

Supplementary Table S1. Genetic characteristics of instrumental variables

SNP	Chromos	Gene name	Risk allele	Non-risk allele	PBD		p val	MAF	MetS	Glucose	Waist
					a	beta					
1 rs426706	1	AGBL4	G	T	-0.03217	0.01819	4.62E-05	0.6633	0.8573	0.5944	0.05698
2 rs12730380	1	ENSG00000233290	A	G	-0.04196	0.02013	1.56E-06	0.7546	0.7592	0.9089	0.179
3 rs2594678	1	None	A	G	-0.03452	0.01744	5.16E-06	0.5821	0.881	0.3677	0.09899
4 rs7581376	2	RASGRP3	A	G	0.03623	0.01974	2.51E-05	0.2415	0.8945	0.244	0.9329
5 rs11122900	2	ENSG00000286481	G	A	0.031408	0.01709	2.23E-05	0.488	0.5771	0.2383	0.7144
6 rs41493149	2	LRP1B	A	G	0.033424	0.01742	9.21E-06	0.4072	0.1634	0.5759	0.9266
7 rs10207472	2	None	A	G	-0.06869	0.03754	2.51E-05	0.94378	0.106	0.7601	0.534
8 rs4663424	2	None	G	A	-0.0355	0.01801	5.54E-06	0.6495	0.6314	0.1435	0.2869
9 rs372517574	3	SUMF1	G	C	0.098298	0.05558	4.68E-05	0.02271	0.663	0.4167	0.4772
10 rs62237505	3	SGO1-AS1	A	G	-0.08603	0.04816	3.88E-05	0.96492	0.3255	0.494	0.6952
11 rs6809021	3	None	G	C	0.033424	0.01896	4.94E-05	0.2794	0.9169	0.01729	0.8876
12 rs6763709	3	None	A	G	0.033021	0.0176	1.62E-05	0.3822	0.4947	0.5374	0.8267
13 rs16864262	3	MBNL1	A	T	-0.03391	0.0184	2.23E-05	0.6831	0.4213	0.6086	0.7239
14 rs559235	3	None	C	T	-0.03082	0.01728	3.96E-05	0.5447	0.8815	0.5262	0.3189
15 rs77335151	4	NIPAL1	G	A	0.074816	0.0381	5.90E-06	0.05085	0.4475	0.6151	0.4465
16 rs112852183	4	None	C	G	-0.06068	0.03288	2.13E-05	0.92375	0.2512	0.8312	0.3534
17 rs4711416	6	None	T	G	0.039811	0.0225	4.65E-05	0.1736	0.1917	0.2687	0.1898
18 rs75521460	9	None	A	G	0.049606	0.02644	1.64E-05	0.1154	0.4534	0.4677	0.6691
19 rs1922159	10	PCDH15	C	T	-0.03175	0.01711	1.93E-05	0.5245	0.6909	0.473	0.3159
20 rs644205	10	None	G	A	-0.05849	0.0293	4.25E-06	0.90176	0.1961	0.01911	0.2211
21 rs808425	10	None	G	T	0.03623	0.02026	4.11E-05	0.2264	0.5157	0.1181	0.4566
22 rs7116119	11	SLC22A9	C	T	0.03583	0.01896	1.21E-05	0.2768	0.2615	0.1388	0.1392
23 rs112382545	11	ETS1	A	G	0.05038	0.02725	2.19E-05	0.1079	0.144	0.5212	0.4999
24 rs7135559	12	PTPRQ	C	A	-0.03245	0.01758	2.14E-05	0.6075	0.547	0.3606	0.471
25 rs9509286	13	IFT88	T	G	0.032216	0.01792	3.89E-05	0.337	0.05646	0.2966	0.7691
26 rs7323767	13	None	A	G	-0.0318	0.018	4.78E-05	0.6482	0.1084	0.4323	0.713

27	rs9556416	13 SOX21-AS1	A	G	-0.04769	0.02682	4.22E-05	0.8809	0.3253	0.27	0.02921
28	rs9805972	14 LINC02307	T	C	0.041787	0.02212	1.26E-05	0.1795	0.594	0.9479	0.8336
29	rs7156733	14 SAMD4A	G	A	-0.05889	0.03324	4.52E-05	0.92547	0.3506	0.229	0.3395
30	rs11844430	14 None	T	C	-0.03306	0.01722	9.90E-06	0.5393	0.319	0.05507	0.5313
31	rs77956082	15 None	A	G	0.049606	0.02575	8.89E-06	0.1219	0.08589	0.8881	0.9342
32	rs12930358	16 RBFOX1	C	G	0.040207	0.02259	3.89E-05	0.1675	0.723	0.2881	0.3517
33	rs7185137	16 None	C	T	0.032216	0.01714	1.56E-05	0.4778	0.25	0.6352	0.5967
34	rs55747549	16 MEAK7	G	C	-0.03654	0.01992	2.39E-05	0.7512	0.8244	0.7325	0.6558
35	rs2637364	17 ASIC2	T	C	0.031408	0.01756	4.22E-05	0.3803	0.4163	0.161	0.8295
36	rs12455899	18 None	T	C	-0.04225	0.02398	4.99E-05	0.847	0.555	0.3192	0.2597
37	rs28628729	18 None	A	G	0.03583	0.02021	4.74E-05	0.2287	0.2568	0.6516	0.3574
38	rs6117294	20 CASC20	T	G	-0.0332	0.01881	4.87E-05	0.7079	0.3384	0.5871	0.3857
39	rs6095646	20 None	A	G	0.039017	0.02118	2.12E-05	0.2014	0.9802	0.8958	0.4464
40	rs6013304	20 None	A	C	-0.03863	0.01994	8.14E-06	0.7477	0.4732	0.8153	0.5697
41	rs6128258	20 None	C	T	0.037426	0.02048	2.82E-05	0.2202	0.2956	0.3893	0.5655
42	rs743492	21 TSPEAR	A	G	0.03623	0.01834	5.18E-06	0.3139	0.583	0.2909	0.5037

P value			
BP	TG	AST/ALT	HDL
0.3107	0.2779	0.05698	0.4193
0.4558	0.2831	0.179	0.7844
0.7711	0.4979	0.09899	0.9246
0.2955	0.1453	0.9329	0.828
0.7685	0.8827	0.7144	0.396
0.1963	0.1037	0.9266	0.5741
0.4547	0.4902	0.534	0.1008
0.5937	0.8964	0.2869	0.2785
0.9904	0.444	0.4772	0.8883
0.6372	0.9575	0.6952	0.6553
0.09206	0.6176	0.8876	0.5745
0.1264	0.328	0.8267	0.5163
0.3177	0.8432	0.7239	0.5871
0.194	0.5821	0.3189	0.4389
0.575	0.9024	0.4465	0.9592
0.4861	0.004604	0.3534	0.1759
0.9314	0.8605	0.1898	0.1189
0.6615	0.09482	0.6691	0.442
0.8507	0.9105	0.3159	0.1041
0.7782	0.01475	0.2211	0.3271
0.4117	0.446	0.4566	0.6905
0.7309	0.7781	0.1392	0.8404
0.7677	0.2615	0.4999	0.9518
0.4224	0.2524	0.471	0.4909
0.8582	0.5921	0.7691	0.4422
0.1188	0.1691	0.713	0.3582

0.4493	0.5356	0.02921	0.5617
0.9494	0.2459	0.8336	0.8206
0.6527	0.4446	0.3395	0.155
0.6898	0.7326	0.5313	0.007766
0.8372	0.04029	0.9342	0.08622
0.4534	0.7227	0.3517	0.0716
0.5966	0.5161	0.5967	0.9778
0.8817	0.1767	0.6558	0.7906
0.3539	0.2773	0.8295	0.1385
0.9995	0.2894	0.2597	0.01807
0.374	0.9942	0.3574	0.962
0.5989	0.8375	0.3857	0.05375
0.409	0.894	0.4464	0.2708
0.313	0.5267	0.5697	0.2551
0.7221	0.0384	0.5655	0.3077
0.6427	0.2004	0.5037	0.9612