

Supplementary Materials

Supplementary Figures

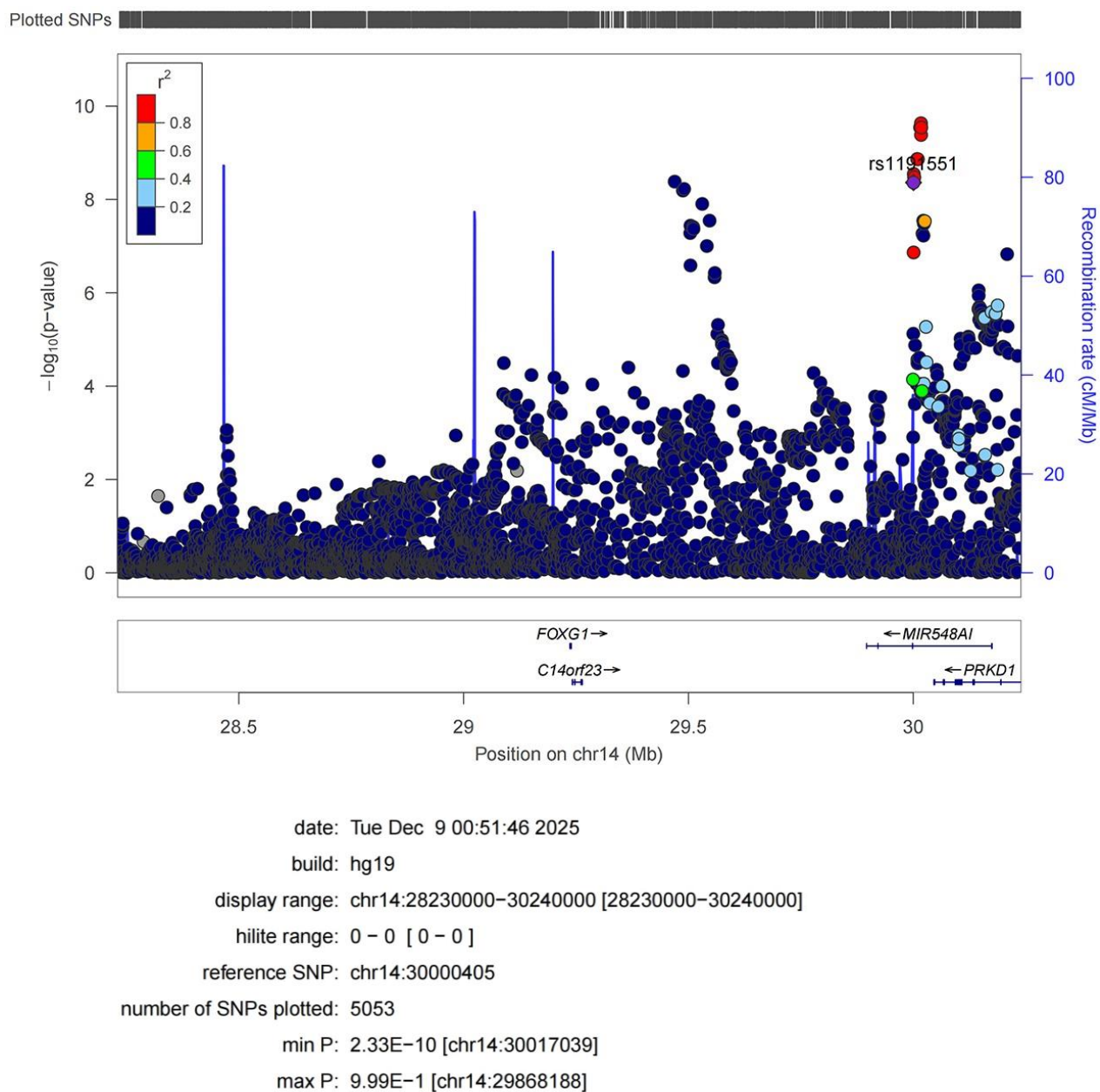


Fig. S1 Genetic association of single-nucleotide polymorphisms (SNPs) spanning the *FOXG1* and flanking regions with schizophrenia in the GWAS of 74,776 cases and 101,023 controls.

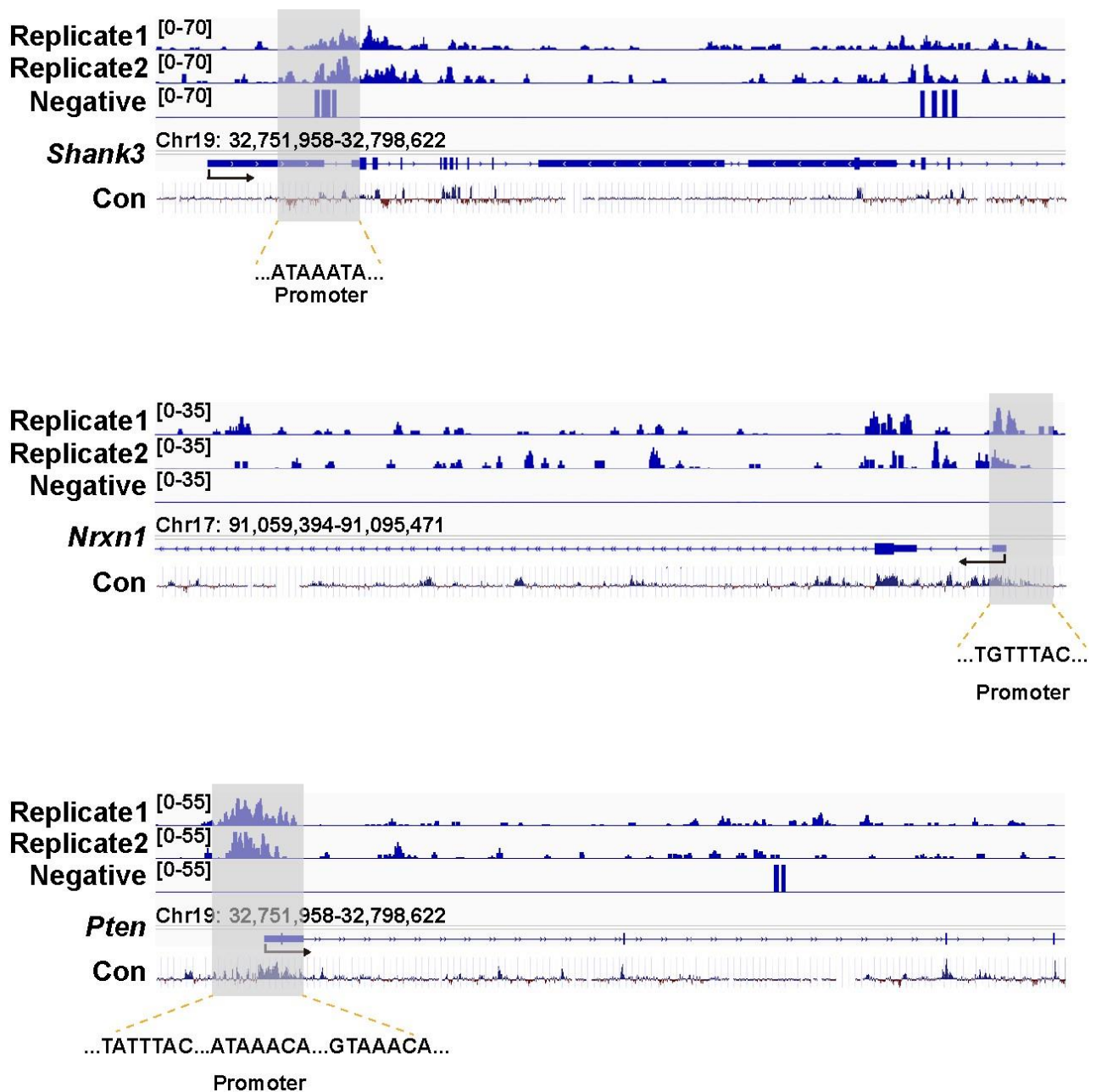


Fig. S2 Identification of potential FOXG1 binding sites at synapse-related gene loci by Integrative Genomics Viewer (IGV) peak plot. CUT&Tag assay with a FOXG1 antibody revealed enrichment peaks at the promoter regions of *Shank3*, *Nrxn1*, and *Pten* (regions highlighted in grey), suggesting that FOXG1 directly binds to and regulates the transcription of these SCZ risk genes.

Supplementary Tables

Table S1 Primers for qPCR

Gene	Sequence
<i>Grm3</i>	Forward: 5'-GGAGTCATTGGCGGTTCGTACAG-3' Reverse: 5'-TGGCACTGGTGGAGGCGTAG-3'
<i>β-actin</i>	Forward: 5'-TGAGAGGGAAATCGTGCGTGAC-3' Reverse: 5'-GCTCGTTGCCAATAGTGATGACC-3'

Table S2 Primer for luciferase reporter vector construction

Gene	Sequence (5'→3')
<i>Grm3</i>	Forward: cgagctcttacgcgtgctagcCCCCCTGGCAGATAGATATGTAGG Reverse: acttagatcgcatctcgagAATATGCACATATTTATCGTCTCCATT

Table S3 Differential expression profile of 128 synaptic-related genes in *Foxg1* cKO mice

Gene_name	<i>Foxg1</i> _cKO_FPKM	Control_FPKM	log ₂ FC	Q-value	Up/Down
<i>Ank3</i>	9.151323766	0.578564748	3.983430121	8.91555E-78	UP
<i>Actr3</i>	0.109473777	28.78129445	-8.03840234	1.64109E-66	DOWN
<i>Nr4a1</i>	17.51591664	584.6769929	-5.06090143	3.27195E-64	DOWN
<i>Pten</i>	0.144607772	19.12501154	-7.04717172	3.93064E-62	DOWN
<i>Shank2</i>	3.433395236	0.054098466	5.987904436	3.59080E-57	UP
<i>Elavl4</i>	5.030285276	0.068193918	6.204853331	6.06958E-57	UP
<i>Nr3c2</i>	3.943713484	0.039130808	6.655106022	9.66083E-54	UP
<i>Srcin1</i>	41.57995939	5.513488396	2.91485104	1.06116E-53	UP
<i>Ppt1</i>	0.245027734	29.42428385	-6.90791844	4.91789E-52	DOWN
<i>Vamp1</i>	7.755812123	0.729899454	3.409508209	5.29583E-51	UP
<i>Git1</i>	0.271567671	27.59074873	-6.66672905	1.53313E-50	DOWN
<i>Arl6ip5</i>	0.162445572	84.94224939	-9.03038209	6.6140E-49	DOWN
<i>Adrb2</i>	0.218615505	55.62743663	-7.99125709	1.08533E-46	DOWN
<i>Mef2a</i>	0.067355766	8.343679499	-6.95273848	2.42658E-43	DOWN
<i>Kalrn</i>	2.38070752	0.252754802	3.235579983	2.78753E-43	UP
<i>P2rx7</i>	7.067569172	0.818906484	3.109443481	1.61582E-42	UP
<i>Adam10</i>	0.112690754	16.40106551	-7.18527658	1.65206E-41	DOWN
<i>Grm1</i>	3.808293112	0.284622736	3.742021705	5.76047E-41	UP
<i>Grn</i>	2.1963923	40.84118706	-4.21681714	1.09369E-36	DOWN
<i>Maoa</i>	1.349109912	36.40721542	-4.75414461	2.16172E-35	DOWN

<i>Syp</i>	54.37505527	13.65297995	1.993729088	3.27963E-34	UP
<i>Rims2</i>	37.54030943	9.687364283	1.954264443	7.52029E-32	UP
<i>Tlr2</i>	0.155438961	21.02188999	-7.07940041	2.56847E-31	DOWN
<i>Cacng2</i>	4.421222529	0.14868997	4.894066116	2.92369E-31	UP
<i>Nlgn3</i>	3.652313903	0.485586074	2.911011812	3.90994E-31	UP
<i>Kidins220</i>	0.031646381	7.877258234	-7.95950922	1.34768E-30	DOWN
<i>Grin1</i>	2.994818827	0.459930881	2.702979757	2.15505E-30	UP
<i>Opa1</i>	6.693230221	1.503836504	2.154054912	3.35603E-28	UP
<i>Nat8l</i>	5.42640395	0.851671303	2.671627804	1.47136E-27	UP
<i>Actr2</i>	2.079171851	30.18049103	-3.85953537	3.80216E-27	DOWN
<i>Bace1</i>	0.060450713	4.463627297	-6.2063134	2.56469E-25	DOWN
<i>Fyn</i>	2.888935443	31.35526975	-3.44009806	4.59107E-25	DOWN
<i>Tubb5</i>	3.332861022	39.56986921	-3.56956923	8.55962E-25	DOWN
<i>Naalad2</i>	4.61474172	0.820426537	2.491803843	1.46594E-24	UP
<i>Atp2b2</i>	3.042340787	0.862314547	1.818895642	7.44771E-24	UP
<i>Hnrnpk</i>	1.654913455	17.20460936	-3.37796746	2.48826E-23	DOWN
<i>Car2</i>	213.3280182	83.72603228	1.349325296	3.02208E-23	UP
<i>Adora1</i>	5.932881166	1.841984628	1.687471865	3.64779E-23	UP
<i>Nfasc</i>	1.403869176	13.84511793	-3.30189694	1.11588E-22	DOWN
<i>Snap25</i>	23.01133307	8.437344282	1.447483687	1.55066E-22	UP
<i>Cit</i>	3.264051981	0.988909551	1.722753554	3.12725E-22	UP
<i>Neurl1a</i>	7.222092326	1.516906474	2.251284726	8.12890E-22	UP
<i>Dnm1</i>	4.02389877	1.188105143	1.759931497	1.77568E-21	UP
<i>Maob</i>	0.739181174	18.27009019	-4.62741193	1.86379E-21	DOWN
<i>Tnf</i>	0.153805984	12.55233897	-6.35070077	2.16719E-21	DOWN
<i>Tsc2</i>	0.661684182	11.50408553	-4.11985971	2.42062E-20	DOWN
<i>Dlgap3</i>	10.34323441	3.468181055	1.576436277	5.19857E-20	UP
<i>Mecp2</i>	0.008321073	1.139907565	-7.09793162	2.75392E-19	DOWN
<i>Dbi</i>	46.54609176	19.63306741	1.245374444	9.23251E-19	UP
<i>Plcl1</i>	17.95743847	7.856326167	1.192654841	1.04559E-17	UP
<i>Cntn2</i>	2.951552486	1.119444182	1.398691402	1.43447E-17	UP
<i>Insr</i>	0.693020291	7.858431164	-3.50327183	1.89236E-17	DOWN
<i>Slc1a2</i>	13.99676332	6.580253744	1.088878127	2.49964E-17	UP
<i>Ube3a</i>	0.172179686	2.208228588	-3.68090267	1.03514E-16	DOWN
<i>Camk2a</i>	4.601540772	1.80459676	1.350440511	1.98044E-16	UP
<i>Cux1</i>	0.312671976	2.896584525	-3.21163094	2.19582E-16	DOWN
<i>Gria2</i>	2.308991909	0.895275463	1.366859566	2.55659E-16	UP
<i>Gfap</i>	0.049450394	5.44821522	-6.78365788	3.00723E-16	DOWN
<i>Itgb1</i>	25.10153484	156.4004345	-2.63939703	3.46646E-16	DOWN
<i>Ywhaz</i>	7.712350216	50.35485678	-2.70688846	8.16460E-16	DOWN
<i>Bche</i>	0.609914718	7.555574995	-3.63086212	1.31225E-15	DOWN
<i>Acsl4</i>	0.146725032	4.789792136	-5.02877612	1.39186E-15	DOWN
<i>Atp2a2</i>	9.594283154	59.62540166	-2.63568016	1.76327E-15	DOWN
<i>Apoe</i>	20.60904476	122.8036299	-2.57500366	7.14647E-15	DOWN

<i>Arf1</i>	27.30823931	164.7044529	-2.59247136	7.40984E-15	DOWN
<i>Rapgef2</i>	0.377807532	3.758839394	-3.31456391	7.63371E-15	DOWN
<i>Dgkz</i>	0.60521345	6.219955972	-3.36138841	9.13353E-15	DOWN
<i>Fgfr2</i>	7.551017348	3.756988207	1.007094444	1.1340E-14	UP
<i>Dcdc2a</i>	4.003863554	1.535157335	1.383006289	1.74174E-14	UP
<i>Strn</i>	0.139046209	3.093614577	-4.47565715	4.08038E-14	DOWN
<i>Actb</i>	32.10772946	178.3129532	-2.47341896	7.39123E-14	DOWN
<i>Apba2</i>	1.373403774	0.044477836	4.948525437	4.26772E-13	UP
<i>Cabp1</i>	6.124108568	2.91290718	1.072040129	6.46253E-13	UP
<i>Gria4</i>	3.620682966	1.2886277	1.490426346	1.13234E-12	UP
<i>Zdhhc2</i>	5.928118439	2.834147909	1.06465922	1.25932E-12	UP
<i>Ctnnd2</i>	4.35685073	1.731703635	1.331093639	3.54676E-12	UP
<i>P2rx1</i>	1.083639745	10.90549325	-3.3310979	7.70579E-12	DOWN
<i>Shank3</i>	0.289440842	3.115979476	-3.42834532	2.39439E-11	DOWN
<i>Negr1</i>	1.003631148	0.26385543	1.92740957	7.52126E-11	UP
<i>Marecks</i>	25.98160297	127.1737531	-2.2912386	7.91388E-11	DOWN
<i>Rest</i>	0.77841886	6.485344273	-3.05856459	9.53126E-11	DOWN
<i>Nedd4</i>	1.166931902	6.718660981	-2.52545336	9.71399E-11	DOWN
<i>Ngef</i>	6.453634992	3.075174572	1.069443671	2.40032E-10	UP
<i>Mapk8</i>	0.095075296	1.762463417	-4.21237898	3.17617E-10	DOWN
<i>Sncb</i>	8.688040915	4.327150497	1.005613599	2.35708E-09	UP
<i>Crebbp</i>	0.877445513	4.695247971	-2.41981991	1.02762E-08	DOWN
<i>Crk</i>	4.204356023	19.53299574	-2.21595648	1.17158E-08	DOWN
<i>Cdc42</i>	66.93668223	277.8055531	-2.05320649	2.30523E-08	DOWN
<i>Nrxn3</i>	0.625971268	0.265956732	1.234904886	4.50328E-08	UP
<i>Nrxn1</i>	0.020215449	0.34763944	-4.10406162	6.10014E-08	DOWN
<i>Sorbs1</i>	36.10715979	147.4312897	-2.0296859	9.14393E-08	DOWN
<i>Fbxo45</i>	1.345235943	8.757085677	-2.7025916	1.89113E-07	DOWN
<i>Dnaja3</i>	2.720791804	13.30562889	-2.28993823	6.30091E-07	DOWN
<i>Sparc</i>	168.3579925	606.7792286	-1.84963949	2.01108E-06	DOWN
<i>Hspa8</i>	70.49877347	249.7282344	-1.82468888	3.70836E-06	DOWN
<i>Fmr1</i>	0.416351761	2.310648415	-2.47242293	4.71499E-06	DOWN
<i>Magi2</i>	0.198268045	1.16263445	-2.55187349	2.49644E-05	DOWN
<i>Sdf4</i>	6.043759925	21.19080965	-1.80992045	4.56095E-05	DOWN
<i>Cyfip1</i>	4.153235675	14.11898747	-1.76532899	6.43763E-05	DOWN
<i>Pak3</i>	0.218630784	0.047793824	2.193600439	8.27893E-05	UP
<i>Taok2</i>	0.928078509	3.760847555	-2.01873907	0.000244256	DOWN
<i>Grm3</i>	0.384136625	3.403717109	-3.14741971	0.000248343	DOWN
<i>Gabrb3</i>	0.031522879	0.496145742	-3.97629276	0.000268007	DOWN
<i>Cntnap2</i>	0.027033643	0.386097776	-3.83613841	0.000363271	DOWN
<i>Slc6a11</i>	0.727863448	3.633243618	-2.31951838	0.000518915	DOWN
<i>Ppp1r9a</i>	0.135783057	0.686027651	-2.33696326	0.000567202	DOWN
<i>Ptpnz1</i>	0.091511481	0.593472756	-2.69715714	0.000583324	DOWN
<i>Flot1</i>	7.60353281	24.46758495	-1.68612991	0.000646106	DOWN

<i>Lrp8</i>	0.69194	2.573910609	-1.8952431	0.001063393	DOWN
<i>Ntrk3</i>	0.0360213	0.251979744	-2.80638561	0.001195054	DOWN
<i>Mark1</i>	3.326822451	11.34257565	-1.7695315	0.001299376	DOWN
<i>Plxnb1</i>	0.35838497	1.659119564	-2.21083582	0.001318963	DOWN
<i>Wasf2</i>	6.091756973	17.72199085	-1.54061039	0.003641697	DOWN
<i>Fcgr2b</i>	1.120475575	3.900956519	-1.79971672	0.004615721	DOWN
<i>Cspg5</i>	0.691166348	2.299610085	-1.73428438	0.006601489	DOWN
<i>Mapk14</i>	7.787040424	22.27457017	-1.51625057	0.006641762	DOWN
<i>Cacnb4</i>	0.0432828	0.361652668	-3.06273906	0.008268373	DOWN
<i>Comt</i>	11.50889932	31.82376618	-1.46735472	0.010534943	DOWN
<i>Ctnnb1</i>	19.41647689	50.63602685	-1.38288276	0.013998755	DOWN
<i>Amigo1</i>	0.070876404	0.475139363	-2.74497342	0.014049662	DOWN
<i>Map2</i>	0.325321517	1.011461494	-1.63650325	0.015264384	DOWN
<i>Gap43</i>	7.521435774	21.17179485	-1.49306359	0.025180908	DOWN
<i>Cacna1b</i>	0.026628	0.217318244	-3.02879333	0.031237468	DOWN
<i>Pla2g6</i>	0.030704747	0.375878526	-3.61373288	0.035221321	DOWN
<i>Slc6a1</i>	4.344112739	11.06274319	-1.34857572	0.041207123	DOWN
<i>Ptpnf</i>	0.399399102	1.285647701	-1.68659237	0.043878768	DOWN
<i>Rap1a</i>	24.6767518	61.00927234	-1.30587602	0.044229555	DOWN
<i>Grin2b</i>	0.186675776	0.580393743	-1.63649724	0.046160788	DOWN
