

Supplementary Material

The Challenge of Stratifying Obesity: Attempts in the Quebec Family Study

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Table S1. List of 231 BMI-associated SNPs from the NHGRI-EBI GWAS catalog.

SNP	Minor allele	Major allele	MAF	HWE P-value	GWAS P-value	Ref
rs1000940	G	A	0.32	0.70	1.3x10-08	1
rs10132280	A	C	0.29	0.22	1.1x10-11	1
rs1016287	T	C	0.26	1.00	2.3x10-11	1
rs10182181	G	A	0.44	0.42	8.8x10-24	1
rs10733682	A	G	0.46	0.04	1.8x10-08	1
rs10938397	G	A	0.44	0.65	3.2x10-38	1
rs10968576	G	A	0.34	0.45	6.6x10-14	1
rs11030104	G	A	0.23	0.52	5.6x10-28	1
rs11057405	A	G	0.09	0.16	2.0x10-08	1
rs11126666	A	G	0.23	0.87	1.3x10-09	1
rs11165643	C	T	0.42	0.82	2.1x10-12	1
rs11170468	C	A	0.28	0.10	7.0x10-08	1
rs11191560	C	T	0.08	0.25	8.4x10-09	1
rs11583200	C	T	0.41	0.56	1.5x10-08	1
rs1167827	A	G	0.40	0.64	6.3x10-10	1
rs11688816	A	G	0.47	0.05	1.9x10-08	1
rs11727676	C	T	0.04	1.00	2.6x10-08	1
rs11847697	T	C	0.05	0.56	4.0x10-09	1
rs12286929	A	G	0.45	0.57	1.3x10-12	1
rs12401738	A	G	0.33	0.90	1.1x10-10	1
rs12429545	A	G	0.13	0.02	1.1x10-12	1
rs12446632	A	G	0.17	0.32	1.5x10-18	1
rs12566985	G	A	0.46	0.36	3.3x10-15	1
rs12885454	A	C	0.34	0.53	1.9x10-10	1
rs12940622	A	G	0.45	0.30	2.5x10-09	1
rs13021737	A	G	0.18	0.70	1.1x10-50	1
rs13078960	G	T	0.23	1.00	1.7x10-14	1
rs13107325	T	C	0.08	0.71	1.8x10-12	1
rs13191362	G	A	0.14	0.36	7.3x10-09	1
rs13201877	G	A	0.15	0.08	4.3x10-08	1
rs1441264	G	A	0.44	0.82	3.0x10-08	1
rs1460676	C	T	0.13	0.63	5.0x10-08	1
rs1516725	T	C	0.13	0.80	1.9x10-22	1
rs1528435	C	T	0.39	0.41	1.2x10-08	1
rs1558902	A	T	0.40	0.56	7.5x10-153	1
rs16851483	T	G	0.06	1.00	3.5x10-10	1
rs16907751	T	C	0.11	0.78	3.9x10-08	1
rs16951275	C	T	0.23	0.20	1.9x10-17	1
rs17001654	G	C	0.19	0.85	7.8x10-09	1
rs17024393	C	T	0.02	1.00	7.0x10-14	1
rs17094222	C	T	0.20	0.59	5.9x10-11	1
rs17203016	G	A	0.19	0.58	3.4x10-08	1
rs17405819	C	T	0.29	0.33	2.1x10-11	1
rs17724992	G	A	0.27	1.00	3.4x10-08	1
rs1808579	T	C	0.45	0.91	4.2x10-08	1
rs1928295	C	T	0.45	0.36	7.9x10-10	1
rs2033529	G	A	0.26	0.88	1.4x10-08	1
rs2033732	T	C	0.25	0.65	4.9x10-08	1
rs205262	G	A	0.27	0.31	1.8x10-10	1
rs2075650	G	A	0.10	0.75	1.2x10-08	1
rs2080454	C	A	0.34	1.00	8.6x10-09	1
rs2112347	G	T	0.37	1.00	6.2x10-17	1
rs2121279	T	C	0.09	1.00	2.3x10-08	1
rs2176040	A	G	0.36	0.46	1.0x10-08	1
rs2176598	T	C	0.29	0.49	3.0x10-08	1
rs2207139	G	A	0.14	0.82	4.1x10-29	1
rs2287019	T	C	0.15	0.38	4.6x10-18	1
rs2365389	T	C	0.44	0.49	1.6x10-10	1
rs2650492	A	G	0.28	0.89	1.9x10-09	1
rs2820292	A	C	0.42	0.25	1.8x10-10	1
rs2836754	T	C	0.37	0.54	1.6x10-08	1
rs29941	A	G	0.33	0.90	2.4x10-08	1
rs3101336	T	C	0.33	0.80	2.7x10-26	1
rs3736485	A	G	0.43	0.21	7.4x10-09	1
rs3810291	G	A	0.32	0.44	4.8x10-15	1
rs3817334	T	C	0.45	1.00	5.1x10-17	1

rs3849570	A	C	0.33	0.44	2.6x10-08	1
rs3888190	A	C	0.36	0.81	3.1x10-23	1
rs4256980	C	G	0.37	0.47	2.9x10-11	1
rs4740619	C	T	0.42	0.56	4.6x10-09	1
rs4787491	A	G	0.48	1.00	2.7x10-08	1
rs492400	C	T	0.40	0.56	6.8x10-09	1
rs543874	G	A	0.21	0.87	2.6x10-35	1
rs6091540	T	C	0.27	0.78	2.2x10-11	1
rs6465468	T	G	0.36	0.81	5.0x10-08	1
rs6477694	C	T	0.33	0.52	2.7x10-08	1
rs6567160	C	T	0.27	1.00	3.9x10-53	1
rs657452	A	G	0.40	0.16	5.5x10-13	1
rs6804842	A	G	0.42	0.82	2.5x10-09	1
rs7138803	A	G	0.38	0.55	8.2x10-24	1
rs7141420	C	T	0.48	0.21	1.2x10-14	1
rs7164727	C	T	0.31	0.90	3.9x10-09	1
rs7239883	G	A	0.41	0.24	1.5x10-08	1
rs7243357	G	T	0.16	0.14	3.9x10-08	1
rs758747	T	C	0.33	1.00	7.5x10-10	1
rs7599312	A	G	0.27	0.78	1.2x10-10	1
rs7715256	G	T	0.40	0.24	8.9x10-09	1
rs7899106	G	A	0.04	1.00	3.0x10-08	1
rs7903146	T	C	0.33	1.00	1.1x10-11	1
rs9374842	C	T	0.26	0.46	2.7x10-08	1
rs9400239	T	C	0.35	0.80	1.6x10-08	1
rs9540493	A	G	0.42	0.91	5.0x10-08	1
rs9641123	C	G	0.42	0.30	2.1x10-10	1
rs977747	T	G	0.35	1.00	2.2x10-08	1
rs9914578	G	C	0.18	0.71	2.1x10-08	1
rs9925964	G	A	0.40	0.41	8.1x10-10	1
rs1406503	C	G	0.03	1.00	9.0x10-06	2
rs1440072	C	T	0.06	1.00	4.0x10-06	2
rs17124318	G	C	0.03	0.20	6.0x10-07	2
rs2373011	G	C	0.45	0.65	9.0x10-06	2
rs817858	G	C	0.02	0.14	7.0x10-06	2
rs9906155	C	T	0.06	0.36	9.0x10-06	2
rs1106683	A	G	0.12	0.29	1.0x10-07	3
rs1106684	G	C	0.12	0.29	2.0x10-06	3
rs1333026	A	G	0.17	1.00	8.0x10-06	3
rs10789336	G	A	0.33	0.70	1.0x10-06	4
rs13130484	T	C	0.44	0.73	6.0x10-09	4
rs1321847	A	G	0.11	1.00	2.0x10-06	4
rs1514175	A	G	0.44	0.42	3.0x10-11	4
rs1561288	T	C	0.22	1.00	5.0x10-08	4
rs2236835	A	G	0.04	1.00	8.0x10-06	4
rs3936060	G	C	0.18	1.00	5.0x10-06	4
rs6107853	A	G	0.43	0.49	2.0x10-06	4
rs7234864	T	C	0.29	0.41	4.0x10-17	4
rs8005845	C	T	0.25	0.45	5.0x10-06	4
rs9940128	A	G	0.41	0.56	4.0x10-23	4
rs1024889	G	A	0.29	0.89	6.0x10-06	5
rs1152846	T	C	0.25	0.18	3.0x10-06	5
rs12517906	T	C	0.22	0.14	6.0x10-06	5
rs1458095	T	C	0.07	0.68	7.0x10-06	5
rs1878047	G	A	0.36	0.11	5.0x10-06	5
rs1927702	C	T	0.46	0.91	6.0x10-06	5
rs2383393	A	G	0.36	0.81	2.0x10-06	5
rs3803915	A	C	0.10	0.19	5.0x10-06	5
rs3934834	T	C	0.13	0.46	6.0x10-07	5
rs824931	C	T	0.37	0.90	3.0x10-06	5
rs10458787	A	G	0.22	0.87	1.0x10-06	6
rs2275215	C	T	0.31	1.00	4.0x10-07	6
rs1121980	A	G	0.41	0.64	4.0x10-08	7
rs10136789	C	T	0.11	0.76	5.0x10-07	8
rs10889850	T	G	0.39	0.81	2.0x10-06	8
rs12693973	G	T	0.28	0.33	2.0x10-06	8
rs12964056	A	G	0.29	0.41	7.0x10-07	8
rs1542829	A	G	0.06	0.10	1.0x10-08	8
rs2016586	T	G	0.36	0.11	3.0x10-06	8
rs8050136	A	C	0.38	0.47	1.0x10-07	8
rs8192472	T	C	0.37	0.27	1.0x10-06	8
rs2033195	C	T	0.40	0.16	6.0x10-06	9

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rs6794092	A	G	0.02	1.00	2.0x10-06	9
rs10993160	G	A	0.03	1.00	6.0x10-07	10
rs12149832	A	G	0.40	0.24	5.0x10-22	10
rs13034723	A	G	0.43	0.42	2.0x10-08	10
rs2206734	T	C	0.15	0.67	1.0x10-11	10
rs2331841	A	G	0.47	0.73	2.0x10-11	10
rs4377469	G	T	0.11	1.00	2.0x10-07	10
rs516636	T	G	0.20	0.86	3.0x10-09	10
rs3096490	A	G	0.37	0.33	5.0x10-07	11
rs955423	C	A	0.42	1.00	3.0x10-07	11
rs10150332	C	T	0.21	0.32	3.0x10-11	12
rs10767664	T	A	0.23	0.26	5.0x10-26	12
rs12444979	T	C	0.17	0.32	3.0x10-21	12
rs13078807	G	A	0.23	0.88	4.0x10-11	12
rs1555543	A	C	0.42	0.64	4.0x10-10	12
rs206936	G	A	0.21	0.39	3.0x10-08	12
rs2241423	A	G	0.22	0.25	1.0x10-18	12
rs2444217	G	A	0.39	0.72	9.0x10-08	12
rs255414	G	A	0.18	0.57	1.0x10-06	12
rs2815752	G	A	0.33	0.80	2.0x10-22	12
rs2867125	T	C	0.18	1.00	3.0x10-49	12
rs2890652	C	T	0.13	0.81	1.0x10-10	12
rs2922763	G	T	0.26	0.77	6.0x10-08	12
rs3764400	C	T	0.14	0.33	4.0x10-07	12
rs4771122	G	A	0.29	0.22	9.0x10-10	12
rs4836133	C	A	0.47	0.65	2.0x10-09	12
rs4929949	C	T	0.49	0.74	3.0x10-09	12
rs571312	A	C	0.27	1.00	6.0x10-42	12
rs713586	C	T	0.43	0.57	6.0x10-22	12
rs7359397	T	C	0.36	0.81	2.0x10-20	12
rs867559	G	A	0.17	0.84	1.0x10-07	12
rs887912	T	C	0.26	0.88	2.0x10-12	12
rs9816226	A	T	0.18	0.56	2.0x10-18	12
rs10783050	C	T	0.38	0.90	4.0x10-06	13
rs10913469	C	T	0.21	0.49	6.0x10-08	13
rs12970134	A	G	0.29	0.68	1.0x10-12	13
rs6265	T	C	0.21	0.74	5.0x10-10	13
rs6499640	G	A	0.42	0.56	4.0x10-13	13
rs7481311	T	C	0.23	0.27	8.0x10-06	13
rs7561317	A	G	0.17	0.84	4.0x10-17	13
rs7647305	T	C	0.21	1.00	7.0x10-11	13
rs925946	T	G	0.30	0.79	9.0x10-10	13
rs10769908	C	T	0.49	0.74	1.0x10-06	14
rs10838738	G	A	0.36	0.62	5.0x10-09	14
rs11084753	A	G	0.34	1.00	2.0x10-08	14
rs12324805	C	A	0.31	0.59	7.0x10-06	14
rs17782313	C	T	0.27	0.78	5.0x10-18	14
rs2145270	C	T	0.35	0.90	6.0x10-06	14
rs6548238	T	C	0.18	1.00	1.0x10-18	14
rs7498665	G	A	0.36	0.81	5.0x10-11	14
rs9939609	A	T	0.38	0.23	4.0x10-51	14
rs10904363	C	G	0.05	1.00	3.0x10-06	15
rs4432245	C	T	0.05	0.49	1.0x10-06	15
rs7202116	G	A	0.38	0.23	2.0x10-10	16
rs11075990	G	A	0.38	0.23	2.0x10-51	17
rs2030323	A	C	0.23	0.26	6.0x10-10	17
rs2568958	G	A	0.33	0.80	2.0x10-14	17
rs2903492	G	A	0.18	0.70	6.0x10-15	17
rs633715	C	T	0.20	1.00	5.0x10-12	17
rs8089364	C	T	0.30	0.69	4.0x10-21	17
rs987237	G	A	0.16	1.00	2.0x10-11	17
rs10261878	A	C	0.04	1.00	1.0x10-10	18
rs17817964	T	C	0.39	0.19	1.0x10-10	18
rs348495	A	G	0.41	0.08	2.0x10-10	18
rs7586879	T	C	0.32	0.09	4.0x10-08	18
rs7708584	A	G	0.40	0.24	5.0x10-14	18
rs974417	T	C	0.14	1.00	6.0x10-06	18
rs62033400	G	A	0.39	0.29	2.0x10-14	19
rs939583	C	T	0.18	0.70	1.0x10-07	19
rs2607292	T	C	0.10	0.76	4.0x10-06	20
rs2967951	T	C	0.12	1.00	1.0x10-06	20

rs933117	A	G	0.07	0.39	6.0x10-06	20
rs11142387	A	C	0.46	0.21	3.0x10-08	21
rs11191580	C	T	0.08	0.26	4.0x10-08	21
rs11671664	A	G	0.08	0.13	3.0x10-12	21
rs12463617	A	C	0.18	0.70	2.0x10-12	21
rs12597579	T	C	0.06	0.29	6.0x10-07	21
rs16858082	C	T	0.41	0.08	4.0x10-09	21
rs2237892	T	C	0.06	0.61	9.0x10-13	21
rs2531995	C	T	0.38	0.06	7.0x10-08	21
rs2535633	G	C	0.42	0.91	2.0x10-10	21
rs261967	C	A	0.41	0.56	8.0x10-13	21
rs4776970	T	A	0.36	0.46	3.0x10-07	21
rs4854307	C	T	0.06	1.00	2.0x10-06	21
rs574367	T	G	0.21	1.00	2.0x10-19	21
rs591166	A	T	0.46	0.82	7.0x10-14	21
rs6545814	G	A	0.42	0.11	1.0x10-10	21
rs6893807	G	A	0.19	0.58	1.0x10-06	21
rs888789	G	A	0.47	0.91	4.0x10-06	21
rs9356744	C	T	0.29	0.89	5.0x10-13	21
rs9473924	T	G	0.25	0.55	4.0x10-07	21
rs9568867	A	G	0.13	0.02	4.0x10-06	21
rs652722	T	C	0.23	0.53	8.0x10-08	22

A total of 163 significant BMI-associated SNPs ($P < 5 \times 10^{-8}$) and 68 SNPs near-significant BMI-associated ($P < 1 \times 10^{-6}$) were selected from 16 previous GWAS (1–16) and 6 GWAS meta-analysis (17–22). SNP: single nucleotide polymorphism. Ref points to the original study reference. MAF: minor allele frequency in the cohort of 881 QFS participants. HWE P-value: Hardy Weinberg equilibrium P-value. GWAS P-value: original P-value of association with BMI. Grey-shaded SNPs were excluded based on HWE or MAF criteria.

Table S2. Association results of 231 BMI-associated SNPs to obesity in the Quebec Family Study discovery sample

SNP	Reported gene	Position	Minor allele	Major allele	β	(SE)	X^2	(P-value)
rs1000940	RABEP1	17:5223976	G	A	-0.11	(0.16)	0.45	(0.504)
rs10132280	STXBP6	14:24998019	A	C	-0.08	(0.17)	0.23	(0.633)
rs10136789	KCNH5	14:62889535	C	T	0.53	(0.24)	4.87	(0.027)
rs10150332	NRXN3	14:79470621	C	T	0.10	(0.19)	0.32	(0.573)
rs1016287	LINC01122	2:59159129	T	C	0.26	(0.17)	2.37	(0.123)
rs10182181	ADCY3	2:25003800	G	A	0.00	(0.15)	0.00	(0.974)
rs1024889	NR	3:70414179	G	A	0.09	(0.16)	0.29	(0.588)
rs10261878	MIR148A	7:25910925	A	C	0.19	(0.40)	0.24	(0.626)
rs10458787	intergenic	10:4613373	A	G	0.04	(0.19)	0.04	(0.851)
rs10733682	LMX1B	9:128500735	A	G	0.19	(0.15)	1.57	(0.211)
rs10767664	BDNF	11:27704439	T	A	0.06	(0.18)	0.10	(0.756)
rs10769908	STK33	11:8462542	C	T	0.01	(0.15)	0.01	(0.936)
rs10783050	NR	1:96571527	C	T	0.04	(0.16)	0.05	(0.817)
rs10789336	NEGR1	1:72372723	G	A	-0.10	(0.16)	0.37	(0.542)
rs10838738	MTCH2	11:47641497	G	A	0.12	(0.15)	0.59	(0.441)
rs10889850	LRRC7	1:69741396	T	G	-0.06	(0.16)	0.13	(0.720)
rs10904363	AKR1CL2	10:4878221	C	G	0.56	(0.34)	2.69	(0.101)
rs10913469	RASAL2	1:177944384	C	T	-0.03	(0.19)	0.03	(0.872)
rs10938397	GNPDA2	4:44877284	G	A	0.19	(0.15)	1.51	(0.219)
rs10968576	LINGO2	9:28404339	G	A	-0.37	(0.17)	4.89	(0.027)
rs10993160	ZNF169	9:94306644	G	A	0.05	(0.44)	0.01	(0.908)
rs11030104	BDNF	11:27641093	G	A	0.09	(0.18)	0.23	(0.634)
rs11057405	CLIP1	12:121347850	A	G	-0.27	(0.28)	0.89	(0.345)
rs1106683	intergenic	7:131768766	A	G	0.07	(0.24)	0.08	(0.776)
rs1106684	intergenic	7:131768906	G	C	0.07	(0.24)	0.08	(0.776)
rs11075990	FTO	16:53785981	G	A	0.47	(0.15)	9.53	(0.002)
rs11084753	KCTD15	19:33831232	A	G	0.08	(0.16)	0.24	(0.625)
rs11126666	KCNK3	2:26782315	A	G	0.11	(0.18)	0.35	(0.556)
rs11142387	KLF9	9:70383416	A	C	-0.01	(0.15)	0.00	(0.972)
rs11165643	PTBP2	1:96696685	C	T	0.13	(0.15)	0.79	(0.374)
rs11170468	CPNE8	12:37716315	C	A	-0.17	(0.17)	0.99	(0.319)
rs11191560	NT5C2	10:104859028	C	T	0.21	(0.27)	0.64	(0.425)
rs11191580	NT5C2	10:103146454	C	T	0.20	(0.27)	0.56	(0.455)
rs1121980	FTO	16:53775335	A	G	0.38	(0.15)	6.41	(0.011)
rs1152846	NR	3:188703109	T	C	-0.05	(0.17)	0.10	(0.747)
rs11583200	ELAVL4	1:50332407	C	T	0.15	(0.15)	0.95	(0.330)
rs11671664	GIPR	19:45669020	A	G	0.00	(0.26)	0.00	(0.989)
rs1167827	HIP1	7:75001105	A	G	0.04	(0.16)	0.06	(0.810)
rs11688816	EHBP1	2:62906552	A	G	-0.02	(0.15)	0.03	(0.872)
rs11727676	HHIP	4:145878514	C	T	0.09	(0.36)	0.06	(0.800)
rs11847697	PRKD1	14:29584863	T	C	-0.44	(0.41)	1.13	(0.288)
rs12149832	FTO	16:53808996	A	G	0.52	(0.15)	12.00	(0.001)
rs12286929	CADM1	11:114527614	A	G	-0.02	(0.15)	0.02	(0.902)
rs12324805	RKHD3	15:82059859	C	A	0.27	(0.16)	2.95	(0.086)
rs12401738	FUBP1	1:78219349	A	G	0.14	(0.16)	0.76	(0.383)
rs12429545	OLFM4	13:53000207	A	G	-0.04	(0.22)	0.04	(0.850)
rs12444979	GPRC5B	16:19922278	T	C	-0.33	(0.21)	2.40	(0.121)
rs12446632	GPRC5B	16:19842890	A	G	-0.33	(0.21)	2.42	(0.120)
rs12463617	TMEM18	2:629244	A	C	-0.54	(0.20)	7.08	(0.008)
rs12517906	NR	5:180743819	T	C	-0.04	(0.18)	0.06	(0.808)
rs12566985	FPGT-TNNI3K	1:74774781	G	A	0.11	(0.15)	0.50	(0.478)
rs12597579	GP2	16:20246545	T	C	0.02	(0.30)	0.01	(0.940)
rs12693973	GALNT13	2:154314627	G	T	0.13	(0.17)	0.58	(0.446)
rs12885454	PRKD1	14:28806589	A	C	-0.22	(0.16)	1.83	(0.176)
rs12940622	RPTOR	17:76230166	A	G	-0.02	(0.15)	0.03	(0.874)
rs12964056	MC4R	18:60006567	A	G	0.30	(0.16)	3.35	(0.067)
rs12970134	MC4R	18:60217517	A	G	0.34	(0.16)	4.15	(0.042)
rs13021737	TMEM18	2:622348	A	G	-0.52	(0.20)	6.49	(0.011)
rs13034723	KLF9	2:190120954	A	G	-0.09	(0.15)	0.35	(0.554)
rs13078807	CADM2	3:85835000	G	A	0.06	(0.18)	0.11	(0.736)
rs13078960	CADM2	3:85890280	G	T	0.07	(0.18)	0.15	(0.702)
rs13107325	SLC39A8	4:103407732	T	C	0.24	(0.29)	0.70	(0.404)
rs13130484	GNPDA2	4:45173674	T	C	0.20	(0.15)	1.66	(0.198)
rs13191362	PARK2	6:162953340	G	A	0.15	(0.22)	0.49	(0.484)
rs13201877	IFNGR1	6:137717234	G	A	-0.04	(0.22)	0.03	(0.857)

rs1321847	ELOVL4	6:79823470	A	G	0.16	(0.24)	0.45	(0.503)
rs1333026	intergenic	13:65546652	A	G	-0.64	(0.23)	8.07	(0.005)
rs1406503	ZNF804B	7:88931564	C	G	-0.44	(0.43)	1.03	(0.310)
rs1440072	KCNE4	2:223072020	C	T	-0.09	(0.30)	0.10	(0.755)
rs1441264	MIR548A2	13:78478920	G	A	-0.05	(0.15)	0.09	(0.763)
rs1458095	NR	11:81274505	T	C	-0.45	(0.32)	2.06	(0.151)
rs1460676	FIGN	2:164275935	C	T	0.43	(0.22)	3.88	(0.049)
rs1514175	TNNI3K	1:74525960	A	G	0.12	(0.15)	0.61	(0.435)
rs1516725	ETV5	3:187306698	T	C	-0.12	(0.23)	0.27	(0.602)
rs1528435	UBE2E3	2:181259207	C	T	-0.19	(0.15)	1.50	(0.221)
rs1542829	COL6A5	3:130418627	A	G	-0.05	(0.30)	0.03	(0.863)
rs1555543	PTBP2	1:96479241	A	C	0.10	(0.15)	0.43	(0.511)
rs1558902	FTO	16:52361075	A	T	0.40	(0.15)	7.13	(0.008)
rs1561288	POMC	2:25146133	T	C	-0.16	(0.19)	0.71	(0.400)
rs16851483	RASA2	3:142758126	T	G	-0.32	(0.38)	0.69	(0.405)
rs16858082	GNPDA2	4:45173787	C	T	0.00	(0.15)	0.00	(0.981)
rs16907751	ZBTB10	8:81538012	T	C	-0.12	(0.28)	0.18	(0.671)
rs16951275	MAP2K5	15:65864222	C	T	-0.24	(0.18)	1.74	(0.187)
rs17001654	SCARB2	4:77348592	G	C	0.44	(0.19)	5.50	(0.019)
rs17024393	GNAT2	1:109956211	C	T	0.11	(0.58)	0.03	(0.855)
rs17094222	HIF1AN	10:102385430	C	T	-0.04	(0.18)	0.06	(0.804)
rs17124318	ATG4C	1:63015059	G	C	0.00	(0.42)	0.00	(0.991)
rs17203016	CREB1	2:207963763	G	A	-0.05	(0.20)	0.05	(0.819)
rs17405819	HNF4G	8:76969139	C	T	0.13	(0.17)	0.58	(0.448)
rs17724992	PGPEP1	19:18315825	G	A	-0.16	(0.17)	0.91	(0.341)
rs17782313	MC4R	18:60183864	C	T	0.24	(0.17)	2.06	(0.151)
rs17817964	FTO	16:53794154	T	C	0.45	(0.15)	9.04	(0.003)
rs1808579	C18orf8	18:19358886	T	C	0.10	(0.15)	0.42	(0.516)
rs1878047	NR	19:51270548	G	A	0.04	(0.16)	0.08	(0.778)
rs1927702	NR	9:15986718	C	T	-0.14	(0.16)	0.84	(0.360)
rs1928295	TLR4	9:119418304	C	T	-0.06	(0.15)	0.16	(0.690)
rs2016586	APOL5	22:35729217	T	G	-0.15	(0.16)	0.86	(0.353)
rs2030323	BDNF	11:27706992	A	C	0.06	(0.18)	0.10	(0.756)
rs2033195	GALNT10	5:154130036	C	T	0.11	(0.16)	0.50	(0.480)
rs2033529	TDRG1	6:40456631	G	A	0.16	(0.17)	0.96	(0.328)
rs2033732	RALYL	8:85242264	T	C	0.14	(0.18)	0.64	(0.425)
rs205262	C6orf106	6:34671142	G	A	-0.04	(0.17)	0.06	(0.803)
rs206936	HMGA1	6:34335092	G	A	0.15	(0.19)	0.60	(0.437)
rs2075650	TOMM40	19:50087459	G	A	-0.17	(0.26)	0.45	(0.504)
rs2080454	CBLN1	16:47620091	C	A	0.04	(0.16)	0.06	(0.813)
rs2112347	POC5	5:75050998	G	T	0.21	(0.16)	1.73	(0.188)
rs2121279	LRP1B	2:142759755	T	C	0.40	(0.26)	2.36	(0.124)
rs2145270	BMP2	20:6641038	C	T	-0.18	(0.16)	1.26	(0.262)
rs2176040	LOC646736	2:226801046	A	G	-0.10	(0.16)	0.40	(0.528)
rs2176598	HSD17B12	11:43820854	T	C	0.07	(0.17)	0.18	(0.673)
rs2206734	CDKAL1	6:20694653	T	C	-0.08	(0.21)	0.15	(0.697)
rs2207139	TFAP2B	6:50953449	G	A	0.51	(0.20)	6.69	(0.010)
rs2236835	PAX7	1:18663757	A	G	-0.18	(0.40)	0.21	(0.649)
rs2237892	KCNQ1	11:2818521	T	C	-0.16	(0.35)	0.20	(0.655)
rs2241423	LBXCOR1	15:67794500	A	G	-0.22	(0.18)	1.45	(0.229)
rs2275215	LAMA2	6:129540247	C	T	0.24	(0.16)	2.19	(0.139)
rs2287019	QPCTL	19:50894012	T	C	-0.24	(0.22)	1.26	(0.263)
rs2331841	MC4R	18:60161404	A	G	0.12	(0.15)	0.69	(0.406)
rs2365389	FHIT	3:61211502	T	C	-0.16	(0.15)	1.12	(0.290)
rs2373011	ANKS1B	12:99567571	G	C	0.07	(0.15)	0.23	(0.634)
rs2383393	NR	4:179743500	A	G	-0.21	(0.16)	1.82	(0.177)
rs2444217	ADCY9	16:3988386	G	A	-0.07	(0.16)	0.19	(0.661)
rs2531995	ADCY9	16:3963466	C	T	0.03	(0.16)	0.03	(0.873)
rs2535633	ITIH4	3:52825614	G	C	-0.04	(0.15)	0.06	(0.808)
rs255414	HTR1A	5:63522073	G	A	0.04	(0.20)	0.04	(0.833)
rs2568958	NEGR1	1:72299433	G	A	-0.03	(0.16)	0.03	(0.870)
rs2607292	MARCH6	5:10372506	T	C	-0.16	(0.25)	0.44	(0.506)
rs261967	PCSK1	5:96514546	C	A	-0.03	(0.16)	0.03	(0.866)
rs2650492	SBK1	16:28240912	A	G	-0.17	(0.17)	1.00	(0.318)
rs2815752	NEGR1	1:72346757	G	A	-0.03	(0.16)	0.03	(0.854)
rs2820292	NAV1	1:200050910	A	C	-0.12	(0.15)	0.66	(0.415)
rs2836754	ETS2	21:39213610	T	C	-0.09	(0.16)	0.36	(0.551)
rs2867125	TMEM18	2:622827	T	C	-0.54	(0.20)	6.91	(0.009)
rs2890652	LRP1B	2:142202362	C	T	0.22	(0.22)	1.02	(0.312)
rs2903492	TMEM18	2:624678	G	A	-0.56	(0.20)	7.46	(0.006)
rs2922763	HNF4G	8:75661476	G	T	0.11	(0.18)	0.42	(0.519)
rs2967951	ROPN1L	5:10463995	T	C	-0.07	(0.22)	0.09	(0.760)

Supplementary Material

rs29941	KCTD15	19:39001372	A	G	0.32 (0.16)	4.20 (0.040)
rs3096490	COL25A1	4:109057975	A	G	0.18 (0.15)	1.33 (0.250)
rs3101336	NEGR1	1:72523773	T	C	-0.03 (0.16)	0.03 (0.870)
rs348495	GNPDA2	4:45182425	A	G	0.00 (0.15)	0.00 (0.981)
rs3736485	DMXL2	15:49535902	A	G	0.09 (0.15)	0.32 (0.570)
rs3764400	CBX1	17:48046570	C	T	0.28 (0.21)	1.69 (0.194)
rs3803915	NR	19:2160530	A	C	-0.46 (0.26)	3.09 (0.079)
rs3810291	ZC3H4	19:52260843	G	A	0.07 (0.17)	0.18 (0.672)
rs3817334	MTCH2	11:47607569	T	C	0.06 (0.15)	0.18 (0.668)
rs3849570	GBE1	3:81874802	A	C	-0.06 (0.16)	0.14 (0.704)
rs3888190	ATP2A1	16:28796987	A	C	-0.04 (0.16)	0.06 (0.813)
rs3934834	NR	1:1070426	T	C	0.12 (0.22)	0.31 (0.575)
rs3936060	ZNF608	5:125011395	G	C	-0.08 (0.19)	0.16 (0.689)
rs4256980	TRIM66	11:8630515	C	G	-0.09 (0.16)	0.36 (0.551)
rs4377469	CCK	3:42261582	G	T	-0.01 (0.24)	0.00 (0.966)
rs4432245	EIF2AK4	15:40032280	C	T	0.10 (0.34)	0.09 (0.760)
rs4740619	C9orf93	9:15624326	C	T	0.09 (0.16)	0.35 (0.555)
rs4771122	GTF3A	13:27446043	G	A	0.07 (0.16)	0.17 (0.680)
rs4776970	MAP2K5	15:67788548	T	A	-0.36 (0.16)	4.86 (0.028)
rs4787491	INO80E	16:29922838	A	G	0.04 (0.16)	0.06 (0.808)
rs4836133	ZNF608	5:124996410	C	A	-0.16 (0.15)	1.02 (0.312)
rs4854307	intergenic	2:443281	C	T	-0.14 (0.35)	0.16 (0.692)
rs492400	USP37	2:219057996	C	T	0.12 (0.15)	0.64 (0.422)
rs4929949	RPL27A	11:8583046	C	T	0.02 (0.15)	0.03 (0.868)
rs516636	SEC16B	1:177886382	T	G	-0.11 (0.19)	0.34 (0.558)
rs543874	SEC16B	1:176156103	G	A	-0.09 (0.19)	0.21 (0.644)
rs571312	MC4R	18:60172536	A	C	0.23 (0.17)	1.88 (0.171)
rs574367	SEC16B	1:177904075	T	G	-0.13 (0.19)	0.44 (0.509)
rs591166	MC4R	18:60174356	A	T	0.15 (0.15)	0.97 (0.324)
rs6091540	ZFP64	20:50521269	T	C	-0.19 (0.17)	1.23 (0.267)
rs6107853	BMP2	20:6629230	A	G	-0.02 (0.15)	0.02 (0.891)
rs62033400	FTO	16:53777876	G	A	0.46 (0.15)	9.27 (0.002)
rs6265	BDNF	11:27658369	T	C	0.16 (0.18)	0.77 (0.382)
rs633715	SEC16B	1:177883445	C	T	-0.12 (0.20)	0.36 (0.548)
rs6465468	ASB4	7:95007450	T	G	0.02 (0.16)	0.02 (0.884)
rs6477694	EPB41L4B	9:110972163	C	T	0.13 (0.16)	0.61 (0.436)
rs6499640	FTO	16:53735765	G	A	-0.54 (0.16)	11.19 (0.001)
rs652722	PAX6	11:31883988	T	C	0.18 (0.18)	0.93 (0.334)
rs6545814	ADCY3	2:24908447	G	A	0.00 (0.15)	0.00 (0.995)
rs6548238	TMEM18	2:634905	T	C	-0.45 (0.20)	4.86 (0.027)
rs6567160	MC4R	18:55980115	C	T	0.22 (0.17)	1.78 (0.183)
rs657452	AGBL4	1:49362434	A	G	0.40 (0.15)	7.11 (0.008)
rs6794092	PP13439	3:171840554	A	G	0.89 (0.58)	2.33 (0.127)
rs6804842	RARB	3:25081441	A	G	0.06 (0.15)	0.14 (0.708)
rs6893807	LINC00461	5:88669203	G	A	-0.34 (0.20)	2.83 (0.093)
rs713586	ADCY3	2:24935139	C	T	0.01 (0.15)	0.01 (0.921)
rs7138803	BCDIN3D	12:48533735	A	G	-0.03 (0.16)	0.03 (0.866)
rs7141420	NRXN3	14:78969207	C	T	-0.14 (0.15)	0.89 (0.344)
rs7164727	LOC100287559	15:70881044	C	T	-0.18 (0.17)	1.13 (0.288)
rs7202116	FTO	16:53787703	G	A	0.47 (0.15)	9.53 (0.002)
rs7234864	MC4R	18:60067625	T	C	0.16 (0.17)	0.88 (0.348)
rs7239883	LOC284260	18:38401669	G	A	-0.10 (0.15)	0.42 (0.519)
rs7243357	GRP	18:55034299	G	T	-0.11 (0.21)	0.28 (0.600)
rs7359397	AC138894.2	16:28874338	T	C	-0.03 (0.16)	0.03 (0.854)
rs7481311	BDNF	11:27561582	T	C	0.35 (0.18)	3.49 (0.062)
rs7498665	SH2B1	16:28871920	G	A	-0.04 (0.16)	0.06 (0.813)
rs7561317	TMEM18	2:644953	A	G	-0.43 (0.20)	4.44 (0.035)
rs7586879	ADCY3	2:24894108	T	C	0.10 (0.16)	0.39 (0.535)
rs758747	NLRC3	16:3567359	T	C	0.18 (0.16)	1.23 (0.267)
rs7599312	ERBB4	2:213121476	A	G	-0.33 (0.18)	3.40 (0.065)
rs7647305	DGKG	3:186116501	T	C	-0.09 (0.18)	0.22 (0.639)
rs7708584	GALNT10	5:154163906	A	G	0.10 (0.16)	0.41 (0.524)
rs7715256	GALNT10	5:153518086	G	T	0.10 (0.16)	0.41 (0.524)
rs7899106	GRID1	10:87400884	G	A	0.07 (0.34)	0.04 (0.840)
rs7903146	TCF7L2	10:114748339	T	C	-0.20 (0.17)	1.49 (0.222)
rs8005845	SERPINA3	14:94628060	C	T	0.19 (0.17)	1.29 (0.257)
rs8050136	FTO	16:53782363	A	C	0.46 (0.15)	9.26 (0.002)
rs8089364	MC4R	18:60191596	C	T	0.34 (0.16)	4.24 (0.039)
rs817858	RAD23B	9:107363530	G	C	-1.03 (0.62)	2.77 (0.096)
rs8192472	CCK	3:42258378	T	C	0.06 (0.16)	0.13 (0.715)
rs824931	NR	2:221936980	C	T	0.26 (0.16)	2.85 (0.091)

rs867559	LMX1B	9:126703046	G	A	-0.14 (0.21)	0.50 (0.482)
rs887912	FANCL	2:59075742	T	C	0.26 (0.17)	2.22 (0.136)
rs888789	FLJ35779	5:75692544	G	A	0.11 (0.16)	0.46 (0.496)
rs925946	BDNF	11:27645655	T	G	0.34 (0.17)	4.12 (0.042)
rs933117	GRIK1	21:29728478	A	G	-0.10 (0.31)	0.11 (0.741)
rs9356744	CDKAL1	6:20685255	C	T	0.12 (0.17)	0.52 (0.469)
rs9374842	LOC285762	6:120227364	C	T	-0.22 (0.18)	1.49 (0.222)
rs939583	TMEM18	2:622531	C	T	-0.56 (0.20)	7.46 (0.006)
rs9400239	FOXO3	6:109084356	T	C	0.02 (0.16)	0.01 (0.906)
rs9473924	TFAP2B	6:50866444	T	G	0.31 (0.17)	3.43 (0.064)
rs9540493	MIR548X2	13:65103705	A	G	-0.13 (0.15)	0.72 (0.396)
rs955423	TENM2	5:166292645	C	A	-0.08 (0.15)	0.25 (0.618)
rs9568867	OLFM4	13:53533217	A	G	-0.02 (0.22)	0.01 (0.931)
rs9641123	CALCR	7:93035668	C	G	-0.24 (0.16)	2.28 (0.131)
rs974417	KLHL32	6:96971722	T	C	-0.02 (0.22)	0.01 (0.916)
rs977747	TAL1	1:47457264	T	G	-0.18 (0.16)	1.29 (0.256)
rs9816226	ETV5	3:186116710	A	T	-0.11 (0.20)	0.30 (0.587)
rs987237	TFAP2B	6:50835337	G	A	0.38 (0.19)	3.88 (0.049)
rs9906155	NR	17:77705615	C	T	0.41 (0.29)	1.96 (0.162)
rs9914578	SMG6	17:1951886	G	C	0.11 (0.20)	0.34 (0.557)
rs9925964	KAT8	16:31037396	G	A	-0.03 (0.15)	0.05 (0.817)
rs9939609	FTO	16:53786615	A	T	0.47 (0.15)	9.53 (0.002)
rs9940128	FTO	16:53766842	A	G	0.38 (0.15)	6.44 (0.011)

SNPs are listed by NCBI's rs number. Grey-shaded SNPs correspond to SNPs having a significant association with obesity, defined as a binary variable (body mass index $\geq 30\text{kg/m}^2$), in the Quebec Family Study (QFS) discovery sample. SNP: single nucleotide polymorphism. Reported gene: gene reported by authors in the NHGRI-EBI GWAS Catalog. Position: SNP localization (chromosome:base pair) in the reference genome GRCh38/hg38. χ^2 corresponds to the association results with obesity. β (SE): beta coefficient of association and standard error.

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