**Characterizing intrinsic molecular features of the immune subtypes of salivary mucoepidermoid carcinoma**

**Supplementary Tables**

**Supplementary Table S1: Cybersort and estimate geneset significance test between immune hot and cold group.**

**Supplementary Table S2: Immune hot group Tumor vs. Normal sample up-regulated DEG list.**

**Supplementary Table S3: Immune hot group Tumor vs. Normal sample down-regulated DEG list.**

**Supplementary Table S4: Immune cold group Tumor vs. Normal sample up-regulated DEG list.**

**Supplementary Table S5: Immune cold group Tumor vs. Normal sample down-regulated DEG list.**

**Supplementary Table S6: List of significant isoform switching genes in immune hot group.**

**Supplementary Table S7: List of significant isoform switching genes in immune cold group.**

**Supplementary Table S8: List of PPI genes in immune hot group.**

**Supplementary Table S9: List of PPI genes in immune cold group.**

**Supplementary Table S10: List of PPI hub genes in immune hot and cold group.**

**Supplementary Table S11. Sequencing Coverage and Quality Statistics.**

**Supplementary Tables.**

**Supplementary Table S1. Cell signature scores.**

|  |  |
| --- | --- |
| **Cybersort\_geneset** | **p.value** |
| B.cells.memory | 0.022848 |
| B.cells.naive | 0.022848 |
| Dendritic.cells.activated | 0.000248 |
| Dendritic.cells.resting | 0.000447 |
| Endothelial\_cells\_MCPcounter | 0.033865 |
| Eosinophils | 0.000791 |
| Fibroblasts\_MCPcounter | 0.022848 |
| Macrophages.M0 | 0.000447 |
| Macrophages.M1 | 0.000447 |
| Macrophages.M2 | 0.000248 |
| Mast.cells.activated | 0.006165 |
| Mast.cells.resting | 0.006165 |
| Monocytes | 0.000447 |
| Neutrophils | 0.001042 |
| NK.cells.activated | 0.000248 |
| NK.cells.resting | 0.000596 |
| Plasma.cells | 0.153492 |
| T.cells.CD4.memory.activated | 0.000248 |
| T.cells.CD4.memory.resting | 0.000791 |
| T.cells.CD4.naive | 0.002308 |
| T.cells.CD8 | 0.000596 |
| T.cells.follicular.helper | 0.004862 |
| T.cells.gamma.delta | 0.000596 |
| T.cells.regulatory..Tregs. | 0.000791 |
| **Estimate** | **p.value** |
| ImmuneScore | 0.000447 |
| StromalScore | 0.000596 |

**Supplementary Table S2. Immune hot group Tumor vs. Normal sample up-regulated DEG list.**

|  |  |  |
| --- | --- | --- |
| gene | log2FoldChange | padj |
| ADAM12 | 3.219612 | 3.84E-06 |
| ADAMDEC1 | 3.46017 | 0.000249 |
| ADAMTS14 | 3.441133 | 0.000115 |
| ALPK2 | 3.235825 | 0.0004 |
| ANO3 | 3.086194 | 0.001933 |
| ANXA8 | 3.893902 | 1.39E-06 |
| ANXA8L1 | 3.485863 | 0.000171 |
| ARSI | 3.291619 | 0.003338 |
| ASPN | 4.498308 | 5.87E-09 |
| ATP10B | 3.007685 | 0.001113 |
| BMP7 | 3.121483 | 0.00022 |
| BMP8A | 3.305912 | 6.17E-06 |
| BNC1 | 3.490653 | 0.000672 |
| C15orf48 | 3.817749 | 5.26E-05 |
| C4orf26 | 4.266583 | 0.000936 |
| CCL22 | 3.066844 | 0.000177 |
| CCR7 | 4.059642 | 1.22E-07 |
| CFB | 3.12666 | 0.001163 |
| CHI3L1 | 3.27517 | 0.001303 |
| CILP2 | 3.519033 | 0.003623 |
| COL10A1 | 4.079089 | 1.05E-07 |
| COL11A1 | 4.35173 | 6.17E-08 |
| COMP | 3.588871 | 0.00087 |
| CORIN | 3.332557 | 0.00019 |
| CR2 | 5.085225 | 4.22E-06 |
| CTSV | 3.070614 | 0.004317 |
| CXCL13 | 5.886268 | 1.55E-10 |
| DSG3 | 4.470901 | 1.23E-06 |
| DUOX2 | 5.944406 | 2.74E-09 |
| DUOXA2 | 6.240214 | 0.000102 |
| EDAR | 3.405359 | 0.000384 |
| EPYC | 5.591681 | 0.000137 |
| FAP | 3.363435 | 1.70E-10 |
| FCRLA | 3.214522 | 0.002558 |
| FGFBP1 | 3.405487 | 0.003952 |
| FN1 | 3.031467 | 0.000221 |
| FSTL4 | 3.867697 | 0.000632 |
| GJB3 | 3.535494 | 0.001335 |
| GRAMD1B | 3.141507 | 0.000919 |
| GREM1 | 4.280596 | 6.12E-06 |
| GRP | 4.996445 | 0.002718 |
| HIST1H2AJ | 3.102103 | 0.001486 |
| HSPB3 | 4.029006 | 0.000854 |
| ITGB6 | 3.056104 | 0.001485 |
| KERA | 3.341512 | 0.001042 |
| KIF26B | 3.12307 | 0.000149 |
| KLK10 | 4.054567 | 5.15E-05 |
| KRT13 | 3.72842 | 0.002149 |
| KYNU | 3.030205 | 0.000883 |
| LAMP5 | 3.393853 | 2.35E-08 |
| LRRC15 | 4.687574 | 2.78E-06 |
| LUM | 3.046871 | 5.67E-06 |
| LYPD3 | 3.380607 | 7.48E-05 |
| MATN3 | 3.053478 | 2.07E-05 |
| MMP1 | 3.37223 | 0.003002 |
| MMP10 | 3.35853 | 0.000168 |
| MMP11 | 3.05349 | 0.000775 |
| MMP13 | 5.202665 | 6.56E-06 |
| MS4A1 | 4.261055 | 8.95E-06 |
| MUC4 | 3.884591 | 9.30E-05 |
| MUC5AC | 3.395519 | 0.004684 |
| MUC6 | 4.191645 | 0.00579 |
| NCCRP1 | 3.563367 | 0.000435 |
| PGLYRP4 | 3.386818 | 0.002486 |
| PI3 | 3.846589 | 0.000699 |
| PLA2G2D | 3.747721 | 0.000139 |
| POSTN | 5.256585 | 3.42E-09 |
| PPAPDC1A | 3.60504 | 1.77E-06 |
| PTHLH | 3.225902 | 0.00043 |
| RGS4 | 4.064335 | 6.17E-06 |
| RHCG | 3.24476 | 0.007198 |
| RNASE7 | 3.389532 | 0.003124 |
| S100A2 | 3.459263 | 0.001907 |
| SCEL | 3.205223 | 0.002869 |
| SCG5 | 3.199013 | 0.000888 |
| SERPINB2 | 3.375218 | 9.52E-05 |
| SERPINB3 | 4.361769 | 0.000853 |
| SERPINB4 | 4.55804 | 0.000711 |
| SERPINB7 | 3.897895 | 0.000678 |
| SERPINE1 | 3.285738 | 3.61E-05 |
| STAP1 | 3.142811 | 0.000107 |
| SULT1E1 | 3.443675 | 0.007741 |
| SVOPL | 3.270079 | 0.002735 |
| TDO2 | 3.430258 | 0.001368 |
| TGM1 | 3.277725 | 0.000245 |
| TIMD4 | 3.323909 | 0.002735 |
| TMPRSS11A | 5.283401 | 0.00022 |
| WISP1 | 3.973852 | 1.11E-07 |
| WNT2 | 3.324369 | 7.92E-06 |

**Supplementary Table S3. Immune hot group Tumor vs. Normal sample down-regulated DEG list.**

|  |  |  |
| --- | --- | --- |
| gene | log2FoldChange | padj |
| AARD | -3.15184 | 0.001903 |
| ABCC6 | -4.61001 | 3.99E-09 |
| ABCG8 | -5.80594 | 0.007803 |
| ACADL | -3.99564 | 1.07E-05 |
| ACBD7 | -3.22002 | 0.000875 |
| ACOT12 | -3.31384 | 0.003906 |
| ADAMTS19 | -4.06475 | 4.77E-05 |
| ADCY5 | -3.32867 | 8.14E-05 |
| ADH1A | -3.74425 | 0.001907 |
| ADRA1A | -4.56366 | 1.05E-07 |
| ADRB1 | -4.35466 | 9.38E-05 |
| AGFG2 | -3.88151 | 5.08E-07 |
| AHSP | -4.69324 | 0.00609 |
| ALAS2 | -4.20509 | 0.000157 |
| AMY2A | -4.64464 | 0.004602 |
| ANGPT4 | -4.36559 | 0.0004 |
| ANGPTL5 | -4.25258 | 0.001194 |
| ANKRD30A | -5.02683 | 0.005412 |
| ANKRD33 | -3.82682 | 0.009313 |
| AQP2 | -5.23391 | 0.004576 |
| AQP5 | -5.05174 | 5.99E-06 |
| AQP6 | -3.60118 | 0.000498 |
| AQP7 | -3.86541 | 0.00035 |
| ARFGEF3 | -3.27416 | 0.000135 |
| ARHGEF38 | -3.18871 | 0.001526 |
| ARHGEF38-IT1 | -3.47624 | 0.007202 |
| ASTN1 | -3.84359 | 9.89E-05 |
| ATP1A2 | -4.02014 | 8.40E-06 |
| ATP2B2 | -4.02918 | 0.002176 |
| AVPR2 | -3.09578 | 0.000375 |
| AZGP1 | -3.8157 | 0.000785 |
| BCAN | -5.04557 | 0.001299 |
| BEND2 | -4.94171 | 0.000298 |
| BHLHA15 | -3.61463 | 0.003503 |
| BPIFB2 | -7.25697 | 0.000118 |
| BPIFB6 | -5.99804 | 0.001375 |
| BSPRY | -3.38125 | 0.000824 |
| C10orf71 | -4.55631 | 0.000936 |
| C10orf90 | -5.89129 | 1.27E-05 |
| C14orf180 | -5.96296 | 0.000891 |
| C19orf80 | -5.20887 | 0.00019 |
| C1orf168 | -4.1343 | 0.000126 |
| C1orf64 | -6.98175 | 3.60E-06 |
| C1orf87 | -4.40328 | 0.00609 |
| C1QTNF9B | -3.38942 | 0.001623 |
| C2orf72 | -4.72329 | 6.17E-06 |
| C4orf19 | -3.05687 | 0.000137 |
| C6orf25 | -3.06076 | 0.001716 |
| C8orf34 | -3.56201 | 8.33E-05 |
| C9orf152 | -4.17186 | 0.000751 |
| CA10 | -5.61711 | 0.000222 |
| CA4 | -4.54521 | 1.93E-06 |
| CADM2 | -3.87414 | 0.000212 |
| CALB2 | -3.03935 | 0.006096 |
| CALML5 | -4.75146 | 0.000593 |
| CAPN9 | -5.27792 | 0.000764 |
| CCDC129 | -5.53406 | 8.29E-07 |
| CCDC160 | -3.38692 | 0.007353 |
| CCDC181 | -3.20575 | 0.009242 |
| CDH12 | -5.91138 | 3.12E-06 |
| CDH20 | -4.46852 | 0.001838 |
| CEBPA | -3.07984 | 6.42E-05 |
| CELF5 | -5.16715 | 8.37E-06 |
| CFD | -5.03188 | 9.26E-05 |
| CHRM1 | -6.97215 | 3.77E-07 |
| CHRM3 | -5.02966 | 5.56E-06 |
| CHST9 | -5.20628 | 1.28E-05 |
| CLCNKB | -4.07194 | 0.000327 |
| CLDN3 | -4.6685 | 2.74E-06 |
| CLDN8 | -3.81548 | 0.00077 |
| CLGN | -3.18414 | 0.005131 |
| CLUL1 | -3.77916 | 0.000223 |
| CLVS2 | -3.96661 | 0.007174 |
| CNTD1 | -4.93044 | 0.000154 |
| CNTFR | -3.92079 | 0.001496 |
| CNTN2 | -4.63469 | 4.11E-05 |
| CNTNAP4 | -3.21822 | 0.009106 |
| COL28A1 | -4.28244 | 1.93E-06 |
| COL9A1 | -4.41958 | 3.55E-05 |
| CPLX3 | -5.252 | 1.59E-05 |
| CPNE4 | -4.29602 | 5.73E-06 |
| CPSF4L | -3.21684 | 0.002607 |
| CRISP2 | -7.10567 | 2.12E-07 |
| CRISP3 | -8.74366 | 4.57E-08 |
| CRX | -5.44107 | 0.005346 |
| CRYM | -4.50011 | 1.62E-06 |
| CSN1S1 | -6.16352 | 0.006714 |
| CSN3 | -3.93305 | 0.001829 |
| CTNNA2 | -3.11603 | 0.002502 |
| CXXC4 | -3.19833 | 0.000106 |
| CYP2A6 | -4.58537 | 0.001568 |
| CYP2C18 | -5.61936 | 0.001626 |
| CYP3A4 | -5.54566 | 0.00087 |
| DAB1 | -3.14978 | 0.007762 |
| DCAF12L2 | -3.37378 | 0.003935 |
| DCDC2 | -3.62089 | 6.96E-05 |
| DCX | -3.37741 | 0.001499 |
| DGAT2 | -3.34362 | 0.000177 |
| DHRS2 | -4.73374 | 0.003342 |
| DKFZP434L187 | -4.4433 | 0.009494 |
| DLGAP1 | -3.39325 | 0.000503 |
| DMRT2 | -3.85245 | 8.86E-07 |
| DMRTA1 | -4.04697 | 3.57E-07 |
| DNAJC22 | -4.40684 | 9.07E-06 |
| DSG1 | -3.75898 | 0.000793 |
| EDN3 | -5.16265 | 0.000116 |
| ELF5 | -4.8502 | 0.000135 |
| EMILIN3 | -3.13492 | 6.50E-05 |
| ENHO | -4.38083 | 0.000964 |
| ENPP3 | -3.28921 | 4.11E-07 |
| ENTPD2 | -3.03255 | 0.000175 |
| EPB42 | -3.89118 | 0.008221 |
| EPHA5 | -3.3647 | 8.25E-05 |
| EPHA7 | -4.3708 | 2.35E-08 |
| ERBB4 | -3.85281 | 0.000224 |
| ERICH2 | -3.96612 | 1.19E-05 |
| ETV1 | -3.64307 | 9.53E-05 |
| EYS | -3.41021 | 0.000437 |
| FAM178B | -3.45525 | 0.001693 |
| FAM180B | -3.68462 | 0.001944 |
| FAM181B | -3.57011 | 0.000919 |
| FAM3B | -3.52338 | 0.005097 |
| FAM3D | -5.13821 | 1.77E-05 |
| FAM95A | -4.64196 | 0.001822 |
| FASN | -3.72261 | 7.53E-06 |
| FBN3 | -4.81086 | 8.09E-07 |
| FBXL16 | -3.15823 | 0.0006 |
| FBXO40 | -3.31092 | 0.001888 |
| FGFBP2 | -3.47537 | 0.001526 |
| FLJ41278 | -3.58305 | 0.00046 |
| FLJ46066 | -6.36418 | 0.001723 |
| FLRT1 | -3.45413 | 0.00542 |
| FOLH1 | -3.04667 | 0.000978 |
| FRMD1 | -4.85902 | 0.005388 |
| FRMPD1 | -3.81958 | 0.002772 |
| FSD2 | -4.06434 | 0.001568 |
| G0S2 | -3.36607 | 0.000698 |
| GABRA4 | -6.24698 | 0.002625 |
| GFAP | -3.50205 | 0.006222 |
| GFI1B | -4.22826 | 0.001388 |
| GJB1 | -3.93461 | 0.000258 |
| GJC3 | -3.75618 | 0.0004 |
| GLB1L3 | -4.37144 | 0.001526 |
| GLYATL1 | -5.77005 | 0.001021 |
| GLYATL2 | -4.19547 | 0.00019 |
| GNMT | -3.04857 | 0.000138 |
| GOLGA8S | -4.38383 | 0.007473 |
| GP2 | -7.71571 | 0.000586 |
| GP9 | -4.81333 | 0.002598 |
| GPD1 | -4.5837 | 0.000241 |
| GPRC5D | -4.47886 | 0.000135 |
| GPRC6A | -4.65265 | 0.00511 |
| GPRIN2 | -3.68695 | 2.17E-05 |
| GPT | -3.83053 | 8.07E-08 |
| GPT2 | -3.10807 | 8.07E-08 |
| GREM2 | -3.81844 | 9.49E-05 |
| GRIA2 | -6.91713 | 8.24E-07 |
| GRIA4 | -4.75542 | 0.000329 |
| GRIN2C | -4.81146 | 0.000576 |
| GYG2 | -3.47246 | 2.04E-05 |
| GYPB | -4.92239 | 0.00159 |
| HBA1 | -4.66361 | 6.48E-05 |
| HBA2 | -3.95644 | 0.000274 |
| HBB | -3.88692 | 0.000407 |
| HBE1 | -4.33462 | 0.007695 |
| HBG2 | -4.26406 | 0.000285 |
| HBM | -4.67368 | 0.006095 |
| HBQ1 | -5.65125 | 0.004642 |
| HCAR1 | -4.61904 | 5.99E-11 |
| HEMGN | -3.38957 | 0.002637 |
| HEPACAM | -4.68129 | 0.000277 |
| HEPACAM2 | -6.09878 | 2.50E-06 |
| HIF3A | -3.57857 | 0.000468 |
| HLF | -3.05698 | 1.22E-07 |
| HPD | -3.96098 | 0.001978 |
| HPSE2 | -5.14632 | 8.59E-11 |
| HRASLS5 | -3.44101 | 0.002735 |
| HSD11B2 | -3.02232 | 0.001105 |
| HSPB7 | -4.94503 | 1.51E-06 |
| IFIT1B | -5.29411 | 0.003032 |
| ITIH6 | -3.23938 | 0.007492 |
| KCNA4 | -4.96544 | 0.001494 |
| KCNE5 | -3.34802 | 0.006795 |
| KCNIP2 | -3.22145 | 9.38E-05 |
| KCTD4 | -5.53718 | 0.000692 |
| KIAA1324 | -5.50901 | 3.42E-09 |
| KIF12 | -3.69738 | 0.000137 |
| KIF1A | -3.66596 | 0.003921 |
| KLB | -4.60852 | 0.000463 |
| KLF15 | -4.04858 | 6.27E-09 |
| KLK1 | -4.61115 | 0.008086 |
| KLK2 | -4.02199 | 0.008573 |
| LDLRAD1 | -3.88748 | 0.003846 |
| LDLRAD2 | -3.24007 | 0.002347 |
| LECT1 | -5.67306 | 1.50E-06 |
| LEFTY1 | -4.59143 | 0.006012 |
| LEP | -5.28774 | 2.21E-05 |
| LGALS12 | -4.71495 | 1.42E-05 |
| LIPE | -5.10971 | 5.65E-07 |
| LL22NC03-75H12.2 | -3.94323 | 0.008941 |
| LMAN1L | -4.82064 | 3.77E-06 |
| LMOD3 | -3.55956 | 0.008037 |
| LPL | -3.56155 | 0.000781 |
| LPPR1 | -6.12269 | 1.99E-06 |
| LRP2 | -3.95599 | 0.000106 |
| LRRC26 | -5.84922 | 2.12E-07 |
| LRRC31 | -7.04219 | 0.000145 |
| LRRTM1 | -6.46498 | 6.93E-05 |
| 1-Mar | -3.4165 | 9.93E-09 |
| MATN4 | -3.31813 | 0.000228 |
| MDGA2 | -4.6464 | 0.000731 |
| MGAM2 | -4.88455 | 4.36E-06 |
| MLPH | -3.1344 | 1.26E-06 |
| MLXIPL | -3.87198 | 0.001338 |
| MMD2 | -4.91995 | 0.009381 |
| MOGAT1 | -5.47189 | 5.91E-05 |
| MORC1 | -5.21109 | 8.22E-05 |
| MPPED1 | -5.48712 | 0.002566 |
| MRAP2 | -3.23748 | 7.06E-05 |
| MT1A | -3.02869 | 0.000577 |
| MT3 | -4.52867 | 0.006908 |
| MTUS2 | -3.15971 | 0.001777 |
| MUC5B | -5.55465 | 0.002321 |
| MYBPC1 | -3.9859 | 0.000274 |
| MYH1 | -3.2244 | 0.002914 |
| MYH2 | -4.13634 | 0.008269 |
| MYH7 | -4.43104 | 0.001725 |
| MYL1 | -5.76344 | 0.002679 |
| MYOT | -3.45995 | 0.001858 |
| MYOZ1 | -3.0876 | 0.001205 |
| NAT8L | -6.38325 | 8.13E-09 |
| NCMAP | -3.50375 | 0.00019 |
| NDST4 | -4.39631 | 0.002783 |
| NECAB1 | -3.84317 | 0.001625 |
| NEURL3 | -3.87756 | 5.67E-05 |
| NKX3-1 | -4.29223 | 0.000119 |
| NPY5R | -3.08247 | 0.007818 |
| NR1I2 | -3.39397 | 0.003007 |
| NRAP | -4.22783 | 0.000229 |
| NRG3 | -4.12547 | 0.000135 |
| NRTN | -3.78738 | 0.000719 |
| NXPE2 | -5.0249 | 5.60E-06 |
| NXPE4 | -4.26238 | 0.008647 |
| NXPH1 | -7.06729 | 0.00219 |
| NYAP1 | -3.27443 | 1.79E-05 |
| ODAM | -3.53153 | 0.002283 |
| OPRK1 | -5.15747 | 0.001212 |
| OR52K1 | -5.04312 | 0.005483 |
| OXGR1 | -3.62379 | 0.000177 |
| PART1 | -5.76723 | 3.46E-07 |
| PAX9 | -3.67859 | 0.000672 |
| PCAT18 | -5.95882 | 1.22E-05 |
| PCDH10 | -3.10084 | 6.14E-05 |
| PCDHA12 | -3.03228 | 0.003503 |
| PCDHA13 | -3.57957 | 1.28E-06 |
| PCK1 | -3.50268 | 0.005213 |
| PCSK2 | -4.60623 | 3.84E-06 |
| PDE11A | -3.61393 | 6.76E-08 |
| PEX5L | -3.84163 | 0.000694 |
| PF4 | -4.45316 | 0.000127 |
| PGLYRP1 | -3.7712 | 0.008516 |
| PHACTR3 | -3.36253 | 0.000824 |
| PHGDH | -3.14102 | 5.48E-16 |
| PHOSPHO1 | -3.43721 | 0.00063 |
| PIGR | -3.51645 | 0.003425 |
| PIK3C2G | -5.23947 | 0.000149 |
| PIP | -3.63337 | 0.003028 |
| PKDREJ | -3.52131 | 0.000413 |
| PLCB4 | -3.6577 | 1.82E-06 |
| PLD5 | -3.4054 | 0.000936 |
| PLEKHS1 | -3.22526 | 0.000956 |
| PLIN1 | -4.94645 | 0.000158 |
| PLIN4 | -5.48575 | 6.32E-06 |
| PLIN5 | -3.66085 | 2.80E-08 |
| PPP1R1B | -5.31413 | 4.11E-07 |
| PPP1R9A | -3.97528 | 1.62E-06 |
| PRB3 | -6.69868 | 8.43E-05 |
| PROM1 | -3.38505 | 0.000888 |
| PRPH | -3.80376 | 0.001338 |
| PRR15L | -3.13288 | 0.004083 |
| PRR18 | -3.82773 | 0.006429 |
| PRR27 | -6.00063 | 5.29E-05 |
| PRR4 | -3.54099 | 0.007649 |
| PRRT4 | -3.59741 | 0.003846 |
| PRSS33 | -3.81946 | 0.001318 |
| PTCH2 | -3.02457 | 0.001099 |
| PTPRQ | -4.20922 | 0.000358 |
| RALYL | -5.6159 | 0.00326 |
| RAP1GAP | -3.91376 | 1.77E-05 |
| RBP4 | -4.86153 | 0.00023 |
| REG4 | -5.44377 | 0.004058 |
| RET | -3.63496 | 4.11E-07 |
| RFX6 | -4.05076 | 0.003228 |
| RIMS1 | -3.88653 | 0.000295 |
| RIMS4 | -4.81343 | 2.78E-06 |
| RMST | -4.3421 | 0.000302 |
| RNA28S5 | -3.51214 | 0.00013 |
| RNASE8 | -5.16226 | 0.006908 |
| ROPN1 | -5.73907 | 0.000177 |
| ROPN1B | -4.86144 | 8.59E-06 |
| RXRG | -3.48533 | 0.001933 |
| SCD | -3.22675 | 0.000237 |
| SCGB3A1 | -5.34964 | 3.60E-07 |
| SCGN | -4.69778 | 0.005934 |
| SCML2 | -3.50474 | 0.001051 |
| SCN4A | -3.03284 | 0.001092 |
| SEMA3E | -3.52073 | 0.004018 |
| SGK2 | -3.51168 | 1.54E-05 |
| SH3BGRL2 | -3.0807 | 4.97E-06 |
| SHISA9 | -3.64852 | 0.000415 |
| SLC13A2 | -5.4443 | 5.58E-06 |
| SLC14A2 | -3.72866 | 0.000242 |
| SLC19A3 | -4.30186 | 0.000183 |
| SLC22A10 | -4.64108 | 0.003824 |
| SLC25A18 | -4.69261 | 1.27E-05 |
| SLC26A5 | -7.21442 | 2.11E-07 |
| SLC29A4 | -4.45439 | 1.77E-05 |
| SLC36A2 | -4.49935 | 0.001476 |
| SLC4A1 | -4.08576 | 0.001184 |
| SLC5A7 | -6.09262 | 9.99E-06 |
| SLC6A2 | -3.77584 | 8.33E-05 |
| SLC7A10 | -3.58962 | 0.008007 |
| SLC7A14 | -5.44088 | 0.000761 |
| SLC9A2 | -4.19987 | 0.000161 |
| SLC9A4 | -4.05138 | 0.001478 |
| SLCO1A2 | -6.11143 | 0.000497 |
| SLFN14 | -4.9344 | 0.009888 |
| SLITRK1 | -4.80065 | 0.00326 |
| SLITRK3 | -4.0367 | 9.38E-05 |
| SLITRK5 | -5.14144 | 9.23E-06 |
| SLITRK6 | -3.60924 | 8.93E-05 |
| SMYD1 | -5.43809 | 0.004469 |
| SORBS1 | -3.32019 | 2.49E-07 |
| SOSTDC1 | -4.80518 | 3.24E-05 |
| SOX10 | -3.60334 | 0.003844 |
| SPHKAP | -5.35401 | 0.000158 |
| SPX | -4.18582 | 0.001021 |
| SRCIN1 | -3.75245 | 2.01E-06 |
| SRMS | -3.27776 | 0.001692 |
| STATH | -4.76285 | 0.002518 |
| STBD1 | -3.38447 | 0.006322 |
| SYCP1 | -7.82115 | 0.000367 |
| SYT13 | -4.47304 | 0.000399 |
| SYTL5 | -3.27513 | 0.003432 |
| TCEAL2 | -4.67989 | 0.000109 |
| TCEAL5 | -3.41241 | 0.004471 |
| TDRD5 | -3.36341 | 2.40E-05 |
| THRSP | -5.41744 | 6.51E-05 |
| TMC2 | -3.04195 | 0.003511 |
| TMEFF2 | -6.34197 | 0.000126 |
| TMEM132B | -3.12155 | 0.001486 |
| TMEM132C | -4.57006 | 0.000281 |
| TMEM221 | -3.69872 | 0.000954 |
| TOX3 | -5.1078 | 1.66E-06 |
| TRIM58 | -3.46079 | 0.000834 |
| TRPV6 | -4.64342 | 0.000251 |
| TSG1 | -4.3305 | 0.000919 |
| TSPAN8 | -4.00765 | 0.00048 |
| TTLL6 | -4.18978 | 0.004398 |
| TTPA | -3.6228 | 0.000498 |
| TUBB1 | -3.56324 | 0.000451 |
| TUSC5 | -5.18674 | 0.003021 |
| UGT2B7 | -4.04265 | 0.003617 |
| UGT3A1 | -5.65344 | 0.000235 |
| UNC13C | -3.32254 | 0.002735 |
| UPP2 | -5.02339 | 0.001933 |
| VIT | -3.32283 | 0.00039 |
| WEE2 | -4.67536 | 0.003563 |
| WIF1 | -5.82277 | 0.00013 |
| WNK2 | -4.06096 | 1.20E-06 |
| WNK4 | -4.13857 | 0.000246 |
| WNT8B | -4.40265 | 0.004262 |
| WWC1 | -3.13887 | 0.000287 |
| XIRP2 | -4.42856 | 0.003013 |
| ZBTB16 | -3.17314 | 0.000672 |
| ZG16B | -3.56687 | 0.00499 |
| ZNF560 | -4.27938 | 0.00733 |
| ZP2 | -4.33473 | 0.001076 |

**Supplementary Table S4. Immune cold group Tumor vs. Normal sample up-regulated DEG list.**

|  |  |  |
| --- | --- | --- |
| gene | log2FoldChange | padj |
| ADAMTS6 | 3.368743 | 6.44E-05 |
| AJAP1 | 3.201057 | 0.002232 |
| AKR1B10 | 3.764114 | 0.007685 |
| ANO3 | 3.280661 | 0.00124 |
| ANXA8 | 3.374929 | 0.000779 |
| ASPN | 3.710338 | 7.94E-05 |
| BMPR1B | 3.211438 | 0.000511 |
| C2orf66 | 3.179802 | 0.00321 |
| CERS3 | 4.031694 | 0.00021 |
| CFB | 3.730263 | 0.000193 |
| COL10A1 | 4.20899 | 4.55E-05 |
| COL11A1 | 3.882775 | 0.001183 |
| COX6B2 | 3.346507 | 0.001165 |
| CPA4 | 3.958632 | 0.000623 |
| DIRAS3 | 3.505031 | 0.000961 |
| DSG3 | 3.607495 | 0.003697 |
| FGFBP1 | 5.23425 | 1.39E-05 |
| FSTL4 | 4.499751 | 3.84E-06 |
| GBP6 | 3.366251 | 0.006426 |
| GDPD2 | 4.097453 | 0.001169 |
| GJB6 | 4.340547 | 7.79E-05 |
| GRAMD1B | 3.212713 | 0.003552 |
| GREM1 | 3.80451 | 0.003071 |
| GSDMC | 3.489305 | 0.000762 |
| HSPB3 | 3.83631 | 0.008903 |
| IGFL1 | 3.894279 | 0.002636 |
| IL20 | 3.032385 | 0.006759 |
| ITGB6 | 3.562964 | 6.19E-05 |
| KCNJ18 | 4.565996 | 0.003125 |
| KIAA1549L | 3.261363 | 0.000292 |
| KRT15 | 3.378699 | 0.001368 |
| KRT6B | 3.323701 | 0.006031 |
| LGALS9B | 3.366006 | 0.008548 |
| LRRC15 | 4.028331 | 0.00099 |
| MMP1 | 3.650726 | 0.00194 |
| MMP10 | 4.457327 | 9.99E-05 |
| MMP11 | 3.00942 | 7.86E-05 |
| MMP13 | 4.087137 | 0.004837 |
| MUC5AC | 3.862423 | 0.002707 |
| MUC6 | 5.46808 | 1.34E-06 |
| NETO2 | 3.277982 | 2.09E-05 |
| ONECUT2 | 3.777403 | 0.000159 |
| OXTR | 3.310697 | 0.000262 |
| PCSK1 | 4.537435 | 0.000451 |
| POSTN | 5.449575 | 3.19E-10 |
| PPEF1 | 3.185848 | 0.002497 |
| PPP2R2C | 4.106185 | 5.46E-05 |
| PRSS3 | 4.207188 | 0.006937 |
| RARRES1 | 3.157875 | 0.000703 |
| S100A2 | 3.634987 | 0.000916 |
| SCG2 | 6.560904 | 7.09E-06 |
| SCGB2A2 | 5.177824 | 0.002229 |
| SERPINB3 | 4.670985 | 0.006925 |
| SH3GL2 | 4.569393 | 0.00067 |
| SLC44A5 | 3.389492 | 0.001005 |
| SLC5A8 | 4.458045 | 0.000922 |
| SLC9A3 | 3.661194 | 0.001252 |
| SLCO1B3 | 3.724605 | 0.007169 |
| SSUH2 | 3.098341 | 0.003021 |
| ST6GAL2 | 3.056076 | 8.04E-06 |
| TFPI2 | 3.379137 | 0.005333 |
| VMO1 | 3.577709 | 0.000502 |
| WISP1 | 3.046017 | 7.88E-05 |

**Supplementary Table S5. Immune cold group Tumor vs. Normal sample down-regulated DEG list.**

|  |  |  |
| --- | --- | --- |
| gene | log2FoldChange | padj |
| AATK | -3.13616 | 4.61E-05 |
| ABCB5 | -4.10106 | 0.002229 |
| ACKR1 | -3.69099 | 7.34E-06 |
| ADAM33 | -3.18075 | 0.000714 |
| ADAMTS8 | -3.54462 | 0.000438 |
| ADGRE3 | -3.17999 | 0.001548 |
| ADGRG3 | -3.26425 | 0.000203 |
| ADH1B | -3.91344 | 0.000753 |
| ADIPOQ | -4.65237 | 0.001067 |
| AHSP | -5.23646 | 0.000593 |
| AIRE | -4.4374 | 0.001651 |
| ALAS2 | -7.60127 | 3.19E-10 |
| ANGPT4 | -5.45114 | 5.92E-05 |
| ANGPTL5 | -3.74724 | 0.00507 |
| AOC3 | -3.75319 | 1.43E-06 |
| APOBR | -3.3263 | 4.75E-05 |
| AQP9 | -4.06671 | 5.71E-05 |
| ARC | -3.12137 | 0.002511 |
| ARG1 | -5.16299 | 0.000481 |
| ATP1A2 | -3.15549 | 0.000174 |
| AVPR2 | -3.26249 | 0.000133 |
| BEND2 | -5.71359 | 0.0017 |
| C11orf21 | -3.55416 | 3.73E-06 |
| C11orf39 | -6.76777 | 0.005123 |
| C14orf180 | -6.73696 | 5.73E-07 |
| C18orf32 | -3.66734 | 0.00579 |
| C19orf35 | -5.65928 | 9.05E-07 |
| C19orf38 | -3.12303 | 9.39E-06 |
| C1QTNF9B | -4.39836 | 0.009264 |
| C20orf195 | -3.35963 | 0.003749 |
| C5AR1 | -3.14615 | 8.01E-05 |
| C6orf25 | -3.25257 | 0.001183 |
| C6orf58 | -7.61259 | 6.32E-09 |
| CA1 | -6.6571 | 3.22E-07 |
| CA7 | -4.11263 | 0.007432 |
| CABP7 | -3.67031 | 0.003153 |
| CADM3 | -3.28418 | 8.67E-06 |
| CALCB | -4.07947 | 0.000844 |
| CCDC175 | -4.60365 | 0.000244 |
| CCL16 | -5.17102 | 6.92E-05 |
| CCL2 | -3.01693 | 0.000221 |
| CCL23 | -3.51933 | 0.004236 |
| CCR10 | -3.75861 | 1.72E-05 |
| CCR3 | -3.1958 | 0.005943 |
| CD300LG | -5.9385 | 8.74E-08 |
| CDH12 | -3.95468 | 0.007255 |
| CES5A | -4.11081 | 0.000924 |
| CFD | -4.65837 | 5.73E-07 |
| CFP | -4.38139 | 8.35E-08 |
| CHRDL1 | -3.01121 | 0.000831 |
| CIDEC | -6.54331 | 4.56E-06 |
| CILP | -3.22467 | 6.24E-05 |
| CLC | -4.3229 | 9.44E-05 |
| CLDN5 | -3.14766 | 5.01E-05 |
| CLEC3B | -3.10145 | 1.08E-05 |
| CLEC4D | -3.29695 | 0.00431 |
| CLEC4E | -3.54738 | 2.87E-05 |
| CLEC4G | -3.99601 | 0.001442 |
| CLVS2 | -4.47347 | 0.003231 |
| CMTM2 | -3.31337 | 0.001448 |
| CMTM5 | -4.27967 | 0.00036 |
| CNTFR | -3.68387 | 5.00E-05 |
| CNTN2 | -3.89818 | 6.10E-05 |
| CNTN5 | -3.71106 | 0.002355 |
| CORO1A | -3.03945 | 7.86E-05 |
| CR1L | -3.02345 | 0.003574 |
| CRISP3 | -5.21701 | 7.03E-05 |
| CSF3R | -4.71882 | 1.58E-07 |
| CXCR1 | -4.46131 | 5.21E-05 |
| CXCR2 | -3.10186 | 0.006431 |
| DAB1 | -3.11792 | 1.85E-05 |
| DOK3 | -3.2677 | 7.77E-06 |
| DPEP3 | -4.03549 | 4.66E-05 |
| DPT | -3.73659 | 1.05E-05 |
| DRC7 | -4.83044 | 0.001928 |
| ELANE | -3.92295 | 0.005986 |
| EPHA7 | -4.00451 | 0.000331 |
| FAM180B | -3.66894 | 0.00013 |
| FAM229A | -3.08596 | 0.001545 |
| FCAR | -4.95915 | 1.57E-06 |
| FCGR3B | -3.81549 | 7.93E-05 |
| FCN1 | -5.43842 | 3.17E-10 |
| FFAR2 | -3.3346 | 0.008311 |
| FFAR3 | -6.11936 | 3.87E-06 |
| FGFBP2 | -3.64216 | 8.04E-06 |
| FGR | -3.47069 | 1.28E-06 |
| FLJ45079 | -5.70094 | 0.005373 |
| FMN2 | -3.1222 | 0.000908 |
| FOLH1B | -4.29308 | 0.001046 |
| FPR2 | -4.11206 | 5.54E-05 |
| FRMD1 | -3.4491 | 0.005796 |
| FUT7 | -4.01514 | 0.000421 |
| FXYD1 | -4.0249 | 9.05E-07 |
| GATA1 | -4.1109 | 0.004477 |
| GFI1B | -5.15668 | 3.05E-05 |
| GFRA3 | -3.07055 | 0.002968 |
| GLT1D1 | -4.97242 | 1.44E-07 |
| GLYAT | -5.03618 | 0.00054 |
| GNRH2 | -3.45441 | 0.001197 |
| GOLGA6A | -3.54674 | 0.007178 |
| GP5 | -3.41923 | 0.004269 |
| GP9 | -6.01023 | 0.000715 |
| GPBAR1 | -3.06317 | 0.004402 |
| GPD1 | -3.45652 | 0.001046 |
| GPIHBP1 | -4.51012 | 2.44E-06 |
| GPR88 | -3.0462 | 0.005446 |
| GZMM | -4.32599 | 2.17E-07 |
| HAR1A | -3.117 | 0.003689 |
| HBA1 | -8.55362 | 6.90E-21 |
| HBA2 | -8.16661 | 6.04E-22 |
| HBB | -7.62213 | 9.60E-19 |
| HBG1 | -4.71347 | 0.001673 |
| HBG2 | -5.23233 | 1.75E-05 |
| HBM | -5.94304 | 0.003382 |
| HEATR9 | -3.6956 | 0.000935 |
| HEMGN | -5.68157 | 1.25E-06 |
| HEPACAM | -3.89899 | 0.000255 |
| HIF3A | -4.55026 | 1.64E-06 |
| HK3 | -3.97088 | 3.73E-06 |
| HLX | -3.32318 | 2.47E-05 |
| HRASLS5 | -3.10529 | 0.00095 |
| HSPA6 | -3.13201 | 0.000295 |
| HSPB2 | -3.03057 | 3.69E-05 |
| HSPB6 | -4.57432 | 2.57E-06 |
| ICAM3 | -3.23516 | 8.28E-08 |
| ICAM4 | -3.07879 | 8.63E-05 |
| IFIT1B | -6.02779 | 9.59E-05 |
| IL18RAP | -3.71738 | 7.63E-06 |
| ITGA2B | -3.48028 | 2.33E-05 |
| ITGA7 | -3.03489 | 1.56E-05 |
| KCNA5 | -3.09868 | 0.000242 |
| KCNIP2 | -3.22692 | 1.50E-05 |
| KLB | -3.10657 | 0.001905 |
| KLF1 | -5.29466 | 0.00012 |
| KLF2 | -3.30962 | 6.73E-06 |
| KLHL33 | -3.99545 | 9.51E-06 |
| LCN10 | -3.34054 | 0.001529 |
| LEP | -3.28647 | 0.004399 |
| LGALS12 | -3.61387 | 0.000895 |
| LGI4 | -3.13054 | 3.73E-06 |
| LILRA1 | -3.21936 | 4.06E-06 |
| LILRA2 | -4.09844 | 1.01E-07 |
| LILRA5 | -3.79343 | 0.000282 |
| LILRA6 | -3.28534 | 0.00032 |
| LILRB2 | -3.27889 | 3.36E-05 |
| LILRB3 | -3.77689 | 2.12E-05 |
| LIPE | -3.79551 | 7.58E-06 |
| LMX1A | -3.81217 | 0.003071 |
| LRRC25 | -3.03933 | 3.79E-05 |
| LTB | -3.14547 | 0.000715 |
| LVRN | -3.5075 | 9.22E-06 |
| LYL1 | -3.10494 | 2.20E-05 |
| LYZ | -3.68924 | 5.06E-05 |
| MAB21L2 | -3.26868 | 0.000436 |
| MAP3K15 | -3.31131 | 0.00027 |
| MATN4 | -3.1427 | 6.90E-07 |
| MEFV | -4.55214 | 3.73E-06 |
| MGAM | -4.23388 | 8.99E-07 |
| MGAT4C | -3.04458 | 0.009037 |
| MLXIPL | -3.70803 | 0.000311 |
| MMP25 | -5.65529 | 2.08E-09 |
| MORC1 | -4.59892 | 0.000864 |
| MRAP | -4.73816 | 0.000269 |
| MT1G | -3.208 | 0.005134 |
| MT1M | -3.17389 | 9.30E-06 |
| MTHFS | -3.85968 | 0.007711 |
| MUC5B | -4.37634 | 0.000228 |
| MUC7 | -3.74175 | 0.00531 |
| MYL4 | -4.29539 | 2.70E-05 |
| MYO1F | -3.1378 | 7.26E-06 |
| MYT1L | -4.97862 | 0.003497 |
| NCF1 | -3.30744 | 7.34E-06 |
| NCR3 | -3.49117 | 0.000905 |
| NEU4 | -4.56536 | 0.00092 |
| NFAM1 | -3.56095 | 5.02E-06 |
| NFE2 | -4.30718 | 4.66E-05 |
| NLRP12 | -4.74703 | 8.99E-07 |
| NLRP6 | -4.73907 | 0.000119 |
| NPR1 | -3.6637 | 1.43E-06 |
| NPY1R | -3.09865 | 0.000626 |
| NRGN | -4.80578 | 3.45E-08 |
| OR2W3 | -4.4102 | 0.000489 |
| OSR1 | -3.15984 | 0.000844 |
| PADI4 | -5.28741 | 1.05E-05 |
| PAX3 | -3.13187 | 0.009028 |
| PCOLCE2 | -4.28086 | 2.01E-07 |
| PCSK2 | -3.34857 | 0.003347 |
| PF4 | -7.56969 | 3.17E-10 |
| PF4V1 | -3.32925 | 0.005675 |
| PGLYRP1 | -6.10268 | 0.000139 |
| PHOSPHO1 | -6.27532 | 6.24E-10 |
| PI16 | -3.85894 | 0.000163 |
| PIP | -4.1971 | 0.002132 |
| PLAC9 | -3.86525 | 1.09E-06 |
| PLIN1 | -6.04607 | 6.35E-11 |
| PLIN4 | -4.40262 | 5.04E-06 |
| PLXNA4 | -3.05913 | 4.53E-05 |
| PPBP | -4.82843 | 6.90E-07 |
| PRAM1 | -3.57068 | 2.33E-05 |
| PRB2 | -4.55286 | 0.000155 |
| PRB3 | -5.48219 | 5.46E-05 |
| PRB4 | -5.93356 | 5.43E-07 |
| PRDM16 | -3.04822 | 3.79E-05 |
| PRKCG | -3.5749 | 0.002021 |
| PROK2 | -5.05435 | 0.000546 |
| PRRT4 | -3.0925 | 0.005675 |
| PRSS33 | -4.21155 | 6.50E-05 |
| PTCH2 | -3.33943 | 4.40E-05 |
| PVRIG | -3.17413 | 0.000438 |
| RASGRP4 | -3.72585 | 6.31E-06 |
| RBP4 | -4.28192 | 8.75E-05 |
| RGL4 | -3.06539 | 0.002125 |
| RGR | -4.17357 | 0.001866 |
| RIMS4 | -3.65116 | 0.000103 |
| RNA45S5 | -4.29042 | 2.86E-06 |
| ROPN1L | -3.64366 | 0.000972 |
| RSPH6A | -3.13614 | 0.001332 |
| RXRG | -3.09791 | 0.001131 |
| S1PR4 | -4.04879 | 3.38E-06 |
| SCML2 | -3.03758 | 0.000831 |
| SCN1A | -4.53772 | 0.007243 |
| SCN4A | -3.08463 | 1.36E-05 |
| SELL | -3.57051 | 3.03E-05 |
| SENCR | -3.12612 | 0.003585 |
| SGCG | -5.03858 | 0.000143 |
| SIGLEC11 | -3.0378 | 0.000523 |
| SIGLEC5 | -3.02937 | 0.000534 |
| SLC11A1 | -3.78095 | 4.53E-05 |
| SLC17A7 | -4.29476 | 1.30E-07 |
| SLC19A3 | -3.80959 | 0.000852 |
| SLC1A6 | -4.23385 | 0.009853 |
| SLC24A4 | -3.0741 | 7.26E-06 |
| SLC25A18 | -3.4171 | 0.000207 |
| SLC4A1 | -8.09158 | 3.66E-11 |
| SLC7A10 | -3.31392 | 0.007137 |
| SOAT2 | -3.21121 | 0.003342 |
| SOX18 | -3.15253 | 0.001525 |
| SPI1 | -3.28225 | 2.56E-05 |
| SPRR2F | -8.1886 | 0.000922 |
| SPTA1 | -3.46795 | 0.001829 |
| SSTR3 | -3.93355 | 2.09E-05 |
| STX11 | -3.2204 | 1.81E-05 |
| SYNE3 | -3.14651 | 9.51E-06 |
| TBX21 | -3.13365 | 4.43E-05 |
| TIMP4 | -3.4564 | 3.37E-05 |
| TMEM132C | -4.18085 | 2.86E-06 |
| TNMD | -4.77963 | 0.004006 |
| TNXB | -3.27038 | 7.92E-06 |
| TPO | -3.14341 | 0.000463 |
| TREM1 | -3.48257 | 0.000262 |
| TREML2 | -3.95806 | 3.55E-06 |
| TRIM50 | -4.46428 | 0.000207 |
| TRIM58 | -4.46402 | 7.02E-07 |
| TSPAN32 | -3.15561 | 1.17E-05 |
| TTLL6 | -5.10398 | 0.002692 |
| TUBB1 | -7.05709 | 2.05E-12 |
| TULP1 | -4.10702 | 0.008332 |
| TUSC5 | -6.37958 | 5.61E-07 |
| VASN | -3.23772 | 0.000203 |
| VIL1 | -5.0115 | 0.001328 |
| VSTM1 | -3.45807 | 0.008788 |
| XPNPEP2 | -3.06473 | 0.002376 |
| ZDHHC19 | -4.03294 | 0.00093 |

**Supplementary Table S6. List of significant isoform switching genes in immune hot group.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| gene\_name | condition\_1 | condition\_2 | gene\_switch\_q\_value | combinedDIF | switchConsequencesGene | Rank |
| TPX2 | N | T | 0.0035 | 1.6913 | TRUE | 1 |
| MYBL2 | N | T | 0.011181 | 1.624111 | TRUE | 2 |
| WNT2 | N | T | 7.76E-09 | 1.596098 | TRUE | 3 |
| SCGB3A1 | N | T | 0.000357 | 1.512375 | TRUE | 4 |
| LDHD | N | T | 2.99E-05 | 1.34745 | TRUE | 5 |
| LZTS1 | N | T | 0.021967 | 1.32795 | TRUE | 6 |
| ADCYAP1R1 | N | T | 0.018681 | 1.324 | TRUE | 7 |
| SLAMF6 | N | T | 0.003297 | 1.12175 | TRUE | 8 |
| RHCG | N | T | 0.003219 | 0.958388 | TRUE | 9 |
| LOXL1 | N | T | 0.030369 | 0.957438 | TRUE | 10 |
| ISLR | N | T | 0.009809 | 0.884463 | TRUE | 11 |
| GPRIN3 | N | T | 0.030778 | 0.8267 | TRUE | 12 |
| PTPN22 | N | T | 5.14E-05 | 0.814763 | TRUE | 13 |
| IFT80 | N | T | 0.006898 | 0.750725 | TRUE | 14 |
| SIRPG | N | T | 0.030089 | 0.729913 | TRUE | 15 |
| MTERF1 | N | T | 0.0057 | 0.7289 | TRUE | 16 |
| RHOQ | N | T | 0.012547 | 0.690763 | TRUE | 17 |
| FHOD3 | N | T | 4.51E-06 | 0.688813 | TRUE | 18 |
| SATB2 | N | T | 0.014513 | 0.668088 | TRUE | 19 |
| UCHL1 | N | T | 0.00298 | 0.605289 | TRUE | 20 |
| COL6A3 | N | T | 0.000261 | 0.602363 | TRUE | 21 |
| PIPOX | N | T | 0.025547 | 0.5816 | TRUE | 22 |
| AR | N | T | 0.045906 | 0.575725 | TRUE | 23 |
| TWNK | N | T | 0.000203 | 0.549613 | TRUE | 24 |
| LIPE | N | T | 0.033298 | 0.549038 | TRUE | 25 |
| SLC29A2 | N | T | 0.036177 | 0.538513 | TRUE | 26 |
| DDAH1 | N | T | 0.0397 | 0.53655 | TRUE | 27 |
| KIF23 | N | T | 0.041801 | 0.534192 | TRUE | 28 |
| COL11A1 | N | T | 0.049831 | 0.525275 | TRUE | 29 |
| PROM1 | N | T | 0.019298 | 0.494677 | TRUE | 30 |
| IL21R | N | T | 0.032321 | 0.4882 | TRUE | 31 |
| SPIRE1 | N | T | 0.000943 | 0.478625 | TRUE | 32 |
| CD72 | N | T | 0.025623 | 0.4627 | TRUE | 33 |
| INPP5J | N | T | 0.0397 | 0.462038 | TRUE | 34 |
| AC118553.2 | N | T | 0.015003 | 0.458813 | TRUE | 35 |
| RASGRP1 | N | T | 0.023525 | 0.45425 | TRUE | 36 |
| MMP24OS | N | T | 0.011084 | 0.45405 | TRUE | 37 |
| FAM192A | N | T | 0.000375 | 0.445075 | TRUE | 38 |
| FAM19A5 | N | T | 0.01961 | 0.4425 | TRUE | 39 |
| AAMDC | N | T | 0.026688 | 0.44145 | TRUE | 40 |
| ARHGAP24 | N | T | 6.03E-08 | 0.440975 | TRUE | 41 |
| MREG | N | T | 0.000908 | 0.425125 | TRUE | 42 |
| GLB1L | N | T | 0.001594 | 0.424688 | TRUE | 43 |
| MAGED1 | N | T | 0.022337 | 0.414588 | TRUE | 44 |
| RGS5 | N | T | 0.000203 | 0.4003 | TRUE | 45 |
| AC004160.1 | N | T | 3.05E-20 | 0.39845 | TRUE | 46 |
| C19orf47 | N | T | 0.036398 | 0.386713 | TRUE | 47 |
| CHN1 | N | T | 0.046394 | 0.37665 | TRUE | 48 |
| LAMB1 | N | T | 3.99E-05 | 0.373913 | TRUE | 49 |
| PRICKLE4 | N | T | 0.001624 | 0.372275 | TRUE | 50 |
| NDUFA4L2 | N | T | 0.017481 | 0.371488 | TRUE | 51 |
| COL10A1 | N | T | 0.019927 | 0.366613 | TRUE | 52 |
| ADCK5 | N | T | 0.004468 | 0.365063 | TRUE | 53 |
| CTPS2 | N | T | 0.044248 | 0.364788 | TRUE | 54 |
| MYH14 | N | T | 0.035463 | 0.363525 | TRUE | 55 |
| ACBD5 | N | T | 0.038423 | 0.363063 | TRUE | 56 |
| POSTN | N | T | 0.010412 | 0.362388 | TRUE | 57 |
| TCN2 | N | T | 0.035663 | 0.36155 | TRUE | 58 |
| MCM3AP | N | T | 0.025799 | 0.357225 | TRUE | 59 |
| FAM114A2 | N | T | 0.0397 | 0.354413 | TRUE | 60 |
| RDH5 | N | T | 0.00165 | 0.354238 | TRUE | 61 |
| PHF23 | N | T | 0.038423 | 0.351613 | TRUE | 62 |
| FUOM | N | T | 0.011358 | 0.342363 | TRUE | 63 |
| CHST4 | N | T | 0.003384 | 0.339225 | TRUE | 64 |
| ABCC4 | N | T | 0.006552 | 0.326038 | TRUE | 65 |
| TRNT1 | N | T | 0.003468 | 0.325875 | TRUE | 66 |
| PITPNB | N | T | 0.021559 | 0.32505 | TRUE | 67 |
| ATP6V0E2 | N | T | 0.03971 | 0.322388 | TRUE | 68 |
| ZNF773 | N | T | 0.000541 | 0.320788 | TRUE | 69 |
| CD247 | N | T | 0.022283 | 0.314525 | TRUE | 70 |
| ADA | N | T | 0.004581 | 0.3141 | TRUE | 71 |
| PCK2 | N | T | 0.021033 | 0.310688 | TRUE | 72 |
| SLC25A10 | N | T | 0.046985 | 0.308925 | TRUE | 73 |
| THAP3 | N | T | 0.003219 | 0.30875 | TRUE | 74 |
| WDR78 | N | T | 0.018769 | 0.30725 | TRUE | 75 |
| EDARADD | N | T | 0.036913 | 0.295425 | TRUE | 76 |
| AMY1A | N | T | 0.001984 | 0.285013 | TRUE | 77 |
| CDH6 | N | T | 0.016397 | 0.283138 | TRUE | 78 |
| ITIH4 | N | T | 0.037612 | 0.282275 | TRUE | 79 |
| ZNF414 | N | T | 0.043751 | 0.280413 | TRUE | 80 |
| DHX57 | N | T | 0.004778 | 0.279825 | TRUE | 81 |
| GPAM | N | T | 0.015003 | 0.271775 | TRUE | 82 |
| IL4R | N | T | 4.51E-05 | 0.271588 | TRUE | 83 |
| ECT2 | N | T | 0.010052 | 0.26615 | TRUE | 84 |
| FGR | N | T | 0.033206 | 0.265638 | TRUE | 85 |
| RPL17 | N | T | 0.015897 | 0.265413 | TRUE | 86 |
| HECW2 | N | T | 0.030099 | 0.260925 | TRUE | 87 |
| ATP10B | N | T | 0.01961 | 0.25965 | TRUE | 88 |
| NOP14-AS1 | N | T | 0.049144 | 0.256963 | TRUE | 89 |
| SPATA13 | N | T | 0.041801 | 0.25385 | TRUE | 90 |
| ADGRD1 | N | T | 0.030523 | 0.253513 | TRUE | 91 |
| BGN | N | T | 0.02732 | 0.253 | TRUE | 92 |
| POLD4 | N | T | 0.001594 | 0.250238 | TRUE | 93 |
| WASH3P | N | T | 0.001538 | 0.250025 | TRUE | 94 |
| EVA1A | N | T | 0.033893 | 0.2493 | TRUE | 95 |
| EIF4A1 | N | T | 0.030523 | 0.24745 | TRUE | 96 |
| ICMT | N | T | 0.035425 | 0.241688 | TRUE | 97 |
| IFT88 | N | T | 0.043324 | 0.226838 | TRUE | 98 |
| OSBP2 | N | T | 0.002566 | 0.226263 | TRUE | 99 |
| SETD6 | N | T | 0.003367 | 0.223513 | TRUE | 100 |
| GLDN | N | T | 0.009227 | 0.220025 | TRUE | 101 |
| C19orf66 | N | T | 0.003031 | 0.217325 | TRUE | 102 |
| CTSD | N | T | 0.027447 | 0.217325 | TRUE | 103 |
| PDE4A | N | T | 0.00204 | 0.211725 | TRUE | 104 |
| NLRX1 | N | T | 0.040468 | 0.210663 | TRUE | 105 |
| MMP11 | N | T | 0.017974 | 0.210183 | TRUE | 106 |
| CAMSAP2 | N | T | 0.033383 | 0.209075 | TRUE | 107 |
| SNUPN | N | T | 0.021869 | 0.205875 | TRUE | 108 |
| CAMSAP3 | N | T | 0.000171 | 0.2048 | TRUE | 109 |
| PRDM2 | N | T | 0.006712 | 0.203588 | TRUE | 110 |
| DUS1L | N | T | 0.047209 | 0.199775 | TRUE | 111 |
| SLC1A3 | N | T | 0.009344 | 0.196138 | TRUE | 112 |
| KBTBD8 | N | T | 0.01647 | 0.194938 | TRUE | 113 |
| MAP4K5 | N | T | 6.27E-05 | 0.193463 | TRUE | 114 |
| TSPAN8 | N | T | 0.019524 | 0.193339 | TRUE | 115 |
| RUNX2 | N | T | 0.0397 | 0.191813 | TRUE | 116 |
| PKM | N | T | 0.011327 | 0.191363 | TRUE | 117 |
| ATAD2B | N | T | 0.020207 | 0.191225 | TRUE | 118 |
| ACOT7 | N | T | 0.021559 | 0.190738 | TRUE | 119 |
| POT1 | N | T | 0.019524 | 0.187513 | TRUE | 120 |
| PNPLA7 | N | T | 0.006552 | 0.187188 | TRUE | 121 |
| CD3G | N | T | 0.049831 | 0.181713 | TRUE | 122 |
| PBX3 | N | T | 1.95E-06 | 0.181513 | TRUE | 123 |
| TSTD1 | N | T | 0.03146 | 0.17815 | TRUE | 124 |
| CDH11 | N | T | 0.036723 | 0.17795 | TRUE | 125 |
| ARAP2 | N | T | 0.001726 | 0.17665 | TRUE | 126 |
| MAP4K1 | N | T | 0.023179 | 0.17665 | TRUE | 127 |
| NFKBIZ | N | T | 0.035217 | 0.1754 | TRUE | 128 |
| SLC19A1 | N | T | 0.040468 | 0.175113 | TRUE | 129 |
| ABI2 | N | T | 0.019311 | 0.174675 | TRUE | 130 |
| RUNX1 | N | T | 0.001502 | 0.174525 | TRUE | 131 |
| RAD9A | N | T | 0.041801 | 0.172925 | TRUE | 132 |
| TECR | N | T | 0.007189 | 0.166738 | TRUE | 133 |
| NRXN3 | N | T | 7.76E-09 | 0.160075 | TRUE | 134 |
| PPP1R16A | N | T | 1.40E-05 | 0.1582 | TRUE | 135 |
| INSIG1 | N | T | 0.039763 | 0.154538 | TRUE | 136 |
| CLIP4 | N | T | 0.000155 | 0.154463 | TRUE | 137 |
| VCAN | N | T | 0.00298 | 0.154438 | TRUE | 138 |
| 2-Mar | N | T | 0.033653 | 0.15345 | TRUE | 139 |
| EYA3 | N | T | 0.0472 | 0.15025 | TRUE | 140 |
| ABCC5 | N | T | 0.002249 | 0.149875 | TRUE | 141 |
| RPS19 | N | T | 0.030089 | 0.14405 | TRUE | 142 |
| ASIC1 | N | T | 0.033395 | 0.143375 | TRUE | 143 |
| ARHGAP28 | N | T | 0.018681 | 0.142263 | TRUE | 144 |
| ZNF512 | N | T | 0.023966 | 0.140825 | TRUE | 145 |
| TTC3 | N | T | 0.000186 | 0.140238 | TRUE | 146 |
| MRPL18 | N | T | 0.040468 | 0.138688 | TRUE | 147 |
| TGOLN2 | N | T | 0.002566 | 0.138325 | TRUE | 148 |
| DPP4 | N | T | 0.043723 | 0.137975 | TRUE | 149 |
| ZNF395 | N | T | 0.015003 | 0.136913 | TRUE | 150 |
| SULF1 | N | T | 0.019524 | 0.132963 | TRUE | 151 |
| ZNF624 | N | T | 0.036177 | 0.130463 | TRUE | 152 |
| RPE | N | T | 0.014749 | 0.12745 | TRUE | 153 |
| ATP2A3 | N | T | 0.001498 | 0.12615 | TRUE | 154 |
| RANBP1 | N | T | 0.031741 | 0.1238 | TRUE | 155 |
| TBC1D4 | N | T | 2.72E-15 | 0.119725 | TRUE | 156 |
| NCAPD3 | N | T | 0.030089 | 0.1191 | TRUE | 157 |
| SP140 | N | T | 0.026151 | 0.118863 | TRUE | 158 |
| TRAF3IP2-AS1 | N | T | 0.033188 | 0.118125 | TRUE | 159 |
| ABLIM2 | N | T | 0.015897 | 0.117888 | TRUE | 160 |
| ZNF17 | N | T | 0.008816 | 0.1166 | TRUE | 161 |
| TNIK | N | T | 0.030713 | 0.115863 | TRUE | 162 |
| BCL2 | N | T | 0.039007 | 0.115475 | TRUE | 163 |
| AP4B1 | N | T | 0.041801 | 0.114813 | TRUE | 164 |
| PARP6 | N | T | 0.021559 | 0.113025 | TRUE | 165 |
| PHGDH | N | T | 0.001936 | 0.1086 | TRUE | 166 |
| JUP | N | T | 0.025205 | 0.106275 | TRUE | 167 |
| DRAM2 | N | T | 8.73E-05 | 0.105863 | TRUE | 168 |
| OXR1 | N | T | 0.020844 | 0.10465 | TRUE | 169 |
| SCAPER | N | T | 0.044248 | 0.103763 | TRUE | 170 |
| ABCA7 | N | T | 0.04262 | 0.102813 | TRUE | 171 |
| AMPD3 | N | T | 0.011541 | 0.1026 | TRUE | 172 |
| ERCC6 | N | T | 0.018681 | 0.102113 | TRUE | 173 |

**Supplementary Table S7. List of significant isoform switching genes in immune cold group.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| gene\_name | condition\_1 | condition\_2 | gene\_switch\_q\_value | combinedDIF | switchConsequencesGene | Rank |
| CD109 | N | T | 2.28E-05 | 1.273442 | TRUE | 1 |
| CTSV | N | T | 0.035196 | 0.966326 | TRUE | 2 |
| PGM2L1 | N | T | 0.010087 | 0.611933 | TRUE | 3 |
| ADGRG2 | N | T | 0.036953 | 0.519127 | TRUE | 4 |
| GCH1 | N | T | 0.046675 | 0.500192 | TRUE | 5 |
| GABPA | N | T | 0.021851 | 0.456167 | TRUE | 6 |
| KCNS3 | N | T | 0.045497 | 0.455417 | TRUE | 7 |
| ATP6V1H | N | T | 0.013268 | 0.450367 | TRUE | 8 |
| IMPDH1 | N | T | 0.010087 | 0.3989 | TRUE | 9 |
| HECW2 | N | T | 0.000227 | 0.385058 | TRUE | 10 |
| ACOT7 | N | T | 0.034723 | 0.3729 | TRUE | 11 |
| POSTN | N | T | 0.045259 | 0.372342 | TRUE | 12 |
| EPB41L4B | N | T | 0.020056 | 0.37215 | TRUE | 13 |
| ZNF395 | N | T | 0.00156 | 0.362117 | TRUE | 14 |
| HSD11B1 | N | T | 0.021851 | 0.362052 | TRUE | 15 |
| ZNF92 | N | T | 0.043581 | 0.358833 | TRUE | 16 |
| APOBEC3A | N | T | 0.012669 | 0.35874 | TRUE | 17 |
| PLCB2 | N | T | 0.000357 | 0.358458 | TRUE | 18 |
| C22orf34 | N | T | 0.031238 | 0.355858 | TRUE | 19 |
| FBLN2 | N | T | 0.037154 | 0.344533 | TRUE | 20 |
| PORCN | N | T | 0.04355 | 0.340408 | TRUE | 21 |
| NAA50 | N | T | 0.039185 | 0.3375 | TRUE | 22 |
| RUNX2 | N | T | 0.001768 | 0.332733 | TRUE | 23 |
| GPRC5C | N | T | 0.00096 | 0.317808 | TRUE | 24 |
| IL1RAP | N | T | 0.021942 | 0.314583 | TRUE | 25 |
| SEC16A | N | T | 0.013268 | 0.3138 | TRUE | 26 |
| RPS10 | N | T | 0.014135 | 0.313708 | TRUE | 27 |
| LZTS3 | N | T | 0.037154 | 0.312417 | TRUE | 28 |
| CDK2AP2 | N | T | 0.005473 | 0.309267 | TRUE | 29 |
| UQCRB | N | T | 0.000661 | 0.307767 | TRUE | 30 |
| TSHZ3 | N | T | 0.046151 | 0.295117 | TRUE | 31 |
| ECE1 | N | T | 0.033343 | 0.292942 | TRUE | 32 |
| NGLY1 | N | T | 0.021851 | 0.292583 | TRUE | 33 |
| FXYD1 | N | T | 0.028311 | 0.290146 | TRUE | 34 |
| MFSD10 | N | T | 0.04331 | 0.277542 | TRUE | 35 |
| GMEB2 | N | T | 0.025117 | 0.277125 | TRUE | 36 |
| BPIFA1 | N | T | 0.047828 | 0.269647 | TRUE | 37 |
| SH3PXD2B | N | T | 0.021238 | 0.267792 | TRUE | 38 |
| IGLL5 | N | T | 0.048988 | 0.260783 | TRUE | 39 |
| AC092835.1 | N | T | 0.022659 | 0.259158 | TRUE | 40 |
| SULF2 | N | T | 0.043849 | 0.251192 | TRUE | 41 |
| DLEU2 | N | T | 0.043849 | 0.250917 | TRUE | 42 |
| PHTF2 | N | T | 0.041267 | 0.246775 | TRUE | 43 |
| NECTIN2 | N | T | 0.046652 | 0.238383 | TRUE | 44 |
| RASGRP3 | N | T | 0.038191 | 0.2233 | TRUE | 45 |
| IL6R | N | T | 0.021238 | 0.2232 | TRUE | 46 |
| ADD1 | N | T | 0.029328 | 0.222208 | TRUE | 47 |
| DOK4 | N | T | 0.010087 | 0.221742 | TRUE | 48 |
| CCDC88B | N | T | 0.024492 | 0.220783 | TRUE | 49 |
| ECT2 | N | T | 0.004143 | 0.219373 | TRUE | 50 |
| KRTCAP2 | N | T | 0.035355 | 0.213917 | TRUE | 51 |
| FCRL5 | N | T | 0.012489 | 0.212602 | TRUE | 52 |
| SPINT2 | N | T | 0.010087 | 0.209692 | TRUE | 53 |
| CNIH4 | N | T | 0.022659 | 0.2053 | TRUE | 54 |
| CYGB | N | T | 0.021238 | 0.190342 | TRUE | 55 |
| KATNAL2 | N | T | 0.002429 | 0.190333 | TRUE | 56 |
| CTTN | N | T | 0.006379 | 0.189992 | TRUE | 57 |
| MTCL1 | N | T | 0.022659 | 0.187742 | TRUE | 58 |
| ZDHHC16 | N | T | 0.010087 | 0.184317 | TRUE | 59 |
| MED25 | N | T | 0.033303 | 0.17485 | TRUE | 60 |
| ATP2A2 | N | T | 0.010087 | 0.167792 | TRUE | 61 |
| PAXX | N | T | 0.014454 | 0.167708 | TRUE | 62 |
| GPAM | N | T | 0.020162 | 0.166992 | TRUE | 63 |
| DAZAP2 | N | T | 0.013152 | 0.166733 | TRUE | 64 |
| RAB28 | N | T | 0.002575 | 0.16655 | TRUE | 65 |
| CTBP2 | N | T | 0.032633 | 0.160467 | TRUE | 66 |
| ZNF354B | N | T | 0.018426 | 0.153542 | TRUE | 67 |
| LEF1 | N | T | 0.037154 | 0.151667 | TRUE | 68 |
| FBXL2 | N | T | 0.002496 | 0.150458 | TRUE | 69 |
| NRP1 | N | T | 0.014135 | 0.148233 | TRUE | 70 |
| DALRD3 | N | T | 0.012378 | 0.147392 | TRUE | 71 |
| SPECC1 | N | T | 0.039185 | 0.146225 | TRUE | 72 |
| SPHK2 | N | T | 0.033834 | 0.146125 | TRUE | 73 |
| FGD6 | N | T | 3.36E-05 | 0.145075 | TRUE | 74 |
| SNRNP25 | N | T | 0.033677 | 0.144533 | TRUE | 75 |
| ZBTB21 | N | T | 0.048988 | 0.131308 | TRUE | 76 |
| DDX42 | N | T | 0.037154 | 0.129658 | TRUE | 77 |
| SERPINB8 | N | T | 0.037154 | 0.1285 | TRUE | 78 |
| IRGQ | N | T | 0.022659 | 0.128258 | TRUE | 79 |
| SULF1 | N | T | 0.015033 | 0.1277 | TRUE | 80 |
| ZBTB38 | N | T | 0.037154 | 0.126342 | TRUE | 81 |
| ALMS1 | N | T | 0.027306 | 0.125842 | TRUE | 82 |
| SNCA | N | T | 0.048988 | 0.12325 | TRUE | 83 |
| KDM2A | N | T | 0.008483 | 0.113042 | TRUE | 84 |
| HNRNPA2B1 | N | T | 0.014135 | 0.110117 | TRUE | 85 |

**Supplementary Table S8. List of PPI genes in immune hot group.**

|  |
| --- |
| Gene |
| CXCL13 |
| POSTN |
| MUC5B |
| LAMB1 |
| ATP2B2 |
| CCR7 |
| COMP |
| MUC6 |
| MUC4 |
| CLVS2 |
| MYH7 |
| DCX |
| MYH2 |
| MMP1 |
| MYH1 |
| ETV1 |
| LUM |
| FN1 |
| LRRTM1 |
| CALB2 |
| CNTN2 |
| MT3 |
| VCAN |
| NXPH1 |
| MYH14 |
| BGN |
| ADRB1 |
| PCK2 |
| SLC1A3 |
| INSIG1 |
| FOLH1 |
| NPY5R |
| SCD |
| TGM1 |
| ADCY5 |
| KBTBD8 |
| TTC3 |
| KIF26B |
| CA10 |
| DGAT2 |
| PCK1 |
| KIF23 |
| EDN3 |
| LPL |
| KIF1A |
| OXGR1 |
| FASN |
| KIF12 |
| GPT |
| PPP1R1B |
| BPIFB2 |
| SPHKAP |
| MLXIPL |
| HBB |
| TGOLN2 |
| KLK2 |
| ADCYAP1R1 |
| MMD2 |
| MYOZ1 |
| HBA2 |
| FBXL16 |
| CNTNAP4 |
| DSG3 |
| DSG1 |
| MUC5AC |
| AVPR2 |
| NKX3-1 |
| ADRA1A |
| ALAS2 |
| HBG2 |
| ZBTB16 |
| GRIA4 |
| PI3 |
| FBXO40 |
| HBE1 |
| GRIA2 |
| PF4 |
| GPD1 |
| CHRM1 |
| CHRM3 |
| HCAR1 |
| HBA1 |
| HBM |
| GRP |
| CHST4 |
| AHSP |
| MYOT |
| PLCB4 |
| PLIN1 |
| MYBPC1 |
| GPRC6A |
| LIPE |
| OPRK1 |
| GRIN2C |
| LEP |
| THRSP |
| HECW2 |
| MYL1 |
| AR |
| EVA1A |
| HBQ1 |

**Supplementary Table S9. List of PPI genes in immune cold group.**

|  |
| --- |
| Gene |
| XPNPEP2 |
| MUC5B |
| SNCA |
| MUC6 |
| S1PR4 |
| MUC7 |
| FGR |
| SSTR3 |
| LYL1 |
| HK3 |
| CRISP3 |
| HBG1 |
| HBG2 |
| CNTN5 |
| MGAM |
| GPR97 |
| C5AR1 |
| NPY1R |
| GFI1B |
| LILRB3 |
| CXCR2 |
| CXCR1 |
| LILRA1 |
| TNXB |
| HBA1 |
| HBA2 |
| CCR3 |
| FFAR2 |
| FFAR3 |
| HBM |
| HBB |
| GNRH2 |
| CIDEC |
| PPBP |
| CCR10 |
| CD109 |
| SLC11A1 |
| AQP9 |
| OXTR |
| MYO1F |
| LEP |
| KLF1 |
| ITGA7 |
| MUC5AC |
| ITGB6 |
| FCAR |
| TREM1 |
| ALAS2 |
| CLEC4D |
| ADIPOQ |
| ITGA2B |
| NCF1 |
| PF4 |
| CCL16 |
| AHSP |
| PLCB2 |
| PLIN1 |
| ARG1 |
| MMP25 |
| LYZ |
| NFE2 |
| GPIHBP1 |
| GATA1 |
| CFP |
| FPR2 |
| CFD |
| PGLYRP1 |
| PRSS3 |
| PROK2 |
| LIPE |
| SPI1 |

**Supplementary Table S10. List of PPI hub genes in immune hot and cold group.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Immune\_hot\_PPI\_hubgene | | | | Immune\_cold\_PPI-hubgene | | | |
| Gene | Freq | log2FoldChange | padj | Gene | Freq | log2FoldChange | padj |
| POSTN | 4 | 5.256585 | 3.42E-09 | POSTN | 2 | 5.449575 | 3.19E-10 |
| MMP13 | 4 | 5.202665 | 6.56E-06 | RUNX2 | 3 | 0.707143 | 0.16418 |
| COL11A1 | 2 | 4.35173 | 6.17E-08 | SNCA | 2 | -1.41631 | 0.063291 |
| CCR7 | 2 | 4.059642 | 1.22E-07 | CCL2 | 6 | -3.01693 | 0.000221 |
| COMP | 3 | 3.588871 | 0.00087 | NPY1R | 2 | -3.09865 | 0.000626 |
| MMP1 | 2 | 3.37223 | 0.003002 | CXCR2 | 4 | -3.10186 | 0.006431 |
| SERPINE1 | 5 | 3.285738 | 3.61E-05 | C5AR1 | 4 | -3.14615 | 8.01E-05 |
| LUM | 3 | 3.046871 | 5.67E-06 | CCR3 | 4 | -3.1958 | 0.005943 |
| FN1 | 6 | 3.031467 | 0.000221 | LILRB2 | 3 | -3.27889 | 3.36E-05 |
| VCAN | 2 | 2.654891 | 2.45E-05 | SPI1 | 6 | -3.28225 | 2.56E-05 |
| BGN | 3 | 1.980041 | 0.011105 | LEP | 5 | -3.28647 | 0.004399 |
| ABCA7 | 2 | 1.308789 | 0.022173 | SPTA1 | 2 | -3.46795 | 0.001829 |
| PKM | 2 | 1.228061 | 0.000986 | FGR | 4 | -3.47069 | 1.28E-06 |
| RUNX2 | 5 | 0.891426 | 0.208639 | ITGA2B | 3 | -3.48028 | 2.33E-05 |
| CTSD | 2 | 0.820742 | 0.086572 | TREM1 | 2 | -3.48257 | 0.000262 |
| AR | 6 | -2.56184 | 1.75E-04 | SELL | 5 | -3.57051 | 3.03E-05 |
| CEBPA | 2 | -3.07984 | 6.42E-05 | LYZ | 3 | -3.68924 | 5.06E-05 |
| SCD | 3 | -3.22675 | 0.000237 | CCR10 | 2 | -3.75861 | 1.72E-05 |
| DGAT2 | 3 | -3.34362 | 0.000177 | LIPE | 3 | -3.79551 | 7.58E-06 |
| NR1I2 | 3 | -3.39397 | 0.003007 | FCGR3B | 3 | -3.81549 | 7.93E-05 |
| GFAP | 3 | -3.50205 | 0.006222 | ELANE | 5 | -3.92295 | 0.005986 |
| PCK1 | 2 | -3.50268 | 0.005213 | S1PR4 | 4 | -4.04879 | 3.38E-06 |
| LPL | 5 | -3.56155 | 0.000781 | GATA1 | 7 | -4.1109 | 0.004477 |
| SOX10 | 3 | -3.60334 | 0.003844 | FPR2 | 7 | -4.11206 | 5.54E-05 |
| FASN | 6 | -3.72261 | 7.53E-06 | SLC17A7 | 2 | -4.29476 | 1.30E-07 |
| GPT | 4 | -3.83053 | 8.07E-08 | CXCR1 | 4 | -4.46131 | 5.21E-05 |
| MLXIPL | 2 | -3.87198 | 0.001338 | CSF3R | 3 | -4.71882 | 1.58E-07 |
| ATP2B2 | 2 | -4.02918 | 0.002176 | PPBP | 4 | -4.82843 | 6.90E-07 |
| SLC4A1 | 2 | -4.08576 | 0.001184 | PF4 | 5 | -7.56969 | 3.17E-10 |
| MYH2 | 2 | -4.13634 | 0.008269 | HBB | 2 | -7.62213 | 9.60E-19 |
| CNTN2 | 4 | -4.63469 | 4.11E-05 | SLC4A1 | 2 | -8.09158 | 3.66E-11 |
| PLIN1 | 2 | -4.94645 | 0.000158 |  |  |  |  |
| LIPE | 5 | -5.10971 | 5.65E-07 |  |  |  |  |
| LEP | 6 | -5.28774 | 2.21E-05 |  |  |  |  |
| GRIA2 | 5 | -6.91713 | 8.24E-07 |  |  |  |  |

**Supplementary Table S11. Sequencing Coverage and Quality Statistics.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sample\_ID | Total number of sequenced reads | Total number of uniquely mapped readsa | RNA integrity number  (RIN) | Ratio  of  all reads aligned to  rRNA regions to  total uniquely  mapped  reads (rRNA  rate) | Ratio  of exon‐mapped reads to total  uniquely mapped reads  (Expression Profile Efficiency) | Total  number  of detected  transcripts with  reads  ≥1 |
| MEC1\_N | 84023838 | 39504852 | 3.9 | 0.124012 | 0.404348 | 24962 |
| MEC1\_T | 71215836 | 61639584 | 7.3 | 0.177531 | 0.642531 | 26727 |
| MEC2\_N | 69927990 | 46194286 | 6.3 | 0.172422 | 0.64844 | 24439 |
| MEC2\_T | 70368930 | 65328892 | 7.7 | 0.2464 | 0.618065 | 25885 |
| MEC3\_N | 93890446 | 65027726 | 5.4 | 0.176781 | 0.60566 | 25904 |
| MEC3\_T | 85148402 | 73352700 | 8.2 | 0.158941 | 0.578694 | 28339 |
| MEC4\_N | 129714064 | 115355296 | 8.3 | 0.145531 | 0.513353 | 28726 |
| MEC4\_T | 84476296 | 76643140 | 9.0 | 0.104614 | 0.512367 | 27672 |
| MEC5\_N | 86144346 | 51823112 | 6.3 | 0.149332 | 0.722834 | 24531 |
| MEC5\_T | 69425734 | 42823444 | 5.9 | 0.12667 | 0.571838 | 24970 |
| MEC6\_N | 60576194 | 50229652 | 2.5 | 0.107166 | 0.595981 | 30124 |
| MEC6\_T | 81247980 | 71968014 | 9.2 | 0.186638 | 0.632847 | 27633 |
| MEC7\_N | 61842172 | 52800060 | 5.8 | 0.214168 | 0.618496 | 30333 |
| MEC7\_T | 90149998 | 81077956 | 6.0 | 0.149393 | 0.572482 | 28824 |
| MEC8\_N | 66603020 | 57787548 | 2.5 | 0.168291 | 0.590515 | 27575 |
| MEC8\_T | 72193060 | 65473404 | 7.0 | 0.227249 | 0.629371 | 26622 |
| MEC9\_N | 171304208 | 121518956 | 2.5 | 0.214819 | 0.617456 | 28009 |
| MEC9\_T | 76847484 | 40971652 | 7.7 | 0.143612 | 0.503426 | 23626 |
| MEC10\_N | 109112316 | 71213944 | 2.5 | 0.0476001 | 0.314495 | 28598 |
| MEC10\_T | 91468864 | 81109406 | 7.5 | 0.148501 | 0.582861 | 27082 |
| MEC11\_N | 91475036 | 91475036 | 6.8 | 0.132964 | 0.601832 | 26590 |
| MEC11\_T | 77220076 | 66817820 | 8.9 | 0.188926 | 0.57368 | 26675 |
| MEC12\_N | 134357894 | 97442248 | 2.4 | 0.00969269 | 0.13106 | 33713 |
| MEC12\_T | 71573838 | 61814078 | 4.9 | 0.207943 | 0.543266 | 27493 |
| MEC13\_N | 150523846 | 94539322 | 2.6 | 0.00536259 | 0.34841 | 21723 |
| MEC13\_T | 82241400 | 62932702 | 9.0 | 0.183296 | 0.457735 | 26926 |
| MEC14\_N | 64046220 | 47178934 | 2.6 | 0.436715 | 0.614114 | 25802 |
| MEC14\_T | 86793528 | 74891748 | 9.3 | 0.266561 | 0.638979 | 27173 |
| MEC15\_N | 94277864 | 79909122 | 7.4 | 0.133253 | 0.598145 | 28912 |
| MEC15\_T | 60492936 | 49085524 | 5.6 | 0.263198 | 0.549436 | 26936 |
| MEC16\_N | 96015604 | 84813932 | 3.8 | 0.24649 | 0.605463 | 30541 |
| MEC16\_T | 122910376 | 110311960 | 8.4 | 0.146004 | 0.5635 | 29083 |
| MEC17\_N | 93551602 | 82702720 | 7.2 | 0.170445 | 0.543759 | 30124 |
| MEC17\_T | 77288306 | 67933262 | 6.4 | 0.0643059 | 0.516074 | 27387 |
| MEC18\_N | 109924958 | 79311508 | 6.6 | 0.111512 | 0.587083 | 26965 |
| MEC18\_T | 94560848 | 35625144 | 2.3 | 0.152505 | 0.335837 | 26748 |
| MEC19\_N | 173978680 | 138516246 | 6.3 | 0.0760267 | 0.340115 | 34533 |
| MEC19\_T | 96660226 | 86398152 | 9.1 | 0.142174 | 0.545691 | 28549 |
| MEC20\_N | 212789018 | 175851310 | 8.4 | 0.148605 | 0.466552 | 29498 |
| MEC20\_T | 88766646 | 77844436 | 8.9 | 0.127953 | 0.583632 | 26971 |