**Supplementary Table 1.** Nominal P values of gene sets significantly associated with successful influenza vaccination responses from four meta-analysis approaches (FDR < 15%).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set | QuSAGE Meta-analysis | Directional Fisher | Directional Stouffer | Effect Size |
| cell cycle (I) (M4.1) | 0.017\* | 0.082\* | 0.034\* | 0.001\* |
| mitotic cell cycle in stimulated CD4 T cells (M4.11) | 0.010\* | 0.038\* | 0.028\* | 0.011\* |
| plasma cells & B cells, immunoglobulins (M156.0) | 0.011\* | 0.004\* | 0.025\* | 0.003\* |
| plasma cells, immunoglobulins (M156.1) | 0.004\* | 0.001\* | 0.007\* | 0.013\* |
| respiratory electron transport chain (mitochondrion) (M216) | 0.014\* | 0.051\* | 0.035\* | 0.000\* |
| respiratory electron transport chain (mitochondrion) (M219) | 0.011\* | 0.020\* | 0.038\* | 0.002\* |
| transcription elongation, RNA polymerase II (M234) | 0.016\* | 0.066\* | 0.109\* | 0.015\* |
| respiratory electron transport chain (mitochondrion) (M238) | 0.019\* | 0.047\* | 0.068\* | 0.001\* |
| Plasma cell surface signature (S3) | 0.011\* | 0.062\* | 0.069\* | 0.017\* |
| Memory B cell surface signature (S9) | 0.016\* | 0.074\* | 0.084\* | 0.005\* |
| enriched in antigen presentation (I) (M71) | 0.020\* | 0.001\* | 0.009\* | 0.282 |
| mitotic cell cycle in stimulated CD4 T cells (M4.5) | 0.029 | 0.031\* | 0.043\* | 0.034\* |
| regulation of antigen presentation and immune response (M5.0) | 0.082 | 0.037\* | 0.026\* | 0.058\* |
| enriched in antigen presentation (III) (M95.1) | 0.049 | 0.041\* | 0.026\* | 0.081\* |
| respiratory electron transport chain (mitochondrion) (M231) | 0.036 | 0.061\* | 0.060\* | 0.000\* |
| MHC-TLR7-TLR8 cluster (M146) | 0.202 | 0.003\* | 0.001 | 0.618 |
| PLK1 signaling events (M4.2) | 0.052 | 0.230 | 0.126\* | 0.000\* |
| C-MYC transcriptional network (M4.12) | 0.056 | 0.253 | 0.157\* | 0.000\* |
| mitotic cell division (M6) | 0.043 | 0.178 | 0.089\* | 0.000\* |
| RA, WNT, CSF receptors network (monocyte) (M23) | 0.085 | 0.252 | 0.134\* | 0.014\* |
| suppression of MAPK signaling (M56) | 0.077 | 0.280 | 0.172\* | 0.078\* |
| proinflammatory dendritic cell, myeloid cell response (M86.1) | 0.085 | 0.280 | 0.151\* | 0.001\* |
| putative targets of PAX3 (M89.1) | 0.083 | 0.290 | 0.167\* | 0.027\* |
| growth factor induced, enriched in nuclear receptor subfamily 4 (M94) | 0.081 | 0.295 | 0.160\* | 0.005\* |
| mismatch repair (I) (M22.0) | 0.135 | 0.122 | 0.085\* | 0.327 |
| inflammasome receptors and signaling (M53) | 0.074 | 0.158 | 0.153\* | 0.210 |
| putative targets of PAX3 (M89.0) | 0.074 | 0.272 | 0.336\* | 0.142 |
| enriched in activated dendritic cells (I) (M119) | 0.067 | 0.075 | 0.075\* | 0.154 |
| targets of FOSL1/2 (M0) | 0.294 | 0.676 | 0.495 | 0.044\* |
| AP-1 transcription factor network (M20) | 0.227 | 0.623 | 0.448 | 0.004\* |
| mismatch repair (II) (M22.1) | 0.115 | 0.340 | 0.195 | 0.006\* |
| proinflammatory cytokines and chemokines (M29) | 0.325 | 0.455 | 0.279 | 0.039\* |
| cell cycle and growth arrest (M31) | 0.195 | 0.566 | 0.383 | 0.017\* |
| signaling in T cells (I) (M35.0) | 0.159 | 0.428 | 0.378 | 0.013\* |
| chemokines and receptors (M38) | 0.354 | 0.531 | 0.366 | 0.006\* |
| RIG-1 like receptor signaling (M68) | 0.283 | 0.644 | 0.536 | 0.067\* |
| chemokines and inflammatory molecules in myeloid cells (M86.0) | 0.116 | 0.418 | 0.253 | 0.009\* |
| enriched in antigen presentation (II) (M95.0) | 0.196 | 0.450 | 0.382 | 0.005\* |
| TBA (M102) | 0.289 | 0.504 | 0.562 | 0.063\* |
| enriched for TF motif TTCNRGNNNNTTC (M172) | 0.213 | 0.469 | 0.352 | 0.001\* |
| TBA (M190) | 0.171 | 0.503 | 0.340 | 0.010\* |
| chaperonin mediated protein folding (I) (M204.0) | 0.124 | 0.297 | 0.182 | 0.001\* |
| purine nucleotide biosynthesis (M212) | 0.241 | 0.540 | 0.515 | 0.038\* |
| enriched for TF motif TNCATNTCCYR (M232) | 0.633 | 0.818 | 0.673 | 0.074\* |
| TBA (M242) | 0.132 | 0.420 | 0.535 | 0.035\* |
| TBA (M243) | 0.045 | 0.186 | 0.332 | 0.046\* |

\*: Gene sets significantly associated with successful influenza vaccination responses (FDR < 15%).