AMP-DCC Data Analysis Report

FUSION

Phase 1

07/10/2019 (15:05)

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This document was generated using Loamstream [15] and the AMP-DCC Data Analysis Pipeline [16]

Contents

1 Data

In order to run the data we received through our analysis pipeline in an efficient manner, the genotype arrays were each given a short code name; GWAS, EXBROAD, EXCIDR, and METABO. In Table 1, we list the corresponding filename of the data set we received, the format of the file set (*note: 'bfile' refers to binary Plink format [1]*), and a liftOver [2] chain file if it was required to remap the variants to GRCh37 / hg19 coordinates

See Figures 1 and 2 for intersection counts of samples and variants available for analysis. The counts for each genotype array have been broken down by inferred ancestry as well.

Table 1: Genotype array information

ID	Filename	Format	LiftOver
GWAS	FUSION_GWAS_portal.acgt	bfile	hg18ToHg19.over.chain.gz
EXBROAD	FUSION_exomechip_Broad_portal	bfile	N/A
EXCIDR	FUSION_exomechip_CIDR_portal	bfile	N/A
METABO	FUSION_metabochip_portal	bfile	hg18ToHg19.over.chain.gz

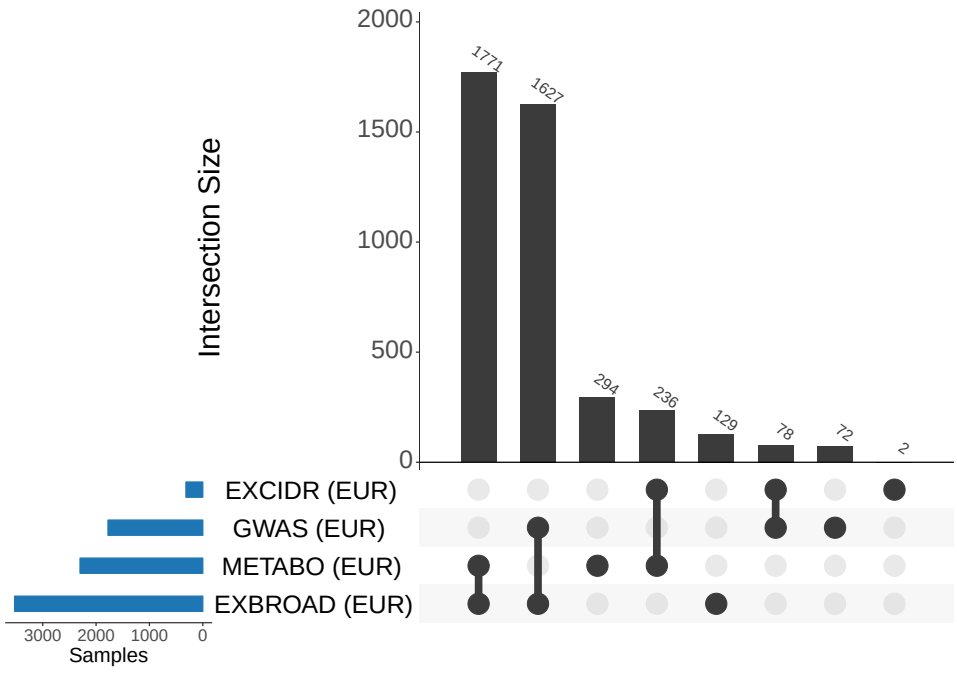


Figure 1: Samples remaining for analysis after quality control

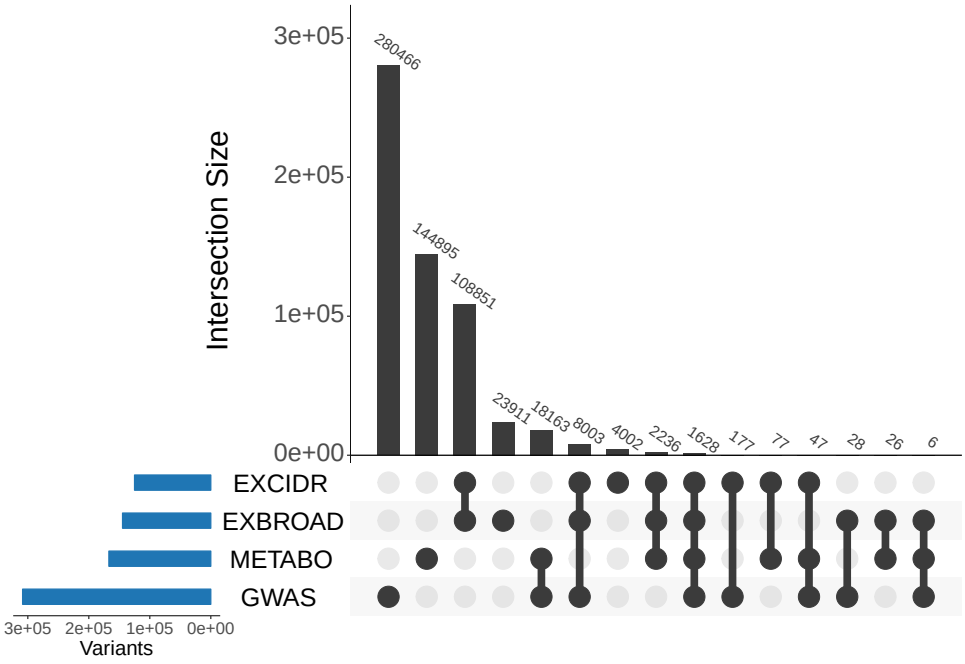


Figure 2: Variants remaining for analysis after quality control

2 Strategy

2.1 Sample structure and pipeline

The strategy we used to perform association testing can be found below. The 'ID' columns are the names used to identify each set of association test results in this document. The 'Report' columns indicate whether or not that particular set of association results will be presented in the tables and plots of the proceeding sections.

2.1.1 Cohort-level analysis

In Table 2, all of the cohorts available for analysis are defined. Each cohort was defined by a single array and one or more ancestral populations.

Table 2: Cohort-level analysis

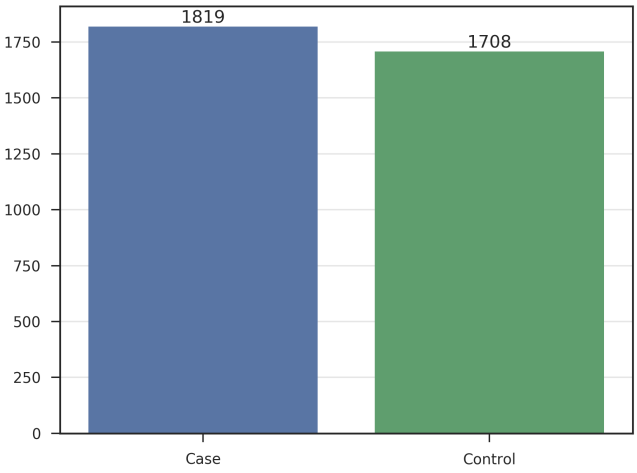
ID	Array	Ancestry	Report
GWAS_EUR	GWAS	EUR	YES
EXBROAD_EUR	EXBROAD	EUR	YES
METABO_EUR	METABO	EUR	YES

2.2 Ancestry Adjustment and Outlier Removal

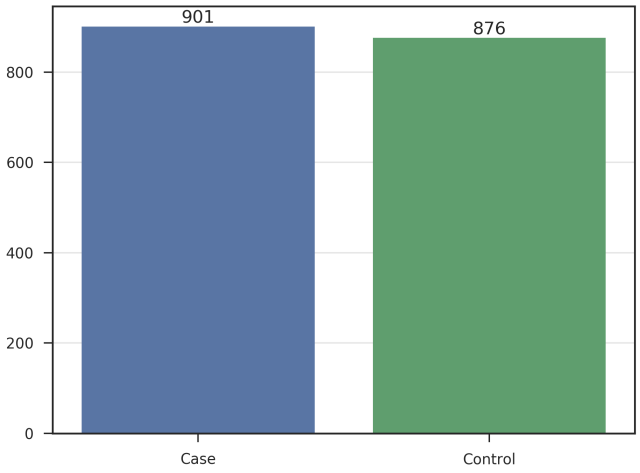
Adjusting the statistical models for underlying ancestry is often crucial to reduce or eliminate Type 1 error. Often analysts include principal components of ancestry as covariates in their models as a matter of convention. In our case, we undertook a more nuanced approach. First, the top 10 PC's were calculated for each cohort using the PC-AiR method [3]. Then, the phenotype of interest was regressed on the covariates to be used in the model and all of the PC's. If the Nth PC exhibited a statistically significant p-value ($p <= 0.05$), we selected PC's $1 - N$ to be included in association testing. Once determined, any sample lying outside 6 standard deviations from the mean on any of the N PC's was marked as an outlier and removed from the sample set. This process was repeated up to a maximum of ten times until no outliers were found, resulting in more homogeneous sample sets for each particular analysis. For this project, a hard minimum of 0 PC's to be included in analysis was set by the analyst.

3 Type 2 Diabetes (T2D_UNKNOWN)

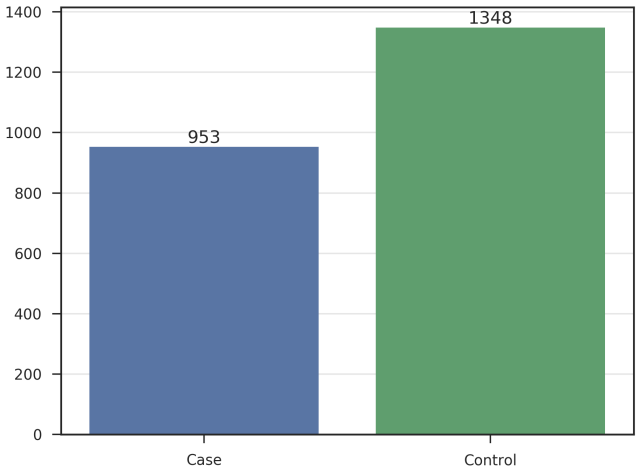
3.1 Summary



(a) EXBROAD_EUR



(b) GWAS_EUR



(c) METABO_EUR

Figure 3: Distribution of T2D_UNKNOWN in cohort-level analyses

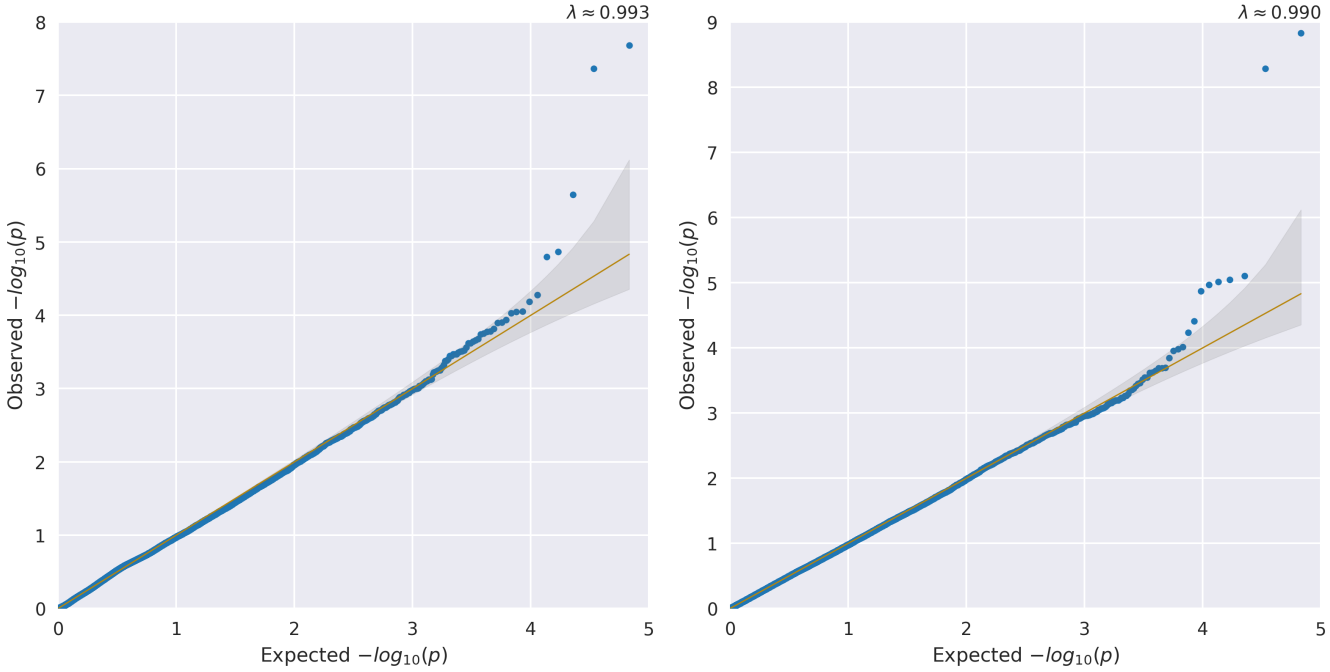
Table 3: Summary of samples removed from Type 2 Diabetes analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	Total	-SampleQc	-missObs	-Kinship	-PcOutlier
EXBROAD_EUR	EXBROAD	EUR	-	Age+SEX+BMI	3563	36	70	38	80
			-	Age+SEX	3563	36	0	38	91
GWAS_EUR	GWAS	EUR	-	Age+SEX	1796	19	0	94	0
			-	Age+SEX+BMI	1796	19	61	94	0
METABO_EUR	METABO	EUR	-	Age+SEX	2344	43	0	152	12
			-	Age+SEX+BMI	2344	43	11	152	12

Table 4: Summary of samples remaining for Type 2 Diabetes analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	PCs	N	Male	Female	Case	Ctrl
EXBROAD_EUR	EXBROAD	EUR	-	Age+SEX+BMI	9	3341	1886	1455	1703	1638
			-	Age+SEX	9	3400	1921	1479	1758	1642
GWAS_EUR	GWAS	EUR	-	Age+SEX	0	1683	918	765	901	782
			-	Age+SEX+BMI	0	1623	885	738	846	777
METABO_EUR	METABO	EUR	-	Age+SEX	7	2137	1189	948	944	1193
			-	Age+SEX+BMI	0	2126	1182	944	934	1192

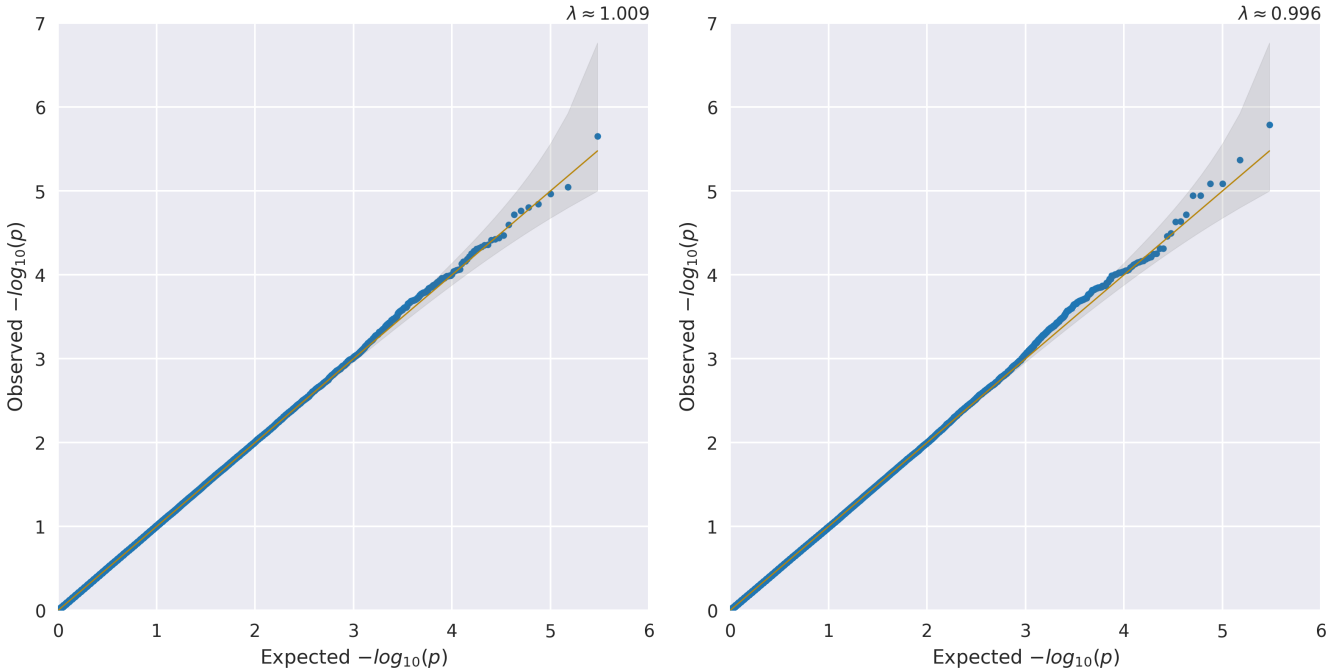
3.2 Calibration



(a) Adjusted Age+SEX

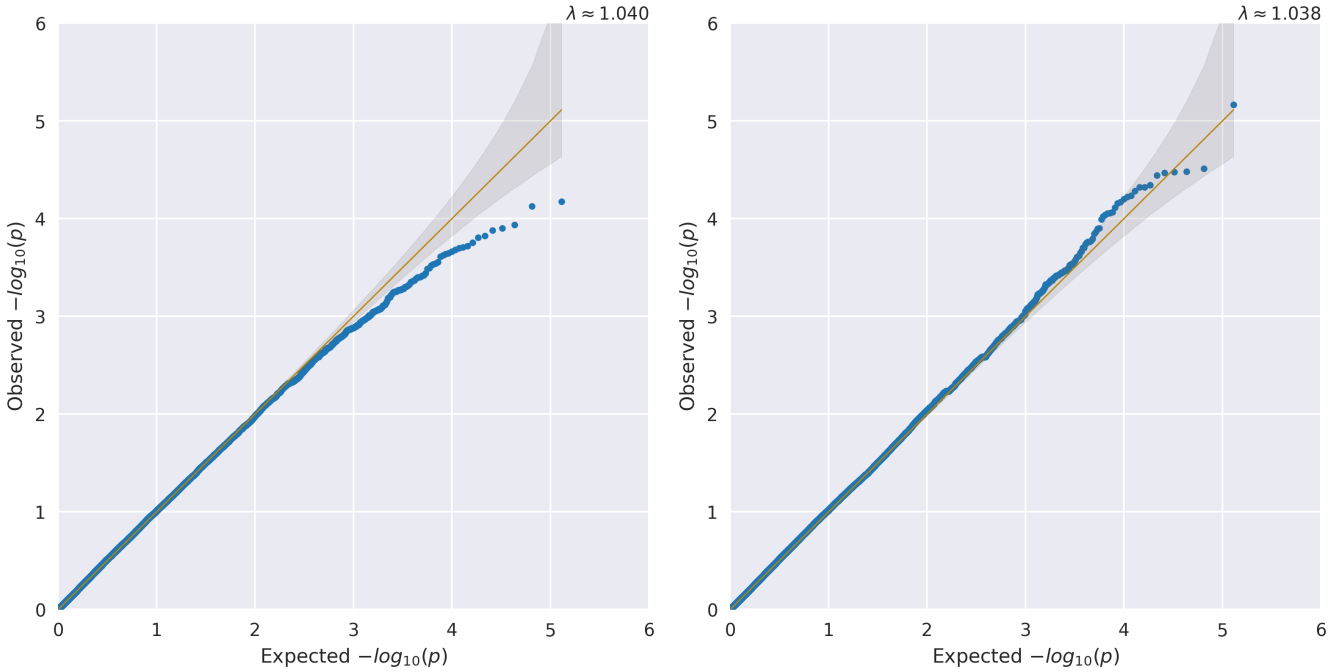
(b) Adjusted Age+SEX+BMI

Figure 4: QQ plots for T2D_UNKNOWN in the EXBROAD_EUR analysis



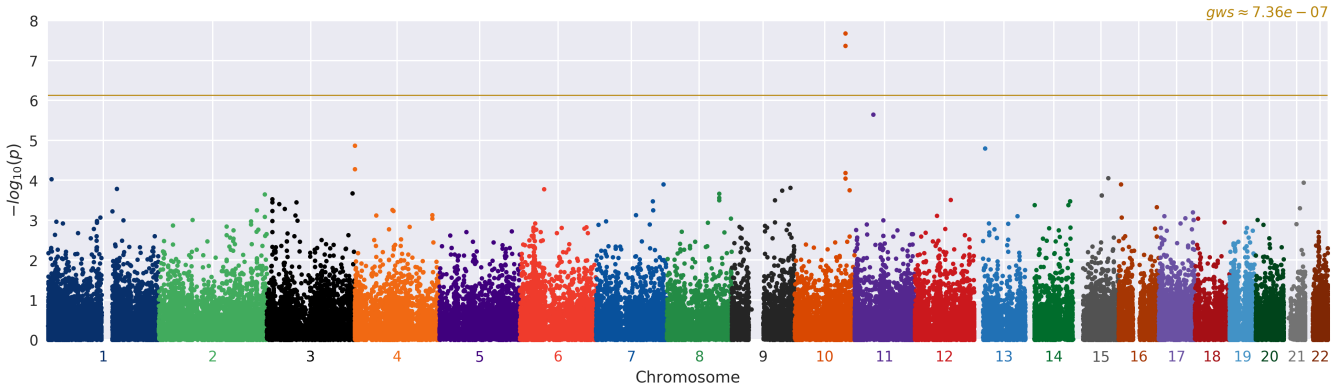
(a) Adjusted Age+SEX (b) Adjusted Age+SEX+BMI

Figure 5: QQ plots for T2D_UNKNOWN in the GWAS_EUR analysis

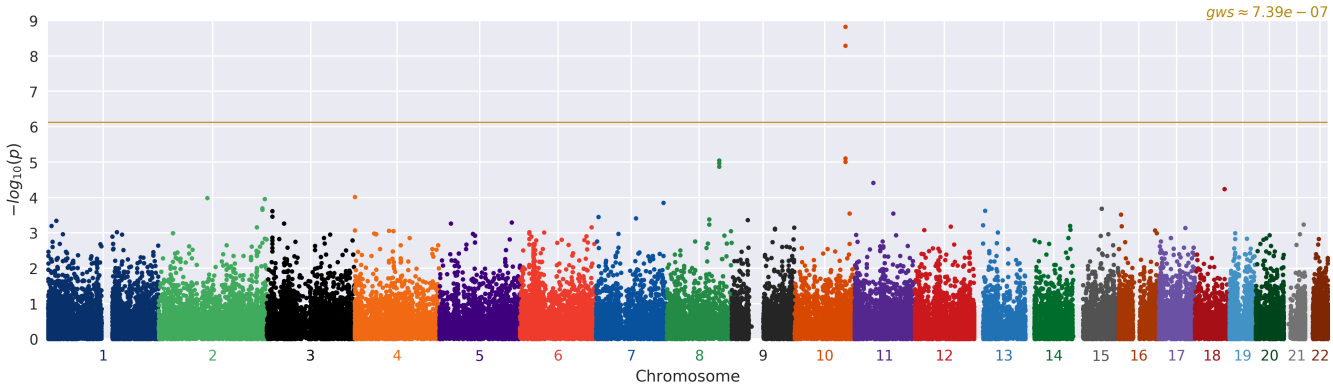


(a) Adjusted Age+SEX (b) Adjusted Age+SEX+BMI

Figure 6: QQ plots for T2D_UNKNOWN in the METABO_EUR analysis

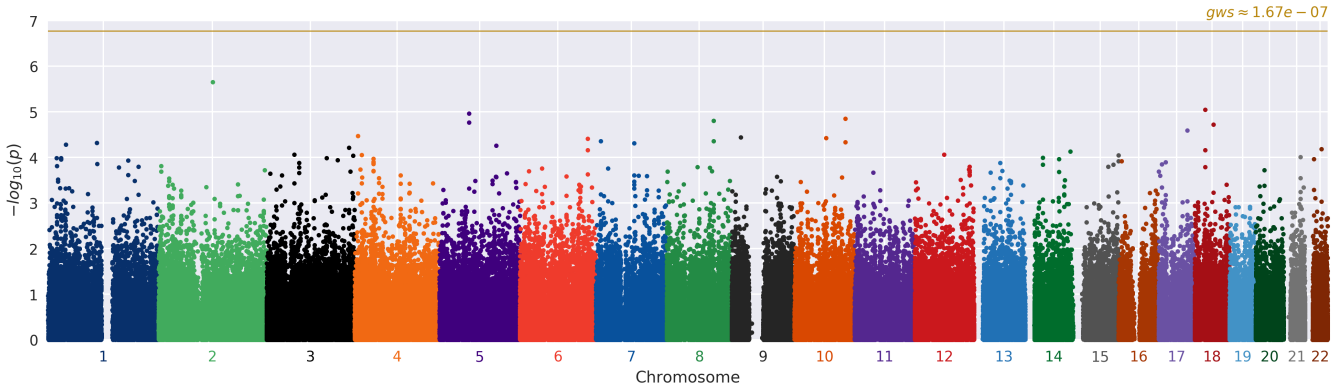


(a) Adjusted Age+SEX

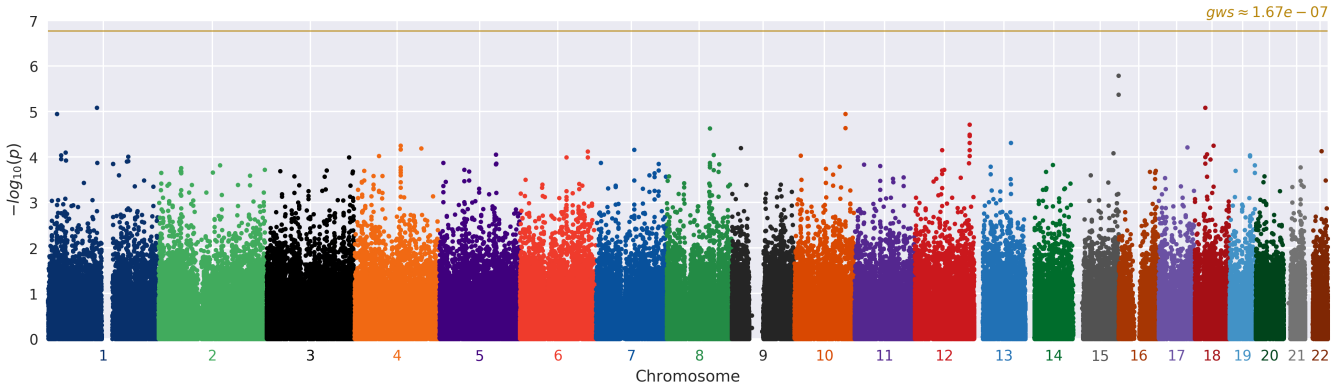


(b) Adjusted Age+SEX+BMI

Figure 7: Manhattan plots for T2D_UNKNOWN in the EXBROAD_EUR analysis

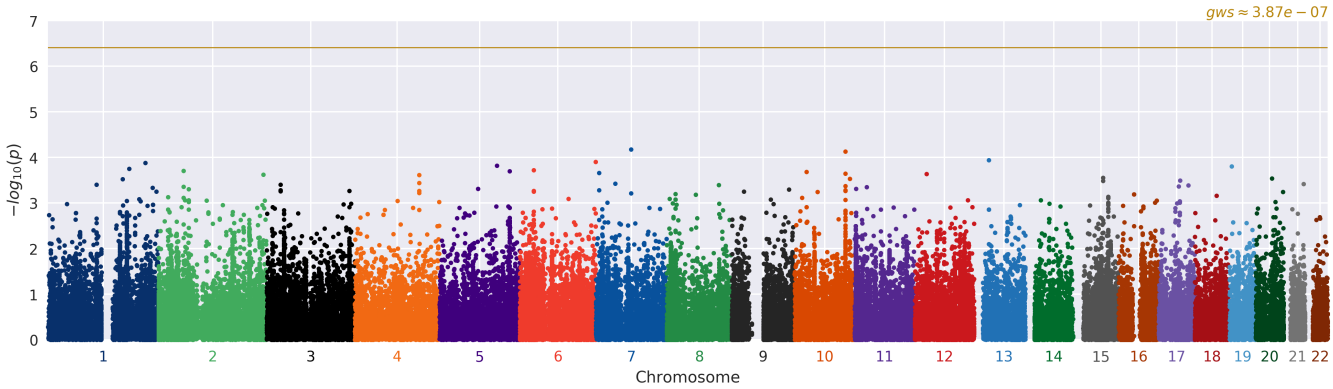


(a) Adjusted Age+SEX

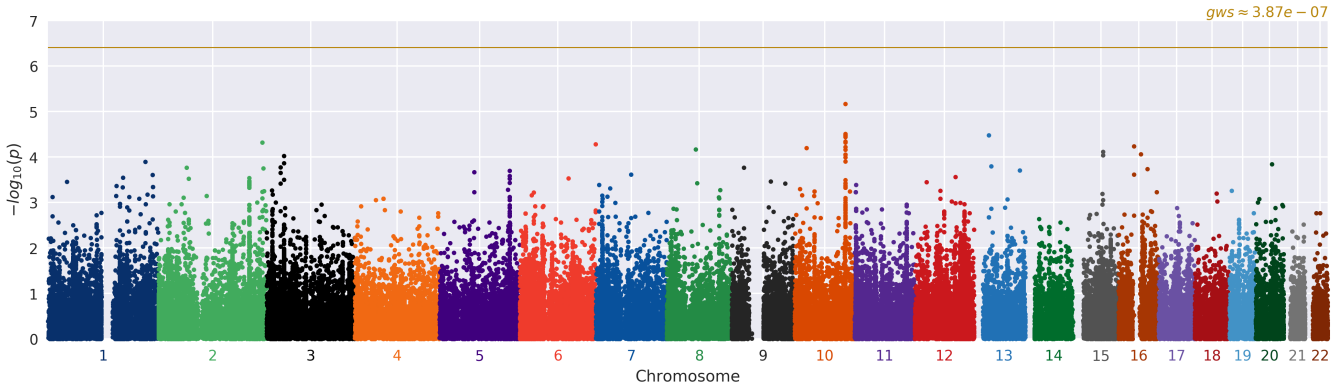


(b) Adjusted Age+SEX+BMI

Figure 8: Manhattan plots for T2D_UNKNOWN in the GWAS_EUR analysis



(a) Adjusted Age+SEX



(b) Adjusted Age+SEX+BMI

Figure 9: Manhattan plots for T2D_UNKNOWN in the METABO_EUR analysis

3.3 Top associations

Table 5: Top variants in the EXBROAD_EUR Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
10	114758349	**rs7903146**	T	C	**TCF7L2**	3,400	1,921	1,479	1,758	1,642	1,418	0.209	0.342	1.408	$2.08 \cdot 10^{-8}$
11	41915366	rs9300039	C	A	LRRC4C	3,400	1,921	1,479	1,758	1,642	638	$9.38 \cdot 10^{-2}$	0.398	1.489	$2.26 \cdot 10^{-6}$
4	629702	rs62295357	C	T	PDE6B	3,400	1,921	1,479	1,758	1,642	16	$2.35 \cdot 10^{-3}$	3.499	33.082	$1.37 \cdot 10^{-5}$
13	24443512	rs149856612	G	T	MIPEP	3,400	1,921	1,479	1,758	1,642	42	$6.18 \cdot 10^{-3}$	1.526	4.601	$1.6 \cdot 10^{-5}$
4	675710	rs141317789	C	T	MFSD7	3,400	1,921	1,479	1,758	1,642	14	$2.06 \cdot 10^{-3}$	3.374	29.189	$5.29 \cdot 10^{-5}$
15	79089111	rs3825807	A	G	ADAMTS7	3,400	1,921	1,479	1,758	1,642	2,344	0.345	0.2	1.221	$8.88 \cdot 10^{-5}$
1	7797625	rs41278954	C	A	CAMTA1	3,400	1,921	1,479	1,758	1,642	346	$5.09 \cdot 10^{-2}$	0.442	1.555	$9.35 \cdot 10^{-5}$
21	44448718	rs2839627	C	T	PKNOX1	3,400	1,921	1,479	1,758	1,642	480	$7.06 \cdot 10^{-2}$	0.37	1.448	$1.15 \cdot 10^{-4}$
7	151815793	exm673911	G	C	GALNT11	3,400	1,921	1,479	1,758	1,642	16	$2.35 \cdot 10^{-3}$	2.434	11.401	$1.26 \cdot 10^{-4}$
16	4935831	rs142210645	G	A	PPL	3,400	1,921	1,479	1,758	1,642	177	$2.6 \cdot 10^{-2}$	0.592	1.808	$1.26 \cdot 10^{-4}$
9	131909736	rs2480452	T	C	PTPA	3,400	1,921	1,479	1,758	1,642	502	$7.38 \cdot 10^{-2}$	0.353	1.424	$1.54 \cdot 10^{-4}$
1	155031376	rs12023499	T	C	ADAM15	3,400	1,921	1,479	1,758	1,642	1,847	0.272	0.206	1.229	$1.65 \cdot 10^{-4}$
6	53989347	exm556356	C	T	MLIP	3,400	1,921	1,479	1,758	1,642	19	$2.79 \cdot 10^{-3}$	2.057	7.819	$1.67 \cdot 10^{-4}$
10	124165615	rs6585827	G	A	PLEKHA1	3,400	1,921	1,479	1,758	1,642	2,574	0.621	0.188	1.207	$1.76 \cdot 10^{-4}$
9	113169631	rs7030192	G	A	SVEP1	3,400	1,921	1,479	1,758	1,642	2,149	0.316	0.198	1.219	$1.81 \cdot 10^{-4}$
3	192497035	rs1505439	A	G	FGF12	3,400	1,921	1,479	1,758	1,642	53	$7.79 \cdot 10^{-3}$	1.1	3.005	$2.11 \cdot 10^{-4}$
8	118184783	**rs13266634**	C	T	**SLC30A8**	3,400	1,921	1,479	1,758	1,642	2,509	0.369	0.186	1.204	$2.18 \cdot 10^{-4}$
2	238483729	rs2280289	G	A	RAB17	3,400	1,921	1,479	1,758	1,642	994	0.146	0.257	1.293	$2.28 \cdot 10^{-4}$
15	63982745	rs34484871	C	A	HERC1	3,400	1,921	1,479	1,758	1,642	173	$2.54 \cdot 10^{-2}$	0.569	1.767	$2.41 \cdot 10^{-4}$
3	12848822	rs11718898	T	C	CAND2	3,400	1,921	1,479	1,758	1,642	2,598	0.618	0.182	1.199	$3.01 \cdot 10^{-4}$

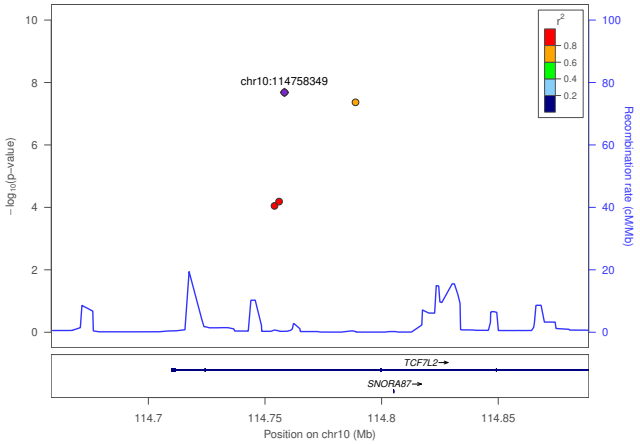


Figure 10: Regional plot for cohort EXBROAD_EUR model Adjusted Age+SEX: rs7903146 $\pm 100kb$

Table 6: Top variants in the EXBROAD_EUR Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
10	114758349	**rs7903146**	T	C	**TCF7L2**	3,341	1,886	1,455	1,703	1,638	1,386	0.793	0.4	1.492	$1.48 \cdot 10^{-9}$
8	118184783	**rs13266634**	C	T	**SLC30A8**	3,341	1,886	1,455	1,703	1,638	2,463	0.631	0.242	1.274	$8.93 \cdot 10^{-6}$
11	41915366	rs9300039	C	A	LRRC4C	3,341	1,886	1,455	1,703	1,638	634	0.905	0.375	1.455	$3.87 \cdot 10^{-5}$
18	66542006	rs745894	G	T	CCDC102B	3,341	1,886	1,455	1,703	1,638	773	0.884	0.328	1.388	$5.82 \cdot 10^{-5}$
4	629702	rs62295357	C	T	PDE6B	3,341	1,886	1,455	1,703	1,638	14	0.998	3.409	30.22	$9.65 \cdot 10^{-5}$
2	109098229	rs139373750	G	A	GCC2	3,341	1,886	1,455	1,703	1,638	98	0.985	0.887	2.429	$1.04 \cdot 10^{-4}$
2	238483729	rs2280289	G	A	RAB17	3,341	1,886	1,455	1,703	1,638	968	0.855	0.293	1.341	$1.1 \cdot 10^{-4}$
7	151815793	exm673911	G	C	GALNT11	3,341	1,886	1,455	1,703	1,638	16	0.998	2.65	14.147	$1.43 \cdot 10^{-4}$
2	233155110	rs6717918	T	C	DIS3L2	3,341	1,886	1,455	1,703	1,638	1,478	0.779	0.234	1.264	$2.02 \cdot 10^{-4}$
15	63982745	rs34484871	C	A	HERC1	3,341	1,886	1,455	1,703	1,638	172	0.974	0.633	1.884	$2.06 \cdot 10^{-4}$
13	24443512	rs149856612	G	T	MIPEP	3,341	1,886	1,455	1,703	1,638	40	0.994	1.416	4.121	$2.38 \cdot 10^{-4}$
3	12848822	rs11718898	T	C	CAND2	3,341	1,886	1,455	1,703	1,638	2,554	0.382	0.201	1.222	$2.41 \cdot 10^{-4}$
10	124165615	rs6585827	G	A	PLEKHA1	3,341	1,886	1,455	1,703	1,638	2,530	0.379	0.197	1.217	$2.84 \cdot 10^{-4}$
11	86519070	rs148223020	A	C	PRSS23	3,341	1,886	1,455	1,703	1,638	9	0.999	3.437	31.081	$2.84 \cdot 10^{-4}$
16	4935831	rs142210645	G	A	PPL	3,341	1,886	1,455	1,703	1,638	175	0.974	0.603	1.828	$3.04 \cdot 10^{-4}$
7	5336713	rs144364439	C	T	SLC29A4	3,341	1,886	1,455	1,703	1,638	35	0.995	1.408	4.088	$3.55 \cdot 10^{-4}$
7	89937168	rs11563551	G	A	CFAP69	3,341	1,886	1,455	1,703	1,638	156	0.977	0.628	1.873	$3.85 \cdot 10^{-4}$
8	95853708	rs11996455	G	A	INTS8	3,341	1,886	1,455	1,703	1,638	3,302	0.506	0.185	1.203	$4.2 \cdot 10^{-4}$
9	35853517	rs148540551	C	T	TMEM8B	3,341	1,886	1,455	1,703	1,638	16	0.998	2.109	8.242	$4.36 \cdot 10^{-4}$
1	18807813	rs200522682	G	C	KLHDC7A	3,341	1,886	1,455	1,703	1,638	37	0.994	1.363	3.906	$4.51 \cdot 10^{-4}$

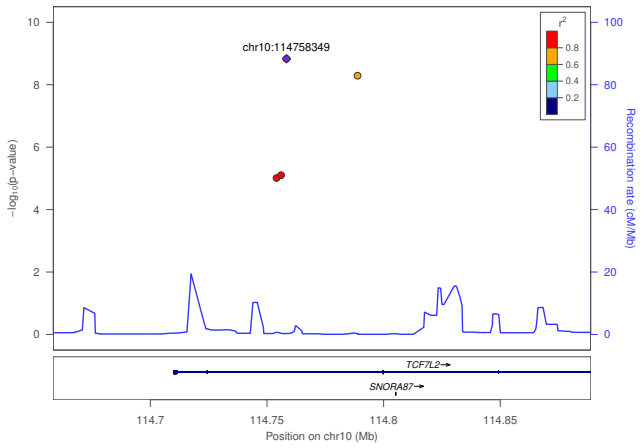


Figure 11: Regional plot for cohort EXBROAD_EUR model Adjusted Age+SEX+BMI: rs7903146 $\pm 100kb$

Table 7: Top variants in the GWAS_EUR Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
2	122036871	rs2953083	A	C	TFCP2L1	1,682	917	765	900	782	1,632	0.485	0.327	1.386	$2.22 \cdot 10^{-6}$
18	23336772	rs12608277	T	C	SS18	1,683	918	765	901	782	1,511	0.449	0.308	1.36	$8.95 \cdot 10^{-6}$
5	66317265	rs1030231	G	A	MAST4	1,683	918	765	901	782	740	0.78	0.375	1.455	$1.09 \cdot 10^{-5}$
10	114808902	**rs12255372**	T	G	**TCF7L2**	1,683	918	765	901	782	618	0.816	0.391	1.478	$1.42 \cdot 10^{-5}$
8	105884484	rs7004837	G	A	LRP12	1,683	918	765	901	782	590	0.825	0.406	1.501	$1.57 \cdot 10^{-5}$
18	42485524	rs616444	A	C	SETBP1	1,683	918	765	901	782	342	0.898	0.478	1.613	$1.9 \cdot 10^{-5}$
17	64663285	rs7207345	T	C	PRKCA	1,683	918	765	901	782	917	0.728	0.327	1.387	$2.54 \cdot 10^{-5}$
4	7738369	rs886374	T	C	SORCS2	1,683	918	765	901	782	820	0.244	0.331	1.393	$3.38 \cdot 10^{-5}$
9	20093557	rs2383134	A	G	MLLT3	1,683	918	765	901	782	438	0.87	0.442	1.556	$3.63 \cdot 10^{-5}$
10	71357954	rs731573	C	T	NEUROG3	1,683	918	765	901	782	722	0.214	0.35	1.419	$3.74 \cdot 10^{-5}$
6	152603209	rs9479283	T	C	SYNE1	1,683	918	765	901	782	94	0.972	0.928	2.529	$3.86 \cdot 10^{-5}$
7	11394751	rs739774	C	T	THSD7A	1,683	918	765	901	782	1,357	0.597	0.294	1.342	$4.37 \cdot 10^{-5}$
1	110375695	rs525566	G	A	EPS8L3	1,650	891	759	880	770	1,248	0.378	0.3	1.349	$4.79 \cdot 10^{-5}$
7	86422232	rs2237562	C	T	GRM3	1,683	918	765	901	782	1,062	0.684	0.312	1.366	$4.91 \cdot 10^{-5}$
1	40741899	rs6676644	T	C	ZMPSTE24	1,683	918	765	901	782	479	0.142	0.414	1.513	$5.19 \cdot 10^{-5}$
5	127661976	rs32215	A	G	FBN2	1,683	918	765	901	782	1,550	0.46	0.275	1.317	$5.55 \cdot 10^{-5}$
3	185112659	rs4687299	A	G	MAP3K13	1,682	918	764	900	782	837	0.249	0.321	1.379	$6.07 \cdot 10^{-5}$
22	36965284	rs1569488	T	C	CACNG2	1,683	918	765	901	782	1,528	0.546	0.277	1.319	$6.51 \cdot 10^{-5}$
14	101350298	rs3825569	C	T	RTL1	1,683	918	765	901	782	1,302	0.387	0.285	1.33	$7.35 \cdot 10^{-5}$
3	61954373	rs1904347	G	A	PTPRG	1,681	916	765	901	780	486	0.855	0.395	1.485	$8.63 \cdot 10^{-5}$

Table 8: Top variants in the GWAS_EUR Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
15	102162653	rs477421	A	G	TM2D3	1,623	885	738	846	777	1,404	0.567	0.37	1.447	$1.62 \cdot 10^{-6}$
18	23336772	rs12608277	T	C	SS18	1,623	885	738	846	777	1,465	0.451	0.335	1.398	$8.16 \cdot 10^{-6}$
1	110375695	rs525566	G	A	EPS8L3	1,593	861	732	828	765	1,208	0.379	0.357	1.429	$8.17 \cdot 10^{-6}$
10	114758349	**rs7903146**	T	C	**TCF7L2**	1,623	885	738	846	777	668	0.794	0.412	1.509	$1.13 \cdot 10^{-5}$
1	20984554	rs640742	A	C	DDOST	1,623	885	738	846	777	1,190	0.633	0.341	1.407	$1.13 \cdot 10^{-5}$
12	123626982	rs1106240	T	C	MPHOSPH9	1,623	885	738	846	777	589	0.181	0.416	1.516	$1.92 \cdot 10^{-5}$
8	97302091	rs11997392	C	T	PTDSS1	1,623	885	738	846	777	178	0.945	0.701	2.015	$2.32 \cdot 10^{-5}$
12	123528405	rs655293	A	G	PITPNM2	1,623	885	738	846	777	580	0.179	0.41	1.506	$3.18 \cdot 10^{-5}$
13	82288840	rs9601679	T	G	**SPRY2**	1,623	885	738	846	777	1,460	0.45	0.306	1.358	$4.88 \cdot 10^{-5}$
4	103578637	rs228614	A	G	MANBA	1,623	885	738	846	777	1,591	0.49	0.306	1.357	$5.56 \cdot 10^{-5}$
18	42485524	rs616444	A	C	SETBP1	1,623	885	738	846	777	331	0.898	0.484	1.623	$5.65 \cdot 10^{-5}$
17	64663285	rs7207345	T	C	PRKCA	1,623	885	738	846	777	892	0.725	0.337	1.4	$6.14 \cdot 10^{-5}$
9	20093557	rs2383134	A	G	MLLT3	1,623	885	738	846	777	421	0.87	0.465	1.592	$6.3 \cdot 10^{-5}$
4	149464950	rs868840	G	A	NR3C2	1,623	885	738	846	777	321	0.901	0.508	1.662	$6.47 \cdot 10^{-5}$
7	86422232	rs2237562	C	T	GRM3	1,623	885	738	846	777	1,018	0.686	0.33	1.391	$6.9 \cdot 10^{-5}$
12	123806219	rs1060105	C	T	SBNO1	1,623	885	738	846	777	670	0.794	0.369	1.446	$7.02 \cdot 10^{-5}$
12	61727679	rs4024193	C	T	FAM19A2	1,623	885	738	846	777	1,064	0.672	0.316	1.372	$7.09 \cdot 10^{-5}$
22	36965284	rs1569488	T	C	CACNG2	1,623	885	738	846	777	1,480	0.544	0.297	1.346	$7.35 \cdot 10^{-5}$
6	152603209	rs9479283	T	C	SYNE1	1,623	885	738	846	777	90	0.972	0.959	2.609	$7.57 \cdot 10^{-5}$
1	39805302	rs3121891	C	T	MACF1	1,623	885	738	846	777	51	$1.57 \cdot 10^{-2}$	1.248	3.482	$7.91 \cdot 10^{-5}$

Table 9: Top variants in the METABO_EUR Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
7	79286874	rs17152717	C	T	MAGI2	2,136	1,188	948	943	1,193	134	0.969	0.773	2.166	$6.68 \cdot 10^{-5}$
10	114785424	**rs7074440**	A	G	**TCF7L2**	2,136	1,188	948	944	1,192	848	0.801	0.319	1.376	$7.45 \cdot 10^{-5}$
13	32711703	rs12873155	T	C	FRY	2,137	1,189	948	944	1,193	2,041	0.522	0.247	1.28	$1.15 \cdot 10^{-4}$
6	170427731	rs4710884	G	A	DLL1	2,137	1,189	948	944	1,193	1,589	0.372	0.252	1.287	$1.25 \cdot 10^{-4}$
1	219184891	rs17048976	A	G	LYPLAL1	2,137	1,189	948	944	1,193	48	0.989	1.171	3.225	$1.32 \cdot 10^{-4}$
5	128802515	rs11242001	A	G	ADAMTS19	2,137	1,189	948	944	1,193	360	0.916	0.442	1.556	$1.5 \cdot 10^{-4}$
19	5122764	rs2620851	A	G	KDM4B	2,136	1,189	947	944	1,192	1,722	0.597	0.244	1.277	$1.56 \cdot 10^{-4}$
1	183174319	rs1172292	G	A	LAMC2	2,136	1,189	947	943	1,193	2,028	0.525	0.238	1.269	$1.76 \cdot 10^{-4}$
6	31441901	rs12665745	G	A	MICB	2,137	1,189	948	944	1,193	653	0.847	0.331	1.392	$1.91 \cdot 10^{-4}$
2	56158279	rs6748550	A	G	EFEMP1	2,137	1,189	948	944	1,193	100	0.977	0.761	2.14	$1.98 \cdot 10^{-4}$
5	157887508	rs11743708	C	G	EBF1	2,137	1,189	948	944	1,193	662	0.845	0.324	1.382	$2.01 \cdot 10^{-4}$
10	26727454	rs2992333	G	A	APBB1IP	2,137	1,189	948	944	1,193	1,305	0.305	0.252	1.287	$2.09 \cdot 10^{-4}$
7	7255479	rs2108790	T	C	C1GALT1	2,137	1,189	948	944	1,193	1,714	0.401	0.242	1.274	$2.18 \cdot 10^{-4}$
12	26981094	rs12579861	G	A	ITPR2	2,137	1,189	948	944	1,193	704	0.835	0.316	1.371	$2.32 \cdot 10^{-4}$
2	235307538	rs2885956	A	G	ARL4C	2,137	1,189	948	944	1,193	1,213	0.284	0.252	1.287	$2.38 \cdot 10^{-4}$
4	144659795	rs13134327	A	G	FREM3	2,137	1,189	948	944	1,193	1,410	0.67	0.248	1.282	$2.44 \cdot 10^{-4}$
15	67425033	rs12102171	T	C	SMAD3	2,137	1,189	948	944	1,193	573	0.866	0.338	1.403	$2.8 \cdot 10^{-4}$
20	36821082	rs6069105	T	G	KIAA1755	2,137	1,189	948	944	1,193	1,243	0.291	0.254	1.289	$2.88 \cdot 10^{-4}$
10	124167512	rs2421016	C	T	PLEKHA1	2,136	1,188	948	943	1,193	1,578	0.369	0.239	1.269	$2.92 \cdot 10^{-4}$
1	168238710	rs6664967	C	A	TBX19	2,135	1,188	947	943	1,192	1,697	0.397	0.232	1.261	$3.01 \cdot 10^{-4}$

Table 10: Top variants in the METABO_EUR Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	CASE	CTRL	MAC	FREQ	EFFECT	OR	P
10	114785424	**rs7074440**	A	G	**TCF7L2**	2,125	1,181	944	934	1,191	843	0.198	0.392	1.481	$6.84 \cdot 10^{-6}$
13	32711703	rs12873155	T	C	FRY	2,126	1,182	944	934	1,192	2,029	0.477	0.291	1.338	$3.33 \cdot 10^{-5}$
2	232907292	rs3100612	A	C	DIS3L2	2,126	1,182	944	934	1,192	1,406	0.669	0.297	1.346	$4.76 \cdot 10^{-5}$
6	170427731	rs4710884	G	A	DLL1	2,126	1,182	944	934	1,192	1,582	0.628	0.289	1.335	$5.23 \cdot 10^{-5}$
16	34275139	rs11861828	A	G	TP53TG3B	2,126	1,182	944	934	1,192	670	0.158	0.369	1.447	$5.85 \cdot 10^{-5}$
10	26727454	rs2992333	G	A	APBB1IP	2,126	1,182	944	934	1,192	1,296	0.695	0.299	1.349	$6.34 \cdot 10^{-5}$
8	65075261	rs4737667	T	C	BHLHE22	2,126	1,182	944	934	1,192	428	0.899	0.47	1.601	$6.77 \cdot 10^{-5}$
15	67425033	rs12102171	T	C	SMAD3	2,126	1,182	944	934	1,192	570	0.134	0.4	1.492	$7.69 \cdot 10^{-5}$
16	49926374	rs6500264	T	G	ZNF423	2,126	1,182	944	934	1,192	1,419	0.666	0.288	1.334	$8.61 \cdot 10^{-5}$
3	38611704	rs4130467	C	T	SCN5A	2,126	1,182	944	934	1,192	1,092	0.743	0.305	1.356	$9.48 \cdot 10^{-5}$
1	219184891	rs17048976	A	G	LYPLAL1	2,126	1,182	944	934	1,192	48	$1.13 \cdot 10^{-2}$	1.328	3.772	$1.27 \cdot 10^{-4}$
20	36821082	rs6069105	T	G	KIAA1755	2,126	1,182	944	934	1,192	1,236	0.709	0.292	1.339	$1.44 \cdot 10^{-4}$
13	38044745	rs9594211	C	T	POSTN	2,126	1,182	944	934	1,192	424	$9.97 \cdot 10^{-2}$	0.44	1.553	$1.6 \cdot 10^{-4}$
3	30679970	rs12495646	C	A	TGFBR2	2,125	1,181	944	933	1,192	1,604	0.377	0.27	1.31	$1.69 \cdot 10^{-4}$
9	27132073	rs13293051	G	T	TEK	2,126	1,182	944	934	1,192	1,756	0.413	0.263	1.301	$1.72 \cdot 10^{-4}$
2	62666220	rs4233976	C	T	TMEM17	2,126	1,182	944	934	1,192	1,661	0.391	0.265	1.304	$1.72 \cdot 10^{-4}$
2	235307538	rs2885956	A	G	ARL4C	2,126	1,182	944	934	1,192	1,208	0.716	0.281	1.324	$1.77 \cdot 10^{-4}$
16	65113651	rs754461	T	C	CDH11	2,126	1,182	944	934	1,192	211	$4.96 \cdot 10^{-2}$	0.582	1.789	$1.84 \cdot 10^{-4}$
13	102272899	rs17624306	C	A	ITGBL1	2,126	1,182	944	934	1,192	173	$4.07 \cdot 10^{-2}$	0.681	1.976	$1.98 \cdot 10^{-4}$
5	157895459	rs12332652	C	T	EBF1	2,126	1,182	944	934	1,192	1,518	0.643	0.265	1.304	$1.99 \cdot 10^{-4}$

3.4 Previously identified risk loci

Table 11 shows statistics from the EXBROAD_EUR cohort for 40 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R}^2 < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R}^2 >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 8 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 35 variants in both studies, 33 exhibit the same direction of effect with the known result (binomial test $p = 1.84e-08$).

Table 11: Top known loci in EXBROAD_EUR model Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	3,400	1,758	1,642	0.792	1.415	$1.42 \cdot 10^{-8}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	3,400	1,758	1,642	0.647	1.156	$4.95 \cdot 10^{-3}$	CDKAL1	1	rs7756992	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.167	$6.95 \cdot 10^{-35}$
9	22132076	**rs2383208**	A	G	3,400	1,758	1,642	0.851	1.23	$2.52 \cdot 10^{-3}$	CDKN2B	1	rs2383208	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.178	$6.73 \cdot 10^{-26}$
3	185511687	**rs4402960**	T	G	3,400	1,758	1,642	0.678	1.121	$2.73 \cdot 10^{-2}$	IGF2BP2	1	rs4402960	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.131	$2.39 \cdot 10^{-23}$
16	53813367	**rs17817449**	G	T	3,400	1,758	1,642	0.606	1.076	0.14	FTO	1	rs17817449	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.126	$7.17 \cdot 10^{-23}$
8	118185025	**rs3802177**	G	A	3,400	1,758	1,642	0.63	1.199	$3.02 \cdot 10^{-4}$	SLC30A8	1	rs3802177	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.136	$1.26 \cdot 10^{-21}$
7	28180556	**rs864745**	T	C	3,400	1,758	1,642	0.503	1.029	0.561	JAZF1	1	rs864745	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$2.28 \cdot 10^{-16}$
10	94485211	**rs2497306**	C	A	3,400	1,758	1,642	0.464	1.021	0.675	HHEX	1	rs2497306	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.1	$1.55 \cdot 10^{-15}$
4	6303022	**rs1801214**	T	C	3,400	1,758	1,642	0.431	1.059	0.24	WFS1	1	rs1801214	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.102	$3.3 \cdot 10^{-15}$
3	123065778	**rs11708067**	A	G	3,400	1,758	1,642	0.831	1.116	$8.8 \cdot 10^{-2}$	ADCY5	1	rs11708067	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.113	$7.19 \cdot 10^{-14}$
2	227100698	**rs2972146**	T	G	3,400	1,758	1,642	0.368	1.036	0.475	IRS1	1	rs2972146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.092	$8.97 \cdot 10^{-13}$
10	94347830	**rs6583826**	G	A	3,400	1,758	1,642	0.499	1.061	0.226	KIF11	1	rs6583826	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.087	$6.67 \cdot 10^{-12}$
11	92673828	**rs1387153**	T	C	3,400	1,758	1,642	0.664	1.107	$4.78 \cdot 10^{-2}$	MTNR1B	1	rs1387153	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.093	$1.59 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	3,400	1,758	1,642	0.648	1.099	$6.2 \cdot 10^{-2}$	ADAMTS9	1	rs6795735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.08	$7.39 \cdot 10^{-11}$
10	80942631	rs12571751	G	A	3,400	1,758	1,642	0.527	1.01	0.844	ZMIZ1	1	rs12571751	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.928	$1.02 \cdot 10^{-10}$
5	76424949	**rs4457053**	G	A	3,400	1,758	1,642	0.228	1.162	$1.07 \cdot 10^{-2}$	ZBED3	1	rs4457053	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.094	$1.76 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	3,400	1,758	1,642	0.766	1.117	$5.62 \cdot 10^{-2}$	ARAP1	1	rs1552224	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.107	$1.79 \cdot 10^{-10}$
17	36101156	**rs7501939**	T	C	3,400	1,758	1,642	0.3	1.073	0.187	HNF1B	1	rs7501939	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.089	$2.39 \cdot 10^{-10}$
8	41519248	**rs516946**	C	T	3,400	1,758	1,642	0.202	1.122	$5.72 \cdot 10^{-2}$	ANK1	1	rs516946	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.091	$2.49 \cdot 10^{-10}$
2	227020653	**rs7578326**	A	G	3,400	1,758	1,642	0.651	1.033	0.513	NYAP2	1	rs7578326	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.083	$3.81 \cdot 10^{-10}$
11	2857194	**rs2237895**	C	A	3,400	1,758	1,642	0.486	1.167	$1.57 \cdot 10^{-3}$	KCNQ1	1	rs2237895	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.095	$4.93 \cdot 10^{-10}$
12	27965150	**rs10842994**	C	T	3,400	1,758	1,642	0.826	1.125	$6.61 \cdot 10^{-2}$	KLHL42	1	rs10842994	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$6.08 \cdot 10^{-10}$
11	17408630	**rs5215**	C	T	3,400	1,758	1,642	0.48	1.026	0.604	KCNJ11	1	rs5215	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.075	$8.5 \cdot 10^{-10}$
2	43732823	**rs7578597**	T	C	3,400	1,758	1,642	0.951	1.02	0.86	THADA	1	rs7578597	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$2 \cdot 10^{-9}$
15	77832762	**rs7177055**	A	G	3,400	1,758	1,642	0.297	1.073	0.187	HMG20A	1	rs7177055	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$4.6 \cdot 10^{-9}$
11	17418477	**rs757110**	C	A	3,400	1,758	1,642	0.482	1.019	0.703	ABCC8	1	rs757110	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5 \cdot 10^{-9}$
9	84308948	**rs2796441**	G	A	3,400	1,758	1,642	0.592	1.02	0.692	TLE1	1	rs2796441	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5.39 \cdot 10^{-9}$
5	55806751	**rs459193**	G	A	3,400	1,758	1,642	0.319	1.024	0.648	AC022431.2	1	rs459193	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.081	$5.99 \cdot 10^{-9}$
19	19407718	**rs10401969**	C	T	3,400	1,758	1,642	0.935	1.141	0.186	SUGP1	1	rs10401969	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$7.04 \cdot 10^{-9}$
2	165528876	**rs13389219**	C	T	3,400	1,758	1,642	0.665	1.095	$8.23 \cdot 10^{-2}$	COBLL1	1	rs13389219	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$1 \cdot 10^{-8}$
19	19658472	**rs16996148**	T	G	3,400	1,758	1,642	0.932	1.082	0.421	CILP2	1	rs16996148	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.124	$1.12 \cdot 10^{-8}$
18	57884750	rs12970134	G	A	3,400	1,758	1,642	0.812	1.028	0.656	MC4R	1	rs12970134	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.927	$1.19 \cdot 10^{-8}$
13	80717156	**rs1359790**	G	A	3,400	1,758	1,642	0.703	1.033	0.54	SPRY2	1	rs1359790	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$1.39 \cdot 10^{-8}$
16	75247245	**rs7202877**	T	G	3,400	1,758	1,642	0.873	1.117	0.128	CTRB1	1	rs7202877	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.117	$3.5 \cdot 10^{-8}$
4	153520475	**rs6813195**	C	T	3,400	1,758	1,642	0.673	1.05	0.351	TMEM154	1	rs6813195	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$5.26 \cdot 10^{-8}$
2	60584819	**rs243021**	G	A	3,400	1,758	1,642	0.544	1.01	0.843	BCL11A	0.996	rs243019	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.067	$2.15 \cdot 10^{-8}$
2	43806918	**rs10495903**	C	T	3,400	1,758	1,642	0.92	1.069	0.462	PLEKHH2	0.915	rs17031133	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$2.69 \cdot 10^{-8}$
19	19379549	**rs58542926**	T	C	3,400	1,758	1,642	0.934	1.122	0.247	HAPLN4	0.879	rs72999033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.172	$2.6 \cdot 10^{-8}$
10	94347830	**rs6583826**	G	A	3,400	1,758	1,642	0.499	1.061	0.226	IDE	0.77	rs2421943	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.109	$6.24 \cdot 10^{-9}$
11	72432985	rs11603334	G	A	3,400	1,758	1,642	0.766	1.117	$5.62 \cdot 10^{-2}$	STARD10	0.767	rs613937	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.91	$8.64 \cdot 10^{-10}$

Table 12 shows statistics from the EXBROAD_EUR cohort for 40 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R}^2 < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R}^2 >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 9 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 35 variants in

both studies, 33 exhibit the same direction of effect with the known result (binomial test $p = 1.84e-08$).

Table 12: Top known loci in EXBROAD_EUR model Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	3,341	1,703	1,638	0.207	1.492	$1.48 \cdot 10^{-9}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	3,341	1,703	1,638	0.352	1.186	$2.11 \cdot 10^{-3}$	CDKAL1	1	rs7756992	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.167	$6.95 \cdot 10^{-35}$
9	22132076	**rs2383208**	A	G	3,341	1,703	1,638	0.149	1.222	$7.27 \cdot 10^{-3}$	CDKN2B	1	rs2383208	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.178	$6.73 \cdot 10^{-26}$
3	185511687	**rs4402960**	T	G	3,341	1,703	1,638	0.322	1.151	$1.18 \cdot 10^{-2}$	IGF2BP2	1	rs4402960	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.131	$2.39 \cdot 10^{-23}$
16	53813367	**rs17817449**	G	T	3,341	1,703	1,638	0.395	1.039	0.471	FTO	1	rs17817449	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.126	$7.17 \cdot 10^{-23}$
8	118185025	**rs3802177**	G	A	3,341	1,703	1,638	0.369	1.271	$1.07 \cdot 10^{-5}$	SLC30A8	1	rs3802177	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.136	$1.26 \cdot 10^{-21}$
7	28180556	**rs864745**	T	C	3,341	1,703	1,638	0.498	1.054	0.313	JAZF1	1	rs864745	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$2.28 \cdot 10^{-16}$
10	94485211	**rs2497306**	C	A	3,341	1,703	1,638	0.533	1.036	0.51	HHEX	1	rs2497306	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.1	$1.55 \cdot 10^{-15}$
4	6303022	**rs1801214**	T	C	3,341	1,703	1,638	0.57	1.049	0.368	WFS1	1	rs1801214	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.102	$3.3 \cdot 10^{-15}$
3	123065778	**rs11708067**	A	G	3,341	1,703	1,638	0.169	1.138	$6.42 \cdot 10^{-2}$	ADCY5	1	rs11708067	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.113	$7.19 \cdot 10^{-14}$
2	227100698	**rs2972146**	T	G	3,341	1,703	1,638	0.632	1.068	0.221	IRS1	1	rs2972146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.092	$8.97 \cdot 10^{-13}$
10	94347830	**rs6583826**	G	A	3,341	1,703	1,638	0.504	1.062	0.262	KIF11	1	rs6583826	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.087	$6.67 \cdot 10^{-12}$
11	92673828	**rs1387153**	T	C	3,341	1,703	1,638	0.337	1.105	$7.24 \cdot 10^{-2}$	MTNR1B	1	rs1387153	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.093	$1.59 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	3,341	1,703	1,638	0.352	1.112	$5.37 \cdot 10^{-2}$	ADAMTS9	1	rs6795735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.08	$7.39 \cdot 10^{-11}$
10	80942631	rs12571751	G	A	3,341	1,703	1,638	0.474	1.008	0.878	ZMIZ1	1	rs12571751	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.928	$1.02 \cdot 10^{-10}$
5	76424949	**rs4457053**	G	A	3,341	1,703	1,638	0.772	1.156	$2.26 \cdot 10^{-2}$	ZBED3	1	rs4457053	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.094	$1.76 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	3,341	1,703	1,638	0.235	1.11	$9.5 \cdot 10^{-2}$	ARAP1	1	rs1552224	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.107	$1.79 \cdot 10^{-10}$
17	36101156	**rs7501939**	T	C	3,341	1,703	1,638	0.7	1.077	0.202	HNF1B	1	rs7501939	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.089	$2.39 \cdot 10^{-10}$
8	41519248	**rs516946**	C	T	3,341	1,703	1,638	0.798	1.162	$2.33 \cdot 10^{-2}$	ANK1	1	rs516946	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.091	$2.49 \cdot 10^{-10}$
2	227020653	**rs7578326**	A	G	3,341	1,703	1,638	0.349	1.076	0.18	NYAP2	1	rs7578326	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.083	$3.81 \cdot 10^{-10}$
11	2857194	**rs2237895**	C	A	3,341	1,703	1,638	0.514	1.188	$1.14 \cdot 10^{-3}$	KCNQ1	1	rs2237895	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.095	$4.93 \cdot 10^{-10}$
12	27965150	**rs10842994**	C	T	3,341	1,703	1,638	0.173	1.18	$1.86 \cdot 10^{-2}$	KLHL42	1	rs10842994	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$6.08 \cdot 10^{-10}$
11	17408630	**rs5215**	C	T	3,341	1,703	1,638	0.522	1.058	0.286	KCNJ11	1	rs5215	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.075	$8.5 \cdot 10^{-10}$
2	43732823	**rs7578597**	T	C	3,341	1,703	1,638	$4.85 \cdot 10^{-2}$	1.053	0.676	THADA	1	rs7578597	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$2 \cdot 10^{-9}$
15	77832762	**rs7177055**	A	G	3,341	1,703	1,638	0.703	1.096	0.116	HMG20A	1	rs7177055	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$4.6 \cdot 10^{-9}$
11	17418477	**rs757110**	C	A	3,341	1,703	1,638	0.52	1.036	0.499	ABCC8	1	rs757110	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5 \cdot 10^{-9}$
9	84308948	**rs2796441**	G	A	3,341	1,703	1,638	0.408	1.042	0.441	TLE1	1	rs2796441	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5.39 \cdot 10^{-9}$
5	55806751	**rs459193**	G	A	3,341	1,703	1,638	0.68	1.036	0.531	AC022431.2	1	rs459193	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.081	$5.99 \cdot 10^{-9}$
19	19407718	**rs10401969**	C	T	3,341	1,703	1,638	$6.51 \cdot 10^{-2}$	1.129	0.262	SUGP1	1	rs10401969	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$7.04 \cdot 10^{-9}$
2	165528876	**rs13389219**	C	T	3,341	1,703	1,638	0.334	1.114	$5.58 \cdot 10^{-2}$	COBLL1	1	rs13389219	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$1 \cdot 10^{-8}$
19	19658472	**rs16996148**	T	G	3,341	1,703	1,638	$6.79 \cdot 10^{-2}$	1.091	0.415	CILP2	1	rs16996148	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.124	$1.12 \cdot 10^{-8}$
18	57884750	rs12970134	G	A	3,341	1,703	1,638	0.188	1.034	0.624	MC4R	1	rs12970134	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.927	$1.19 \cdot 10^{-8}$
13	80717156	**rs1359790**	G	A	3,341	1,703	1,638	0.298	1.044	0.455	SPRY2	1	rs1359790	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$1.39 \cdot 10^{-8}$
16	75247245	**rs7202877**	T	G	3,341	1,703	1,638	0.128	1.15	$7.53 \cdot 10^{-2}$	CTRB1	1	rs7202877	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.117	$3.5 \cdot 10^{-8}$
4	153520475	**rs6813195**	C	T	3,341	1,703	1,638	0.328	1.05	0.385	TMEM154	1	rs6813195	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$5.26 \cdot 10^{-8}$
2	60584819	**rs243021**	G	A	3,341	1,703	1,638	0.456	1.003	0.952	BCL11A	0.996	rs243019	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.067	$2.15 \cdot 10^{-8}$
2	43806918	**rs10495903**	C	T	3,341	1,703	1,638	$7.92 \cdot 10^{-2}$	1.125	0.231	PLEKHH2	0.915	rs17031133	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$2.69 \cdot 10^{-8}$
19	19379549	**rs58542926**	T	C	3,341	1,703	1,638	$6.58 \cdot 10^{-2}$	1.114	0.316	HAPLN4	0.879	rs72999033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.172	$2.6 \cdot 10^{-8}$
10	94347830	**rs6583826**	G	A	3,341	1,703	1,638	0.504	1.062	0.262	IDE	0.77	rs2421943	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.109	$6.24 \cdot 10^{-9}$
11	72432985	rs11603334	G	A	3,341	1,703	1,638	0.235	1.11	$9.5 \cdot 10^{-2}$	STARD10	0.767	rs613937	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.91	$8.64 \cdot 10^{-10}$

Table 13 shows statistics from the GWAS_EUR cohort for 46 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 8 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 34 variants in both studies, 29 exhibit the same direction of effect with the known result (binomial test $p = 1.93e-05$).

Table 13: Top known loci in GWAS_EUR model Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	1,683	901	782	0.793	1.425	$4.61 \cdot 10^{-5}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	1,682	901	781	0.634	1.196	$1.34 \cdot 10^{-2}$	CDKAL1	1	rs7756992	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.167	$6.95 \cdot 10^{-35}$
9	22132076	**rs2383208**	A	G	1,683	901	782	0.848	1.314	$5.65 \cdot 10^{-3}$	CDKN2B	1	rs2383208	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.178	$6.73 \cdot 10^{-26}$
16	53818460	**rs3751812**	T	G	1,682	900	782	0.585	1.013	0.857	FTO	1	rs3751812	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.128	$3.47 \cdot 10^{-23}$
8	118184783	**rs13266634**	C	T	1,679	899	780	0.633	1.279	$6.22 \cdot 10^{-4}$	SLC30A8	1	rs13266634	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.134	$4.97 \cdot 10^{-21}$
10	94462882	**rs1111875**	C	T	1,683	901	782	0.544	1.078	0.275	HHEX	1	rs1111875	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.11	$1.98 \cdot 10^{-19}$
7	28189411	**rs1635852**	T	C	1,683	901	782	0.503	1.089	0.209	JAZF1	1	rs1635852	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.101	$7.66 \cdot 10^{-16}$
3	185490734	**rs7648605**	G	T	1,683	901	782	0.704	1.212	$1.02 \cdot 10^{-2}$	IGF2BP2	1	rs7648605	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.116	$9.76 \cdot 10^{-16}$
10	94232247	**rs2149632**	T	C	1,683	901	782	0.627	1.092	0.222	IDE	1	rs2149632	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$2.22 \cdot 10^{-14}$
4	6293350	**rs10012946**	C	T	1,683	901	782	0.428	1.058	0.414	WFS1	1	rs10012946	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.092	$1.05 \cdot 10^{-13}$
10	94354204	**rs3824735**	T	G	1,670	895	775	0.627	1.084	0.264	KIF11	1	rs3824735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.097	$7.43 \cdot 10^{-13}$
2	227099180	rs2943645	C	T	1,683	901	782	0.357	1.092	0.219	IRS1	1	rs2943645	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.916	$1.15 \cdot 10^{-12}$
11	2847069	**rs163184**	G	T	1,683	901	782	0.363	1.054	0.462	KCNQ1	1	rs163184	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.086	$1.18 \cdot 10^{-11}$
11	92673828	**rs1387153**	T	C	1,683	901	782	0.664	1.146	$6.04 \cdot 10^{-2}$	MTNR1B	1	rs1387153	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.093	$1.59 \cdot 10^{-11}$
4	6315954	**rs10804976**	T	G	1,682	901	781	0.484	1.123	$9.01 \cdot 10^{-2}$	PPP2R2C	1	rs10804976	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.085	$3.77 \cdot 10^{-11}$
7	14898282	**rs17168486**	T	C	1,683	901	782	0.79	1.052	0.551	DGKB	1	rs17168486	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.105	$5.94 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	1,683	901	782	0.66	1.068	0.363	ADAMTS9	1	rs6795735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.08	$7.39 \cdot 10^{-11}$
5	76425867	**rs7708285**	G	A	1,660	885	775	0.222	1.121	0.177	ZBED3	1	rs7708285	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.095	$1.45 \cdot 10^{-10}$
3	12391207	**rs6802898**	C	T	1,683	901	782	0.84	1.223	$3.54 \cdot 10^{-2}$	PPARG	1	rs6802898	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.122	$1.63 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	1,683	901	782	0.77	1.124	0.155	ARAP1	1	rs1552224	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.107	$1.79 \cdot 10^{-10}$
2	43610027	**rs13408002**	C	T	1,683	901	782	0.961	1.464	$3.48 \cdot 10^{-2}$	THADA	1	rs13408002	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.151	$1.93 \cdot 10^{-10}$
17	36101156	**rs7501939**	T	C	1,682	900	782	0.3	1.103	0.197	HNF1B	1	rs7501939	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.089	$2.39 \cdot 10^{-10}$
8	41523745	**rs6989203**	G	A	1,683	901	782	0.798	1.055	0.54	ANK1	1	rs6989203	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.089	$6.31 \cdot 10^{-10}$
11	17408630	**rs5215**	C	T	1,683	901	782	0.466	1.132	$7.09 \cdot 10^{-2}$	KCNJ11	1	rs5215	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.075	$8.5 \cdot 10^{-10}$
3	123094451	**rs2877716**	C	T	1,683	901	782	0.184	1.147	0.126	ADCY5	1	rs2877716	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$1.04 \cdot 10^{-9}$
12	66212318	**rs2261181**	T	C	1,683	901	782	0.93	1.185	0.216	HMGA2	1	rs2261181	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.126	$1.16 \cdot 10^{-9}$
3	23454790	**rs1496653**	A	G	1,683	901	782	0.679	1.205	$1.32 \cdot 10^{-2}$	UBE2E2	1	rs1496653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.085	$3.56 \cdot 10^{-9}$
11	17418477	**rs757110**	C	A	1,683	901	782	0.469	1.132	$6.86 \cdot 10^{-2}$	ABCC8	1	rs757110	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5 \cdot 10^{-9}$
18	57884750	rs12970134	G	A	1,683	901	782	0.809	1.133	0.156	MC4R	1	rs12970134	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.927	$1.19 \cdot 10^{-8}$
11	72669777	**rs11605166**	T	C	1,682	900	782	0.72	1.059	0.456	FCHSD2	1	rs11605166	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.089	$1.86 \cdot 10^{-8}$
15	77747190	**rs7178572**	G	A	1,683	901	782	0.316	1.078	0.306	HMG20A	1	rs7178572	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.075	$2.17 \cdot 10^{-8}$
2	165513091	rs10195252	C	T	1,681	901	780	0.653	1.06	0.424	COBLL1	1	rs10195252	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.934	$3.01 \cdot 10^{-8}$
2	165501849	rs3923113	C	A	1,683	901	782	0.669	1.061	0.423	GRB14	1	rs3923113	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.932	$3.28 \cdot 10^{-8}$
12	27949283	rs3751235	C	T	1,683	901	782	0.8	1.058	0.505	KLHL42	1	rs7960190	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.926	$4.27 \cdot 10^{-8}$
2	60584819	rs243021	A	G	1,683	901	782	0.536	1.057	0.44	BCL11A	0.996	rs243019	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.937	$2.15 \cdot 10^{-8}$
13	80715893	**rs1215451**	G	A	1,683	901	782	0.698	1.103	0.191	SPRY2	0.995	rs1359790	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$1.39 \cdot 10^{-8}$
10	80948593	rs703974	G	A	1,683	901	782	0.638	1.037	0.62	ZMIZ1	0.971	rs703982	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.932	$2.34 \cdot 10^{-9}$
16	75295639	rs13337397	C	A	1,683	901	782	0.873	1.219	$5.92 \cdot 10^{-2}$	CTRB1	0.935	rs7202877	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.895	$3.5 \cdot 10^{-8}$
2	43806918	**rs10495903**	C	T	1,683	901	782	0.922	1.158	0.262	PLEKHH2	0.915	rs17031133	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$2.69 \cdot 10^{-8}$
12	71425164	**rs7959965**	C	T	1,683	901	782	0.432	1.03	0.679	CTD-2021H9.3	0.909	rs7955901	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.072	$6.51 \cdot 10^{-9}$
19	19721722	rs12610185	G	A	1,683	901	782	0.934	1.099	0.507	CILP2	0.906	rs17216525	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.891	$3.74 \cdot 10^{-8}$
19	19721722	rs12610185	G	A	1,683	901	782	0.934	1.099	0.507	GATAD2A	0.893	rs3794991	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.891	$3.71 \cdot 10^{-8}$
11	72669777	**rs11605166**	T	C	1,682	900	782	0.72	1.059	0.456	STARD10	0.851	rs613937	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$8.64 \cdot 10^{-10}$
19	19329924	rs2228603	C	T	1,683	901	782	0.928	1.126	0.38	HAPLN4	0.849	rs72999033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.853	$2.6 \cdot 10^{-8}$
2	227093745	**rs2943641**	T	C	1,683	901	782	0.357	1.092	0.219	NYAP2	0.799	rs2943653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.087	$8.64 \cdot 10^{-12}$
19	19329924	**rs2228603**	C	T	1,683	901	782	0.928	1.126	0.38	SUGP1	0.733	rs10401969	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$7.04 \cdot 10^{-9}$

Table 14 shows statistics from the GWAS_EUR cohort for 46 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 9 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 34 variants in both studies, 28 exhibit the same direction of effect with the known result (binomial test $p = 9.76e - 05$).

Table 14: Top known loci in GWAS_EUR model Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	1,623	846	777	0.206	1.509	$1.13 \cdot 10^{-5}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	1,622	846	776	0.364	1.199	$1.97 \cdot 10^{-2}$	CDKAL1	1	rs7756992	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.167	$6.95 \cdot 10^{-35}$
9	22132076	**rs2383208**	A	G	1,623	846	777	0.152	1.291	$1.71 \cdot 10^{-2}$	CDKN2B	1	rs2383208	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.178	$6.73 \cdot 10^{-26}$
16	53818460	rs3751812	G	T	1,622	845	777	0.415	1.036	0.639	FTO	1	rs3751812	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.886	$3.47 \cdot 10^{-23}$
8	118184783	**rs13266634**	C	T	1,619	844	775	0.368	1.345	$1.43 \cdot 10^{-4}$	SLC30A8	1	rs13266634	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.134	$4.97 \cdot 10^{-21}$
10	94462882	**rs1111875**	C	T	1,623	846	777	0.456	1.082	0.288	HHEX	1	rs1111875	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.11	$1.98 \cdot 10^{-19}$
7	28189411	**rs1635852**	T	C	1,623	846	777	0.499	1.077	0.314	JAZF1	1	rs1635852	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.101	$7.66 \cdot 10^{-16}$
3	185490734	**rs7648605**	G	T	1,623	846	777	0.294	1.186	$3.47 \cdot 10^{-2}$	IGF2BP2	1	rs7648605	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.116	$9.76 \cdot 10^{-16}$
10	94232247	**rs2149632**	T	C	1,623	846	777	0.376	1.082	0.312	IDE	1	rs2149632	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.099	$2.22 \cdot 10^{-14}$
4	6293350	**rs10012946**	C	T	1,623	846	777	0.573	1.094	0.229	WFS1	1	rs10012946	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.092	$1.05 \cdot 10^{-13}$
10	94354204	**rs3824735**	T	G	1,610	840	770	0.377	1.072	0.372	KIF11	1	rs3824735	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.097	$7.43 \cdot 10^{-13}$
2	227099180	rs2943645	C	T	1,623	846	777	0.643	1.056	0.487	IRS1	1	rs2943645	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.916	$1.15 \cdot 10^{-12}$
11	2847069	**rs163184**	G	T	1,623	846	777	0.637	1.058	0.47	KCNQ1	1	rs163184	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.086	$1.18 \cdot 10^{-11}$
11	92673828	**rs1387153**	T	C	1,623	846	777	0.335	1.114	0.168	MTNR1B	1	rs1387153	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.093	$1.59 \cdot 10^{-11}$
4	6315954	**rs10804976**	T	G	1,622	846	776	0.517	1.142	$7.09 \cdot 10^{-2}$	PPP2R2C	1	rs10804976	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.085	$3.77 \cdot 10^{-11}$
7	14898282	**rs17168486**	T	C	1,623	846	777	0.208	1.025	0.783	DGKB	1	rs17168486	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.105	$5.94 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	1,623	846	777	0.34	1.098	0.23	ADAMTS9	1	rs6795735	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.08	$7.39 \cdot 10^{-11}$
5	76425867	**rs7708285**	G	A	1,600	830	770	0.778	1.12	0.217	ZBED3	1	rs7708285	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.095	$1.45 \cdot 10^{-10}$
3	12391207	**rs6802898**	C	T	1,623	846	777	0.161	1.308	$9.85 \cdot 10^{-3}$	PPARG	1	rs6802898	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.122	$1.63 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	1,623	846	777	0.23	1.081	0.384	ARAP1	1	rs1552224	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.107	$1.79 \cdot 10^{-10}$
2	43610027	**rs13408002**	C	T	1,623	846	777	$3.94 \cdot 10^{-2}$	1.584	$1.81 \cdot 10^{-2}$	THADA	1	rs13408002	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.151	$1.93 \cdot 10^{-10}$
17	36101156	**rs7501939**	T	C	1,622	845	777	0.699	1.149	$8.93 \cdot 10^{-2}$	HNF1B	1	rs7501939	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.089	$2.39 \cdot 10^{-10}$
8	41523745	**rs6989203**	G	A	1,623	846	777	0.199	1.127	0.215	ANK1	1	rs6989203	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.089	$6.31 \cdot 10^{-10}$
11	17408630	**rs5215**	C	T	1,623	846	777	0.536	1.156	$5.05 \cdot 10^{-2}$	KCNJ11	1	rs5215	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.075	$8.5 \cdot 10^{-10}$
3	123094451	**rs2877716**	C	T	1,623	846	777	0.816	1.158	0.129	ADCY5	1	rs2877716	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.096	$1.04 \cdot 10^{-9}$
12	66212318	**rs2261181**	T	C	1,623	846	777	$6.96 \cdot 10^{-2}$	1.211	0.2	HMGA2	1	rs2261181	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.126	$1.16 \cdot 10^{-9}$
3	23454790	**rs1496653**	A	G	1,623	846	777	0.32	1.205	$2.16 \cdot 10^{-2}$	UBE2E2	1	rs1496653	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.085	$3.56 \cdot 10^{-9}$
11	17418477	**rs757110**	C	A	1,623	846	777	0.532	1.149	$5.89 \cdot 10^{-2}$	ABCC8	1	rs757110	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.074	$5 \cdot 10^{-9}$
18	57884750	rs12970134	G	A	1,623	846	777	0.192	1.105	0.296	MC4R	1	rs12970134	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.927	$1.19 \cdot 10^{-8}$
11	72669777	**rs11605166**	T	C	1,622	845	777	0.279	1.013	0.873	FCHSD2	1	rs11605166	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.089	$1.86 \cdot 10^{-8}$
15	77747190	**rs7178572**	G	A	1,623	846	777	0.685	1.059	0.475	HMG20A	1	rs7178572	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.075	$2.17 \cdot 10^{-8}$
2	165513091	rs10195252	C	T	1,621	846	775	0.347	1.051	0.53	COBLL1	1	rs10195252	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.934	$3.01 \cdot 10^{-8}$
2	165501849	rs3923113	C	A	1,623	846	777	0.331	1.054	0.511	GRB14	1	rs3923113	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.932	$3.28 \cdot 10^{-8}$
12	27949283	rs3751235	C	T	1,623	846	777	0.2	1.074	0.441	KLHL42	1	rs7960190	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.926	$4.27 \cdot 10^{-8}$
2	60584819	rs243021	A	G	1,623	846	777	0.465	1.083	0.302	BCL11A	0.996	rs243019	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.937	$2.15 \cdot 10^{-8}$
13	80715893	**rs1215451**	G	A	1,623	846	777	0.304	1.105	0.214	SPRY2	0.995	rs1359790	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.077	$1.39 \cdot 10^{-8}$
10	80948593	rs703974	G	A	1,623	846	777	0.362	1.049	0.544	ZMIZ1	0.971	rs703982	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.932	$2.34 \cdot 10^{-9}$
16	75295639	rs13337397	C	A	1,623	846	777	0.127	1.244	$5.68 \cdot 10^{-2}$	CTRB1	0.935	rs7202877	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.895	$3.5 \cdot 10^{-8}$
2	43806918	**rs10495903**	C	T	1,623	846	777	$7.83 \cdot 10^{-2}$	1.331	$4.62 \cdot 10^{-2}$	PLEKHH2	0.915	rs17031133	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.106	$2.69 \cdot 10^{-8}$
12	71425164	**rs7959965**	C	T	1,623	846	777	0.569	1.084	0.295	CTD-2021H9.3	0.909	rs7955901	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.072	$6.51 \cdot 10^{-9}$
19	19721722	rs12610185	G	A	1,623	846	777	$6.62 \cdot 10^{-2}$	1.069	0.665	CILP2	0.906	rs17216525	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.891	$3.74 \cdot 10^{-8}$
19	19721722	rs12610185	G	A	1,623	846	777	$6.62 \cdot 10^{-2}$	1.069	0.665	GATAD2A	0.893	rs3794991	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.891	$3.71 \cdot 10^{-8}$
11	72669777	**rs11605166**	T	C	1,622	845	777	0.279	1.013	0.873	STARD10	0.851	rs613937	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.099	$8.64 \cdot 10^{-10}$
19	19329924	rs2228603	C	T	1,623	846	777	$7.21 \cdot 10^{-2}$	1.108	0.483	HAPLN4	0.849	rs72999033	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	0.853	$2.6 \cdot 10^{-8}$
2	227093745	**rs2943641**	T	C	1,623	846	777	0.643	1.056	0.487	NYAP2	0.799	rs2943653	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.087	$8.64 \cdot 10^{-12}$
19	19329924	**rs2228603**	C	T	1,623	846	777	$7.21 \cdot 10^{-2}$	1.108	0.483	SUGP1	0.733	rs10401969	$1.5 \cdot 10^{5}$	34,840	$1.15 \cdot 10^{5}$	1.135	$7.04 \cdot 10^{-9}$

Table 15 shows statistics from the METABO_EUR cohort for 50 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 12 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 50 variants in both studies, 40 exhibit the same direction of effect with the known result (binomial test $p = 1.19e - 05$).

Table 15: Top known loci in METABO_EUR model Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	2,137	944	1,193	0.209	1.337	$2.26 \cdot 10^{-4}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	2,137	944	1,193	0.343	1.016	0.809	CDKAL1	1	rs7756992	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.167	$6.95 \cdot 10^{-35}$
9	22134094	**rs10811661**	T	C	2,136	943	1,193	0.131	1.112	0.249	CDKN2B	1	rs10811661	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.185	$3.72 \cdot 10^{-27}$
3	185511687	**rs4402960**	T	G	2,137	944	1,193	0.318	1.124	$8.31 \cdot 10^{-2}$	IGF2BP2	1	rs4402960	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.131	$2.39 \cdot 10^{-23}$
16	53819169	**rs9936385**	C	T	2,137	944	1,193	0.386	1.139	$4.63 \cdot 10^{-2}$	FTO	1	rs9936385	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.129	$2.61 \cdot 10^{-23}$
8	118185025	**rs3802177**	G	A	2,137	944	1,193	0.383	1.155	$2.55 \cdot 10^{-2}$	SLC30A8	1	rs3802177	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.136	$1.26 \cdot 10^{-21}$
10	94462882	**rs1111875**	C	T	2,137	944	1,193	0.479	1.09	0.172	HHEX	1	rs1111875	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.11	$1.98 \cdot 10^{-19}$
7	28196413	rs849135	A	G	2,137	944	1,193	0.441	1.022	0.74	JAZF1	1	rs849135	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.904	$3.06 \cdot 10^{-17}$
4	6289986	**rs4458523**	G	T	2,134	943	1,191	0.573	1.026	0.69	WFS1	1	rs4458523	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.098	$2.02 \cdot 10^{-15}$
10	94262359	**rs11187033**	T	A	2,135	943	1,192	0.391	1.129	$5.98 \cdot 10^{-2}$	IDE	1	rs11187033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$4.57 \cdot 10^{-15}$
10	94394402	**rs10882095**	T	G	2,137	944	1,193	0.395	1.123	$7.25 \cdot 10^{-2}$	KIF11	1	rs10882095	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.101	$1.17 \cdot 10^{-14}$
2	227093585	**rs2943640**	C	A	2,137	944	1,193	0.617	1.155	$2.5 \cdot 10^{-2}$	IRS1	1	rs2943640	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$2.69 \cdot 10^{-14}$
3	123082398	**rs11717195**	T	C	2,137	944	1,193	0.176	1.052	0.538	ADCY5	1	rs11717195	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.112	$6.47 \cdot 10^{-14}$
3	12393125	**rs1801282**	C	G	2,137	944	1,193	0.17	1.108	0.225	PPARG	1	rs1801282	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.13	$1.05 \cdot 10^{-12}$
2	227047771	**rs2943653**	T	C	2,137	944	1,193	0.643	1.127	$6.64 \cdot 10^{-2}$	NYAP2	1	rs2943653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.087	$8.64 \cdot 10^{-12}$
2	43690030	rs10203174	T	C	2,137	944	1,193	$5.52 \cdot 10^{-2}$	1.086	0.552	THADA	1	rs10203174	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.874	$9.5 \cdot 10^{-12}$
11	2847069	**rs163184**	G	T	2,137	944	1,193	0.643	1.181	$1.26 \cdot 10^{-2}$	KCNQ1	1	rs163184	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.086	$1.18 \cdot 10^{-11}$
11	92673828	**rs1387153**	T	C	2,135	944	1,191	0.337	1.097	0.162	MTNR1B	1	rs1387153	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.093	$1.59 \cdot 10^{-11}$
17	36102381	**rs11651052**	A	G	2,137	944	1,193	0.646	1.004	0.958	HNF1B	1	rs11651052	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.104	$1.97 \cdot 10^{-11}$
4	6315954	rs10804976	G	T	2,137	944	1,193	0.511	1.022	0.728	PPP2R2C	1	rs10804976	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.922	$3.77 \cdot 10^{-11}$
5	76427311	**rs6878122**	G	A	2,136	943	1,193	0.779	1.084	0.284	ZBED3	1	rs6878122	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$5.04 \cdot 10^{-11}$
7	14898282	**rs17168486**	T	C	2,137	944	1,193	0.194	1.051	0.529	DGKB	1	rs17168486	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.105	$5.94 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	2,137	944	1,193	0.359	1.126	$7.33 \cdot 10^{-2}$	ADAMTS9	1	rs6795735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.08	$7.39 \cdot 10^{-11}$
10	80942631	**rs12571751**	A	G	2,137	944	1,193	0.476	1.074	0.267	ZMIZ1	1	rs12571751	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.078	$1.02 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	2,137	944	1,193	0.237	1.081	0.296	ARAP1	1	rs1552224	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.107	$1.79 \cdot 10^{-10}$
8	41519248	**rs516946**	C	T	2,137	944	1,193	0.801	1.094	0.256	ANK1	1	rs516946	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.091	$2.49 \cdot 10^{-10}$
12	27965150	**rs10842994**	C	T	2,137	944	1,193	0.172	1.203	$2.7 \cdot 10^{-2}$	KLHL42	1	rs10842994	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$6.08 \cdot 10^{-10}$
11	17408630	rs5215	T	C	2,137	944	1,193	0.51	1.044	0.504	KCNJ11	1	rs5215	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.93	$8.5 \cdot 10^{-10}$
11	72474839	**rs613937**	A	G	2,137	944	1,193	0.259	1.072	0.34	STARD10	1	rs613937	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$8.64 \cdot 10^{-10}$
12	66212318	**rs2261181**	T	C	2,137	944	1,193	$7.96 \cdot 10^{-2}$	1.345	$1.06 \cdot 10^{-2}$	HMGA2	1	rs2261181	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.126	$1.16 \cdot 10^{-9}$
3	23454790	**rs1496653**	A	G	2,137	944	1,193	0.299	1.033	0.643	UBE2E2	1	rs1496653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.085	$3.56 \cdot 10^{-9}$
15	77832762	**rs7177055**	A	G	2,137	944	1,193	0.705	1.094	0.21	HMG20A	1	rs7177055	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$4.6 \cdot 10^{-9}$
11	17418477	rs757110	A	C	2,137	944	1,193	0.511	1.05	0.44	ABCC8	1	rs757110	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.931	$5 \cdot 10^{-9}$
9	84308948	**rs2796441**	G	A	2,136	944	1,192	0.403	1.063	0.343	TLE1	1	rs2796441	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5.39 \cdot 10^{-9}$
5	55806751	**rs459193**	G	A	2,137	944	1,193	0.682	1.115	0.106	AC022431.2	1	rs459193	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.081	$5.99 \cdot 10^{-9}$
15	91544076	**rs12899811**	G	A	2,137	944	1,193	0.342	1.055	0.415	VPS33B	1	rs12899811	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.076	$6.34 \cdot 10^{-9}$
12	71439589	rs7138300	T	C	2,137	944	1,193	0.625	1.004	0.951	CTD-2021H9.3	1	rs7138300	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.935	$6.47 \cdot 10^{-9}$
19	19407718	**rs10401969**	C	T	2,137	944	1,193	$6.22 \cdot 10^{-2}$	1.362	$1.76 \cdot 10^{-2}$	SUGP1	1	rs10401969	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$7.04 \cdot 10^{-9}$
1	214154719	**rs2075423**	G	T	2,137	944	1,193	0.445	1.022	0.724	PROX1	1	rs2075423	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$8.1 \cdot 10^{-9}$
2	165528876	**rs13389219**	C	T	2,137	944	1,193	0.33	1.205	$6.2 \cdot 10^{-3}$	COBLL1	1	rs13389219	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$1 \cdot 10^{-8}$
11	72629946	**rs17244499**	A	G	2,137	944	1,193	0.315	1.067	0.333	FCHSD2	1	rs17244499	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.086	$1.07 \cdot 10^{-8}$
19	19658472	**rs16996148**	T	G	2,137	944	1,193	$6.55 \cdot 10^{-2}$	1.228	0.105	CILP2	1	rs16996148	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.124	$1.12 \cdot 10^{-8}$
18	57884750	**rs12970134**	A	G	2,137	944	1,193	0.181	1.105	0.227	MC4R	1	rs12970134	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.078	$1.19 \cdot 10^{-8}$
13	80717156	rs1359790	A	G	2,137	944	1,193	0.294	1.062	0.387	SPRY2	1	rs1359790	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.929	$1.39 \cdot 10^{-8}$
2	43850357	**rs11901680**	G	C	2,137	944	1,193	$8.73 \cdot 10^{-2}$	1.027	0.81	PLEKHH2	1	rs11901680	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.109	$1.49 \cdot 10^{-8}$
2	60568745	rs243088	A	T	2,137	944	1,193	0.452	1.035	0.586	BCL11A	1	rs243088	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.935	$1.81 \cdot 10^{-8}$
19	19460541	rs73001065	C	G	2,137	944	1,193	$6.15 \cdot 10^{-2}$	1.356	$1.99 \cdot 10^{-2}$	MAU2	1	rs73001065	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.856	$2.24 \cdot 10^{-8}$
19	19366632	**rs72999033**	T	C	2,137	944	1,193	$6.2 \cdot 10^{-2}$	1.332	$2.76 \cdot 10^{-2}$	HAPLN4	1	rs72999033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.172	$2.6 \cdot 10^{-8}$
2	165501849	**rs3923113**	A	C	2,137	944	1,193	0.316	1.203	$7.11 \cdot 10^{-3}$	GRB14	1	rs3923113	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$3.28 \cdot 10^{-8}$
16	75247245	rs7202877	G	T	2,137	944	1,193	0.134	1.011	0.901	CTRB1	1	rs7202877	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.895	$3.5 \cdot 10^{-8}$

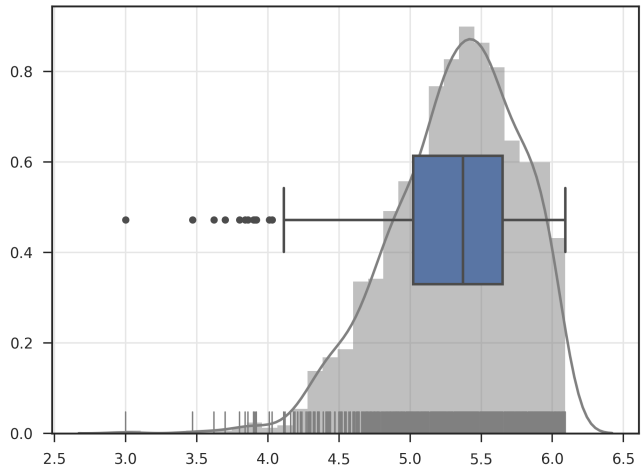
Table 16 shows statistics from the METABO_EUR cohort for 50 loci that were shown to be significantly associated with Type 2 Diabetes in the 2012 Nature Genetics paper by Morris et al [7]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 9 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 50 variants in both studies, 43 exhibit the same direction of effect with the known result (binomial test $p = 1.05e - 07$).

Table 16: Top known loci in METABO_EUR model Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

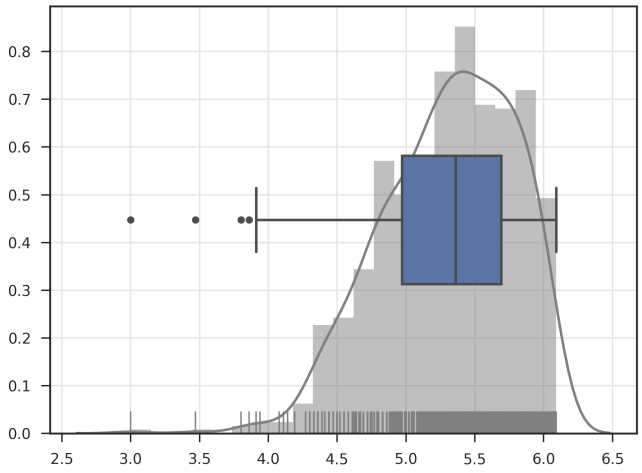
CHR	POS	ID	EA	OA	N	CASE	CTRL	FREQ	OR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$CASE_{KNOWN}$	$CTRL_{KNOWN}$	OR_{KNOWN}	P_{KNOWN}
10	114758349	**rs7903146**	T	C	2,125	934	1,191	0.791	1.427	$3.05 \cdot 10^{-5}$	TCF7L2	1	rs7903146	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.389	$1.2 \cdot 10^{-139}$
6	20679709	**rs7756992**	G	A	2,125	934	1,191	0.657	1.041	0.577	CDKAL1	1	rs7756992	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.167	$6.95 \cdot 10^{-35}$
9	22134094	**rs10811661**	T	C	2,124	933	1,191	0.869	1.109	0.31	CDKN2B	1	rs10811661	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.185	$3.72 \cdot 10^{-27}$
3	185511687	**rs4402960**	T	G	2,125	934	1,191	0.682	1.126	0.107	IGF2BP2	1	rs4402960	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.131	$2.39 \cdot 10^{-23}$
16	53819169	**rs9936385**	C	T	2,125	934	1,191	0.614	1.11	0.143	FTO	1	rs9936385	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.129	$2.61 \cdot 10^{-23}$
8	118185025	**rs3802177**	G	A	2,125	934	1,191	0.618	1.251	$1.46 \cdot 10^{-3}$	SLC30A8	1	rs3802177	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.136	$1.26 \cdot 10^{-21}$
10	94462882	**rs1111875**	C	T	2,125	934	1,191	0.52	1.131	$7.28 \cdot 10^{-2}$	HHEX	1	rs1111875	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.11	$1.98 \cdot 10^{-19}$
7	28196413	**rs849135**	G	A	2,125	934	1,191	0.559	1.036	0.62	JAZF1	1	rs849135	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$3.06 \cdot 10^{-17}$
4	6289986	**rs4458523**	G	T	2,122	933	1,189	0.426	1.015	0.829	WFS1	1	rs4458523	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.098	$2.02 \cdot 10^{-15}$
10	94262359	**rs11187033**	T	A	2,123	933	1,190	0.608	1.125	$9.34 \cdot 10^{-2}$	IDE	1	rs11187033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.106	$4.57 \cdot 10^{-15}$
10	94394402	**rs10882095**	T	G	2,125	934	1,191	0.604	1.129	$8.62 \cdot 10^{-2}$	KIF11	1	rs10882095	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.101	$1.17 \cdot 10^{-14}$
2	227093585	**rs2943640**	C	A	2,125	934	1,191	0.384	1.147	$5.04 \cdot 10^{-2}$	IRS1	1	rs2943640	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$2.69 \cdot 10^{-14}$
3	123082398	**rs11717195**	T	C	2,125	934	1,191	0.824	1.112	0.238	ADCY5	1	rs11717195	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.112	$6.47 \cdot 10^{-14}$
3	12393125	**rs1801282**	C	G	2,125	934	1,191	0.831	1.165	$9.77 \cdot 10^{-2}$	PPARG	1	rs1801282	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.13	$1.05 \cdot 10^{-12}$
2	227047771	**rs2943653**	T	C	2,125	934	1,191	0.357	1.124	0.101	NYAP2	1	rs2943653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.087	$8.64 \cdot 10^{-12}$
2	43690030	rs10203174	T	C	2,125	934	1,191	0.945	1.116	0.472	THADA	1	rs10203174	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.874	$9.5 \cdot 10^{-12}$
11	2847069	**rs163184**	G	T	2,125	934	1,191	0.357	1.215	$7.03 \cdot 10^{-3}$	KCNQ1	1	rs163184	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.086	$1.18 \cdot 10^{-11}$
11	92673828	**rs1387153**	T	C	2,123	934	1,189	0.664	1.092	0.222	MTNR1B	1	rs1387153	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.093	$1.59 \cdot 10^{-11}$
17	36102381	**rs11651052**	A	G	2,125	934	1,191	0.354	1.032	0.663	HNF1B	1	rs11651052	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.104	$1.97 \cdot 10^{-11}$
4	6315954	rs10804976	G	T	2,125	934	1,191	0.489	1.058	0.41	PPP2R2C	1	rs10804976	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.922	$3.77 \cdot 10^{-11}$
5	76427311	**rs6878122**	G	A	2,124	933	1,191	0.22	1.101	0.242	ZBED3	1	rs6878122	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$5.04 \cdot 10^{-11}$
7	14898282	**rs17168486**	T	C	2,125	934	1,191	0.806	1.02	0.826	DGKB	1	rs17168486	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.105	$5.94 \cdot 10^{-11}$
3	64705365	**rs6795735**	C	T	2,125	934	1,191	0.64	1.125	0.103	ADAMTS9	1	rs6795735	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.08	$7.39 \cdot 10^{-11}$
10	80942631	**rs12571751**	A	G	2,125	934	1,191	0.524	1.07	0.334	ZMIZ1	1	rs12571751	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.078	$1.02 \cdot 10^{-10}$
11	72433098	**rs1552224**	A	C	2,125	934	1,191	0.763	1.111	0.198	ARAP1	1	rs1552224	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.107	$1.79 \cdot 10^{-10}$
8	41519248	**rs516946**	C	T	2,125	934	1,191	0.199	1.145	0.116	ANK1	1	rs516946	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.091	$2.49 \cdot 10^{-10}$
12	27965150	**rs10842994**	C	T	2,125	934	1,191	0.829	1.292	$5.72 \cdot 10^{-3}$	KLHL42	1	rs10842994	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.096	$6.08 \cdot 10^{-10}$
11	17408630	**rs5215**	C	T	2,125	934	1,191	0.489	1.017	0.808	KCNJ11	1	rs5215	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.075	$8.5 \cdot 10^{-10}$
11	72474839	**rs613937**	A	G	2,125	934	1,191	0.741	1.087	0.29	STARD10	1	rs613937	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.099	$8.64 \cdot 10^{-10}$
12	66212318	**rs2261181**	T	C	2,125	934	1,191	0.921	1.472	$2.11 \cdot 10^{-3}$	HMGA2	1	rs2261181	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.126	$1.16 \cdot 10^{-9}$
3	23454790	**rs1496653**	A	G	2,125	934	1,191	0.701	1.053	0.497	UBE2E2	1	rs1496653	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.085	$3.56 \cdot 10^{-9}$
15	77832762	**rs7177055**	A	G	2,125	934	1,191	0.296	1.148	$7.62 \cdot 10^{-2}$	HMG20A	1	rs7177055	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.077	$4.6 \cdot 10^{-9}$
11	17418477	rs757110	A	C	2,125	934	1,191	0.489	1.008	0.908	ABCC8	1	rs757110	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.931	$5 \cdot 10^{-9}$
9	84308948	**rs2796441**	G	A	2,124	934	1,190	0.597	1.078	0.289	TLE1	1	rs2796441	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.074	$5.39 \cdot 10^{-9}$
5	55806751	**rs459193**	G	A	2,125	934	1,191	0.317	1.108	0.16	AC022431.2	1	rs459193	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.081	$5.99 \cdot 10^{-9}$
15	91544076	**rs12899811**	G	A	2,125	934	1,191	0.658	1.095	0.209	VPS33B	1	rs12899811	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.076	$6.34 \cdot 10^{-9}$
12	71439589	rs7138300	T	C	2,125	934	1,191	0.374	1.013	0.852	CTD-2021H9.3	1	rs7138300	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.935	$6.47 \cdot 10^{-9}$
19	19407718	**rs10401969**	C	T	2,125	934	1,191	0.938	1.332	$4.36 \cdot 10^{-2}$	SUGP1	1	rs10401969	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.135	$7.04 \cdot 10^{-9}$
1	214154719	**rs2075423**	G	T	2,125	934	1,191	0.554	1.022	0.754	PROX1	1	rs2075423	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$8.1 \cdot 10^{-9}$
2	165528876	**rs13389219**	C	T	2,125	934	1,191	0.67	1.248	$2.84 \cdot 10^{-3}$	COBLL1	1	rs13389219	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$1 \cdot 10^{-8}$
11	72629946	**rs17244499**	A	G	2,125	934	1,191	0.685	1.095	0.219	FCHSD2	1	rs17244499	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.086	$1.07 \cdot 10^{-8}$
19	19658472	**rs16996148**	T	G	2,125	934	1,191	0.934	1.244	0.115	CILP2	1	rs16996148	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.124	$1.12 \cdot 10^{-8}$
18	57884750	**rs12970134**	A	G	2,125	934	1,191	0.82	1.059	0.522	MC4R	1	rs12970134	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.078	$1.19 \cdot 10^{-8}$
13	80717156	rs1359790	A	G	2,125	934	1,191	0.705	1.046	0.555	SPRY2	1	rs1359790	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.929	$1.39 \cdot 10^{-8}$
2	43850357	**rs11901680**	C	G	2,125	934	1,191	0.913	1.008	0.948	PLEKHH2	1	rs11901680	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.109	$1.49 \cdot 10^{-8}$
2	60568745	rs243088	A	T	2,125	934	1,191	0.549	1.015	0.827	BCL11A	1	rs243088	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.935	$1.81 \cdot 10^{-8}$
19	19460541	rs73001065	C	G	2,125	934	1,191	0.938	1.33	$4.55 \cdot 10^{-2}$	MAU2	1	rs73001065	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	0.856	$2.24 \cdot 10^{-8}$
19	19366632	**rs72999033**	T	C	2,125	934	1,191	0.938	1.309	$5.79 \cdot 10^{-2}$	HAPLN4	1	rs72999033	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.172	$2.6 \cdot 10^{-8}$
2	165501849	**rs3923113**	A	C	2,125	934	1,191	0.684	1.213	$9.83 \cdot 10^{-3}$	GRB14	1	rs3923113	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.073	$3.28 \cdot 10^{-8}$
16	75247245	**rs7202877**	T	G	2,125	934	1,191	0.866	1.036	0.723	CTRB1	1	rs7202877	$1.5 \cdot 10^5$	34,840	$1.15 \cdot 10^5$	1.117	$3.5 \cdot 10^{-8}$

4 Fasting Glucose (GLU_FAST)

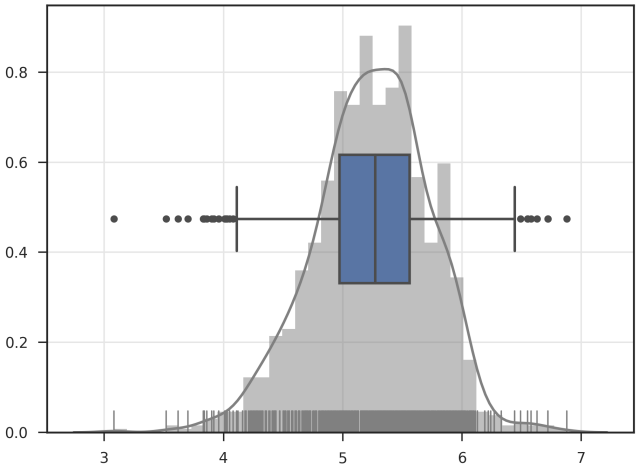
4.1 Summary



(a) EXBROAD_EUR



(b) GWAS_EUR



(c) METABO_EUR

Figure 12: Distribution of GLU_FAST in cohort-level analyses

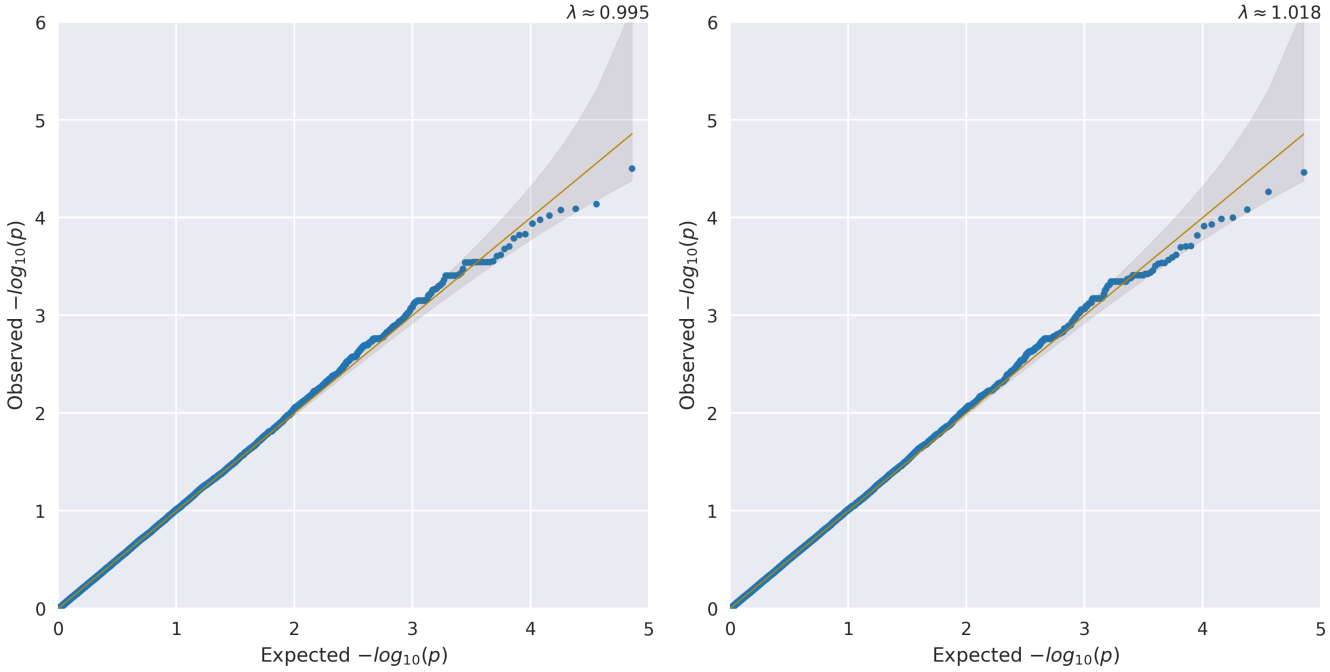
Table 17: Summary of samples removed from Fasting Glucose analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	Total	-SampleQc	-missObs	-Kinship	-PcOutlier
EXBROAD_EUR	EXBROAD	EUR	invn	Age+SEX+BMI	3563	36	1980	15	19
			invn	Age+SEX	3563	36	1977	15	19
GWAS_EUR	GWAS	EUR	invn	Age+SEX+BMI	1796	19	919	79	1
			invn	Age+SEX	1796	19	916	79	0
METABO_EUR	METABO	EUR	invn	Age+SEX+BMI	2344	43	1127	130	0
			invn	Age+SEX	2344	43	1126	130	0

Table 18: Summary of samples remaining for Fasting Glucose analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	PCs	N	Male	Female	Max	Min	μ	$\tilde{x}$	σ
EXBROAD_EUR	EXBROAD	EUR	invn	Age+SEX+BMI	2	1529	811	718	6.09	3.0	5.317	5.36	0.453
			invn	Age+SEX	2	1532	813	719	6.09	3.0	5.317	5.365	0.453
GWAS_EUR	GWAS	EUR	invn	Age+SEX+BMI	9	786	396	390	6.09	3.0	5.335	5.38	0.47
			invn	Age+SEX	3	790	400	390	6.09	3.0	5.336	5.38	0.47
METABO_EUR	METABO	EUR	invn	Age+SEX+BMI	1	1072	560	512	6.72	3.52	5.252	5.3	0.47
			invn	Age+SEX	2	1073	560	513	6.72	3.52	5.252	5.3	0.47

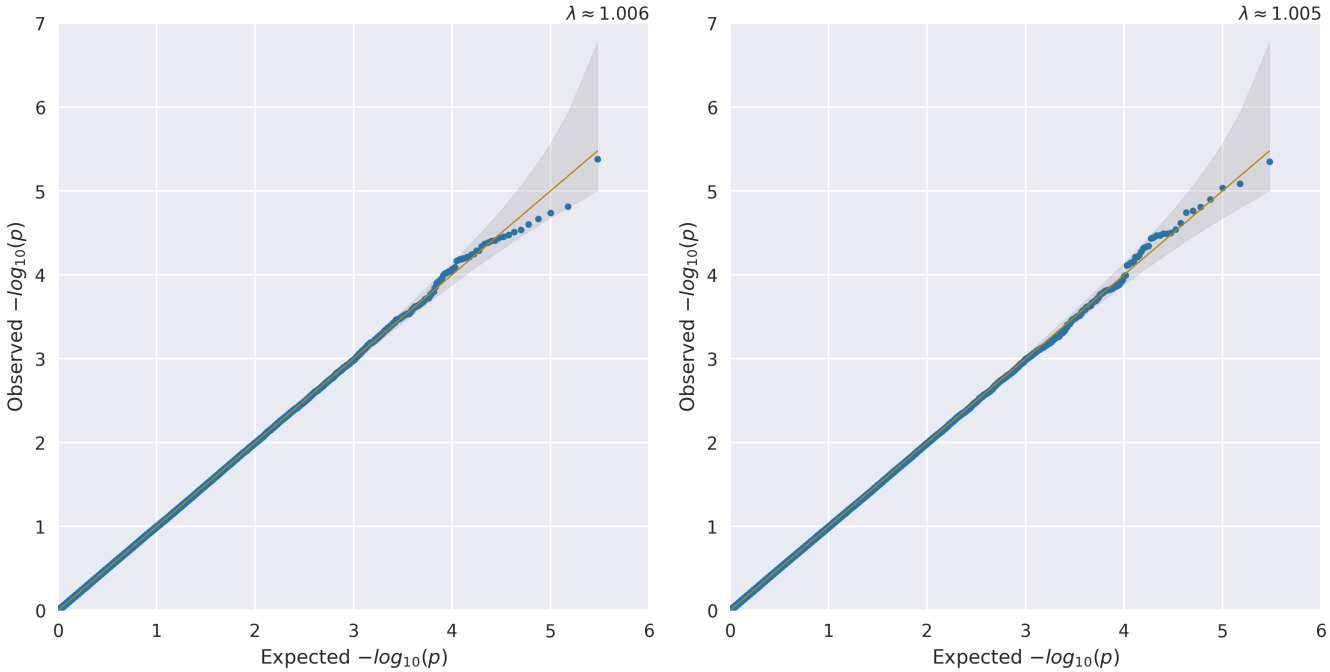
4.2 Calibration



(a) invn Adjusted Age+SEX

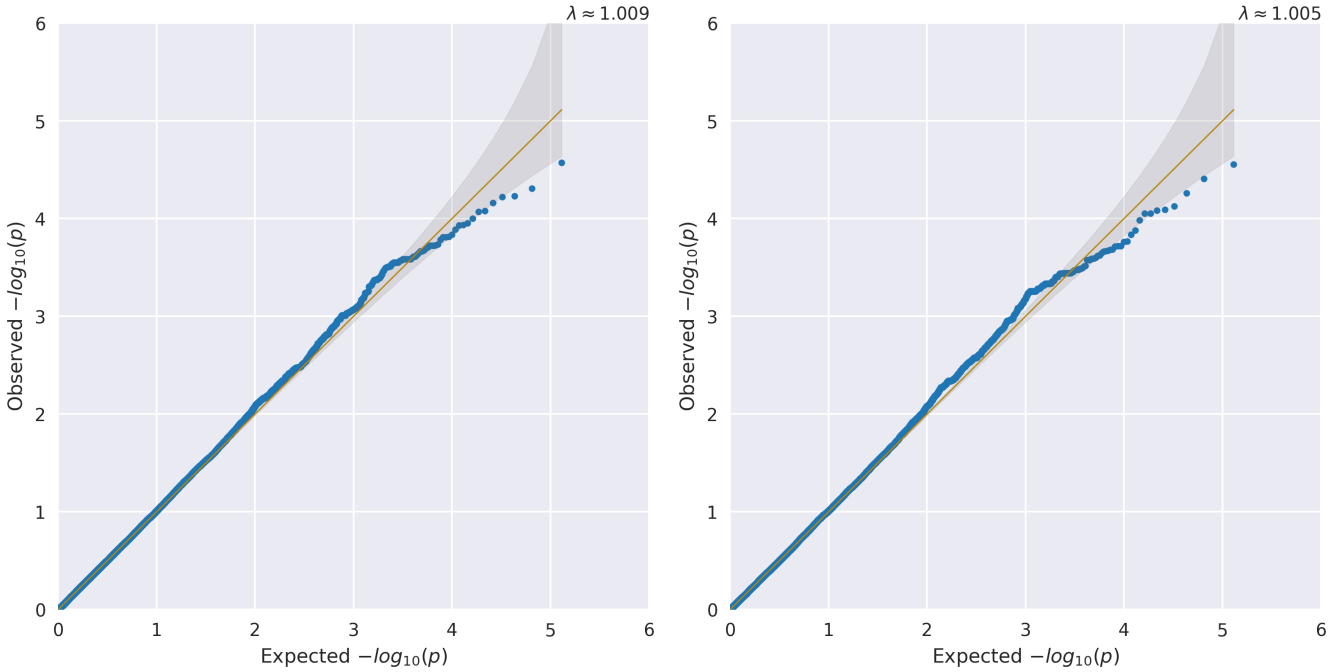
(b) invn Adjusted Age+SEX+BMI

Figure 13: QQ plots for GLU_FAST in the EXBROAD_EUR analysis



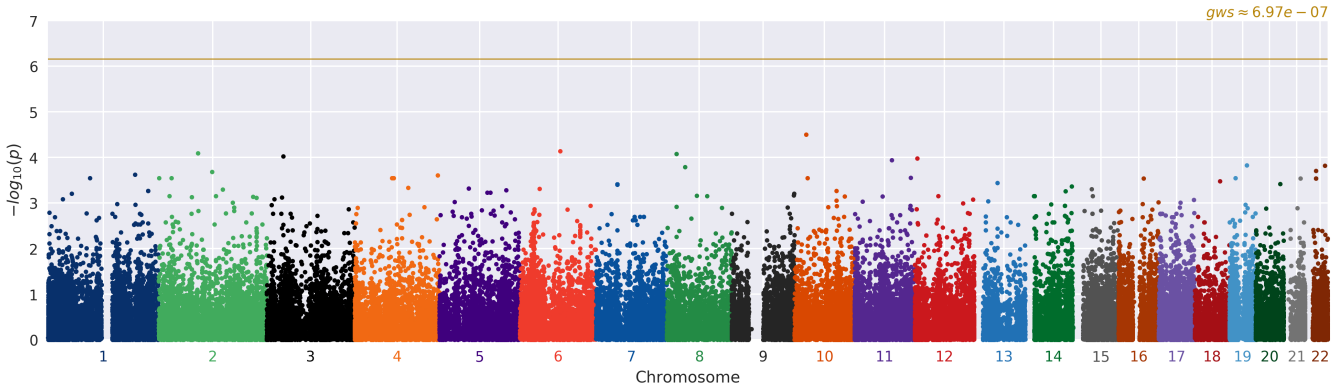
(a) invn Adjusted Age+SEX (b) invn Adjusted Age+SEX+BMI

Figure 14: QQ plots for GLU_FAST in the GWAS_EUR analysis

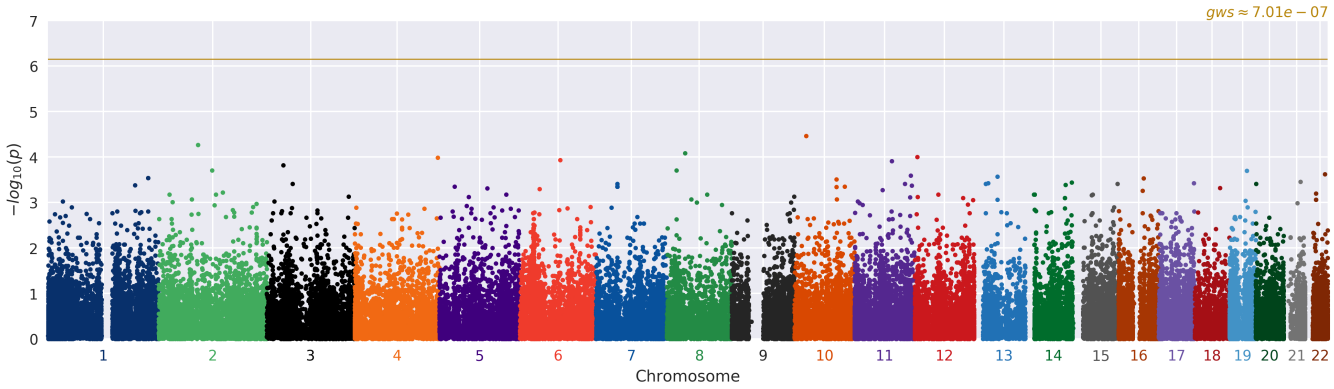


(a) invn Adjusted Age+SEX (b) invn Adjusted Age+SEX+BMI

Figure 15: QQ plots for GLU_FAST in the METABO_EUR analysis

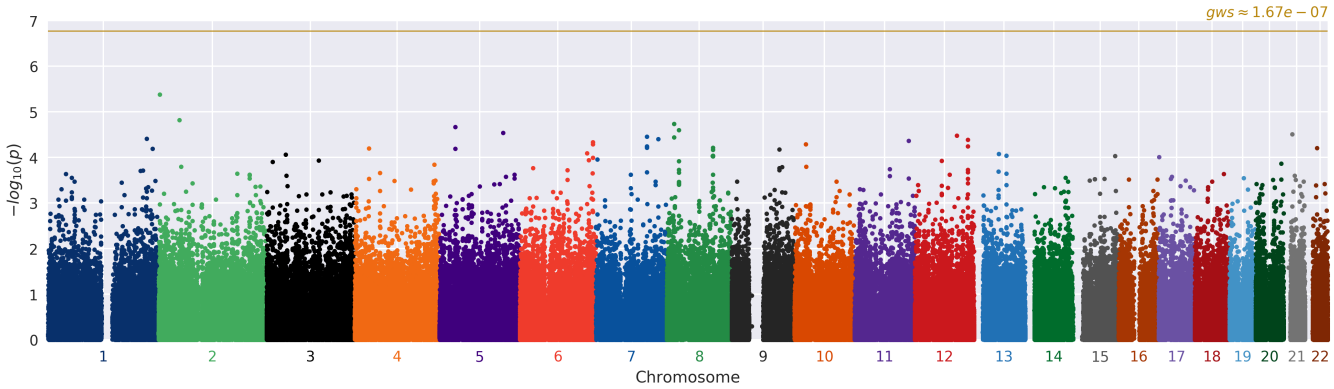


(a) invn Adjusted Age+SEX

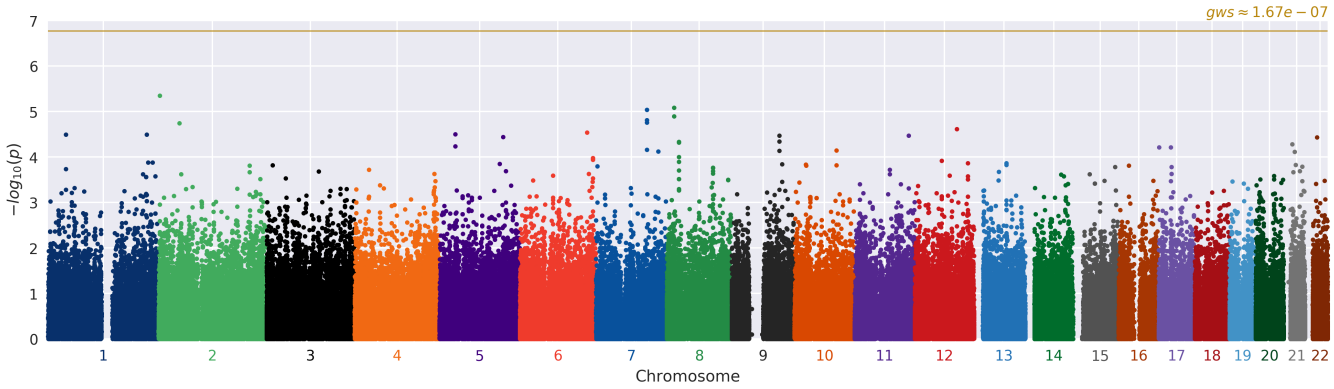


(b) invn Adjusted Age+SEX+BMI

Figure 16: Manhattan plots for GLU_FAST in the EXBROAD_EUR analysis

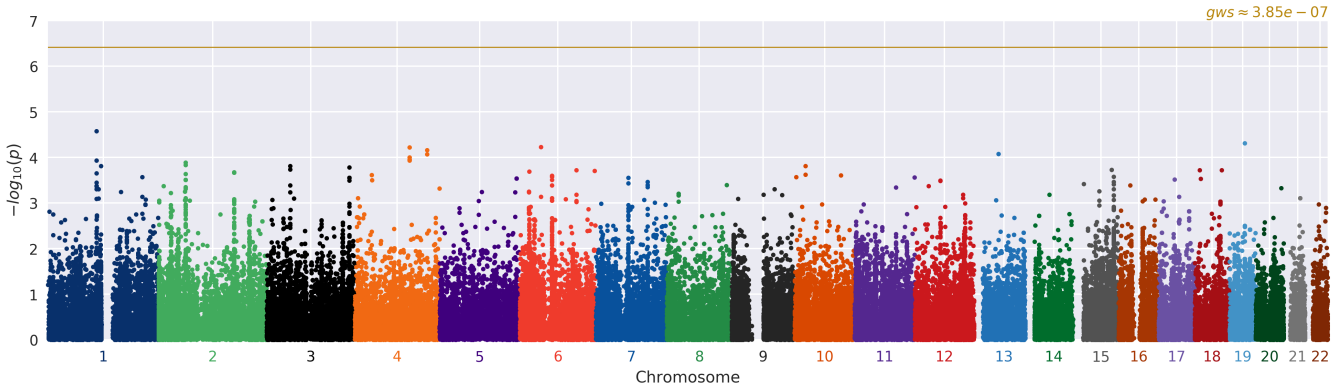


(a) invn Adjusted Age+SEX

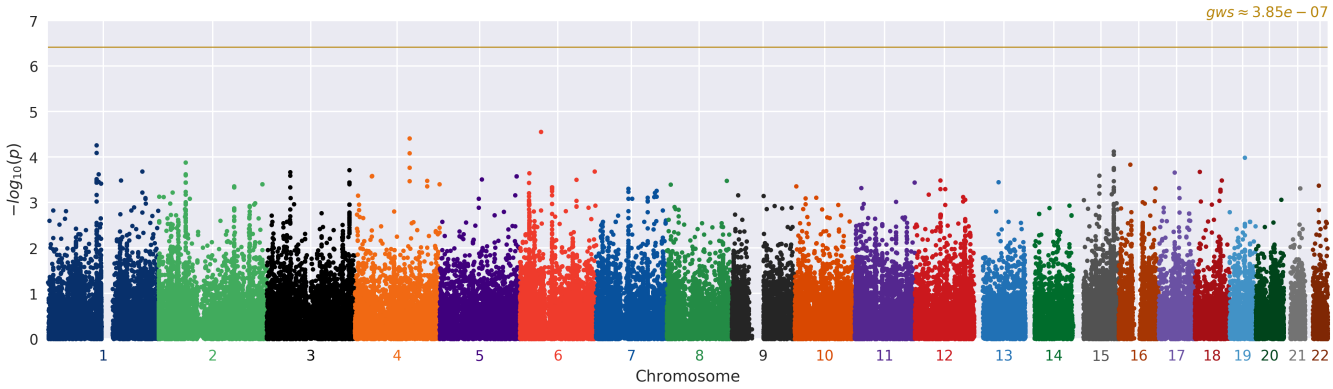


(b) invn Adjusted Age+SEX+BMI

Figure 17: Manhattan plots for GLU_FAST in the GWAS_EUR analysis



(a) invn Adjusted Age+SEX



(b) invn Adjusted Age+SEX+BMI

Figure 18: Manhattan plots for GLU_FAST in the METABO_EUR analysis

4.3 Top associations

Table 19: Top variants in the EXBROAD_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
10	26377331	rs72787346	C	T	MYO3A	1,532	813	719	4	$1.31 \cdot 10^{-3}$	2.054	0.492	$3.15 \cdot 10^{-5}$
6	90371215	rs114646660	T	C	MDN1	1,532	813	719	11	$3.59 \cdot 10^{-3}$	1.185	0.298	$7.24 \cdot 10^{-5}$
2	88417387	rs2970895	A	G	SMYD1	1,532	813	719	1,328	0.433	0.143	$3.62 \cdot 10^{-2}$	$8.11 \cdot 10^{-5}$
8	22423972	rs150705192	G	C	SORBS3	1,532	813	719	3	$9.79 \cdot 10^{-4}$	2.236	0.567	$8.35 \cdot 10^{-5}$
3	37366459	rs11718848	C	A	GOLGA4	1,532	813	719	997	0.325	0.145	$3.7 \cdot 10^{-2}$	$9.49 \cdot 10^{-5}$
12	6103650	rs61750615	G	A	VWF	1,532	813	719	2	$6.53 \cdot 10^{-4}$	2.701	0.695	$1.05 \cdot 10^{-4}$
11	83455707	rs3885683	T	C	DLG2	1,532	813	719	563	0.184	0.178	$4.61 \cdot 10^{-2}$	$1.15 \cdot 10^{-4}$
19	39369369	rs2015	G	T	SIRT2	1,532	813	719	1,187	0.387	0.139	$3.64 \cdot 10^{-2}$	$1.48 \cdot 10^{-4}$
22	44324767	rs141106484	A	G	PNPLA3	1,532	813	719	16	$5.22 \cdot 10^{-3}$	0.937	0.247	$1.51 \cdot 10^{-4}$
8	41582031	rs61735313	G	T	ANK1	1,532	813	719	25	$8.16 \cdot 10^{-3}$	0.749	0.198	$1.63 \cdot 10^{-4}$
22	24579503	rs9680526	A	T	SUSD2	1,532	813	719	35	$1.14 \cdot 10^{-2}$	0.627	0.168	$1.97 \cdot 10^{-4}$
2	120005569	rs17805141	C	T	STEAP3	1,532	813	719	203	$6.63 \cdot 10^{-2}$	0.264	$7.11 \cdot 10^{-2}$	$2.08 \cdot 10^{-4}$
1	195738953	rs12035482	G	T	KCNT2	1,532	813	719	1,449	0.473	0.134	$3.64 \cdot 10^{-2}$	$2.39 \cdot 10^{-4}$
4	187005912	rs199768900	A	G	TLR3	1,532	813	719	18	$5.87 \cdot 10^{-3}$	0.856	0.233	$2.46 \cdot 10^{-4}$
11	126203911	rs171271	G	A	DCPS	1,532	813	719	1,262	0.412	0.134	$3.68 \cdot 10^{-2}$	$2.79 \cdot 10^{-4}$
10	29822358	rs138539716	C	T	SVIL	1,532	813	719	1	$3.26 \cdot 10^{-4}$	3.573	0.982	$2.84 \cdot 10^{-4}$
19	13869925	rs142725009	C	A	CCDC130	1,532	813	719	1	$3.26 \cdot 10^{-4}$	3.573	0.982	$2.84 \cdot 10^{-4}$
1	94514466	rs61754030	C	T	ABCA4	1,532	813	719	1	$3.26 \cdot 10^{-4}$	3.573	0.982	$2.84 \cdot 10^{-4}$
2	28766134	exm182612	C	T	PLB1	1,532	813	719	1	$3.26 \cdot 10^{-4}$	3.573	0.982	$2.84 \cdot 10^{-4}$
2	669801	rs77005891	C	T	TMEM18	1,532	813	719	1	$3.26 \cdot 10^{-4}$	3.573	0.982	$2.84 \cdot 10^{-4}$

Table 20: Top variants in the EXBROAD_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
10	26377331	rs72787346	C	T	MYO3A	1,529	811	718	4	0.999	2.042	0.492	$3.43 \cdot 10^{-5}$
2	88417387	rs2970895	A	G	SMYD1	1,529	811	718	1,324	0.567	0.146	$3.62 \cdot 10^{-2}$	$5.43 \cdot 10^{-5}$
8	41582031	rs61735313	G	T	ANK1	1,529	811	718	25	0.992	0.781	0.198	$8.3 \cdot 10^{-5}$
12	6103650	rs61750615	G	A	VWF	1,529	811	718	2	0.999	2.707	0.694	$1 \cdot 10^{-4}$
4	187005912	rs199768900	A	G	TLR3	1,529	811	718	18	0.994	0.906	0.233	$1.03 \cdot 10^{-4}$
6	90371215	rs114646660	T	C	MDN1	1,529	811	718	11	0.996	1.149	0.298	$1.17 \cdot 10^{-4}$
11	83455707	rs3885683	T	C	DLG2	1,529	811	718	563	0.816	0.177	$4.6 \cdot 10^{-2}$	$1.22 \cdot 10^{-4}$
3	37366459	rs11718848	C	A	GOLGA4	1,529	811	718	996	0.674	0.14	$3.7 \cdot 10^{-2}$	$1.51 \cdot 10^{-4}$
8	22423972	rs150705192	G	C	SORBS3	1,529	811	718	3	0.999	2.116	0.567	$1.96 \cdot 10^{-4}$
2	120005569	rs17805141	C	T	STEAP3	1,529	811	718	203	0.934	0.265	$7.1 \cdot 10^{-2}$	$1.97 \cdot 10^{-4}$
19	39369369	rs2015	G	T	SIRT2	1,529	811	718	1,186	0.612	0.136	$3.64 \cdot 10^{-2}$	$2.01 \cdot 10^{-4}$
22	44324767	rs141106484	A	G	PNPLA3	1,529	811	718	16	0.995	0.907	0.246	$2.4 \cdot 10^{-4}$
11	126203911	rs171271	G	A	DCPS	1,529	811	718	1,260	0.588	0.135	$3.68 \cdot 10^{-2}$	$2.54 \cdot 10^{-4}$
13	52598273	exm1070074	G	A	ALG11	1,529	811	718	3	0.999	2.072	0.567	$2.7 \cdot 10^{-4}$
1	225528340	rs12184324	T	C	DNAH14	1,529	811	718	99	0.968	0.367	0.101	$2.89 \cdot 10^{-4}$
16	56576763	rs9927912	C	T	MT4	1,529	811	718	1,187	0.388	0.131	$3.62 \cdot 10^{-2}$	$2.95 \cdot 10^{-4}$
10	94714427	rs11187225	G	C	EXOC6	1,529	811	718	278	0.909	0.22	$6.09 \cdot 10^{-2}$	$3.1 \cdot 10^{-4}$
21	37734516	rs141637413	T	C	MORC3	1,529	811	718	3	0.999	2.036	0.568	$3.48 \cdot 10^{-4}$
14	104206781	rs200104091	C	T	PPP1R13B	1,529	811	718	8	0.997	1.246	0.349	$3.65 \cdot 10^{-4}$
13	31821992	rs4943266	C	T	B3GLCT	1,529	811	718	28	$9.16 \cdot 10^{-3}$	0.668	0.187	$3.75 \cdot 10^{-4}$

Table 21: Top variants in the GWAS_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
2	2912305	rs1729917	A	G	TSSC1	790	400	390	148	$9.37 \cdot 10^{-2}$	0.395	$8.53 \cdot 10^{-2}$	$4.18 \cdot 10^{-6}$
2	47207665	rs1865260	A	G	TTC7A	790	400	390	268	0.83	0.286	$6.58 \cdot 10^{-2}$	$1.53 \cdot 10^{-5}$
8	16977611	rs2705191	A	G	MICU3	790	400	390	675	0.573	0.216	$5 \cdot 10^{-2}$	$1.84 \cdot 10^{-5}$
5	35724053	rs7710255	G	A	SPEF2	790	400	390	666	0.422	0.208	$4.86 \cdot 10^{-2}$	$2.16 \cdot 10^{-5}$
8	27819749	rs2726942	C	T	SCARA5	790	400	390	742	0.47	0.211	$4.98 \cdot 10^{-2}$	$2.5 \cdot 10^{-5}$
5	142974644	rs11167821	A	G	NR3C1	790	400	390	352	0.777	0.247	$5.87 \cdot 10^{-2}$	$2.91 \cdot 10^{-5}$
21	19546614	rs2824679	C	T	CHODL	789	400	389	499	0.316	0.227	$5.41 \cdot 10^{-2}$	$3.09 \cdot 10^{-5}$
12	95081562	rs7138248	A	G	TMCC3	790	400	390	491	0.689	0.223	$5.35 \cdot 10^{-2}$	$3.33 \cdot 10^{-5}$
7	114714282	rs639470	G	A	MDFIC	790	400	390	558	0.353	0.217	$5.22 \cdot 10^{-2}$	$3.52 \cdot 10^{-5}$
1	222281875	rs11118950	G	T	DUSP10	790	400	390	500	0.684	0.221	$5.34 \cdot 10^{-2}$	$3.88 \cdot 10^{-5}$
7	139942889	rs2253729	C	T	KDM7A	788	398	390	613	0.389	0.21	$5.08 \cdot 10^{-2}$	$3.94 \cdot 10^{-5}$
12	119519668	rs7973439	G	A	SRRM4	790	400	390	661	0.418	0.202	$4.9 \cdot 10^{-2}$	$4.11 \cdot 10^{-5}$
11	121216567	rs716066	G	A	SC5D	790	400	390	219	0.861	0.3	$7.29 \cdot 10^{-2}$	$4.29 \cdot 10^{-5}$
6	163838794	rs2759388	G	A	QKI	790	400	390	449	0.716	0.236	$5.76 \cdot 10^{-2}$	$4.59 \cdot 10^{-5}$
10	26014964	rs2504203	T	G	GPR158	787	399	388	225	0.143	0.29	$7.12 \cdot 10^{-2}$	$5.13 \cdot 10^{-5}$
8	103877434	rs1055376	G	A	AZIN1	790	400	390	718	0.546	0.205	$5.08 \cdot 10^{-2}$	$6.1 \cdot 10^{-5}$
22	26898242	rs713900	G	A	TFIP11	790	400	390	36	$2.28 \cdot 10^{-2}$	0.68	0.169	$6.27 \cdot 10^{-5}$
4	32147858	rs7674818	A	C	PCDH7	790	400	390	93	0.941	0.422	0.105	$6.35 \cdot 10^{-5}$
1	235728896	rs488618	T	C	GNG4	790	400	390	535	0.339	0.213	$5.3 \cdot 10^{-2}$	$6.47 \cdot 10^{-5}$
9	107090297	rs17239163	G	T	OR13F1	790	400	390	266	0.832	0.264	$6.58 \cdot 10^{-2}$	$6.66 \cdot 10^{-5}$

Table 22: Top variants in the GWAS_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
2	2912305	rs1729917	A	G	TSSC1	786	396	390	147	0.906	0.395	$8.55 \cdot 10^{-2}$	$4.48 \cdot 10^{-6}$
8	16977611	rs2705191	A	G	MICU3	786	396	390	673	0.428	0.226	$5.03 \cdot 10^{-2}$	$8.17 \cdot 10^{-6}$
7	114714282	rs639470	G	A	MDFIC	786	396	390	557	0.646	0.234	$5.24 \cdot 10^{-2}$	$9.19 \cdot 10^{-6}$
2	47207665	rs1865260	A	G	TTC7A	786	396	390	267	0.17	0.285	$6.6 \cdot 10^{-2}$	$1.8 \cdot 10^{-5}$
12	95081562	rs7138248	A	G	TMCC3	786	396	390	488	0.31	0.228	$5.36 \cdot 10^{-2}$	$2.42 \cdot 10^{-5}$
6	151301951	rs7752450	T	C	MTHFD1L	786	396	390	72	$4.58 \cdot 10^{-2}$	0.508	0.121	$2.88 \cdot 10^{-5}$
5	35724053	rs7710255	G	A	SPEF2	786	396	390	662	0.579	0.205	$4.9 \cdot 10^{-2}$	$3.15 \cdot 10^{-5}$
1	222281875	rs11118950	G	T	DUSP10	786	396	390	499	0.317	0.224	$5.36 \cdot 10^{-2}$	$3.22 \cdot 10^{-5}$
1	40813932	rs4660403	A	G	COL9A2	786	396	390	372	0.763	0.242	$5.8 \cdot 10^{-2}$	$3.22 \cdot 10^{-5}$
11	121216567	rs716066	G	A	SC5D	786	396	390	219	0.139	0.305	$7.3 \cdot 10^{-2}$	$3.38 \cdot 10^{-5}$
9	107090297	rs17239163	G	T	OR13F1	786	396	390	266	0.169	0.275	$6.59 \cdot 10^{-2}$	$3.4 \cdot 10^{-5}$
5	142974644	rs11167821	A	G	NR3C1	786	396	390	347	0.221	0.247	$5.93 \cdot 10^{-2}$	$3.6 \cdot 10^{-5}$
22	26898242	rs713900	G	A	TFIP11	786	396	390	36	0.977	0.701	0.169	$3.66 \cdot 10^{-5}$
9	107059946	rs791868	T	C	SMC2	777	389	388	403	0.741	0.229	$5.59 \cdot 10^{-2}$	$4.55 \cdot 10^{-5}$
8	27819749	rs2726942	C	T	SCARA5	786	396	390	741	0.529	0.205	$5.01 \cdot 10^{-2}$	$4.66 \cdot 10^{-5}$
8	27530475	rs1036710	T	C	SCARA3	786	396	390	60	$3.82 \cdot 10^{-2}$	0.522	0.128	$4.82 \cdot 10^{-5}$
21	19546614	rs2824679	C	T	CHODL	785	396	389	497	0.683	0.221	$5.43 \cdot 10^{-2}$	$5.27 \cdot 10^{-5}$
17	27431425	rs7212295	A	G	MYO18A	784	395	389	759	0.484	0.202	$5.01 \cdot 10^{-2}$	$6.12 \cdot 10^{-5}$
17	1177002	rs1472180	A	G	BHLHA9	786	396	390	467	0.297	0.22	$5.45 \cdot 10^{-2}$	$6.14 \cdot 10^{-5}$
10	94779550	rs835256	T	C	EXOC6	784	395	389	156	$9.95 \cdot 10^{-2}$	0.337	$8.44 \cdot 10^{-2}$	$7.11 \cdot 10^{-5}$

Table 23: Top variants in the METABO_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
1	109788453	rs10776804	A	T	CELSR2	1,073	560	513	1,055	0.492	0.179	$4.25 \cdot 10^{-2}$	$2.67 \cdot 10^{-5}$
19	34298964	rs117591765	A	G	KCTD15	1,073	560	513	6	$2.8 \cdot 10^{-3}$	1.664	0.408	$4.9 \cdot 10^{-5}$
6	47338091	rs6938470	G	A	TNFRSF21	1,073	560	513	332	0.155	0.24	$5.95 \cdot 10^{-2}$	$5.9 \cdot 10^{-5}$
4	123342324	rs1383044	A	G	ADAD1	1,073	560	513	188	$8.76 \cdot 10^{-2}$	0.308	$7.63 \cdot 10^{-2}$	$5.98 \cdot 10^{-5}$
4	163055608	rs7699959	A	G	FSTL5	1,073	560	513	1,035	0.518	0.175	$4.39 \cdot 10^{-2}$	$6.91 \cdot 10^{-5}$
13	54586637	rs4341651	T	C	OLFM4	1,071	558	513	545	0.746	0.192	$4.85 \cdot 10^{-2}$	$8.38 \cdot 10^{-5}$
4	123373133	rs2069772	C	T	IL2	1,072	559	513	882	0.411	0.171	$4.37 \cdot 10^{-2}$	$1 \cdot 10^{-4}$
4	123026869	rs6534338	T	C	KIAA1109	1,073	560	513	901	0.58	0.167	$4.31 \cdot 10^{-2}$	$1.11 \cdot 10^{-4}$
1	109783570	rs4246520	T	A	SARS	1,066	555	511	851	0.601	0.169	$4.38 \cdot 10^{-2}$	$1.16 \cdot 10^{-4}$
2	60593634	rs243047	C	T	BCL11A	1,071	559	512	518	0.758	0.195	$5.08 \cdot 10^{-2}$	$1.3 \cdot 10^{-4}$
3	52336545	rs115139103	G	A	GLYCTK	1,073	560	513	56	$2.61 \cdot 10^{-2}$	0.518	0.136	$1.54 \cdot 10^{-4}$
1	119627434	rs80193249	T	C	WARS2	1,073	560	513	9	$4.19 \cdot 10^{-3}$	1.263	0.332	$1.54 \cdot 10^{-4}$
10	25117363	rs6482445	T	C	PRTFDC1	1,073	560	513	259	0.879	0.258	$6.8 \cdot 10^{-2}$	$1.55 \cdot 10^{-4}$
3	185840443	rs6793368	T	C	ETV5	1,073	560	513	381	0.822	0.213	$5.64 \cdot 10^{-2}$	$1.64 \cdot 10^{-4}$
3	52264660	rs77633859	A	C	TWF2	1,073	560	513	57	$2.66 \cdot 10^{-2}$	0.508	0.135	$1.84 \cdot 10^{-4}$
15	86449967	rs11073599	C	T	KLHL25	1,073	560	513	595	0.277	0.176	$4.69 \cdot 10^{-2}$	$1.87 \cdot 10^{-4}$
18	60810812	rs12963776	A	G	BCL2	1,073	560	513	381	0.178	0.209	$5.57 \cdot 10^{-2}$	$1.89 \cdot 10^{-4}$
6	127281547	rs987763	T	C	RSPO3	1,073	560	513	920	0.429	0.162	$4.33 \cdot 10^{-2}$	$1.89 \cdot 10^{-4}$
18	10902336	rs17569311	C	T	PIEZO2	1,073	560	513	502	0.234	0.187	$4.98 \cdot 10^{-2}$	$1.9 \cdot 10^{-4}$
6	168347714	rs683465	G	A	MLLT4	1,073	560	513	394	0.184	0.2	$5.36 \cdot 10^{-2}$	$1.96 \cdot 10^{-4}$

Table 24: Top variants in the METABO_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
6	47338091	rs6938470	G	A	TNFRSF21	1,072	560	512	331	0.154	0.25	$5.94 \cdot 10^{-2}$	$2.8 \cdot 10^{-5}$
4	123373133	rs2069772	C	T	IL2	1,071	559	512	882	0.412	0.181	$4.38 \cdot 10^{-2}$	$3.92 \cdot 10^{-5}$
1	109788453	rs10776804	A	T	CELSR2	1,072	560	512	1,054	0.492	0.172	$4.25 \cdot 10^{-2}$	$5.5 \cdot 10^{-5}$
15	91508803	rs4932182	A	C	PRC1	1,071	559	512	751	0.351	0.179	$4.51 \cdot 10^{-2}$	$7.5 \cdot 10^{-5}$
1	109783570	rs4246520	T	A	SARS	1,065	555	510	851	0.6	0.173	$4.38 \cdot 10^{-2}$	$8.14 \cdot 10^{-5}$
4	123026869	rs6534338	T	C	KIAA1109	1,072	560	512	901	0.58	0.17	$4.31 \cdot 10^{-2}$	$8.23 \cdot 10^{-5}$
15	91506452	rs2034085	C	T	RCCD1	1,072	560	512	772	0.36	0.176	$4.46 \cdot 10^{-2}$	$8.89 \cdot 10^{-5}$
19	34298964	rs117591765	A	G	KCTD15	1,072	560	512	6	$2.8 \cdot 10^{-3}$	1.589	0.408	$1.04 \cdot 10^{-4}$
2	60593634	rs243047	C	T	BCL11A	1,070	559	511	518	0.758	0.195	$5.08 \cdot 10^{-2}$	$1.32 \cdot 10^{-4}$
16	25792679	rs4555160	T	C	HS3ST4	1,072	560	512	454	0.212	0.204	$5.34 \cdot 10^{-2}$	$1.46 \cdot 10^{-4}$
4	123342324	rs1383044	A	G	ADAD1	1,072	560	512	188	$8.77 \cdot 10^{-2}$	0.288	$7.64 \cdot 10^{-2}$	$1.7 \cdot 10^{-4}$
3	185840443	rs6793368	T	C	ETV5	1,072	560	512	379	0.823	0.212	$5.67 \cdot 10^{-2}$	$1.93 \cdot 10^{-4}$
1	212387260	rs11119883	T	G	PPP2R5A	1,072	560	512	667	0.311	0.169	$4.55 \cdot 10^{-2}$	$2.07 \cdot 10^{-4}$
6	168347714	rs683465	G	A	MLLT4	1,072	560	512	394	0.184	0.199	$5.36 \cdot 10^{-2}$	$2.08 \cdot 10^{-4}$
18	10902336	rs17569311	C	T	PIEZO2	1,072	560	512	502	0.234	0.185	$4.97 \cdot 10^{-2}$	$2.12 \cdot 10^{-4}$
3	52336545	rs115139103	G	A	GLYCTK	1,072	560	512	56	$2.61 \cdot 10^{-2}$	0.506	0.136	$2.14 \cdot 10^{-4}$
17	36105858	rs34443065	T	C	HNF1B	1,072	560	512	153	$7.14 \cdot 10^{-2}$	0.306	$8.24 \cdot 10^{-2}$	$2.17 \cdot 10^{-4}$
6	21128195	rs74995413	T	G	**CDKAL1**	1,072	560	512	20	$9.33 \cdot 10^{-3}$	0.83	0.224	$2.26 \cdot 10^{-4}$
1	114377568	rs2476601	G	A	PTPN22	1,072	560	512	306	0.857	0.222	$6.03 \cdot 10^{-2}$	$2.37 \cdot 10^{-4}$
15	58730498	rs588136	T	C	LIPC	1,072	560	512	482	0.775	0.187	$5.11 \cdot 10^{-2}$	$2.55 \cdot 10^{-4}$

4.4 Previously identified risk loci

Table 25 shows statistics from the EXBROAD_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 12 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 39 variants in both studies, 27 exhibit the same direction of effect with the known result (binomial test $p = 0.0119$).

Table 25: Top known loci in EXBROAD_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	1,532	0.309	0.103	$3.88 \cdot 10^{-2}$	$8.02 \cdot 10^{-3}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
2	169791438	**rs552976**	G	A	1,532	0.349	0.119	$3.72 \cdot 10^{-2}$	$1.38 \cdot 10^{-3}$	ABCB11	1	rs552976	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$9.03 \cdot 10^{-149}$
11	92673828	**rs1387153**	T	C	1,532	0.68	$5.53 \cdot 10^{-2}$	$3.84 \cdot 10^{-2}$	0.15	MTNR1B	1	rs1387153	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.91 \cdot 10^{-143}$
7	44231886	**rs6975024**	C	T	1,532	0.903	0.106	$5.96 \cdot 10^{-2}$	$7.47 \cdot 10^{-2}$	GCK	1	rs6975024	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.88 \cdot 10^{-99}$
7	15064309	**rs2191349**	T	G	1,532	0.565	$8.97 \cdot 10^{-2}$	$3.59 \cdot 10^{-2}$	$1.25 \cdot 10^{-2}$	DGKB	1	rs2191349	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.28 \cdot 10^{-42}$
2	27730940	**rs1260326**	C	T	1,532	0.34	$6.4 \cdot 10^{-2}$	$3.75 \cdot 10^{-2}$	$8.86 \cdot 10^{-2}$	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118185733	rs11558471	G	A	1,532	0.615	$7.63 \cdot 10^{-4}$	$3.69 \cdot 10^{-2}$	0.984	SLC30A8	1	rs11558471	$1.33 \cdot 10^{5}$	$-2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.8 \cdot 10^{-37}$
15	62383155	**rs4502156**	T	C	1,532	0.424	$7.38 \cdot 10^{-2}$	$3.59 \cdot 10^{-2}$	$4.01 \cdot 10^{-2}$	C2CD4A	1	rs4502156	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.38 \cdot 10^{-25}$
10	114758349	**rs7903146**	T	C	1,532	0.823	$2.54 \cdot 10^{-2}$	$4.75 \cdot 10^{-2}$	0.594	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
3	123065778	rs11708067	G	A	1,532	0.821	$1.18 \cdot 10^{-2}$	$4.63 \cdot 10^{-2}$	0.799	ADCY5	1	rs11708067	$1.33 \cdot 10^{5}$	$-2.3 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.3 \cdot 10^{-18}$
11	61597972	rs1535	G	A	1,532	0.582	$2.28 \cdot 10^{-2}$	$3.6 \cdot 10^{-2}$	0.526	FADS2	1	rs1535	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.01 \cdot 10^{-17}$
11	61570783	rs174547	C	T	1,532	0.581	$2.42 \cdot 10^{-2}$	$3.6 \cdot 10^{-2}$	0.501	FADS1	1	rs174547	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.33 \cdot 10^{-17}$
9	22132076	**rs2383208**	A	G	1,532	0.838	0.126	$4.93 \cdot 10^{-2}$	$1.05 \cdot 10^{-2}$	CDKN2B	1	rs2383208	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$2.16 \cdot 10^{-17}$
11	61557803	rs102275	C	T	1,532	0.578	$2.11 \cdot 10^{-2}$	$3.61 \cdot 10^{-2}$	0.558	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
10	113042093	**rs10885122**	G	T	1,532	0.147	$8.08 \cdot 10^{-3}$	$5 \cdot 10^{-2}$	0.872	ADRA2A	1	rs10885122	$1.33 \cdot 10^{5}$	$2.7 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.32 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	1,532	0.337	$8.5 \cdot 10^{-2}$	$3.72 \cdot 10^{-2}$	$2.24 \cdot 10^{-2}$	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
13	28487599	**rs11619319**	G	A	1,532	0.751	$8.31 \cdot 10^{-3}$	$4.11 \cdot 10^{-2}$	0.84	PDX1	1	rs11619319	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.33 \cdot 10^{-15}$
8	9183358	**rs9987289**	A	G	1,532	0.143	0.103	$5.12 \cdot 10^{-2}$	$4.53 \cdot 10^{-2}$	RP11-10A14.4	1	rs9987289	$1.33 \cdot 10^{5}$	$2.7 \cdot 10^{-2}$	$3.8 \cdot 10^{-3}$	$6.11 \cdot 10^{-13}$
9	4292083	rs10758593	G	A	1,532	0.559	$7.86 \cdot 10^{-2}$	$3.63 \cdot 10^{-2}$	$3.08 \cdot 10^{-2}$	GLIS3	1	rs10758593	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.17 \cdot 10^{-12}$
2	27995931	**rs3792252**	G	A	1,532	0.314	$4.82 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	0.22	MRPL33	1	rs3792252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.6 \cdot 10^{-12}$
7	50791579	rs6943153	C	T	1,532	0.484	$3.96 \cdot 10^{-2}$	$3.63 \cdot 10^{-2}$	0.275	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
2	169721377	rs479661	A	G	1,532	0.118	$1.32 \cdot 10^{-2}$	$5.45 \cdot 10^{-2}$	0.809	NOSTRIN	1	rs479661	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$8.56 \cdot 10^{-12}$
11	72432985	rs11603334	A	G	1,532	0.754	$3.47 \cdot 10^{-4}$	$4.15 \cdot 10^{-2}$	0.993	ARAP1	1	rs11603334	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.12 \cdot 10^{-11}$
20	22557099	**rs6113722**	G	A	1,532	0.966	0.222	$9.96 \cdot 10^{-2}$	$2.59 \cdot 10^{-2}$	FOXA2	1	rs6113722	$1.33 \cdot 10^{5}$	$3.5 \cdot 10^{-2}$	$5.3 \cdot 10^{-3}$	$2.49 \cdot 10^{-11}$
9	111680359	**rs16913693**	T	G	1,532	0.974	$1.95 \cdot 10^{-2}$	0.115	0.865	IKBKAP	1	rs16913693	$1.33 \cdot 10^{5}$	$4.3 \cdot 10^{-2}$	$6.6 \cdot 10^{-3}$	$3.51 \cdot 10^{-11}$
11	48009074	**rs11039482**	C	T	1,532	0.894	$4.44 \cdot 10^{-2}$	$5.79 \cdot 10^{-2}$	0.444	PTPRJ	1	rs11039482	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$9.36 \cdot 10^{-11}$
9	139256766	**rs3829109**	G	A	1,532	0.646	$6.74 \cdot 10^{-2}$	$3.67 \cdot 10^{-2}$	$6.67 \cdot 10^{-2}$	DNLZ	1	rs3829109	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.13 \cdot 10^{-10}$
14	100839261	**rs3783347**	G	T	1,532	0.822	$4.18 \cdot 10^{-3}$	$4.76 \cdot 10^{-2}$	0.93	WARS	1	rs3783347	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.32 \cdot 10^{-10}$
1	214159256	**rs340874**	C	T	1,532	0.573	$4.91 \cdot 10^{-2}$	$3.64 \cdot 10^{-2}$	0.177	PROX1	1	rs340874	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.08 \cdot 10^{-10}$
11	48333360	**rs1483121**	G	A	1,532	0.886	$3.89 \cdot 10^{-2}$	$5.58 \cdot 10^{-2}$	0.486	OR4S1	1	rs1483121	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$1.7 \cdot 10^{-9}$
6	20679709	**rs7756992**	G	A	1,532	0.662	$4.17 \cdot 10^{-2}$	$3.85 \cdot 10^{-2}$	0.279	CDKAL1	1	rs7756992	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.79 \cdot 10^{-9}$
12	133041618	**rs10747083**	A	G	1,532	0.366	$1.18 \cdot 10^{-2}$	$3.67 \cdot 10^{-2}$	0.748	FBRSL1	1	rs10747083	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.57 \cdot 10^{-9}$
20	39743905	rs6072275	G	A	1,532	0.763	$9.07 \cdot 10^{-3}$	$4.17 \cdot 10^{-2}$	0.828	TOP1	1	rs6072275	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.66 \cdot 10^{-8}$
3	185513392	**rs7651090**	G	A	1,532	0.693	$4.11 \cdot 10^{-4}$	$3.77 \cdot 10^{-2}$	0.991	IGF2BP2	1	rs7651090	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.75 \cdot 10^{-8}$
13	33554302	rs576674	A	G	1,532	$9.01 \cdot 10^{-2}$	$6.47 \cdot 10^{-2}$	$6.17 \cdot 10^{-2}$	0.295	KL	1	rs576674	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
3	49455330	**rs11715915**	C	T	1,532	0.551	$2.42 \cdot 10^{-2}$	$3.64 \cdot 10^{-2}$	0.506	AMT	1	rs11715915	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.9 \cdot 10^{-8}$
7	44229068	**rs1799884**	T	C	1,532	0.903	0.106	$5.96 \cdot 10^{-2}$	$7.47 \cdot 10^{-2}$	YKT6	1	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
3	170732300	rs5400	G	A	1,532	0.852	$6.34 \cdot 10^{-2}$	$4.98 \cdot 10^{-2}$	0.204	SLC2A2	1	rs1280	$1.33 \cdot 10^{5}$	$-2.6 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$8.56 \cdot 10^{-18}$
11	47290984	**rs1449627**	G	T	1,532	0.587	$8.85 \cdot 10^{-2}$	$3.58 \cdot 10^{-2}$	$1.35 \cdot 10^{-2}$	MADD	1	rs3816725	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.47 \cdot 10^{-11}$
11	61569830	**rs174546**	T	C	1,532	0.581	$2.42 \cdot 10^{-2}$	$3.6 \cdot 10^{-2}$	0.501	MYRF	0.968	rs174535	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.38 \cdot 10^{-17}$
11	45878992	rs7945565	A	G	1,532	0.521	$5.68 \cdot 10^{-2}$	$3.5 \cdot 10^{-2}$	0.105	CRY2	0.968	rs6485644	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.31 \cdot 10^{-23}$
11	45878992	rs7945565	A	G	1,532	0.521	$5.68 \cdot 10^{-2}$	$3.5 \cdot 10^{-2}$	0.105	SLC35C1	0.948	rs11607883	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$6.32 \cdot 10^{-24}$
2	27801759	**rs1919128**	A	G	1,532	0.728	$6.74 \cdot 10^{-2}$	$4.05 \cdot 10^{-2}$	$9.62 \cdot 10^{-2}$	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
2	27972833	**rs12104449**	G	A	1,532	0.888	$6.31 \cdot 10^{-2}$	$5.69 \cdot 10^{-2}$	0.268	SLC4A1AP	0.911	rs2178198	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$1.02 \cdot 10^{-9}$
19	46202172	**rs2287019**	C	T	1,532	0.783	$4.82 \cdot 10^{-2}$	$4.23 \cdot 10^{-2}$	0.255	GIPR	0.89	rs11672660	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$5.83 \cdot 10^{-9}$
2	27711893	rs1260327	G	A	1,532	0.503	$7.12 \cdot 10^{-3}$	$3.66 \cdot 10^{-2}$	0.846	IFT172	0.888	rs780110	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.82 \cdot 10^{-20}$
11	47286290	rs7120118	C	T	1,532	0.59	$7.44 \cdot 10^{-2}$	$3.58 \cdot 10^{-2}$	$3.77 \cdot 10^{-2}$	NR1H3	0.836	rs10838681	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$8.84 \cdot 10^{-11}$
2	27995931	rs3792252	G	A	1,532	0.314	$4.82 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	0.22	AC074091.13	0.786	rs867282	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.76 \cdot 10^{-11}$
2	28323869	rs6547829	C	T	1,532	0.913	0.162	$6.26 \cdot 10^{-2}$	$9.98 \cdot 10^{-3}$	BRE	0.765	rs937813	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$3.4 \cdot 10^{-3}$	$9.87 \cdot 10^{-10}$
2	27424636	rs1395	G	A	1,532	0.302	$7.07 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	$7.12 \cdot 10^{-2}$	TRIM54	0.723	rs13404446	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.09 \cdot 10^{-9}$

Table 26 shows statistics from the EXBROAD_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 10 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 39 variants in both studies, 28 exhibit the same direction of effect with the known result (binomial test $p = 0.00474$).

Table 26: Top known loci in EXBROAD_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	1,529	0.691	$9.7 \cdot 10^{-2}$	$3.88 \cdot 10^{-2}$	$1.25 \cdot 10^{-2}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
2	169791438	**rs552976**	G	A	1,529	0.651	0.114	$3.72 \cdot 10^{-2}$	$2.16 \cdot 10^{-3}$	ABCB11	1	rs552976	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$9.03 \cdot 10^{-149}$
11	92673828	**rs1387153**	T	C	1,529	0.32	$5.17 \cdot 10^{-2}$	$3.84 \cdot 10^{-2}$	0.179	MTNR1B	1	rs1387153	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.91 \cdot 10^{-143}$
7	44231886	**rs6975024**	C	T	1,529	$9.65 \cdot 10^{-2}$	$9.62 \cdot 10^{-2}$	$5.99 \cdot 10^{-2}$	0.109	GCK	1	rs6975024	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.88 \cdot 10^{-99}$
7	15064309	**rs2191349**	T	G	1,529	0.435	$9.39 \cdot 10^{-2}$	$3.59 \cdot 10^{-2}$	$9.13 \cdot 10^{-3}$	DGKB	1	rs2191349	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.28 \cdot 10^{-42}$
2	27730940	**rs1260326**	C	T	1,529	0.66	$6.46 \cdot 10^{-2}$	$3.75 \cdot 10^{-2}$	$8.55 \cdot 10^{-2}$	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118185733	**rs11558471**	A	G	1,529	0.385	$1.04 \cdot 10^{-2}$	$3.69 \cdot 10^{-2}$	0.778	SLC30A8	1	rs11558471	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.8 \cdot 10^{-37}$
15	62383155	**rs4502156**	T	C	1,529	0.577	$6.45 \cdot 10^{-2}$	$3.59 \cdot 10^{-2}$	$7.28 \cdot 10^{-2}$	C2CD4A	1	rs4502156	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.38 \cdot 10^{-25}$
10	114758349	**rs7903146**	T	C	1,529	0.176	$3.67 \cdot 10^{-2}$	$4.77 \cdot 10^{-2}$	0.442	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
3	123065778	rs11708067	G	A	1,529	0.179	$1.32 \cdot 10^{-2}$	$4.63 \cdot 10^{-2}$	0.775	ADCY5	1	rs11708067	$1.33 \cdot 10^{5}$	$-2.3 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.3 \cdot 10^{-18}$
11	61597972	rs1535	G	A	1,529	0.418	$2.33 \cdot 10^{-2}$	$3.6 \cdot 10^{-2}$	0.518	FADS2	1	rs1535	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.01 \cdot 10^{-17}$
11	61570783	rs174547	C	T	1,529	0.419	$2.42 \cdot 10^{-2}$	$3.61 \cdot 10^{-2}$	0.503	FADS1	1	rs174547	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.33 \cdot 10^{-17}$
9	22132076	**rs2383208**	A	G	1,529	0.161	0.114	$4.95 \cdot 10^{-2}$	$2.17 \cdot 10^{-2}$	CDKN2B	1	rs2383208	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$2.16 \cdot 10^{-17}$
11	61557803	rs102275	C	T	1,529	0.422	$2.13 \cdot 10^{-2}$	$3.61 \cdot 10^{-2}$	0.555	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
10	113042093	**rs10885122**	G	T	1,529	0.854	$9.77 \cdot 10^{-3}$	$5.02 \cdot 10^{-2}$	0.846	ADRA2A	1	rs10885122	$1.33 \cdot 10^{5}$	$2.7 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.32 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	1,529	0.663	$8.82 \cdot 10^{-2}$	$3.72 \cdot 10^{-2}$	$1.78 \cdot 10^{-2}$	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
13	28487599	**rs11619319**	G	A	1,529	0.249	$9.89 \cdot 10^{-3}$	$4.1 \cdot 10^{-2}$	0.81	PDX1	1	rs11619319	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.33 \cdot 10^{-15}$
8	9183358	**rs9987289**	A	G	1,529	0.857	$9.7 \cdot 10^{-2}$	$5.12 \cdot 10^{-2}$	$5.86 \cdot 10^{-2}$	RP11-10A14.4	1	rs9987289	$1.33 \cdot 10^{5}$	$2.7 \cdot 10^{-2}$	$3.8 \cdot 10^{-3}$	$6.11 \cdot 10^{-13}$
9	4292083	rs10758593	G	A	1,529	0.441	$7.78 \cdot 10^{-2}$	$3.63 \cdot 10^{-2}$	$3.24 \cdot 10^{-2}$	GLIS3	1	rs10758593	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.17 \cdot 10^{-12}$
2	27995931	**rs3792252**	G	A	1,529	0.686	$4.93 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	0.209	MRPL33	1	rs3792252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.6 \cdot 10^{-12}$
7	50791579	rs6943153	C	T	1,529	0.515	$3.15 \cdot 10^{-2}$	$3.63 \cdot 10^{-2}$	0.385	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
2	169721377	rs479661	A	G	1,529	0.882	$1.3 \cdot 10^{-2}$	$5.45 \cdot 10^{-2}$	0.812	NOSTRIN	1	rs479661	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$8.56 \cdot 10^{-12}$
11	72432985	rs11603334	A	G	1,529	0.247	$7.21 \cdot 10^{-3}$	$4.15 \cdot 10^{-2}$	0.862	ARAP1	1	rs11603334	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.12 \cdot 10^{-11}$
20	22557099	**rs6113722**	G	A	1,529	$3.43 \cdot 10^{-2}$	0.233	$9.95 \cdot 10^{-2}$	$1.92 \cdot 10^{-2}$	FOXA2	1	rs6113722	$1.33 \cdot 10^{5}$	$3.5 \cdot 10^{-2}$	$5.3 \cdot 10^{-3}$	$2.49 \cdot 10^{-11}$
9	111680359	**rs16913693**	T	G	1,529	$2.58 \cdot 10^{-2}$	$2.77 \cdot 10^{-2}$	0.115	0.809	IKBKAP	1	rs16913693	$1.33 \cdot 10^{5}$	$4.3 \cdot 10^{-2}$	$6.6 \cdot 10^{-3}$	$3.51 \cdot 10^{-11}$
11	48009074	**rs11039482**	C	T	1,529	0.105	$4.46 \cdot 10^{-2}$	$5.8 \cdot 10^{-2}$	0.442	PTPRJ	1	rs11039482	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$9.36 \cdot 10^{-11}$
9	139256766	**rs3829109**	G	A	1,529	0.355	$6.33 \cdot 10^{-2}$	$3.68 \cdot 10^{-2}$	$8.55 \cdot 10^{-2}$	DNLZ	1	rs3829109	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.13 \cdot 10^{-10}$
14	100839261	**rs3783347**	G	T	1,529	0.178	$9.1 \cdot 10^{-3}$	$4.76 \cdot 10^{-2}$	0.848	WARS	1	rs3783347	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.32 \cdot 10^{-10}$
1	214159256	**rs340874**	C	T	1,529	0.428	$5.21 \cdot 10^{-2}$	$3.63 \cdot 10^{-2}$	0.152	PROX1	1	rs340874	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.08 \cdot 10^{-10}$
11	48333360	**rs1483121**	G	A	1,529	0.114	$4.13 \cdot 10^{-2}$	$5.59 \cdot 10^{-2}$	0.46	OR4S1	1	rs1483121	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$1.7 \cdot 10^{-9}$
6	20679709	**rs7756992**	G	A	1,529	0.337	$4.73 \cdot 10^{-2}$	$3.85 \cdot 10^{-2}$	0.219	CDKAL1	1	rs7756992	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.79 \cdot 10^{-9}$
12	133041618	**rs10747083**	A	G	1,529	0.636	$6.82 \cdot 10^{-3}$	$3.67 \cdot 10^{-2}$	0.853	FBRSL1	1	rs10747083	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.57 \cdot 10^{-9}$
20	39743905	rs6072275	G	A	1,529	0.237	$4.83 \cdot 10^{-3}$	$4.17 \cdot 10^{-2}$	0.908	TOP1	1	rs6072275	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.66 \cdot 10^{-8}$
3	185513392	**rs7651090**	G	A	1,529	0.307	$1.08 \cdot 10^{-3}$	$3.77 \cdot 10^{-2}$	0.977	IGF2BP2	1	rs7651090	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.75 \cdot 10^{-8}$
13	33554302	rs576674	A	G	1,529	0.91	$7.08 \cdot 10^{-2}$	$6.17 \cdot 10^{-2}$	0.251	KL	1	rs576674	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
3	49455330	**rs11715915**	C	T	1,529	0.45	$2.18 \cdot 10^{-2}$	$3.64 \cdot 10^{-2}$	0.55	AMT	1	rs11715915	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.9 \cdot 10^{-8}$
7	44229068	**rs1799884**	T	C	1,529	$9.65 \cdot 10^{-2}$	$9.62 \cdot 10^{-2}$	$5.99 \cdot 10^{-2}$	0.109	YKT6	1	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
3	170732300	rs5400	G	A	1,529	0.148	$6.58 \cdot 10^{-2}$	$4.98 \cdot 10^{-2}$	0.187	SLC2A2	1	rs1280	$1.33 \cdot 10^{5}$	$-2.6 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$8.56 \cdot 10^{-18}$
11	47290984	**rs1449627**	G	T	1,529	0.413	$9.11 \cdot 10^{-2}$	$3.58 \cdot 10^{-2}$	$1.1 \cdot 10^{-2}$	MADD	1	rs3816725	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.47 \cdot 10^{-11}$
11	61569830	**rs174546**	T	C	1,529	0.419	$2.42 \cdot 10^{-2}$	$3.61 \cdot 10^{-2}$	0.503	MYRF	0.968	rs174535	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.38 \cdot 10^{-17}$
11	45878992	rs7945565	A	G	1,529	0.479	$5.54 \cdot 10^{-2}$	$3.49 \cdot 10^{-2}$	0.113	CRY2	0.968	rs6485644	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.31 \cdot 10^{-23}$
11	45878992	rs7945565	A	G	1,529	0.479	$5.54 \cdot 10^{-2}$	$3.49 \cdot 10^{-2}$	0.113	SLC35C1	0.948	rs11607883	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$6.32 \cdot 10^{-24}$
2	27801759	**rs1919128**	A	G	1,529	0.272	$6.33 \cdot 10^{-2}$	$4.05 \cdot 10^{-2}$	0.118	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
2	27972833	**rs12104449**	G	A	1,529	0.112	$6.37 \cdot 10^{-2}$	$5.68 \cdot 10^{-2}$	0.262	SLC4A1AP	0.911	rs2178198	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$1.02 \cdot 10^{-9}$
19	46202172	**rs2287019**	C	T	1,529	0.217	$4.97 \cdot 10^{-2}$	$4.22 \cdot 10^{-2}$	0.239	GIPR	0.89	rs11672660	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$5.83 \cdot 10^{-9}$
2	27711893	rs1260327	G	A	1,529	0.497	$6.84 \cdot 10^{-3}$	$3.66 \cdot 10^{-2}$	0.852	IFT172	0.888	rs780110	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.82 \cdot 10^{-20}$
11	47286290	rs7120118	C	T	1,529	0.41	$7.71 \cdot 10^{-2}$	$3.58 \cdot 10^{-2}$	$3.13 \cdot 10^{-2}$	NR1H3	0.836	rs10838681	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$8.84 \cdot 10^{-11}$
2	27995931	rs3792252	G	A	1,529	0.686	$4.93 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	0.209	AC074091.13	0.786	rs867282	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.76 \cdot 10^{-11}$
2	28323869	rs6547829	C	T	1,529	$8.7 \cdot 10^{-2}$	0.153	$6.26 \cdot 10^{-2}$	$1.45 \cdot 10^{-2}$	BRE	0.765	rs937813	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$3.4 \cdot 10^{-3}$	$9.87 \cdot 10^{-10}$
2	27424636	rs1395	G	A	1,529	0.698	$7.04 \cdot 10^{-2}$	$3.92 \cdot 10^{-2}$	$7.28 \cdot 10^{-2}$	TRIM54	0.723	rs13404446	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.09 \cdot 10^{-9}$

Table 27 shows statistics from the GWAS_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 6 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 40 variants in both studies, 28 exhibit the same direction of effect with the known result (binomial test $p = 0.00829$).

Table 27: Top known loci in GWAS_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	790	0.702	0.108	$5.54 \cdot 10^{-2}$	$5.06 \cdot 10^{-2}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
11	92673828	**rs1387153**	T	C	790	0.318	0.103	$5.41 \cdot 10^{-2}$	$5.74 \cdot 10^{-2}$	MTNR1B	1	rs1387153	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.91 \cdot 10^{-143}$
2	169785449	**rs503931**	C	A	790	0.566	$5.92 \cdot 10^{-2}$	$5.09 \cdot 10^{-2}$	0.245	ABCB11	1	rs503931	$1.33 \cdot 10^{5}$	$3.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.54 \cdot 10^{-69}$
2	169750483	**rs477224**	C	T	790	0.806	$8.12 \cdot 10^{-2}$	$6.29 \cdot 10^{-2}$	0.197	SPC25	1	rs477224	$1.33 \cdot 10^{5}$	$3.6 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$6.02 \cdot 10^{-57}$
7	44211337	**rs2971671**	C	T	790	0.263	0.107	$5.83 \cdot 10^{-2}$	$6.83 \cdot 10^{-2}$	GCK	1	rs2971671	$1.33 \cdot 10^{5}$	$3.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.07 \cdot 10^{-50}$
2	27730940	**rs1260326**	C	T	786	0.669	$6.22 \cdot 10^{-2}$	$5.14 \cdot 10^{-2}$	0.227	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118184783	rs13266634	T	C	788	0.398	$1.38 \cdot 10^{-2}$	$5.27 \cdot 10^{-2}$	0.794	SLC30A8	1	rs13266634	$1.33 \cdot 10^{5}$	$-2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.47 \cdot 10^{-35}$
7	14898282	**rs17168486**	T	C	790	0.204	$7.21 \cdot 10^{-2}$	$6.09 \cdot 10^{-2}$	0.237	DGKB	1	rs17168486	$1.33 \cdot 10^{5}$	$3.1 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$3.17 \cdot 10^{-28}$
10	114758349	**rs7903146**	T	C	790	0.177	$6.93 \cdot 10^{-2}$	$6.55 \cdot 10^{-2}$	0.29	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
11	45873091	rs11605924	C	A	779	0.487	$9.37 \cdot 10^{-3}$	$4.93 \cdot 10^{-2}$	0.849	CRY2	1	rs11605924	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$3.93 \cdot 10^{-19}$
11	61580635	rs174556	T	C	790	0.408	$3.28 \cdot 10^{-2}$	$5.08 \cdot 10^{-2}$	0.519	FADS1	1	rs174556	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.82 \cdot 10^{-18}$
11	61597972	rs1535	G	A	790	0.439	$5.32 \cdot 10^{-2}$	$4.96 \cdot 10^{-2}$	0.284	FADS2	1	rs1535	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.01 \cdot 10^{-17}$
9	22132076	**rs2383208**	A	G	790	0.169	0.153	$6.99 \cdot 10^{-2}$	$2.92 \cdot 10^{-2}$	CDKN2B	1	rs2383208	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$2.16 \cdot 10^{-17}$
11	61552680	rs174537	T	G	790	0.439	$5.14 \cdot 10^{-2}$	$4.99 \cdot 10^{-2}$	0.303	MYRF	1	rs174537	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.35 \cdot 10^{-17}$
11	61557803	rs102275	C	T	790	0.442	$4.49 \cdot 10^{-2}$	$4.98 \cdot 10^{-2}$	0.368	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	790	0.677	0.162	$5.28 \cdot 10^{-2}$	$2.24 \cdot 10^{-3}$	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
13	28491198	**rs2293941**	A	G	790	0.243	$4.92 \cdot 10^{-2}$	$5.85 \cdot 10^{-2}$	0.401	PDX1	1	rs2293941	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.66 \cdot 10^{-15}$
11	47318157	**rs749067**	T	C	790	0.304	0.109	$5.3 \cdot 10^{-2}$	$4.09 \cdot 10^{-2}$	MADD	1	rs749067	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$6.12 \cdot 10^{-15}$
8	9177732	**rs983309**	T	G	790	0.828	$7.65 \cdot 10^{-2}$	$6.71 \cdot 10^{-2}$	0.255	RP11-10A14.4	1	rs983309	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.29 \cdot 10^{-15}$
9	4293150	rs10814916	A	C	786	0.534	$1.39 \cdot 10^{-2}$	$5.07 \cdot 10^{-2}$	0.784	GLIS3	1	rs10814916	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.26 \cdot 10^{-13}$
3	123094451	rs2877716	T	C	790	0.808	$5.8 \cdot 10^{-4}$	$6.33 \cdot 10^{-2}$	0.993	ADCY5	1	rs2877716	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$3.95 \cdot 10^{-13}$
2	27988821	**rs13013484**	G	A	790	0.675	$9.41 \cdot 10^{-2}$	$5.39 \cdot 10^{-2}$	$8.14 \cdot 10^{-2}$	MRPL33	1	rs13013484	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$5.36 \cdot 10^{-13}$
2	169605967	**rs2390732**	A	G	788	0.622	$6.13 \cdot 10^{-3}$	$5.15 \cdot 10^{-2}$	0.905	CERS6	1	rs2390732	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$7.1 \cdot 10^{-13}$
7	50791579	rs6943153	C	T	790	0.516	$4.21 \cdot 10^{-2}$	$4.97 \cdot 10^{-2}$	0.397	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
2	169721377	**rs479661**	G	A	790	0.875	$4.19 \cdot 10^{-2}$	$7.55 \cdot 10^{-2}$	0.579	NOSTRIN	1	rs479661	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$8.56 \cdot 10^{-12}$
11	72433098	**rs1552224**	A	C	790	0.24	$1.96 \cdot 10^{-2}$	$5.89 \cdot 10^{-2}$	0.739	ARAP1	1	rs1552224	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.54 \cdot 10^{-11}$
2	27951658	**rs867282**	T	C	790	0.742	$8.98 \cdot 10^{-2}$	$5.79 \cdot 10^{-2}$	0.121	AC074091.13	1	rs867282	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.76 \cdot 10^{-11}$
1	214145706	**rs340883**	T	C	790	0.375	$6.93 \cdot 10^{-2}$	$5.26 \cdot 10^{-2}$	0.188	PROX1	1	rs340883	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$4.08 \cdot 10^{-11}$
2	27152874	rs1371614	C	T	790	0.211	$7.21 \cdot 10^{-2}$	$6.03 \cdot 10^{-2}$	0.232	DPYSL5	1	rs1371614	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.09 \cdot 10^{-11}$
15	62424649	**rs4775471**	C	T	790	0.211	0.159	$6.12 \cdot 10^{-2}$	$9.59 \cdot 10^{-3}$	C2CD4B	1	rs4775471	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$9.73 \cdot 10^{-11}$
11	72851463	**rs1783598**	T	C	790	0.644	$2.1 \cdot 10^{-2}$	$5.33 \cdot 10^{-2}$	0.694	FCHSD2	1	rs1783598	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.19 \cdot 10^{-10}$
11	47054448	**rs7101470**	A	G	782	$8.44 \cdot 10^{-2}$	$9.85 \cdot 10^{-2}$	$9.09 \cdot 10^{-2}$	0.279	C11orf49	1	rs7101470	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$3.4 \cdot 10^{-3}$	$1.2 \cdot 10^{-10}$
3	170756985	rs6785233	G	T	790	$4.56 \cdot 10^{-2}$	$8.92 \cdot 10^{-2}$	0.116	0.443	SLC2A2	1	rs6785233	$1.33 \cdot 10^{5}$	$-2.5 \cdot 10^{-2}$	$4.1 \cdot 10^{-3}$	$4.8 \cdot 10^{-10}$
2	27895073	**rs2178198**	C	T	786	0.119	$2.08 \cdot 10^{-2}$	$7.67 \cdot 10^{-2}$	0.787	SLC4A1AP	1	rs2178198	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$1.02 \cdot 10^{-9}$
11	48333360	**rs1483121**	G	A	790	0.109	$4.47 \cdot 10^{-2}$	$8.14 \cdot 10^{-2}$	0.583	OR4S1	1	rs1483121	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$1.7 \cdot 10^{-9}$
6	20679709	**rs7756992**	G	A	789	0.347	$1.05 \cdot 10^{-2}$	$5.38 \cdot 10^{-2}$	0.845	CDKAL1	1	rs7756992	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.79 \cdot 10^{-9}$
11	92664875	**rs737383**	C	T	790	0.448	$4.1 \cdot 10^{-2}$	$5.13 \cdot 10^{-2}$	0.424	FAT3	1	rs737383	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.37 \cdot 10^{-8}$
13	33554302	rs576674	A	G	790	0.901	0.12	$8.32 \cdot 10^{-2}$	0.148	KL	1	rs576674	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
2	28213424	**rs10175508**	C	T	790	0.677	$6.86 \cdot 10^{-2}$	$5.48 \cdot 10^{-2}$	0.212	BRE	1	rs10175508	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$2.31 \cdot 10^{-8}$
3	185529080	**rs1470579**	C	A	790	0.291	$5.13 \cdot 10^{-3}$	$5.49 \cdot 10^{-2}$	0.926	IGF2BP2	1	rs7633675	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.12 \cdot 10^{-8}$
9	139254897	rs10870149	G	A	790	0.505	$8.14 \cdot 10^{-2}$	$5.01 \cdot 10^{-2}$	0.104	GPSM1	0.988	rs1128905	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$5.81 \cdot 10^{-9}$
7	44235668	**rs4607517**	A	G	790	$9.11 \cdot 10^{-2}$	0.128	$8.6 \cdot 10^{-2}$	0.136	YKT6	0.987	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
3	49572140	rs4625	A	G	790	0.451	$3.87 \cdot 10^{-2}$	$5.05 \cdot 10^{-2}$	0.443	AMT	0.986	rs11715915	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.9 \cdot 10^{-8}$
11	46699124	rs8914	G	A	782	$7.67 \cdot 10^{-2}$	0.211	$9.47 \cdot 10^{-2}$	$2.63 \cdot 10^{-2}$	AMBRA1	0.98	rs11038913	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$3.5 \cdot 10^{-3}$	$4.29 \cdot 10^{-8}$
20	39792063	rs2228246	G	A	790	0.247	$2.37 \cdot 10^{-2}$	$5.84 \cdot 10^{-2}$	0.685	TOP1	0.971	rs6072275	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.66 \cdot 10^{-8}$
11	45864323	rs7121775	C	T	790	0.254	$4.27 \cdot 10^{-2}$	$5.85 \cdot 10^{-2}$	0.465	SLC35C1	0.966	rs11038668	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.96 \cdot 10^{-8}$
12	133044914	**rs10781655**	T	C	790	0.637	$1.87 \cdot 10^{-3}$	$5.11 \cdot 10^{-2}$	0.971	FBRSL1	0.948	rs10747083	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.57 \cdot 10^{-9}$
11	47179829	**rs1060573**	A	G	790	0.584	0.126	$5.03 \cdot 10^{-2}$	$1.28 \cdot 10^{-2}$	PACSIN3	0.92	rs11039119	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$3.49 \cdot 10^{-8}$
2	27801493	**rs1919127**	T	C	790	0.266	$7.31 \cdot 10^{-2}$	$5.7 \cdot 10^{-2}$	0.2	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
11	47662932	rs7120548	T	C	790	0.21	$4.98 \cdot 10^{-2}$	$6.09 \cdot 10^{-2}$	0.414	MTCH2	0.894	rs7118178	$1.33 \cdot 10^{5}$	$-1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.84 \cdot 10^{-14}$

Table 28 shows statistics from the GWAS_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 4 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 40 variants in both studies, 29 exhibit the same direction of effect with the known result (binomial test $p = 0.00321$).

Table 28: Top known loci in GWAS_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	786	0.298	0.109	$5.6 \cdot 10^{-2}$	$5.13 \cdot 10^{-2}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
11	92673828	**rs1387153**	T	C	786	0.682	$9.1 \cdot 10^{-2}$	$5.44 \cdot 10^{-2}$	$9.5 \cdot 10^{-2}$	MTNR1B	1	rs1387153	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.91 \cdot 10^{-143}$
2	169785449	**rs503931**	C	A	786	0.433	$6.23 \cdot 10^{-2}$	$5.14 \cdot 10^{-2}$	0.226	ABCB11	1	rs503931	$1.33 \cdot 10^{5}$	$3.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.54 \cdot 10^{-69}$
2	169750483	**rs477224**	C	T	786	0.193	$8.2 \cdot 10^{-2}$	$6.33 \cdot 10^{-2}$	0.196	SPC25	1	rs477224	$1.33 \cdot 10^{5}$	$3.6 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$6.02 \cdot 10^{-57}$
7	44211337	**rs2971671**	C	T	786	0.736	0.107	$5.85 \cdot 10^{-2}$	$6.82 \cdot 10^{-2}$	GCK	1	rs2971671	$1.33 \cdot 10^{5}$	$3.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.07 \cdot 10^{-50}$
2	27730940	**rs1260326**	C	T	782	0.332	$6.08 \cdot 10^{-2}$	$5.16 \cdot 10^{-2}$	0.239	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118184783	**rs13266634**	C	T	784	0.602	$6.28 \cdot 10^{-3}$	$5.29 \cdot 10^{-2}$	0.906	SLC30A8	1	rs13266634	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.47 \cdot 10^{-35}$
7	14898282	**rs17168486**	T	C	786	0.795	$7.01 \cdot 10^{-2}$	$6.15 \cdot 10^{-2}$	0.255	DGKB	1	rs17168486	$1.33 \cdot 10^{5}$	$3.1 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$3.17 \cdot 10^{-28}$
10	114758349	**rs7903146**	T	C	786	0.824	$6.86 \cdot 10^{-2}$	$6.57 \cdot 10^{-2}$	0.297	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
11	45873091	**rs11605924**	A	C	775	0.512	$8.37 \cdot 10^{-3}$	$4.97 \cdot 10^{-2}$	0.866	CRY2	1	rs11605924	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$3.93 \cdot 10^{-19}$
11	61580635	rs174556	T	C	786	0.592	$3.28 \cdot 10^{-2}$	$5.11 \cdot 10^{-2}$	0.521	FADS1	1	rs174556	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.82 \cdot 10^{-18}$
11	61597972	rs1535	G	A	786	0.56	$5.67 \cdot 10^{-2}$	$5 \cdot 10^{-2}$	0.257	FADS2	1	rs1535	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.01 \cdot 10^{-17}$
9	22132076	**rs2383208**	A	G	786	0.833	0.126	$7.07 \cdot 10^{-2}$	$7.54 \cdot 10^{-2}$	CDKN2B	1	rs2383208	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$2.16 \cdot 10^{-17}$
11	61552680	rs174537	T	G	786	0.56	$5.4 \cdot 10^{-2}$	$5.03 \cdot 10^{-2}$	0.283	MYRF	1	rs174537	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.35 \cdot 10^{-17}$
11	61557803	rs102275	C	T	786	0.558	$4.67 \cdot 10^{-2}$	$5.02 \cdot 10^{-2}$	0.352	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	786	0.322	0.166	$5.33 \cdot 10^{-2}$	$1.93 \cdot 10^{-3}$	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
13	28491198	**rs2293941**	A	G	786	0.757	$5.23 \cdot 10^{-2}$	$5.87 \cdot 10^{-2}$	0.373	PDX1	1	rs2293941	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.66 \cdot 10^{-15}$
11	47318157	**rs749067**	T	C	786	0.697	0.11	$5.33 \cdot 10^{-2}$	$3.93 \cdot 10^{-2}$	MADD	1	rs749067	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$6.12 \cdot 10^{-15}$
8	9177732	**rs983309**	T	G	786	0.17	$7.48 \cdot 10^{-2}$	$6.77 \cdot 10^{-2}$	0.27	RP11-10A14.4	1	rs983309	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.29 \cdot 10^{-15}$
9	4293150	rs10814916	A	C	782	0.466	$9.19 \cdot 10^{-3}$	$5.1 \cdot 10^{-2}$	0.857	GLIS3	1	rs10814916	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.26 \cdot 10^{-13}$
3	123094451	rs2877716	T	C	786	0.191	$2.11 \cdot 10^{-2}$	$6.37 \cdot 10^{-2}$	0.741	ADCY5	1	rs2877716	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$3.95 \cdot 10^{-13}$
2	27988821	**rs13013484**	G	A	786	0.324	$8.93 \cdot 10^{-2}$	$5.42 \cdot 10^{-2}$	$9.96 \cdot 10^{-2}$	MRPL33	1	rs13013484	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$5.36 \cdot 10^{-13}$
2	169605967	**rs2390732**	A	G	784	0.378	$4.5 \cdot 10^{-3}$	$5.16 \cdot 10^{-2}$	0.931	CERS6	1	rs2390732	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$7.1 \cdot 10^{-13}$
7	50791579	rs6943153	C	T	786	0.484	$1.73 \cdot 10^{-2}$	$5.02 \cdot 10^{-2}$	0.73	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
2	169721377	**rs479661**	G	A	786	0.125	$3.4 \cdot 10^{-2}$	$7.57 \cdot 10^{-2}$	0.653	NOSTRIN	1	rs479661	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$8.56 \cdot 10^{-12}$
11	72433098	**rs1552224**	A	C	786	0.76	$4.97 \cdot 10^{-3}$	$5.9 \cdot 10^{-2}$	0.933	ARAP1	1	rs1552224	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.54 \cdot 10^{-11}$
2	27951658	**rs867282**	T	C	786	0.257	$9.94 \cdot 10^{-2}$	$5.84 \cdot 10^{-2}$	$8.91 \cdot 10^{-2}$	AC074091.13	1	rs867282	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.76 \cdot 10^{-11}$
1	214145706	**rs340883**	T	C	786	0.625	$8.26 \cdot 10^{-2}$	$5.26 \cdot 10^{-2}$	0.117	PROX1	1	rs340883	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$4.08 \cdot 10^{-11}$
2	27152874	rs1371614	C	T	786	0.789	$8.14 \cdot 10^{-2}$	$6.06 \cdot 10^{-2}$	0.18	DPYSL5	1	rs1371614	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.09 \cdot 10^{-11}$
15	62424649	**rs4775471**	C	T	786	0.789	0.142	$6.14 \cdot 10^{-2}$	$2.07 \cdot 10^{-2}$	C2CD4B	1	rs4775471	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$9.73 \cdot 10^{-11}$
11	72851463	**rs1783598**	T	C	786	0.357	$8.24 \cdot 10^{-3}$	$5.33 \cdot 10^{-2}$	0.877	FCHSD2	1	rs1783598	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.19 \cdot 10^{-10}$
11	47054448	**rs7101470**	A	G	779	0.917	$9.81 \cdot 10^{-2}$	$9.14 \cdot 10^{-2}$	0.283	C11orf49	1	rs7101470	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$3.4 \cdot 10^{-3}$	$1.2 \cdot 10^{-10}$
3	170756985	rs6785233	G	T	786	0.955	$9.26 \cdot 10^{-2}$	0.117	0.429	SLC2A2	1	rs6785233	$1.33 \cdot 10^{5}$	$-2.5 \cdot 10^{-2}$	$4.1 \cdot 10^{-3}$	$4.8 \cdot 10^{-10}$
2	27895073	**rs2178198**	C	T	782	0.88	$1.32 \cdot 10^{-3}$	$7.72 \cdot 10^{-2}$	0.986	SLC4A1AP	1	rs2178198	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$1.02 \cdot 10^{-9}$
11	48333360	**rs1483121**	G	A	786	0.891	$5.98 \cdot 10^{-2}$	$8.18 \cdot 10^{-2}$	0.465	OR4S1	1	rs1483121	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$1.7 \cdot 10^{-9}$
6	20679709	**rs7756992**	G	A	785	0.655	$2.83 \cdot 10^{-2}$	$5.42 \cdot 10^{-2}$	0.602	CDKAL1	1	rs7756992	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.79 \cdot 10^{-9}$
11	92664875	**rs737383**	C	T	786	0.552	$2.5 \cdot 10^{-2}$	$5.19 \cdot 10^{-2}$	0.629	FAT3	1	rs737383	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.37 \cdot 10^{-8}$
13	33554302	rs576674	A	G	786	$9.99 \cdot 10^{-2}$	0.111	$8.36 \cdot 10^{-2}$	0.183	KL	1	rs576674	$1.33 \cdot 10^{5}$	$-1.7 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
2	28213424	**rs10175508**	C	T	786	0.323	$7.37 \cdot 10^{-2}$	$5.49 \cdot 10^{-2}$	0.18	BRE	1	rs10175508	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$2.31 \cdot 10^{-8}$
3	185529080	rs1470579	A	C	786	0.709	$1.14 \cdot 10^{-3}$	$5.49 \cdot 10^{-2}$	0.983	IGF2BP2	1	rs7633675	$1.33 \cdot 10^{5}$	$-1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.12 \cdot 10^{-8}$
9	139254897	rs10870149	G	A	786	0.492	$7.81 \cdot 10^{-2}$	$5.03 \cdot 10^{-2}$	0.121	GPSM1	0.988	rs1128905	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$5.81 \cdot 10^{-9}$
7	44235668	**rs4607517**	A	G	786	0.91	0.119	$8.78 \cdot 10^{-2}$	0.174	YKT6	0.987	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
3	49572140	rs4625	A	G	786	0.55	$3.85 \cdot 10^{-2}$	$5.1 \cdot 10^{-2}$	0.45	AMT	0.986	rs11715915	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.9 \cdot 10^{-8}$
11	46699124	rs8914	G	A	779	0.924	0.211	$9.56 \cdot 10^{-2}$	$2.75 \cdot 10^{-2}$	AMBRA1	0.98	rs11038913	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$3.5 \cdot 10^{-3}$	$4.29 \cdot 10^{-8}$
20	39792063	rs2228246	G	A	786	0.753	$2.4 \cdot 10^{-2}$	$5.86 \cdot 10^{-2}$	0.683	TOP1	0.971	rs6072275	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.66 \cdot 10^{-8}$
11	45864323	rs7121775	C	T	786	0.746	$4.68 \cdot 10^{-2}$	$5.87 \cdot 10^{-2}$	0.426	SLC35C1	0.966	rs11038668	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.96 \cdot 10^{-8}$
12	133044914	rs10781655	C	T	786	0.36	$1.2 \cdot 10^{-2}$	$5.14 \cdot 10^{-2}$	0.815	FBRSL1	0.948	rs10747083	$1.33 \cdot 10^{5}$	$-1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.57 \cdot 10^{-9}$
11	47179829	**rs1060573**	A	G	786	0.417	$9.82 \cdot 10^{-2}$	$5.06 \cdot 10^{-2}$	$5.26 \cdot 10^{-2}$	PACSIN3	0.92	rs11039119	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$3.49 \cdot 10^{-8}$
2	27801493	**rs1919127**	T	C	786	0.733	$6.28 \cdot 10^{-2}$	$5.71 \cdot 10^{-2}$	0.272	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
11	47662932	rs7120548	T	C	786	0.791	$5.09 \cdot 10^{-2}$	$6.16 \cdot 10^{-2}$	0.409	MTCH2	0.894	rs7118178	$1.33 \cdot 10^{5}$	$-1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.84 \cdot 10^{-14}$

Table 29 shows statistics from the METABO_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 5 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 50 variants in both studies, 39 exhibit the same direction of effect with the known result (binomial test $p = 4.51e - 05$).

Table 29: Top known loci in METABO_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	1,072	0.314	0.119	$4.72 \cdot 10^{-2}$	$1.17 \cdot 10^{-2}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
2	169802252	**rs853787**	T	G	1,072	0.35	0.142	$4.58 \cdot 10^{-2}$	$1.92 \cdot 10^{-3}$	ABCB11	1	rs853787	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.51 \cdot 10^{-166}$
11	92690661	**rs11020124**	C	T	1,072	0.672	$5.42 \cdot 10^{-2}$	$4.63 \cdot 10^{-2}$	0.242	MTNR1B	1	rs11020124	$1.33 \cdot 10^{5}$	$6.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.81 \cdot 10^{-144}$
7	44231886	**rs6975024**	C	T	1,072	0.91	0.102	$7.53 \cdot 10^{-2}$	0.176	GCK	1	rs6975024	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.88 \cdot 10^{-99}$
7	44248828	**rs2908282**	A	G	1,072	0.91	0.102	$7.53 \cdot 10^{-2}$	0.176	YKT6	1	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
2	169750483	rs477224	T	C	1,072	0.167	$3.49 \cdot 10^{-2}$	$5.72 \cdot 10^{-2}$	0.542	SPC25	1	rs477224	$1.33 \cdot 10^{5}$	$-3.6 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$6.02 \cdot 10^{-57}$
7	15064309	**rs2191349**	T	G	1,072	0.554	$9.08 \cdot 10^{-2}$	$4.34 \cdot 10^{-2}$	$3.67 \cdot 10^{-2}$	DGKB	1	rs2191349	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.28 \cdot 10^{-42}$
2	27730940	**rs1260326**	C	T	1,070	0.351	$8.24 \cdot 10^{-2}$	$4.58 \cdot 10^{-2}$	$7.24 \cdot 10^{-2}$	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118185733	**rs11558471**	A	G	1,072	0.605	$3.79 \cdot 10^{-2}$	$4.37 \cdot 10^{-2}$	0.387	SLC30A8	1	rs11558471	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.8 \cdot 10^{-37}$
2	169703974	**rs11676084**	G	A	1,072	0.735	$1.24 \cdot 10^{-2}$	$4.92 \cdot 10^{-2}$	0.802	NOSTRIN	1	rs11676084	$1.33 \cdot 10^{5}$	$2.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.65 \cdot 10^{-32}$
15	62383155	**rs4502156**	T	C	1,072	0.426	$5.18 \cdot 10^{-2}$	$4.35 \cdot 10^{-2}$	0.234	C2CD4A	1	rs4502156	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.38 \cdot 10^{-25}$
11	45839709	**rs11607883**	G	A	1,070	0.533	$6.58 \cdot 10^{-2}$	$4.23 \cdot 10^{-2}$	0.12	SLC35C1	1	rs11607883	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$6.32 \cdot 10^{-24}$
11	45855998	**rs6485644**	C	T	1,072	0.535	$6.75 \cdot 10^{-2}$	$4.24 \cdot 10^{-2}$	0.112	CRY2	1	rs6485644	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.31 \cdot 10^{-23}$
11	47346723	**rs11039182**	T	C	1,072	0.829	$5.77 \cdot 10^{-2}$	$5.82 \cdot 10^{-2}$	0.321	MADD	1	rs11039182	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$4.82 \cdot 10^{-22}$
10	114758349	rs7903146	C	T	1,072	0.815	$3.5 \cdot 10^{-3}$	$5.75 \cdot 10^{-2}$	0.951	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$-2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
2	27685388	**rs780110**	A	G	1,072	0.542	$3.58 \cdot 10^{-2}$	$4.43 \cdot 10^{-2}$	0.42	IFT172	1	rs780110	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.82 \cdot 10^{-20}$
2	27839539	**rs2068834**	T	C	1,072	0.693	$7.54 \cdot 10^{-2}$	$4.73 \cdot 10^{-2}$	0.112	ZNF512	1	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
11	61603510	**rs174576**	C	A	1,072	0.6	$6.88 \cdot 10^{-2}$	$4.43 \cdot 10^{-2}$	0.12	FADS2	1	rs174576	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.18 \cdot 10^{-18}$
3	123065778	**rs11708067**	A	G	1,071	0.826	$3.91 \cdot 10^{-2}$	$5.66 \cdot 10^{-2}$	0.489	ADCY5	1	rs11708067	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.3 \cdot 10^{-18}$
10	113039667	rs11195502	T	C	1,072	0.922	$2.24 \cdot 10^{-2}$	$8.3 \cdot 10^{-2}$	0.787	ADRA2A	1	rs11195502	$1.33 \cdot 10^{5}$	$-3.2 \cdot 10^{-2}$	$3.7 \cdot 10^{-3}$	$1.97 \cdot 10^{-18}$
9	22134094	**rs10811661**	T	C	1,072	0.863	0.131	$6.25 \cdot 10^{-2}$	$3.55 \cdot 10^{-2}$	CDKN2B	1	rs10811661	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$5.65 \cdot 10^{-18}$
11	61580635	**rs174556**	C	T	1,072	0.625	$5.86 \cdot 10^{-2}$	$4.51 \cdot 10^{-2}$	0.193	FADS1	1	rs174556	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.82 \cdot 10^{-18}$
3	170713290	**rs1280**	T	C	1,072	0.852	0.114	$5.93 \cdot 10^{-2}$	$5.51 \cdot 10^{-2}$	SLC2A2	1	rs1280	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$8.56 \cdot 10^{-18}$
11	61552680	**rs174537**	G	T	1,072	0.599	$6.71 \cdot 10^{-2}$	$4.42 \cdot 10^{-2}$	0.129	MYRF	1	rs174537	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.35 \cdot 10^{-17}$
2	27934731	**rs6727215**	G	A	1,072	0.805	$8.94 \cdot 10^{-2}$	$5.5 \cdot 10^{-2}$	0.105	AC074091.13	1	rs6727215	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$3.21 \cdot 10^{-17}$
11	61557803	**rs102275**	T	C	1,072	0.596	$6.54 \cdot 10^{-2}$	$4.43 \cdot 10^{-2}$	0.14	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	1,072	0.361	$6.16 \cdot 10^{-2}$	$4.42 \cdot 10^{-2}$	0.164	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
2	27967260	rs13023194	G	C	1,072	0.813	$8.46 \cdot 10^{-2}$	$5.6 \cdot 10^{-2}$	0.131	MRPL33	1	rs13023194	$1.33 \cdot 10^{5}$	$-2.2 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.04 \cdot 10^{-15}$
13	28487599	rs11619319	A	G	1,072	0.745	$2.45 \cdot 10^{-2}$	$4.85 \cdot 10^{-2}$	0.614	PDX1	1	rs11619319	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.33 \cdot 10^{-15}$
8	9177732	**rs983309**	T	G	1,072	0.168	$4.84 \cdot 10^{-2}$	$5.8 \cdot 10^{-2}$	0.404	RP11-10A14.4	1	rs983309	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.29 \cdot 10^{-15}$
11	47659135	**rs7118178**	G	A	1,072	0.831	$2.35 \cdot 10^{-2}$	$5.85 \cdot 10^{-2}$	0.688	MTCH2	1	rs7118178	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.84 \cdot 10^{-14}$
11	47600438	**rs2280231**	C	T	1,072	0.831	$2.35 \cdot 10^{-2}$	$5.85 \cdot 10^{-2}$	0.688	KBTBD4	1	rs2280231	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.67 \cdot 10^{-13}$
9	4293150	rs10814916	A	C	1,072	0.479	$5.54 \cdot 10^{-2}$	$4.3 \cdot 10^{-2}$	0.198	GLIS3	1	rs10814916	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.26 \cdot 10^{-13}$
2	169605967	**rs2390732**	A	G	1,072	0.389	$6.15 \cdot 10^{-3}$	$4.41 \cdot 10^{-2}$	0.889	CERS6	1	rs2390732	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$7.1 \cdot 10^{-13}$
7	50791579	rs6943153	C	T	1,072	0.496	$1.25 \cdot 10^{-2}$	$4.41 \cdot 10^{-2}$	0.776	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
7	44178743	rs882020	C	T	1,072	0.813	$7.02 \cdot 10^{-2}$	$5.51 \cdot 10^{-2}$	0.203	MYL7	1	rs882020	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.04 \cdot 10^{-12}$
1	214150445	**rs17712208**	A	T	1,072	0.987	0.386	0.195	$4.82 \cdot 10^{-2}$	PROX1	1	rs17712208	$1.33 \cdot 10^{5}$	$5.1 \cdot 10^{-2}$	$7.4 \cdot 10^{-3}$	$3.22 \cdot 10^{-12}$
11	47354905	**rs11570115**	T	C	1,072	0.914	$3.55 \cdot 10^{-2}$	$7.94 \cdot 10^{-2}$	0.655	MYBPC3	1	rs11570115	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.5 \cdot 10^{-3}$	$5.37 \cdot 10^{-12}$
2	27860258	**rs2141371**	G	A	1,070	0.348	$7.36 \cdot 10^{-2}$	$4.63 \cdot 10^{-2}$	0.113	GPN1	1	rs2141371	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$6.59 \cdot 10^{-12}$
11	72432985	**rs11603334**	G	A	1,072	0.753	$2.52 \cdot 10^{-2}$	$5.04 \cdot 10^{-2}$	0.617	ARAP1	1	rs11603334	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.12 \cdot 10^{-11}$
7	44162355	rs2979422	T	C	1,072	0.817	$7.25 \cdot 10^{-2}$	$5.6 \cdot 10^{-2}$	0.195	POLD2	1	rs2979422	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$1.78 \cdot 10^{-11}$
20	22557099	**rs6113722**	G	A	1,072	0.97	0.238	0.128	$6.29 \cdot 10^{-2}$	FOXA2	1	rs6113722	$1.33 \cdot 10^{5}$	$3.5 \cdot 10^{-2}$	$5.3 \cdot 10^{-3}$	$2.49 \cdot 10^{-11}$
9	111680359	**rs16913693**	T	G	1,072	0.969	$9.99 \cdot 10^{-2}$	0.128	0.434	IKBKAP	1	rs16913693	$1.33 \cdot 10^{5}$	$4.3 \cdot 10^{-2}$	$6.6 \cdot 10^{-3}$	$3.51 \cdot 10^{-11}$
2	27152874	**rs1371614**	T	C	1,072	0.787	$2.57 \cdot 10^{-2}$	$5.17 \cdot 10^{-2}$	0.62	DPYSL5	1	rs1371614	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.09 \cdot 10^{-11}$
11	47275064	rs10838681	G	A	1,072	0.639	$2.01 \cdot 10^{-2}$	$4.51 \cdot 10^{-2}$	0.656	NR1H3	1	rs10838681	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$8.84 \cdot 10^{-11}$
11	48009074	rs11039482	T	C	1,072	0.895	$9.1 \cdot 10^{-2}$	$7.06 \cdot 10^{-2}$	0.197	PTPRJ	1	rs11039482	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$9.36 \cdot 10^{-11}$
15	62424649	**rs4775471**	C	T	1,072	0.801	$4.88 \cdot 10^{-3}$	$5.45 \cdot 10^{-2}$	0.929	C2CD4B	1	rs4775471	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$9.73 \cdot 10^{-11}$
2	28113911	**rs2305929**	A	G	1,072	0.832	$9.86 \cdot 10^{-2}$	$5.81 \cdot 10^{-2}$	$9 \cdot 10^{-2}$	RBKS	1	rs2305929	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1 \cdot 10^{-10}$
9	139256766	**rs3829109**	G	A	1,071	0.655	$8.82 \cdot 10^{-2}$	$4.53 \cdot 10^{-2}$	$5.19 \cdot 10^{-2}$	DNLZ	1	rs3829109	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.13 \cdot 10^{-10}$
11	72851463	**rs1783598**	T	C	1,072	0.356	$3.04 \cdot 10^{-2}$	$4.56 \cdot 10^{-2}$	0.505	FCHSD2	1	rs1783598	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.19 \cdot 10^{-10}$

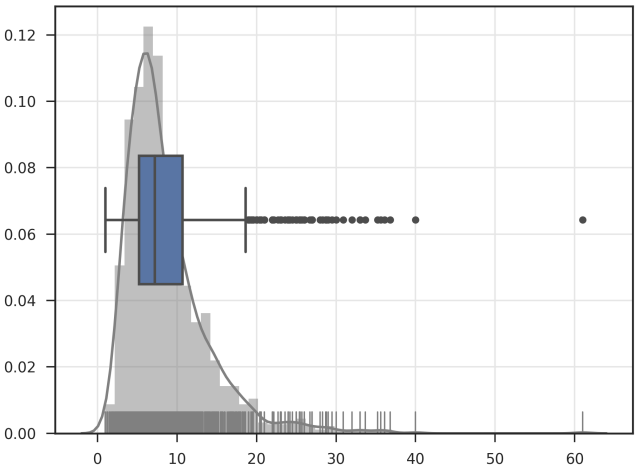
Table 30 shows statistics from the METABO_EUR cohort for 50 loci that were shown to be significantly associated with Fasting Glucose in the 2012 Nature Genetics paper by Scott et al [8]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 5 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 50 variants in both studies, 39 exhibit the same direction of effect with the known result (binomial test $p = 4.51e-05$).

Table 30: Top known loci in METABO_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

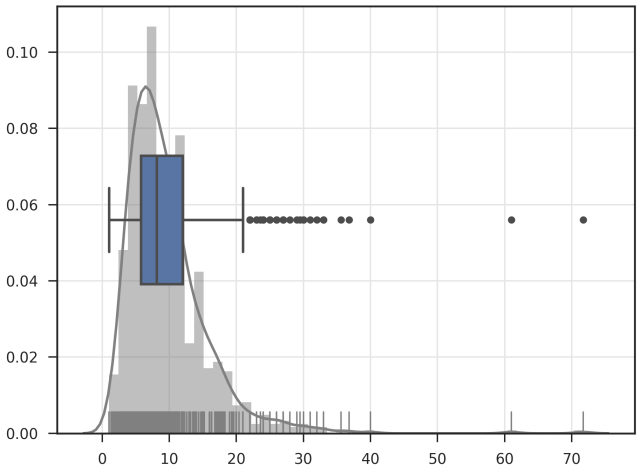
CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	169763148	**rs560887**	C	T	1,072	0.685	0.116	$4.71 \cdot 10^{-2}$	$1.37 \cdot 10^{-2}$	G6PC2	1	rs560887	$1.33 \cdot 10^{5}$	$7.1 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$1.4 \cdot 10^{-178}$
2	169802252	**rs853787**	T	G	1,072	0.649	0.138	$4.57 \cdot 10^{-2}$	$2.61 \cdot 10^{-3}$	ABCB11	1	rs853787	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.51 \cdot 10^{-166}$
11	92690661	**rs11020124**	C	T	1,072	0.328	$4.87 \cdot 10^{-2}$	$4.63 \cdot 10^{-2}$	0.293	MTNR1B	1	rs11020124	$1.33 \cdot 10^{5}$	$6.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.81 \cdot 10^{-144}$
7	44231886	**rs6975024**	C	T	1,072	$9 \cdot 10^{-2}$	$9.32 \cdot 10^{-2}$	$7.55 \cdot 10^{-2}$	0.217	GCK	1	rs6975024	$1.33 \cdot 10^{5}$	$6.1 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.88 \cdot 10^{-99}$
7	44248828	**rs2908282**	A	G	1,072	$9 \cdot 10^{-2}$	$9.32 \cdot 10^{-2}$	$7.55 \cdot 10^{-2}$	0.217	YKT6	1	rs2908282	$1.33 \cdot 10^{5}$	$5.7 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$1.04 \cdot 10^{-88}$
2	169750483	rs477224	T	C	1,072	0.833	$3.97 \cdot 10^{-2}$	$5.73 \cdot 10^{-2}$	0.489	SPC25	1	rs477224	$1.33 \cdot 10^{5}$	$-3.6 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$6.02 \cdot 10^{-57}$
7	15064309	**rs2191349**	T	G	1,072	0.445	$9.93 \cdot 10^{-2}$	$4.33 \cdot 10^{-2}$	$2.21 \cdot 10^{-2}$	DGKB	1	rs2191349	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.28 \cdot 10^{-42}$
2	27730940	**rs1260326**	C	T	1,070	0.649	$7.5 \cdot 10^{-2}$	$4.59 \cdot 10^{-2}$	0.103	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.17 \cdot 10^{-41}$
8	118185733	**rs11558471**	A	G	1,072	0.396	$4.26 \cdot 10^{-2}$	$4.38 \cdot 10^{-2}$	0.33	SLC30A8	1	rs11558471	$1.33 \cdot 10^{5}$	$2.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.8 \cdot 10^{-37}$
2	169703974	**rs11676084**	G	A	1,072	0.265	$1.27 \cdot 10^{-2}$	$4.91 \cdot 10^{-2}$	0.797	NOSTRIN	1	rs11676084	$1.33 \cdot 10^{5}$	$2.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.65 \cdot 10^{-32}$
15	62383155	**rs4502156**	T	C	1,072	0.574	$3.39 \cdot 10^{-2}$	$4.35 \cdot 10^{-2}$	0.435	C2CD4A	1	rs4502156	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.38 \cdot 10^{-25}$
11	45839709	**rs11607883**	G	A	1,070	0.467	$5.93 \cdot 10^{-2}$	$4.23 \cdot 10^{-2}$	0.161	SLC35C1	1	rs11607883	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$6.32 \cdot 10^{-24}$
11	45855998	**rs6485644**	C	T	1,072	0.465	$6.26 \cdot 10^{-2}$	$4.24 \cdot 10^{-2}$	0.14	CRY2	1	rs6485644	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.31 \cdot 10^{-23}$
11	47346723	**rs11039182**	T	C	1,072	0.171	$5.83 \cdot 10^{-2}$	$5.82 \cdot 10^{-2}$	0.317	MADD	1	rs11039182	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$4.82 \cdot 10^{-22}$
10	114758349	rs7903146	C	T	1,072	0.186	$9.74 \cdot 10^{-3}$	$5.73 \cdot 10^{-2}$	0.865	TCF7L2	1	rs7903146	$1.33 \cdot 10^{5}$	$-2.2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$2.71 \cdot 10^{-20}$
2	27685388	**rs780110**	A	G	1,072	0.458	$3.16 \cdot 10^{-2}$	$4.43 \cdot 10^{-2}$	0.477	IFT172	1	rs780110	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.82 \cdot 10^{-20}$
2	27839539	**rs2068834**	T	C	1,072	0.306	$5.42 \cdot 10^{-2}$	$4.74 \cdot 10^{-2}$	0.253	ZNF512	1	rs2068834	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.68 \cdot 10^{-20}$
11	61603510	**rs174576**	C	A	1,072	0.401	$7.56 \cdot 10^{-2}$	$4.42 \cdot 10^{-2}$	$8.75 \cdot 10^{-2}$	FADS2	1	rs174576	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.18 \cdot 10^{-18}$
3	123065778	**rs11708067**	A	G	1,071	0.175	$4.14 \cdot 10^{-2}$	$5.66 \cdot 10^{-2}$	0.464	ADCY5	1	rs11708067	$1.33 \cdot 10^{5}$	$2.3 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.3 \cdot 10^{-18}$
10	113039667	rs11195502	T	C	1,072	$7.79 \cdot 10^{-2}$	$6.96 \cdot 10^{-2}$	$8.25 \cdot 10^{-2}$	0.399	ADRA2A	1	rs11195502	$1.33 \cdot 10^{5}$	$-3.2 \cdot 10^{-2}$	$3.7 \cdot 10^{-3}$	$1.97 \cdot 10^{-18}$
9	22134094	**rs10811661**	T	C	1,072	0.137	0.127	$6.25 \cdot 10^{-2}$	$4.29 \cdot 10^{-2}$	CDKN2B	1	rs10811661	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$5.65 \cdot 10^{-18}$
11	61580635	**rs174556**	C	T	1,072	0.375	$6.61 \cdot 10^{-2}$	$4.5 \cdot 10^{-2}$	0.142	FADS1	1	rs174556	$1.33 \cdot 10^{5}$	$2 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$7.82 \cdot 10^{-18}$
3	170713290	**rs1280**	T	C	1,072	0.148	0.101	$5.94 \cdot 10^{-2}$	$8.78 \cdot 10^{-2}$	SLC2A2	1	rs1280	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$8.56 \cdot 10^{-18}$
11	61552680	**rs174537**	G	T	1,072	0.401	$7.4 \cdot 10^{-2}$	$4.41 \cdot 10^{-2}$	$9.4 \cdot 10^{-2}$	MYRF	1	rs174537	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.35 \cdot 10^{-17}$
2	27934731	**rs6727215**	G	A	1,072	0.195	$6.33 \cdot 10^{-2}$	$5.51 \cdot 10^{-2}$	0.251	AC074091.13	1	rs6727215	$1.33 \cdot 10^{5}$	$2.2 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$3.21 \cdot 10^{-17}$
11	61557803	**rs102275**	T	C	1,072	0.404	$7.23 \cdot 10^{-2}$	$4.42 \cdot 10^{-2}$	0.103	TMEM258	1	rs102275	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.97 \cdot 10^{-17}$
5	95539448	**rs4869272**	T	C	1,072	0.639	$6.93 \cdot 10^{-2}$	$4.42 \cdot 10^{-2}$	0.117	PCSK1	1	rs4869272	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.02 \cdot 10^{-15}$
2	27967260	rs13023194	G	C	1,072	0.186	$5.69 \cdot 10^{-2}$	$5.6 \cdot 10^{-2}$	0.31	MRPL33	1	rs13023194	$1.33 \cdot 10^{5}$	$-2.2 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.04 \cdot 10^{-15}$
13	28487599	rs11619319	A	G	1,072	0.255	$2.17 \cdot 10^{-2}$	$4.86 \cdot 10^{-2}$	0.654	PDX1	1	rs11619319	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.33 \cdot 10^{-15}$
8	9177732	**rs983309**	T	G	1,072	0.832	$4.45 \cdot 10^{-2}$	$5.8 \cdot 10^{-2}$	0.443	RP11-10A14.4	1	rs983309	$1.33 \cdot 10^{5}$	$2.6 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$6.29 \cdot 10^{-15}$
11	47659135	**rs7118178**	G	A	1,072	0.168	$1.53 \cdot 10^{-2}$	$5.86 \cdot 10^{-2}$	0.794	MTCH2	1	rs7118178	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$3.84 \cdot 10^{-14}$
11	47600438	**rs2280231**	C	T	1,072	0.168	$1.53 \cdot 10^{-2}$	$5.86 \cdot 10^{-2}$	0.794	KBTBD4	1	rs2280231	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$1.67 \cdot 10^{-13}$
9	4293150	rs10814916	A	C	1,072	0.521	$5.61 \cdot 10^{-2}$	$4.3 \cdot 10^{-2}$	0.193	GLIS3	1	rs10814916	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.26 \cdot 10^{-13}$
2	169605967	**rs2390732**	A	G	1,072	0.611	$1.51 \cdot 10^{-2}$	$4.39 \cdot 10^{-2}$	0.731	CERS6	1	rs2390732	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$7.1 \cdot 10^{-13}$
7	50791579	rs6943153	C	T	1,072	0.504	$1.99 \cdot 10^{-3}$	$4.4 \cdot 10^{-2}$	0.964	GRB10	1	rs6943153	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.63 \cdot 10^{-12}$
7	44178743	rs882020	C	T	1,072	0.187	$6.11 \cdot 10^{-2}$	$5.51 \cdot 10^{-2}$	0.268	MYL7	1	rs882020	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.04 \cdot 10^{-12}$
1	214150445	**rs17712208**	A	T	1,072	$1.26 \cdot 10^{-2}$	0.363	0.195	$6.35 \cdot 10^{-2}$	PROX1	1	rs17712208	$1.33 \cdot 10^{5}$	$5.1 \cdot 10^{-2}$	$7.4 \cdot 10^{-3}$	$3.22 \cdot 10^{-12}$
11	47354905	**rs11570115**	T	C	1,072	$8.58 \cdot 10^{-2}$	$2.24 \cdot 10^{-2}$	$7.95 \cdot 10^{-2}$	0.778	MYBPC3	1	rs11570115	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.5 \cdot 10^{-3}$	$5.37 \cdot 10^{-12}$
2	27860258	**rs2141371**	G	A	1,070	0.652	$6.62 \cdot 10^{-2}$	$4.64 \cdot 10^{-2}$	0.154	GPN1	1	rs2141371	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$6.59 \cdot 10^{-12}$
11	72432985	**rs11603334**	G	A	1,072	0.247	$1.64 \cdot 10^{-2}$	$5.04 \cdot 10^{-2}$	0.745	ARAP1	1	rs11603334	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.8 \cdot 10^{-3}$	$1.12 \cdot 10^{-11}$
7	44162355	rs2979422	T	C	1,072	0.183	$5.98 \cdot 10^{-2}$	$5.6 \cdot 10^{-2}$	0.286	POLD2	1	rs2979422	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$1.78 \cdot 10^{-11}$
20	22557099	**rs6113722**	G	A	1,072	$3.03 \cdot 10^{-2}$	0.25	0.128	$5.11 \cdot 10^{-2}$	FOXA2	1	rs6113722	$1.33 \cdot 10^{5}$	$3.5 \cdot 10^{-2}$	$5.3 \cdot 10^{-3}$	$2.49 \cdot 10^{-11}$
9	111680359	**rs16913693**	T	G	1,072	$3.13 \cdot 10^{-2}$	0.113	0.127	0.375	IKBKAP	1	rs16913693	$1.33 \cdot 10^{5}$	$4.3 \cdot 10^{-2}$	$6.6 \cdot 10^{-3}$	$3.51 \cdot 10^{-11}$
2	27152874	**rs1371614**	T	C	1,072	0.213	$2.2 \cdot 10^{-2}$	$5.18 \cdot 10^{-2}$	0.671	DPYSL5	1	rs1371614	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$7.09 \cdot 10^{-11}$
11	47275064	rs10838681	G	A	1,072	0.361	$3.46 \cdot 10^{-3}$	$4.51 \cdot 10^{-2}$	0.939	NR1H3	1	rs10838681	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.4 \cdot 10^{-3}$	$8.84 \cdot 10^{-11}$
11	48009074	rs11039482	T	C	1,072	0.105	$9.31 \cdot 10^{-2}$	$7.06 \cdot 10^{-2}$	0.188	PTPRJ	1	rs11039482	$1.33 \cdot 10^{5}$	$-2 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$9.36 \cdot 10^{-11}$
15	62424649	**rs4775471**	C	T	1,072	0.199	$2.46 \cdot 10^{-3}$	$5.46 \cdot 10^{-2}$	0.964	C2CD4B	1	rs4775471	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.5 \cdot 10^{-3}$	$9.73 \cdot 10^{-11}$
2	28113911	**rs2305929**	A	G	1,072	0.168	$6.53 \cdot 10^{-2}$	$5.82 \cdot 10^{-2}$	0.262	RBKS	1	rs2305929	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1 \cdot 10^{-10}$
9	139256766	**rs3829109**	G	A	1,071	0.345	$9.39 \cdot 10^{-2}$	$4.53 \cdot 10^{-2}$	$3.85 \cdot 10^{-2}$	DNLZ	1	rs3829109	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.13 \cdot 10^{-10}$
11	72851463	**rs1783598**	T	C	1,072	0.644	$2.38 \cdot 10^{-2}$	$4.53 \cdot 10^{-2}$	0.599	FCHSD2	1	rs1783598	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.6 \cdot 10^{-3}$	$1.19 \cdot 10^{-10}$

5 Fasting Insulin (INS_FAST)

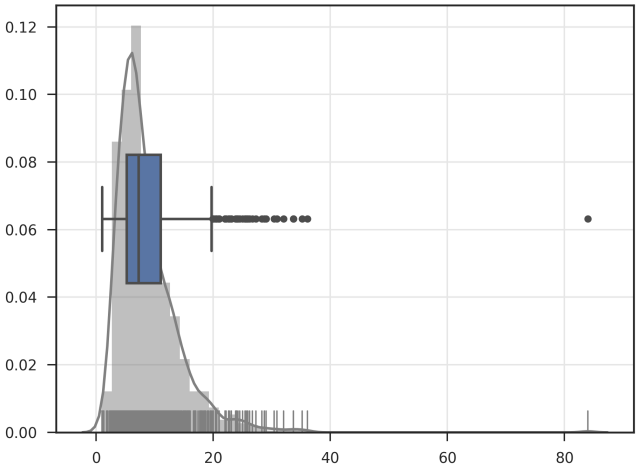
5.1 Summary



(a) EXBROAD_EUR



(b) GWAS_EUR



(c) METABO_EUR

Figure 19: Distribution of INS_FAST in cohort-level analyses

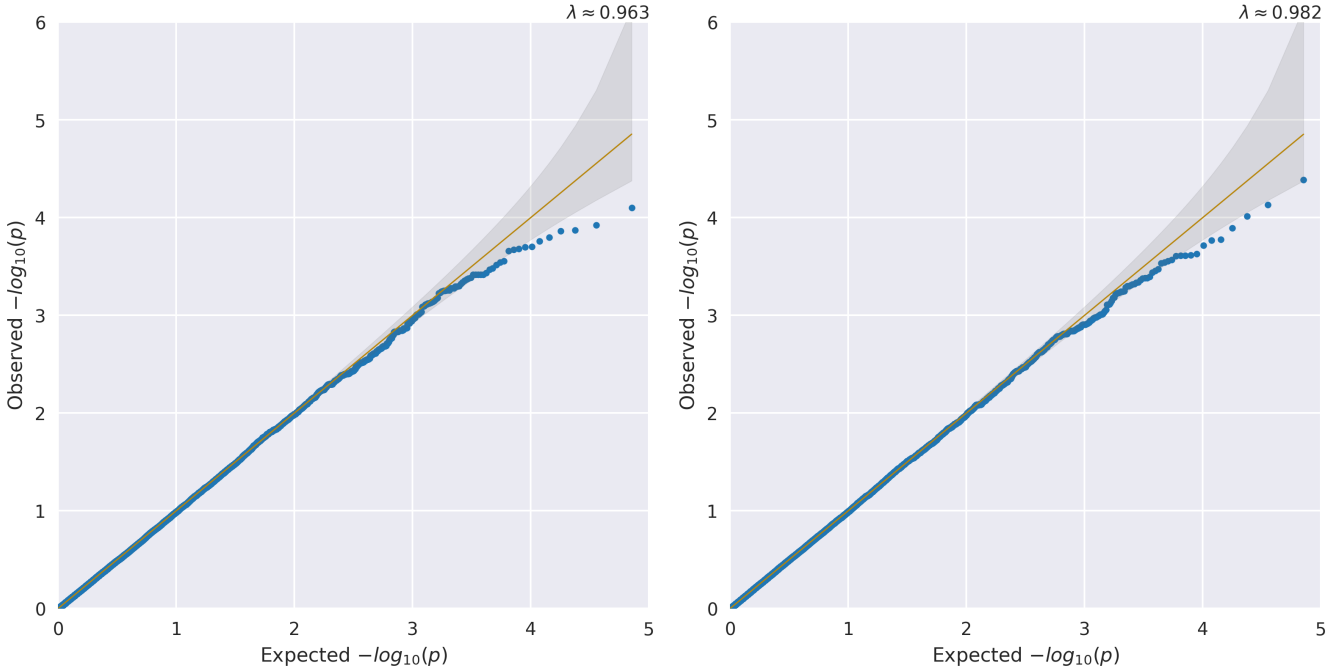
Table 31: Summary of samples removed from Fasting Insulin analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	Total	-SampleQc	-missObs	-Kinship	-PcOutlier
EXBROAD_EUR	EXBROAD	EUR	invn	Age+SEX+BMI	3563	36	2029	13	33
			invn	Age+SEX	3563	36	2026	13	23
GWAS_EUR	GWAS	EUR	invn	Age+SEX	1796	19	917	79	3
			invn	Age+SEX+BMI	1796	19	920	79	1
METABO_EUR	METABO	EUR	invn	Age+SEX+BMI	2344	43	1189	127	0
			invn	Age+SEX	2344	43	1188	126	7

Table 32: Summary of samples remaining for Fasting Insulin analysis by cohort and model

Cohort	Array	Ancestry	Trans	Covars	PCs	N	Male	Female	Max	Min	μ	$\tilde{x}$	σ
EXBROAD_EUR	EXBROAD	EUR	invn	Age+SEX+BMI	8	1468	768	700	61.0	1.0	8.682	7.25	5.359
			invn	Age+SEX	3	1481	778	703	61.0	1.0	8.68	7.3	5.345
GWAS_EUR	GWAS	EUR	invn	Age+SEX	3	786	399	387	71.7	1.0	9.476	8.0	6.179
			invn	Age+SEX+BMI	7	785	396	389	71.7	1.0	9.503	8.0	6.18
METABO_EUR	METABO	EUR	invn	Age+SEX+BMI	0	1013	522	491	36.1	1.0	8.432	7.0	4.951
			invn	Age+SEX	3	1008	518	490	36.1	1.0	8.418	7.0	4.936

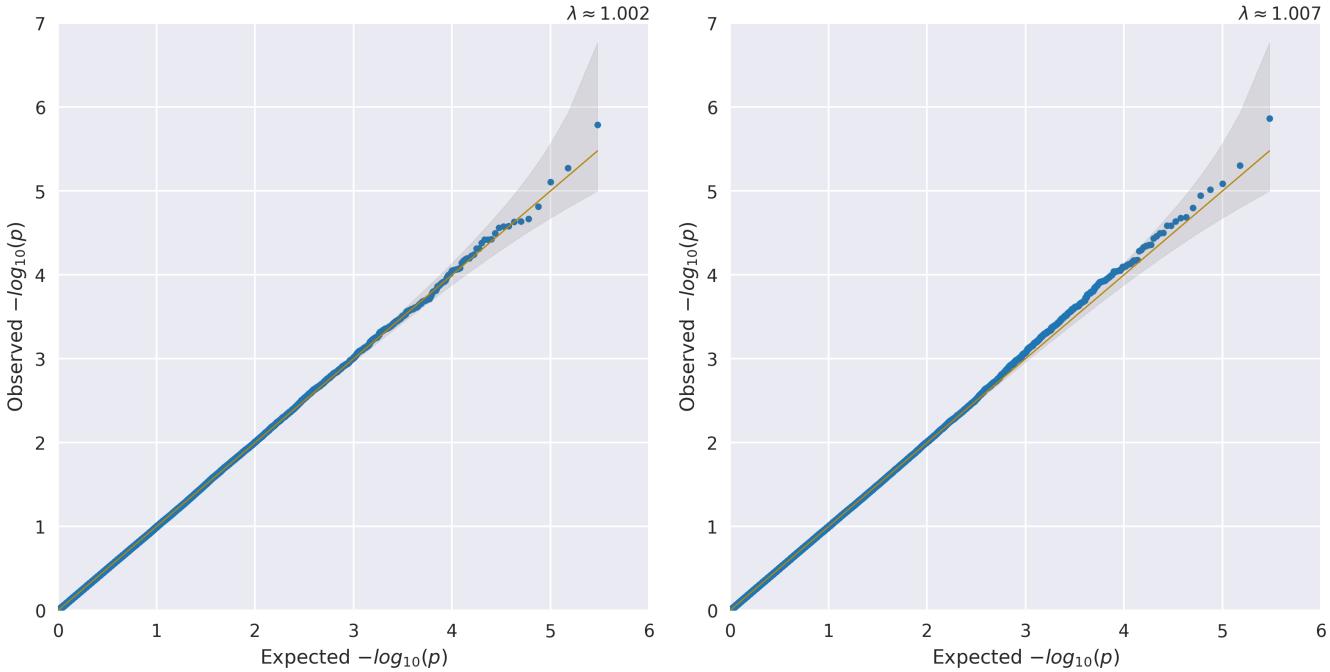
5.2 Calibration



(a) invn Adjusted Age+SEX

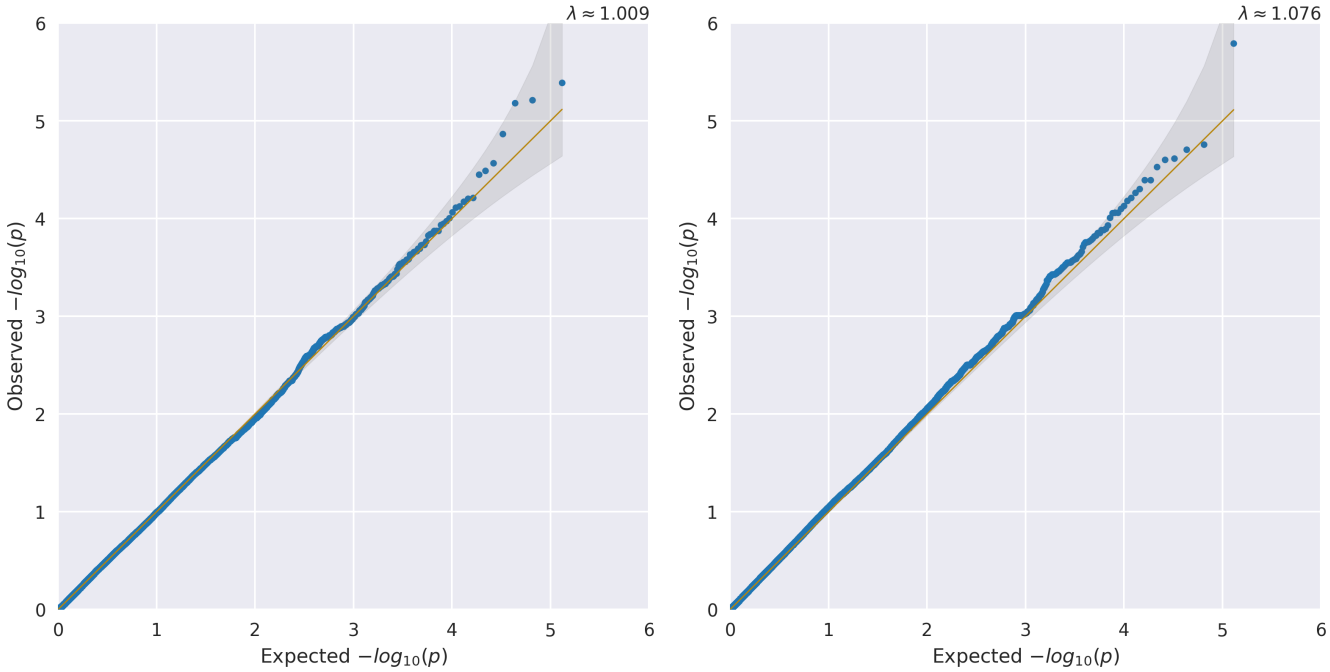
(b) invn Adjusted Age+SEX+BMI

Figure 20: QQ plots for INS_FAST in the EXBROAD_EUR analysis



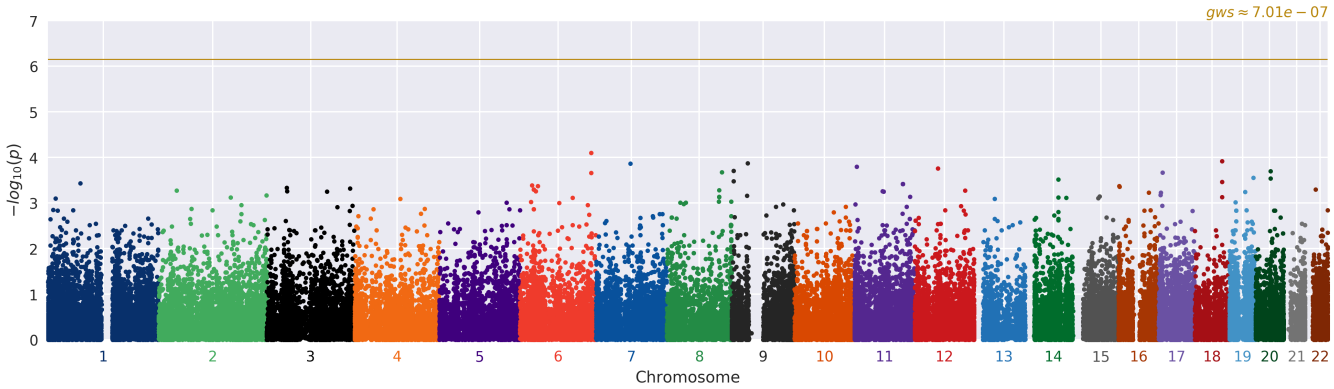
(a) invn Adjusted Age+SEX (b) invn Adjusted Age+SEX+BMI

Figure 21: QQ plots for INS_FAST in the GWAS_EUR analysis

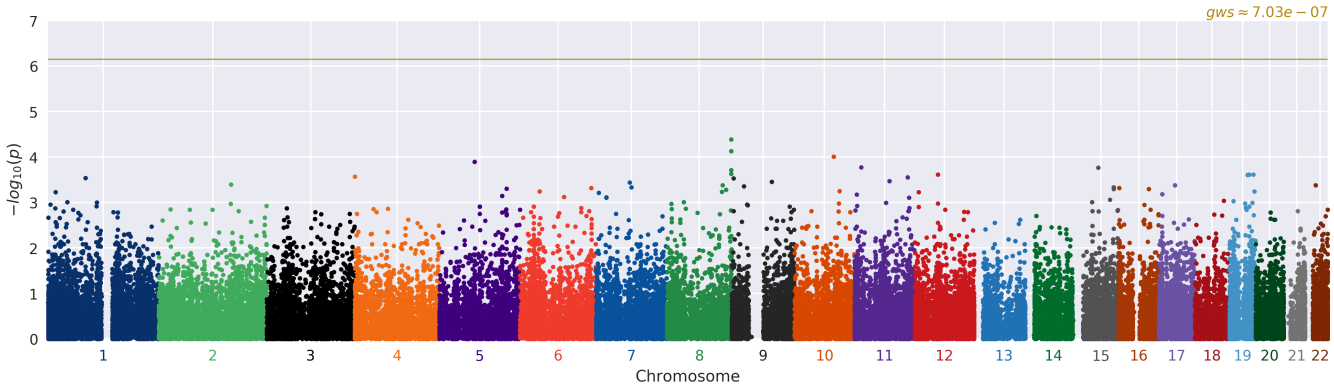


(a) invn Adjusted Age+SEX (b) invn Adjusted Age+SEX+BMI

Figure 22: QQ plots for INS_FAST in the METABO_EUR analysis

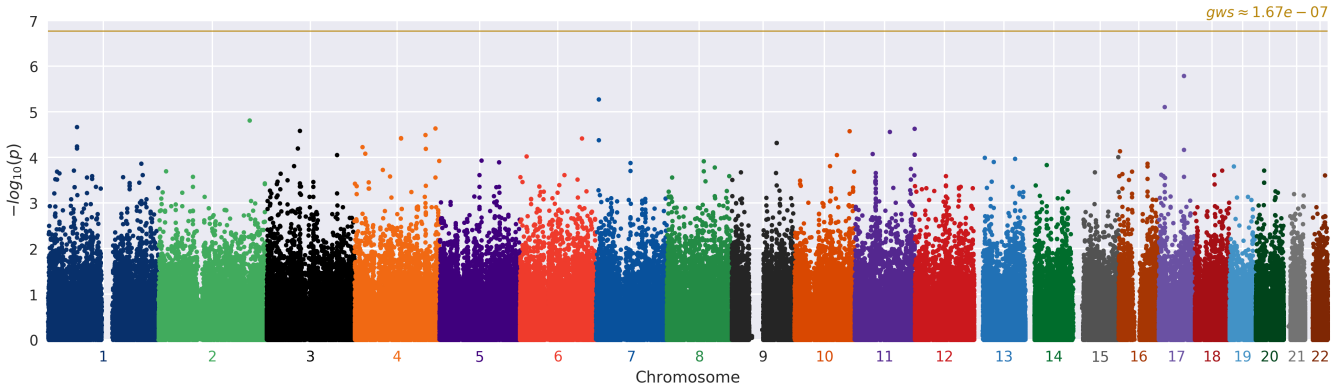


(a) invn Adjusted Age+SEX

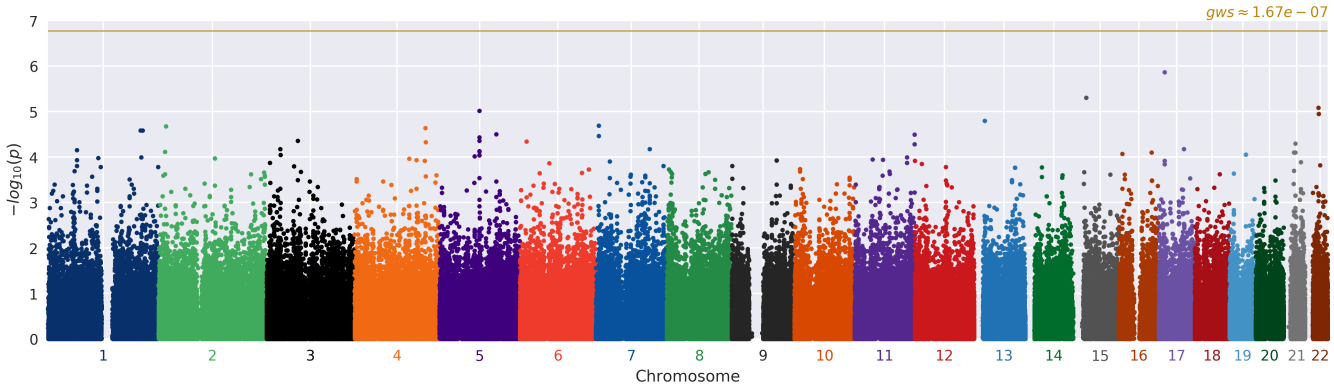


(b) invn Adjusted Age+SEX+BMI

Figure 23: Manhattan plots for INS_FAST in the EXBROAD_EUR analysis

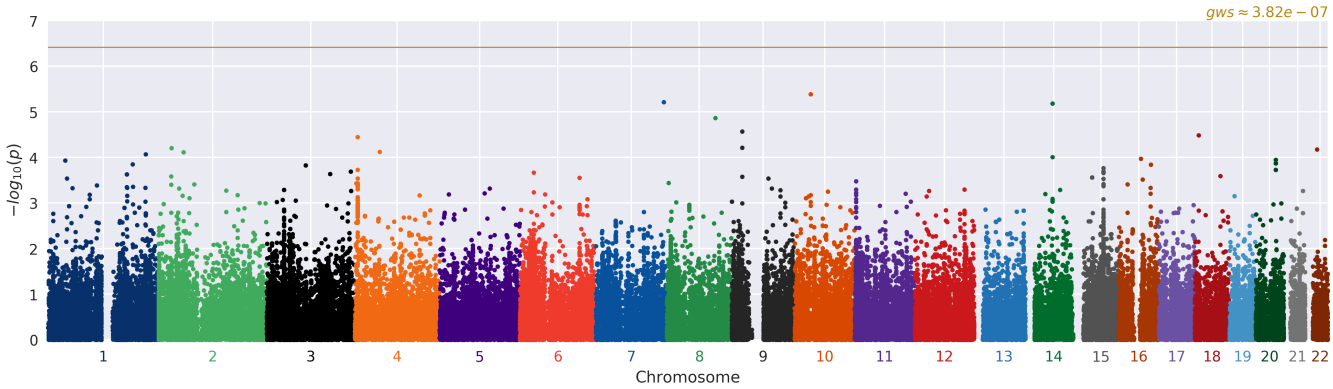


(a) invn Adjusted Age+SEX

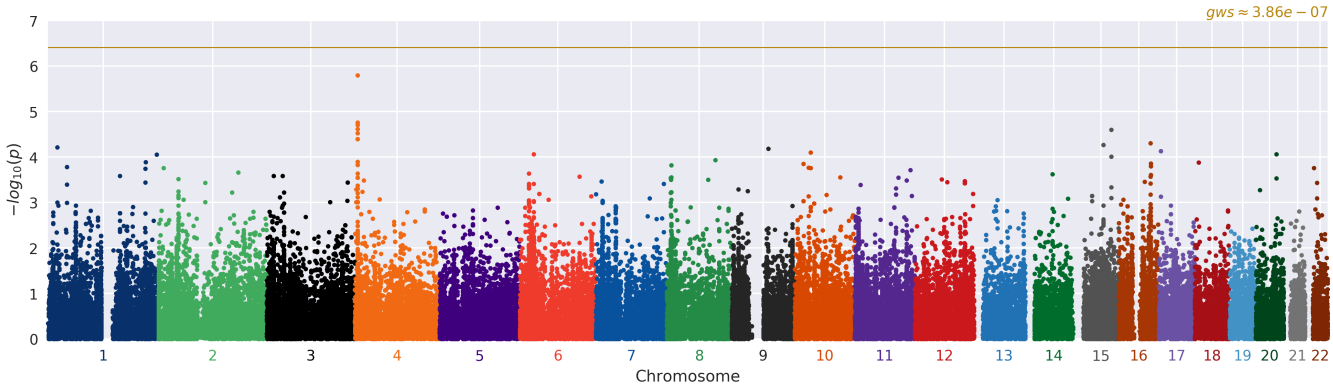


(b) invn Adjusted Age+SEX+BMI

Figure 24: Manhattan plots for INS_FAST in the GWAS_EUR analysis



(a) invn Adjusted Age+SEX



(b) invn Adjusted Age+SEX+BMI

Figure 25: Manhattan plots for INS_FAST in the METABO_EUR analysis

5.3 Top associations

Table 33: Top variants in the EXBROAD_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
6	160113872	rs4880	A	G	SOD2	1,481	778	703	1,460	0.493	0.146	$3.69 \cdot 10^{-2}$	$7.97 \cdot 10^{-5}$
18	61383354	rs17071550	T	C	SERPINB11	1,481	778	703	505	0.17	0.189	$4.9 \cdot 10^{-2}$	$1.2 \cdot 10^{-4}$
9	35674191	rs113042654	A	G	CA9	1,481	778	703	11	$3.71 \cdot 10^{-3}$	1.152	0.301	$1.35 \cdot 10^{-4}$
7	77778668	rs3807694	C	T	MAGI2	1,481	778	703	1,108	0.626	0.143	$3.75 \cdot 10^{-2}$	$1.37 \cdot 10^{-4}$
11	4639292	rs11600417	A	C	TRIM68	1,481	778	703	1,122	0.621	0.144	$3.8 \cdot 10^{-2}$	$1.59 \cdot 10^{-4}$
12	52283249	exm1003749	T	C	ANKRD33	1,463	767	696	3	$1.03 \cdot 10^{-3}$	2.165	0.575	$1.74 \cdot 10^{-4}$
9	4292083	rs10758593	G	A	GLIS3	1,481	778	703	1,292	0.436	0.14	$3.75 \cdot 10^{-2}$	$1.98 \cdot 10^{-4}$
20	33488771	rs6120757	T	C	ACSS2	1,481	778	703	1,159	0.609	0.14	$3.75 \cdot 10^{-2}$	$2.01 \cdot 10^{-4}$
8	124121749	rs61752913	G	A	TBC1D31	1,481	778	703	2	$6.75 \cdot 10^{-4}$	2.614	0.703	$2.1 \cdot 10^{-4}$
17	8811678	rs726679	A	G	PIK3R5	1,481	778	703	1,396	0.529	0.135	$3.64 \cdot 10^{-2}$	$2.13 \cdot 10^{-4}$
6	160196343	rs25683	A	G	ACAT2	1,481	778	703	1,207	0.593	0.139	$3.76 \cdot 10^{-2}$	$2.2 \cdot 10^{-4}$
19	53611802	rs61733666	G	T	ZNF415	1,481	778	703	59	$1.99 \cdot 10^{-2}$	0.482	0.132	$2.78 \cdot 10^{-4}$
14	74388908	rs1127392	T	C	ZNF410	1,481	778	703	1,390	0.469	0.134	$3.7 \cdot 10^{-2}$	$3.06 \cdot 10^{-4}$
18	61323012	exm1390895	G	C	SERPINB3	1,481	778	703	416	0.14	0.191	$5.31 \cdot 10^{-2}$	$3.42 \cdot 10^{-4}$
1	72748084	rs142674139	G	C	NEGR1	1,481	778	703	20	$6.75 \cdot 10^{-3}$	0.762	0.213	$3.69 \cdot 10^{-4}$
11	108114727	rs3218707	G	C	ATM	1,481	778	703	2	$6.75 \cdot 10^{-4}$	2.507	0.704	$3.82 \cdot 10^{-4}$
11	108382834	rs141078173	T	C	EXPH5	1,481	778	703	2	$6.75 \cdot 10^{-4}$	2.507	0.704	$3.82 \cdot 10^{-4}$
6	27277402	rs6456773	C	T	POM121L2	1,481	778	703	11	0.996	1.066	0.301	$4.12 \cdot 10^{-4}$
6	40360265	rs200804161	G	A	LRFN2	1,481	778	703	60	$2.03 \cdot 10^{-2}$	0.465	0.132	$4.21 \cdot 10^{-4}$
16	1384711	rs141912338	T	C	BAIAP3	1,480	778	702	2	$6.76 \cdot 10^{-4}$	2.496	0.707	$4.27 \cdot 10^{-4}$

Table 34: Top variants in the EXBROAD_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$\text{GENE}_{\text{CLOSEST}}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
8	145011204	rs6993938	A	G	PLEC	1,468	768	700	1,137	0.387	0.157	$3.81 \cdot 10^{-2}$	$4.12 \cdot 10^{-5}$
10	88416963	rs7901458	A	G	OPN4	1,467	768	699	74	$2.52 \cdot 10^{-2}$	0.466	0.119	$9.72 \cdot 10^{-5}$
5	78996050	rs6870619	G	A	CMYA5	1,468	768	700	891	0.303	0.153	$3.99 \cdot 10^{-2}$	$1.28 \cdot 10^{-4}$
11	14666116	rs142935352	C	A	PDE3B	1,468	768	700	75	$2.55 \cdot 10^{-2}$	0.445	0.118	$1.68 \cdot 10^{-4}$
15	56208822	rs111308798	G	C	NEDD4	1,468	768	700	6	$2.04 \cdot 10^{-3}$	1.533	0.407	$1.7 \cdot 10^{-4}$
19	44223113	rs11555891	A	G	IRGC	1,468	768	700	146	$4.97 \cdot 10^{-2}$	0.317	$8.61 \cdot 10^{-2}$	$2.42 \cdot 10^{-4}$
19	53611802	rs61733666	G	T	ZNF415	1,468	768	700	57	$1.94 \cdot 10^{-2}$	0.495	0.134	$2.44 \cdot 10^{-4}$
12	52283249	exm1003749	T	C	ANKRD33	1,450	757	693	3	$1.03 \cdot 10^{-3}$	2.118	0.576	$2.44 \cdot 10^{-4}$
19	40762860	rs184042322	T	G	AKT2	1,468	768	700	35	$1.19 \cdot 10^{-2}$	0.628	0.171	$2.48 \cdot 10^{-4}$
4	845678	exm379354	C	T	GAK	1,468	768	700	2	$6.81 \cdot 10^{-4}$	2.575	0.705	$2.69 \cdot 10^{-4}$
11	119027724	rs139879498	G	A	AP002956	1,468	768	700	7	$2.38 \cdot 10^{-3}$	1.374	0.377	$2.78 \cdot 10^{-4}$
1	85029077	rs15911	C	T	CTBS	1,468	768	700	535	0.182	0.173	$4.75 \cdot 10^{-2}$	$2.87 \cdot 10^{-4}$
9	4292083	rs10758593	G	A	GLIS3	1,468	768	700	1,285	0.438	0.137	$3.76 \cdot 10^{-2}$	$2.92 \cdot 10^{-4}$
11	78360169	rs1792134	T	C	TENM4	1,468	768	700	1,338	0.544	0.134	$3.72 \cdot 10^{-2}$	$3.38 \cdot 10^{-4}$
9	90321802	rs56169226	T	G	DAPK1	1,468	768	700	30	$1.02 \cdot 10^{-2}$	0.64	0.179	$3.5 \cdot 10^{-4}$
7	75695613	rs10256	A	G	MDH2	1,468	768	700	223	$7.6 \cdot 10^{-2}$	0.252	$7.05 \cdot 10^{-2}$	$3.63 \cdot 10^{-4}$
2	162849809	rs144519975	C	G	DPP4	1,468	768	700	3	$1.02 \cdot 10^{-3}$	2.041	0.576	$4.05 \cdot 10^{-4}$
17	36194230	rs6607302	T	C	HNF1B	1,468	768	700	1,289	0.561	0.133	$3.77 \cdot 10^{-2}$	$4.15 \cdot 10^{-4}$
8	126075826	exm720367	T	C	KIAA0196	1,468	768	700	36	$1.23 \cdot 10^{-2}$	0.579	0.164	$4.17 \cdot 10^{-4}$
22	23524386	rs56321828	G	C	BCR	1,468	768	700	10	$3.41 \cdot 10^{-3}$	1.116	0.316	$4.18 \cdot 10^{-4}$

Table 35: Top variants in the GWAS_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
17	56378067	rs12451466	G	A	TSPOAP1	786	399	387	257	0.837	0.325	$6.73 \cdot 10^{-2}$	$1.64 \cdot 10^{-6}$
7	6449496	rs2303361	T	C	DAGLB	786	399	387	350	0.777	0.27	$5.89 \cdot 10^{-2}$	$5.3 \cdot 10^{-6}$
17	13251229	rs11653851	G	A	HS3ST3A1	786	399	387	330	0.79	0.274	$6.1 \cdot 10^{-2}$	$7.84 \cdot 10^{-6}$
2	205036413	rs4673287	G	A	ICOS	786	399	387	459	0.708	0.243	$5.59 \cdot 10^{-2}$	$1.53 \cdot 10^{-5}$
1	65943872	rs12409877	A	G	LEPR	785	398	387	759	0.517	0.214	$5.01 \cdot 10^{-2}$	$2.15 \cdot 10^{-5}$
4	181560051	rs2251152	G	A	TENM3	786	399	387	571	0.363	0.222	$5.21 \cdot 10^{-2}$	$2.31 \cdot 10^{-5}$
11	134923846	rs11224208	C	A	AP003062	786	399	387	181	0.885	0.343	$8.06 \cdot 10^{-2}$	$2.35 \cdot 10^{-5}$
3	74718758	rs1447826	T	C	CNTN3	786	399	387	609	0.387	0.215	$5.09 \cdot 10^{-2}$	$2.62 \cdot 10^{-5}$
10	123540904	rs2420963	A	G	ATE1	786	399	387	633	0.403	0.211	$4.99 \cdot 10^{-2}$	$2.66 \cdot 10^{-5}$
11	78794440	rs4945324	C	T	TENM4	786	399	387	346	0.78	0.257	$6.1 \cdot 10^{-2}$	$2.74 \cdot 10^{-5}$
4	159158275	rs2272050	A	G	TMEM144	786	399	387	416	0.735	0.242	$5.79 \cdot 10^{-2}$	$3.19 \cdot 10^{-5}$
4	104059542	rs2243682	A	G	CENPE	785	399	386	477	0.696	0.221	$5.33 \cdot 10^{-2}$	$3.77 \cdot 10^{-5}$
6	139058418	rs9402997	C	T	GVQW2	786	399	387	532	0.338	0.22	$5.31 \cdot 10^{-2}$	$3.79 \cdot 10^{-5}$
7	6410528	rs4724800	A	G	RAC1	786	399	387	497	0.684	0.225	$5.45 \cdot 10^{-2}$	$4.17 \cdot 10^{-5}$
9	100740124	rs4743150	C	T	ANP32B	786	399	387	313	0.801	0.253	$6.2 \cdot 10^{-2}$	$4.83 \cdot 10^{-5}$
4	17385551	rs2122574	C	T	QDPR	786	399	387	521	0.331	0.212	$5.25 \cdot 10^{-2}$	$5.94 \cdot 10^{-5}$
3	69566911	rs6774608	C	T	FRMD4B	786	399	387	340	0.784	0.239	$5.95 \cdot 10^{-2}$	$6.34 \cdot 10^{-5}$
4	159804265	rs4600878	A	C	FNIP2	786	399	387	656	0.583	0.209	$5.21 \cdot 10^{-2}$	$6.5 \cdot 10^{-5}$
16	2911320	rs7192880	T	C	PRSS22	786	399	387	724	0.461	0.2	$5.01 \cdot 10^{-2}$	$7.24 \cdot 10^{-5}$
4	24011608	rs7672552	C	T	PPARGC1A	786	399	387	676	0.43	0.196	$4.95 \cdot 10^{-2}$	$8.29 \cdot 10^{-5}$

Table 36: Top variants in the GWAS_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
17	13251229	rs11653851	G	A	HS3ST3A1	785	396	389	329	0.79	0.295	$6.06 \cdot 10^{-2}$	$1.36 \cdot 10^{-6}$
15	29418987	rs10851484	G	A	FAM189A1	785	396	389	116	0.926	0.42	$9.14 \cdot 10^{-2}$	$4.96 \cdot 10^{-6}$
22	30199926	rs12485243	C	T	ASCC2	785	396	389	255	0.838	0.309	$6.88 \cdot 10^{-2}$	$8.24 \cdot 10^{-6}$
5	89907016	rs490812	A	C	ADGRV1	785	396	389	670	0.573	0.222	$4.99 \cdot 10^{-2}$	$9.59 \cdot 10^{-6}$
22	30563343	rs9614152	G	A	HORMAD2	784	395	389	254	0.838	0.305	$6.89 \cdot 10^{-2}$	$1.13 \cdot 10^{-5}$
13	23612645	rs1170698	G	A	SGCG	785	396	389	507	0.323	0.232	$5.34 \cdot 10^{-2}$	$1.58 \cdot 10^{-5}$
7	6410528	rs4724800	A	G	RAC1	785	396	389	493	0.686	0.233	$5.43 \cdot 10^{-2}$	$2.05 \cdot 10^{-5}$
2	16892189	rs798379	T	C	FAM49A	781	394	387	54	0.965	0.569	0.133	$2.11 \cdot 10^{-5}$
4	159158275	rs2272050	A	G	TMEM144	785	396	389	415	0.736	0.245	$5.75 \cdot 10^{-2}$	$2.3 \cdot 10^{-5}$
1	213636801	rs12036568	T	C	RPS6KC1	785	396	389	728	0.464	0.209	$4.93 \cdot 10^{-2}$	$2.6 \cdot 10^{-5}$
1	209088514	rs7368359	C	T	CAMK1G	785	396	389	581	0.63	0.219	$5.16 \cdot 10^{-2}$	$2.6 \cdot 10^{-5}$
5	127697589	rs10519991	A	G	FBN2	785	396	389	152	0.903	0.36	$8.59 \cdot 10^{-2}$	$3.16 \cdot 10^{-5}$
11	134930689	rs4540845	A	G	AP003062	785	396	389	254	0.838	0.285	$6.81 \cdot 10^{-2}$	$3.21 \cdot 10^{-5}$
7	6449496	rs2303361	T	C	DAGLB	785	396	389	346	0.78	0.246	$5.9 \cdot 10^{-2}$	$3.44 \cdot 10^{-5}$
5	89791258	rs2255938	A	G	POLR3G	784	395	389	565	0.36	0.217	$5.22 \cdot 10^{-2}$	$3.68 \cdot 10^{-5}$
3	69566911	rs6774608	C	T	FRMD4B	785	396	389	342	0.782	0.242	$5.9 \cdot 10^{-2}$	$4.4 \cdot 10^{-5}$
6	15172268	rs7747637	C	T	JARID2	785	396	389	120	0.924	0.383	$9.33 \cdot 10^{-2}$	$4.53 \cdot 10^{-5}$
4	159804265	rs4600878	A	C	FNIP2	785	396	389	654	0.583	0.212	$5.19 \cdot 10^{-2}$	$4.7 \cdot 10^{-5}$
21	26327951	rs762205	C	T	MRPL39	785	396	389	189	0.12	0.312	$7.66 \cdot 10^{-2}$	$5.05 \cdot 10^{-5}$
7	120683751	rs4730988	T	G	CPED1	785	396	389	517	0.329	0.21	$5.23 \cdot 10^{-2}$	$6.68 \cdot 10^{-5}$

Table 37: Top variants in the METABO_EUR invn Adjusted Age+SEX model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
10	36592064	rs1219610	G	A	FZD8	1,008	518	490	666	0.33	0.222	$4.8 \cdot 10^{-2}$	$4.09 \cdot 10^{-6}$
7	152784173	rs2710243	G	A	ACTR3B	1,008	518	490	887	0.44	0.205	$4.51 \cdot 10^{-2}$	$6.11 \cdot 10^{-6}$
14	61105736	rs3783820	T	C	SIX1	1,008	518	490	315	0.844	0.28	$6.19 \cdot 10^{-2}$	$6.55 \cdot 10^{-6}$
8	109660089	rs2935762	G	A	TMEM74	1,007	517	490	594	0.705	0.214	$4.89 \cdot 10^{-2}$	$1.37 \cdot 10^{-5}$
9	23311645	rs10757412	C	A	ELAVL2	1,008	518	490	772	0.383	0.188	$4.46 \cdot 10^{-2}$	$2.7 \cdot 10^{-5}$
18	8937035	rs6506625	A	C	MTCL1	1,006	518	488	767	0.381	0.193	$4.61 \cdot 10^{-2}$	$3.24 \cdot 10^{-5}$
4	6277330	chr4:6328231	G	T	WFS1	997	509	488	449	0.225	0.215	$5.18 \cdot 10^{-2}$	$3.54 \cdot 10^{-5}$
2	28514717	rs76495770	G	T	BRE	1,008	518	490	90	0.955	0.431	0.107	$6.24 \cdot 10^{-5}$
22	27054179	rs16982564	G	A	CRYBA4	1,007	517	490	392	0.805	0.222	$5.54 \cdot 10^{-2}$	$6.71 \cdot 10^{-5}$
4	55953483	rs2125489	A	G	KDR	1,008	518	490	233	0.884	0.266	$6.68 \cdot 10^{-2}$	$7.49 \cdot 10^{-5}$
2	56082610	rs6545528	C	T	EFEMP1	1,008	518	490	298	0.852	0.245	$6.17 \cdot 10^{-2}$	$7.69 \cdot 10^{-5}$
1	219798501	rs17546126	A	G	ZC3H11B	1,007	517	490	56	0.972	0.544	0.138	$8.58 \cdot 10^{-5}$
14	60798753	rs17097336	C	T	PPM1A	1,008	518	490	338	0.832	0.23	$5.89 \cdot 10^{-2}$	$9.88 \cdot 10^{-5}$
16	50114098	rs7191639	G	A	HEATR3	1,008	518	490	359	0.822	0.224	$5.75 \cdot 10^{-2}$	$1.07 \cdot 10^{-4}$
20	44735854	rs6065926	G	A	CD40	1,008	518	490	535	0.265	0.19	$4.9 \cdot 10^{-2}$	$1.13 \cdot 10^{-4}$
1	38738214	rs12075234	A	G	POU3F1	1,008	518	490	959	0.524	0.172	$4.44 \cdot 10^{-2}$	$1.16 \cdot 10^{-4}$
1	190764092	rs650913	T	C	BRINP3	1,007	517	490	957	0.475	0.168	$4.41 \cdot 10^{-2}$	$1.42 \cdot 10^{-4}$
16	72142038	rs36033103	G	T	DHX38	1,008	518	490	147	0.927	0.325	$8.51 \cdot 10^{-2}$	$1.44 \cdot 10^{-4}$
3	87798921	rs12498102	A	C	HTR1F	1,008	518	490	157	0.922	0.315	$8.28 \cdot 10^{-2}$	$1.49 \cdot 10^{-4}$
15	68048974	rs8042507	G	T	MAP2K5	1,008	518	490	651	0.323	0.174	$4.6 \cdot 10^{-2}$	$1.7 \cdot 10^{-4}$

Table 38: Top variants in the METABO_EUR invn Adjusted Age+SEX+BMI model (**bold** variants indicate previously identified associations)

CHR	POS	ID	EA	OA	$GENE_{CLOSEST}$	N	MALE	FEMALE	MAC	FREQ	EFFECT	STDERR	P
4	6277330	chr4:6328231	G	T	WFS1	1,002	513	489	451	0.775	0.247	$5.13 \cdot 10^{-2}$	$1.61 \cdot 10^{-6}$
15	86298852	rs2542606	G	A	KLHL25	1,013	522	491	849	0.581	0.189	$4.47 \cdot 10^{-2}$	$2.51 \cdot 10^{-5}$
16	72078043	rs763665	C	T	HP	1,013	522	491	332	0.164	0.242	$5.94 \cdot 10^{-2}$	$4.99 \cdot 10^{-5}$
15	68016492	rs138516014	G	A	MAP2K5	1,013	522	491	86	$4.24 \cdot 10^{-2}$	0.442	0.109	$5.46 \cdot 10^{-5}$
1	21102799	rs2274120	A	G	HP1BP3	1,013	522	491	110	$5.43 \cdot 10^{-2}$	0.395	$9.82 \cdot 10^{-2}$	$6.11 \cdot 10^{-5}$
9	81975570	rs10780304	T	C	TLE4	1,013	522	491	681	0.664	0.189	$4.72 \cdot 10^{-2}$	$6.59 \cdot 10^{-5}$
17	4856580	rs238239	T	C	ENO3	1,013	522	491	978	0.483	0.181	$4.55 \cdot 10^{-2}$	$7.38 \cdot 10^{-5}$
10	36592064	rs1219610	G	A	FZD8	1,013	522	491	669	0.67	0.189	$4.78 \cdot 10^{-2}$	$7.93 \cdot 10^{-5}$
6	31002013	rs6933349	A	G	MUC22	1,013	522	491	430	0.212	0.213	$5.42 \cdot 10^{-2}$	$8.71 \cdot 10^{-5}$
20	46401287	rs11699888	C	T	SULF2	1,013	522	491	103	$5.08 \cdot 10^{-2}$	0.398	0.101	$8.72 \cdot 10^{-5}$
1	245130641	rs6700087	G	T	EFCAB2	1,013	522	491	617	0.695	0.186	$4.72 \cdot 10^{-2}$	$8.78 \cdot 10^{-5}$
15	86230029	rs49363	C	T	AKAP13	1,013	522	491	892	0.56	0.175	$4.48 \cdot 10^{-2}$	$9.81 \cdot 10^{-5}$
8	109660089	rs2935762	G	A	TMEM74	1,012	521	491	599	0.296	0.189	$4.88 \cdot 10^{-2}$	$1.17 \cdot 10^{-4}$
1	219798501	rs17546126	A	G	ZC3H11B	1,012	521	491	56	$2.77 \cdot 10^{-2}$	0.524	0.136	$1.3 \cdot 10^{-4}$
18	8937035	rs6506625	A	C	MTCL1	1,011	522	489	774	0.617	0.175	$4.55 \cdot 10^{-2}$	$1.31 \cdot 10^{-4}$
16	72142038	rs36033103	G	T	DHX38	1,013	522	491	147	$7.26 \cdot 10^{-2}$	0.323	$8.46 \cdot 10^{-2}$	$1.4 \cdot 10^{-4}$
10	20118436	rs4748612	C	T	PLXDC2	1,013	522	491	948	0.532	0.162	$4.25 \cdot 10^{-2}$	$1.41 \cdot 10^{-4}$
8	10593061	rs4840511	A	C	CTD-2135J3	1,013	522	491	60	$2.96 \cdot 10^{-2}$	0.494	0.13	$1.51 \cdot 10^{-4}$
1	42835786	rs11587576	C	G	RIMKLA	1,013	522	491	143	$7.06 \cdot 10^{-2}$	0.328	$8.68 \cdot 10^{-2}$	$1.65 \cdot 10^{-4}$
10	32054468	rs10740847	A	C	ARHGAP12	1,013	522	491	378	0.187	0.208	$5.51 \cdot 10^{-2}$	$1.7 \cdot 10^{-4}$

5.4 Previously identified risk loci

Table 39 shows statistics from the EXBROAD_EUR cohort for 16 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R}^2 < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R}^2 >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 5 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 10 variants in both studies, 9 exhibit the same direction of effect with the known result (binomial test $p = 0.0107$).

Table 39: Top known loci in EXBROAD_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	**rs1260326**	C	T	1,481	0.662	$4.88 \cdot 10^{-3}$	$3.87 \cdot 10^{-2}$	0.9	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227020653	**rs7578326**	A	G	1,481	0.358	$7.63 \cdot 10^{-3}$	$3.77 \cdot 10^{-2}$	0.84	NYAP2	1	rs7578326	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.25 \cdot 10^{-16}$
2	165540800	**rs12328675**	T	C	1,481	0.102	0.131	$6.19 \cdot 10^{-2}$	$3.48 \cdot 10^{-2}$	COBLL1	1	rs12328675	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.2 \cdot 10^{-3}$	$2.58 \cdot 10^{-14}$
8	9185146	**rs2126259**	T	C	1,481	0.844	$5.1 \cdot 10^{-2}$	$5.14 \cdot 10^{-2}$	0.321	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
19	33899065	**rs731839**	G	A	1,481	0.655	$8.54 \cdot 10^{-2}$	$3.91 \cdot 10^{-2}$	$2.92 \cdot 10^{-2}$	PEPD	1	rs731839	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.13 \cdot 10^{-12}$
4	106081636	**rs9884482**	C	T	1,481	0.404	$6.69 \cdot 10^{-2}$	$3.74 \cdot 10^{-2}$	$7.42 \cdot 10^{-2}$	TET2	1	rs9884482	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.91 \cdot 10^{-11}$
5	55806751	**rs459193**	G	A	1,481	0.677	$2.3 \cdot 10^{-2}$	$3.93 \cdot 10^{-2}$	0.558	AC022431.2	1	rs459193	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.15 \cdot 10^{-10}$
1	219652033	rs2791552	A	C	1,481	0.657	$1.02 \cdot 10^{-2}$	$3.84 \cdot 10^{-2}$	0.791	LYPLAL1	1	rs2791552	$1.33 \cdot 10^{5}$	$-1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.57 \cdot 10^{-9}$
1	219750717	**rs4846567**	G	T	1,481	0.296	$3.69 \cdot 10^{-2}$	$4.11 \cdot 10^{-2}$	0.37	SLC30A10	1	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
5	53300662	**rs4311394**	G	A	1,481	0.252	$8.35 \cdot 10^{-2}$	$4.2 \cdot 10^{-2}$	$4.72 \cdot 10^{-2}$	ARL15	1	rs4311394	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.63 \cdot 10^{-8}$
2	227093745	rs2943641	C	T	1,481	0.622	$2.89 \cdot 10^{-2}$	$3.78 \cdot 10^{-2}$	0.445	IRS1	0.992	rs2943645	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
4	89740128	rs13133548	G	A	1,481	0.507	$4.34 \cdot 10^{-3}$	$3.67 \cdot 10^{-2}$	0.906	FAM13A	0.98	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
4	157720124	rs4691380	C	T	1,481	0.252	0.133	$4.15 \cdot 10^{-2}$	$1.39 \cdot 10^{-3}$	PDGFC	0.965	rs6822892	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.58 \cdot 10^{-10}$
2	27801759	**rs1919128**	A	G	1,481	0.27	$1.03 \cdot 10^{-2}$	$4.19 \cdot 10^{-2}$	0.806	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
12	102875569	rs35767	G	A	1,481	0.775	$3.6 \cdot 10^{-2}$	$4.43 \cdot 10^{-2}$	0.416	IGF1	0.828	rs860598	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
4	157720124	**rs4691380**	C	T	1,481	0.252	0.133	$4.15 \cdot 10^{-2}$	$1.39 \cdot 10^{-3}$	RP11-171N4.2	0.738	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$

Table 40 shows statistics from the EXBROAD_EUR cohort for 16 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R}^2 < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R}^2 >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 4 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 10 variants in both studies, 8 exhibit the same direction of effect with the known result (binomial test $p = 0.0547$).

Table 40: Top known loci in EXBROAD_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	rs1260326	T	C	1,468	0.338	$1.64 \cdot 10^{-2}$	$3.89 \cdot 10^{-2}$	0.673	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227020653	**rs7578326**	A	G	1,468	0.642	$4.8 \cdot 10^{-2}$	$3.79 \cdot 10^{-2}$	0.205	NYAP2	1	rs7578326	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.25 \cdot 10^{-16}$
2	165540800	**rs12328675**	T	C	1,468	0.899	0.146	$6.28 \cdot 10^{-2}$	$2.03 \cdot 10^{-2}$	COBLL1	1	rs12328675	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.2 \cdot 10^{-3}$	$2.58 \cdot 10^{-14}$
8	9185146	**rs2126259**	T	C	1,468	0.155	$2.56 \cdot 10^{-2}$	$5.17 \cdot 10^{-2}$	0.62	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
19	33899065	**rs731839**	G	A	1,468	0.344	$5.81 \cdot 10^{-2}$	$3.93 \cdot 10^{-2}$	0.139	PEPD	1	rs731839	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.13 \cdot 10^{-12}$
4	106081636	**rs9884482**	C	T	1,468	0.597	$8.43 \cdot 10^{-2}$	$3.78 \cdot 10^{-2}$	$2.58 \cdot 10^{-2}$	TET2	1	rs9884482	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.91 \cdot 10^{-11}$
5	55806751	**rs459193**	G	A	1,468	0.324	$6.1 \cdot 10^{-2}$	$3.94 \cdot 10^{-2}$	0.122	AC022431.2	1	rs459193	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.15 \cdot 10^{-10}$
1	219652033	rs2791552	A	C	1,468	0.344	$6.76 \cdot 10^{-3}$	$3.87 \cdot 10^{-2}$	0.861	LYPLAL1	1	rs2791552	$1.33 \cdot 10^{5}$	$-1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.57 \cdot 10^{-9}$
1	219750717	**rs4846567**	G	T	1,468	0.704	$6.24 \cdot 10^{-2}$	$4.13 \cdot 10^{-2}$	0.132	SLC30A10	1	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
5	53300662	**rs4311394**	G	A	1,468	0.75	$7.11 \cdot 10^{-2}$	$4.23 \cdot 10^{-2}$	$9.3 \cdot 10^{-2}$	ARL15	1	rs4311394	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.63 \cdot 10^{-8}$
2	227093745	rs2943641	C	T	1,468	0.378	$6.97 \cdot 10^{-2}$	$3.8 \cdot 10^{-2}$	$6.67 \cdot 10^{-2}$	IRS1	0.992	rs2943645	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
4	89740128	rs13133548	G	A	1,468	0.493	$8.49 \cdot 10^{-4}$	$3.68 \cdot 10^{-2}$	0.982	FAM13A	0.98	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
4	157720124	rs4691380	C	T	1,468	0.747	0.112	$4.18 \cdot 10^{-2}$	$7.32 \cdot 10^{-3}$	PDGFC	0.965	rs6822892	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.58 \cdot 10^{-10}$
2	27801759	rs1919128	G	A	1,468	0.728	$2.77 \cdot 10^{-2}$	$4.2 \cdot 10^{-2}$	0.51	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
12	102875569	rs35767	G	A	1,468	0.225	$6.4 \cdot 10^{-2}$	$4.44 \cdot 10^{-2}$	0.15	IGF1	0.828	rs860598	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
4	157720124	**rs4691380**	C	T	1,468	0.747	0.112	$4.18 \cdot 10^{-2}$	$7.32 \cdot 10^{-3}$	RP11-171N4.2	0.738	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$

Table 41 shows statistics from the GWAS_EUR cohort for 18 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. None of the variants shows even nominal significance ($p < 0.05$) in this study. Out of the 10 variants in both studies, 7 exhibit the same direction of effect with the known result (binomial test $p = 0.172$).

Table 41: Top known loci in GWAS_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	rs1260326	T	C	782	0.331	$2.46 \cdot 10^{-2}$	$5.16 \cdot 10^{-2}$	0.634	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227099180	rs2943645	C	T	786	0.345	$3.71 \cdot 10^{-2}$	$5.31 \cdot 10^{-2}$	0.485	IRS1	1	rs2943645	$1.33 \cdot 10^{5}$	$-1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
2	165513091	**rs10195252**	T	C	784	0.661	$8.81 \cdot 10^{-2}$	$5.27 \cdot 10^{-2}$	$9.51 \cdot 10^{-2}$	COBLL1	1	rs10195252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.26 \cdot 10^{-16}$
2	227054881	rs2943633	A	C	786	0.555	$6.17 \cdot 10^{-2}$	$5.07 \cdot 10^{-2}$	0.224	NYAP2	1	rs2943633	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.78 \cdot 10^{-13}$
8	9185146	**rs2126259**	T	C	786	0.154	$4.03 \cdot 10^{-2}$	$6.99 \cdot 10^{-2}$	0.565	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
3	12116620	**rs308971**	G	A	786	$9.03 \cdot 10^{-2}$	0.107	$8.53 \cdot 10^{-2}$	0.209	TIMP4	1	rs308971	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$2.97 \cdot 10^{-11}$
4	106071064	**rs974801**	G	A	786	0.607	$8.01 \cdot 10^{-2}$	$5.05 \cdot 10^{-2}$	0.113	TET2	1	rs974801	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.27 \cdot 10^{-11}$
19	33889000	**rs889140**	G	A	785	0.38	$6.87 \cdot 10^{-2}$	$5.09 \cdot 10^{-2}$	0.177	PEPD	1	rs889140	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.64 \cdot 10^{-9}$
1	219722104	**rs4846565**	G	A	786	0.657	0.104	$5.51 \cdot 10^{-2}$	$5.87 \cdot 10^{-2}$	LYPLAL1	1	rs4846565	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.76 \cdot 10^{-9}$
5	53300662	**rs4311394**	G	A	786	0.754	$1.17 \cdot 10^{-2}$	$5.77 \cdot 10^{-2}$	0.839	ARL15	1	rs4311394	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.63 \cdot 10^{-8}$
4	157674780	rs2162100	C	T	786	0.751	$9.59 \cdot 10^{-2}$	$5.68 \cdot 10^{-2}$	$9.19 \cdot 10^{-2}$	PDGFC	0.996	rs6855363	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.77 \cdot 10^{-10}$
12	102910810	rs855211	G	A	786	0.222	$4.44 \cdot 10^{-2}$	$5.99 \cdot 10^{-2}$	0.459	IGF1	0.993	rs860598	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
3	12391207	**rs6802898**	T	C	786	0.825	$6.52 \cdot 10^{-2}$	$6.6 \cdot 10^{-2}$	0.323	PPARG	0.99	rs17036328	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.59 \cdot 10^{-12}$
4	89711849	rs2290782	C	T	786	0.483	$6.42 \cdot 10^{-2}$	$5.06 \cdot 10^{-2}$	0.206	FAM13A	0.961	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
2	27801493	rs1919127	C	T	786	0.733	$1.63 \cdot 10^{-2}$	$5.72 \cdot 10^{-2}$	0.776	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
4	157642163	**rs1469245**	G	A	786	0.734	$9.57 \cdot 10^{-2}$	$5.58 \cdot 10^{-2}$	$8.71 \cdot 10^{-2}$	RP11-171N4.2	0.865	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$
1	219708773	**rs1572505**	C	A	786	0.658	0.105	$5.5 \cdot 10^{-2}$	$5.57 \cdot 10^{-2}$	SLC30A10	0.746	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
6	34904584	**rs847851**	A	G	786	0.796	$1.85 \cdot 10^{-2}$	$6.23 \cdot 10^{-2}$	0.767	UHRF1BP1	0.745	rs6912327	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$

Table 42 shows statistics from the GWAS_EUR cohort for 18 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes

data. There are 3 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 10 variants in both studies, 8 exhibit the same direction of effect with the known result (binomial test $p = 0.0547$).

Table 42: Top known loci in GWAS_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	rs1260326	T	C	781	0.668	$3.1 \cdot 10^{-2}$	$5.13 \cdot 10^{-2}$	0.545	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227099180	**rs2943645**	T	C	785	0.655	$8.66 \cdot 10^{-4}$	$5.29 \cdot 10^{-2}$	0.987	IRS1	1	rs2943645	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
2	165513091	**rs10195252**	T	C	783	0.34	0.108	$5.26 \cdot 10^{-2}$	$4 \cdot 10^{-2}$	COBLL1	1	rs10195252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.26 \cdot 10^{-16}$
2	227054881	rs2943633	A	C	785	0.445	$3.52 \cdot 10^{-2}$	$5.05 \cdot 10^{-2}$	0.486	NYAP2	1	rs2943633	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.78 \cdot 10^{-13}$
8	9185146	**rs2126259**	T	C	785	0.847	$3.75 \cdot 10^{-2}$	$6.97 \cdot 10^{-2}$	0.591	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
3	12116620	**rs308971**	G	A	785	0.909	0.146	$8.46 \cdot 10^{-2}$	$8.47 \cdot 10^{-2}$	TIMP4	1	rs308971	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$2.97 \cdot 10^{-11}$
4	106071064	**rs974801**	G	A	785	0.393	$6.18 \cdot 10^{-2}$	$5.02 \cdot 10^{-2}$	0.219	TET2	1	rs974801	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.27 \cdot 10^{-11}$
19	33889000	**rs889140**	G	A	784	0.619	$7.85 \cdot 10^{-2}$	$5.05 \cdot 10^{-2}$	0.12	PEPD	1	rs889140	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.64 \cdot 10^{-9}$
1	219722104	**rs4846565**	G	A	785	0.342	$9.48 \cdot 10^{-2}$	$5.49 \cdot 10^{-2}$	$8.44 \cdot 10^{-2}$	LYPLAL1	1	rs4846565	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.76 \cdot 10^{-9}$
5	53300662	**rs4311394**	G	A	785	0.246	$9.79 \cdot 10^{-3}$	$5.75 \cdot 10^{-2}$	0.865	ARL15	1	rs4311394	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$2.63 \cdot 10^{-8}$
4	157674780	rs2162100	C	T	785	0.248	0.118	$5.68 \cdot 10^{-2}$	$3.78 \cdot 10^{-2}$	PDGFC	0.996	rs6855363	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$4.77 \cdot 10^{-10}$
12	102910810	rs855211	G	A	785	0.777	$3.1 \cdot 10^{-2}$	$6 \cdot 10^{-2}$	0.605	IGF1	0.993	rs860598	$1.33 \cdot 10^{5}$	$-1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
3	12391207	**rs6802898**	T	C	785	0.175	$2.16 \cdot 10^{-2}$	$6.6 \cdot 10^{-2}$	0.743	PPARG	0.99	rs17036328	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.59 \cdot 10^{-12}$
4	89711849	rs2290782	C	T	785	0.517	$6.79 \cdot 10^{-2}$	$5.02 \cdot 10^{-2}$	0.177	FAM13A	0.961	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
2	27801493	rs1919127	C	T	785	0.267	$1.5 \cdot 10^{-2}$	$5.69 \cdot 10^{-2}$	0.792	ZNF512	0.913	rs2068834	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
4	157642163	**rs1469245**	G	A	785	0.266	0.114	$5.59 \cdot 10^{-2}$	$4.26 \cdot 10^{-2}$	RP11-171N4.2	0.865	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$
1	219708773	**rs1572505**	C	A	785	0.341	$9.56 \cdot 10^{-2}$	$5.48 \cdot 10^{-2}$	$8.14 \cdot 10^{-2}$	SLC30A10	0.746	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
6	34904584	rs847851	G	A	785	0.203	$4.19 \cdot 10^{-3}$	$6.2 \cdot 10^{-2}$	0.946	UHRF1BP1	0.745	rs6912327	$1.33 \cdot 10^{5}$	$-1.6 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$

Table 43 shows statistics from the METABO_EUR cohort for 19 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R^2} < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R^2} >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 1 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 19 variants in both studies, 17 exhibit the same direction of effect with the known result (binomial test $p = 0.000364$).

Table 43: Top known loci in METABO_EUR model invn Adjusted Age+SEX (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	**rs1260326**	C	T	1,005	0.652	$4.63 \cdot 10^{-2}$	$4.77 \cdot 10^{-2}$	0.331	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227099180	**rs2943645**	T	C	1,007	0.592	$5.26 \cdot 10^{-2}$	$4.57 \cdot 10^{-2}$	0.25	IRS1	1	rs2943645	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
2	165513091	**rs10195252**	T	C	1,007	0.366	$1.45 \cdot 10^{-2}$	$4.66 \cdot 10^{-2}$	0.756	COBLL1	1	rs10195252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.26 \cdot 10^{-16}$
2	227020653	**rs7578326**	A	G	1,007	0.381	$3.53 \cdot 10^{-2}$	$4.59 \cdot 10^{-2}$	0.442	NYAP2	1	rs7578326	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.25 \cdot 10^{-16}$
8	9185146	**rs2126259**	T	C	1,007	0.839	$9.21 \cdot 10^{-2}$	$6.06 \cdot 10^{-2}$	0.129	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
5	53272664	**rs4865796**	A	G	1,007	0.665	$8.99 \cdot 10^{-2}$	$4.64 \cdot 10^{-2}$	$5.33 \cdot 10^{-2}$	ARL15	1	rs4865796	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.16 \cdot 10^{-12}$
3	12390484	**rs17036328**	T	C	1,007	0.181	$4.66 \cdot 10^{-2}$	$5.89 \cdot 10^{-2}$	0.429	PPARG	1	rs17036328	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.59 \cdot 10^{-12}$
19	33899065	**rs731839**	G	A	1,007	0.655	0.128	$4.79 \cdot 10^{-2}$	$7.54 \cdot 10^{-3}$	PEPD	1	rs731839	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.13 \cdot 10^{-12}$
3	12116620	rs308971	A	G	1,007	0.887	$8.01 \cdot 10^{-2}$	$7.07 \cdot 10^{-2}$	0.257	TIMP4	1	rs308971	$1.33 \cdot 10^{5}$	$-2.1 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$2.97 \cdot 10^{-11}$
4	106071064	**rs974801**	G	A	1,007	0.404	$2.62 \cdot 10^{-2}$	$4.67 \cdot 10^{-2}$	0.576	TET2	1	rs974801	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.27 \cdot 10^{-11}$
5	55806751	**rs459193**	G	A	1,007	0.67	$2.24 \cdot 10^{-2}$	$4.71 \cdot 10^{-2}$	0.634	AC022431.2	1	rs459193	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.15 \cdot 10^{-10}$
4	157683685	**rs1425486**	C	T	1,007	0.254	0.1	$5.12 \cdot 10^{-2}$	$5.05 \cdot 10^{-2}$	PDGFC	1	rs1425486	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.84 \cdot 10^{-10}$
2	27839539	**rs2068834**	T	C	1,007	0.305	$1.73 \cdot 10^{-2}$	$4.94 \cdot 10^{-2}$	0.727	ZNF512	1	rs2068834	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
1	219722104	**rs4846565**	G	A	1,007	0.368	$2.24 \cdot 10^{-3}$	$4.58 \cdot 10^{-2}$	0.961	LYPLAL1	1	rs4846565	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.76 \cdot 10^{-9}$
1	219750717	**rs4846567**	G	T	1,007	0.298	$2.75 \cdot 10^{-2}$	$4.86 \cdot 10^{-2}$	0.572	SLC30A10	1	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
12	102898446	**rs860598**	A	G	1,007	0.767	$1.58 \cdot 10^{-2}$	$5.38 \cdot 10^{-2}$	0.769	IGF1	1	rs860598	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
4	89741269	rs3822072	G	A	1,007	0.489	$4.92 \cdot 10^{-2}$	$4.48 \cdot 10^{-2}$	0.272	FAM13A	1	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
6	34764922	**rs6912327**	T	C	1,006	0.102	$7.46 \cdot 10^{-2}$	$7.16 \cdot 10^{-2}$	0.297	UHRF1BP1	1	rs6912327	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
4	157616767	**rs1464454**	G	A	1,006	0.279	$6.46 \cdot 10^{-2}$	$5.03 \cdot 10^{-2}$	0.2	RP11-171N4.2	1	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$

Table 44 shows statistics from the METABO_EUR cohort for 19 loci that were shown to be significantly associated with Fasting Insulin in the 2012 Nature Genetics paper by Scott et al [13]. Where a previously reported variant was not genotyped in the study (indicated by $\bar{R}^2 < 1$), if available, a tagging variant in LD with the reported variant ($\bar{R}^2 >= 0.7$ and within 250kb) was provided. Tags were identified using 1000 Genomes data. There are 1 variants that show at least nominal significance ($p < 0.05$) in this study. Out of the 19 variants in both studies, 16 exhibit the same direction of effect with the known result (binomial test $p = 0.00221$).

Table 44: Top known loci in METABO_EUR model invn Adjusted Age+SEX+BMI (**bold** variants indicate matching direction of effect)

CHR	POS	ID	EA	OA	N	FREQ	EFFECT	STDERR	P	$GENE_{CLOSEST}$	R^2	ID_{KNOWN}	N_{KNOWN}	$EFFECT_{KNOWN}$	$STDERR_{KNOWN}$	P_{KNOWN}
2	27730940	**rs1260326**	C	T	1,011	0.652	$1.23 \cdot 10^{-2}$	$4.74 \cdot 10^{-2}$	0.796	GCKR	1	rs1260326	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.74 \cdot 10^{-22}$
2	227099180	**rs2943645**	T	C	1,013	0.592	$4.43 \cdot 10^{-2}$	$4.54 \cdot 10^{-2}$	0.33	IRS1	1	rs2943645	$1.33 \cdot 10^{5}$	$1.9 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$2.26 \cdot 10^{-19}$
2	165513091	**rs10195252**	T	C	1,013	0.365	$5.64 \cdot 10^{-2}$	$4.61 \cdot 10^{-2}$	0.222	COBLL1	1	rs10195252	$1.33 \cdot 10^{5}$	$1.7 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.26 \cdot 10^{-16}$
2	227020653	**rs7578326**	A	G	1,013	0.381	$4.02 \cdot 10^{-2}$	$4.57 \cdot 10^{-2}$	0.379	NYAP2	1	rs7578326	$1.33 \cdot 10^{5}$	$1.8 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.25 \cdot 10^{-16}$
8	9185146	**rs2126259**	T	C	1,013	0.839	$6.68 \cdot 10^{-2}$	$6.02 \cdot 10^{-2}$	0.267	RP11-10A14.4	1	rs2126259	$1.33 \cdot 10^{5}$	$2.4 \cdot 10^{-2}$	$3.3 \cdot 10^{-3}$	$3.3 \cdot 10^{-13}$
5	53272664	**rs4865796**	A	G	1,013	0.662	$5.83 \cdot 10^{-2}$	$4.61 \cdot 10^{-2}$	0.206	ARL15	1	rs4865796	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.16 \cdot 10^{-12}$
3	12390484	**rs17036328**	T	C	1,013	0.182	$9.29 \cdot 10^{-2}$	$5.82 \cdot 10^{-2}$	0.111	PPARG	1	rs17036328	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3 \cdot 10^{-3}$	$3.59 \cdot 10^{-12}$
19	33899065	**rs731839**	G	A	1,013	0.656	0.118	$4.77 \cdot 10^{-2}$	$1.38 \cdot 10^{-2}$	PEPD	1	rs731839	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$5.13 \cdot 10^{-12}$
3	12116620	**rs308971**	G	A	1,013	0.888	$2.33 \cdot 10^{-2}$	$7.03 \cdot 10^{-2}$	0.741	TIMP4	1	rs308971	$1.33 \cdot 10^{5}$	$2.1 \cdot 10^{-2}$	$3.1 \cdot 10^{-3}$	$2.97 \cdot 10^{-11}$
4	106071064	**rs974801**	G	A	1,013	0.402	$1.73 \cdot 10^{-2}$	$4.62 \cdot 10^{-2}$	0.708	TET2	1	rs974801	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$3.27 \cdot 10^{-11}$
5	55806751	**rs459193**	G	A	1,013	0.67	$1.5 \cdot 10^{-2}$	$4.62 \cdot 10^{-2}$	0.746	AC022431.2	1	rs459193	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.15 \cdot 10^{-10}$
4	157683685	**rs1425486**	C	T	1,013	0.253	$7.31 \cdot 10^{-2}$	$5.1 \cdot 10^{-2}$	0.153	PDGFC	1	rs1425486	$1.33 \cdot 10^{5}$	$1.4 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$2.84 \cdot 10^{-10}$
2	27839539	rs2068834	C	T	1,013	0.305	$4.69 \cdot 10^{-2}$	$4.89 \cdot 10^{-2}$	0.338	ZNF512	1	rs2068834	$1.33 \cdot 10^{5}$	$-1.4 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$1.24 \cdot 10^{-9}$
1	219722104	rs4846565	A	G	1,013	0.37	$1.18 \cdot 10^{-2}$	$4.57 \cdot 10^{-2}$	0.797	LYPLAL1	1	rs4846565	$1.33 \cdot 10^{5}$	$-1.3 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$1.76 \cdot 10^{-9}$
1	219750717	**rs4846567**	G	T	1,013	0.3	$4.17 \cdot 10^{-2}$	$4.84 \cdot 10^{-2}$	0.388	SLC30A10	1	rs4846567	$1.33 \cdot 10^{5}$	$1.3 \cdot 10^{-2}$	$2.3 \cdot 10^{-3}$	$9.61 \cdot 10^{-9}$
12	102898446	**rs860598**	A	G	1,013	0.766	$8.19 \cdot 10^{-2}$	$5.34 \cdot 10^{-2}$	0.125	IGF1	1	rs860598	$1.33 \cdot 10^{5}$	$1.5 \cdot 10^{-2}$	$2.7 \cdot 10^{-3}$	$1.46 \cdot 10^{-8}$
4	89741269	rs3822072	G	A	1,013	0.489	$1.55 \cdot 10^{-2}$	$4.46 \cdot 10^{-2}$	0.728	FAM13A	1	rs3822072	$1.33 \cdot 10^{5}$	$-1.2 \cdot 10^{-2}$	$2.1 \cdot 10^{-3}$	$1.8 \cdot 10^{-8}$
6	34764922	**rs6912327**	T	C	1,012	0.102	$2.04 \cdot 10^{-2}$	$7.14 \cdot 10^{-2}$	0.775	UHRF1BP1	1	rs6912327	$1.33 \cdot 10^{5}$	$1.6 \cdot 10^{-2}$	$2.9 \cdot 10^{-3}$	$2.26 \cdot 10^{-8}$
4	157616767	**rs1464454**	G	A	1,012	0.278	$3.78 \cdot 10^{-2}$	$5.01 \cdot 10^{-2}$	0.451	RP11-171N4.2	1	rs1464454	$1.33 \cdot 10^{5}$	$1.2 \cdot 10^{-2}$	$2.2 \cdot 10^{-3}$	$5.11 \cdot 10^{-8}$

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