Table S1. Differential expressed genes enriched in the specific immune-related pathways by KEGG enrichment analysis.

|  |  |  |
| --- | --- | --- |
| Gene ID | Gene symbol | Up- or down-regulated |
| 1. **IgA production**
 |
| ncbi\_105061813 | CCR9 | Up |
| ncbi\_105062175 | AICDA | Up |
| ncbi\_105062879 | TGFB1 | Up |
| ncbi\_105064235 | HLA-DOA | Up |
| ncbi\_105064238 | HLA-DMA | Up |
| ncbi\_105064239 | HLA-DMB | Up |
| ncbi\_105064245 | HLA-DOB | Up |
| ncbi\_105064246 | HLA-DRB1 | Up |
| ncbi\_105064247 | HLA-DRB1 | Up |
| ncbi\_105064248 | HLA-DQA2 | Up |
| ncbi\_105064249 | HLA-DQB1 | Up |
| ncbi\_105064250 | HLA-DRA | Up |
| ncbi\_105064276 | HLA-DRB1 | Up |
| ncbi\_105066901 | TNFSF13B | Up |
| ncbi\_105067053 | CD40LG | Up |
| ncbi\_105071211 | LTBR | Down |
| ncbi\_105071882 | CD40 | Up |
| ncbi\_105072525 | MAP3K14 | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105072984 | ITGA4 | Up |
| ncbi\_105073193 | TNFRSF13C | Up |
| ncbi\_105074241 | TNFRSF17 | Up |
| ncbi\_105074341 | IL15RA | Down |
| ncbi\_105075425 | IL10 | Up |
| ncbi\_105076376 | ITGB7 | Up |
| ncbi\_105077504 | TNFSF13 | Down |
| ncbi\_105078061 | ICOSLG | Up |
| ncbi\_105078099 | Madcam1 | Up |
| ncbi\_105078293 | CCL25 | Up |
| ncbi\_105078516 | CXCL12 | Up |
| ncbi\_105079801 | IL6 | Up |
| ncbi\_105081591 | CD80 | Up |
| ncbi\_105081617 | CD86 | Up |
| ncbi\_105081933 | TNFRSF13B | Up |
| ncbi\_105082277 | ICOS | Up |
| ncbi\_105082279 | CD28 | Up |
| ncbi\_105083390 | CXCR4 | Up |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.14532 | IGHG1 | Up |
| MSTRG.14534 | IGHG2 | Up |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| 1. **Th1/Th2/Th17 cell differentiation**
 |
| ncbi\_105062116 | STAT6 | Up |
| ncbi\_105063497 | RUNX3 | Up |
| ncbi\_105063980 | STAT4 | Up |
| ncbi\_105063982 | STAT1 | Up |
| ncbi\_105064175 | MAPK13 | Down |
| ncbi\_105064235 | HLA-DOA | Up |
| ncbi\_105064238 | HLA-DMA | Up |
| ncbi\_105064239 | HLA-DMB | Up |
| ncbi\_105064245 | HLA-DOB | Up |
| ncbi\_105064246 | HLA-DRB1 | Up |
| ncbi\_105064247 | HLA-DRB1 | Up |
| ncbi\_105064248 | HLA-DQA2 | Up |
| ncbi\_105064249 | HLA-DQB1 | Up |
| ncbi\_105064250 | HLA-DRA | Up |
| ncbi\_105064276 | HLA-DRB1 | Up |
| ncbi\_105064618 | JAK1 | Up |
| ncbi\_105064951 | JAG1 | Up |
| ncbi\_105066646 | IL12A | Up |
| ncbi\_105066766 | LCK | Up |
| ncbi\_105067817 | CD3G | Up |
| ncbi\_105067818 | CD3D | Up |
| ncbi\_105067821 | CD3E | Up |
| ncbi\_105067906 | PPP3CA | Up |
| ncbi\_105067913 | NFKB1 | Up |
| ncbi\_105068057 | CD247 | Up |
| ncbi\_105068381 | TYK2 | Up |
| ncbi\_105069046 | NFATC1 | Up |
| ncbi\_105069349 | MAPK1 | Up |
| ncbi\_105069770 | NOTCH1 | Up |
| ncbi\_105070806 | MAPK12 | Up |
| ncbi\_105070807 | MAPK11 | Up |
| ncbi\_105071091 | CD4 | Up |
| ncbi\_105071245 | IKBKB | Up |
| ncbi\_105071674 | JUN | Down |
| ncbi\_105071843 | NFATC2 | Up |
| ncbi\_105071908 | RBPJL | Down |
| ncbi\_105071939 | PLCG1 | Up |
| ncbi\_105072189 | ZAP70 | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105073156 | IL2RB | Up |
| ncbi\_105073341 | TBX21 | Up |
| ncbi\_105074228 | GATA3 | Up |
| ncbi\_105074303 | PRKCQ | Up |
| ncbi\_105074562 | NOTCH3 | Up |
| ncbi\_105074697 | IL2RA | Up |
| ncbi\_105074856 | NFATC3 | Up |
| ncbi\_105075281 | RBPJ | Up |
| ncbi\_105075289 | FOS | Down |
| ncbi\_105077267 | IFNGR1 | Up |
| ncbi\_105077723 | MAPK10 | Up |
| ncbi\_105078829 | V-MAF | Up |
| ncbi\_105079173 | JAK2 | Up |
| ncbi\_105079218 | NOTCH2 | Up |
| ncbi\_105080031 | JAG2 | Up |
| ncbi\_105080117 | STAT5A | Up |
| ncbi\_105080118 | STAT5B | Up |
| ncbi\_105082560 | JAK3 | Up |
| ncbi\_105082567 | IL12RB1 | Up |
| ncbi\_105082839 | Mapk3 | Down |
| ncbi\_105082855 | LAT | Up |
| ncbi\_105083483 | MAML2 | Up |
| ncbi\_105083690 | IL2RG | Up |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.16869 | MAML2 | Down |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| ncbi\_105062116 | STAT6 | Up |
| ncbi\_105062879 | TGFB1 | Up |
| ncbi\_105063982 | STAT1 | Up |
| ncbi\_105064175 | MAPK13 | Down |
| ncbi\_105064235 | HLA-DOA | Up |
| ncbi\_105064238 | HLA-DMA | Up |
| ncbi\_105064239 | HLA-DMB | Up |
| ncbi\_105064245 | HLA-DOB | Up |
| ncbi\_105064246 | HLA-DRB1 | Up |
| ncbi\_105064247 | HLA-DRB1 | Up |
| ncbi\_105064248 | HLA-DQA2 | Up |
| ncbi\_105064249 | HLA-DQB1 | Up |
| ncbi\_105064250 | HLA-DRA | Up |
| ncbi\_105064276 | HLA-DRB1 | Up |
| ncbi\_105064618 | JAK1 | Up |
| ncbi\_105066766 | LCK | Up |
| ncbi\_105067114 | IL21 | Up |
| ncbi\_105067391 | TGFBR1 | Up |
| ncbi\_105067817 | CD3G | Up |
| ncbi\_105067818 | CD3D | Up |
| ncbi\_105067821 | CD3E | Up |
| ncbi\_105067906 | PPP3CA | Up |
| ncbi\_105067913 | NFKB1 | Up |
| ncbi\_105068057 | CD247 | Up |
| ncbi\_105068250 | IL6R | Up |
| ncbi\_105068307 | IL27RA | Up |
| ncbi\_105068381 | TYK2 | Up |
| ncbi\_105068579 | RXRA | Down |
| ncbi\_105069046 | NFATC1 | Up |
| ncbi\_105069349 | MAPK1 | Up |
| ncbi\_105070210 | RUNX1 | Up |
| ncbi\_105070806 | MAPK12 | Up |
| ncbi\_105070807 | MAPK11 | Up |
| ncbi\_105071091 | CD4 | Up |
| ncbi\_105071245 | IKBKB | Up |
| ncbi\_105071674 | JUN | Down |
| ncbi\_105071703 | RORC | Down |
| ncbi\_105071843 | NFATC2 | Up |
| ncbi\_105071939 | PLCG1 | Up |
| ncbi\_105072137 | IL1B | Up |
| ncbi\_105072189 | ZAP70 | Up |
| ncbi\_105072217 | IL1R1 | Up |
| ncbi\_105072636 | TGFBR2 | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105073156 | IL2RB | Up |
| ncbi\_105073341 | TBX21 | Up |
| ncbi\_105073656 | IL21R | Up |
| ncbi\_105074009 | SMAD2 | Up |
| ncbi\_105074228 | GATA3 | Up |
| ncbi\_105074303 | PRKCQ | Up |
| ncbi\_105074647 | HIF1A | Up |
| ncbi\_105074697 | IL2RA | Up |
| ncbi\_105074856 | NFATC3 | Up |
| ncbi\_105075289 | FOS | Down |
| ncbi\_105075556 | IL23R | Up |
| ncbi\_105077267 | IFNGR1 | Up |
| ncbi\_105077723 | MAPK10 | Up |
| ncbi\_105077802 | IL6ST | Up |
| ncbi\_105078609 | AHR | Up |
| ncbi\_105079173 | JAK2 | Up |
| ncbi\_105079416 | FOXP3 | Up |
| ncbi\_105079801 | IL6 | Up |
| ncbi\_105079942 | HSP90AA1 | Up |
| ncbi\_105080117 | STAT5A | Up |
| ncbi\_105080118 | STAT5B | Up |
| ncbi\_105080511 | RORA | Up |
| ncbi\_105081397 | IL22 | Up |
| ncbi\_105082560 | JAK3 | Up |
| ncbi\_105082567 | IL12RB1 | Up |
| ncbi\_105082839 | Mapk3 | Down |
| ncbi\_105082855 | LAT | Up |
| ncbi\_105083690 | IL2RG | Up |
| ncbi\_105083823 | HSP90AB1 | Up |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| ncbi\_105062116 | STAT6 | Up |
| ncbi\_105063497 | RUNX3 | Up |
| ncbi\_105063980 | STAT4 | Up |
| ncbi\_105063982 | STAT1 | Up |
| ncbi\_105064175 | MAPK13 | Down |
| ncbi\_105064235 | HLA-DOA | Up |
| ncbi\_105064238 | HLA-DMA | Up |
| ncbi\_105064239 | HLA-DMB | Up |
| ncbi\_105064245 | HLA-DOB | Up |
| ncbi\_105064246 | HLA-DRB1 | Up |
| ncbi\_105064247 | HLA-DRB1 | Up |
| ncbi\_105064248 | HLA-DQA2 | Up |
| ncbi\_105064249 | HLA-DQB1 | Up |
| ncbi\_105064250 | HLA-DRA | Up |
| ncbi\_105064276 | HLA-DRB1 | Up |
| ncbi\_105064618 | JAK1 | Up |
| ncbi\_105064951 | JAG1 | Up |
| ncbi\_105066646 | IL12A | Up |
| ncbi\_105066766 | LCK | Up |
| ncbi\_105067817 | CD3G | Up |
| ncbi\_105067818 | CD3D | Up |
| ncbi\_105067821 | CD3E | Up |
| ncbi\_105067906 | PPP3CA | Up |
| ncbi\_105067913 | NFKB1 | Up |
| ncbi\_105068057 | CD247 | Up |
| ncbi\_105068381 | TYK2 | Up |
| ncbi\_105069046 | NFATC1 | Up |
| ncbi\_105069349 | MAPK1 | Up |
| ncbi\_105069770 | NOTCH1 | Up |
| ncbi\_105070806 | MAPK12 | Up |
| ncbi\_105070807 | MAPK11 | Up |
| ncbi\_105071091 | CD4 | Up |
| ncbi\_105071245 | IKBKB | Up |
| ncbi\_105071674 | JUN | Down |
| ncbi\_105071843 | NFATC2 | Up |
| ncbi\_105071908 | RBPJL | Down |
| ncbi\_105071939 | PLCG1 | Up |
| ncbi\_105072189 | ZAP70 | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105073156 | IL2RB | Up |
| ncbi\_105073341 | TBX21 | Up |
| ncbi\_105074228 | GATA3 | Up |
| ncbi\_105074303 | PRKCQ | Up |
| ncbi\_105074562 | NOTCH3 | Up |
| ncbi\_105074697 | IL2RA | Up |
| ncbi\_105074856 | NFATC3 | Up |
| ncbi\_105075281 | RBPJ | Up |
| ncbi\_105075289 | FOS | Down |
| ncbi\_105077267 | IFNGR1 | Up |
| ncbi\_105077723 | MAPK10 | Up |
| ncbi\_105078829 | V-MAF | Up |
| ncbi\_105079173 | JAK2 | Up |
| ncbi\_105079218 | NOTCH2 | Up |
| ncbi\_105080031 | JAG2 | Up |
| ncbi\_105080117 | STAT5A | Up |
| ncbi\_105080118 | STAT5B | Up |
| ncbi\_105082560 | JAK3 | Up |
| ncbi\_105082567 | IL12RB1 | Up |
| ncbi\_105082839 | Mapk3 | Down |
| ncbi\_105082855 | LAT | Up |
| ncbi\_105083483 | MAML2 | Up |
| ncbi\_105083690 | IL2RG | Up |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.16869 | MAML2 | Down |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| 1. **T cell receptor signaling pathway**
 |
| ncbi\_105062297 | KRAS | Up |
| ncbi\_105062855 | AKT2 | Up |
| ncbi\_105063518 | PDCD1 | Up |
| ncbi\_105064109 | MAP3K7 | Up |
| ncbi\_105064175 | MAPK13 | Down |
| ncbi\_105064416 | PIK3R1 | Up |
| ncbi\_105065653 | GRB2 | Up |
| ncbi\_105066766 | LCK | Up |
| ncbi\_105067053 | CD40LG | Up |
| ncbi\_105067817 | CD3G | Up |
| ncbi\_105067818 | CD3D | Up |
| ncbi\_105067821 | CD3E | Up |
| ncbi\_105067906 | PPP3CA | Up |
| ncbi\_105067913 | NFKB1 | Up |
| ncbi\_105068057 | CD247 | Up |
| ncbi\_105068613 | VAV2 | Up |
| ncbi\_105069046 | NFATC1 | Up |
| ncbi\_105069349 | MAPK1 | Up |
| ncbi\_105069943 | HRAS | Down |
| ncbi\_105070018 | PTPRC | Up |
| ncbi\_105070806 | MAPK12 | Up |
| ncbi\_105070807 | MAPK11 | Up |
| ncbi\_105070875 | CDC42 | Up |
| ncbi\_105071091 | CD4 | Up |
| ncbi\_105071204 | PTPN6 | Up |
| ncbi\_105071245 | IKBKB | Up |
| ncbi\_105071674 | JUN | Down |
| ncbi\_105071706 | MAP3K8 | Up |
| ncbi\_105071843 | NFATC2 | Up |
| ncbi\_105071939 | PLCG1 | Up |
| ncbi\_105072189 | ZAP70 | Up |
| ncbi\_105072260 | CD8A | Up |
| ncbi\_105072377 | DLG1 | Up |
| ncbi\_105072383 | Pak2 | Up |
| ncbi\_105072525 | MAP3K14 | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105073098 | Grap2 | Up |
| ncbi\_105073996 | MALT1 | Up |
| ncbi\_105074074 | TNF | Up |
| ncbi\_105074303 | PRKCQ | Up |
| ncbi\_105074856 | NFATC3 | Up |
| ncbi\_105074908 | TEC | Up |
| ncbi\_105075198 | PTPN6 | Up |
| ncbi\_105075289 | FOS | Down |
| ncbi\_105075425 | IL10 | Up |
| ncbi\_105075749 | PAK3 | Up |
| ncbi\_105076883 | RASGRP1 | Up |
| ncbi\_105077134 | FYN | Up |
| ncbi\_105077723 | MAPK10 | Up |
| ncbi\_105078075 | CARD11 | Up |
| ncbi\_105078399 | VAV1 | Up |
| ncbi\_105078489 | SOS2 | Up |
| ncbi\_105079555 | NRAS | Up |
| ncbi\_105080142 | CBLB | Up |
| ncbi\_105080927 | ITK | Up |
| ncbi\_105082277 | ICOS | Up |
| ncbi\_105082278 | CTLA4 | Up |
| ncbi\_105082279 | CD28 | Up |
| ncbi\_105082679 | PIK3R2 | Up |
| ncbi\_105082694 | LCP2 | Up |
| ncbi\_105082839 | Mapk3 | Down |
| ncbi\_105082855 | LAT | Up |
| ncbi\_105083596 | AKT3 | Up |
| ncbi\_105083612 | PAK1 | Down |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |
| 1. **antigen processing and presentation**
 |
| ncbi\_105061640 | HLA-A | Up |
| ncbi\_105062008 | CANX | Up |
| ncbi\_105062207 | KLRD1 | Up |
| ncbi\_105062210 | KLRC1 | Up |
| ncbi\_105064235 | HLA-DOA | Up |
| ncbi\_105064238 | HLA-DMA | Up |
| ncbi\_105064239 | HLA-DMB | Up |
| ncbi\_105064241 | TAP1 | Up |
| ncbi\_105064243 | TAP2 | Up |
| ncbi\_105064245 | HLA-DOB | Up |
| ncbi\_105064246 | HLA-DRB1 | Up |
| ncbi\_105064247 | HLA-DRB1 | Up |
| ncbi\_105064248 | HLA-DQA2 | Up |
| ncbi\_105064249 | HLA-DQB1 | Up |
| ncbi\_105064250 | HLA-DRA | Up |
| ncbi\_105064276 | HLA-DRB1 | Up |
| ncbi\_105065248 | Mr1 | Up |
| ncbi\_105066308 | RFXAP | Up |
| ncbi\_105068023 | HSPA6 | Up |
| ncbi\_105071091 | CD4 | Up |
| ncbi\_105071715 | RFX5 | Up |
| ncbi\_105071741 | CTSS | Up |
| ncbi\_105072260 | CD8A | Up |
| ncbi\_105072753 | NFYC | Up |
| ncbi\_105072900 | TRBV25-1 | Up |
| ncbi\_105072963 | CREB1 | Up |
| ncbi\_105074074 | TNF | Up |
| ncbi\_105074084 | HLA-B | Up |
| ncbi\_105074299 | CD74 | Up |
| ncbi\_105074668 | HSPA2 | Up |
| ncbi\_105076977 | B2M | Up |
| ncbi\_105078638 | HSPA8 | Up |
| ncbi\_105078803 | CTSL | Up |
| ncbi\_105079874 | LGMN | Up |
| ncbi\_105079942 | HSP90AA1 | Up |
| ncbi\_105081302 | NFYB | Up |
| ncbi\_105082116 | HSPA4 | Up |
| ncbi\_105082680 | IFI30 | Up |
| ncbi\_105083758 | NFYA | Up |
| ncbi\_105083823 | HSP90AB1 | Up |
| ncbi\_105084049 | Patr-A | Up |
| MSTRG.10587 | Patr-A | Up |
| MSTRG.11100 | TRAV16 | Up |
| MSTRG.11101 | TRAV18 | Up |
| MSTRG.11102 | TRAV18 | Up |
| MSTRG.11103 | TRAV8-4 | Up |
| MSTRG.2847 | TRBV16 | Up |
| MSTRG.2850 | TRBV14 | Up |
| MSTRG.2852 | TRBV10-3 | Up |
| MSTRG.2853 | TRBV7-9 | Up |
| MSTRG.2854 | TRBV5-5 | Up |
| MSTRG.2855 | V-TCR | Up |
| MSTRG.2857 | TRBV12-4 | Up |
| MSTRG.2858 | TRBV3-1 | Up |
| MSTRG.4011 | TRAV9-2 | Up |
| MSTRG.4012 | TRAV14DV4 | Up |
| MSTRG.4014 | TRAV9-2 | Up |
| MSTRG.4016 | TRAV8-3 | Up |
| MSTRG.4017 | TRAV9-1 | Up |
| MSTRG.4019 | TRAV2 | Up |
| MSTRG.4391 | HLA-C | Up |
| MSTRG.6776 | TRDV1 | Up |
| MSTRG.6780 | TRAV23DV6 | Up |
| MSTRG.6781 | TRDV1 | Up |
| MSTRG.6787 | TRA | Up |
| MSTRG.84 | TRB | Up |
| MSTRG.85 | TRB | Up |
| MSTRG.86 | TRB | Up |
| MSTRG.87 | TRBV29-1 | Up |
| MSTRG.89 | TRBV27 | Up |