

Figure S1 Scatter plots and funnel plots of Mendelian randomization (MR) analyses for Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), and Irritable bowel syndrome (H) on COPD. The 95%CI of odds ratio for each IV is shown by vertical and horizontal lines. The slope of the lines represents the estimated causal effect of the MR methods.

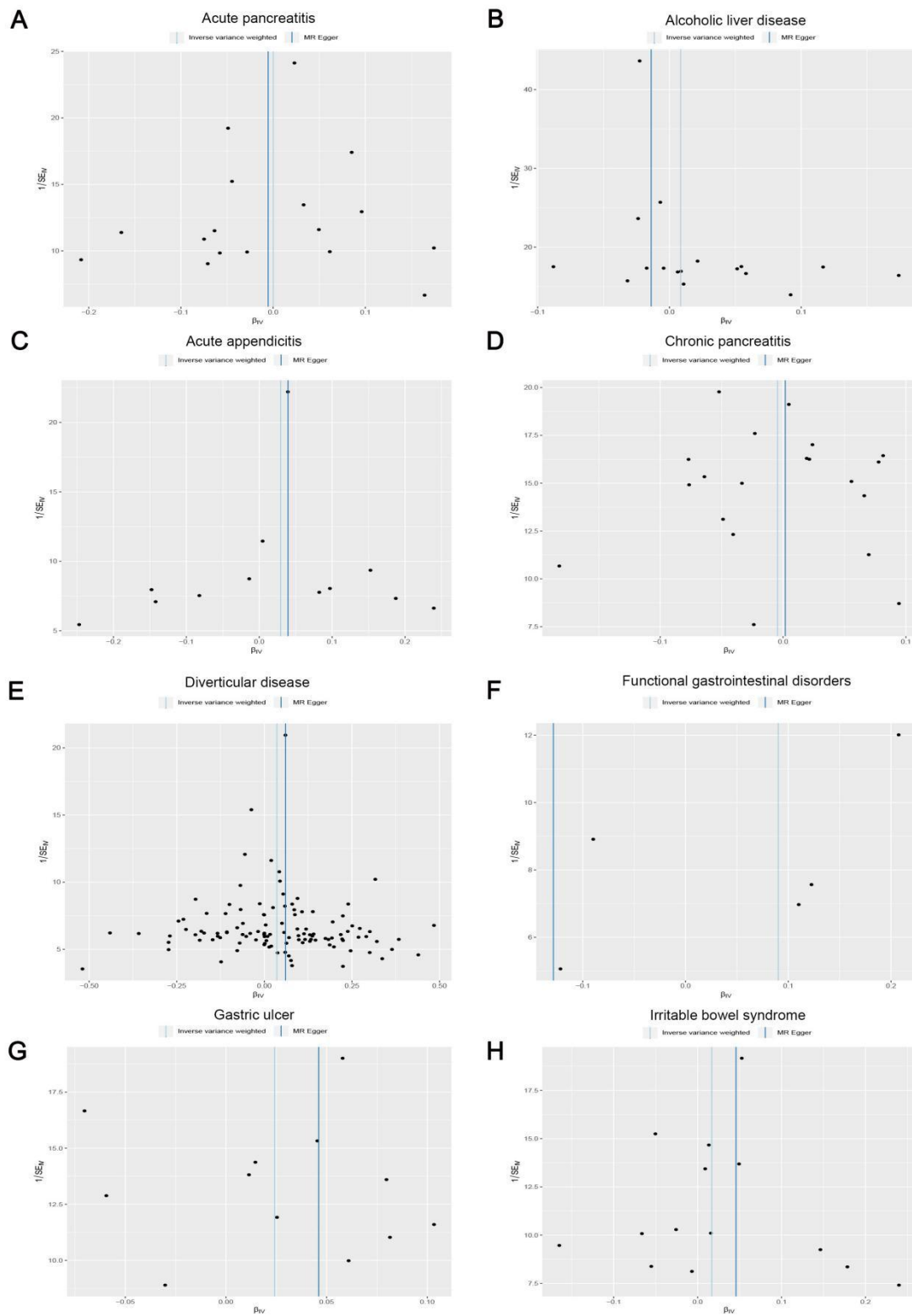


Figure S2 Funnel plot of Mendelian randomization results. Funnel plots for overall heterogeneity of MR estimates for the effect of Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), and Irritable bowel syndrome (H) on COPD. IVW, inverse-variance weighted.

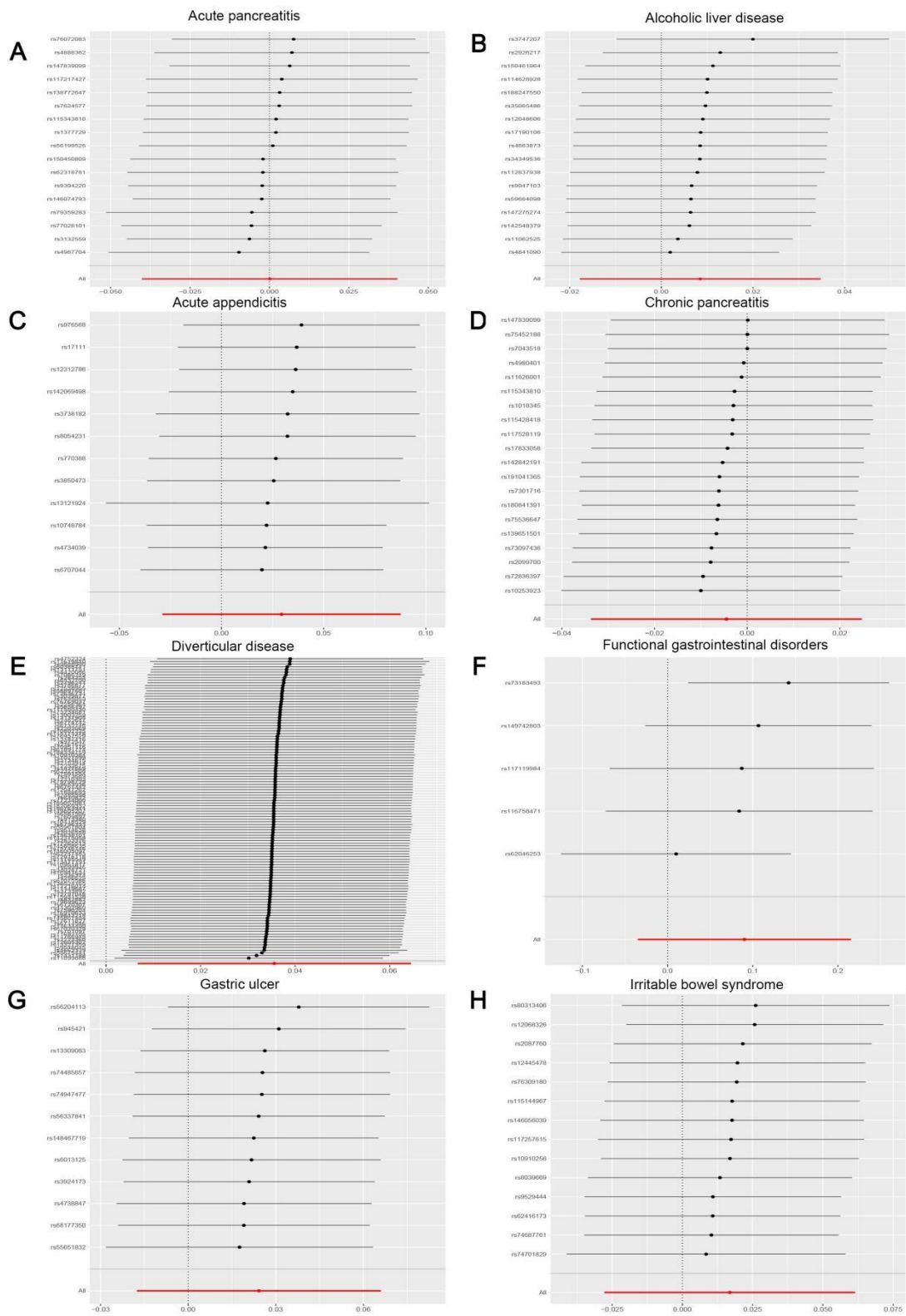


Figure S3 Leave-one-out plots of Mendelian randomization sensitivity analysis of Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), and Irritable bowel syndrome (H) on COPD.

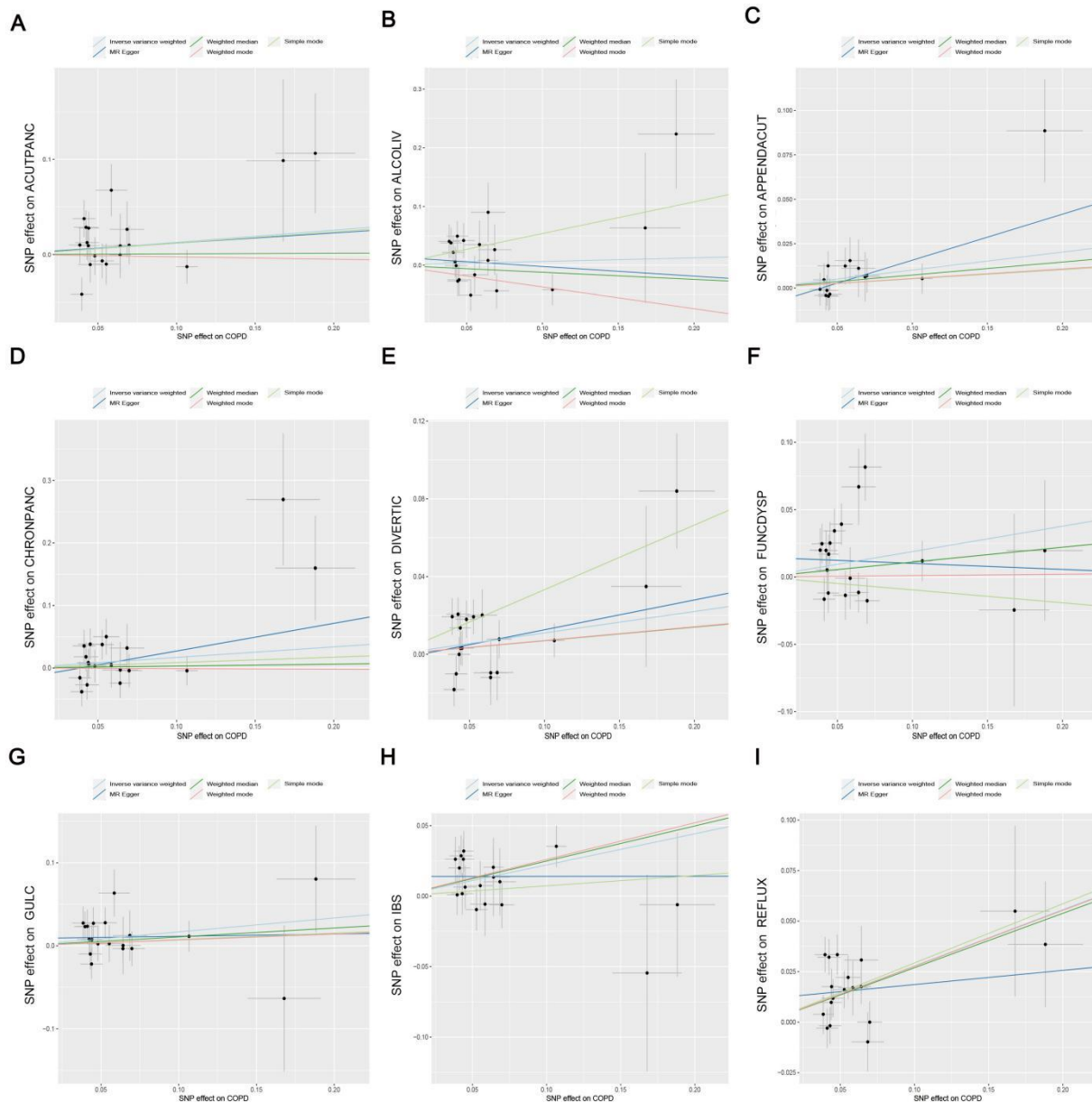


Figure S4 Scatter plots and funnel plots of Mendelian randomization (MR) analyses for COPD on Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), Irritable bowel syndrome (H), and Gastroesophageal reflux disease(I). The 95%CI of odd ratio for each IV is shown by vertical and horizontal lines. The slope of the lines represents the estimated causal effect of the MR methods.

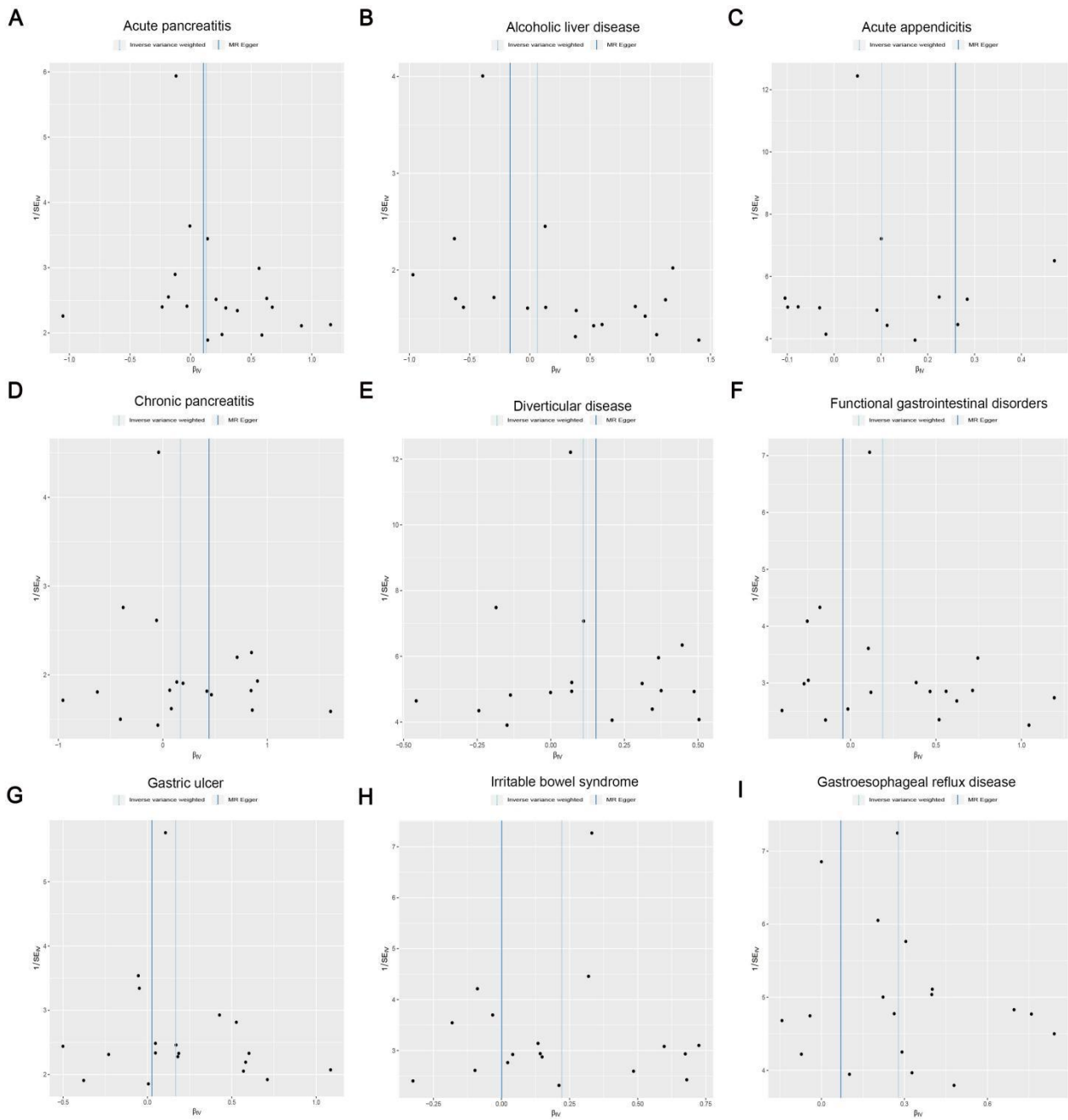


Figure S5 Funnel plot of Mendelian randomization results. Funnel plots for overall heterogeneity of MR estimates for the effect of COPD on Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), Irritable bowel syndrome (H), and Gastroesophageal reflux disease(I). IVW, inverse-variance weighted.

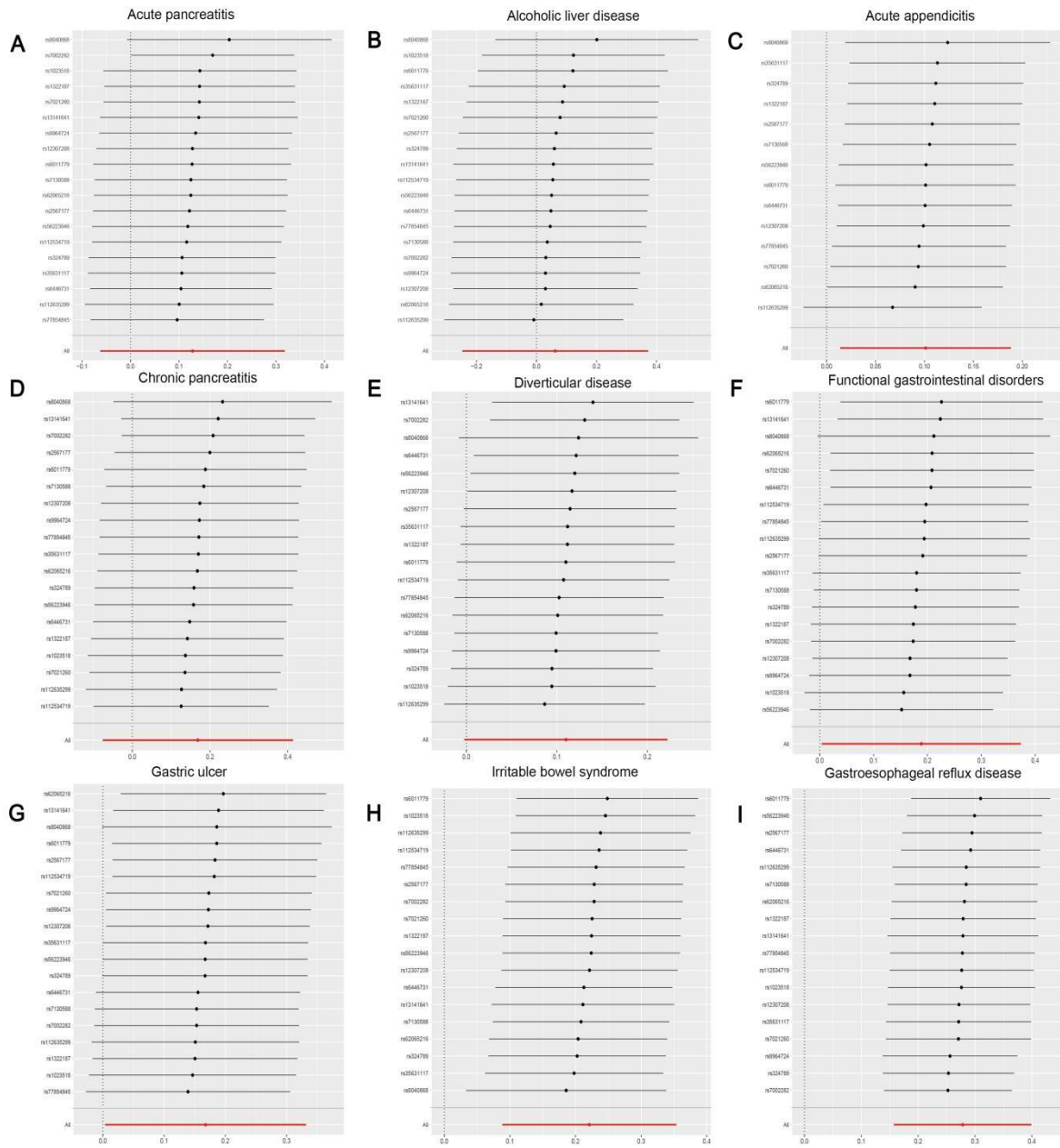


Figure S6 Leave-one-out plots of Mendelian randomization sensitivity analysis of COPD on Acute pancreatitis (A), Alcoholic liver disease (B), Acute appendicitis (C), Chronic pancreatitis (D), Diverticular disease (E), Functional gastrointestinal disorders (F), Gastric ulcer (G), Irritable bowel syndrome (H), and Gastroesophageal reflux disease(I).

Supplementary Table S1. GWAS data sources

Supplementary Table S2. 21 independent associations identified with GCTA-COJO (conditional and joint) analysis applied to GWAS summary statistics (MTAG-COPD)

Supplementary Table S3. Pleiotropic genomic loci in COPD and GERD, appendicitis, IBS, diverticular disease, acute gastritis, acute pancreatitis, chronic pancreatitis, functional gastrointestinal disorder, and alcoholic liver disease) identified by FUMA using LPACO results

Supplementary Table S4. The annotation in FUMA is based on the result of MAGMA

Supplementary Table S5. MAGMA combined with POPS screening (POPS score>1)

Supplementary Table S6. Gene ontology enrichment

Supplementary Table S7. KEGG pathway enrichment

Supplementary Table S8. Mammalian Phenotype ontology based on pleiotropic genes

Supplementary Table S9. Bliss analysis from pQTL (ARIC, Decode, and UKB-PP) to MTAG-COPD (FDR < 0.05 and $p_{HEIDI} > 0.01$)

Supplementary Table S10: Drug-Gene Interaction Network of Pleiotropic Genes in COPD-GI Comorbidity

Supplementary Table S1. GWAS data sources

Disease	Data source	Case	Control	Ancestry
Chronic obstructive pulmonary disease	PMID: 36777996	58,559	937,358	European
Gastric ulcer	FinnGen	6,459	350,064	European
Chronic gastritis	FinnGen	10,317	350,064	European
Acute gastritis	FinnGen	2,558	350,064	European
Acute pancreatitis	FinnGen	6,787	361,641	European
Chronic pancreatitis	FinnGen	3,875	361,641	European
Irritable bowel syndrome	FinnGen	10,329	329,381	European
Gastroesophageal reflux disease	FinnGen	28,859	350,064	European
Alcoholic liver disease	FinnGen	3,047	400,247	European
Non-alcoholic fatty liver disease	FinnGen	2,568	409,613	European
Duodenal ulcer	FinnGen	3,795	350,064	European
Functional gastrointestinal disorders	FinnGen	9,680	350,064	European
Acute appendicitis	FinnGen	31,628	378,082	European
Diverticular disease	FinnGen	33,619	329,381	European
Inflammatory bowel disease	FinnGen	9,083	392,974	European
Celiac disease	FinnGen	4,115	394,391	European

Supplementary Table S2. 21 independent associations identified with GCTA-COJO (conditional and joint) analysis applied to GWAS summary statistics (MTAG-COPD)

Chr	SNP	bp	refA	freq	b	se	p	n	freq_gen0	bJ	bJ_se	pJ	LD_r
4	rs6446731	3284751	A	0.2942	0.00878356	0.0015653	2.01E-08	995887	0.282306	0.00878356	0.00156533	2.01E-08	0
4	rs35631117	67804304	T	0.5407	-0.00932569	0.00143131	7.25E-11	995876	0.533797	-0.00932569	0.00143134	7.25E-11	0
4	rs77854845	112371633	C	0.1316	-0.0120195	0.00210995	1.22E-08	995886	0.127237	-0.0120195	0.00210999	1.22E-08	0
4	rs13141641	145506456	C	0.4527	-0.0134957	0.00143299	4.60E-21	995830	0.425447	-0.0134957	0.00143305	4.62E-21	0
5	rs1023518	131793772	T	0.284	0.0109741	0.00158178	3.98E-12	995871	0.274354	0.0109741	0.00158181	3.99E-12	0
6	rs9273404	32627160	G	0.4695	0.0105979	0.0017091	5.61E-10	696415	0.460239	0.038679	0.00303501	3.35E-37	-0.838182
6	rs9274503	32634103	T	0.3792	0.00204739	0.00173324	0.237504	716484	0.478131	0.0344609	0.0030778	4.24E-29	0
6	rs1322187	165365464	T	0.3253	0.00919265	0.00162925	1.68E-08	869681	0.290258	0.00919265	0.00162928	1.68E-08	0
7	rs112534719	117096293	C	0.02358	0.0343174	0.00484995	1.49E-12	935549	0.0208748	0.0343174	0.00485008	1.49E-12	0
8	rs7002282	10666993	G	0.5831	-0.00810406	0.00144668	2.12E-08	995887	0.60338	-0.00810406	0.0014467	2.12E-08	0
8	rs71519637	27334098	T	0.09957	0.0140994	0.00238216	3.24E-09	995884	0.0914513	0.0131227	0.0023881	3.91E-08	-0.0724478
8	rs113623975	27412605	G	0.1188	-0.0141604	0.00227448	4.79E-10	935560	0.11829	-0.0132805	0.00228016	5.73E-09	0
9	rs7021260	128671151	T	0.7144	0.0109878	0.00169133	8.22E-11	868094	0.675944	0.0115091	0.00169365	1.08E-11	-0.0555297
9	rs3025343	136478355	A	0.09592	0.0135448	0.00242216	2.24E-08	995888	0.0914513	0.0143993	0.00242546	2.91E-09	0
12	rs12307208	68117741	C	0.09872	-0.013306	0.00239127	2.63E-08	995888	0.101392	-0.013306	0.0023913	2.63E-08	0
14	rs112635299	94838142	T	0.02004	0.0381296	0.0052514	3.85E-13	935546	0.0168986	0.0381296	0.00525154	3.85E-13	0
15	rs8040868	78911181	C	0.3877	0.0227831	0.00147048	3.83E-54	986875	0.416501	0.0227831	0.00147066	3.94E-54	0
17	rs62065216	38218773	A	0.4436	0.00901066	0.00148128	1.18E-09	935562	0.417495	0.00901066	0.00148131	1.18E-09	0
18	rs9964724	35159124	T	0.7011	-0.0100395	0.00155814	1.17E-10	995877	0.667992	-0.0103213	0.0015589	3.57E-11	0.0317613
18	rs2567177	38450197	C	0.3617	0.00884711	0.00154539	1.04E-08	918925	0.327038	0.00915942	0.00154614	3.14E-09	0
20	rs6011779	61984317	T	0.7938	-0.0147202	0.00176303	6.86E-17	995849	0.809145	-0.0147202	0.0017631	6.88E-17	0

Supplementary Table S3. Pleiotropic genomic loci in COPD and (GERD, appendicitis, IBS, diverticular disease, acute gastritis, acute pancreatitis, chronic pancreatitis, functional gastrointestinal disorder, and alcoholic liver disease) Identified by FUMA using LPACO results

rsID	GenomicLocus	unliqID	chr.x	pos.x	p	start	end	nSNPs	nGWASNSPs	nIndSigSNPs	IndSigSNPs	nLeadSNPs	LeadSNPs	dist.x	unliqID.y	chr.y	pos.y	non_effect_allele	effect_allele	MAF	gwasP	r2	IndSigSNP	GenomicLocus.y	nearestGene	dist.y	func	CADD	RDB	minChrState	commonChrState	posMapFit	eqtlMapFit	cIMapFit	group				
rs181026312	7:142540047	142540042	2.29E-09	141857339	142540042	9	2	2	rs181026312rs1	rs181026312	NA	7:142540042.CT	7	142540042	T	C	0.002982	2.29E-09	1	rs181026312	2	EPHBE	12749	intergenic	1.635	3a	5	15	0	0	0	0	ACUTPANC						
rs554919880	5:14720433	14720433	7.25E-10	147183902	147243796	27	24	2	rs554919880rs1	rs554919880	NA	5:147204334.G-GA AAA	5	147204334	G	GAAAA	0.007952	7.25E-10	1	rs554919880	1	SPINK1	0	intronic	4.359	NA	5	15	1	0	0	0	0	ACUTPANC					
rs61204866	5:157801528015	780152801	3.81E-11	7871929	78934531	210	135	5	rs61204866rs7	rs61204866	NA	5:15780152801.A-G	15	78815296	G	A	0.2356	3.81E-11	1	rs61204866	1	HYKK	0	intronic	5.367	6	5	15	1	0	0	0	0	ACUTPANC					
rs659567	8:18607408.8	1067400	3.54E-08	10384212	10796472	146	91	1	rs659567	rs659567	NA	8:18607408.CT	8	1067400	T	T	0.4284	3.54E-08	1	rs659567	1	SOX7:SOX7:CT:0.00.00	0	ncRNA_intronic	2.714	6	9	15	1	0	0	0	0	0	ACUTPANC				
rs112635299	14:9483814214	94838142	1.36E-08	94838142	94844947	2	1	1	rs112635299	rs112635299	NA	14:94838142.CT	14	94838142	G	T	0.0169	1.36E-08	1	rs112635299	1	SERPINA1	4941	intergenic	0.272	5	5	15	1	0	0	0	0	0	0	ALCO			
rs1284466	3:22443021322	44330213	2.49E-08	44324277	44381482	76	61	1	rs1284466	rs1284466	NA	3:224430213.A-G	22	44330213	A	G	0.1799	2.49E-08	1	rs1284466	3	PNPLA3	0	intronic	2.838	6	4	14	1	0	0	0	0	0	0	ALCO			
rs58365910	15:7894903415	78949034	2.89E-12	78719291	79074518	248	160	3	rs58365910rs1	rs58365910	NA	15:78949034.CT	15	78949034	T	C	0.3748	2.89E-12	1	rs58365910	2	PSMA4	7429	intergenic	3.16	6	5	15	1	0	0	0	0	0	0	0	ALCO		
rs1322296	4:1454346884	145434688	3.11E-09	145433890	145516737	39	26	1	rs1322296	rs1322296	NA	4:145434688.CT	4	145434688	T	C	0.4076	3.11E-09	1	rs1322296	4	RP11-361D14.24534	0	intergenic	0.284	7	14	15	0	0	0	0	0	0	0	0	APPEN		
rs112635299	14:9483814214	94838142	1.61E-10	94838142	94844947	2	1	1	rs112635299	rs112635299	NA	14:94838142.CT	14	94838142	G	T	0.0169	1.61E-10	1	rs112635299	5	SERPINA1	4941	intergenic	0.272	5	5	15	1	0	0	0	0	0	0	APPEN			
rs3197999	3:349721532	349721532	4.19E-09	34983550	49731861	140	89	1	rs3197999	rs3197999	NA	3:349721532.A-G	3	49721532	G	A	0.3131	4.19E-09	1	rs3197999	2	MST1	21	exonic	2.1	NA	4	15	1	0	0	0	0	0	0	0	APPEN		
rs35700343	1:1221052802	221052802	4.34E-08	221052802	221052802	2	2	1	rs35700343	rs35700343	NA	1:1221052802.CT	1	221052802	CT	A	0.174	4.34E-08	1	rs35700343	1	HLA-AS1:HLA-XL:0.00	0	ncRNA_intronic	2.054	NA	1	15	1	0	0	0	0	0	0	0	APPEN		
rs653330	4:1117319364	111731936	1.02E-11	111719408	11173700	13	11	1	rs653330	rs653330	NA	4:111731936.CT	4	111731936	G	C	0.4086	1.02E-11	1	rs653330	3	RP11-777N19.113435	0	intergenic	8.148	7	14	15	0	0	0	0	0	0	0	0	APPEN		
rs8042849	15:7881792915	78817929	1.45E-09	78719591	78936168	84	55	1	rs8042849	rs8042849	NA	15:78817929.CT	15	78817929	C	T	0.3907	1.45E-09	1	rs8042849	6	HYKK	0	intronic	1.935	7	5	15	1	0	0	0	0	0	0	0	APPEN		
rs113812546	7:1169678387	116967838	5.07E-12	116806103	117357607	15	14	5	rs113812546rs2	rs113812546	NA	7:116967838.A-C	7	116967838	C	A	0.01988	5.07E-12	1	rs113812546	2	WNT2	4494	intergenic	0.408	4	5	14	1	0	0	0	0	0	0	0	0	CHRONC	
rs3691084	15:7907425315	79074253	1.50E-08	78905299	79105350	137	73	1	rs3691084	rs3691084	NA	15:79074253.A-G	15	79074253	G	A	0.4195	1.50E-08	1	rs3691084	3	ADAMTS7	0	intronic	5.219	5	4	15	1	0	0	0	0	0	0	0	0	CHRONC	
rs554919880	5:14720433	14720433	5.89E-10	147183902	147234796	27	24	2	rs554919880rs1	rs554919880	NA	5:147204334.G-GA AAA	5	147204334	G	GAAAA	0.007952	5.89E-10	1	rs554919880	1	SPINK1	0	intronic	4.359	NA	5	15	1	0	0	0	0	0	0	0	0	CHRONC	
rs10928235	2:1456781142	145678114	8.53E-11	145634153	145754503	3	25	1	rs10928235	rs10928235	NA	2:145678114.A-T	2	145678114	A	T	0.2256	8.53E-11	1	rs10928235	5	TEXA1	0	ncRNA_intronic	1.195	6	5	15	1	0	0	0	0	0	0	0	0	DIVER	
rs112635299	14:9483814214	94838142	1.68E-09	94838142	94844947	2	1	1	rs112635299	rs112635299	NA	14:94838142.CT	14	94838142	G	T	0.0169	1.68E-09	1	rs112635299	17	SERPINA1	4941	intergenic	0.272	5	5	15	1	0	0	0	0	0	0	0	0	DIVER	
rs11677892	2:1444307112	144430711	1.97E-11	144274527	144503445	149	88	8	rs11677892	rs11677892	NA	2:144430711.A-G	2	144430711	A	G	0.3678	1.97E-11	1	rs11677892	4	ARHGAP15	0	intronic	1.799	6	4	15	1	0	0	0	0	0	0	0	0	DIVER	
rs117210485	9:1363881489	136388148	2.95E-08	136248480	136388148	6	5	1	rs117210485	rs117210485	NA	9:136388148.A-G	9	136388148	G	A	0.04274	2.95E-08	1	rs117210485	13	TMEM80	0	intronic	0.556	2	15	15	1	0	0	0	0	0	0	0	0	DIVER	
rs11748149	5:1569773935	156977393	6.15E-09	156942628	157040002	66	53	1	rs11748149	rs11748149	NA	5:156977393.A-G	5	156977393	G	A	0.1014	6.15E-09	1	rs11748149	10	ADAM19	0	intronic	2.166	1f	2	15	1	0	0	0	0	0	0	0	0	DIVER	
rs11899380	2:256079696.2	56079696	1.63E-12	55992410	56102744	23	18	2	rs11899380rs1	rs11899380	NA	2:256079696.A-G	2	56079696	G	A	0.1233	1.63E-12	1	rs11899380	3	EFEMP1	13492	intergenic	5.502	7	5	15	0	0	0	0	0	0	0	0	0	DIVER	
rs13862788	9:128385974	128385974	2.96E-09	128152244	128495888	233	159	2	rs13862788rs1	rs13862788	NA	9:128385974.G-GCTCTCCC	9	128385974	GCTCTCCC	G	0.4672	2.96E-09	1	rs13862788	12	MARPKAP1	0	intronic	1.083	NA	5	15	1	0	0	0	0	0	0	0	0	DIVER	
rs1568083	18:157667091615	76679016	5.16E-11	76382015	77251889	626	420	5	rs1568083rs441	rs1568083	NA	18:1576670916.CT	15	7670916	C	T	0.1172	5.16E-11	1	rs1568083	18	SCAPER	0	intronic	1.525	6	5	15	1	0	0	0	0	0	0	0	0	DIVER	
rs183775180	20:2041387520	20413875	2.83E-08	20413875	20727438	3	3	1	rs183775180	rs183775180	NA	20:20413875.CT	20	20413875	T	C	0.00497	2.83E-08	1	rs183775180	24	RALGAP2	0	intronic	0.871	7	4	15	1	0	0	0	0	0	0	0	0	DIVER	
rs1876767	2:222609832.2	22609832	2.08E-10	22431110	22606275	138	82	2	rs1876767rs11	rs1876767	NA	2:222609832.G-T	2	22609832	G	T	0.3728	2.08E-10	1	rs1876767	2	ACOR8490.2:AC0000	0	ncRNA_intronic	0.427	7	5	15	0	0	0	0	0	0	0	0	0	DIVER	
rs2038527	15:7885161515	78851615	2.44E-09	78719501	78936168	89	55	1	rs2038527	rs2038527	NA	15:78851615.A-G	15	78851615	G	A	0.3738	2.44E-09	1	rs2038527	19	CHRNA5	6246	intergenic	7.964	NA	5	15	1	0	0	0	0	0	0	0	0	DIVER	
rs2330552	8:544415578.5	44415578	5.83E-10	44406517	44566335	44	32	1	rs2330552	rs2330552	NA	8:544415578.A-C	8	44415578	A	C	0.4415	5.83E-10	1	rs2330552	8	FGF10-AS1	1486	intergenic	1.164	6	5	15	0	0	0	0	0	0	0	0	0	DIVER	
rs2473302	1:122353824	22353824	2.66E-08	22351976	22470115	80	44	1	rs2473302	rs2473302	NA	1:12235382.CT	1	2235382	C	T	0.2644	2.66E-08	1	rs2473302	1	LINC00339	0	ncRNA_intronic	7.619	NA	1	15	0	0	0	0	0	0	0	0	0	0	DIVER
rs276216	10:106089640	106089648	1.07E-09	106077586	106111179	41	24	1	rs276216	rs276216	NA	10:106089648.A-G	10	106089648	A	G	0.3459	1.07E-09	1	rs276216	15	TPRP	0	UTRS	8.898	NA	1	15	1	0	0	0	0	0	0	0	0	DIVER	
rs28544299	4:7860512.44	7860512	1.89E-08	7844754	7939080	94	58	1	rs28544299	rs28544299	NA	4:7860512.C	4	7860512</																									

Supplementary Table S4. The annotation in fuma based on the result of MAGMA

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000162670	1	190066792	190446759	1056	68	368428	4.3538	6.69E-06	BRINP3	0.01061482
ENSG00000164266	5	147204131	147211349	23	10	368428	5.0401	2.33E-07	SPINK1	0.0010884
ENSG00000188107	6	64429876	66417118	8089	222	368428	3.8403	6.14E-05	EYS	0.04522202
ENSG00000154438	7	117003276	117068177	140	38	368428	3.8318	6.36E-05	ASZ1	0.04522202
ENSG00000171044	8	10753555	11058875	1321	66	368428	4.3501	6.81E-06	XKR6	0.01061482
ENSG00000171056	8	10581278	10697357	630	35	368428	4.0362	2.72E-05	SOX7	0.02825066
ENSG00000173273	8	9413424	9639856	977	39	368428	4.471	3.89E-06	TNKS	0.00910818
ENSG00000184608	8	11225911	11296167	382	56	368428	3.7995	7.25E-05	C8orf12	0.04670262
ENSG00000258724	8	10582909	10697357	620	34	368428	3.9941	3.25E-05	SOX7	0.02894427
ENSG00000204682	10	21781587	21786191	11	5	368428	3.826	6.51E-05	CASC10	0.04522202
ENSG00000149295	11	113280318	113346413	231	47	368428	4.0434	2.63E-05	DRD2	0.02825066
ENSG00000110851	12	108126643	108155049	99	17	368428	4.2036	1.31E-05	PRDM4	0.01639322
ENSG00000136045	12	108079509	108106944	94	22	368428	3.7834	7.73E-05	PWP1	0.04670262
ENSG00000100711	14	104182067	104200005	68	26	368428	4.3821	5.88E-06	ZFYVE21	0.01061482
ENSG00000041357	15	78832747	78841604	38	11	368428	4.3957	5.52E-06	PSMA4	0.01061482
ENSG00000080644	15	78885394	78913637	116	22	368428	5.306	5.60E-08	CHRNA3	0.00039559
ENSG00000103591	15	67493371	67547533	153	27	368428	4.6306	1.82E-06	AAGAB	0.00487577
ENSG00000103599	15	67547138	67794598	609	59	368428	3.9977	3.20E-05	IQCH	0.02894427
ENSG00000117971	15	78916461	79020096	347	50	368428	3.7892	7.56E-05	CHRN4	0.04670262
ENSG00000136381	15	78729773	78793798	165	30	368428	5.694	6.21E-09	IREB2	0.00011617
ENSG00000166949	15	67356101	67487533	452	82	368428	3.7725	8.08E-05	SMAD3	0.04727114
ENSG00000169684	15	78857862	78887611	87	22	368428	5.2834	6.34E-08	CHRNA5	0.00039559
ENSG00000188266	15	78799906	78829714	108	16	368428	4.6986	1.31E-06	HYKK	0.00408676
ENSG00000099365	16	31000577	31021949	42	13	368428	3.867	5.51E-05	STX1B	0.04483449
ENSG00000103496	16	31044210	31054296	21	8	368428	4.3023	8.45E-06	STX4	0.01217116
ENSG00000103507	16	31117428	31124110	16	9	368428	4.2613	1.02E-05	BCKDK	0.01358526
ENSG00000103510	16	31127075	31142714	39	15	368428	3.8188	6.70E-05	KAT8	0.04522202
ENSG00000151006	16	31094746	31100949	20	9	368428	3.8166	6.76E-05	PRSS53	0.04522202
ENSG00000167395	16	31085743	31095517	25	13	368428	4.1665	1.55E-05	ZNF646	0.01808978
ENSG00000167397	16	31102163	31107301	8	4	368428	3.8774	5.28E-05	VKORC1	0.04483449
ENSG00000255439	16	31094760	31106277	28	12	368428	4.0104	3.03E-05	RP11-196G11.1	0.02894427
ENSG00000130203	19	45409011	45412650	9	5	368428	4.7022	1.29E-06	APOE	0.00408676
ENSG00000152061	1	174128548	174964445	2461	46	403294	4.2048	1.31E-05	RABGAP1L	0.01793051

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000184588	1	66258197	66840259	2117	141	403294	4.432	4.67E-06	PDE4B	0.01092032
ENSG00000158092	3	136581050	136668665	255	23	403294	4.1575	1.61E-05	NCK1	0.01881627
ENSG00000168917	3	136537489	136574734	113	16	403294	4.2304	1.17E-05	SLC35G2	0.01793051
ENSG00000105963	7	937540	995043	355	71	403294	3.9788	3.46E-05	ADAP1	0.02549669
ENSG00000164850	7	1121844	1133451	72	27	403294	4.3578	6.57E-06	GPBR1	0.01366248
ENSG00000178381	7	1191707	1200395	68	18	403294	4.5337	2.90E-06	ZFAND2A	0.01085157
ENSG00000240230	7	938415	1015235	469	84	403294	4.2142	1.25E-05	COX19	0.01793051
ENSG00000136574	8	11534468	11617511	384	68	403294	3.848	5.95E-05	GATA4	0.03714837
ENSG00000171044	8	10753555	11058875	1321	66	403294	4.0856	2.20E-05	XKR6	0.02176115
ENSG00000175806	8	9911778	10286401	1874	123	403294	3.9206	4.42E-05	MSRA	0.02952297
ENSG00000182319	8	8175258	8244008	292	44	403294	4.1631	1.57E-05	SGK223	0.01881627
ENSG00000184608	8	11225911	11296167	382	56	403294	4.4932	3.51E-06	C8orf12	0.01092032
ENSG00000255098	8	11870545	11873043	13	6	403294	3.8103	6.94E-05	RP11-481A20.11	0.04190538
ENSG00000125952	14	65472892	65569413	369	57	403294	4.4384	4.53E-06	MAX	0.01092032
ENSG00000125954	14	65381203	65528521	577	72	403294	3.9729	3.55E-05	CHURC1-FNTB	0.02549669
ENSG00000257365	14	65381203	65529368	579	74	403294	4.0346	2.73E-05	FNTB	0.02517571
ENSG00000080644	15	78885394	78913637	116	22	403294	5.272	6.75E-08	CHRNA3	0.0003157
ENSG00000117971	15	78916461	79020096	347	50	403294	5.739	4.76E-09	CHRNA4	4.46E-05
ENSG00000136378	15	79051545	79103773	265	32	403294	4.1989	1.34E-05	ADAMTS7	0.01793051
ENSG00000136381	15	78729773	78793798	165	30	403294	5.5744	1.24E-08	IREB2	7.75E-05
ENSG00000169684	15	78857862	78887611	87	22	403294	5.909	1.72E-09	CHRNA5	3.22E-05
ENSG00000188266	15	78799906	78829714	108	16	403294	4.2146	1.25E-05	HYKK	0.01793051
ENSG00000174939	16	29911696	29931185	43	19	403294	3.867	5.51E-05	ASPHD1	0.03556549
ENSG00000174943	16	29916333	29938356	59	19	403294	4.0845	2.21E-05	KCTD13	0.02176115
ENSG00000120071	17	44107282	44302733	964	13	403294	3.975	3.52E-05	KANSL1	0.02549669
ENSG00000120088	17	43699267	43913194	1172	16	403294	4.027	2.82E-05	CRHR1	0.02517571
ENSG00000185294	17	43922256	43924438	11	2	403294	3.9645	3.68E-05	SPPL2C	0.02549669
ENSG00000186868	17	43971748	44105700	802	11	403294	3.9697	3.60E-05	MAPT	0.02549669
ENSG00000256762	17	44076616	44077060	1	1	403294	3.9777	3.48E-05	STH	0.02549669
ENSG00000101204	20	61975420	62009753	205	51	403294	4.1385	1.75E-05	CHRNA4	0.0192421
ENSG00000116544	1	35331037	35395186	158	62	409710	4.1882	1.41E-05	DLGAP3	0.00773934
ENSG00000152061	1	174128548	174964445	2461	46	409710	4.0118	3.01E-05	RABGAP1L	0.01295456
ENSG00000135999	2	149402009	149545130	462	33	409710	4.0192	2.92E-05	EPC2	0.01295456
ENSG00000004534	3	49977440	50137478	376	35	409710	3.7271	9.69E-05	RBM6	0.03072798
ENSG00000067560	3	49396578	49450431	132	28	409710	4.7096	1.24E-06	RHOA	0.00232234
ENSG00000145020	3	49454211	49460186	7	3	409710	3.6133	0.00015114	AMT	0.04562965

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000145022	3	49449639	49453908	10	5	409710	5.1549	1.27E-07	TCTA	0.0007673
ENSG00000145029	3	49460379	49466759	8	5	409710	4.8665	5.68E-07	NICN1	0.0017715
ENSG00000164061	3	49591922	49708978	248	45	409710	5.5804	1.20E-08	BSN	0.00022462
ENSG00000164062	3	49711435	49721396	14	10	409710	4.3855	5.79E-06	APEH	0.00515841
ENSG00000164068	3	49726932	49758962	76	24	409710	4.2459	1.09E-05	RNF123	0.00688698
ENSG00000164077	3	49946302	49967606	35	13	409710	4.3422	7.05E-06	MON1A	0.00557024
ENSG00000164078	3	49924435	49941299	26	12	409710	3.8562	5.76E-05	MST1R	0.02072659
ENSG00000172037	3	49158547	49170551	17	12	409710	3.8328	6.33E-05	LAMB2	0.02237013
ENSG00000173402	3	49506146	49573048	146	31	409710	4.5771	2.36E-06	DAG1	0.00294122
ENSG00000173531	3	49721380	49726934	7	4	409710	5.4135	3.09E-08	MST1	0.00028922
ENSG00000176095	3	49761727	49823975	133	27	409710	4.2916	8.87E-06	IP6K1	0.00592886
ENSG00000182179	3	49842640	49851379	21	11	409710	3.943	4.02E-05	UBA7	0.01609828
ENSG00000183763	3	49866034	49894007	56	18	409710	4.1665	1.55E-05	TRAIIP	0.00827282
ENSG00000187492	3	49828165	49837268	20	11	409710	4.2209	1.22E-05	CDHR4	0.00711752
ENSG00000228008	3	49941278	49954370	19	8	409710	3.8952	4.91E-05	CTD-2330K9.3	0.01874283
ENSG00000233276	3	49394609	49396033	3	1	409710	4.6296	1.83E-06	GPX1	0.00263708
ENSG00000138785	4	106603784	106817143	757	30	409710	3.7474	8.93E-05	INTS12	0.02882637
ENSG00000164093	4	111538579	111563279	66	23	409710	4.1154	1.93E-05	PITX2	0.00977535
ENSG00000064652	5	122179134	122365049	794	37	409710	4.2052	1.30E-05	SNX24	0.00739871
ENSG00000145868	5	147763498	147822399	173	35	409710	4.2428	1.10E-05	FBXO38	0.00688698
ENSG00000145879	5	147691982	147695485	16	6	409710	4.7923	8.25E-07	SPINK7	0.00192919
ENSG00000204909	5	147700766	147719412	85	17	409710	4.4912	3.54E-06	SPINK9	0.00414323
ENSG00000268126	5	147698550	147701891	24	8	409710	4.7191	1.18E-06	AC091948.1	0.00232234
ENSG00000104408	8	109213445	109447562	969	46	409710	5.024	2.53E-07	EIF3E	0.00094717
ENSG00000104412	8	109455830	109499145	149	19	409710	3.8024	7.16E-05	EMC2	0.02483463
ENSG00000164989	9	15552895	16061661	1960	42	409710	3.9879	3.33E-05	CCDC171	0.01386505
ENSG00000119919	10	101292690	101296278	10	5	409710	4.0116	3.02E-05	NKX2-3	0.01295456
ENSG00000138193	10	95753746	96092580	1096	116	409710	4.0093	3.05E-05	PLCE1	0.01295456
ENSG00000148834	10	105995114	106027217	91	26	409710	3.5852	0.0001684	GSTO1	0.04925174
ENSG00000134825	11	61535973	61560274	51	17	409710	3.749	8.88E-05	TMEM258	0.02882637
ENSG00000149485	11	61567099	61596790	60	15	409710	3.9419	4.04E-05	FADS1	0.01609828
ENSG00000080644	15	78885394	78913637	116	22	409710	4.3551	6.65E-06	CHRNA3	0.00557024
ENSG00000103855	15	73976307	74006859	127	28	409710	3.6709	0.00012086	CD276	0.03770429
ENSG00000117971	15	78916461	79020096	347	50	409710	5.1066	1.64E-07	CHRN4	0.0007673
ENSG00000136378	15	79051545	79103773	265	32	409710	3.7963	7.34E-05	ADAMTS7	0.02498955
ENSG00000136381	15	78729773	78793798	165	30	409710	3.8659	5.53E-05	IREB2	0.02030793

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000169684	15	78857862	78887611	87	22	409710	4.7961	8.09E-07	CHRNA5	0.00192919
ENSG00000256061	15	55702723	55800432	436	46	409710	4.1484	1.67E-05	DYX1C1	0.00870335
ENSG00000260916	15	55632230	55700708	326	31	409710	4.3394	7.14E-06	CCPG1	0.00557024
ENSG00000261652	15	55700746	55710962	55	15	409710	4.2217	1.21E-05	C15orf65	0.00711752
ENSG00000168488	16	28834356	28848558	43	9	409710	4.6479	1.68E-06	ATXN2L	0.00261568
ENSG00000176476	16	28565236	28603111	135	27	409710	4.0978	2.09E-05	CCDC101	0.01027076
ENSG00000177548	16	28915742	28947847	68	32	409710	4.3018	8.47E-06	RABEP2	0.00592127
ENSG00000178188	16	28857921	28885526	74	13	409710	4.6065	2.05E-06	SH2B1	0.00273791
ENSG00000178952	16	28853732	28857729	6	3	409710	4.0844	2.21E-05	TUFM	0.01050969
ENSG00000184730	16	28505970	28510291	10	5	409710	4.307	8.28E-06	APOBR	0.00592127
ENSG00000188603	16	28477983	28506896	53	21	409710	4.4472	4.35E-06	CLN3	0.00452341
ENSG00000196296	16	28889726	28915830	73	26	409710	4.6695	1.51E-06	ATP2A1	0.00256862
ENSG00000196502	16	28616903	28634946	76	11	409710	4.4498	4.30E-06	SULT1A1	0.00452341
ENSG00000197165	16	28603264	28608430	33	15	409710	3.7508	8.81E-05	SULT1A2	0.02882637
ENSG00000197272	16	28510683	28523372	34	12	409710	4.3	8.54E-06	IL27	0.00592127
ENSG00000261832	16	28477974	28503333	45	19	409710	4.4027	5.35E-06	CLN3	0.00500379
ENSG00000073605	17	38060848	38076107	60	13	409710	3.8827	5.16E-05	GSDMB	0.01933457
ENSG00000161395	17	37827375	37853050	84	12	409710	3.9212	4.41E-05	PGAP3	0.01718156
ENSG00000186075	17	38024417	38034149	38	7	409710	3.6645	0.00012392	ZBPB2	0.03802516
ENSG00000198740	17	47366568	47439835	195	33	409710	4.0806	2.25E-05	ZNF652	0.01050969
ENSG00000101115	20	50400581	50419059	88	24	409710	4.4097	5.18E-06	SALL4	0.00500379
ENSG00000100285	22	29876219	29887379	34	14	409710	3.5933	0.00016324	NEFH	0.04850042
ENSG00000164266	5	147204131	147211349	23	10	365516	5.2613	7.15E-08	SPINK1	0.00133901
ENSG00000169223	5	176758563	176778853	53	20	365516	4.1543	1.63E-05	LMAN2	0.03392741
ENSG00000171044	8	10753555	11058875	1321	66	365516	4.1637	1.57E-05	XKR6	0.03392741
ENSG00000184608	8	11225911	11296167	382	56	365516	4.2619	1.01E-05	C8orf12	0.03161782
ENSG00000136378	15	79051545	79103773	265	32	365516	4.1959	1.36E-05	ADAMTS7	0.03392741
ENSG00000102882	16	30125426	30134827	30	18	365516	4.87	5.58E-07	MAPK3	0.00522148
ENSG00000125107	16	58553855	58663790	395	31	365516	4.4	5.41E-06	CNOT1	0.02407846
ENSG00000149930	16	29984962	30003582	32	10	365516	4.0378	2.70E-05	TAOK2	0.04590504
ENSG00000174939	16	29911696	29931185	43	19	365516	4.1149	1.94E-05	ASPHD1	0.03624928
ENSG00000174943	16	29916333	29938356	59	19	365516	4.3624	6.43E-06	KCTD13	0.02407846
ENSG00000101204	20	61975420	62009753	205	51	365516	4.4746	3.83E-06	CHRNA4	0.02388167
ENSG00000070831	1	22379120	22419437	129	32	363000	3.8963	4.88E-05	CDC42	0.01693112
ENSG00000116329	1	29138654	29190208	212	41	363000	3.7267	9.70E-05	OPRD1	0.02604797
ENSG00000130940	1	10696661	10856707	653	137	363000	3.7537	8.71E-05	CASZ1	0.0250922

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000162552	1	22443798	22470462	112	26	363000	4.6473	1.68E-06	WNT4	0.00095365
ENSG00000213047	1	197473878	197744826	570	61	363000	3.7296	9.59E-05	DENND1B	0.02604797
ENSG00000235750	1	175126123	175162135	136	24	363000	4.8362	6.62E-07	KIAA0040	0.00049538
ENSG00000075884	2	143848931	144525921	2207	168	363000	8.5098	8.71E-18	ARHGAP15	1.63E-13
ENSG00000115159	2	157291802	157470247	516	37	363000	3.7292	9.60E-05	GPD2	0.02604797
ENSG00000269383	2	100986705	100987007	3	2	363000	3.6591	0.00012654	AC012493.2	0.03076072
ENSG00000138271	3	151011891	151034740	96	22	363000	3.8351	6.28E-05	GPR87	0.01991056
ENSG00000144893	3	150803484	151154860	1327	82	363000	4.4242	4.84E-06	MED12L	0.00226521
ENSG00000163960	3	196074533	196159345	215	58	363000	3.7069	0.00010491	UBXN7	0.02727369
ENSG00000168237	3	52321105	52329272	21	7	363000	3.8038	7.12E-05	GLYCTK	0.02116501
ENSG00000169313	3	151055168	151102600	191	41	363000	3.9312	4.23E-05	P2RY12	0.01540421
ENSG00000174944	3	150929905	150996255	242	43	363000	4.8517	6.12E-07	P2RY14	0.00047731
ENSG00000071205	4	148653214	148993931	1119	101	363000	3.5282	0.00020922	ARHGAP10	0.04553698
ENSG00000138696	4	95679119	96079599	1668	91	363000	3.7217	9.90E-05	BMPR1B	0.02608894
ENSG00000196526	4	7760441	7941653	1044	64	363000	4.7089	1.25E-06	AFAP1	0.00072836
ENSG00000064652	5	122179134	122365049	794	37	363000	5.8124	3.08E-09	SNX24	5.24E-06
ENSG00000072682	5	131527531	131631008	394	45	363000	3.6976	0.00010882	P4HA2	0.02779117
ENSG00000135074	5	156822542	157002783	781	49	363000	4.0139	2.99E-05	ADAM19	0.01215124
ENSG00000168938	5	122358945	122372436	60	22	363000	3.8596	5.68E-05	PPIC	0.01832589
ENSG00000197536	5	131746328	131811736	249	38	363000	4.3056	8.33E-06	C5orf56	0.00371116
ENSG00000164465	6	117774980	117891021	503	47	363000	3.6206	0.00014698	DCBLD1	0.03438965
ENSG00000049540	7	73442119	73484237	128	46	363000	6.1094	5.00E-10	ELN	1.17E-06
ENSG00000106683	7	73497263	73536855	140	45	363000	4.7091	1.24E-06	LIMK1	0.00072836
ENSG00000176349	7	1878222	1889567	68	15	363000	3.7256	9.74E-05	AC110781.3	0.02604797
ENSG00000171056	8	10581278	10697357	630	35	363000	3.5044	0.00022883	SOX7	0.0485974
ENSG00000119487	9	128199672	128469513	842	50	363000	5.0216	2.56E-07	MAPKAP1	0.00023976
ENSG00000177984	9	139654086	139660707	30	8	363000	3.8686	5.47E-05	LCN15	0.0182935
ENSG00000244187	9	139685807	139687709	12	7	363000	3.9824	3.41E-05	TMEM141	0.01330421
ENSG00000065621	10	106028631	106064703	100	32	363000	4.1623	1.58E-05	GSTO2	0.00685601
ENSG00000078403	10	21823094	22032559	381	90	363000	3.6273	0.00014319	MLLT10	0.03392697
ENSG00000148798	10	105036920	105050108	40	12	363000	3.6675	0.00012248	INA	0.03016553
ENSG00000148834	10	105995114	106027217	91	26	363000	4.3205	7.78E-06	GSTO1	0.00355313
ENSG00000148835	10	105127724	105148822	46	21	363000	3.9944	3.24E-05	TAF5	0.01291343
ENSG00000148841	10	106071894	106098162	87	27	363000	5.2469	7.73E-08	ITPRIP	8.51E-05
ENSG00000156374	10	105062553	105110891	113	40	363000	4.0266	2.83E-05	PCGF6	0.01177029
ENSG00000173915	10	105148798	105156223	19	11	363000	3.9741	3.53E-05	USMG5	0.01349339

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000180592	10	21802407	21814611	17	11	363000	3.8064	7.05E-05	SKIDA1	0.02116501
ENSG00000197748	10	105889646	105992120	333	42	363000	3.6819	0.00011577	WDR96	0.0288931
ENSG00000149295	11	113280318	113346413	231	47	363000	3.7281	9.65E-05	DRD2	0.02604797
ENSG00000170209	11	113258513	113271140	35	10	363000	3.6952	0.00010987	ANKK1	0.02779117
ENSG00000100599	14	92980118	93155339	750	123	363000	3.9526	3.87E-05	RIN3	0.01447051
ENSG00000080644	15	78885394	78913637	116	22	363000	4.9919	2.99E-07	CHRNA3	0.00026651
ENSG00000103591	15	67493371	67547533	153	27	363000	4.748	1.03E-06	AAGAB	0.00068655
ENSG00000103599	15	67547138	67794598	609	59	363000	4.7192	1.18E-06	IQCH	0.00072836
ENSG00000117906	15	77223960	77242601	43	20	363000	4.4937	3.50E-06	RCN2	0.00168006
ENSG00000117971	15	78916461	79020096	347	50	363000	5.0953	1.74E-07	CHRN4	0.00017519
ENSG00000136381	15	78729773	78793798	165	30	363000	4.6009	2.10E-06	IREB2	0.00106394
ENSG00000140374	15	76507696	76603813	277	27	363000	5.5338	1.57E-08	ETF1A	2.44E-05
ENSG00000140386	15	76640526	77197785	1510	49	363000	6.113	4.89E-10	SCAPER	1.17E-06
ENSG00000156218	15	84322838	84708594	1296	77	363000	3.5523	0.00019097	ADAMTSL3	0.04306719
ENSG00000159556	15	76629065	76634817	14	6	363000	4.6076	2.04E-06	ISL2	0.00106394
ENSG00000169684	15	78857862	78887611	87	22	363000	5.3852	3.62E-08	CHRNA5	4.23E-05
ENSG00000169758	15	76352178	76521462	566	79	363000	6.2853	1.64E-10	C15orf27	7.65E-07
ENSG00000188266	15	78799906	78829714	108	16	363000	3.7849	7.69E-05	HYKK	0.02248821
ENSG00000052344	16	31142756	31147083	8	5	363000	4.7684	9.29E-07	PRSS8	0.00064377
ENSG00000099364	16	30934376	30960104	45	14	363000	3.8692	5.46E-05	FBXL19	0.0182935
ENSG00000099365	16	31000577	31021949	42	13	363000	5.5002	1.90E-08	STX1B	2.73E-05
ENSG00000099381	16	30968615	30996437	66	25	363000	3.8195	6.69E-05	SETD1A	0.02051523
ENSG00000099385	16	30844947	30906281	109	33	363000	3.533	0.00020544	BCL7C	0.0452403
ENSG00000102996	16	58059470	58080805	65	26	363000	4.932	4.07E-07	MMP15	0.00033123
ENSG00000103005	16	58033450	58055522	62	19	363000	3.9263	4.31E-05	USB1	0.01540421
ENSG00000103264	16	87360593	87425748	272	52	363000	3.8634	5.59E-05	FBXO31	0.01832589
ENSG00000103496	16	31044210	31054296	21	8	363000	5.8333	2.72E-09	STX4	5.09E-06
ENSG00000103507	16	31117428	31124110	16	9	363000	6.5834	2.30E-11	BCKDK	2.15E-07
ENSG00000103510	16	31127075	31142714	39	15	363000	6.4013	7.70E-11	KAT8	4.81E-07
ENSG00000140941	16	87417601	87438385	87	27	363000	3.6503	0.00013098	MAP1LC3B	0.03143184
ENSG00000141101	16	69775770	69788843	45	16	363000	4.632	1.81E-06	NOB1	0.0009969
ENSG00000151006	16	31094746	31100949	20	9	363000	4.7105	1.24E-06	PRSS53	0.00072836
ENSG00000153815	16	81478775	81745367	1375	180	363000	3.5336	0.000205	CMIP	0.0452403
ENSG00000162086	16	3355406	3368852	38	11	363000	3.5738	0.00017591	ZNF75A	0.04015468
ENSG00000166188	16	58028572	58034357	17	7	363000	4.0977	2.09E-05	ZNF319	0.00887616
ENSG00000167394	16	31072164	31085641	37	13	363000	5.4427	2.62E-08	ZNF668	3.51E-05

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000167395	16	31085743	31095517	25	13	363000	6.2364	2.24E-10	ZNF646	8.38E-07
ENSG00000167397	16	31102163	31107301	8	4	363000	6.1379	4.18E-10	VKORC1	1.17E-06
ENSG00000169900	16	31227283	31228680	1	1	363000	3.9236	4.36E-05	PYDC1	0.01540421
ENSG00000178226	16	31150246	31161415	22	13	363000	4.6026	2.09E-06	PRSS36	0.00106394
ENSG00000181019	16	69740899	69760854	69	24	363000	4.7745	9.01E-07	NQO1	0.00064377
ENSG00000198373	16	69796209	69975644	700	46	363000	4.5929	2.19E-06	WWP2	0.00107648
ENSG00000255439	16	31094760	31106277	28	12	363000	5.39	3.52E-08	RP11-196G11.1	4.23E-05
ENSG00000172466	18	32912176	32925446	36	14	363000	3.5018	0.00023107	ZNF24	0.0485974
ENSG00000187323	18	49866542	51057784	5902	172	363000	4.9695	3.36E-07	DCC	0.00028549
ENSG00000130203	19	45409011	45412650	9	5	363000	5.9349	1.47E-09	APOE	3.06E-06
ENSG00000130208	19	45417504	45422606	17	9	363000	5.0913	1.78E-07	APOC1	0.00017519
ENSG00000131941	19	33469499	33555794	362	50	363000	3.8289	6.44E-05	RHPN2	0.02007755
ENSG00000267748	19	38779791	38795550	64	19	363000	3.5101	0.00022393	CTB-102L5.4	0.04817841
ENSG00000130584	20	62375019	62462597	434	39	363000	3.6047	0.00015626	ZBTB46	0.03610956
ENSG00000143226	1	161475220	161493803	77	22	378923	3.8177	6.74E-05	FCGR2A	0.04759155
ENSG00000152061	1	174128548	174964445	2461	46	378923	3.9433	4.02E-05	RABGAP1L	0.0395866
ENSG00000162552	1	22443798	22470462	112	26	378923	3.9779	3.48E-05	WNT4	0.0395866
ENSG00000172995	3	35680437	35835988	474	64	378923	3.9543	3.84E-05	ARPP21	0.0395866
ENSG00000196782	4	140637907	141075338	1454	194	378923	5.6565	7.72E-09	MAML3	6.11E-05
ENSG00000188107	6	64429876	66417118	8089	222	378923	5.0391	2.34E-07	EYS	0.0007296
ENSG00000171044	8	10753555	11058875	1321	66	378923	5.5656	1.31E-08	XKR6	6.11E-05
ENSG00000171056	8	10581278	10697357	630	35	378923	5.6442	8.30E-09	SOX7	6.11E-05
ENSG00000184608	8	11225911	11296167	382	56	378923	4.5837	2.28E-06	C8orf12	0.00610688
ENSG00000215346	8	10983980	10987745	17	6	378923	4.1324	1.80E-05	AF131215.5	0.03054607
ENSG00000254093	8	10622473	10697394	448	36	378923	5.485	2.07E-08	PINX1	7.74E-05
ENSG00000258724	8	10582909	10697357	620	34	378923	5.5705	1.27E-08	SOX7	6.11E-05
ENSG00000173611	9	127704887	127905785	534	56	378923	4.0498	2.56E-05	SCAI	0.03768221
ENSG00000149295	11	113280318	113346413	231	47	378923	4.2538	1.05E-05	DRD2	0.02223906
ENSG00000176697	11	27676440	27743605	173	39	378923	3.8468	5.98E-05	BDNF	0.04479143
ENSG00000125954	14	65381203	65528521	577	72	378923	3.8587	5.70E-05	CHURC1-FNTB	0.04444901
ENSG00000257365	14	65381203	65529368	579	74	378923	3.9093	4.63E-05	FNTB	0.04125002
ENSG00000117971	15	78916461	79020096	347	50	378923	4.1514	1.65E-05	CHRNA4	0.03054607
ENSG00000136381	15	78729773	78793798	165	30	378923	3.9833	3.40E-05	IREB2	0.0395866
ENSG00000153774	16	75327596	75467383	668	35	378923	3.813	6.86E-05	CFDP1	0.04759155
ENSG00000261717	16	75446582	75498604	269	24	378923	4.0259	2.84E-05	RP11-77K12.1	0.0379454
ENSG00000141452	18	21083473	21111746	75	25	378923	3.8618	5.63E-05	C18orf8	0.04444901

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000141458	18	21086148	21166862	237	52	378923	3.8832	5.16E-05	NPC1	0.04386308
ENSG00000268797	19	41307202	41404187	435	71	378923	4.2499	1.07E-05	CTC-490E21.12	0.02223906
ENSG00000101204	20	61975420	62009753	205	51	378923	4.0449	2.62E-05	CHRNA4	0.03768221
ENSG00000197114	20	62338817	62367494	105	19	378923	3.9513	3.89E-05	ZGPAT	0.0395866
ENSG00000273154	20	62340216	62370456	112	19	378923	3.9134	4.55E-05	RP4-583P15.15	0.04125002
ENSG00000197536	5	131746328	131811736	249	38	359744	4.3663	6.32E-06	C5orf56	0.02365506
ENSG00000065621	10	106028631	106064703	100	32	359744	4.5665	2.48E-06	GSTO2	0.01547417
ENSG00000148834	10	105995114	106027217	91	26	359744	4.097	2.09E-05	GSTO1	0.04351519
ENSG00000148841	10	106071894	106098162	87	27	359744	5.4373	2.71E-08	ITPRIP	0.00025317
ENSG00000080644	15	78885394	78913637	116	22	359744	4.0541	2.52E-05	CHRNA3	0.04709262
ENSG00000117971	15	78916461	79020096	347	50	359744	5.6527	7.90E-09	CHRN4	0.00014779
ENSG00000136381	15	78729773	78793798	165	30	359744	4.2036	1.31E-05	IREB2	0.03098531
ENSG00000169684	15	78857862	78887611	87	22	359744	4.2589	1.03E-05	CHRNA5	0.03098531
ENSG00000073605	17	38060848	38076107	60	13	359744	4.4408	4.48E-06	GSDMB	0.0209665
ENSG00000161395	17	37827375	37853050	84	12	359744	4.2018	1.32E-05	PGAP3	0.03098531
ENSG00000104408	8	109213445	109447562	969	46	356523	4.2502	1.07E-05	EIF3E	0.02499087
ENSG00000148841	10	106071894	106098162	87	27	356523	4.516	3.15E-06	ITPRIP	0.01404823
ENSG00000125954	14	65381203	65528521	577	72	356523	4.2759	9.52E-06	CHURC1-FNTB	0.02499087
ENSG00000257365	14	65381203	65529368	579	74	356523	4.3317	7.40E-06	FNTB	0.02307461
ENSG00000080644	15	78885394	78913637	116	22	356523	5.192	1.04E-07	CHRNA3	0.00064914
ENSG00000117971	15	78916461	79020096	347	50	356523	5.8118	3.09E-09	CHRN4	5.46E-05
ENSG00000136381	15	78729773	78793798	165	30	356523	4.4788	3.75E-06	IREB2	0.01404823
ENSG00000169684	15	78857862	78887611	87	22	356523	5.7046	5.83E-09	CHRNA5	5.46E-05
ENSG00000152061	1	174128548	174964445	2461	46	339710	3.9724	3.56E-05	RABGAP1L	0.03857156
ENSG00000115159	2	157291802	157470247	516	37	339710	3.881	5.20E-05	GPD2	0.04015083
ENSG00000145029	3	49460379	49466759	8	5	339710	4.7311	1.12E-06	NICN1	0.00298579
ENSG00000164061	3	49591922	49708978	248	45	339710	4.5966	2.15E-06	BSN	0.00476248
ENSG00000164068	3	49726932	49758962	76	24	339710	3.924	4.36E-05	RNF123	0.03881846
ENSG00000172037	3	49158547	49170551	17	12	339710	4.8393	6.52E-07	LAMB2	0.00203284
ENSG00000173531	3	49721380	49726934	7	4	339710	4.2186	1.23E-05	MST1	0.01769715
ENSG00000176095	3	49761727	49823975	133	27	339710	4.5072	3.29E-06	IP6K1	0.00614905
ENSG00000182179	3	49842640	49851379	21	11	339710	3.9625	3.71E-05	UBA7	0.03857156
ENSG00000183763	3	49866034	49894007	56	18	339710	4.459	4.12E-06	TRAIIP	0.00700428
ENSG00000187492	3	49828165	49837268	20	11	339710	4.1235	1.87E-05	CDHR4	0.02328769
ENSG00000233276	3	49394609	49396033	3	1	339710	3.9352	4.16E-05	GPX1	0.03881846
ENSG00000109670	4	153242410	153457253	668	37	339710	3.8641	5.57E-05	FBXW7	0.04015083

GENE	CHR	START	STOP	NSNPS	NPARAM	N	ZSTAT	P	SYMBOL	FDR
ENSG00000169194	5	131991955	131996802	11	4	339710	4.5832	2.29E-06	IL13	0.00476248
ENSG00000104412	8	109455830	109499145	149	19	339710	3.9392	4.09E-05	EMC2	0.03881846
ENSG00000171044	8	10753555	11058875	1321	66	339710	3.7838	7.72E-05	XKR6	0.04998545
ENSG00000149084	11	43577986	43878167	1066	53	339710	3.9063	4.69E-05	HSD17B12	0.03987615
ENSG00000176697	11	27676440	27743605	173	39	339710	3.9802	3.44E-05	BDNF	0.03857156
ENSG00000080644	15	78885394	78913637	116	22	339710	6.8853	2.88E-12	CHRNA3	2.70E-08
ENSG00000117971	15	78916461	79020096	347	50	339710	5.4055	3.23E-08	CHRNA4	0.00014885
ENSG00000136378	15	79051545	79103773	265	32	339710	5.3682	3.98E-08	ADAMTS7	0.00014885
ENSG00000136381	15	78729773	78793798	165	30	339710	6.4352	6.17E-11	IREB2	3.85E-07
ENSG00000169684	15	78857862	78887611	87	22	339710	7.5269	2.60E-14	CHRNA5	4.86E-10
ENSG00000185787	15	79102829	79190475	398	35	339710	4.161	1.58E-05	MORF4L1	0.02117808
ENSG00000188266	15	78799906	78829714	108	16	339710	4.2996	8.56E-06	HYKK	0.01334515
ENSG00000261717	16	75446582	75498604	269	24	339710	3.8711	5.42E-05	RP11-77K12.1	0.04015083
ENSG00000130520	19	18417040	18434084	57	21	339710	3.864	5.58E-05	LSM4	0.04015083
ENSG00000197114	20	62338817	62367494	105	19	339710	3.8271	6.48E-05	ZGPAT	0.04494261
ENSG00000273154	20	62340216	62370456	112	19	339710	3.7831	7.74E-05	RP4-583P15.15	0.04998545

Supplementary Table S5. MAGMA combined with POPS screening (POPS score>1)

ENSGID	PoPS_Score	Y	Y_proj	project_out_covariates_gene	feature_selection_gene	training_gene
ENSG00000130203	2.45569910587	4.7022	4.6951634	TRUE	TRUE	TRUE
ENSG00000149295	1.18847465916	4.0434	4.01621416	TRUE	TRUE	TRUE
ENSG00000162670	1.48949952811	4.3538	4.26905274	TRUE	TRUE	TRUE
ENSG00000164266	2.24372038387	5.0401	5.0416022	TRUE	TRUE	TRUE
ENSG00000120088	1.0719853148	4.027	3.71616227	TRUE	TRUE	TRUE
ENSG00000178381	1.32750845865	4.5337	4.53470089	TRUE	TRUE	TRUE
ENSG00000184588	1.4908405275	4.432	4.42957397	TRUE	TRUE	TRUE
ENSG00000164266	2.15517157186	5.2613	5.27017696	TRUE	TRUE	TRUE
ENSG00000049540	1.40717913543	6.1094	6.15855356	TRUE	TRUE	TRUE
ENSG00000075884	1.54825811631	8.5098	8.55116595	TRUE	TRUE	TRUE
ENSG00000130203	2.32512088861	5.9349	5.9052197	TRUE	TRUE	TRUE
ENSG00000130208	1.921342841	5.0913	5.03586367	TRUE	TRUE	TRUE
ENSG00000172995	1.68321204249	3.9543	3.9128336	TRUE	TRUE	TRUE
ENSG00000196782	1.10996944475	5.6565	5.71524228	TRUE	TRUE	TRUE
ENSG00000065621	1.38925231608	4.5665	4.59345964	TRUE	TRUE	TRUE

Supplementary Table S6. Gene ontology enrichment

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:1901385	regulation of voltage-gated calcium channel activity	3/13/2024	49/18903	4.60E-06	0.002122955755	0.000832846578	DRD2/CRHR1/PDE4B	3
BP	GO:0034382	chylomicron remnant clearance	2/13/2024	6/18903	6.54E-06	0.002122955755	0.000832846578	APOE/APOC1	2
BP	GO:0071830	triglyceride-rich lipoprotein particle clearance	2/13/2024	6/18903	6.54E-06	0.002122955755	0.000832846578	APOE/APOC1	2
BP	GO:0034447	very-low-density lipoprotein particle clearance	2/13/2024	7/18903	9.15E-06	0.002168125478	0.000850566896	APOE/APOC1	2
BP	GO:0051051	negative regulation of transport	5/13/2024	479/18903	1.11E-05	0.002168125478	0.000850566896	APOE/DRD2/SPINK1/CRHR1/APOC5	5
BP	GO:0048149	behavioral response to ethanol	2/13/2024	9/18903	1.57E-05	0.002228155493	0.000874116982	DRD2/CRHR1	2
BP	GO:0051926	negative regulation of calcium ion transport	3/13/2024	74/18903	1.60E-05	0.002228155493	0.000874116982	DRD2/SPINK1/CRHR1	3
BP	GO:0051924	regulation of calcium ion transport	4/13/2024	268/18903	2.55E-05	0.003109665082	0.001219937777	DRD2/SPINK1/CRHR1/PDE4B	4
BP	GO:0033700	phospholipid efflux	2/13/2024	13/18903	3.39E-05	0.003480160966	0.001365285238	APOE/APOC1	2
BP	GO:0015850	organic hydroxy compound transport	4/13/2024	292/18903	3.57E-05	0.003480160966	0.001365285238	APOE/DRD2/CRHR1/APOC1	4
BP	GO:1901019	regulation of calcium ion transmembrane transporter activity	3/13/2024	102/18903	4.19E-05	0.003714090407	0.001457056974	DRD2/CRHR1/PDE4B	3
BP	GO:0034375	high-density lipoprotein particle remodeling	2/13/2024	16/18903	5.21E-05	0.004229467916	0.00165924225	APOE/APOC1	2
BP	GO:0071243	cellular response to arsenic-containing substance	2/13/2024	20/18903	8.24E-05	0.005742358428	0.002252757062	ZFAND2A/GSTO2	2
BP	GO:0045471	response to ethanol	3/13/2024	128/18903	8.25E-05	0.005742358428	0.002252757062	DRD2/SPINK1/CRHR1	3
BP	GO:1901386	negative regulation of voltage-gated calcium channel activity	2/13/2024	24/18903	0.000119477962	0.006099506608	0.002392868149	DRD2/CRHR1	2
BP	GO:0034377	plasma lipoprotein particle assembly	2/13/2024	26/18903	0.000140580501	0.006099506608	0.002392868149	APOE/APOC1	2
BP	GO:0032368	regulation of lipid transport	3/13/2024	155/18903	0.000145597833	0.006099506608	0.002392868149	APOE/CRHR1/APOC1	3
BP	GO:0010959	regulation of metal ion transport	4/13/2024	423/18903	0.000150577364	0.006099506608	0.002392868149	DRD2/SPINK1/CRHR1/PDE4B	4
BP	GO:0007189	adenylate cyclase-activating G protein-coupled receptor signaling pathway	3/13/2024	157/18903	0.000151224253	0.006099506608	0.002392868149	DRD2/CRHR1/PDE4B	3
BP	GO:0071880	adenylate cyclase-activating adrenergic receptor signaling pathway	2/13/2024	27/18903	0.000151768047	0.006099506608	0.002392868149	DRD2/PDE4B	2
BP	GO:0006869	lipid transport	4/13/2024	433/18903	0.000164747325	0.006099506608	0.002392868149	APOE/DRD2/CRHR1/APOC1	4
BP	GO:0006816	calcium ion transport	4/13/2024	440/18903	0.000175227125	0.006099506608	0.002392868149	DRD2/SPINK1/CRHR1/PDE4B	4
BP	GO:0045936	negative regulation of phosphate metabolic process	4/13/2024	440/18903	0.000175227125	0.006099506608	0.002392868149	APOE/DRD2/SPINK1/APOC1	4
BP	GO:0007263	nitric oxide mediated signal transduction	2/13/2024	29/18903	0.000175413201	0.006099506608	0.002392868149	APOE/SPINK1	2
BP	GO:0065005	protein-lipid complex assembly	2/13/2024	29/18903	0.000175413201	0.006099506608	0.002392868149	APOE/APOC1	2
BP	GO:0010563	negative regulation of phosphorus metabolic process	4/13/2024	441/18903	0.000176762845	0.006099506608	0.002392868149	APOE/DRD2/SPINK1/APOC1	4
BP	GO:0043271	negative regulation of ion transport	3/13/2024	167/18903	0.000181487212	0.006099506608	0.002392868149	DRD2/SPINK1/CRHR1	3
BP	GO:0034368	protein-lipid complex remodeling	2/13/2024	30/18903	0.000187869813	0.006099506608	0.002392868149	APOE/APOC1	2
BP	GO:0034369	plasma lipoprotein particle remodeling	2/13/2024	30/18903	0.000187869813	0.006099506608	0.002392868149	APOE/APOC1	2
BP	GO:0045940	positive regulation of steroid metabolic process	2/13/2024	30/18903	0.000187869813	0.006099506608	0.002392868149	APOE/APOC1	2
BP	GO:0034367	protein-containing complex remodeling	2/13/2024	32/18903	0.000214048626	0.006515105041	0.002555909575	APOE/APOC1	2
BP	GO:0046685	response to arsenic-containing substance	2/13/2024	32/18903	0.000214048626	0.006515105041	0.002555909575	ZFAND2A/GSTO2	2
BP	GO:0071875	adrenergic receptor signaling pathway	2/13/2024	33/18903	0.000227769832	0.006722661109	0.0026373349	DRD2/PDE4B	2
BP	GO:1905952	regulation of lipid localization	3/13/2024	185/18903	0.000245395816	0.006961082568	0.002730868877	APOE/CRHR1/APOC1	3
BP	GO:0010876	lipid localization	4/13/2024	483/18903	0.00025055449	0.006961082568	0.002730868877	APOE/DRD2/CRHR1/APOC1	4
BP	GO:1903169	regulation of calcium ion transmembrane transport	3/13/2024	188/18903	0.000257288473	0.006961082568	0.002730868877	DRD2/CRHR1/PDE4B	3
BP	GO:0007616	long-term memory	2/13/2024	36/18903	0.000271454706	0.007145861719	0.002803358699	APOE/DRD2	2
BP	GO:2001257	regulation of cation channel activity	3/13/2024	197/18903	0.000295194965	0.007566313056	0.002968303944	DRD2/CRHR1/PDE4B	3
BP	GO:0030100	regulation of endocytosis	3/13/2024	209/18903	0.000351121283	0.008769028969	0.003440135649	APOE/DRD2/APOC1	3
BP	GO:0042596	fear response	2/13/2024	43/18903	0.000388029941	0.009448529066	0.003706707069	APOE/CRHR1	2
BP	GO:1901020	negative regulation of calcium ion transmembrane transporter activity	2/13/2024	44/18903	0.000406349896	0.0095691538	0.003754028779	DRD2/CRHR1	2
BP	GO:0071827	plasma lipoprotein particle organization	2/13/2024	45/18903	0.000425084963	0.0095691538	0.003754028779	APOE/APOC1	2
BP	GO:0030072	peptide hormone secretion	3/13/2024	225/18903	0.000435758177	0.0095691538	0.003754028779	DRD2/SPINK1/CRHR1	3
BP	GO:1900271	regulation of long-term synaptic potentiation	2/13/2024	46/18903	0.00044423465	0.0095691538	0.003754028779	APOE/DRD2	2
BP	GO:0002790	peptide secretion	3/13/2024	230/18903	0.00046466876	0.0095691538	0.003754028779	DRD2/SPINK1/CRHR1	3
BP	GO:0071825	protein-lipid complex subunit organization	2/13/2024	48/18903	0.000483775922	0.0095691538	0.003754028779	APOE/APOC1	2
BP	GO:0046883	regulation of hormone secretion	3/13/2024	234/18903	0.000488667165	0.0095691538	0.003754028779	DRD2/SPINK1/CRHR1	3
BP	GO:0007188	adenylate cyclase-modulating G protein-coupled receptor signaling pathway	3/13/2024	248/18903	0.000578915413	0.0095691538	0.003754028779	DRD2/CRHR1/PDE4B	3
BP	GO:0034381	plasma lipoprotein particle clearance	2/13/2024	53/18903	0.000589850659	0.0095691538	0.003754028779	APOE/APOC1	2
BP	GO:0009636	response to toxic substance	3/13/2024	250/18903	0.000592620081	0.0095691538	0.003754028779	APOE/DRD2/GSTO2	3
BP	GO:0045744	negative regulation of G protein-coupled receptor signaling pathway	2/13/2024	54/18903	0.000612299677	0.0095691538	0.003754028779	DRD2/PDE4B	2
BP	GO:0097305	response to alcohol	3/13/2024	253/18903	0.000613565632	0.0095691538	0.003754028779	DRD2/SPINK1/CRHR1	3
BP	GO:0015833	peptide transport	3/13/2024	254/18903	0.000620651753	0.0095691538	0.003754028779	DRD2/SPINK1/CRHR1	3
BP	GO:0006898	receptor-mediated endocytosis	3/13/2024	257/18903	0.000642225227	0.0095691538	0.003754028779	APOE/DRD2/APOC1	3
BP	GO:0045761	regulation of adenylate cyclase activity	2/13/2024	56/18903	0.00065842788	0.0095691538	0.003754028779	DRD2/CRHR1	2
BP	GO:1903170	negative regulation of calcium ion transmembrane transport	2/13/2024	56/18903	0.00065842788	0.0095691538	0.003754028779	DRD2/CRHR1	2
BP	GO:0048168	regulation of neuronal synaptic plasticity	2/13/2024	57/18903	0.000682106091	0.0095691538	0.003754028779	APOE/DRD2	2
BP	GO:0010578	regulation of adenylate cyclase activity involved in G protein-coupled receptor signaling pathway	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	CRHR1	1
BP	GO:0010900	negative regulation of phosphatidylcholine catabolic process	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOC1	1
BP	GO:0071831	intermediate-density lipoprotein particle clearance	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:0090731	cellular response to very-low-density lipoprotein particle stimulus	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:0150200	regulation of transport across blood-brain barrier	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0150201	positive regulation of transport across blood-brain barrier	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1903000	regulation of lipid transport across blood-brain barrier	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1903002	positive regulation of lipid transport across blood-brain barrier	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1905853	regulation of heparan sulfate binding	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1905855	positive regulation of heparan sulfate binding	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1905858	regulation of heparan sulfate proteoglycan binding	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1905860	positive regulation of heparan sulfate proteoglycan binding	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:1905890	regulation of cellular response to very-low-density lipoprotein particle stimulus	1/13/2024	1/18903	0.000687721526	0.0095691538	0.003754028779	APOE	1
BP	GO:0032412	regulation of ion transmembrane transporter activity	3/13/2024	281/18903	0.000832317252	0.011110835359	0.004358838469	DRD2/CRHR1/PDE4B	3
BP	GO:0051055	negative regulation of lipid biosynthetic process	2/13/2024	63/18903	0.00083274228	0.011110835359	0.004358838469	APOE/APOC1	2
BP	GO:2001258	negative regulation of cation channel activity	2/13/2024	63/18903	0.00083274228	0.011110835359	0.004358838469	DRD2/CRHR1	2
BP	GO:0022898	regulation of transmembrane transporter activity	3/13/2024	291/18903	0.000921038984	0.011961226277	0.004692451247	DRD2/CRHR1/PDE4B	3
BP	GO:0046879	hormone secretion	3/13/2024	291/18903	0.000921038984	0.011961226277	0.004692451247	DRD2/SPINK1/CRHR1	3
BP	GO:0015909	long-chain fatty acid transport	2/13/2024	67/18903	0.000941289832	0.012063372325	0.004732523672	APOE/DRD2	2
BP	GO:0042886	amide transport	3/13/2024	296/18903	0.00096757484	0.012239193431	0.004801499206	DRD2/SPINK1/CRHR1	3
BP	GO:0009914	hormone transport	3/13/2024	300/18903	0.001005864851	0.012560414931	0.00492751607	DRD2/SPINK1/CRHR1	3
BP	GO:0033344	cholesterol efflux	2/13/2024	71/18903	0.00105630004	0.013023243534	0.005109086137	APOE/APOC1	2
BP	GO:0050709	negative regulation of protein secretion	2/13/2024	72/18903	0.001086058769	0.013222765507	0.005187359644	APOE/DRD2	2
BP	GO:0050795	regulation of behavior	2/13/2024	73/18903	0.001116219006	0.013422189031	0.005265594529	APOE/DRD2	2
BP	GO:0051339	regulation of lyase activity	2/13/2024	76/18903	0.00120910397	0.014361795937	0.005634207203	DRD2/CRHR1	2
BP	GO:0031279	regulation of cyclase activity	2/13/2024	77/18903	0.001240865445	0.014561481241	0.005712544786	DRD2/CRHR1	2
BP	GO:0032409	regulation of transporter activity	3/13/2024	326/18903	0.001278421669	0.014717101992	0.005773595616	DRD2/CRHR1/PDE4B	3
BP	GO:0032371	regulation of sterol transport	2/13/2024	81/18903	0.00137189768	0.014717101992	0.005773595616	APOE/APOC1	2
BP	GO:0032374	regulation of cholesterol transport	2/13/2024	81/18903	0.00137189768	0.014717101992	0.005773595616	APOE/APOC1	2
BP	GO:0033555	multicellular organismal response to stress	2/13/2024	81/18903	0.00137189768	0.014717101992	0.005773595616	APOE/CRHR1	2
BP	GO:0010877	lipid transport involved in lipid storage	1/13/2024	2/18903	0.001375006449	0.014717101992	0.005773595616	APOE	1
BP	GO:0051867	general adaptation syndrome, behavioral process	1/13/2024	2/18903	0.001375006449	0.014717101992	0.005773595616	CRHR1	1
BP	GO:0150174	negative regulation of phosphatidylcholine metabolic process	1/13/2024	2/18903	0.001375006449	0.014717101992	0.005773595616	APOC1	1
BP	GO:1901898	negative regulation of relaxation of cardiac muscle	1/13/2024	2/18903	0.001375006449	0.014717101992	0.005773595616	PDE4B	1
BP	GO:0001933	negative regulation of protein phosphorylation	3/13/2024	338/18903	0.001418519335	0.015017802523	0.005891561997	APOE/DRD2/SPINK1	3
BP	GO:0097006	regulation of plasma lipoprotein particle levels	2/13/2024	84/18903	0.00147434414	0.015440980565	0.006057576943	APOE/APOC1	2
BP	GO:0070588	calcium ion transmembrane transport	3/13/2024	345/18903	0.001504555656	0.015589757545	0.006115942925	DRD2/CRHR1/PDE4B	3
BP	GO:0032413	negative regulation of ion transmembrane transporter activity	2/13/2024	89/18903	0.00165299735	0.016947572832	0.006648620921	DRD2/CRHR1	2
BP	GO:0090277	positive regulation of peptide hormone secretion	2/13/2024	92/18903	0.00176491385	0.017772095516	0.006972085456	DRD2/SPINK1	2
BP	GO:0002793	positive regulation of peptide secretion	2/13/2024	94/18903	0.00184148553	0.017772095516	0.006972085456	DRD2/SPINK1	2
BP	GO:0045807	positive regulation of endocytosis	2/13/2024	96/18903	0.001919621344	0.017772095516	0.006972085456	APOE/DRD2	2
BP	GO:0042326	negative regulation of phosphorylation	3/13/2024	381/18903	0.001999149697	0.017772095516	0.006972085456	APOE/DRD2/SPINK1	3
BP	GO:0010751	negative regulation of nitric oxide mediated signal transduction	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	SPINK1	1
BP	GO:0010899	regulation of phosphatidylcholine catabolic process	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	APOC1	1
BP	GO:0021769	orbitofrontal cortex development	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:0032805	positive regulation of low-density lipoprotein particle receptor catabolic process	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	APOE	1
BP	GO:0044467	glial cell-derived neurotrophic factor production	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:0051586	positive regulation of dopamine uptake involved in synaptic transmission	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:0051866	general adaptation syndrome	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	CRHR1	1
BP	GO:0051944	positive regulation of catecholamine uptake involved in synaptic transmission	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:0060160	negative regulation of dopamine receptor signaling pathway	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:0061771	response to caloric restriction	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	APOE	1
BP	GO:0090187	positive regulation of pancreatic juice secretion	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	SPINK1	1
BP	GO:1900166	regulation of glial cell-derived neurotrophic factor production	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2/CRHR1/PDE4B	3
BP	GO:1900168	positive regulation of glial cell-derived neurotrophic factor production	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	DRD2	1
BP	GO:2000852	regulation of corticosterone secretion	1/13/2024	3/18903	0.002061855024	0.017772095516	0.006972085456	CRHR1	1
BP	GO:0098869	cellular oxidant detoxification	2/13/2024	100/18903	0.002080570291	0.017776100558	0.006973656655	APOE/GSTO2	2
BP	GO:0015908	fatty acid transport	2/13/2024	101/18903	0.002121779225	0.017942550291	0.007038955575	APOE/DRD2	2
BP	GO:0050878	regulation of body fluid levels	3/13/2024	390/18903	0.002136895107	0.017942550291	0.007038955575	APOE/DRD2/SPINK1	3
BP	GO:0019218	regulation of steroid metabolic process	2/13/2024	102/18903	0.002163375898	0.01800964209	0.007065276212	APOE/APOC1	2
BP	GO:1904062	regulation of cation transmembrane transport	3/13/2024	394/18903	0.00219997931	0.018093302397	0.007098096585	DRD2/CRHR1/PDE4B	3
BP	GO:0006641	triglyceride metabolic process	2/13/2024	104/18903	0.002247730585	0.018093302397	0.007098096585	APOE/APOC1	2
BP	GO:0015914	phospholipid transport	2/13/2024	104/18903	0.002247730585	0.018093302397	0.007098096585	APOE/APOC1	2
BP	GO:0060291	long-term synaptic potentiation	2/13/2024	104/18903	0.002247730585	0.018093302397	0.007098096585	APOE/DRD2	2
BP	GO:0071868	cellular response to monoamine stimulus	2/13/2024	105/18903	0.002290487663	0.018137682792	0.007115507245	DRD2/PDE4B	2
BP	GO:0071870	cellular response to catecholamine stimulus	2/13/2024	105/18903	0.002290487663	0.018137682792	0.007115507245	DRD2/PDE4B	2
BP	GO:0062014	negative regulation of small molecule metabolic process	2/13/2024	108/18903	0.002421072215	0.018715272522	0.007342098698	APOE/APOC1	2
BP	GO:0071867	response to monoamine	2/13/2024	108/18903	0.002421072215	0.018715272522	0.007342098698	DRD2/PDE4B	2
BP	GO:0071869	response to catecholamine	2/13/2024	108/18903	0.002421072215	0.018715272522	0.007342098698	DRD2/PDE4B	2
BP	GO:1904063	negative regulation of cation transmembrane transport	2/13/2024	109/18903	0.002465369949	0.018718968878	0.007343548798	DRD2/CRHR1	2

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0045833	negative regulation of lipid metabolic process	2/13/2024	110/18903	0.00251005168	0.018718968878	0.007343548798	APOE/APOC1	2
BP	GO:0050678	regulation of epithelial cell proliferation	3/13/2024	414/18903	0.002532930168	0.018718968878	0.007343548798	APOE/DRD2/SPINK1	3
BP	GO:0048259	regulation of receptor-mediated endocytosis	2/13/2024	112/18903	0.002600565268	0.018718968878	0.007343548798	DRD2/APOC1	2
BP	GO:0032410	negative regulation of transporter activity	2/13/2024	115/18903	0.002739203988	0.018718968878	0.007343548798	DRD2/CRHR1	2
BP	GO:0034766	negative regulation of ion transmembrane transport	2/13/2024	115/18903	0.002739203988	0.018718968878	0.007343548798	DRD2/CRHR1	2
BP	GO:1990748	cellular detoxification	2/13/2024	115/18903	0.002739203988	0.018718968878	0.007343548798	APOE/GSTO2	2
BP	GO:0010873	positive regulation of cholesterol esterification	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE/APOC1	1
BP	GO:0010916	negative regulation of very-low-density lipoprotein particle clearance	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOC1	1
BP	GO:0042321	negative regulation of circadian sleep/wake cycle, sleep	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	DRD2	1
BP	GO:0097114	NMDA glutamate receptor clustering	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE	1
BP	GO:0140192	regulation of adenylate cyclase-activating adrenergic receptor signaling pathway involved in heart process	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	PDE4B	1
BP	GO:0140199	negative regulation of adenylate cyclase-activating adrenergic receptor signaling pathway involved in heart process	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	PDE4B	1
BP	GO:1902952	positive regulation of dendritic spine maintenance	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE	1
BP	GO:1902994	regulation of phospholipid efflux	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE	1
BP	GO:1902995	positive regulation of phospholipid efflux	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE	1
BP	GO:1905908	positive regulation of amyloid fibril formation	1/13/2024	4/18903	0.002748267505	0.018718968878	0.007343548798	APOE	1
BP	GO:0009410	response to xenobiotic stimulus	3/13/2024	432/18903	0.002858136198	0.01933211567	0.007584089472	DRD2/PDE4B/GSTO2	3
BP	GO:0007613	memory	2/13/2024	120/18903	0.002977886468	0.020003182204	0.007847352361	APOE/DRD2	2
BP	GO:0030301	cholesterol transport	2/13/2024	121/18903	0.003026761486	0.020192230738	0.007921517084	APOE/APOC1	2
BP	GO:0046887	positive regulation of hormone secretion	2/13/2024	123/18903	0.003125646349	0.020570132051	0.008069769734	DRD2/SPINK1	2
BP	GO:0097237	cellular response to toxic substance	2/13/2024	123/18903	0.003125646349	0.020570132051	0.008069769734	APOE/GSTO2	2
BP	GO:0051224	negative regulation of protein transport	2/13/2024	129/18903	0.003431346347	0.021580347078	0.00846608234	APOE/DRD2	2
BP	GO:0010915	regulation of very-low-density lipoprotein particle clearance	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	APOC1	1
BP	GO:0033602	negative regulation of dopamine secretion	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	DRD2	1
BP	GO:0035934	corticosterone secretion	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	CRHR1	1
BP	GO:0043435	response to corticotropin-releasing hormone	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	CRHR1	1
BP	GO:0071376	cellular response to corticotropin-releasing hormone stimulus	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	CRHR1	1
BP	GO:0090325	regulation of locomotion involved in locomotory behavior	1/13/2024	5/18903	0.003434244145	0.021580347078	0.00846608234	DRD2	1
BP	GO:0006639	acylglycerol metabolic process	2/13/2024	132/18903	0.003589261629	0.022314079112	0.008753929231	APOE/APOC1	2
BP	GO:0023061	signal release	3/13/2024	470/18903	0.003627239462	0.022314079112	0.008753929231	DRD2/SPINK1/CRHR1	3
BP	GO:0006638	neutral lipid metabolic process	2/13/2024	133/18903	0.003642647411	0.022314079112	0.008753929231	APOE/APOC1	2
BP	GO:1904950	negative regulation of establishment of protein localization	2/13/2024	133/18903	0.003642647411	0.022314079112	0.008753929231	APOE/DRD2	2
BP	GO:0015918	sterol transport	2/13/2024	135/18903	0.003750537262	0.02268958567	0.008901242406	APOE/APOC1	2
BP	GO:0035270	endocrine system development	2/13/2024	135/18903	0.003750537262	0.02268958567	0.008901242406	DRD2/CRHR1	2
BP	GO:0050673	epithelial cell proliferation	3/13/2024	481/18903	0.003871436472	0.022799265813	0.008944270496	APOE/DRD2/SPINK1	3
BP	GO:0008203	cholesterol metabolic process	2/13/2024	139/18903	0.003970777321	0.022799265813	0.008944270496	APOE/APOC1	2
BP	GO:0008277	regulation of G protein-coupled receptor signaling pathway	2/13/2024	139/18903	0.003970777321	0.022799265813	0.008944270496	DRD2/PDE4B	2
BP	GO:0042157	lipoprotein metabolic process	2/13/2024	140/18903	0.004026763917	0.022799265813	0.008944270496	APOE/APOC1	2
BP	GO:0007195	adenylate cyclase-inhibiting dopamine receptor signaling pathway	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	DRD2	1
BP	GO:0007270	neuron-neuron synaptic transmission	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	DRD2	1
BP	GO:0010872	regulation of cholesterol esterification	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	APOC1	1
BP	GO:0021853	cerebral cortex GABAergic interneuron migration	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	DRD2	1
BP	GO:0032799	low-density lipoprotein receptor particle metabolic process	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	APOE	1
BP	GO:0032802	low-density lipoprotein particle receptor catabolic process	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	APOE	1
BP	GO:0032803	regulation of low-density lipoprotein particle receptor catabolic process	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	APOE	1
BP	GO:0051582	positive regulation of neurotransmitter uptake	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	DRD2	1
BP	GO:0071878	negative regulation of adenylate cyclase-activating adrenergic receptor signaling pathway	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	PDE4B	1
BP	GO:1901897	regulation of relaxation of cardiac muscle	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	PDE4B	1
BP	GO:1990379	lipid transport across blood-brain barrier	1/13/2024	6/18903	0.004119785198	0.022799265813	0.008944270496	APOE	1
BP	GO:0030534	adult behavior	2/13/2024	143/18903	0.004196940224	0.023095026997	0.009060299146	DRD2/CRHR1	2
BP	GO:0015748	organophosphate ester transport	2/13/2024	148/18903	0.004487928564	0.024345937416	0.009551037806	APOE/APOC1	2
BP	GO:1902652	secondary alcohol metabolic process	2/13/2024	149/18903	0.004547226331	0.024345937416	0.009551037806	APOE/APOC1	2
BP	GO:1903531	negative regulation of secretion by cell	2/13/2024	151/18903	0.004666918348	0.024345937416	0.009551037806	APOE/DRD2	2
BP	GO:0007221	positive regulation of transcription of Notch receptor target	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	MAML3	1
BP	GO:0021894	cerebral cortex GABAergic interneuron development	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	DRD2	1
BP	GO:0051005	negative regulation of lipoprotein lipase activity	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	APOC1	1
BP	GO:0051458	corticotropin secretion	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	CRHR1	1
BP	GO:0051823	regulation of synapse structural plasticity	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	DRD2	1
BP	GO:0060696	regulation of phospholipid catabolic process	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	APOC1	1
BP	GO:0090186	regulation of pancreatic juice secretion	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	SPINK1	1
BP	GO:1901078	negative regulation of relaxation of muscle	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	PDE4B	1
BP	GO:1990384	hyaloid vascular plexus regression	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	DRD2	1
BP	GO:2000646	positive regulation of receptor catabolic process	1/13/2024	7/18903	0.004804890918	0.024345937416	0.009551037806	APOE	1
BP	GO:0016125	sterol metabolic process	2/13/2024	154/18903	0.00484919082	0.024345937416	0.009551037806	APOE/APOC1	2
BP	GO:0034763	negative regulation of transmembrane transport	2/13/2024	154/18903	0.00484919082	0.024345937416	0.009551037806	DRD2/CRHR1	2

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0045834	positive regulation of lipid metabolic process	2/13/2024	154/18903	0.00484919082	0.024345937416	0.009551037806	APOE/APOC1	2
BP	GO:0098754	detoxification	2/13/2024	154/18903	0.00484919082	0.024345937416	0.009551037806	APOE/GSTO2	2
BP	GO:0046434	organophosphate catabolic process	2/13/2024	161/18903	0.005287191054	0.025705927683	0.010084569057	PDE4B/APOC1	2
BP	GO:0017038	protein import	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:0032489	regulation of Cdc42 protein signal transduction	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:0045541	negative regulation of cholesterol biosynthetic process	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:0051584	regulation of dopamine uptake involved in synaptic transmission	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	DRD2	1
BP	GO:0051940	regulation of catecholamine uptake involved in synaptic transmission	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	DRD2	1
BP	GO:0060158	phospholipase C-activating dopamine receptor signaling pathway	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	DRD2	1
BP	GO:0090206	negative regulation of cholesterol metabolic process	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:0106119	negative regulation of sterol biosynthetic process	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:1900004	negative regulation of serine-type endopeptidase activity	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	SPINK1	1
BP	GO:1900223	positive regulation of amyloid-beta clearance	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:1902572	negative regulation of serine-type peptidase activity	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	SPINK1	1
BP	GO:1903726	negative regulation of phospholipid metabolic process	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOC1	1
BP	GO:1905920	positive regulation of CoA-transferase activity	1/13/2024	8/18903	0.005489561558	0.025705927683	0.010084569057	APOE	1
BP	GO:0050806	positive regulation of synaptic transmission	2/13/2024	170/18903	0.005876251232	0.027149687778	0.010650963648	APOE/DRD2	2
BP	GO:0006198	cAMP catabolic process	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	PDE4B	1
BP	GO:0019852	L-ascorbic acid metabolic process	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	GSTO2	1
BP	GO:0021826	substrate-independent telencephalic tangential migration	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	DRD2	1
BP	GO:0021830	interneuron migration from the subpallium to the cortex	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	DRD2	1
BP	GO:0021843	substrate-independent telencephalic tangential interneuron migration	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	DRD2	1
BP	GO:0034433	steroid esterification	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	APOC1	1
BP	GO:0034434	sterol esterification	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	APOC1	1
BP	GO:0034435	cholesterol esterification	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	APOC1	1
BP	GO:0060124	positive regulation of growth hormone secretion	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	DRD2	1
BP	GO:0086023	adenylate cyclase-activating adrenergic receptor signaling pathway involved in heart process	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	PDE4B	1
BP	GO:1901334	lactone metabolic process	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	GSTO2	1
BP	GO:2000822	regulation of behavioral fear response	1/13/2024	9/18903	0.006173797372	0.027149687778	0.010650963648	APOE	1
BP	GO:0048660	regulation of smooth muscle cell proliferation	2/13/2024	175/18903	0.006215996278	0.027149687778	0.010650963648	APOE/ELN	2
BP	GO:0051048	negative regulation of secretion	2/13/2024	175/18903	0.006215996278	0.027149687778	0.010650963648	APOE/DRD2	2
BP	GO:0050680	negative regulation of epithelial cell proliferation	2/13/2024	176/18903	0.006285009153	0.027328566584	0.010721138733	APOE/DRD2	2
BP	GO:0048659	smooth muscle cell proliferation	2/13/2024	179/18903	0.006494167555	0.027486835591	0.010783228487	APOE/ELN	2
BP	GO:0090276	regulation of peptide hormone secretion	2/13/2024	179/18903	0.006494167555	0.027486835591	0.010783228487	DRD2/SPINK1	2
BP	GO:0002791	regulation of peptide secretion	2/13/2024	182/18903	0.006706496364	0.027486835591	0.010783228487	DRD2/SPINK1	2
BP	GO:0046890	regulation of lipid biosynthetic process	2/13/2024	182/18903	0.006706496364	0.027486835591	0.010783228487	APOE/APOC1	2
BP	GO:0071466	cellular response to xenobiotic stimulus	2/13/2024	183/18903	0.006777975115	0.027486835591	0.010783228487	PDE4B/GSTO2	2
BP	GO:0090087	regulation of peptide transport	2/13/2024	184/18903	0.006849804374	0.027486835591	0.010783228487	DRD2/SPINK1	2
BP	GO:0006707	cholesterol catabolic process	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:0016127	sterol catabolic process	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:0034379	very-low-density lipoprotein particle assembly	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOC1	1
BP	GO:0051967	negative regulation of synaptic transmission, glutamatergic	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	DRD2	1
BP	GO:0090281	negative regulation of calcium ion import	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	SPINK1	1
BP	GO:0097113	AMPA glutamate receptor clustering	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:0097688	glutamate receptor clustering	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:0150172	regulation of phosphatidylcholine metabolic process	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOC1	1
BP	GO:1900003	regulation of serine-type endopeptidase activity	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	SPINK1	1
BP	GO:1902571	regulation of serine-type peptidase activity	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	SPINK1	1
BP	GO:1903365	regulation of fear response	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:1905918	regulation of CoA-transferase activity	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	APOE	1
BP	GO:2000849	regulation of glucocorticoid secretion	1/13/2024	10/18903	0.006857598612	0.027486835591	0.010783228487	CRHR1	1
BP	GO:0021892	cerebral cortex GABAergic interneuron differentiation	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	DRD2	1
BP	GO:0031987	locomotion involved in locomotory behavior	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	DRD2	1
BP	GO:0034776	response to histamine	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	DRD2	1
BP	GO:0048755	branching morphogenesis of a nerve	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	DRD2	1
BP	GO:0060159	regulation of dopamine receptor signaling pathway	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	DRD2	1
BP	GO:0071872	cellular response to epinephrine stimulus	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	PDE4B	1
BP	GO:2000644	regulation of receptor catabolic process	1/13/2024	11/18903	0.007540965532	0.029379601714	0.011525770477	APOE	1
BP	GO:0061136	regulation of proteasomal protein catabolic process	2/13/2024	194/18903	0.007587278544	0.029442268133	0.011550354839	APOE/ZFAND2A	2
BP	GO:0007626	locomotory behavior	2/13/2024	197/18903	0.007815281794	0.029557479804	0.011595552976	APOE/DRD2	2
BP	GO:0010749	regulation of nitric oxide mediated signal transduction	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	SPINK1	1
BP	GO:0014854	response to inactivity	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0030432	peristalsis	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0031223	auditory behavior	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0034370	triglyceride-rich lipoprotein particle remodeling	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	APOE	1

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0034372	very-low-density lipoprotein particle remodeling	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	APOE	1
BP	GO:0035815	positive regulation of renal sodium excretion	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0035933	glucocorticoid secretion	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	CRHR1	1
BP	GO:0042756	drinking behavior	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0048521	negative regulation of behavior	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0051583	dopamine uptake involved in synaptic transmission	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0051934	catecholamine uptake involved in synaptic transmission	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0060123	regulation of growth hormone secretion	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0060134	prepulse inhibition	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:0090209	negative regulation of triglyceride metabolic process	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	APOE	1
BP	GO:0106072	negative regulation of adenylate cyclase-activating G protein-coupled receptor signaling pathway	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	PDE4B	1
BP	GO:1900272	negative regulation of long-term synaptic potentiation	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	APOE	1
BP	GO:1902950	regulation of dendritic spine maintenance	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	APOE	1
BP	GO:2001223	negative regulation of neuron migration	1/13/2024	12/18903	0.008223898385	0.029557479804	0.011595552976	DRD2	1
BP	GO:1903828	negative regulation of protein localization	2/13/2024	203/18903	0.008280575305	0.029651765982	0.011632541934	APOE/DRD2	2
BP	GO:0007204	positive regulation of cytosolic calcium ion concentration	2/13/2024	205/18903	0.008438412145	0.030106276299	0.011810848694	DRD2/SPINK1	2
BP	GO:0048167	regulation of synaptic plasticity	2/13/2024	207/18903	0.008597612729	0.03056231678	0.011989755745	APOE/DRD2	2
BP	GO:0045732	positive regulation of protein catabolic process	2/13/2024	209/18903	0.008758173608	0.030761812374	0.012068018904	APOE/ZFAND2A	2
BP	GO:0050807	regulation of synapse organization	2/13/2024	209/18903	0.008758173608	0.030761812374	0.012068018904	APOE/DRD2	2
BP	GO:0009214	cyclic nucleotide catabolic process	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	PDE4B	1
BP	GO:0030157	pancreatic juice secretion	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	SPINK1	1
BP	GO:0033604	negative regulation of catecholamine secretion	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	DRD2	1
BP	GO:0035810	positive regulation of urine volume	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	DRD2	1
BP	GO:0051481	negative regulation of cytosolic calcium ion concentration	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	DRD2	1
BP	GO:1905907	negative regulation of amyloid fibril formation	1/13/2024	13/18903	0.008906397423	0.030761812374	0.012068018904	APOE	1
BP	GO:0008016	regulation of heart contraction	2/13/2024	214/18903	0.009165504533	0.031544881326	0.012375220924	DRD2/PDE4B	2
BP	GO:0050803	regulation of synapse structure or activity	2/13/2024	215/18903	0.009247983639	0.031716676284	0.012442616979	APOE/DRD2	2
BP	GO:0001976	nervous system process involved in regulation of systemic arterial blood pressure	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	DRD2	1
BP	GO:0007638	mechanosensory behavior	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	DRD2	1
BP	GO:0030252	growth hormone secretion	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	DRD2	1
BP	GO:0042754	negative regulation of circadian rhythm	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	DRD2	1
BP	GO:0048148	behavioral response to cocaine	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	DRD2	1
BP	GO:0071871	response to epinephrine	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	PDE4B	1
BP	GO:1901077	regulation of relaxation of muscle	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	PDE4B	1
BP	GO:1901841	regulation of high voltage-gated calcium channel activity	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	PDE4B	1
BP	GO:2001140	positive regulation of phospholipid transport	1/13/2024	14/18903	0.009588462898	0.031874275982	0.012504444416	APOE	1
BP	GO:0070374	positive regulation of ERK1 and ERK2 cascade	2/13/2024	223/18903	0.009919899708	0.032689779714	0.012824370513	APOE/DRD2	2
BP	GO:0051651	maintenance of location in cell	2/13/2024	226/18903	0.010177378253	0.032689779714	0.012824370513	APOE/DRD2	2
BP	GO:1903050	regulation of proteolysis involved in protein catabolic process	2/13/2024	227/18903	0.010263868917	0.032689779714	0.012824370513	APOE/ZFAND2A	2
BP	GO:0002031	G protein-coupled receptor internalization	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	DRD2	1
BP	GO:0007567	parturition	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	CRHR1	1
BP	GO:0032488	Cdc42 protein signal transduction	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0034380	high-density lipoprotein particle assembly	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0034384	high-density lipoprotein particle clearance	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0035641	locomotory exploration behavior	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0090205	positive regulation of cholesterol metabolic process	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0106070	regulation of adenylate cyclase-activating G protein-coupled receptor signaling pathway	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	PDE4B	1
BP	GO:1904936	interneuron migration	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	DRD2	1
BP	GO:2001138	regulation of phospholipid transport	1/13/2024	15/18903	0.010270095064	0.032689779714	0.012824370513	APOE	1
BP	GO:0021984	adenohypophysis development	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	DRD2	1
BP	GO:0034374	low-density lipoprotein particle remodeling	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:0034638	phosphatidylcholine catabolic process	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOC1	1
BP	GO:0042159	lipoprotein catabolic process	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:0045187	regulation of circadian sleep/wake cycle, sleep	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	DRD2	1
BP	GO:0051044	positive regulation of membrane protein ectodomain proteolysis	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:0060033	anatomical structure regression	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	DRD2	1
BP	GO:0060046	regulation of acrosome reaction	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	SPINK1	1
BP	GO:0060456	positive regulation of digestive system process	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	SPINK1	1
BP	GO:0072578	neurotransmitter-gated ion channel clustering	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:0097154	GABAergic neuron differentiation	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	DRD2	1
BP	GO:0099170	postsynaptic modulation of chemical synaptic transmission	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	DRD2	1
BP	GO:1902931	negative regulation of alcohol biosynthetic process	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:1905906	regulation of amyloid fibril formation	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	APOE	1
BP	GO:2000846	regulation of corticosteroid hormone secretion	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	CRHR1	1
BP	GO:2001256	regulation of store-operated calcium entry	1/13/2024	16/18903	0.010951294173	0.033125964361	0.012995488018	SPINK1	1

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0045088	regulation of innate immune response	2/13/2024	240/18903	0.01141826344	0.034431543624	0.01350767355	APOE/DRD2	2
BP	GO:0055089	fatty acid homeostasis	1/13/2024	17/18903	0.011632060476	0.034647177076	0.013592267674	APOE	1
BP	GO:0055119	relaxation of cardiac muscle	1/13/2024	17/18903	0.011632060476	0.034647177076	0.013592267674	PDE4B	1
BP	GO:0060192	negative regulation of lipase activity	1/13/2024	17/18903	0.011632060476	0.034647177076	0.013592267674	APOC1	1
BP	GO:0090494	dopamine uptake	1/13/2024	17/18903	0.011632060476	0.034647177076	0.013592267674	DRD2	1
BP	GO:0033002	muscle cell proliferation	2/13/2024	247/18903	0.012062743507	0.035820463951	0.014052554214	APOE/ELN	2
BP	GO:0043117	positive regulation of vascular permeability	1/13/2024	18/18903	0.012312394227	0.035996603873	0.014121654821	APOE	1
BP	GO:0050802	circadian sleep/wake cycle, sleep	1/13/2024	18/18903	0.012312394227	0.035996603873	0.014121654821	DRD2	1
BP	GO:0051580	regulation of neurotransmitter uptake	1/13/2024	18/18903	0.012312394227	0.035996603873	0.014121654821	DRD2	1
BP	GO:0086103	G protein-coupled receptor signaling pathway involved in heart process	1/13/2024	18/18903	0.012312394227	0.035996603873	0.014121654821	PDE4B	1
BP	GO:0090493	catecholamine uptake	1/13/2024	18/18903	0.012312394227	0.035996603873	0.014121654821	DRD2	1
BP	GO:0060047	heart contraction	2/13/2024	250/18903	0.012343804614	0.035996603873	0.014121654821	DRD2/PDE4B	2
BP	GO:0007625	grooming behavior	1/13/2024	19/18903	0.012992295676	0.037272288702	0.014622112611	DRD2	1
BP	GO:0010544	negative regulation of platelet activation	1/13/2024	19/18903	0.012992295676	0.037272288702	0.014622112611	APOE	1
BP	GO:0010985	negative regulation of lipoprotein particle clearance	1/13/2024	19/18903	0.012992295676	0.037272288702	0.014622112611	APOC1	1
BP	GO:0035813	regulation of renal sodium excretion	1/13/2024	19/18903	0.012992295676	0.037272288702	0.014622112611	DRD2	1
BP	GO:0035930	corticosteroid hormone secretion	1/13/2024	19/18903	0.012992295676	0.037272288702	0.014622112611	CRHR1	1
BP	GO:0050708	regulation of protein secretion	2/13/2024	257/18903	0.013010860533	0.037272288702	0.014622112611	APOE/DRD2	2
BP	GO:0003015	heart process	2/13/2024	261/18903	0.013399062153	0.038265227542	0.01501164768	DRD2/PDE4B	2
BP	GO:1903522	regulation of blood circulation	2/13/2024	263/18903	0.013595068632	0.038265227542	0.01501164768	DRD2/PDE4B	2
BP	GO:0001780	neutrophil homeostasis	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	PDE4B	1
BP	GO:0042749	regulation of circadian sleep/wake cycle	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	DRD2	1
BP	GO:0043691	reverse cholesterol transport	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	APOE	1
BP	GO:0044794	positive regulation by host of viral process	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	APOE	1
BP	GO:0051004	regulation of lipoprotein lipase activity	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	APOC1	1
BP	GO:1900221	regulation of amyloid-beta clearance	1/13/2024	20/18903	0.013671765077	0.038265227542	0.01501164768	APOE	1
BP	GO:0002029	desensitization of G protein-coupled receptor signaling pathway	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0007194	negative regulation of adenylate cyclase activity	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0021756	striatum development	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0022401	negative adaptation of signaling pathway	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0022410	circadian sleep/wake cycle process	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0035812	renal sodium excretion	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	DRD2	1
BP	GO:0097062	dendritic spine maintenance	1/13/2024	21/18903	0.01435080268	0.039373751577	0.015446527421	APOE	1
BP	GO:0031348	negative regulation of defense response	2/13/2024	272/18903	0.014492717838	0.039651424646	0.015555460009	APOE/DRD2	2
BP	GO:0007611	learning or memory	2/13/2024	273/18903	0.014594026229	0.039816755035	0.01562031998	APOE/DRD2	2
BP	GO:0002115	store-operated calcium entry	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	SPINK1	1
BP	GO:0035809	regulation of urine volume	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	DRD2	1
BP	GO:0044062	regulation of excretion	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	DRD2	1
BP	GO:0045717	negative regulation of fatty acid biosynthetic process	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	APOC1	1
BP	GO:0051000	positive regulation of nitric-oxide synthase activity	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	APOE	1
BP	GO:2000831	regulation of steroid hormone secretion	1/13/2024	22/18903	0.015029408736	0.040326843276	0.015820430249	CRHR1	1
BP	GO:1903532	positive regulation of secretion by cell	2/13/2024	278/18903	0.015105246347	0.040418983357	0.015856577282	DRD2/SPINK1	2
BP	GO:0014821	phasic smooth muscle contraction	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	DRD2	1
BP	GO:0023058	adaptation of signaling pathway	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	DRD2	1
BP	GO:0045540	regulation of cholesterol biosynthetic process	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	APOE	1
BP	GO:0046058	cAMP metabolic process	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	PDE4B	1
BP	GO:0048169	regulation of long-term neuronal synaptic plasticity	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	DRD2	1
BP	GO:0106118	regulation of sterol biosynthetic process	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	APOE	1
BP	GO:1900273	positive regulation of long-term synaptic potentiation	1/13/2024	23/18903	0.015707583499	0.041182785292	0.016156220751	DRD2	1
BP	GO:0006874	cellular calcium ion homeostasis	2/13/2024	284/18903	0.015728948797	0.041182785292	0.016156220751	APOE/DRD2	2
BP	GO:0031280	negative regulation of cyclase activity	1/13/2024	24/18903	0.016385327218	0.042444969973	0.016651382363	DRD2	1
BP	GO:0042745	circadian sleep/wake cycle	1/13/2024	24/18903	0.016385327218	0.042444969973	0.016651382363	DRD2	1
BP	GO:0051043	regulation of membrane protein ectodomain proteolysis	1/13/2024	24/18903	0.016385327218	0.042444969973	0.016651382363	APOE	1
BP	GO:0051590	positive regulation of neurotransmitter transport	1/13/2024	24/18903	0.016385327218	0.042444969973	0.016651382363	DRD2	1
BP	GO:0001964	startle response	1/13/2024	25/18903	0.017062640145	0.044082258623	0.017293699211	DRD2	1
BP	GO:0006706	steroid catabolic process	1/13/2024	26/18903	0.01773952253	0.045589168719	0.017884867875	APOE	1
BP	GO:0050995	negative regulation of lipid catabolic process	1/13/2024	26/18903	0.01773952253	0.045589168719	0.017884867875	APOC1	1
BP	GO:0051047	positive regulation of secretion	2/13/2024	304/18903	0.017887537842	0.045716180367	0.017934695205	DRD2/SPINK1	2
BP	GO:0051056	regulation of small GTPase mediated signal transduction	2/13/2024	305/18903	0.017998643241	0.045716180367	0.017934695205	APOE/ARHGAP15	2
BP	GO:0071375	cellular response to peptide hormone stimulus	2/13/2024	306/18903	0.018110048188	0.045716180367	0.017934695205	SPINK1/CRHR1	2
BP	GO:0001963	synaptic transmission, dopaminergic	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0002092	positive regulation of receptor internalization	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0010875	positive regulation of cholesterol efflux	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	APOE	1
BP	GO:0021544	subpallium development	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0021895	cerebral cortex neuron differentiation	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
BP	GO:0030325	adrenal gland development	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	CRHR1	1
BP	GO:0035929	steroid hormone secretion	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	CRHR1	1
BP	GO:0045745	positive regulation of G protein-coupled receptor signaling pathway	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0051350	negative regulation of lyase activity	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0051953	negative regulation of amine transport	1/13/2024	27/18903	0.018415974626	0.045716180367	0.017934695205	DRD2	1
BP	GO:0055074	calcium ion homeostasis	2/13/2024	309/18903	0.018446056349	0.045716180367	0.017934695205	APOE/DRD2	2
BP	GO:0019932	second-messenger-mediated signaling	2/13/2024	314/18903	0.019012023936	0.046110960928	0.018089569671	APOE/SPINK1	2
BP	GO:0050890	cognition	2/13/2024	314/18903	0.019012023936	0.046110960928	0.018089569671	APOE/DRD2	2
BP	GO:0002052	positive regulation of neuroblast proliferation	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	DRD2	1
BP	GO:0007190	activation of adenylate cyclase activity	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	CRHR1	1
BP	GO:0010894	negative regulation of steroid biosynthetic process	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	APOE	1
BP	GO:0010996	response to auditory stimulus	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	DRD2	1
BP	GO:0014072	response to isoquinoline alkaloid	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	DRD2	1
BP	GO:0032801	receptor catabolic process	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	APOE	1
BP	GO:0035640	exploration behavior	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	APOE	1
BP	GO:0043278	response to morphine	1/13/2024	28/18903	0.019091996682	0.046110960928	0.018089569671	DRD2	1
BP	GO:0070372	regulation of ERK1 and ERK2 cascade	2/13/2024	315/18903	0.019126106997	0.046110960928	0.018089569671	APOE/DRD2	2
BP	GO:0030431	sleep	1/13/2024	29/18903	0.019767588949	0.047306220237	0.018558476111	DRD2	1
BP	GO:0097254	renal tubular secretion	1/13/2024	29/18903	0.019767588949	0.047306220237	0.018558476111	DRD2	1
BP	GO:1902430	negative regulation of amyloid-beta formation	1/13/2024	29/18903	0.019767588949	0.047306220237	0.018558476111	APOE	1
BP	GO:0008202	steroid metabolic process	2/13/2024	323/18903	0.020049379886	0.047745956011	0.018730986742	APOE/APOC1	2
BP	GO:0072503	cellular divalent inorganic cation homeostasis	2/13/2024	323/18903	0.020049379886	0.047745956011	0.018730986742	APOE/DRD2	2
BP	GO:0015849	organic acid transport	2/13/2024	324/18903	0.020166109163	0.047906805669	0.018794088899	APOE/DRD2	2
BP	GO:0001975	response to amphetamine	1/13/2024	30/18903	0.020442751678	0.048094782933	0.018867833356	DRD2	1
BP	GO:0007271	synaptic transmission, cholinergic	1/13/2024	30/18903	0.020442751678	0.048094782933	0.018867833356	APOE	1
BP	GO:0032372	negative regulation of sterol transport	1/13/2024	30/18903	0.020442751678	0.048094782933	0.018867833356	APOC1	1
BP	GO:0032375	negative regulation of cholesterol transport	1/13/2024	30/18903	0.020442751678	0.048094782933	0.018867833356	APOC1	1
BP	GO:0048638	regulation of developmental growth	2/13/2024	332/18903	0.021110424976	0.049206771544	0.019304072269	APOE/DRD2	2
BP	GO:0010039	response to iron ion	1/13/2024	31/18903	0.021117485119	0.049206771544	0.019304072269	DRD2	1
BP	GO:0040018	positive regulation of multicellular organism growth	1/13/2024	31/18903	0.021117485119	0.049206771544	0.019304072269	DRD2	1
BP	GO:0045939	negative regulation of steroid metabolic process	1/13/2024	31/18903	0.021117485119	0.049206771544	0.019304072269	APOE	1
BP	GO:0016042	lipid catabolic process	2/13/2024	336/18903	0.021589530146	0.049824420174	0.019546379037	APOE/APOC1	2
BP	GO:0003180	aortic valve morphogenesis	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	ELN	1
BP	GO:0007628	adult walking behavior	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	DRD2	1
BP	GO:0032770	positive regulation of monooxygenase activity	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	APOE	1
BP	GO:0048240	sperm capacitation	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	SPINK1	1
BP	GO:0050482	arachidonic acid secretion	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	DRD2	1
BP	GO:0051482	positive regulation of cytosolic calcium ion concentration involved in phospholipase C-activating G protein-coupled signaling pathway	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	DRD2	1
BP	GO:1903963	arachidonate transport	1/13/2024	32/18903	0.021791789522	0.049824420174	0.019546379037	DRD2	1
CC	GO:0042627	chylomicron	2/13/2024	13/19869	3.07E-05	0.001964119997	0.001099174415	APOE/APOC1	2
CC	GO:0034361	very-low-density lipoprotein particle	2/13/2024	20/19869	7.46E-05	0.001964119997	0.001099174415	APOE/APOC1	2
CC	GO:0034385	triglyceride-rich plasma lipoprotein particle	2/13/2024	20/19869	7.46E-05	0.001964119997	0.001099174415	APOE/APOC1	2
CC	GO:0034364	high-density lipoprotein particle	2/13/2024	27/19869	0.000137433795	0.002714317445	0.001519005099	APOE/APOC1	2
CC	GO:0034358	plasma lipoprotein particle	2/13/2024	36/19869	0.000245857972	0.00323712997	0.00181158506	APOE/APOC1	2
CC	GO:1990777	lipoprotein particle	2/13/2024	36/19869	0.000245857972	0.00323712997	0.00181158506	APOE/APOC1	2
CC	GO:0032994	protein-lipid complex	2/13/2024	39/19869	0.000288855797	0.003259943992	0.001824352401	APOE/APOC1	2
CC	GO:0034365	discoidal high-density lipoprotein particle	1/13/2024	2/19869	0.001308175961	0.012918237619	0.007229393471	APOE	1
CC	GO:0034363	intermediate-density lipoprotein particle	1/13/2024	4/19869	0.00261477208	0.022951888257	0.012844494428	APOE	1
CC	GO:0071953	elastic fiber	1/13/2024	5/19869	0.003267478245	0.025813078133	0.014445693292	ELN	1
CC	GO:0043025	neuronal cell body	3/13/2024	497/19869	0.00369017931	0.026502196864	0.014831342682	APOE/DRD2/BRINP3	3
CC	GO:0043197	dendritic spine	2/13/2024	175/19869	0.005644620023	0.034683409853	0.019409769671	DRD2/PDE4B	2
CC	GO:0044309	neuron spine	2/13/2024	176/19869	0.005707396558	0.034683409853	0.019409769671	DRD2/PDE4B	2
CC	GO:0098691	dopaminergic synapse	1/13/2024	11/19869	0.007175442468	0.038931965531	0.02178737578	DRD2	1
CC	GO:0034362	low-density lipoprotein particle	1/13/2024	12/19869	0.007825393079	0.038931965531	0.02178737578	APOE	1
CC	GO:0008021	synaptic vesicle	2/13/2024	208/19869	0.007884955044	0.038931965531	0.02178737578	DRD2/PDE4B	2
CC	GO:0070382	exocytic vesicle	2/13/2024	226/19869	0.009250734703	0.042988708328	0.024057638238	DRD2/PDE4B	2
CC	GO:0000930	gamma-tubulin complex	1/13/2024	16/19869	0.010421269914	0.045737795735	0.025596101544	PDE4B	1
CC	GO:0043083	synaptic cleft	1/13/2024	18/19869	0.011716856008	0.04871745393	0.027263598468	APOE	1
MF	GO:0060228	phosphatidylcholine-sterol O-acyltransferase activator activity	2/12/2024	6/18432	5.82E-06	0.000465591796	0.000159281404	APOE/APOC1	2
MF	GO:0046911	metal chelating activity	1/12/2024	1/18432	0.000651041667	0.013013063638	0.00445183756	APOE	1
MF	GO:0015056	corticotrophin-releasing factor receptor activity	1/12/2024	2/18432	0.001301694778	0.013013063638	0.00445183756	CRHR1	1
MF	GO:0043404	corticotrophin-releasing hormone receptor activity	1/12/2024	2/18432	0.001301694778	0.013013063638	0.00445183756	CRHR1	1
MF	GO:0045174	glutathione dehydrogenase (ascorbate) activity	1/12/2024	2/18432	0.001301694778	0.013013063638	0.00445183756	GSTO2	1
MF	GO:0050610	methylarsenate reductase activity	1/12/2024	2/18432	0.001301694778	0.013013063638	0.00445183756	GSTO2	1
MF	GO:0051424	corticotrophin-releasing hormone binding	1/12/2024	2/18432	0.001301694778	0.013013063638	0.00445183756	CRHR1	1

ONTOLOGY	ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
MF	GO:0016209	antioxidant activity	2/12/2024	85/18432	0.001346114294	0.013013063638	0.00445183756	APOE/GSTO2	2
MF	GO:0001591	dopamine neurotransmitter receptor activity, coupled via Gi/Go	1/12/2024	3/18432	0.001951959546	0.013013063638	0.00445183756	DRD2	1
MF	GO:0016672	oxidoreductase activity, acting on a sulfur group of donors, quinone or similar compound as acceptor	1/12/2024	3/18432	0.001951959546	0.013013063638	0.00445183756	GSTO2	1
MF	GO:0030613	oxidoreductase activity, acting on phosphorus or arsenic in donors	1/12/2024	3/18432	0.001951959546	0.013013063638	0.00445183756	GSTO2	1
MF	GO:0030614	oxidoreductase activity, acting on phosphorus or arsenic in donors, disulfide as acceptor	1/12/2024	3/18432	0.001951959546	0.013013063638	0.00445183756	GSTO2	1
MF	GO:0070326	very-low-density lipoprotein particle receptor binding	1/12/2024	4/18432	0.00260183618	0.016011299566	0.005477549852	APOE	1
MF	GO:0004952	dopamine neurotransmitter receptor activity	1/12/2024	5/18432	0.00325132489	0.017340399416	0.005932241905	DRD2	1
MF	GO:0015038	glutathione disulfide oxidoreductase activity	1/12/2024	5/18432	0.00325132489	0.017340399416	0.005932241905	GSTO2	1
MF	GO:0035240	dopamine binding	1/12/2024	7/18432	0.004549139386	0.022745696929	0.007781422634	DRD2	1
MF	GO:0030023	extracellular matrix constituent conferring elasticity	1/12/2024	9/18432	0.005845404714	0.027507786891	0.009410558673	ELN	1
MF	GO:0097493	structural molecule activity conferring elasticity	1/12/2024	11/18432	0.007140122558	0.031733878034	0.010856326696	ELN	1
MF	GO:0004859	phospholipase inhibitor activity	1/12/2024	13/18432	0.008433294595	0.03373317838	0.011540297867	APOC1	1
MF	GO:1901338	catecholamine binding	1/12/2024	13/18432	0.008433294595	0.03373317838	0.011540297867	DRD2	1
MF	GO:0004115	3',5'-cyclic-AMP phosphodiesterase activity	1/12/2024	17/18432	0.011015007963	0.040054574411	0.013702880719	PDE4B	1
MF	GO:0055102	lipase inhibitor activity	1/12/2024	17/18432	0.011015007963	0.040054574411	0.013702880719	APOC1	1
MF	GO:0043395	heparan sulfate proteoglycan binding	1/12/2024	18/18432	0.011659472796	0.040554687987	0.013873972206	APOE	1
MF	GO:0035255	ionotropic glutamate receptor binding	1/12/2024	22/18432	0.01423348437	0.042808784623	0.014645110529	DRD2	1
MF	GO:0120020	cholesterol transfer activity	1/12/2024	22/18432	0.01423348437	0.042808784623	0.014645110529	APOE	1
MF	GO:0030552	cAMP binding	1/12/2024	23/18432	0.014876026368	0.042808784623	0.014645110529	PDE4B	1
MF	GO:0120015	sterol transfer activity	1/12/2024	23/18432	0.014876026368	0.042808784623	0.014645110529	APOE	1
MF	GO:0004114	3',5'-cyclic-nucleotide phosphodiesterase activity	1/12/2024	24/18432	0.015518184426	0.042808784623	0.014645110529	PDE4B	1
MF	GO:0050750	low-density lipoprotein particle receptor binding	1/12/2024	24/18432	0.015518184426	0.042808784623	0.014645110529	APOE	1
MF	GO:0004112	cyclic-nucleotide phosphodiesterase activity	1/12/2024	26/18432	0.016801349554	0.043358321429	0.014833109962	PDE4B	1
MF	GO:0004364	glutathione transferase activity	1/12/2024	26/18432	0.016801349554	0.043358321429	0.014833109962	GSTO2	1
MF	GO:0070325	lipoprotein particle receptor binding	1/12/2024	29/18432	0.018723222902	0.04425847244	0.015141056361	APOE	1
MF	GO:0042277	peptide binding	2/12/2024	330/18432	0.018734476825	0.04425847244	0.015141056361	APOE/CRHR1	2
MF	GO:0071813	lipoprotein particle binding	1/12/2024	30/18432	0.019363081693	0.04425847244	0.015141056361	APOE	1
MF	GO:0071814	protein-lipid complex binding	1/12/2024	30/18432	0.019363081693	0.04425847244	0.015141056361	APOE	1
MF	GO:0031210	phosphatidylcholine binding	1/12/2024	31/18432	0.020002558001	0.04445012889	0.015206623041	APOC1	1
MF	GO:0043015	gamma-tubulin binding	1/12/2024	34/18432	0.021918694107	0.047391771041	0.016212974304	PDE4B	1
MF	GO:0015248	sterol transporter activity	1/12/2024	36/18432	0.023194209572	0.047577865788	0.016276638296	APOE	1
MF	GO:0043394	proteoglycan binding	1/12/2024	36/18432	0.023194209572	0.047577865788	0.016276638296	APOE	1
MF	GO:0030551	cyclic nucleotide binding	1/12/2024	37/18432	0.023831395345	0.04766279069	0.016305691552	PDE4B	1
MF	GO:0004857	enzyme inhibitor activity	2/12/2024	395/18432	0.026232182405	0.049184414811	0.016826247172	SPINK1/APOC1	2
MF	GO:0050997	quaternary ammonium group binding	1/12/2024	41/18432	0.026376330211	0.049184414811	0.016826247172	APOC1	1
MF	GO:0035254	glutamate receptor binding	1/12/2024	42/18432	0.027011612905	0.049184414811	0.016826247172	DRD2	1
MF	GO:0048156	tau protein binding	1/12/2024	43/18432	0.027646515605	0.049184414811	0.016826247172	APOE	1
MF	GO:0033218	amide binding	2/12/2024	408/18432	0.027858529009	0.049184414811	0.016826247172	APOE/CRHR1	2
MF	GO:0015036	disulfide oxidoreductase activity	1/12/2024	44/18432	0.028281038516	0.049184414811	0.016826247172	GSTO2	1

Supplementary Table S7. KEGG pathway enrichment

ID	Description	GeneRatio	BgRatio	pvalue	p.adjust	qvalue	geneID	Count
hsa04024	cAMP signaling pathway	3/8/2024	226/8842	0.000839153825	0.013399844332	0.012224419391	1813/1394/5142	3
hsa04979	Cholesterol metabolism	2/8/2024	51/8842	0.000893322955	0.013399844332	0.012224419391	348/341	2
hsa04080	Neuroactive ligand-receptor interaction	2/8/2024	368/8842	0.040957221445	0.160601334993	0.14651349859	1813/1394	2
hsa05030	Cocaine addiction	1/8/2024	49/8842	0.043500312576	0.160601334993	0.14651349859	1813	1
hsa00480	Glutathione metabolism	1/8/2024	58/8842	0.051307545797	0.160601334993	0.14651349859	119391	1
hsa04730	Long-term depression	1/8/2024	60/8842	0.053034894436	0.160601334993	0.14651349859	1394	1
hsa04330	Notch signaling pathway	1/8/2024	62/8842	0.054759490486	0.160601334993	0.14651349859	55534	1
hsa05204	Chemical carcinogenesis - DNA adducts	1/8/2024	71/8842	0.062486210142	0.160601334993	0.14651349859	119391	1
hsa00982	Drug metabolism - cytochrome P450	1/8/2024	73/8842	0.064195734054	0.160601334993	0.14651349859	119391	1
hsa01524	Platinum drug resistance	1/8/2024	75/8842	0.065902529744	0.160601334993	0.14651349859	119391	1
hsa00980	Metabolism of xenobiotics by cytochrome P450	1/8/2024	79/8842	0.069307951384	0.160601334993	0.14651349859	119391	1
hsa00983	Drug metabolism - other enzymes	1/8/2024	81/8842	0.071006584786	0.160601334993	0.14651349859	119391	1
hsa05032	Morphine addiction	1/8/2024	91/8842	0.079459126302	0.160601334993	0.14651349859	5142	1
hsa04540	Gap junction	1/8/2024	92/8842	0.080300667496	0.160601334993	0.14651349859	1813	1
hsa04658	Th1 and Th2 cell differentiation	1/8/2024	92/8842	0.080300667496	0.160601334993	0.14651349859	55534	1
hsa04974	Protein digestion and absorption	1/8/2024	105/8842	0.091179606615	0.170961762403	0.155965116578	2006	1
hsa04928	Parathyroid hormone synthesis, secretion and action	1/8/2024	115/8842	0.099471234343	0.17553747237	0.160139448478	5142	1
hsa00230	Purine metabolism	1/8/2024	128/8842	0.110151347355	0.179076567326	0.163368096508	5142	1
hsa04728	Dopaminergic synapse	1/8/2024	132/8842	0.113415159306	0.179076567326	0.163368096508	1813	1
hsa05418	Fluid shear stress and atherosclerosis	1/8/2024	141/8842	0.120720464404	0.181080696606	0.165196424974	119391	1
hsa04934	Cushing syndrome	1/8/2024	155/8842	0.13197959453	0.188542277901	0.172003481594	1394	1
hsa05225	Hepatocellular carcinoma	1/8/2024	170/8842	0.143902766751	0.19623104557	0.179017795958	119391	1
hsa05034	Alcoholism	1/8/2024	188/8842	0.158021215683	0.206114629152	0.188034398524	1813	1
hsa04015	Rap1 signaling pathway	1/8/2024	212/8842	0.176528681382	0.212976281076	0.194294151157	1813	1
hsa05207	Chemical carcinogenesis - receptor activation	1/8/2024	215/8842	0.17881689494	0.212976281076	0.194294151157	119391	1
hsa05208	Chemical carcinogenesis - reactive oxygen species	1/8/2024	226/8842	0.187159483647	0.212976281076	0.194294151157	119391	1
hsa04820	Cytoskeleton in muscle cells	1/8/2024	232/8842	0.191678652968	0.212976281076	0.194294151157	2006	1
hsa05012	Parkinson disease	1/8/2024	271/8842	0.220521093459	0.236272600134	0.215546933456	1813	1
hsa05165	Human papillomavirus infection	1/8/2024	333/8842	0.264521042303	0.273642457555	0.249638733208	55534	1
hsa05010	Alzheimer disease	1/8/2024	391/8842	0.303698930153	0.303698930153	0.277058673122	348	1

Supplementary Table S8. Mammalian Phenotype ontology based on pleiotropic genes

trait	phenotype	p	GENE
respiratory system phenotype	MP:0005388	0.01691831701	APOE,DRD2,CRHR1,ELN
cardiovascular system phenotype	MP:0005385	0.03063679848	APOE,DRD2,BRINP3,CRHR1,ELN,GSTO2
integument phenotype	MP:0010771	0.06953635698	APOE,DRD2,SPINK1,GSTO2
taste/olfaction phenotype	MP:0005394	0.08341168205	APOE
digestive/alimentary phenotype	MP:0005381	0.0976843474	APOE,DRD2,SPINK1
liver/biliary system phenotype	MP:0005370	0.10137267066	APOE,DRD2,APOC1
skeleton phenotype	MP:0005390	0.11588861205	APOE,DRD2,BRINP3,GSTO2
nervous system phenotype	MP:0003631	0.12445777565	APOE,DRD2,CRHR1,PDE4B,ARPP21
renal/urinary system phenotype	MP:0005367	0.13189103852	APOE,DRD2,BRINP3
endocrine/exocrine gland phenotype	MP:0005379	0.14872956456	APOE,DRD2,SPINK1,CRHR1
growth/size/body region phenotype	MP:0005378	0.22200602128	APOE,DRD2,BRINP3,SPINK1,ELN,GSTO2
immune system phenotype	MP:0005387	0.23117699843	APOE,DRD2,SPINK1,PDE4B,ARHGAP15
adipose tissue phenotype	MP:0005375	0.23670684445	APOE,DRD2
mortality/aging	MP:0010768	0.24360192762	APOE,DRD2,SPINK1,CRHR1,PDE4B,ELN
behavior/neurological phenotype	MP:0005386	0.26372714565	APOE,DRD2,BRINP3,CRHR1,PDE4B
hematopoietic system phenotype	MP:0005397	0.26545367641	APOE,DRD2,SPINK1,PDE4B,ARHGAP15
homeostasis/metabolism phenotype	MP:0005376	0.32012808853	APOE,DRD2,SPINK1,CRHR1,ELN,APOC1
muscle phenotype	MP:0005369	0.32378586188	APOE,ELN
pigmentation phenotype	MP:0001186	0.32903833526	DRD2
neoplasm	MP:0002006	0.42576047846	DRD2
cellular phenotype	MP:0005384	0.46405559695	APOE,DRD2,ZFAND2A,PDE4B
hearing/vestibular/ear phenotype	MP:0005377	0.46819578345	APOE
limbs/digits/tail phenotype	MP:0005371	0.59890162953	DRD2
vision/eye phenotype	MP:0005391	0.61230339253	APOE,CRHR1
reproductive system phenotype	MP:0005389	0.89920135148	DRD2

Supplementary Table S9. Bliss analysis from pQTL (ARIC, Decode and UKB-PP) to MTAG-COPD (FDR < 0.05 and p_HEIDI > 0.01)

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
5	131409483	131411859	CSF2	0.00106066	6.34476218	2.23E-10	0.18045946808	0.02952918	9.89E-10	16	64	4.31E-06	ARIC
4	145567173	145666423	HHIP	0.01646128	6.02319584	1.71E-09	0.04663350671	0.00800871	5.79E-09	9	15	1.26E-05	ARIC
1	161511549	161600917	FCGR3A	0.37664882	5.84451904	5.08E-09	0.01522011136	0.00268847	1.50E-08	12	20	1.33E-05	ARIC
10	105995114	106027217	GSTO1	0.29889075	5.90113793	3.61E-09	0.00959679436	0.00167994	1.11E-08	12	16	1.33E-05	ARIC
15	73344051	73597547	NEO1	0.10946353	-5.8420592	5.16E-09	-0.0421420609	0.00744688	1.52E-08	6	15	1.33E-05	ARIC
1	161551101	161648444	FCGR2B	0.43271266	-5.7348667	9.76E-09	-0.026466724	0.00475882	2.67E-08	12	29	1.94E-05	ARIC
1	161192082	161193421	APOA2	0.002724	-5.1615553	2.45E-07	-0.0842633419	0.01673531	4.78E-07	65	183	0.00023639	ARIC
3	49394609	49396033	GPX1	0.01128053	5.19521765	2.04E-07	0.03610139878	0.00712589	4.06E-07	6	26	0.00023639	ARIC
16	30125426	30134827	MAPK3	0.19147276	-5.1571596	2.51E-07	-0.0384993396	0.00765244	4.88E-07	16	32	0.00023639	ARIC
16	30434940	30441396	DCTPP1	0.00434065	-4.9959131	5.86E-07	-0.0923114015	0.01891147	1.05E-06	27	81	0.00045964	ARIC
10	76854192	76868979	DUSP13	0.03780754	-4.9269928	8.35E-07	-0.0134782627	0.00279805	1.46E-06	37	102	0.00057757	ARIC
3	49721380	49726934	MST1	0.43147473	4.90250344	9.46E-07	0.01070437801	0.00223279	1.63E-06	13	40	0.0005935	ARIC
2	31557187	31637581	XDH	0.00218388	4.80613181	1.54E-06	0.05810408868	0.01235178	2.55E-06	83	196	0.00081297	ARIC
14	42076773	42373752	LRFN5	0.00350408	4.7668848	1.87E-06	0.06278118061	0.01345111	3.05E-06	29	79	0.00081297	ARIC
14	94843084	94857030	SERPINA1	0.19520646	-4.7725874	1.82E-06	-0.0152572014	0.00326518	2.97E-06	8	15	0.00081297	ARIC
15	78832747	78841604	PSMA4	0.00226279	-4.7584918	1.95E-06	-0.0712650099	0.01529457	3.17E-06	82	195	0.00081297	ARIC
19	41223008	41246765	ITPKC	0.0067599	-4.7765329	1.78E-06	-0.0133041534	0.00284496	2.92E-06	100	231	0.00081297	ARIC
12	120907653	120936296	DYNLL1	0.00200084	-4.6067317	4.09E-06	-0.0831247068	0.01840262	6.27E-06	55	118	0.00143927	ARIC
16	29789561	29793096	ZG16	0.00435099	4.61407015	3.95E-06	0.07377629422	0.01630809	6.07E-06	35	88	0.00143927	ARIC
19	1065922	1086627	HMHA1	0.06755086	4.58005264	4.65E-06	0.02869345418	0.00638783	7.06E-06	12	16	0.0015389	ARIC
3	129033615	129035120	H1FX	0.00080583	-4.5665672	4.96E-06	-0.0969606998	0.02164689	7.49E-06	45	107	0.00155557	ARIC
6	43044006	43129457	PTK7	0.03307404	4.535828	5.74E-06	0.0202325442	0.0045464	8.58E-06	59	123	0.00169993	ARIC
14	65472892	65569413	MAX	0.07487533	-4.5121492	6.42E-06	-0.0109955819	0.00248324	9.52E-06	20	41	0.00172858	ARIC
20	62328021	62330037	TNFRSF6B	0.01363115	-4.5158332	6.31E-06	-0.0227919796	0.00514331	9.36E-06	121	246	0.00172858	ARIC
5	176758563	176778853	LMAN2	0.01621721	4.36037851	1.30E-05	0.03432164076	0.00801068	1.83E-05	28	93	0.00319433	ARIC
17	37894180	37903544	GRB7	0.00081572	-4.2941254	1.75E-05	-0.0455085956	0.01077967	2.42E-05	29	80	0.00391528	ARIC
19	45409011	45412650	APOE	0.02209145	-4.3001171	1.71E-05	-0.0271391286	0.00641983	2.36E-05	15	22	0.00391528	ARIC
16	29817427	29823649	MAZ	0.00302971	-4.2664685	1.99E-05	-0.1056013878	0.02517034	2.72E-05	27	74	0.00424023	ARIC
1	38326369	38412729	INPP5B	0.18695543	4.19003246	2.79E-05	0.01359213155	0.00329677	3.74E-05	10	21	0.00562582	ARIC
13	111968531	111996596	TEX29	0.00045209	-4.1788553	2.93E-05	-0.0522845896	0.0127144	3.92E-05	105	228	0.00569489	ARIC
3	49924435	49941299	MST1R	0.00247069	4.10747087	4.00E-05	0.10303435402	0.02547653	5.25E-05	12	51	0.00738146	ARIC
5	147691982	147695485	SPINK7	0.03453583	-4.0529658	5.06E-05	-0.0258721615	0.00648047	6.54E-05	9	16	0.00891456	ARIC
1	25071848	25170815	CLIC4	0.04789601	-4.0207986	5.80E-05	-0.0366789121	0.00925854	7.44E-05	11	15	0.009835	ARIC

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
19	45147098	45166850	PVR	0.00467473	4.00610211	6.17E-05	0.02745829685	0.00695569	7.89E-05	89	234	0.0101227	ARIC
5	131877136	131892530	IL5	0.00034574	3.98661237	6.70E-05	0.13618618713	0.03466193	8.53E-05	3	16	0.0106266	ARIC
3	119243140	119278449	CD80	0.00297948	-3.9763533	7.00E-05	-0.0488802019	0.01247204	8.88E-05	76	171	0.01069846	ARIC
17	60704762	60770958	MRC2	0.0851141	3.9709024	7.16E-05	0.02407358556	0.00615068	9.08E-05	40	124	0.01069846	ARIC
1	183155373	183214035	LAMC2	0.20267532	-3.9604009	7.48E-05	-0.0092285055	0.0023639	9.46E-05	9	15	0.0108588	ARIC
3	49061758	49066841	IMPDH2	0.00251646	3.94803475	7.88E-05	0.12800373336	0.03288798	9.94E-05	10	37	0.01110961	ARIC
12	10103915	10148293	CLEC12A	0.4299616	-3.9250122	8.67E-05	-0.0049575043	0.00128098	0.0001088	27	68	0.0115693	ARIC
12	10564911	10573194	KLRC3	0.00097966	-3.9273184	8.59E-05	-0.0438108296	0.01131391	0.0001078	86	213	0.0115693	ARIC
1	159842154	159869955	CFAP45	0.00077139	-3.8986609	9.67E-05	-0.0234243704	0.00609236	0.0001206	108	253	0.01252088	ARIC
1	149754227	150478933	FCGR1A	0.00301777	-3.870175	0.00010875725	-0.0848753885	0.02223267	0.0001348	17	32	0.0136638	ARIC
16	30064411	30081778	ALDOA	0.00158524	-3.860394	0.00011320435	-0.1045693506	0.0274588	0.00014	42	99	0.01386943	ARIC
12	122688090	122693499	B3GNT4	0.00120254	-3.8528616	0.00011674536	-0.0687611584	0.01809023	0.0001441	41	114	0.01396243	ARIC
11	43902361	43941816	ALKBH3	0.02496311	3.81797838	0.00013454972	0.02839509112	0.00753671	0.0001648	97	225	0.01562441	ARIC
17	43224684	43229468	HEXIM1	0.01800199	3.72316337	0.00019674212	0.1075903339	0.02926397	0.0002364	7	15	0.02193104	ARIC
15	101811022	101817705	VIMP	0.00286619	-3.7103286	0.00020699041	-0.0284739805	0.00777084	0.0002481	155	350	0.02253436	ARIC
22	50925213	50929077	MIOX	0.00212886	-3.7048535	0.0002115129	-0.0449444969	0.01228345	0.0002533	94	189	0.02253436	ARIC
15	65255362	65282648	SPG21	0.00362559	-3.6927506	0.00022184157	-0.0612007085	0.01677968	0.000265	50	128	0.02310796	ARIC
1	33116743	33151812	RBBP4	0.00321967	3.68190528	0.00023149742	0.06432571575	0.01768706	0.000276	31	105	0.02359189	ARIC
16	1840414	1844972	IGFALS	0.01078508	3.65060054	0.00026162787	0.0279604336	0.00775223	0.00031	62	147	0.02599604	ARIC
7	100770370	100782547	SERPINE1	0.02511024	-3.6369613	0.00027587341	-0.0174348785	0.00485161	0.0003261	28	55	0.02682656	ARIC
1	161592986	161601753	FCGR3B	0.09571893	3.62819873	0.00028540554	0.01583707622	0.00441736	0.0003368	11	20	0.02719581	ARIC
1	203181955	203242769	CHIT1	0.34323743	-3.6227944	0.00029143743	-0.0076135212	0.00212669	0.0003436	12	15	0.02723882	ARIC
1	117452679	117532980	PTGFRN	0.3353817	-3.6103739	0.00030575598	-0.0047423025	0.00132911	0.0003597	10	21	0.02800377	ARIC
4	70894130	70902255	HTN3	0.00685211	-3.5818221	0.00034120617	-0.0415447333	0.0117341	0.0003993	10	19	0.03050351	ARIC
6	146864829	146876101	RAB32	0.00289285	3.57744648	0.00034696723	0.0597076355	0.01688423	0.0004058	62	151	0.03050351	ARIC
16	67516474	67517716	AGRP	0.03125857	-3.5699704	0.00035702155	-0.0119731335	0.0033927	0.000417	6	15	0.03081517	ARIC
1	2522078	2564481	MMEL1	0.00118976	-3.5471644	0.00038940154	-0.040953108	0.01167722	0.000453	111	232	0.03291997	ARIC
3	20081515	20195896	KAT2B	0.00114264	3.52612753	0.00042168385	0.05316716687	0.01524813	0.0004888	52	140	0.03446182	ARIC
5	78073032	78281910	ARSB	0.04249895	3.51929672	0.00043269248	0.01880458843	0.0054033	0.000501	8	15	0.03446182	ARIC
20	62218955	62258394	GMEB2	0.00302222	-3.51663	0.00043706257	-0.0364313423	0.0104759	0.0005059	123	244	0.03446182	ARIC
22	50713408	50746056	PLXNB2	0.2506377	3.51933684	0.00043262704	0.01920267251	0.00551762	0.000501	11	16	0.03446182	ARIC
4	106815932	106925184	NPNT	0.06573217	-3.466658	0.00052697183	-0.0158523771	0.00462252	0.000605	27	104	0.03996464	ARIC
10	125425871	125454123	GPR26	0.00267153	-3.4701254	0.0005202154	-0.016099115	0.00468989	0.0005975	124	296	0.03996464	ARIC
19	8428173	8439257	ANGPTL4	0.01471782	3.46242236	0.00053533635	0.09093731664	0.02654884	0.0006142	10	18	0.03996602	ARIC
1	161475220	161493803	FCGR2A	0.40236334	-3.4381715	0.00058565656	-0.0163707442	0.00481231	0.0006693	10	15	0.04276207	ARIC
10	85980254	85985345	LRIT2	0.00494402	-3.4350552	0.00059243324	-0.039560934	0.01163956	0.0006767	77	184	0.04276207	ARIC

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
2	27851114	27874375	GPN1	0.00248445	3.41398817	0.00064019355	0.05940389087	0.01758312	0.0007289	24	69	0.04476215	ARIC
5	140868808	140892546	PCDHGC5	0.00316237	3.41634207	0.00063468466	0.04971227914	0.01470456	0.0007229	72	190	0.04476215	ARIC
16	69740899	69760854	NQO1	0.16944375	-3.3933481	0.00069043847	-0.006239381	0.00185779	0.0007837	25	60	0.04745622	ARIC
4	980785	998316	IDUA	0.24052908	-3.3720501	0.00074610878	-0.0144233106	0.00432109	0.0008442	37	81	0.04948521	ARIC
7	12250867	12282993	TMEM106B	0.03960972	-3.3744492	0.00073963578	-0.0187181088	0.00560388	0.0008372	81	201	0.04948521	ARIC
12	57125380	57146157	PRIM1	0.00280916	3.36966384	0.00075259934	0.03083766558	0.00924509	0.0008512	44	131	0.04948521	ARIC
4	145567173	145666423	HHIP	0.01256057	7.46574831	8.28E-14	0.082801606	0.01167761	1.34E-12	87	223	5.87E-09	deCODE
10	105995114	106027217	GSTO1	0.28037513	6.42938581	1.28E-10	0.004570137	0.00073872	6.15E-10	96	238	1.35E-06	deCODE
16	30125426	30134827	MAPK3	0.02871361	-6.3161221	2.68E-10	-0.014353456	0.00235857	1.16E-09	62	181	1.70E-06	deCODE
14	78708734	80330762	NRXN3	0.03541141	-6.1011362	1.05E-09	-0.020637792	0.00350206	3.79E-09	250	555	4.17E-06	deCODE
8	9413424	9639856	TNKS	0.0002605	-5.8522464	4.85E-09	-0.083290531	0.01469418	1.44E-08	211	482	1.27E-05	deCODE
3	49721380	49726934	MST1	0.48114802	5.53260076	3.16E-08	0.006059023	0.00112686	7.58E-08	23	72	5.56E-05	deCODE
1	161475220	161493803	FCGR2A	0.49699443	-5.4744631	4.39E-08	-0.005213157	0.00097925	1.02E-07	164	413	6.39E-05	deCODE
1	38326369	38412729	INPP5B	0.02250938	5.03156696	4.86E-07	0.023680458	0.00481858	8.91E-07	192	450	0.00048978	deCODE
17	38171614	38174066	CSF3	0.00118116	4.94257261	7.71E-07	0.085787258	0.01775565	1.35E-06	99	258	0.00066232	deCODE
17	44668035	44834830	NSF	0.00686969	4.91060451	9.08E-07	0.731969818	0.1524387	1.57E-06	7	15	0.00069212	deCODE
1	161551101	161648444	FCGR2B	0.56764825	-4.8659439	1.14E-06	-0.003100937	0.00065145	1.94E-06	190	433	0.00070972	deCODE
19	42177235	42212881	CEACAM7	0.00078278	-4.8837475	1.04E-06	-0.120043831	0.02513132	1.78E-06	114	307	0.00070972	deCODE
14	94843084	94857030	SERPINA1	0.12034121	-4.7446941	2.09E-06	-0.010203602	0.00219595	3.38E-06	288	595	0.00114233	deCODE
9	127962821	127996437	RABEPK	0.00071035	4.70122786	2.59E-06	0.144417093	0.0313555	4.11E-06	95	231	0.00129136	deCODE
8	11351510	11422113	BLK	0.0012239	-4.6576141	3.20E-06	-0.070677124	0.01548292	5.00E-06	142	421	0.00137463	deCODE
12	120881764	120884215	TRIAP1	0.00055249	4.66359587	3.11E-06	0.060600387	0.01325913	4.87E-06	115	266	0.00137463	deCODE
16	31142756	31147083	PRSS8	0.00529706	4.55920711	5.13E-06	0.062402695	0.01395327	7.74E-06	53	171	0.00200318	deCODE
16	30434940	30441396	DCTPP1	0.00115944	-4.5127959	6.40E-06	-0.050115737	0.01131659	9.49E-06	53	166	0.00231935	deCODE
17	49707674	50237377	CA10	0.03146852	-4.4332631	9.28E-06	-0.014382101	0.00330362	1.34E-05	141	359	0.00310369	deCODE
1	150547032	150552066	MCL1	0.00474254	-4.4121739	1.02E-05	-0.102215124	0.02358722	1.47E-05	12	19	0.0031335	deCODE
5	130494720	130507428	HINT1	0.00234361	4.40778477	1.04E-05	0.288604683	0.06666244	1.50E-05	9	23	0.0031335	deCODE
6	90036344	90062567	UBE2J1	0.00040318	-4.3582231	1.31E-05	-0.104322603	0.02436052	1.85E-05	159	338	0.00353626	deCODE
12	121163538	121177811	ACADS	0.00085674	4.35893492	1.31E-05	0.104222072	0.02433321	1.84E-05	116	272	0.00353626	deCODE
17	39032193	39041479	KRT20	0.0032229	4.32574523	1.52E-05	0.06275673	0.01476045	2.12E-05	102	294	0.00373421	deCODE
19	54810571	54824409	LILRA5	0.11054966	-4.3260473	1.52E-05	-0.00727179	0.00171022	2.12E-05	404	925	0.00373421	deCODE
22	50713408	50746056	PLXNB2	0.10311564	4.28543537	1.82E-05	0.013625198	0.00323373	2.51E-05	228	434	0.00425588	deCODE
8	9911778	10286401	MSRA	0.00125224	-4.2677644	1.97E-05	-0.05275173	0.01256982	2.71E-05	210	505	0.0044136	deCODE
2	27650657	27665126	NRBP1	0.00115119	4.24247222	2.21E-05	0.093649561	0.02244346	3.01E-05	71	216	0.00473041	deCODE
1	162531323	162569627	UAP1	0.00284274	4.20952096	2.56E-05	0.069665901	0.01682188	3.45E-05	174	400	0.0052377	deCODE
11	69467844	69490184	ORAOV1	0.0010078	-4.1796828	2.92E-05	-0.070036836	0.01702808	3.91E-05	212	469	0.00572757	deCODE

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
8	67088620	67090960	CRH	0.00105788	-4.1317898	3.60E-05	-0.093029817	0.0228718	4.75E-05	70	193	0.0066221	deCODE
10	82167585	82192753	FAM213A	0.00539459	4.12856683	3.65E-05	0.045110327	0.01109895	4.82E-05	156	368	0.0066221	deCODE
1	161592986	161601753	FCGR3B	0.08006167	4.10447234	4.05E-05	0.007991254	0.00197733	5.31E-05	170	410	0.00690819	deCODE
2	56093102	56151274	EFEMP1	0.01764919	-4.0892055	4.33E-05	-0.013580606	0.00337249	5.65E-05	109	271	0.00690819	deCODE
5	131527531	131631008	P4HA2	0.00030749	-4.1012445	4.11E-05	-0.140300428	0.03474199	5.38E-05	57	179	0.00690819	deCODE
7	99815864	99819113	PVRIG	0.00065628	-4.090355	4.31E-05	-0.15363381	0.03814168	5.63E-05	62	175	0.00690819	deCODE
15	73344051	73597547	NEO1	0.02111355	-4.0615636	4.87E-05	-0.016634484	0.00415807	6.32E-05	95	232	0.00751584	deCODE
1	157800704	157868046	CD5L	0.04154536	-3.9426009	8.06E-05	-0.020203647	0.00519786	0.0001015	148	377	0.01145417	deCODE
1	203181955	203242769	CHIT1	0.35170139	-3.9442005	8.01E-05	-0.002539671	0.00065313	0.0001009	177	399	0.01145417	deCODE
7	136912088	137028611	PTN	0.03115742	-3.9192561	8.88E-05	-0.019973241	0.00516828	0.0001113	169	407	0.01224057	deCODE
5	43376747	43412493	CCL28	0.00231337	-3.9072994	9.33E-05	-0.07780654	0.020193	0.0001166	59	149	0.01250051	deCODE
16	1840414	1844972	IGFALS	0.04414952	3.90141672	9.56E-05	0.014606732	0.00379641	0.0001193	183	476	0.01250051	deCODE
2	27851114	27874375	GPN1	0.0021355	3.88863974	0.000100808	0.070135658	0.01828697	0.0001254	99	254	0.01283377	deCODE
19	39390340	39399533	NFKBIB	0.00026627	3.88180566	0.000103684	0.042965662	0.01122189	0.0001288	152	374	0.01288027	deCODE
7	99564343	99573780	AZGP1	0.02214059	-3.8493097	0.000118451	-0.015188309	0.00399944	0.0001461	44	137	0.01428537	deCODE
8	27092840	27115937	STMN4	0.00059216	3.83473074	0.000125702	0.089525634	0.0236613	0.0001546	181	383	0.01439579	deCODE
8	22877646	22926692	TNFRSF10B	0.00061807	-3.836034	0.000125037	-0.071742028	0.0189549	0.0001538	242	518	0.01439579	deCODE
11	57154267	57158130	PRG2	0.00153263	-3.8305837	0.00012784	-0.033501963	0.00886376	0.000157	56	166	0.01439579	deCODE
12	48498922	48540187	PFKM	0.01535543	3.81499672	0.000136185	0.019045183	0.00505887	0.0001667	135	305	0.0149728	deCODE
14	65472892	65569413	MAX	0.01645647	-3.8042703	0.000142223	-0.023058699	0.00614175	0.0001737	112	266	0.01528933	deCODE
19	54799506	54809979	LILRA3	0.4150661	-3.7750756	0.000159959	-0.001764027	0.00047339	0.0001942	451	972	0.01675705	deCODE
1	26856252	26901521	RPS6KA1	0.00762485	3.69069245	0.000223644	0.040335739	0.01106504	0.000267	78	227	0.02181296	deCODE
2	62900986	63273622	EHBP1	0.00121095	-3.6779375	0.000235128	-0.093163088	0.02564312	0.0002801	74	200	0.02181296	deCODE
4	100044808	100078949	ADH4	0.00561366	-3.6792384	0.000233931	-0.0409282	0.0112616	0.0002787	93	257	0.02181296	deCODE
7	100770370	100782547	SERPINE1	0.00816168	-3.6804823	0.000232793	-0.02830474	0.00778563	0.0002774	113	289	0.02181296	deCODE
16	29674600	29710020	QPRT	0.00056538	-3.6895984	0.000224608	-0.137971539	0.03785976	0.0002681	71	197	0.02181296	deCODE
19	54777075	54785039	LILRB2	0.30629153	-3.675553	0.000237335	-0.002452652	0.00067552	0.0002826	438	969	0.02181296	deCODE
19	1065922	1086627	HMHA1	0.01064019	3.67013823	0.000242419	0.029369628	0.00810071	0.0002883	376	912	0.02187371	deCODE
16	29817427	29823649	MAZ	0.00056017	-3.6605843	0.000251641	-0.070378219	0.01946102	0.0002988	67	184	0.02228082	deCODE
16	29882480	29910868	SEZ6L2	0.00071671	-3.6546446	0.000257538	-0.09401361	0.02603785	0.0003054	71	200	0.02239808	deCODE
16	31227283	31228680	PYDC1	0.00075652	3.63236876	0.000280831	0.115370957	0.03214384	0.0003317	50	178	0.02392472	deCODE
17	43238067	43247407	HEXIM2	0.00485761	3.60165769	0.000316195	0.0365276	0.01026163	0.0003714	95	239	0.026356	deCODE
6	43044006	43129457	PTK7	0.00843106	3.59410532	0.000325508	0.026819401	0.00754976	0.0003818	207	435	0.02666574	deCODE
2	70484518	70508323	PCYOX1	0.14522391	-3.5896551	0.000331116	-0.014077329	0.00396761	0.0003881	49	88	0.02668022	deCODE
1	175284330	175712906	TNR	0.01301313	-3.5732983	0.000352513	-0.037143433	0.01051538	0.000412	128	304	0.02686315	deCODE
11	43380482	43516483	TTC17	0.00073274	-3.5711818	0.000355374	-0.063860842	0.01808958	0.0004152	167	371	0.02686315	deCODE

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
13	38136720	38172981	POSTN	0.04511896	3.58102979	0.000342243	0.010279178	0.00290393	0.0004005	138	317	0.02686315	deCODE
17	41843489	41856356	DUSP3	0.00059493	-3.5739272	0.000351667	-0.105060344	0.02973768	0.000411	70	221	0.02686315	deCODE
8	61591337	61779465	CHD7	0.00154055	3.56092706	0.000369548	0.072315861	0.02054213	0.0004309	116	309	0.02748073	deCODE
6	34204650	34214008	HMGA1	0.00044262	-3.5430161	0.000395579	-0.296432175	0.08462011	0.0004599	10	305	0.02890723	deCODE
17	18231187	18266856	SHMT1	0.18807879	3.53057836	0.000414652	0.003892061	0.00111485	0.000481	75	210	0.02981137	deCODE
1	196788887	196801319	CFHR1	0.18594634	3.52664681	0.000420858	0.00403208	0.00115622	0.0004879	64	171	0.02981753	deCODE
7	37945543	38065297	SFRP4	0.01987096	-3.5218543	0.00042854	-0.083227104	0.02389746	0.0004964	11	19	0.02992181	deCODE
3	120347020	120401418	HGD	0.00912216	-3.5113342	0.000445863	-0.027776346	0.0079989	0.0005156	86	209	0.03065692	deCODE
11	63304281	63313934	RARRES3	0.00096378	3.50759945	0.000452169	0.112526907	0.03243863	0.0005226	98	239	0.03065699	deCODE
1	161154098	161168846	ADAMTS4	0.00216295	3.49122486	0.000480811	0.06779579	0.01963328	0.0005542	147	377	0.03208356	deCODE
16	2059927	2070756	NPW	0.06592836	3.48659615	0.00048921	0.010198603	0.00295729	0.0005634	184	516	0.03219573	deCODE
11	1773982	1785222	CTSD	0.05022444	3.47660269	0.00050781	0.009803079	0.00285057	0.0005839	248	612	0.03293807	deCODE
16	31445569	31454346	ZNF843	0.00011948	3.46169069	0.000536794	0.174274973	0.05088949	0.0006158	52	162	0.03429533	deCODE
2	27321757	27341995	CGREF1	0.00084135	3.45748707	0.000545238	0.051017325	0.0149151	0.000625	62	200	0.03437645	deCODE
15	63613577	63674360	CA12	0.00216128	3.44243676	0.000576499	0.029392579	0.00862973	0.0006593	141	359	0.03581361	deCODE
10	5454514	5500426	NET1	0.00185289	3.43873175	0.000584446	0.053957647	0.01585876	0.000668	315	667	0.03584379	deCODE
17	40688190	40696467	NAGLU	0.17485892	3.43326992	0.000596348	0.007473222	0.00219988	0.000681	30	74	0.03610238	deCODE
6	2988221	3019996	NQO2	0.38854182	3.42068004	0.000624648	0.007633706	0.0022552	0.000712	250	571	0.0371438	deCODE
7	12250867	12282993	TMEM106B	0.00650536	-3.4184569	0.000629773	-0.027870203	0.00823884	0.0007176	182	434	0.0371438	deCODE
8	11839830	11842099	DEFB135	0.00067716	-3.3899077	0.000699161	-0.064173195	0.01912668	0.0007932	141	420	0.04058093	deCODE
9	133971863	133998539	AIF1L	0.13712654	-3.371686	0.000747096	-0.004847272	0.00145235	0.0008453	217	431	0.04274893	deCODE
3	129693148	129696781	TRH	0.00122232	-3.358438	0.000783843	-0.074897919	0.02252769	0.0008851	88	233	0.044256	deCODE
16	69740899	69760854	NQO1	0.2016311	-3.352841	0.000799866	-0.003718863	0.00112038	0.0009025	62	183	0.04461699	deCODE
2	76974845	77820445	LRRTM4	0.00346906	-3.3340763	0.000855832	-0.047828352	0.01448856	0.000963	186	439	0.04507778	deCODE
5	78073032	78281910	ARSB	0.01036016	3.34329634	0.000827894	0.022087723	0.00667294	0.0009328	185	399	0.04507778	deCODE
7	100487615	100494594	ACHE	0.00100573	-3.3345891	0.000854255	-0.072995228	0.02210899	0.0009613	116	275	0.04507778	deCODE
12	62654119	62811211	USP15	0.01512445	3.33551738	0.000851408	0.015629952	0.00473275	0.0009582	173	358	0.04507778	deCODE
16	71559136	71572649	CHST4	0.00324434	3.34005967	0.000837604	0.319856044	0.09672362	0.0009433	10	19	0.04507778	deCODE
2	173420101	173489823	PDK1	0.01549002	-3.3155103	0.00091476	-0.016962001	0.00516642	0.0010266	188	438	0.04730571	deCODE
10	115999018	116051272	VWA2	0.05470199	-3.3139592	0.000919849	-0.024361832	0.00742372	0.0010321	124	289	0.04730571	deCODE
1	9005926	9035151	CA6	0.18998875	3.29511627	0.00098381	0.004395401	0.0013469	0.001101	184	422	0.04988181	deCODE
8	8993765	9009084	PPP1R3B	0.00109217	3.28993197	0.001002116	0.022615285	0.00694076	0.0011207	149	379	0.04988181	deCODE
22	51061182	51066607	ARSA	0.00417026	3.28950324	0.001003644	0.016965061	0.00520734	0.0011223	148	289	0.04988181	deCODE
8	27348296	27403081	EPHX2	0.007671	-7.121832	1.07E-12	-0.233868502	0.03441994	1.09E-11	11	15	1.51E-08	UKB-PP
17	38171614	38174066	CSF3	0.00419646	6.08314548	1.18E-09	0.099595518	0.01694709	4.18E-09	96	262	2.90E-06	UKB-PP
16	30194148	30200397	CORO1A	0.00062178	-5.8155911	6.04E-09	-0.167056603	0.02964622	1.75E-08	44	138	8.10E-06	UKB-PP

chr	p0	p1	gene	R2	Zscore.classic	p.classic	beta_BLISS	se_BLISS	p_BLISS	n_used_snp	n_snp	FDR	group
8	9911778	10286401	MSRA	0.00195254	-5.0585289	4.23E-07	-0.384145932	0.07777064	7.83E-07	12	16	0.00027182	UKB-PP
20	62328021	62330037	TNFRSF6B	0.06474243	-4.9722027	6.62E-07	-0.023792879	0.0048965	1.18E-06	41	84	0.00032725	UKB-PP
1	161475220	161493803	FCGR2A	0.30766302	-4.8542829	1.21E-06	-0.006665108	0.00140344	2.04E-06	15	29	0.00047258	UKB-PP
3	49506146	49573048	DAG1	0.00196442	-4.6281597	3.69E-06	-0.079880449	0.01760583	5.70E-06	17	61	0.00113057	UKB-PP
17	43298811	43324687	FMNL1	0.00031224	4.3782673	1.20E-05	0.104878626	0.02438232	1.70E-05	83	214	0.00294441	UKB-PP
7	99965153	99997719	PILRA	0.43587521	-4.2522643	2.12E-05	-0.023814162	0.00569446	2.89E-05	5	16	0.00445662	UKB-PP
1	161040788	161059348	NECTIN4	0.03517472	4.1961619	2.71E-05	0.062113237	0.0150443	3.65E-05	8	15	0.00464468	UKB-PP
7	99933737	99965356	PILRB	0.58975676	-4.1940118	2.74E-05	-0.006445218	0.00156185	3.68E-05	9	16	0.00464468	UKB-PP
5	147582357	147594700	SPINK6	0.05909043	-4.1013113	4.11E-05	-0.012525743	0.00310165	5.38E-05	89	198	0.00622438	UKB-PP
5	35852797	35879705	IL7R	0.25083238	4.06166283	4.87E-05	0.00902764	0.00225656	6.32E-05	8	15	0.00674526	UKB-PP
6	43193367	43197222	DNPH1	0.05188943	-4.0122892	6.01E-05	-0.014043543	0.00355217	7.70E-05	38	77	0.00763536	UKB-PP
16	30434940	30441396	DCTPP1	0.00424113	-3.9159589	9.00E-05	-0.103754477	0.02686944	0.0001127	9	15	0.01043082	UKB-PP
14	65472892	65569413	MAX	0.00419031	-3.8501861	0.000118028	-0.045870941	0.01207624	0.0001456	18	32	0.01202094	UKB-PP
16	29882480	29910868	SEZ6L2	0.02248383	3.84731552	0.000119419	0.016121498	0.00424731	0.0001472	35	110	0.01202094	UKB-PP
5	78073032	78281910	ARSB	0.0533416	3.75530922	0.000173128	0.014757026	0.0039804	0.0002094	161	380	0.01494914	UKB-PP
6	14117872	14137149	CD83	0.01942426	-3.7563595	0.000172403	-0.023633859	0.006373	0.0002085	153	394	0.01494914	UKB-PP
9	5510545	5571282	PDCD1LG2	0.17326777	3.74781284	0.000178383	0.004391196	0.00118674	0.0002154	96	213	0.01494914	UKB-PP
12	122326637	122356203	PSMD9	0.01678363	3.64616172	0.000266186	0.046045898	0.0127817	0.0003152	23	61	0.02083235	UKB-PP
1	155023042	155035252	ADAM15	0.30539533	-3.6250844	0.000288867	-0.022064358	0.00615945	0.0003407	8	16	0.02149637	UKB-PP
19	54810571	54824409	LILRA5	0.06921307	-3.6012526	0.000316688	-0.029089812	0.00817305	0.0003719	9	15	0.0224453	UKB-PP
11	60869867	60895324	CD5	0.01627518	3.5875914	0.000333747	0.026030608	0.00734068	0.000391	111	295	0.0226138	UKB-PP
2	27321757	27341995	CGREF1	0.15625119	-3.564397	0.000364694	-0.007295021	0.00207027	0.0004255	15	42	0.02362613	UKB-PP
19	40953696	40971747	BLVRB	0.0085936	3.51665018	0.000437029	0.028550417	0.00820968	0.0005058	154	375	0.02700327	UKB-PP
22	37521878	37571094	IL2RB	0.00122191	-3.4703232	0.000519832	-0.073412253	0.0213848	0.0005971	210	497	0.03069656	UKB-PP
17	72690452	72709117	CD300LF	0.39758878	-3.3701404	0.000751299	-0.00423214	0.00126861	0.0008498	15	23	0.04212704	UKB-PP
5	31193857	31329253	CDH6	0.20653323	3.3042347	0.000952361	0.014741477	0.00450507	0.0010672	26	43	0.04540187	UKB-PP
10	70042417	70092806	PBLD	0.10201905	3.30809032	0.000939345	0.011683152	0.00356636	0.0010531	8	15	0.04540187	UKB-PP
10	118380352	118404654	PNLIPRP2	0.27901463	3.31771208	0.00090758	0.006502009	0.00197915	0.0010189	28	92	0.04540187	UKB-PP
12	53342655	53346685	KRT18	0.00138405	3.33396526	0.000856174	0.071397005	0.02162888	0.0009634	134	336	0.04540187	UKB-PP
19	54597922	54606000	OSCAR	0.26998249	-3.3008956	0.000963767	-0.01045777	0.00319911	0.0010794	45	101	0.04540187	UKB-PP
7	22765503	22771621	IL6	0.00170465	3.26668158	0.00108816	0.05560684	0.01718497	0.0012131	184	372	0.04677149	UKB-PP
8	90945564	91015456	NBN	0.00213801	3.2725094	0.001065973	0.032830077	0.01012825	0.0011893	62	182	0.04677149	UKB-PP
16	31271311	31344213	ITGAM	0.01381186	-3.2764292	0.001051287	-0.111630451	0.03439824	0.0011735	7	16	0.04677149	UKB-PP

Supplementary Table S10: Drug-Gene Interaction Network of Pleiotropic Genes in COPD-GI Comorbidity

gene	drug	regulatory approval	indication	interaction score
MAML3	PERPHENAZINE	Approved	Antipsychotic Agents	4.039051634
APOE	GANCICLOVIR	Approved		0.226326169
APOE	IRBESARTAN	Approved	antihypertensive agent	0.226326169
APOE	NICOTINE POLACRILEX	Approved	Central Nervous System Stimulants	0.039361073
APOE	FENOFIBRATE MICRONIZED	Approved	anticholesterolaemic agent,antidyslipidaemic agent	0.069638821
APOE	PRAVASTATIN SODIUM	Approved	anticholesterolaemic agent,antihypercholesterolemic agent	0.134119211
APOE	GINKGO BILOBA EXTRACT	Approved		0.362121871
APOE	HUMAN CHORIONIC GONADOTROPIN	Approved		0.095295229
APOE	RITONAVIR	Approved		0.100589408
APOE	DONEPEZIL	Approved	for treatment of alzheimer's disease	0.339489254
APOE	LECANEMAB	Approved		0.452652338
APOE	LORAZEPAM	Approved	Anti-anxiety Agents; Anticonvulsants; Hypnotics and Sedatives	0.072424374
APOE	RIVASTIGMINE	Approved	for treatment of Alzheimer's disease	0.258658479
APOE	SOYBEAN SEED OIL	Approved		0.362121871
APOE	BUPROPION HYDROCHLORIDE	Approved	smoking-cessation agent,appetite suppressant,antidepressant	0.106506433
APOE	TROGLITAZONE	Approved		0.069638821
APOE	NORETHINDRONE ACETATE	Approved		0.301768225
APOE	LUTEIN	Approved		0.905304676
APOE	TRIAMCINOLONE	Approved	for treatment of diabetic macular edema	0.078722146
APOE	FLUVASTATIN	Approved	antihypercholesterolemic agent	0.226326169
APOE	PREDNISONE	Approved	corticosteroid,antiinflammatory agent	0.042107194
APOE	GALANTAMINE	Approved	for treatment of alzheimer's disease	0.226326169
APOE	VITAMIN E	Approved		0.113163085
APOE	TRETINOIN	Approved	for treatment of acne	0.019896806
DRD2	CABERGOLINE	Approved	Antiparkinson Agents	0.077827576
DRD2	PROMAZINE	Approved	Antiemetics; Antipsychotic Agents	0.021846337
DRD2	BREXPIPRAZOLE	Approved	antidepressant	0.088945801
DRD2	REMOXIPRIDE	Approved	Antipsychotic Agents	0.103770101
DRD2	SULPIRIDE	Approved	Second-Generation; Antipsychotic Agents,Antidepressive Agents	0.088945801
DRD2	LEVODOPA	Approved	antiparkinson agent	0.017295017
DRD2	LENVATINIB	Approved	antineoplastic agent	0.011530011
DRD2	LOXAPINE	Approved	antipsychotic agent	0.063858524
DRD2	THIORIDAZINE	Approved	Antipsychotic Agents	0.028626235
DRD2	MOLINDONE	Approved	Antipsychotic Agents	0.138360135
DRD2	PROCHLORPERAZINE	Approved	antiemetic,antimigraine agent	0.0296486
DRD2	DROPERIDOL	Approved	Anesthesia,Adjuncts	0.138360135
DRD2	HALOPERIDOL DECANOATE	Approved	Antipsychotic Agents	0.021846337
DRD2	TRIFLUPROMAZINE	Approved	Antiemetics; Antipsychotic Agents	0.077827576
DRD2	PIMOZIDE	Approved	Antidyskinetics; Antipsychotic Agents	0.024416494
DRD2	IOPERIDONE	Approved	atypical,antipsychotic agent	0.039531467
DRD2	BROMPERIDOL	Approved		0.622620608
DRD2	FLUPHENAZINE HYDROCHLORIDE	Approved	Antipsychotic Agents	0.028300937
DRD2	DOPAMINE	Approved		0.007156559
DRD2	NAPHAZOLINE	Approved		0.041508041
DRD2	CLOZAPINE	Approved	Antipsychotic Agents	0.014977128
DRD2	LUMATEPERONE	Approved	antipsychotic agent	0.059297201
DRD2	ARIPIPRAZOLE LAUROXIL	Approved	antipsychotic agent	0.043692674
DRD2	OLANZAPINE	Approved	for treatment of bipolar disorder,antidepressant,antipsychotic agent	0.010923169
DRD2	CARIPRAZINE HYDROCHLORIDE	Approved		0.103770101
DRD2	THIOTHIXENE	Approved		0.069180068
DRD2	FLUSPIRILENE	Approved	Antipsychotic Agents	0.037734582
DRD2	ERGOLOID MESYLATES, USP	Approved	Nootropic Agents; Vasodilator Agents	0.015964631
DRD2	ZUCLOPENTHIXOL	Approved	Antipsychotic Agents	0.155655152
DRD2	ZIPRASIDONE	Approved	antipsychotic agent	0.026779381
DRD2	DAPIPIRAZOLE	Approved	ophthalmological agent	0.041508041
DRD2	METOCLOPRAMIDE HYDROCHLORIDE	Approved	antimigraine agent,antiemetic,for treatment of gastroesophageal reflux disease,motilant,for treatment of diabetic gastroparesis	0.059297201
DRD2	INFIGRATINIB	Approved		0.007686674
DRD2	BROMOCRIPTINE MESYLATE	Approved		0.0296486
DRD2	AMINEPTIN	Approved		0.069180068
DRD2	PALIPERIDONE	Approved	antipsychotic agent	0.051885051
DRD2	MINAPRINE	Approved	Antidepressive Agents	0.069180068
DRD2	METHAMPHETAMINE	Approved	neuroprotectant	0.008647508
DRD2	ROTIGOTINE	Approved	antiparkinson agent	0.062262061
DRD2	AXITINIB	Approved	antineoplastic agent	0.009433646
DRD2	RISPERIDONE	Approved	antipsychotic agent,Antipsychotic Agents	0.01858569
DRD2	ROPINIROLE	Approved	for treatment of restlegs legs syndrome,antiparkinson agent	0.172950169
DRD2	CLEBOPRIDE	Approved		0.069180068
DRD2	FLUPHENAZINE DECANOATE	Approved		0.207540203
DRD2	LOXAPINE SUCCINATE	Approved		0.034590034
DRD2	BROMOCRIPTINE	Approved	antidiabetic	0.020084536
DRD2	CHLORPROTHIXENE	Approved	Antipsychotic Agents	0.083016081
DRD2	CARIPRAZINE	Approved	antipsychotic agent	0.083016081
DRD2	PERGOLIDE MESYLATE	Approved		0.0296486
DRD2	ACETOPHENAZINE	Approved	Antipsychotic Agents	0.207540203
DRD2	LURASIDONE HYDROCHLORIDE	Approved	antipsychotic agent	0.103770101
DRD2	PRALSETINIB	Approved		0.0296486
DRD2	SERTINDOLE	Approved	antipsychotic agent	0.0296486
DRD2	MESORIDAZINE	Approved	Antipsychotic Agents	0.062262061
DRD2	TRIMIPRAMINE MALEATE	Approved		0.025942525
DRD2	APOMORPHINE	Approved	antiparkinson agent,for treatment of erectile dysfunction,for treatment of sexual dysfunction in women	0.030746697
DRD2	THIETHYLPERAZINE MALEATE	Approved		0.207540203
DRD2	PRAMIPEXOLE	Approved	antiparkinson agent	0.124524122
DRD2	THIOTHIXENE HYDROCHLORIDE	Approved		0.069180068
DRD2	PHENOXYBENZAMINE	Approved	Anticonvulsants; Hypnotics and Sedatives	0.018867291
DRD2	TRIFLUOPERAZINE	Approved	Antiemetics; Antipsychotic Agents	0.013836014
DRD2	FRUQUINTINIB	Approved	antineoplastic agent	0.0296486
DRD2	PAZOPANIB	Approved	antineoplastic agent	0.003578279
DRD2	PERPHENAZINE	Approved	Antipsychotic Agents	0.031929262
DRD2	BUSPIRONE	Approved	Anti-anxiety Agents	0.059297201
DRD2	CHLORPROMAZINE HYDROCHLORIDE	Approved		0.012208247
DRD2	PROMAZINE HYDROCHLORIDE	Approved		0.025942525
DRD2	VANDETANIB	Approved	antineoplastic agent	0.003578279
DRD2	BENZQUINAMIDE HYDROCHLORIDE	Approved		0.207540203
DRD2	MINAPRINE HYDROCHLORIDE	Approved		0.023060023
DRD2	BENPERIDOL	Approved		0.051885051
DRD2	ERDAFTINIB	Approved		0.017295017
DRD2	THIETHYLPERAZINE	Approved	Antiemetics	0.056601873
DRD2	METHOTRIMEPRAZINE	Approved	Antipsychotic Agents	0.0296486
DRD2	FLUPHENAZINE ENANTHATE	Approved		0.207540203
DRD2	PIPERACETAZINE	Approved		0.069180068
DRD2	LITHIUM	Approved		0.009882867
DRD2	TRIFLUOPERAZINE HYDROCHLORIDE	Approved		0.018867291
DRD2	OLANZAPINE PAMOATE	Approved		0.041508041
DRD2	TOLAZOLINE	Approved	Antihypertensive Agents	0.041508041
DRD2	MEPHENTERMINE	Approved	Antihypertensive Agents; Vasoconstrictor Agents	0.103770101
DRD2	THIETHYLPERAZINE MALATE	Approved		0.025942525
DRD2	TIVOZANIB	Approved	antineoplastic agent	0.023060023
DRD2	ASENAPINE MALEATE	Approved		0.103770101
DRD2	PERGOLIDE	Approved	Antiparkinson Agents	0.061041236
DRD2	PHENTOLAMINE	Approved	Antihypertensive Agents,for treatment of erectile dysfunction	0.013836014

gene	drug	regulatory approval	indication	interaction score
DRD2	VERALIPRIDE	Approved		0.207540203
DRD2	ACETOPHENAZINE MALEATE	Approved		0.207540203
DRD2	DIHYDROERGOTAMINE MESYLATE	Approved	antimigraine agent	0.02075402
DRD2	CARPHENAZINE	Approved	Antipsychotic Agents	0.155655152
DRD2	SUMATRIPTAN	Approved	antimigraine agent	0.018046974
DRD2	EPHEDRINE	Approved	Central Nervous System Stimulants	0.012208247
DRD2	DISULFIRAM	Approved	Alcohol Deterrents	0.009653033
DRD2	PAREGORIC	Approved	analgesic	0.009023487
DRD2	DEHYDRATED ALCOHOL	Approved		0.005254182
DRD2	PRAMIPEXOLE DIHYDROCHLORIDE	Approved		0.069180068
DRD2	REGORAFENIB	Approved	antineoplastic agent	0.006289097
DRD2	CABOZANTINIB S-MALATE	Approved	antineoplastic agent	0.009433646
DRD2	PROPOFOL	Approved	sedative	0.01338969
DRD2	MESORIDAZINE BESYLATE	Approved		0.103770101
DRD2	DEXTROAMPHETAMINE SULFATE	Approved	for treatment of ADHD,for treatment of cognitive dysfunction	0.021846337
DRD2	RAMUCIRUMAB	Approved	antineoplastic agent	0.034590034
DRD2	METARAMINOL	Approved	Antihypertensive Agents; Vasoconstrictor Agents	0.0296486
DRD2	SORAFENIB	Approved	antineoplastic agent	0.001820528
DRD2	SUNITINIB	Approved	antineoplastic agent	0.004235514
DRD2	PHENYLTOLOXAMINE	Approved		0.103770101
DRD2	PSEUDOEPHEDRINE	Approved	antiallergy agent	0.012208247
DRD2	TRIFLUPROMAZINE HYDROCHLORIDE	Approved		0.034590034
DRD2	AMOXAPINE	Approved	antidepressant	0.013836014
DRD2	DOMPERIDONE	Approved	Antiemetics	0.118594401
DRD2	REMOXIPRIDE HYDROCHLORIDE	Approved		0.207540203
DRD2	ASENAPINE	Approved	antipsychotic agent	0.016603216
DRD2	PEXIDARTINIB	Approved		0.0148243
DRD2	METHYLDOPA ANHYDROUS	Approved	Antihypertensive Agents	0.006694845
DRD2	NINTEDANIB ESYLATE	Approved	antineoplastic agent	0.008301608
DRD2	PHENYLEPHRINE	Approved	for treatment of incontinence	0.012971263
DRD2	CHLORPROMAZINE	Approved		0.072919531
DRD2	AMISULPRIDE	Approved	antipsychotic agent,antiemetic	0.031929262
DRD2	QUETIAPINE FUMARATE	Approved	antidepressant,antipsychotic agent	0.034590034
DRD2	CARPHENAZINE MALEATE	Approved		0.069180068
DRD2	MELEVODOPA	Approved	antiparkinson agent	0.0296486
DRD2	ROPINIROLE HYDROCHLORIDE	Approved		0.051885051
DRD2	HALOPERIDOL LACTATE	Approved		0.051885051
DRD2	LOXAPINE HYDROCHLORIDE	Approved		0.041508041
DRD2	PROPIOMAZINE	Approved	Hypnotics and Sedatives	0.0296486
DRD2	CAFFEINE	Approved	Central Nervous System Stimulants	0.011218389
DRD2	NALTREXONE	Approved	for treatment of substance abuse,appetite suppressant,analgesic	0.024416494
DRD2	RASAGILINE	Approved	antiparkinson agent	0.059297201
CRHR1	DOXEPIN HYDROCHLORIDE	Approved	hypnotic,antimigraine agent	0.066297565
CRHR1	DESPRAMINE	Approved	Tricyclic,Antidepressive Agents	0.074797252
CRHR1	AMITRIPTYLINE HYDROCHLORIDE	Approved	analgesic	0.064824285
CRHR1	TRIMIPRAMINE	Approved	Tricyclic,Antidepressive Agents	0.088396753
CRHR1	CLOMIPRAMINE	Approved	Tricyclic,Antidepressive Agents	0.076765601
CRHR1	TELAVANCIN	Approved		2.917092846
CRHR1	FLUOXETINE HYDROCHLORIDE	Approved	for treatment of bipolar disorder,for treatment of autism,antidepressant,for treatment of sleep apnea	0.208363775
CRHR1	NORTRIPTYLINE	Approved	antidepressant,antiasthmatic agent	0.091159151
PDE4B	AMINOPHYLLINE	Approved		0.116683714
PDE4B	FLAVOXATE HYDROCHLORIDE	Approved		0.145854642
PDE4B	RESVERATROL	Approved	antineoplastic agent,antidiabetic,for treatment of herpes simplex virus 1	0.023813003
PDE4B	ROFLUMILAST	Approved	for treatment of chronic obstructive pulmonary disorder (COPD)	0.388945713
PDE4B	DYPHYLLINE	Approved	Bronchodilator Agents; Vasodilator Agents	0.500073059
PDE4B	THEOPHYLLINE SODIUM GLYCINATE	Approved		0.116683714
PDE4B	INAMRINONE	Approved	Cardiotonic Agents; Phosphodiesterase Inhibitors	0.122824962
PDE4B	CRISABOROLE	Approved	antipsoriatic,antiinflammatory agent	0.33338204
PDE4B	THEOPHYLLINE	Approved	bronchodilator	0.129648571
PDE4B	PAPAVERINE	Approved	Antispasmodics; Anti-impotence Agents; Vasodilator Agents	0.155578285
PDE4B	APREMILAST	Approved	antipsoriatic,DMARD,antiinflammatory agent	0.233367428
PDE4B	RITODRINE	Approved	Tocolytic Agents	0.777891426
PDE4B	CAFFEINE	Approved	Central Nervous System Stimulants	0.063072278
PDE4B	AMLEXANOX	Approved		0.089756703
PDE4B	PENTOXIFYLLINE	Approved	for treatment of amyotrophic lateral sclerosis (ALS)	0.100014612
PDE4B	DEHYDRATED ALCOHOL	Approved		0.029540181
PDE4B	OXTRIPHYLLINE	Approved		0.116683714
PDE4B	ASPIRIN	Approved	NSAID,antithrombotic,anticoagulant	0.008275441
APOC1	MISOPROSTOL	Approved	labor-inducing agent	0.243091071
APOC1	ALPROSTADIL	Approved	for treatment of sexual dysfunction in women,for treatment of erectile dysfunction	0.084553416
APOC1	DINOPROSTONE	Approved	Abortifacient Agents	0.097236428
APOC1	RITONAVIR	Approved		0.144053968
APOC1	ILOPROST	Approved	antihypertensive agent	0.162060714
APOC1	TREPROSTINIL	Approved	Antihypertensive Agents; Antithrombotic Agents	0.216080952