1.00	177
Testosterone cluster	Ovarian cancer	0.88 (0.81,0.95)	8.6E-04	0.92 (0.81,0.5)	0.21	0.46	0.93 (0.81,0.5)	0.30	231	0.87 (0.81,0.95)	1.3E-03	0.92 (0.82,1.07)	0.28	0.36	0.93 (0.81,1.07)	0.31	192
SHBG	Breast cancer	0.97 (0.88,1.06)	0.48	0.96 (0.83,1.1)	0.56	0.89	1 (0.92,1.1)	0.94	343	0.96 (0.87,1.07)	0.48	0.95 (0.82,1.1)	0.50	0.81	1 (0.92,1.1)	0.96	212
SHBG	Breast cancer, ER positive	0.91 (0.82,1.01)	0.07	0.93 (0.81,0.9)	0.38	0.62	0.99 (0.91,1)	0.91	343	0.89 (0.79,1)	0.05	0.93 (0.79,1.09)	0.35	0.46	0.99 (0.91,1)	0.90	212
SHBG	Breast cancer, ER negative	1.14 (1.01,1.28)	0.03	1.06 (0.89,1.27)	0.50	0.29	1.16 (0.99,1.35)	0.08	343	1.16 (1.02,1.33)	0.03	1.06 (0.88,1.27)	0.53	0.15	1.16 (0.98,1.36)	0.09	212
SHBG	Endometrial cancer	0.77 (0.67,0.89)	2.6E-04	0.73 (0.6,0.89)	2.2E-03	0.46	0.79 (0.64,0.99)	0.04	351	0.73 (0.63,0.85)	4.5E-05	0.73 (0.6,0.89)	2.2E-03	0.96	0.79 (0.63,0.99)	0.04	217
SHBG	Endometrial cancer - Endometrioid	0.78 (0.67,0.91)	1.8E-03	0.72 (0.58,0.9)	4.4E-03	0.36	0.79 (0.62,1.02)	0.07	351	0.74 (0.62,0.87)	4.5E-04	0.73 (0.58,0.92)	8.2E-03	0.97	0.79 (0.62,1.02)	0.07	217
SHBG	Endometrial cancer - Non-Endometrioid	0.78 (0.55,1.11)	0.17	0.66 (0.39,1.11)	0.12	0.39	0.68 (0.38,1.21)	0.19	315	0.84 (0.57,1.25)	0.38	0.63 (0.37,1.08)	0.09	0.12	0.68 (0.37,1.26)	0.22	193
SHBG	Ovarian cancer	1 (0.89,1.13)	0.96	0.94 (0.79,1.11)	0.45	0.27	1 (0.84,1.18)	0.97	343	0.99 (0.88,1.12)	0.90	0.92 (0.78,1.09)	0.34	0.21	0.91 (0.77,1.09)	0.30	212
SHBG cluster	Breast cancer	0.97 (0.88,1.07)	0.52	0.96 (0.83,1.1)	0.52	0.79	1 (0.91,1.1)	0.97	355	0.97 (0.87,1.07)	0.54	0.95 (0.82,1.09)	0.46	0.67	1 (0.91,1.1)	0.99	229
SHBG cluster	Breast cancer, ER positive	0.91 (0.82,1.01)	0.07	0.93 (0.81,0.7)	0.31	0.69	1 (0.9,1.1)	0.95	355	0.89 (0.8,1)	0.05	0.92 (0.79,1.08)	0.31	0.52	1 (0.9,1.1)	0.95	229
SHBG cluster	Breast cancer, ER negative	1.15 (1.02,1.3)	0.02	1.06 (0.89,1.26)	0.51	0.20	1.18 (1.01,1.38)	0.04	355	1.17 (1.03,1.34)	0.02	1.04 (0.87,1.25)	0.64	0.06	1.18 (1.03,1.39)	0.05	229
SHBG cluster	Endometrial cancer	0.75 (0.65,0.86)	3.1E-05	0.74 (0.61,0.9)	2.6E-03	0.95	0.79 (0.63,0.98)	0.04	363	0.71 (0.61,0.82)	5.0E-06	0.74 (0.61,0.91)	3.5E-03	0.45	0.79 (0.63,0.98)	0.04	234
SHBG cluster	Endometrial cancer - Endometrioid	0.75 (0.65,0.88)	3.7E-04	0.73 (0.59,0.9)	4.5E-03	0.67	0.8 (0.62,1.02)	0.07	363	0.72 (0.61,0.85)	8.2E-05	0.75 (0.6,0.94)	0.01	0.53	0.8 (0.62,1.02)	0.07	234
SHBG cluster	Endometrial cancer - Non-Endometrioid	0.79 (0.56,1.14)	0.21	0.74 (0.45,1.23)	0.25	0.71	0.68 (0.37,1.23)	0.20	325	0.83 (0.56,1.24)	0.36	0.69 (0.41,1.17)	0.17	0.30	0.68 (0.37,1.24)	0.21	208
SHBG cluster	Ovarian cancer	1.02 (0.9,1.15)	0.79	0.94 (0.81,1.12)	0.50	0.22	1 (0.84,1.18)	0.99	355	1.01 (0.89,1.14)	0.88	0.92 (0.78,1.09)	0.34	0.11	0.92 (0.77,1.09)	0.32	229

Note: P values < 0.05 are in bold.

ER positive = estrogen receptor positive subtype
ER negative = estrogen receptor negative subtype

Supplementary Table S28: Proxy variants included in genetic instruments with relevant weights.

Trait	Sex	Signal	1KG_proxy	1KG_Trait	1KG_Other	1KG_Weigl	1KG_SE_wi	HM_proxy	HM_Trait	HM_Other	HM_Weigl	HM_SE_weight
Bioavailable testosterone	Females	1:154580015_TC_T	rs10712198	TC	T	0.015	0.003	rs12125166	C	T	0.015	0.003
Bioavailable testosterone	Females	rs199816133	rs11301122	C	CA	0.029	0.003	rs7047907	A	G	0.029	0.003
Bioavailable testosterone	Females	rs35596561	rs11301327	CT	C	0.025	0.003	rs11870935	G	A	0.024	0.003
Bioavailable testosterone	Females	15:53094375_TTTTG_T	rs142760249	T	TTTTG	0.030	0.004	rs8025128	T	C	0.029	0.004
Bioavailable testosterone	Females	12:25412725_AATTAT	rs144766289	A	AATTATTG	0.028	0.005	rs12320328	G	A	0.024	0.005
Bioavailable testosterone	Females	4:69468698_ATAGAGG	rs146290882	A	ATAGAGG	0.023	0.003	rs4860985	C	T	0.016	0.003
Bioavailable testosterone	Females	2:20421849_AACAC_A	rs150420836	A	AACAC	0.022	0.003	rs2002090	A	G	0.021	0.003
Bioavailable testosterone	Females	18:3812373_AT_A	rs199630283	A	AT	0.019	0.003	rs3786434	A	T	0.015	0.003
Bioavailable testosterone	Females	14:98567544_CAA_C	rs200382892	C	CAA	0.018	0.003	rs10145335	A	G	0.018	0.003
Bioavailable testosterone	Females	8:25248334_GT_G	rs34014169	GT	G	0.014	0.003	rs1000798	G	T	0.014	0.003
Bioavailable testosterone	Females	rs386705174	rs36135983	GT	G	0.039	0.003	rs2295709	T	C	0.039	0.003
Bioavailable testosterone	Females	9:114826326_TG_T	rs374590100	TG	T	0.022	0.003	rs9695214	T	C	0.021	0.003
Bioavailable testosterone	Females	rs746258907	rs3842247	AG	A	0.016	0.003	rs312023	G	A	0.015	0.003
Bioavailable testosterone	Females	15:43674414_AAAAAA	rs535287577	AAAAAAG	A	0.024	0.005	rs3213990	C	A	0.009	0.004
Bioavailable testosterone	Females	10:65224458_CA_C	rs55739257	CA	C	0.032	0.003	rs6479905	G	A	0.030	0.003
Bioavailable testosterone	Females	8:81418150_ATTTT_A	rs565764689	ATTTT	A	0.023	0.003	rs272617	T	C	0.022	0.003
Bioavailable testosterone	Females	17:63685553_CA_C	rs5821582	C	CA	0.017	0.003	rs11079581	C	T	0.017	0.003
Bioavailable testosterone	Females	rs67952556	rs5974638	G	A	0.012	0.003	NA				
Bioavailable testosterone	Females	13:22693754_TC_T	rs66467027	T	TC	0.019	0.003	rs12871430	T	C	0.018	0.003
Bioavailable testosterone	Females	6:130386212_GGAGA	rs71822536	G	GGAGA	0.017	0.003	rs9375703	G	T	0.016	0.003
Bioavailable testosterone	Females	rs764029425	rs77032872	T	TG	0.036	0.003	rs3779196	T	C	0.036	0.003
Bioavailable testosterone	Females	rs112635299	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs113247979	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs114165349	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs114303452	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs11733695	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs12683780	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs140584594	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs149624078	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs17580	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs17853284	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs181255261	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs191780890	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs202200760	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs28641793	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs34931250	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs35008345	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs45446698	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs56196860	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs5855544	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs61755050	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs62025141	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs74652944	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs76895963	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs78058190	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs879619	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs9379084	Signal in 1KG					NA				
Bioavailable testosterone	Females	rs13430258	Signal in 1KG					rs10202783	A	T	0.015	0.003
Bioavailable testosterone	Females	rs2282248	Signal in 1KG					rs10857859	C	G	0.014	0.003
Bioavailable testosterone	Females	rs11031005	Signal in 1KG					rs11031006	A	G	0.023	0.004
Bioavailable testosterone	Females	rs6538437	Signal in 1KG					rs11107124	C	G	0.016	0.003
Bioavailable testosterone	Females	rs8111359	Signal in 1KG					rs11673632	C	T	0.027	0.004
Bioavailable testosterone	Females	rs35783704	Signal in 1KG					rs11774829	A	T	0.033	0.004
Bioavailable testosterone	Females	rs13030651	Signal in 1KG					rs11897732	G	A	0.016	0.003
Bioavailable testosterone	Females	rs77031559	Signal in 1KG					rs11927030	G	A	0.022	0.005
Bioavailable testosterone	Females	rs1989147	Signal in 1KG					rs12130462	C	T	0.023	0.003
Bioavailable testosterone	Females	rs12135478	Signal in 1KG					rs12142033	A	G	0.014	0.003
Bioavailable testosterone	Females	rs4368453	Signal in 1KG					rs12487629	C	T	0.017	0.003
Bioavailable testosterone	Females	rs71397837	Signal in 1KG					rs12900736	C	T	0.020	0.003
Bioavailable testosterone	Females	rs34269793	Signal in 1KG					rs12999558	A	G	0.033	0.006
Bioavailable testosterone	Females	rs71633359	Signal in 1KG					rs13130929	A	G	0.022	0.003
Bioavailable testosterone	Females	rs17245822	Signal in 1KG					rs1337985	C	T	0.014	0.003
Bioavailable testosterone	Females	rs7089122	Signal in 1KG					rs1538831	A	G	0.024	0.003
Bioavailable testosterone	Females	rs34954997	Signal in 1KG					rs157582	C	T	0.015	0.003
Bioavailable testosterone	Females	rs1640272	Signal in 1KG					rs1640271	C	T	0.021	0.003
Bioavailable testosterone	Females	rs199746610	Signal in 1KG					rs16889714	A	T	0.034	0.007
Bioavailable testosterone	Females	rs61856128	Signal in 1KG					rs17134158	C	T	0.032	0.003
Bioavailable testosterone	Females	rs17287714	Signal in 1KG					rs17288007	A	G	0.019	0.005
Bioavailable testosterone	Females	rs549035841	Signal in 1KG					rs17558745	C	T	0.015	0.003
Bioavailable testosterone	Females	rs34255979	Signal in 1KG					rs17651629	C	T	0.019	0.004
Bioavailable testosterone	Females	rs62396733	Signal in 1KG					rs17794619	A	G	0.021	0.004
Bioavailable testosterone	Females	rs11235688	Signal in 1KG					rs1783596	T	C	0.015	0.003
Bioavailable testosterone	Females	rs8178824	Signal in 1KG					rs1801689	C	A	0.057	0.007
Bioavailable testosterone	Females	rs3832126	Signal in 1KG					rs1861398	C	G	0.032	0.003
Bioavailable testosterone	Females	rs371347025	Signal in 1KG					rs1901825	A	T	0.014	0.003
Bioavailable testosterone	Females	rs113172275	Signal in 1KG					rs1939768	T	G	0.049	0.005
Bioavailable testosterone	Females	rs7780066	Signal in 1KG					rs2035647	G	A	0.023	0.003
Bioavailable testosterone	Females	rs61237993	Signal in 1KG					rs2050789	G	A	0.016	0.004
Bioavailable testosterone	Females	rs12645584	Signal in 1KG					rs2135509	A	G	0.017	0.003
Bioavailable testosterone	Females	rs117327231	Signal in 1KG					rs2276273	C	T	0.075	0.008
Bioavailable testosterone	Females	rs199787521	Signal in 1KG					rs2280861	G	A	0.016	0.003
Bioavailable testosterone	Females	rs11879227	Signal in 1KG					rs2287019	C	T	0.020	0.003
Bioavailable testosterone	Females	rs11621792	Signal in 1KG					rs2332328	T	C	0.022	0.003
Bioavailable testosterone	Females	rs6684361	Signal in 1KG					rs2392239	T	C	0.040	0.003
Bioavailable testosterone	Females	rs2954111	Signal in 1KG					rs2466145	T	C	0.015	0.003
Bioavailable testosterone	Females	rs62223042	Signal in 1KG					rs2836961	C	A	0.015	0.003
Bioavailable testosterone	Females	rs40270	Signal in 1KG					rs30000	A	G	0.017	0.003

Bioavailable testosterone	Females	rs2391139	Signal in 1KG	rs3103180	G	A	0.024	0.003
Bioavailable testosterone	Females	rs62263023	Signal in 1KG	rs3731544	A	C	0.028	0.005
Bioavailable testosterone	Females	rs563306865	Signal in 1KG	rs3924462	G	T	0.015	0.003
Bioavailable testosterone	Females	rs7418101	Signal in 1KG	rs4000699	T	C	0.015	0.003
Bioavailable testosterone	Females	rs13153019	Signal in 1KG	rs4075958	A	G	0.015	0.003
Bioavailable testosterone	Females	rs381194	Signal in 1KG	rs409952	G	A	0.011	0.003
Bioavailable testosterone	Females	rs9636441	Signal in 1KG	rs4671416	A	G	0.017	0.003
Bioavailable testosterone	Females	rs62231822	Signal in 1KG	rs4685148	T	C	0.017	0.004
Bioavailable testosterone	Females	rs6772177	Signal in 1KG	rs4687612	G	A	0.018	0.004
Bioavailable testosterone	Females	rs2397112	Signal in 1KG	rs4715353	C	T	0.016	0.003
Bioavailable testosterone	Females	rs56205943	Signal in 1KG	rs4760355	G	A	0.020	0.003
Bioavailable testosterone	Females	rs56731455	Signal in 1KG	rs4843291	G	A	0.014	0.003
Bioavailable testosterone	Females	rs7239564	Signal in 1KG	rs4891540	G	A	0.030	0.004
Bioavailable testosterone	Females	rs2374456	Signal in 1KG	rs4953716	T	A	0.015	0.003
Bioavailable testosterone	Females	rs12543598	Signal in 1KG	rs5303	A	G	0.020	0.003
Bioavailable testosterone	Females	rs182375344	Signal in 1KG	rs5942939	T	C	0.016	0.003
Bioavailable testosterone	Females	rs5970442	Signal in 1KG	rs5970441	C	T	0.027	0.003
Bioavailable testosterone	Females	rs590097	Signal in 1KG	rs604126	G	A	0.032	0.003
Bioavailable testosterone	Females	rs6073431	Signal in 1KG	rs6073435	A	T	0.012	0.003
Bioavailable testosterone	Females	rs629042	Signal in 1KG	rs629445	G	A	0.028	0.003
Bioavailable testosterone	Females	rs113347955	Signal in 1KG	rs6468492	G	C	0.025	0.007
Bioavailable testosterone	Females	rs71447853	Signal in 1KG	rs6494531	A	G	0.014	0.003
Bioavailable testosterone	Females	rs62144584	Signal in 1KG	rs6761875	T	C	0.019	0.003
Bioavailable testosterone	Females	rs13072623	Signal in 1KG	rs6804701	T	A	0.015	0.003
Bioavailable testosterone	Females	rs111475133	Signal in 1KG	rs7163907	T	C	0.021	0.003
Bioavailable testosterone	Females	rs112933999	Signal in 1KG	rs732310	T	G	0.014	0.003
Bioavailable testosterone	Females	rs529143892	Signal in 1KG	rs7515597	C	T	0.018	0.003
Bioavailable testosterone	Females	rs73350117	Signal in 1KG	rs7706547	C	T	0.021	0.003
Bioavailable testosterone	Females	rs77491205	Signal in 1KG	rs7758037	G	C	0.018	0.003
Bioavailable testosterone	Females	rs7139079	Signal in 1KG	rs7953249	G	A	0.021	0.003
Bioavailable testosterone	Females	rs7301634	Signal in 1KG	rs7964231	T	C	0.015	0.003
Bioavailable testosterone	Females	rs36019311	Signal in 1KG	rs799166	G	C	0.028	0.004
Bioavailable testosterone	Females	rs56332871	Signal in 1KG	rs8023580	T	C	0.029	0.003
Bioavailable testosterone	Females	rs10851395	Signal in 1KG	rs8040086	G	A	0.018	0.003
Bioavailable testosterone	Females	rs11653686	Signal in 1KG	rs8076023	C	G	0.065	0.004
Bioavailable testosterone	Females	rs850294	Signal in 1KG	rs850293	C	A	0.034	0.004
Bioavailable testosterone	Females	rs58072681	Signal in 1KG	rs9319570	G	A	0.062	0.005
Bioavailable testosterone	Females	rs10504255	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs10757893	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs10778215	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs11047261	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs11078597	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1119208	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs11683361	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1171617	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs11784903	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1214759	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs12189146	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs12564492	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs12658172	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs13020003	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs13092573	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1432679	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1515098	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs168189	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs1688043	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs171021	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs17128091	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs2152318	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs2266782	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs2587507	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs34341	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs351370	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs3732218	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs3814707	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs388430	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4135247	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4149056	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4690098	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4712976	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4793788	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs4869893	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs573833	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6008259	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6020423	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6129778	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6258	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6486122	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6788984	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs6792725	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs687339	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7078330	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7183977	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7248104	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs727428	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7291444	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7314285	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs738409	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs7633673	Signal in 1KG	Signal in HM				
Bioavailable testosterone	Females	rs8046391	Signal in 1KG	Signal in HM				

Bioavailable testosterone	Males	rs10982156	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs1112195	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs11703376	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs12796488	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs12907068	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs13065463	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs13835	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs1454836	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs17703883	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs2035837	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs2090409	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs2184968	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs243466	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs2961853	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs3733897	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs3821866	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4274916	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4483209	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4503095	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4562360	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4678408	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4872310	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs4919686	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs5905042	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs5913997	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs5915287	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs618888	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs6486542	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs6729954	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs7496293	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs757309	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs7679843	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs7872329	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs7915430	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs8061590	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs912202	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs950716	Signal in 1KG										Signal in HM
Bioavailable testosterone	Males	rs9824196	Signal in 1KG										Signal in HM
Estradiol	Males	rs188982745	NA										
Estradiol	Males	rs559555	NA										
Estradiol	Males	rs776715248	NA										
Estradiol	Males	rs12850857	rs1385696	T	C	0.005	0.001	rs1385696	T	C	0.005	0.001	
Estradiol	Males	rs781858752	rs147250649	TG	T	0.008	0.001	NA					
Estradiol	Males	4:69958680_GA_G	rs57058697	GA	G	0.007	0.001	rs4587017	T	G	0.007	0.001	
Estradiol	Males	5:35983283_CA_C	rs78247641	C	CA	0.008	0.001	rs4869450	A	T	0.007	0.001	
Estradiol	Males	rs112881196	Signal in 1KG					NA					
Estradiol	Males	rs117826558	Signal in 1KG					NA					
Estradiol	Males	rs201687269	Signal in 1KG					NA					
Estradiol	Males	rs34019140	Signal in 1KG					NA					
Estradiol	Males	rs45446698	Signal in 1KG					NA					
Estradiol	Males	rs56196860	Signal in 1KG					NA					
Estradiol	Males	rs570754094	Signal in 1KG					NA					
Estradiol	Males	rs113047993	Signal in 1KG					rs11082219	G	A	0.006	0.001	
Estradiol	Males	rs10425629	Signal in 1KG					rs2547231	C	A	0.008	0.001	
Estradiol	Males	rs5933688	Signal in 1KG					rs5934505	C	T	0.008	0.001	
Estradiol	Males	rs7173595	Signal in 1KG					rs727479	A	C	0.016	0.001	
Estradiol	Males	rs1260326	Signal in 1KG					Signal in HM					
Estradiol	Males	rs3751591	Signal in 1KG					Signal in HM					
Estradiol	Males	rs657152	Signal in 1KG					Signal in HM					
Estradiol	Males	rs727428	Signal in 1KG					Signal in HM					
SHBG	Females	15:43025006_CT_C	NA										
SHBG	Females	rs560436873	NA										
SHBG	Females	rs73519353	NA										
SHBG	Females	17:48627860_CCT_C	rs10586811	C	CCT	0.009	0.002	rs1132414	G	A	0.009	0.002	
SHBG	Females	12:26614614_CAT_C	rs10599348	C	CAT	0.010	0.002	rs17395011	T	C	0.010	0.002	
SHBG	Females	15:51052455_CT_C	rs10717809	C	CT	0.008	0.002	rs12593469	T	C	0.008	0.001	
SHBG	Females	rs768159759	rs113165924	A	AG	0.014	0.003	NA					
SHBG	Females	1:93787087_TA_T	rs113348816	T	TA	0.009	0.002	rs2391251	T	C	0.009	0.002	
SHBG	Females	1:23747996_GA_G	rs11340914	G	GA	0.011	0.002	rs2077066	T	C	0.009	0.002	
SHBG	Females	rs390408	rs131658	G	C	0.014	0.002	rs140489	A	G	0.014	0.002	
SHBG	Females	rs11054861	rs1388046179	A	G	0.022	0.004	rs11054604	A	G	0.022	0.005	
SHBG	Females	rs771193934	rs139153780	AGGCATG(A		0.010	0.002	NA					
SHBG	Females	rs770971500	rs140871704	C	CTTTT	0.010	0.002	rs12786104	G	T	0.009	0.002	
SHBG	Females	15:53094375_TTTTG	rs142760249	TTTTG	T	0.028	0.002	rs8025128	C	T	0.027	0.002	
SHBG	Females	10:65158772_AAAG_A	rs150036478	A	AAAG	0.047	0.001	rs7912893	A	T	0.046	0.001	
SHBG	Females	rs781996653	rs199649980	TTATTTTA	T	0.009	0.001	rs7801259	A	T	0.008	0.001	
SHBG	Females	rs201874554	rs200289656	A	ACC	0.015	0.003	rs9828746	C	T	0.015	0.003	
SHBG	Females	8:81457499_CA_C	rs200988859	C	CA	0.026	0.002	rs440837	G	A	0.026	0.002	
SHBG	Females	13:50565104_ACT_A	rs201736780	A	ACT	0.038	0.005	rs2812208	C	G	0.037	0.005	
SHBG	Females	8:59415339_TTG_T	rs201812242	T	TTG	0.011	0.001	rs8192870	G	T	0.010	0.001	
SHBG	Females	3:122361173_TTTTT	rs2668335	C	T	0.010	0.002	rs2668332	C	T	0.009	0.002	
SHBG	Females	2:208469213_ATCTT	rs34171849	ATCTT	A	0.012	0.002	rs2551928	A	G	0.012	0.002	
SHBG	Females	2:191559843_GT_G	rs34400883	GT	G	0.011	0.002	rs10202868	T	C	0.010	0.002	
SHBG	Females	4:103877471_TA_T	rs35614802	T	TA	0.009	0.001	rs3974604	C	T	0.009	0.001	
SHBG	Females	rs10747689	rs4759319	T	G	0.006	0.001	Signal in HM					
SHBG	Females	19:7223973_TTTG_T	rs4804414	C	T	0.018	0.001	rs4804416	T	G	0.018	0.001	
SHBG	Females	7:130438531_CTTTTT	rs559324308	C	TTTTTT	0.010	0.001	rs13241538	C	G	0.009	0.001	
SHBG	Females	12:12562340_GT_G	rs56268462	G	GT	0.010	0.002	rs6488523	G	C	0.009	0.002	
SHBG	Females	1:57170378_AATC_A	rs5774298	A	AATC	0.011	0.002	rs2746347	T	C	0.011	0.002	
SHBG	Females	12:103483327_AT_A	rs5800562	AT	A	0.026	0.001	rs10745954	A	G	0.026	0.001	

SHBG	Females	9:127474886_CA_C	rs5900623	CA	C	0.007	0.001	rs722477	A	G	0.006	0.001
SHBG	Females	rs202021413	rs61377352	TA	T	0.010	0.001	rs11240358	G	A	0.010	0.001
SHBG	Females	1:155867257_CAA_C	rs66756214	C	CAA	0.009	0.002	rs12563627	C	T	0.008	0.002
SHBG	Females	rs778571122	rs67805125	GTGTTTTT	G	0.011	0.001	rs1401454	C	T	0.011	0.001
SHBG	Females	rs34184867	rs7147511	C	T	0.008	0.001	rs12897338	C	T	0.007	0.001
SHBG	Females	6:130386212_GGAGA	rs71822536	GGAGA	G	0.009	0.002	rs9375703	T	G	0.009	0.002
SHBG	Females	1:221048577_TGA_T	rs72353756	T	TGA	0.009	0.002	NA				
SHBG	Females	rs775181992	rs76976306	A	AGCCCT	0.014	0.002	NA				
SHBG	Females	rs764029425	rs77032872	TG	T	0.038	0.002	rs3779196	C	T	0.038	0.002
SHBG	Females	rs1005421	Signal in 1KG					NA				
SHBG	Females	rs114165349	Signal in 1KG					NA				
SHBG	Females	rs114816312	Signal in 1KG					NA				
SHBG	Females	rs114949263	Signal in 1KG					NA				
SHBG	Females	rs115209326	Signal in 1KG					NA				
SHBG	Females	rs11539938	Signal in 1KG					NA				
SHBG	Females	rs116279971	Signal in 1KG					NA				
SHBG	Females	rs11688682	Signal in 1KG					NA				
SHBG	Females	rs117522510	Signal in 1KG					NA				
SHBG	Females	rs140584594	Signal in 1KG					NA				
SHBG	Females	rs143378550	Signal in 1KG					NA				
SHBG	Females	rs144293483	Signal in 1KG					NA				
SHBG	Females	rs148911629	Signal in 1KG					NA				
SHBG	Females	rs17580	Signal in 1KG					NA				
SHBG	Females	rs185044544	Signal in 1KG					NA				
SHBG	Females	rs191591035	Signal in 1KG					NA				
SHBG	Females	rs1962883	Signal in 1KG					NA				
SHBG	Females	rs202200760	Signal in 1KG					NA				
SHBG	Females	rs28925904	Signal in 1KG					NA				
SHBG	Females	rs28929470	Signal in 1KG					NA				
SHBG	Females	rs28929474	Signal in 1KG					NA				
SHBG	Females	rs5117	Signal in 1KG					NA				
SHBG	Females	rs528350911	Signal in 1KG					NA				
SHBG	Females	rs60018147	Signal in 1KG					NA				
SHBG	Females	rs61755050	Signal in 1KG					NA				
SHBG	Females	rs61830291	Signal in 1KG					NA				
SHBG	Females	rs62515079	Signal in 1KG					NA				
SHBG	Females	rs6736913	Signal in 1KG					NA				
SHBG	Females	rs72648854	Signal in 1KG					NA				
SHBG	Females	rs72681869	Signal in 1KG					NA				
SHBG	Females	rs72766607	Signal in 1KG					NA				
SHBG	Females	rs76767219	Signal in 1KG					NA				
SHBG	Females	rs76895963	Signal in 1KG					NA				
SHBG	Females	rs7696472	Signal in 1KG					NA				
SHBG	Females	rs78058190	Signal in 1KG					NA				
SHBG	Females	rs79237700	Signal in 1KG					NA				
SHBG	Females	rs79287178	Signal in 1KG					NA				
SHBG	Females	rs79391862	Signal in 1KG					NA				
SHBG	Females	rs9379084	Signal in 1KG					NA				
SHBG	Females	rs555234816	Signal in 1KG					rs10101067	G	C	0.017	0.003
SHBG	Females	rs10095380	Signal in 1KG					rs10110651	T	C	0.010	0.002
SHBG	Females	rs75077113	Signal in 1KG					rs1034528	C	G	0.010	0.002
SHBG	Females	rs58489806	Signal in 1KG					rs10401969	T	C	0.010	0.003
SHBG	Females	rs2288926	Signal in 1KG					rs10416529	C	T	0.005	0.002
SHBG	Females	rs7252372	Signal in 1KG					rs10421262	T	G	0.006	0.001
SHBG	Females	rs13150068	Signal in 1KG					rs10440319	C	G	0.017	0.001
SHBG	Females	rs140312320	Signal in 1KG					rs1057050	G	A	0.016	0.003
SHBG	Females	rs7481219	Signal in 1KG					rs1058900	T	C	0.007	0.001
SHBG	Females	rs13042148	Signal in 1KG					rs1074683	C	G	0.007	0.002
SHBG	Females	rs10815276	Signal in 1KG					rs10758706	G	C	0.008	0.001
SHBG	Females	rs12543287	Signal in 1KG					rs10808961	A	G	0.010	0.002
SHBG	Females	rs35233014	Signal in 1KG					rs10881583	C	T	0.014	0.002
SHBG	Females	rs548235873	Signal in 1KG					rs10883795	C	T	0.006	0.002
SHBG	Females	rs150584036	Signal in 1KG					rs10888695	T	C	0.009	0.002
SHBG	Females	rs34331968	Signal in 1KG					rs10922096	T	C	0.012	0.001
SHBG	Females	rs9366291	Signal in 1KG					rs10946313	T	C	0.007	0.001
SHBG	Females	rs4837794	Signal in 1KG					rs10985009	T	C	0.011	0.002
SHBG	Females	rs7298820	Signal in 1KG					rs11045237	C	A	0.013	0.002
SHBG	Females	rs11188601	Signal in 1KG					rs11188604	G	T	0.010	0.001
SHBG	Females	rs71468663	Signal in 1KG					rs11231698	C	T	0.011	0.003
SHBG	Females	rs34311866	Signal in 1KG					rs11248059	C	G	0.010	0.002
SHBG	Females	rs5791099	Signal in 1KG					rs11606433	T	C	0.005	0.002
SHBG	Females	rs7484541	Signal in 1KG					rs11614506	C	T	0.014	0.002
SHBG	Females	rs5813220	Signal in 1KG					rs11630468	A	G	0.013	0.001
SHBG	Females	rs11637595	Signal in 1KG					rs11634257	T	A	0.009	0.002
SHBG	Females	rs11641834	Signal in 1KG					rs11641548	A	C	0.011	0.001
SHBG	Females	rs4122352	Signal in 1KG					rs11644601	C	T	0.011	0.002
SHBG	Females	rs140302625	Signal in 1KG					rs11650087	A	T	0.067	0.002
SHBG	Females	rs72844546	Signal in 1KG					rs11656524	G	A	0.009	0.001
SHBG	Females	rs112966033	Signal in 1KG					rs11656665	A	G	0.014	0.001
SHBG	Females	rs111288118	Signal in 1KG					rs11666281	C	T	0.013	0.002
SHBG	Females	rs4804669	Signal in 1KG					rs11666603	T	C	0.009	0.002
SHBG	Females	rs4077285	Signal in 1KG					rs11673628	G	C	0.013	0.002
SHBG	Females	rs4871015	Signal in 1KG					rs11785664	T	C	0.006	0.001
SHBG	Females	rs4264433	Signal in 1KG					rs11870935	A	G	0.018	0.001
SHBG	Females	rs113408476	Signal in 1KG					rs1211184	T	C	0.011	0.002
SHBG	Females	rs1223796	Signal in 1KG					rs1223792	T	C	0.013	0.002
SHBG	Females	rs75130744	Signal in 1KG					rs12320328	A	G	0.022	0.003
SHBG	Females	rs72782727	Signal in 1KG					rs12599036	A	G	0.009	0.002
SHBG	Females	rs11738093	Signal in 1KG					rs12654393	G	T	0.012	0.002
SHBG	Females	rs784504	Signal in 1KG					rs1274963	G	A	0.008	0.002

SHBG	Females	rs6803518	Signal in 1KG	rs13085868	A	G	0.004	0.002
SHBG	Females	rs28712547	Signal in 1KG	rs1364907	C	T	0.010	0.002
SHBG	Females	rs138204164	Signal in 1KG	rs1511021	T	G	0.011	0.002
SHBG	Females	rs146104952	Signal in 1KG	rs16832501	C	T	0.010	0.002
SHBG	Females	rs68002561	Signal in 1KG	rs16835135	G	A	0.015	0.003
SHBG	Females	rs921153	Signal in 1KG	rs17007989	C	T	0.008	0.002
SHBG	Females	rs28459049	Signal in 1KG	rs17144574	T	C	0.006	0.002
SHBG	Females	rs78890745	Signal in 1KG	rs17288007	G	A	0.018	0.003
SHBG	Females	rs73036519	Signal in 1KG	rs17356664	C	T	0.011	0.002
SHBG	Females	rs12138803	Signal in 1KG	rs17369123	C	T	0.008	0.002
SHBG	Females	rs41280463	Signal in 1KG	rs17369400	A	G	0.009	0.002
SHBG	Females	rs112332688	Signal in 1KG	rs17372936	T	C	0.008	0.002
SHBG	Females	rs74090351	Signal in 1KG	rs17377267	G	T	0.016	0.003
SHBG	Females	rs72836346	Signal in 1KG	rs17484848	C	T	0.011	0.002
SHBG	Females	rs59837038	Signal in 1KG	rs17608660	A	G	0.008	0.002
SHBG	Females	rs4709746	Signal in 1KG	rs17630640	G	A	0.008	0.002
SHBG	Females	rs34255979	Signal in 1KG	rs17651629	T	C	0.024	0.002
SHBG	Females	rs2009310	Signal in 1KG	rs17677199	C	G	0.004	0.001
SHBG	Females	rs6860245	Signal in 1KG	rs17764730	T	C	0.011	0.002
SHBG	Females	rs147153202	Signal in 1KG	rs17790453	G	C	0.013	0.002
SHBG	Females	rs62580766	Signal in 1KG	rs17806063	G	A	0.011	0.002
SHBG	Females	rs8178824	Signal in 1KG	rs1801689	A	C	0.041	0.004
SHBG	Females	rs17887160	Signal in 1KG	rs1882551	G	C	0.009	0.002
SHBG	Females	rs28636815	Signal in 1KG	rs1946959	A	G	0.011	0.001
SHBG	Females	rs11376788	Signal in 1KG	rs194742	T	C	0.007	0.002
SHBG	Females	rs183015141	Signal in 1KG	rs2051792	C	T	0.028	0.006
SHBG	Females	rs80235628	Signal in 1KG	rs2130779	G	T	0.017	0.003
SHBG	Females	rs13379043	Signal in 1KG	rs2159176	G	T	0.008	0.002
SHBG	Females	rs111270317	Signal in 1KG	rs2241165	C	T	0.008	0.002
SHBG	Females	rs1634791	Signal in 1KG	rs2249742	C	T	0.009	0.001
SHBG	Females	rs2246223	Signal in 1KG	rs2251188	G	A	0.007	0.001
SHBG	Females	rs34154818	Signal in 1KG	rs2276936	A	C	0.009	0.001
SHBG	Females	rs549664712	Signal in 1KG	rs2291542	C	T	0.013	0.002
SHBG	Females	rs11621792	Signal in 1KG	rs2332328	C	T	0.021	0.001
SHBG	Females	rs35696875	Signal in 1KG	rs2394529	C	G	0.010	0.002
SHBG	Females	rs6058067	Signal in 1KG	rs2424993	G	C	0.009	0.002
SHBG	Females	rs6831257	Signal in 1KG	rs2602856	C	A	0.008	0.001
SHBG	Females	rs1870927	Signal in 1KG	rs2615799	T	C	0.007	0.002
SHBG	Females	rs71531849	Signal in 1KG	rs2718167	C	T	0.009	0.001
SHBG	Females	rs2723555	Signal in 1KG	rs2723572	T	C	0.006	0.001
SHBG	Females	rs550767741	Signal in 1KG	rs2741990	T	C	0.022	0.002
SHBG	Females	rs696825	Signal in 1KG	rs2780103	T	C	0.025	0.002
SHBG	Females	rs568656	Signal in 1KG	rs2791757	C	A	0.009	0.001
SHBG	Females	rs13303359	Signal in 1KG	rs2821231	C	T	0.007	0.001
SHBG	Females	rs9461793	Signal in 1KG	rs2858312	G	C	0.008	0.002
SHBG	Females	rs59774409	Signal in 1KG	rs2878342	T	C	0.014	0.003
SHBG	Females	rs62128735	Signal in 1KG	rs2974238	A	G	0.010	0.002
SHBG	Females	rs2980858	Signal in 1KG	rs2980859	G	C	0.008	0.002
SHBG	Females	rs40270	Signal in 1KG	rs30000	G	A	0.017	0.002
SHBG	Females	rs528806375	Signal in 1KG	rs301033	T	C	0.008	0.001
SHBG	Females	rs3018695	Signal in 1KG	rs3019748	G	A	0.006	0.001
SHBG	Females	rs35475471	Signal in 1KG	rs3114652	C	T	0.009	0.002
SHBG	Females	rs11103377	Signal in 1KG	rs3780190	G	A	0.007	0.001
SHBG	Females	rs62303689	Signal in 1KG	rs3792603	A	G	0.005	0.002
SHBG	Females	rs11664106	Signal in 1KG	rs3810068	C	T	0.006	0.001
SHBG	Females	rs12797706	Signal in 1KG	rs3814707	A	G	0.014	0.002
SHBG	Females	rs1684608	Signal in 1KG	rs3848375	T	C	0.009	0.002
SHBG	Females	rs73670309	Signal in 1KG	rs4266553	C	G	0.009	0.002
SHBG	Females	rs58321169	Signal in 1KG	rs4273712	A	G	0.008	0.002
SHBG	Females	rs67651018	Signal in 1KG	rs4316741	G	A	0.008	0.002
SHBG	Females	rs13200245	Signal in 1KG	rs4472353	C	T	0.008	0.002
SHBG	Females	rs62486442	Signal in 1KG	rs4474021	G	T	0.006	0.002
SHBG	Females	rs11130982	Signal in 1KG	rs4504165	C	T	0.006	0.002
SHBG	Females	rs201468966	Signal in 1KG	rs4660808	C	T	0.016	0.002
SHBG	Females	rs57158761	Signal in 1KG	rs4686683	T	G	0.004	0.001
SHBG	Females	rs6772177	Signal in 1KG	rs4687612	A	G	0.009	0.002
SHBG	Females	rs469721	Signal in 1KG	rs469772	C	T	0.013	0.002
SHBG	Females	rs10939934	Signal in 1KG	rs4700486	A	G	0.007	0.001
SHBG	Females	rs67890964	Signal in 1KG	rs4782568	G	C	0.009	0.001
SHBG	Females	rs139974673	Signal in 1KG	rs481837	C	T	0.021	0.004
SHBG	Females	rs150115323	Signal in 1KG	rs4946230	A	C	0.004	0.001
SHBG	Females	rs2498786	Signal in 1KG	rs4983559	G	A	0.011	0.001
SHBG	Females	rs4830411	Signal in 1KG	rs5741879	C	T	0.007	0.001
SHBG	Females	rs5753111	Signal in 1KG	rs5749082	T	A	0.014	0.002
SHBG	Females	rs35143646	Signal in 1KG	rs5982926	G	A	0.007	0.001
SHBG	Females	rs12012896	Signal in 1KG	rs5985281	C	T	0.025	0.001
SHBG	Females	rs6073431	Signal in 1KG	rs6073435	T	A	0.015	0.001
SHBG	Females	rs16995626	Signal in 1KG	rs6091237	C	A	0.017	0.003
SHBG	Females	rs12804411	Signal in 1KG	rs612611	G	A	0.013	0.002
SHBG	Females	rs545206972	Signal in 1KG	rs6258	C	T	0.674	0.008
SHBG	Females	rs199607859	Signal in 1KG	rs668459	T	C	0.010	0.001
SHBG	Females	rs555754	Signal in 1KG	rs668871	T	C	0.016	0.001
SHBG	Females	rs2364717	Signal in 1KG	rs6726395	G	A	0.007	0.001
SHBG	Females	rs62186584	Signal in 1KG	rs6739772	G	A	0.006	0.002
SHBG	Females	rs13108218	Signal in 1KG	rs6818397	T	G	0.016	0.001
SHBG	Females	rs6879874	Signal in 1KG	rs6885410	A	C	0.007	0.002
SHBG	Females	rs28360642	Signal in 1KG	rs6916515	G	A	0.020	0.002
SHBG	Females	rs2438109	Signal in 1KG	rs710628	C	A	0.008	0.001
SHBG	Females	rs5820605	Signal in 1KG	rs7225002	G	A	0.006	0.001
SHBG	Females	rs34385891	Signal in 1KG	rs7240326	C	T	0.008	0.001

SHBG	Females	rs858519	Signal in 1KG	rs727428	C	T	0.100	0.001
SHBG	Females	rs5750131	Signal in 1KG	rs7293	C	T	0.005	0.001
SHBG	Females	rs11830764	Signal in 1KG	rs7314285	G	T	0.040	0.003
SHBG	Females	rs7250869	Signal in 1KG	rs731839	A	G	0.009	0.002
SHBG	Females	rs7321688	Signal in 1KG	rs7324744	A	G	0.007	0.002
SHBG	Females	rs10153315	Signal in 1KG	rs7342974	T	C	0.009	0.001
SHBG	Females	rs3747207	Signal in 1KG	rs738408	T	C	0.019	0.002
SHBG	Females	rs1047891	Signal in 1KG	rs7422339	NA	NA	NA	NA
SHBG	Females	rs9426829	Signal in 1KG	rs7531982	T	A	0.014	0.001
SHBG	Females	rs12624244	Signal in 1KG	rs7568216	C	T	0.021	0.003
SHBG	Females	rs11720108	Signal in 1KG	rs7613951	T	C	0.007	0.002
SHBG	Females	rs3733321	Signal in 1KG	rs7661888	G	A	0.007	0.001
SHBG	Females	rs6531735	Signal in 1KG	rs7676961	T	C	0.006	0.001
SHBG	Females	rs34499031	Signal in 1KG	rs7756992	A	G	0.009	0.002
SHBG	Females	rs80126506	Signal in 1KG	rs7870251	G	A	0.008	0.001
SHBG	Females	rs35198068	Signal in 1KG	rs7903146	C	T	0.008	0.002
SHBG	Females	rs7475279	Signal in 1KG	rs7908297	G	A	0.021	0.002
SHBG	Females	rs76491020	Signal in 1KG	rs7939376	T	G	0.014	0.003
SHBG	Females	rs7139079	Signal in 1KG	rs7953249	A	G	0.013	0.001
SHBG	Females	rs12311848	Signal in 1KG	rs7975482	G	A	0.011	0.002
SHBG	Females	rs56332871	Signal in 1KG	rs8023580	C	T	0.037	0.002
SHBG	Females	rs78057960	Signal in 1KG	rs8076052	C	A	0.009	0.002
SHBG	Females	rs8176741	Signal in 1KG	rs8176743	C	T	0.016	0.003
SHBG	Females	rs820504	Signal in 1KG	rs820506	G	A	0.011	0.002
SHBG	Females	rs1418652	Signal in 1KG	rs823105	G	A	0.007	0.001
SHBG	Females	rs848476	Signal in 1KG	rs848487	C	T	0.007	0.002
SHBG	Females	rs10622246	Signal in 1KG	rs849142	C	T	0.009	0.001
SHBG	Females	rs1738386	Signal in 1KG	rs851972	A	G	0.008	0.001
SHBG	Females	rs10238028	Signal in 1KG	rs868564	T	C	0.018	0.003
SHBG	Females	rs35568851	Signal in 1KG	rs873308	A	G	0.007	0.001
SHBG	Females	rs11079685	Signal in 1KG	rs9303516	G	A	0.007	0.001
SHBG	Females	rs10774095	Signal in 1KG	rs933420	T	C	0.007	0.002
SHBG	Females	rs11047237	Signal in 1KG	rs9634098	C	T	0.028	0.004
SHBG	Females	rs62271373	Signal in 1KG	rs9844972	G	C	0.021	0.003
SHBG	Females	rs9872754	Signal in 1KG	rs9864898	C	T	0.009	0.002
SHBG	Females	rs11967262	Signal in 1KG	rs998584	C	A	0.009	0.001
SHBG	Females	rs10095930	Signal in 1KG	Signal in HM				
SHBG	Females	rs10108150	Signal in 1KG	Signal in HM				
SHBG	Females	rs10189479	Signal in 1KG	Signal in HM				
SHBG	Females	rs1033667	Signal in 1KG	Signal in HM				
SHBG	Females	rs1037169	Signal in 1KG	Signal in HM				
SHBG	Females	rs10461018	Signal in 1KG	Signal in HM				
SHBG	Females	rs10486782	Signal in 1KG	Signal in HM				
SHBG	Females	rs10489206	Signal in 1KG	Signal in HM				
SHBG	Females	rs10511002	Signal in 1KG	Signal in HM				
SHBG	Females	rs10857228	Signal in 1KG	Signal in HM				
SHBG	Females	rs10880868	Signal in 1KG	Signal in HM				
SHBG	Females	rs10883451	Signal in 1KG	Signal in HM				
SHBG	Females	rs10893876	Signal in 1KG	Signal in HM				
SHBG	Females	rs10961205	Signal in 1KG	Signal in HM				
SHBG	Females	rs11021232	Signal in 1KG	Signal in HM				
SHBG	Females	rs11078597	Signal in 1KG	Signal in HM				
SHBG	Females	rs11186719	Signal in 1KG	Signal in HM				
SHBG	Females	rs1126161	Signal in 1KG	Signal in HM				
SHBG	Females	rs1128249	Signal in 1KG	Signal in HM				
SHBG	Females	rs11556924	Signal in 1KG	Signal in HM				
SHBG	Females	rs11601507	Signal in 1KG	Signal in HM				
SHBG	Females	rs11666245	Signal in 1KG	Signal in HM				
SHBG	Females	rs11668201	Signal in 1KG	Signal in HM				
SHBG	Females	rs11690748	Signal in 1KG	Signal in HM				
SHBG	Females	rs11774700	Signal in 1KG	Signal in HM				
SHBG	Females	rs11780978	Signal in 1KG	Signal in HM				
SHBG	Females	rs11791747	Signal in 1KG	Signal in HM				
SHBG	Females	rs12280075	Signal in 1KG	Signal in HM				
SHBG	Females	rs1229498	Signal in 1KG	Signal in HM				
SHBG	Females	rs12438742	Signal in 1KG	Signal in HM				
SHBG	Females	rs12454712	Signal in 1KG	Signal in HM				
SHBG	Females	rs12593818	Signal in 1KG	Signal in HM				
SHBG	Females	rs1260326	Signal in 1KG	Signal in HM				
SHBG	Females	rs12613243	Signal in 1KG	Signal in HM				
SHBG	Females	rs12787996	Signal in 1KG	Signal in HM				
SHBG	Females	rs12864658	Signal in 1KG	Signal in HM				
SHBG	Females	rs12906447	Signal in 1KG	Signal in HM				
SHBG	Females	rs13018007	Signal in 1KG	Signal in HM				
SHBG	Females	rs13237750	Signal in 1KG	Signal in HM				
SHBG	Females	rs1330307	Signal in 1KG	Signal in HM				
SHBG	Females	rs13394092	Signal in 1KG	Signal in HM				
SHBG	Females	rs1433210	Signal in 1KG	Signal in HM				
SHBG	Females	rs1530439	Signal in 1KG	Signal in HM				
SHBG	Females	rs1650527	Signal in 1KG	Signal in HM				
SHBG	Females	rs17128091	Signal in 1KG	Signal in HM				
SHBG	Females	rs17202341	Signal in 1KG	Signal in HM				
SHBG	Females	rs1730862	Signal in 1KG	Signal in HM				
SHBG	Females	rs1741344	Signal in 1KG	Signal in HM				
SHBG	Females	rs174537	Signal in 1KG	Signal in HM				
SHBG	Females	rs17492269	Signal in 1KG	Signal in HM				
SHBG	Females	rs17583875	Signal in 1KG	Signal in HM				
SHBG	Females	rs17616365	Signal in 1KG	Signal in HM				
SHBG	Females	rs17669311	Signal in 1KG	Signal in HM				
SHBG	Females	rs1782652	Signal in 1KG	Signal in HM				

SHBG	Females	rs1801282	Signal in 1KG	Signal in HM
SHBG	Females	rs1872992	Signal in 1KG	Signal in HM
SHBG	Females	rs198358	Signal in 1KG	Signal in HM
SHBG	Females	rs2018519	Signal in 1KG	Signal in HM
SHBG	Females	rs2057655	Signal in 1KG	Signal in HM
SHBG	Females	rs2064074	Signal in 1KG	Signal in HM
SHBG	Females	rs2068888	Signal in 1KG	Signal in HM
SHBG	Females	rs2176040	Signal in 1KG	Signal in HM
SHBG	Females	rs2207132	Signal in 1KG	Signal in HM
SHBG	Females	rs2239222	Signal in 1KG	Signal in HM
SHBG	Females	rs2299055	Signal in 1KG	Signal in HM
SHBG	Females	rs2525570	Signal in 1KG	Signal in HM
SHBG	Females	rs267733	Signal in 1KG	Signal in HM
SHBG	Females	rs275177	Signal in 1KG	Signal in HM
SHBG	Females	rs2915023	Signal in 1KG	Signal in HM
SHBG	Females	rs2924808	Signal in 1KG	Signal in HM
SHBG	Females	rs2925979	Signal in 1KG	Signal in HM
SHBG	Females	rs2970871	Signal in 1KG	Signal in HM
SHBG	Females	rs2986669	Signal in 1KG	Signal in HM
SHBG	Females	rs3001032	Signal in 1KG	Signal in HM
SHBG	Females	rs34651	Signal in 1KG	Signal in HM
SHBG	Females	rs3747367	Signal in 1KG	Signal in HM
SHBG	Females	rs3749228	Signal in 1KG	Signal in HM
SHBG	Females	rs3751129	Signal in 1KG	Signal in HM
SHBG	Females	rs3768420	Signal in 1KG	Signal in HM
SHBG	Females	rs3782735	Signal in 1KG	Signal in HM
SHBG	Females	rs4092465	Signal in 1KG	Signal in HM
SHBG	Females	rs4149056	Signal in 1KG	Signal in HM
SHBG	Females	rs4307773	Signal in 1KG	Signal in HM
SHBG	Females	rs4327143	Signal in 1KG	Signal in HM
SHBG	Females	rs4450871	Signal in 1KG	Signal in HM
SHBG	Females	rs4530527	Signal in 1KG	Signal in HM
SHBG	Females	rs4563785	Signal in 1KG	Signal in HM
SHBG	Females	rs4810580	Signal in 1KG	Signal in HM
SHBG	Females	rs4876993	Signal in 1KG	Signal in HM
SHBG	Females	rs4976033	Signal in 1KG	Signal in HM
SHBG	Females	rs5112	Signal in 1KG	Signal in HM
SHBG	Females	rs6088776	Signal in 1KG	Signal in HM
SHBG	Females	rs6129778	Signal in 1KG	Signal in HM
SHBG	Females	rs6546096	Signal in 1KG	Signal in HM
SHBG	Females	rs6706	Signal in 1KG	Signal in HM
SHBG	Females	rs6792725	Signal in 1KG	Signal in HM
SHBG	Females	rs687339	Signal in 1KG	Signal in HM
SHBG	Females	rs740516	Signal in 1KG	Signal in HM
SHBG	Females	rs740893	Signal in 1KG	Signal in HM
SHBG	Females	rs7567544	Signal in 1KG	Signal in HM
SHBG	Females	rs799157	Signal in 1KG	Signal in HM
SHBG	Females	rs8027064	Signal in 1KG	Signal in HM
SHBG	Females	rs8107967	Signal in 1KG	Signal in HM
SHBG	Females	rs868655	Signal in 1KG	Signal in HM
SHBG	Females	rs8756	Signal in 1KG	Signal in HM
SHBG	Females	rs892225	Signal in 1KG	Signal in HM
SHBG	Females	rs899865	Signal in 1KG	Signal in HM
SHBG	Females	rs925098	Signal in 1KG	Signal in HM
SHBG	Females	rs9556403	Signal in 1KG	Signal in HM
SHBG	Females	rs9644032	Signal in 1KG	Signal in HM
SHBG	Females	rs9697210	Signal in 1KG	Signal in HM
SHBG	Females	rs9834503	Signal in 1KG	Signal in HM
SHBG	Females	rs9987289	Signal in 1KG	Signal in HM
SHBG	Males	rs184640919	NA	
SHBG	Males	rs186915841	NA	
SHBG	Males	rs191884522	NA	
SHBG	Males	rs771435780	rs10652572	G GGA 0.012 0.001 rs663892 G A 0.011 0.001
SHBG	Males	1:93033928_CT_C	rs10708162	C CT 0.013 0.001 rs1556562 T G 0.013 0.001
SHBG	Males	rs370654105	rs11071896	A G 0.006 0.001 rs11071896 A G 0.006 0.001
SHBG	Males	16:1786202_TGTGTGA	rs111208278	A G 0.009 0.002 rs11248888 G C 0.009 0.002
SHBG	Males	rs768159759	rs113165924	A AG 0.013 0.002 NA
SHBG	Males	1:23747996_GA_G	rs11340914	G GA 0.008 0.001 rs2077066 T C 0.006 0.001
SHBG	Males	rs142740991	rs13026220	G A 0.008 0.001 rs4972356 A G 0.008 0.001
SHBG	Males	rs771193934	rs139153780	AGGCATG(A) 0.006 0.001 NA
SHBG	Males	rs754959778	rs139427260	CGT C 0.005 0.001 rs12946718 C A 0.004 0.001
SHBG	Males	9:112204335_AT_A	rs143574276	AT A 0.010 0.002 NA
SHBG	Males	17:8567107_CA_C	rs145235154	CA C 0.043 0.008 NA
SHBG	Males	8:81430449_AT_A	rs149972150	A AT 0.022 0.002 rs16907708 A G 0.016 0.002
SHBG	Males	1:1510035_GGC_G	rs150737039	G GGC 0.010 0.001 rs7520996 C T 0.009 0.001
SHBG	Males	X:133611871_AT_A	rs17885587	A AT 0.009 0.001 rs6634988 C A 0.009 0.001
SHBG	Males	rs202128511	rs1871269	C T 0.012 0.001 rs1871269 C T 0.012 0.001
SHBG	Males	rs780309846	rs200092173	AAAAAAC A 0.005 0.001 rs5934229 C G 0.005 0.001
SHBG	Males	5:36206855_GAT_G	rs200108309	G GAT 0.020 0.004 NA
SHBG	Males	8:81457499_CA_C	rs200988859	C CA 0.014 0.002 rs440837 G A 0.014 0.002
SHBG	Males	1:196914907_AGT_A	rs201838824	AGT A 0.010 0.001 rs4085749 C T 0.010 0.001
SHBG	Males	2:191559843_GT_G	rs34400883	GT G 0.010 0.001 rs10202868 T C 0.010 0.001
SHBG	Males	rs749761903	rs34783163	A AT 0.008 0.001 rs1890000 T G 0.007 0.001
SHBG	Males	6:28419903_GGT_G	rs34841551	G GGT 0.007 0.001 rs916403 G A 0.006 0.001
SHBG	Males	6:27223966_CTCTA_C	rs35237909	C CTCTA 0.013 0.002 rs13194491 T C 0.012 0.002
SHBG	Males	17:16062400_TA_T	rs35251798	T TA 0.006 0.001 rs6416868 G A 0.006 0.001
SHBG	Males	rs769447487	rs35842744	T TTA 0.011 0.001 rs2298058 T C 0.011 0.001
SHBG	Males	1:25827633_CT_C	rs36046328	CT C 0.011 0.001 rs873308 A G 0.010 0.001
SHBG	Males	4:128987952_ATT_A	rs369613185	A ATT 0.006 0.001 rs1975878 C T 0.006 0.001
SHBG	Males	7:74298343_TGAGA_T	rs370429728	T TGAGA 0.008 0.001 rs2529273 C T 0.006 0.001

SHBG	Males	12:93632423_CA_C	rs373308981	CA	C	0.012	0.002	rs17790453	G	C	0.012	0.002
SHBG	Males	2:111925731_CTTATG	rs3833441	CTTATGTT	C	0.016	0.003	rs3761706	G	A	0.016	0.003
SHBG	Males	19:7223973_TTTG_T	rs4804414	C	T	0.011	0.001	rs4804416	T	G	0.011	0.001
SHBG	Males	rs4860987	rs537034155	T	A	0.030	0.001	rs4860985	T	C	0.024	0.001
SHBG	Males	9:123780856_AAAGGA	rs541538591	AAAGGAA	A	0.008	0.001	rs7033790	T	C	0.006	0.001
SHBG	Males	rs768651403	rs563720344	GT	G	0.008	0.001	rs11264422	A	T	0.006	0.001
SHBG	Males	rs762450647	rs5848822	CT	C	0.007	0.001	rs9311403	T	C	0.005	0.001
SHBG	Males	9:125949547_TA_T	rs5900565	TA	T	0.016	0.004	rs10985915	G	A	0.009	0.002
SHBG	Males	rs41412647	rs62241124	C	A	0.010	0.001	rs2739330	T	C	0.010	0.001
SHBG	Males	3:49562992_CT_C	rs66961854	CT	C	0.010	0.001	rs11130202	C	T	0.009	0.001
SHBG	Males	1:167851935_TGTAGT	rs67452660	T	TGTAGTGA	0.007	0.001	rs203847	G	A	0.006	0.001
SHBG	Males	11:65227616_CAAA_C	rs67493133	CAAA	C	0.007	0.001	rs1626021	A	G	0.007	0.001
SHBG	Males	rs778571122	rs67805125	GTGTTTTT	G	0.010	0.001	rs1401454	C	T	0.010	0.001
SHBG	Males	rs753645751	rs71148383	G	GA	0.009	0.002	rs1476099	A	G	0.009	0.002
SHBG	Males	rs773816354	rs71464658	TAACAGG	T	0.012	0.001	rs12882639	T	C	0.011	0.001
SHBG	Males	rs757253787	rs71470961	T	TC	0.008	0.001	rs12277928	T	G	0.007	0.001
SHBG	Males	13:115013423_TTCTC	rs71666677	TTCTC	T	0.009	0.001	rs11617448	G	A	0.009	0.001
SHBG	Males	14:25948829_AAC_A	rs71960108	AAC	A	0.012	0.001	rs10132280	A	C	0.011	0.001
SHBG	Males	17:67080811_CT_C	rs72013736	C	CT	0.008	0.001	rs740517	C	A	0.008	0.001
SHBG	Males	1:35734986_AAGTGCA	rs72327719	A	AAGTGCA	0.010	0.002	rs645886	G	A	0.010	0.002
SHBG	Males	rs775181992	rs76976306	A	AGCCCT	0.010	0.001	NA				
SHBG	Males	9:19084633_CT_C	rs7860122	G	A	0.009	0.001	rs7860122	G	A	0.009	0.001
SHBG	Males	rs997907	rs7920217	T	C	0.008	0.001	rs2273698	A	G	0.008	0.001
SHBG	Males	rs1005421	Signal in 1KG					NA				
SHBG	Males	rs111767734	Signal in 1KG					NA				
SHBG	Males	rs111917063	Signal in 1KG					NA				
SHBG	Males	rs114165349	Signal in 1KG					NA				
SHBG	Males	rs114949263	Signal in 1KG					NA				
SHBG	Males	rs11539938	Signal in 1KG					NA				
SHBG	Males	rs116483731	Signal in 1KG					NA				
SHBG	Males	rs11751920	Signal in 1KG					NA				
SHBG	Males	rs1349852	Signal in 1KG					NA				
SHBG	Males	rs138529890	Signal in 1KG					NA				
SHBG	Males	rs140386498	Signal in 1KG					NA				
SHBG	Males	rs140584594	Signal in 1KG					NA				
SHBG	Males	rs148082013	Signal in 1KG					NA				
SHBG	Males	rs148911629	Signal in 1KG					NA				
SHBG	Males	rs149624078	Signal in 1KG					NA				
SHBG	Males	rs149663666	Signal in 1KG					NA				
SHBG	Males	rs149675684	Signal in 1KG					NA				
SHBG	Males	rs180956060	Signal in 1KG					NA				
SHBG	Males	rs185073832	Signal in 1KG					NA				
SHBG	Males	rs187325356	Signal in 1KG					NA				
SHBG	Males	rs191591035	Signal in 1KG					NA				
SHBG	Males	rs199910997	Signal in 1KG					NA				
SHBG	Males	rs2002094	Signal in 1KG					NA				
SHBG	Males	rs200883214	Signal in 1KG					NA				
SHBG	Males	rs202200760	Signal in 1KG					NA				
SHBG	Males	rs28562483	Signal in 1KG					NA				
SHBG	Males	rs28929474	Signal in 1KG					NA				
SHBG	Males	rs35067979	Signal in 1KG					NA				
SHBG	Males	rs3747647	Signal in 1KG					NA				
SHBG	Males	rs41284816	Signal in 1KG					NA				
SHBG	Males	rs4782568	Signal in 1KG					NA				
SHBG	Males	rs528350911	Signal in 1KG					NA				
SHBG	Males	rs549677458	Signal in 1KG					NA				
SHBG	Males	rs56196860	Signal in 1KG					NA				
SHBG	Males	rs565471584	Signal in 1KG					NA				
SHBG	Males	rs60018147	Signal in 1KG					NA				
SHBG	Males	rs61755050	Signal in 1KG					NA				
SHBG	Males	rs62618693	Signal in 1KG					NA				
SHBG	Males	rs6736913	Signal in 1KG					NA				
SHBG	Males	rs67527887	Signal in 1KG					NA				
SHBG	Males	rs6939861	Signal in 1KG					NA				
SHBG	Males	rs72663907	Signal in 1KG					NA				
SHBG	Males	rs72683923	Signal in 1KG					NA				
SHBG	Males	rs72948115	Signal in 1KG					NA				
SHBG	Males	rs73266316	Signal in 1KG					NA				
SHBG	Males	rs7438888	Signal in 1KG					NA				
SHBG	Males	rs76895963	Signal in 1KG					NA				
SHBG	Males	rs78319058	Signal in 1KG					NA				
SHBG	Males	rs78444298	Signal in 1KG					NA				
SHBG	Males	rs79287178	Signal in 1KG					NA				
SHBG	Males	rs9266184	Signal in 1KG					NA				
SHBG	Males	rs9379084	Signal in 1KG					NA				
SHBG	Males	rs6831352	Signal in 1KG					rs10017466	C	T	0.020	0.001
SHBG	Males	rs62442919	Signal in 1KG					rs10267825	G	C	0.006	0.001
SHBG	Males	rs10411958	Signal in 1KG					rs10413329	G	A	0.007	0.001
SHBG	Males	rs4645936	Signal in 1KG					rs1049728	G	C	0.013	0.003
SHBG	Males	rs1570516	Signal in 1KG					rs10513272	C	T	0.006	0.001
SHBG	Males	rs13042148	Signal in 1KG					rs1074683	C	G	0.005	0.001
SHBG	Males	rs34771269	Signal in 1KG					rs10785870	T	C	0.011	0.001
SHBG	Males	rs12543287	Signal in 1KG					rs10808961	A	G	0.009	0.001
SHBG	Males	rs11111274	Signal in 1KG					rs10860865	T	G	0.007	0.001
SHBG	Males	rs35234337	Signal in 1KG					rs10972554	G	A	0.005	0.001
SHBG	Males	rs34006916	Signal in 1KG					rs1106583	C	T	0.018	0.003
SHBG	Males	rs540730	Signal in 1KG					rs1106766	T	C	0.018	0.001
SHBG	Males	rs12690320	Signal in 1KG					rs11091033	C	T	0.004	0.001
SHBG	Males	rs3927496	Signal in 1KG					rs11190401	C	T	0.008	0.001
SHBG	Males	rs56187480	Signal in 1KG					rs11630468	A	G	0.012	0.001

SHBG	Males	rs11641834	Signal in 1KG	rs11641548	A	C	0.011	0.001
SHBG	Males	rs45512696	Signal in 1KG	rs11671010	C	T	0.020	0.002
SHBG	Males	rs4077285	Signal in 1KG	rs11673628	G	C	0.011	0.002
SHBG	Males	rs7623513	Signal in 1KG	rs11709758	C	T	0.009	0.002
SHBG	Males	rs13280055	Signal in 1KG	rs11786272	A	C	0.004	0.002
SHBG	Males	rs17145750	Signal in 1KG	rs11974409	G	A	0.010	0.002
SHBG	Males	rs116338429	Signal in 1KG	rs12019871	C	T	0.009	0.002
SHBG	Males	rs141811210	Signal in 1KG	rs12094601	A	T	0.006	0.001
SHBG	Males	rs1799941	Signal in 1KG	rs12150660	T	G	0.116	0.001
SHBG	Males	rs75130744	Signal in 1KG	rs12320328	A	G	0.025	0.002
SHBG	Males	rs10822153	Signal in 1KG	rs12355784	A	C	0.064	0.001
SHBG	Males	rs61929307	Signal in 1KG	rs12367370	G	A	0.004	0.001
SHBG	Males	rs56237852	Signal in 1KG	rs12380094	G	C	0.007	0.002
SHBG	Males	rs142627977	Signal in 1KG	rs12452315	A	C	0.012	0.001
SHBG	Males	rs35824797	Signal in 1KG	rs12463074	G	A	0.016	0.003
SHBG	Males	rs55962409	Signal in 1KG	rs12599288	T	C	0.008	0.001
SHBG	Males	rs79354983	Signal in 1KG	rs12657064	G	A	0.016	0.002
SHBG	Males	rs34390319	Signal in 1KG	rs12769216	T	A	0.015	0.002
SHBG	Males	rs12950562	Signal in 1KG	rs12943914	A	G	0.011	0.001
SHBG	Males	rs36013981	Signal in 1KG	rs12946903	C	T	0.007	0.001
SHBG	Males	rs144794875	Signal in 1KG	rs12979519	T	A	0.008	0.002
SHBG	Males	rs144647926	Signal in 1KG	rs1320527	A	T	0.009	0.002
SHBG	Males	rs4809604	Signal in 1KG	rs1412957	A	G	0.006	0.001
SHBG	Males	rs36086195	Signal in 1KG	rs1497406	G	A	0.017	0.001
SHBG	Males	rs7655064	Signal in 1KG	rs1511021	T	G	0.008	0.002
SHBG	Males	rs6005840	Signal in 1KG	rs1547014	T	C	0.017	0.001
SHBG	Males	rs62195072	Signal in 1KG	rs1550532	C	G	0.008	0.001
SHBG	Males	rs200138078	Signal in 1KG	rs1575775	G	A	0.006	0.001
SHBG	Males	rs72708162	Signal in 1KG	rs16836630	C	G	0.015	0.002
SHBG	Males	rs10083137	Signal in 1KG	rs16927028	C	A	0.019	0.003
SHBG	Males	rs2234694	Signal in 1KG	rs16988435	C	T	0.013	0.003
SHBG	Males	rs17036326	Signal in 1KG	rs17036328	C	T	0.017	0.002
SHBG	Males	rs75170914	Signal in 1KG	rs17128091	C	G	0.012	0.001
SHBG	Males	rs79717793	Signal in 1KG	rs17134608	G	A	0.024	0.002
SHBG	Males	rs78890745	Signal in 1KG	rs17288007	G	A	0.013	0.003
SHBG	Males	rs1730865	Signal in 1KG	rs1730864	C	T	0.026	0.001
SHBG	Males	rs565728741	Signal in 1KG	rs1732847	C	G	0.011	0.002
SHBG	Males	rs72729610	Signal in 1KG	rs17369400	A	G	0.010	0.002
SHBG	Males	rs143709973	Signal in 1KG	rs17511686	A	G	0.013	0.003
SHBG	Males	rs11732763	Signal in 1KG	rs17628895	T	C	0.012	0.002
SHBG	Males	rs11734408	Signal in 1KG	rs17637318	C	T	0.008	0.001
SHBG	Males	rs34255979	Signal in 1KG	rs17651629	T	C	0.024	0.002
SHBG	Males	rs2259305	Signal in 1KG	rs1772182	G	C	0.012	0.001
SHBG	Males	rs562609617	Signal in 1KG	rs17767383	A	G	0.010	0.001
SHBG	Males	rs62580766	Signal in 1KG	rs17806063	G	A	0.009	0.002
SHBG	Males	rs28507491	Signal in 1KG	rs1946959	A	G	0.014	0.001
SHBG	Males	rs201764793	Signal in 1KG	rs1983639	A	G	0.009	0.001
SHBG	Males	rs12694450	Signal in 1KG	rs2030452	G	C	0.006	0.001
SHBG	Males	rs36103835	Signal in 1KG	rs2113991	T	C	0.006	0.001
SHBG	Males	rs7540115	Signal in 1KG	rs2153278	T	C	0.008	0.001
SHBG	Males	rs13379043	Signal in 1KG	rs2159176	G	T	0.006	0.002
SHBG	Males	rs10657979	Signal in 1KG	rs2160348	T	C	0.016	0.001
SHBG	Males	rs11994858	Signal in 1KG	rs2202749	G	A	0.011	0.001
SHBG	Males	rs12059956	Signal in 1KG	rs2266782	G	A	0.008	0.001
SHBG	Males	rs1799831	Signal in 1KG	rs2268572	G	A	0.008	0.002
SHBG	Males	rs4673528	Signal in 1KG	rs2287432	C	T	0.005	0.001
SHBG	Males	rs62134282	Signal in 1KG	rs2301741	T	C	0.007	0.001
SHBG	Males	rs11419346	Signal in 1KG	rs2303084	G	C	0.005	0.002
SHBG	Males	rs2288004	Signal in 1KG	rs2303222	T	C	0.007	0.001
SHBG	Males	rs7175361	Signal in 1KG	rs2304580	C	T	0.009	0.002
SHBG	Males	rs11621792	Signal in 1KG	rs2332328	C	T	0.011	0.001
SHBG	Males	rs10027275	Signal in 1KG	rs2358184	A	G	0.012	0.001
SHBG	Males	rs7780562	Signal in 1KG	rs2391211	C	T	0.007	0.002
SHBG	Males	rs9738226	Signal in 1KG	rs2393791	T	C	0.019	0.001
SHBG	Males	rs10649697	Signal in 1KG	rs2409110	A	T	0.009	0.001
SHBG	Males	rs11655704	Signal in 1KG	rs2411984	A	G	0.031	0.001
SHBG	Males	rs778239811	Signal in 1KG	rs2473057	C	T	0.006	0.001
SHBG	Males	rs1640267	Signal in 1KG	rs2537855	G	A	0.017	0.001
SHBG	Males	rs2564923	Signal in 1KG	rs2564940	G	A	0.008	0.001
SHBG	Males	rs1870927	Signal in 1KG	rs2615799	T	C	0.005	0.001
SHBG	Males	rs3812275	Signal in 1KG	rs2718167	C	T	0.007	0.001
SHBG	Males	rs36108764	Signal in 1KG	rs2896906	T	C	0.010	0.002
SHBG	Males	rs3006593	Signal in 1KG	rs2934649	G	T	0.007	0.001
SHBG	Males	rs2905801	Signal in 1KG	rs2952993	A	G	0.014	0.001
SHBG	Males	rs2222018	Signal in 1KG	rs2972144	A	G	0.013	0.001
SHBG	Males	rs2431752	Signal in 1KG	rs299284	T	C	0.010	0.002
SHBG	Males	rs40270	Signal in 1KG	rs30000	G	A	0.013	0.001
SHBG	Males	rs12928099	Signal in 1KG	rs3198697	T	C	0.006	0.001
SHBG	Males	rs631695	Signal in 1KG	rs3740643	C	A	0.016	0.001
SHBG	Males	rs71584764	Signal in 1KG	rs3748656	T	C	0.010	0.002
SHBG	Males	rs13315174	Signal in 1KG	rs3772537	C	G	0.007	0.001
SHBG	Males	rs6950023	Signal in 1KG	rs3779196	C	T	0.031	0.002
SHBG	Males	rs111981233	Signal in 1KG	rs3810194	C	T	0.024	0.002
SHBG	Males	rs12797706	Signal in 1KG	rs3814707	A	G	0.012	0.001
SHBG	Males	rs2277283	Signal in 1KG	rs3890102	G	A	0.009	0.001
SHBG	Males	rs35526088	Signal in 1KG	rs3900628	A	C	0.005	0.001
SHBG	Males	rs72753908	Signal in 1KG	rs3914699	A	G	0.007	0.002
SHBG	Males	rs55855238	Signal in 1KG	rs4092465	G	A	0.009	0.001
SHBG	Males	rs187437	Signal in 1KG	rs41746	A	T	0.008	0.001
SHBG	Males	rs58321169	Signal in 1KG	rs4273712	A	G	0.008	0.001

SHBG	Males	rs28650012	Signal in 1KG	rs4581712	A	C	0.007	0.001
SHBG	Males	rs35654957	Signal in 1KG	rs4647939	G	A	0.006	0.001
SHBG	Males	rs111643014	Signal in 1KG	rs4713766	A	C	0.021	0.004
SHBG	Males	rs4762755	Signal in 1KG	rs4762758	A	G	0.008	0.001
SHBG	Males	rs904801	Signal in 1KG	rs4782367	T	C	0.008	0.001
SHBG	Males	rs4812336	Signal in 1KG	rs4810245	A	G	0.008	0.001
SHBG	Males	rs139974673	Signal in 1KG	rs481837	C	T	0.040	0.003
SHBG	Males	rs60005573	Signal in 1KG	rs4927912	C	A	0.007	0.002
SHBG	Males	rs45490496	Signal in 1KG	rs4983559	G	A	0.007	0.001
SHBG	Males	rs501470	Signal in 1KG	rs505870	A	C	0.015	0.001
SHBG	Males	rs665731	Signal in 1KG	rs586486	C	G	0.004	0.002
SHBG	Males	rs73631501	Signal in 1KG	rs5933745	C	G	0.010	0.001
SHBG	Males	rs1418334	Signal in 1KG	rs5942974	A	G	0.040	0.001
SHBG	Males	rs2283760	Signal in 1KG	rs5987245	G	A	0.005	0.001
SHBG	Males	rs7286550	Signal in 1KG	rs5995498	T	G	0.008	0.001
SHBG	Males	rs73909848	Signal in 1KG	rs6096186	C	T	0.014	0.002
SHBG	Males	rs591939	Signal in 1KG	rs646123	G	A	0.008	0.001
SHBG	Males	rs6480299	Signal in 1KG	rs6480297	G	A	0.011	0.001
SHBG	Males	rs62012358	Signal in 1KG	rs6494130	C	G	0.007	0.001
SHBG	Males	rs6632893	Signal in 1KG	rs6629176	C	T	0.006	0.001
SHBG	Males	rs73547906	Signal in 1KG	rs6648534	T	C	0.005	0.001
SHBG	Males	rs71586027	Signal in 1KG	rs6699729	T	A	0.010	0.001
SHBG	Males	rs4675682	Signal in 1KG	rs6740584	T	C	0.009	0.001
SHBG	Males	rs11398692	Signal in 1KG	rs677231	T	A	0.006	0.001
SHBG	Males	rs13108218	Signal in 1KG	rs6818397	T	G	0.014	0.001
SHBG	Males	rs34372369	Signal in 1KG	rs6954724	A	G	0.016	0.002
SHBG	Males	rs12536766	Signal in 1KG	rs6978392	G	A	0.004	0.001
SHBG	Males	rs148427769	Signal in 1KG	rs7061449	T	C	0.012	0.003
SHBG	Males	rs190712692	Signal in 1KG	rs7254892	A	G	0.014	0.004
SHBG	Males	rs12818938	Signal in 1KG	rs7315782	G	A	0.009	0.002
SHBG	Males	rs7631981	Signal in 1KG	rs7374856	A	C	0.005	0.001
SHBG	Males	rs112352679	Signal in 1KG	rs7410318	T	C	0.010	0.002
SHBG	Males	rs6900473	Signal in 1KG	rs7451021	T	C	0.009	0.001
SHBG	Males	rs112965849	Signal in 1KG	rs748510	T	C	0.008	0.001
SHBG	Males	rs4333851	Signal in 1KG	rs7528979	T	C	0.008	0.002
SHBG	Males	rs6750410	Signal in 1KG	rs7568216	C	T	0.018	0.002
SHBG	Males	rs62182125	Signal in 1KG	rs7607369	A	G	0.006	0.001
SHBG	Males	rs55646464	Signal in 1KG	rs7705502	G	A	0.006	0.001
SHBG	Males	rs35225944	Signal in 1KG	rs7788596	C	T	0.010	0.001
SHBG	Males	rs4725944	Signal in 1KG	rs7789389	G	C	0.008	0.001
SHBG	Males	rs73109480	Signal in 1KG	rs7790348	T	C	0.011	0.002
SHBG	Males	rs75349541	Signal in 1KG	rs7817760	C	T	0.008	0.002
SHBG	Males	rs1567353	Signal in 1KG	rs7856320	C	T	0.006	0.001
SHBG	Males	rs4988308	Signal in 1KG	rs7944040	T	C	0.005	0.001
SHBG	Males	rs56332871	Signal in 1KG	rs8023580	C	T	0.029	0.001
SHBG	Males	rs8176526	Signal in 1KG	rs8176528	G	A	0.006	0.001
SHBG	Males	rs820503	Signal in 1KG	rs820506	G	A	0.009	0.002
SHBG	Males	rs860262	Signal in 1KG	rs849134	G	A	0.010	0.001
SHBG	Males	rs3742366	Signal in 1KG	rs8548	C	A	0.009	0.001
SHBG	Males	rs71115649	Signal in 1KG	rs937862	C	G	0.006	0.001
SHBG	Males	rs4714001	Signal in 1KG	rs9394368	C	G	0.005	0.001
SHBG	Males	rs62394490	Signal in 1KG	rs9461224	T	G	0.011	0.001
SHBG	Males	rs8066941	Signal in 1KG	rs9906593	A	C	0.015	0.001
SHBG	Males	rs59708846	Signal in 1KG	rs9970076	G	A	0.020	0.002
SHBG	Males	rs10069690	Signal in 1KG	Signal in HM				
SHBG	Males	rs10107182	Signal in 1KG	Signal in HM				
SHBG	Males	rs10116426	Signal in 1KG	Signal in HM				
SHBG	Males	rs10153800	Signal in 1KG	Signal in HM				
SHBG	Males	rs1037169	Signal in 1KG	Signal in HM				
SHBG	Males	rs10421262	Signal in 1KG	Signal in HM				
SHBG	Males	rs1058319	Signal in 1KG	Signal in HM				
SHBG	Males	rs10864086	Signal in 1KG	Signal in HM				
SHBG	Males	rs10868080	Signal in 1KG	Signal in HM				
SHBG	Males	rs10871794	Signal in 1KG	Signal in HM				
SHBG	Males	rs10895277	Signal in 1KG	Signal in HM				
SHBG	Males	rs11601507	Signal in 1KG	Signal in HM				
SHBG	Males	rs11666245	Signal in 1KG	Signal in HM				
SHBG	Males	rs11739158	Signal in 1KG	Signal in HM				
SHBG	Males	rs11743810	Signal in 1KG	Signal in HM				
SHBG	Males	rs11856926	Signal in 1KG	Signal in HM				
SHBG	Males	rs11867902	Signal in 1KG	Signal in HM				
SHBG	Males	rs1229492	Signal in 1KG	Signal in HM				
SHBG	Males	rs12364060	Signal in 1KG	Signal in HM				
SHBG	Males	rs12454712	Signal in 1KG	Signal in HM				
SHBG	Males	rs1260326	Signal in 1KG	Signal in HM				
SHBG	Males	rs12696304	Signal in 1KG	Signal in HM				
SHBG	Males	rs12705095	Signal in 1KG	Signal in HM				
SHBG	Males	rs13389219	Signal in 1KG	Signal in HM				
SHBG	Males	rs1351394	Signal in 1KG	Signal in HM				
SHBG	Males	rs157935	Signal in 1KG	Signal in HM				
SHBG	Males	rs17050272	Signal in 1KG	Signal in HM				
SHBG	Males	rs17185536	Signal in 1KG	Signal in HM				
SHBG	Males	rs174528	Signal in 1KG	Signal in HM				
SHBG	Males	rs17583875	Signal in 1KG	Signal in HM				
SHBG	Males	rs17669311	Signal in 1KG	Signal in HM				
SHBG	Males	rs17747324	Signal in 1KG	Signal in HM				
SHBG	Males	rs1782652	Signal in 1KG	Signal in HM				
SHBG	Males	rs1788641	Signal in 1KG	Signal in HM				
SHBG	Males	rs1801689	Signal in 1KG	Signal in HM				
SHBG	Males	rs1859690	Signal in 1KG	Signal in HM				

SHBG	Males	rs1871395	Signal in 1KG							Signal in HM		
SHBG	Males	rs1883783	Signal in 1KG							Signal in HM		
SHBG	Males	rs1890426	Signal in 1KG							Signal in HM		
SHBG	Males	rs198384	Signal in 1KG							Signal in HM		
SHBG	Males	rs1991401	Signal in 1KG							Signal in HM		
SHBG	Males	rs2106727	Signal in 1KG							Signal in HM		
SHBG	Males	rs2106854	Signal in 1KG							Signal in HM		
SHBG	Males	rs211644	Signal in 1KG							Signal in HM		
SHBG	Males	rs2156805	Signal in 1KG							Signal in HM		
SHBG	Males	rs2197771	Signal in 1KG							Signal in HM		
SHBG	Males	rs2216707	Signal in 1KG							Signal in HM		
SHBG	Males	rs2238799	Signal in 1KG							Signal in HM		
SHBG	Males	rs2239222	Signal in 1KG							Signal in HM		
SHBG	Males	rs2247213	Signal in 1KG							Signal in HM		
SHBG	Males	rs2275560	Signal in 1KG							Signal in HM		
SHBG	Males	rs2287322	Signal in 1KG							Signal in HM		
SHBG	Males	rs234051	Signal in 1KG							Signal in HM		
SHBG	Males	rs246192	Signal in 1KG							Signal in HM		
SHBG	Males	rs2721195	Signal in 1KG							Signal in HM		
SHBG	Males	rs2820441	Signal in 1KG							Signal in HM		
SHBG	Males	rs29681	Signal in 1KG							Signal in HM		
SHBG	Males	rs329122	Signal in 1KG							Signal in HM		
SHBG	Males	rs34651	Signal in 1KG							Signal in HM		
SHBG	Males	rs3746575	Signal in 1KG							Signal in HM		
SHBG	Males	rs3780190	Signal in 1KG							Signal in HM		
SHBG	Males	rs3781085	Signal in 1KG							Signal in HM		
SHBG	Males	rs3782735	Signal in 1KG							Signal in HM		
SHBG	Males	rs3795128	Signal in 1KG							Signal in HM		
SHBG	Males	rs445	Signal in 1KG							Signal in HM		
SHBG	Males	rs4715316	Signal in 1KG							Signal in HM		
SHBG	Males	rs4841133	Signal in 1KG							Signal in HM		
SHBG	Males	rs4979372	Signal in 1KG							Signal in HM		
SHBG	Males	rs5749082	Signal in 1KG							Signal in HM		
SHBG	Males	rs6258	Signal in 1KG							Signal in HM		
SHBG	Males	rs6595447	Signal in 1KG							Signal in HM		
SHBG	Males	rs6792725	Signal in 1KG							Signal in HM		
SHBG	Males	rs687339	Signal in 1KG							Signal in HM		
SHBG	Males	rs6965401	Signal in 1KG							Signal in HM		
SHBG	Males	rs7096937	Signal in 1KG							Signal in HM		
SHBG	Males	rs7210574	Signal in 1KG							Signal in HM		
SHBG	Males	rs7254776	Signal in 1KG							Signal in HM		
SHBG	Males	rs7314285	Signal in 1KG							Signal in HM		
SHBG	Males	rs738409	Signal in 1KG							Signal in HM		
SHBG	Males	rs7694379	Signal in 1KG							Signal in HM		
SHBG	Males	rs7735249	Signal in 1KG							Signal in HM		
SHBG	Males	rs7808613	Signal in 1KG							Signal in HM		
SHBG	Males	rs7892835	Signal in 1KG							Signal in HM		
SHBG	Males	rs8030357	Signal in 1KG							Signal in HM		
SHBG	Males	rs8038032	Signal in 1KG							Signal in HM		
SHBG	Males	rs8038465	Signal in 1KG							Signal in HM		
SHBG	Males	rs856534	Signal in 1KG							Signal in HM		
SHBG	Males	rs864899	Signal in 1KG							Signal in HM		
SHBG	Males	rs876435	Signal in 1KG							Signal in HM		
SHBG	Males	rs907866	Signal in 1KG							Signal in HM		
SHBG	Males	rs9697210	Signal in 1KG							Signal in HM		
SHBG	Males	rs9914426	Signal in 1KG							Signal in HM		
Total testosterone	Females	7:98188671_CCTT_C	NA									
Total testosterone	Females	rs749512116	rs111287576	CAGAT	C	0.033	0.004	rs12643026	C	A	0.032	0.004
Total testosterone	Females	17:53371413_TA_T	rs11287227	TA	T	0.019	0.003	rs10852974	G	C	0.018	0.003
Total testosterone	Females	1:150186390_AG_A	rs11303226	A	AG	0.017	0.003	rs6665499	C	T	0.016	0.003
Total testosterone	Females	2:32504650_AT_A	rs11316138	A	AT	0.017	0.003	NA				
Total testosterone	Females	3:156851624_CA_C	rs11327349	C	CA	0.019	0.003	rs12487629	C	T	0.018	0.003
Total testosterone	Females	22:31626042_CTT_C	rs139901221	CTT	C	0.016	0.003	rs5997919	A	G	0.015	0.003
Total testosterone	Females	12:123639761_TAAAT	rs142398365	TAAATA	T	0.019	0.004	rs1727315	G	A	0.017	0.003
Total testosterone	Females	11:123438708_TGAG	rs146910549	T	TGAG	0.048	0.005	rs850293	C	A	0.047	0.004
Total testosterone	Females	rs776074878	rs199508240	CA	C	0.021	0.003	rs2249225	T	C	0.019	0.003
Total testosterone	Females	10:5034014_ATTAC_A	rs199669245	ATTAC	A	0.183	0.019	NA				
Total testosterone	Females	6:34753277_GA_G	rs200893385	G	GA	0.018	0.003	rs6457792	G	A	0.015	0.003
Total testosterone	Females	rs28484580	rs2272676	T	G	0.015	0.003	rs4235404	G	C	0.015	0.003
Total testosterone	Females	rs11427441	rs2941541	T	C	0.020	0.003	rs2941541	T	C	0.020	0.003
Total testosterone	Females	10:126834851_AT_A	rs34558482	A	AT	0.016	0.003	NA				
Total testosterone	Females	11:110176972_CT_C	rs34750130	CT	C	0.017	0.003	rs1618597	C	T	0.016	0.003
Total testosterone	Females	21:43349613_GC_G	rs35497661	G	GC	0.033	0.005	rs11702562	C	T	0.035	0.005
Total testosterone	Females	9:127663551_AT_A	rs35565039	AT	A	0.018	0.003	rs4838236	G	A	0.017	0.003
Total testosterone	Females	20:60691366_CT_C	rs35952104	C	CT	0.019	0.004	rs6089650	T	C	0.019	0.004
Total testosterone	Females	12:49441189_CT_C	rs550005425	CT	C	0.061	0.010	NA				
Total testosterone	Females	15:66049600_TG_T	rs557277320	TG	T	0.019	0.003	rs6494537	C	T	0.018	0.003
Total testosterone	Females	2:135432074_CGCGCC	rs55920206	T	C	0.016	0.003	rs4954160	C	A	0.016	0.003
Total testosterone	Females	rs745932882	rs57387401	AG	A	0.027	0.003	rs2488087	G	A	0.025	0.003
Total testosterone	Females	4:57746479_TA_T	rs5858399	TA	T	0.020	0.003	rs2170073	A	G	0.019	0.003
Total testosterone	Females	3:119786083_CA_C	rs67515346	CA	C	0.017	0.003	rs334563	C	A	0.016	0.003
Total testosterone	Females	6:144301525_GT_G	rs71024882	G	GT	0.028	0.003	rs9399469	A	T	0.027	0.003
Total testosterone	Females	3:27554392_CT_C	rs71087617	C	CT	0.054	0.009	rs9823830	A	G	0.054	0.009
Total testosterone	Females	3:20085213_CTT_C	rs75154183	A	G	0.019	0.004	rs2365366	T	G	0.020	0.004
Total testosterone	Females	21:40645556_AAGGCT	rs78610475	A	AAGGCTG/	0.021	0.004	NA				
Total testosterone	Females	rs779008104	rs79280477	AAAACAG/	A	0.024	0.003	rs7758037	G	C	0.024	0.003
Total testosterone	Females	rs774224295	rs884171	A	T	0.017	0.003	rs884171	A	T	0.017	0.003
Total testosterone	Females	rs532213132	rs9897769	A	G	0.016	0.003	NA				
Total testosterone	Females	rs10910476	Signal in 1KG					NA				
Total testosterone	Females	rs112635299	Signal in 1KG					NA				

Total testosterone	Females	rs112694713	Signal in 1KG	NA					
Total testosterone	Females	rs113247979	Signal in 1KG	NA					
Total testosterone	Females	rs11778724	Signal in 1KG	NA					
Total testosterone	Females	rs117913411	Signal in 1KG	NA					
Total testosterone	Females	rs1229984	Signal in 1KG	NA					
Total testosterone	Females	rs12683780	Signal in 1KG	NA					
Total testosterone	Females	rs138983180	Signal in 1KG	NA					
Total testosterone	Females	rs17853284	Signal in 1KG	NA					
Total testosterone	Females	rs184265581	Signal in 1KG	NA					
Total testosterone	Females	rs187370584	Signal in 1KG	NA					
Total testosterone	Females	rs34557412	Signal in 1KG	NA					
Total testosterone	Females	rs34931250	Signal in 1KG	NA					
Total testosterone	Females	rs35008345	Signal in 1KG	NA					
Total testosterone	Females	rs4464040	Signal in 1KG	NA					
Total testosterone	Females	rs45446698	Signal in 1KG	NA					
Total testosterone	Females	rs56196860	Signal in 1KG	NA					
Total testosterone	Females	rs577721086	Signal in 1KG	NA					
Total testosterone	Females	rs5855544	Signal in 1KG	NA					
Total testosterone	Females	rs62621812	Signal in 1KG	NA					
Total testosterone	Females	rs72660136	Signal in 1KG	NA					
Total testosterone	Females	rs72693130	Signal in 1KG	NA					
Total testosterone	Females	rs7342537	Signal in 1KG	NA					
Total testosterone	Females	rs74652944	Signal in 1KG	NA					
Total testosterone	Females	rs7530117	Signal in 1KG	NA					
Total testosterone	Females	rs77822621	Signal in 1KG	NA					
Total testosterone	Females	rs2903385	Signal in 1KG	rs10010325	A	C	0.024	0.003	
Total testosterone	Females	rs13269725	Signal in 1KG	rs10112467	G	A	0.029	0.005	
Total testosterone	Females	rs34163044	Signal in 1KG	rs10164112	C	T	0.016	0.003	
Total testosterone	Females	rs7573187	Signal in 1KG	rs10202783	A	T	0.019	0.003	
Total testosterone	Females	rs59397130	Signal in 1KG	rs10498514	C	A	0.055	0.009	
Total testosterone	Females	rs9599996	Signal in 1KG	rs10507808	G	A	0.013	0.003	
Total testosterone	Females	rs10740131	Signal in 1KG	rs10761779	G	A	0.027	0.003	
Total testosterone	Females	rs2062479	Signal in 1KG	rs10801628	C	T	0.015	0.003	
Total testosterone	Females	rs571084788	Signal in 1KG	rs10864316	A	G	0.023	0.004	
Total testosterone	Females	rs61987429	Signal in 1KG	rs10873181	A	C	0.017	0.003	
Total testosterone	Females	rs11024458	Signal in 1KG	rs11024460	C	T	0.019	0.003	
Total testosterone	Females	rs11031005	Signal in 1KG	rs11031006	A	G	0.033	0.004	
Total testosterone	Females	rs11191801	Signal in 1KG	rs1107300	T	C	0.023	0.003	
Total testosterone	Females	rs10686842	Signal in 1KG	rs11086102	C	G	0.028	0.003	
Total testosterone	Females	rs35801460	Signal in 1KG	rs11168740	A	G	0.020	0.003	
Total testosterone	Females	rs4632729	Signal in 1KG	rs11249528	C	A	0.027	0.003	
Total testosterone	Females	rs111328885	Signal in 1KG	rs11572082	C	G	0.033	0.004	
Total testosterone	Females	rs76299412	Signal in 1KG	rs11605437	C	T	0.035	0.004	
Total testosterone	Females	rs8111359	Signal in 1KG	rs11673632	C	T	0.050	0.005	
Total testosterone	Females	rs56109436	Signal in 1KG	rs11784691	G	A	0.021	0.004	
Total testosterone	Females	rs34584018	Signal in 1KG	rs11855102	T	C	0.015	0.003	
Total testosterone	Females	rs505237	Signal in 1KG	rs12140250	G	A	0.015	0.003	
Total testosterone	Females	rs1214761	Signal in 1KG	rs1214759	G	A	0.031	0.003	
Total testosterone	Females	rs62059839	Signal in 1KG	rs12150660	T	G	0.030	0.003	
Total testosterone	Females	rs28612846	Signal in 1KG	rs12154905	G	A	0.015	0.003	
Total testosterone	Females	rs12185851	Signal in 1KG	rs12185822	A	G	0.021	0.003	
Total testosterone	Females	rs1242518	Signal in 1KG	rs1242490	C	G	0.020	0.003	
Total testosterone	Females	rs12893790	Signal in 1KG	rs12434496	G	A	0.021	0.004	
Total testosterone	Females	rs35397738	Signal in 1KG	rs12470654	G	A	0.018	0.003	
Total testosterone	Females	rs60117481	Signal in 1KG	rs12500824	A	G	0.019	0.003	
Total testosterone	Females	rs1278526	Signal in 1KG	rs1278527	T	C	0.019	0.003	
Total testosterone	Females	rs75848431	Signal in 1KG	rs12788072	G	A	0.029	0.004	
Total testosterone	Females	rs34269793	Signal in 1KG	rs12999558	A	G	0.065	0.006	
Total testosterone	Females	rs4586943	Signal in 1KG	rs13143896	G	A	0.018	0.003	
Total testosterone	Females	rs13184921	Signal in 1KG	rs13164781	C	T	0.025	0.003	
Total testosterone	Females	rs13229619	Signal in 1KG	rs13232120	T	A	0.054	0.004	
Total testosterone	Females	rs17245822	Signal in 1KG	rs1337985	C	T	0.028	0.003	
Total testosterone	Females	rs440150	Signal in 1KG	rs16928809	A	G	0.026	0.005	
Total testosterone	Females	rs200457494	Signal in 1KG	rs17084051	A	C	0.022	0.003	
Total testosterone	Females	rs36032941	Signal in 1KG	rs17134158	C	T	0.060	0.003	
Total testosterone	Females	rs6127099	Signal in 1KG	rs17216707	T	C	0.019	0.004	
Total testosterone	Females	rs72738949	Signal in 1KG	rs17509458	T	A	0.019	0.003	
Total testosterone	Females	rs77432559	Signal in 1KG	rs17646414	T	C	0.020	0.005	
Total testosterone	Females	rs6997799	Signal in 1KG	rs17711248	C	G	0.023	0.003	
Total testosterone	Females	rs72731535	Signal in 1KG	rs17757282	A	G	0.025	0.004	
Total testosterone	Females	rs11235688	Signal in 1KG	rs1783596	T	C	0.020	0.003	
Total testosterone	Females	rs75287599	Signal in 1KG	rs1800447	G	A	0.042	0.005	
Total testosterone	Females	rs111882448	Signal in 1KG	rs1925953	T	A	0.016	0.003	
Total testosterone	Females	rs2147419	Signal in 1KG	rs2031613	T	C	0.018	0.003	
Total testosterone	Females	rs58723250	Signal in 1KG	rs2034678	A	T	0.033	0.003	
Total testosterone	Females	rs1872930	Signal in 1KG	rs2035647	G	A	0.051	0.003	
Total testosterone	Females	rs61237993	Signal in 1KG	rs2050789	G	A	0.024	0.004	
Total testosterone	Females	rs3032555	Signal in 1KG	rs2232015	T	A	0.017	0.003	
Total testosterone	Females	rs8184986	Signal in 1KG	rs2236141	C	T	0.021	0.004	
Total testosterone	Females	rs569421885	Signal in 1KG	rs2250477	C	G	0.055	0.003	
Total testosterone	Females	rs13094915	Signal in 1KG	rs2272088	A	G	0.016	0.003	
Total testosterone	Females	rs117327231	Signal in 1KG	rs2276273	C	T	0.135	0.008	
Total testosterone	Females	rs199787521	Signal in 1KG	rs2280861	G	A	0.027	0.003	
Total testosterone	Females	rs1032388	Signal in 1KG	rs2295709	T	C	0.054	0.003	
Total testosterone	Females	rs7256920	Signal in 1KG	rs2302593	C	G	0.019	0.003	
Total testosterone	Females	rs35249079	Signal in 1KG	rs2306409	A	G	0.022	0.003	
Total testosterone	Females	rs62162863	Signal in 1KG	rs2341098	T	G	0.018	0.003	
Total testosterone	Females	rs6684361	Signal in 1KG	rs2392239	T	C	0.076	0.003	
Total testosterone	Females	rs2608652	Signal in 1KG	rs2608659	G	T	0.014	0.003	
Total testosterone	Females	rs10147094	Signal in 1KG	rs2614462	G	C	0.016	0.003	

Total testosterone	Females	rs2824138	Signal in 1KG	rs2824140	T	C	0.026	0.004
Total testosterone	Females	rs2517582	Signal in 1KG	rs2844664	T	C	0.024	0.003
Total testosterone	Females	rs9457466	Signal in 1KG	rs3127194	A	C	0.016	0.003
Total testosterone	Females	rs33959428	Signal in 1KG	rs31863	G	A	0.015	0.003
Total testosterone	Females	rs35427	Signal in 1KG	rs35441	C	T	0.016	0.003
Total testosterone	Females	rs2011425	Signal in 1KG	rs3732218	G	A	0.032	0.005
Total testosterone	Females	rs2879910	Signal in 1KG	rs3760818	T	A	0.014	0.003
Total testosterone	Females	rs58175144	Signal in 1KG	rs3768015	A	G	0.014	0.003
Total testosterone	Females	rs3771243	Signal in 1KG	rs3771240	C	T	0.029	0.003
Total testosterone	Females	rs371162363	Signal in 1KG	rs3775198	G	A	0.033	0.005
Total testosterone	Females	rs4067	Signal in 1KG	rs3821829	C	T	0.024	0.004
Total testosterone	Females	rs13153019	Signal in 1KG	rs4075958	A	G	0.023	0.003
Total testosterone	Females	rs34632394	Signal in 1KG	rs4128755	T	C	0.016	0.003
Total testosterone	Females	rs10687319	Signal in 1KG	rs4234100	T	C	0.011	0.003
Total testosterone	Females	rs4431325	Signal in 1KG	rs4421084	T	C	0.049	0.006
Total testosterone	Females	rs12837203	Signal in 1KG	rs4523430	T	C	0.019	0.003
Total testosterone	Females	rs62231822	Signal in 1KG	rs4685148	T	C	0.036	0.005
Total testosterone	Females	rs35199395	Signal in 1KG	rs4746822	T	C	0.017	0.003
Total testosterone	Females	rs71624037	Signal in 1KG	rs4854611	G	C	0.035	0.005
Total testosterone	Females	rs12708515	Signal in 1KG	rs4886426	A	T	0.021	0.003
Total testosterone	Females	rs2374456	Signal in 1KG	rs4953716	T	A	0.023	0.003
Total testosterone	Females	rs4245930	Signal in 1KG	rs4956037	G	A	0.024	0.003
Total testosterone	Females	rs12628709	Signal in 1KG	rs5763110	T	A	0.026	0.005
Total testosterone	Females	rs7884765	Signal in 1KG	rs5985503	A	G	0.023	0.003
Total testosterone	Females	rs590097	Signal in 1KG	rs604126	G	A	0.057	0.003
Total testosterone	Females	rs11697333	Signal in 1KG	rs6087398	T	C	0.019	0.003
Total testosterone	Females	rs6100174	Signal in 1KG	rs6100163	T	C	0.014	0.003
Total testosterone	Females	rs9506725	Signal in 1KG	rs629445	G	A	0.051	0.003
Total testosterone	Females	rs494242	Signal in 1KG	rs643434	G	A	0.017	0.003
Total testosterone	Females	rs36088520	Signal in 1KG	rs6434887	A	G	0.026	0.005
Total testosterone	Females	rs7618363	Signal in 1KG	rs6442176	T	C	0.034	0.004
Total testosterone	Females	rs11948639	Signal in 1KG	rs6595442	T	C	0.017	0.003
Total testosterone	Females	rs12078363	Signal in 1KG	rs6662137	T	G	0.027	0.003
Total testosterone	Females	rs59741822	Signal in 1KG	rs6734803	G	A	0.032	0.005
Total testosterone	Females	rs17201704	Signal in 1KG	rs6788984	A	G	0.043	0.004
Total testosterone	Females	rs11638521	Signal in 1KG	rs7181230	G	A	0.064	0.003
Total testosterone	Females	rs28421540	Signal in 1KG	rs7243806	A	G	0.032	0.003
Total testosterone	Females	rs4804181	Signal in 1KG	rs7258994	T	C	0.034	0.003
Total testosterone	Females	rs12977787	Signal in 1KG	rs732310	T	G	0.014	0.003
Total testosterone	Females	rs10799713	Signal in 1KG	rs7521867	T	C	0.027	0.003
Total testosterone	Females	rs7519368	Signal in 1KG	rs7527076	G	A	0.034	0.003
Total testosterone	Females	rs7529520	Signal in 1KG	rs7535757	A	G	0.018	0.003
Total testosterone	Females	rs3136354	Signal in 1KG	rs7562048	G	A	0.023	0.003
Total testosterone	Females	rs7575635	Signal in 1KG	rs7580013	G	A	0.037	0.004
Total testosterone	Females	rs534141419	Signal in 1KG	rs7610906	C	A	0.015	0.003
Total testosterone	Females	rs67596711	Signal in 1KG	rs768863	T	G	0.039	0.003
Total testosterone	Females	rs75217853	Signal in 1KG	rs7766042	C	T	0.033	0.005
Total testosterone	Females	rs9638084	Signal in 1KG	rs7808966	C	A	0.019	0.003
Total testosterone	Females	rs1169289	Signal in 1KG	rs7979473	A	G	0.018	0.003
Total testosterone	Females	rs61661087	Signal in 1KG	rs8040086	G	A	0.028	0.003
Total testosterone	Females	rs534645300	Signal in 1KG	rs8058961	A	G	0.019	0.003
Total testosterone	Females	rs8126001	Signal in 1KG	rs8121509	C	T	0.017	0.003
Total testosterone	Females	rs232159	Signal in 1KG	rs8182293	G	A	0.017	0.003
Total testosterone	Females	rs12436785	Signal in 1KG	rs897713	C	T	0.030	0.003
Total testosterone	Females	rs1870940	Signal in 1KG	rs905938	T	C	0.024	0.003
Total testosterone	Females	rs76830943	Signal in 1KG	rs915178	C	T	0.019	0.003
Total testosterone	Females	rs58072681	Signal in 1KG	rs9319570	G	A	0.109	0.006
Total testosterone	Females	rs2344744	Signal in 1KG	rs9366197	T	C	0.017	0.003
Total testosterone	Females	rs11191421	Signal in 1KG	rs9527	C	T	0.037	0.003
Total testosterone	Females	rs9832502	Signal in 1KG	rs9870681	T	C	0.017	0.003
Total testosterone	Females	rs112367565	Signal in 1KG	rs9959639	T	C	0.047	0.007
Total testosterone	Females	rs1009360	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10108398	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10168169	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10501081	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10817260	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10821415	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs10865479	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs11125180	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1119208	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs11673591	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1171617	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs11774829	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs11782259	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs11892043	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs12564492	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1260326	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs12658172	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs12900736	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1314911	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1547308	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1660322	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs167096	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs17043570	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs17053931	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs171021	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs17362923	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs17764067	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1883711	Signal in 1KG	Signal in HM				
Total testosterone	Females	rs1939769	Signal in 1KG	Signal in HM				

Total testosterone	Females	rs2074585	Signal in 1KG										Signal in HM
Total testosterone	Females	rs2113944	Signal in 1KG										Signal in HM
Total testosterone	Females	rs2186945	Signal in 1KG										Signal in HM
Total testosterone	Females	rs2270445	Signal in 1KG										Signal in HM
Total testosterone	Females	rs2473140	Signal in 1KG										Signal in HM
Total testosterone	Females	rs267190	Signal in 1KG										Signal in HM
Total testosterone	Females	rs287884	Signal in 1KG										Signal in HM
Total testosterone	Females	rs312023	Signal in 1KG										Signal in HM
Total testosterone	Females	rs3776299	Signal in 1KG										Signal in HM
Total testosterone	Females	rs3849653	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4149056	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4294422	Signal in 1KG										Signal in HM
Total testosterone	Females	rs437115	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4453027	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4736359	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4820829	Signal in 1KG										Signal in HM
Total testosterone	Females	rs487624	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4943729	Signal in 1KG										Signal in HM
Total testosterone	Females	rs4961485	Signal in 1KG										Signal in HM
Total testosterone	Females	rs5751229	Signal in 1KG										Signal in HM
Total testosterone	Females	rs6008259	Signal in 1KG										Signal in HM
Total testosterone	Females	rs6020423	Signal in 1KG										Signal in HM
Total testosterone	Females	rs6460528	Signal in 1KG										Signal in HM
Total testosterone	Females	rs674486	Signal in 1KG										Signal in HM
Total testosterone	Females	rs6904345	Signal in 1KG										Signal in HM
Total testosterone	Females	rs7291444	Signal in 1KG										Signal in HM
Total testosterone	Females	rs7633673	Signal in 1KG										Signal in HM
Total testosterone	Females	rs784420	Signal in 1KG										Signal in HM
Total testosterone	Females	rs7977247	Signal in 1KG										Signal in HM
Total testosterone	Females	rs8044588	Signal in 1KG										Signal in HM
Total testosterone	Females	rs8045779	Signal in 1KG										Signal in HM
Total testosterone	Females	rs837493	Signal in 1KG										Signal in HM
Total testosterone	Females	rs873779	Signal in 1KG										Signal in HM
Total testosterone	Females	rs881613	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9319895	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9552597	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9611014	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9687846	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9850919	Signal in 1KG										Signal in HM
Total testosterone	Females	rs9898480	Signal in 1KG										Signal in HM
Total testosterone	Males	rs140357247	NA										
Total testosterone	Males	19:35555222_GTC_G	rs10577478	G	GTC	0.037	0.004	NA					
Total testosterone	Males	6:100108564_TG_T	rs10706082	T	TG	0.022	0.003	NA					
Total testosterone	Males	9:140774721_T_C	rs10867084	C	T	0.017	0.003	rs10867084	C	T	0.017	0.003	
Total testosterone	Males	rs66956368	rs112765699	T	A	0.030	0.004	rs3821866	G	C	0.014	0.003	
Total testosterone	Males	rs113017476	rs112881196	G	C	0.190	0.008	NA					
Total testosterone	Males	rs111538456	rs113277738		0	0	0.000	rs2731440	T	A	0.026	0.003	
Total testosterone	Males	rs746303202	rs11335288	A	AG	0.020	0.003	rs3766927	C	T	0.020	0.003	
Total testosterone	Males	6:131936324_GTTT_G	rs139719926	GTTT	G	0.026	0.004	rs2245133	T	C	0.025	0.004	
Total testosterone	Males	10:81073027_CCCACC	rs146292747	CCCACCCA	C	0.021	0.004	rs7077812	T	C	0.019	0.004	
Total testosterone	Males	7:150502468_AT_A	rs146541367	A	AT	0.033	0.005	NA					
Total testosterone	Males	10:65158772_AAAG_A	rs150036478	A	AAAG	0.110	0.003	rs7912893	A	T	0.109	0.003	
Total testosterone	Males	3:152118069_ATTTATA	rs151332772	A	ATTTATAA	0.035	0.005	rs17370867	C	T	0.034	0.005	
Total testosterone	Males	7:78482336_AG_A	rs200907201	AG	A	0.052	0.009	NA					
Total testosterone	Males	rs761954625	rs201897302	CTG	C	0.032	0.003	rs5914796	A	T	0.031	0.003	
Total testosterone	Males	rs5787948	rs2803608	T	C	0.017	0.003	rs2803608	T	C	0.017	0.003	
Total testosterone	Males	rs71027236	rs34018823	C	A	0.019	0.004	rs1468684	G	C	0.020	0.004	
Total testosterone	Males	5:135639923_GA_G	rs34941172	GA	G	0.031	0.004	rs11958545	C	T	0.030	0.004	
Total testosterone	Males	16:1684027_CA_C	rs35510689	C	CA	0.029	0.005	rs7196996	C	G	0.029	0.006	
Total testosterone	Males	rs66844552	rs35614701	G	A	0.016	0.003	rs873308	A	G	0.015	0.003	
Total testosterone	Males	17:17917246_AT_A	rs35745875	AT	A	0.019	0.003	rs2955382	T	C	0.017	0.003	
Total testosterone	Males	1:221045347_AT_A	rs36079165	A	AT	0.021	0.003	rs2247213	G	A	0.019	0.003	
Total testosterone	Males	X:146434326_GTTT_G	rs368611801	GTTT	G	0.017	0.002	rs5951961	G	C	0.016	0.002	
Total testosterone	Males	10:69632729_AT_A	rs371054378	AT	A	0.024	0.003	rs2224573	A	G	0.023	0.003	
Total testosterone	Males	16:28704506_ATTT_A	rs371092802	ATTT	A	0.034	0.003	rs12325278	A	G	0.033	0.003	
Total testosterone	Males	rs2016572	rs556503353	G	A	0.026	0.003	NA					
Total testosterone	Males	6:160768849_CTGCC	rs557136302	C	CTGCCCTG	0.020	0.003	rs487060	T	C	0.020	0.003	
Total testosterone	Males	9:97023094_ATTTTTT	rs561717345	A	ATTTTTTT	0.016	0.003	rs9696843	G	A	0.011	0.003	
Total testosterone	Males	20:39951474_TA_T	rs57706173	T	TA	0.022	0.003	rs6029632	A	G	0.022	0.003	
Total testosterone	Males	10:93564864_CT_C	rs5786972	CT	C	0.020	0.003	rs7076687	A	G	0.019	0.003	
Total testosterone	Males	rs782159242	rs5961192	G	T	0.014	0.002	rs5961192	G	T	0.014	0.002	
Total testosterone	Males	rs139316391	rs59774409	T	C	0.050	0.006	rs3810194	C	T	0.049	0.006	
Total testosterone	Males	4:69447407_GT_G	rs61573189	GT	G	0.060	0.004	NA					
Total testosterone	Males	1:167851935_TGAGT	rs67452660	T	TGAGTGA	0.017	0.003	rs203847	G	A	0.015	0.003	
Total testosterone	Males	rs11433420	rs67808154	T	TA	0.019	0.003	rs1402398	G	A	0.018	0.003	
Total testosterone	Males	rs775181992	rs76976306	A	AGCCCT	0.023	0.004	NA					
Total testosterone	Males	rs112765699	Signal in 1KG					NA					
Total testosterone	Males	rs114165349	Signal in 1KG					NA					
Total testosterone	Males	rs114816312	Signal in 1KG					NA					
Total testosterone	Males	rs1203109	Signal in 1KG					NA					
Total testosterone	Males	rs12810788	Signal in 1KG					NA					
Total testosterone	Males	rs145602600	Signal in 1KG					NA					
Total testosterone	Males	rs145843487	Signal in 1KG					NA					
Total testosterone	Males	rs146447930	Signal in 1KG					NA					
Total testosterone	Males	rs17580	Signal in 1KG					NA					
Total testosterone	Males	rs191591035	Signal in 1KG					NA					
Total testosterone	Males	rs202200760	Signal in 1KG					NA					
Total testosterone	Males	rs28929474	Signal in 1KG					NA					
Total testosterone	Males	rs41310053	Signal in 1KG					NA					
Total testosterone	Males	rs4782568	Signal in 1KG					NA					

Total testosterone	Males	rs528845403	Signal in 1KG	NA				
Total testosterone	Males	rs534541609	Signal in 1KG	NA				
Total testosterone	Males	rs543504257	Signal in 1KG	NA				
Total testosterone	Males	rs550628400	Signal in 1KG	NA				
Total testosterone	Males	rs55707100	Signal in 1KG	NA				
Total testosterone	Males	rs56196860	Signal in 1KG	NA				
Total testosterone	Males	rs61755050	Signal in 1KG	NA				
Total testosterone	Males	rs61762319	Signal in 1KG	NA				
Total testosterone	Males	rs6736913	Signal in 1KG	NA				
Total testosterone	Males	rs6939861	Signal in 1KG	NA				
Total testosterone	Males	rs72681869	Signal in 1KG	NA				
Total testosterone	Males	rs76767219	Signal in 1KG	NA				
Total testosterone	Males	rs7696472	Signal in 1KG	NA				
Total testosterone	Males	rs77044968	Signal in 1KG	NA				
Total testosterone	Males	rs79391862	Signal in 1KG	NA				
Total testosterone	Males	rs79488654	Signal in 1KG	NA				
Total testosterone	Males	rs565931739	Signal in 1KG	rs10019555	G	A	0.037	0.004
Total testosterone	Males	rs3841946	Signal in 1KG	rs1006895	T	C	0.033	0.004
Total testosterone	Males	rs7835492	Signal in 1KG	rs10101710	A	T	0.039	0.036
Total testosterone	Males	rs1812755	Signal in 1KG	rs10484012	T	C	0.020	0.003
Total testosterone	Males	rs12543287	Signal in 1KG	rs10808961	A	G	0.018	0.003
Total testosterone	Males	rs199950405	Signal in 1KG	rs10867605	G	A	0.018	0.004
Total testosterone	Males	rs35182096	Signal in 1KG	rs10881583	C	T	0.022	0.004
Total testosterone	Males	rs540730	Signal in 1KG	rs1106766	T	C	0.030	0.004
Total testosterone	Males	rs7143218	Signal in 1KG	rs11160582	T	C	0.024	0.003
Total testosterone	Males	rs139713000	Signal in 1KG	rs11622474	T	C	0.028	0.004
Total testosterone	Males	rs12926107	Signal in 1KG	rs11641548	A	C	0.024	0.003
Total testosterone	Males	rs841194	Signal in 1KG	rs11648117	G	C	0.025	0.004
Total testosterone	Males	rs200651966	Signal in 1KG	rs11852815	C	T	0.023	0.003
Total testosterone	Males	rs1799941	Signal in 1KG	rs12150660	T	G	0.190	0.003
Total testosterone	Males	rs35824797	Signal in 1KG	rs12463074	G	A	0.044	0.007
Total testosterone	Males	rs10028954	Signal in 1KG	rs12503526	A	T	0.019	0.003
Total testosterone	Males	rs3809272	Signal in 1KG	rs1265566	T	C	0.018	0.003
Total testosterone	Males	rs34702488	Signal in 1KG	rs12740128	C	T	0.025	0.004
Total testosterone	Males	rs34131245	Signal in 1KG	rs12780499	C	T	0.029	0.005
Total testosterone	Males	rs12910403	Signal in 1KG	rs12900045	T	C	0.018	0.003
Total testosterone	Males	rs2764772	Signal in 1KG	rs12931939	T	C	0.024	0.004
Total testosterone	Males	rs28394864	Signal in 1KG	rs12937634	T	C	0.050	0.003
Total testosterone	Males	rs2668776	Signal in 1KG	rs1398217	G	C	0.021	0.003
Total testosterone	Males	rs10832570	Signal in 1KG	rs1401454	C	T	0.025	0.003
Total testosterone	Males	rs36086195	Signal in 1KG	rs1497406	G	A	0.019	0.003
Total testosterone	Males	rs59194935	Signal in 1KG	rs1523327	T	A	0.018	0.003
Total testosterone	Males	rs62415384	Signal in 1KG	rs1574430	C	A	0.016	0.003
Total testosterone	Males	rs1349359	Signal in 1KG	rs1631380	A	C	0.016	0.003
Total testosterone	Males	rs201814405	Signal in 1KG	rs17033491	A	G	0.026	0.004
Total testosterone	Males	rs79717793	Signal in 1KG	rs17134608	G	A	0.049	0.004
Total testosterone	Males	rs9986829	Signal in 1KG	rs17168570	C	A	0.038	0.003
Total testosterone	Males	rs112530420	Signal in 1KG	rs17395416	T	G	0.023	0.004
Total testosterone	Males	rs34851490	Signal in 1KG	rs17651629	T	C	0.044	0.005
Total testosterone	Males	rs576009056	Signal in 1KG	rs17696392	A	T	0.022	0.004
Total testosterone	Males	rs56853305	Signal in 1KG	rs1850512	C	T	0.021	0.005
Total testosterone	Males	rs2583948	Signal in 1KG	rs1993669	C	T	0.035	0.005
Total testosterone	Males	rs4871844	Signal in 1KG	rs2241260	G	A	0.015	0.003
Total testosterone	Males	rs2306216	Signal in 1KG	rs2242229	G	T	0.026	0.004
Total testosterone	Males	rs2540945	Signal in 1KG	rs2249105	G	A	0.018	0.003
Total testosterone	Males	rs3768321	Signal in 1KG	rs2293476	G	C	0.026	0.004
Total testosterone	Males	rs11621792	Signal in 1KG	rs2332328	C	T	0.016	0.003
Total testosterone	Males	rs12406721	Signal in 1KG	rs2335077	G	A	0.032	0.003
Total testosterone	Males	rs11099675	Signal in 1KG	rs2358184	A	G	0.021	0.004
Total testosterone	Males	rs2393775	Signal in 1KG	rs2393791	T	C	0.026	0.003
Total testosterone	Males	rs62062271	Signal in 1KG	rs2532288	T	C	0.029	0.004
Total testosterone	Males	rs575146	Signal in 1KG	rs2739330	T	C	0.017	0.003
Total testosterone	Males	rs4754839	Signal in 1KG	rs2846855	A	G	0.017	0.003
Total testosterone	Males	rs2957683	Signal in 1KG	rs2923089	C	T	0.016	0.003
Total testosterone	Males	rs2905801	Signal in 1KG	rs2952993	A	G	0.029	0.003
Total testosterone	Males	rs40270	Signal in 1KG	rs30000	G	A	0.019	0.003
Total testosterone	Males	rs9383605	Signal in 1KG	rs3020418	G	A	0.019	0.003
Total testosterone	Males	rs12787293	Signal in 1KG	rs341053	G	A	0.020	0.003
Total testosterone	Males	rs631695	Signal in 1KG	rs3740643	C	A	0.023	0.003
Total testosterone	Males	rs573396813	Signal in 1KG	rs3752210	T	A	0.016	0.003
Total testosterone	Males	rs7015	Signal in 1KG	rs3779196	C	T	0.055	0.004
Total testosterone	Males	rs34396520	Signal in 1KG	rs3806661	G	A	0.018	0.003
Total testosterone	Males	rs10750766	Signal in 1KG	rs3814707	A	G	0.023	0.004
Total testosterone	Males	rs2012736	Signal in 1KG	rs3892170	G	C	0.047	0.005
Total testosterone	Males	rs73079476	Signal in 1KG	rs4149056	T	C	0.054	0.004
Total testosterone	Males	rs55867305	Signal in 1KG	rs4278125	G	A	0.032	0.003
Total testosterone	Males	rs112107457	Signal in 1KG	rs4645631	C	G	0.027	0.004
Total testosterone	Males	rs6766859	Signal in 1KG	rs4678408	G	A	0.031	0.003
Total testosterone	Males	rs12125882	Signal in 1KG	rs473629	T	A	0.017	0.003
Total testosterone	Males	rs28892005	Signal in 1KG	rs4775935	T	G	0.028	0.003
Total testosterone	Males	rs4525526	Signal in 1KG	rs4790285	C	T	0.033	0.004
Total testosterone	Males	rs1441911	Signal in 1KG	rs4859658	G	A	0.021	0.004
Total testosterone	Males	rs35737316	Signal in 1KG	rs4951318	C	G	0.036	0.004
Total testosterone	Males	rs45490496	Signal in 1KG	rs4983559	G	A	0.019	0.003
Total testosterone	Males	rs112265145	Signal in 1KG	rs5934505	C	T	0.097	0.002
Total testosterone	Males	rs6073431	Signal in 1KG	rs6073435	T	A	0.029	0.003
Total testosterone	Males	rs650558	Signal in 1KG	rs646123	G	A	0.019	0.003
Total testosterone	Males	rs61922185	Signal in 1KG	rs6487172	T	C	0.021	0.003
Total testosterone	Males	rs72630041	Signal in 1KG	rs6525588	G	C	0.016	0.003
Total testosterone	Males	rs11096640	Signal in 1KG	rs6531214	G	A	0.015	0.003

Total testosterone	Males	rs3742223	Signal in 1KG	rs6577061	C	T	0.021	0.005
Total testosterone	Males	rs74805556	Signal in 1KG	rs6624226	G	A	0.038	0.003
Total testosterone	Males	rs34040779	Signal in 1KG	rs664595	T	C	0.017	0.004
Total testosterone	Males	rs10649609	Signal in 1KG	rs6712203	T	C	0.017	0.003
Total testosterone	Males	rs13108218	Signal in 1KG	rs6818397	T	G	0.022	0.003
Total testosterone	Males	rs11772470	Signal in 1KG	rs6961634	A	G	0.030	0.004
Total testosterone	Males	rs34955534	Signal in 1KG	rs6996954	T	C	0.038	0.005
Total testosterone	Males	rs10982192	Signal in 1KG	rs7038862	T	C	0.022	0.004
Total testosterone	Males	rs57349855	Signal in 1KG	rs7200841	T	C	0.021	0.003
Total testosterone	Males	rs7216664	Signal in 1KG	rs7210574	C	T	0.017	0.003
Total testosterone	Males	rs11671304	Signal in 1KG	rs7251104	G	C	0.017	0.003
Total testosterone	Males	rs2038695	Signal in 1KG	rs7338818	C	T	0.021	0.003
Total testosterone	Males	rs200647710	Signal in 1KG	rs738508	T	C	0.015	0.003
Total testosterone	Males	rs141509569	Signal in 1KG	rs7516840	C	G	0.021	0.003
Total testosterone	Males	rs6750410	Signal in 1KG	rs7568216	C	T	0.041	0.006
Total testosterone	Males	rs7065171	Signal in 1KG	rs757309	A	G	0.018	0.002
Total testosterone	Males	rs12614829	Signal in 1KG	rs7596561	T	C	0.030	0.004
Total testosterone	Males	rs7610366	Signal in 1KG	rs7621942	C	T	0.021	0.003
Total testosterone	Males	rs55869022	Signal in 1KG	rs7649178	G	A	0.026	0.005
Total testosterone	Males	rs140218129	Signal in 1KG	rs767602	G	T	0.026	0.005
Total testosterone	Males	rs1933801	Signal in 1KG	rs7759938	T	C	0.038	0.003
Total testosterone	Males	rs148204274	Signal in 1KG	rs7831029	G	A	0.016	0.003
Total testosterone	Males	rs7912521	Signal in 1KG	rs7908228	G	T	0.049	0.003
Total testosterone	Males	rs56332871	Signal in 1KG	rs8023580	C	T	0.047	0.003
Total testosterone	Males	rs12445820	Signal in 1KG	rs8053548	C	T	0.024	0.004
Total testosterone	Males	rs62076019	Signal in 1KG	rs8075262	A	G	0.014	0.003
Total testosterone	Males	rs1708302	Signal in 1KG	rs849135	A	G	0.018	0.003
Total testosterone	Males	rs10958704	Signal in 1KG	rs881301	T	C	0.020	0.003
Total testosterone	Males	rs72721770	Signal in 1KG	rs887507	G	A	0.019	0.003
Total testosterone	Males	rs2551641	Signal in 1KG	rs889895	G	A	0.021	0.004
Total testosterone	Males	rs148262335	Signal in 1KG	rs912202	C	G	0.026	0.003
Total testosterone	Males	rs6676846	Signal in 1KG	rs912795	G	A	0.029	0.004
Total testosterone	Males	rs7824394	Signal in 1KG	rs952559	G	A	0.024	0.003
Total testosterone	Males	rs13289095	Signal in 1KG	rs9697210	G	A	0.021	0.004
Total testosterone	Males	rs7166920	Signal in 1KG	rs972265	A	C	0.019	0.003
Total testosterone	Males	rs9970140	Signal in 1KG	rs9970076	G	A	0.040	0.006
Total testosterone	Males	rs10192634	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10279715	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1033667	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10421262	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1058319	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10864086	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10868080	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10892924	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs10982156	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1154401	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs11607114	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs11703376	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs11735092	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1229498	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs12320328	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs12336359	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs12470971	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1260326	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs12796488	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs13074711	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1421085	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1624295	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs17408832	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs1994721	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs2090409	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs2239222	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs267733	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs2721195	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs2862954	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs329122	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs3808869	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs42945	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs4757142	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs4841133	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs60701	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs618888	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs6258	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs645040	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs6486542	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs6792725	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs6870458	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7182912	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7314285	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs738409	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7679843	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7735249	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7773995	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7828742	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7844586	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7915430	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs7997628	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs8107967	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs881090	Signal in 1KG	Signal in HM				
Total testosterone	Males	rs9461224	Signal in 1KG	Signal in HM				

Total testosterone	Males	X:54243748_CA_C	X:54243748	CA	C	0.016	0.003 NA
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1KG = 1000 Genomes

HM = HapMap2

NA = missing in hormone results

SE = standard error

Notes: Weights are effects from the relevant hormone analysis.

Supplementary Table S29: Variants excluded from Mendelian randomization analyses as a result of Steiger filtering.

Notes: Variants excluded have a larger effect size (absolute) in one or more of the 11 metabolic outcome traits listed than the sex hormone exposure (indicated by "1" in the table below). All effect sizes compared were in standard deviations and were from GWAS of inverse-normalized phenotypes in UK Biobank.

Signal	Exposure	Sex	Variant has larger effect on metabolic trait than sex hormone.													
			Glucose	T2D	WHR	BMI	HDL	LDL	Cholesterol	Triglycerides	CAD	DBP	SBP	Total		
rs2594948	Bioavailable testosterone	Males	1	0	1	1	1	1	1	1	1	0	1	1	1	10
16:53822169_AT_A	Bioavailable testosterone	Males	0	1	0	1	1	1	0	0	0	0	0	1	0	4
rs1178947	Bioavailable testosterone	Males	0	0	0	0	1	0	1	0	1	0	0	0	0	2
rs1753454	Bioavailable testosterone	Males	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs6129778	Bioavailable testosterone	Females	1	0	1	0	0	0	1	1	0	1	1	1	1	7
rs7291444	Bioavailable testosterone	Females	0	1	0	0	0	0	1	1	0	1	1	0	0	5
rs182375344	Bioavailable testosterone	Females	0	1	1	0	0	0	1	1	1	0	0	0	0	5
rs4135247	Bioavailable testosterone	Females	0	0	1	0	0	0	1	1	1	0	0	0	0	4
rs381194	Bioavailable testosterone	Females	0	0	1	0	0	0	1	1	0	1	0	0	0	4
rs9987289	Bioavailable testosterone	Females	1	0	0	0	0	1	1	1	0	0	0	0	0	4
rs34954997	Bioavailable testosterone	Females	0	0	1	0	0	0	1	1	1	0	0	0	0	4
rs13020003	Bioavailable testosterone	Females	0	0	1	0	1	1	0	0	1	0	0	0	0	3
rs78058190	Bioavailable testosterone	Females	0	0	1	0	1	0	0	0	1	0	0	0	0	3
rs34241	Bioavailable testosterone	Females	0	0	0	1	0	1	1	1	0	0	0	0	0	3
rs10504255	Bioavailable testosterone	Females	0	0	0	0	0	0	1	1	0	0	0	0	0	3
rs1515098	Bioavailable testosterone	Females	0	0	0	0	0	0	1	0	1	0	0	0	0	2
rs40270	Bioavailable testosterone	Females	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs77491205	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	0	1	1	1	2
rs9379084	Bioavailable testosterone	Females	1	1	0	0	0	0	0	0	0	0	0	0	0	2
rs36019311	Bioavailable testosterone	Females	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs7139079	Bioavailable testosterone	Females	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs17580	Bioavailable testosterone	Females	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs879619	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	0	0	1	1	2
rs11078597	Bioavailable testosterone	Females	0	0	0	0	0	0	0	1	1	0	0	0	0	2
rs3596561	Bioavailable testosterone	Females	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs11879227	Bioavailable testosterone	Females	1	0	0	1	0	0	0	0	0	0	0	0	0	2
rs34255979	Bioavailable testosterone	Females	0	0	0	0	0	1	0	1	0	0	0	0	0	2
rs6020423	Bioavailable testosterone	Females	1	1	0	0	0	0	0	0	0	0	0	0	0	2
rs6129778	Bioavailable testosterone	Females	0	0	0	0	0	0	1	1	0	0	0	0	0	2
1:154580015_TC_T	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs140584594	Bioavailable testosterone	Females	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs7418101	Bioavailable testosterone	Females	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs13030651	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs6772177	Bioavailable testosterone	Females	0	0	1	0	0	0	0	0	0	0	0	0	0	1
rs114303452	Bioavailable testosterone	Females	0	0	0	0	0	0	0	1	0	0	0	0	0	1
6:130386212_GGAGA_G	Bioavailable testosterone	Females	0	0	1	0	0	0	0	0	0	0	0	0	0	1
10:65224458_CA_C	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs11031005	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs3814707	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	0	1	0	0	1
rs6486122	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs56205943	Bioavailable testosterone	Females	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs76895963	Bioavailable testosterone	Females	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs8046391	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	0	0	0	1	0	1
rs8178824	Bioavailable testosterone	Females	0	0	0	0	0	0	1	0	0	0	0	0	0	1
rs112933999	Bioavailable testosterone	Females	0	0	0	1	0	0	0	0	0	0	0	0	0	1
rs7248104	Bioavailable testosterone	Females	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs6073431	Bioavailable testosterone	Females	0	0	0	0	0	1	0	1	0	0	0	0	0	1
rs1260326	Oestradiol	Males	1	1	0	1	0	1	1	1	1	1	0	0	0	7
rs12850857	Oestradiol	Males	0	1	1	0	1	0	0	0	1	0	0	0	0	4
rs56196860	Oestradiol	Males	0	1	1	0	0	0	0	0	0	1	0	0	0	3
rs657152	Oestradiol	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs45446698	Oestradiol	Males	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs727428	Oestradiol	Males	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs113047993	Oestradiol	Males	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs201687269	Oestradiol	Males	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs117826558	Oestradiol	Males	0	1	0	0	0	0	0	0	0	0	0	0	0	1
rs174528	SHBG	Males	1	0	0	0	0	1	1	1	1	0	0	0	0	5
rs190712692	SHBG	Males	0	0	0	0	0	1	1	1	1	0	0	0	0	5
rs4841133	SHBG	Males	1	0	0	0	0	1	1	1	0	0	0	0	0	4
rs1747324	SHBG	Males	1	1	1	1	0	0	0	0	0	1	0	0	0	4
rs907866	SHBG	Males	0	0	0	0	0	1	1	1	0	0	0	0	0	3
rs55646464	SHBG	Males	0	0	1	0	1	0	0	0	1	0	0	0	0	3
rs17185536	SHBG	Males	0	0	0	1	0	1	1	0	0	0	0	0	0	3
rs1890426	SHBG	Males	0	0	0	0	0	1	1	1	0	0	0	0	0	3
rs11419346	SHBG	Males	0	0	0	1	0	0	0	0	0	0	1	1	3	3
rs12454712	SHBG	Males	0	0	0	1	0	0	0	0	1	1	0	0	0	3
rs200138078	SHBG	Males	0	0	1	0	1	0	0	0	1	0	0	0	0	3
1:23747996_GA_G	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
1:25827633_CT_C	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs2820441	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs13389219	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs17050272	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs2222018	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs112965849	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs34651	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
6:27223966_CTCTA_C	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs17145750	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs10107182	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs856534	SHBG	Males	0	0	0	0	0	0	1	0	1	0	0	0	0	2
rs11601507	SHBG	Males	0	0	0	0	0	0	1	0	0	1	0	0	0	2
13:115013423_TTCTC_T	SHBG	Males	0	0	0	0	0	0	0	0	0	0	1	1	2	2
rs12928099	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs7254776	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs3795128	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs771193934	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs2234694	SHBG	Males	0	0	0	0	0	0	1	1	0	0	0	0	0	2
rs2283760	SHBG	Males	0	0	0	0	0	1	0	0	1	0	0	0	0	2
rs140584594	SHBG	Males	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs141811210	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs2275560	SHBG	Males	0	0	1	0	0	0	0	0	0	0	0	0	0	1
rs71584764	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs771435780	SHBG	Males	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs1260326	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs62182125	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs329122	SHBG	Males	0	0	1	0	0	0	0	0	0	0	0	0	0	1
rs40270	SHBG	Males	0	0	1	0	0	0	0	0	0	0	0	0	0	1
rs199910997	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs4714001	SHBG	Males	0	0	0	0	0	0	0	0	1	0	0	0	0	1
rs9266184	SHBG	Males	0	0	1	0	0	0	0	0	0	0	0	0	0	1
rs1799831	SHBG	Males	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs2106727	SHBG	Males	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs13280055	SHBG	Males	0	0	0	0	0	0	0	0	0	1	0	0	0	1
rs7096937	SHBG	Males	0	0	0	0	0	1	0	0	0	0	0	0	0	1
rs4645936	SHBG	Males	0													

