**Supplementary Table 4**

All significant KEGG pathways associated with risk subgroups were analyzed by GSEA.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pathway name | Size | FDR *P-*value | Pathway name | Size | FDR *P-*value |
| KEGG\_CHEMOKINE\_SIGNALING\_PATHWAY | 188 | 0 | KEGG\_TYPE\_I\_DIABETES\_MELLITUS | 41 | 4.25E-04 |
| KEGG\_JAK\_STAT\_SIGNALING\_PATHWAY | 155 | 0 | KEGG\_TRYPTOPHAN\_METABOLISM | 39 | 4.49E-04 |
| KEGG\_TOLL\_LIKE\_RECEPTOR\_SIGNALING\_PATHWAY | 102 | 0 | KEGG\_MAPK\_SIGNALING\_PATHWAY | 266 | 6.34E-04 |
| KEGG\_VIRAL\_MYOCARDITIS | 68 | 0 | KEGG\_INTESTINAL\_IMMUNE\_NETWORK\_FOR\_IGA\_PRODUCTION | 45 | 6.13E-04 |
| KEGG\_APOPTOSIS | 87 | 0 | KEGG\_PANCREATIC\_CANCER | 69 | 0.00119823 |
| KEGG\_FC\_GAMMA\_R\_MEDIATED\_PHAGOCYTOSIS | 96 | 0 | KEGG\_PRIMARY\_IMMUNODEFICIENCY | 35 | 0.00155821 |
| KEGG\_CYTOKINE\_CYTOKINE\_RECEPTOR\_INTERACTION | 263 | 0 | KEGG\_ASTHMA | 28 | 0.00237109 |
| KEGG\_NATURAL\_KILLER\_CELL\_MEDIATED\_CYTOTOXICITY | 132 | 0 | KEGG\_NEUROTROPHIN\_SIGNALING\_PATHWAY | 126 | 0.00386452 |
| KEGG\_ANTIGEN\_PROCESSING\_AND\_PRESENTATION | 81 | 0 | KEGG\_COMPLEMENT\_AND\_COAGULATION\_CASCADES | 69 | 0.00483011 |
| KEGG\_T\_CELL\_RECEPTOR\_SIGNALING\_PATHWAY | 108 | 0 | KEGG\_NON\_SMALL\_CELL\_LUNG\_CANCER | 54 | 0.00506794 |
| KEGG\_CYTOSOLIC\_DNA\_SENSING\_PATHWAY | 54 | 0 | KEGG\_ALLOGRAFT\_REJECTION | 35 | 0.00509909 |
| KEGG\_B\_CELL\_RECEPTOR\_SIGNALING\_PATHWAY | 75 | 0 | KEGG\_GRAFT\_VERSUS\_HOST\_DISEASE | 37 | 0.00532936 |
| KEGG\_LEUKOCYTE\_TRANSENDOTHELIAL\_MIGRATION | 116 | 0 | KEGG\_EPITHELIAL\_CELL\_SIGNALING\_IN\_HELICOBACTER\_PYLORI\_INFECTION | 68 | 0.00533951 |
| KEGG\_CELL\_ADHESION\_MOLECULES\_CAMS | 131 | 0 | KEGG\_PANTOTHENATE\_AND\_COA\_BIOSYNTHESIS | 16 | 0.00538484 |
| KEGG\_NOD\_LIKE\_RECEPTOR\_SIGNALING\_PATHWAY | 62 | 0 | KEGG\_SNARE\_INTERACTIONS\_IN\_VESICULAR\_TRANSPORT | 38 | 0.0095789 |
| KEGG\_PROTEASOME | 46 | 0 | KEGG\_AMYOTROPHIC\_LATERAL\_SCLEROSIS\_ALS | 52 | 0.01093585 |
| KEGG\_LEISHMANIA\_INFECTION | 69 | 0 | KEGG\_ADIPOCYTOKINE\_SIGNALING\_PATHWAY | 67 | 0.01342995 |
| KEGG\_AUTOIMMUNE\_THYROID\_DISEASE | 50 | 0 | KEGG\_RENAL\_CELL\_CARCINOMA | 69 | 0.01661448 |
| KEGG\_HEMATOPOIETIC\_CELL\_LINEAGE | 85 | 0 | KEGG\_VEGF\_SIGNALING\_PATHWAY | 76 | 0.01627602 |
| KEGG\_SYSTEMIC\_LUPUS\_ERYTHEMATOSUS | 56 | 0 | KEGG\_TYPE\_II\_DIABETES\_MELLITUS | 47 | 0.01747127 |
| KEGG\_FC\_EPSILON\_RI\_SIGNALING\_PATHWAY | 79 | 0 | KEGG\_PATHWAYS\_IN\_CANCER | 324 | 0.0207128 |
| KEGG\_PATHOGENIC\_ESCHERICHIA\_COLI\_INFECTION | 56 | 3.87E-05 | KEGG\_NICOTINATE\_AND\_NICOTINAMIDE\_METABOLISM | 24 | 0.02230028 |
| KEGG\_RIG\_I\_LIKE\_RECEPTOR\_SIGNALING\_PATHWAY | 70 | 3.70E-05 | KEGG\_NEUROACTIVE\_LIGAND\_RECEPTOR\_INTERACTION | 271 | 0.03788542 |
| KEGG\_PRION\_DISEASES | 35 | 1.35E-04 | KEGG\_LYSOSOME | 121 | 0.03873639 |
| KEGG\_REGULATION\_OF\_ACTIN\_CYTOSKELETON | 213 | 3.31E-04 | KEGG\_UBIQUITIN\_MEDIATED\_PROTEOLYSIS | 134 | 0.04134918 |
| KEGG\_ACUTE\_MYELOID\_LEUKEMIA | 57 | 3.58E-04 | KEGG\_GLIOMA | 65 | 0.04098754 |
| KEGG\_ENDOCYTOSIS | 181 | 3.44E-04 |  |  |  |