

**Supplementary Table 19.** Bonferroni significant results of gene-based association analyses for the GWAS meta-analysis of AUDIT-C

Gene name	Z score	Effect size	P value	expression	ctd	perfected	perfo	Ps used	( covarian	Ps model	rain tissue
MAPT	5.919	0.021	3.24E-09	0.058	0.076	1.56E-03	16	16	16		cerebellum
CRHR1-IT1	-5.840	-0.011	5.23E-09	0.190	0.291	1.63E-09	24	24	24		rontal cortex
PLEKHM1	5.718	0.007	1.08E-08	0.472	0.562	1.02E-28	45	45	45		cerebellum
SPPL2C	-5.699	-0.010	1.21E-08	0.233	0.358	5.43E-15	38	38	38		cerebellum
.RRC37A4	5.697	0.007	1.22E-08	0.436	0.574	2.09E-23	23	23	23		us accumbens
11-259G1	-5.694	-0.006	1.24E-08	0.605	0.605	8.86E-28	70	70	70		cortex
DND1P1	-5.693	-0.011	1.25E-08	0.177	0.320	2.66E-09	19	19	19		ypothalamus
11-707O2	-5.682	-0.008	1.33E-08	0.296	0.478	1.30E-19	22	22	22		us accumbens
LRRC37A2	-5.681	-0.007	1.34E-08	0.506	0.638	1.46E-34	40	40	40		cerebellum
11-707O2	-5.659	-0.009	1.52E-08	0.282	0.504	1.92E-17	22	22	22		ippocampus
DND1P1	-5.644	-0.008	1.66E-08	0.291	0.461	3.42E-19	10	10	10		caudate
ARHGAP2	-5.643	-0.012	1.67E-08	0.143	0.192	1.27E-06	27	27	27		us accumbens
ARL17A	-5.625	-0.010	1.85E-08	0.213	0.295	2.77E-10	29	29	29		us accumbens
11-259G1	-5.616	-0.009	1.95E-08	0.233	0.365	2.04E-13	47	47	47		cortex
11-259G1	-5.598	-0.008	2.17E-08	0.302	0.527	3.17E-17	23	23	23		putamen
.RRC37A4	5.572	0.007	2.52E-08	0.473	0.546	3.55E-20	44	44	44		ippocampus
.RRC37A4	5.565	0.008	2.63E-08	0.299	0.356	3.49E-15	428	428	428		ypothalamus
DND1P1	-5.560	-0.008	2.70E-08	0.316	0.432	9.56E-15	22	22	22		r cingulate cortex
CRHR1-IT1	-5.549	-0.007	2.87E-08	0.406	0.486	1.10E-17	24	24	24		putamen
11-259G1	-5.546	-0.007	2.92E-08	0.477	0.556	1.29E-27	44	44	44		cerebellum
11-259G1	-5.539	-0.007	3.04E-08	0.481	0.579	7.78E-30	44	44	44		cerebellum
ARL17A	-5.531	-0.007	3.19E-08	0.447	0.600	4.74E-31	37	37	37		cerebellum
11-259G1	-5.530	-0.008	3.21E-08	0.327	0.547	1.87E-19	39	39	39		r cingulate cortex
11-259G1	-5.524	-0.007	3.32E-08	0.404	0.333	6.89E-17	56	56	56		caudate
11-707O2	-5.517	-0.007	3.45E-08	0.368	0.554	7.83E-27	16	16	16		cerebellum
11-259G1	-5.514	-0.008	3.50E-08	0.326	0.513	1.40E-19	24	24	24		us accumbens
11-707O2	-5.511	-0.008	3.57E-08	0.233	0.438	1.11E-15	18	18	18		rontal cortex
DND1P1	-5.501	-0.007	3.77E-08	0.357	0.420	4.71E-15	20	20	20		us accumbens
CRHR1-IT1	-5.491	-0.009	4.00E-08	0.267	0.385	5.17E-13	35	35	35		r cingulate cortex
11-259G1	-5.487	-0.008	4.09E-08	0.242	0.395	3.86E-13	13	13	13		rontal cortex
11-259G1	-5.479	-0.007	4.27E-08	0.380	0.415	1.74E-13	35	35	35		rontal cortex
11-259G1	-5.467	-0.007	4.58E-08	0.423	0.532	4.86E-23	34	34	34		caudate
.RRC37A4	5.458	0.007	4.81E-08	0.449	0.546	3.90E-18	42	43	43		putamen
11-259G1	-5.454	-0.009	4.91E-08	0.241	0.475	6.68E-15	20	20	20		ypothalamus
.RRC37A4	5.446	0.006	5.16E-08	0.616	0.735	1.50E-36	40	40	40		r cingulate cortex
.RRC37A4	5.426	0.007	5.76E-08	0.459	0.646	6.55E-32	375	375	375		cortex
.RRC37A4	5.420	0.008	5.96E-08	0.388	0.530	3.58E-28	438	438	438		cerebellum
CRHR1-IT1	-5.418	-0.008	6.01E-08	0.284	0.465	4.14E-19	31	31	31		caudate
ARL17A	-5.418	-0.011	6.03E-08	0.146	0.385	5.36E-13	31	31	31		r cingulate cortex
11-259G1	-5.414	-0.007	6.18E-08	0.335	0.514	1.18E-23	38	38	38		cerebellum
11-259G1	-5.410	-0.015	6.31E-08	0.090	0.128	3.07E-04	25	25	25		ypothalamus
11-707O2	-5.393	-0.006	6.92E-08	0.458	0.591	4.17E-26	36	36	36		cortex
CRHR1-IT1	-5.366	-0.008	8.06E-08	0.304	0.398	1.56E-14	25	25	25		cortex
DND1P1	-5.340	-0.008	9.29E-08	0.205	0.377	1.65E-12	24	24	24		rontal cortex
ARL17A	-5.335	-0.007	9.58E-08	0.382	0.485	1.33E-18	34	34	34		cortex
LRRC37A2	-5.334	-0.005	9.63E-08	0.630	0.598	2.84E-29	78	79	79		caudate
DND1P1	-5.313	-0.006	1.08E-07	0.416	0.565	1.76E-25	36	36	36		cortex
LRRC37A2	-5.305	-0.006	1.13E-07	0.583	0.572	1.12E-21	32	33	33		r cingulate cortex
DND1P1	-5.304	-0.007	1.13E-07	0.382	0.330	2.29E-11	25	25	25		ippocampus
11-259G1	-5.304	-0.006	1.13E-07	0.509	0.515	1.35E-20	57	57	57		cortex
11-707O2	-5.296	-0.007	1.18E-07	0.371	0.391	9.15E-12	26	26	26		ypothalamus
CRHR1-IT1	-5.291	-0.009	1.22E-07	0.251	0.289	6.32E-10	35	35	35		us accumbens
11-259G1	-5.289	-0.007	1.23E-07	0.413	0.478	1.65E-15	43	43	43		ippocampus
LRRC37A2	-5.277	-0.006	1.31E-07	0.509	0.544	3.04E-18	45	46	46		ippocampus
11-707O2	-5.276	-0.006	1.32E-07	0.470	0.493	2.94E-16	32	33	33		putamen
11-259G1	-5.258	-0.005	1.46E-07	0.585	0.567	1.98E-21	71	72	72		r cingulate cortex
11-259G1	-5.229	-0.008	1.70E-07	0.322	0.506	9.70E-20	45	45	45		ippocampus
.RRC37A4	5.219	0.006	1.80E-07	0.521	0.652	6.54E-33	26	26	26		caudate
LRRC37A2	-5.208	-0.005	1.91E-07	0.621	0.622	1.44E-23	79	79	79		ypothalamus
CRHR1-IT1	-5.189	-0.011	2.12E-07	0.190	0.183	4.73E-08	26	26	26		cerebellum
LRRC37A2	-5.170	-0.007	2.34E-07	0.317	0.510	3.58E-18	32	32	32		rontal cortex
FMNL1	5.159	0.009	2.48E-07	0.223	0.292	7.06E-13	374	374	374		cerebellum

CRHR1-IT1	-5.158	-0.008	2.50E-07	0.254	0.266	2.01E-08	28	28	28	ypothalamus
RRC37A17	5.152	0.020	2.58E-07	0.047	0.085	7.74E-04	16	16	16	cerebellum
RRC37A4	5.148	0.005	2.64E-07	0.614	0.606	1.13E-23	55	56	56	rontal cortex
MAMSTR	5.146	0.022	2.66E-07	0.034	0.133	2.26E-04	18	18	18	ypothalamus
ARL17A	-5.143	-0.006	2.71E-07	0.440	0.454	6.32E-14	52	52	52	ypothalamus
LRRC37A2	-5.131	-0.006	2.89E-07	0.575	0.674	1.12E-33	41	42	42	cortex
P11-360F5	-5.110	-0.009	3.21E-07	0.158	0.251	2.31E-10	47	47	47	cerebellum
P11-360F5	-5.083	-0.014	3.71E-07	0.071	0.168	8.48E-06	26	26	26	cortex
FUT2	5.075	0.028	3.88E-07	0.018	0.049	2.11E-02	9	9	9	us accumbens
DND1P1	-5.057	-0.006	4.25E-07	0.345	0.454	1.16E-14	34	35	35	putamen
LRRC37A	-5.050	-0.006	4.43E-07	0.381	0.507	2.93E-23	23	23	23	cerebellum
P11-259G1	-5.032	-0.006	4.86E-07	0.385	0.499	9.02E-16	47	47	47	ypothalamus
CRHR1-IT1	-5.022	-0.008	5.13E-07	0.266	0.413	1.04E-12	39	39	39	ippocampus
ARL17A	-5.017	-0.007	5.26E-07	0.322	0.433	6.96E-14	49	50	50	rontal cortex
P11-259G1	-5.015	-0.008	5.30E-07	0.298	0.316	3.84E-11	35	35	35	us accumbens
LRP4	-5.014	-0.011	5.34E-07	0.114	0.049	1.73E-02	44	44	44	cortex
LRRC37A2	-5.009	-0.006	5.48E-07	0.440	0.569	6.36E-25	37	38	38	us accumbens
NTN5	5.000	0.017	5.72E-07	0.049	0.072	9.16E-03	5	5	5	ypothalamus
P11-707O2	-4.984	-0.005	6.22E-07	0.568	0.496	4.93E-17	49	50	50	ir cingulate cortex
PLEKHM1	-4.977	-0.016	6.46E-07	0.060	0.153	7.31E-05	12	12	12	ir cingulate cortex
RFC1	-4.939	-0.022	7.84E-07	0.028	0.058	5.63E-03	30	30	30	cerebellum
DND1P1	-4.939	-0.009	7.87E-07	0.206	0.203	5.84E-08	28	28	28	cerebellum
P11-259G1	-4.935	-0.006	8.02E-07	0.413	0.473	1.68E-17	45	45	45	us accumbens
LRRC37A2	-4.927	-0.006	8.36E-07	0.532	0.610	3.54E-22	56	56	56	putamen
SLC39A13	-4.915	-0.021	8.87E-07	0.025	0.039	3.35E-02	5	5	5	caudate
NDUFS3	-4.897	-0.021	9.74E-07	0.033	0.090	3.89E-04	33	33	33	cerebellum
ARL17A	-4.885	-0.008	1.03E-06	0.265	0.353	1.92E-10	42	43	43	putamen
NPIP9	4.863	0.013	1.15E-06	0.091	0.034	3.16E-02	24	24	24	cerebellum
ARL17A	-4.845	-0.008	1.26E-06	0.252	0.409	2.15E-16	22	23	23	caudate