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| **Immune cell abbreviation** | **Gene set signature of immune cell** |
| CD4\_naive | CD2/CD3G/CD4/CD40LG/GIMAP6/GLG1/HMOX2/IL7R/ITK/LIMD2/  LY9/NAA16/OBSCN/PACS1/PLCL1/RPL14/SEPT9/SNPH/TPP2/TRAF1/ZBTB40 |
| CD8\_naive | BLNK/CA14/CALY/CCDC87/CCR7/CD8A/CD8B/CRTAM/FXYD7/GJB4/  GPR15/HTR1B/KERA/KRT1/LIN28A/MAN1C1/MOGAT2/NKTR/PSG11/  RRH/SLC17A4/SMCP/SMR3B/TNKS2/TREM1/ZNF208 |
| Cytotoxic | BLNK/CD8A/CD8B/GNLY/GZMA/GZMH/ITGAM/KLRK1/KNG1/PRF1/  PSORS1C2/PTGDR2/SCN3A/TNFRSF10C |
| Exhausted | ADGRG1/AFAP1L2/CCND2/CD38/CD8A/CD8B/CHST12/CTLA4/DFNB31/  EOMES/FUT8/ITM2A/LAG3/MYO1E/NDFIP2/PARK7/PDCD1/SIRPG/SNX9 |
| Tr1 | CCR4/CD28/CD4/LAX1/TNFRSF4 |
| nTreg | CD4/CD5/CTLA4/DUSP4/FOXP3/IL10RA/IL2RA/SIT1/STAT5A/TNFRSF9 |
| iTreg | ATG2B/CCR3/CCR4/CCR8/CD28/CD5/CTLA4/FASLG/FOXP3/GALNT8/  HS3ST3B1/ICOS/IL10RA/NFATC3/PPM1B/SIT1/STAT5A/TTN/ZFYVE9 |
| Th1 | APBB2/CCL4/CTLA4/EIF2B2/GGT1/IFNG/IL2/LTA/MNAT1/SLAMF1/  STAT1/SYNGR3/TACO1 |
| Th2 | GATA3/GSTA4/GZMK/IL4/SLC25A44 |
| Th17 | CD4/IL17RA/IL1R1/IL21/RORC |

**Table S1.** The Table depicts the gene set signature of each immune cell used in ImmuCellAI analysis.