Table S20: GO function analysis of ranked signals from CEU population using the T_1 test statistic.

Description	p-value	Enrichment	Genes
MHC class II receptor activity	8.1×10^{-11}	49.2	*HLA-DPA1*, *HLA-DQA1*, *HLA-DQA2*, *HLA-DQB1*, *HLA-DQB2*, *HLA-DRA*, *HLA-DRB1*
Phospholipid binding	6.2×10^{-9}	1.9	*ABCA1*, *AFAP1*, *AKAP13*, *ALS2*, *ANXA6*, *APBB1IP*, *ARHGAP22*, *ARHGAP23*, *ARHGAP24*, *ARHGAP25*, *ARHGAP42*, *ARHGEF18*, *ARHGEF3*, *ASAP1*, *BCR*, *CADPS*, *CADPS2*, *CCDC88A*, *CDC42BPA*, *DAPP1*, *DGKH*, *DNM3*, *DOCK10*, *DOK6*, *DYSF*, *ELMO1*, *FARP1*, *FGD4*, *FGD5*, *GRB10*, *HIP1*, *IQSEC1*, *ITPR1*, *ITPR2*, *KALRN*, *KIF16B*, *MCF2L2*, *MYO10*, *MYO1B*, *MYOF*, *NGEF*, *NOXO1*, *OSBPL3*, *PARD3*, *PCLO*, *PHLDB2*, *PIK3C2B*, *PLA2G4A*, *PLA2G4C*, *PLCB1*, *PLCG2*, *PLCH1*, *PLCL1*, *PLD1*, *PLEK*, *PLEKHA6*, *PLEKHA7*, *PLEKHG1*, *PLEKHH2*, *PON1*, *PREX1*, *PREX2*, *PSD3*, *PXK*, *RASGRF1*, *RASGRF2*, *RTKN2*, *SBF2*, *SCARB1*, *SGIP1*, *SKAP2*, *SNTB1*, *SNTG2*, *SNX16*, *SNX19*, *SNX24*, *SNX29*, *SNX31*, *SNX5*, *SNX7*, *SPATA13*, *STAP1*, *SWAP70*, *TEC*, *TIAM1*, *TIAM2*, *TULP3*, *VAV1*, *VAV2*, *VAV3*, *VNN1*, *ZFYVE1*, *ZFYVE28*
Metal ion binding	2.5×10^{-8}	1.4	*ABO*, *ACSM5*, *ACTN1*, *ACTN2*, *ADARB2*, *ADCY3*, *ADCY5*, *ADCY8*, *ADD2*, *AGMAT*, *AKAP13*, *ALPL*, *AMDHD1*, *AMPD3*, *ANGPT2*, *ANXA6*, *APIP*, *APOA1BP*, *APP*, *ARSB*, *ARSG*, *ARSJ*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP2C2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *B4GALT1*, *BMPR1B*, *BNIP2*, *C1GALT1*, *CABP5*, *CABS1*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CADPS*, *CADPS2*, *CAPN14*, *CAPN8*, *CAPN9*, *CARS2*, *CASQ2*, *CCBE1*, *CDC42BPA*, *CDH10*, *CDH13*, *CDH23*, *CDH4*, *CDH9*, *CDHR2*, *CDKAL1*, *CLSTN2*, *CNOT6*, *COL27A1*, *COL5A2*, *COL9A1*, *COLEC12*, *CUBN*, *CYBRD1*, *CYP2C8*, *CYP2E1*, *CYP4F11*, *CYP4F12*, *CYP4F2*, *CYP4F3*, *CYP4F8*, *CYP4Z1*, *DBH*, *DCHS2*, *DDAH1*, *DDR1*, *DGKB*, *DGKH*, *DMRT1*, *DNER*, *DPYD*, *DSC1*, *DSG1*, *DTNA*, *EBF2*, *EFCAB11*, *EFCAB4B*, *EFEMP1*, *EGLN1*, *ELAC2*, *ELTD1*, *EMR1*, *EMR2*, *ENDOU*, *ENOSF1*, *ENPP1*, *EYS*, *F13A1*, *F5*, *FAHD1*, *FARS2*, *FAT2*, *FAT3*, *FAT4*, *FBN2*, *FBP2*, *FCER2*, *FGD4*, *FGD5*, *FHIT*, *FRAS1*, *FSCB*, *FSTL4*, *FSTL5*, *FTO*, *FXN*, *GALNT10*, *GALNT2*, *GALNTL6*, *GLRX3*, *GPR39*, *GRM7*, *GUCA1A*, *HAAO*, *HDAC7*, *HDHD2*, *HGD*, *HMGCLL1*, *HPCAL4*, *IDO2*, *IMPA2*, *INPP1*, *ITGA1*, *ITGA2*, *ITGA9*, *KALRN*, *KCNIP1*, *KCNIP4*, *KSR2*, *LEPREL1*, *LHPP*, *LOXL2*, *LRP1B*, *LTBP1*, *LTF*, *LYAR*, *MAN1A1*, *MAST4*, *MATN2*, *ME3*, *MGAT1*, *MGAT5B*, *MGMT*, *MLPH*, *MMP20*, *MOB2*, *MOB3B*, *MOXD1*, *MYO5A*, *NCALD*, *NCS1*, *NECAB2*, *NELL1*, *NELL2*, *NID2*, *NME7*, *NOTCH2*, *NOTCH4*, *NRP1*, *NRXN1*, *NRXN3*, *NUBPL*, *OAS1*, *OCM2*, *PADI2*, *PADI4*, *PADI6*, *PCDH15*, *PCDH17*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PCLO*, *PDE11A*, *PDE1A*, *PDE1C*, *PDE3A*, *PDE4D*, *PDE8B*, *PDSS1*, *PELO*, *PFKP*, *PGM2*, *PINK1*, *PKD1L2*, *PLA2G4A*, *PLA2G4E*, *PLCB1*, *PLCB4*, *PLCH1*, *PLCL1*, *PLCZ1*, *PLOD2*, *PLSCR1*, *PON1*, *PPA2*, *PRIM2*, *PRKCE*, *PRPSAP1*, *PRTFDC1*, *PRUNE2*, *PXDN*, *PXDNL*, *RELN*, *RIMS1*, *RIMS2*, *RNPEP*, *RPS6KA2*, *RYR2*, *RYR3*, *SCD5*, *SCN1A*, *SLC25A25*, *SLC8A1*, *SLIT3*, *SMOC1*, *SMOC2*, *SNCA*, *SPARCL1*, *STAC*, *STK32A*, *STK32B*, *SVEP1*, *SWAP70*, *SYT6*, *SYT9*, *TAF1B*, *TEC*, *TESC*, *THBS2*, *TIMP2*, *TKT*, *TNFRSF11A*, *TP63*, *TPD52*, *TPO*, *TYW1*, *UNC13C*, *VAV2*, *VAV3*, *ZFYVE28*
MHC class I receptor activity	2.8×10^{-8}	760.6	*HLA-A*, *HLA-B*, *HLA-C*
Transmembrane transporter activity	3.6×10^{-8}	1.6	*ABCA1*, *ABCA4*, *ABCB5*, *ABCC11*, *ABCC4*, *AKR1C4*, *ANO1*, *ANO2*, *AQP8*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP6V1G2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *COX7B2*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *NMUR2*, *OCA2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SLC10A2*, *SLC12A6*, *SLC12A8*, *SLC14A1*, *SLC14A2*, *SLC15A2*, *SLC15A5*, *SLC16A14*, *SLC17A5*, *SLC19A3*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC24A4*, *SLC28A1*, *SLC2A1*, *SLC2A14*, *SLC2A9*, *SLC30A9*, *SLC31A2*, *SLC35D2*, *SLC38A4*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC41A3*, *SLC4A7*, *SLC5A12*, *SLC6A5*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *SV2B*, *SV2C*, *TAP1*, *TAP2*, *TOMM7*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*

GO categories in which false discovery rate is less than 0.01.

Table S20 continued.

Description	p-value	Enrichment	Genes
Calcium ion binding	2.0×10^{-7}	1.8	*ACTN1*, *ACTN2*, *CABP5*, *CABS1*, *CADPS*, *CAPN14*, *CAPN8*, *CAPN9*, *CASQ2*, *CCBE1*, *CDH10*, *CDH13*, *CDH23*, *CDH4*, *CDH9*, *CDHR2*, *CLSTN2*, *CUBN*, *DCHS2*, *DGKB*, *DNER*, *DSC1*, *DSG1*, *DTNA*, *EFCAB11*, *EFCAB4B*, *EFEMP1*, *ELTD1*, *EMR1*, *EMR2*, *EYS*, *FAT2*, *FAT4*, *FSCB*, *FSTL4*, *FSTL5*, *GRM7*, *GUCA1A*, *HPCAL4*, *KCNIP1*, *KCNIP4*, *LRP1B*, *LTBP1*, *MAN1A1*, *MATN2*, *MGMT*, *MMP20*, *MYO5A*, *NCALD*, *NELL1*, *NID2*, *NOTCH4*, *OCM2*, *PADI2*, *PADI4*, *PADI6*, *PCDH15*, *PCDH17*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PCLO*, *PKD1L2*, *PLCB1*, *PLCB4*, *PLCH1*, *PLSCR1*, *PON1*, *RYR2*, *RYR3*, *SLC25A25*, *SLIT3*, *SMOC1*, *SMOC2*, *SNCA*, *SPARCL1*, *SVEP1*, *SWAP70*, *TESC*, *THBS2*, *TPD52*, *TPO*
Ion gated channel activity	2.5×10^{-7}	2.0	*ANO1*, *ANO2*, *ASIC2*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPC4*, *TRPC6*
Gated channel activity	2.5×10^{-7}	2.0	*ANO1*, *ANO2*, *ASIC2*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPC4*, *TRPC6*
Substrate-specific transmembrane transporter activity	2.7×10^{-7}	1.6	*ABCA1*, *AKR1C4*, *ANO1*, *ANO2*, *AQP8*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *COX7B2*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *NMUR2*, *OCA2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SLC10A2*, *SLC12A6*, *SLC14A1*, *SLC14A2*, *SLC15A2*, *SLC17A5*, *SLC19A3*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC28A1*, *SLC2A1*, *SLC2A14*, *SLC2A9*, *SLC30A9*, *SLC31A2*, *SLC35D2*, *SLC38A4*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC41A3*, *SLC4A7*, *SLC6A5*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *TAP1*, *TAP2*, *TOMM7*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*
Rho guanyl-nucleotide exchange factor activity	$6.4 \times 10^{-}$	3.3	*AKAP13*, *ALS2*, *ARHGEF18*, *ARHGEF3*, *ARHGEF37*, *BCR*, *DOCK10*, *FARP1*, *FGD4*, *FGD5*, *KALRN*, *MCF2L2*, *NGEF*, *PLEKHG1*, *PREX1*, *PREX2*, *RASGRF1*, *RASGRF2*, *SPATA13*, *TIAM1*, *TIAM2*, *VAV1*, *VAV2*, *VAV3*
Ion transmembrane transporter activity	8.3×10^{-7}	1.6	*ABCA1*, *AKR1C4*, *ANO1*, *ANO2*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *COX7B2*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *NMUR2*, *OCA2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SLC10A2*, *SLC12A6*, *SLC15A2*, *SLC17A5*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC28A1*, *SLC2A9*, *SLC30A9*, *SLC31A2*, *SLC38A4*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC41A3*, *SLC4A7*, *SLC6A5*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*
Glutamate receptor activity	2.6×10^{-6}	4.9	*GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM4*, *GRM5*, *GRM7*, *GRM8*

GO categories in which false discovery rate is less than 0.01.

Table S20 continued.

Description	p-value	Enrichment	Genes
Substrate-specific channel activity	3.0×10^{-6}	1.8	*ANO1*, *ANO2*, *AQP8*, *AQP9*, *ASIC2*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*
Ion channel activity	5.0×10^{-6}	1.8	*ANO1*, *ANO2*, *ASIC2*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*
Receptor activity	5.1×10^{-6}	1.5	*ABCA1*, *ADRA1A*, *ALK*, *ASGR2*, *BAI3*, *BMPR1B*, *CLEC1A*, *CLEC1B*, *CNR2*, *COLEC12*, *CUBN*, *DAB2*, *DCC*, *DMBT1*, *DNER*, *EFEMP1*, *ELTD1*, *EMR1*, *ENDOU*, *EPHB1*, *ERBB4*, *F2RL2*, *FAS*, *FSHR*, *GABRR1*, *GPR111*, *GPR139*, *GPR158*, *GPR39*, *GPR78*, *GRIA1*, *GRIK2*, *GRIK3*, *GRIN2A*, *GRIN3A*, *GRM5*, *GRM7*, *GRM8*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DOA*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQA2*, *HLA-DQB1*, *HLA-DQB2*, *HLA-DRA*, *HLA-DRB1*, *HLA-F*, *HLA-G*, *IL1RL2*, *ITGB5*, *ITGBL1*, *KLRB1*, *LGR5*, *LHCGR*, *LOXL2*, *LRP1B*, *LTBP1*, *MCC*, *NOTCH4*, *NPSR1*, *NRP1*, *NRXN1*, *NRXN3*, *OPCML*, *OPRK1*, *OR10AG1*, *OR10C1*, *OR12D2*, *OR13C5*, *OR14A16*, *OR1L8*, *OR1N2*, *OR1S1*, *OR2AK2*, *OR2L13*, *OR2T4*, *OR2W3*, *OR4C3*, *OR4C45*, *OR51B2*, *OR51B6*, *OR51E1*, *OR51F1*, *OR51I2*, *OR51M1*, *OR51Q1*, *OR52E2*, *OR52E6*, *OR52J3*, *OR52N2*, *OR52N4*, *OR52R1*, *OR5AC2*, *OR5F1*, *OR5I1*, *OR5P2*, *OR5W2*, *OR8G1*, *OR8G5*, *OR8H3*, *OR8I2*, *OR8U8*, *OR9G1*, *OR9G9*, *PDGFRL*, *PGLYRP4*, *PKHD1*, *PLA2R1*, *PLXNA4*, *PPYR1*, *PROKR2*, *PTCHD3*, *PTGER3*, *PTPRB*, *PTPRD*, *PTPRM*, *RAMP3*, *ROBO2*, *ROR1*, *RORA*, *RXRG*, *SCARB1*, *SEMA3A*, *SEMA3E*, *SEMA5A*, *SEMA6D*, *SORCS1*, *SORCS2*, *SORCS3*, *TAS2R19*, *TAS2R20*, *TEK*, *TMPRSS15*, *TNFRSF11A*, *TSHR*
Passive transmembrane transporter activity	1.3×10^{-5}	1.8	*ANO1*, *ANO2*, *AQP8*, *AQP9*, *ASIC2*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*
Channel activity	1.3×10^{-5}	1.8	*ANO1*, *ANO2*, *AQP8*, *AQP9*, *ASIC2*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *LRRC52*, *MCOLN2*, *NALCN*, *NCS1*, *NMUR2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*
Lipid binding	1.4×10^{-5}	1.6	*ABCA1*, *ADH4*, *ADH5*, *AFAP1*, *AKAP13*, *AKR1C2*, *ALS2*, *ANXA6*, *APBB1IP*, *ARHGAP22*, *ARHGAP23*, *ARHGAP24*, *ARHGAP25*, *ARHGAP42*, *ARHGEF18*, *ARHGEF3*, *ASAP1*, *BCR*, *CADPS*, *CADPS2*, *CCDC88A*, *CDC42BPA*, *DAPP1*, *DGKH*, *DNM3*, *DOCK10*, *DOK6*, *DYSF*, *ELMO1*, *ESRRB*, *ESRRG*, *FABP2*, *FARP1*, *FER*, *FGD4*, *FGD5*, *GRB10*, *HIP1*, *HSDL2*, *INSR*, *IQSEC1*, *ITPR1*, *ITPR2*, *KALRN*, *KIF16B*, *KL*, *LAMA1*, *LAMC1*, *LYN*, *MCF2L2*, *MYO10*, *MYO1B*, *MYOF*, *NGEF*, *OPN4*, *OSBPL3*, *PARD3*, *PCLO*, *PHLDB2*, *PIK3C2B*, *PLA2G4A*, *PLA2G4C*, *PLCB1*, *PLCG2*, *PLCH1*, *PLCL1*, *PLD1*, *PLEK*, *PLEKHA6*, *PLEKHA7*, *PLEKHG1*, *PLEKHH2*, *PON1*, *PREX1*, *PREX2*, *PSD3*, *PXK*, *RASGRF1*, *RASGRF2*, *RTKN2*, *SBF2*, *SCARB1*, *SCP2*, *SGIP1*, *SH3GL2*, *SKAP2*, *SNTB1*, *SNTG2*, *SNX16*, *SNX19*, *SNX24*, *SNX29*, *SNX31*, *SNX5*, *SNX7*, *SOAT1*, *SPATA13*, *STAP1*, *SWAP70*, *TEC*, *TIAM1*, *TIAM2*, *TULP3*, *UGT1A7*, *UGT1A8*, *UGT1A9*, *UNC13A*, *VAV2*, *VAV3*, *VNN1*, *ZFYVE1*, *ZFYVE28*

GO categories in which false discovery rate is less than 0.01.

Table S20 continued.

Description	p-value	Enrichment	Genes
Transmembrane signaling receptor activity	1.5×10^{-5}	1.5	*ABCA1*, *ADRA1A*, *AKR1C3*, *ALK*, *BAI3*, *BMPR1B*, *CLEC1A*, *CLEC1B*, *CNR2*, *DCC*, *DNER*, *EFEMP1*, *ELTD1*, *EMR1*, *EPHB1*, *ERBB4*, *F2RL2*, *FAS*, *FLT3*, *FSHR*, *FZD6*, *GABRR1*, *GPR111*, *GPR139*, *GPR158*, *GPR39*, *GPR78*, *GRIA1*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN3A*, *GRM5*, *GRM7*, *GRM8*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DOA*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQA2*, *HLA-DQB1*, *HLA-DQB2*, *HLA-DRA*, *HLA-DRB1*, *HLA-F*, *HLA-G*, *IL1RL2*, *KLRB1*, *LGR5*, *LHCGR*, *LTBP1*, *NPSR1*, *NRP1*, *OPCML*, *OPRK1*, *OR10AG1*, *OR10C1*, *OR12D2*, *OR13C5*, *OR14A16*, *OR1L8*, *OR1N2*, *OR1S1*, *OR2AK2*, *OR2L13*, *OR2T4*, *OR2W3*, *OR4C3*, *OR4C45*, *OR51B2*, *OR51B6*, *OR51E1*, *OR51F1*, *OR51I2*, *OR51M1*, *OR51Q1*, *OR52E2*, *OR52E6*, *OR52J3*, *OR52N2*, *OR52N4*, *OR52R1*, *OR5AC2*, *OR5F1*, *OR5I1*, *OR5P2*, *OR5W2*, *OR8G1*, *OR8G5*, *OR8H3*, *OR8I2*, *OR8U8*, *OR9G1*, *OR9G9*, *PDGFRL*, *PLXNA4*, *PPYR1*, *PROKR2*, *PTCHD3*, *PTGER3*, *PTPRB*, *PTPRD*, *PTPRM*, *ROBO2*, *ROR1*, *ROR2*, *SEMA5A*, *SORCS1*, *SORCS2*, *SORCS3*, *TAS2R19*, *TAS2R20*, *TEK*, *TNFRSF11A*, *TSHR*
Metal ion transmembrane transporter activity	1.7×10^{-5}	1.8	*ASIC2*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *FGF2*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SLC10A2*, *SLC1A2*, *SLC1A6*, *SLC28A1*, *SLC31A2*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC4A7*, *SLC6A5*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*
Ras guanyl-nucleotide exchange factor activity	1.9×10^{-5}	2.6	*AKAP13*, *ALS2*, *ARHGEF18*, *ARHGEF3*, *ARHGEF37*, *BCR*, *DOCK10*, *FARP1*, *FGD4*, *FGD5*, *KALRN*, *MCF2L2*, *NGEF*, *PLEKHG1*, *PREX1*, *PREX2*, *RAPGEF4*, *RASGRF1*, *RASGRF2*, *RGL1*, *RIN2*, *SBF2*, *SPATA13*, *TIAM1*, *TIAM2*, *VAV1*, *VAV2*, *VAV3*
Signaling receptor activity	2.1×10^{-5}	7.8	*DMBT1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQB1*, *OR4C3*
Transporter activity	2.2×10^{-5}	1.4	*ABCA1*, *ABCA4*, *ABCB5*, *ABCC11*, *ABCC4*, *ABCG8*, *AKR1C4*, *ANO1*, *ANO2*, *AP1S3*, *AQP8*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP6V1G2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *COX7B2*, *CPLX1*, *CUBN*, *FABP2*, *FGF2*, *FLVCR1*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *KPNA7*, *LRRC52*, *MCOLN2*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *NMUR2*, *NUP88*, *OCA2*, *PCLO*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *PLSCR1*, *RAMP3*, *RYR1*, *RYR2*, *RYR3*, *SCARB1*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SCP2*, *SLC10A2*, *SLC12A6*, *SLC12A8*, *SLC14A1*, *SLC14A2*, *SLC15A2*, *SLC15A5*, *SLC16A14*, *SLC17A5*, *SLC19A3*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC24A4*, *SLC28A1*, *SLC2A1*, *SLC2A14*, *SLC2A9*, *SLC30A9*, *SLC31A2*, *SLC35D2*, *SLC37A1*, *SLC37A2*, *SLC38A4*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC41A3*, *SLC4A7*, *SLC5A12*, *SLC6A5*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *SLCO1C1*, *SLCO5A1*, *SLCO6A1*, *SV2B*, *SV2C*, *SYNPR*, *SYT6*, *SYT9*, *TAP1*, *TAP2*, *TOMM7*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*
Signal transducer activity	2.3×10^{-5}	5.8	*DMBT1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *OR4C3*, *RGS6*
Molecular transducer activity	2.3×10^{-5}	5.8	*DMBT1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *OR4C3*, *RGS6*

GO categories in which false discovery rate is less than 0.01.

Table S20 continued.

Description	p-value	Enrichment	Genes
Substrate-specific transporter activity	2.6×10^{-5}	1.5	*ABCA1*, *ABCA4*, *ABCG8*, *AKR1C4*, *ANO1*, *ANO2*, *AP1S3*, *AQP8*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*, *BEST3*, *CACNA1A*, *CACNA2D1*, *CACNA2D3*, *CACNB2*, *CHRNA9*, *CHRNB3*, *CLCA2*, *CLCNKB*, *CLIC5*, *CNGA1*, *CNGA3*, *COX7B2*, *FABP2*, *FGF2*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIA1*, *GRIA4*, *GRID2*, *GRIK2*, *GRIK3*, *GRIK4*, *GRIN2A*, *GRIN2B*, *GRIN3A*, *GRM7*, *ITPR1*, *ITPR2*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNH7*, *KCNIP1*, *KCNIP4*, *KCNJ12*, *KCNJ16*, *KCNK10*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KCNQ5*, *KPNA7*, *LRRC52*, *MCOLN2*, *MRS2*, *NALCN*, *NCS1*, *NIPAL1*, *NIPAL3*, *NMUR2*, *OCA2*, *PEX5L*, *PIEZO1*, *PIEZO2*, *PKD1L2*, *PLSCR1*, *RAMP3*, *RYR1*, *RYR2*, *RYR3*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SCP2*, *SLC10A2*, *SLC12A6*, *SLC14A1*, *SLC14A2*, *SLC15A2*, *SLC17A5*, *SLC19A3*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC28A1*, *SLC2A1*, *SLC2A14*, *SLC2A9*, *SLC30A9*, *SLC31A2*, *SLC35D2*, *SLC38A4*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC41A3*, *SLC4A7*, *SLC6A5*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *TAP1*, *TAP2*, *TOMM7*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*, *ZDHHC13*
Phospholipid-translocating ATPase activity	4.2×10^{-5}	6.2	*ABCA4*, *ATP10B*, *ATP10D*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *ATP9B*

GO categories in which false discovery rate is less than 0.01.