

## Supplementary Tables

### **Pan-cancer immunogenomic analyses reveal genotype-immunophenotype relationships and predictors of response to checkpoint blockade**

Pornpimol Charoentong<sup>†</sup>, Francesca Finotello<sup>†</sup>, Mihaela Angelova<sup>†</sup>, Clemens Mayer, Mirjana Efremova, Dietmar Rieder, Hubert Hackl, Zlatko Trajanoski\*

<sup>1</sup>Biocenter, Division of Bioinformatics, Medical University of Innsbruck, Innsbruck, Austria

<sup>†</sup>Equal contribution

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1. Table S1. Genomic and clinical data for 19 solid cancers
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Table 1 Genomic and clinical data for 19 solid tumors

| <b>Data</b>                   | <b>Source</b>   | <b>patients</b> |
|-------------------------------|---|-----------------|
| clinical information          | <a href="http://firebrowse.org/">http://firebrowse.org/</a>   | 9151            |
| somatic mutations (MAF files) | <a href="https://docs.google.com/spreadsheets/d/18SS7g6P8QCRL-2uDKS0uvVt_2O9YbtfMcy_ep_SWCus/edit">https://docs.google.com/spreadsheets/d/18SS7g6P8QCRL-2uDKS0uvVt_2O9YbtfMcy_ep_SWCus/edit</a> | 6472            |
| Exome-seq (BAM files)         | <a href="https://cghub.ucsc.edu">https://cghub.ucsc.edu</a>   | 6472            |
| SNP arrays                    | <a href="https://tcga-data.nci.nih.gov/tcga/">https://tcga-data.nci.nih.gov/tcga/</a>   | 3540            |
| Gene expression microarrays   | <a href="https://tcga-data.nci.nih.gov/tcga/">https://tcga-data.nci.nih.gov/tcga/</a>   | 550             |
| RNA-seq expression            | <a href="http://firebrowse.org/">http://firebrowse.org/</a>   | 8243            |

Table 2 The list of cancer germline antigens (CGA) was obtained from the Cancer-Testis database<sup>36</sup>.

| <b>Gene</b> | <b>Catagory</b>   |
|-------------|-------------------|
| ACRBP       | Germline Antigens |
| ACTL8       | Germline Antigens |
| ADAM2       | Germline Antigens |
| ADAM29      | Germline Antigens |
| AKAP3       | Germline Antigens |
| AKAP4       | Germline Antigens |
| ANKRD45     | Germline Antigens |
| ARMC3       | Germline Antigens |
| ARX         | Germline Antigens |
| ATAD2       | Germline Antigens |
| BAGE        | Germline Antigens |
| BAGE2       | Germline Antigens |
| BRDT        | Germline Antigens |
| C15orf60    | Germline Antigens |
| C21orf99    | Germline Antigens |
| CABYR       | Germline Antigens |
| CAGE1       | Germline Antigens |
| CALR3       | Germline Antigens |
| CASC5       | Germline Antigens |
| CCDC110     | Germline Antigens |
| CCDC33      | Germline Antigens |
| CCDC36      | Germline Antigens |
| CCDC62      | Germline Antigens |
| CCDC83      | Germline Antigens |
| CCNA1       | Germline Antigens |
| CEP290      | Germline Antigens |
| CEP55       | Germline Antigens |
| COX6B2      | Germline Antigens |
| CPXCR1      | Germline Antigens |
| CRISP2      | Germline Antigens |
| CSAG1       | Germline Antigens |
| CSAG2       | Germline Antigens |
| CT45A1      | Germline Antigens |
| CT45A2      | Germline Antigens |
| CT45A3      | Germline Antigens |
| CT45A4      | Germline Antigens |
| CT45A5      | Germline Antigens |
| CT45A6      | Germline Antigens |
| CT47A1      | Germline Antigens |
| CT47A10     | Germline Antigens |
| CT47A11     | Germline Antigens |
| CT47A2      | Germline Antigens |
| CT47A6      | Germline Antigens |

|          |                   |
|----------|-------------------|
| CT47A7   | Germline Antigens |
| CT47A9   | Germline Antigens |
| CT47B1   | Germline Antigens |
| CTAG1B   | Germline Antigens |
| CTAG2    | Germline Antigens |
| CTAGE1   | Germline Antigens |
| CTAGE5   | Germline Antigens |
| CTCFL    | Germline Antigens |
| CTNNA2   | Germline Antigens |
| CXorf48  | Germline Antigens |
| DCAF12   | Germline Antigens |
| DDX43    | Germline Antigens |
| DDX53    | Germline Antigens |
| DKKL1    | Germline Antigens |
| DMRT1    | Germline Antigens |
| DNAJB8   | Germline Antigens |
| DPPA2    | Germline Antigens |
| DSCR8    | Germline Antigens |
| ELOVL4   | Germline Antigens |
| FAM133A  | Germline Antigens |
| FAM46D   | Germline Antigens |
| FATE1    | Germline Antigens |
| FBXO39   | Germline Antigens |
| FMR1NB   | Germline Antigens |
| FTHL17   | Germline Antigens |
| GAGE1    | Germline Antigens |
| GAGE12D  | Germline Antigens |
| GAGE12F  | Germline Antigens |
| GAGE12J  | Germline Antigens |
| GAGE13   | Germline Antigens |
| GAGE2A   | Germline Antigens |
| GAGE4    | Germline Antigens |
| GAGE8    | Germline Antigens |
| GPAT2    | Germline Antigens |
| GPATCH2  | Germline Antigens |
| HEMGN    | Germline Antigens |
| HORMAD1  | Germline Antigens |
| HORMAD2  | Germline Antigens |
| HSPB9    | Germline Antigens |
| IGF2BP3  | Germline Antigens |
| IGSF11   | Germline Antigens |
| KDM5B    | Germline Antigens |
| KIAA0100 | Germline Antigens |
| LDHC     | Germline Antigens |
| LEMD1    | Germline Antigens |
| LIPI     | Germline Antigens |
| LUZP4    | Germline Antigens |

|         |                   |
|---------|-------------------|
| LY6K    | Germline Antigens |
| MAEL    | Germline Antigens |
| MAGEA1  | Germline Antigens |
| MAGEA10 | Germline Antigens |
| MAGEA11 | Germline Antigens |
| MAGEA12 | Germline Antigens |
| MAGEA2  | Germline Antigens |
| MAGEA3  | Germline Antigens |
| MAGEA4  | Germline Antigens |
| MAGEA5  | Germline Antigens |
| MAGEA6  | Germline Antigens |
| MAGEA8  | Germline Antigens |
| MAGEA9B | Germline Antigens |
| MAGEB1  | Germline Antigens |
| MAGEB2  | Germline Antigens |
| MAGEB3  | Germline Antigens |
| MAGEB4  | Germline Antigens |
| MAGEB6  | Germline Antigens |
| MAGEC1  | Germline Antigens |
| MAGEC2  | Germline Antigens |
| MAGEC3  | Germline Antigens |
| MORC1   | Germline Antigens |
| MPP1    | Germline Antigens |
| NLRP4   | Germline Antigens |
| NOL4    | Germline Antigens |
| NR6A1   | Germline Antigens |
| NUF2    | Germline Antigens |
| NXF2    | Germline Antigens |
| NXF2B   | Germline Antigens |
| ODF1    | Germline Antigens |
| ODF2    | Germline Antigens |
| ODF3    | Germline Antigens |
| ODF4    | Germline Antigens |
| OIP5    | Germline Antigens |
| OTOA    | Germline Antigens |
| PAGE1   | Germline Antigens |
| PAGE2   | Germline Antigens |
| PAGE2B  | Germline Antigens |
| PAGE3   | Germline Antigens |
| PAGE4   | Germline Antigens |
| PAGE5   | Germline Antigens |
| PASD1   | Germline Antigens |
| PBK     | Germline Antigens |
| PIWIL1  | Germline Antigens |
| PIWIL2  | Germline Antigens |
| PLAC1   | Germline Antigens |
| POTEA   | Germline Antigens |

|         |                   |
|---------|-------------------|
| POTEB   | Germline Antigens |
| POTEC   | Germline Antigens |
| POTED   | Germline Antigens |
| POTEE   | Germline Antigens |
| POTEG   | Germline Antigens |
| POTEH   | Germline Antigens |
| PRAME   | Germline Antigens |
| PRM1    | Germline Antigens |
| PRM2    | Germline Antigens |
| PRSS54  | Germline Antigens |
| PRSS55  | Germline Antigens |
| PTPN20A | Germline Antigens |
| RBM46   | Germline Antigens |
| RGS22   | Germline Antigens |
| RNF17   | Germline Antigens |
| ROPN1   | Germline Antigens |
| RQCD1   | Germline Antigens |
| SAGE1   | Germline Antigens |
| SEMG1   | Germline Antigens |
| SLCO6A1 | Germline Antigens |
| SPA17   | Germline Antigens |
| SPACA3  | Germline Antigens |
| SPAG1   | Germline Antigens |
| SPAG17  | Germline Antigens |
| SPAG4   | Germline Antigens |
| SPAG6   | Germline Antigens |
| SPAG8   | Germline Antigens |
| SPAG9   | Germline Antigens |
| SPANXA2 | Germline Antigens |
| SPANXB2 | Germline Antigens |
| SPANXC  | Germline Antigens |
| SPANXE  | Germline Antigens |
| SPANXN1 | Germline Antigens |
| SPANXN2 | Germline Antigens |
| SPANXN3 | Germline Antigens |
| SPANXN4 | Germline Antigens |
| SPANXN5 | Germline Antigens |
| SPATA19 | Germline Antigens |
| SPEF2   | Germline Antigens |
| SPINLW1 | Germline Antigens |
| SPO11   | Germline Antigens |
| SSX1    | Germline Antigens |
| SSX2    | Germline Antigens |
| SSX3    | Germline Antigens |
| SSX4    | Germline Antigens |
| SSX5    | Germline Antigens |
| SSX6    | Germline Antigens |

|          |                   |
|----------|-------------------|
| SSX7     | Germline Antigens |
| SYCE1    | Germline Antigens |
| SYCP1    | Germline Antigens |
| TAF7L    | Germline Antigens |
| TDRD1    | Germline Antigens |
| TDRD6    | Germline Antigens |
| TEKT5    | Germline Antigens |
| TEX101   | Germline Antigens |
| TEX14    | Germline Antigens |
| TEX15    | Germline Antigens |
| TFDP3    | Germline Antigens |
| THEG     | Germline Antigens |
| TMEFF1   | Germline Antigens |
| TMEFF2   | Germline Antigens |
| TMEM108  | Germline Antigens |
| TMPRSS12 | Germline Antigens |
| TPPP2    | Germline Antigens |
| TPTE     | Germline Antigens |
| TSGA10   | Germline Antigens |
| TSPY2    | Germline Antigens |
| TSPY3    | Germline Antigens |
| TSSK6    | Germline Antigens |
| TTK      | Germline Antigens |
| TULP2    | Germline Antigens |
| VENTXP1  | Germline Antigens |
| XAGE1D   | Germline Antigens |
| XAGE2    | Germline Antigens |
| XAGE3    | Germline Antigens |
| XAGE5    | Germline Antigens |
| ZNF165   | Germline Antigens |
| ZNF645   | Germline Antigens |

Table 3 Fractions of clonal/subclonal neoantigens and neoantigens arising from driver/passenger genes.

| <b>Cancer type</b> | <b>Driver</b> | <b>Passenger</b> | <b>Clonal</b> | <b>Subclonal</b> |
|--------------------|---------------|------------------|---------------|------------------|
| BLCA               | 8.64          | 91.36            | 66.54         | 33.46            |
| BRCA               | 8.4           | 91.6             | 62.75         | 37.25            |
| CESC               | 7.96          | 92.04            | 49.96         | 50.04            |
| CRC                | 6.97          | 93.03            | 68.23         | 31.77            |
| GBM                | 10.6          | 89.4             | 44.88         | 55.12            |
| HNSC               | 8.64          | 91.36            | 58.57         | 41.43            |
| KICH               | 8.9           | 91.1             | 30.75         | 69.25            |
| KIRC               | 8.42          | 91.58            | 48.46         | 51.54            |
| KIRP               | 6.32          | 93.68            | 48.83         | 51.17            |
| LIHC               | 8.14          | 91.86            | 55.7          | 44.3             |
| LUAD               | 7.27          | 92.73            | 70.73         | 29.27            |
| LUSC               | 7             | 93               | 65.01         | 34.99            |
| OV                 | 9.27          | 90.73            | NA            | NA               |
| PAAD               | 7.56          | 92.44            | 52.08         | 47.92            |
| PRAD               | 8.13          | 91.87            | 56.5          | 43.5             |
| SKCM               | 6.83          | 93.17            | 60.86         | 39.14            |
| STAD               | 6.7           | 93.3             | NA            | NA               |
| THCA               | 9.88          | 90.12            | 43.18         | 56.82            |
| UCEC               | 7.34          | 92.66            | 60.59         | 39.41            |



Table 4 List of parameters which are used in the random forest classification approach

| <b>Name</b>          | <b>Category</b>         |
|----------------------|-------------------------|
| Mutation load        | Somatic mutation        |
| Neoantigen           | Somatic mutation        |
| Neoantigen frequency | Somatic mutation        |
| B2M                  | MHC-classical, class-I  |
| TAP1                 | MHC-classical, class-I  |
| TAP2                 | MHC-classical, class-I  |
| TAPBP                | MHC-classical, class-I  |
| HLA-A                | MHC-classical, class-I  |
| HLA-B                | MHC-classical, class-I  |
| HLA-C                | MHC-classical, class-I  |
| HLA-DPA1             | MHC-classical, class-II |
| HLA-DPB1             | MHC-classical, class-II |
| HLA-DQA1             | MHC-classical, class-II |
| HLA-DQA2             | MHC-classical, class-II |
| HLA-DQB1             | MHC-classical, class-II |
| HLA-DRA              | MHC-classical, class-II |
| HLA-DRB1             | MHC-classical, class-II |
| HLA-E                | MHC-non-class, class-I  |
| HLA-F                | MHC-non-class, class-I  |
| HLA-G                | MHC-non-class, class-I  |
| HLA-DMA              | MHC-non-class, class-II |
| HLA-DMB              | MHC-non-class, class-II |
| HLA-DOA              | MHC-non-class, class-II |
| HLA-DOB              | MHC-non-class, class-II |
| CTLA4                | Immunoinhibitor         |
| PDCD1                | Immunoinhibitor         |
| LAG3                 | Immunoinhibitor         |
| BTLA                 | Immunoinhibitor         |
| CD160                | Immunoinhibitor         |
| IDO1                 | Immunoinhibitor         |
| IL10                 | Immunoinhibitor         |
| IL10RB               | Immunoinhibitor         |
| TGFB1                | Immunoinhibitor         |
| TGFBR1               | Immunoinhibitor         |
| VTCN1                | Immunoinhibitor         |
| CD244                | Immunoinhibitor         |
| LGALS9               | Immunoinhibitor         |
| HAVCR2               | Immunoinhibitor         |
| ADORA2A              | Immunoinhibitor         |
| TIGIT                | Immunoinhibitor         |
| CSF1R                | Immunoinhibitor         |
| KIR2DL1              | Immunoinhibitor         |
| KIR2DL2              | Immunoinhibitor         |
| KIR2DL3              | Immunoinhibitor         |

|           |                  |
|-----------|------------------|
| KDR       | Immunoinhibitor  |
| CD96      | Immunoinhibitor  |
| PVRL2     | Immunoinhibitor  |
| MICA      | Immunostimulator |
| MICB      | Immunostimulator |
| CD27      | Immunostimulator |
| CD274     | Immunostimulator |
| CD28      | Immunostimulator |
| CD40      | Immunostimulator |
| CD40LG    | Immunostimulator |
| CD70      | Immunostimulator |
| CD80      | Immunostimulator |
| CD86      | Immunostimulator |
| ICOS      | Immunostimulator |
| ICOSLG    | Immunostimulator |
| IL6       | Immunostimulator |
| IL6R      | Immunostimulator |
| PDCD1LG2  | Immunostimulator |
| TMEM173   | Immunostimulator |
| TNFRSF13B | Immunostimulator |
| TNFRSF13C | Immunostimulator |
| TNFRSF14  | Immunostimulator |
| TNFRSF17  | Immunostimulator |
| TNFRSF18  | Immunostimulator |
| TNFRSF4   | Immunostimulator |
| TNFRSF9   | Immunostimulator |
| TNFSF13   | Immunostimulator |
| TNFSF13B  | Immunostimulator |
| TNFSF18   | Immunostimulator |
| TNFSF4    | Immunostimulator |
| TNFSF9    | Immunostimulator |
| TNFSF15   | Immunostimulator |
| TNFRSF25  | Immunostimulator |
| HHLA2     | Immunostimulator |
| TMIGD2    | Immunostimulator |
| C10orf54  | Immunostimulator |
| BTNL2     | Immunostimulator |
| CD276     | Immunostimulator |
| CD48      | Immunostimulator |
| TNFSF14   | Immunostimulator |
| TNFRSF8   | Immunostimulator |
| CD70      | Immunostimulator |
| PVR       | Immunostimulator |
| LTA       | Immunostimulator |
| MICA      | Immunostimulator |
| MICB      | Immunostimulator |
| IL2RA     | Immunostimulator |

|                                 |                   |
|---------------------------------|-------------------|
| ENTPD1                          | Immunostimulator  |
| NT5E                            | Immunostimulator  |
| CXCR4                           | Immunostimulator  |
| CXCL12                          | Immunostimulator  |
| KLRK1                           | Immunostimulator  |
| NKG2A                           | Immunostimulator  |
| RAET1E                          | Immunostimulator  |
| ULBP1                           | Immunostimulator  |
| Activated B cell                | Adaptive immunity |
| Activated CD4 T cell            | Adaptive immunity |
| Activated CD8 T cell            | Adaptive immunity |
| Central memory CD4 T cell       | Adaptive immunity |
| Central memory CD8 T cell       | Adaptive immunity |
| Effector memory CD4 T cell      | Adaptive immunity |
| Effector memory CD8 T cell      | Adaptive immunity |
| Gamma delta T cell              | Adaptive immunity |
| Immature B cell                 | Adaptive immunity |
| Memory B cell                   | Adaptive immunity |
| Regulatory T cell               | Adaptive immunity |
| T follicular helper cell        | Adaptive immunity |
| Type 1 T helper cell            | Adaptive immunity |
| Type 17 T helper cell           | Adaptive immunity |
| Type 2 T helper cell            | Adaptive immunity |
| Activated dendritic cell        | Innate immunity   |
| CD56bright natural killer cell  | Innate immunity   |
| CD56dim natural killer cell     | Innate immunity   |
| Eosinophil                      | Innate immunity   |
| Immature dendritic cell         | Innate immunity   |
| Macrophage                      | Innate immunity   |
| Mast cell                       | Innate immunity   |
| Monocyte                        | Innate immunity   |
| Myeloid-derived suppressor cell | Innate immunity   |
| Natural killer cell             | Innate immunity   |
| Natural killer T cell           | Innate immunity   |
| Neutrophil                      | Innate immunity   |
| Plasmacytoid dendritic cell     | Innate immunity   |

Table 5 List of microarray data from 37 studies for identifying immune-related genes

| Population           | Data set          | Sample ID                          | PubMed ID |
|----------------------|-------------------|------------------------------------|-----------|
| B cell activated     | GSE49910          | GSM1209557_HH1791_u133plus2_251104 | 24053356  |
| B cell activated     | GSE49910          | GSM1209554_HH1763_UI33plus2_201004 | 24053356  |
| B cell activated     | GSE49910          | GSM1209555_HH1778_u133plus2_211004 | 24053356  |
| B cell activated     | GSE49910          | GSM1209556_HH1786_U133plus2_091104 | 24053356  |
| B cell activated     | GSE28490          | GSM705301_mRNA_CD19_EXP9           | 22276136  |
| B cell activated     | GSE28490          | GSM705300_mRNA_CD19_EXP8           | 22276136  |
| B cell activated     | GSE28490          | GSM705299_mRNA_CD19_EXP7           | 22276136  |
| B cell activated     | GSE28490          | GSM705298_mRNA_CD19_EXP6           | 22276136  |
| B cell activated     | GSE28490          | GSM705297_mRNA_CD19_EXP11          | 22276136  |
| B cell activated     | GSE1133           | GSM18881                           | 15075390  |
| B cell activated     | GSE1133           | GSM18882                           | 15075390  |
| B cell memory        | Chtanova data set | GSM565315                          | 16339519  |
| B cell memory        | GSE22886          | GSM565316                          | 15789058  |
| B cell memory        | GSE22886          | GSM565317                          | 15789058  |
| B cell memory        | GSE22886          | GSM565318                          | 15789058  |
| B cell memory        | GSE22886          | GSM565319                          | 15789058  |
| B cell memory        | GSE22886          | GSM565320                          | 15789058  |
| B cell memory        | GSE22886          | GSM565321                          | 15789058  |
| B cell memory        | GSE22886          | GSM565322                          | 15789058  |
| B cell memory        | GSE13411          | GSM338403                          | 19124732  |
| B cell memory        | GSE13411          | GSM338404                          | 19124732  |
| B cell memory        | GSE13411          | GSM338405                          | 19124732  |
| B cell memory        | GSE13411          | GSM338406                          | 19124732  |
| B cell naïve         | Chtanova data set | A_TS_RN_CD19+_U133A_130104         | 16339519  |
| B cell naïve         | Chtanova data set | A_TS_2CD19+_U133A_180204           | 16339519  |
| B cell naïve         | GSE22886          | GSM565314                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565313                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565312                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565311                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565310                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565309                          | 15789058  |
| B cell naïve         | GSE22886          | GSM565308                          | 15789058  |
| B cell naïve         | GSE13411          | GSM338401                          | 19124732  |
| B cell naïve         | GSE13411          | GSM338402                          | 19124732  |
| CD4 T cell activated | GSE8835           | GSM219478                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219479                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219480                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219481                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219482                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219483                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219484                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219485                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219486                          | 15965501  |
| CD4 T cell activated | GSE8835           | GSM219487                          | 15965501  |

|                      |            |                                    |           |
|----------------------|------------|------------------------------------|-----------|
| CD4 T cell activated | GSE8835    | GSM219488                          | 15965501  |
| CD4 T cell activated | GSE8835    | GSM219489                          | 15965501  |
| CD4 T cell activated | GSE6740    | GSM155228                          | 175251300 |
| CD4 T cell activated | GSE6740    | GSM155230                          | 175251300 |
| CD4 T cell activated | GSE6740    | GSM155233                          | 175251300 |
| CD4 T cell activated | GSE6740    | GSM155235                          | 175251300 |
| CD4 T cell activated | GSE6740    | GSM155237                          | 175251300 |
| CD4 T cell activated | GSE49910   | GSM1209565_HH1769_UI33plus2_201004 | 24053356  |
| CD4 T cell activated | GSE49910   | GSM1209567_HH1774_u133plus2_211004 | 24053356  |
| CD4 T cell activated | GSE49910   | GSM1209571_HH1792_u133plus2_251104 | 24053356  |
| CD4 T cell activated | GSE28726   | GSM711687_1_4_CD4_3_S              | 21632718  |
| CD4 T cell activated | GSE28726   | GSM710979_1_CD4_1_S                | 21632718  |
| CD4 T cell activated | GSE28726   | GSM711481_1_CD4_4_S                | 21632718  |
| CD4 T cell activated | GSE28726   | GSM711685_4_CD4_2_S                | 21632718  |
| CD4 T cell activated | GSE17354   | GSM433804                          | 19652199  |
| CD4 T cell activated | GSE17354   | GSM433806                          | 19652199  |
| CD4 T cell activated | GSE17354   | GSM433808                          | 19652199  |
| CD4 T cell activated | GSE17354   | GSM433810                          | 19652199  |
| CD4 T cell activated | GSE1133    | GSM18877                           | 15075390  |
| CD4 T cell activated | GSE1133    | GSM18878                           | 15075390  |
| CD4 T cell activated | E-MEXP-243 | 031028nr.6                         | 15746248  |
| CD4 T cell activated | E-MEXP-243 | 031028nr.1                         | 15746248  |
| CD4 T cell activated | E-MEXP-243 | 031028nr.16                        | 15746248  |
| CD4 T cell resting   | GSE28726   | GSM710977_1_CD4_1_N                | 21632718  |
| CD4 T cell resting   | GSE28726   | GSM711464_1_CD4_4_N                | 21632718  |
| CD4 T cell resting   | GSE28726   | GSM711666_1_4_CD4_2_N              | 21632718  |
| CD4 T cell resting   | GSE28726   | GSM711686_4_CD4_3_N                | 21632718  |
| CD4 T cell resting   | GSE24634   | GSM607510_don1_0                   | 21347372  |
| CD4 T cell resting   | GSE24634   | GSM607511_don2_0                   | 21347372  |
| CD4 T cell resting   | GSE24634   | GSM607512_don3_0                   | 21347372  |
| CD4 T cell resting   | GSE22886   | GSM565273                          | 15789058  |
| CD4 T cell resting   | GSE22886   | GSM565274                          | 15789058  |
| CD4 T cell resting   | GSE22886   | GSM565275                          | 15789058  |
| CD4 T cell resting   | GSE1460    | GSM24616                           | 15210650  |
| CD4 T cell resting   | GSE1460    | GSM24617                           | 15210650  |
| CD4 T cell resting   | GSE1460    | GSM24618                           | 15210650  |
| CD4 T cell resting   | GSE1460    | GSM24619                           | 15210650  |
| CD4 T cell resting   | GSE1460    | GSM24620                           | 15210650  |
| CD4 T cell resting   | E-MEXP-750 | TN_U133A_1                         | 16791882  |
| CD4 T cell resting   | E-MEXP-750 | TN_U133A_2                         | 16791882  |
| CD4 T cell resting   | E-MEXP-750 | TN_U133A_3                         | 16791882  |
| CD8 T cell activated | GSE8835    | GSM219510                          | 15965501  |
| CD8 T cell activated | GSE8835    | GSM219511                          | 15965501  |
| CD8 T cell activated | GSE8835    | GSM219512                          | 15965501  |
| CD8 T cell activated | GSE8835    | GSM219513                          | 15965501  |
| CD8 T cell activated | GSE8835    | GSM219514                          | 15965501  |
| CD8 T cell activated | GSE8835    | GSM219515                          | 15965501  |

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|---------------------------|-------------------|------------------------------------|-----------|
| CD8 T cell activated      | GSE8835           | GSM219516                          | 15965501  |
| CD8 T cell activated      | GSE8835           | GSM219517                          | 15965501  |
| CD8 T cell activated      | GSE8835           | GSM219518                          | 15965501  |
| CD8 T cell activated      | GSE8835           | GSM219519                          | 15965501  |
| CD8 T cell activated      | GSE8835           | GSM219520                          | 15965501  |
| CD8 T cell activated      | GSE8835           | GSM219521                          | 15965501  |
| CD8 T cell activated      | GSE6740           | GSM155229                          | 175251300 |
| CD8 T cell activated      | GSE6740           | GSM155232                          | 175251300 |
| CD8 T cell activated      | GSE6740           | GSM155234                          | 175251300 |
| CD8 T cell activated      | GSE6740           | GSM155236                          | 175251300 |
| CD8 T cell activated      | GSE6740           | GSM155238                          | 175251300 |
| CD8 T cell activated      | GSE49910          | GSM1209564_HH1765_U133plus2_201004 | 24053356  |
| CD8 T cell activated      | GSE49910          | GSM1209566_HH1770_U133plus2_041104 | 24053356  |
| CD8 T cell activated      | GSE49910          | GSM1209568_HH1775_u133plus2_211004 | 24053356  |
| CD8 T cell activated      | GSE49910          | GSM1209569_HH1780_u133plus2_211004 | 24053356  |
| CD8 T cell activated      | GSE49910          | GSM1209570_HH1788_U133plus2_091104 | 24053356  |
| CD8 T cell activated      | GSE49910          | GSM1209572_HH1793_u133plus2_251104 | 24053356  |
| CD8 T cell activated      | GSE17354          | GSM433805                          | 19652199  |
| CD8 T cell activated      | GSE17354          | GSM433807                          | 19652199  |
| CD8 T cell activated      | GSE17354          | GSM433809                          | 19652199  |
| CD8 T cell activated      | GSE17354          | GSM433811                          | 19652199  |
| CD8 T cell activated      | GSE1133           | GSM18879                           | 15075390  |
| CD8 T cell activated      | GSE1133           | GSM18880                           | 15075390  |
| CD8 T cell resting        | GSE49910          | GSM1209581_TW1676_u133plus2_061004 | 24053356  |
| CD8 T cell resting        | GSE49910          | GSM1209582_TW1680_u133plus2_061004 | 24053356  |
| CD8 T cell resting        | GSE49910          | GSM1209583_TW1684_u133plus2_061004 | 24053356  |
| CD8 T cell resting        | GSE49910          | GSM1209584_TW1688_u133plus2_061004 | 24053356  |
| CD8 T cell resting        | GSE22886          | GSM565269                          | 15789058  |
| CD8 T cell resting        | GSE22886          | GSM565270                          | 15789058  |
| CD8 T cell resting        | GSE22886          | GSM565271                          | 15789058  |
| CD8 T cell resting        | GSE22886          | GSM565272                          | 15789058  |
| Dendritic cells activated | Chtanova data set | A_LW_DC6hLPS_HC_U133A              | 16339519  |
| Dendritic cells activated | Chtanova data set | A_LW_DC6hLPS_U133A_200503          | 16339519  |
| Dendritic cells activated | Chtanova data set | A_LW_DC48hLPS_HC_U133A             | 16339519  |
| Dendritic cells activated | Chtanova data set | A_LW_DC48hLPS_U133A_200503         | 16339519  |
| Dendritic cells activated | GSE59237          | GSM1431116_DC_Control_6h_R1        | 25114264  |
| Dendritic cells activated | GSE59237          | GSM1431117_DC_Control_6h_R2        | 25114264  |
| Dendritic cells activated | GSE59237          | GSM1431118_DC_Control_6h_R3        | 25114264  |
| Dendritic cells activated | GSE59237          | GSM1431119_DC_Control_6h_R4        | 25114264  |
| Dendritic cells activated | GSE22886          | GSM565372                          | 15789058  |
| Dendritic cells activated | GSE22886          | GSM565373                          | 15789058  |
| Dendritic cells activated | GSE22886          | GSM565374                          | 15789058  |
| Dendritic cells activated | GSE22886          | GSM565375                          | 15789058  |
| Dendritic cells activated | GSE22886          | GSM565376                          | 15789058  |
| Dendritic cells activated | GSE22886          | GSM565377                          | 15789058  |
| Dendritic cells activated | GSE11943          | GSM301727                          | 23497451  |
| Dendritic cells activated | GSE11943          | GSM301728                          | 23497451  |

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|---------------------------|-------------------|-----------------------------|----------|
| Dendritic cells activated | GSE11943          | GSM301729                   | 23497451 |
| Dendritic cells activated | GSE11943          | GSM301730                   | 23497451 |
| Dendritic cells activated | GSE1133           | GSM18873                    | 15075390 |
| Dendritic cells activated | GSE1133           | GSM18874                    | 15075390 |
| Dendritic cells resting   | GSE59237          | GSM1431110_DC_Control_0h_R1 | 25114264 |
| Dendritic cells resting   | GSE59237          | GSM1431111_DC_Control_0h_R2 | 25114264 |
| Dendritic cells resting   | GSE59237          | GSM1431112_DC_Control_0h_R3 | 25114264 |
| Dendritic cells resting   | GSE59237          | GSM1431113_DC_Control_0h_R4 | 25114264 |
| Dendritic cells resting   | GSE59237          | GSM1431114_DC_Control_0h_R5 | 25114264 |
| Dendritic cells resting   | GSE59237          | GSM1431115_DC_Control_0h_R6 | 25114264 |
| Dendritic cells resting   | GSE22886          | GSM565366                   | 15789058 |
| Dendritic cells resting   | GSE22886          | GSM565367                   | 15789058 |
| Dendritic cells resting   | GSE22886          | GSM565368                   | 15789058 |
| Dendritic cells resting   | GSE22886          | GSM565369                   | 15789058 |
| Dendritic cells resting   | GSE22886          | GSM565370                   | 15789058 |
| Dendritic cells resting   | GSE22886          | GSM565371                   | 15789058 |
| Eosinophils               | Chtanova data set | A_MF_2hrEosinophils_U133A   | 16339519 |
| Eosinophils               | Chtanova data set | A_MF_ControlEosinophil      | 16339519 |
| Eosinophils               | GSE28698          | GSM710733_Rep1-TP-cntrl     | 22271894 |
| Eosinophils               | GSE28698          | GSM710735_Rep2-TP-cntrl     | 22271894 |
| Eosinophils               | GSE28698          | GSM710737_Rep3-TP-cntrl     | 22271894 |
| Immature dendritic cells  | Chtanova data set | A_LW_imDC_U133A_200503      | 16339519 |
| Immature dendritic cells  | Chtanova data set | A_SZ_imDC2_U133A_250603     | 16339519 |
| Immature dendritic cells  | GSE6863           | GSM158184                   | 18314479 |
| Immature dendritic cells  | GSE6863           | GSM158186                   | 18314479 |
| Immature dendritic cells  | GSE6863           | GSM158187                   | 18314479 |
| Immature dendritic cells  | GSE23371          | GSM573357                   | 21708028 |
| Immature dendritic cells  | GSE23371          | GSM573358                   | 21708028 |
| Immature dendritic cells  | GSE23371          | GSM573359                   | 21708028 |
| Macrophages M1            | GSE35495          | GSM115055_M1_D1_chipA       | 23293084 |
| Macrophages M1            | GSE35495          | GSM115056_M1_D2_chipA       | 23293084 |
| Macrophages M1            | GSE35495          | GSM115057_M1_D3_chipA       | 23293084 |
| Macrophages M2            | GSE35495          | GSM115058_M2_D1_chipA       | 23293084 |
| Macrophages M2            | GSE35495          | GSM115059_M2_D2_chipA       | 23293084 |
| Macrophages M2            | GSE35495          | GSM115060_M2_D3_chipA       | 23293084 |
| Mast cells activated      | Chtanova data set | A_LW_mastcellIgE_U133A      | 16339519 |
| Mast cells activated      | Chtanova data set | A_MF_IgEMASTCELL_U133A      | 16339519 |
| Mast cells activated      | GSE25320          | GSM622849                   | 24009880 |
| Mast cells activated      | GSE25320          | GSM622850                   | 24009880 |
| Mast cells activated      | GSE25320          | GSM622851                   | 24009880 |
| Mast cells activated      | GSE25320          | GSM622852                   | 24009880 |
| Mast cells resting        | Chtanova data set | A_LW_mastcellctrl_U133A     | 16339519 |
| Mast cells resting        | Chtanova data set | A_MF_ControlMASTCELL_U133A  | 16339519 |
| MDSC                      | GSE52376          |                             | 25113564 |
| Monocytes                 | GSE5580           | GSM129730                   | 17032758 |
| Monocytes                 | GSE5580           | GSM129733                   | 17032758 |
| Monocytes                 | GSE5580           | GSM129736                   | 17032758 |

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|-------------------------|-------------------|------------------------------------|----------|
| Monocytes               | GSE5580           | GSM129739                          | 17032758 |
| Monocytes               | GSE5580           | GSM129742                          | 17032758 |
| Monocytes               | GSE5580           | GSM129745                          | 17032758 |
| Monocytes               | GSE5580           | GSM129748                          | 17032758 |
| Monocytes               | GSE49910          | GSM1209585_HH1762_UI33plus2_201004 | 24053356 |
| Monocytes               | GSE49910          | GSM1209586_HH1767_UI33plus2_201004 | 24053356 |
| Monocytes               | GSE49910          | GSM1209587_HH1772_u133plus2_211004 | 24053356 |
| Monocytes               | GSE49910          | GSM1209588_HH1777_U133plus2_041104 | 24053356 |
| Monocytes               | GSE49910          | GSM1209589_HH1785_U133plus2_011204 | 24053356 |
| Monocytes               | GSE49910          | GSM1209590_HH1790_U133plus2_091104 | 24053356 |
| Monocytes               | GSE35495          | GSM115046_M0_D1_chipA              | 23293084 |
| Monocytes               | GSE35495          | GSM115047_M0_D2_chipA              | 23293084 |
| Monocytes               | GSE35495          | GSM115048_M0_D3_chipA              | 23293084 |
| Monocytes               | GSE22886          | GSM565330                          | 15789058 |
| Monocytes               | GSE22886          | GSM565331                          | 15789058 |
| Monocytes               | GSE22886          | GSM565332                          | 15789058 |
| Monocytes               | GSE22886          | GSM565333                          | 15789058 |
| Monocytes               | GSE22886          | GSM565334                          | 15789058 |
| Monocytes               | GSE22886          | GSM565335                          | 15789058 |
| Monocytes               | GSE22886          | GSM565336                          | 15789058 |
| Monocytes               | GSE22886          | GSM565337                          | 15789058 |
| Monocytes               | GSE22886          | GSM565338                          | 15789058 |
| Monocytes               | GSE22886          | GSM565339                          | 15789058 |
| Monocytes               | GSE22886          | GSM565340                          | 15789058 |
| Monocytes               | GSE22886          | GSM565341                          | 15789058 |
| Myeloid dendritic cells | GSE42058          | GSM1031685_204_PBMC_CD11c_U133_2.0 | --       |
| Myeloid dendritic cells | GSE42058          | GSM1031686_213_PBMC_CD11c_U133_2.0 | --       |
| Myeloid dendritic cells | GSE42058          | GSM1031687_214_PBMC_CD11c_U133_2.0 | --       |
| Myeloid dendritic cells | GSE42058          | GSM1031688_215_PBMC_CD11c_U133_2.0 | --       |
| Neutrophils             | Chtanova data set | A_LW_neutrophil_U133A              | 16339519 |
| Neutrophils             | Chtanova data set | A_MF_neutrophils_U133A             | 16339519 |
| Neutrophils             | Chtanova data set | A_TS_MSNeutroLPS_U133A             | 16339519 |
| Neutrophils             | GSE49910          | GSM1209558_HH1713_u133plus2_011004 | 24053356 |
| Neutrophils             | GSE49910          | GSM1209559_HH1712_u133plus2_011004 | 24053356 |
| Neutrophils             | GSE49910          | GSM1209560_HH1714_u133plus2_011004 | 24053356 |
| Neutrophils             | GSE39889          | GSM980737_C1                       | 23451220 |
| Neutrophils             | GSE39889          | GSM980741_C2                       | 23451220 |
| Neutrophils             | GSE39889          | GSM980745_C3                       | 23451220 |
| Neutrophils             | GSE39889          | GSM980749_C4                       | 23451220 |
| Neutrophils             | GSE20151          | GSM313630                          | 20663022 |
| Neutrophils             | GSE20151          | GSM313632                          | 20663022 |
| NK activated            | GSE8059           | GSM198943                          | 17623099 |
| NK activated            | GSE8059           | GSM198944                          | 17623099 |
| NK activated            | GSE8059           | GSM198945                          | 17623099 |
| NK activated            | GSE27838          | GSM687236                          | 22419581 |
| NK activated            | GSE27838          | GSM687237                          | 22419581 |
| NK activated            | GSE27838          | GSM687238                          | 22419581 |



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|---------------|----------|----------------------|----------|
| NK activated  | GSE27838 | GSM687239            | 22419581 |
| NK activated  | GSE27838 | GSM687240            | 22419581 |
| NK activated  | GSE27838 | GSM687241            | 22419581 |
| NK activated  | GSE27838 | GSM687242            | 22419581 |
| NK activated  | GSE27838 | GSM687243            | 22419581 |
| NK activated  | GSE22886 | GSM565297            | 15789058 |
| NK activated  | GSE22886 | GSM565298            | 15789058 |
| NK activated  | GSE22886 | GSM565299            | 15789058 |
| NK activated  | GSE22886 | GSM565300            | 15789058 |
| NK activated  | GSE22886 | GSM565301            | 15789058 |
| NK activated  | GSE22886 | GSM565302            | 15789058 |
| NK activated  | GSE22886 | GSM565303            | 15789058 |
| NK activated  | GSE22886 | GSM565304            | 15789058 |
| NK activated  | GSE22886 | GSM565305            | 15789058 |
| NK activated  | GSE22886 | GSM565306            | 15789058 |
| NK activated  | GSE22886 | GSM565307            | 15789058 |
| NK resting    | GSE8059  | GSM198942            | 17623099 |
| NK resting    | GSE22886 | GSM565296            | 15789058 |
| NK resting    | GSE22886 | GSM565295            | 15789058 |
| NK resting    | GSE22886 | GSM565294            | 15789058 |
| NK resting    | GSE22886 | GSM565293            | 15789058 |
| NKT activated | GSE28726 | GSM711691_4_NKT_9_S  | 21632718 |
| NKT activated | GSE28726 | GSM711608_1_NKT_1_S  | 21632718 |
| NKT activated | GSE28726 | GSM711610_1_NKT_4_S  | 21632718 |
| NKT activated | GSE28726 | GSM711612_1_NKT_14_S | 21632718 |
| NKT activated | GSE28726 | GSM711614_1_NKT_22_S | 21632718 |
| NKT activated | GSE28726 | GSM711689_4_NKT_1_S  | 21632718 |
| Plasma cell   | GSE6477  | GSM149062            | 19996089 |
| Plasma cell   | GSE6477  | GSM149063            | 19996089 |
| Plasma cell   | GSE6477  | GSM149064            | 19996089 |
| Plasma cell   | GSE6477  | GSM149065            | 19996089 |
| Plasma cell   | GSE6477  | GSM149066            | 19996089 |
| Plasma cell   | GSE6477  | GSM149067            | 19996089 |
| Plasma cell   | GSE6477  | GSM149068            | 19996089 |
| Plasma cell   | GSE6477  | GSM149069            | 19996089 |
| Plasma cell   | GSE6477  | GSM149070            | 19996089 |
| Plasma cell   | GSE6477  | GSM149071            | 19996089 |
| Plasma cell   | GSE6477  | GSM149072            | 19996089 |
| Plasma cell   | GSE6477  | GSM149073            | 19996089 |
| Plasma cell   | GSE22886 | GSM565326            | 15789058 |
| Plasma cell   | GSE22886 | GSM565327            | 15789058 |
| Plasma cell   | GSE22886 | GSM565328            | 15789058 |
| Plasma cell   | GSE22886 | GSM565329            | 15789058 |
| Plasma cell   | GSE22886 | GSM565323            | 15789058 |
| Plasma cell   | GSE22886 | GSM565324            | 15789058 |
| Plasma cell   | GSE22886 | GSM565325            | 15789058 |
| Plasma cell   | GSE13411 | GSM338407            | 19124732 |

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|------------------------------|-------------------|------------------------------------|-----------|
| Plasmacytoid dendritic cells | GSE37750          | GSM926937_HD1_Balashov1_1-22-09_2  | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926938_HD2_Balashov1_3-2-09     | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926939_HD3_Balashov3_21         | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926940_HD4_Balashov3_19         | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926941_HD5_Balashov5_1_12-07-09 | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926942_HD6_Balashov5_1_12-10-09 | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926943_HD7_Balashov5_1_12-16-09 | 22688425  |
| Plasmacytoid dendritic cells | GSE37750          | GSM926944_HD8_Balashov5_8_07-06-10 | 22688425  |
| Plasmacytoid dendritic cells | GSE11943          | GSM301723                          | 23497451  |
| Plasmacytoid dendritic cells | GSE11943          | GSM301724                          | 23497451  |
| Plasmacytoid dendritic cells | GSE11943          | GSM301725                          | 23497451  |
| Plasmacytoid dendritic cells | GSE11943          | GSM301726                          | 23497451  |
| Plasmacytoid dendritic cells | E-MEXP-2555       | DP146                              | 22534476  |
| Plasmacytoid dendritic cells | E-MEXP-2555       | DP207                              | 22534476  |
| Plasmacytoid dendritic cells | E-MEXP-2555       | DP224                              | 22534476  |
| T cell follicular helper     | Chtanova data set | A_MF_CD57+_U133A_010502            | 16339519  |
| T cell follicular helper     | Chtanova data set | A_LW_CD57+_U133A_121102            | 16339519  |
| T cell follicular helper     | Chtanova data set | A_LW_CD57+_U133A_030603            | 16339519  |
| T cell follicular helper     | E-MEXP-750        | CXCR5hiICOShi_U133A_1              | 16791882  |
| T cell follicular helper     | E-MEXP-750        | CXCR5hiICOShi_U133A_2              | 16791882  |
| T cell follicular helper     | E-MEXP-750        | CXCR5hiICOShi_U133A_3              | 16791882  |
| T cells regulatory           | GSE4527           | GSM101519                          | 16702978  |
| T cells regulatory           | GSE4527           | GSM101521                          | 16702978  |
| T cells regulatory           | GSE24634          | GSM607516_don1_3+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607517_don2_3+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607518_don3_3+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607528_don1_5+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607529_don2_5+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607530_don3_5+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607540_don1_7+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607541_don2_7+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607542_don3_7+4+25              | 21347372  |
| T cells regulatory           | GSE24634          | GSM607552_don1_10+4+25             | 21347372  |
| T cells regulatory           | GSE24634          | GSM607553_don2_10+4+25             | 21347372  |
| T cells regulatory           | GSE24634          | GSM607554_don3_10+4+25             | 21347372  |
| T cells regulatory           | GSE13017          | GSM326123                          | 194532521 |
| T cells regulatory           | GSE13017          | GSM326124                          | 194532521 |
| T gamma delta                | Chtanova data set | A_TS_RN_gdTcells_U133A             | 16339519  |
| T gamma delta                | Chtanova data set | A_TS_RN_gdTcellsREP_A              | 16339519  |
| T gamma delta                | GSE27291          | GSM674836_BC2902B_6h               | 21968650  |
| T gamma delta                | GSE27291          | GSM674837_BC2902B_J7               | 21968650  |
| T gamma delta                | GSE27291          | GSM674839_BC2901A_6h               | 21968650  |
| T gamma delta                | GSE27291          | GSM674840_BC2901A_J7               | 21968650  |
| T gamma delta                | GSE27291          | GSM674842_BC2802B_6h               | 21968650  |
| T gamma delta                | GSE27291          | GSM674843_BC2802B_J7               | 21968650  |
| T gamma delta                | GSE27291          | GSM674845_BC2401B_6h               | 21968650  |
| T gamma delta                | GSE27291          | GSM674846_BC2401B_J7               | 21968650  |

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|---------------|-------------------|---------------------------------|----------|
| T gamma delta | GSE13906          | GSM349848                       | 20132662 |
| T gamma delta | GSE13906          | GSM349849                       | 20132662 |
| T helper 1    | Chtanova data set | A_MF_TH1human_U133A_290502      | 16339519 |
| T helper 1    | Chtanova data set | A_TS_TC_Th1_U133A_141003        | 16339519 |
| T helper 1    | GSE4527           | GSM101518                       | 16702978 |
| T helper 1    | GSE2770           | GSM60732                        | 14607935 |
| T helper 1    | GSE2770           | GSM60718                        | 14607935 |
| T helper 1    | GSE2770           | GSM60704                        | 14607935 |
| T helper 1    | GSE2770           | GSM60705                        | 14607935 |
| T helper 1    | GSE2770           | GSM60711                        | 14607935 |
| T helper 1    | GSE2770           | GSM60728                        | 14607935 |
| T helper 1    | GSE22886          | GSM565276                       | 15789058 |
| T helper 1    | GSE22886          | GSM565277                       | 15789058 |
| T helper 1    | GSE22886          | GSM565278                       | 15789058 |
| T helper 1    | GSE22886          | GSM565279                       | 15789058 |
| T helper 1    | GSE22886          | GSM565280                       | 15789058 |
| T helper 17   | GSE51540          | GSM1247614_1299_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247616_1302_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247619_1305_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247620_1306_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247622_1308_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247624_1390_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247626_1392_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247628_1394_HG-U133_Plus_2_ | 24492460 |
| T helper 17   | GSE51540          | GSM1247630_1396_HG-U133_Plus_2_ | 24492460 |
| T helper 2    | Chtanova data set | A_MF_TH2human_U133A_290502      | 16339519 |
| T helper 2    | Chtanova data set | A_TS_TC_Th2_U133A_141003        | 16339519 |
| T helper 2    | GSE4527           | GSM101520                       | 16702978 |
| T helper 2    | GSE2770           | GSM60719                        | 14607935 |
| T helper 2    | GSE2770           | GSM60708                        | 14607935 |
| T helper 2    | GSE2770           | GSM60709                        | 14607935 |
| T helper 2    | GSE2770           | GSM60713                        | 14607935 |
| T helper 2    | GSE2770           | GSM60724                        | 14607935 |
| T helper 2    | GSE2770           | GSM60730                        | 14607935 |
| T helper 2    | GSE22886          | GSM565281                       | 15789058 |
| T helper 2    | GSE22886          | GSM565282                       | 15789058 |
| T helper 2    | GSE22886          | GSM565283                       | 15789058 |
| T helper 2    | GSE22886          | GSM565284                       | 15789058 |
| T helper 2    | GSE22886          | GSM565285                       | 15789058 |
| T helper 2    | GSE22886          | GSM565286                       | 15789058 |

Chtanova data set was downloaded from :

[http://linkage.garvan.unsw.edu.au/public/microarrays/Arthritis\\_Inflammation/index.html](http://linkage.garvan.unsw.edu.au/public/microarrays/Arthritis_Inflammation/index.html)

Table 6 List of Pancancer immune metagenes

| <b>Metagene</b> | <b>Cell type</b>     | <b>Immunity</b> |
|-----------------|----------------------|-----------------|
| ADAM28          | Activated B cell     | Adaptive        |
| CD180           | Activated B cell     | Adaptive        |
| CD79B           | Activated B cell     | Adaptive        |
| BLK             | Activated B cell     | Adaptive        |
| CD19            | Activated B cell     | Adaptive        |
| MS4A1           | Activated B cell     | Adaptive        |
| TNFRSF17        | Activated B cell     | Adaptive        |
| IGHM            | Activated B cell     | Adaptive        |
| GNG7            | Activated B cell     | Adaptive        |
| MICAL3          | Activated B cell     | Adaptive        |
| SPIB            | Activated B cell     | Adaptive        |
| HLA-DOB         | Activated B cell     | Adaptive        |
| IGKC            | Activated B cell     | Adaptive        |
| PNOC            | Activated B cell     | Adaptive        |
| FCRL2           | Activated B cell     | Adaptive        |
| BACH2           | Activated B cell     | Adaptive        |
| CR2             | Activated B cell     | Adaptive        |
| TCL1A           | Activated B cell     | Adaptive        |
| AKNA            | Activated B cell     | Adaptive        |
| ARHGAP25        | Activated B cell     | Adaptive        |
| CCL21           | Activated B cell     | Adaptive        |
| CD27            | Activated B cell     | Adaptive        |
| CD38            | Activated B cell     | Adaptive        |
| CLEC17A         | Activated B cell     | Adaptive        |
| CLEC9A          | Activated B cell     | Adaptive        |
| CLECL1          | Activated B cell     | Adaptive        |
| AIM2            | Activated CD4 T cell | Adaptive        |
| BIRC3           | Activated CD4 T cell | Adaptive        |
| BRIP1           | Activated CD4 T cell | Adaptive        |
| CCL20           | Activated CD4 T cell | Adaptive        |
| CCL4            | Activated CD4 T cell | Adaptive        |
| CCL5            | Activated CD4 T cell | Adaptive        |
| CCNB1           | Activated CD4 T cell | Adaptive        |
| CCR7            | Activated CD4 T cell | Adaptive        |
| DUSP2           | Activated CD4 T cell | Adaptive        |
| ESCO2           | Activated CD4 T cell | Adaptive        |
| ETS1            | Activated CD4 T cell | Adaptive        |
| EXO1            | Activated CD4 T cell | Adaptive        |
| EXOC6           | Activated CD4 T cell | Adaptive        |
| IARS            | Activated CD4 T cell | Adaptive        |
| ITK             | Activated CD4 T cell | Adaptive        |
| KIF11           | Activated CD4 T cell | Adaptive        |
| KNTC1           | Activated CD4 T cell | Adaptive        |
| NUF2            | Activated CD4 T cell | Adaptive        |

|           |                           |          |
|-----------|---------------------------|----------|
| PRC1      | Activated CD4 T cell      | Adaptive |
| PSAT1     | Activated CD4 T cell      | Adaptive |
| RGS1      | Activated CD4 T cell      | Adaptive |
| RTKN2     | Activated CD4 T cell      | Adaptive |
| SAMSN1    | Activated CD4 T cell      | Adaptive |
| SELL      | Activated CD4 T cell      | Adaptive |
| TRAT1     | Activated CD4 T cell      | Adaptive |
| ADRM1     | Activated CD8 T cell      | Adaptive |
| AHSA1     | Activated CD8 T cell      | Adaptive |
| C1GALT1C1 | Activated CD8 T cell      | Adaptive |
| CCT6B     | Activated CD8 T cell      | Adaptive |
| CD37      | Activated CD8 T cell      | Adaptive |
| CD3D      | Activated CD8 T cell      | Adaptive |
| CD3E      | Activated CD8 T cell      | Adaptive |
| CD3G      | Activated CD8 T cell      | Adaptive |
| CD69      | Activated CD8 T cell      | Adaptive |
| CD8A      | Activated CD8 T cell      | Adaptive |
| CETN3     | Activated CD8 T cell      | Adaptive |
| CSE1L     | Activated CD8 T cell      | Adaptive |
| GEMIN6    | Activated CD8 T cell      | Adaptive |
| GNLY      | Activated CD8 T cell      | Adaptive |
| GPT2      | Activated CD8 T cell      | Adaptive |
| GZMA      | Activated CD8 T cell      | Adaptive |
| GZMH      | Activated CD8 T cell      | Adaptive |
| GZMK      | Activated CD8 T cell      | Adaptive |
| IL2RB     | Activated CD8 T cell      | Adaptive |
| LCK       | Activated CD8 T cell      | Adaptive |
| MPZL1     | Activated CD8 T cell      | Adaptive |
| NKG7      | Activated CD8 T cell      | Adaptive |
| PIK3IP1   | Activated CD8 T cell      | Adaptive |
| PTRH2     | Activated CD8 T cell      | Adaptive |
| TIMM13    | Activated CD8 T cell      | Adaptive |
| ZAP70     | Activated CD8 T cell      | Adaptive |
| ABHD3     | Central memory CD4 T cell | Adaptive |
| AHNAK     | Central memory CD4 T cell | Adaptive |
| ANXA2P2   | Central memory CD4 T cell | Adaptive |
| AQP3      | Central memory CD4 T cell | Adaptive |
| ATHL1     | Central memory CD4 T cell | Adaptive |
| BMI1      | Central memory CD4 T cell | Adaptive |
| BZW2      | Central memory CD4 T cell | Adaptive |
| CD63      | Central memory CD4 T cell | Adaptive |
| COL4A1    | Central memory CD4 T cell | Adaptive |
| CYLD      | Central memory CD4 T cell | Adaptive |
| ELMO2     | Central memory CD4 T cell | Adaptive |
| FYN       | Central memory CD4 T cell | Adaptive |
| GLIPR1    | Central memory CD4 T cell | Adaptive |
| GSS       | Central memory CD4 T cell | Adaptive |

|           |                            |          |
|-----------|----------------------------|----------|
| IFITM2    | Central memory CD4 T cell  | Adaptive |
| ITGB1     | Central memory CD4 T cell  | Adaptive |
| ITGB2     | Central memory CD4 T cell  | Adaptive |
| KLF5      | Central memory CD4 T cell  | Adaptive |
| LSP1      | Central memory CD4 T cell  | Adaptive |
| NDUFB9    | Central memory CD4 T cell  | Adaptive |
| PKM2      | Central memory CD4 T cell  | Adaptive |
| SFXN3     | Central memory CD4 T cell  | Adaptive |
| SIRPG     | Central memory CD4 T cell  | Adaptive |
| SMAD4     | Central memory CD4 T cell  | Adaptive |
| STX4      | Central memory CD4 T cell  | Adaptive |
| TRADD     | Central memory CD4 T cell  | Adaptive |
| VIM       | Central memory CD4 T cell  | Adaptive |
| XRCC6     | Central memory CD4 T cell  | Adaptive |
| ACTN4     | Central memory CD8 T cell  | Adaptive |
| ADAM12    | Central memory CD8 T cell  | Adaptive |
| ADCY9     | Central memory CD8 T cell  | Adaptive |
| F13A1     | Central memory CD8 T cell  | Adaptive |
| FCER1G    | Central memory CD8 T cell  | Adaptive |
| FCGR3B    | Central memory CD8 T cell  | Adaptive |
| FGF7      | Central memory CD8 T cell  | Adaptive |
| FKBP4     | Central memory CD8 T cell  | Adaptive |
| GLUD1     | Central memory CD8 T cell  | Adaptive |
| GM2A      | Central memory CD8 T cell  | Adaptive |
| GUSB      | Central memory CD8 T cell  | Adaptive |
| IL1RN     | Central memory CD8 T cell  | Adaptive |
| NOL11     | Central memory CD8 T cell  | Adaptive |
| NTRK1     | Central memory CD8 T cell  | Adaptive |
| RARA      | Central memory CD8 T cell  | Adaptive |
| RNF128    | Central memory CD8 T cell  | Adaptive |
| SIGLEC1   | Central memory CD8 T cell  | Adaptive |
| TNFRSF11A | Central memory CD8 T cell  | Adaptive |
| TOX4      | Central memory CD8 T cell  | Adaptive |
| UBA52     | Central memory CD8 T cell  | Adaptive |
| ULBP1     | Central memory CD8 T cell  | Adaptive |
| ATM       | Effector memory CD4 T cell | Adaptive |
| CASP3     | Effector memory CD4 T cell | Adaptive |
| CASQ1     | Effector memory CD4 T cell | Adaptive |
| CD300E    | Effector memory CD4 T cell | Adaptive |
| DARS      | Effector memory CD4 T cell | Adaptive |
| DOCK9     | Effector memory CD4 T cell | Adaptive |
| EXOSC9    | Effector memory CD4 T cell | Adaptive |
| EZH2      | Effector memory CD4 T cell | Adaptive |
| GDE1      | Effector memory CD4 T cell | Adaptive |
| IL34      | Effector memory CD4 T cell | Adaptive |
| NCOA4     | Effector memory CD4 T cell | Adaptive |
| NEFL      | Effector memory CD4 T cell | Adaptive |

|          |                            |          |
|----------|----------------------------|----------|
| PDGFRL   | Effector memory CD4 T cell | Adaptive |
| PTGS1    | Effector memory CD4 T cell | Adaptive |
| REPS1    | Effector memory CD4 T cell | Adaptive |
| SCG2     | Effector memory CD4 T cell | Adaptive |
| SDPR     | Effector memory CD4 T cell | Adaptive |
| SIGLEC14 | Effector memory CD4 T cell | Adaptive |
| SIGLEC6  | Effector memory CD4 T cell | Adaptive |
| TAL1     | Effector memory CD4 T cell | Adaptive |
| TFEC     | Effector memory CD4 T cell | Adaptive |
| TIPIN    | Effector memory CD4 T cell | Adaptive |
| TPK1     | Effector memory CD4 T cell | Adaptive |
| UQCRB    | Effector memory CD4 T cell | Adaptive |
| USP9Y    | Effector memory CD4 T cell | Adaptive |
| WIPF1    | Effector memory CD4 T cell | Adaptive |
| ZCRB1    | Effector memory CD4 T cell | Adaptive |
| ACAP1    | Effector memory CD8 T cell | Adaptive |
| APOL3    | Effector memory CD8 T cell | Adaptive |
| ARHGAP10 | Effector memory CD8 T cell | Adaptive |
| ATP10D   | Effector memory CD8 T cell | Adaptive |
| C3AR1    | Effector memory CD8 T cell | Adaptive |
| CCR5     | Effector memory CD8 T cell | Adaptive |
| CD160    | Effector memory CD8 T cell | Adaptive |
| CD55     | Effector memory CD8 T cell | Adaptive |
| CFLAR    | Effector memory CD8 T cell | Adaptive |
| CMKLR1   | Effector memory CD8 T cell | Adaptive |
| DAPP1    | Effector memory CD8 T cell | Adaptive |
| FCRL6    | Effector memory CD8 T cell | Adaptive |
| FLT3LG   | Effector memory CD8 T cell | Adaptive |
| GZMM     | Effector memory CD8 T cell | Adaptive |
| HAPLN3   | Effector memory CD8 T cell | Adaptive |
| HLA-DMB  | Effector memory CD8 T cell | Adaptive |
| HLA-DPA1 | Effector memory CD8 T cell | Adaptive |
| HLA-DPB1 | Effector memory CD8 T cell | Adaptive |
| IFI16    | Effector memory CD8 T cell | Adaptive |
| LIME1    | Effector memory CD8 T cell | Adaptive |
| LTK      | Effector memory CD8 T cell | Adaptive |
| NFKBIA   | Effector memory CD8 T cell | Adaptive |
| SETD7    | Effector memory CD8 T cell | Adaptive |
| SIK1     | Effector memory CD8 T cell | Adaptive |
| TRIB2    | Effector memory CD8 T cell | Adaptive |
| ACP5     | Gamma delta T cell         | Adaptive |
| AQP9     | Gamma delta T cell         | Adaptive |
| BTN3A2   | Gamma delta T cell         | Adaptive |
| C1orf54  | Gamma delta T cell         | Adaptive |
| CARD8    | Gamma delta T cell         | Adaptive |
| CCL18    | Gamma delta T cell         | Adaptive |
| CD209    | Gamma delta T cell         | Adaptive |

|          |                    |          |
|----------|--------------------|----------|
| CD33     | Gamma delta T cell | Adaptive |
| CD36     | Gamma delta T cell | Adaptive |
| CDK5     | Gamma delta T cell | Adaptive |
| IL10RB   | Gamma delta T cell | Adaptive |
| KLRF1    | Gamma delta T cell | Adaptive |
| LGALS1   | Gamma delta T cell | Adaptive |
| MAPK7    | Gamma delta T cell | Adaptive |
| KLHL7    | Gamma delta T cell | Adaptive |
| KRT80    | Gamma delta T cell | Adaptive |
| LAMC1    | Gamma delta T cell | Adaptive |
| LCORL    | Gamma delta T cell | Adaptive |
| LMNB1    | Gamma delta T cell | Adaptive |
| MEIS3P1  | Gamma delta T cell | Adaptive |
| MPL      | Gamma delta T cell | Adaptive |
| FABP1    | Gamma delta T cell | Adaptive |
| FABP5    | Gamma delta T cell | Adaptive |
| FADD     | Gamma delta T cell | Adaptive |
| MFAP3L   | Gamma delta T cell | Adaptive |
| MINPP1   | Gamma delta T cell | Adaptive |
| RPS24    | Gamma delta T cell | Adaptive |
| RPS7     | Gamma delta T cell | Adaptive |
| RPS9     | Gamma delta T cell | Adaptive |
| ABP1     | Gamma delta T cell | Adaptive |
| CCL13    | Gamma delta T cell | Adaptive |
| CD22     | Immature B cell    | Adaptive |
| CYBB     | Immature B cell    | Adaptive |
| FAM129C  | Immature B cell    | Adaptive |
| FCRL1    | Immature B cell    | Adaptive |
| FCRL3    | Immature B cell    | Adaptive |
| FCRL5    | Immature B cell    | Adaptive |
| FCRLA    | Immature B cell    | Adaptive |
| HDAC9    | Immature B cell    | Adaptive |
| HLA-DQA1 | Immature B cell    | Adaptive |
| HVCN1    | Immature B cell    | Adaptive |
| KIAA0226 | Immature B cell    | Adaptive |
| NCF1     | Immature B cell    | Adaptive |
| NCF1B    | Immature B cell    | Adaptive |
| P2RY10   | Immature B cell    | Adaptive |
| SP100    | Immature B cell    | Adaptive |
| TXNIP    | Immature B cell    | Adaptive |
| STAP1    | Immature B cell    | Adaptive |
| TAGAP    | Immature B cell    | Adaptive |
| ZCCHC2   | Immature B cell    | Adaptive |
| AICDA    | Memory B cell      | Adaptive |
| CCNA2    | Memory B cell      | Adaptive |
| CDKN3    | Memory B cell      | Adaptive |
| CLCN5    | Memory B cell      | Adaptive |



|         |                          |          |
|---------|--------------------------|----------|
| ENPP1   | Memory B cell            | Adaptive |
| FCER1A  | Memory B cell            | Adaptive |
| FCRL4   | Memory B cell            | Adaptive |
| MYC     | Memory B cell            | Adaptive |
| RUNX2   | Memory B cell            | Adaptive |
| SORL1   | Memory B cell            | Adaptive |
| SOX5    | Memory B cell            | Adaptive |
| STAT5A  | Memory B cell            | Adaptive |
| STAT5B  | Memory B cell            | Adaptive |
| TLR9    | Memory B cell            | Adaptive |
| CCL3L1  | Regulatory T cell        | Adaptive |
| CD72    | Regulatory T cell        | Adaptive |
| CLEC5A  | Regulatory T cell        | Adaptive |
| FOXP3   | Regulatory T cell        | Adaptive |
| ITGA4   | Regulatory T cell        | Adaptive |
| L1CAM   | Regulatory T cell        | Adaptive |
| LIPA    | Regulatory T cell        | Adaptive |
| LRP1    | Regulatory T cell        | Adaptive |
| LRRC42  | Regulatory T cell        | Adaptive |
| MARCO   | Regulatory T cell        | Adaptive |
| MMP12   | Regulatory T cell        | Adaptive |
| MNDA    | Regulatory T cell        | Adaptive |
| MRC1    | Regulatory T cell        | Adaptive |
| MS4A6A  | Regulatory T cell        | Adaptive |
| PELO    | Regulatory T cell        | Adaptive |
| PLEK    | Regulatory T cell        | Adaptive |
| PRSS23  | Regulatory T cell        | Adaptive |
| PTGIR   | Regulatory T cell        | Adaptive |
| ST8SIA4 | Regulatory T cell        | Adaptive |
| STAB1   | Regulatory T cell        | Adaptive |
| B3GAT1  | T follicular helper cell | Adaptive |
| CDK5R1  | T follicular helper cell | Adaptive |
| PDCD1   | T follicular helper cell | Adaptive |
| BCL6    | T follicular helper cell | Adaptive |
| CD200   | T follicular helper cell | Adaptive |
| CD83    | T follicular helper cell | Adaptive |
| CD84    | T follicular helper cell | Adaptive |
| FGF2    | T follicular helper cell | Adaptive |
| GPR18   | T follicular helper cell | Adaptive |
| CEBPA   | T follicular helper cell | Adaptive |
| CECR1   | T follicular helper cell | Adaptive |
| CLEC10A | T follicular helper cell | Adaptive |
| CLEC4A  | T follicular helper cell | Adaptive |
| CSF1R   | T follicular helper cell | Adaptive |
| CTSS    | T follicular helper cell | Adaptive |
| DMN     | T follicular helper cell | Adaptive |
| DPP4    | T follicular helper cell | Adaptive |

|          |                          |          |
|----------|--------------------------|----------|
| LRRC32   | T follicular helper cell | Adaptive |
| MC5R     | T follicular helper cell | Adaptive |
| MICA     | T follicular helper cell | Adaptive |
| NCAM1    | T follicular helper cell | Adaptive |
| NCR2     | T follicular helper cell | Adaptive |
| NRP1     | T follicular helper cell | Adaptive |
| PDCD1LG2 | T follicular helper cell | Adaptive |
| PDCD6    | T follicular helper cell | Adaptive |
| PRDX1    | T follicular helper cell | Adaptive |
| RAE1     | T follicular helper cell | Adaptive |
| RAET1E   | T follicular helper cell | Adaptive |
| SIGLEC7  | T follicular helper cell | Adaptive |
| SIGLEC9  | T follicular helper cell | Adaptive |
| TYRO3    | T follicular helper cell | Adaptive |
| CHST12   | T follicular helper cell | Adaptive |
| CLIC3    | T follicular helper cell | Adaptive |
| IVNS1ABP | T follicular helper cell | Adaptive |
| KIR2DL2  | T follicular helper cell | Adaptive |
| LGMN     | T follicular helper cell | Adaptive |
| CD70     | Type 1 T helper cell     | Adaptive |
| TBX21    | Type 1 T helper cell     | Adaptive |
| ADAM8    | Type 1 T helper cell     | Adaptive |
| AHCYL2   | Type 1 T helper cell     | Adaptive |
| ALCAM    | Type 1 T helper cell     | Adaptive |
| B3GALNT1 | Type 1 T helper cell     | Adaptive |
| BBS12    | Type 1 T helper cell     | Adaptive |
| BST1     | Type 1 T helper cell     | Adaptive |
| CD151    | Type 1 T helper cell     | Adaptive |
| CD47     | Type 1 T helper cell     | Adaptive |
| CD48     | Type 1 T helper cell     | Adaptive |
| CD52     | Type 1 T helper cell     | Adaptive |
| CD53     | Type 1 T helper cell     | Adaptive |
| CD59     | Type 1 T helper cell     | Adaptive |
| CD6      | Type 1 T helper cell     | Adaptive |
| CD68     | Type 1 T helper cell     | Adaptive |
| CD7      | Type 1 T helper cell     | Adaptive |
| CD96     | Type 1 T helper cell     | Adaptive |
| CFHR3    | Type 1 T helper cell     | Adaptive |
| CHRM3    | Type 1 T helper cell     | Adaptive |
| CLEC7A   | Type 1 T helper cell     | Adaptive |
| COL23A1  | Type 1 T helper cell     | Adaptive |
| COL4A4   | Type 1 T helper cell     | Adaptive |
| COL5A3   | Type 1 T helper cell     | Adaptive |
| DAB1     | Type 1 T helper cell     | Adaptive |
| DLEU7    | Type 1 T helper cell     | Adaptive |
| DOC2B    | Type 1 T helper cell     | Adaptive |
| EMP1     | Type 1 T helper cell     | Adaptive |

|          |                      |          |
|----------|----------------------|----------|
| F12      | Type 1 T helper cell | Adaptive |
| FURIN    | Type 1 T helper cell | Adaptive |
| GAB3     | Type 1 T helper cell | Adaptive |
| GATM     | Type 1 T helper cell | Adaptive |
| GFPT2    | Type 1 T helper cell | Adaptive |
| GPR25    | Type 1 T helper cell | Adaptive |
| GREM2    | Type 1 T helper cell | Adaptive |
| HAVCR1   | Type 1 T helper cell | Adaptive |
| HSD11B1  | Type 1 T helper cell | Adaptive |
| HUNK     | Type 1 T helper cell | Adaptive |
| IGF2     | Type 1 T helper cell | Adaptive |
| RCSD1    | Type 1 T helper cell | Adaptive |
| RYR1     | Type 1 T helper cell | Adaptive |
| SAV1     | Type 1 T helper cell | Adaptive |
| SELE     | Type 1 T helper cell | Adaptive |
| SELP     | Type 1 T helper cell | Adaptive |
| SH3KBP1  | Type 1 T helper cell | Adaptive |
| SIT1     | Type 1 T helper cell | Adaptive |
| SLC35B3  | Type 1 T helper cell | Adaptive |
| SIGLEC10 | Type 1 T helper cell | Adaptive |
| SKAP1    | Type 1 T helper cell | Adaptive |
| THUMPD2  | Type 1 T helper cell | Adaptive |
| TIGIT    | Type 1 T helper cell | Adaptive |
| ZEB2     | Type 1 T helper cell | Adaptive |
| ENC1     | Type 1 T helper cell | Adaptive |
| FAM134B  | Type 1 T helper cell | Adaptive |
| FBXO30   | Type 1 T helper cell | Adaptive |
| FCGR2C   | Type 1 T helper cell | Adaptive |
| STAC     | Type 1 T helper cell | Adaptive |
| LTC4S    | Type 1 T helper cell | Adaptive |
| MAN1B1   | Type 1 T helper cell | Adaptive |
| MDH1     | Type 1 T helper cell | Adaptive |
| MMD      | Type 1 T helper cell | Adaptive |
| RGS16    | Type 1 T helper cell | Adaptive |
| IL12A    | Type 1 T helper cell | Adaptive |
| P2RX5    | Type 1 T helper cell | Adaptive |
| CD97     | Type 1 T helper cell | Adaptive |
| ITGB4    | Type 1 T helper cell | Adaptive |
| ICAM3    | Type 1 T helper cell | Adaptive |
| METRNL   | Type 1 T helper cell | Adaptive |
| TNFRSF1A | Type 1 T helper cell | Adaptive |
| IRF1     | Type 1 T helper cell | Adaptive |
| HTR2B    | Type 1 T helper cell | Adaptive |
| CALD1    | Type 1 T helper cell | Adaptive |
| MOCOS    | Type 1 T helper cell | Adaptive |
| TRAF3IP2 | Type 1 T helper cell | Adaptive |
| TLR8     | Type 1 T helper cell | Adaptive |

|          |                       |          |
|----------|-----------------------|----------|
| TRAF1    | Type 1 T helper cell  | Adaptive |
| DUSP14   | Type 1 T helper cell  | Adaptive |
| IL17A    | Type 17 T helper cell | Adaptive |
| IL17RA   | Type 17 T helper cell | Adaptive |
| C2CD4A   | Type 17 T helper cell | Adaptive |
| C2CD4B   | Type 17 T helper cell | Adaptive |
| CA2      | Type 17 T helper cell | Adaptive |
| CCDC65   | Type 17 T helper cell | Adaptive |
| CEACAM3  | Type 17 T helper cell | Adaptive |
| IL17C    | Type 17 T helper cell | Adaptive |
| IL17F    | Type 17 T helper cell | Adaptive |
| IL17RC   | Type 17 T helper cell | Adaptive |
| IL17RE   | Type 17 T helper cell | Adaptive |
| IL23A    | Type 17 T helper cell | Adaptive |
| ILDR1    | Type 17 T helper cell | Adaptive |
| LONRF3   | Type 17 T helper cell | Adaptive |
| SH2D6    | Type 17 T helper cell | Adaptive |
| TNIP2    | Type 17 T helper cell | Adaptive |
| ABCA1    | Type 17 T helper cell | Adaptive |
| ABCB1    | Type 17 T helper cell | Adaptive |
| ADAMTS12 | Type 17 T helper cell | Adaptive |
| ANK1     | Type 17 T helper cell | Adaptive |
| ANKRD22  | Type 17 T helper cell | Adaptive |
| B3GALT2  | Type 17 T helper cell | Adaptive |
| CAMTA1   | Type 17 T helper cell | Adaptive |
| CCR9     | Type 17 T helper cell | Adaptive |
| CD40     | Type 17 T helper cell | Adaptive |
| GPR44    | Type 17 T helper cell | Adaptive |
| IFT80    | Type 17 T helper cell | Adaptive |
| ASB2     | Type 2 T helper cell  | Adaptive |
| CSRP2    | Type 2 T helper cell  | Adaptive |
| DAPK1    | Type 2 T helper cell  | Adaptive |
| DLC1     | Type 2 T helper cell  | Adaptive |
| DNAJC12  | Type 2 T helper cell  | Adaptive |
| DUSP6    | Type 2 T helper cell  | Adaptive |
| GNAI1    | Type 2 T helper cell  | Adaptive |
| LAMP3    | Type 2 T helper cell  | Adaptive |
| NRP2     | Type 2 T helper cell  | Adaptive |
| OSBPL1A  | Type 2 T helper cell  | Adaptive |
| PDE4B    | Type 2 T helper cell  | Adaptive |
| PHLDA1   | Type 2 T helper cell  | Adaptive |
| PLA2G4A  | Type 2 T helper cell  | Adaptive |
| RAB27B   | Type 2 T helper cell  | Adaptive |
| RBMS3    | Type 2 T helper cell  | Adaptive |
| RNF125   | Type 2 T helper cell  | Adaptive |
| TMPRSS3  | Type 2 T helper cell  | Adaptive |
| GATA3    | Type 2 T helper cell  | Adaptive |

|          |                                |          |
|----------|--------------------------------|----------|
| BIRC5    | Type 2 T helper cell           | Adaptive |
| CDC25C   | Type 2 T helper cell           | Adaptive |
| CDC7     | Type 2 T helper cell           | Adaptive |
| CENPF    | Type 2 T helper cell           | Adaptive |
| CXCR6    | Type 2 T helper cell           | Adaptive |
| DHFR     | Type 2 T helper cell           | Adaptive |
| EVI5     | Type 2 T helper cell           | Adaptive |
| GSTA4    | Type 2 T helper cell           | Adaptive |
| HELLS    | Type 2 T helper cell           | Adaptive |
| IL26     | Type 2 T helper cell           | Adaptive |
| LAIR2    | Type 2 T helper cell           | Adaptive |
| ABCD1    | Activated dendritic cell       | Innate   |
| C1QC     | Activated dendritic cell       | Innate   |
| CAPG     | Activated dendritic cell       | Innate   |
| CCL3L3   | Activated dendritic cell       | Innate   |
| CD207    | Activated dendritic cell       | Innate   |
| CD302    | Activated dendritic cell       | Innate   |
| ATP5B    | Activated dendritic cell       | Innate   |
| ATP5L    | Activated dendritic cell       | Innate   |
| ATP6V1A  | Activated dendritic cell       | Innate   |
| BCL2L1   | Activated dendritic cell       | Innate   |
| C1QB     | Activated dendritic cell       | Innate   |
| SNURF    | Activated dendritic cell       | Innate   |
| SPCS3    | Activated dendritic cell       | Innate   |
| CCNA1    | Activated dendritic cell       | Innate   |
| CEACAM8  | Activated dendritic cell       | Innate   |
| NOS2     | Activated dendritic cell       | Innate   |
| SRA1     | Activated dendritic cell       | Innate   |
| TNFRSF6B | Activated dendritic cell       | Innate   |
| TREM1    | Activated dendritic cell       | Innate   |
| TREML1   | Activated dendritic cell       | Innate   |
| RHOA     | Activated dendritic cell       | Innate   |
| SLC25A37 | Activated dendritic cell       | Innate   |
| TNFSF14  | Activated dendritic cell       | Innate   |
| TREML4   | Activated dendritic cell       | Innate   |
| VNN2     | Activated dendritic cell       | Innate   |
| XPO6     | Activated dendritic cell       | Innate   |
| CLEC4C   | Activated dendritic cell       | Innate   |
| TNFAIP2  | Activated dendritic cell       | Innate   |
| UBD      | Activated dendritic cell       | Innate   |
| ACTR3    | Activated dendritic cell       | Innate   |
| RAB1A    | Activated dendritic cell       | Innate   |
| SLA      | Activated dendritic cell       | Innate   |
| HLA-DQA2 | Activated dendritic cell       | Innate   |
| SIGLEC5  | Activated dendritic cell       | Innate   |
| SLAMF9   | Activated dendritic cell       | Innate   |
| ABAT     | CD56bright natural killer cell | Innate   |

|          |                                |        |
|----------|--------------------------------|--------|
| C11orf75 | CD56bright natural killer cell | Innate |
| C5orf15  | CD56bright natural killer cell | Innate |
| CDHR1    | CD56bright natural killer cell | Innate |
| DCAF12   | CD56bright natural killer cell | Innate |
| DYNLL1   | CD56bright natural killer cell | Innate |
| GPR137B  | CD56bright natural killer cell | Innate |
| HCP5     | CD56bright natural killer cell | Innate |
| HDGFRP2  | CD56bright natural killer cell | Innate |
| KRT86    | CD56bright natural killer cell | Innate |
| MLST8    | CD56bright natural killer cell | Innate |
| ELMOD3   | CD56bright natural killer cell | Innate |
| ENTPD5   | CD56bright natural killer cell | Innate |
| FAM119A  | CD56bright natural killer cell | Innate |
| FAM179A  | CD56bright natural killer cell | Innate |
| CLIC2    | CD56bright natural killer cell | Innate |
| COX7A2L  | CD56bright natural killer cell | Innate |
| CREB3L4  | CD56bright natural killer cell | Innate |
| CSF1     | CD56bright natural killer cell | Innate |
| CSNK2A2  | CD56bright natural killer cell | Innate |
| CSTA     | CD56bright natural killer cell | Innate |
| CSTB     | CD56bright natural killer cell | Innate |
| CTPS     | CD56bright natural killer cell | Innate |
| CTSD     | CD56bright natural killer cell | Innate |
| FST      | CD56bright natural killer cell | Innate |
| GATA2    | CD56bright natural killer cell | Innate |
| GMPR     | CD56bright natural killer cell | Innate |
| HDC      | CD56bright natural killer cell | Innate |
| HEY1     | CD56bright natural killer cell | Innate |
| HOXA1    | CD56bright natural killer cell | Innate |
| HS2ST1   | CD56bright natural killer cell | Innate |
| HS3ST1   | CD56bright natural killer cell | Innate |
| BCL11B   | CD56bright natural killer cell | Innate |
| CDH3     | CD56bright natural killer cell | Innate |
| MYL6B    | CD56bright natural killer cell | Innate |
| NAA16    | CD56bright natural killer cell | Innate |
| CIQA     | CD56bright natural killer cell | Innate |
| CIQB     | CD56bright natural killer cell | Innate |
| CYP27B1  | CD56bright natural killer cell | Innate |
| EIF3M    | CD56bright natural killer cell | Innate |
| CYP27A1  | CD56dim natural killer cell    | Innate |
| DDX55    | CD56dim natural killer cell    | Innate |
| DYRK2    | CD56dim natural killer cell    | Innate |
| RPL37A   | CD56dim natural killer cell    | Innate |
| NOTCH3   | CD56dim natural killer cell    | Innate |
| AKR7A3   | CD56dim natural killer cell    | Innate |
| GPRC5C   | CD56dim natural killer cell    | Innate |
| GRIN1    | CD56dim natural killer cell    | Innate |

|          |                             |        |
|----------|-----------------------------|--------|
| HLA-E    | CD56dim natural killer cell | Innate |
| PORCN    | CD56dim natural killer cell | Innate |
| PSMC4    | CD56dim natural killer cell | Innate |
| UPP1     | CD56dim natural killer cell | Innate |
| IL21R    | CD56dim natural killer cell | Innate |
| KIR2DS1  | CD56dim natural killer cell | Innate |
| KIR2DS2  | CD56dim natural killer cell | Innate |
| KIR2DS5  | CD56dim natural killer cell | Innate |
| GIPR     | Eosinophil                  | Innate |
| KRT18P50 | Eosinophil                  | Innate |
| LRMP     | Eosinophil                  | Innate |
| FOSB     | Eosinophil                  | Innate |
| RRP12    | Eosinophil                  | Innate |
| GPR183   | Eosinophil                  | Innate |
| NR4A3    | Eosinophil                  | Innate |
| ST3GAL6  | Eosinophil                  | Innate |
| DEPDC5   | Eosinophil                  | Innate |
| PDE6C    | Eosinophil                  | Innate |
| PKD2L2   | Eosinophil                  | Innate |
| GPR65    | Eosinophil                  | Innate |
| IL5RA    | Eosinophil                  | Innate |
| P2RY14   | Eosinophil                  | Innate |
| DACH1    | Eosinophil                  | Innate |
| DAPK2    | Eosinophil                  | Innate |
| EMR3     | Eosinophil                  | Innate |
| ACADM    | Immature dendritic cell     | Innate |
| AHCYL1   | Immature dendritic cell     | Innate |
| ALDH1A2  | Immature dendritic cell     | Innate |
| ALDH3A2  | Immature dendritic cell     | Innate |
| ALDH9A1  | Immature dendritic cell     | Innate |
| ALOX15   | Immature dendritic cell     | Innate |
| AMT      | Immature dendritic cell     | Innate |
| ARL1     | Immature dendritic cell     | Innate |
| ATIC     | Immature dendritic cell     | Innate |
| ATP5A1   | Immature dendritic cell     | Innate |
| CAPZA1   | Immature dendritic cell     | Innate |
| LILRA5   | Immature dendritic cell     | Innate |
| RDX      | Immature dendritic cell     | Innate |
| RRAGD    | Immature dendritic cell     | Innate |
| TACSTD2  | Immature dendritic cell     | Innate |
| INPP5F   | Immature dendritic cell     | Innate |
| RAB38    | Immature dendritic cell     | Innate |
| PLAU     | Immature dendritic cell     | Innate |
| CSF3R    | Immature dendritic cell     | Innate |
| SLC18A2  | Immature dendritic cell     | Innate |
| AMPD2    | Immature dendritic cell     | Innate |
| CLTB     | Immature dendritic cell     | Innate |

|          |                         |        |
|----------|-------------------------|--------|
| C1orf162 | Immature dendritic cell | Innate |
| AIF1     | Macrophage              | Innate |
| CCL1     | Macrophage              | Innate |
| CCL14    | Macrophage              | Innate |
| CCL23    | Macrophage              | Innate |
| CCL26    | Macrophage              | Innate |
| CD300LB  | Macrophage              | Innate |
| CNR1     | Macrophage              | Innate |
| CNR2     | Macrophage              | Innate |
| EIF1     | Macrophage              | Innate |
| EIF4A1   | Macrophage              | Innate |
| FPR1     | Macrophage              | Innate |
| FPR2     | Macrophage              | Innate |
| FRAT2    | Macrophage              | Innate |
| GPR27    | Macrophage              | Innate |
| GPR77    | Macrophage              | Innate |
| RNASE2   | Macrophage              | Innate |
| MS4A2    | Macrophage              | Innate |
| BASP1    | Macrophage              | Innate |
| IGSF6    | Macrophage              | Innate |
| HK3      | Macrophage              | Innate |
| VNN1     | Macrophage              | Innate |
| FES      | Macrophage              | Innate |
| NPL      | Macrophage              | Innate |
| FZD2     | Macrophage              | Innate |
| FAM198B  | Macrophage              | Innate |
| HNMT     | Macrophage              | Innate |
| SLC15A3  | Macrophage              | Innate |
| CD4      | Macrophage              | Innate |
| TXNDC3   | Macrophage              | Innate |
| FRMD4A   | Macrophage              | Innate |
| CRYBB1   | Macrophage              | Innate |
| HRH1     | Macrophage              | Innate |
| WNT5B    | Macrophage              | Innate |
| ADAMTS3  | Mast cell               | Innate |
| CPA3     | Mast cell               | Innate |
| CMA1     | Mast cell               | Innate |
| CTSG     | Mast cell               | Innate |
| ARHGAP15 | Mast cell               | Innate |
| CPM      | Mast cell               | Innate |
| FCN1     | Mast cell               | Innate |
| FTL      | Mast cell               | Innate |
| HSPA6    | Mast cell               | Innate |
| ITGA9    | Mast cell               | Innate |
| RNASE3   | Mast cell               | Innate |
| S100A4   | Mast cell               | Innate |
| SIGLEC8  | Mast cell               | Innate |



|          |                     |        |
|----------|---------------------|--------|
| SLC6A4   | Mast cell           | Innate |
| PTGS2    | Mast cell           | Innate |
| EGR3     | Mast cell           | Innate |
| PILRA    | Mast cell           | Innate |
| CCR2     | MDSC                | Innate |
| CD14     | MDSC                | Innate |
| CD2      | MDSC                | Innate |
| CD86     | MDSC                | Innate |
| CXCR4    | MDSC                | Innate |
| FCGR2A   | MDSC                | Innate |
| FCGR2B   | MDSC                | Innate |
| FCGR3A   | MDSC                | Innate |
| FERMT3   | MDSC                | Innate |
| GPSM3    | MDSC                | Innate |
| IL18BP   | MDSC                | Innate |
| IL4R     | MDSC                | Innate |
| ITGAL    | MDSC                | Innate |
| ITGAM    | MDSC                | Innate |
| PARVG    | MDSC                | Innate |
| PSAP     | MDSC                | Innate |
| PTGER2   | MDSC                | Innate |
| PTGES2   | MDSC                | Innate |
| S100A8   | MDSC                | Innate |
| S100A9   | MDSC                | Innate |
| ASGR2    | Monocyte            | Innate |
| CFP      | Monocyte            | Innate |
| ASGR1    | Monocyte            | Innate |
| CD1D     | Monocyte            | Innate |
| UPK3A    | Monocyte            | Innate |
| ACTG1    | Monocyte            | Innate |
| ANXA5    | Monocyte            | Innate |
| ATP6V1B2 | Monocyte            | Innate |
| CFL1     | Monocyte            | Innate |
| DAZAP2   | Monocyte            | Innate |
| CTBS     | Monocyte            | Innate |
| EMR4P    | Monocyte            | Innate |
| HIVEP2   | Monocyte            | Innate |
| MARCKSL1 | Monocyte            | Innate |
| MBP      | Monocyte            | Innate |
| MMP15    | Monocyte            | Innate |
| PNPLA6   | Monocyte            | Innate |
| TMBIM6   | Monocyte            | Innate |
| PQBP1    | Monocyte            | Innate |
| TEX264   | Monocyte            | Innate |
| IKZF1    | Monocyte            | Innate |
| AKT3     | Natural killer cell | Innate |
| AXL      | Natural killer cell | Innate |

|        |                       |        |
|--------|-----------------------|--------|
| BST2   | Natural killer cell   | Innate |
| CDH2   | Natural killer cell   | Innate |
| CRTAM  | Natural killer cell   | Innate |
| CSF2RA | Natural killer cell   | Innate |
| CTSZ   | Natural killer cell   | Innate |
| CXCL1  | Natural killer cell   | Innate |
| CYTH1  | Natural killer cell   | Innate |
| DAXX   | Natural killer cell   | Innate |
| DGKH   | Natural killer cell   | Innate |
| DLL4   | Natural killer cell   | Innate |
| DPYD   | Natural killer cell   | Innate |
| ERBB3  | Natural killer cell   | Innate |
| F11R   | Natural killer cell   | Innate |
| FAM27A | Natural killer cell   | Innate |
| FAM49A | Natural killer cell   | Innate |
| FASLG  | Natural killer cell   | Innate |
| FCGR1A | Natural killer cell   | Innate |
| FN1    | Natural killer cell   | Innate |
| FSTL1  | Natural killer cell   | Innate |
| FUCA1  | Natural killer cell   | Innate |
| GBP3   | Natural killer cell   | Innate |
| GLS2   | Natural killer cell   | Innate |
| GRB2   | Natural killer cell   | Innate |
| LST1   | Natural killer cell   | Innate |
| BCL2   | Natural killer cell   | Innate |
| CDC5L  | Natural killer cell   | Innate |
| FGF18  | Natural killer cell   | Innate |
| FUT5   | Natural killer cell   | Innate |
| FZR1   | Natural killer cell   | Innate |
| GAGE2  | Natural killer cell   | Innate |
| IGFBP5 | Natural killer cell   | Innate |
| KANK2  | Natural killer cell   | Innate |
| LDB3   | Natural killer cell   | Innate |
| BTN2A2 | Natural killer T cell | Innate |
| CD101  | Natural killer T cell | Innate |
| CD109  | Natural killer T cell | Innate |
| CNPY3  | Natural killer T cell | Innate |
| CNPY4  | Natural killer T cell | Innate |
| CREB1  | Natural killer T cell | Innate |
| CRTC2  | Natural killer T cell | Innate |
| CRTC3  | Natural killer T cell | Innate |
| CSF2   | Natural killer T cell | Innate |
| KLRC1  | Natural killer T cell | Innate |
| FUT4   | Natural killer T cell | Innate |
| ICAM2  | Natural killer T cell | Innate |
| IL32   | Natural killer T cell | Innate |
| LAMP2  | Natural killer T cell | Innate |

|           |                       |        |
|-----------|-----------------------|--------|
| LILRB5    | Natural killer T cell | Innate |
| KLRG1     | Natural killer T cell | Innate |
| HSPA4     | Natural killer T cell | Innate |
| HSPB6     | Natural killer T cell | Innate |
| ISM2      | Natural killer T cell | Innate |
| ITIH2     | Natural killer T cell | Innate |
| KDM4C     | Natural killer T cell | Innate |
| KIR2DS4   | Natural killer T cell | Innate |
| KIRREL3   | Natural killer T cell | Innate |
| SDCBP     | Natural killer T cell | Innate |
| NFATC2IP  | Natural killer T cell | Innate |
| MICB      | Natural killer T cell | Innate |
| KIR2DL1   | Natural killer T cell | Innate |
| KIR2DL3   | Natural killer T cell | Innate |
| KIR3DL1   | Natural killer T cell | Innate |
| KIR3DL2   | Natural killer T cell | Innate |
| NCR1      | Natural killer T cell | Innate |
| FOSL1     | Natural killer T cell | Innate |
| TSLP      | Natural killer T cell | Innate |
| SLC7A7    | Natural killer T cell | Innate |
| SPP1      | Natural killer T cell | Innate |
| TREM2     | Natural killer T cell | Innate |
| UBASH3A   | Natural killer T cell | Innate |
| YBX2      | Natural killer T cell | Innate |
| CCDC88A   | Natural killer T cell | Innate |
| CLEC1A    | Natural killer T cell | Innate |
| THBD      | Natural killer T cell | Innate |
| PDPN      | Natural killer T cell | Innate |
| VCAM1     | Natural killer T cell | Innate |
| EMR1      | Natural killer T cell | Innate |
| CREB5     | Neutrophil            | Innate |
| CDA       | Neutrophil            | Innate |
| CHST15    | Neutrophil            | Innate |
| S100A12   | Neutrophil            | Innate |
| APOBEC3A  | Neutrophil            | Innate |
| CASP5     | Neutrophil            | Innate |
| MMP25     | Neutrophil            | Innate |
| HAL       | Neutrophil            | Innate |
| C1orf183  | Neutrophil            | Innate |
| FFAR2     | Neutrophil            | Innate |
| MAK       | Neutrophil            | Innate |
| CXCR1     | Neutrophil            | Innate |
| STEAP4    | Neutrophil            | Innate |
| MGAM      | Neutrophil            | Innate |
| BTNL8     | Neutrophil            | Innate |
| CXCR2     | Neutrophil            | Innate |
| TNFRSF10C | Neutrophil            | Innate |

|         |                             |        |
|---------|-----------------------------|--------|
| VNN3    | Neutrophil                  | Innate |
| CBX6    | Plasmacytoid dendritic cell | Innate |
| DAB2    | Plasmacytoid dendritic cell | Innate |
| DDX17   | Plasmacytoid dendritic cell | Innate |
| HIGD1A  | Plasmacytoid dendritic cell | Innate |
| IDH3A   | Plasmacytoid dendritic cell | Innate |
| IL3RA   | Plasmacytoid dendritic cell | Innate |
| MAGED1  | Plasmacytoid dendritic cell | Innate |
| NUCB2   | Plasmacytoid dendritic cell | Innate |
| OFD1    | Plasmacytoid dendritic cell | Innate |
| OGT     | Plasmacytoid dendritic cell | Innate |
| PDIA4   | Plasmacytoid dendritic cell | Innate |
| SERTAD2 | Plasmacytoid dendritic cell | Innate |
| SIRPA   | Plasmacytoid dendritic cell | Innate |
| TMED2   | Plasmacytoid dendritic cell | Innate |
| ENG     | Plasmacytoid dendritic cell | Innate |
| FCAR    | Plasmacytoid dendritic cell | Innate |
| IGF1    | Plasmacytoid dendritic cell | Innate |
| ITGA2B  | Plasmacytoid dendritic cell | Innate |
| GABARAP | Plasmacytoid dendritic cell | Innate |
| GPX1    | Plasmacytoid dendritic cell | Innate |
| KRT23   | Plasmacytoid dendritic cell | Innate |
| PROK2   | Plasmacytoid dendritic cell | Innate |
| RALB    | Plasmacytoid dendritic cell | Innate |
| RETNLB  | Plasmacytoid dendritic cell | Innate |
| RNF141  | Plasmacytoid dendritic cell | Innate |
| SEC14L1 | Plasmacytoid dendritic cell | Innate |
| SEPX1   | Plasmacytoid dendritic cell | Innate |
| EMP3    | Plasmacytoid dendritic cell | Innate |
| CD300LF | Plasmacytoid dendritic cell | Innate |
| ABTB1   | Plasmacytoid dendritic cell | Innate |
| KLHL21  | Plasmacytoid dendritic cell | Innate |
| PHRF1   | Plasmacytoid dendritic cell | Innate |