Mendelian randomization study of height and body mass index as modifiers of ovarian cancer risk in 22,588 *BRCA1* and *BRCA2* mutation carriers

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Running title: Height, body mass index, and ovarian cancer risk

Abstract: 200 words (limits 200)

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Abstract

Background Height and body mass index (BMI) are associated with higher ovarian cancer risk in the general population, but whether such associations exist among *BRCA1/2* mutation carriers is unknown.

Methods We applied a Mendelian randomization approach to examine height/BMI with ovarian cancer risk using the Consortium of Investigators for the Modifiers of *BRCA1/2* (CIMBA) dataset, comprising 14,676 *BRCA1* and 7,912 *BRCA2* mutation carriers, with 2,923 ovarian cancer cases. We created a height genetic-score (height-GS) using 586 height-associated variants and a BMI genetic-score (BMI-GS) using 93 BMI-associated variants. Associations were assessed using weighted Cox models.

Results Observed height was not associated with ovarian cancer risk (hazard ratio [HR]: 1.07 per 10-cm increase in height, 95% confidence interval [CI]: 0.94–1.23). Height-GS showed similar results (HR=1.02, 95%CI: 0.85–1.23). Higher BMI was significantly associated with increased risk in premenopausal women with HR=1.25 (95%CI: 1.06–1.48) and HR=1.59 (95%CI: 1.08–2.33) per 5-kg/m^2 increase in observed and genetically determined BMI, respectively. No association was found for postmenopausal women. Interaction between menopausal status and BMI was significant ($P_{interaction}$<0.05).

Conclusion Our observation of a positive association between BMI and ovarian cancer risk in premenopausal *BRCA1/2* mutation carriers is consistent with findings in the general population.

Keywords: ovarian neoplasms, Mendelian randomization, *BRCA1*, *BRCA2*, body height, body mass index

Introduction

Ovarian cancer is the fifth leading cause of cancer deaths in US women, due to its typically advanced stage at presentation.[1,2] Furthermore, unlike breast or colorectal cancer, there is no proven screening method for ovarian cancer to identify early disease and initiate treatment to improve survival.[3,4] Family history, oral contraceptive use, parity, body mass index (BMI), and genetic variants are potentially useful in estimating lifetime risk.[1] In particular, inherited *BRCA1* and *BRCA2* mutations are associated with increased lifetime risk of ovarian cancer and account for ~10-15% of overall disease incidence.[5-7] However, among mutation carriers, age at diagnosis is variable. Penetrance of *BRCA1/2* mutations is likely modified by other genetic variants and lifestyle or reproductive factors.[8,9] Investigation of these factors could aid in implementation of strategies to reduce ovarian cancer risk among mutation carriers.

Both height and BMI are quantitative traits with substantial genetic bases. In recent genome-wide association studies (GWAS), numerous genetic variants were found to be associated with these traits.[10,11] In the general population, both height and BMI appear to be positively but inconsistently associated with risk of ovarian cancer.[12-14] Previous studies also showed that the association between BMI and ovarian cancer was stronger in premenopausal women.[12,15,16] Because of differences in age at onset and tumor histology/grade, risk factors for ovarian cancer might be different for *BRCA1/2* mutation carriers than women in the general population.[17] Only one case-control study, with 469 ovarian cancer cases, has examined anthropometric measurements in *BRCA1/2* mutation carriers and found that neither height nor BMI were related to ovarian cancer risk.[18] Larger, adequately-powered studies are needed to assess whether a relationship between either height or BMI and ovarian cancer risk exists for *BRCA1/2* mutation carriers, and if the direction of association is concordant with that in the general population.

Mendelian randomization (MR) methods use genetic markers associated with a trait as an instrumental variable (IV) to assess their potential relationship with a disease outcome.[19-21] Compared to traditional epidemiologic approaches, MR can reduce biases such as reverse causation and residual confounding, that can interfere with causal interpretations. However, the MR approach requires that the genetic variants are associated with the exposure, the variants are not or only weakly associated with confounding factors in the causal pathway, and the variants only affect disease risk through the exposure (i.e. absence of pleiotropic effects).[20,21] To the degree that these assumptions are met, the MR approach can strengthen the evidence for a causal relationship between exposure and disease.

Herein, using traditional epidemiologic and MR methods, we conducted analyses of height and BMI and their association with ovarian cancer risk in the Consortium of Investigators for the Modifiers of *BRCA1/2* (CIMBA), with 22,588 participants. We examined heterogeneity of these associations with respect to the mutation carried (*BRCA1* vs *BRCA2*), menopausal status, tumor histology, and tumor grade.

Methods

Characteristics of the CIMBA consortium and information on specific genotyping protocols are provided in the **Supplementary Methods** and were described previously.[22-24]

Selection of Genetic Variants

From the latest publications of the Genetic Investigation of Anthropometric Traits, we identified SNPs associated with height or BMI at genome-wide significance level ($P<5x10^{-8}$).[11,25]

SNPs with low imputation quality (<0.5) were excluded, leaving 586 SNPs for height and 93 for BMI. **Supplementary Tables 1** and **2** provide additional details on these SNPs.

Statistical Analysis

Calculation of the height- and BMI-genetic scores (GS) was described in detail previously.[24] Briefly, we calculated the weighted sums of all of the height- and BMI-associated variants under additive models, which do not include interactions between variants. Namely, we used the formulas: $Height - GS = \sum_{i=1}^{586} \beta_{XGi} SNP_i$ and $BMI - GS = \sum_{i=1}^{93} \beta_{XGi} SNP_i$, where β_{XGi} is the literature-reported per-allele magnitude of association of the *i*th-SNP for height and BMI, respectively. A scaling factor was calculated by regressing each GS against its respective trait among non-case carriers. The corresponding regression coefficients were β_0 (intercept=165.455) and β_1 (slope=5.217) for height and β_0 (22.607) and β_1 (5.523) for BMI. In the present study, BMI-GS was scaled to BMI at date of questionnaire, rather than BMI at age 18, as previous GWAS were based on BMI measurements in middle-aged adults.

We subsequently modeled each scaled-GS against ovarian cancer risk using weighted Cox models. Our primary outcome of interest was ovarian cancer diagnosis, with individuals censored for breast cancer diagnosis, risk-reducing bilateral salpingo-oophorectomy, death, or end of follow-up, whichever occurred first. Due to the study design of CIMBA, weights in the model were applied for cases and non-cases based on previously observed incidence of ovarian cancer in *BRCA1/2* carriers.[26,27] We applied a robust sandwich variance-estimation approach to the risk estimates to account for non-independence among multiple carriers per family. Additionally, we performed subgroup analyses by *BRCA1/2* mutations and menopausal status. Menopausal status was defined as a time-varying covariate, coded as premenopausal from birth until age at natural

menopause or bilateral salpingo-oophorectomy. For individuals with missing age at menopause, we imputed the age as 50 years. Imputing missing age at menopause as 46 did not materially change the results. The mean and median ages at natural menopause in this population were 46 and 48, respectively. All analyses were adjusted for the first eight principal components (to account for ethnicity and population stratification), birth cohort, and country of enrollment. Additional analyses assessed the associations of height and BMI with ovarian cancer subgroups, by histological type (serous vs. non-serous) and by tumor grade (well- or moderately-differentiated tumors vs. poorly- or un-differentiated).

Additionally, phenotype associations with each individual height- and BMI-variant were assessed and pooled using inverse variance-weighted meta-analysis. The individual associations were obtained by first extracting β_{XGi} for each SNP *i*, which represents the per-allele magnitude of association with height or BMI from previous GWAS. Next, we calculated β_{YGi} and $SE(\beta_{YGi})$ using multivariate-adjusted weighted Cox models for each SNP using the CIMBA data, where ovarian cancer risk is predicted by genotype *G* (with *G*=0,1,2 for the allele corresponding to greater height or BMI), principal components, birth cohort, *BRCA* mutation, and country of enrollment. The overall causal association (β_{YX}) is calculated using inverse-variance weighted estimate of each variant's effect: $\beta_{YX} = \frac{\sum_i \beta_{XGi}\beta_{YGi}SE(\beta_{YGi})^{-2}}{\sum_i {\beta_{XGi}}^2 SE(\beta_{YGi})^{-2}}$. Standard error was estimated as $SE_{YX} = \sqrt{\frac{1}{\sum_i {\beta_{XGi}}^2 SE(\beta_{YGi})^{-2}}}$ using the Burgess's method.[19,28] Egger's test was used to assess for possible pleiotropic effects of the variants (i.e. whether variants influence the outcome through other pathways), to ensure that this assumption held.[29]

Finally, in participants with available data on height and BMI, we conducted a formal IV analysis using the method of two-stage residual inclusion regression.[30] In stage one, observed height or BMI was regressed against the corresponding GS, principal components, birth cohort,

country, and mutation status. In the second stage, we used a Cox model to fit ovarian cancer risk against height or BMI, birth cohort, country, mutation status, and residuals from stage one. Variance estimates were obtained through 10,000 boot-straps (see details in **Supplementary Methods**). In these individuals, we also analyzed the association between observed measurements of height or BMI and ovarian cancer risk using weighted Cox models, adjusted for established ovarian cancer risk factors including birth cohort, menopausal status, age at menarche (years) and parity (continuous). The BMI values used were obtained at the date of questionnaire, usually close to the date of genetic testing and recalled for BMI at age 18.

In models with menopausal status as time-varying variable, the test for heterogeneity by menopausal status was essentially a test of the proportional hazards assumption. All analyses were performed using SAS 9.4 (SAS Institute, Cary, NC) and Stata 14.0 (StataCorp, College Station, TX). A two-sided *P*-value<0.05 was considered statistically significant unless stated otherwise.

Results

Demographic and Clinical Characteristics

Characteristics for the 22,588 individuals in the CIMBA consortium, comprising 14,676 *BRCA1* and 7,912 *BRCA2* mutation carriers, are shown in **Table 1**. We documented 2,923 women with ovarian cancer (*BRCA1:* 2,319; *BRCA2*: 604). Compared with non-cases, participants who developed ovarian cancer were more often parous women, were younger at first live birth, and were from earlier birth cohorts At the date of questionnaire/interview, height measurement was available for 7,657 participants and BMI measurement for 7,516 participants. Most tumors for *BRCA1/2* mutation carriers were invasive, of serous, poorly or undifferentiated grade, and stages 3 or 4 at diagnosis, characteristics which are consistent with prior reports.[31]

Observed and Predicted Height on Risk of Ovarian Cancer

In the survival modelling of ovarian cancer risk, age was used as the underlying time scale and the numbers of individuals retained in the analysis were 20535, 14647, 7375, and 2832 at ages 30, 40, 50, and 60 years, respectively, suggesting that statistical power for the late age is limited. After adjustment for birth cohort, country of enrollment, mutation, menopausal status, and principal components, a nonsignificant association was found for observed height and ovarian cancer risk (HR=1.07 per 10-cm increase, 95%CI: 0.94–1.23, P=0.31) (**Table 2**). We found broadly consistent associations of height in both *BRCA1* and *BRCA2* mutation carriers, by menopausal status, and by tumor histological type and grade.

The height-GS was significantly associated with height in all participants, in ovarian cancer cases, and in non-case participants (all $P<10^{-24}$) (**Supplementary Table 3**). Overall, approximately 13.4% of the variation in height was explained by the height-GS. Besides height, we found weaker associations between the height-GS and body weight, and age at menarche.

In MR analysis, height-GS had a nonsignificant positive association with ovarian cancer risk, HR=1.02 per 10-cm increase in genetically-predicted height, 95%CI: 0.85–1.23, P=0.82 (**Table 3**). We found similar associations by subgroups of mutation, menopausal status, and tumor grade.

Combining the effects of all 586 height-associated variants using inverse-variance weighted meta-analysis, we obtained similar findings (HR=1.02, 95%CI: 0.83-1.26, P=0.83) (**Table 3**). Among the SNPs that were combined, there was a low degree of heterogeneity (I^2=0%). Examining small-study effects using Egger's test did not suggest likely pleiotropic effects. In the

two-stage residual inclusion analysis, the estimated relative risk was larger though with wide CIs, which overlapped with those derived using other methods (HR=1.20, 95%CI: 0.86–1.69, *P*=0.29).

Observed and Predicted BMI on Risk of Ovarian Cancer

After multivariable adjustment, we found a nonsignificant positive association between BMI at date of questionnaire completion and ovarian cancer risk, HR=1.04 per 5-kg/m^2 increase in BMI, 95%CI: 0.95–1.14, *P*=0.42 (**Table 4**). In a pre-specified analysis, the association between BMI and ovarian cancer risk was stronger in premenopausal women (HR=1.25, 95%CI: 1.06–1.48; *P*=0.009), whereas no association was found in postmenopausal women (HR=0.98, 95%CI: 0.88–1.10), with significant interaction (*P*=0.02). We found that BMI was a significant predictor of non-serous ovarian cancer risk (HR=1.25, 95%CI: 1.06–1.49), but not for serous ovarian cancer (HR=0.98, 95%CI: 0.84–1.15).

Similar to BMI at date of questionnaire completion, we detected a significant interaction of BMI in young adulthood and menopausal status (*P*=0.01), with a stronger association for premenopausal women (HR=1.34, 95%CI: 0.97–1.84) compared with postmenopausal women (HR=0.82, 95%CI: 0.65–1.04).

BMI-GS was strongly associated with BMI at both date of questionnaire completion and young adulthood (**Supplementary Table 4**). Overall, the BMI-GS explained 2.6% of the variation in BMI at date of questionnaire completion and 1.7% of the variation in young adulthood BMI. We found associations between the BMI-GS and height and age at menarche, though the strength of the association was weaker than the association with BMI.

In the entire consortium, the BMI-GS had a nonsignificant positive association with ovarian cancer risk with a HR=1.10 per 5-kg/m^2 of genetically predicted BMI, 95%CI: 0.86–1.42,

P=0.44 (**Table 5**). We found heterogeneity by menopausal status (*P*=0.006). BMI-GS was positively associated with ovarian cancer risk in premenopausal women (HR=1.59, 95%CI: 1.08–2.33) but not in postmenopausal women (HR=0.80, 95%CI: 0.58–1.11). BMI-GS also tended to be more associated with non-serous (HR=1.60, 95%CI: 0.83-3.08) than serous tumors (HR=0.92, 95%CI: 0.59–1.43).

We found similar results when we statistically combined the associations of the 93 BMI-associated variants, with an overall HR=1.12, 95%CI: 0.86–1.46. Heterogeneity was low (I^2=15.9%), indicating a low likelihood of pleiotropic associations. Using the two-stage residual inclusion approach, we found a generally similar association (HR=1.37, 95%CI: 0.84–2.24, *P*=0.21).

Individual SNPs and Ovarian Cancer Risk

We found 22 height-associated and 4 BMI-associated SNPs that were nominally associated with ovarian cancer risk (*P*<0.05) (**Table 6**). None of these SNPs were significantly associated with ovarian cancer risk after correcting for multiple testing. We cross-checked these identified SNPs with the most up-to-date list of ovarian cancer susceptibility SNPs and did not find any overlaps.[32]

Discussion

Using data from a large international consortium of *BRCA1/2* mutation carriers, we found no statistically significant association between height and ovarian cancer risk. Interestingly, we observed interactions between BMI (both observed and genetically predicted) and menopausal

status on ovarian cancer risk, with increasing BMI associated with increased risk in premenopausal but not in postmenopausal women.

Our finding of a positive association between BMI and overall ovarian cancer risk in *BRCA1 and BRCA2* mutation carriers is corroborated by several prior studies in the general population.[12,14,15,33] One MR analysis using 77 BMI-associated SNPs, conducted in the general population, found that each 1-standard deviation (SD) increment in genetically-predicted adult BMI corresponded to an odds ratio (OR) of 1.35 (95%CI 1.05-1.72).[34] We found that 5-kg/m^2 (about 1 SD) increment in genetically-predicted BMI was associated with a HR=1.10 (95%CI: 0.86–1.42) in mutation carriers. However, the association of BMI with ovarian cancer risk is likely to vary by menopausal status. In the general population, significant differential association of BMI with ovarian cancer risk by menopausal status has been found in some studies[15,16,35,36] but not others.[12,37] A pooled analysis of 47 epidemiologic studies with 25,157 ovarian cancer cases showed that the relative risk per 5-kg/m^2 increase in BMI was 1.12 (95%CI: 1.07–1.17) in premenopausal women and 1.08 (95%CI: 1.04–1.12) in postmenopausal women.[12] The largest single cohort study, with 3,686 ovarian cancer cases, found the HR per 5-kg/m^2 increase in BMI was 1.21 (99%CI: 1.09–1.33) in premenopausal and 1.07 (99%CI: 1.02–1.12) in postmenopausal women.[15] An MR analysis conducted in the general population also observed stronger associations for non-high grade serous carcinomas in premenopausal women (OR=1.62, 95%CI: 0.88–3.01) compared with postmenopausal hormone replacement therapy (HRT) users (OR=1.26, 95%CI: 0.57–2.82) and postmenopausal HRT non-users (OR=1.17, 95%CI: 0.61–2.24), though no formal statistical tests examining heterogeneity were performed.[14] Similarly, we found in *BRCA1/2* mutation carriers that 5-kg/m^2 increment in genetically-predicted BMI was associated with a HR=1.59 (95%CI: 1.08-2.33) for premenopausal ovarian cancer and a HR=0.80 (95%CI: 0.58-1.11) for postmenopausal

ovarian cancer. Studies which have not demonstrated significant variation by menopausal status tended to show that the positive association between BMI and ovarian cancer risk was primarily among those who had never used HRT.[12] Taken together, our results and previous literature are suggestive that higher BMI may increase ovarian cancer risk in premenopausal women, but not in postmenopausal women.

Additionally, several studies that had sufficient numbers of cases to evaluate the relationship between BMI and ovarian cancer risk by histologic subtype have shown significant heterogeneity. Observational studies in the Ovarian Cancer Cohort Consortium found stronger associations between BMI and endometrioid (OR=1.17 per 5-kg/m^2, 95%CI: 1.11–1.23) or mucinous ovarian cancer (OR=1.19, 95%CI: 1.06–1.32), but no association with serous ovarian cancer (OR=0.98, 95%CI: 0.94–1.02).[16] A more recent MR analysis in the same consortium using a genetic score comprised of 87 SNPs showed that a genetically predicted BMI had a stronger association with endometrioid (OR=1.17, 95%CI: 0.87-1.59) or mucinous ovarian cancer (OR=1.18, 95%CI: 0.84-1.67) than high grade serous cancer (OR=1.06, 95%CI: 0.89-1.27), though the 95%CIs for these estimates were largely overlapping.[14] Consistent with findings in the general population, our study in *BRCA1/2* mutation carriers showed that BMI was positively associated with non-serous ovarian cancer (HR=1.25 per 5-kg/m^2, 95%CI: 1.06-1.49 in observed BMI and HR=1.60, 95%CI: 0.83-3.08, per 5-kg/m^2 in genetically predicted BMI), of which endometrioid is a major subtype. Of note, obesity is an established risk factor for endometrial cancer.[38] However, subsequent studies with greater number of cases of different ovarian cancer subtypes are needed to assess whether the effect of obesity truly differs by tumor subtype.

Our finding of a nonsignificant positive association between height and ovarian cancer risk is also consistent with prior epidemiological studies in the general population.[12,37,39] In the general

population, 5-cm increment in height was associated with a 7% increase (95%CI: 5-9%) in ovarian cancer risk,[12] and 5-cm increment in genetically predicted height was associated with a 6% (95%CI: 1–11%) increase in ovarian cancer risk.[39] The associations for observed height did not differ significantly between ovarian histological types,[2,12] while genetically predicted height had a stronger association with clear cell (OR=1.20, 95%CI: 1.04–1.38) or low grade/borderline serous ovarian cancers (OR=1.15, 95%CI: 1.01–1.30), compared to high-grade serous (OR=1.05, 95%CI: 0.99–1.11).[39] We did not find statistically significant heterogeneity by histology in our study of mutation carriers, though point estimates varied across histology.

Several biological mechanisms potentially explain the associations observed in our study. Overweight/obese women are more likely to have anovulatory cycles and fertility issues, particularly when caused by polycystic ovarian syndrome (PCOS), and thus have an increased risk of ovarian cancer.[40,41] The association of PCOS with ovarian cancer risk was mainly confined to premenopausal women.[42] Some studies have suggested that *BRCA1/2* mutation carriers may have subclinical ovarian insufficiency, which could mediate the relationship between obesity-related infertility and increased ovarian cancer risk.[43] Obesity itself also creates a proinflammatory state and adipocyte secreted inflammatory markers have been implicated in ovarian cancer development.[44] Circulating levels of estradiol, androgen, and progesterone have also been implicated in the risk of ovarian cancer.[45,46] One study in *BRCA1/2* mutation carriers showed higher estradiol levels during each menstrual cycle compared with non-carriers, supporting the potential role of sex hormones in ovarian tumorigenesis in this population.[47] Obese premenopausal women tend to have lower circulating levels of progesterone compared with normal weight women.[48] Higher progesterone levels may reduce ovarian cancer risk, through upregulation of p53, leading to tumor cell apoptosis.[46,49-51] Taken together, these pathways may explain the association

of higher BMI with premenopausal ovarian cancer risk. Additionally, height has been associated with higher levels of circulating insulin-like growth factor-1 (IGF-1),[52,53] a pathway that has been implicated in tumor transformation and may exert anti-apoptotic and mitogenic effects.[54,55] Moreover, *BRCA1* may directly interact with the IGF-1 pathway to mediate cancer risk.[56]

Our study has several strengths, including large sample size, genetic scores utilizing most identified height- and BMI-variants, several MR methods, and consistent findings between observed and genetically-predicted phenotypes. Several limitations of our study should be considered. First, even with a large sample size, the CIs for most risk estimates were wide, which limits inferences about causation. While both the height- and BMI-GS were clearly associated with their respective traits, they were only able to explain 13.4% and 2.6% of the variation, respectively. This reduced the statistical precision of our risk estimates. During the preparation of our manuscript, a new genome-wide meta-analysis[57] found a substantial number of new genetic loci related to height and BMI, increasing the amount of variation that could be explained for these two traits to 24.6% and 6.0%, respectively, although the variation that could be explained when examining these SNPs in a validation cohort was 14.0% and 2.3%. This is comparable to the amount of variation that could be explained using the set of genetic variants in our study. Including these additional SNPs may be able to improve the precision of our estimates for both height and BMI. Moreover, the inclusion of rare variants to strengthen the height and BMI genetic instruments should also be considered in future studies.[58] Our study did not explicitly examine whether adding height or BMI (either observed or genetically predicted) to existing polygenic risk scores for ovarian cancer could further refine risk prediction. Histology was only available in a subset of ovarian cancer patients, which limits our capacity to understand subtype-specific effects of BMI

and height. Our study only included women of European ancestry, which may preclude generalization to women of other racial/ethnic groups.

In summary, our study suggests that higher BMI may be causally associated with ovarian cancer risk in *BRCA1/2* carriers, possibly more so for premenopausal women. BMI could be used to identify premenopausal women at elevated risk of ovarian cancer. Our finding of a stronger association between BMI and non-serous ovarian cancer warrants confirmation in future studies.

Additional Information

Ethics approval and consent to participate

The current work and all contributing studies in CIMBA received approval from the local institutional review board or ethics committee. Written informed consent was provided by all of the participants participating in each individual CIMBA study. The institutional committees that approved individual studies are listed in the Supplemental Materials.

Conflict of interest

Dr. Georg Pfeiler received honoraria and grant from Pfizer, Roche, Novartis, Accord, AstraZeneca, Amgen, Accord, and Lilly. Dr. Ritu Salani served on advisory board for Tesaro, Clovis, Astra Zeneca, Ethicon, and Genmab, and speaker's bureau for Tesaro, Genentech. Other authors declare no conflicts of interest.

Availability of data and materials

Due to the sensitive nature of the data used in this study, data requests by researchers trained in maintaining human subject confidentiality may be directed to the corresponding author of this study.

Authors' contributions

This study is based on a large consortium which consists of multiple individual studies. The co-authors are individual studies' principal investigators and key personals who collected the data and designed the overall goal of the consortium, i.e. to identify risk modification factors for BRCA1/2 mutation carriers. D.H., F.Q., M.A.R., T.R.R, O.I.O, and G.C. were responsible for study design of this particular analysis. F.Q. and D.H. performed the data analysis and wrote the first draft of the manuscript. All authors provided critical feedback on the contents of the manuscript and approved the final version for submission.

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Table 1. Baseline characteristics of participants in the CIMBA consortium with genotype information

Variable	Ovarian cancer cases N = 2,923	Non-cases N = 19,665	*P*-value[b]
Mutation carrier status			<0.0001
BRCA1	2319 (79.3)	12357 (62.8)	
BRCA2	604 (20.7)	7308 (37.2)	
Year of birth, median (IQR)	1948 (1940, 1955)	1960 (1951, 1969)	<0.0001
Age at diagnosis or censoring, y (mean ± SD)	52.5 ± 9.8	44.7 ± 12.4	<0.0001
Ethnicity, n (%)			0.07
Caucasian, not otherwise specified	2060 (89.7)	13613 (88.4)	
Ashkenazi Jewish	237 (10.3)	1780 (11.6)	
Height in cm, n	784	6,873	
Mean ± SD	163.2 ± 6.5	164.8 ± 6.9	<0.0001
Weight at baseline[a] in kg, n	780	6,789	
Mean ± SD	69.0 ± 14.6	68.5 ± 14.1	0.32
Body mass index at baseline[a] in kg/m^2, n	772	6,744	
Mean ± SD	25.9 ± 5.3	25.2 ± 5.1	0.0002
Weight in early adulthood in kg, n	536	4,912	
Mean ± SD	56.5 ± 8.3	57.9 ± 9.5	0.0007
Body mass index in early adulthood in kg/m^2, n	536	4,881	
Mean ± SD	21.2 ± 3.0	21.3 ± 3.3	0.43
Age at menarche in years, n	771	6,688	
Mean ± SD	13.0 ± 1.5	13.0 ± 1.5	0.90
Parous, n (%)			<0.0001
Yes	805 (88.3)	5790 (77.4)	
No	107 (11.7)	1692 (22.6)	
Age at first live birth in years, n	735	5,555	
Mean ± SD	24.4 ± 4.5	25.4 ± 4.9	<0.0001
Menopausal status, n (%)			<0.0001
Premenopausal	112 (11.5)	3816 (51.1)	
Postmenopausal	863 (88.5)	3654 (48.9)	
Age at menopause, y (mean ± SD)	46.8 ± 5.7	44.7 ± 6.1	<0.0001
Tumor behavior, n (%)			
Invasive	1228 (99.2)		
Borderline	10 (0.8)		
Tumor histotype, n (%)			
Serous	892 (67.9)		
Mucinous	20 (1.5)		
Endometriod	141 (10.7)		
Clear cell	17 (1.3)		
Other	243 (18.5)		
Tumor grade, n (%)			
Well-differentiated	43 (4.6)		
Moderately differentiated	196 (21.0)		
Poorly/un-differentiated	696 (74.4)		
Tumor stage, n (%)			
Borderline	2 (0.3)		
Stage 1	121 (16.4)		
Stage 2	93 (12.6)		
Stage 3	412 (55.7)		
Stage 4	112 (15.1)		

BMI, body mass index; IQR, interquartile range; SD, standard deviation

[a] Reported at the date of questionnaire

[b] *P*-values for comparing cases and non-cases were calculated from logistic regression models with robust sandwich variance estimator.

Table 2. Association of height and ovarian cancer risk using observed height, among 7,657 participants

	N/events	HR (95%CI)	*P*-value
Per 10 cm increase in observed height			
All participants (confounding adjustment sequentially)			
Adjusted for principal components	7657/784	1.12 (0.97 - 1.29)	0.12
Additionally adjusted for country	7657/784	1.15 (1.00 - 1.32)	0.06
Additionally adjusted for birth cohort	7657/784	1.05 (0.91 - 1.21)	0.53
Additionally adjusted for mutation status	7657/784	1.06 (0.92 - 1.22)	0.42
Additionally adjusted for menopausal status	**7657/784**	**1.07 (0.94 - 1.23)**	**0.31**
Additionally adjusted for parity and age at menarche	7090/724	1.09 (0.94 - 1.26)	0.24
By mutation status[a]			
BRCA1 carrier	4502/552	1.07 (0.91 - 1.24)	0.42
BRCA2 carrier	3155/232	1.11 (0.85 - 1.45)	0.44
$P_{interaction}$			0.64
By menopausal status[b]			
Premenopausal	7657/105	1.02 (0.72 - 1.42)	0.93
Postmenopausal	4328/679	1.09 (0.94 - 1.26)	0.27
$P_{interaction}$			0.71
By tumor subtype[c]			
Serous	7360/319	1.07 (0.87 - 1.31)	0.52
Non-serous[d]	7360/168	1.30 (1.01 - 1.68)	0.045
P_{het}			0.24
By tumor grade[c]			
Well- or moderately-differentiated	7252/111	1.12 (0.83 - 1.52)	0.46
Poorly/un-differentiated	7252/268	1.15 (0.93 - 1.43)	0.19
P_{het}			0.89

HR, hazard ratio; CI, confidence interval

[a] Adjusted for principal components, birth cohort, country of enrollment, and menopausal status in weighted Cox model

[b] Adjusted for principal components, mutation status, birth cohort, and country of enrollment.

[c] Adjusted for principal components, birth cohort, country of enrollment, mutation status, and menopausal status

[d] Includes endometrioid, mucinous, clear cell, and other histologic types

Table 3. Association of height and ovarian cancer risk among 22,588 participants in CIMBA, per 10 cm increase in genetically predicted height

	N/events	HR (95%CI)	*P*-value	Heterogeneity (I^2)
Height-GS[a]				
All participants (confounding adjustment sequentially)				
Adjusted for principal components	22588/2923	0.99 (0.82 - 1.19)	0.89	
Additionally adjusted for country	22588/2923	0.97 (0.81 - 1.17)	0.77	
Additionally adjusted for birth cohort	22588/2923	0.98 (0.82 - 1.18)	0.83	
Additionally adjusted for mutation status	22588/2923	1.02 (0.85 - 1.22)	0.13	
Additionally adjusted for menopausal status	22588/2923	**1.02 (0.85 - 1.23)**	**0.82**	
By mutation status[b]				
BRCA1 carrier	14676/2319	1.02 (0.83 - 1.25)	0.87	
BRCA2 carrier	7912/604	1.04 (0.68 - 1.57)	0.87	
$P_{interaction}$			0.99	
By menopausal status[c]				
Premenopausal	22588/967	0.96 (0.73 - 1.26)	0.77	
Postmenopausal	9219/1955	1.08 (0.85 - 1.38)	0.52	
$P_{interaction}$			0.50	
By tumor subtype[d]				
Serous	20978/892	1.36 (0.97 - 1.90)	0.08	
Non-serous	20978/421	0.95 (0.58 - 1.56)	0.84	
P_{het}			0.25	
By tumor grade[d]				
Well- or moderately-differentiated	20600/239	1.63 (0.86 - 3.09)	0.14	
Poorly/un-differentiated	20600/696	1.20 (0.82 - 1.74)	0.35	
P_{het}			0.42	
Meta-analysis method[e]				
All participants	22588/2923	1.02 (0.83 - 1.26)	0.83	0.0%
BRCA1 carrier	14676/2319	1.02 (0.81 - 1.28)	0.89	0.0%
BRCA2 carrier	7912/604	1.05 (0.67 - 1.66)	0.82	7.0%
$P_{interaction}$			0.89	
Two-stage residual inclusion method[f]				
All participants	7657/784	1.20 (0.86 - 1.69)	0.29	
BRCA1 carrier	4502/552	1.40 (0.94 - 2.10)	0.10	
BRCA2 carrier	3155/232	0.93 (0.49 - 1.74)	0.81	

HR, hazard ratio; CI, confidence interval; GS, genetic score

[a] Height genetic score combining 586 height-associated single-nucleotide polymorphisms (SNPs)

[b] Adjusted for principal components, birth cohort, country of enrollment, and menopausal status in weighted Cox model

[c] Adjusted for principal components, mutation status, birth cohort, and country of enrollment

[d] Adjusted for principal components, mutation status, menopausal status, birth cohort, and country of enrollment

[e] Hazard ratios were calculated using inverse-variance meta-analysis and re-scaled to the corresponding units by calculating the height measurements per *z*-score among controls. Effect estimates for ovarian cancer for each SNP were calculated from weighted Cox model adjusting for principal components, birth cohort, country of enrollment, menopausal status, and mutation status

[f] Analysis was performed among 7,657 participants with measured height

Table 4. Association of BMI and ovarian cancer risk using observed body mass index (BMI)

	N/events	HR (95%CI)	*P*-value
Per 5 kg/m^2 increase in BMI at date of questionnaire			
All participants (confounding adjustment sequentially)			
Adjusted for principal components	7516/772	1.00 (0.90 - 1.10)	0.96
Additionally adjusted for country	7516/772	0.99 (0.90 - 1.09)	0.84
Additionally adjusted for birth cohort	7516/772	1.02 (0.93 - 1.12)	0.72
Additionally adjusted for mutation status	7516/772	1.06 (0.96 - 1.16)	0.26
Additionally adjusted for menopausal status	**7516/772**	**1.04 (0.95 - 1.14)**	**0.42**
Additionally adjusted for parity and age at menarche	6964/715	1.04 (0.94 - 1.14)	0.48
By mutation status[a]			
BRCA1 carrier	4401/543	1.06 (0.95 - 1.17)	0.31
BRCA2 carrier	3115/229	0.96 (0.81 - 1.15)	0.67
$P_{interaction}$			0.35
By menopausal status[b]			
Premenopausal	**7516/102**	**1.25 (1.06 - 1.48)**	**0.009**
Postmenopausal	4257/670	0.98 (0.88 - 1.10)	0.78
$\boldsymbol{P_{interaction}}$			**0.02**
By tumor subtype[c]			
Serous	7223/312	0.98 (0.84 - 1.15)	0.83
Non-serous[d]	**7223/167**	**1.25 (1.06 - 1.49)**	**0.01**
P_{het}			**0.04**
By tumor grade[c]			
Well- or moderately-differentiated	7252/109	1.05 (0.84 - 1.32)	0.65
Poorly/un-differentiated	7252/268	0.95 (0.82 - 1.11)	0.54
P_{het}			0.47
Per 5 kg/m^2 increase in BMI in young adulthood			
All participants (confounding adjustment sequentially)			
Unadjusted	5417/536	0.86 (0.69 - 1.07)	0.17
Adjusted for country	5417/536	0.86 (0.69 - 1.08)	0.19
Additionally adjusted for birth cohort	5417/536	0.87 (0.70 - 1.08)	0.21
Additionally adjusted for mutation status	5417/536	0.91 (0.73 - 1.13)	0.39
Additionally adjusted for menopausal status	5417/536	0.93 (0.76 - 1.16)	0.53
Additionally adjusted for parity and age at menarche	5210/516	0.92 (0.74 - 1.14)	0.42
By mutation status[a]			
BRCA1 carrier	3134/380	0.92 (0.71 - 1.18)	0.50
BRCA2 carrier	2283/156	1.00 (0.74 - 1.36)	0.99
$P_{interaction}$			0.73
By menopausal status[b]			
Premenopausal	**5417/67**	**1.34 (0.97 - 1.84)**	**0.07**
Postmenopausal	3094/469	0.82 (0.65 - 1.04)	0.11
$\boldsymbol{P_{interaction}}$			**0.01**

HR, hazard ratio; CI, confidence interval

[a] Adjusted for principal components, birth cohort, country of enrollment, and menopausal status in weighted Cox model

[b] Adjusted for principal components, mutation status, birth cohort, and country of enrollment

[c] Adjusted for principal components, birth cohort, country of enrollment, mutation status, and menopausal status

[d] Includes endometrioid, mucinous, clear cell, and other histological types

Table 5. Association of body mass index genetic score (BMI-GS) and ovarian cancer risk among 22,588 participants in CIMBA, per 5 kg/m^2 increase in genetically predicted BMI

Breast cancer group	N/events	HR (95%CI)	*P*-value	Heterogeneity (I^2)
BMI-GS[a]				
All participants (confounding adjustment sequentially)				
Adjusted for principal components	22588/2923	1.12 (0.87 - 1.45)	0.37	
Additionally adjusted for country	22588/2923	1.11 (0.86 - 1.44)	0.41	
Additionally adjusted for birth cohort	22588/2923	1.12 (0.87 - 1.45)	0.36	
Additionally adjusted for mutation status	22588/2923	1.11 (0.86 - 1.42)	0.43	
Additionally adjusted for menopausal status	**22588/2923**	**1.10 (0.86 - 1.42)**	**0.44**	
By mutation status[b]				
BRCA1 carrier	14676/2319	1.16 (0.88 - 1.53)	0.31	
BRCA2 carrier	7912/604	0.81 (0.46 - 1.43)	0.46	
$P_{interaction}$			0.27	
By menopausal status[c]				
Premenopausal	**22588/967**	**1.59 (1.08 - 2.33)**	**0.02**	
Postmenopausal	9219/1955	0.80 (0.58 - 1.11)	0.18	
$\boldsymbol{P_{interaction}}$			**0.006**	
By tumor subtype[d]				
Serous	20978/892	0.92 (0.59 - 1.43)	0.71	
Non-serous	**20978/421**	**1.60 (0.83 - 3.08)**	**0.16**	
$\boldsymbol{P_{het}}$			**0.17**	
By tumor grade[d]				
Well- or moderately-differentiated	20600/239	1.20 (0.52 - 2.75)	0.67	
Poorly/un-differentiated	20600/696	0.74 (0.45 - 1.21)	0.23	
P_{het}			0.33	
Meta-analysis method[e]				
All participants	22588/2923	1.12 (0.86 - 1.46)	0.39	15.9%
BRCA1 carrier	14676/2319	1.18 (0.88 - 1.57)	0.26	17.2%
BRCA2 carrier	7912/604	0.80 (0.45 - 1.43)	0.45	0.0%
$P_{interaction}$			0.24	
Two-stage residual inclusion method[f]				
All participants	7516/772	1.37 (0.84 - 2.24)	0.21	
BRCA1 carrier	4401/543	1.24 (0.67 - 2.27)	0.49	
BRCA2 carrier	3115/229	1.57 (0.67 - 3.66)	0.30	

HR, hazard ratio; CI, confidence interval

[a] BMI-GS was constructed by combining 93 BMI-associated single-nucleotide polymorphisms (SNPs)

[b] Adjusted for principal components, birth cohort, country of enrollment, and menopausal status in weighted Cox model

[c] Adjusted for principal components, mutation status, birth cohort, and country of enrollment

[d] Adjusted for principal components, mutation status, menopausal status, birth cohort, and country of enrollment

[e] Hazard ratios were calculated using inverse-variance meta-analysis and re-scaled to the corresponding units by calculating the height measurements per *z*-score among controls. Effect estimates for ovarian cancer for each SNP were calculated from weighted Cox model adjusting for principal components, birth cohort, country of enrollment, menopausal status, and mutation status

[f] Analysis was performed among 7,516 participants with measured BMI

Table 6. Height or body mass index (BMI) single-nucleotide polymorphisms (SNPs) statistically significantly associated ($P < 0.05$) with ovarian cancer risk in CIMBA

Rsid	Chromosome	Position	Nearest gene	Reference allele in CIMBA	Effect allele in CIMBA	Effect allele frequency in CIMBA	Imputation quality[a]	Association with ovarian cancer in CIMBA		
								Log hazard ratio[b]	Standard error	*P*-value
Height										
rs11049611	12	28600244	*CCDC91*	C	T	0.28	1	0.127	0.036	0.0004
rs6902771	6	152157881	*ESR1*	C	T	0.46	0.98	0.091	0.032	0.005
rs584828	17	38599230	*IGFBP4*	C	T	0.39	0.68	0.109	0.040	0.006
rs3817428	15	89415247	*ACAN*	C	G	0.22	0.51	0.144	0.053	0.006
rs7517682	1	103519589	*COL11A1*	G	A	0.56	0.98	0.085	0.033	0.009
rs12470505	2	219908369	*CCDC108*	T	G	0.10	0.97	-0.143	0.055	0.009
rs26024	5	127696022	*FBN2*	A	C	0.34	1	-0.087	0.034	0.011
rs13113518	4	56399648	*CLOCK*	T	C	0.37	0.99	0.081	0.033	0.014
rs7319045	13	92024574	*GPC5*	A	G	0.61	0.92	0.084	0.035	0.017
rs2044124	17	61845425	*CCDC47*	T	C	0.95	0.91	0.187	0.079	0.018
rs9309101	2	43629612	*THADA*	A	G	0.35	1	0.076	0.033	0.021
rs11867943	17	54229842	*ANKFN1*	A	T	0.11	0.96	0.118	0.051	0.022
rs12779328	10	12943973	*CCDC3*	C	T	0.30	0.94	-0.080	0.036	0.026
rs8073371	17	46096276	*COPZ2*	C	T	0.20	1.00	-0.095	0.043	0.029
rs2013265	8	24092500	*ADAM28*	C	T	0.22	0.62	0.104	0.047	0.029
rs11687941	2	242191410	*HDLBP*	C	G	0.26	0.96	-0.079	0.037	0.031
rs6838153	4	122720999	*EXOSC9*	A	G	0.33	0.99	-0.072	0.034	0.033
rs7112925	11	66826160	*RHOD*	C	T	0.36	0.95	-0.071	0.034	0.037
rs16942341	15	89388905	*ACAN*	C	T	0.03	0.60	0.255	0.123	0.039
rs6080830	20	17771113	*BANF2*	A	G	0.43	0.68	-0.080	0.039	0.041
rs867245	4	2218888	*POLN*	C	G	0.07	1.00	0.122	0.060	0.043
rs1155939	6	126866133	*C6orf173*	C	A	0.51	0.99	0.064	0.033	0.049
BMI										
rs16851483	3	141275436	*RASA2*	G	T	0.07	1	-0.203	0.068	0.003
rs2207139	6	50845490	*TFAP2B*	A	G	0.16	0.99	0.120	0.043	0.005
rs2033732	8	85079709	*RALYL*	T	C	0.75	0.72	-0.088	0.042	0.037
rs6804842	3	25106437	*RARB*	A	G	0.58	0.58	0.087	0.044	0.046

[a] Imputation quality of 1 indicates genotyped SNPs.
[b] Per-allele association with ovarian cancer was adjusted for principal components, birth cohort, menopausal status, age at menopause, country of enrollment and mutation status in weighted Cox models

SUPPLEMENTARY MATERIALS

Supplementary Methods

Study Population: CIMBA Consortium

The Consortium of Investigators of Modifiers of BRCA1/2 (CIMBA) is an international collaboration developed to assess clinical and genetic risk factors in BRCA1/2 carriers and their respective associations with the development of breast and ovarian cancer [1, 2]. Investigators from 33 countries including 55 centers and multicenter consortia submitted de-identified data to a central database. The selection criteria for participants are as follows: 1) female carriers of verified disease-causing mutation in either *BRCA1* or *BRCA2* (participants were excluded if they carried mutations in both genes, N = 84) and 2), who were 18 years of age or older, with sufficient clinical data to assess risk which could include demographic/clinical characteristics, specific cancer diagnosis, ascertainment and follow-up dates, and history of prophylactic surgeries. At each center, carriers underwent interview and clinical testing or participated in a research study, after providing written informed consent in accordance with the local institutional review board. A family identifier was applied to indicate related individuals. Race/ethnicity were obtained via questionnaires in pre-defined categories or open-ended questions. Participants with self-reported non-European ancestry were excluded from the present analysis.

Genotyping and Imputation

The genotyping for the current analysis was conducted using the Collaborative Oncological Gene-Environment Study (iCOGS) custom array [3-5]. This array was part of a multi-consortia collaboration, including the Breast Cancer Association Consortium (BCAC), Ovarian Cancer Association Consortium (OCAC), and the Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome (PRACTICAL), to identify and replicate common and rare genetic variants associated with the development of breast, ovarian, and prostate cancers. Development of the array was divided among the consortium in the following distribution: 25% was allotted to each of BCAC, OCAC, and PRACTICAL, 17.5% to CIMBA, and the remaining 7.5% were designed to be from common pathways that have been previously researched. Ultimately, the iCOGs array comprised of 220,123 SNPs, of which 211,155 were successfully manufactured for genotyping.

Genotyping for *BRCA1* carriers was conducted at the Mayo Clinic (USA) and for *BRCA2* carriers at McGill University and Génome Québec Innovation Centre (both in Canada). Genotypes identified through the iCOGs array were called using the Illumina GenCall algorithm [3, 4]. A total of 270 samples from Hapmap2 were used to generate a cluster file for the initial file. For the final call, 3,018 individuals were selected, which included samples from each of the study centers, consortia, and ethnicities from the iCOGs collaboration. Plates at this stage that have a consistently high call rate were used. A different cluster file was generated using 380 genotyped samples from the 1000 Genomes project and Hapmap including European, African, and Asian ethnicity along with 160 positive control samples for rare variants for the iCOGs array. This file was used to call the remaining genotype samples. Subsequently, additional exclusion criteria for quality assurance were applied: 1) single nucleotide polymorphisms (SNPs) located on the Y chromosome, 2) monomorphic SNPs, 3) SNPs that deviated significantly from Hardy-Weinberg equilibrium ($P < 10^{-7}$), 4) SNPs with call rates < 95%, or 5) SNPs demonstrating extreme heterozygosity [3, 5]. After applying these quality control measures to the original 211,155 SNPs from the iCOGs array, we included data on 200,720 SNPs in *BRCA1* mutation carriers and 200,908 SNPs in *BRCA2* mutation carriers. For SNPs not genotyped on the iCOGS custom array, imputation was performed using the IMPUTE2 software based on the January 2012 version of the 1,000 Genomes haplotype [6]. SNPs were excluded from the analysis if they had imputation quality $r^2 < 0.30$. After applying these quality control and exclusion criteria, the current analysis included genotype data from 14,676 *BRCA1* carriers (7,360 of them developed breast cancer) and 7,912 *BRCA2* carriers (4,091 of them developed breast cancer).

Principal components analysis was conducted using 33,661 autosomal SNPs (MAF > 0.05) that were weakly correlated with one another (pairwise $r^2 < 0.1$) with 267 HapMap samples (ancestries represented included CHB, JPT, YRI, and CEU) [3]. The first 15 principal components were available for analysis in the present study.

Two-stage Residual Inclusion Regression

In the main instrumental variable (IV) analysis of the data, we have constructed the literature-reported per-allele associations between BMI and SNPs to build a genetic score (GS) for BMI using the formula: $BMI - GS = \sum_{i=1}^{93} \beta_{XGi} SNP_i$. Then we used $BMI - GS$ in the Cox regression of ovarian cancer risk. This method and the inverse variance-weighted meta-analysis

method can both be considered as two-stage predictor substitution (2SPS) method, while the predictor is from the external genome-wide association of BMI in the literature. For non-linear models, the 2SPS methods may give biased estimates in theory [7]. An alternative method of the two-stage instrumental variable analysis is the two-stage residual inclusion (2SRI) method, which can give consistent estimates [7, 8]. For the present study, we described the 2SRI regression using BMI as an example. In the first stage, we fit a linear model of observed BMI as below:

$$BMI = \alpha_0 + \beta_{xg}GS + \boldsymbol{\alpha_2 birthcohort} + \boldsymbol{\alpha_3 country_j} + \boldsymbol{\alpha_4} mutation + \boldsymbol{\alpha_4 PC} + e$$

where β_{xg} is the estimated effect of genetic score in the current BRCA1/2 study sample, ***birthcohort***, ***country, PC*** *(principal components)* are vectors of the dummy variables the three factors, and e is the residual of the regression. Under the assumptions of instrumental variable analysis, e can represent the unobserved confounders. so if it is adjusted for, then the confounding effect for BMI would cease to exist.

In the second stage, we fit a stratified Cox model of ovarian cancer including both observed BMI and the residual *e* as below:

$$\log\left(\frac{h_j(t)}{h_j(0)}\right) = \beta_{yx}BMI + \beta_1 e + \boldsymbol{\beta_2 birthcohort} + \beta_3 mutation + \boldsymbol{\beta_4 PC}$$

where β_{yx} is the IV estimate of interest, and *j* indicates category of study country for stratified Cox model. In both stage 1 and 2 of the model, we used the robust sandwich estimator of variance to account for non-independence among multiple carriers per family, but there is no easy close-form formula to calculate variance for the simultaneous two equation model. Therefore, we applied the bootstrapping method to estimate variance. In brief, we generated 10,000 randomly selected datasets with replacement, run the 2SRI 10,000 times, and the variation in β_{yx} estimates was used to calculate its 95% confidence interval.

Although the 2SRI method is preferred for non-linear IV regression in theory, its estimator β_{yx} is less stable than the 2SPS estimator β_{YX} because the 2SPS method utilized β_{XGi} directly and data from all study participants even if BMI was missing. Therefore, we considered the 2SRI method as a sensitivity analysis.

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Supplementary Table 1. List of 586 height-associated genetic variants and their associations with height in prior published GWAS and in CIMBA, along with effect on ovarian cancer risk in CIMBA

Rsid #	Chromosome	Position	Nearest gene	Published reference allele	Published effect allele	Effect allele frequency in published GWAS	Effect allele frequency in CIMBA	Imputation quality [1]	Published association with height			Association with height in CIMBA			Association with ovarian cancer in CIMBA			Association with ovarian cancer in *BRCA1*carriers			Association with ovarian cancer in *BRCA2*carriers		
									Beta[2]	SE	*P*-value[3]	Beta (cm)	SE	*P*-value[3]	Log Hazard Ratio[4]	SE	*P*-value[5]	Log Hazard Ratio[4]	SE	*P*-value[5]	Log Hazard Ratio[4]	SE	*P*-value[5]
rs425277	1	2069172	*PRKCZ*	C	T	0.28	0.29	0.99	0.028	0.003	1E-17	0.072	0.117	0.5397	-0.018	0.036	0.614	-0.029	0.039	0.459	0.062	0.079	0.437
rs9434723	1	9292282	*H6PD*	G	A	0.16	0.15	0.72	0.029	0.004	9E-13	-0.182	0.170	0.2854	-0.019	0.053	0.722	-0.023	0.058	0.696	0.006	0.113	0.961
rs10779751	1	11284336	*FRAP1*	A	G	0.72	0.72	1.00	-0.021	0.003	2E-10	-0.127	0.117	0.2766	-0.014	0.036	0.687	-0.033	0.039	0.395	0.118	0.082	0.149
rs2284746	1	17306675	*MFAP2*	C	G	0.52	0.50	0.84	0.04	0.003	1E-40	0.422	0.113	0.0002	-0.014	0.035	0.680	-0.016	0.039	0.684	-0.006	0.077	0.936
rs12137162	1	19763396	*CAPZB*	C	A	0.28	0.26	0.88	0.019	0.003	4E-09	0.246	0.126	0.052	-0.014	0.039	0.720	-0.028	0.043	0.522	0.077	0.088	0.379
rs212524	1	21583311	*ECE1*	T	C	0.60	0.59	0.93	0.021	0.003	5E-12	-0.004	0.109	0.9699	-0.029	0.034	0.384	-0.045	0.037	0.229	0.072	0.075	0.334
rs1014987	1	22498824	*WNT4*	C	G	0.25	0.23	0.94	0.02	0.004	2E-08	-0.084	0.124	0.4964	0.028	0.038	0.467	0.030	0.042	0.476	0.012	0.079	0.883
rs2806561	1	23504795	*LUZP1*	A	G	0.43	0.43	0.73	-0.027	0.003	2E-20	-0.014	0.124	0.9128	-0.005	0.039	0.890	-0.017	0.043	0.702	0.067	0.083	0.418
rs4601530	1	25044111	*CLIC4*	C	T	0.26	0.28	0.55	-0.025	0.003	3E-14	-0.075	0.157	0.6336	0.057	0.047	0.229	0.041	0.052	0.433	0.158	0.102	0.122
rs17163588	1	26450009	*PDIK1L*	C	T	0.18	0.18	1	0.027	0.004	3E-12	0.404	0.136	0.003	0.041	0.041	0.314	0.032	0.045	0.475	0.102	0.094	0.276
rs2219320	1	26803430	*HMGN2*	T	C	0.25	0.27	1	-0.022	0.004	2E-10	-0.512	0.117	<.0001	-0.009	0.036	0.794	-0.008	0.040	0.842	-0.016	0.081	0.843
rs12119525	1	27503662	*SLC9A1*	T	A	0.36	0.34	0.82	0.018	0.003	5E-09	-0.108	0.121	0.3737	0.037	0.037	0.313	0.037	0.041	0.357	0.032	0.083	0.704
rs16834765	1	32371442	*PTP4A2*	C	T	0.06	0.05	0.82	0.045	0.006	2E-12	0.394	0.263	0.1336	0.077	0.080	0.337	0.087	0.088	0.318	0.009	0.188	0.961
rs7544462	1	37962756	*C1orf149*	A	C	0.09	0.07	0.96	-0.032	0.005	2E-09	-0.282	0.207	0.174	-0.087	0.067	0.194	-0.050	0.073	0.491	-0.363	0.162	0.025
rs6600365	1	41556253	*SCMH1*	C	T	0.57	0.56	1.00	-0.027	0.003	2E-20	-0.179	0.106	0.0912	0.022	0.033	0.498	0.032	0.036	0.377	-0.044	0.065	0.495
rs564914	1	47915233	*FOXD2*	A	T	0.39	0.39	0.96	0.024	0.003	2E-15	0.157	0.108	0.1479	-0.029	0.033	0.387	-0.018	0.037	0.619	-0.108	0.075	0.148
rs12855	1	51440093	*CDKN2C*	C	T	0.09	0.10	0.96	0.038	0.005	7E-14	-0.018	0.181	0.9222	0.102	0.054	0.058	0.116	0.059	0.049	-0.005	0.121	0.970
rs17387330	1	54119578	*GLIS1*	G	A	0.32	0.27	0.67	0.017	0.003	4E-08	0.049	0.141	0.7302	-0.003	0.044	0.946	-0.028	0.049	0.565	0.159	0.092	0.083
rs6691924	1	54954245	*ACOT11*	C	T	0.90	0.88	0.50	0.032	0.005	2E-10	-0.486	0.228	0.0328	0.018	0.070	0.795	0.053	0.076	0.489	-0.222	0.163	0.174
rs2815379	1	67510474	*SLC35D1*	A	G	0.71	0.71	0.76	0.018	0.003	2E-08	0.076	0.131	0.5616	0.044	0.041	0.277	0.053	0.045	0.237	-0.015	0.091	0.865
rs17391694	1	78623626	*GIPC2*	C	T	0.12	0.10	0.66	0.043	0.005	4E-16	0.699	0.206	0.0007	0.017	0.068	0.801	0.012	0.074	0.869	0.050	0.153	0.744
rs567401	1	85988158	*DDAH1*	C	T	0.17	0.17	0.63	0.025	0.004	2E-09	0.198	0.171	0.2477	-0.069	0.055	0.210	-0.092	0.061	0.132	0.075	0.117	0.520
rs7551732	1	89139041	*PKN2*	T	A	0.61	0.60	0.95	0.027	0.003	6E-20	0.084	0.108	0.4404	0.033	0.034	0.332	0.036	0.037	0.332	0.003	0.073	0.962
rs2811594	1	93343282	*FAM69A*	A	G	0.63	0.65	0.93	0.024	0.003	4E-14	0.516	0.112	<.0001	0.036	0.035	0.305	0.030	0.039	0.440	0.084	0.079	0.289
rs17113369	1	95787223	*RWDD3*	T	C	0.03	0.04	0.81	-0.073	0.013	6E-09	-0.247	0.299	0.4097	-0.027	0.087	0.757	-0.011	0.095	0.909	-0.153	0.222	0.489
rs7517682	1	103519589	*COL11A1*	G	A	0.56	0.56	0.98	-0.023	0.003	4E-14	-0.153	0.107	0.1517	0.085	0.033	0.009	0.091	0.036	0.012	0.048	0.073	0.506
rs12120956	1	113202571	*CAPZA1*	G	A	0.23	0.20	0.95	-0.025	0.004	2E-12	-0.163	0.132	0.2172	0.014	0.039	0.718	0.009	0.042	0.841	0.053	0.087	0.546
rs1321666	1	118492052	*WDR3*	T	C	0.48	0.47	0.99	0.017	0.003	3E-08	-0.035	0.105	0.7379	0.049	0.033	0.137	0.045	0.036	0.208	0.071	0.076	0.354
rs9428104	1	118855587	*SPAG17*	A	G	0.75	0.75	1	0.043	0.003	3E-36	0.454	0.119	0.0001	0.036	0.036	0.319	0.027	0.039	0.489	0.099	0.082	0.229
rs12144094	1	120264823	*PHGDH*	C	G	0.16	0.16	0.96	-0.025	0.004	2E-09	-0.126	0.149	0.396	0.023	0.044	0.600	0.018	0.048	0.712	0.052	0.095	0.586
rs6658763	1	146692373	*FMO5*	C	T	0.08	0.08	0.76	-0.036	0.005	4E-11	0.345	0.218	0.1131	0.002	0.070	0.975	0.001	0.077	0.993	0.022	0.153	0.887
rs3767627	1	149938898	*OTUD7B*	T	C	0.16	0.14	1.00	-0.036	0.004	4E-19	-0.438	0.150	0.0035	0.080	0.045	0.074	0.085	0.049	0.081	0.038	0.104	0.717
rs2298265	1	151259043	*ZNF687*	C	T	0.12	0.13	0.88	-0.03	0.005	8E-11	-0.190	0.171	0.2649	0.076	0.050	0.126	0.089	0.055	0.107	-0.010	0.101	0.923
rs6688100	1	160399586	*VANGL2*	T	C	0.52	0.50	0.72	-0.016	0.003	2E-08	-0.151	0.127	0.2342	-0.040	0.039	0.304	-0.058	0.043	0.179	0.076	0.083	0.359
rs4656220	1	170649277	*PRRX1*	C	T	0.39	0.37	0.76	0.021	0.003	2E-10	-0.078	0.124	0.5269	-0.005	0.038	0.894	-0.021	0.043	0.617	0.098	0.081	0.225
rs6694089	1	172083881	*DNM3*	G	A	0.28	0.27	1.00	0.039	0.003	4E-33	0.283	0.117	0.0154	-0.019	0.034	0.589	-0.025	0.038	0.510	0.025	0.078	0.746
rs12125882	1	172141403	*DNM3*	A	T	0.43	0.42	0.90	0.027	0.003	1E-19	0.050	0.111	0.6515	-0.059	0.034	0.087	-0.064	0.038	0.088	-0.018	0.075	0.815
rs2421992	1	172241251	*DNM3*	C	T	0.70	0.70	0.67	0.024	0.003	2E-12	0.224	0.135	0.0981	-0.002	0.041	0.965	-0.022	0.045	0.628	0.130	0.095	0.168
rs17369123	1	172355841	*DNM3*	C	T	0.19	0.16	0.98	0.031	0.004	1E-16	0.162	0.141	0.2505	-0.008	0.046	0.856	0.015	0.051	0.760	-0.167	0.097	0.084
rs1325596	1	176794066	*PAPPA2*	G	A	0.57	0.55	0.79	0.025	0.003	1E-17	0.224	0.118	0.0579	-0.071	0.038	0.058	-0.077	0.041	0.062	-0.037	0.082	0.652
rs4652773	1	183054827	*LAMC1*	A	G	0.54	0.53	0.96	-0.024	0.003	1E-15	-0.172	0.106	0.1055	0.030	0.034	0.381	0.032	0.038	0.394	0.004	0.073	0.953

rs3814333	1	184007119	*GLT25D2*	C	T	0.32	0.29	1.00	0.049	0.003	5E-51	0.310	0.113	0.0061	0.021	0.036	0.565	0.019	0.039	0.619	0.022	0.083	0.793
rs2275325	1	203800735	*ZC3H11A*	G	C	0.28	0.26	0.98	0.019	0.003	2E-09	-0.118	0.118	0.3178	-0.050	0.037	0.177	-0.063	0.041	0.124	0.028	0.080	0.723
rs10863936	1	212237798	*DTL*	G	A	0.53	0.53	0.91	-0.02	0.003	1E-11	0.032	0.109	0.7665	-0.020	0.034	0.561	-0.030	0.037	0.411	0.068	0.071	0.343
rs6540834	1	214627419	*PTPN14*	C	T	0.34	0.38	0.63	-0.027	0.003	3E-16	-0.300	0.133	0.0247	0.045	0.040	0.256	0.042	0.044	0.334	0.065	0.092	0.480
rs10495098	1	218516310	*TGFB2*	G	T	0.41	0.41	0.84	0.019	0.003	7E-10	0.097	0.115	0.3999	0.014	0.036	0.695	-0.001	0.039	0.979	0.125	0.077	0.107
rs991967	1	218615451	*TGFB2*	A	C	0.28	0.30	1.00	0.034	0.003	2E-26	0.156	0.114	0.1734	-0.030	0.035	0.397	-0.035	0.039	0.366	-0.001	0.075	0.992
rs12411277	1	218975475	*TGFB2*	G	A	0.37	0.36	0.66	-0.022	0.003	2E-13	-0.181	0.134	0.1774	-0.074	0.042	0.076	-0.092	0.046	0.046	0.039	0.091	0.666
rs4428898	1	219739966	*SLC30A10*	G	A	0.46	0.46	0.89	-0.023	0.003	3E-15	-0.017	0.109	0.8778	0.024	0.033	0.458	0.027	0.036	0.460	0.010	0.075	0.893
rs1935157	1	221317258	*HLX*	C	G	0.30	0.29	0.62	0.025	0.003	1E-14	0.173	0.145	0.2314	-0.034	0.045	0.446	-0.029	0.050	0.564	-0.084	0.099	0.399
rs6696239	1	227750068	*ZNF678*	G	A	0.19	0.17	1.00	-0.038	0.004	7E-24	-0.320	0.137	0.0193	-0.011	0.043	0.800	-0.009	0.047	0.847	-0.018	0.093	0.845
rs11799609	1	243618317	*SDCCAG8*	G	T	0.16	0.16	1.00	0.026	0.004	1E-09	0.120	0.142	0.3969	-0.059	0.046	0.200	-0.058	0.051	0.257	-0.073	0.098	0.457
rs17038954	2	1645673	*PXDN*	C	T	0.06	0.07	0.52	0.044	0.006	1E-12	0.256	0.293	0.3816	0.003	0.100	0.975	-0.022	0.111	0.842	0.184	0.192	0.338
rs10048625	2	1775648	*MYT1L*	C	T	0.18	0.16	0.70	0.027	0.004	6E-11	0.244	0.173	0.1581	0.010	0.054	0.857	0.012	0.060	0.840	-0.001	0.114	0.991
rs3885668	2	10178479	*KLF11*	C	T	0.57	0.59	0.58	-0.022	0.003	8E-13	-0.032	0.139	0.8166	0.006	0.043	0.887	0.033	0.048	0.487	-0.165	0.092	0.072
rs2345835	2	18574952	*RDH14*	T	C	0.54	0.53	0.75	0.018	0.003	2E-09	0.121	0.120	0.3142	0.048	0.037	0.196	0.067	0.041	0.100	-0.080	0.077	0.301
rs13006748	2	20151819	*WDR35*	G	C	0.30	0.28	0.87	0.023	0.003	6E-11	-0.093	0.123	0.4527	0.049	0.037	0.186	0.062	0.041	0.127	-0.044	0.086	0.613
rs7561273	2	24247514	*LOC38893*	A	G	0.54	0.55	1.00	0.025	0.003	8E-18	0.257	0.105	0.0144	-0.024	0.033	0.467	-0.019	0.036	0.590	-0.054	0.075	0.468
rs2278483	2	25040082	*CENPO*	C	T	0.23	0.23	0.87	0.041	0.003	8E-33	0.027	0.133	0.8421	0.022	0.041	0.586	0.009	0.045	0.850	0.106	0.090	0.236
rs2289195	2	25463483	*DNMT3A*	G	A	0.43	0.41	0.65	0.038	0.003	2E-37	0.422	0.133	0.0015	0.056	0.041	0.165	0.046	0.045	0.306	0.130	0.088	0.141
rs780094	2	27741237	*GCKR*	T	C	0.61	0.57	1.00	0.021	0.003	6E-12	0.201	0.106	0.0574	0.022	0.032	0.488	0.018	0.035	0.608	0.050	0.072	0.486
rs7605699	2	33315750	*LTBP1*	G	C	0.19	0.23	1.00	-0.028	0.004	2E-12	-0.226	0.125	0.0701	-0.009	0.038	0.811	-0.006	0.041	0.880	-0.031	0.084	0.715
rs6714546	2	33361425	*LTBP1*	A	G	0.72	0.71	0.99	0.03	0.003	2E-18	0.198	0.117	0.0885	0.021	0.037	0.579	0.034	0.041	0.409	-0.058	0.081	0.473
rs6751657	2	33405151	*LTBP1*	T	C	0.53	0.51	1.00	0.024	0.003	7E-16	0.241	0.104	0.0205	-0.019	0.031	0.541	-0.040	0.034	0.250	0.123	0.068	0.072
rs711245	2	36768875	*CRIM1*	G	A	0.33	0.32	0.89	-0.024	0.003	4E-14	-0.177	0.117	0.1305	0.055	0.037	0.134	0.039	0.041	0.345	0.179	0.081	0.028
rs6544089	2	37758745	*CDC42EP3*	C	T	0.39	0.36	0.79	0.02	0.003	8E-11	0.125	0.123	0.3086	0.059	0.037	0.114	0.066	0.041	0.107	0.014	0.084	0.869
rs17511102	2	37960613	*CDC42EP3*	A	T	0.09	0.06	0.55	0.053	0.006	9E-21	0.139	0.286	0.6264	0.048	0.088	0.585	0.071	0.096	0.457	-0.129	0.204	0.525
rs13416119	2	42462930	*EML4*	A	G	0.10	0.08	0.87	-0.029	0.005	2E-08	0.088	0.202	0.6635	-0.033	0.064	0.602	-0.047	0.071	0.509	0.058	0.135	0.669
rs9309101	2	43629612	*THADA*	A	G	0.33	0.35	1.00	0.021	0.003	6E-11	0.065	0.108	0.5481	0.076	0.033	0.021	0.085	0.036	0.019	0.008	0.074	0.910
rs897080	2	44774202	*C2orf34*	C	T	0.74	0.79	0.90	-0.028	0.003	2E-16	-0.204	0.135	0.1297	0.064	0.043	0.135	0.053	0.047	0.259	0.150	0.096	0.117
rs17032525	2	44907331	*C2orf34*	G	A	0.13	0.14	0.93	0.025	0.005	5E-08	0.247	0.154	0.1095	-0.010	0.048	0.835	-0.027	0.053	0.617	0.119	0.107	0.265
rs12474201	2	46921285	*SOCS5*	G	A	0.36	0.36	0.97	0.028	0.003	2E-19	0.274	0.110	0.0124	0.002	0.034	0.950	0.013	0.037	0.719	-0.079	0.075	0.295
rs354196	2	54966407	*SPTBN1*	A	G	0.53	0.54	0.94	0.021	0.003	6E-12	0.009	0.108	0.9333	-0.037	0.032	0.251	-0.046	0.036	0.193	0.029	0.069	0.677
rs3791679	2	56096892	*EFEMP1*	A	G	0.23	0.24	1.00	-0.06	0.004	2E-67	-0.592	0.121	<.0001	-0.025	0.038	0.513	-0.027	0.042	0.522	-0.014	0.078	0.858
rs2120335	2	68495002	*PPP3R1*	G	A	0.41	0.43	0.80	-0.019	0.003	8E-10	-0.184	0.118	0.1177	0.043	0.037	0.245	0.050	0.041	0.220	-0.011	0.080	0.891
rs7568069	2	71584485	*ZNF638*	G	A	0.58	0.58	1.00	-0.022	0.003	3E-13	-0.327	0.107	0.0022	0.003	0.033	0.938	0.006	0.037	0.880	-0.018	0.067	0.794
rs11684404	2	88924622	*EIF2AK3*	T	C	0.34	0.32	0.99	0.032	0.003	9E-25	0.212	0.110	0.0543	-0.002	0.035	0.947	0.021	0.038	0.587	-0.162	0.078	0.037
rs11683207	2	98333290	*ZAP70*	T	C	0.20	0.14	0.82	-0.023	0.004	5E-08	0.199	0.163	0.2213	-0.022	0.053	0.682	-0.044	0.059	0.452	0.125	0.111	0.260
rs13388725	2	109047190	*GCC2*	A	G	0.41	0.39	0.67	0.018	0.003	2E-09	0.189	0.130	0.145	-0.013	0.041	0.747	-0.010	0.045	0.826	-0.031	0.088	0.723
rs2166898	2	121612659	*GLI2*	G	A	0.16	0.17	0.55	-0.027	0.004	9E-11	-0.010	0.188	0.9596	-0.037	0.059	0.527	-0.013	0.064	0.843	-0.207	0.134	0.124
rs7567288	2	134434824	*NAP5*	T	C	0.20	0.18	0.81	0.029	0.004	3E-14	0.210	0.146	0.1499	-0.023	0.047	0.620	-0.050	0.052	0.338	0.143	0.103	0.165
rs4953951	2	136187345	*ZRANB3*	C	T	0.10	0.13	0.98	-0.036	0.005	1E-11	-0.183	0.167	0.272	-0.002	0.048	0.961	0.020	0.052	0.699	-0.179	0.116	0.124
rs749234	2	145231349	*ZEB2*	A	G	0.68	0.69	0.74	-0.017	0.003	2E-08	-0.142	0.132	0.2814	0.062	0.041	0.129	0.050	0.045	0.262	0.138	0.088	0.117
rs540652	2	169707428	*NOSTRIN*	C	T	0.46	0.46	0.86	0.021	0.003	3E-12	0.060	0.112	0.5936	0.044	0.034	0.193	0.042	0.037	0.255	0.060	0.075	0.419
rs12987566	2	172152646	*METTL8*	C	T	0.26	0.26	0.88	0.024	0.003	1E-12	0.202	0.126	0.1077	-0.009	0.040	0.816	-0.002	0.044	0.967	-0.062	0.089	0.487
rs6746356	2	174815898	*SP3*	A	C	0.25	0.24	0.79	-0.019	0.003	1E-08	0.070	0.137	0.6115	-0.032	0.044	0.460	-0.017	0.048	0.714	-0.144	0.099	0.144
rs7567851	2	178684720	*PDE11A*	G	C	0.08	0.09	0.98	0.039	0.006	1E-12	0.388	0.187	0.0376	0.011	0.057	0.849	0.023	0.063	0.715	-0.060	0.121	0.618
rs833152	2	183219101	*PDE1A*	C	A	0.58	0.58	0.55	-0.017	0.003	2E-08	-0.037	0.143	0.7937	-0.049	0.042	0.247	-0.037	0.047	0.429	-0.131	0.096	0.172
rs12693589	2	191832662	*STAT1*	T	C	0.25	0.25	1.00	0.022	0.003	9E-11	0.037	0.119	0.758	-0.041	0.038	0.276	-0.052	0.042	0.217	0.036	0.079	0.652

rs6435143	2	203194256	*NOP5/NOP*	A	C	0.56	0.56	0.84	-0.019	0.003	2E-10	0.057	0.115	0.6206	-0.029	0.036	0.413	-0.019	0.039	0.621	-0.101	0.081	0.210
rs4425077	2	216410516	*FN1*	G	C	0.60	0.60	0.86	-0.02	0.003	1E-10	-0.160	0.115	0.166	0.008	0.036	0.814	0.011	0.039	0.773	-0.004	0.076	0.963
rs17181956	2	218146080	*TNP1*	C	T	0.13	0.10	0.86	-0.028	0.005	4E-09	-0.356	0.184	0.0535	-0.106	0.058	0.069	-0.132	0.065	0.042	0.056	0.116	0.627
rs994533	2	218284278	*TNS1*	G	C	0.33	0.32	1.00	-0.027	0.003	1E-17	-0.075	0.111	0.4968	-0.023	0.034	0.504	-0.034	0.038	0.364	0.058	0.078	0.462
rs1864439	2	218616633	*TNS1*	C	T	0.89	0.90	0.88	0.027	0.005	3E-08	0.249	0.184	0.1762	0.055	0.057	0.337	0.038	0.062	0.544	0.178	0.128	0.164
rs992157	2	219154781	*PNKD/TMB*	G	A	0.57	0.55	1.00	0.022	0.003	6E-13	0.041	0.104	0.6921	-0.019	0.033	0.561	-0.024	0.036	0.503	0.019	0.071	0.792
rs2305833	2	219305404	*VIL1*	G	C	0.58	0.58	0.87	0.028	0.003	4E-21	0.223	0.115	0.0515	-0.002	0.035	0.945	0.001	0.039	0.982	-0.032	0.082	0.692
rs12470505	2	219908369	*CCDC108*	T	G	0.10	0.10	0.97	-0.048	0.005	6E-22	-0.522	0.175	0.0029	-0.143	0.055	0.009	-0.137	0.060	0.023	-0.189	0.129	0.143
rs16859517	2	219949184	*NHEJ1*	C	T	0.04	0.04	0.79	0.067	0.008	5E-17	0.665	0.294	0.0239	-0.056	0.081	0.493	-0.140	0.091	0.126	0.456	0.174	0.009
rs6761041	2	225030129	*SERPINE2*	T	C	0.45	0.43	0.99	-0.023	0.003	3E-15	0.091	0.106	0.3888	-0.046	0.032	0.158	-0.039	0.036	0.272	-0.087	0.072	0.225
rs6733349	2	232268312	*B3GNT7*	T	C	0.34	0.37	0.52	-0.022	0.003	1E-12	-0.024	0.150	0.8714	-0.016	0.045	0.725	-0.011	0.050	0.822	-0.043	0.102	0.671
rs6754426	2	232322779	*NCL*	G	A	0.45	0.43	0.99	-0.027	0.003	2E-17	-0.217	0.107	0.0422	0.013	0.033	0.689	0.016	0.036	0.652	-0.011	0.073	0.882
rs4973429	2	232377818	*C2orf52*	G	T	0.34	0.36	0.99	-0.029	0.003	1E-19	-0.171	0.110	0.1219	-0.015	0.034	0.656	0.000	0.037	0.993	-0.120	0.075	0.109
rs2679184	2	232779223	*NPPC*	T	C	0.23	0.26	0.53	-0.031	0.004	2E-14	-0.227	0.165	0.1676	-0.038	0.050	0.453	-0.046	0.055	0.401	0.021	0.112	0.850
rs749052	2	232796610	*NPPC*	T	C	0.06	0.07	0.65	-0.067	0.006	2E-26	-0.373	0.255	0.1444	-0.061	0.076	0.417	-0.057	0.083	0.487	-0.087	0.186	0.640
rs11677466	2	232982257	*DIS3L2*	A	T	0.09	0.07	0.70	0.064	0.007	3E-23	0.799	0.233	0.0006	-0.057	0.077	0.457	-0.062	0.086	0.471	-0.026	0.162	0.875
rs3116168	2	232989831	*DIS3L2*	T	C	0.73	0.68	0.65	0.039	0.003	1E-31	0.610	0.140	<.0001	0.045	0.044	0.301	0.054	0.048	0.259	-0.022	0.099	0.827
rs2343240	2	233087483	*DIS3L2*	T	C	0.03	0.02	0.91	-0.078	0.01	3E-15	0.340	0.351	0.3326	0.014	0.111	0.901	0.006	0.122	0.963	0.074	0.259	0.775
rs13393800	2	233442091	*EIF4E2*	G	A	0.29	0.26	0.55	0.027	0.003	1E-17	-0.041	0.159	0.796	-0.026	0.049	0.604	-0.025	0.054	0.639	-0.030	0.113	0.791
rs4344931	2	241818527	*AGXT*	A	C	0.71	0.70	0.66	0.02	0.003	8E-10	0.020	0.143	0.8865	0.072	0.044	0.103	0.091	0.049	0.061	-0.048	0.098	0.625
rs11687941	2	242191410	*HDLBP*	C	G	0.25	0.26	0.96	-0.025	0.003	4E-13	-0.170	0.123	0.1673	-0.079	0.037	0.031	-0.105	0.040	0.010	0.106	0.082	0.196
rs2633761	3	4728104	*ITPR1*	G	A	0.50	0.46	0.99	0.016	0.003	3E-08	0.189	0.104	0.0687	-0.028	0.032	0.389	-0.050	0.035	0.158	0.113	0.069	0.101
rs13078528	3	11646954	*VGLL4*	G	A	0.94	0.95	0.83	0.045	0.006	1E-12	0.212	0.257	0.4102	-0.009	0.081	0.912	-0.017	0.089	0.844	0.044	0.174	0.800
rs2596831	3	12632652	*RAF1*	G	C	0.43	0.43	0.99	-0.017	0.003	7E-09	-0.257	0.106	0.016	-0.008	0.032	0.796	-0.014	0.035	0.693	0.031	0.072	0.673
rs2597513	3	13555836	*HDAC11*	C	T	0.89	0.89	0.72	-0.039	0.005	3E-16	-0.377	0.201	0.06	-0.071	0.058	0.222	-0.085	0.064	0.184	0.020	0.131	0.879
rs9816693	3	38047954	*VILL*	G	C	0.17	0.15	0.84	0.031	0.004	3E-15	0.145	0.158	0.3595	0.029	0.050	0.567	0.045	0.055	0.405	-0.082	0.110	0.455
rs3915129	3	41243742	*CTNNB1*	T	G	0.47	0.45	1.00	0.016	0.003	4E-08	0.191	0.104	0.0672	-0.050	0.033	0.126	-0.031	0.036	0.389	-0.174	0.072	0.015
rs13088462	3	51071713	*DOCK3*	T	C	0.06	0.05	1.00	0.059	0.007	8E-18	0.577	0.231	0.0125	0.082	0.075	0.277	0.120	0.081	0.138	-0.226	0.179	0.208
rs4256170	3	51192126	*DOCK3*	G	A	0.01	0.03	0.75	0.191	0.028	1E-11	0.630	0.335	0.0603	0.108	0.109	0.323	0.143	0.118	0.225	-0.159	0.260	0.541
rs2240919	3	52831701	*ITIH3*	C	G	0.34	0.34	1.00	-0.027	0.003	5E-17	-0.171	0.110	0.1218	0.048	0.034	0.158	0.040	0.037	0.281	0.106	0.074	0.154
rs2581830	3	53134098	*RFT1*	T	C	0.60	0.59	1.00	-0.031	0.003	4E-25	-0.082	0.107	0.4412	0.002	0.033	0.955	0.000	0.036	0.991	0.008	0.071	0.915
rs2034172	3	55411763	*WNT5A*	A	G	0.68	0.66	0.75	0.018	0.003	4E-08	-0.298	0.128	0.0199	-0.045	0.039	0.255	-0.028	0.043	0.509	-0.165	0.090	0.065
rs9835332	3	56667682	*C3orf63*	G	C	0.46	0.46	0.93	-0.028	0.003	4E-22	-0.396	0.108	0.0003	-0.027	0.033	0.416	-0.022	0.036	0.545	-0.058	0.075	0.440
rs1658351	3	58013573	*FLNB*	C	T	0.65	0.69	0.95	-0.023	0.003	1E-12	-0.298	0.114	0.0089	0.050	0.036	0.167	0.049	0.039	0.213	0.050	0.082	0.540
rs6794009	3	61513495	*PTPRG*	A	G	0.44	0.44	0.88	0.016	0.003	4E-08	0.019	0.113	0.8671	0.027	0.036	0.443	0.019	0.039	0.625	0.084	0.076	0.268
rs17806888	3	67416322	*SUCLG2*	T	C	0.12	0.13	0.93	-0.034	0.005	3E-12	-0.344	0.163	0.0351	-0.025	0.051	0.620	-0.046	0.056	0.405	0.114	0.112	0.310
rs2175513	3	68622366	*FAM19A1*	G	A	0.57	0.55	0.86	-0.017	0.003	3E-08	-0.120	0.114	0.2929	0.012	0.035	0.731	0.004	0.038	0.919	0.067	0.075	0.366
rs12330322	3	72455355	*RYBP*	C	T	0.22	0.22	0.83	-0.034	0.004	3E-22	-0.193	0.140	0.1686	0.071	0.042	0.089	0.108	0.046	0.020	-0.176	0.092	0.055
rs7633464	3	98715823	*DCBLD2*	G	A	0.48	0.47	1.00	0.019	0.003	1E-10	0.214	0.105	0.0417	0.020	0.032	0.543	0.021	0.036	0.559	0.008	0.070	0.912
rs9825951	3	99269921	*COL8A1*	T	A	0.65	0.63	0.84	-0.022	0.003	3E-12	-0.159	0.116	0.17	0.036	0.035	0.309	0.046	0.039	0.237	-0.031	0.078	0.691
rs1797625	3	112826415	*C3orf17*	A	T	0.36	0.36	0.91	0.019	0.003	5E-10	-0.029	0.114	0.7957	-0.011	0.036	0.751	-0.011	0.039	0.784	-0.014	0.083	0.863
rs1533269	3	114214611	*ZBTB20*	C	A	0.30	0.33	0.83	-0.02	0.003	1E-09	-0.234	0.124	0.0583	0.020	0.037	0.582	0.020	0.041	0.623	0.022	0.087	0.800
rs1546391	3	114697457	*ZBTB20*	C	G	0.07	0.09	0.97	0.039	0.006	7E-11	0.349	0.193	0.0707	0.021	0.057	0.706	0.026	0.063	0.677	-0.014	0.123	0.909
rs4974480	3	134178562	*ANAPC13*	A	T	0.68	0.68	0.95	0.026	0.003	2E-16	0.260	0.115	0.0241	0.007	0.036	0.856	0.011	0.040	0.791	-0.017	0.078	0.824
rs9880211	3	136107549	*STAG1*	G	A	0.25	0.25	1.00	-0.03	0.003	2E-18	-0.107	0.121	0.3757	0.019	0.037	0.613	0.022	0.041	0.601	-0.001	0.082	0.988
rs724016	3	141105570	*ZBTB38*	A	G	0.44	0.42	0.99	0.078	0.003	3E-158	0.357	0.106	0.0007	0.045	0.033	0.170	0.041	0.036	0.264	0.076	0.069	0.274
rs11714558	3	141163045	*ZBTB38*	T	C	0.03	0.02	0.52	-0.134	0.019	2E-12	0.352	0.492	0.4741	0.014	0.146	0.926	0.054	0.159	0.733	-0.276	0.359	0.442

rs936339	3	142535505	*PCOLCE2*	C	T	0.19	0.18	0.93	0.022	0.004	2E-08	0.124	0.138	0.3696	0.000	0.044	0.999	-0.003	0.048	0.953	0.008	0.101	0.934
rs4325879	3	156851984	*CCNL1*	C	T	0.27	0.27	0.97	-0.021	0.004	3E-09	-0.184	0.121	0.1271	-0.021	0.035	0.550	-0.025	0.038	0.523	0.008	0.080	0.921
rs6441170	3	157806960	*SHOX2*	T	C	0.38	0.41	0.76	0.022	0.003	1E-12	0.194	0.120	0.1078	-0.065	0.038	0.083	-0.062	0.041	0.133	-0.092	0.083	0.271
rs7652177	3	171969077	*FNDC3B*	C	G	0.51	0.52	0.73	0.038	0.003	3E-39	0.259	0.122	0.0334	0.057	0.038	0.133	0.069	0.042	0.099	-0.031	0.081	0.707
rs509035	3	172163449	*GHSR*	G	A	0.32	0.29	0.97	0.031	0.003	3E-23	0.374	0.115	0.0012	0.018	0.036	0.614	0.021	0.040	0.592	0.002	0.080	0.980
rs9858528	3	183355405	*KLHL24*	A	G	0.26	0.27	0.98	-0.022	0.003	4E-11	-0.209	0.120	0.0821	-0.013	0.036	0.716	-0.013	0.040	0.736	-0.014	0.083	0.862
rs720390	3	185548683	*IGF2BP2*	G	A	0.38	0.36	0.69	0.035	0.003	1E-29	0.283	0.131	0.0305	-0.041	0.041	0.315	-0.049	0.045	0.275	0.011	0.089	0.900
rs2300921	3	185651001	*SFRS10*	T	C	0.42	0.41	0.98	0.018	0.003	9E-09	0.299	0.107	0.0052	-0.013	0.033	0.688	-0.012	0.036	0.743	-0.016	0.073	0.827
rs4686904	3	187438522	*BCL6*	C	T	0.65	0.66	0.99	-0.021	0.003	3E-11	-0.377	0.110	0.0006	0.007	0.034	0.846	-0.013	0.037	0.716	0.151	0.079	0.056
rs7646824	3	190815978	*OSTN*	A	G	0.11	0.11	0.96	-0.026	0.005	5E-08	-0.008	0.169	0.9611	-0.021	0.050	0.679	-0.043	0.057	0.446	0.094	0.103	0.358
rs9841435	3	191111160	*CCDC50*	A	G	0.32	0.32	1.00	0.02	0.003	2E-10	-0.142	0.112	0.2065	0.010	0.034	0.775	-0.007	0.038	0.857	0.117	0.074	0.115
rs3958122	4	1693931	*SLBP*	C	T	0.35	0.34	0.98	0.027	0.003	3E-18	0.253	0.111	0.0226	0.037	0.035	0.285	0.031	0.038	0.414	0.071	0.076	0.350
rs867245	4	2218888	*POLN*	C	G	0.06	0.07	1.00	-0.041	0.006	8E-11	0.095	0.215	0.6598	0.122	0.060	0.043	0.121	0.067	0.069	0.122	0.134	0.360
rs6829680	4	7912333	*AFAP1*	G	A	0.44	0.46	0.91	0.017	0.003	4E-09	0.075	0.111	0.4978	0.029	0.035	0.404	0.030	0.039	0.438	0.030	0.073	0.685
rs2302580	4	8608634	*CPZ*	C	T	0.42	0.44	1.00	-0.029	0.004	4E-15	-0.354	0.106	0.0008	0.044	0.032	0.173	0.053	0.036	0.140	-0.009	0.073	0.904
rs763318	4	12963574	*RAB28*	G	A	0.47	0.47	0.63	-0.021	0.003	8E-13	-0.081	0.133	0.5388	-0.020	0.041	0.621	0.008	0.045	0.853	-0.214	0.087	0.014
rs4834927	4	13194091	*RAB28*	A	G	0.34	0.34	0.69	0.019	0.003	7E-10	0.079	0.133	0.5513	0.061	0.042	0.144	0.098	0.046	0.035	-0.186	0.091	0.041
rs7692995	4	17936634	*LCORL*	T	C	0.15	0.18	0.99	-0.074	0.004	1E-71	-0.546	0.140	<.0001	-0.022	0.041	0.587	-0.039	0.045	0.395	0.084	0.090	0.351
rs16994718	4	38688362	*KLF3*	C	T	0.15	0.15	0.69	-0.025	0.004	2E-09	-0.178	0.179	0.3198	-0.008	0.053	0.879	0.007	0.059	0.910	-0.117	0.118	0.324
rs2306596	4	39343940	*RFC1*	C	A	0.52	0.53	0.97	0.019	0.003	8E-11	0.229	0.106	0.0308	-0.008	0.033	0.811	-0.018	0.036	0.611	0.064	0.075	0.392
rs1996422	4	48687351	*FRYL*	A	G	0.28	0.26	1.00	0.022	0.003	3E-11	0.023	0.117	0.8419	0.034	0.038	0.362	0.048	0.042	0.244	-0.065	0.081	0.427
rs13113518	4	56399648	*CLOCK*	T	C	0.36	0.37	0.99	0.018	0.003	8E-09	0.081	0.108	0.4559	0.081	0.033	0.014	0.075	0.036	0.038	0.125	0.072	0.080
rs17081935	4	57823476	*C4orf14*	C	T	0.19	0.19	0.94	0.031	0.004	7E-17	0.457	0.137	0.0009	0.063	0.043	0.142	0.046	0.048	0.340	0.180	0.092	0.050
rs9993613	4	73476014	*ADAMTS3*	T	G	0.53	0.55	0.72	-0.03	0.003	5E-24	-0.087	0.125	0.4855	0.011	0.039	0.780	0.007	0.043	0.864	0.039	0.081	0.632
rs17556750	4	82155568	*PRKG2*	C	A	0.31	0.28	0.92	0.046	0.003	8E-48	0.371	0.121	0.0021	0.005	0.038	0.888	-0.019	0.042	0.651	0.163	0.082	0.046
rs2167645	4	82184049	*PRKG2*	C	T	0.04	0.03	0.52	0.139	0.021	8E-11	0.607	0.453	0.1796	-0.076	0.136	0.576	-0.139	0.150	0.354	0.334	0.306	0.276
rs17499117	4	82204091	*PRKG2*	A	G	0.04	0.05	0.64	0.14	0.021	2E-11	0.681	0.297	0.0218	-0.029	0.090	0.747	-0.057	0.099	0.568	0.148	0.199	0.458
rs6813055	4	88630031	*DMP1*	A	T	0.50	0.46	0.99	-0.017	0.003	2E-08	0.210	0.106	0.0475	-0.004	0.033	0.896	0.007	0.037	0.857	-0.081	0.073	0.271
rs12639764	4	106216205	*TET2*	T	C	0.38	0.37	1.00	-0.027	0.003	2E-19	0.025	0.107	0.8123	-0.010	0.034	0.763	-0.004	0.038	0.926	-0.057	0.074	0.439
rs1562975	4	109408608	*RPL34*	G	A	0.30	0.26	0.76	0.025	0.003	6E-15	0.068	0.138	0.621	0.008	0.041	0.840	0.026	0.045	0.559	-0.112	0.095	0.239
rs7659107	4	114742249	*CAMK2D*	A	G	0.23	0.21	0.66	0.024	0.004	9E-12	0.388	0.155	0.0126	-0.006	0.049	0.902	-0.002	0.055	0.970	-0.039	0.104	0.706
rs6838153	4	122720999	*EXOSC9*	A	G	0.34	0.33	0.99	0.022	0.003	3E-12	0.090	0.112	0.4201	-0.072	0.034	0.033	-0.061	0.037	0.100	-0.154	0.077	0.044
rs12513181	4	123835656	*NUDT6*	C	A	0.74	0.73	1.00	-0.02	0.003	3E-09	-0.028	0.118	0.8098	-0.045	0.037	0.219	-0.060	0.040	0.138	0.056	0.083	0.496
rs11100790	4	144442611	*SMARCA5*	T	C	0.20	0.25	0.59	0.025	0.004	8E-12	0.033	0.156	0.8344	-0.036	0.048	0.446	-0.038	0.052	0.462	-0.019	0.107	0.857
rs7654571	4	145321006	*HHIP*	A	G	0.77	0.75	0.80	-0.022	0.004	4E-09	0.237	0.135	0.0785	-0.044	0.040	0.276	-0.044	0.044	0.320	-0.051	0.091	0.573
rs6845999	4	145565826	*HHIP*	C	T	0.44	0.43	0.82	0.051	0.003	5E-67	0.314	0.118	0.0078	-0.024	0.036	0.512	-0.029	0.040	0.459	0.012	0.082	0.882
rs1812175	4	145574844	*HHIP*	A	G	0.84	0.83	1.00	0.079	0.004	2E-86	0.484	0.141	0.0006	0.013	0.044	0.766	0.000	0.048	0.993	0.107	0.097	0.269
rs17777628	4	145592686	*HHIP*	G	A	0.04	0.04	0.97	-0.053	0.008	8E-12	-0.928	0.275	0.0007	-0.007	0.080	0.933	0.004	0.087	0.966	-0.080	0.193	0.680
rs4240326	4	145839264	*ANAPC10*	A	G	0.54	0.55	0.89	-0.04	0.003	3E-43	-0.345	0.111	0.0019	-0.018	0.035	0.606	0.001	0.039	0.974	-0.149	0.077	0.053
rs996743	4	146128884	*OTUD4*	A	G	0.08	0.09	0.83	-0.063	0.007	2E-22	-0.240	0.201	0.2329	0.036	0.061	0.550	0.044	0.065	0.496	-0.023	0.153	0.882
rs13133465	4	146192618	*OTUD4*	C	G	0.06	0.05	0.65	-0.045	0.007	4E-12	-0.390	0.282	0.1666	-0.047	0.090	0.601	-0.032	0.098	0.745	-0.183	0.209	0.382
rs13150868	4	152180671	*ESSPL*	G	T	0.44	0.46	0.55	0.017	0.003	2E-08	0.054	0.142	0.7009	-0.032	0.043	0.461	-0.031	0.047	0.520	-0.032	0.094	0.731
rs955748	4	184215675	*WWC2*	A	G	0.75	0.76	1.00	0.028	0.003	3E-16	0.050	0.122	0.6828	0.041	0.037	0.265	0.034	0.041	0.398	0.082	0.080	0.304
rs17410035	5	31541142	*C5orf22*	G	T	0.33	0.33	1.00	0.019	0.003	9E-10	0.097	0.111	0.3813	-0.042	0.034	0.217	-0.045	0.037	0.221	-0.017	0.078	0.830
rs7731703	5	32694942	*NPR3*	C	T	0.32	0.33	1.00	-0.03	0.003	4E-18	-0.227	0.112	0.0426	-0.028	0.034	0.399	-0.026	0.037	0.485	-0.042	0.072	0.563
rs3811958	5	32772043	*NPR3*	A	G	0.26	0.25	0.56	0.027	0.003	3E-16	0.021	0.160	0.8977	0.028	0.048	0.557	0.026	0.053	0.623	0.043	0.106	0.686
rs9292468	5	32819073	*C5orf23*	T	C	0.60	0.59	0.75	-0.036	0.003	2E-33	-0.198	0.124	0.11	-0.005	0.038	0.893	-0.008	0.041	0.846	0.017	0.086	0.844
rs11745439	5	33230034	*TARS*	A	G	0.72	0.71	0.84	0.026	0.003	8E-16	-0.001	0.127	0.9935	0.005	0.040	0.899	0.028	0.044	0.534	-0.139	0.084	0.098

rs301901	5	37046626	*NIPBL*	A	G	0.44	0.45	0.93	-0.024	0.003	4E-16	-0.178	0.109	0.1008	-0.019	0.034	0.590	-0.027	0.038	0.472	0.035	0.073	0.629
rs3812040	5	39426020	*DAB2*	T	C	0.28	0.27	0.90	-0.024	0.003	2E-13	0.043	0.122	0.7228	0.037	0.038	0.331	0.035	0.042	0.411	0.059	0.086	0.491
rs17574650	5	42436916	*GHR*	A	C	0.11	0.11	0.74	0.038	0.005	2E-12	0.124	0.192	0.5172	-0.005	0.061	0.935	-0.006	0.066	0.926	0.010	0.138	0.945
rs2961830	5	50454732	*ISL1*	A	T	0.65	0.63	0.84	-0.02	0.003	2E-10	-0.015	0.119	0.8968	-0.021	0.036	0.557	-0.039	0.040	0.322	0.104	0.081	0.199
rs7716219	5	54955071	*SLC38A9*	T	C	0.69	0.70	0.97	-0.03	0.003	7E-22	-0.304	0.115	0.0084	-0.008	0.035	0.828	0.002	0.039	0.967	-0.065	0.077	0.401
rs2662027	5	56254485	*MIER3*	G	T	0.10	0.10	1.00	-0.033	0.005	6E-12	-0.229	0.170	0.1782	0.078	0.051	0.124	0.083	0.056	0.137	0.048	0.113	0.672
rs7727731	5	64674446	*ADAMTS6*	C	T	0.11	0.12	0.67	0.033	0.005	1E-11	0.066	0.189	0.7277	0.005	0.061	0.938	-0.018	0.067	0.793	0.150	0.123	0.222
rs9291926	5	67599656	*PIK3R1*	T	G	0.51	0.51	0.99	-0.019	0.003	3E-10	-0.164	0.104	0.1146	-0.008	0.033	0.798	-0.007	0.036	0.850	-0.017	0.070	0.814
rs34651	5	72144005	*TNPO1*	C	T	0.92	0.93	0.86	-0.041	0.006	2E-12	-0.595	0.215	0.0057	0.000	0.070	1.000	-0.020	0.076	0.790	0.156	0.164	0.342
rs820848	5	73964660	*HEXB*	A	G	0.29	0.29	1.00	0.021	0.004	3E-09	0.098	0.115	0.3948	0.033	0.035	0.346	0.025	0.039	0.515	0.080	0.076	0.295
rs7712162	5	78945171	*PAPD4*	C	T	0.19	0.17	0.94	0.023	0.004	5E-10	0.255	0.143	0.0737	0.017	0.044	0.701	0.001	0.049	0.984	0.118	0.094	0.207
rs32855	5	79836192	*FAM151B*	G	A	0.78	0.79	0.96	0.024	0.004	6E-11	0.047	0.132	0.723	0.020	0.039	0.610	0.005	0.043	0.916	0.132	0.095	0.164
rs6894139	5	88327782	*MEF2C*	T	G	0.44	0.48	0.93	-0.03	0.003	6E-24	-0.249	0.107	0.0201	-0.008	0.033	0.813	-0.003	0.037	0.943	-0.047	0.076	0.534
rs12186664	5	95630225	*PCSK1*	A	T	0.32	0.31	0.70	0.021	0.003	3E-11	0.256	0.134	0.0571	-0.009	0.041	0.830	-0.016	0.045	0.721	0.043	0.092	0.645
rs6594336	5	108073085	*FER*	T	C	0.56	0.55	0.97	0.017	0.003	1E-08	0.050	0.107	0.6431	0.037	0.033	0.264	0.049	0.036	0.174	-0.046	0.076	0.548
rs13177718	5	108113344	*FER*	C	T	0.08	0.08	0.97	-0.043	0.006	3E-13	-0.409	0.203	0.0436	0.111	0.060	0.065	0.145	0.066	0.028	-0.100	0.132	0.449
rs1582931	5	122657199	*CCDC100*	G	A	0.47	0.47	0.91	-0.028	0.003	3E-20	-0.153	0.110	0.1637	-0.027	0.034	0.433	-0.021	0.038	0.569	-0.062	0.078	0.431
rs6887276	5	127378294	*SLC12A2*	C	G	0.45	0.47	0.82	0.018	0.003	1E-09	0.118	0.114	0.3009	0.067	0.035	0.057	0.061	0.039	0.115	0.106	0.079	0.177
rs26024	5	127696022	*FBN2*	A	C	0.34	0.34	1.00	0.023	0.003	3E-14	0.226	0.109	0.0377	-0.087	0.034	0.011	-0.116	0.038	0.002	0.088	0.071	0.212
rs39623	5	129054621	*ADAMTS19*	A	T	0.92	0.93	0.94	-0.034	0.005	3E-10	-0.232	0.210	0.2702	0.030	0.064	0.640	0.028	0.070	0.687	0.056	0.146	0.700
rs7701414	5	131585958	*PDLIM4*	A	G	0.44	0.46	1.00	0.037	0.003	1E-34	0.221	0.105	0.0355	0.001	0.033	0.985	-0.004	0.036	0.917	0.026	0.071	0.711
rs526896	5	134356705	*PITX1*	T	G	0.28	0.28	0.84	-0.036	0.003	2E-25	-0.114	0.128	0.3746	-0.054	0.039	0.161	-0.050	0.043	0.243	-0.082	0.084	0.330
rs9327705	5	134510303	*PITX1*	G	A	0.23	0.23	1.00	0.02	0.004	2E-08	-0.020	0.125	0.8706	0.019	0.038	0.615	0.013	0.042	0.758	0.057	0.081	0.478
rs165189	5	139145747	*PSD2*	A	G	0.15	0.14	0.64	0.029	0.005	2E-10	0.193	0.190	0.3094	-0.025	0.058	0.666	-0.030	0.064	0.637	0.004	0.124	0.974
rs4624820	5	141681788	*SPRY4*	G	A	0.52	0.55	1.00	0.018	0.003	1E-09	-0.037	0.103	0.7202	-0.031	0.032	0.339	-0.046	0.036	0.194	0.068	0.072	0.342
rs2974438	5	168250903	*SLIT3*	G	A	0.20	0.22	0.77	-0.037	0.004	4E-24	-0.214	0.144	0.1362	0.003	0.047	0.942	-0.012	0.052	0.811	0.102	0.093	0.269
rs4620037	5	170875097	*FGF18*	A	C	0.20	0.23	0.66	-0.032	0.004	1E-18	-0.139	0.156	0.3701	-0.034	0.048	0.472	-0.028	0.053	0.599	-0.082	0.107	0.444
rs1529701	5	171000977	*FGF18*	T	C	0.70	0.71	0.95	0.021	0.003	5E-10	0.187	0.117	0.1093	0.012	0.037	0.740	0.018	0.040	0.654	-0.027	0.084	0.751
rs33852	5	171189571	*FBXW11*	A	G	0.33	0.32	0.93	0.03	0.003	2E-21	0.244	0.115	0.0347	0.016	0.035	0.640	0.016	0.038	0.681	0.030	0.080	0.707
rs12153391	5	171203438	*FBXW11*	C	A	0.26	0.25	0.92	-0.033	0.004	2E-21	-0.059	0.124	0.6375	0.018	0.039	0.645	-0.001	0.043	0.979	0.141	0.082	0.086
rs7733195	5	172994624	*FAM44B*	G	A	0.36	0.37	1.00	-0.029	0.003	3E-21	-0.259	0.109	0.0175	0.026	0.034	0.439	0.053	0.038	0.157	-0.158	0.077	0.041
rs422421	5	176517326	*FGFR4*	T	C	0.78	0.77	1.00	0.034	0.004	2E-20	0.264	0.126	0.0354	0.013	0.038	0.730	0.016	0.042	0.702	-0.005	0.087	0.958
rs11950938	5	176576293	*NSD1*	C	G	0.03	0.02	0.90	0.061	0.009	5E-11	0.162	0.346	0.6395	0.011	0.108	0.919	0.071	0.116	0.538	-0.483	0.274	0.077
rs12055154	5	176675423	*NSD1*	A	G	0.03	0.02	0.83	-0.059	0.01	2E-09	-0.918	0.391	0.0188	0.022	0.120	0.852	0.048	0.133	0.720	-0.118	0.270	0.662
rs11750568	5	178535713	*ADAMTS2*	A	G	0.67	0.70	0.79	-0.02	0.003	6E-11	-0.030	0.127	0.8139	-0.066	0.040	0.096	-0.080	0.044	0.065	0.035	0.086	0.686
rs6879260	5	179731014	*GFPT2*	T	C	0.61	0.63	0.57	0.027	0.003	2E-18	0.124	0.144	0.3906	-0.062	0.044	0.159	-0.048	0.049	0.322	-0.153	0.097	0.115
rs932445	6	2167225	*GMDS*	T	C	0.41	0.36	0.69	-0.018	0.003	6E-09	-0.348	0.133	0.0087	-0.036	0.041	0.370	-0.033	0.045	0.461	-0.066	0.089	0.462
rs17603945	6	7213016	*RREB1*	G	A	0.20	0.17	0.99	0.03	0.004	1E-15	0.374	0.138	0.0068	0.006	0.044	0.888	0.009	0.048	0.851	-0.020	0.096	0.838
rs9392918	6	7708631	*BMP6*	T	C	0.47	0.46	0.99	0.038	0.003	4E-38	0.123	0.105	0.2392	0.010	0.033	0.763	0.016	0.036	0.652	-0.040	0.072	0.575
rs17330192	6	17589375	*FAM8A1*	T	C	0.28	0.21	0.78	0.019	0.003	2E-08	0.032	0.143	0.824	-0.059	0.045	0.186	-0.062	0.049	0.211	-0.047	0.100	0.641
rs4141885	6	26157481	*HIST1H1E*	A	T	0.08	0.12	0.70	-0.073	0.008	8E-22	-0.638	0.194	0.001	0.006	0.055	0.910	0.025	0.060	0.676	-0.129	0.126	0.306
rs806794	6	26200677	*HIST1H2B*	A	G	0.29	0.31	0.95	-0.06	0.003	5E-74	-0.309	0.116	0.0079	0.035	0.035	0.307	0.039	0.038	0.304	0.009	0.077	0.906
rs1265097	6	31106459	*PSORS1C1*	C	A	0.12	0.13	1.00	-0.059	0.005	2E-32	-0.351	0.162	0.0307	-0.020	0.047	0.671	-0.018	0.051	0.725	-0.026	0.106	0.810
rs2857693	6	31588384	*BAT2*	G	T	0.38	0.44	1.00	-0.034	0.003	3E-29	-0.505	0.105	<.0001	-0.013	0.033	0.702	-0.023	0.037	0.525	0.066	0.075	0.381
rs12204421	6	33628863	*ITPR3*	A	G	0.26	0.27	0.95	-0.027	0.003	1E-14	-0.072	0.121	0.5552	0.062	0.037	0.097	0.040	0.041	0.328	0.213	0.082	0.010
rs3957165	6	33784864	*MLN*	C	T	0.81	0.80	0.91	0.022	0.004	2E-08	-0.093	0.135	0.4937	0.014	0.042	0.745	0.002	0.046	0.962	0.103	0.097	0.290
rs12214804	6	34188866	*HMGA1*	C	T	0.92	0.90	0.98	-0.084	0.006	2E-49	-0.462	0.181	0.0107	-0.017	0.055	0.755	-0.022	0.062	0.719	0.015	0.116	0.896
rs3800461	6	34616322	*C6orf106*	G	C	0.13	0.11	1.00	0.053	0.005	9E-33	0.647	0.163	<.0001	0.004	0.052	0.945	-0.003	0.057	0.964	0.054	0.116	0.645

rs6919534	6	35246903	*ZNF76*	G	A	0.87	0.85	1.00	0.05	0.004	8E-31	0.140	0.144	0.3307	-0.007	0.045	0.873	-0.014	0.049	0.777	0.039	0.100	0.701
rs6899744	6	35286295	*DEF6*	G	T	0.02	0.02	0.97	-0.132	0.014	2E-22	0.068	0.420	0.8712	-0.119	0.129	0.353	-0.111	0.142	0.432	-0.167	0.292	0.566
rs4713902	6	35614026	*FKBP5*	T	C	0.27	0.29	1.00	-0.027	0.004	9E-15	0.121	0.116	0.2969	0.061	0.034	0.077	0.056	0.038	0.140	0.093	0.074	0.206
rs16895130	6	41924931	*CCND3*	A	G	0.28	0.29	0.88	0.023	0.003	4E-12	-0.204	0.125	0.1023	0.018	0.037	0.631	0.027	0.041	0.513	-0.039	0.085	0.650
rs10948222	6	45244415	*SUPT3H*	T	C	0.58	0.42	0.98	0.031	0.003	1E-20	0.131	0.106	0.219	-0.034	0.033	0.295	-0.031	0.036	0.381	-0.056	0.072	0.441
rs9395264	6	47475022	*CD2AP*	T	G	0.68	0.70	0.93	0.02	0.003	2E-10	0.012	0.119	0.9225	-0.044	0.037	0.231	-0.040	0.040	0.325	-0.075	0.078	0.336
rs12190423	6	72202711	*OGFRL1*	G	C	0.38	0.38	0.86	-0.017	0.003	3E-08	-0.139	0.115	0.2279	0.023	0.035	0.514	0.027	0.039	0.489	-0.008	0.076	0.915
rs12209223	6	76164589	*FILIP1*	C	A	0.12	0.09	0.75	0.051	0.005	5E-25	0.278	0.204	0.1725	-0.006	0.063	0.927	-0.044	0.070	0.530	0.237	0.129	0.065
rs6903448	6	76173832	*FILIP1*	C	T	0.16	0.16	0.80	-0.035	0.004	9E-18	-0.197	0.159	0.215	0.010	0.051	0.843	0.029	0.056	0.613	-0.117	0.109	0.283
rs648831	6	80956208	*BCKDHB*	C	T	0.50	0.51	0.94	0.031	0.003	3E-26	0.297	0.106	0.0053	-0.049	0.034	0.149	-0.061	0.038	0.105	0.028	0.073	0.700
rs1341278	6	81038921	*BCKDHB*	T	G	0.06	0.05	1.00	0.056	0.006	6E-18	0.247	0.226	0.2762	-0.112	0.073	0.126	-0.143	0.081	0.079	0.081	0.152	0.592
rs9443804	6	81315597	*BCKDHB*	A	G	0.44	0.46	0.81	0.024	0.003	4E-15	0.151	0.115	0.1889	0.052	0.035	0.141	0.063	0.039	0.104	-0.026	0.078	0.740
rs310421	6	81792063	*FAM46A*	G	T	0.54	0.55	0.83	0.032	0.003	3E-27	0.092	0.115	0.4243	0.066	0.036	0.064	0.057	0.039	0.142	0.126	0.082	0.123
rs3828760	6	82456984	*FAM46A*	C	T	0.12	0.12	0.69	0.03	0.005	1E-10	0.279	0.191	0.144	0.027	0.059	0.646	0.012	0.065	0.854	0.140	0.133	0.293
rs761391	6	85448103	*TBX18*	C	T	0.54	0.54	0.82	-0.019	0.003	8E-09	-0.126	0.116	0.2768	-0.052	0.035	0.130	-0.056	0.038	0.141	-0.026	0.081	0.750
rs314263	6	105392745	*LIN28B*	C	T	0.68	0.69	1.00	-0.043	0.003	1E-42	-0.468	0.113	<.0001	-0.008	0.034	0.811	-0.013	0.037	0.716	0.033	0.076	0.664
rs479744	6	109020032	*FOXO3*	G	T	0.21	0.23	0.79	-0.025	0.004	8E-12	-0.165	0.141	0.2426	-0.032	0.044	0.468	-0.048	0.048	0.321	0.068	0.096	0.477
rs6920372	6	109723939	*PPIL6*	G	A	0.41	0.43	0.99	-0.025	0.003	2E-17	-0.393	0.105	0.0002	-0.054	0.032	0.099	-0.050	0.036	0.156	-0.075	0.072	0.296
rs2145357	6	116451442	*NT5DC1*	A	G	0.27	0.27	0.96	0.021	0.003	4E-10	0.242	0.119	0.0423	-0.004	0.037	0.923	-0.003	0.041	0.948	-0.017	0.078	0.831
rs1405212	6	117490664	*VGLL2*	T	C	0.59	0.65	0.88	0.023	0.003	2E-14	0.092	0.115	0.423	-0.007	0.035	0.852	0.004	0.039	0.914	-0.076	0.077	0.324
rs389663	6	117868051	*DCBLD1*	T	C	0.68	0.67	0.75	-0.022	0.003	3E-12	-0.313	0.129	0.0153	0.046	0.039	0.241	0.066	0.044	0.128	-0.090	0.083	0.279
rs4895801	6	126216403	*NCOA7*	C	G	0.47	0.44	0.89	0.017	0.003	6E-09	0.224	0.112	0.0461	0.033	0.034	0.332	0.011	0.038	0.782	0.182	0.075	0.016
rs1155939	6	126866133	*C6orf173*	C	A	0.50	0.51	0.99	0.042	0.003	1E-45	0.166	0.105	0.1132	0.064	0.033	0.049	0.066	0.036	0.067	0.054	0.070	0.442
rs1415701	6	130345835	*L3MBTL3*	G	A	0.27	0.26	1.00	-0.044	0.004	2E-34	-0.219	0.120	0.0685	-0.032	0.036	0.376	-0.052	0.039	0.180	0.116	0.082	0.157
rs7740107	6	130374461	*L3MBTL3*	T	A	0.74	0.75	1.00	-0.042	0.003	2E-36	-0.220	0.120	0.0676	-0.043	0.036	0.231	-0.062	0.040	0.117	0.092	0.083	0.268
rs6921207	6	131327956	*EPB41L2*	G	A	0.37	0.37	0.95	0.023	0.003	3E-14	0.347	0.111	0.0017	-0.020	0.034	0.566	-0.023	0.038	0.543	0.001	0.078	0.990
rs7745166	6	142617680	*GPR126*	C	A	0.43	0.46	0.69	-0.026	0.003	4E-16	-0.015	0.127	0.9092	-0.016	0.038	0.679	-0.018	0.041	0.665	-0.001	0.088	0.987
rs4896582	6	142703877	*GPR126*	G	A	0.30	0.32	0.99	-0.051	0.003	3E-55	-0.293	0.113	0.0098	-0.018	0.035	0.601	-0.015	0.039	0.702	-0.042	0.072	0.564
rs2748483	6	146335560	*GRM1*	A	T	0.45	0.43	0.94	-0.019	0.003	4E-10	-0.067	0.108	0.535	-0.025	0.034	0.452	-0.032	0.037	0.399	0.015	0.073	0.835
rs6902771	6	152157881	*ESR1*	C	T	0.46	0.46	0.98	0.031	0.003	7E-25	0.259	0.107	0.0151	0.091	0.032	0.005	0.084	0.036	0.018	0.140	0.072	0.051
rs3020418	6	152345162	*ESR1*	G	A	0.30	0.28	1.00	0.032	0.003	8E-24	0.081	0.116	0.4846	0.004	0.036	0.904	0.022	0.039	0.573	-0.129	0.084	0.124
rs11156098	6	156587831	*ARID1B*	T	C	0.88	0.90	0.90	-0.027	0.005	2E-08	-0.635	0.180	0.0004	-0.059	0.056	0.298	-0.052	0.062	0.398	-0.098	0.128	0.444
rs1832871	6	158722034	*TULP4*	A	G	0.66	0.68	0.82	-0.025	0.003	2E-15	-0.182	0.123	0.1391	-0.023	0.037	0.526	-0.037	0.040	0.360	0.072	0.082	0.380
rs9456307	6	158929442	*TULP4*	T	A	0.06	0.05	0.49	-0.053	0.007	2E-15	-0.747	0.352	0.0339	0.128	0.099	0.194	0.156	0.108	0.148	-0.049	0.236	0.835
rs991946	6	166329862	*T*	C	T	0.48	0.45	0.82	-0.021	0.003	8E-13	-0.017	0.117	0.8871	-0.032	0.038	0.401	-0.034	0.042	0.419	-0.008	0.075	0.914
rs2763273	6	168834623	*SMOC2*	C	T	0.24	0.23	0.92	-0.022	0.003	3E-10	-0.299	0.131	0.0221	0.043	0.040	0.286	0.046	0.045	0.309	0.018	0.084	0.832
rs7774834	6	169349731	*THBS2*	C	A	0.51	0.50	0.99	0.018	0.003	5E-10	0.001	0.104	0.9945	-0.029	0.032	0.366	-0.024	0.035	0.492	-0.062	0.071	0.385
rs798497	7	2795957	*GNA12*	A	G	0.30	0.29	0.97	-0.057	0.003	2E-71	-0.291	0.117	0.0131	0.032	0.036	0.367	0.042	0.039	0.280	-0.040	0.080	0.613
rs4725061	7	8086639	*GLCCI1*	A	G	0.44	0.43	0.71	0.02	0.003	1E-10	0.163	0.126	0.1942	-0.031	0.038	0.420	-0.011	0.042	0.787	-0.169	0.088	0.055
rs929637	7	12276522	*TMEM106B*	G	T	0.22	0.23	1.00	-0.021	0.004	2E-09	-0.020	0.126	0.8755	-0.012	0.038	0.761	-0.002	0.042	0.970	-0.083	0.086	0.336
rs17140875	7	19248278	*FERD3L*	G	T	0.05	0.05	0.58	-0.043	0.007	7E-09	-0.008	0.300	0.9788	0.111	0.092	0.228	0.118	0.101	0.245	0.072	0.205	0.724
rs2390151	7	19642100	*TWISTNB*	G	T	0.18	0.19	0.92	0.033	0.004	3E-17	0.155	0.140	0.2665	-0.043	0.045	0.338	-0.058	0.050	0.243	0.051	0.095	0.587
rs3807931	7	20381674	*ITGB8*	G	A	0.45	0.46	0.95	0.027	0.003	1E-19	-0.045	0.108	0.6769	-0.026	0.033	0.439	-0.019	0.037	0.607	-0.071	0.072	0.324
rs12538407	7	23521316	*IGF2BP3*	A	G	0.40	0.39	0.99	-0.032	0.003	4E-26	-0.122	0.107	0.2564	-0.019	0.032	0.551	-0.019	0.035	0.582	-0.019	0.073	0.797
rs1055144	7	25871109	*NFE2L3*	C	T	0.19	0.18	1.00	0.021	0.004	8E-09	0.175	0.135	0.193	0.019	0.041	0.640	0.031	0.045	0.493	-0.060	0.099	0.544
rs552707	7	28205303	*JAZF1*	T	C	0.69	0.72	0.99	-0.046	0.003	9E-46	-0.196	0.117	0.0948	-0.035	0.036	0.336	-0.054	0.039	0.171	0.104	0.081	0.200
rs12533079	7	28751137	*CREB5*	T	G	0.21	0.21	1.00	-0.022	0.004	2E-09	-0.272	0.129	0.0345	-0.022	0.040	0.575	-0.028	0.044	0.527	0.014	0.087	0.875
rs6462432	7	32935524	*KBTBD2*	G	A	0.39	0.40	0.65	0.017	0.003	3E-08	0.197	0.128	0.1248	0.035	0.040	0.376	0.052	0.044	0.233	-0.084	0.091	0.357

rs6974574	7	38110073	*STARD3NL*	A	T	0.69	0.66	0.93	0.03	0.003	1E-18	0.281	0.114	0.0134	-0.046	0.034	0.184	-0.048	0.038	0.203	-0.023	0.076	0.765
rs1007358	7	46201355	*IGFBP3*	A	G	0.23	0.23	0.60	0.021	0.004	9E-10	0.114	0.162	0.4817	0.018	0.049	0.713	0.035	0.054	0.516	-0.103	0.106	0.329
rs6949739	7	46417403	*IGFBP3*	T	A	0.09	0.08	0.97	-0.038	0.005	7E-13	-0.338	0.196	0.0858	0.077	0.062	0.214	0.073	0.069	0.290	0.096	0.129	0.458
rs2715094	7	50730452	*GRB10*	G	A	0.75	0.79	0.79	-0.021	0.003	9E-10	-0.070	0.144	0.6253	-0.006	0.043	0.894	-0.009	0.047	0.842	0.013	0.105	0.904
rs1113765	7	55889334	*14-Sep*	G	A	0.19	0.21	0.71	-0.024	0.004	2E-10	-0.437	0.153	0.0041	-0.014	0.046	0.761	-0.043	0.051	0.397	0.171	0.097	0.076
rs12669267	7	73304636	*WBSCR28*	C	T	0.13	0.14	0.52	-0.029	0.005	3E-08	-0.401	0.200	0.0453	-0.022	0.062	0.720	-0.024	0.068	0.721	-0.011	0.142	0.938
rs17807185	7	77308295	*RSBN1L*	A	G	0.38	0.39	0.62	0.022	0.003	4E-13	0.266	0.136	0.0505	0.022	0.041	0.589	0.037	0.045	0.404	-0.087	0.095	0.364
rs2888877	7	92228400	*CDK6*	T	C	0.78	0.79	0.96	-0.066	0.004	4E-69	-0.361	0.133	0.0065	0.024	0.041	0.552	0.007	0.044	0.871	0.154	0.096	0.108
rs42039	7	92244422	*CDK6*	C	T	0.27	0.26	1.00	0.068	0.003	4E-88	0.241	0.121	0.046	-0.003	0.037	0.928	0.018	0.041	0.665	-0.151	0.079	0.054
rs6971575	7	96039648	*SLC25A13*	C	G	0.71	0.73	0.80	-0.021	0.004	3E-09	-0.132	0.128	0.3036	-0.043	0.040	0.284	-0.069	0.044	0.114	0.142	0.088	0.108
rs17250196	7	99817196	*GATS/PVR*	G	T	0.06	0.05	0.88	0.045	0.007	4E-10	0.886	0.259	0.0006	-0.088	0.084	0.296	-0.102	0.093	0.273	0.032	0.170	0.850
rs6952113	7	120777619	*C7orf58*	G	A	0.38	0.40	0.93	-0.018	0.003	1E-09	-0.195	0.111	0.0805	0.028	0.034	0.396	0.025	0.037	0.497	0.049	0.073	0.502
rs6962887	7	135045786	*CNOT4*	T	G	0.32	0.31	0.61	-0.023	0.003	6E-11	-0.375	0.144	0.0091	0.019	0.045	0.681	0.014	0.050	0.776	0.043	0.096	0.653
rs273945	7	137611566	*CREB3L2*	A	C	0.58	0.58	1.00	0.019	0.003	1E-09	0.284	0.105	0.007	0.058	0.032	0.070	0.081	0.035	0.021	-0.096	0.070	0.167
rs822531	7	148629759	*EZH2*	C	T	0.78	0.77	0.67	0.036	0.004	2E-18	-0.027	0.155	0.8606	-0.015	0.047	0.754	-0.034	0.051	0.513	0.127	0.113	0.262
rs6955948	7	150508720	*TMEM176A*	C	T	0.28	0.29	0.99	0.031	0.003	5E-20	0.015	0.114	0.8962	0.011	0.035	0.753	-0.007	0.039	0.849	0.152	0.079	0.054
rs4875421	8	4827332	*CSMD1*	T	A	0.55	0.53	0.95	-0.019	0.003	1E-10	0.090	0.108	0.4047	0.012	0.034	0.715	-0.004	0.037	0.920	0.122	0.070	0.083
rs429433	8	8747894	*MFHAS1*	A	G	0.95	0.96	0.60	-0.046	0.007	1E-10	0.128	0.343	0.7091	-0.009	0.102	0.928	-0.025	0.112	0.821	0.103	0.237	0.664
rs7834383	8	13273477	*DLC1*	G	T	0.35	0.32	0.87	0.022	0.003	2E-11	0.269	0.118	0.0228	0.019	0.037	0.605	0.021	0.041	0.604	0.001	0.079	0.987
rs7823327	8	22562352	*PEBP4*	G	T	0.49	0.50	0.67	0.019	0.003	6E-11	0.193	0.126	0.1253	0.008	0.040	0.840	0.016	0.044	0.727	-0.046	0.085	0.593
rs4273857	8	23173053	*LOXL2*	A	G	0.76	0.77	0.99	-0.027	0.003	9E-15	-0.175	0.123	0.1546	0.009	0.039	0.816	0.029	0.043	0.490	-0.134	0.084	0.112
rs17088184	8	23375235	*SLC25A37*	C	G	0.17	0.15	1.00	0.025	0.004	5E-10	0.111	0.146	0.4455	-0.047	0.046	0.303	-0.035	0.050	0.488	-0.135	0.102	0.184
rs2013265	8	24092500	*ADAM28*	C	T	0.25	0.22	0.62	-0.028	0.003	2E-16	-0.468	0.160	0.0034	0.104	0.047	0.029	0.119	0.052	0.022	0.005	0.106	0.965
rs3812423	8	25298710	*KCTD9*	G	C	0.36	0.36	0.99	-0.021	0.003	2E-12	-0.209	0.110	0.0568	-0.035	0.034	0.305	-0.038	0.037	0.306	-0.025	0.076	0.747
rs568610	8	27527995	*SCARA3*	C	T	0.24	0.26	0.83	0.022	0.003	1E-10	-0.210	0.130	0.1074	-0.039	0.039	0.319	-0.032	0.043	0.450	-0.090	0.091	0.320
rs6988484	8	49413780	*EFCAB1*	T	C	0.25	0.27	0.96	0.022	0.003	5E-11	0.027	0.123	0.8257	-0.025	0.036	0.493	-0.047	0.040	0.239	0.121	0.080	0.134
rs10958476	8	57095808	*PLAG1*	T	C	0.21	0.20	1.00	0.051	0.004	2E-40	0.254	0.130	0.0512	0.027	0.040	0.503	0.018	0.044	0.673	0.088	0.088	0.319
rs9650315	8	57155598	*CHCHD7*	G	T	0.13	0.16	0.81	-0.061	0.005	2E-41	-0.467	0.163	0.0042	0.042	0.049	0.392	0.060	0.054	0.268	-0.084	0.103	0.414
rs2956605	8	75883054	*CRISPLD1*	A	C	0.62	0.61	1.00	-0.024	0.003	5E-15	-0.191	0.108	0.0773	-0.024	0.033	0.464	-0.033	0.036	0.364	0.041	0.072	0.567
rs4735677	8	78148191	*PXMP3*	A	T	0.28	0.29	1.00	0.037	0.003	6E-30	0.234	0.116	0.0442	0.010	0.036	0.777	0.033	0.039	0.397	-0.156	0.080	0.052
rs2737220	8	116637685	*TRPS1*	T	C	0.62	0.62	1.00	-0.017	0.003	1E-08	-0.233	0.107	0.029	-0.046	0.032	0.150	-0.043	0.035	0.226	-0.071	0.072	0.324
rs1550162	8	117563532	*EIF3H*	G	A	0.71	0.73	1.00	-0.024	0.003	1E-13	-0.177	0.118	0.1313	0.047	0.036	0.190	0.030	0.040	0.451	0.165	0.079	0.037
rs1599473	8	120475358	*NOV*	G	T	0.25	0.24	0.91	-0.027	0.003	1E-14	-0.114	0.130	0.3782	0.041	0.041	0.310	0.047	0.045	0.289	0.007	0.089	0.941
rs8180991	8	126500350	*TRIB1*	C	G	0.23	0.22	0.79	-0.028	0.004	3E-15	-0.229	0.143	0.1101	0.043	0.044	0.329	0.065	0.048	0.174	-0.122	0.103	0.239
rs4733724	8	130723728	*MLZE*	A	G	0.20	0.21	0.95	-0.05	0.004	1E-41	-0.192	0.132	0.1445	-0.067	0.040	0.095	-0.088	0.045	0.051	0.063	0.084	0.454
rs1036821	8	135650483	*ZFAT*	G	A	0.30	0.30	1.00	-0.037	0.003	1E-30	-0.321	0.114	0.0049	0.011	0.035	0.745	-0.009	0.039	0.821	0.150	0.081	0.062
rs11783655	8	145037573	*PLEC1*	T	A	0.40	0.40	0.95	-0.018	0.003	1E-09	-0.090	0.110	0.4124	0.012	0.034	0.719	0.031	0.037	0.395	-0.129	0.075	0.087
rs7033940	9	6440419	*UHRF2*	G	C	0.13	0.12	0.98	-0.024	0.004	5E-08	0.099	0.163	0.5441	-0.036	0.051	0.475	-0.037	0.056	0.513	-0.034	0.105	0.743
rs2149163	9	16455833	*BNC2*	G	C	0.40	0.38	0.95	0.02	0.003	2E-11	0.331	0.111	0.0028	-0.014	0.035	0.689	-0.012	0.039	0.762	-0.029	0.076	0.703
rs3927536	9	16787670	*BNC2*	C	T	0.78	0.75	0.90	0.021	0.004	2E-09	0.151	0.128	0.2403	-0.044	0.038	0.243	-0.059	0.042	0.159	0.053	0.086	0.540
rs10962832	9	17048990	*CNTLN*	A	T	0.16	0.15	0.99	-0.024	0.004	4E-08	0.043	0.144	0.7644	-0.006	0.044	0.886	0.005	0.049	0.915	-0.087	0.099	0.379
rs1576900	9	18629792	*ADAMTSL1*	G	A	0.30	0.30	0.91	-0.019	0.003	7E-09	-0.243	0.119	0.0414	0.003	0.037	0.924	0.018	0.040	0.652	-0.101	0.086	0.240
rs3763631	9	35808334	*NPR2/SPA*	C	G	0.31	0.30	1.00	-0.019	0.003	1E-09	-0.167	0.114	0.1429	0.002	0.035	0.952	-0.019	0.039	0.626	0.144	0.076	0.057
rs958225	9	78759705	*PCSK5*	T	A	0.05	0.07	0.50	0.046	0.008	7E-09	-0.058	0.288	0.8402	-0.085	0.088	0.337	-0.071	0.096	0.462	-0.180	0.200	0.367
rs7853235	9	86660782	*RMI1*	T	C	0.80	0.80	0.94	-0.029	0.004	8E-15	-0.409	0.134	0.0023	-0.015	0.042	0.710	-0.010	0.046	0.835	-0.058	0.092	0.533
rs181338	9	89108161	*ZCCHC6*	C	T	0.51	0.51	0.96	0.028	0.003	3E-22	0.194	0.106	0.0675	0.001	0.032	0.971	0.008	0.035	0.828	-0.044	0.071	0.533
rs7043114	9	95387983	*IPPK*	C	T	0.56	0.60	0.70	-0.029	0.003	2E-22	-0.130	0.127	0.3034	0.005	0.040	0.890	0.018	0.044	0.673	-0.087	0.090	0.335
rs1257763	9	96893945	*PTPDC1*	A	G	0.96	0.96	0.72	-0.078	0.01	2E-16	0.135	0.325	0.6792	-0.046	0.099	0.646	0.000	0.113	0.998	-0.296	0.180	0.101

rs12347744	9	97575273	*C9orf3*	C	T	0.07	0.06	0.77	-0.039	0.006	5E-11	-0.725	0.251	0.0039	0.101	0.079	0.204	0.146	0.087	0.093	-0.207	0.184	0.262
rs4448343	9	98266370	*PTCH1*	A	G	0.35	0.34	1.00	0.035	0.003	5E-30	0.166	0.111	0.1337	-0.013	0.034	0.693	-0.008	0.037	0.823	-0.050	0.079	0.523
rs1329393	9	98318926	*PTCH1*	C	T	0.16	0.17	0.71	0.034	0.005	2E-13	-0.127	0.164	0.438	0.039	0.050	0.441	0.025	0.055	0.654	0.135	0.112	0.230
rs817300	9	98380222	*PTCH1*	G	A	0.07	0.06	0.62	-0.085	0.007	4E-34	-0.911	0.269	0.0007	-0.050	0.088	0.567	-0.063	0.097	0.519	0.040	0.178	0.822
rs10990303	9	98410405	*PTCH1*	C	T	0.23	0.22	0.91	0.036	0.004	4E-24	0.163	0.130	0.2102	0.019	0.041	0.640	0.025	0.045	0.584	-0.020	0.088	0.819
rs7870753	9	99201585	*HABP4*	A	G	0.22	0.23	0.98	0.043	0.004	4E-33	0.504	0.128	<.0001	-0.066	0.040	0.093	-0.075	0.044	0.085	-0.007	0.088	0.941
rs989393	9	101743336	*COL15A1*	T	C	0.29	0.29	0.76	-0.022	0.003	3E-11	-0.066	0.132	0.6185	0.003	0.040	0.948	0.008	0.045	0.853	-0.039	0.083	0.643
rs9409082	9	108901049	*TMEM38B*	C	T	0.24	0.25	0.97	-0.028	0.004	9E-15	0.093	0.123	0.4489	0.048	0.036	0.186	0.057	0.040	0.154	-0.011	0.082	0.888
rs902143	9	109181911	*ZNF462*	C	T	0.45	0.42	0.94	0.02	0.003	1E-11	0.052	0.109	0.6322	-0.059	0.033	0.075	-0.068	0.037	0.063	0.002	0.072	0.975
rs7027110	9	109599046	*ZNF462*	G	A	0.23	0.22	0.88	0.032	0.003	2E-20	0.045	0.133	0.7369	-0.017	0.042	0.688	-0.002	0.047	0.957	-0.113	0.091	0.216
rs3739707	9	113792706	*LPAR1*	C	A	0.25	0.29	0.69	-0.024	0.004	4E-12	-0.158	0.140	0.2587	0.016	0.042	0.700	0.045	0.046	0.327	-0.202	0.101	0.044
rs10119624	9	118305438	*1-Dec*	G	A	0.67	0.66	0.97	0.024	0.003	4E-14	0.163	0.111	0.1421	0.017	0.033	0.602	0.029	0.037	0.433	-0.053	0.074	0.473
rs12344396	9	118921327	*PAPPA*	G	C	0.62	0.56	0.71	0.019	0.003	8E-10	-0.016	0.128	0.9031	0.022	0.038	0.568	0.011	0.042	0.797	0.099	0.087	0.257
rs7033487	9	119129257	*PAPPA*	T	C	0.21	0.19	1.00	-0.037	0.004	1E-24	-0.288	0.131	0.028	0.077	0.041	0.061	0.083	0.045	0.068	0.040	0.090	0.657
rs1742829	9	119422807	*ASTN2*	T	A	0.92	0.92	0.99	-0.037	0.006	2E-11	-0.190	0.200	0.3411	-0.018	0.060	0.759	-0.018	0.066	0.781	-0.020	0.129	0.876
rs7466269	9	133464084	*FUBP3*	A	G	0.36	0.38	0.66	-0.033	0.003	1E-27	-0.126	0.132	0.3401	-0.024	0.042	0.568	0.006	0.046	0.892	-0.224	0.093	0.016
rs3132297	9	137301866	*RXRA*	A	G	0.83	0.82	0.90	0.023	0.004	4E-08	0.092	0.146	0.5276	-0.008	0.044	0.859	0.003	0.048	0.954	-0.081	0.098	0.407
rs7849585	9	139111870	*QSOX2*	G	T	0.33	0.32	0.93	0.036	0.003	1E-29	0.112	0.116	0.3348	0.023	0.036	0.521	0.023	0.039	0.556	0.019	0.080	0.810
rs3812591	9	139341612	*SEC16A*	T	C	0.27	0.27	0.99	0.024	0.003	7E-13	0.198	0.119	0.0972	-0.052	0.037	0.162	-0.043	0.040	0.286	-0.113	0.085	0.182
rs4332428	10	4965434	*AKR1C1*	A	G	0.12	0.13	0.72	-0.036	0.005	2E-15	-0.187	0.182	0.3037	-0.016	0.055	0.774	-0.033	0.060	0.577	0.105	0.122	0.390
rs12779328	10	12943973	*CCDC3*	C	T	0.28	0.30	0.94	-0.028	0.003	2E-17	-0.184	0.118	0.1175	-0.080	0.036	0.026	-0.089	0.040	0.026	-0.020	0.076	0.789
rs4350272	10	25056118	*ARHGAP21*	A	G	0.72	0.74	0.85	-0.02	0.003	3E-09	-0.152	0.128	0.2337	0.076	0.039	0.052	0.063	0.042	0.140	0.172	0.092	0.063
rs7069985	10	27890831	*RAB18*	A	G	0.25	0.22	0.94	0.023	0.003	2E-11	-0.010	0.130	0.9395	0.061	0.039	0.117	0.070	0.043	0.105	0.007	0.085	0.938
rs10995319	10	52762887	*PRKG1*	T	C	0.24	0.23	0.96	-0.019	0.003	3E-08	-0.128	0.126	0.3091	-0.038	0.039	0.329	-0.053	0.043	0.221	0.063	0.080	0.430
rs1171615	10	61469090	*SLC16A9*	C	T	0.78	0.81	0.67	-0.022	0.004	6E-09	-0.208	0.163	0.1996	0.022	0.049	0.655	0.013	0.054	0.805	0.080	0.113	0.480
rs10997979	10	69937192	*MYPN*	A	G	0.50	0.47	0.99	0.021	0.003	4E-13	0.317	0.104	0.0024	-0.027	0.033	0.418	-0.022	0.037	0.557	-0.053	0.070	0.454
rs4746769	10	70196580	*DNA2*	T	C	0.14	0.16	0.80	-0.029	0.004	9E-12	0.019	0.162	0.9066	0.034	0.047	0.476	0.006	0.052	0.905	0.205	0.098	0.037
rs1815314	10	80928793	*ZMIZ1*	G	A	0.42	0.41	1.00	-0.022	0.003	5E-14	-0.122	0.105	0.242	-0.011	0.032	0.724	-0.010	0.035	0.780	-0.023	0.071	0.747
rs1923367	10	81132829	*ZCCHC24*	G	C	0.48	0.50	0.92	-0.03	0.003	5E-24	-0.031	0.110	0.7747	0.007	0.034	0.826	-0.016	0.037	0.663	0.176	0.076	0.021
rs2631676	10	93037409	*PCGF5*	A	G	0.19	0.17	0.99	0.028	0.004	5E-13	0.227	0.137	0.0995	0.033	0.043	0.445	0.043	0.047	0.365	-0.034	0.095	0.723
rs915506	10	97805074	*CCNJ*	G	A	0.35	0.35	0.61	-0.021	0.003	1E-11	-0.006	0.139	0.9663	-0.060	0.043	0.163	-0.058	0.047	0.218	-0.070	0.095	0.458
rs11599750	10	101805442	*CPN1*	C	T	0.38	0.39	1.00	-0.023	0.003	3E-14	-0.188	0.106	0.0762	0.001	0.032	0.978	0.018	0.035	0.601	-0.123	0.075	0.102
rs10883563	10	102684380	*FAM178A*	C	A	0.55	0.55	0.88	0.023	0.003	6E-15	0.421	0.112	0.0002	0.001	0.034	0.984	-0.002	0.038	0.955	0.023	0.076	0.765
rs7899004	10	104341435	*SUFU*	T	C	0.44	0.42	0.95	-0.025	0.003	7E-17	-0.065	0.109	0.549	-0.029	0.034	0.387	-0.052	0.038	0.165	0.124	0.074	0.092
rs6584575	10	105577409	*SH3PXD2A*	G	A	0.10	0.11	0.98	0.034	0.005	1E-10	0.145	0.178	0.4166	-0.019	0.051	0.705	-0.026	0.056	0.645	0.019	0.120	0.872
rs291979	10	121129797	*GRK5*	G	A	0.23	0.23	0.92	0.029	0.004	2E-16	0.325	0.130	0.0122	-0.038	0.040	0.340	-0.036	0.044	0.412	-0.058	0.090	0.519
rs1614303	10	123396806	*FGFR2*	G	T	0.83	0.82	1.00	0.022	0.004	6E-09	0.107	0.136	0.4322	0.046	0.042	0.273	0.048	0.046	0.296	0.033	0.093	0.719
rs10794175	10	126358073	*FAM53B*	G	T	0.43	0.44	1.00	0.02	0.003	6E-12	-0.011	0.106	0.9166	0.045	0.032	0.159	0.031	0.035	0.385	0.148	0.075	0.047
rs11245515	10	126824068	*CTBP2*	T	C	0.44	0.44	1.00	-0.017	0.003	9E-09	-0.005	0.105	0.9641	0.012	0.032	0.696	0.012	0.035	0.725	0.012	0.072	0.870
rs11244750	10	127673877	*FANK1*	C	T	0.32	0.35	0.83	0.018	0.003	2E-08	0.188	0.121	0.1199	-0.034	0.038	0.370	-0.038	0.042	0.357	-0.004	0.082	0.958
rs2272566	11	244552	*PSMD13*	A	G	0.52	0.55	0.85	-0.016	0.003	3E-08	-0.049	0.113	0.6626	0.052	0.035	0.137	0.044	0.038	0.255	0.114	0.078	0.147
rs2735469	11	2022804	*MRPL23*	A	G	0.84	0.84	1.00	-0.029	0.005	3E-10	-0.332	0.144	0.0214	0.045	0.044	0.305	0.059	0.048	0.226	-0.050	0.102	0.621
rs4320932	11	2171601	*INS-IGF2*	T	C	0.19	0.21	1.00	-0.029	0.004	2E-12	-0.487	0.129	0.0002	-0.021	0.041	0.598	-0.016	0.045	0.718	-0.055	0.085	0.515
rs17659078	11	2284590	*ASCL2*	C	A	0.27	0.25	1.00	0.021	0.003	6E-10	0.074	0.119	0.5356	0.044	0.037	0.231	0.032	0.040	0.433	0.130	0.087	0.134
rs2237886	11	2810731	*KCNQ1*	C	T	0.11	0.09	0.86	0.043	0.005	5E-18	0.478	0.189	0.0116	0.055	0.059	0.354	0.066	0.065	0.305	-0.032	0.135	0.815
rs6485978	11	12678415	*TEAD1*	T	C	0.46	0.42	0.62	0.023	0.003	1E-15	0.251	0.134	0.0609	0.050	0.041	0.221	0.056	0.045	0.216	0.010	0.094	0.919
rs2099745	11	12924265	*TEAD1*	G	A	0.08	0.06	0.72	-0.036	0.006	2E-09	0.182	0.250	0.4677	-0.135	0.080	0.091	-0.166	0.089	0.061	0.036	0.174	0.838
rs10766065	11	13277961	*ARNTL*	C	T	0.73	0.71	0.97	-0.019	0.003	3E-08	0.027	0.116	0.8188	0.027	0.036	0.440	0.019	0.039	0.637	0.095	0.077	0.219

rs7126398	11	14268729	*SPON1*	G	C	0.08	0.06	0.96	0.041	0.006	3E-12	0.591	0.227	0.0091	-0.074	0.078	0.344	-0.087	0.087	0.318	0.012	0.148	0.934
rs757081	11	17351683	*NUCB2*	C	G	0.34	0.33	0.83	0.024	0.003	8E-15	0.222	0.121	0.0677	0.013	0.038	0.727	0.030	0.041	0.471	-0.097	0.083	0.245
rs10767838	11	30347927	*C11orf46*	A	G	0.28	0.28	0.91	-0.025	0.003	3E-14	-0.275	0.124	0.0263	0.026	0.038	0.494	0.013	0.042	0.748	0.110	0.081	0.172
rs3802758	11	45936035	*PEX16*	G	A	0.94	0.92	0.73	0.039	0.007	2E-09	0.772	0.227	0.0007	-0.011	0.069	0.876	-0.032	0.075	0.667	0.158	0.157	0.314
rs1681630	11	47969152	*PTPRJ*	T	C	0.66	0.69	0.76	-0.029	0.003	2E-20	-0.344	0.129	0.0078	-0.019	0.040	0.642	-0.025	0.044	0.566	0.024	0.085	0.774
rs3782089	11	65336819	*SSSCA1*	C	T	0.06	0.08	0.93	-0.053	0.007	5E-16	-0.283	0.202	0.1606	0.045	0.059	0.445	0.073	0.064	0.256	-0.140	0.142	0.324
rs7112925	11	66826160	*RHOD*	C	T	0.36	0.36	0.95	-0.024	0.003	6E-15	-0.075	0.112	0.5066	-0.071	0.034	0.037	-0.075	0.038	0.045	-0.042	0.076	0.582
rs2510396	11	68417652	*GAL*	G	C	0.86	0.86	0.87	0.029	0.004	9E-12	0.369	0.159	0.02	-0.009	0.049	0.847	-0.018	0.054	0.737	0.055	0.107	0.607
rs3750972	11	68830628	*TPCN2*	T	G	0.48	0.49	0.99	0.019	0.003	1E-09	0.234	0.105	0.0259	0.040	0.032	0.220	0.028	0.036	0.435	0.125	0.070	0.077
rs4357716	11	69163161	*MYEOV*	C	T	0.14	0.14	1.00	0.031	0.005	7E-11	0.284	0.150	0.0579	0.060	0.047	0.206	0.070	0.052	0.180	-0.016	0.099	0.875
rs11236294	11	74739934	*NEU3*	G	T	0.29	0.31	0.62	0.019	0.003	5E-09	-0.012	0.142	0.9328	0.006	0.043	0.884	-0.014	0.048	0.765	0.143	0.096	0.138
rs606452	11	75276178	*SERPINH1*	A	C	0.86	0.82	0.54	-0.043	0.004	2E-23	-0.209	0.185	0.2582	0.061	0.057	0.282	0.096	0.062	0.123	-0.177	0.127	0.163
rs632124	11	118613235	*DDX6*	T	A	0.42	0.41	0.73	0.023	0.003	2E-14	0.055	0.124	0.6578	0.000	0.038	0.999	0.031	0.042	0.457	-0.227	0.085	0.008
rs10790381	11	120257495	*ARHGEF12*	A	G	0.18	0.16	0.57	-0.027	0.004	2E-12	-0.322	0.192	0.0934	0.053	0.059	0.367	0.039	0.065	0.544	0.148	0.132	0.259
rs1461503	11	122845075	*BSX*	A	C	0.57	0.56	1.00	0.018	0.003	5E-10	0.064	0.106	0.5442	0.002	0.033	0.958	0.000	0.036	0.995	0.015	0.071	0.833
rs11221442	11	128577624	*FLI1*	G	C	0.25	0.23	0.53	-0.027	0.004	3E-14	0.003	0.172	0.9872	0.052	0.053	0.330	0.097	0.058	0.097	-0.270	0.118	0.022
rs11612228	12	576984	*B4GALNT3*	C	T	0.38	0.36	1.00	0.02	0.003	7E-10	0.027	0.109	0.8057	0.019	0.034	0.580	0.019	0.038	0.613	0.020	0.073	0.780
rs7299326	12	1573005	*ERC1*	C	T	0.05	0.06	0.86	-0.041	0.007	1E-08	-0.364	0.224	0.1049	0.009	0.069	0.891	-0.004	0.077	0.963	0.094	0.145	0.516
rs2856321	12	11855773	*ETV6*	G	A	0.64	0.66	0.97	-0.031	0.003	8E-24	-0.372	0.111	0.0008	-0.036	0.034	0.283	-0.025	0.037	0.501	-0.114	0.075	0.126
rs1420023	12	12876111	*CDKN1B*	C	G	0.12	0.12	0.94	-0.028	0.005	2E-08	-0.146	0.167	0.3809	0.099	0.052	0.057	0.098	0.057	0.087	0.102	0.111	0.358
rs4326884	12	20536371	*PDE3A*	G	A	0.51	0.51	0.87	0.019	0.003	2E-10	0.014	0.115	0.905	-0.007	0.035	0.832	-0.004	0.039	0.927	-0.039	0.079	0.620
rs11047239	12	24207780	*SOX5*	C	G	0.30	0.28	0.91	0.023	0.003	3E-13	0.153	0.120	0.2052	0.020	0.038	0.601	0.030	0.042	0.475	-0.049	0.079	0.534
rs1861908	12	27997409	*KLHDC5*	C	G	0.80	0.77	1.00	-0.023	0.004	1E-08	-0.069	0.125	0.5795	0.000	0.039	0.991	-0.005	0.043	0.912	0.029	0.089	0.745
rs11049611	12	28600244	*CCDC91*	C	T	0.30	0.28	1.00	-0.038	0.003	3E-32	-0.312	0.116	0.0074	0.127	0.036	0.000	0.138	0.040	0.001	0.051	0.079	0.522
rs12820411	12	28952342	*CCDC91*	G	C	0.32	0.33	0.93	-0.021	0.003	3E-11	-0.189	0.117	0.1052	0.031	0.036	0.386	0.047	0.040	0.241	-0.068	0.077	0.373
rs10843390	12	29496991	*ERGIC2*	C	T	0.29	0.29	0.99	0.021	0.003	5E-11	0.015	0.115	0.8957	-0.028	0.036	0.437	-0.010	0.039	0.794	-0.146	0.083	0.077
rs10880969	12	46827023	*SLC38A2*	T	C	0.70	0.70	0.98	0.024	0.003	6E-13	0.095	0.116	0.4154	0.038	0.035	0.286	0.034	0.039	0.380	0.074	0.082	0.364
rs2306694	12	56680636	*CS*	A	G	0.07	0.06	1.00	0.046	0.006	2E-15	0.183	0.212	0.3884	0.014	0.070	0.844	0.049	0.075	0.516	-0.260	0.177	0.143
rs10877030	12	58256714	*CTDSP2*	T	G	0.32	0.30	0.93	-0.023	0.003	4E-13	-0.254	0.117	0.0299	-0.035	0.036	0.321	-0.026	0.039	0.500	-0.097	0.080	0.225
rs17122659	12	59956923	*SLC16A7*	A	G	0.12	0.10	0.81	0.031	0.005	5E-10	0.312	0.192	0.1036	0.101	0.057	0.076	0.122	0.062	0.050	-0.062	0.128	0.626
rs2164968	12	65677086	*MSRB3*	T	C	0.38	0.36	1.00	0.018	0.003	1E-08	0.000	0.109	0.9995	0.021	0.033	0.513	0.007	0.036	0.848	0.113	0.071	0.114
rs8756	12	66359752	*HMGA2*	C	A	0.51	0.55	1.00	-0.059	0.003	5E-90	-0.524	0.104	<.0001	0.043	0.032	0.187	0.038	0.035	0.284	0.074	0.073	0.309
rs11175992	12	66391396	*HMGA2*	T	A	0.28	0.28	0.64	-0.048	0.004	1E-33	-0.318	0.148	0.0314	0.014	0.045	0.758	0.015	0.049	0.756	0.010	0.103	0.926
rs10748128	12	69827658	*FRS2*	G	T	0.35	0.35	0.64	0.038	0.003	4E-29	0.354	0.136	0.009	-0.051	0.041	0.222	-0.055	0.046	0.229	-0.015	0.093	0.875
rs17783015	12	90231386	*ATP2B1*	C	T	0.16	0.14	0.82	-0.023	0.004	2E-08	-0.053	0.163	0.7453	-0.007	0.050	0.890	-0.029	0.055	0.596	0.135	0.110	0.219
rs11107062	12	93919840	*MRPL42*	C	T	0.21	0.17	0.74	0.028	0.004	1E-11	0.261	0.157	0.0971	0.006	0.049	0.896	0.021	0.054	0.690	-0.105	0.115	0.362
rs3825199	12	93976954	*SOCS2*	A	G	0.23	0.21	1.00	0.051	0.004	4E-49	0.264	0.128	0.0387	-0.006	0.039	0.874	0.003	0.043	0.950	-0.067	0.089	0.454
rs10859567	12	94126925	*CRADD*	T	G	0.44	0.42	0.96	-0.035	0.003	5E-33	-0.160	0.108	0.1377	-0.029	0.033	0.372	-0.025	0.036	0.488	-0.062	0.075	0.404
rs7971536	12	102373788	*CCDC53*	T	A	0.46	0.48	0.63	-0.029	0.003	2E-19	-0.100	0.129	0.437	0.034	0.040	0.390	0.041	0.044	0.351	-0.015	0.092	0.869
rs833706	12	103062597	*PAH*	A	G	0.25	0.25	0.97	-0.021	0.004	3E-09	0.036	0.123	0.7706	-0.016	0.038	0.666	0.003	0.041	0.936	-0.145	0.084	0.083
rs2164747	12	104344836	*HSP90B1*	A	G	0.10	0.12	0.99	0.029	0.005	5E-09	-0.016	0.164	0.9213	-0.062	0.050	0.219	-0.056	0.055	0.310	-0.103	0.113	0.364
rs2888893	12	107338631	*C12orf23*	C	T	0.49	0.54	0.99	-0.017	0.003	9E-09	-0.080	0.106	0.4499	0.014	0.032	0.664	0.009	0.036	0.799	0.044	0.072	0.541
rs11616067	12	116393174	*MED13L*	A	G	0.24	0.23	0.96	-0.021	0.004	8E-09	0.008	0.125	0.9478	0.021	0.037	0.566	-0.005	0.041	0.910	0.197	0.079	0.013
rs4767473	12	117365506	*FBXW8*	G	A	0.86	0.88	0.75	0.025	0.004	3E-08	-0.139	0.186	0.4563	0.006	0.056	0.908	-0.014	0.061	0.817	0.146	0.129	0.256
rs497273	12	121204682	*SPPL3*	C	G	0.62	0.66	0.99	-0.018	0.003	7E-09	-0.123	0.110	0.2621	0.035	0.035	0.319	0.025	0.038	0.522	0.095	0.076	0.215
rs11835818	12	122494809	*BCL7A*	T	C	0.49	0.47	0.62	0.022	0.003	2E-13	0.183	0.133	0.1677	0.004	0.041	0.930	0.015	0.045	0.744	-0.070	0.090	0.437
rs7980687	12	123822711	*SBNO1*	G	A	0.20	0.21	0.97	0.039	0.004	1E-26	0.200	0.129	0.1203	0.003	0.040	0.934	-0.001	0.045	0.989	0.030	0.087	0.731
rs11057552	12	124750895	*FAM101A*	T	A	0.18	0.18	0.99	0.028	0.004	4E-13	0.386	0.136	0.0047	0.071	0.042	0.090	0.068	0.046	0.136	0.093	0.097	0.336

rs1809889	12	124801226	*FAM101A*	T	C	0.71	0.73	0.94	-0.032	0.003	4E-21	-0.367	0.120	0.0023	-0.013	0.038	0.732	0.006	0.042	0.878	-0.136	0.083	0.103
rs1199734	13	21570246	*LATS2*	T	G	0.81	0.80	0.58	0.022	0.004	2E-08	-0.134	0.175	0.4439	0.024	0.052	0.639	0.041	0.057	0.467	-0.110	0.114	0.337
rs11618507	13	30172751	*SLC7A1*	G	T	0.25	0.20	1.00	0.023	0.004	3E-10	0.226	0.128	0.0788	0.065	0.040	0.107	0.072	0.045	0.104	0.023	0.088	0.796
rs12323101	13	33143406	*PDS5B*	G	A	0.37	0.35	1.00	0.021	0.003	1E-11	0.343	0.109	0.0017	0.065	0.034	0.058	0.076	0.037	0.043	-0.012	0.082	0.880
rs12863103	13	33723244	*STARD13*	C	T	0.29	0.30	1.00	-0.019	0.003	2E-09	-0.246	0.115	0.0322	0.056	0.036	0.120	0.040	0.040	0.310	0.163	0.080	0.042
rs7334755	13	50469913	*C13orf1*	C	T	0.19	0.20	1.00	-0.032	0.004	9E-15	-0.092	0.132	0.4868	-0.008	0.040	0.845	-0.005	0.044	0.912	-0.029	0.089	0.740
rs2687950	13	50718468	*KCNRG*	C	T	0.25	0.25	0.87	0.036	0.003	9E-27	0.285	0.128	0.0265	-0.008	0.040	0.837	-0.015	0.045	0.736	0.031	0.084	0.713
rs1753637	13	51084173	*DLEU7*	T	G	0.69	0.71	0.99	-0.036	0.003	1E-29	-0.160	0.116	0.1673	0.004	0.035	0.918	0.016	0.038	0.681	-0.082	0.077	0.285
rs3118905	13	51105334	*DLEU7*	G	A	0.28	0.29	0.97	-0.058	0.003	1E-69	-0.344	0.118	0.0036	0.046	0.036	0.204	0.037	0.040	0.351	0.102	0.076	0.179
rs4883972	13	75058481	*KLF12*	C	G	0.45	0.50	0.73	-0.019	0.003	3E-10	0.031	0.121	0.7951	-0.009	0.036	0.801	-0.024	0.040	0.539	0.097	0.084	0.248
rs3818416	13	78474468	*EDNRB*	A	C	0.77	0.75	0.94	0.021	0.004	2E-09	0.174	0.125	0.1657	0.046	0.039	0.241	0.044	0.043	0.308	0.050	0.087	0.567
rs11616380	13	80705315	*SPRY2*	G	T	0.28	0.29	0.85	0.019	0.003	1E-08	0.202	0.123	0.1006	-0.053	0.039	0.173	-0.034	0.043	0.423	-0.173	0.081	0.032
rs6563199	13	81550449	*SPRY2*	T	C	0.65	0.65	0.92	-0.018	0.003	1E-08	-0.330	0.113	0.0034	0.019	0.035	0.595	0.014	0.039	0.717	0.049	0.078	0.531
rs7319045	13	92024574	*GPC5*	A	G	0.61	0.61	0.92	-0.024	0.003	8E-15	0.042	0.112	0.7107	0.084	0.035	0.017	0.086	0.039	0.027	0.068	0.076	0.372
rs7985356	13	115027462	*CDC16*	T	A	0.23	0.23	1.00	-0.023	0.003	5E-11	-0.081	0.124	0.5128	-0.070	0.038	0.065	-0.085	0.042	0.040	0.030	0.085	0.726
rs8017130	14	23759156	*HOMEZ*	A	G	0.69	0.67	0.80	0.023	0.003	1E-11	0.100	0.125	0.4208	-0.035	0.037	0.350	-0.032	0.042	0.440	-0.053	0.079	0.498
rs1950500	14	24830850	*NFATC4*	T	C	0.70	0.70	0.65	-0.031	0.003	3E-22	-0.250	0.140	0.0738	-0.020	0.044	0.647	-0.012	0.049	0.801	-0.074	0.093	0.424
rs12435366	14	35838389	*NFKBIA*	C	T	0.27	0.23	0.94	-0.023	0.004	5E-11	-0.104	0.129	0.4213	0.056	0.038	0.143	0.072	0.041	0.083	-0.060	0.095	0.528
rs10131337	14	37144516	*PAX9*	C	T	0.24	0.23	0.51	0.027	0.004	3E-12	0.587	0.173	0.0007	0.047	0.052	0.362	0.037	0.057	0.513	0.116	0.115	0.317
rs4901537	14	55203126	*SAMD4A*	G	C	0.74	0.81	0.65	-0.022	0.004	2E-09	0.082	0.164	0.6173	-0.067	0.050	0.180	-0.069	0.055	0.214	-0.061	0.112	0.587
rs11624136	14	59688820	*DAAM1*	G	A	0.50	0.51	0.97	0.018	0.003	2E-09	0.060	0.106	0.5738	-0.005	0.034	0.887	-0.002	0.037	0.958	-0.019	0.074	0.800
rs2093210	14	60957279	*C14orf39*	C	T	0.58	0.58	0.98	-0.039	0.003	3E-35	-0.139	0.107	0.1938	0.024	0.034	0.469	0.025	0.037	0.502	0.029	0.072	0.684
rs2781373	14	65568215	*MAX*	G	A	0.38	0.35	0.63	-0.021	0.003	4E-12	-0.006	0.138	0.9652	0.046	0.043	0.283	0.060	0.047	0.204	-0.045	0.094	0.636
rs1980850	14	68647188	*RAD51L1*	A	G	0.83	0.80	1.00	0.03	0.004	4E-14	0.440	0.133	0.001	-0.024	0.039	0.541	-0.023	0.043	0.587	-0.019	0.085	0.820
rs2058092	14	73932966	*NUMB*	T	C	0.44	0.47	0.71	-0.017	0.003	1E-08	-0.249	0.126	0.0474	0.061	0.039	0.116	0.060	0.043	0.161	0.078	0.086	0.364
rs862034	14	74990746	*LTBP2*	A	G	0.64	0.64	0.78	0.028	0.003	6E-20	0.212	0.123	0.0835	-0.028	0.039	0.460	-0.035	0.042	0.414	0.012	0.086	0.889
rs7154721	14	92427348	*TRIP11*	T	C	0.43	0.43	1.00	-0.027	0.003	5E-20	-0.177	0.105	0.0937	0.005	0.033	0.878	0.017	0.036	0.641	-0.068	0.071	0.344
rs1190545	14	102904179	*KIAA0329*	G	C	0.74	0.74	0.98	0.025	0.003	4E-14	-0.031	0.120	0.7978	-0.039	0.037	0.297	-0.037	0.041	0.370	-0.056	0.086	0.513
rs12882130	14	103878774	*MARK3*	C	G	0.37	0.36	0.63	-0.025	0.003	5E-15	0.050	0.138	0.716	0.001	0.042	0.987	-0.012	0.046	0.794	0.091	0.092	0.328
rs10152739	15	38483866	*SPRED1*	A	T	0.25	0.27	0.99	0.022	0.003	1E-10	0.190	0.120	0.1129	0.001	0.037	0.981	0.022	0.040	0.585	-0.154	0.084	0.068
rs316618	15	41796498	*LTK*	T	A	0.22	0.22	0.97	-0.026	0.004	3E-12	-0.286	0.126	0.0234	-0.002	0.039	0.956	0.022	0.042	0.611	-0.168	0.088	0.056
rs10744956	15	51269629	*AP4E1*	A	G	0.78	0.80	0.98	0.028	0.004	4E-15	-0.091	0.131	0.4889	-0.020	0.039	0.613	-0.024	0.043	0.579	-0.001	0.086	0.994
rs16964211	15	51530495	*CYP19A1*	G	A	0.05	0.06	0.99	-0.057	0.007	1E-15	-0.191	0.227	0.3992	0.027	0.069	0.700	-0.016	0.077	0.835	0.284	0.139	0.041
rs782930	15	61408362	*RORA*	G	A	0.35	0.33	0.93	-0.02	0.003	3E-10	-0.395	0.113	0.0005	0.045	0.034	0.182	0.036	0.037	0.330	0.103	0.072	0.151
rs7177711	15	62379971	*FAM148A*	A	G	0.46	0.44	0.61	-0.021	0.003	5E-13	0.022	0.134	0.8714	0.006	0.041	0.886	0.005	0.045	0.910	0.011	0.096	0.907
rs7162825	15	63439186	*LACTB*	C	T	0.50	0.50	0.98	0.016	0.003	4E-08	0.035	0.105	0.7419	-0.035	0.032	0.279	-0.054	0.035	0.122	0.107	0.076	0.159
rs10152591	15	70048157	*TLE3*	A	C	0.10	0.09	0.96	-0.044	0.005	2E-17	-0.182	0.186	0.3287	0.006	0.060	0.925	0.004	0.067	0.952	0.009	0.125	0.941
rs975210	15	70364352	*TLE3*	G	A	0.18	0.16	1.00	0.035	0.004	1E-17	0.309	0.142	0.03	-0.013	0.045	0.775	0.006	0.050	0.905	-0.144	0.096	0.134
rs11634405	15	72084693	*THSD4*	A	G	0.64	0.62	0.70	-0.02	0.003	4E-10	-0.177	0.130	0.1713	0.058	0.040	0.148	0.060	0.044	0.169	0.036	0.088	0.686
rs12904334	15	72842705	*ARIH1*	G	A	0.02	0.02	0.87	0.084	0.013	4E-11	1.033	0.441	0.0193	-0.053	0.139	0.702	-0.075	0.153	0.623	0.110	0.309	0.722
rs4337252	15	74226765	*LOXL1*	G	C	0.50	0.48	1.00	0.026	0.003	3E-19	0.304	0.103	0.0031	-0.016	0.032	0.624	-0.007	0.036	0.853	-0.083	0.070	0.235
rs5742915	15	74336633	*PML*	T	C	0.47	0.45	1.00	0.035	0.003	2E-29	0.041	0.104	0.6924	-0.013	0.033	0.699	-0.011	0.036	0.750	-0.022	0.072	0.760
rs16968242	15	76740219	*SCAPER*	C	G	0.07	0.07	0.95	0.035	0.006	2E-09	-0.107	0.208	0.6081	0.010	0.064	0.878	0.013	0.071	0.851	-0.021	0.131	0.875
rs12914466	15	81836638	*TMC3*	G	A	0.62	0.60	0.56	0.017	0.003	1E-08	0.135	0.142	0.3436	0.015	0.043	0.726	0.003	0.047	0.955	0.099	0.095	0.298
rs17349981	15	82231920	*MEX3B*	A	T	0.15	0.12	0.63	-0.025	0.004	4E-09	-0.146	0.195	0.4535	0.118	0.061	0.054	0.111	0.067	0.096	0.149	0.141	0.290
rs2257011	15	84266145	*SH3GL3*	G	T	0.50	0.49	0.86	0.044	0.003	1E-47	0.262	0.111	0.0187	-0.023	0.035	0.518	-0.012	0.039	0.762	-0.103	0.076	0.171
rs7162542	15	84514290	*ADAMTSL3*	C	G	0.55	0.57	0.99	0.046	0.003	8E-55	0.290	0.105	0.0056	-0.019	0.032	0.551	-0.002	0.036	0.952	-0.143	0.070	0.042
rs11855014	15	85728834	*PDE8A*	G	A	0.29	0.31	0.83	-0.022	0.003	9E-11	0.124	0.124	0.3201	0.038	0.037	0.301	0.055	0.041	0.176	-0.080	0.084	0.340

rs11633371	15	89356832	*ACAN*	G	T	0.49	0.48	0.96	0.028	0.003	1E-20	0.280	0.106	0.0086	-0.027	0.032	0.401	-0.029	0.036	0.410	-0.013	0.074	0.859
rs16942341	15	89388905	*ACAN*	C	T	0.03	0.03	0.60	-0.138	0.01	3E-43	-1.584	0.403	<.0001	0.255	0.123	0.039	0.226	0.139	0.103	0.415	0.248	0.095
rs3817428	15	89415247	*ACAN*	C	G	0.28	0.22	0.51	-0.039	0.003	2E-31	-0.089	0.172	0.6045	0.144	0.053	0.006	0.149	0.058	0.010	0.112	0.121	0.353
rs2238300	15	89851580	*FANCI*	G	A	0.40	0.38	1.00	-0.021	0.003	2E-12	0.042	0.107	0.6934	-0.004	0.033	0.908	0.004	0.036	0.908	-0.061	0.074	0.408
rs7181724	15	94551607	*MCTP2*	A	G	0.45	0.45	0.68	0.02	0.003	1E-10	-0.051	0.127	0.6884	-0.060	0.040	0.134	-0.063	0.044	0.151	-0.034	0.084	0.682
rs2871865	15	99194896	*IGF1R*	C	G	0.12	0.12	0.89	-0.062	0.005	2E-34	-0.625	0.172	0.0003	-0.044	0.051	0.392	-0.030	0.056	0.589	-0.141	0.115	0.221
rs2573625	15	100513158	*ADAMTS17*	C	T	0.67	0.64	0.77	0.029	0.003	6E-20	0.220	0.127	0.0825	0.023	0.038	0.543	0.021	0.041	0.617	0.034	0.082	0.683
rs4246302	15	100687967	*ADAMTS17*	A	G	0.32	0.31	0.80	0.027	0.003	2E-16	0.148	0.125	0.2363	0.009	0.038	0.819	0.012	0.042	0.776	-0.023	0.082	0.778
rs4548838	15	100761190	*ADAMTS17*	T	C	0.54	0.55	0.94	-0.033	0.003	9E-28	-0.405	0.108	0.0002	-0.011	0.034	0.738	-0.003	0.037	0.932	-0.072	0.073	0.323
rs8042424	15	101762539	*CHSY1*	C	T	0.26	0.24	0.82	-0.023	0.004	8E-11	-0.162	0.135	0.2306	0.001	0.041	0.983	-0.013	0.045	0.773	0.104	0.089	0.245
rs11648796	16	792190	*NARFL*	A	G	0.25	0.29	0.72	0.033	0.004	1E-18	0.135	0.135	0.3206	0.003	0.042	0.938	-0.001	0.047	0.989	0.028	0.092	0.761
rs12597498	16	990815	*LMF1*	C	T	0.37	0.37	0.99	0.018	0.003	8E-09	0.304	0.109	0.0051	0.014	0.033	0.664	0.005	0.036	0.893	0.080	0.074	0.284
rs26868	16	2249376	*CASKIN1*	T	A	0.47	0.41	0.89	0.029	0.003	3E-18	0.199	0.113	0.0786	-0.013	0.035	0.720	-0.026	0.039	0.499	0.072	0.078	0.357
rs2014467	16	2336394	*ABCA3*	T	C	0.34	0.35	0.55	0.019	0.003	2E-09	0.174	0.146	0.2324	-0.002	0.045	0.960	-0.005	0.050	0.925	0.010	0.097	0.914
rs12926008	16	2488211	*CCNF*	T	C	0.69	0.65	0.53	0.02	0.003	3E-10	0.336	0.149	0.0242	0.040	0.045	0.384	0.066	0.050	0.189	-0.143	0.098	0.142
rs129963	16	3796147	*CREBBP*	T	C	0.58	0.54	1.00	0.021	0.003	3E-10	0.065	0.104	0.5305	0.018	0.033	0.589	0.009	0.037	0.815	0.082	0.071	0.246
rs2531992	16	4021734	*ADCY9*	A	G	0.85	0.83	0.78	0.027	0.004	1E-10	0.408	0.161	0.011	-0.061	0.048	0.204	-0.082	0.053	0.121	0.069	0.110	0.527
rs960006	16	4911195	*UBN1*	T	C	0.47	0.47	0.54	0.02	0.003	1E-09	0.067	0.145	0.6427	0.010	0.044	0.813	0.006	0.048	0.903	0.038	0.099	0.706
rs1659127	16	14388305	*MKL2*	G	A	0.34	0.33	1.00	0.03	0.003	3E-19	0.134	0.112	0.2317	-0.011	0.034	0.752	-0.032	0.038	0.402	0.125	0.074	0.088
rs2023693	16	20880040	*DCUN1D3*	A	G	0.60	0.57	0.76	0.017	0.003	2E-08	0.265	0.121	0.0293	0.014	0.038	0.708	0.003	0.042	0.938	0.082	0.086	0.337
rs11642612	16	30030195	*FLJ25404*	A	C	0.40	0.39	1.00	0.016	0.003	4E-08	0.021	0.107	0.8466	-0.013	0.033	0.686	-0.019	0.036	0.603	0.027	0.073	0.711
rs4785393	16	50259483	*PAPD5*	A	G	0.16	0.19	0.93	0.023	0.004	1E-08	-0.246	0.137	0.0726	-0.011	0.042	0.789	-0.023	0.046	0.621	0.074	0.088	0.401
rs8058684	16	53515118	*RBL2*	G	A	0.31	0.32	1.00	0.021	0.003	1E-10	0.061	0.113	0.5915	-0.033	0.035	0.347	-0.043	0.039	0.266	0.049	0.074	0.512
rs1966913	16	67384226	*LRRC36*	A	T	0.04	0.05	0.85	-0.044	0.007	1E-09	-0.572	0.267	0.0321	-0.100	0.083	0.226	-0.119	0.092	0.193	0.032	0.176	0.857
rs3790086	16	69887707	*WWP2*	C	G	0.44	0.42	0.91	-0.023	0.003	3E-15	-0.170	0.110	0.1221	0.039	0.034	0.244	0.049	0.037	0.185	-0.028	0.076	0.712
rs217181	16	72114002	*HPR*	C	T	0.20	0.19	1.00	0.024	0.004	4E-10	0.260	0.131	0.0467	0.067	0.040	0.093	0.077	0.044	0.079	0.001	0.092	0.991
rs11640018	16	75328308	*CFDP1*	T	C	0.37	0.38	0.55	0.019	0.003	2E-09	0.059	0.143	0.6795	0.043	0.046	0.350	0.041	0.051	0.413	0.053	0.092	0.570
rs4243206	16	81589983	*CMIP*	A	C	0.81	0.81	0.61	-0.024	0.004	2E-09	-0.125	0.173	0.4702	0.030	0.053	0.574	0.034	0.059	0.567	0.013	0.113	0.906
rs6420435	16	82184201	*MPHOSPH6*	A	C	0.79	0.75	0.91	-0.023	0.004	3E-10	0.078	0.126	0.5373	-0.036	0.039	0.356	-0.041	0.042	0.334	0.000	0.083	0.996
rs2326458	16	84987679	*ZDHHC7*	C	A	0.75	0.74	0.95	-0.022	0.004	5E-10	-0.166	0.123	0.1768	0.004	0.035	0.911	-0.010	0.039	0.797	0.105	0.086	0.220
rs4843367	16	86417890	*FOXF1*	C	T	0.34	0.36	0.74	-0.019	0.003	2E-09	-0.095	0.125	0.4477	-0.035	0.039	0.370	-0.055	0.044	0.211	0.097	0.082	0.238
rs8052560	16	88777242	*C16orf84*	C	A	0.79	0.80	1.00	0.036	0.004	4E-16	0.129	0.129	0.317	0.023	0.041	0.574	0.032	0.045	0.477	-0.035	0.090	0.697
rs2377058	16	89734831	*C16orf55*	A	G	0.34	0.35	1.00	0.017	0.003	4E-08	0.077	0.108	0.4773	-0.005	0.034	0.874	0.000	0.037	0.998	-0.040	0.072	0.577
rs870183	17	599811	*VPS53*	A	G	0.53	0.54	1.00	0.017	0.003	6E-09	0.036	0.104	0.7303	0.042	0.032	0.199	0.028	0.036	0.433	0.134	0.073	0.065
rs9217	17	7363088	*ZBTB4*	T	C	0.37	0.35	1.00	0.028	0.003	5E-20	0.434	0.109	<.0001	-0.061	0.033	0.067	-0.077	0.037	0.037	0.040	0.075	0.587
rs1625895	17	7578115	*TP53*	T	C	0.88	0.86	0.99	0.03	0.005	4E-10	0.136	0.153	0.3754	-0.025	0.046	0.586	-0.025	0.051	0.623	-0.023	0.102	0.823
rs8067165	17	8031936	*HES7*	C	G	0.60	0.58	1.00	0.023	0.003	7E-12	0.151	0.106	0.1531	0.015	0.033	0.641	0.016	0.036	0.656	0.011	0.070	0.881
rs4640244	17	21284223	*KCNJ12*	A	G	0.39	0.34	0.56	-0.025	0.003	2E-13	0.049	0.149	0.7396	-0.025	0.045	0.579	-0.005	0.049	0.923	-0.161	0.105	0.124
rs3809790	17	27955540	*SSH2*	C	T	0.47	0.46	0.75	-0.016	0.003	5E-08	0.006	0.123	0.9578	0.000	0.036	0.989	-0.009	0.040	0.818	0.069	0.078	0.379
rs3760318	17	29247715	*CENTA2*	G	A	0.37	0.37	1.00	-0.041	0.003	3E-41	-0.384	0.107	0.0003	-0.043	0.033	0.188	-0.045	0.036	0.205	-0.033	0.074	0.657
rs2028067	17	30239698	*UTP6*	T	C	0.17	0.20	0.60	0.031	0.004	8E-16	0.121	0.168	0.4742	0.024	0.050	0.637	0.023	0.055	0.674	0.024	0.113	0.833
rs2338115	17	36929578	*PIP4K2B*	C	T	0.54	0.52	0.71	0.023	0.003	1E-14	-0.312	0.126	0.013	0.002	0.037	0.961	0.022	0.041	0.587	-0.143	0.086	0.096
rs584828	17	38599230	*IGFBP4*	C	T	0.40	0.39	0.68	-0.025	0.003	4E-17	-0.257	0.130	0.0482	0.109	0.040	0.006	0.105	0.043	0.016	0.134	0.091	0.144
rs9766	17	40852841	*EZH1*	G	A	0.54	0.50	0.98	0.021	0.003	9E-13	0.063	0.104	0.5473	0.006	0.033	0.857	0.011	0.036	0.764	-0.023	0.070	0.740
rs4986172	17	43216281	*ACBD4*	C	T	0.35	0.43	0.85	-0.034	0.003	8E-27	-0.364	0.115	0.0016	0.027	0.036	0.459	0.034	0.039	0.392	-0.021	0.080	0.793
rs8073371	17	46096276	*COPZ2*	C	T	0.22	0.20	1.00	-0.025	0.004	4E-12	0.057	0.129	0.6572	-0.095	0.043	0.029	-0.093	0.048	0.054	-0.103	0.092	0.259
rs318095	17	46974734	*ATP5G1*	T	C	0.54	0.52	0.86	-0.024	0.003	2E-16	-0.211	0.113	0.0611	-0.022	0.035	0.530	-0.039	0.038	0.311	0.092	0.078	0.240
rs2072153	17	47390014	*ZNF652*	G	C	0.31	0.32	0.99	0.026	0.003	4E-16	0.168	0.114	0.1415	0.057	0.035	0.105	0.065	0.039	0.091	-0.005	0.079	0.951

rs4605213	17	49244747	*NME1-NME*	G	C	0.34	0.35	0.92	0.018	0.003	8E-09	0.017	0.114	0.8807	0.000	0.035	0.998	0.010	0.039	0.795	-0.071	0.077	0.358
rs11867943	17	54229842	*ANKFN1*	A	T	0.12	0.11	0.96	0.027	0.005	1E-08	0.275	0.170	0.1054	0.118	0.051	0.022	0.110	0.057	0.052	0.182	0.111	0.103
rs1401795	17	54839652	*C17orf67*	A	G	0.49	0.54	0.56	-0.03	0.003	1E-23	-0.072	0.138	0.6023	0.013	0.044	0.759	-0.001	0.048	0.981	0.110	0.101	0.273
rs2079795	17	59496649	*C17orf82*	T	C	0.67	0.67	0.99	-0.045	0.003	2E-46	-0.414	0.111	0.0002	-0.013	0.034	0.705	-0.027	0.037	0.462	0.086	0.077	0.264
rs2378870	17	59638623	*NACA2*	T	C	0.63	0.61	0.98	-0.02	0.003	4E-10	0.165	0.107	0.124	0.025	0.033	0.454	0.031	0.036	0.390	-0.017	0.073	0.811
rs2044124	17	61845425	*CCDC47*	T	C	0.94	0.95	0.91	-0.045	0.007	9E-12	-0.447	0.245	0.0679	0.187	0.079	0.018	0.177	0.087	0.042	0.272	0.174	0.118
rs2854207	17	61947107	*CSH2*	C	G	0.27	0.26	0.92	0.046	0.003	1E-42	0.200	0.123	0.1051	0.022	0.037	0.558	0.026	0.041	0.522	0.005	0.085	0.952
rs2070776	17	62007498	*CD79B*	A	G	0.65	0.66	1.00	0.042	0.003	6E-41	0.382	0.109	0.0005	-0.064	0.034	0.059	-0.052	0.038	0.166	-0.146	0.077	0.056
rs3923086	17	63549488	*AXIN2*	A	C	0.60	0.54	1.00	0.024	0.003	5E-13	0.400	0.106	0.0002	-0.032	0.032	0.318	-0.031	0.035	0.374	-0.032	0.072	0.660
rs2072268	17	66303352	*ARSG*	G	A	0.48	0.52	0.72	-0.02	0.003	1E-10	-0.248	0.123	0.0426	-0.004	0.037	0.916	0.000	0.041	0.996	-0.035	0.083	0.676
rs11867479	17	68090207	*KCNJ16*	C	T	0.35	0.33	0.97	0.026	0.003	2E-16	0.323	0.112	0.0038	-0.013	0.034	0.692	-0.032	0.037	0.393	0.118	0.080	0.141
rs10083886	17	69923355	*SOX9*	C	T	0.26	0.27	0.99	0.019	0.003	7E-09	0.157	0.118	0.1861	0.012	0.036	0.734	0.022	0.039	0.578	-0.050	0.085	0.553
rs2117563	17	73368985	*GRB2*	A	G	0.83	0.81	0.94	0.024	0.004	1E-09	0.442	0.140	0.0016	0.059	0.042	0.165	0.074	0.047	0.114	-0.042	0.091	0.642
rs1552173	17	76718842	*PSCD1*	C	T	0.54	0.53	0.60	-0.018	0.003	8E-10	-0.035	0.137	0.8002	-0.006	0.040	0.871	-0.024	0.044	0.580	0.122	0.094	0.192
rs1478610	17	79422252	*BAHCC1*	G	A	0.37	0.37	0.60	0.025	0.004	9E-10	-0.063	0.140	0.6533	-0.031	0.043	0.473	-0.026	0.047	0.583	-0.071	0.096	0.457
rs888403	18	2766938	*SMCHD1*	A	G	0.36	0.30	0.54	0.019	0.003	9E-09	-0.200	0.153	0.1906	-0.002	0.047	0.963	-0.012	0.052	0.814	0.069	0.103	0.502
rs692964	18	13094132	*CEP192*	G	A	0.60	0.63	0.73	-0.019	0.003	2E-10	-0.137	0.125	0.275	0.009	0.039	0.828	-0.012	0.043	0.785	0.154	0.093	0.097
rs14062	18	19450303	*MIB1*	A	G	0.67	0.69	0.87	0.018	0.003	8E-09	0.046	0.121	0.7023	0.000	0.037	0.991	-0.011	0.041	0.793	0.083	0.080	0.298
rs4369779	18	20735408	*CABLES1*	T	C	0.79	0.81	0.96	0.056	0.004	2E-53	0.486	0.135	0.0003	-0.026	0.042	0.540	-0.054	0.046	0.238	0.172	0.096	0.074
rs11661645	18	45888770	*KIAA0427*	G	A	0.31	0.32	0.90	0.02	0.003	5E-10	0.180	0.119	0.1285	-0.039	0.036	0.274	-0.026	0.039	0.500	-0.138	0.085	0.104
rs2337143	18	46482070	*SMAD7*	A	G	0.65	0.66	0.77	-0.018	0.003	3E-08	-0.417	0.124	0.0008	0.025	0.039	0.519	0.023	0.042	0.586	0.041	0.086	0.632
rs12458127	18	46657358	*DYM*	C	T	0.08	0.06	0.77	-0.057	0.006	1E-21	-0.399	0.251	0.1127	-0.152	0.081	0.062	-0.148	0.090	0.099	-0.182	0.169	0.281
rs9967417	18	46959500	*DYM*	G	C	0.57	0.60	0.73	-0.04	0.003	2E-40	-0.278	0.125	0.0257	-0.011	0.037	0.767	0.010	0.041	0.802	-0.160	0.082	0.053
rs11152213	18	57852948	*MC4R*	A	C	0.25	0.23	0.99	0.025	0.004	7E-13	0.373	0.123	0.0025	-0.040	0.039	0.307	-0.058	0.044	0.187	0.066	0.082	0.417
rs8097893	18	74983055	*GALR1*	A	G	0.05	0.04	0.51	-0.042	0.007	5E-10	0.340	0.374	0.3623	0.124	0.110	0.260	0.142	0.123	0.250	0.030	0.220	0.891
rs11659752	18	77222862	*NFATC1*	T	G	0.30	0.30	0.82	-0.024	0.003	6E-13	0.044	0.124	0.7234	-0.003	0.039	0.937	0.029	0.042	0.493	-0.235	0.085	0.006
rs11880992	19	2176403	*DOT1L*	G	A	0.40	0.42	0.95	0.033	0.003	7E-28	0.081	0.108	0.4525	-0.014	0.034	0.688	-0.019	0.037	0.612	0.024	0.077	0.755
rs2074977	19	3434028	*NFIC*	A	C	0.36	0.35	1.00	0.029	0.003	2E-20	-0.118	0.108	0.2768	0.006	0.034	0.856	-0.012	0.037	0.745	0.134	0.077	0.083
rs2123731	19	4929473	*UHRF1*	A	G	0.27	0.27	0.70	-0.023	0.004	2E-11	-0.302	0.138	0.0293	-0.033	0.044	0.457	-0.025	0.048	0.608	-0.082	0.095	0.389
rs891088	19	7184762	*INSR*	A	G	0.26	0.27	0.83	0.029	0.003	7E-18	0.243	0.131	0.0633	0.015	0.041	0.719	0.040	0.045	0.367	-0.172	0.095	0.070
rs1346490	19	7244233	*INSR*	A	C	0.39	0.43	0.71	-0.018	0.003	1E-08	-0.003	0.125	0.9828	0.043	0.037	0.245	0.036	0.041	0.381	0.087	0.081	0.285
rs8102380	19	10801185	*ILF3*	G	A	0.69	0.64	0.61	-0.02	0.003	8E-11	-0.110	0.137	0.4207	0.035	0.043	0.411	0.026	0.047	0.583	0.103	0.095	0.278
rs7259684	19	12186611	*LOC72974*	A	G	0.07	0.09	0.91	0.035	0.006	4E-08	0.158	0.197	0.4241	-0.117	0.063	0.061	-0.118	0.070	0.090	-0.110	0.129	0.394
rs8103068	19	17522869	*BST2*	T	C	0.14	0.15	0.79	-0.031	0.005	2E-11	-0.302	0.172	0.0796	-0.055	0.050	0.272	-0.075	0.055	0.176	0.069	0.109	0.527
rs10401193	19	19591066	*GATAD2A*	A	G	0.18	0.17	0.99	-0.028	0.004	9E-14	0.065	0.137	0.6347	0.036	0.043	0.407	0.024	0.048	0.622	0.114	0.094	0.226
rs8103992	19	19665643	*PBX4*	A	C	0.80	0.78	0.98	-0.029	0.004	1E-14	0.069	0.129	0.593	0.011	0.040	0.787	0.046	0.044	0.299	-0.228	0.088	0.009
rs7253628	19	31047269	*ZNF536*	A	G	0.16	0.15	0.98	0.024	0.004	2E-09	0.222	0.145	0.1262	-0.041	0.045	0.356	-0.061	0.049	0.219	0.089	0.096	0.357
rs4802134	19	38346685	*SIPA1L3*	A	G	0.79	0.75	1.00	-0.027	0.004	3E-11	-0.088	0.122	0.4689	-0.018	0.036	0.612	-0.010	0.040	0.810	-0.074	0.077	0.336
rs4803468	19	41922352	*BCKDHA*	A	G	0.58	0.59	0.77	-0.03	0.003	2E-21	-0.057	0.122	0.6418	-0.025	0.037	0.504	-0.047	0.041	0.257	0.121	0.083	0.146
rs11880124	19	42683791	*DEDD2*	A	G	0.09	0.09	0.94	-0.041	0.005	2E-14	-0.649	0.189	0.0006	0.073	0.055	0.185	0.074	0.061	0.223	0.063	0.128	0.623
rs2682587	19	44082429	*XRCC1*	C	A	0.20	0.18	1.00	0.023	0.004	2E-09	-0.057	0.134	0.672	-0.057	0.042	0.171	-0.057	0.046	0.211	-0.056	0.091	0.541
rs7273787	20	4098567	*SMOX*	A	G	0.35	0.30	0.57	0.022	0.003	3E-12	0.027	0.149	0.8556	0.007	0.045	0.876	0.008	0.050	0.879	0.004	0.100	0.968
rs17721822	20	6469596	*BMP2*	G	A	0.37	0.35	0.94	-0.035	0.003	3E-29	-0.135	0.113	0.2319	-0.038	0.035	0.281	-0.038	0.038	0.327	-0.036	0.080	0.654
rs1884897	20	6612832	*BMP2*	A	G	0.64	0.62	0.80	-0.044	0.003	1E-48	-0.484	0.120	<.0001	-0.051	0.037	0.175	-0.036	0.041	0.381	-0.163	0.081	0.043
rs6080830	20	17771113	*BANF2*	A	G	0.44	0.43	0.68	-0.016	0.003	4E-08	-0.087	0.127	0.4949	-0.080	0.039	0.041	-0.098	0.043	0.023	0.048	0.084	0.569
rs7261425	20	20068635	*C20orf26*	C	G	0.29	0.29	0.70	-0.021	0.003	2E-10	-0.176	0.136	0.1952	-0.043	0.042	0.299	-0.045	0.046	0.330	-0.035	0.094	0.709
rs6137287	20	21180259	*C20orf19*	C	T	0.31	0.28	0.95	0.02	0.003	4E-10	0.184	0.118	0.12	0.041	0.036	0.265	0.049	0.040	0.224	-0.019	0.085	0.821
rs1074683	20	32304653	*PXMP4*	C	G	0.24	0.24	0.97	-0.044	0.003	8E-38	0.010	0.123	0.9379	0.036	0.037	0.337	0.027	0.042	0.516	0.094	0.078	0.227

rs1535466	20	33718706	*EDEM2*	G	A	0.73	0.75	1.00	-0.027	0.003	3E-16	-0.285	0.118	0.0161	-0.063	0.038	0.094	-0.068	0.042	0.104	-0.036	0.079	0.643
rs143384	20	34025756	*GDF5*	A	G	0.42	0.43	0.86	0.075	0.003	1E-121	0.387	0.112	0.0006	0.052	0.035	0.129	0.052	0.038	0.171	0.053	0.078	0.497
rs2425163	20	34432670	*PHF20*	A	G	0.18	0.19	0.98	0.058	0.004	3E-52	0.307	0.131	0.0193	0.048	0.041	0.247	0.062	0.045	0.170	-0.043	0.092	0.641
rs4812586	20	35544673	*SAMHD1*	A	G	0.16	0.14	1.00	-0.03	0.004	9E-14	0.106	0.151	0.4842	0.018	0.046	0.700	0.033	0.051	0.519	-0.075	0.099	0.446
rs2224538	20	38552078	*MAFB*	T	C	0.35	0.36	0.87	-0.017	0.003	2E-08	-0.028	0.116	0.8106	-0.039	0.037	0.298	-0.064	0.041	0.119	0.121	0.078	0.122
rs17450430	20	47772264	*STAU1*	A	T	0.24	0.25	0.67	0.035	0.003	2E-24	0.211	0.146	0.1492	-0.008	0.045	0.853	-0.010	0.050	0.840	0.003	0.100	0.980
rs6020202	20	48634821	*SNAI1*	G	A	0.22	0.24	1.00	-0.022	0.004	8E-10	0.025	0.124	0.8414	-0.017	0.038	0.651	-0.010	0.041	0.817	-0.067	0.085	0.428
rs1326023	20	54842378	*MC3R*	A	G	0.70	0.69	1.00	-0.024	0.003	1E-13	0.115	0.114	0.3154	-0.027	0.036	0.454	-0.030	0.039	0.445	-0.006	0.077	0.937
rs2057291	20	57472043	*GNAS*	A	G	0.66	0.66	0.54	-0.02	0.003	2E-10	0.134	0.150	0.3703	0.007	0.044	0.872	0.006	0.049	0.904	0.019	0.104	0.852
rs3026499	20	57948773	*EDN3*	G	A	0.33	0.32	0.59	-0.026	0.005	5E-08	-0.157	0.146	0.2832	-0.056	0.045	0.209	-0.066	0.049	0.179	0.005	0.098	0.963
rs6061231	20	60956917	*RPS21*	C	A	0.28	0.28	1.00	-0.021	0.003	1E-10	0.189	0.116	0.1029	0.014	0.037	0.695	0.021	0.041	0.608	-0.026	0.074	0.730
rs2829941	21	27208935	*APP*	G	T	0.61	0.59	0.90	0.017	0.003	3E-08	0.113	0.112	0.3141	-0.006	0.035	0.860	-0.027	0.038	0.487	0.135	0.073	0.067
rs2834442	21	35690786	*KCNE2*	T	A	0.64	0.66	0.98	0.024	0.003	4E-15	0.231	0.112	0.039	0.019	0.034	0.565	0.015	0.037	0.692	0.049	0.078	0.531
rs2211866	21	39688107	*KCNJ15*	A	G	0.59	0.59	0.96	-0.022	0.003	4E-13	-0.077	0.108	0.4755	-0.015	0.033	0.659	-0.013	0.037	0.728	-0.029	0.073	0.695
rs9977276	21	47436327	*COL6A1*	T	G	0.78	0.79	1.00	0.022	0.004	3E-10	-0.113	0.128	0.3756	-0.007	0.039	0.858	0.007	0.042	0.878	-0.109	0.083	0.190
rs7284476	22	38129332	*TRIOBP*	G	A	0.43	0.41	0.76	0.018	0.003	6E-09	0.067	0.122	0.5793	0.056	0.038	0.143	0.061	0.042	0.144	0.017	0.086	0.842
rs5757318	22	39275656	*CBX6*	A	T	0.15	0.15	0.70	0.029	0.005	2E-09	0.150	0.173	0.3846	-0.024	0.055	0.670	-0.039	0.061	0.525	0.075	0.118	0.528
rs738288	22	39907661	*SMCR7L*	G	A	0.53	0.57	0.85	-0.02	0.003	6E-11	-0.030	0.116	0.7953	0.039	0.036	0.285	0.050	0.040	0.209	-0.044	0.082	0.587

CIMBA: The Consortium of Investigators of Modifiers of *BRCA1/2*; GWAS: genome-wide association studies

Notes:

[1] Imputation quality of 1 indicates genotyped SNPs.

[2] Effect estimate after height standardization.

[3] *P*-values were calculated using student's *t*-test. All *P*-values are two-sided.

[4] Association with ovarian cancer were estamated using weighted Cox models that adjusted for principal components, birth cohort, menopausal status, country of enrollment and mutation status.

[5] *P*-values were calculated using chi-squared test. All *P*-values are two-sided.

Supplementary Table 2. List of 93 BMI-associated genetic variants and their associations with BMI in prior published GWAS and in CIMBA, along with effect on ovarian cancer risk in CIMBA

Rsid #	Chromosome	Position	Nearest gene	Reference allele	Effect allele	Effect allele frequency in published GWAS	Effect allele frequency in CIMBA	Imputation quality[1]	Published association with BMI			Association with BMI in CIMBA			Association with ovarian cancer in CIMBA			Association with ovarian cancer in *BRCA1*carriers			Association with ovarian cancer in *BRCA2*carriers		
									Beta[2]	SE	*P*-value[3]	Beta, Kg/m^2[2]	SE	*P*-value[3]	Log Hazard Ratio[4]	SE	*P*-value[5]	Log Hazard Ratio[4]	SE	*P*-value[5]	Log Hazard Ratio[4]	SE	*P*-value[5]
rs977747	1	47684677	*TAL1*	T	G	0.61	0.61	0.97	-0.017	0.003	8.7E-08	-0.164	0.085	0.0544	0.005	0.033	0.8834	0.000	0.036	0.9948	0.036	0.071	0.6140
rs657452	1	49589847	*AGBL4*	A	G	0.61	0.62	0.93	-0.023	0.003	5.5E-13	-0.108	0.087	0.214	-0.047	0.033	0.1596	-0.046	0.037	0.2092	-0.053	0.073	0.4694
rs11583200	1	50559820	*ELAVL4*	C	T	0.60	0.61	0.88	-0.018	0.003	1.5E-08	-0.167	0.090	0.0622	-0.024	0.035	0.4898	-0.005	0.039	0.9060	-0.162	0.074	0.0275
rs3101336	1	72751185	*NEGR1*	T	C	0.61	0.64	1.00	0.033	0.003	2.7E-26	0.141	0.085	0.0972	-0.025	0.033	0.4576	-0.042	0.037	0.2464	0.100	0.077	0.1982
rs12566985	1	75002193	*FPGT*	G	A	0.55	0.57	0.99	-0.024	0.003	3.3E-15	-0.272	0.082	0.0009	-0.053	0.032	0.0946	-0.075	0.035	0.0329	0.085	0.067	0.2055
rs12401738	1	78446761	*FUBP1*	G	A	0.35	0.33	0.81	0.021	0.003	1.2E-10	0.106	0.096	0.2704	0.038	0.039	0.3234	0.060	0.042	0.1597	-0.115	0.089	0.1964
rs11165643	1	96924097	*PTBP2*	C	T	0.58	0.59	0.68	0.022	0.003	2.1E-12	0.172	0.101	0.0905	0.004	0.040	0.9221	0.021	0.044	0.6390	-0.106	0.083	0.2023
rs17024393	1	110154688	*GNAT2*	T	C	0.04	0.03	0.98	0.066	0.009	7.0E-14	0.456	0.253	0.0714	-0.146	0.093	0.1181	-0.171	0.101	0.0914	0.048	0.229	0.8323
rs543874	1	177889480	*SEC16B*	A	G	0.19	0.18	1.00	0.048	0.004	2.6E-35	0.286	0.104	0.006	0.046	0.042	0.2717	0.050	0.046	0.2810	0.028	0.089	0.7563
rs2820292	1	201784287	*NAV1*	A	C	0.56	0.54	0.94	0.020	0.003	1.8E-10	0.281	0.086	0.001	-0.017	0.033	0.6073	-0.015	0.036	0.6704	-0.027	0.075	0.7189
rs13021737	2	632348	*TMEM18*	A	G	0.83	0.81	0.99	0.060	0.004	1.1E-50	0.479	0.106	<.0001	0.020	0.042	0.6332	0.026	0.046	0.5688	-0.027	0.091	0.7695
rs10182181	2	25150296	*ADCY3*	A	G	0.46	0.45	0.64	0.031	0.003	8.8E-24	0.191	0.104	0.067	0.013	0.041	0.7565	0.031	0.046	0.4987	-0.105	0.094	0.2669
rs11126666	2	26928811	*KCNK3*	G	A	0.28	0.25	0.54	0.021	0.003	1.3E-09	-0.033	0.130	0.8018	-0.001	0.050	0.9775	-0.004	0.056	0.9366	0.014	0.111	0.9001
rs1016287	2	59305625	*LINC011*	T	C	0.71	0.70	0.93	-0.023	0.003	2.3E-11	-0.105	0.092	0.2527	0.028	0.037	0.4436	0.033	0.040	0.4134	-0.010	0.081	0.9066
rs11688816	2	63053048	*EHBP1*	G	A	0.48	0.50	1.00	-0.017	0.003	1.9E-08	0.040	0.082	0.6282	0.009	0.033	0.7753	0.011	0.036	0.7513	-0.008	0.072	0.9121
rs2121279	2	143043285	*LRP1B*	C	T	0.15	0.12	0.83	0.024	0.004	2.3E-08	-0.102	0.137	0.4584	-0.018	0.053	0.7381	-0.029	0.059	0.6225	0.051	0.115	0.6543
rs1460676	2	164567689	*FIGN*	T	C	0.17	0.17	1.00	0.020	0.004	9.0E-07	0.018	0.112	0.8689	0.080	0.041	0.0502	0.104	0.045	0.0201	-0.092	0.097	0.3433
rs1528435	2	181550962	*UBE2E3*	C	T	0.63	0.62	0.88	0.018	0.003	1.2E-08	0.111	0.089	0.2112	0.030	0.036	0.4070	0.021	0.040	0.5925	0.083	0.074	0.2658
rs17203016	2	208255518	*CREB1*	A	G	0.20	0.18	0.90	0.021	0.004	8.2E-08	-0.236	0.112	0.0352	0.064	0.044	0.1464	0.070	0.048	0.1450	0.014	0.096	0.8874
rs7599312	2	213413231	*ERBB4*	G	A	0.28	0.27	0.88	-0.022	0.003	1.2E-10	0.092	0.098	0.3483	0.052	0.039	0.1736	0.048	0.042	0.2630	0.078	0.085	0.3558
rs492400	2	219349752	*USP37*	C	T	0.58	0.59	0.86	-0.016	0.003	4.2E-07	-0.216	0.090	0.0168	-0.004	0.036	0.9139	0.000	0.039	0.9940	-0.035	0.082	0.6667
rs2176040	2	227092802	*LOC6467*	A	G	0.63	0.64	1.00	-0.014	0.003	6.1E-06	0.003	0.086	0.9706	0.024	0.034	0.4749	0.025	0.037	0.5054	0.023	0.076	0.7617
rs6804842	3	25106437	*RARB*	A	G	0.57	0.58	0.58	0.019	0.003	2.5E-09	-0.050	0.109	0.6453	0.087	0.044	0.0461	0.099	0.048	0.0398	0.004	0.090	0.9627
rs2365389	3	61236462	*FHIT*	C	T	0.42	0.41	0.96	-0.020	0.003	1.6E-10	-0.101	0.085	0.2358	0.022	0.033	0.5041	0.015	0.037	0.6915	0.076	0.072	0.2916

rs3849570	3	81792112	*GBE1*	C	A	0.36	0.30	0.84	0.019	0.003	2.6E-08	0.117	0.097	0.2271	-0.039	0.038	0.3032	-0.060	0.042	0.1533	0.109	0.086	0.2055
rs13078960	3	85807590	*CADM2*	T	G	0.20	0.20	0.91	0.030	0.004	1.7E-14	0.071	0.107	0.5102	-0.079	0.042	0.0585	-0.069	0.046	0.1302	-0.136	0.096	0.1552
rs16851483	3	141275436	*RASA2*	G	T	0.07	0.07	1.00	0.048	0.008	3.6E-10	-0.141	0.163	0.3871	-0.203	0.068	0.0030	-0.204	0.075	0.0068	-0.188	0.148	0.2033
rs1516725	3	185824004	*ETV5*	T	C	0.87	0.86	0.88	0.045	0.005	1.9E-22	-0.071	0.127	0.5764	0.043	0.050	0.3829	0.053	0.055	0.3376	-0.020	0.108	0.8511
rs10938397	4	45182527	*GNPDA2*	A	G	0.43	0.43	1.00	0.040	0.003	3.2E-38	0.302	0.083	0.0003	0.004	0.033	0.8913	0.016	0.036	0.6491	-0.076	0.073	0.2982
rs17001654	4	77129568	*SCARB2*	C	G	0.15	0.17	0.75	0.031	0.005	7.8E-09	0.044	0.128	0.7285	0.019	0.048	0.6883	0.021	0.053	0.6881	0.006	0.106	0.9567
rs13107325	4	103188709	*SLC39A8*	C	T	0.07	0.09	0.76	0.048	0.007	1.8E-12	0.163	0.171	0.3384	0.035	0.067	0.6061	0.031	0.074	0.6751	0.056	0.150	0.7092
rs11727676	4	145659064	*HHIP*	T	C	0.09	0.09	0.68	-0.036	0.006	2.6E-08	-0.055	0.172	0.751	0.060	0.064	0.3526	0.059	0.070	0.4042	0.066	0.159	0.6756
rs2112347	5	75015242	*POC5*	T	G	0.37	0.37	0.99	-0.026	0.003	6.2E-17	-0.239	0.085	0.0052	-0.008	0.033	0.8196	0.013	0.037	0.7139	-0.158	0.076	0.0369
rs7715256	5	153537893	*GALNT10*	G	T	0.58	0.56	0.99	-0.016	0.003	1.7E-07	-0.167	0.083	0.0449	-0.049	0.033	0.1373	-0.049	0.036	0.1770	-0.051	0.071	0.4782
rs205262	6	34563164	*C6orf10*	A	G	0.27	0.28	1.00	0.022	0.004	1.8E-10	0.185	0.091	0.0419	-0.015	0.036	0.6817	-0.017	0.039	0.6608	0.003	0.078	0.9739
rs2033529	6	40348653	*TDRG1*	A	G	0.29	0.30	0.63	0.019	0.003	1.4E-08	-0.015	0.113	0.8912	-0.040	0.045	0.3724	-0.034	0.049	0.4949	-0.077	0.098	0.4344
rs2207139	6	50845490	*TFAP2B*	A	G	0.18	0.16	0.99	0.045	0.004	4.1E-29	0.170	0.110	0.1224	0.120	0.043	0.0050	0.146	0.047	0.0019	-0.057	0.094	0.5439
rs9400239	6	108977663	*FOXO3*	T	C	0.69	0.70	0.97	0.019	0.003	1.6E-08	0.105	0.091	0.2458	0.016	0.035	0.6492	0.024	0.039	0.5304	-0.036	0.075	0.6292
rs9374842	6	120185665	*LOC2857*	C	T	0.75	0.77	0.89	0.019	0.004	9.7E-08	0.055	0.105	0.6025	0.021	0.040	0.5949	0.018	0.044	0.6728	0.040	0.089	0.6523
rs13191362	6	163033350	*PARK2*	A	G	0.12	0.12	0.91	-0.028	0.005	7.3E-09	-0.026	0.131	0.8453	0.022	0.052	0.6650	0.054	0.057	0.3383	-0.192	0.117	0.1001
rs1167827	7	75163169	*HIP1*	A	G	0.55	0.58	1.00	0.020	0.003	6.3E-10	-0.077	0.084	0.3553	-0.010	0.032	0.7688	0.006	0.036	0.8681	-0.110	0.072	0.1268
rs9641123	7	93197732	*CALCR*	G	C	0.43	0.41	1.00	0.019	0.004	5.0E-07	0.266	0.084	0.0016	0.014	0.031	0.6584	0.003	0.035	0.9228	0.082	0.069	0.2323
rs6465468	7	95169514	*ASB4*	G	T	0.30	0.26	0.65	0.017	0.004	2.3E-06	0.031	0.117	0.7881	-0.074	0.046	0.1082	-0.076	0.051	0.1339	-0.056	0.099	0.5758
rs17405819	8	76806584	*HNF4G*	T	C	0.30	0.31	0.97	-0.022	0.003	2.1E-11	-0.203	0.089	0.023	-0.010	0.035	0.7822	-0.020	0.039	0.6132	0.054	0.074	0.4689
rs16907751	8	81375457	*ZBTB10*	C	T	0.08	0.12	0.79	-0.035	0.007	1.3E-07	-0.187	0.145	0.1977	-0.027	0.056	0.6278	-0.052	0.063	0.4017	0.131	0.118	0.2670
rs2033732	8	85079709	*RALYL*	T	C	0.75	0.75	0.72	0.019	0.004	4.9E-08	0.068	0.112	0.5437	-0.088	0.042	0.0369	-0.047	0.047	0.3162	-0.345	0.088	<.0001
rs4740619	9	15634326	*C9orf93*	T	C	0.46	0.46	0.97	-0.018	0.003	4.6E-09	-0.065	0.083	0.4323	0.034	0.034	0.3128	0.032	0.037	0.3994	0.051	0.072	0.4843
rs10968576	9	28414339	*LINGO2*	A	G	0.32	0.30	0.99	0.025	0.003	6.6E-14	0.098	0.089	0.2701	0.048	0.035	0.1739	0.056	0.039	0.1475	-0.004	0.080	0.9639
rs6477694	9	111932342	*EPB41L4*	C	T	0.63	0.67	0.97	-0.017	0.003	2.7E-08	-0.152	0.088	0.0851	-0.042	0.034	0.2077	-0.042	0.037	0.2565	-0.045	0.071	0.5226
rs1928295	9	120378483	*TLR4*	T	C	0.45	0.45	0.91	-0.019	0.003	7.9E-10	-0.139	0.087	0.1099	-0.047	0.034	0.1612	-0.041	0.037	0.2647	-0.084	0.077	0.2744
rs10733682	9	129460914	*LMX1B*	A	G	0.52	0.51	0.83	-0.017	0.003	1.8E-08	-0.070	0.091	0.4389	0.026	0.036	0.4748	0.029	0.039	0.4533	0.002	0.080	0.9764
rs7899106	10	87410904	*GRID1*	A	G	0.05	0.05	0.95	0.040	0.007	3.0E-08	0.084	0.191	0.6602	0.097	0.075	0.1964	0.126	0.081	0.1228	-0.132	0.176	0.4525

rs17094222	10	102395440	*HIF1AN*	T	C	0.21	0.22	0.74	0.025	0.004	5.9E-11	0.140	0.114	0.219	-0.019	0.044	0.6750	-0.020	0.049	0.6898	-0.012	0.097	0.8987
rs11191560	10	104869038	*NT5C2*	T	C	0.09	0.09	0.86	0.031	0.005	8.5E-09	0.029	0.160	0.8581	-0.113	0.061	0.0636	-0.123	0.067	0.0655	-0.051	0.136	0.7070
rs7903146	10	114758349	*TCF7L2*	C	T	0.29	0.30	1.00	-0.023	0.003	1.1E-11	-0.151	0.089	0.0896	-0.061	0.034	0.0746	-0.061	0.038	0.1055	-0.061	0.074	0.4080
rs4256980	11	8673939	*TRIM66*	C	G	0.65	0.64	1.00	0.021	0.003	2.9E-11	0.093	0.086	0.2804	-0.041	0.033	0.2173	-0.038	0.036	0.2930	-0.060	0.074	0.4214
rs11030104	11	27684517	*BDNF*	A	G	0.21	0.23	0.99	-0.041	0.004	5.6E-28	-0.369	0.098	0.0002	0.039	0.039	0.3073	0.068	0.042	0.1101	-0.147	0.085	0.0850
rs2176598	11	43864278	*HSD17B1*	T	C	0.75	0.74	0.98	-0.020	0.004	3.0E-08	0.049	0.095	0.6044	0.013	0.037	0.7153	0.028	0.041	0.4975	-0.081	0.075	0.2791
rs3817334	11	47650993	*MTCH2*	C	T	0.41	0.43	0.75	0.026	0.003	5.2E-17	0.170	0.097	0.0781	0.034	0.037	0.3547	0.036	0.040	0.3671	0.019	0.084	0.8219
rs12286929	11	115022404	*CADM1*	A	G	0.52	0.51	0.72	0.022	0.003	1.3E-12	-0.001	0.097	0.9879	-0.056	0.038	0.1402	-0.055	0.042	0.1948	-0.069	0.081	0.3895
rs7138803	12	50247468	*BCDIN3D*	G	A	0.38	0.39	0.95	0.032	0.003	8.2E-24	0.079	0.086	0.3581	0.027	0.033	0.4177	0.036	0.037	0.3301	-0.028	0.073	0.7044
rs11057405	12	122781897	*CLIP1*	G	A	0.10	0.10	0.69	-0.031	0.006	2.0E-08	-0.283	0.160	0.0765	0.084	0.068	0.2179	0.086	0.075	0.2522	0.076	0.148	0.6088
rs12429545	13	54102206	*OLFM4*	G	A	0.13	0.14	0.52	0.033	0.005	1.1E-12	0.282	0.161	0.0794	0.084	0.064	0.1902	0.077	0.071	0.2794	0.134	0.144	0.3488
rs9540493	13	66205704	*MIR548X*	A	G	0.54	0.55	0.62	-0.017	0.003	1.4E-07	0.029	0.104	0.7778	-0.045	0.041	0.2635	-0.058	0.045	0.1951	0.046	0.085	0.5824
rs1441264	13	79580919	*MIR548A*	G	A	0.61	0.64	0.55	0.018	0.003	6.0E-08	0.114	0.115	0.3219	0.001	0.044	0.9736	0.006	0.049	0.9034	-0.030	0.093	0.7455
rs10132280	14	25928179	*STXBP6*	C	A	0.32	0.32	0.88	-0.023	0.003	1.1E-11	-0.262	0.095	0.0058	-0.051	0.037	0.1726	-0.066	0.041	0.1104	0.049	0.080	0.5403
rs12885454	14	29736838	*PRKD1*	C	A	0.36	0.34	0.99	-0.021	0.003	1.9E-10	-0.129	0.086	0.1356	-0.043	0.034	0.1983	-0.055	0.037	0.1390	0.039	0.076	0.6033
rs7141420	14	79899454	*NRXN3*	C	T	0.53	0.50	0.64	0.023	0.003	1.2E-14	-0.014	0.102	0.8951	0.006	0.040	0.8734	0.004	0.044	0.9332	0.029	0.095	0.7596
rs3736485	15	51748610	*DMXL2*	A	G	0.55	0.51	0.89	-0.018	0.003	7.4E-09	-0.092	0.087	0.2915	0.009	0.035	0.7923	0.004	0.039	0.9190	0.043	0.072	0.5526
rs16951275	15	68077168	*MAP2K5*	T	C	0.22	0.24	1.00	-0.031	0.004	1.9E-17	-0.265	0.096	0.0055	0.013	0.037	0.7218	0.032	0.040	0.4236	-0.130	0.084	0.1245
rs7164727	15	73093991	*LOC1002*	C	T	0.69	0.67	0.91	0.018	0.003	6.8E-08	-0.004	0.092	0.9632	0.033	0.035	0.3578	0.008	0.039	0.8384	0.198	0.079	0.0121
rs758747	16	3627358	*NLRC3*	C	T	0.27	0.29	1.00	0.023	0.004	7.5E-10	0.041	0.090	0.645	0.005	0.035	0.8935	0.002	0.038	0.9688	0.032	0.072	0.6600
rs12446632	16	19935389	*GPRC5B*	G	A	0.13	0.14	0.98	-0.040	0.005	1.5E-18	-0.254	0.116	0.0282	0.007	0.046	0.8845	0.005	0.050	0.9145	0.008	0.109	0.9402
rs2650492	16	28333411	*SBK1*	G	A	0.30	0.23	0.61	0.021	0.004	1.9E-09	0.235	0.126	0.0623	-0.053	0.050	0.2954	-0.055	0.055	0.3215	-0.028	0.109	0.7970
rs3888190	16	28889486	*ATP2A1*	C	A	0.40	0.36	1.00	0.031	0.003	3.1E-23	0.160	0.085	0.0604	-0.025	0.034	0.4748	-0.022	0.038	0.5647	-0.042	0.077	0.5839
rs4787491	16	30015337	*INO80E*	A	G	0.51	0.54	0.92	0.016	0.003	2.2E-06	0.212	0.086	0.0134	-0.022	0.035	0.5247	-0.025	0.039	0.5115	-0.004	0.075	0.9608
rs9925964	16	31129895	*KAT8*	A	G	0.38	0.39	0.99	-0.019	0.003	8.1E-10	-0.238	0.084	0.0047	0.034	0.033	0.2994	0.035	0.036	0.3384	0.029	0.070	0.6797
rs2080454	16	49062590	*CBLN1*	C	A	0.59	0.59	0.72	-0.017	0.003	6.6E-08	-0.011	0.097	0.9114	0.073	0.038	0.0568	0.074	0.042	0.0794	0.060	0.085	0.4771
rs1558902	16	53803574	*FTO*	T	A	0.42	0.42	1.00	0.082	0.003	7.5E-153	0.492	0.083	<.0001	0.059	0.031	0.0613	0.070	0.035	0.0422	-0.021	0.070	0.7598
rs9914578	17	2005136	*SMG6*	C	G	0.21	0.19	0.98	0.020	0.004	9.0E-08	0.136	0.104	0.1915	0.021	0.040	0.5872	0.008	0.044	0.8612	0.113	0.088	0.1993

rs1000940	17	5283252	*RABEP1*	A	G	0.32	0.31	0.99	0.019	0.003	1.3E-08	0.074	0.088	0.3998	-0.018	0.036	0.6137	-0.010	0.039	0.7912	-0.076	0.079	0.3371
rs12940622	17	78615571	*RPTOR*	G	A	0.43	0.42	0.73	-0.018	0.003	2.5E-09	-0.040	0.097	0.6779	-0.012	0.037	0.7392	-0.010	0.041	0.8039	-0.027	0.082	0.7445
rs1808579	18	21104888	*C18orf8*	C	T	0.47	0.44	0.91	-0.017	0.003	4.2E-08	-0.086	0.087	0.3217	0.026	0.034	0.4414	0.040	0.037	0.2856	-0.068	0.075	0.3650
rs7239883	18	40147671	*LOC2842*	G	A	0.61	0.60	0.85	-0.016	0.003	1.6E-07	-0.098	0.091	0.284	-0.005	0.036	0.9002	-0.029	0.040	0.4699	0.163	0.081	0.0450
rs7243357	18	56883319	*GRP*	T	G	0.19	0.18	0.94	-0.022	0.004	3.9E-08	-0.025	0.111	0.8186	0.016	0.043	0.7074	0.009	0.047	0.8532	0.067	0.091	0.4640
rs6567160	18	57829135	*MC4R*	T	C	0.24	0.23	0.99	0.056	0.004	3.9E-53	0.408	0.097	<.0001	-0.038	0.040	0.3315	-0.054	0.044	0.2159	0.057	0.082	0.4855
rs17724992	19	18454825	*PGPEP1*	A	G	0.25	0.26	1.00	-0.019	0.004	3.4E-08	-0.090	0.093	0.333	-0.057	0.036	0.1124	-0.060	0.040	0.1308	-0.042	0.078	0.5941
rs29941	19	34309532	*KCTD15*	A	G	0.67	0.69	1.00	0.018	0.003	2.4E-08	0.118	0.089	0.1833	-0.006	0.034	0.8581	-0.002	0.037	0.9613	-0.031	0.074	0.6744
rs2075650	19	45395619	*TOMM40*	A	G	0.15	0.14	0.75	-0.026	0.005	1.3E-08	-0.080	0.135	0.5536	0.057	0.053	0.2845	0.053	0.058	0.3618	0.071	0.118	0.5470
rs2287019	19	46202172	*QPCTL*	C	T	0.20	0.21	0.67	-0.036	0.004	4.6E-18	-0.093	0.122	0.4445	-0.004	0.050	0.9289	-0.029	0.055	0.6052	0.172	0.103	0.0935
rs3810291	19	47569003	*ZC3H4*	G	A	0.67	0.67	1.00	0.028	0.004	4.8E-15	0.075	0.087	0.3908	-0.013	0.034	0.7063	-0.018	0.038	0.6384	0.017	0.073	0.8201
rs6091540	20	51087862	*ZFP64*	C	T	0.28	0.28	0.64	-0.019	0.004	8.0E-08	0.051	0.114	0.6513	0.022	0.044	0.6153	0.024	0.048	0.6182	0.016	0.098	0.8716
rs2836754	21	40291740	*ETS2*	T	C	0.61	0.62	1.00	0.016	0.003	4.2E-07	0.051	0.084	0.542	-0.051	0.033	0.1204	-0.054	0.036	0.1355	-0.032	0.071	0.6574

CIMBA: The Consortium of Investigators of Modifiers of *BRCA1/2*; GWAS: genome-wide association studies

Notes:

[1] Imputation quality of 1 indicates genotyped SNPs.

[2] Effect estimate after BMI standardization.

[3] *P*-values were calculated using student's *t*-test. All *P*-values are two-sided.

[4] Association with ovarian cancer were estamated using weighted Cox models that adjusted for principal components, birth cohort, menopausal status, country of enrollment and mutation status.

[5] *P*-values were calculated using chi-squared test. All *P*-values are two-sided.

Supplementary Table 3. Associations of the height genetic score (height-GS) with height and ovarian cancer risk factors

	Number of participants	Summary effect	Standard error	*P*-value	% variation explained
Measured height, cm					
All participants	7,657	0.993	0.029	7.00E-241	13.4
BRCA1 carriers	4,502	1.004	0.037	3.84E-149	14.0
BRCA2 carriers	3,155	0.980	0.046	2.48E-94	12.6
Case participants	784	0.939	0.087	1.20E-25	13.1
Control participants	6,873	1.000	0.031	2.31E-218	13.5
Traditional risk factors					
BMI, kg/m^2	7,516	-0.010	0.024	0.66	
Weight, kg	7,569	0.798	0.064	2.73E-35	
Age at baseline, y	22,588	-0.128	0.032	4.52E-05	
Age at menarche, y	7,459	0.028	0.007	7.25E-05	
Parous, yes vs no	8,394	-0.010	0.011	0.35	
Age at first live birth, y	6,290	-0.013	0.025	0.58	
Menopausal status, pre vs post	8,445	0.012	0.009	0.18	
Age at menopause, y	4,336	-0.080	0.036	0.03	

Notes:

Regression coefficient is presented for continuous variables and natural log-scale odds ratio for binary variables, per unit increase of the weighted height genetic score. P-values were calculated from linear regression models for all variables except for parity and menopausal status (logistic regression models).

Supplementary Table 4. Associations of the body mass index genetic score (BMI-GS) with BMI and ovarian cancer risk factors

	Number of participants	Summary effect	Standard error	*P*-value	% variation explained
Observed BMI at date of questionniare, kg/m^2					
All participants	7,516	0.966	0.069	2.79E-44	2.6
BRCA1 carrier	4,401	0.912	0.088	8.05E-25	2.4
BRCA2 carrier	3,115	1.048	0.110	2.10E-21	2.9
Case participants	772	0.671	0.215	1.88E-03	1.3
Control participants	6,744	1.000	0.073	1.11E-42	2.7
Premenopausal control participants	3,253	0.949	0.101	1.09E-20	2.6
Postmenopausal control participants	3,152	1.052	0.109	8.10E-22	2.9
Observed BMI in young adulthood, kg/m^2					
All participants	5,417	0.971	0.102	2.31E-21	1.7
BRCA1 carrier	3,134	0.942	0.132	1.24E-12	1.6
BRCA2 carrier	2,283	1.015	0.160	2.76E-10	1.7
Case participants	536	0.734	0.285	1.04E-02	1.2
Control participants	4,881	1.000	0.109	5.69E-20	1.7
Premenopausal control participants	2,180	1.171	0.168	4.18E-12	2.2
Postmenopausal control participants	2,365	0.872	0.153	1.27E-08	1.4
Traditional risk factors					
Height	7,657	0.371	0.092	5.40E-05	
Age at baseline, y	22,588	-0.165	0.085	0.79	
Age at menarche, y	7,459	-0.104	0.020	3.30E-07	
Parous, yes vs no	8,394	0.028	0.031	0.38	
Age at first live birth, y	6,290	-0.131	0.073	0.07	
Menopausal status, pre vs post	8,445	-0.027	0.026	0.28	
Age at menopause, y	4,336	-0.200	0.108	0.06	

Notes:

Regression coefficient is presented for continuous variables and natural log-scale odds ratio for binary variables, per unit increase of the weighted BMI genetic score. *P*-values were calculated from linear regression models for all variables except for parity and menopausal status (logistic regression models).