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ORIGINAL RESEARCH

Mendelian Randomization Analyses Suggest Childhood Body Size Indirectly Influences End Points From Across the Cardiovascular Disease Spectrum Through Adult Body Size

Grace M. Power, MSc; Jessica Tyrrell, PhD; Timothy M. Frayling, PhD; George Davey Smith, FRS; Tom G. Richardson, PhD

BACKGROUND: Obesity is associated with long-term health consequences including cardiovascular disease. Separating the independent effects of childhood and adulthood obesity on cardiovascular disease risk is challenging as children with obesity typically remain overweight throughout the lifecourse.

METHODS AND RESULTS: This study used 2-sample univariable and multivariable Mendelian randomization to estimate the effect of childhood body size both independently and after accounting for adult body size on 12 endpoints across the cardiovascular disease disease spectrum. Univariable analyses identified strong evidence of a total effect between genetically predicted childhood body size and increased risk of atherosclerosis, atrial fibrillation, coronary artery disease, heart failure, hypertension, myocardial infarction, peripheral artery disease, and varicose veins. However, evidence of a direct effect was weak after accounting for adult body size using multivariable Mendelian randomization, suggesting that childhood body size indirectly increases risk of these 8 disease outcomes via the pathway involving adult body size.

CONCLUSIONS: These findings suggest that the effect of genetically predicted childhood body size on the cardiovascular disease outcomes analyzed in this study are a result of larger body size persisting into adulthood. Further research is necessary to ascertain the critical timepoints where, if ever, the detrimental impact of obesity initiated in early life begins to become immutable.

Key Words: cardiovascular disease ■ genetic epidemiology ■ lifecourse ■ Mendelian randomization ■ obesity

Approximately 2.6 million people worldwide die as a result of obesity related diseases each year, including cardiovascular diseases (CVDs), such as heart disease and stroke.[1] The World Health Organization posits that obesity results from and might influence social disparities.[2] Therefore, decreasing the frequency of obesity and thus reducing associated long-term adverse health consequences is key to reducing health inequity, with the goal of achieving health attainment as well as poverty reduction globally.

The extent and prevalence of obesity have been growing steadily in both pediatric and adult populations over the past 4 decades.[3] In a 2017 meta-analysis, pooled estimates from 21 cohort and case-control studies suggest that childhood obesity may be a risk factor for selected adult CVD risk factors;

Correspondence to: Grace M. Power and Tom G. Richardson, MRC Integrative Epidemiology Unit at the University of Bristol, Population Health Sciences, Bristol Medical School, University of Bristol, Bristol BS8 2BN, UK. E-mails: grace.power@bristol.ac.uk; tom.g.richardson@bristol.ac.uk

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CLINICAL PERSPECTIVE

What Is New?

- This Mendelian randomization investigation provides univariable evidence that genetically predicted childhood obesity increases risk of 8 types of cardiovascular disease.
- Evidence of total effects substantially attenuated upon accounting for body size in adulthood.

What Are the Clinical Implications?

- These findings suggest that childhood obesity influences cardiovascular disease risk as a result of the long-term effect of adiposity persisting into adulthood.
- Risks associated with childhood adiposity may therefore potentially be reversed by early resolution of obesity in prepubertal children.
- Further research is required to elucidate whether there are critical timepoints in the lifecourse where the effects of childhood obesity may be reversed through lifestyle modifications.

Nonstandard Abbreviations and Acronyms

FDR	false discovery rate
MR	Mendelian randomization

however, causal effects independent of adult adiposity could not be established.[4] This is in part due to the inherent problems with observational investigations, in which standard statistical techniques used to adjust for confounding do not fully negate bias, which may lead to spurious findings.[5] Furthermore, whether prepubertal childhood obesity has a lasting effect on different types of cardiovascular disease or whether those who become nonobese by adulthood have a similar risk to individuals who were never obese[6,7] is yet to be determined.

A lifecourse approach crucially investigates the contribution of early and later life factors together to identify risk and protective mechanisms across the lifespan.[8] The issues described relating to observational studies make separating the effects of obesity at different stages throughout the lifecourse challenging, which is one of the motivations behind using human genetics through the application of an approach known as Mendelian randomization (MR).[9] MR is often implemented as an instrumental variable analysis that exploits the random assortment of genetic variants at birth.[10] Thus, by using this approach, it is possible to estimate the causal effects between closely related exposures and disease outcomes of interest, while mitigating the influence of common observational epidemiological issues relating to confounding and reverse causation.[5]

Multivariable MR is an extension of this approach that uses multiple genetic variants associated with multiple exposures to concurrently estimate the causal effect of each risk factor on an outcome. It has previously been applied to separate the independent effects of childhood and adult body size on disease risk,[9] using genetic instruments for self-reported perceived body size at age 10 and body mass index (BMI) in adulthood (average age 56.5 years).[11,12] In addition, these childhood effects have been replicated using measured BMI data from the Young Finns Study[13] and the HUNT Study (Nord-Trøndelag Health Study).[14] Childhood body size has been shown to have an effect on coronary artery disease using univariable MR (odds ratio [OR], 1.49; 95% CI, 1.33–1.68). However, after accounting for adult body size using multivariable MR, this effect attenuated (OR, 1.02; 95% CI, 0.86–1.22), suggesting that the childhood effects are because of sustained effects of adiposity over time.[9] This approach has not yet been applied to comprehensively evaluate end points throughout the CVD spectrum, however.

This investigation sets out to examine whether genetically predicted childhood body size has a direct effect on a comprehensive list of CVD outcomes, independent of adult body size, that have been linked previously to obesity. Initially, univariable MR was applied to estimate the "total effect" of early life body size on 12 CVD outcomes (ie, without accounting for adult body size). Multivariable MR was then used to estimate the "direct" (Figure 1A) and "indirect" (Figure 1B) effect of early life body size on the CVD outcomes. Estimating the independent effects of childhood and adult body size on a spectrum of CVD outcomes is of public health importance to better understand whether risks associated with childhood adiposity are lasting or can be minimized, suspended, or even reversed by resolution of obesity in early life.[15]

METHODS

The data that support the findings of this study are all available from within the supplementary materials or publicly accessible from the resources cited. Data were obtained from the UKBB (UK Biobank) study, which obtained ethics approval from the Research Ethics Committee (REC; approval number: 11/NW/0382) and informed consent from all participants enrolled in UKBB.'

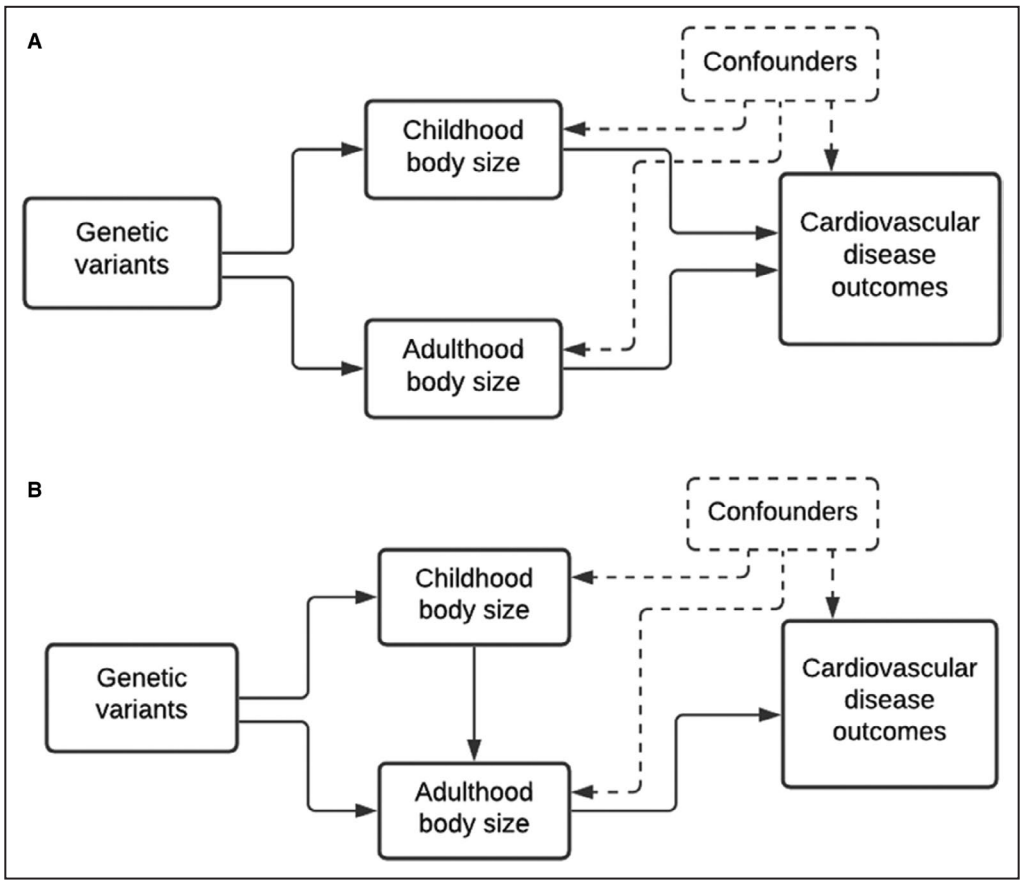

Figure 1. Directed acyclic graphs indicating 2 scenarios to explain the causal effect between childhood body size and disease outcomes in later life.
Childhood body size has a direct effect on cardiovascular disease (CVD) risk independent of body size in adulthood (**A**), and childhood body size has an indirect effect on CVD risk, through body size in adulthood (**B**).

DATA RESOURCES

Genetic Variants for Childhood and Adult Body Size

Genetic instruments for childhood and adult body size were identified previously, where 295 and 557 independent genetic variants were identified, respectively (using $P<5\times10^{-8}$ and $r^2<0.001$) from a large-scale genome-wide association study (GWAS) of 453 169 participants in the UKBB study.[11,12] Adulthood measured BMI (mean age=56.5 years) was obtained at baseline using height (measured in cm) and weight (to the nearest 0.1 kg). In addition, participants were asked the question "When you were 10 years old, compared to average would you describe yourself as thinner, about average, or plumper?" For comparability purposes, BMI in adults was transformed into a categorical variable comprising 3 groups indicating body sizes indicative of being "thinner" (21.1–25 kg/m^2), "about average" (25–31.7 kg/m^2), and "plumper" (31.7–59.9 kg/m^2). Throughout this study, these measures are described as childhood and adult body size, respectively. The estimates derived in our analysis thus reflect a change in the odds of each change in weight category within childhood and adult groups (eg, from "thinner" to "about average" or from "about average" to "plumper").

GWAS were conducted on individuals who had both measures available adjusting for age, sex, and the genotyping chip used to measure genetic data in the UKBB. This analysis applied linear regression and thus assumes that the effect of a single nucleotide polymorphism from the lowest to the middle category of the body size variables is the same as the effect from the middle to the highest. The GWAS used for childhood body size was also adjusted for month of birth. Conditional F-statistics generated for childhood (F=13.6) and adult (F=16.0) body size instruments suggested that weak instrument bias was unlikely to influence findings from these analyses.[9] Validation and simulation analyses for measures have been performed and comparisons of genome-wide effect

estimates between early life and adult body size in the UKBB made[9] (Table S1). Scores have been validated in the Young Finns Study.[13] This study indicated that the genetic score for childhood body size was a stronger predictor of childhood BMI compared with the adult body size score (area under the curve coefficients, 0.74; 95% CI, 0.65–0.82 versus 0.62, 0.53–0.72; *P*=0.02) and the adult genetic score was a stronger predictor of adult BMI than the childhood body size score (area under the curve coefficients, 0.62; 95% CI, 0.58–0.65 versus 0.57, 0.54–0.60; *P*=0.02). In addition, findings from the HUNT Study validated the childhood and adult gene scores for BMI with repeated BMI measurements of a Norwegian population aged 12 to 70 over 6 decades, confirming that both polygenetic risk scores were valid instruments. This study showed that the predictive performance of the childhood score was better in those aged 12 to 15.9 years compared with 24 to 29.9 years (polygenic risk scores 6.7% versus 2.4%) and that of the adult score was better in those aged 24 to 29.9 years compared to 12 to 15.9 years (3.9% versus 3.6%).[14] Thus, the predictive ability of these BMI scores have been validated in 2 further population groups in addition to validation analyses undertaken in the original study that conducted the GWAS.[13,14]

Genetic Effects on Cardiovascular Disease Outcomes

The CVD end points analyzed in this study comprised those available from GWAS that BMI has been shown to influence previously.[16–18] Genetic estimates on coronary artery disease and myocardial infarction were obtained from the Coronary Artery Disease Genome-wide Replication and Meta-analysis plus the Coronary Artery Disease Genetics (CARDIOGRAMplusC4D) consortium.[19] Effect estimates on stroke were obtained from a GWAS undertaken by the MEGASTROKE consortium.[20] These GWAS were additionally selected as they did not include the UKBB study, to avoid overlapping samples with our instrument identification data set. Genetic estimates for the remaining CVD outcomes (all N>1000 cases) had also been associated with BMI in the literature and were obtained from the FinnGen (FinnGen-tutkimushanke vie suomalaiset löytöretkelle genomitietoon) study (freeze 4), which brings together the nationwide network of Finnish biobanks and digital health care data. *International Classification of Diseases, Tenth Revision* (*ICD-10*) codes are available for these outcomes[21] (Table S2).

Statistical Analysis

The "total effects" of genetically predicted childhood body size on each of the 12 CVD outcomes were estimated in a 2-sample setting using the "TwoSampleMR" R package.[22] We initially applied the inverse variance weighted method, which provides an overall weighted estimate of causal effects of an exposure on an outcome by combining estimates using each variant in a fixed effect meta-analysis model.[23] Weighted median and MR-Egger methods were additionally used in this study to assess the robustness of univariable results to horizontal pleiotropy, the phenomenon whereby genetic variants influence multiple traits or disease outcomes via independent biological pathways.[24,25]

To mitigate false positive rates due to multiple testing, false discovery rate (FDR) corrections were used to adjust the *P* values computed for the univariable MR estimates using the inverse variance weighted method. For comparative purposes, we also undertook univariable MR analyses of adult body size for all 12 outcomes.

Multivariable MR using the inverse variance weighted method was conducted to fit childhood and adult body size as simultaneous risk factors on the remaining CVD outcomes, which were robust to FDR corrections in the previous analysis. This enabled the estimation of the "direct" effect of childhood body size on the CVD outcomes after accounting for adult body size.

Forest plots were generated using the R package "ggplot2."[26] All analyses were undertaken using R (version 3.5.1).

RESULTS

The total effects through univariable analyses indicated strong evidence of an effect between genetically predicted childhood body size and atherosclerosis (OR, 1.76; 95% CI, 1.37–2.27; $P=1.25\times10^{-5}$), atrial fibrillation and flutter (OR, 1.69; 95% CI, 1.39–2.06; $P=2.00\times10^{-7}$), coronary artery disease (OR, 1.53; 95% CI, 1.36–1.72; $P=1.61\times10^{-12}$), heart failure (OR, 1.72; 95% CI, 1.45–2.05; $P=5.5\times10^{-10}$), hypertension (OR, 1.77; 95% CI, 1.53–2.04; $P=6.30\times10^{-15}$), myocardial infarction (OR, 1.51; 95% CI, 1.36–1.74; $P=8.85\times10^{-11}$), peripheral artery disease (OR, 1.89; 95% CI, 1.48–2.42; $P=4.69\times10^{-7}$), and varicose veins (OR, 1.57; 95% CI, 1.29–1.91; $P=6.7\times10^{-6}$). These 8 outcomes were robust to FDR <0.05 corrections. Additionally, there was little evidence of an effect between genetically predicted childhood body size and pulmonary heart disease (OR, 1.28; 95% CI, 0.97–1.69; *P*=0.09), angina pectoris (OR, 1.15; 95% CI, 0.95–1.37; *P*=0.15), pulmonary embolism (OR, 1.27; 95% CI, 0.95–1.72; *P*=0.11), and stroke (OR, 1.57; 95% CI, 0.93–1.16; *P*=0.50) (Table S3) based on FDR <0.05. For comparison, univariable estimates for adult body size on these 12 CVD end points can be found in Table S4.

Consistent patterns of associations were observed using the weighted median method employed for robustness (Table S5). The MR-Egger method did not suggest that horizontal pleiotropy was responsible for the estimates derived, with the possible exception of the estimate between childhood body size and atrial fibrillation and flutter (Table S6).

Upon accounting for adult body size using multivariable MR, estimates for all 8 end points that survived FDR corrections in the univariable analysis substantially attenuated (Figure 2A). These estimates provided little evidence of a direct effect between genetically predicted childhood body size and atherosclerosis (OR, 1.13; 95% CI, 0.81–1.59; P=0.468), atrial fibrillation and flutter (OR, 0.91; 95% CI, 0.71–1.17; P=0.462), coronary heart disease (OR, 1.05; 95% CI, 0.89–1.25; P=0.551), heart failure (OR, 0.87; 95% CI, 0.69–1.09; P=0.224), hypertension (OR, 0.96; 95% CI, 0.90–1.15; P=0.650), myocardial infarction (OR, 0.98; 95% CI, 0.82–1.18; P=0.848), peripheral artery disease (OR, 1.25; 95% CI, 0.90–1.73; P=0.118), and varicose veins (OR, 1.17; 95% CI, 0.92–1.50; P=0.211). In contrast, multivariable analyses provided strong evidence that adult body size directly increases risk of the 8 CVD disease outcomes analyzed (Figure 2B). Lastly, although there was little evidence of an effect between childhood body size and the 4 outcomes not included in multivariable analyses, adult body size provided strong evidence of a total effect on angina pectoris (OR, 1.67; 95% CI, 1.36–2.05; P=1.28×10^{-6}), pulmonary embolism (OR, 1.61; 95% CI, 1.15–2.25; P=0.005), pulmonary heart disease (OR, 1.77; 95% CI, 1.30–2.42; P=2.96×10^{-4}), and stroke (OR, 1.56; 95% CI, 1.36–1.79; P=1.36×10^{-10}) (Table S7).

DISCUSSION

In the present MR investigation, we applied a lifecourse approach to investigate the mechanisms underlying the causal effect of genetically predicted childhood body size on the risk of a spectrum of later life CVD outcomes linked to obesity. This was to determine whether childhood body size has an independent effect on CVD risk or whether its influence can be explained by accounting for body size in adulthood. We report results based on direct or indirect effects as described previously in the multivariable Mendelian randomization literature.[27] A consistent relationship between higher childhood body size and an increase in the odds of CVD was identified in univariable analyses. When accounting for adult body size, however, estimates attenuated to include the null (and in some cases reversed direction of effect), indicating weak evidence of a direct effect between childhood body size and CVD outcomes in multivariable analyses. There was strong evidence indicating the influence of adult body size on CVD outcomes in both univariable and multivariable analyses.

Results from this study are in line with previous clinical and epidemiological observational research, indicating that childhood adiposity is a risk factor for several disease outcomes, including type 2 diabetes mellitus, hypertension, dyslipidemia and carotid-artery atherosclerosis, only if individuals remain overweight into puberty or later ages.[6,7] These findings therefore highlight the importance of prevention efforts to reduce adiposity in prepubescent children to help mitigate adverse cardiovascular consequences in later life.[28] Ensuring socially disadvantaged groups benefit from relevant public health interventions aimed at

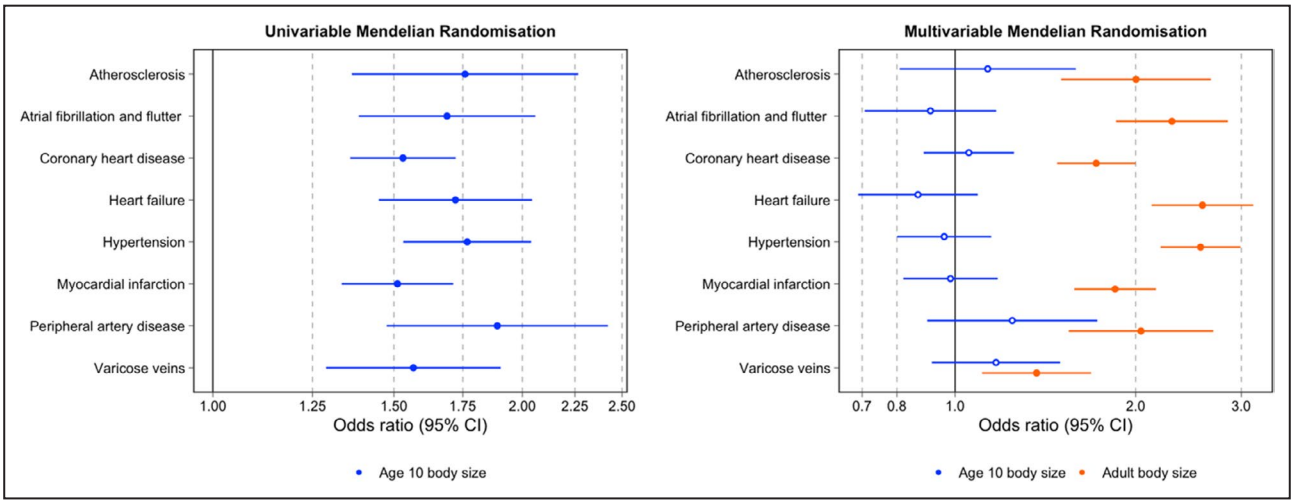

Figure 2. Univariable for childhood body size (A) and multivariable for childhood and adult body size (B) Mendelian randomization onto CVD outcomes.
CVD indicates cardiovascular disease.

reducing obesity is especially key in both policy and practice, because obesity levels in high-income countries disproportionately affect ethnic minority, low-income, and other socially marginalized populations.[29] For example, in the context of the United States, the prevalence of a BMI above the 85th percentile for age and sex rose to 35% in Hispanic and Black children compared with 20% in their counterparts of European ancestry.[28]

In addition, findings from this report highlight the advantages of considering the long-term effects of childhood and early adult risk factors on later disease to elucidate processes operating across the lifecourse, that influence the development of disease risk.[8] Previous longitudinal research has investigated adverse outcomes in overweight individuals at multiple different stages throughout early life. For example, a retrospective cohort study comprising individuals born between 1930 and 1989 in Copenhagen, Denmark, assessed the adverse effects of weight gain in childhood (7 years of age), adolescence (13 years of age) and early adulthood on type 2 diabetes mellitus risk.[7] Whereas those who were overweight between 7 to 13 years who had subsequently maintained normal weight in early adulthood had a risk of type 2 diabetes mellitus similar to those with normal weights at all ages, those who were overweight between 13 and early adulthood had a risk of type 2 diabetes mellitus higher than those who had never been overweight. In addition, a prospective cohort study completed on the Israeli Defence Force Medical Corps revealed that elevated BMI in both adolescence (mean 17.44±0.46 years) and adulthood (mean 30.59±5.30 years) were independently associated with angiography-proven coronary heart disease.[30] Furthermore, in this study we found that the effect sizes of childhood body size estimates on CVD were consistently smaller than adulthood body size in univariable analyses. Although the magnitude of total effect estimates are relevant from a lifecourse perspective, only through multivariable analyses can evidence of direct and indirect effects be inferred. Future investigations using genetics would benefit from developing genetic scores for multiple age groups to assess the causal effects of increased body size at specific ages on adverse outcomes related to obesity.

Strengths and Limitations

Although the association between obesity and CVD risk has been investigated longitudinally in observational research, this is a unique study in that it estimates effects on various endpoints throughout the CVD disease spectrum, using genetically predicted exposures at separate timepoints in the lifecourse. Doing so means that our effect estimates should be more robust to reverse causation and confounding compared with previous observational estimates. In addition, this investigation leverages large sample sizes available through the UKBB study (n=453 169) for measures of early and later life body size and the CARDIOGRAMplusC4D consortium (n=185 000), MEGASTROKE consortium (n=521 612), and FinnGen study (n=269 077) for measures of CVD outcomes, increasing study power. This study also uses a 2-sample approach, where the risk factor and outcome are taken from nonoverlapping data sets, minimizing the potential for bias from overfitting.[31] Furthermore, weighted median and MR-Egger methods were used to assess the robustness of univariable results to horizontal pleiotropy.

This study, however, also has important limitations. First, participants' self-reporting of their body size in childhood may have resulted in differential social desirability bias, with respect to retrospective weight recall at age 10. Furthermore, the age of participants in adulthood when reporting this information could potentially influence the childhood body size measurement, because individuals recalled their body weight at different ages in midlife, resulting in different lengths of time since they were children. To account for this, GWAS were conducted on individuals who had both measures available adjusting for age, as well as sex and the genotyping chip. Though, as described earlier using measured BMI data from the Young Finns Study[13] and the HUNT Study,[14] the genetic score for early life body size has been shown to be a better predictor of childhood BMI and the score for adult body size a better predictor of adult BMI. Second, although effect estimates in this study were positive, there was weak evidence of a genetically predicted effect between childhood body size and 4 of the 12 risk factors in univariable analyses. This may be because of a lack of power based on the number of cases for these endpoints in the FinnGen dataset. However, this could also potentially indicate that having a larger body size does not begin to exert its effect on angina pectoris, pulmonary embolism, pulmonary heart disease, and stroke as early in the lifecourse as other outcomes assessed. This requires further investigation. Third, this study uses genetically determined body size, which may not translate directly into weight loss or gain from lifestyle reforms.[9] Fourth, selection bias using the UKBB is an important limitation, because participants in the UKBB are more likely to be older, female, and live in less socioeconomically deprived areas than participants in nationally representative data sources.[32] Underrepresentation of younger, male, nonbinary, or any other gender identity and the lowest socioeconomic position group is therefore problematic, with the potential to cause issues for instrumental variable

analyses.[33] Furthermore, because allele frequencies and disease or exposure rates vary between different subgroups of the population, introducing the potential for confounding, this study performs analyses in homogeneous populations of European ancestry.[34] This therefore provides evidence of the causal effects identified only within this single ancestry group and may thus not be generalizable to other ancestry populations. Future research should therefore investigate estimates derived in this study across a broader range of different ancestries. Lastly, genetic correlation has been shown to exist in the UKBB between birth location and several health outcomes relevant to our study, after adjusting for population structure, including hypertension and BMI.[35] Future work to assess the extent to which environmental factors confounded with location may influence findings from UKBB analyses would be worthwhile.

CONCLUSIONS

These findings provide evidence that the total effect of childhood body size on CVD outcomes is a result of larger body size persisting into adulthood, suggesting that childhood obesity is unlikely to have a direct causal effect on the CVD outcomes assessed in this work. Importantly, elevated risk of these types of CVD associated with childhood adiposity may therefore putatively be mitigated or potentially reversed by early resolution of obesity in early life.

ARTICLE INFORMATION

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Affiliations

MRC Integrative Epidemiology Unit, Population Health Sciences, Bristol Medical School, University of Bristol, United Kingdom (G.M.P., G.D.S., T.G.R.); Genetics of Complex Traits, University of Exeter Medical School, University of Exeter, United Kingdom (J.T., T.M.F.); and Department of Genetics, Novo Nordisk Research Centre Oxford, United Kingdom, (T.G.R.).

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Disclosures

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Supplementary Material

Table S1–S7

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SUPPLEMENTAL MATERIAL

Table S1. Comparison of genome-wide effect estimates between early life and adult body size in the UK Biobank.

SNP	Chromosome	Base position	Closest gene	Effect allele	Other allele	Beta (Adult)	SE (Adult)	P (Adult)	Beta (Age 10)	SE (Age 10)	P (Age 10)	Interaction P
rs6938973	6	98421721	MMS22L	T	C	-0.0118066	0.00140063	3.5E-17	0.00589934	0.00143123	0.000038	9.86E-15
rs12042908	1	74997762	TNNI3K	A	G	0.0104426	0.00138041	3.9E-14	0.0274603	0.0014112	2.5E-84	7.27E-14
rs13254613	8	64804804	YTHDF3	A	C	0.00564903	0.00144394	0.000091	-0.0125693	0.00147501	1.6E-17	1.71E-13
rs78444298	1	184672098	EDEM3	G	A	-0.0166763	0.00498629	0.00082	0.042032	0.00509751	1.6E-16	1.03E-11
rs9843653	3	49920571	MST1R	T	C	-0.0175503	0.00137056	1.5E-37	-0.00406936	0.00140159	0.0037	1.29E-11
rs77960	5	103964585	NUDT12	G	A	-0.00624158	0.00146057	0.000019	0.0105292	0.00149263	1.7E-12	1.93E-11
rs4744246	9	96254464	FAM120A	A	G	0.000944429	0.00144792	0.51	-0.0157627	0.00147894	1.6E-26	2.38E-11
rs1250597	10	81010250	ZMIZ1	A	G	-0.00853653	0.00139856	1E-09	0.00394057	0.00142889	0.0058	5.97E-10
rs2725371	8	30854033	PURG	A	G	0.0100376	0.0014969	2E-11	-0.00346122	0.00152911	0.024	7.16E-10
rs1320251	17	21264396	KCNJ12	C	T	0.0123928	0.00138267	3.2E-19	-0.00036868	0.00141185	0.79	9.27E-10
rs7132908	12	50263148	FAIM2	G	A	-0.0186209	0.00141036	8.4E-40	-0.0312648	0.00144009	1.6E-104	3.98E-09
rs543874	1	177889480	SEC16B	A	G	-0.0301239	0.00169429	1E-70	-0.0471181	0.00173208	6E-163	4.69E-09
rs35957544	8	73440371	KCNB2	G	T	0.0126785	0.00139004	7.4E-20	0.00133392	0.00141995	0.35	1.03E-08
rs788858	4	82138300	PRKG2	A	G	0.000576386	0.00151019	0.7	0.0122893	0.00154345	1.7E-15	1.54E-08
rs10182458	2	25150641	ADCY3	A	G	-0.0199485	0.00136878	4.1E-48	-0.0359119	0.00139965	3.5E-145	1.94E-08
rs115319174	2	207066474	GPR1	G	C	-0.0113095	0.00296902	0.00014	-0.0423448	0.00303598	3.3E-44	2.31E-08
rs217672	14	62361021	SYT16	A	C	-0.0118089	0.00154676	2.3E-14	0.00101877	0.00157954	0.52	2.39E-08
rs17770336	9	28414625	LINGO2	C	T	-0.0155163	0.00146443	3.1E-26	-0.00384235	0.00149581	0.01	3.51E-08
rs13292699	9	15910044	CCDC171	A	C	0.0125361	0.00138627	1.5E-19	-0.00147231	0.00141598	0.3	4.17E-08
rs236660	7	75050086	POM121C	T	C	-0.0144693	0.00143954	9.1E-24	-0.0012696	0.00147066	0.39	4.65E-08
rs429358	19	45411941	APOE	T	C	0.0160691	0.00190178	2.9E-17	-0.00345424	0.00194151	0.075	0.000000105
rs147730268	12	123024476	KNTC1	G	T	0.0228315	0.00248522	4E-20	-0.00115027	0.00253762	0.65	0.000000127
rs2269610	6	33289935	DAXX	G	C	-0.0127637	0.00176726	5.1E-13	0.00177773	0.00180586	0.32	0.000000155
rs2999158	1	113239478	MOV10	T	C	-0.00326079	0.0014499	0.025	0.00886901	0.00148224	2.2E-09	0.000000175
rs4806814	19	1860147	KLF16	G	A	0.0126512	0.00190443	3.1E-11	-0.0020999	0.00194422	0.28	0.000000296
rs2767486	1	65991203	LEPR	A	G	-0.00136324	0.0017049	0.42	-0.0153659	0.00174293	1.2E-18	0.000000419
rs60644673	7	100096742	NYAP1	G	T	-0.00406274	0.00173954	0.02	0.0100289	0.00177714	0.000000017	0.000000419
rs34260097	6	100727703	SIM1	T	G	-0.00236251	0.00164269	0.15	-0.0178193	0.00167858	2.5E-26	0.000000438
rs72910629	6	69761994	BAI3	A	G	-0.0132548	0.00201085	4.3E-11	0.00225962	0.00205477	0.27	0.0000007
rs7206608	16	82872628	CDH13	C	G	-0.00978895	0.00146872	2.6E-11	0.0000455	0.00150014	0.98	0.000000711
rs59227842	11	43692423	HSD17B12	A	G	-0.0152449	0.00149355	1.8E-24	-0.000569076	0.00152569	0.71	0.00000081
rs6265	11	27679916	BDNF	C	T	0.0245417	0.00175291	1.5E-44	0.0117028	0.00179063	6.3E-11	0.000000817
rs12253527	10	21819824	MLLT10	G	A	-0.0136135	0.00146958	2E-20	-0.00000961	0.00150144	0.99	0.000000877
rs13186637	5	153108558	GRIA1	T	C	0.00868308	0.00144114	1.7E-09	-0.00064613	0.00147277	0.66	0.000000973
rs17716502	8	116659731	TRPS1	C	T	0.0162355	0.00171408	2.7E-21	0.00470841	0.00175096	0.0072	0.00000105
rs12538826	7	99030228	PTCD1	T	C	0.0167586	0.00215398	7.2E-15	-0.00143349	0.00220054	0.51	0.00000127
rs7424120	2	59313974	FANCL	C	T	0.0142008	0.0014016	4E-24	0.00397895	0.00143321	0.0055	0.00000139
rs149457	5	107438057	FBXL17	C	T	0.0150324	0.00182987	2.1E-16	0.00198417	0.00187003	0.29	0.00000141
rs113569731	3	47093206	SETD2	C	A	-0.0151686	0.00241102	3.1E-10	-0.000292565	0.00246561	0.91	0.00000191
rs62259692	3	51847709	IQCF3	G	A	-0.0177511	0.00293025	1.4E-09	0.00133971	0.00299659	0.65	0.00000235
rs9421249	10	118623322	ENO4	C	T	-0.0104412	0.00156447	2.5E-11	0.00149155	0.00159839	0.35	0.00000267
rs1000471	15	89986583	RHCG	C	T	0.000909527	0.00168998	0.59	-0.00950759	0.00172531	0.000000036	0.00000303
rs181617194	12	122011598	KDM2B	T	C	0.0226623	0.00376431	1.7E-09	0.000121726	0.00384367	0.97	0.00000335
rs6577497	1	8605667	RERE	A	T	-0.00220462	0.00140295	0.12	0.00807228	0.00143424	0.000000018	0.00000335
rs7424771	2	161276378	RBMS1	G	A	-0.00230822	0.0013764	0.094	0.00893011	0.00140744	2.2E-10	0.00000402
rs12033257	1	112318484	KCND3	A	G	0.00980287	0.0014192	4.9E-12	-0.000757207	0.00145086	0.6	0.00000414
rs1840660	7	114352615	FOXP2	G	A	-0.00995498	0.00141493	2E-12	0.00143567	0.00144551	0.32	0.00000537
rs2594994	3	11339960	ATG7	T	A	0.00210708	0.0017896	0.24	0.015449	0.00183012	3.1E-17	0.00000552
rs4077093	12	51593616	POU6F1	T	G	0.00969144	0.00167974	7.9E-09	0.000465637	0.00171515	0.79	0.00000556
rs7893571	10	16750129	RSU1	G	T	-0.0101768	0.00145748	2.9E-12	-0.00193319	0.00148908	0.19	0.00000609
rs473837	8	60906881	CA8	G	T	0.00863143	0.00143586	1.8E-09	-0.00100543	0.00146675	0.49	0.00000693
rs11134512	5	167847460	WWC1	T	G	0.00824166	0.00146708	1.9E-08	0.00111736	0.00149928	0.46	0.00000723
rs6950388	7	1270699	UNCX	G	A	-0.00945149	0.00169839	2.6E-08	0.00114819	0.0017351	0.51	0.00000806
rs1411432	9	16728532	BNC2	A	C	-0.0124381	0.00176815	2E-12	0.00149441	0.00180604	0.41	0.00000924
rs10960276	9	11819686	TYRP1	C	A	0.00809436	0.00143164	1.6E-08	-0.00233632	0.00146232	0.11	0.00000952
rs7570446	2	193801010	TMEFF2	C	A	-0.00780228	0.00137254	1.3E-08	0.00206294	0.00140349	0.14	0.00000985
rs1454687	3	94038085	NSUN3	C	G	0.0122831	0.00136952	3E-19	0.00123916	0.00140053	0.38	0.00000997
rs4660586	1	42407229	HIVEP3	C	T	0.00896084	0.00156363	0.00000001	-0.00062795	0.00159851	0.69	0.00001
rs11691869	2	100805996	AFF3	C	A	0.0112311	0.00142704	3.5E-15	-0.000364773	0.00145922	0.8	0.0000101
rs61971082	13	86494667	SLITRK6	T	G	-0.0101252	0.00152324	3E-11	0.000162024	0.00155575	0.92	0.0000122
rs2678204	1	201800511	IPO9	T	G	-0.0150162	0.00144491	2.7E-25	-0.00575098	0.00147714	0.000099	0.0000125
rs7548936	1	91207757	BARHL2	G	C	-0.00848296	0.00141586	2.1E-09	0.00185106	0.00144744	0.2	0.0000127
rs809955	4	140874760	MAML3	G	A	0.0101003	0.00142485	1.4E-12	-0.000730481	0.00145623	0.62	0.0000127
rs7433076	3	90234502	EPHA3	T	A	0.00951719	0.00137849	5.1E-12	-0.00091675	0.0014097	0.52	0.0000131
rs13427822	2	213414265	ERBB4	A	G	0.00944934	0.00155587	1.3E-09	-0.000583709	0.00159095	0.71	0.0000137
rs3814883	16	29994922	TAOK2	C	T	-0.014757	0.00137637	8.1E-27	-0.00608707	0.00140582	0.000015	0.0000138
rs2433733	2	230816703	FBXO36	G	A	0.010504	0.00146427	7.3E-13	0.000690913	0.00149729	0.64	0.0000139
rs11642387	16	6753239	RBFOX1	A	G	0.0128653	0.00229443	2.1E-08	-0.00220489	0.00234351	0.35	0.0000165
rs4658403	1	243832560	AKT3	C	T	0.0136423	0.00183985	1.2E-13	0.0000935	0.00188089	0.96	0.0000168
rs11708540	3	70593081	FOXP1	G	A	-0.0106156	0.00189063	0.00000002	0.00206605	0.00193343	0.29	0.0000174
rs403694	21	46567625	ADARB1	C	T	-0.0121794	0.00138306	1.3E-18	-0.00186034	0.00141136	0.19	0.0000182
rs72976986	19	4050424	ZBTB7A	G	A	0.0138512	0.00176589	4.4E-15	0.0006307	0.00180278	0.73	0.0000212
rs117911387	9	130446836	STXBP1	G	A	-0.00367597	0.00326088	0.26	-0.0245792	0.00333076	1.6E-13	0.0000227
rs55931203	17	65854602	BPTF	C	T	-0.0125644	0.00177792	1.6E-12	-0.00191964	0.00181544	0.29	0.0000234
rs4419475	4	96150044	UNC5C	A	T	-0.00809618	0.00139493	6.5E-09	0.00115585	0.00142565	0.42	0.0000261
rs116195355	1	39941508	MACF1	C	A	0.0259588	0.00396473	5.9E-11	0.00409363	0.00405317	0.31	0.0000262
rs409696	2	147900651	ACVR2A	G	A	0.0114218	0.00138666	1.8E-16	0.00154584	0.00141793	0.28	0.0000283

rs73213484	4	28489339	RP11-180C1.1	A	T	0.0146376	0.00197063	1.1E-13	0.00124259	0.00201403	0.54	0.0000302
rs10927006	1	243557659	SDCCAG8	T	C	0.0119925	0.00195352	8.3E-10	0.000884198	0.0019971	0.66	0.0000309
rs1977658	1	107607037	PRMT6	T	G	0.00810079	0.00145332	2.5E-08	-0.0009635	0.00148574	0.52	0.0000315
rs10499014	6	97947755	MMS22L	C	G	0.0100464	0.00155554	1.1E-10	-0.000664623	0.00158952	0.68	0.0000354
rs2237025	4	55541879	KIT	T	C	0.0102433	0.00139113	1.8E-13	-0.000288029	0.00142177	0.84	0.0000359
rs2164300	4	67813017	CENPC	C	T	0.00754945	0.00137666	4.2E-08	-0.00126483	0.00140698	0.37	0.0000366
rs8192675	3	170724883	SLC2A2	T	C	-0.0117042	0.00150889	8.7E-15	-0.000768842	0.00154305	0.62	0.0000385
rs55880046	16	19941557	GPRC5B	T	G	0.0168634	0.00196315	8.7E-18	0.0298545	0.00200515	3.9E-50	0.0000386
rs11782074	8	142617096	AC138647.1	G	T	-0.00971808	0.00143319	1.2E-11	0.000824495	0.00146403	0.57	0.0000414
rs9395520	6	13183523	PHACTR1	C	T	0.00975752	0.00149027	5.9E-11	0.000665362	0.00152282	0.66	0.000042
rs601338	19	49206674	FUT2	G	A	0.000916599	0.00137129	0.5	0.00938062	0.00139994	2.1E-11	0.0000442
rs12357890	10	99762693	CRTAC1	A	G	-0.0121927	0.00138837	1.6E-18	-0.00152667	0.00141848	0.28	0.000048
rs117903946	16	67449639	ZDHHC1	G	A	-0.0097792	0.00386646	0.011	-0.0322531	0.00394917	3.2E-16	0.0000556
rs62106258	2	417167	FAM150B	T	C	0.0591385	0.00318191	4.2E-77	0.0802051	0.00325367	3.6E-134	0.0000625
rs8134638	21	40644170	BRWD1	T	C	-0.00779677	0.00142034	0.00000004	0.000768208	0.00144941	0.6	0.0000661
rs34517439	1	78450517	DNAJB4	C	A	-0.0246975	0.00211727	1.9E-31	-0.0137682	0.0021645	2E-10	0.0000685
rs35852935	4	17991522	LCORL	A	C	-0.0218858	0.00374062	4.9E-09	0.000639291	0.00382301	0.87	0.0000693
rs10973159	9	36992547	PAX5	G	T	-0.00805227	0.00141346	1.2E-08	0.00174034	0.00144375	0.23	0.0000701
rs4916229	1	171443368	PRRC2C	C	G	-0.0151299	0.00233311	8.9E-11	0.000377044	0.00238515	0.87	0.0000707
rs10774018	12	2157925	CACNA1C	G	C	-0.0094769	0.00165987	1.1E-08	-0.00231586	0.00169486	0.17	0.0000716
rs3737992	1	33234128	KIAA1522	G	A	0.0137318	0.00182503	5.3E-14	0.00307401	0.00186573	0.099	0.0000716
rs78369934	17	61739101	MAP3K3	T	C	0.0199362	0.00304655	6E-11	-0.00344213	0.00311083	0.27	0.0000727
rs10185199	2	40282202	SLC8A1	G	A	0.00999545	0.00156387	1.6E-10	0.000100347	0.00159914	0.95	0.0000747
rs10805383	5	63034606	HTR1A	G	A	-0.0104667	0.00137409	2.6E-14	-0.001566	0.00140425	0.26	0.0000806
rs7306710	12	66376091	HMGA2	T	C	0.000734811	0.00138144	0.59	0.00996644	0.00141056	1.6E-12	0.0000809
rs6507054	18	31248323	ASXL3	T	C	-0.00928368	0.00139315	2.7E-11	0.000859588	0.00142239	0.55	0.0000821
rs4572029	10	70889053	VPS26A	A	G	-0.000721662	0.00171259	0.67	0.0111075	0.00174972	2.2E-10	0.0000862
rs34898535	16	31025641	STX1B	C	T	0.0143098	0.00141495	4.8E-24	0.00667281	0.00144522	0.0000039	0.0000894
rs9515446	13	112217108	RP11-65D24.2	A	G	-0.00969209	0.00138007	2.2E-12	-0.000458885	0.00140953	0.74	0.0000922
rs2056477	7	2079744	MAD1L1	G	C	0.0115643	0.00163545	1.5E-12	0.00289922	0.00167081	0.083	0.0000926
rs9366863	6	34688946	C6orf106	T	C	0.0173843	0.00145749	8.5E-33	0.00754408	0.00148933	0.00000041	0.0000943
rs1017529	17	27912415	GIT1	C	A	-0.0106224	0.00183966	7.7E-09	-0.00093032	0.00187847	0.62	0.0000959
rs396354	2	86850022	CHMP3	T	C	0.0103984	0.0015204	8E-12	0.0013629	0.00155469	0.38	0.0000981
rs61217499	12	108417780	WSCD2	G	C	0.0127589	0.00167171	2.3E-14	0.00159702	0.00170695	0.35	0.000109213
rs151252883	2	228998026	SPHKAP	T	G	-0.00921571	0.00144166	1.6E-10	-0.00190531	0.00147417	0.2	0.000120473
rs412243	16	339672	AXIN1	T	C	0.0104789	0.00141618	1.4E-13	0.00408455	0.00144647	0.0047	0.000132466
rs262956	3	183486117	YEATS2	T	G	0.00911918	0.00143655	2.2E-10	0.00142997	0.00146908	0.33	0.000141612
rs71495049	10	34014435	PARD3	G	A	-0.0170656	0.00247827	5.7E-12	-0.00034582	0.002532	0.89	0.000144836
rs3759584	14	103990799	CKB	T	C	0.009739	0.00143449	1.1E-11	0.000275608	0.00146488	0.85	0.000152674
rs4425224	3	56249398	ERC2	C	A	0.0124424	0.00223714	2.7E-08	-0.00011864	0.00228779	0.96	0.00015344
rs2837398	21	41427168	DSCAM	A	C	-0.00819988	0.00140095	4.8E-09	0.00138608	0.00142962	0.33	0.000163603
rs4671328	2	58935282	FANCL	T	G	0.0131699	0.00138617	2.1E-21	0.00562223	0.00141743	0.000073	0.000175851
rs6575340	14	94023972	UNC79	G	A	-0.0133217	0.00142984	1.2E-20	-0.00569274	0.00146014	0.000097	0.000181139
rs10160769	11	76474827	TSKU	G	C	0.00918268	0.00168019	4.6E-08	-0.000987279	0.00171634	0.57	0.000192773
rs270689	6	104790532	HACE1	A	T	-0.0101052	0.00171918	4.2E-09	-0.000649021	0.00175674	0.71	0.000201214
rs2958542	11	62181882	SCGB1A1	C	T	0.000350902	0.00143322	0.81	0.00823945	0.00146406	0.000000018	0.000201884
rs28726372	1	84353839	TTLL7	T	C	-0.00907801	0.00148344	9.4E-10	-0.001432	0.00151653	0.35	0.000206214
rs7601895	2	55281901	RTN4	C	G	0.0103104	0.00148708	4.1E-12	0.000278247	0.00152061	0.85	0.000209617
rs9477762	6	18507853	RNF144B	A	T	-0.0201859	0.00305238	3.8E-11	0.000271923	0.00311905	0.93	0.000212647
rs112898427	2	67561335	ETAA1	C	T	0.00104054	0.00151548	0.49	0.0103395	0.00154965	2.5E-11	0.000215316
rs10503555	8	15763818	TUSC3	A	G	-0.000646069	0.00138509	0.64	0.0077774	0.00141489	0.000000039	0.000222604
rs28408562	15	60917079	RORA	C	G	-0.00784012	0.00137968	1.3E-08	0.0000407	0.00140853	0.98	0.00022643
rs8011566	14	42939471	LRFN5	T	A	-0.00873021	0.00139086	3.5E-10	-0.000688592	0.00142033	0.63	0.000233642
rs7321285	13	54319327	OLFM4	A	C	0.0113478	0.00171932	4.1E-11	0.00146088	0.00175602	0.41	0.000244918
rs7958241	12	49509262	LMBR1L	A	G	-0.00498997	0.00144519	0.00055	-0.0130618	0.00147566	8.6E-19	0.000244933
rs11079849	17	47090785	IGF2BP1	C	T	0.0122339	0.00146379	6.4E-17	0.00141712	0.00149467	0.34	0.000246864
rs13104584	4	80811227	ANTXR2	G	A	-0.00864396	0.00139769	6.2E-10	-0.000193276	0.00142848	0.89	0.000249312
rs10169594	2	41637688	C2orf91	T	C	-0.00788339	0.0014266	3.3E-08	-0.000454997	0.00145877	0.76	0.000256988
rs58351927	17	5297038	NUP88	A	G	-0.0101443	0.0014973	1.2E-11	-0.00016717	0.0015289	0.91	0.000268478
rs824207	15	24007729	NDN	A	G	-0.00220679	0.00137526	0.11	-0.00930969	0.00140401	3.3E-11	0.000268808
rs183315407	1	46201427	IPP	G	A	0.0263723	0.0034926	4.3E-14	0.00453817	0.0035705	0.2	0.000293454
rs2516726	16	2095065	NTHL1	T	C	0.00990951	0.00164497	1.7E-09	0.00241747	0.00168016	0.15	0.000294332
rs1458156	12	41887940	PDZRN4	C	T	-0.00928804	0.00137304	1.3E-11	-0.00119199	0.00140199	0.4	0.000342333
rs862320	16	69651866	NFAT5	C	T	0.0143991	0.0013964	6.2E-25	0.00619317	0.00142627	0.000014	0.000364415
rs10404726	19	18834514	CRTC1	C	T	0.0122931	0.00137833	4.7E-19	0.00655626	0.00140712	0.0000032	0.000365358
rs80236973	3	188001014	LPP	C	T	0.0121589	0.0020083	1.4E-09	0.0000983	0.00205377	0.96	0.00037583
rs12681792	8	62054463	CLVS1	C	A	-0.0095618	0.00174588	4.3E-08	-0.000691572	0.00178344	0.7	0.00038693
rs67679818	7	110672704	IMMP2L	C	T	0.000406124	0.00139936	0.77	0.00779682	0.00142961	0.000000049	0.000388444
rs10204994	2	35443726	CRIM1	G	A	0.0101127	0.0016282	5.3E-10	0.000702062	0.00166492	0.67	0.000390225
rs35918296	8	76862208	HNF4G	C	T	0.0101759	0.00139402	2.9E-13	0.0166507	0.00142402	1.4E-31	0.000393968
rs112380819	3	9498519	SETD5	G	A	-0.0136884	0.00225826	1.3E-09	-0.00105451	0.00230938	0.65	0.000402594
rs567230078	6	43588227	GTPBP2	T	A	0.0250634	0.00424894	3.7E-09	0.00456547	0.00434176	0.29	0.000431868
rs1631026	2	26953850	KCNK3	C	T	-0.0107027	0.00137118	5.9E-15	-0.00268744	0.0014021	0.055	0.000475997
rs61813324	1	156049877	MEX3A	C	T	-0.0182963	0.00202748	1.8E-19	-0.00534173	0.0020727	0.01	0.000490051
rs7084503	10	2666859	PFKP	T	C	0.00486841	0.00137799	0.00041	0.012897	0.00140787	5.2E-20	0.000491534
rs10174253	2	181323160	CWC22	A	C	-0.011209	0.00153204	2.5E-13	-0.00308421	0.00156659	0.049	0.000495967
rs1477290	5	87988934	MEF2C	T	C	-0.0199356	0.00200994	3.5E-23	-0.00814691	0.00205406	0.000073	0.000499345
rs36007635	6	163009335	PARK2	G	A	0.0137121	0.00199026	5.6E-12	0.00264647	0.00203374	0.19	0.000503232
rs10756555	9	14459089	NFIB	G	A	0.0102529	0.00138891	1.6E-13	0.00113354	0.00141867	0.42	0.000521384
rs945211	1	32191798	BAI2	G	C	-0.00849357	0.0014077	1.6E-09	-0.00206335	0.0014391	0.15	0.000549797

rs7182917	15	52080803	TMOD2	T	C	0.00873699	0.00138531	2.8E-10	0.00224617	0.00141427	0.11	0.002950311
rs13107325	4	103188709	SLC39A8	C	T	-0.0287138	0.00260568	3.1E-28	-0.021509	0.00266307	6.7E-16	0.002989822
rs62621197	19	8670147	ADAMTS10	C	T	-0.00649794	0.00376905	0.085	-0.0235313	0.0038478	9.6E-10	0.003050638
rs6050446	20	25195509	ENTPD6	A	G	-0.0264171	0.00389465	1.2E-11	-0.00669706	0.00397522	0.092	0.003073386
rs7808296	7	103127620	RELN	C	T	-0.00254656	0.00147615	0.085	-0.0100374	0.00150806	2.8E-11	0.003151586
rs1324110	6	93913200	EPHA7	G	C	0.00776998	0.00138403	0.00000002	0.00157096	0.00141426	0.27	0.003227397
rs10095724	8	53739232	RB1CC1	G	A	0.00295535	0.00143019	0.039	0.00937064	0.00146096	1.4E-10	0.003251315
rs13174863	5	139080745	CXXC5	A	G	-0.0136233	0.00194393	2.4E-12	-0.00402819	0.00198659	0.043	0.003469566
rs7175642	15	59450079	MYO1E	T	G	0.00859149	0.00147129	5.2E-09	0.00122353	0.00150205	0.42	0.003498348
rs3181269	11	33755956	CD59	C	T	0.00349142	0.00157276	0.026	0.00932683	0.0016066	6.4E-09	0.003637126
rs2229330	1	6649228	ZBTB48	T	G	-0.00347061	0.00263546	0.19	-0.0197417	0.00269425	2.3E-13	0.00375035
rs2187642	12	11855624	ETV6	A	C	-0.00158448	0.00141476	0.26	-0.0111759	0.00144458	1E-14	0.003789832
rs3753639	1	154986091	ZBTB7B	T	C	-0.0114965	0.00160241	7.3E-13	-0.00137638	0.00163815	0.4	0.003910227
rs836179	12	50503082	GPD1	A	G	0.00237187	0.00142112	0.095	0.00980524	0.00145108	1.4E-11	0.003938384
rs6823268	4	145982563	ANAPC10	A	G	-0.0081752	0.00141821	8.2E-09	-0.00235515	0.00144945	0.1	0.003992638
rs34298980	6	40409243	LRFN2	T	C	0.0132574	0.00144434	4.4E-20	0.00588487	0.00147589	0.000067	0.004016212
rs11655704	17	47448172	RP11-81K2.1	T	C	0.00244246	0.00147345	0.097	0.00827198	0.00150455	0.000000038	0.00410523
rs1369159	15	66360842	MEGF11	C	T	0.00787534	0.0013963	1.7E-08	0.00263201	0.00142549	0.065	0.004113603
rs2253310	6	108888593	FOXO3	C	G	-0.0105591	0.00141638	9E-14	-0.00513631	0.00144732	0.00039	0.004187978
rs2275241	9	129370576	LMX1B	G	A	-0.00411426	0.00141867	0.0037	-0.0103897	0.00144907	7.5E-13	0.004289318
rs7331420	13	99236471	STK24	G	A	0.00914179	0.00152583	2.1E-09	-0.000762593	0.0015584	0.62	0.004294773
rs67913249	5	43204126	NIM1K	C	G	0.00934618	0.00145015	1.2E-10	0.00307131	0.00148198	0.038	0.004371666
rs34196306	6	27425644	ZNF184	G	C	-0.00919436	0.00223807	0.00004	-0.0199863	0.00228695	2.3E-18	0.004398136
rs78517245	3	42587865	SEC22C	T	C	-0.0343879	0.00584937	4.1E-09	-0.00697895	0.0059818	0.24	0.004419839
rs12110721	6	55190480	GFRAL	G	A	-0.00788425	0.00185334	0.000021	-0.0189364	0.00189383	1.5E-23	0.00444215
rs4500770	16	74658430	RFWD3	A	T	0.00782096	0.00142756	4.3E-08	0.000195701	0.0014581	0.89	0.004549716
rs1177279	2	61295122	KIAA1841	A	G	0.00206449	0.00152979	0.18	0.00883119	0.00156428	0.000000016	0.004786429
rs12748436	1	177761109	SEC16B	C	G	-0.00565205	0.00258435	0.029	-0.015605	0.002642	3.5E-09	0.004886058
rs61754230	12	72179446	RAB21	C	T	-0.0273798	0.0049283	2.8E-08	-0.00981169	0.0050322	0.051	0.005124163
rs9834519	3	156379637	TIPARP	C	T	0.015592	0.0025405	8.4E-10	0.00635684	0.00259802	0.014	0.005191597
rs10823826	10	53649431	PRKG1	C	T	-0.00897916	0.00158888	1.6E-08	-0.00255677	0.00162333	0.12	0.005241267
rs11205303	1	149906413	MTMR11	T	C	0.0012358	0.00139422	0.38	0.0095816	0.00142532	1.8E-11	0.005443306
rs2035806	10	133984916	JAKMIP3	G	A	0.00954916	0.00138642	5.7E-12	0.00256304	0.00141647	0.07	0.005464625
rs4545941	19	16534207	EPS15L1	T	C	-0.00211814	0.0018643	0.26	-0.0108751	0.00190325	0.000000011	0.0055171
rs2343681	3	136535024	SLC35G2	G	A	-0.0123563	0.00167752	1.8E-13	-0.00450582	0.00171549	0.0086	0.00551951
rs12713889	2	77225361	LRRTM4	T	C	0.00570459	0.00145418	0.000087	0.0116905	0.00148697	3.8E-15	0.005543345
rs111584879	15	66678173	TIPIN	T	C	0.00878936	0.00161059	4.8E-08	0.00133028	0.00164426	0.42	0.005645054
rs575840515	1	80796649	LPHN2	A	G	-0.00900837	0.00152109	3.2E-09	-0.00190383	0.00155502	0.22	0.005761362
rs9462670	6	41014309	OARD1	G	C	-0.00941609	0.00162679	7.1E-09	-0.000986425	0.00166233	0.55	0.005871044
rs2051559	4	3298800	RGS12	T	C	-0.0138644	0.00202875	8.3E-12	-0.0103118	0.00207344	0.00000066	0.005888223
rs201475383	20	26273991	FAM182B	G	A	0.0240169	0.00391789	8.8E-10	0.0069822	0.00399894	0.081	0.005939936
rs12031634	1	34584393	CSMD2	G	A	0.00880574	0.00150452	4.8E-09	0.0036029	0.00153808	0.019	0.006038232
rs61985411	14	41336102	LRFN5	T	A	-0.0165324	0.00275855	2.1E-09	-0.00147493	0.002817	0.6	0.006041274
rs61936936	12	116391685	MED13L	A	T	-0.00486384	0.00229556	0.034	-0.0136211	0.00234396	6.2E-09	0.006078032
rs215634	7	32369148	PDE1C	A	G	0.0104342	0.00141137	1.4E-13	0.00343967	0.00144188	0.017	0.006335508
rs6979832	7	127856276	LEP	A	G	-0.00330062	0.00137966	0.017	-0.00941916	0.00140949	2.3E-11	0.006358941
rs10935143	3	134665159	EPHB1	G	A	0.00839848	0.00137905	1.1E-09	0.000763137	0.00141027	0.59	0.006363082
rs2866720	7	70106310	AUTS2	C	T	-0.00912913	0.0014182	1.2E-10	-0.0014556	0.00144886	0.32	0.006443831
rs10505836	12	19288508	PLEKHA5	A	C	-0.0121361	0.00199185	1.1E-09	-0.00307879	0.00203385	0.13	0.006551459
rs17029006	3	12329452	PPARG	C	T	0.0103969	0.0015534	2.2E-11	0.00441996	0.00158857	0.0054	0.006609749
rs2970356	15	90623540	ZNF710	C	G	-0.00361773	0.00155211	0.02	-0.0104594	0.00158456	4.1E-11	0.006643579
rs11150462	16	82451679	CDH13	T	A	0.00844366	0.0014248	3.1E-09	0.00309566	0.00145528	0.033	0.006853195
rs60497719	19	33971746	PEPD	G	A	-0.00966895	0.00158251	1E-09	-0.000429737	0.00161557	0.79	0.007059581
rs13329943	16	24733751	TNRC6A	C	T	-0.0113063	0.00155186	3.2E-13	-0.00546069	0.00158506	0.00057	0.007147804
rs28839214	4	145313641	GYPA	G	T	-0.00891646	0.00140514	2.2E-10	-0.00383324	0.00143609	0.0076	0.007474707
rs12477385	2	166144850	SCN2A	G	T	0.00924442	0.00164143	1.8E-08	0.00227952	0.00167844	0.17	0.007519801
rs2755253	1	67470843	SLC35D1	C	T	0.00153108	0.00150569	0.31	0.008712	0.00153927	0.000000015	0.007829571
rs1778830	1	156489974	IQGAP3	G	A	-0.009908	0.00142688	3.8E-12	-0.0037383	0.0014587	0.01	0.007969598
rs7264802	20	62692440	TCEA2	A	G	-0.00980735	0.00159143	7.2E-10	-0.00221817	0.00162435	0.17	0.007978942
rs7539903	1	209208033	CAMK1G	T	A	0.0076915	0.00140708	4.6E-08	0.001183	0.00143847	0.41	0.008176092
rs61986330	14	73314450	DPF3	C	A	0.00873325	0.00153905	1.4E-08	0.00362951	0.00157166	0.021	0.008204722
rs329118	5	133861663	JADE2	C	T	0.00948808	0.00139007	8.8E-12	0.00353033	0.00142058	0.013	0.008215378
rs75957461	19	11166163	SMARCA4	C	T	-0.0176806	0.00304742	6.6E-09	-0.00510904	0.00311109	0.1	0.008255818
rs6669341	1	47678458	TAL1	A	G	0.0106846	0.0013873	1.3E-14	0.00627858	0.00141824	0.0000096	0.008406413
rs12037905	1	219628036	SLC30A10	C	T	0.00792729	0.00138814	1.1E-08	0.000748607	0.0014191	0.6	0.008422635
rs3131336	6	28831611	TRIM27	C	T	-0.00818467	0.00213074	0.00012	-0.019064	0.00217729	2E-18	0.008443093
rs2939931	10	121636406	MCMBP	T	C	-0.00274182	0.00137365	0.046	-0.00785688	0.00140343	0.000000022	0.008481064
rs1865341	9	8845911	PTPRD	C	T	-0.00899606	0.00161509	2.5E-08	-0.000627794	0.0016497	0.7	0.008516992
rs76520838	15	47916618	SEMA6D	C	T	-0.0232182	0.00386698	1.9E-09	-0.00412475	0.00394783	0.3	0.008536224
rs2583410	4	102182199	PPP3CA	A	C	-0.0133529	0.00193619	5.3E-12	-0.00522084	0.00197884	0.0083	0.008591386
rs7989098	13	27925496	GTF3A	T	C	-0.00742477	0.0015923	0.0000031	-0.0120926	0.00162629	1E-13	0.008852163
rs6511826	19	12706991	ZNF490	G	A	0.013982	0.00245639	1.3E-08	0.00551122	0.00250771	0.028	0.008887634
rs34542489	17	51917844	KIF2B	A	C	0.00777978	0.00140115	2.8E-08	0.00252149	0.00143071	0.078	0.008989157
rs869400	3	185826740	DGKG	T	G	-0.0183105	0.00176638	3.5E-25	-0.00922265	0.00180637	0.00000033	0.009048169
rs1477890	4	18511738	LCORL	A	G	-0.00977959	0.00137366	1.1E-12	-0.0042684	0.00140391	0.0024	0.009381794
rs6963840	7	78144371	MAGI2	C	T	-0.0129345	0.00189361	8.5E-12	-0.00684037	0.00193454	0.00041	0.009431928
rs2660241	16	4940023	PPL	T	C	-0.00812512	0.00142623	1.2E-08	-0.00240525	0.00145674	0.099	0.009447561
rs818898	9	6970806	KDM4C	A	G	0.00619175	0.00149048	0.000033	0.0120672	0.00152242	2.3E-15	0.009558092
rs12644329	4	143634746	INPP4B	G	A	0.00791227	0.00141949	2.5E-08	0.00177866	0.00145075	0.22	0.009713174
rs4989244	9	102100348	SEC61B	G	A	0.00763477	0.00138564	3.6E-08	0.00260557	0.00141533	0.066	0.009727535

rs35809007	2	47019521	LINC01118	G	A	0.0105922	0.00142731	1.2E-13	0.00433584	0.0014595	0.003	0.010094931
rs115866895	1	1592638	SLC35E2B	A	G	0.0120194	0.0015664	1.7E-14	0.00560296	0.00160134	0.00047	0.010293043
rs73085586	20	22430241	FOXA2	G	A	-0.00465313	0.00171669	0.0067	-0.00970779	0.0017522	0.00000003	0.010334787
rs7503580	17	79087036	BAIAP2	C	T	-0.00487897	0.00189311	0.01	-0.0111158	0.00193305	8.9E-09	0.010385599
rs4911382	20	32553095	RALY	C	T	-0.00831839	0.00139678	2.6E-09	-0.0022266	0.00142568	0.12	0.010644474
rs7840305	8	57168101	CHCHD7	A	G	0.00341742	0.00141931	0.016	0.008059	0.00144985	0.000000027	0.010975357
rs16996644	20	15813475	MACROD2	C	G	-0.0106002	0.00206764	0.00000029	-0.0193482	0.00211042	4.8E-20	0.011014364
rs12992672	2	632592	TMEM18	G	A	-0.0359503	0.00181142	1.2E-87	-0.0433484	0.00185227	4E-121	0.0111035
rs3815156	17	29685150	NF1	A	G	-0.00529424	0.00180617	0.0034	-0.010306	0.00184428	0.000000023	0.011565044
rs4759073	12	54653258	CBX5	G	A	0.00934791	0.00139222	1.9E-11	0.000435375	0.00142157	0.76	0.011653261
rs9438393	1	205782718	SLC41A1	A	G	0.00526644	0.00139059	0.00015	0.0103485	0.0014216	3.4E-13	0.01170179
rs72753485	9	96673230	BARX1	G	C	-0.0155961	0.00249848	4.3E-10	-0.0036761	0.00255202	0.15	0.011931028
rs1547205	9	98815145	ERCC6L2	G	C	0.0132049	0.00232169	1.3E-08	0.00201872	0.00237144	0.39	0.012072566
rs4648450	1	2723214	TTC34	C	A	0.0098008	0.00137971	1.2E-12	0.00435452	0.00141048	0.002	0.012291742
rs724623	14	47303577	MDGA2	A	C	0.0102441	0.00137406	9E-14	0.00437332	0.00140317	0.0018	0.012362303
rs35162296	6	26318262	HIST1H4H	C	T	-0.0114195	0.0022233	0.00000028	-0.0200619	0.00227186	1E-18	0.01237244
rs1899689	7	121964349	CADPS2	C	T	-0.00773624	0.00140509	3.7E-08	-0.00309859	0.00143546	0.031	0.012386562
rs78886584	1	16859325	FAM231B	A	G	-0.0084915	0.0013848	8.7E-10	-0.00152215	0.00141569	0.28	0.012391498
rs9594686	13	42723197	DGKH	C	T	0.00604231	0.00180431	0.00081	0.0107007	0.00184282	6.4E-09	0.012783336
rs1598121	3	82694710	GBE1	A	G	-0.00896415	0.00142305	3E-10	-0.0032264	0.00145527	0.027	0.012895303
rs9888533	13	107854612	FAM155A	C	T	-0.00765412	0.00139943	4.5E-08	-0.0011471	0.0014293	0.42	0.013187276
rs2576135	13	54691442	OLFM4	T	A	0.0131674	0.00238721	3.5E-08	0.00120958	0.00243817	0.62	0.013214562
rs7511698	1	25015638	SRRM1	C	T	0.00821032	0.00148524	3.2E-08	0.00314307	0.00151837	0.038	0.013338296
rs28711392	11	13349559	ARNTL	T	C	0.0117792	0.00143412	2.1E-16	0.00576055	0.00146498	0.000084	0.013467765
rs7549358	1	115252609	NRAS	G	C	0.00882987	0.00142922	6.5E-10	0.00361946	0.0014611	0.013	0.013572218
rs1905616	8	93235675	RUNX1T1	G	A	0.00819683	0.00145677	1.8E-08	0.000802342	0.00148811	0.59	0.01402263
rs6752979	2	81741750	CTNNA2	G	A	-0.00895678	0.00146997	1.1E-09	-0.00367287	0.00150312	0.015	0.014032948
rs6449532	5	60715446	ZSWIM6	C	T	0.00697674	0.00142588	0.00000099	0.0110534	0.00145717	3.3E-14	0.014363953
rs7020196	9	12289527	TYRP1	C	T	0.00778854	0.00141323	3.6E-08	0.000551538	0.00144352	0.7	0.014377489
rs368540015	7	74292165	GTF2IRD2	A	G	-0.0181657	0.00324824	2.2E-08	-0.00572743	0.00331846	0.084	0.014377606
rs6761463	2	50201547	NRXN1	G	C	0.0125814	0.00185776	1.3E-11	0.00361307	0.00189965	0.057	0.01455048
rs35390852	4	143067054	INPP4B	G	A	-0.0113857	0.00208652	4.8E-08	-0.0013317	0.00213247	0.53	0.014631605
rs6583310	3	196170985	UBXN7	G	C	-0.00878295	0.0013839	2.2E-10	-0.00326447	0.00141523	0.021	0.014689735
rs1987960	20	30649834	HCK	T	C	-0.0189251	0.00331178	1.1E-08	-0.00562982	0.0033803	0.096	0.014744999
rs115778101	1	78198554	USP33	T	C	0.0177683	0.00321873	3.4E-08	0.00692255	0.00329052	0.035	0.015091607
rs10116891	9	122651993	RP11-295D22.1	G	A	-0.00993581	0.00228645	0.000014	-0.0135983	0.00233545	5.8E-09	0.015718569
rs12450028	17	2207425	SRR	C	T	0.00685806	0.00144277	0.000002	0.0115636	0.00147321	4.2E-15	0.015785559
rs537508	4	171042158	AADAT	G	C	-0.00777315	0.00139636	2.6E-08	-0.00326427	0.00142711	0.022	0.015967644
rs7020564	9	109670016	ZNF462	A	T	0.00497384	0.00152062	0.0011	0.0100197	0.0015532	1.1E-10	0.015968261
rs10953577	7	108263540	DNAJB9	T	C	-0.00247917	0.00141639	0.08	-0.00858308	0.00144701	0.000000003	0.016156161
rs34994596	15	80991447	ABHD17C	T	C	0.0111514	0.00150201	1.1E-13	0.00477498	0.00153342	0.0018	0.01650868
rs34373881	3	20432033	SGOL1	G	A	0.00883268	0.00153671	9E-09	0.00198039	0.00157151	0.21	0.016652236
rs45521740	19	2245622	SF3A2	G	A	-0.0180325	0.00295173	1E-09	-0.00869428	0.0030134	0.0039	0.017984149
rs200801362	6	31555480	LST1	T	C	-0.00607736	0.00253968	0.017	-0.0188461	0.00259515	3.8E-13	0.01802019
rs2629881	3	59778271	FHIT	C	T	-0.00263976	0.00165496	0.11	-0.0105954	0.00169243	3.8E-10	0.018056076
rs4663213	2	236807893	AGAP1	G	A	0.0094607	0.00165947	1.2E-08	0.00103579	0.00169689	0.54	0.018364109
rs112852122	20	47498117	ARFGEF2	G	A	0.0133703	0.00191182	2.7E-12	0.00375107	0.00195137	0.055	0.018619791
rs9615723	22	48386670	FAM19A5	C	T	0.00771492	0.00140281	3.8E-08	0.00226115	0.0014315	0.11	0.018870846
rs9370527	6	56245812	COL21A1	G	A	-0.00327636	0.00160074	0.041	-0.00949473	0.00163571	6.4E-09	0.018960632
rs11513729	12	112273499	MAPKAPK5	C	T	0.00799293	0.00141154	1.5E-08	0.00106932	0.00144129	0.46	0.019564768
rs1476698	2	242296449	FARP2	A	G	0.00138506	0.00141763	0.33	0.00822246	0.0014496	0.000000014	0.022013211
rs7239114	18	45921214	ZBTB7C	G	A	-0.00644481	0.00138816	0.0000034	-0.0134996	0.00141729	1.7E-21	0.022399676
rs533493779	2	104447054	TMEM182	A	T	-0.00869294	0.00142487	1.1E-09	-0.000575884	0.001457	0.69	0.022930495
rs11765062	7	54417515	VSTM2A	T	C	0.00751629	0.00137499	4.6E-08	0.000936617	0.00140472	0.5	0.022963313
rs1409158	1	119538890	TBX15	C	T	0.00923072	0.00161087	0.00000001	0.00333182	0.0016468	0.043	0.023361182
rs1333010	13	66205228	PCDH9	G	A	0.00653104	0.00140819	0.0000035	0.0120684	0.00143825	4.8E-17	0.023440556
rs12885251	14	99670791	BCL11B	G	A	0.00762803	0.00139078	4.1E-08	0.00213171	0.00142025	0.13	0.023751521
rs77976727	8	4300554	CSMD1	C	T	-0.00743742	0.00235836	0.0016	-0.0151036	0.0024091	3.6E-10	0.023776099
rs8015400	14	25930988	STXBP6	C	A	-0.0126459	0.00146766	6.9E-18	-0.00733747	0.00149876	0.00000098	0.024195466
rs10842356	12	24621348	BCAT1	A	T	0.00518695	0.00137144	0.00016	0.00823376	0.00140036	4.1E-09	0.024505514
rs142503704	5	92622421	NR2F1	G	A	-0.0262684	0.00467519	1.9E-08	-0.00812529	0.0047778	0.089	0.024660599
rs4723263	7	33194826	BBS9	G	C	-0.00253823	0.00138286	0.066	-0.00832963	0.00141275	3.7E-09	0.024836345
rs73422097	6	41727740	PGC	A	G	-0.00587366	0.00149213	0.000083	-0.0106191	0.00152472	3.3E-12	0.025444845
rs13061117	3	181186466	SOX2	T	C	-0.0146976	0.00242091	1.3E-09	-0.0079932	0.00247572	0.0012	0.025993132
rs61937656	12	39483502	CPNE8	G	A	0.00506716	0.00164351	0.002	0.0117234	0.00167816	2.8E-12	0.02619685
rs4575195	10	114765747	TCF7L2	C	A	0.00959417	0.00147977	9E-11	0.00442711	0.00151186	0.0034	0.026338786
rs1040046	6	83473573	UBE3D	C	A	-0.0112601	0.00192094	4.6E-09	-0.00124798	0.0019629	0.52	0.026392676
rs788163	2	172931559	METAP1D	A	C	-0.0100556	0.00153629	5.9E-11	-0.00356573	0.00157094	0.023	0.026746769
rs686431	6	35974217	SLC26A8	C	T	-0.0147642	0.00508885	0.0037	-0.030172	0.0052	6.5E-09	0.026774516
rs2246623	17	74084449	EXOC7	C	T	0.00479438	0.00138107	0.00052	0.00894181	0.00141021	2.3E-10	0.026965243
rs78907487	22	22151939	MAPK1	A	C	-0.00677401	0.00193715	0.00047	-0.0123725	0.00197676	3.9E-10	0.02702925
rs7103389	11	881639	CHID1	T	C	-0.00946008	0.00142256	2.9E-11	-0.00453219	0.00145317	0.0018	0.027167704
rs12927792	16	9713194	RP11-297M9.1	C	T	-0.00867045	0.00139549	5.2E-10	-0.00196508	0.00142535	0.17	0.027318788
rs2083323	18	1856272	METTL4	G	A	-0.0104121	0.00179988	7.3E-09	-0.0050254	0.00183766	0.0062	0.027430303
rs13218383	6	120173501	MAN1A1	C	G	0.00931833	0.00145169	1.4E-10	0.00422494	0.0014834	0.0044	0.027796792
rs9673839	16	76895693	RP11-58C22.1	A	G	-0.00830314	0.00137898	1.7E-09	-0.00319534	0.00140847	0.023	0.027873741
rs2186118	1	66456465	PDE4B	C	A	0.00986064	0.00151196	6.9E-11	0.00489994	0.00154569	0.0015	0.027920812
rs4074404	1	187683956	PLA2G4A	T	A	-0.00483623	0.00188095	0.01	-0.0126757	0.0019229	4.3E-11	0.027954707
rs35193668	13	33092929	N4BP2L2	C	T	0.0104702	0.00143054	2.5E-13	0.00567781	0.00146108	0.0001	0.028250277
rs698147	5	3513485	IRX1	A	G	0.00877987	0.0013771	1.8E-10	0.00140861	0.00140733	0.32	0.028600076

rs3806114	6	20482335	E2F3	G	A	0.00878865	0.00147166	2.3E-09	0.00151126	0.00150381	0.31	0.028752625
rs1704190	2	200760629	C2orf69	G	A	-0.00833069	0.00142051	4.5E-09	-0.00123448	0.00145254	0.4	0.028828951
rs10860295	12	98542699	RP11-181C3.1	T	C	-0.00180776	0.0013812	0.19	-0.00851585	0.00141032	1.6E-09	0.029287587
rs139497	22	41640098	RANGAP1	C	T	0.00619711	0.00149173	0.000033	0.0102085	0.00152224	2E-11	0.029573269
rs868784	11	43944388	C11orf96	G	A	0.00787224	0.00141664	2.7E-08	0.00227508	0.00144712	0.12	0.030020767
rs6597653	9	133788465	FIBCD1	G	C	-0.0085299	0.00140699	1.3E-09	-0.00305337	0.00143714	0.034	0.030302637
rs11215403	11	115058585	CADM1	G	A	0.00590973	0.00159996	0.00022	0.0132366	0.00163438	5.5E-16	0.030437904
rs146980124	17	44627649	ARL17A	A	C	0.00548036	0.0016892	0.0012	0.0102411	0.00172485	2.9E-09	0.031060136
rs1799507	12	16427314	SLC15A5	G	A	-0.0108354	0.00195679	3.1E-08	-0.00295156	0.00199804	0.14	0.03107603
rs7141912	14	35649431	KIAA0391	A	T	0.0118214	0.00206846	1.1E-08	0.00613534	0.00211229	0.0037	0.031222715
rs212517	1	21577159	ECE1	T	A	0.00156219	0.00139997	0.26	0.00875288	0.0014312	9.6E-10	0.031940958
rs12213441	6	143208838	HIVEP2	C	T	-0.0105064	0.00167201	3.3E-10	-0.00385056	0.00170854	0.024	0.032227459
rs9603697	13	40783323	AL133318.1	C	T	-0.0085306	0.00146459	5.7E-09	-0.0129577	0.00149585	4.6E-18	0.032732558
rs36131051	3	107888841	IFT57	T	G	0.0107943	0.00171155	2.9E-10	0.000827802	0.0017503	0.64	0.034145107
rs10896348	11	68357368	PPP6R3	T	C	0.00720097	0.00153112	0.0000026	0.0118678	0.00156406	3.3E-14	0.034563572
rs9852062	3	45373442	LARS2	T	A	0.00817197	0.00138361	3.5E-09	0.00289301	0.00141493	0.041	0.034610962
rs7162542	15	84514290	ADAMTSL3	C	G	0.00314669	0.00138179	0.023	0.00931445	0.00141068	4E-11	0.035517028
rs1286138	14	91485445	RPS6KA5	T	G	-0.00900388	0.00146728	8.4E-10	-0.00544322	0.00149837	0.00028	0.035559634
rs7759938	6	105378954	LIN28B	C	T	-0.00304747	0.00146741	0.038	-0.00997693	0.00149947	2.9E-11	0.035723566
rs78565420	8	85703065	RALYL	C	T	-0.018757	0.00315301	2.7E-09	-0.0106744	0.00322084	0.00092	0.036245462
rs79675564	2	211286896	LANCL1	C	A	-0.0150946	0.00255465	3.4E-09	-0.00366598	0.00261226	0.16	0.0364714
rs16940823	18	22137319	HRH4	C	A	0.010772	0.00178542	1.6E-09	0.00341791	0.00182289	0.061	0.037385628
rs12951079	17	34933059	GGNBP2	G	A	0.0107877	0.00140507	1.6E-14	0.0074237	0.00143471	0.00000023	0.037429776
rs7038966	9	73777777	TRPM3	C	T	-0.00947635	0.00140121	1.4E-11	-0.00365092	0.00143123	0.011	0.037584731
rs10760277	9	126093999	CRB2	C	T	-0.00886536	0.00141365	3.6E-10	-0.00168407	0.00144394	0.24	0.038042894
rs11040333	11	49346332	FOLH1	G	A	-0.00397729	0.00151208	0.0085	-0.00854938	0.00154462	0.000000031	0.038633661
rs10823504	10	72034062	NPFFR1	G	A	0.000901726	0.00281193	0.75	0.0158621	0.0028729	0.000000034	0.039871951
rs7518221	1	225561346	DNAH14	T	C	0.00795352	0.00143293	2.8E-08	0.0018025	0.0014649	0.22	0.040921179
rs7931626	11	28421841	METTL15	C	T	0.00527104	0.00137584	0.00013	0.00970346	0.00140544	5E-12	0.043379127
rs66674732	13	62721160	PCDH20	G	A	-0.00816409	0.00141088	7.2E-09	-0.00267594	0.00144099	0.063	0.043621463
rs9579775	13	20616557	ZMYM2	A	C	-0.0146498	0.00208415	2.1E-12	-0.00467691	0.00212864	0.028	0.044631338
rs544957562	9	33978015	UBAP2	A	T	0.0123934	0.00202306	9E-10	0.00573856	0.00206642	0.0055	0.045950774
rs4432271	16	20245283	GP2	C	T	-0.0115565	0.00206349	2.1E-08	-0.0175304	0.00210763	9E-17	0.046056039
rs80082351	3	114415926	ZBTB20	A	G	0.018501	0.00284688	8.1E-11	0.00748991	0.00291133	0.01	0.046539114
rs16839832	1	196349909	KCNT2	G	T	-0.00265015	0.00249835	0.29	-0.0140808	0.00255407	0.000000035	0.04740739
rs76824303	3	62459819	CADPS	A	C	0.0151797	0.00234294	9.2E-11	0.00618417	0.00239599	0.0098	0.047534914
rs544200874	4	20124826	SLIT2	C	T	-0.0176783	0.0027129	7.2E-11	-0.00865278	0.00277265	0.0018	0.047578885
rs113132247	9	131026108	GOLGA2	G	A	-0.0123286	0.0019113	1.1E-10	-0.00549973	0.00195226	0.0048	0.047733299
rs62379271	5	105870033	EFNA5	T	G	-0.0078061	0.00139152	0.00000002	-0.00321644	0.00142206	0.024	0.048401106
rs11047138	12	24019853	SOX5	C	G	-0.0143769	0.00262949	4.6E-08	-0.00508395	0.00268493	0.058	0.048972068
rs7086898	10	104386152	SUFU	A	G	-0.0138742	0.00253258	4.3E-08	-0.00497773	0.00258749	0.054	0.049460543
rs57488047	15	79403002	RASGRF1	T	C	0.00986083	0.00138545	1.1E-12	0.00377491	0.00141442	0.0076	0.049804678
rs11856579	15	78012688	LINGO1	G	A	0.00917954	0.00155262	3.4E-09	0.00487577	0.00158509	0.0021	0.050405273
rs12147845	14	101144596	DLK1	C	T	-0.0135688	0.00214705	2.6E-10	-0.00775094	0.00219254	0.00041	0.050832014
rs7606059	2	188152749	CALCRL	T	C	-0.00404686	0.00146282	0.0057	-0.0105079	0.0014958	2.1E-12	0.051915241
rs8124896	20	21385659	NKX2-4	T	C	-0.0131677	0.00228357	8.1E-09	-0.00577363	0.00233081	0.013	0.052813998
rs4677813	3	194863860	XXYLT1	T	C	0.00893255	0.00158099	1.6E-08	0.00559913	0.00161678	0.00053	0.053062705
rs884152	8	25770557	EBF2	G	T	-0.00332391	0.0014324	0.02	-0.00851231	0.00146322	0.000000006	0.054623685
rs34811474	4	25408838	ANAPC4	G	A	0.0165964	0.00162688	2E-24	0.0102115	0.00166271	8.2E-10	0.054632877
rs76702514	1	195148296	KCNT2	C	G	0.0101367	0.001689	2E-09	0.00391119	0.00172668	0.024	0.055399445
rs12821683	12	58588964	XRCC6BP1	G	C	-0.0111753	0.00201297	2.8E-08	-0.00532484	0.00205541	0.0096	0.056015602
rs73078357	3	48695834	CELSR3	T	C	0.0118946	0.00209239	1.3E-08	0.00489077	0.00213976	0.022	0.056895598
rs7869098	9	27816218	LINGO2	T	G	0.00636075	0.00137674	0.0000038	0.00984298	0.00140624	2.6E-12	0.057057987
rs12462975	19	30272202	CCNE1	G	A	-0.0114755	0.00146997	5.9E-15	-0.00515105	0.00150068	0.0006	0.057365504
rs114728753	3	78483402	ROBO1	A	C	-0.00895145	0.00146561	1E-09	-0.00131501	0.00149879	0.38	0.057601386
rs7565437	2	65646966	SPRED2	T	C	0.00200679	0.0013944	0.15	0.00818295	0.00142584	9.5E-09	0.057731627
rs9788550	14	29681138	PRKD1	G	C	0.0137871	0.00159576	5.6E-18	0.00768056	0.00162958	0.0000024	0.058146177
rs680071	11	103088414	DYNC2H1	T	C	-0.0117393	0.0021142	2.8E-08	-0.00613943	0.00215969	0.0045	0.058993867
rs1222216	11	30346052	ARL14EP	C	T	0.0121516	0.00163666	1.1E-13	0.00508542	0.00167187	0.0024	0.059274907
rs12634936	3	147716498	ZIC1	T	C	-0.0181042	0.00314699	8.8E-09	-0.0110744	0.00321824	0.00058	0.059983727
rs4677156	3	72417857	RYBP	A	T	0.00378299	0.00164241	0.021	0.00924646	0.00167959	0.000000037	0.060335066
rs329651	11	133767622	IGSF9B	G	T	-0.0110894	0.00173557	1.7E-10	-0.00717249	0.00177292	0.000052	0.060456641
rs4783789	16	51446707	SALL1	T	C	0.00165356	0.00164771	0.32	0.0095829	0.00168296	0.000000012	0.061573683
rs12363672	11	55684028	OR5W2	A	C	-0.0238392	0.00429171	2.8E-08	-0.0132424	0.00438406	0.0025	0.061752495
rs10457469	6	126083658	HEY2	G	A	-0.00763453	0.00137206	2.6E-08	-0.00308041	0.00140203	0.028	0.062338597
rs2034963	3	48170802	CDC25A	G	C	0.00500354	0.00144686	0.00054	0.0110872	0.00147962	6.7E-14	0.062610953
rs7719067	5	153538241	MFAP3	A	G	0.0093096	0.00138359	1.7E-11	0.0134519	0.00141395	1.8E-21	0.062907105
rs117455294	20	57427951	GNAS	C	A	0.00489944	0.0031084	0.11	0.0193211	0.00317271	1.1E-09	0.06342545
rs2207894	20	54387343	CBLN4	C	T	0.00760055	0.0017451	0.000013	0.0143543	0.0017812	7.7E-16	0.064001799
rs146910503	2	25446473	DNMT3A	G	A	0.0147822	0.00491444	0.0026	0.0334167	0.00502526	2.9E-11	0.065188252
rs1805123	7	150645534	KCNH2	T	G	0.0110468	0.00159322	4.1E-12	0.00583885	0.00162766	0.00033	0.067501198
rs10791113	11	130873165	SNX19	A	G	-0.00856944	0.00137526	4.6E-10	-0.00396314	0.00140485	0.0048	0.069501882
rs796915	6	154304628	OPRM1	C	G	-0.00736863	0.00149082	0.00000077	-0.0129135	0.00152339	2.3E-17	0.069754936
rs72755233	15	100692953	ADAMTS17	G	A	-0.0096828	0.00217908	0.0000088	-0.0176324	0.00222464	2.3E-15	0.069801394
rs10146997	14	79945162	NRXN3	A	G	-0.0159997	0.00165074	3.2E-22	-0.00868742	0.00168572	0.00000026	0.071590119
rs3823674	7	50571996	DDC	C	T	0.00765672	0.00138882	3.5E-08	0.00484169	0.00141884	0.00064	0.073239869
rs72652703	8	67209548	CRH	T	C	0.00992488	0.001578	3.2E-10	0.00486743	0.00161195	0.0025	0.07333846
rs35221880	12	133301500	ANKLE2	T	C	0.00857287	0.00155424	3.5E-08	0.00472496	0.00158701	0.0029	0.073791833
rs1775255	6	51243035	PKHD1	G	T	-0.00945521	0.00137505	6.1E-12	-0.0133493	0.00140509	2.1E-21	0.075064479
rs7145882	14	103255461	TRAF3	T	C	0.0114597	0.00144519	2.2E-15	0.0081884	0.00147582	0.000000029	0.0752351

rs7814267	8	5545084	CSMD1	A	G	-0.0055326	0.00178809	0.002	-0.0108902	0.00182656	2.5E-09	0.075535317
rs6679458	1	96946253	PTBP2	G	T	-0.0115552	0.00138957	9.1E-17	-0.00669756	0.00142057	0.0000024	0.075976352
rs114593013	3	84113491	CADM2	A	G	0.0197179	0.00294476	2.1E-11	0.0115525	0.00301143	0.00012	0.076773373
rs12454712	18	60845884	BCL2	T	C	-0.00811303	0.00141626	0.00000001	-0.00602653	0.00144599	0.000031	0.077251569
rs2157295	22	42701984	TCF20	T	G	-0.0049354	0.00141856	0.0005	-0.00795969	0.00144757	0.000000038	0.07808564
rs1436348	3	104612668	ALCAM	A	G	-0.00966304	0.00138887	3.5E-12	-0.0044633	0.00142031	0.0017	0.079144165
rs201666051	9	20920868	FOCAD	C	T	-0.00149182	0.00141899	0.29	-0.00824182	0.0014494	0.000000013	0.079186365
rs10736156	10	104019447	GBF1	C	A	-0.0118278	0.00188917	3.8E-10	-0.00785032	0.00193013	0.000048	0.079297596
rs6606686	12	110903380	GPN3	G	C	0.00974754	0.00147061	3.4E-11	0.00596426	0.00150162	0.000071	0.081052194
rs1582931	5	122657199	CEP120	G	A	0.00965729	0.00138429	3E-12	0.0053046	0.00141467	0.00018	0.081667733
rs11633022	15	73074890	ADPGK	C	A	-0.0108928	0.0014426	4.3E-14	-0.00503714	0.00147276	0.00063	0.082135765
rs74080008	1	51047717	FAF1	G	T	0.00559341	0.00152116	0.00024	0.00901336	0.00155509	6.8E-09	0.082867594
rs11209943	1	72750500	NEGR1	A	G	-0.0140816	0.00139655	6.6E-24	-0.0183431	0.0014277	8.8E-38	0.083237035
rs2875762	6	124925032	NKAIN2	G	C	-0.0110373	0.00160426	6E-12	-0.00516927	0.00163931	0.0016	0.083698734
rs2238435	16	4014282	ADCY9	C	G	-0.014148	0.00141187	1.2E-23	-0.0164809	0.00144207	3E-30	0.084845383
rs34292685	11	64049021	GPR137	C	T	0.0127228	0.00185993	7.9E-12	0.00531169	0.00189995	0.0052	0.087883394
rs12941038	17	66509143	PRKAR1A	C	T	-0.00474693	0.00163424	0.0037	-0.00954182	0.00166872	0.000000011	0.088939019
rs6719507	2	29733801	ALK	G	A	0.00301515	0.00137852	0.029	0.00781795	0.00140961	0.000000029	0.091518813
rs347551	5	119389031	PRR16	C	G	-0.00889176	0.00139474	1.8E-10	-0.00309272	0.00142535	0.03	0.092741531
rs2425856	20	44911954	CDH22	A	G	0.00842158	0.00138117	1.1E-09	0.00347821	0.00140974	0.014	0.093076697
rs651533	1	82375561	LPHN2	T	A	0.00929619	0.00159479	5.6E-09	0.0045563	0.00163036	0.0052	0.093082803
rs4764949	12	103658096	C12orf42	A	G	0.0119345	0.00146505	3.8E-16	0.00801214	0.00149593	0.000000085	0.093270115
rs28465175	15	53427155	ONECUT1	A	G	0.0150381	0.00270111	2.6E-08	0.0123747	0.00275759	0.0000072	0.093748297
rs4482463	2	205375909	PARD3B	C	A	0.018863	0.00257351	2.3E-13	0.00946665	0.00263155	0.00032	0.097437004
rs7230240	18	42597978	SETBP1	C	T	0.00939729	0.00150477	4.2E-10	0.00272606	0.00153636	0.076	0.097778788
rs9291816	5	63932508	RGS7BP	C	T	0.00797556	0.0014656	5.3E-08	0.0133785	0.00149777	4.2E-19	0.098167921
rs7749708	6	153375907	RGS17	C	T	-0.00998267	0.00150851	3.7E-11	-0.00468521	0.00154146	0.0024	0.100679322
rs10799778	1	23313353	LACTBL1	T	G	0.0125819	0.00183897	7.8E-12	0.00705079	0.00187999	0.00018	0.102365214
rs3129942	6	32338283	C6orf10	G	T	-0.00800723	0.00156428	0.00000031	-0.013944	0.00159845	2.7E-18	0.103033382
rs4467770	6	12086826	HIVEP1	G	A	-0.00986966	0.00155197	2E-10	-0.00624841	0.00158587	0.000081	0.103113613
rs11000993	10	76084111	ADK	T	C	-0.013812	0.00207909	3.1E-11	-0.00633592	0.00212417	0.0029	0.104152442
rs114263339	5	50932343	ISL1	C	T	-0.0252802	0.00432869	5.2E-09	-0.0136122	0.0044237	0.0021	0.104265336
rs7354849	1	232765308	SIPA1L2	A	G	-0.00425564	0.0013795	0.002	-0.00817408	0.00141027	6.8E-09	0.107168208
rs1320903	3	131758077	CPNE4	G	A	-0.0146157	0.00146919	2.6E-23	-0.0100084	0.00150245	2.7E-11	0.107267945
rs3791478	2	240064139	HDAC4	T	C	0.00464182	0.00221479	0.036	0.0125091	0.00226474	0.000000033	0.110141737
rs1619120	9	87302196	NTRK2	A	G	-0.00679342	0.00140193	0.0000013	-0.00806432	0.00143197	0.000000018	0.11200225
rs6843852	4	162132758	FSTL5	C	T	-0.00871909	0.00137121	2E-10	-0.00476679	0.00140141	0.00067	0.112363875
rs7672	16	68294800	PLA2G15	C	G	0.00468552	0.00152735	0.0022	0.00900368	0.00156003	7.9E-09	0.113107372
rs8030456	15	68076856	MAP2K5	C	T	0.0183432	0.00163636	3.7E-29	0.0213135	0.00167058	2.8E-37	0.113123052
rs113962925	17	46044446	CDK5RAP3	C	T	-0.0171085	0.00263645	8.6E-11	-0.00894893	0.00269208	0.00089	0.113352695
rs1381010	4	112677085	C4orf32	G	A	0.00823717	0.00148666	0.00000003	0.00281207	0.00151941	0.064	0.114629306
rs762705	3	50313527	LSMEM2	A	C	0.00721404	0.00191619	0.00017	0.0107589	0.00195957	0.00000004	0.116474486
rs1296685	22	18230964	BID	A	G	-0.00949275	0.00169731	2.2E-08	-0.0060927	0.00173202	0.00044	0.11700587
rs947088	20	17171373	PCSK2	G	T	-0.00726977	0.00153011	0.000002	-0.0106197	0.00156177	1E-11	0.118301386
rs3172332	3	153973408	ARHGEF26	T	C	0.00269351	0.00142352	0.058	0.00801043	0.00145575	0.000000037	0.119999088
rs3125326	10	63053788	TMEM26	A	C	-0.00789262	0.00141947	2.7E-08	-0.00448372	0.00145024	0.002	0.121732968
rs3902951	14	69789755	GALNT16	T	G	-0.010523	0.00163159	1.1E-10	-0.00473325	0.00166616	0.0045	0.122935054
rs28462076	4	65696174	TECRL	A	G	0.00939268	0.00162009	6.7E-09	0.00624026	0.00165578	0.00016	0.123347968
rs9260164	6	29911684	HLA-A	C	T	-0.00985598	0.00157978	4.4E-10	-0.0151662	0.00161429	5.7E-21	0.125129473
rs55726687	12	991306	WNK1	G	A	-0.0137557	0.00168297	3E-16	-0.0144994	0.00171845	3.2E-17	0.125534695
rs1373349	18	63282992	CDH7	C	T	0.00980624	0.00148041	3.5E-11	0.00212836	0.00151148	0.16	0.125685785
rs7123283	11	122809055	C11orf63	C	T	0.00253327	0.00138144	0.067	0.00832173	0.00141117	3.7E-09	0.126329828
rs1452991	6	141473363	NMBR	G	A	-0.0057654	0.001427	0.000053	-0.010059	0.00145817	5.3E-12	0.127637278
rs74929176	17	54905494	C17orf67	C	T	0.00904667	0.00165261	4.4E-08	0.00503913	0.00168748	0.0028	0.131643435
rs72917533	2	175238924	CIR1	T	C	0.011462	0.00176411	8.2E-11	0.00466368	0.0018039	0.0097	0.137015723
rs12705894	7	113351252	PPP1R3A	G	A	0.00780083	0.00138156	1.6E-08	0.00189878	0.00141142	0.18	0.137395137
rs77560793	1	175001179	MRPS14	G	A	0.0245625	0.00399409	7.8E-10	0.0062456	0.00408318	0.13	0.140501774
rs7355953	3	85792137	CADM2	T	C	-0.0106292	0.00167149	2E-10	-0.015159	0.00170933	7.4E-19	0.141443425
rs8096658	18	77156537	NFATC1	C	G	0.00428786	0.00138951	0.002	0.00902376	0.00141867	2E-10	0.14306836
rs11642090	16	81730582	CMIP	T	C	-0.00728434	0.00142829	0.00000034	-0.0117093	0.00145885	1E-15	0.149655912
rs661878	11	29188691	METTL15	A	G	0.00860245	0.00201805	0.00002	0.0137542	0.00206148	2.5E-11	0.15400519
rs9480184	6	155987788	NOX3	C	T	-0.0098556	0.00168442	4.9E-09	-0.00511342	0.00172121	0.003	0.154588252
rs815163	1	190294726	BRINP3	T	C	0.0107541	0.00137834	6.1E-15	0.00583636	0.00140908	0.000034	0.157123839
rs4958568	5	152016093	NMUR2	G	A	0.00480597	0.00153334	0.0017	0.00995639	0.00156699	2.1E-10	0.15732532
rs11218510	11	121922587	BLID	G	A	0.0080957	0.00140221	7.8E-09	0.00321674	0.00143238	0.025	0.158524635
rs1788808	18	21090023	NPC1	A	G	0.0127402	0.00137473	1.9E-20	0.00881097	0.00140358	3.4E-10	0.159980605
rs2542615	10	131128952	MGMT	C	T	0.00843562	0.00145857	7.3E-09	0.00220981	0.00149019	0.14	0.160731485
rs4672338	2	60217457	BCL11A	C	T	-0.008354	0.00144845	8E-09	-0.00460002	0.00148112	0.0019	0.166497588
rs4792716	17	15943144	NCOR1	A	G	-0.00810528	0.0013842	4.8E-09	-0.00346804	0.00141341	0.014	0.172003095
rs1296328	4	137083193	PCDH18	A	C	0.0117384	0.00138729	2.6E-17	0.00803962	0.00141785	0.000000014	0.179915715
rs6029180	20	39178923	MAFB	A	G	-0.00818774	0.00147876	3.1E-08	-0.00457439	0.00150935	0.0024	0.181901513
rs12883788	14	33303540	AKAP6	C	T	-0.0124311	0.00138188	2.3E-19	-0.0100392	0.00141116	1.1E-12	0.183477076
rs10133279	14	82702712	SEL1L	C	T	-0.0048279	0.00139096	0.00052	-0.00896156	0.00142043	2.8E-10	0.184865767
rs61909165	11	134589355	AP003062.1	T	A	-0.012264	0.00182095	1.6E-11	-0.00886811	0.00186014	0.0000019	0.187328528
rs61746970	19	51132746	SYT3	G	A	-0.0213186	0.00361813	3.8E-09	-0.00888319	0.00369372	0.016	0.187905645
rs1696057	12	90767160	CCER1	T	C	0.00391427	0.00144691	0.0068	0.00831199	0.00147741	0.000000018	0.188289502
rs143662847	8	48804722	PRKDC	C	T	0.0193182	0.0035338	4.6E-08	0.00931519	0.00360983	0.0099	0.188312042
rs1199333	3	138091701	MRAS	G	T	0.00932218	0.00176316	0.00000012	0.0135434	0.00180308	5.9E-14	0.189122455
rs12641981	4	45179883	GNPDA2	C	T	-0.0186736	0.00138471	1.9E-41	-0.0222039	0.00141521	1.8E-55	0.191363698
rs39862	5	66185151	MAST4	T	C	0.00963482	0.00152366	2.6E-10	0.0116464	0.0015571	7.5E-14	0.191458742

rs2735556	3	88105360	CGGBP1	T	C	0.0129473	0.00214812	1.7E-09	0.017187	0.00219676	5.1E-15	0.191701351
rs1013737	18	937050	ADCYAP1	G	C	-0.00585259	0.00137434	0.000021	-0.0106383	0.00140318	3.4E-14	0.193192148
rs2141004	2	6194359	DKFZP761K232	A	C	0.00738983	0.00155318	0.000002	0.0100488	0.00158821	2.5E-10	0.195319868
rs6069625	20	54747469	MC3R	A	G	0.00872998	0.00155672	0.00000002	0.00357745	0.00158892	0.024	0.19594918
rs2658797	11	93212254	SMCO4	C	T	0.00779058	0.00137105	1.3E-08	0.00324825	0.00140056	0.02	0.196949133
rs67257872	11	8530218	STK33	A	G	0.0105979	0.00137933	1.5E-14	0.00701931	0.00140901	0.00000063	0.19772073
rs12187066	5	88800355	MEF2C	A	G	-0.0101906	0.00157523	9.8E-11	-0.00598703	0.00160981	0.0002	0.19816282
rs62425398	6	166416028	PDE10A	C	A	-0.00911641	0.00223532	0.000045	-0.0154122	0.00228414	1.5E-11	0.20101218
rs2268762	3	38516075	ACVR2B	A	G	-0.00438642	0.00140427	0.0018	-0.00799477	0.00143606	0.000000026	0.201022199
rs8038574	15	95275890	MCTP2	T	C	0.00907367	0.00145054	4E-10	0.00484626	0.00148087	0.0011	0.205079023
rs62277889	2	198783693	PLCL1	C	T	0.0105949	0.00158158	2.1E-11	0.00640711	0.00161724	0.000074	0.205678304
rs7498665	16	28883241	SH2B1	A	G	-0.0172834	0.00140127	5.9E-35	-0.0134393	0.00143125	6E-21	0.209728015
rs11223204	11	132652554	OPCML	A	G	-0.00873553	0.00138674	3E-10	-0.00617047	0.00141658	0.000013	0.211702984
rs9814758	3	123062657	ADCY5	T	G	0.00838747	0.00143726	5.4E-09	0.00488837	0.00146979	0.00088	0.213424705
rs56803094	15	99222509	IGF1R	A	G	0.00957693	0.00164509	5.8E-09	0.00594203	0.00167949	0.0004	0.218036481
rs2247401	15	53156672	ONECUT1	G	A	-0.00852417	0.001561	4.7E-08	-0.00407787	0.00159363	0.011	0.219000871
rs79686965	11	46020909	PHF21A	A	G	-0.0310439	0.00555666	2.3E-08	-0.0138044	0.00567623	0.015	0.226006651
rs6798941	3	52893465	TMEM110	C	T	-0.0109993	0.00150528	2.7E-13	-0.00520743	0.00153936	0.00072	0.228044509
rs11525873	7	138817193	TTC26	T	C	0.014829	0.00231302	1.4E-10	0.0175009	0.00236302	1.3E-13	0.229928767
rs7102934	11	84648068	DLG2	T	C	-0.00907898	0.00149355	1.2E-09	-0.00507042	0.00152569	0.00089	0.231950058
rs4971239	1	203491150	OPTC	G	A	-0.0114876	0.00184196	4.5E-10	-0.00942842	0.00188304	0.00000055	0.232025506
rs148137538	1	173399677	PRDX6	A	G	0.0250491	0.00457729	4.4E-08	0.0135299	0.00467938	0.0038	0.23976297
rs8130408	21	39237138	KCNJ6	A	C	-0.00467883	0.00158127	0.0031	-0.00901268	0.00161364	0.000000023	0.242323457
rs200744777	20	6609610	BMP2	T	G	-0.00937915	0.00139283	1.7E-11	-0.0121262	0.00142165	1.5E-17	0.249818688
rs7550711	1	110082886	GPR61	C	T	-0.0426419	0.004316	5.1E-23	-0.0484123	0.00441228	5.2E-28	0.250021933
rs57590313	4	113323430	ALPK1	C	A	-0.0101728	0.00178824	1.3E-08	-0.00697726	0.00182762	0.00013	0.251547534
rs10796828	11	69490346	ORAOV1	T	G	-0.00784804	0.00142571	3.7E-08	-0.0113389	0.00145639	6.9E-15	0.252511408
rs78607331	12	57648644	R3HDM2	C	T	-0.0179538	0.00331476	6.1E-08	-0.0238811	0.00338464	1.7E-12	0.257175046
rs17399739	10	87490850	GRID1	A	G	-0.0177508	0.00271192	5.9E-11	-0.020955	0.00277071	3.9E-14	0.260801988
rs1402989	3	27056851	NEK10	C	T	-0.00402825	0.00137099	0.0033	-0.00779167	0.00140203	0.000000027	0.262368613
rs17773370	18	57951433	MC4R	G	A	-0.0158879	0.00276123	8.7E-09	-0.0118565	0.00281918	0.000026	0.266858874
rs41310284	10	102447647	PAX2	C	A	0.0177406	0.00229148	9.8E-15	0.0206042	0.00234116	1.4E-18	0.267168602
rs112859723	3	131625376	CPNE4	T	C	0.0111434	0.00191128	5.5E-09	0.00882031	0.00195455	0.0000064	0.268463809
rs3748126	7	76632736	UPK3B	C	G	0.0165225	0.00182279	1.3E-19	0.0131465	0.0018622	1.7E-12	0.268627638
rs9610387	22	36476762	RBFOX2	G	A	0.00788695	0.00245745	0.0013	0.0137993	0.00250771	0.000000037	0.270266249
rs2281148	20	36433288	CTNNBL1	T	C	-0.00554598	0.00158632	0.00047	-0.00979394	0.00161914	1.5E-09	0.270622905
rs35894137	8	43071838	HGSNAT	C	T	0.014227	0.00251993	1.6E-08	0.00782259	0.00257415	0.0024	0.270922361
rs594585	16	65939803	CDH5	T	G	0.00487033	0.00140994	0.00055	0.00795132	0.0014401	0.000000034	0.273159566
rs2968973	4	130740404	C4orf33	C	T	0.00811383	0.00143085	1.4E-08	0.00992715	0.00146237	1.1E-11	0.273526681
rs6548220	2	225951	SH3YL1	A	G	0.00935841	0.00148347	2.8E-10	0.00524133	0.00151692	0.00055	0.276509421
rs113230003	19	18460956	PGPEP1	G	A	0.0126164	0.00157671	1.2E-15	0.00699893	0.00160965	0.000014	0.280971432
rs811054	16	72251132	PMFBP1	C	T	-0.00863679	0.00138424	4.4E-10	-0.00465946	0.00141385	0.00098	0.286395592
rs7439324	4	44501351	KCTD8	C	T	0.00752666	0.00186209	0.000053	0.0107707	0.0019031	0.000000015	0.287707649
rs59893724	5	80830788	SSBP2	A	G	0.0114154	0.00159677	8.7E-13	0.00613892	0.00163182	0.00017	0.288704892
rs13047416	21	40309436	ETS2	C	G	0.00865747	0.00142161	1.1E-09	0.0123424	0.0014507	1.8E-17	0.291614011
rs8111074	19	51776117	SIGLECL1	G	T	0.00838998	0.00151756	3.2E-08	0.00601454	0.00154926	0.0001	0.304078732
rs10969334	9	29717279	LINGO2	C	A	0.00867165	0.00140574	6.9E-10	0.00633714	0.00143587	0.00001	0.304553404
rs6601451	8	10243681	MSRA	C	G	0.0115699	0.00137389	3.7E-17	0.00781386	0.00140345	0.000000026	0.304600637
rs10790809	11	126372550	KIRREL3	A	G	-0.00656622	0.00138038	0.000002	-0.00966875	0.00141008	7E-12	0.305722951
rs4688359	3	61198880	FHIT	C	T	0.010469	0.00141661	1.5E-13	0.0130482	0.00144868	2.1E-19	0.312934541
rs62171698	2	143959096	ARHGAP15	C	A	-0.0120557	0.00196697	8.8E-10	-0.00639125	0.00201133	0.0015	0.314524625
rs538579	3	62711674	CADPS	G	C	-0.0079853	0.00147593	6.3E-08	-0.0084219	0.00150934	0.000000024	0.322558606
rs11134679	5	170623391	RANBP17	A	G	-0.0124028	0.00147968	5.2E-17	-0.00860276	0.00151215	0.000000013	0.323487587
rs17619860	8	87779603	CNGB3	T	C	-0.0104045	0.00186001	2.2E-08	-0.00566931	0.00190003	0.0028	0.329240238
rs630602	1	54728864	SSBP3	G	C	-0.00772636	0.00140837	4.1E-08	-0.0101454	0.00143978	1.8E-12	0.337007832
rs12517187	5	112444682	MCC	C	T	-0.00824621	0.00138786	2.8E-09	-0.00450524	0.00141832	0.0015	0.339654761
rs138329430	1	174619318	RABGAP1L	G	A	-0.0127982	0.00219309	5.4E-09	-0.0100646	0.002242	0.0000072	0.342074358
rs1517037	18	56878274	GRP	C	T	0.00992268	0.00175754	1.6E-08	0.00703328	0.00179442	0.000089	0.346715769
rs34778589	22	50709957	MAPK11	A	C	-0.0143368	0.0025	9.8E-09	-0.0103151	0.00255113	0.000053	0.347023385
rs56094641	16	53806453	FTO	A	G	-0.0465215	0.00139707	4E-243	-0.0472597	0.00142696	1.6E-240	0.356936285
rs10887571	10	88030441	GRID1	C	T	-0.00682159	0.0013894	0.00000091	-0.00798055	0.00141952	0.000000019	0.362884726
rs2450444	10	93010383	PCGF5	G	A	0.00807358	0.00143771	0.00000002	0.00524032	0.00146889	0.00036	0.36473487
rs2417998	9	111958746	EPB41L4B	C	G	0.00841353	0.00151559	2.8E-08	0.00596932	0.00154807	0.00012	0.365991085
rs10111937	8	54160092	OPRK1	C	T	-0.00490206	0.00149609	0.0011	-0.00836953	0.00152827	0.000000043	0.366501416
rs8117463	20	17231063	PCSK2	G	A	0.00518926	0.00146851	0.00041	0.0088999	0.00149889	2.9E-09	0.378106465
rs7536458	1	118864602	SPAG17	T	G	-0.00740047	0.00155402	0.0000019	-0.0101185	0.00158868	1.9E-10	0.381042455
rs10749659	1	151033979	MLLT11	C	T	0.0101834	0.00163239	4.4E-10	0.0063934	0.0016688	0.00013	0.387013605
rs68015088	18	51484010	MBD2	G	A	0.00500633	0.00144839	0.00055	0.00810392	0.00147879	0.000000043	0.390853466
rs12429545	13	54102206	OLFM4	G	A	-0.0200311	0.00206205	2.6E-22	-0.0206347	0.00210607	1.2E-22	0.393230202
rs6870983	5	87697533	TMEM161B	C	T	0.0137971	0.00167313	1.6E-16	0.0097013	0.00170986	0.000000014	0.394624196
rs112875651	8	126506694	TRIB1	G	A	-0.00835363	0.00142292	4.3E-09	-0.00479365	0.00145353	0.00097	0.396061157
rs719802	11	113234679	TTC12	T	C	0.00820044	0.0014076	5.7E-09	0.00391242	0.00143789	0.0065	0.399898646
rs827803	3	157920266	RSRC1	G	T	0.00786618	0.00138053	1.2E-08	0.00580979	0.00141178	0.000039	0.402080035
rs2234458	11	65639374	EFEMP2	C	T	0.0128189	0.00142617	2.5E-19	0.0125771	0.00145686	6E-18	0.405530475
rs79236537	5	86727690	CCNH	G	T	-0.0298957	0.00489434	1E-09	-0.0185066	0.00500176	0.00022	0.407248678
rs8008772	14	88321884	GALC	A	T	-0.00926237	0.00159022	5.7E-09	-0.00772414	0.00162392	0.000002	0.415017328
rs957512	9	120405705	TLR4	T	C	0.00879661	0.00146254	1.8E-09	0.0103405	0.00149388	4.5E-12	0.417440374
rs142315514	1	147050816	BCL9	C	A	-0.0213869	0.00379002	1.7E-08	-0.0138614	0.00387455	0.00035	0.42898166
rs7012648	8	28091482	ELP3	G	A	-0.00684619	0.00139578	0.00000093	-0.00973962	0.00142581	8.4E-12	0.430287508
rs7753558	6	117523471	VGLL2	C	A	0.00570277	0.00143129	0.000068	0.00908761	0.00146255	5.2E-10	0.432940184

rs4739558	8	38337264	FGFR1	A	G	0.00809748	0.00140056	7.4E-09	0.00829517	0.00143069	6.7E-09	0.446523149
rs73982435	17	31473455	ASIC2	C	T	0.00942922	0.00166802	1.6E-08	0.00756369	0.00170321	0.000009	0.465811913
rs512121	18	7548501	PTPRM	T	C	0.0105713	0.00174913	1.5E-09	0.00930527	0.00178584	0.00000019	0.476966036
rs7453694	6	51739528	PKHD1	C	T	-0.00979363	0.00152053	1.2E-10	-0.00598175	0.00155374	0.00012	0.477819349
rs12045879	1	15817090	CELA2B	C	T	0.0061829	0.00147365	0.000027	0.00988708	0.00150652	5.3E-11	0.47958885
rs59714050	3	141267294	RASA2	T	A	-0.019371	0.00275265	2E-12	-0.0228386	0.00281497	4.9E-16	0.487035858
rs1633418	22	20091756	DGCR8	T	C	0.00792126	0.00141049	0.00000002	0.004885	0.00143933	0.00069	0.491327207
rs3861871	9	129424719	LMX1B	A	G	-0.00828546	0.00139067	2.6E-09	-0.00711657	0.00142047	0.00000054	0.493601675
rs11496125	7	103417557	RELN	C	T	-0.0109238	0.00139455	4.8E-15	-0.00854189	0.00142469	0.000000002	0.500013878
rs7951870	11	46373311	DGKZ	T	C	-0.00715047	0.00182188	0.000087	-0.0115536	0.00186108	5.4E-10	0.52090774
rs12798028	11	47604639	NDUFS3	C	T	-0.0150337	0.00139188	3.4E-27	-0.0145642	0.00142183	1.3E-24	0.527357034
rs559231	18	39644247	PIK3C3	G	T	-0.00952495	0.00141154	1.5E-11	-0.00909768	0.00144117	2.7E-10	0.531546264
rs73026723	19	31017177	ZNF536	C	T	0.0140677	0.00190031	1.3E-13	0.0094854	0.00194001	0.000001	0.542994723
rs4148155	4	89054667	ABCG2	A	G	0.0143494	0.00215753	2.9E-11	0.00641588	0.00220505	0.0036	0.546516121
rs7656673	4	30840331	PCDH7	A	G	-0.00828306	0.00139847	3.2E-09	-0.011556	0.00142927	6.2E-16	0.551539336
rs3810291	19	47569003	ZC3H4	G	A	-0.0157949	0.00146479	4.1E-27	-0.0147393	0.00149539	6.4E-23	0.571383505
rs72892910	6	50816887	TFAP2B	G	T	-0.0252844	0.00181803	5.7E-44	-0.0246629	0.00185774	3.2E-40	0.573603603
rs7711823	5	158489315	EBF1	A	G	0.00657182	0.00142907	0.0000043	0.00838771	0.00146043	9.3E-09	0.578259633
rs34722008	4	38659594	AC021860.1	G	A	0.00699237	0.00143592	0.0000011	0.00826538	0.00146755	0.000000018	0.582424518
rs75706763	2	145669168	ZEB2	A	G	-0.0177039	0.00313665	1.7E-08	-0.0121363	0.00320738	0.00015	0.586664804
rs12484438	22	40558064	TNRC6B	T	C	0.0128869	0.00145125	6.7E-19	0.0117799	0.00148093	1.8E-15	0.593098027
rs55658481	2	219284215	VIL1	G	A	-0.0089689	0.00144403	5.3E-10	-0.00815869	0.0014766	0.000000033	0.605224249
rs11976084	7	137437156	DGKI	C	T	-0.00856668	0.00151882	1.7E-08	-0.0066061	0.00155165	0.000021	0.610879573
rs58084604	18	57849429	MC4R	C	T	-0.0351865	0.00162237	2.6E-104	-0.0331788	0.00165642	3E-89	0.639182079
rs1852006	7	77829768	MAGI2	G	A	0.00883089	0.00143031	6.7E-10	0.00877312	0.00146122	1.9E-09	0.647257549
rs2712667	12	99588917	ANKS1B	G	C	0.00962407	0.00143716	2.1E-11	0.00848645	0.00146746	7.3E-09	0.658849548
rs55896564	8	11447093	BLK	G	A	0.0116966	0.00138218	2.6E-17	0.00911305	0.00141192	1.1E-10	0.680319936
rs55838622	5	95711605	PCSK1	A	C	-0.00989605	0.00164361	1.7E-09	-0.00673263	0.00167968	0.000061	0.688876447
rs1422067	5	77424836	AP3B1	C	T	0.00870177	0.00160988	6.5E-08	0.0108803	0.00164522	3.8E-11	0.690202603
rs9922288	16	24550930	RBBP6	A	G	0.00938916	0.00163749	9.8E-09	0.0105391	0.00167252	3E-10	0.692806621
rs10791902	11	67093360	SSH3	C	T	-0.00563275	0.00140655	0.000062	-0.00791481	0.00143682	0.000000036	0.696581727
rs11150745	17	78757626	RPTOR	A	G	0.0137948	0.00147616	9.2E-21	0.0121511	0.00150731	7.5E-16	0.702479635
rs72618637	2	48953979	GTF2A1L	T	A	0.0099921	0.00177487	1.8E-08	0.00628905	0.00181489	0.00053	0.705135669
rs7752998	6	34398358	RPS10	A	T	0.0102464	0.00174849	4.6E-09	0.00734414	0.00178668	0.000039	0.706890342
rs111768603	3	42329113	CCK	G	T	0.0159053	0.00219022	3.8E-13	0.0154313	0.00223981	5.6E-12	0.750423451
rs7619139	3	25110415	RARB	T	A	-0.00884007	0.00139518	2.4E-10	-0.00979985	0.00142677	6.5E-12	0.759791664
rs3931548	9	103113652	TEX10	C	A	-0.0105077	0.0014385	2.8E-13	-0.00540991	0.00146933	0.00023	0.761641771
rs80082536	3	35195311	ARPP21	A	G	-0.0128944	0.00212463	1.3E-09	-0.00715424	0.00217273	0.00099	0.771183462
rs7827182	8	8380471	SGK223	G	C	-0.0112266	0.00137268	2.9E-16	-0.00848727	0.00140221	1.4E-09	0.776826066
rs4836133	5	124332103	ZNF608	C	A	-0.00836449	0.00141129	3.1E-09	0.00231309	0.00246539	0.35	0.786351589
rs62004865	15	74207695	LOXL1	T	A	-0.0135621	0.00224169	1.4E-09	-0.0117753	0.00228856	0.00000027	0.814628514
rs7928320	11	116942753	SIK3	C	G	-0.0172858	0.00297269	6.1E-09	-0.00223066	0.00303665	0.46	0.836253954
rs59428052	2	53861389	GPR75-ASB3	A	G	0.0114661	0.00199987	9.8E-09	0.00833123	0.00204497	0.000046	0.867118662
rs8089514	18	69224478	RP11-723G8.2	T	A	-0.0081679	0.00143938	1.4E-08	-0.00731918	0.00146959	0.00000063	0.876197736
rs1576655	13	79587841	RBM26	A	C	-0.0113489	0.00142746	1.9E-15	-0.0118472	0.00145793	4.4E-16	0.886607189
rs12606230	18	52492252	RAB27B	T	C	-0.0116875	0.00162392	6.2E-13	-0.0127194	0.001658	1.7E-14	0.911819108
rs72673947	8	118884379	EXT1	A	G	-0.0140208	0.00223036	3.3E-10	-0.0118252	0.00227835	0.00000021	0.923011464
rs61992671	14	101531854	AL117190.3	A	G	0.00988005	0.00143461	5.7E-12	0.00757897	0.001465	0.00000023	0.925555966
rs62048187	15	38117049	TMCO5A	G	C	-0.00601476	0.00150076	0.000061	-0.00838898	0.00153213	0.000000044	0.934936884
rs57636386	18	58048295	MC4R	T	C	0.0247018	0.00248459	2.7E-23	0.0235012	0.00253674	2E-20	0.947256486
rs1423534	5	63977000	FAM159B	G	A	0.00770872	0.00139391	3.2E-08	0.00714486	0.00142451	0.00000053	0.948333389
rs35775580	7	130420740	KLF14	A	G	0.0180149	0.00324057	2.7E-08	0.0132438	0.00331061	0.000063	0.948565676
rs112253053	19	19425145	SUGP1	T	A	0.013771	0.00186963	1.8E-13	0.0101428	0.00190869	0.00000011	0.967308093
rs28350	3	42418446	LYZL4	A	G	0.0126363	0.00179146	1.7E-12	0.00969738	0.00183201	0.00000012	0.969187358
rs1834144	18	40744790	RIT2	C	A	0.00792997	0.00142258	2.5E-08	0.00681807	0.00145244	0.0000027	0.990302683
rs12140153	1	62579891	INADL	G	T	0.0214472	0.00240105	4.2E-19	0.021828	0.0024546	6E-19	0.994017345
rs9317002	13	59175727	PCDH17	C	A	-0.0113783	0.00138238	1.9E-16	-0.0115024	0.00141189	3.7E-16	0.996218241

SNP - single nucleotide polymorphism identifier, Beta - effect estimate coefficient for SNP on body size, SE- standard error of the effect estimate, P - corresponding p -value

Table S2. A summary of the genetic datasets used in this study.

Outcome	Sample size	Cases	Control	Year	Ancestry	Study	ICD-10 codes
Angina pectoris	167333	14712	152621	2020	European	FinnGen study	I20
Atherosclerosis	172780	4937	167843	2020	European	FinnGen study	I70
Atrial fibrillation and flutter	114539	17325	97214	2020	European	FinnGen study	I48
Coronary artery disease	184305	60801	123504	2015	Mixed	CARDIoGRAMplusC4D consortium	
Heart failure	168862	9576	159286	2020	European	FinnGen study	I50
Hypertension	176899	43576	133323	2020	European	FinnGen study	I10
Myocardial infarction	171875	43676	128199	2015	Mixed	CARDIoGRAMplusC4D consortium	
Peripheral artery disease	173166	5323	167843	2020	European	FinnGen study	I73.9
Pulmonary embolism	176613	3016	173597	2020	European	FinnGen study	I26
Pulmonary heart disease	176899	3302	173597	2020	European	FinnGen study	I27
Stroke	446696	40585	406111	2015	Mixed	MEGASTROKE consortium	
Varicose veins	167879	13928	153951	2020	European	FinnGen study	I83

Table S3. Inverse variance weighted method results for univariable Mendelian randomization analyses for childhood body size on cardiovascular disease outcomes.

Outcome	F-stat	nSNPs	Beta	SE	P	OR	FDR
Angina pectoris	13.6	302	0.136	0.093	0.145	1.145	0.289
Atherosclerosis	13.6	302	0.565	0.129	0.000	1.759	0.000
Atrial fibrillation and flutter	13.6	302	0.524	0.101	0.000	1.690	0.000
Coronary heart disease	13.6	276	0.426	0.060	0.000	1.531	0.000
Heart failure	13.6	302	0.543	0.088	0.000	1.722	0.000
Hypertension	13.6	302	0.570	0.073	0.000	1.768	0.000
Myocardial infarction	13.6	276	0.413	0.064	0.000	1.512	0.000
Peripheral artery disease	13.6	302	0.637	0.126	0.000	1.891	0.000
Pulmonary embolism	13.6	302	0.242	0.152	0.111	1.274	0.243
Pulmonary heart disease	13.6	302	0.245	0.143	0.087	1.278	0.208
Stroke	13.6	278	0.039	0.058	0.502	1.040	0.635
Varicose veins	13.6	302	0.449	0.100	0.000	1.567	0.000

Table S4. Inverse variance weighted method results for univariable Mendelian randomization analyses for adult body size on cardiovascular disease.

Outcome	F-stat	nSNPs	Beta	SE	P	OR
Angina pectoris	16	562	0.389	0.076	0.000	1.476
Atherosclerosis	16	562	0.761	0.105	0.000	2.141
Atrial fibrillation and flutter	16	562	0.769	0.077	0.000	2.157
Coronary heart disease	16	505	0.569	0.055	0.000	1.766
Heart failure	16	562	0.865	0.073	0.000	2.374
Hypertension	16	562	0.919	0.055	0.000	2.507
Myocardial infarction	16	505	0.598	0.058	0.000	1.818
Peripheral artery disease	16	562	0.844	0.101	0.000	2.326
Pulmonary embolism	16	562	0.420	0.123	0.001	1.522
Pulmonary heart disease	16	562	0.493	0.114	0.000	1.637
Stroke	16	511	0.298	0.050	0.000	1.347
Varicose veins	16	562	0.414	0.072	0.000	1.513

Table S5. Weighted median results for univariable Mendelian randomization analyses for childhood and adult body size on cardiovascular disease outcomes.

Exposure	Outcome	nSNPs	Beta	SE	P	OR
Age 10 body size	Angina pectoris	302	0.326	0.156	0.036	1.386
Age 10 body size	Atherosclerosis	302	0.571	0.205	0.005	1.770
Age 10 body size	Atrial fibrillation and flutter	302	0.430	0.153	0.005	1.538
Age 10 body size	Coronary heart disease	276	0.487	0.089	0.000	1.627
Age 10 body size	Heart failure	302	0.605	0.151	0.000	1.832
Age 10 body size	Hypertension	302	0.634	0.095	0.000	1.885
Age 10 body size	Myocardial infarction	276	0.519	0.106	0.000	1.681
Age 10 body size	Peripheral artery disease	302	0.482	0.188	0.010	1.619
Age 10 body size	Pulmonary embolism	302	0.433	0.255	0.090	1.542
Age 10 body size	Pulmonary heart disease	302	0.495	0.236	0.036	1.641
Age 10 body size	Stroke	278	0.013	0.090	0.886	1.013
Age 10 body size	Varicose veins	302	0.707	0.141	0.000	2.027
Adult body size	Angina pectoris	562	0.384	0.128	0.003	1.469
Adult body size	Atherosclerosis	562	0.662	0.163	0.000	1.939
Adult body size	Atrial fibrillation and flutter	562	0.841	0.122	0.000	2.319
Adult body size	Coronary heart disease	505	0.639	0.087	0.000	1.895
Adult body size	Heart failure	562	0.846	0.133	0.000	2.331
Adult body size	Hypertension	562	1.057	0.076	0.000	2.876
Adult body size	Myocardial infarction	505	0.578	0.088	0.000	1.782
Adult body size	Peripheral artery disease	562	0.774	0.166	0.000	2.168
Adult body size	Pulmonary embolism	562	0.579	0.214	0.007	1.783
Adult body size	Pulmonary heart disease	562	0.767	0.207	0.000	2.152
Adult body size	Stroke	511	0.226	0.078	0.004	1.253
Adult body size	Varicose veins	562	0.562	0.116	0.000	1.755

Table S6. MR-Egger results for univariable Mendelian randomization analyses for childhood and adult body size on cardiovascular disease outcomes.

Exposure	Outcome	nSNPs	Beta	SE	P	OR
Age 10 body size	Angina pectoris	302	0.234	0.215	0.277	1.264
Age 10 body size	Atherosclerosis	302	1.180	0.297	0.000	3.253
Age 10 body size	Atrial fibrillation and flutter	302	0.391	0.233	0.095	1.478
Age 10 body size	Coronary heart disease	276	0.554	0.137	0.000	1.741
Age 10 body size	Heart failure	302	0.554	0.203	0.007	1.740
Age 10 body size	Hypertension	302	0.766	0.169	0.000	2.150
Age 10 body size	Myocardial infarction	276	0.650	0.145	0.000	1.916
Age 10 body size	Peripheral artery disease	302	1.132	0.291	0.000	3.102
Age 10 body size	Pulmonary embolism	302	-0.172	0.351	0.623	0.842
Age 10 body size	Pulmonary heart disease	302	-0.030	0.331	0.927	0.970
Age 10 body size	Stroke	278	0.069	0.132	0.603	1.071
Age 10 body size	Varicose veins	302	0.475	0.231	0.040	1.609
Adult body size	Angina pectoris	562	0.493	0.221	0.026	1.636
Adult body size	Atherosclerosis	562	1.244	0.303	0.000	3.471
Adult body size	Atrial fibrillation and flutter	562	0.749	0.224	0.001	2.114
Adult body size	Coronary heart disease	505	0.877	0.165	0.000	2.403
Adult body size	Heart failure	562	1.087	0.210	0.000	2.966
Adult body size	Hypertension	562	1.177	0.160	0.000	3.245
Adult body size	Myocardial infarction	505	0.814	0.173	0.000	2.258
Adult body size	Peripheral artery disease	562	1.285	0.291	0.000	3.614
Adult body size	Pulmonary embolism	562	0.838	0.355	0.019	2.311
Adult body size	Pulmonary heart disease	562	1.062	0.329	0.001	2.891
Adult body size	Stroke	511	0.110	0.149	0.461	1.116
Adult body size	Varicose veins	562	0.745	0.209	0.000	2.107

Table S7. Inverse variance weighted method results for multivariable Mendelian randomization analyses for childhood and adult body size on cardiovascular disease outcomes.

Exposure	Outcome	nSNPs	Beta	SE	OR	LCI	UCI	P
Age 10 body size	Angina pectoris	263	-0.175	0.124	0.839	0.657	1.071	0.159
Age 10 body size	Atherosclerosis	263	0.125	0.172	1.133	0.808	1.589	0.468
Age 10 body size	Atrial fibrillation and flutter	263	-0.095	0.129	0.910	0.707	1.171	0.462
Age 10 body size	Coronary heart disease	241	0.053	0.088	1.054	0.886	1.254	0.551
Age 10 body size	Heart failure	263	-0.142	0.117	0.867	0.689	1.091	0.224
Age 10 body size	Hypertension	263	-0.042	0.092	0.959	0.801	1.149	0.650
Age 10 body size	Myocardial infarction	241	-0.018	0.092	0.983	0.820	1.178	0.848
Age 10 body size	Peripheral artery disease	263	0.219	0.167	1.245	0.899	1.726	0.188
Age 10 body size	Pulmonary embolism	263	-0.022	0.201	0.979	0.660	1.451	0.915
Age 10 body size	Pulmonary heart disease	263	-0.078	0.186	0.925	0.642	1.332	0.676
Age 10 body size	Stroke	243	-0.271	0.080	0.762	0.652	0.892	0.001
Age 10 body size	Varicose veins	263	0.157	0.126	1.170	0.915	1.496	0.211
Adult body size	Angina pectoris	522	0.512	0.106	1.669	1.357	2.054	0.000
Adult body size	Atherosclerosis	522	0.694	0.147	2.002	1.502	2.669	0.000
Adult body size	Atrial fibrillation and flutter	522	0.832	0.109	2.298	1.854	2.848	0.000
Adult body size	Coronary heart disease	472	0.542	0.077	1.719	1.479	1.997	0.000
Adult body size	Heart failure	522	0.949	0.100	2.584	2.126	3.140	0.000
Adult body size	Hypertension	522	0.942	0.078	2.565	2.200	2.990	0.000
Adult body size	Myocardial infarction	472	0.614	0.080	1.848	1.580	2.162	0.000
Adult body size	Peripheral artery disease	522	0.713	0.142	2.041	1.546	2.693	0.000
Adult body size	Pulmonary embolism	522	0.474	0.171	1.607	1.150	2.246	0.005
Adult body size	Pulmonary heart disease	522	0.573	0.158	1.773	1.300	2.419	0.000
Adult body size	Stroke	476	0.444	0.069	1.559	1.361	1.785	0.000
Adult body size	Varicose veins	522	0.313	0.107	1.367	1.109	1.685	0.003