

Table S2: 52 canonical pathways classified with IPA

| Ingenuity Canonical Pathways | -log(p-value) | Ratio | Genes |
|--|----------------------|--------------|------------------------------------|
| 1 Antigen Presentation Pathway | 7.5E00 | 1.35E-01 | NLRC5,HLA-DRB1,HLA-B,TAP1,HLA-DRB5 |
| 2 Graft-versus-Host Disease Signaling | 3.64E00 | 6.25E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 3 Autoimmune Thyroid Disease Signaling | 3.61E00 | 6.12E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 4 Cdc42 Signaling | 3.1E00 | 2.4E-02 | HLA-DRB1,HLA-B,IQGAP1,HLA-DRB5 |
| 5 Allograft Rejection Signaling | 2.89E00 | 3.49E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 6 Crosstalk between Dendritic Cells and Natural Killer Cells | 2.85E00 | 3.37E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 7 OX40 Signaling Pathway | 2.85E00 | 3.37E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 8 Communication between Innate and Adaptive Immune Cells | 2.82E00 | 3.3E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 9 Type I Diabetes Mellitus Signaling | 2.59E00 | 2.73E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 10 B Cell Development | 2.49E00 | 5.88E-02 | HLA-DRB1,HLA-DRB5 |
| 11 Nur77 Signaling in T Lymphocytes | 2.05E00 | 3.51E-02 | HLA-DRB1,HLA-DRB5 |
| 12 Catecholamine Biosynthesis | 2E00 | 2.5E-01 | DBH |
| 13 Biotin-carboxyl Carrier Protein Assembly | 2E00 | 2.5E-01 | HLCS |
| 14 Dendritic Cell Maturation | 2E00 | 1.68E-02 | HLA-DRB1,HLA-B,HLA-DRB5 |
| 15 Calcium-induced T Lymphocyte Apoptosis | 1.96E00 | 3.12E-02 | HLA-DRB1,HLA-DRB5 |
| 16 CMP-N-acetylneuraminat Biosynthesis I (Eukaryotes) | 1.91E00 | 2E-01 | GNE |
| 17 Hepatic Fibrosis / Hepatic Stellate Cell Activation | 1.89E00 | 1.52E-02 | COL4A1,COL4A2,COL9A2 |
| 18 T Helper Cell Differentiation | 1.87E00 | 2.82E-02 | HLA-DRB1,HLA-DRB5 |
| 19 IL-4 Signaling | 1.81E00 | 2.63E-02 | HLA-DRB1,HLA-DRB5 |
| 20 Altered T Cell and B Cell Signaling in Rheumatoid Arthritis | 1.69E00 | 2.27E-02 | HLA-DRB1,HLA-DRB5 |
| 21 iCOS-iCOSL Signaling in T Helper Cells | 1.53E00 | 1.85E-02 | HLA-DRB1,HLA-DRB5 |
| 22 CD28 Signaling in T Helper Cells | 1.46E00 | 1.69E-02 | HLA-DRB1,HLA-DRB5 |
| 23 PKCθ Signaling in T Lymphocytes | 1.46E00 | 1.69E-02 | HLA-DRB1,HLA-DRB5 |
| 24 Role of NFAT in Regulation of the Immune Response | 1.17E00 | 1.17E-02 | HLA-DRB1,HLA-DRB5 |
| 25 Glutathione-mediated Detoxification | 1.14E00 | 3.33E-02 | GSTM5 |
| 26 NRF2-mediated Oxidative Stress Response | 1.13E00 | 1.11E-02 | GSTM5,ENC1 |
| 27 Cytotoxic T Lymphocyte-mediated Apoptosis of Target Cells | 1.12E00 | 3.12E-02 | HLA-B |
| 28 Oncostatin M Signaling | 1.09E00 | 2.94E-02 | MT2A |
| 29 Interferon Signaling | 1.09E00 | 2.94E-02 | TAP1 |
| 30 Notch Signaling | 1.04E00 | 2.63E-02 | DTX1 |
| 31 Neuroprotective Role of THOP1 in Alzheimer's Disease | 1.02E00 | 2.5E-02 | HLA-B |
| 32 Primary Immunodeficiency Signaling | 9.15E-01 | 1.92E-02 | TAP1 |
| 33 Protein Ubiquitination Pathway | 8.78E-01 | 7.84E-03 | HLA-B,TAP1 |
| 34 Pyridoxal 5'-phosphate Salvage Pathway | 8.31E-01 | 1.56E-02 | PDXK |
| 35 Remodeling of Epithelial Adherens Junctions | 8.07E-01 | 1.47E-02 | IQGAP1 |
| 36 PEDF Signaling | 7.89E-01 | 1.41E-02 | ARHGAP22 |
| 37 Caveolar-mediated Endocytosis Signaling | 7.84E-01 | 1.39E-02 | HLA-B |
| 38 TREM1 Signaling | 7.68E-01 | 1.33E-02 | NLRC5 |
| 39 CTLA4 Signaling in Cytotoxic T Lymphocytes | 7.05E-01 | 1.14E-02 | HLA-B |
| 40 Virus Entry via Endocytic Pathways | 7.01E-01 | 1.12E-02 | HLA-B |
| 41 Rac Signaling | 6.41E-01 | 9.62E-03 | IQGAP1 |
| 42 Gas Signaling | 6.23E-01 | 9.17E-03 | HCAR3 |
| 43 Aryl Hydrocarbon Receptor Signaling | 5.3E-01 | 7.14E-03 | GSTM5 |
| 44 Epithelial Adherens Junction Signaling | 5.15E-01 | 6.85E-03 | IQGAP1 |
| 45 Germ Cell-Sertoli Cell Junction Signaling | 4.82E-01 | 6.25E-03 | IQGAP1 |
| 46 IL-8 Signaling | 4.35E-01 | 5.46E-03 | IQGAP1 |
| 47 Actin Cytoskeleton Signaling | 3.77E-01 | 4.61E-03 | IQGAP1 |
| 48 LPS/IL-1 Mediated Inhibition of RXR Function | 3.74E-01 | 4.57E-03 | GSTM5 |
| 49 cAMP-mediated signaling | 3.74E-01 | 4.57E-03 | HCAR3 |
| 50 Systemic Lupus Erythematosus Signaling | 3.73E-01 | 4.55E-03 | HLA-B |
| 51 Signaling by Rho Family GTPases | 3.53E-01 | 4.27E-03 | IQGAP1 |
| 52 G-Protein Coupled Receptor Signaling | 3.25E-01 | 3.91E-03 | HCAR3 |
| 53 Xenobiotic Metabolism Signaling | 3.07E-01 | 3.69E-03 | GSTM5 |