Table S16: GO process analysis of ranked signals from CEU population using the T_1 test statistic.

Description	p-value	Enrichment	Genes
Interferon-gamma-mediated signaling pathway	4.6×10^{-14}	108.4	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Cellular response to interferon-gamma	3.0×10^{-13}	87.6	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Biological adhesion	6.6×10^{-13}	1.9	*ACTN2*, *ADAM12*, *AJAP1*, *AMTN*, *ANGPT1*, *APP*, *B4GALT1*, *BMPR1B*, *CADM2*, *CD151*, *CDH10*, *CDH13*, *CDH23*, *CDH4*, *CDH9*, *CDHR2*, *CDON*, *CDSN*, *CFDP1*, *CHL1*, *CLCA2*, *CLDN1*, *CLDN10*, *CLDN14*, *CLDN20*, *CLSTN2*, *CNTN1*, *CNTN4*, *CNTN5*, *CNTNAP2*, *CNTNAP4*, *CNTNAP5*, *COL13A1*, *COL4A3*, *COL5A1*, *CPXM2*, *CTNNA3*, *CXADR*, *CXCL12*, *DAB1*, *DCHS2*, *DDR1*, *DPT*, *DSC1*, *DSCAM*, *DSG1*, *EMR1*, *EMR2*, *ENTPD1*, *EPHB1*, *F5*, *FAT2*, *FAT3*, *FAT4*, *FER*, *HABP2*, *HPSE*, *IGFBP7*, *IGSF5*, *ITGA1*, *ITGA11*, *ITGA2*, *ITGA9*, *ITGB3*, *ITGB5*, *ITGBL1*, *KIFC3*, *LAMA1*, *LAMA2*, *LAMC1*, *LAMC2*, *LOXL2*, *LPP*, *LSAMP*, *MAGI1*, *MEGF10*, *MEGF11*, *MTSS1*, *NCAM2*, *NELL2*, *NFASC*, *NID2*, *NINJ2*, *NRCAM*, *NRP1*, *NRXN1*, *NRXN3*, *NTM*, *NTN1*, *ODZ3*, *OPCML*, *PARVB*, *PCDH15*, *PCDH17*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PDZD2*, *PKD1L1*, *PKHD1*, *PKP1*, *PKP2*, *PLEK*, *PLEKHA7*, *PLXNC1*, *PPFIBP1*, *PRKCA*, *PRKCE*, *PRPH2*, *PTPRD*, *PTPRF*, *PTPRM*, *PTPRT*, *PTPRU*, *RELN*, *ROBO2*, *ROR2*, *RPSA*, *SCARB1*, *SDK1*, *SEMA5A*, *SIRPA*, *SORBS1*, *SPON1*, *SSPO*, *SVEP1*, *SYK*, *TEK*, *THBS2*, *TMEM8A*, *TNN*, *TNR*, *VNN1*, *VWF*
Cell adhesion	6.6×10^{-13}	1.9	*ACTN2*, *ADAM12*, *AJAP1*, *AMTN*, *ANGPT1*, *APP*, *B4GALT1*, *BMPR1B*, *CADM2*, *CD151*, *CDH10*, *CDH13*, *CDH23*, *CDH4*, *CDH9*, *CDHR2*, *CDON*, *CDSN*, *CFDP1*, *CHL1*, *CLCA2*, *CLDN1*, *CLDN10*, *CLDN14*, *CLDN20*, *CLSTN2*, *CNTN1*, *CNTN4*, *CNTN5*, *CNTNAP2*, *CNTNAP4*, *CNTNAP5*, *COL13A1*, *COL4A3*, *COL5A1*, *CPXM2*, *CTNNA3*, *CXADR*, *CXCL12*, *DAB1*, *DCHS2*, *DDR1*, *DPT*, *DSC1*, *DSCAM*, *DSG1*, *EMR1*, *EMR2*, *ENTPD1*, *EPHB1*, *F5*, *FAT2*, *FAT3*, *FAT4*, *FER*, *HABP2*, *HPSE*, *IGFBP7*, *IGSF5*, *ITGA1*, *ITGA11*, *ITGA2*, *ITGA9*, *ITGB3*, *ITGB5*, *ITGBL1*, *KIFC3*, *LAMA1*, *LAMA2*, *LAMC1*, *LAMC2*, *LOXL2*, *LPP*, *LSAMP*, *MAGI1*, *MEGF10*, *MEGF11*, *MTSS1*, *NCAM2*, *NELL2*, *NFASC*, *NID2*, *NINJ2*, *NRCAM*, *NRP1*, *NRXN1*, *NRXN3*, *NTM*, *NTN1*, *ODZ3*, *OPCML*, *PARVB*, *PCDH15*, *PCDH17*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PDZD2*, *PKD1L1*, *PKHD1*, *PKP1*, *PKP2*, *PLEK*, *PLEKHA7*, *PLXNC1*, *PPFIBP1*, *PRKCA*, *PRKCE*, *PRPH2*, *PTPRD*, *PTPRF*, *PTPRM*, *PTPRT*, *PTPRU*, *RELN*, *ROBO2*, *ROR2*, *RPSA*, *SCARB1*, *SDK1*, *SEMA5A*, *SIRPA*, *SORBS1*, *SPON1*, *SSPO*, *SVEP1*, *SYK*, *TEK*, *THBS2*, *TMEM8A*, *TNN*, *TNR*, *VNN1*, *VWF*
Response to interferon-gamma	1.6×10^{-12}	71.9	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of exogenous peptide antigen	3.0×10^{-11}	43.5	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of exogenous antigen	3.2×10^{-11}	43.0	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of peptide antigen	4.1×10^{-11}	31.0	*ERAP1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation	1.7×10^{-10}	27.2	*ERAP1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Cell-cell adhesion	1.6×10^{-9}	2.9	*BMPR1B*, *CDH10*, *CDH13*, *CDH4*, *CDSN*, *CLDN10*, *CLDN14*, *CNTN4*, *COL13A1*, *CTNNA3*, *DCHS2*, *DSC1*, *DSG1*, *FAT2*, *IGSF5*, *MEGF11*, *NRCAM*, *NRXN1*, *NTN1*, *ODZ3*, *PCDH15*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PKD1L1*, *PKHD1*, *PLEK*, *PTPRD*, *PTPRM*, *ROBO2*, *SYK*, *TEK*, *VNN1*
Regulation of immune response	2.1×10^{-9}	13.3	*DMBT1*, *ERAP1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
Antigen processing and presentation of exogenous peptide antigen via MHC class I TAP-independent	2.8×10^{-9}	1352.2	*HLA-A*, *HLA-B*, *HLA-C*
Cytokine-mediated signaling pathway	4.2×10^{-9}	24.0	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Homophilic cell adhesion	9.5×10^{-9}	4.1	*CDH10*, *CDH13*, *CDH4*, *DCHS2*, *DSC1*, *DSG1*, *FAT2*, *ODZ3*, *PCDH15*, *PCDHA1*, *PCDHA10*, *PCDHA11*, *PCDHA12*, *PCDHA13*, *PCDHA2*, *PCDHA3*, *PCDHA4*, *PCDHA5*, *PCDHA6*, *PCDHA7*, *PCDHA8*, *PCDHA9*, *PCDHAC1*, *PTPRM*, *ROBO2*
Cellular response to cytokine stimulus	3.3×10^{-8}	18.9	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Immune response-activating signal transduction	4.8×10^{-8}	25.2	*DMBT1*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*

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

Table S16 continued.

Description	p-value	Enrichment	Genes
Immune response-regulating signaling pathway	7.4×10^{-8}	23.7	*DMBT1*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
T cell costimulation	9.5×10^{-8}	27.0	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRA*, *HLA-DRB1*, *HLA-DRB5*
Lymphocyte costimulation	1.1×10^{-7}	26.6	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRA*, *HLA-DRB1*, *HLA-DRB5*
Response to cytokine stimulus	1.9×10^{-7}	19.5	*HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*
Detection of bacterium	2.1×10^{-7}	49.9	*HLA-A*, *HLA-B*, *HLA-DRB1*, *HLA-DRB5*, *PGLYRP4*
Activation of immune response	2.4×10^{-7}	20.1	*DMBT1*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
T cell receptor signaling pathway	3.2×10^{-7}	56.2	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Regulation of immune system process	4.5×10^{-7}	8.0	*DMBT1*, *ERAP1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
Antigen processing and presentation of exogenous peptide antigen via MHC class II	5.2×10^{-7}	50.8	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of peptide or polysaccharide antigen via MHC class II	6.0×10^{-7}	49.7	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of peptide antigen via MHC class II	6.0×10^{-7}	49.7	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Regulation of potassium ion transport	1.1×10^{-6}	13.1	*ANK2*, *ANK3*, *CASQ2*, *DPP6*, *NEDD4*, *NEDD4L*, *PLCB4*, *STK39*
Antigen receptor-mediated signaling pathway	1.2×10^{-6}	43.6	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Positive regulation of immune response	1.6×10^{-6}	15.4	*DMBT1*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
Immune response-activating cell surface receptor signaling pathway	1.6×10^{-6}	41.1	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Protein localization to membrane	1.9×10^{-6}	13.1	*ANK2*, *ANK3*, *CPE*, *DLG2*, *MAGI2*, *RAMP3*, *RELN*, *SCP2*
Immune response-regulating cell surface receptor signaling pathway	2.6×10^{-6}	37.5	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Cellular response to type I interferon	2.9×10^{-6}	190.2	*HLA-A*, *HLA-B*, *HLA-C*
Type I interferon-mediated signaling pathway	2.9×10^{-6}	190.2	*HLA-A*, *HLA-B*, *HLA-C*
Response to type I interferon	3.0×10^{-6}	187.2	*HLA-A*, *HLA-B*, *HLA-C*
Immune response	3.2×10^{-6}	8.9	*DMBT1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
Positive regulation of T cell activation	4.0×10^{-6}	27.7	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Antigen processing and presentation of exogenous peptide antigen via MHC class I TAP-dependent	4.4×10^{-6}	169.0	*HLA-A*, *HLA-B*, *HLA-C*
Antigen processing and presentation of exogenous peptide antigen via MHC class I	5.0×10^{-6}	160.1	*HLA-A*, *HLA-B*, *HLA-C*
Positive regulation of ion transmembrane transporter activity	5.1×10^{-6}	17.8	*ANK2*, *ANK3*, *PLCG2*, *RELN*, *RYR2*, *TRPC6*
Detection of biotic stimulus	6.0×10^{-6}	28.2	*HLA-A*, *HLA-B*, *HLA-DRB1*, *HLA-DRB5*, *PGLYRP4*
Immunoglobulin production involved in immunoglobulin mediated immune response	6.6×10^{-6}	117.6	*HLA-DQB1*, *HLA-DRB1*, *HLA-DRB5*
Humoral immune response mediated by circulating immunoglobulin	6.6×10^{-6}	117.6	*HLA-DQB1*, *HLA-DRB1*, *HLA-DRB5*
Regulation of response to stimulus	9.9×10^{-6}	3.5	*DMBT1*, *ERAP1*, *FXN*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *KALRN*, *MAGI2*, *MAP2K3*, *RGL1*, *RGS6*, *USP20*, *WWTR1*
Antigen processing and presentation of peptide antigen via MHC class I	9.9×10^{-6}	132.3	*HLA-A*, *HLA-B*, *HLA-C*
Regulation of potassium ion transmembrane transporter activity	1.0×10^{-5}	35.3	*ANK2*, *CASQ2*, *NEDD4*, *NEDD4L*
Positive regulation of lymphocyte activation	1.4×10^{-5}	22.1	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Regulation of ion transmembrane transporter activity	1.6×10^{-5}	8.2	*ANK2*, *ANK3*, *CASQ2*, *NEDD4*, *NEDD4L*, *PLCG2*, *RELN*, *RYR2*, *TRPC6*
Immunoglobulin production	1.9×10^{-5}	88.2	*HLA-DQB1*, *HLA-DRB1*, *HLA-DRB5*
Regulation of T cell activation	1.9×10^{-5}	20.7	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Regulation of membrane potential	2.1×10^{-5}	2.4	*ABCB5*, *ACTN2*, *ADRA1A*, *ANK2*, *ANK3*, *CACNA1A*, *CASQ2*, *CNR2*, *DPP6*, *GRID2*, *GRIK2*, *GRIK3*, *GRIN2A*, *GRIN2B*, *KCNIP1*, *KCNMB2*, *KCNMB3*, *LRRK2*, *NEDD4*, *NEDD4L*, *NRXN1*, *PEX5L*, *PID1*, *PKP2*, *RELN*, *RYR2*, *SCN10A*, *SCN1A*, *SLC1A6*, *SNCA*
Axon guidance	2.1×10^{-5}	1.9	*ANK2*, *ANK3*, *BMPR1B*, *CAP1*, *CDH4*, *CHL1*, *CNTN1*, *CNTN4*, *COL4A1*, *COL4A2*, *COL4A3*, *COL5A2*, *COL9A1*, *CXCL12*, *DCC*, *DOCK1*, *EPHA7*, *EPHB1*, *ETV1*, *ITGA1*, *ITGA2*, *ITGA9*, *ITGB3*, *KCNQ3*, *LAMA1*, *LAMA2*, *LAMC1*, *LMX1A*, *MATN2*, *MYO10*, *NCK2*, *NFASC*, *NRCAM*, *NRP1*, *NRXN1*, *NRXN3*, *NTN1*, *NTN4*, *PLXNA4*, *PLXNC1*, *PTPRM*, *RAC2*, *RELN*, *ROBO2*, *RPS6KA2*, *SCN3B*, *SEMA3A*, *SEMA3E*, *SEMA5A*, *SEMA6D*, *SH3GL2*, *SLIT3*, *SPTB*, *TNR*, *TRPC4*, *TRPC6*, *UNC5C*, *VAV2*
Positive regulation of leukocyte activation	2.2×10^{-5}	20.2	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Response to bacterium	2.5×10^{-5}	19.3	*DMBT1*, *ERAP1*, *HLA-A*, *HLA-B*, *HLA-DRB1*

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

Table S16 continued.

Description	p-value	Enrichment	Genes
Positive regulation of cell activation	2.6×10^{-5}	19.5	*HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*
Ion transport	2.7×10^{-5}	1.5	*ADD2*, *ADRA1A*, *AKR1C4*, *ANK2*, *ANO1*, *ANXA6*, *AQP8*, *AQP9*, *ASIC2*, *ATP10B*, *ATP10D*, *ATP12A*, *ATP1A4*, *ATP1B3*, *ATP2C2*, *ATP5C1*, *ATP6V0E2*, *ATP6V1C2*, *ATP6V1G2*, *ATP8A1*, *ATP8A2*, *ATP8B1*, *ATP9A*, *BSPRY*, *CACNA1A*, *CACNA2D1*, *CACNB2*, *CAMK2D*, *CASR*, *CDH23*, *CLIC5*, *CPLX1*, *EFCAB4B*, *ENPP1*, *FGF2*, *FXN*, *GABRB2*, *GABRG3*, *GABRR1*, *GLRA3*, *GRIN3A*, *ITPR1*, *KCNA6*, *KCNAB1*, *KCNB2*, *KCNJ12*, *KCNJ16*, *KCNK2*, *KCNMB1*, *KCNMB2*, *KCNMB3*, *KCNQ3*, *KCNQ4*, *KLHL3*, *LHCGR*, *LTF*, *LYN*, *NEDD4L*, *NMUR1*, *NMUR2*, *NTRK2*, *OCA2*, *PIEZO1*, *PIEZO2*, *PLA2G4A*, *PLCG2*, *PLCZ1*, *PRKAB2*, *PRKAG2*, *PRKCE*, *RAMP3*, *RIMS1*, *RYR1*, *RYR2*, *RYR3*, *SCARA5*, *SCN10A*, *SCN1A*, *SCN3A*, *SCN3B*, *SCN9A*, *SCNN1G*, *SLC10A2*, *SLC12A6*, *SLC12A8*, *SLC15A2*, *SLC17A5*, *SLC1A2*, *SLC1A6*, *SLC22A16*, *SLC22A4*, *SLC22A5*, *SLC24A4*, *SLC25A37*, *SLC27A6*, *SLC30A9*, *SLC31A2*, *SLC38A4*, *SLC38A8*, *SLC38A9*, *SLC39A11*, *SLC39A14*, *SLC39A8*, *SLC4A7*, *SLC5A12*, *SLC7A7*, *SLC8A1*, *SLC8A3*, *SLC9A4*, *SLC9A8*, *SLC9A9*, *SLC9C1*, *SLCO1B1*, *SLCO1B3*, *SLCO1C1*, *SNCA*, *SYK*, *TG*, *TRPA1*, *TRPC4*, *TRPC6*, *TRPM3*
Immune system process	2.9×10^{-5}	7.5	*DMBT1*, *HLA-A*, *HLA-B*, *HLA-C*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*
Regulation of transmembrane transporter activity	3.0×10^{-5}	7.6	*ANK2*, *ANK3*, *CASQ2*, *NEDD4*, *NEDD4L*, *PLCG2*, *RELN*, *RYR2*, *TRPC6*
Positive regulation of transporter activity	3.9×10^{-5}	13.2	*ANK2*, *ANK3*, *PLCG2*, *RELN*, *RYR2*, *TRPC6*
Regulation of potassium ion transmembrane transport	4.0×10^{-5}	27.4	*ANK2*, *CASQ2*, *NEDD4*, *NEDD4L*
Positive regulation of immune system process	4.4×10^{-5}	9.6	*DMBT1*, *HLA-DPA1*, *HLA-DPB1*, *HLA-DQA1*, *HLA-DQB1*, *HLA-DRB1*, *MAP2K3*
Regulation of transporter activity	4.8×10^{-5}	3.2	*ANK2*, *ANK3*, *CAMK2D*, *CASQ2*, *CNIH3*, *DAPK1*, *EFCAB4B*, *MYO5A*, *NEDD4*, *NEDD4L*, *NRXN1*, *PLCG2*, *PON1*, *RELN*, *RYR2*, *SNCA*, *TESC*, *TRDN*, *TRPC6*
Phospholipid transport	5.4×10^{-5}	12.7	*ABCA1*, *ABCA4*, *ATP10D*, *ATP8A1*, *SCARB1*, *SCP2*

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