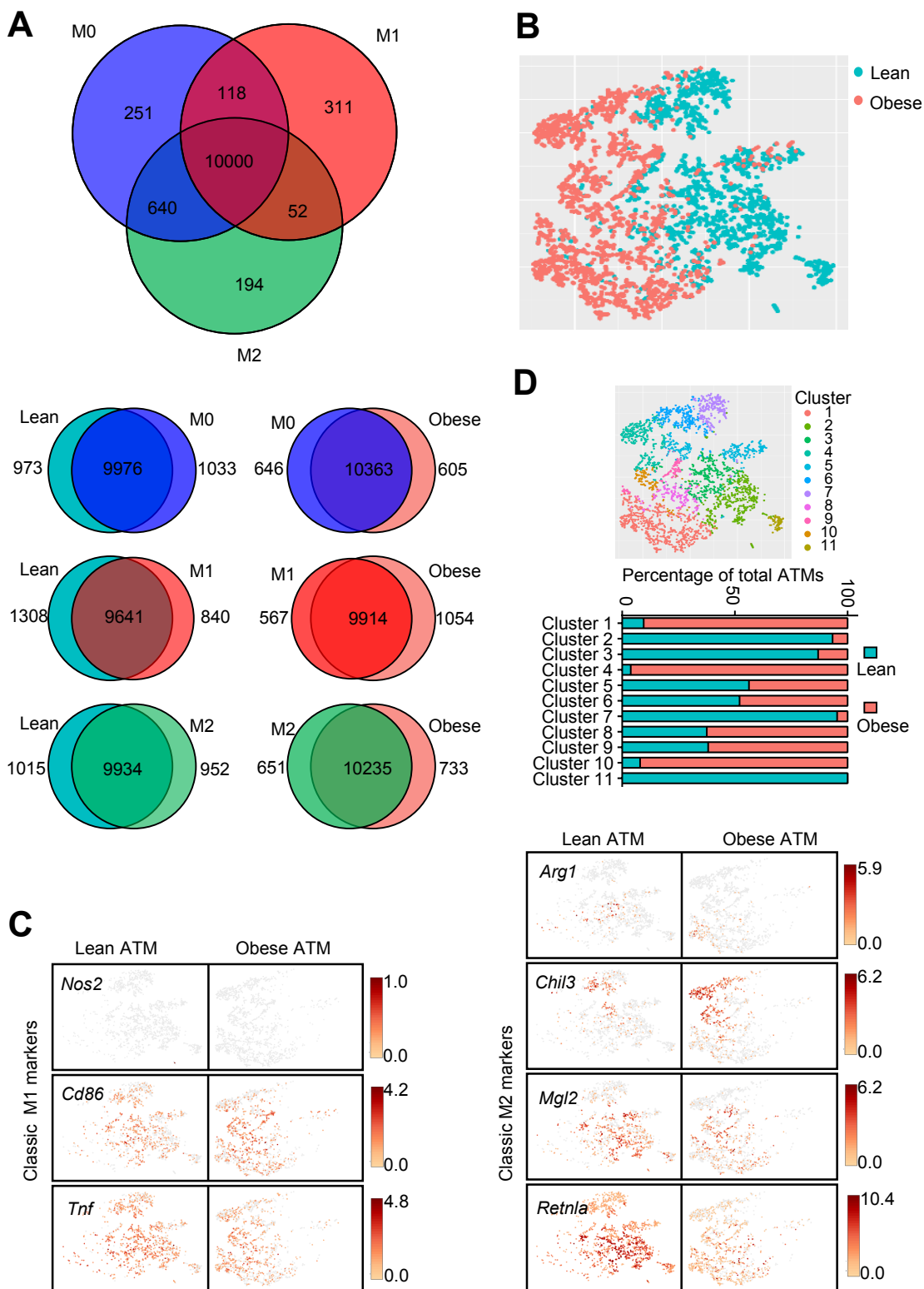
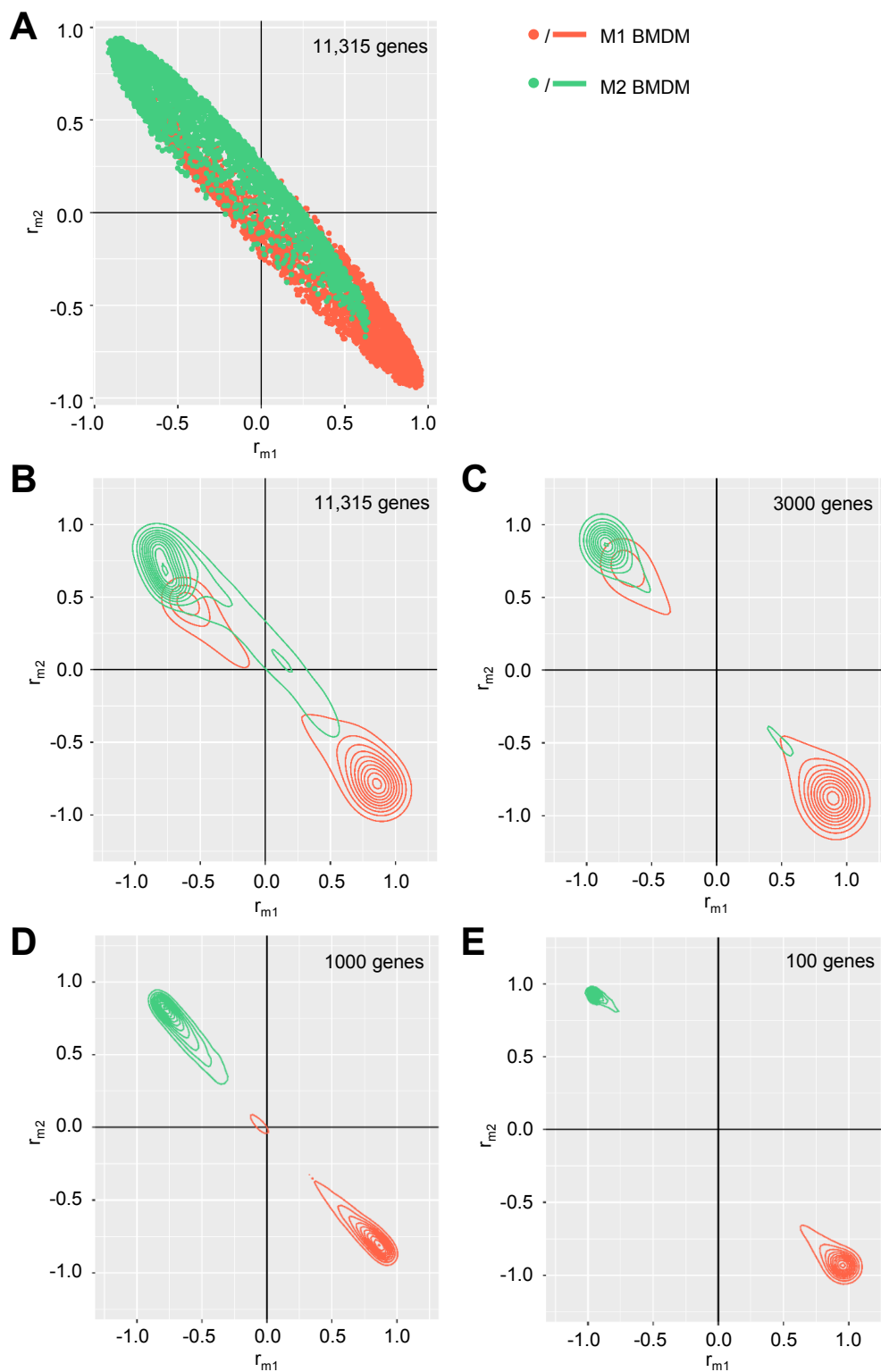




**Supplemental Figure s1. scRNA-seq of BMDMs and ATMs.** (A) Venn Diagram (non-proportional) of genes expressed in >1% of M0, M1, or M2 BMDMs and lean or obese ATMs. (B) t-SNE clustering of scRNA-seq from 1710 lean and 1758 obese ATMs.

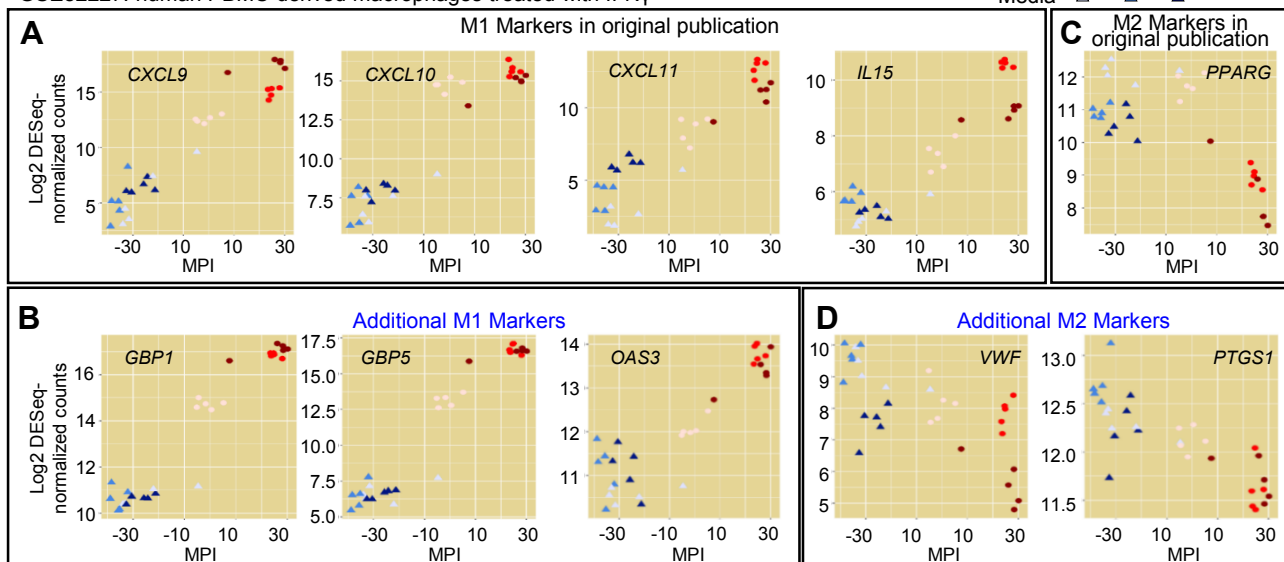
(C) Expression of classic M1 and M2 markers in ATMs by t-SNE plots. (D) t-SNE dimensional reduction of ATMs by cluster (left) and percentage (right); color bars representing log2 transformed expression levels.



**Supplemental Figure s2. Identification of gene sets allows efficient separation of BMDM M1 and M2 activation states.** (A)  $r_{m1}$  vs.  $r_{m2}$  dot plot of M1 and M2 BMDMs including 11,315 genes expressed in >1% of M1 and/or M2 BMDMs. (B)  $r_{m1}$  vs.  $r_{m2}$  contour plot of M1 and M2 BMDMs including 11,315 genes expressed in >1% of M1 and/or M2 BMDMs. (C-E)  $r_{m1}$  vs.  $r_{m2}$  contour plots of M1 and M2 BMDMs using the top 3000, 1000, and 100 most differentially expressed (absolute fold change) and significantly changed genes (FDR-adjusted  $p < 10^{-10}$ ).

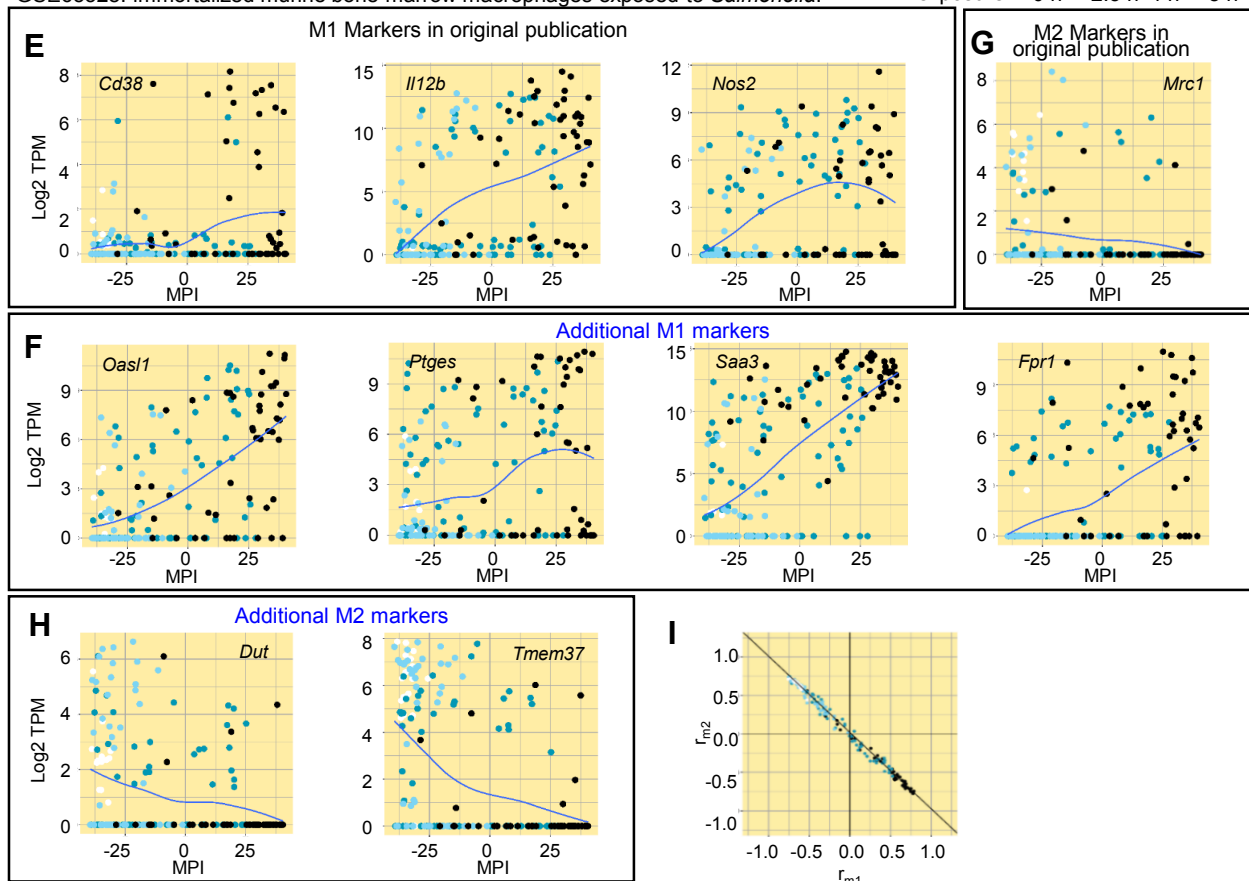
GSE82227: human PBMC-derived macrophages treated with IFN $\gamma$

IFN $\gamma$  2h 6h 24h  
Media  $\triangle$   $\triangle$   $\triangle$



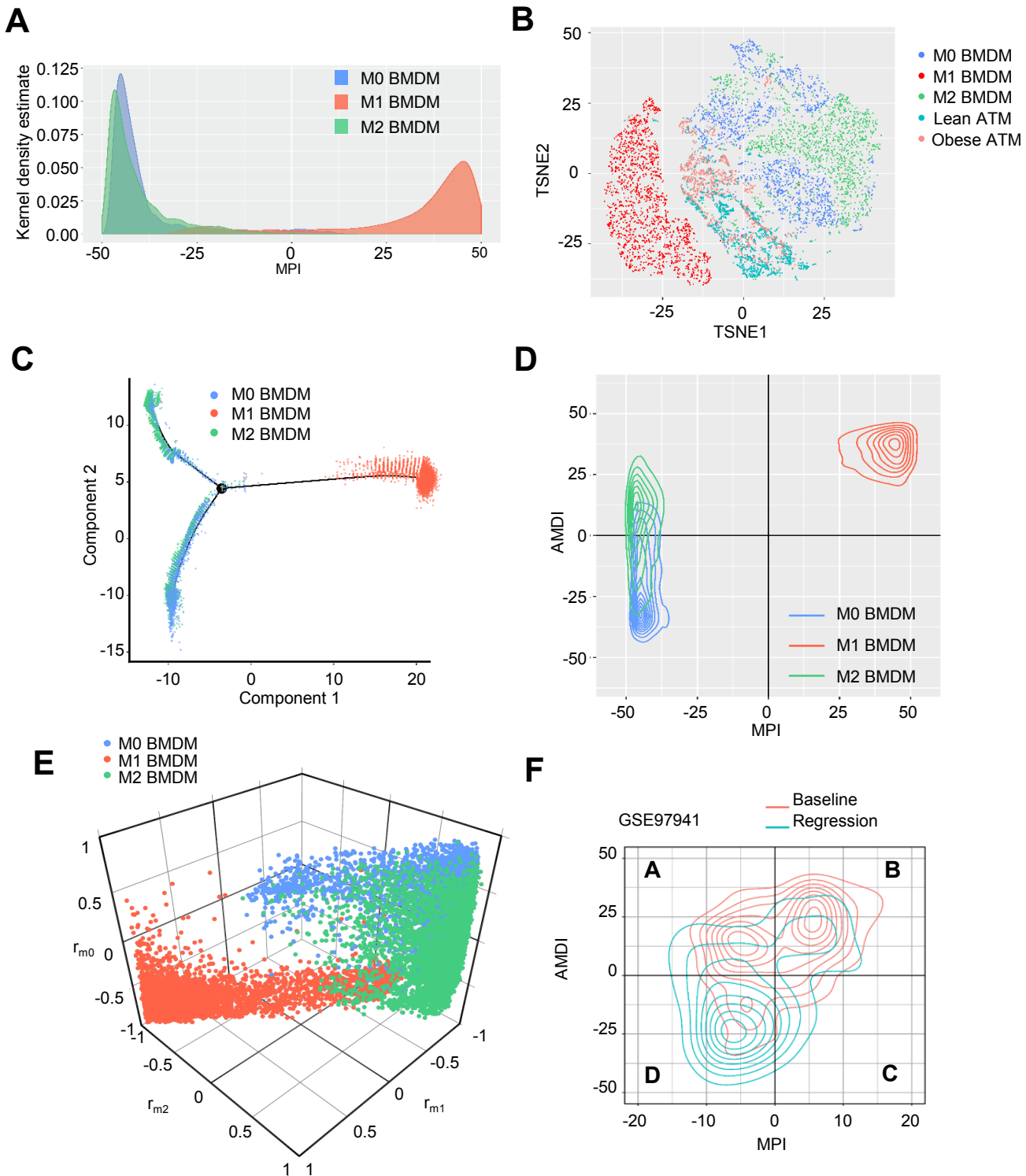
GSE65528: immortalized murine bone marrow macrophages exposed to *Salmonella*.

Time after exposure:  $\circ$  0 h  $\bullet$  2.5 h  $\bullet$  4 h  $\bullet$  8 h

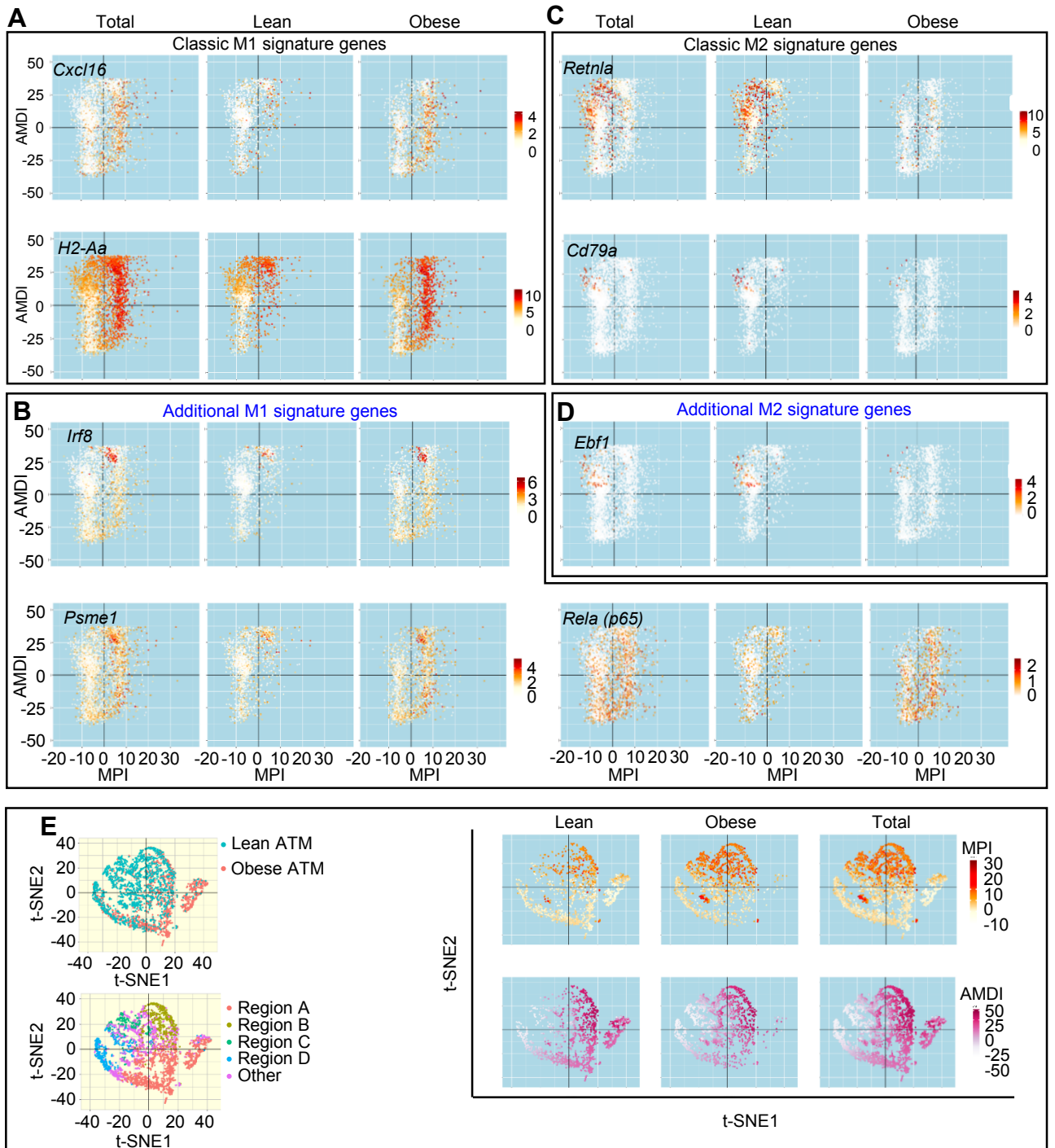


**Supplemental Figure s3. Application of MPI to characterize expression patterns of signature genes from IFN $\gamma$ -stimulated (GSE82227) and *Salmonella*-stimulated (GSE65528) macrophages.** (A-D) Gene-specific expression by MPI plots of human PBMC-derived macrophages stimulated with IFN $\gamma$  for 2, 6, and 24 hours; M1 (A) and M2 (C) activation genes reported in the original publication and additional M1 (B) and M2 (D) signature genes identified by MPI application; expression levels are

log2(DESeq-normalized counts+1). (E-H), Gene-specific expression by MPI plots of immortalized murine BMDMs 0, 2.5, 4, and 8 hours after *Salmonella* exposure; M1 (E) and M2 (G) activation genes reported in the original publication and additional M1 (F) and M2 (H) signature genes identified in the present study; expression levels are log2(TPM+1); Blue curves are loess smoothing lines. (I)  $r_{m1}$  vs.  $r_{m2}$  dot plot of the entire dataset.

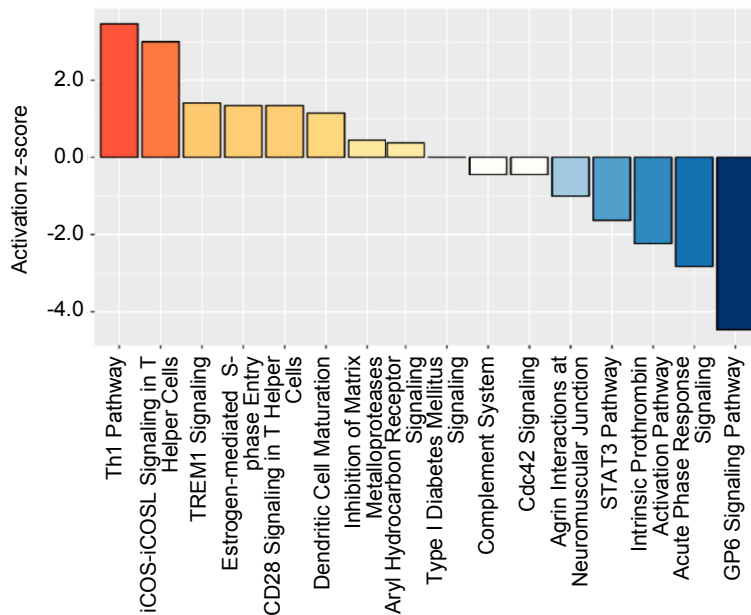


**Supplemental Figure s4. Successful separation of BMDMs with various activation states using PSGs and AMDSGs.** (A) Macrophage distributions along the MPI scale. (B) t-SNE analyses of BMDM M0/M1/M2 and ATM transcriptomes with PSGs and AMDSGs. Single-cell transcriptome profiles of M0, M1, M2 BMDMs (4736 cells from each sample) were analyzed using cell trajectory algorithms (30) with the whole transcriptome (C) that displayed overlapping of M0 and M2 populations. (D) M0, M1, and M2 BMDM separation by MacSpectrum. (E) 3D plot of  $rm_1$ ,  $rm_2$ , and  $rm_0$  (see Methods for calculation details) values from single-cell transcriptome profiles of M0, M1, and M2 populations. (F) Murine aortic macrophages during atherosclerosis progression (baseline) and regression (GSE97941) depicted by MacSpectrum (31), with the four regions (A,B,C, and D) labelled.

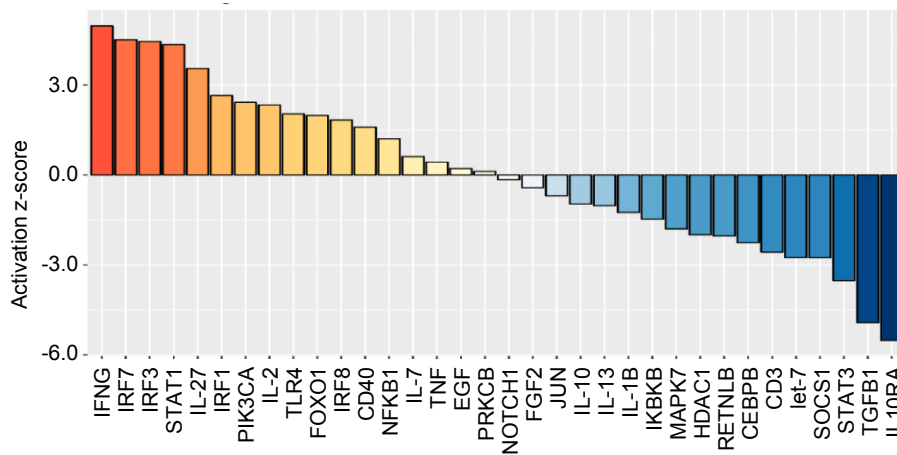


**Supplemental Figure s5. MacSpectrum analysis of ATMs in obesity.** (A-D) Expression of known classic M1 (A) and M2 genes (C), and additional M1 and M2 genes identified in this study (B, D) by MacSpectrum plot of total, lean, and obese ATMs. Expression levels are  $\log_2(\text{UMI counts}+1)$ . (E) t-SNE dimensional reduction of ATMs using PSGs and AMDSGs.

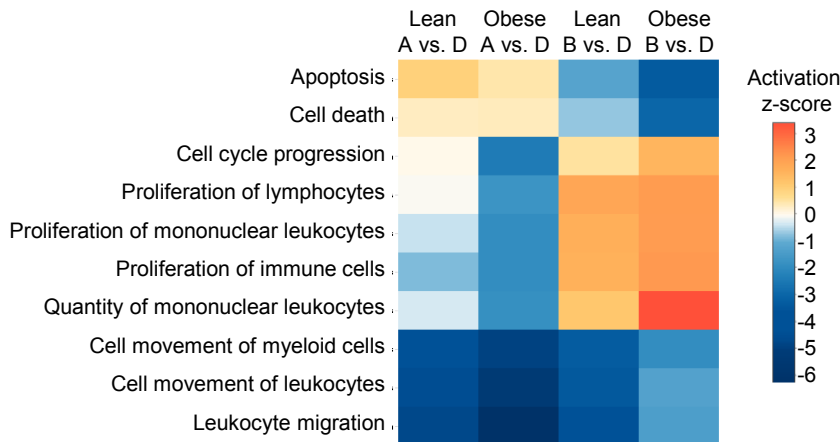
**A**



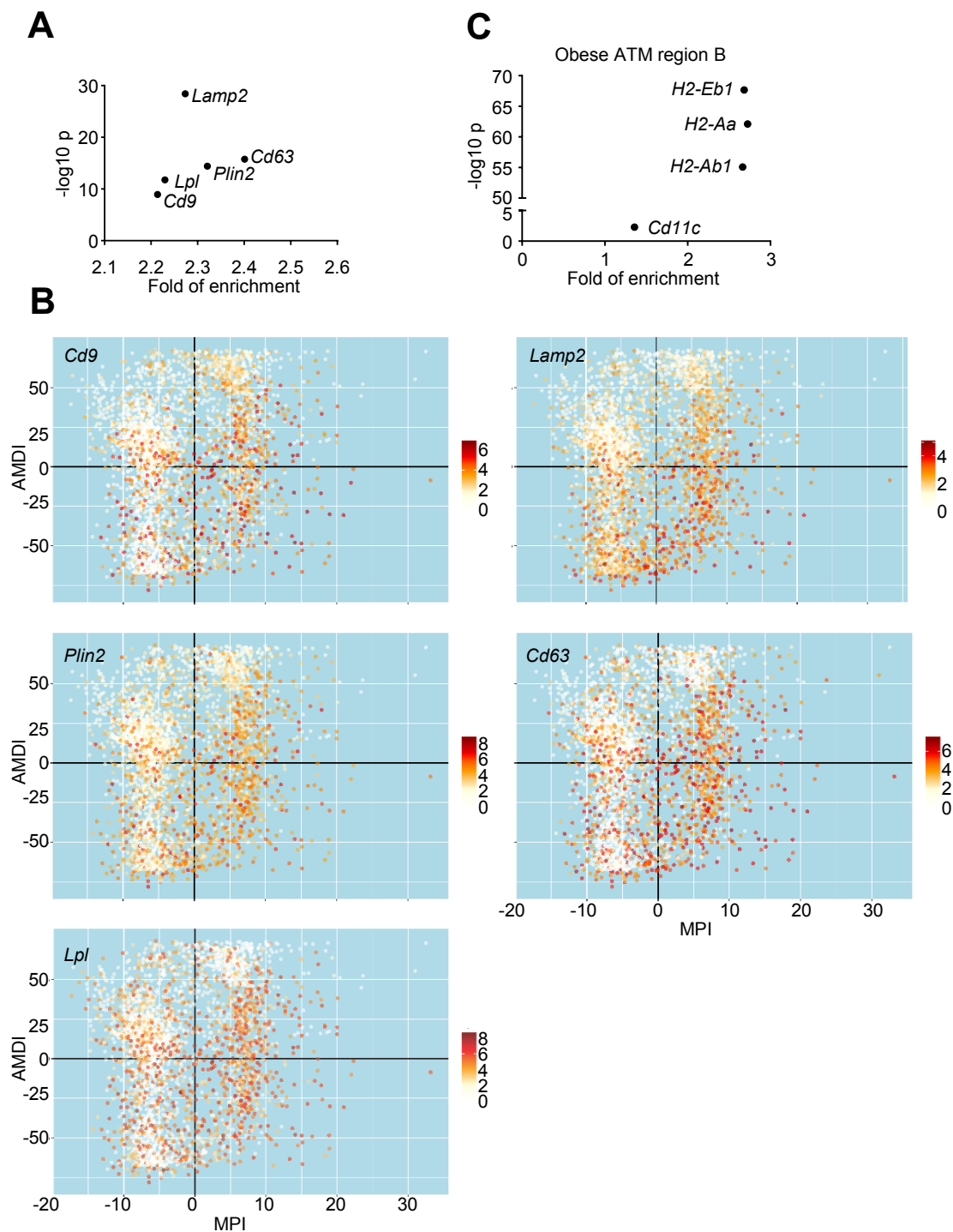
**B**



**C**

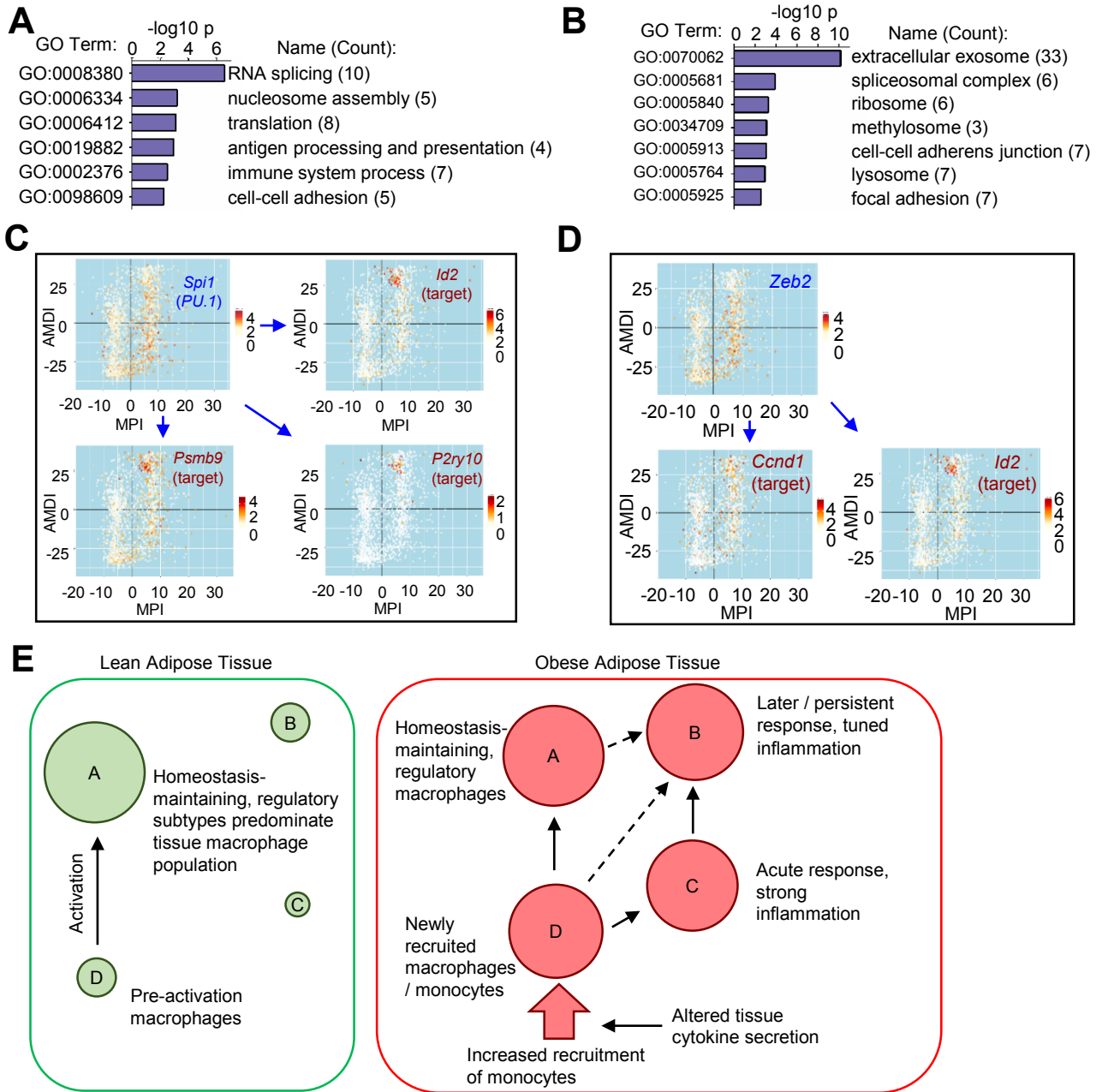


**Supplemental Figure s6. Signaling pathway and regulator analysis of ATM subsets identified by the MacSpectrum.** (A, B) Enriched pathways (A) and upstream regulators (B) in region B vs. A ATMs identified by IPA; positive and negative z-scores indicate estimated activation or inhibition, respectively; all pathways and regulators displayed are significantly different at  $p < 0.05$ . (C) Most enriched biological functions in lean and obese ATMs in regions A and B compared to total (lean+obese) cells in region D identified by IPA; functions listed were significantly enriched ( $p < 10^{-30}$ ) in at least one of the four comparisons (columns); positive and negative z-scores indicate estimated activation or inhibition, respectively.



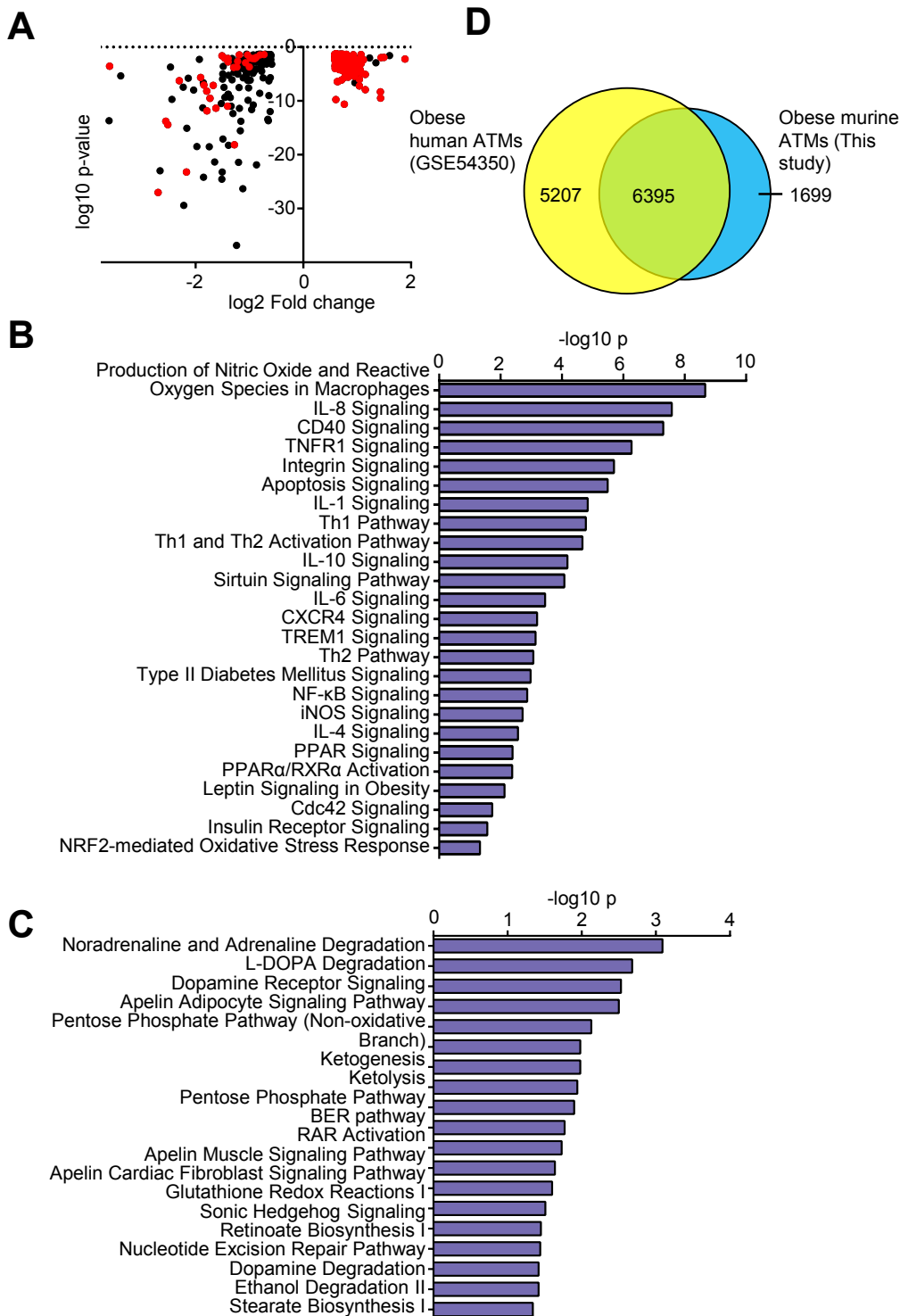
**Supplemental Figure s7. MacSpectrum consistently identified reported features of murine ATMs.** (A), (B) Enrichment of reported Cd9<sup>+</sup> ATM signature genes in region C of obese ATMs. (C) Enrichment of dendritic cell signature genes in region B of

obese ATMs. p-values in (A), (C) were determined by 2-tailed Welch's t-test, color bars in (B) represented log<sub>2</sub>(UMI counts+1) of the genes.



**Supplemental Figure s8. MacSpectrum revealed dynamic changes of ATM subsets in obesity.** Obese or lean ATMs in regions A and B were analyzed using NIH-DAVID Bioinformatics Resources for gene function (A) and subcellular location (B). (C) Enrichment of transcription factor *Spi1* (*PU.1*) in region C, and its targets *Id2*, *Psmb9*, and *P2ry10* in region B of the obese ATMs. (D) Enrichment of transcription factor *Zeb2* in region C, and its targets *Ccnd1* and *Id2* in region B of the obese ATMs. (E) Schematic of ATM subpopulation changes during development of obesity. Under lean condition, a small quantity of less mature/ pre-activation (region D) reside in visceral adipose tissue; a dominant macrophage subset displays an “M2-like” phenotype (region A). Under an obese condition, recruitment of peripheral monocytes (region D) into adipose tissue is enhanced, which could replenish a tissue-maintenance “M2-like” subset (region A); more

importantly, a large portion of them gave rise to an immature but highly inflammatory subpopulation (C) as an initial response to the pro-inflammatory micro-environment in the tissue. Continuous exposure to the pro-inflammatory cues further developed the region C cells into a subpopulation (B) bearing a mature and tuned pro-inflammatory profile; and those cells accounted for the later/more-persistent responses to obesity stress. Targets of regulators in C, D were identified using IPA; expression levels in C, D are  $\log_2(\text{UMI counts}+1)$ .



**Supplemental Figure s9. Profiles of disease-associated gene sets identified by MacSpectrum.** (A) Log2 fold changes and log10  $p$ -values of the 603 genes that showed significant differential expression in obese vs lean monocyte-like cells. The 385 genes that consistently displayed polarization-associated expression are colored red,  $p$ -values were determined by 2-tailed Welch's  $t$ -test. (B) Pathways significantly enriched in the 436 genes that were expressed with distinct macrophage polarization pattern in murine ATMs and displayed significant differential expression ( $p < 0.05$ ) in CD14 $^{+}$  cells isolated from obese human subjects with or without diabetes (GSE54350). (C) Pathways significantly enriched in the 23 gene candidates identified using MacSpectrum in blood monocytes of obese patients. (D) Venn Diagram of the top 50% most abundant genes (average expressions) in obese human (GSE54350) and murine ATMs.

**Supplemental Table s1. The heatmap of normalized gene expression levels (PSG).**

| MPI:     | 0~5      | 5~10     | 10~15    | 15~20    | 20~25    | 25~30    | 30~35    | 35~40     | 40~45    | 45~50    | 50~55    | 55~60    | 60~65    | 65~70    | 70~75    | 75~80    | 80~85    | 85~90    | 90~95    | 95~100   |
|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Lcn2     | 0.164931 | 0        | 0        | 2.085618 | 44.75845 | 31.01304 | 22.93887 | 9.062513  | 0        | 63.19691 | 13.97218 | 12.13055 | 86.07744 | 15.73738 | 42.50906 | 100      | 80.92307 | 61.08739 | 73.71322 | 75.4552  |
| Il1b     | 1.073117 | 0        | 0.283095 | 0.707287 | 9.649399 | 2.771716 | 5.190649 | 7.74538   | 27.77528 | 20.17151 | 53.53786 | 10.45952 | 76.20779 | 49.17321 | 49.88281 | 57.93042 | 52.21867 | 100      | 84.20648 | 81.66737 |
| Krt16    | 0        | 0        | 0        | 6.335696 | 4.93834  | 10.72624 | 24.5041  | 24.55392  | 12.99192 | 9.186318 | 20.44905 | 29.03272 | 28.82937 | 40.90942 | 44.72083 | 42.80772 | 70.01576 | 56.78057 | 89.21563 | 100      |
| Tspan3   | 3.890476 | 2.48183  | 4.784245 | 7.734912 | 0        | 6.90659  | 11.54743 | 3.847183  | 21.12182 | 17.13118 | 18.58828 | 18.0554  | 23.88357 | 38.20089 | 40.45736 | 41.20442 | 55.30588 | 78.6918  | 100      | 97.39805 |
| Ms4a6d   | 0        | 1.850069 | 8.207661 | 20.80568 | 16.8647  | 14.0129  | 19.09144 | 11.60558  | 10.12532 | 17.90823 | 23.84004 | 19.44927 | 27.57239 | 31.76971 | 43.20178 | 51.04449 | 62.19845 | 71.18785 | 92.01666 | 100      |
| Fpr1     | 0        | 0        | 0        | 2.684371 | 15.01412 | 27.13472 | 13.04768 | 11.38366  | 13.28502 | 27.73738 | 27.47253 | 18.30541 | 23.35905 | 29.35251 | 31.0793  | 57.70762 | 50.81226 | 79.73744 | 86.15997 | 100      |
| Il1a     | 0.249092 | 0.097837 | 0        | 1.311804 | 13.44916 | 15.35266 | 15.92608 | 20.88235  | 24.33881 | 34.86503 | 37.52656 | 21.41705 | 26.97866 | 41.56193 | 47.87442 | 59.12794 | 65.31123 | 94.82731 | 82.21884 | 100      |
| Clec4e   | 0        | 0.348139 | 0.524177 | 4.126546 | 8.359667 | 13.9626  | 17.91455 | 17.20705  | 17.48879 | 24.18236 | 19.45136 | 25.56913 | 35.82178 | 46.38156 | 38.70964 | 58.29535 | 70.74982 | 74.2506  | 84.89144 | 100      |
| Ly6i     | 0.04138  | 0.060559 | 0        | 1.053188 | 9.006369 | 13.09771 | 14.35653 | 19.15819  | 12.38475 | 22.78246 | 30.71901 | 33.22295 | 31.84322 | 42.16436 | 48.57337 | 68.38718 | 60.96465 | 81.83715 | 84.26707 | 100      |
| Ifit1bl1 | 0.07938  | 0.116155 | 0        | 2.004987 | 8.237848 | 11.23247 | 10.65908 | 17.1752   | 15.78553 | 17.91054 | 29.1376  | 28.76719 | 30.26912 | 47.07085 | 45.59647 | 74.18148 | 67.00708 | 68.76239 | 89.68657 | 100      |
| Ms4a4c   | 0        | 0.144678 | 0.161736 | 0.329194 | 5.501504 | 11.32916 | 11.30265 | 16.33391  | 15.65177 | 25.65145 | 36.31523 | 36.55962 | 45.47643 | 48.10841 | 59.55525 | 62.57138 | 70.02454 | 80.8639  | 93.64205 | 100      |
| Ms4a6b   | 0        | 0.990745 | 1.455285 | 1.736658 | 7.184948 | 9.401959 | 11.8133  | 17.53666  | 15.74342 | 31.15729 | 36.38339 | 38.31097 | 39.16234 | 43.56273 | 61.90182 | 61.90182 | 71.95159 | 77.9192  | 93.33387 | 100      |
| Tma16    | 0        | 1.209669 | 3.174466 | 2.564681 | 9.773174 | 9.229134 | 12.40281 | 18.81448  | 14.3771  | 32.66686 | 24.6744  | 41.2715  | 41.20196 | 40.92723 | 52.13054 | 59.73244 | 79.01552 | 78.60707 | 90.81006 | 100      |
| Fyb      | 1.584675 | 0        | 1.432058 | 2.187273 | 4.791883 | 6.701434 | 11.12046 | 14.206    | 20.48779 | 25.63925 | 32.0108  | 32.3375  | 38.77772 | 46.62552 | 49.36168 | 64.30849 | 73.77099 | 81.70176 | 93.55203 | 100      |
| Pirb     | 0.766045 | 0        | 0.460176 | 4.640763 | 11.77054 | 12.6885  | 11.6185  | 17.49538  | 21.1263  | 33.31711 | 26.43419 | 28.17665 | 40.16537 | 46.81246 | 46.5813  | 60.15206 | 70.38364 | 80.54869 | 91.18465 | 100      |
| Ccl5     | 0        | 0.024099 | 0.037689 | 0.46977  | 5.006636 | 9.343507 | 11.0126  | 16.25367  | 21.88513 | 27.23829 | 31.00067 | 35.48988 | 38.23623 | 40.60106 | 44.89089 | 49.02028 | 57.2411  | 74.44002 | 92.04628 | 100      |
| GlrX     | 0        | 0.557905 | 1.537678 | 4.150396 | 3.322355 | 6.73694  | 12.09269 | 10.78326  | 19.10241 | 19.42362 | 31.12962 | 27.44531 | 32.81136 | 38.72305 | 52.22953 | 58.2814  | 69.77678 | 75.04793 | 97.61467 | 100      |
| Ptges    | 2.716895 | 0        | 4.815413 | 0.916041 | 2.45555  | 15.0404  | 18.73801 | 18.7835   | 14.87462 | 31.23185 | 20.01319 | 28.83883 | 48.12486 | 36.63184 | 35.48806 | 73.6963  | 48.25341 | 72.05039 | 88.05551 | 100      |
| Sil2a6   | 0        | 0.870254 | 7.554059 | 10.77753 | 17.26446 | 20.91645 | 26.80093 | 8.588892  | 18.14518 | 24.51657 | 19.27202 | 41.29966 | 47.67907 | 35.06274 | 51.72727 | 66.18273 | 69.07751 | 81.73064 | 94.65356 | 100      |
| Il18     | 2.077894 | 0        | 3.615066 | 7.298044 | 5.370516 | 3.959696 | 12.93272 | 17.173932 | 25.78533 | 23.36635 | 21.41842 | 37.07305 | 35.99689 | 26.81525 | 56.03031 | 66.08056 | 67.93871 | 73.30154 | 93.33486 | 100      |
| Ccl8     | 0        | 1.840282 | 15.90544 | 33.6068  | 27.79343 | 36.72183 | 27.58921 | 22.47237  | 30.7596  | 49.20709 | 40.47343 | 53.55568 | 54.56284 | 83.14521 | 86.36677 | 93.63003 | 93.97531 | 100      | 86.42499 | 91.95685 |
| Cd74     | 0        | 8.463858 | 21.92943 | 34.67411 | 33.64848 | 45.48283 | 54.22275 | 66.77427  | 57.96747 | 29.7954  | 44.37288 | 61.49524 | 57.50568 | 71.1492  | 81.05466 | 83.95171 | 90.16482 | 100      | 93.90034 | 99.13987 |
| H2-Eb1   | 0        | 3.43272  | 11.59064 | 19.46826 | 27.29648 | 37.69495 | 47.44426 | 51.59082  | 54.82399 | 36.2074  | 56.14158 | 75.1442  | 56.53499 | 78.22626 | 91.64484 | 84.67466 | 93.24582 | 100      | 86.31573 | 87.4232  |
| H2-Ab1   | 0        | 4.19947  | 12.52819 | 23.78084 | 29.37138 | 43.89834 | 49.75493 | 59.63136  | 55.17042 | 31.93498 | 49.25579 | 64.91642 | 58.92534 | 74.03513 | 84.40846 | 86.73782 | 89.43338 | 100      | 88.9919  | 94.43843 |
| H2-Aa    | 0        | 6.528699 | 17.89386 | 27.97304 | 28.62768 | 39.69918 | 46.92291 | 53.44084  | 52.55016 | 31.01288 | 48.52733 | 67.15725 | 55.48232 | 75.1468  | 85.95272 | 83.97016 | 91.36632 | 100      | 87.43438 | 90.03874 |
| Clec4n   | 0        | 5.621641 | 10.17094 | 19.51663 | 28.43877 | 40.47886 | 18.98669 | 62.18185  | 31.08208 | 26.30084 | 34.53423 | 15.16919 | 46.29404 | 43.5346  | 67.56477 | 70.5096  | 87.42546 | 89.38061 | 92.46787 | 100      |
| Pla2g7   | 0        | 7.788368 | 14.41161 | 26.8347  | 34.68695 | 51.02074 | 48.53714 | 61.51953  | 45.08249 | 40.80936 | 39.41139 | 34.75206 | 47.28466 | 64.35079 | 57.87244 | 76.35789 | 80.55261 | 78.43673 | 84.38596 | 100      |
| Ccl2     | 0        | 5.43396  | 20.22762 | 21.56873 | 25.957   | 18.9931  | 39.14135 | 25.04739  | 27.33289 | 46.16979 | 32.09767 | 35.20272 | 44.68972 | 55.23792 | 71.04601 | 78.13933 | 86.13181 | 89.64713 | 88.36498 | 100      |
| H2-K1    | 0        | 3.408989 | 11.17189 | 20.50738 | 33.61728 | 36.77558 | 37.0308  | 38.99003  | 33.30927 | 36.9044  | 37.21414 | 43.4595  | 47.12311 | 58.09455 | 61.60525 | 71.80244 | 78.05444 | 85.42744 | 89.58341 | 100      |
| H2-M3    | 0        | 2.66731  | 6.918936 | 16.94272 | 23.50108 | 29.84803 | 30.09076 | 38.95496  | 40.67887 | 39.0949  | 34.95868 | 39.71244 | 56.56239 | 60.4243  | 69.79723 | 69.70261 | 84.31752 | 92.4677  | 94.06847 | 100      |
| H2-T23   | 0        | 0.793841 | 11.22978 | 19.90969 | 27.02897 | 37.90571 | 30.94574 | 35.84607  | 39.90075 | 44.2865  | 45.95381 | 38.81026 | 58.84779 | 60.5535  | 69.47111 | 83.35271 | 88.10535 | 93.61564 | 90.80506 | 100      |
| C1qa     | 0        | 5.786812 | 10.28836 | 13.19794 | 26.29494 | 26.28673 | 20.7143  | 27.08035  | 43.29772 | 48.47303 | 50.11835 | 27.49627 | 52.61209 | 93.00513 | 54.89712 | 79.37863 | 91.09925 | 92.66192 | 100      | 96.99929 |
| Il27     | 0.336746 | 0.258515 | 0.162709 | 0        | 18.10661 | 15.9542  | 16.5283  | 20.91265  | 24.33228 | 48.1619  | 44.32647 | 35.37802 | 51.71335 | 64.15544 | 71.49474 | 74.19403 | 72.85803 | 83.94503 | 94.15324 | 100      |
| Ddx58    | 0        | 2.139452 | 3.74693  | 1.180017 | 28.07786 | 20.37179 | 20.74469 | 28.68303  | 30.08697 | 32.76131 | 58.10904 | 32.72505 | 66.73476 | 63.78937 | 65.87314 | 67.21684 | 77.17572 | 81.21527 | 92.56723 | 100      |
| Pgs1     | 0.202046 | 0        | 8.822261 | 14.32026 | 14.33749 | 26.00319 | 28.45723 | 39.86683  | 32.81272 | 40.26966 | 56.93488 | 49.02439 | 61.9306  | 69.62564 | 63.42685 | 80.26653 | 90.37744 | 90.76543 | 90.22153 | 100      |
| Dtx3l    | 0        | 0.853315 | 0.147323 | 8.247569 | 11.6672  | 19.96289 | 25.45625 | 34.60177  | 32.07447 | 39.12131 | 54.45996 | 59.42697 | 64.67091 | 69.66179 | 53.58952 | 75.90119 | 79.00809 | 89.61076 | 91.36367 | 100      |
| Gbp5     | 0        | 0.023829 | 0.135881 | 1.626511 | 15.81484 | 24.90704 | 27.04304 | 29.81401  | 37.34498 | 40.19719 | 51.11796 | 52.51276 | 64.04257 | 71.65238 | 67.9414  | 78.49399 | 84.09741 | 90.03923 | 94.41612 | 100      |
| Trim30a  | 0        | 0.119709 | 1.703321 | 3.984307 | 17.02174 | 25.00341 | 26.38219 | 35.6312   | 31.70325 | 41.45723 | 55.11473 | 60.18798 | 55.40862 | 68.07542 | 69.32205 | 77.05238 | 84.51944 | 88.96685 | 91.86194 | 100      |
| Ifit2    | 0.047421 | 0.045135 | 0        | 2.23559  | 15.68339 | 23.36222 | 24.55696 | 38.66599  | 36.30876 | 45.49666 | 50.44438 | 57.53949 | 59.10654 | 65.30443 | 67.70829 | 76.73581 | 85.10568 | 90.083   | 91.09412 | 100      |
| Oas3     | 0.875773 | 0.939801 | 0        | 2.3536   | 17.54229 | 23.8945  | 25.72802 | 35.65659  | 35.56951 | 43.66347 | 48.73527 | 63.06932 | 60.55704 | 69.28335 | 68.05843 | 78.81161 | 84.89795 | 90.83895 | 95.69722 | 100      |
| Gbp7     | 0        | 0.731335 | 0.181738 | 1.797614 | 18.30481 | 23.93582 | 22.89862 | 34.85554  | 33.67335 | 44.53463 | 50.07571 | 60.21934 | 61.22825 | 72.11783 | 67.5638  | 76.90877 | 86.07197 | 90.76366 | 94.36539 | 100      |
| Oas12    | 0.538302 | 0.177857 | 0        | 1.435534 | 16.45599 | 21.65294 | 24.48745 | 28.43585  | 37.78913 | 48.52388 | 52.78018 | 59.20409 | 62.03597 | 65.10016 | 69.67198 | 77.23813 | 85.05796 | 88.93597 | 95.12056 | 100      |
| Irgm1    | 0        | 0.297181 | 0.972138 | 2.104719 | 13.89918 | 17.36192 | 21.37899 | 31.48702  | 32.543   | 45.79473 | 48.31741 | 58.29313 | 57.94943 | 70.66176 | 68.92047 | 81.5735  | 86.3082  | 90.21649 | 93.85633 | 100      |
| Cd274    | 0.90089  | 0        | 0.038368 | 2.091167 | 14.91407 | 20.59936 | 23.54087 | 33.66661  | 35.7381  | 46.62296 | 53.45277 | 58.38471 | 55.56599 | 67.95786 | 70.93439 | 81.81692 | 83.81745 | 89.8329  | 94.00817 | 100      |
| Sifn8    | 3.301289 | 0        | 2.191235 | 5.142435 | 23.00976 | 23.49091 | 28.86675 | 31.64546  | 23.93651 | 39.7174  | 53.59187 | 57.21727 | 54.92465 | 70.348   | 68.25878 | 78.36998 | 86.85625 | 92.90072 | 100      |          |
| Igtp     | 0.032295 | 0.033268 | 0        | 2.098032 | 15.62636 | 19.76745 | 24.7256  | 24.44844  | 28.33012 | 44.84291 | 42.52882 | 54.95661 | 58.27198 | 62.52148 | 64.48425 | 71.70386 | 81.4448  | 85.39478 | 91.93645 | 100      |
| Tapbp1   | 0.573979 | 0        | 1.550743 | 2.720401 | 15.88167 | 15.58412 | 24.59638 | 29.46677  | 29.84431 | 42.87401 | 40.8697  | 54.40465 | 55.43628 | 63.16119 | 65.      |          |          |          |          |          |

|           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |     |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Ifi47     | 0        | 0.633991 | 2.28945  | 4.172283 | 16.28881 | 20.2214  | 23.68913 | 30.18181 | 32.74555 | 36.70987 | 44.64414 | 52.61826 | 44.85211 | 64.0833  | 61.85782 | 75.82469 | 85.01144 | 88.62782 | 93.31835 | 100      |     |
| Gbp2      | 0        | 0.42978  | 0.599843 | 2.943089 | 17.23045 | 22.61664 | 25.59439 | 29.05242 | 28.90889 | 40.9491  | 39.34363 | 54.36656 | 50.01959 | 65.46797 | 63.57444 | 74.97224 | 82.36336 | 85.88429 | 92.97712 | 100      |     |
| Stat1     | 0.240125 | 0        | 0.485868 | 3.922373 | 17.41034 | 22.717   | 29.7016  | 32.86678 | 33.74833 | 39.41434 | 40.09341 | 56.79671 | 51.81108 | 65.2663  | 63.74876 | 73.65046 | 84.0244  | 88.33051 | 95.227   | 100      |     |
| Gbp9      | 0        | 0.305458 | 1.511217 | 3.79     | 16.04266 | 24.32026 | 29.13844 | 24.85248 | 36.63944 | 41.10141 | 49.45635 | 46.31179 | 47.70299 | 68.11918 | 66.30673 | 71.62036 | 84.10544 | 87.94059 | 91.94999 | 100      |     |
| Apobec3   | 0        | 2.329389 | 4.065535 | 4.244304 | 14.42873 | 22.55109 | 25.07709 | 23.69049 | 39.07834 | 37.10797 | 49.11271 | 53.88175 | 53.4698  | 63.65288 | 65.88519 | 76.79473 | 84.93453 | 92.88672 | 96.15166 | 100      |     |
| Parp10    | 0        | 2.823971 | 4.544528 | 2.526684 | 23.87594 | 30.99206 | 20.95357 | 31.92565 | 40.22676 | 58.01379 | 44.30598 | 64.04469 | 60.76989 | 66.65895 | 58.65771 | 66.7419  | 81.11347 | 87.96365 | 88.77906 | 100      |     |
| Icam1     | 0        | 1.251738 | 4.167556 | 4.208425 | 31.36362 | 29.56241 | 29.58702 | 39.56886 | 28.38306 | 49.99614 | 51.82644 | 57.07597 | 59.61119 | 61.59158 | 68.62569 | 74.56137 | 80.03049 | 87.52402 | 90.22301 | 100      |     |
| Cd69      | 0        | 0.673706 | 0.851657 | 3.330465 | 23.76963 | 24.3278  | 19.78978 | 32.88449 | 27.03984 | 56.60959 | 52.00593 | 56.05334 | 59.3118  | 63.49529 | 61.69869 | 79.95169 | 84.82395 | 85.57603 | 98.83886 | 100      |     |
| Tmem2     | 0        | 1.441201 | 2.56553  | 4.116373 | 15.845   | 24.54489 | 20.35395 | 35.78652 | 37.3384  | 36.33445 | 31.75148 | 49.60192 | 62.43931 | 68.74622 | 60.16085 | 75.79546 | 88.31259 | 86.80744 | 90.8175  | 100      |     |
| Herc6     | 0.667202 | 0        | 1.652534 | 4.404066 | 20.22927 | 26.25673 | 25.48411 | 35.84715 | 30.75113 | 37.46097 | 40.54535 | 54.97359 | 61.626   | 71.06217 | 67.55526 | 73.29367 | 79.21238 | 84.90895 | 92.89807 | 100      |     |
| Ifi203    | 0        | 0.210153 | 2.262351 | 5.274124 | 17.05925 | 21.87382 | 22.2769  | 34.64887 | 32.51669 | 41.98263 | 34.69863 | 50.15797 | 61.73789 | 67.43976 | 62.20357 | 67.09185 | 79.64431 | 85.71694 | 93.09594 | 100      |     |
| Ifi44     | 0.069956 | 0.30668  | 0.718547 | 0        | 13.72124 | 21.97205 | 18.5949  | 31.8885  | 35.07516 | 51.4035  | 40.5086  | 49.8487  | 53.86279 | 61.23551 | 64.25054 | 66.72676 | 76.32551 | 81.66819 | 91.60224 | 100      |     |
| Hcls1     | 0        | 0.183569 | 5.960956 | 8.608413 | 21.32551 | 24.89365 | 28.24598 | 31.74068 | 33.41835 | 42.25861 | 50.39913 | 43.55858 | 49.47286 | 58.31403 | 56.14115 | 70.8051  | 79.63685 | 83.52461 | 91.12753 | 100      |     |
| Rsad2     | 0.32865  | 0        | 0.653421 | 3.430289 | 17.71859 | 22.5089  | 28.8965  | 34.11664 | 34.24935 | 33.84674 | 49.16332 | 54.13914 | 54.67879 | 60.98333 | 66.17924 | 70.02029 | 76.47448 | 85.14274 | 93.41818 | 100      |     |
| Slco3a1   | 0.0409   | 0        | 0.140574 | 1.042405 | 18.96957 | 29.05677 | 27.01927 | 29.64085 | 28.51303 | 35.45798 | 42.94425 | 47.63871 | 55.45164 | 58.75512 | 64.33932 | 66.07934 | 76.06732 | 84.85054 | 93.24905 | 100      |     |
| Ptk2b     | 0        | 1.36981  | 3.250492 | 3.522711 | 23.83543 | 21.31174 | 33.03658 | 49.72705 | 38.87514 | 58.10808 | 51.85281 | 54.04381 | 54.62057 | 77.74161 | 64.9277  | 79.52497 | 88.03974 | 90.48687 | 95.89195 | 100      |     |
| Tnf       | 0        | 0.61553  | 1.41483  | 3.974946 | 20.47548 | 24.44526 | 35.1789  | 46.56011 | 25.56688 | 41.29686 | 46.81764 | 59.69482 | 57.94111 | 78.42742 | 67.31716 | 75.15966 | 80.26167 | 88.89265 | 93.39782 | 100      |     |
| Rnf213    | 0.740387 | 0        | 0.597031 | 3.028358 | 21.13944 | 21.3949  | 26.15907 | 26.6548  | 43.90132 | 38.4873  | 42.54997 | 45.08306 | 57.94083 | 52.49031 | 75.21592 | 63.55891 | 75.54935 | 83.15967 | 88.11571 | 92.78655 | 100 |
| Parp14    | 3.800876 | 1.487578 | 0        | 3.895962 | 24.66963 | 27.49637 | 30.14339 | 39.62635 | 38.89759 | 38.70906 | 55.1107  | 64.48054 | 56.88855 | 71.94676 | 67.37547 | 76.66481 | 83.50042 | 88.7215  | 93.05893 | 100      |     |
| H2-DMa    | 0        | 4.215117 | 9.348375 | 17.70258 | 17.676   | 26.35783 | 28.23225 | 34.0007  | 36.71684 | 40.63244 | 45.04725 | 58.97404 | 52.1517  | 76.87832 | 74.47762 | 80.65391 | 92.50187 | 99.56739 | 93.94878 | 100      |     |
| H2-DMb1   | 0        | 3.967084 | 12.25872 | 16.43403 | 14.37675 | 24.84003 | 28.35164 | 33.90134 | 39.35737 | 37.49052 | 32.00181 | 58.20249 | 58.8432  | 73.00083 | 73.2763  | 82.7904  | 89.66081 | 100      | 96.34372 | 98.96026 |     |
| Znfx1     | 2.922185 | 0        | 8.574519 | 8.079707 | 18.37236 | 18.70617 | 17.7079  | 31.31692 | 34.20092 | 40.14642 | 39.57104 | 62.48864 | 61.9615  | 76.96079 | 70.33426 | 76.78393 | 81.41908 | 87.14555 | 92.19151 | 100      |     |
| H2-Q7     | 0        | 1.803171 | 8.407704 | 7.887286 | 23.42464 | 26.44916 | 27.25736 | 32.55924 | 37.07305 | 48.37166 | 42.78844 | 56.72296 | 66.07286 | 71.99665 | 79.44304 | 81.67394 | 81.25615 | 91.25227 | 92.95397 | 100      |     |
| Irgm2     | 2.286545 | 2.165182 | 0        | 4.534219 | 15.89705 | 21.3427  | 26.16602 | 28.16664 | 35.26415 | 47.60506 | 47.14891 | 67.2523  | 63.7158  | 68.0531  | 73.74802 | 81.56503 | 80.88651 | 90.69783 | 97.20539 | 100      |     |
| Slamf8    | 0.603505 | 0        | 1.482185 | 6.4655   | 16.14981 | 19.31075 | 22.77149 | 35.50587 | 35.47593 | 48.8841  | 52.28592 | 68.47117 | 54.73071 | 71.34011 | 74.4366  | 84.04522 | 95.46049 | 96.1143  | 97.01118 | 100      |     |
| Trim30d   | 0        | 0.291187 | 1.720075 | 4.27376  | 17.2212  | 20.85386 | 24.81444 | 30.39793 | 31.86476 | 52.02305 | 48.14441 | 65.0537  | 53.43034 | 76.4042  | 67.79537 | 78.18904 | 90.79604 | 88.76588 | 97.04228 | 100      |     |
| Pydc4     | 0        | 0.094827 | 0.147117 | 0.776091 | 10.41755 | 20.86801 | 26.23867 | 26.82558 | 31.56886 | 49.95059 | 42.93787 | 52.26545 | 51.407   | 72.78783 | 70.70075 | 74.00862 | 87.08462 | 89.30023 | 96.58663 | 100      |     |
| Cxcl9     | 0        | 0.011916 | 0        | 0.727934 | 9.497676 | 16.65813 | 21.62536 | 26.19114 | 41.45095 | 45.6785  | 41.97691 | 51.17796 | 54.55894 | 71.46281 | 80.51878 | 81.22358 | 90.51509 | 94.38945 | 93.97949 | 100      |     |
| Cycs      | 0        | 1.087631 | 7.98569  | 9.45604  | 11.62334 | 19.44939 | 26.14205 | 30.00198 | 39.92345 | 47.10093 | 49.05344 | 54.59382 | 55.02185 | 68.07974 | 71.9526  | 80.92111 | 87.83348 | 92.43051 | 93.76274 | 100      |     |
| Ptgs2     | 0.108312 | 0        | 0.084383 | 4.20612  | 26.23241 | 27.29698 | 35.9245  | 35.07737 | 45.28091 | 50.29854 | 47.73379 | 53.00412 | 50.66038 | 46.63122 | 77.65477 | 68.78959 | 79.44253 | 87.19359 | 94.06703 | 100      |     |
| Ccr12     | 0.718236 | 0        | 11.36391 | 15.71125 | 30.35238 | 28.01461 | 35.15733 | 24.10013 | 31.65411 | 38.31206 | 43.53443 | 52.16806 | 54.1216  | 49.08488 | 77.09322 | 76.95393 | 76.9175  | 76.74946 | 91.20738 | 100      |     |
| Helz2     | 0        | 1.329067 | 1.424453 | 3.664528 | 26.89759 | 35.6685  | 28.73548 | 38.06517 | 31.55026 | 53.36722 | 43.27036 | 59.25989 | 61.03097 | 42.64808 | 60.59016 | 85.4698  | 81.29062 | 89.29992 | 94.63931 | 100      |     |
| Pla2g4a   | 0        | 0.479454 | 4.78639  | 11.24138 | 25.62628 | 33.80846 | 37.76049 | 45.69887 | 34.56825 | 46.84398 | 38.11676 | 70.37141 | 44.34367 | 56.12527 | 73.46085 | 80.121   | 86.14839 | 86.72596 | 92.0788  | 100      |     |
| Parp12    | 0        | 1.63026  | 2.850322 | 4.501987 | 20.27878 | 30.47892 | 31.75519 | 29.55658 | 26.97251 | 39.05906 | 30.99635 | 62.72212 | 52.22091 | 57.48019 | 60.65842 | 73.22936 | 84.36893 | 94.13054 | 92.19057 | 100      |     |
| F830016BC | 0.280627 | 0        | 0.126111 | 1.034903 | 16.46255 | 29.60987 | 21.44992 | 35.61392 | 30.23659 | 41.84938 | 36.73177 | 60.25797 | 52.28468 | 54.06605 | 76.2674  | 79.31527 | 82.59889 | 87.57694 | 94.19064 | 100      |     |
| Gm12185   | 1.754515 | 2.014295 | 0        | 1.6098   | 19.22136 | 33.9678  | 32.65115 | 33.9122  | 29.01405 | 40.91642 | 42.25414 | 60.01736 | 52.93429 | 47.31523 | 68.98002 | 77.83892 | 78.67971 | 90.63363 | 92.29052 | 100      |     |
| Cnn3      | 0        | 0.894104 | 1.475193 | 1.669437 | 20.03042 | 30.10851 | 31.30306 | 35.49443 | 46.01915 | 49.19729 | 57.76878 | 59.73011 | 62.15546 | 73.83778 | 75.3351  | 86.40973 | 94.07128 | 96.3286  | 98.86516 | 100      |     |
| Ilgp1     | 0        | 0.01405  | 0.359681 | 1.700953 | 18.58662 | 26.63796 | 25.77974 | 38.77863 | 35.98564 | 48.87252 | 47.85163 | 59.69886 | 54.53337 | 66.50135 | 68.36763 | 83.99834 | 91.59958 | 91.58313 | 92.44748 | 100      |     |
| Cflar     | 0.596748 | 0        | 3.176521 | 5.611972 | 22.46325 | 21.96256 | 27.65924 | 40.76198 | 36.99668 | 51.836   | 53.25684 | 57.92908 | 57.53331 | 70.43963 | 67.20454 | 82.21545 | 86.35581 | 90.86969 | 95.24235 | 100      |     |
| Fgl2      | 1.220381 | 0        | 1.197855 | 7.420281 | 23.3284  | 32.58936 | 27.51897 | 36.89049 | 37.58905 | 50.05391 | 47.75067 | 55.72481 | 59.02524 | 69.56164 | 72.16898 | 82.24861 | 93.87485 | 96.00666 | 95.23689 | 100      |     |
| Tap1      | 0        | 0.344681 | 2.311798 | 8.347108 | 26.92269 | 34.68504 | 31.15887 | 38.89451 | 35.22734 | 43.91229 | 48.85993 | 59.86767 | 59.45728 | 70.24977 | 68.36246 | 80.76761 | 88.53809 | 90.90168 | 90.90742 | 100      |     |
| H2-Q6     | 0.06724  | 0        | 4.345518 | 5.872809 | 31.85038 | 32.3287  | 35.19621 | 37.88394 | 32.46203 | 44.81103 | 53.99977 | 68.65142 | 60.54005 | 64.3618  | 92.20367 | 85.03815 | 83.71982 | 92.44361 | 95.38653 | 100      |     |
| Il15ra    | 1.497848 | 0        | 1.034877 | 3.533985 | 26.32388 | 36.22122 | 24.68215 | 37.15698 | 27.76159 | 40.2789  | 55.56638 | 67.11786 | 72.32535 | 68.80007 | 77.45595 | 78.89426 | 90.51465 | 91.11982 | 96.74799 | 100      |     |
| H2-Q4     | 0        | 0.650094 | 8.887526 | 5.854782 | 32.41962 | 34.02351 | 34.37841 | 42.1657  | 28.97055 | 34.12615 | 43.78951 | 66.99434 | 65.09614 | 65.83016 | 71.73838 | 80.15864 | 86.84665 | 91.36716 | 95.97639 | 100      |     |
| Serpinb9  | 0        | 0.169391 | 3.8044   | 4.36441  | 19.97612 | 20.40626 | 18.29511 | 40.69235 | 39.13851 | 32.68092 | 38.51795 | 56.317   | 62.75974 | 50.48073 | 80.06692 | 75.34337 | 94.94484 | 92.04319 | 90.03064 | 100      |     |
| Slc6a19   | 0.468028 | 0.228708 | 0        | 1.982513 | 26.01399 | 21.98986 | 25.80655 | 49.38582 | 31.10825 | 44.29336 | 32.63657 | 67.36048 | 75.08625 | 60.97205 | 63.47362 | 72.42788 | 86.95759 | 89.92733 | 90.9144  | 100      |     |
| Nlrc5     | 0        | 0.499319 | 1.448345 | 9.800724 | 44.65266 | 33.93155 | 39.13564 | 51.44442 | 48.36157 | 32.74956 | 39.10311 | 57.73576 | 61.36999 | 59.29229 | 73.62528 | 78.49787 | 90.9162  | 88.28659 | 94.28334 | 100      |     |
| Nod1      | 0        | 0.034438 | 1.567097 | 3.235195 | 18.66922 | 35.45626 | 40.16932 | 30.88524 | 43.74335 | 29.50977 | 39.89246 | 65.17304 | 59.80728 | 65.58421 |          |          |          |          |          |          |     |

|          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |     |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Prdx1    | 0        | 2.224155 | 8.483287 | 13.41028 | 16.7315  | 26.66765 | 29.23896 | 40.62282 | 55.27547 | 57.83517 | 62.02785 | 52.05402 | 51.1224  | 48.15486 | 53.36343 | 70.43412 | 87.28678 | 87.25248 | 84.17705 | 100 |
| Hmox1    | 0        | 3.57931  | 12.24919 | 16.5799  | 17.9423  | 31.14998 | 31.92888 | 41.84404 | 48.72483 | 51.64181 | 55.98205 | 42.9196  | 43.79393 | 54.75001 | 51.26367 | 68.30344 | 87.177   | 90.74963 | 87.83273 | 100 |
| Mmp14    | 0        | 2.656532 | 3.346587 | 8.397534 | 20.32774 | 32.76896 | 22.36729 | 21.68534 | 34.71364 | 36.15284 | 74.06046 | 41.39144 | 54.35382 | 45.95502 | 54.91877 | 57.91971 | 81.89719 | 90.39472 | 97.68507 | 100 |
| Hck      | 0        | 0.635177 | 10.56809 | 8.47671  | 15.33667 | 23.11256 | 25.95535 | 28.81245 | 37.76839 | 40.28244 | 61.38144 | 37.03404 | 38.19935 | 50.04965 | 50.53199 | 65.62884 | 73.91399 | 85.36674 | 88.47287 | 100 |
| Cfb      | 0        | 0        | 0        | 1.503477 | 37.29592 | 32.58928 | 26.51985 | 38.75792 | 29.69158 | 5.43112  | 27.23377 | 38.92002 | 33.07522 | 49.20989 | 56.71744 | 67.94453 | 73.72368 | 83.80959 | 93.14218 | 100 |
| Slc28a2  | 0.203257 | 0        | 4.518202 | 2.999423 | 24.24933 | 22.60192 | 21.14115 | 42.04638 | 15.68887 | 27.11507 | 36.76919 | 40.10828 | 58.65509 | 43.84943 | 63.29269 | 55.40264 | 68.40807 | 87.72324 | 88.97676 | 100 |
| Ass1     | 0        | 9.579987 | 10.16569 | 15.37497 | 23.80882 | 19.73464 | 22.68611 | 23.74792 | 28.61326 | 15.91636 | 27.84898 | 47.99038 | 60.13929 | 44.78229 | 62.754   | 69.1593  | 77.51597 | 89.00025 | 86.82266 | 100 |
| Sema4a   | 0        | 2.620917 | 1.114003 | 9.329102 | 28.84824 | 38.87598 | 38.82286 | 41.14715 | 32.82282 | 24.63963 | 35.01014 | 39.90116 | 56.33703 | 63.82085 | 44.08496 | 62.05904 | 71.56532 | 84.27136 | 93.91326 | 100 |
| C3       | 0        | 0.74956  | 0.902348 | 2.723827 | 23.97167 | 29.04333 | 24.37641 | 33.76378 | 23.5827  | 34.6498  | 36.76555 | 58.18342 | 46.06707 | 60.99734 | 59.25064 | 62.86277 | 72.422   | 80.16835 | 89.19668 | 100 |
| Acs1l    | 1.080469 | 0        | 0.58826  | 3.52585  | 17.63459 | 26.29377 | 21.481   | 40.7079  | 33.14007 | 40.1988  | 35.85934 | 43.37408 | 46.89654 | 54.02768 | 44.96002 | 64.19438 | 78.93631 | 84.86324 | 87.68902 | 100 |
| Ddx60    | 0.34306  | 0        | 0.032844 | 1.649113 | 25.2526  | 33.00386 | 25.41799 | 42.88804 | 36.52679 | 34.77926 | 37.7234  | 42.15771 | 35.15767 | 54.9885  | 58.57703 | 61.23807 | 74.12198 | 76.97533 | 86.66692 | 100 |
| Gsdmd    | 0        | 3.571641 | 7.850134 | 20.02053 | 21.39792 | 33.17726 | 31.4446  | 23.5434  | 29.46167 | 39.19659 | 35.09053 | 37.18    | 36.38261 | 42.8992  | 60.41278 | 67.59641 | 77.88619 | 84.75671 | 93.11255 | 100 |
| Tuba1a   | 0        | 1.674227 | 13.52984 | 16.67749 | 16.46874 | 19.64206 | 28.9487  | 31.22617 | 42.78319 | 27.15604 | 34.71007 | 41.82257 | 37.49245 | 38.03019 | 50.69434 | 71.51008 | 78.6282  | 83.49545 | 90.83935 | 100 |
| Ubc      | 0        | 1.292427 | 11.38815 | 20.36066 | 27.33563 | 22.84152 | 29.79524 | 28.5513  | 35.59865 | 32.83157 | 32.00583 | 41.93082 | 38.02147 | 43.56    | 53.01801 | 60.204   | 78.51325 | 79.66781 | 91.1984  | 100 |
| Il2rg    | 2.405549 | 0        | 6.256679 | 11.18162 | 21.70745 | 24.61519 | 26.12933 | 23.3014  | 25.8421  | 27.36708 | 39.95901 | 45.38229 | 47.74985 | 57.68752 | 59.19204 | 65.88001 | 73.27432 | 81.4517  | 92.29726 | 100 |
| Tapbp    | 0.964668 | 0        | 1.438333 | 10.51519 | 22.88604 | 27.79652 | 28.9492  | 30.17154 | 24.01413 | 27.71154 | 37.44813 | 46.51995 | 45.66765 | 61.63163 | 59.87658 | 67.64256 | 80.41426 | 86.47176 | 91.6043  | 100 |
| Mx1      | 0        | 0.819778 | 0.345729 | 3.967632 | 17.16558 | 22.38892 | 22.8743  | 29.35576 | 19.70949 | 25.86691 | 36.53962 | 48.60217 | 45.76019 | 54.36718 | 59.49114 | 67.93776 | 77.55542 | 80.02489 | 96.89804 | 100 |
| Plpp1    | 0        | 2.056832 | 1.273516 | 8.176546 | 15.00093 | 22.84813 | 25.20397 | 20.97134 | 24.77796 | 21.63814 | 37.57854 | 50.50148 | 44.99615 | 52.45685 | 61.39825 | 63.18429 | 84.66778 | 86.5976  | 93.32574 | 100 |
| Slc11a1  | 0.091898 | 0        | 3.483902 | 11.68063 | 23.07889 | 26.03381 | 27.29672 | 32.86023 | 30.45259 | 35.00843 | 33.06558 | 42.09747 | 37.43818 | 56.43717 | 58.63971 | 71.85639 | 83.91239 | 86.71604 | 90.12664 | 100 |
| Samhd1   | 0        | 0.214428 | 2.758168 | 8.257847 | 19.40446 | 24.70221 | 23.49541 | 27.35173 | 27.14393 | 32.83244 | 32.85883 | 46.83097 | 41.49092 | 54.04912 | 55.13128 | 72.4192  | 81.68674 | 86.32998 | 89.9008  | 100 |
| Sp110    | 1.033963 | 0        | 2.832402 | 7.92303  | 12.78413 | 19.55156 | 26.67118 | 32.93391 | 34.33559 | 34.03522 | 51.47822 | 52.92024 | 40.00398 | 57.99823 | 54.02771 | 73.48279 | 77.55631 | 82.1234  | 91.19877 | 100 |
| Nfkbia   | 0        | 1.31914  | 5.034891 | 7.39203  | 16.90882 | 17.44149 | 23.50828 | 23.59057 | 27.66503 | 29.25424 | 36.02635 | 48.9104  | 44.05921 | 54.70214 | 59.31596 | 66.16664 | 74.19371 | 82.04815 | 90.07774 | 100 |
| Slamf7   | 0        | 0.764463 | 4.177402 | 13.28356 | 14.95623 | 21.95955 | 24.8333  | 27.68461 | 30.86024 | 33.66119 | 34.89753 | 44.96053 | 41.75195 | 53.60992 | 62.8262  | 66.13919 | 77.00984 | 84.50367 | 93.2365  | 100 |
| AA467197 | 0        | 7.705862 | 13.64118 | 19.51905 | 14.09297 | 17.09671 | 38.28446 | 31.7132  | 26.11201 | 25.24975 | 32.09849 | 46.92697 | 46.58298 | 52.92861 | 65.241   | 77.91614 | 81.39138 | 85.11567 | 93.52798 | 100 |
| Ptpn6    | 0.516247 | 0        | 0.610705 | 12.50512 | 20.8626  | 27.53989 | 31.39318 | 31.2542  | 32.69276 | 27.04256 | 43.16212 | 48.83188 | 50.62889 | 51.18607 | 60.93848 | 69.70706 | 84.54229 | 93.6401  | 98.38819 | 100 |
| Fpr2     | 0        | 0        | 0        | 0.801478 | 12.58605 | 19.59906 | 20.68613 | 30.65414 | 13.72116 | 31.09719 | 26.1467  | 37.65268 | 44.33346 | 44.53452 | 40.2767  | 57.45534 | 63.03499 | 73.97331 | 87.55739 | 100 |
| Ctsc     | 0        | 0.769743 | 2.252666 | 5.82494  | 21.41406 | 30.41837 | 26.89446 | 38.06237 | 20.88025 | 28.5061  | 26.57037 | 39.17513 | 41.14344 | 50.6467  | 57.03866 | 64.45242 | 74.9891  | 82.04426 | 89.81001 | 100 |
| Bst1     | 0        | 0.886318 | 4.938442 | 12.37865 | 20.2433  | 21.86776 | 30.97574 | 35.9322  | 21.91841 | 25.78389 | 30.00225 | 31.64079 | 41.02347 | 42.07475 | 48.84492 | 65.59128 | 77.16659 | 83.64896 | 88.00923 | 100 |
| Fam3b    | 0        | 0.12962  | 0.678887 | 4.910352 | 6.304423 | 12.28267 | 16.52334 | 14.41235 | 12.96199 | 30.8581  | 34.50275 | 55.97051 | 49.55548 | 42.18428 | 56.35727 | 48.76371 | 63.21062 | 69.48512 | 95.13736 | 100 |
| Cmpk2    | 0        | 0.198848 | 0.322864 | 1.477134 | 13.1142  | 15.57434 | 16.30614 | 24.11426 | 22.54933 | 27.05818 | 49.95673 | 57.46695 | 37.02397 | 57.46069 | 49.98332 | 68.91364 | 67.83005 | 71.66138 | 89.84426 | 100 |
| Tgm2     | 0        | 2.377516 | 3.337632 | 12.39245 | 18.77569 | 16.78729 | 27.01415 | 30.22129 | 21.37285 | 30.89336 | 37.82226 | 56.31274 | 33.91014 | 46.84326 | 50.92023 | 73.75708 | 77.8402  | 76.81518 | 86.68849 | 100 |
| Selm     | 4.118339 | 2.378836 | 5.348118 | 13.93267 | 0        | 6.147885 | 14.28943 | 19.01083 | 16.68888 | 43.90801 | 37.37916 | 42.45444 | 29.22734 | 43.5864  | 45.30281 | 61.16485 | 72.71505 | 85.43406 | 89.80613 | 100 |
| B2m      | 0        | 1.756869 | 9.212694 | 17.96793 | 13.9563  | 16.49194 | 25.64869 | 22.79338 | 29.55896 | 29.65967 | 34.46943 | 36.47143 | 36.95248 | 46.32409 | 58.13017 | 66.84713 | 77.04782 | 83.90498 | 88.75147 | 100 |
| Phyh     | 2.89533  | 0        | 9.401192 | 17.55136 | 11.60004 | 12.32439 | 21.29334 | 16.16312 | 27.62306 | 30.40099 | 33.81098 | 39.86865 | 31.07213 | 51.54231 | 56.29234 | 60.54697 | 72.30891 | 82.87252 | 85.761   | 100 |
| Msr1     | 1.24812  | 0        | 6.259193 | 10.90249 | 12.3709  | 16.90136 | 21.9177  | 22.31729 | 32.05347 | 26.15945 | 33.68164 | 35.12467 | 36.95766 | 42.05241 | 48.73616 | 61.35021 | 74.77051 | 77.37575 | 90.04276 | 100 |
| Gmfg     | 0        | 2.154763 | 7.738406 | 12.25152 | 9.451425 | 11.46523 | 19.69785 | 19.52702 | 25.51777 | 27.2445  | 25.64865 | 35.31314 | 41.27617 | 47.657   | 56.1596  | 62.27732 | 77.17218 | 83.21323 | 91.31067 | 100 |
| Casp1    | 0        | 0.010458 | 3.972158 | 10.09952 | 12.12847 | 15.60567 | 19.66597 | 19.6561  | 23.13705 | 29.86586 | 34.60412 | 40.8533  | 43.12978 | 46.92372 | 58.69243 | 66.65484 | 80.4771  | 83.19537 | 92.11574 | 100 |
| Nfkbi    | 2.074304 | 0        | 8.970763 | 10.75822 | 12.75243 | 9.323528 | 19.29996 | 17.88567 | 26.83415 | 29.14139 | 36.10522 | 37.15724 | 47.4359  | 48.98103 | 56.60999 | 62.45202 | 77.77971 | 80.0641  | 92.55653 | 100 |
| Arhgdib  | 0        | 2.266328 | 9.394958 | 12.24085 | 8.130309 | 10.56382 | 15.82318 | 16.04079 | 26.47756 | 31.4474  | 33.71447 | 40.2818  | 39.87355 | 46.29521 | 52.73337 | 63.9927  | 77.16523 | 80.99286 | 91.46994 | 100 |
| Mlkl     | 0        | 0.185311 | 2.720151 | 8.177261 | 13.15923 | 18.21666 | 27.76837 | 25.31983 | 32.5637  | 46.67689 | 33.00308 | 49.48672 | 32.20742 | 47.42534 | 68.06638 | 70.05094 | 80.14148 | 84.69199 | 91.25223 | 100 |
| Mfsd7a   | 0        | 0.379433 | 1.834868 | 0.126391 | 13.68787 | 9.19153  | 18.46503 | 28.57027 | 30.40358 | 40.43808 | 38.20267 | 51.21893 | 34.6535  | 56.45719 | 61.85108 | 59.57383 | 74.45492 | 83.56684 | 92.35705 | 100 |
| Fas      | 0        | 2.230079 | 6.573398 | 5.767552 | 15.52916 | 18.24285 | 20.29724 | 22.78017 | 15.0687  | 37.61756 | 39.10141 | 56.12644 | 57.48557 | 52.43369 | 66.29223 | 71.43717 | 77.50814 | 86.67418 | 90.34603 | 100 |
| Trim30b  | 0.178896 | 0.087341 | 0        | 0.7621   | 14.60439 | 13.7591  | 20.19666 | 24.30342 | 28.05959 | 37.75891 | 34.00366 | 61.85523 | 51.25769 | 55.71099 | 66.53309 | 69.5998  | 79.68435 | 83.57746 | 92.38079 | 100 |
| Rhoh     | 0        | 1.552434 | 0.864055 | 5.222797 | 15.8339  | 10.43403 | 20.34129 | 19.8153  | 20.55773 | 33.41013 | 27.62793 | 62.91663 | 50.57641 | 54.46649 | 65.40653 | 76.76357 | 82.72592 | 85.05363 | 95.61402 | 100 |
| Ubd      | 0        | 0.050578 | 0        | 0.276695 | 9.232853 | 11.72129 | 19.43953 | 26.55592 | 29.59906 | 37.07006 | 40.13416 | 61.99175 | 44.19637 | 43.18581 | 74.80655 | 69.617   | 78.57649 | 84.15859 | 88.39521 | 100 |
| Kynu     | 0        | 0.534369 | 0.923821 | 0.851597 | 12.37395 | 24.25963 | 30.80875 | 31.37314 | 21.22063 | 27.24872 | 36.89713 | 73.11568 | 39.75231 | 49.19395 | 71.16711 | 67.67713 | 73.29395 | 82.89204 | 91.47093 | 100 |
| Stat2    | 1.687725 | 0.258376 | 0        | 8.194307 | 9.516474 | 28.24527 | 22.99753 | 30.45588 | 32.88016 | 27.10436 | 48.37699 | 32.00499 | 36.76543 | 55.40452 | 73.89331 | 68.8517  | 80.25937 | 86.36776 | 95.58142 | 100 |
| Slc31a1  | 0.271169 | 0        | 4.659777 | 9.563801 | 11.42237 | 17.30515 | 17.96563 | 27.94319 | 26.2036  | 28.54068 | 39.0842  | 32.7323  | 35.19736 | 50.66326 | 60.59138 | 80.02331 | 82.65753 | 82.7721  | 88.6842  | 10  |

|           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |            |          |          |          |          |          |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|
| Csrp1     | 3.230108 | 0        | 4.795936 | 8.986324 | 7.949596 | 7.074535 | 23.39027 | 14.16696 | 33.00503 | 31.21874 | 34.62214 | 48.81901 | 46.98    | 67.15801 | 65.76538   | 75.33124 | 78.61261 | 90.88961 | 98.74227 | 100      |
| ldnk      | 1.207884 | 0        | 4.779107 | 7.95272  | 4.115605 | 6.184421 | 15.8237  | 12.88266 | 35.47062 | 31.01656 | 40.45099 | 49.49049 | 56.25983 | 62.53908 | 63.70979   | 72.26611 | 80.33166 | 85.4054  | 94.48046 | 100      |
| Limd2     | 1.474903 | 1.58571  | 3.096357 | 0        | 4.456972 | 9.622825 | 9.391584 | 16.07356 | 23.16123 | 35.48392 | 41.19518 | 53.31641 | 58.25987 | 62.46273 | 60.38892   | 62.66717 | 76.8809  | 87.02326 | 100      | 99.70266 |
| Sepw1     | 3.542425 | 0.673516 | 3.481985 | 4.839433 | 0        | 4.862483 | 8.842383 | 14.7704  | 29.03564 | 38.26356 | 40.7368  | 47.21792 | 53.10605 | 68.72708 | 69.55705   | 70.08667 | 85.68069 | 90.69626 | 96.08699 | 100      |
| 5-Mar     | 4.626601 | 2.424997 | 5.552769 | 8.751888 | 0        | 4.526097 | 8.424969 | 4.679453 | 32.25948 | 33.49381 | 37.22664 | 44.85619 | 64.31184 | 61.8379  | 71.49558   | 81.38648 | 88.29981 | 94.80063 |          |          |
| Irf8      | 1.111001 | 0        | 2.984139 | 2.277891 | 6.765574 | 9.194552 | 12.77999 | 9.494236 | 29.79029 | 27.83307 | 33.91859 | 67.06122 | 37.84881 | 65.40992 | 76.51532   | 77.03227 | 96.99265 | 92.28479 | 97.02844 | 100      |
| Myd88     | 0.822888 | 0        | 7.242065 | 5.123787 | 8.253774 | 16.46673 | 14.17138 | 13.38949 | 37.67756 | 11.6986  | 42.23243 | 60.36302 | 52.89467 | 50.59156 | 68.03434   | 69.47007 | 86.25673 | 91.40651 | 96.03072 | 100      |
| Il1rn     | 0        | 0.78898  | 5.663789 | 5.943849 | 7.215236 | 12.45533 | 16.81383 | 12.44043 | 29.40629 | 28.73906 | 49.14472 | 30.24376 | 49.30605 | 56.30931 | 85.07355   | 63.70323 | 71.17382 | 78.35384 | 84.72144 | 100      |
| Ins16     | 0        | 0.190775 | 5.47137  | 7.338082 | 3.213269 | 7.016747 | 14.01141 | 4.278651 | 27.69407 | 38.77938 | 35.83227 | 30.43052 | 37.96681 | 55.02403 | 65.14387   | 62.77531 | 73.85755 | 91.11562 | 92.03229 | 100      |
| Car13     | 4.156611 | 0        | 8.885928 | 1.889123 | 0.73278  | 1.393533 | 15.39617 | 16.13436 | 18.96511 | 23.50903 | 40.58754 | 37.4991  | 32.43409 | 61.30944 | 67.31275   | 76.78662 | 74.33687 | 85.95237 | 100      | 99.51645 |
| Il15      | 0.611632 | 0        | 1.754482 | 2.532532 | 2.239781 | 8.677973 | 8.656536 | 3.401763 | 22.54447 | 22.99986 | 37.90991 | 51.58801 | 41.8899  | 51.98456 | 66.69178   | 69.12104 | 76.56609 | 85.79122 | 94.97766 | 100      |
| Sp140     | 0        | 0.876736 | 3.368681 | 5.133166 | 0.807789 | 8.552125 | 11.14901 | 13.36769 | 26.79875 | 28.0459  | 34.7383  | 42.86671 | 36.57145 | 59.42615 | 62.57525   | 65.8497  | 81.08571 | 86.10598 | 93.94071 | 100      |
| Atxn7l1   | 0.7934   | 0        | 2.513927 | 6.543649 | 2.587729 | 9.246114 | 14.62224 | 10.43982 | 28.67366 | 22.23566 | 34.30254 | 46.22924 | 37.79642 | 49.31695 | 65.94174   | 64.67259 | 76.55407 | 85.29059 | 99.66003 | 100      |
| Nupr1     | 0        | 1.644182 | 1.717064 | 4.258772 | 5.567474 | 7.388404 | 11.24382 | 6.138407 | 18.1207  | 24.35523 | 29.95572 | 41.35324 | 55.01047 | 52.55133 | 64.06493   | 67.04332 | 62.16785 | 85.16147 | 100      | 98.24937 |
| Ms4a6c    | 0        | 0.970833 | 3.705195 | 6.7781   | 6.157014 | 9.610961 | 13.18305 | 13.23634 | 17.80377 | 27.9544  | 37.83762 | 39.8244  | 45.77122 | 59.29189 | 58.30915   | 67.30486 | 74.50634 | 85.22507 | 96.06194 | 100      |
| H2-T22    | 1.464115 | 0        | 0.895565 | 0.771819 | 0.032433 | 5.827562 | 11.33472 | 9.993601 | 20.0721  | 32.15583 | 37.2851  | 40.52542 | 46.29589 | 57.67513 | 64.12974   | 70.93435 | 77.47206 | 86.10484 | 96.78389 | 100      |
| Plgrkt    | 0.702467 | 0        | 5.636286 | 10.86354 | 7.017706 | 11.87421 | 19.72945 | 27.4627  | 26.77478 | 23.5778  | 39.74826 | 44.53166 | 40.14063 | 50.94656 | 66.83133   | 69.60248 | 83.12667 | 87.92882 | 93.83043 | 100      |
| Apool     | 0        | 2.514078 | 7.379285 | 11.94643 | 9.561655 | 5.470165 | 23.85507 | 17.08579 | 22.63454 | 31.12411 | 40.38156 | 41.38116 | 42.9775  | 50.29467 | 60.30732   | 68.26632 | 81.7515  | 84.03071 | 90.45466 | 100      |
| Snx10     | 0        | 0.594691 | 6.014808 | 9.321954 | 9.568089 | 11.35353 | 18.54095 | 27.57642 | 24.96302 | 34.41483 | 37.58368 | 41.05694 | 40.98147 | 54.07846 | 60.22054   | 65.81323 | 77.97199 | 84.93864 | 88.36767 | 100      |
| Cd86      | 0        | 1.370079 | 1.46914  | 6.304095 | 15.06903 | 17.65991 | 18.8062  | 20.03396 | 19.1349  | 27.79166 | 47.31516 | 44.5988  | 41.30798 | 57.94153 | 68.10627   | 68.3919  | 78.73465 | 84.28938 | 87.85562 | 100      |
| Ube2l6    | 0        | 0.348652 | 4.196342 | 1.691079 | 9.897345 | 10.5823  | 17.17364 | 11.48299 | 21.55943 | 36.09944 | 49.66434 | 47.28207 | 46.19062 | 56.8878  | 69.58488   | 73.74863 | 82.60381 | 86.59488 | 91.17465 | 100      |
| 1600014C1 | 0.478979 | 0        | 2.892406 | 2.434463 | 7.72865  | 13.61172 | 14.20799 | 19.81662 | 28.92895 | 36.42468 | 41.86556 | 53.68433 | 59.25016 | 69.24108 | 69.24428   | 75.50059 | 82.32902 | 91.63895 |          |          |
| Xaf1      | 0        | 0.233003 | 1.354811 | 2.668237 | 7.369307 | 11.63862 | 15.31139 | 21.03972 | 27.1504  | 34.31517 | 36.68977 | 49.97608 | 49.25274 | 57.77188 | 66.57159   | 68.88473 | 78.37317 | 83.89756 | 93.36589 | 100      |
| Phf11d    | 0.489292 | 0        | 0.597456 | 1.096476 | 7.850174 | 12.00283 | 16.68705 | 20.75188 | 23.12151 | 31.63226 | 34.22569 | 50.4146  | 48.84298 | 52.11242 | 66.89605   | 69.32038 | 80.68799 | 84.42837 | 91.61057 | 100      |
| Il18bp    | 0        | 0.348186 | 1.543917 | 2.736927 | 10.12797 | 13.53635 | 13.34358 | 22.44354 | 29.02303 | 33.15879 | 39.77718 | 46.62847 | 45.16061 | 52.28658 | 63.5731    | 68.39352 | 77.1028  | 83.99614 | 90.60146 | 100      |
| Mndal     | 0        | 0.33631  | 1.110066 | 5.074343 | 9.786437 | 14.23043 | 19.89618 | 23.41216 | 25.97839 | 34.12392 | 40.59366 | 45.97426 | 45.01565 | 55.70451 | 67.00253   | 68.62609 | 80.02128 | 82.99487 | 92.89266 | 100      |
| Sifn2     | 0        | 0.053516 | 2.098572 | 4.475813 | 9.103206 | 12.51617 | 18.72412 | 19.72696 | 29.038   | 33.10656 | 41.47849 | 51.92026 | 45.39773 | 53.27522 | 64.04865   | 70.05185 | 81.6882  | 86.0449  | 93.68873 | 100      |
| Phf11a    | 0.260559 | 0        | 1.398684 | 1.688651 | 8.291268 | 8.652141 | 14.07885 | 19.44233 | 29.06226 | 28.7744  | 35.12197 | 50.37741 | 43.5579  | 56.53968 | 61.01449   | 61.97478 | 76.73254 | 84.31123 | 96.38869 | 100      |
| Rnf135    | 0.068203 | 0        | 0.703533 | 2.079302 | 13.8361  | 7.710151 | 16.59967 | 17.08432 | 28.66615 | 32.09352 | 36.61024 | 46.88447 | 42.29853 | 51.67665 | 64.54554   | 66.80953 | 77.54398 | 81.55819 | 96.18577 | 100      |
| Irf7      | 0.001668 | 0.058885 | 0        | 1.014972 | 6.1578   | 10.26519 | 13.52981 | 16.37168 | 28.3328  | 35.95528 | 39.60947 | 49.91587 | 45.1044  | 54.80937 | 64.52024   | 68.93434 | 77.07521 | 83.55513 | 95.41074 | 100      |
| Phf11b    | 0.243528 | 0        | 0.754338 | 0.754742 | 6.622139 | 10.35217 | 11.16227 | 15.65556 | 29.6452  | 32.25476 | 36.66188 | 44.58914 | 44.24423 | 55.70225 | 62.92746   | 66.58444 | 74.9431  | 81.88285 | 93.72568 | 100      |
| Ifi205    | 0        | 0.129166 | 0.330598 | 0.299338 | 7.406067 | 14.23212 | 12.56379 | 19.40753 | 26.08604 | 27.42436 | 41.20888 | 42.66026 | 46.45179 | 54.93916 | 57.75038   | 64.01818 | 76.50404 | 82.42016 | 92.08943 | 100      |
| Cst7      | 0.43066  | 0        | 4.783855 | 5.464471 | 8.567828 | 10.63073 | 12.23695 | 18.89699 | 24.91782 | 34.70122 | 37.43894 | 46.27127 | 48.82653 | 56.72412 | 57.05469   | 66.83235 | 74.87157 | 86.18437 | 93.69761 | 100      |
| Cd300lf   | 3.284518 | 0        | 2.153716 | 5.223315 | 12.96761 | 9.844971 | 15.10174 | 15.2005  | 10.797   | 32.53604 | 34.38606 | 40.36716 | 57.33056 | 50.57929 | 62.58697   | 73.77217 | 83.85553 | 90.06304 | 95.21447 | 100      |
| Procr     | 0        | 0.030358 | 0.379423 | 2.656884 | 15.4397  | 18.57491 | 13.68509 | 22.91794 | 28.17911 | 36.74228 | 38.96431 | 41.63825 | 45.82393 | 46.67366 | 65.25372   | 70.19471 | 78.7196  | 81.05911 | 92.42757 | 100      |
| Ifit3     | 0        | 0.030734 | 0.078754 | 1.309803 | 13.35881 | 16.50096 | 18.71523 | 26.24881 | 20.68007 | 41.58479 | 44.10421 | 42.37173 | 47.26329 | 56.9975  | 58.40726   | 69.50373 | 82.439   | 85.11583 | 96.11291 | 100      |
| Cd38      | 0.040481 | 0        | 0.49724  | 1.532516 | 9.218573 | 19.15567 | 14.8761  | 26.45266 | 19.2925  | 44.43426 | 44.026   | 45.18359 | 48.30826 | 46.66903 | 55.47027   | 65.64217 | 77.93777 | 85.21384 | 91.14422 | 100      |
| Nmi       | 1.220505 | 0        | 5.58078  | 8.654694 | 11.87706 | 14.35447 | 24.19443 | 18.0687  | 23.17802 | 37.50228 | 46.7015  | 39.97954 | 45.60477 | 42.90823 | 64.68323   | 78.32259 | 77.69514 | 81.08225 | 94.05089 | 100      |
| Marcksl1  | 0        | 1.530208 | 7.1825   | 1.476381 | 15.42338 | 10.52447 | 16.31619 | 14.59825 | 22.81475 | 38.30173 | 44.27875 | 47.78436 | 42.6844  | 42.35339 | 60.12463   | 66.33697 | 71.99628 | 85.6904  | 98.68447 | 100      |
| Isg20     | 1.409215 | 0        | 0.061897 | 2.293729 | 6.241845 | 7.983278 | 13.09914 | 14.27392 | 16.32844 | 36.10594 | 41.49177 | 48.01805 | 47.87537 | 47.04424 | 60.9424    | 70.38084 | 70.76068 | 78.69356 | 96.96696 | 100      |
| Trim12a   | 1.684365 | 0        | 4.504153 | 5.844316 | 11.37905 | 13.60419 | 15.8701  | 25.49459 | 34.77649 | 33.44175 | 35.45807 | 57.06729 | 62.76466 | 47.50832 | 65.44553   | 72.54767 | 77.91019 | 86.68034 | 95.47775 | 100      |
| Batf2     | 0        | 0.408756 | 0.629782 | 0.22015  | 7.958366 | 10.79336 | 20.43704 | 19.85173 | 23.585   | 37.26438 | 44.15338 | 50.76958 | 58.68804 | 51.22036 | 62.94411   | 69.98338 | 79.96416 | 84.97277 | 92.87821 | 100      |
| Cxcl10    | 0        | 0.013549 | 0.105526 | 0.676269 | 5.182707 | 12.84836 | 17.80322 | 22.59118 | 32.05286 | 43.82969 | 41.07265 | 51.38521 | 57.4341  | 57.33226 | 67.83539   | 73.33432 | 77.51603 | 84.57502 | 91.08779 | 100      |
| Ly6e      | 0        | 0.34918  | 0.497219 | 2.899177 | 10.4679  | 15.51185 | 17.65209 | 22.72341 | 27.9268  | 43.23727 | 44.46419 | 53.88969 | 53.21736 | 58.48123 | 71.3854    | 75.41901 | 83.48539 | 88.69648 | 95.06305 | 100      |
| Pyhin1    | 0        | 0.296675 | 2.124335 | 5.800501 | 9.20103  | 14.07787 | 15.41677 | 20.93722 | 28.44704 | 40.38523 | 45.31295 | 52.99452 | 49.73484 | 54.80026 | 65.84249   | 71.3145  | 79.84696 | 86.26334 | 95.73897 | 100      |
| Ifi35     | 0        | 0.045094 | 2.618596 | 4.160313 | 9.042773 | 15.63419 | 20.55773 | 22.96998 | 39.09146 | 38.46144 | 48.29247 | 51.37288 | 59.91874 | 58.67455 | 65.75502   | 72.47694 | 74.74973 | 86.13015 | 94.15217 | 100      |
| Nfkbie    | 0.819695 | 1.116277 | 2.510575 | 0        | 9.918767 | 15.65572 | 21.45347 | 15.39598 | 34.17835 | 33.59502 | 38.46255 | 53.67846 | 54.51878 | 58.4647  | 59.12475   | 74.6621  | 82.01381 | 84.75818 | 93.832   | 100      |
| Ehd1      | 0        | 0.731407 | 3.843837 | 5.866045 | 15.3471  | 19.11373 | 24.25516 | 25.46158 | 28.67766 | 32.46213 | 46.19361 | 51.27314 | 52.46801 | 51.85468 | 60.36633</ |          |          |          |          |          |

|          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Psm2b    | 1.628148 | 0        | 6.006422 | 8.335915 | 7.33246  | 15.08751 | 26.43287 | 18.23848 | 32.26108 | 38.08058 | 42.31621 | 56.73974 | 49.65641 | 56.26196 | 63.19064 | 64.51805 | 84.50709 | 87.78927 | 91.04519 | 100      |
| Usp18    | 0        | 0.560634 | 4.116903 | 4.34084  | 18.31495 | 23.58153 | 23.24582 | 24.05788 | 24.24915 | 30.30836 | 37.21534 | 49.30599 | 52.61537 | 58.38364 | 67.57251 | 75.83562 | 79.88862 | 88.96599 | 97.95854 | 100      |
| Vrk2     | 0        | 0.204323 | 2.870113 | 5.971092 | 13.70804 | 18.86511 | 21.04304 | 23.51953 | 24.07475 | 37.79598 | 33.89151 | 53.30051 | 43.75437 | 55.9792  | 58.45536 | 76.39525 | 85.54359 | 87.72146 | 91.48279 | 100      |
| Gbp4     | 0        | 0.042189 | 0.128597 | 1.369495 | 14.13024 | 18.33748 | 19.11008 | 24.99956 | 28.24315 | 38.4172  | 36.5452  | 50.15142 | 49.21021 | 54.937   | 63.91725 | 69.9662  | 79.43604 | 83.75998 | 91.92945 | 100      |
| Gbp6     | 0.145573 | 0        | 0.187151 | 1.667207 | 16.04627 | 17.58427 | 19.25724 | 28.26538 | 24.78983 | 40.22356 | 39.85211 | 45.04784 | 46.61177 | 58.83974 | 62.5966  | 73.11041 | 79.19516 | 85.5973  | 92.42698 | 100      |
| Pnp      | 0        | 0.929837 | 7.179447 | 10.8764  | 13.05207 | 18.68637 | 24.27452 | 17.82704 | 33.0674  | 36.30075 | 38.58038 | 49.63129 | 59.27017 | 61.55295 | 67.94461 | 77.89668 | 86.46007 | 89.59688 | 100      |          |
| Fcgr4    | 1.091944 | 0        | 2.759749 | 10.63793 | 12.71776 | 17.77047 | 23.50217 | 24.63889 | 28.7947  | 37.30915 | 41.50965 | 38.49829 | 45.40699 | 60.12405 | 64.45462 | 72.88069 | 80.15128 | 88.40803 | 92.95001 | 100      |
| Psm1     | 0        | 0.005855 | 6.795017 | 14.62923 | 13.04041 | 16.62656 | 23.10187 | 23.16579 | 30.498   | 37.51482 | 44.54934 | 39.88783 | 44.52057 | 58.03254 | 61.22506 | 70.21194 | 81.84957 | 89.05219 | 90.69152 | 100      |
| Usb1     | 0        | 0.912473 | 5.138621 | 17.04631 | 7.249257 | 11.93498 | 21.07189 | 21.15949 | 26.36495 | 35.21914 | 41.64951 | 41.76028 | 51.77435 | 55.06601 | 60.80926 | 74.41575 | 84.40932 | 86.50756 | 93.61165 | 100      |
| Psm8     | 0        | 1.933104 | 7.959734 | 11.11103 | 13.29892 | 17.63249 | 20.17223 | 23.76506 | 32.66406 | 31.8576  | 41.30021 | 48.17317 | 49.36165 | 58.81342 | 63.27811 | 76.70908 | 80.98004 | 90.54614 | 92.44395 | 100      |
| Socs1    | 0        | 1.346582 | 5.149248 | 12.45267 | 13.5075  | 15.16126 | 18.68559 | 23.49522 | 32.18713 | 40.28807 | 36.34496 | 43.8621  | 48.3451  | 61.01868 | 58.3529  | 75.95151 | 79.43017 | 87.06476 | 94.21426 | 100      |
| Casp4    | 1.510221 | 0        | 3.803123 | 8.012436 | 14.5269  | 19.28226 | 19.91356 | 20.4969  | 22.51351 | 31.30652 | 34.67186 | 44.35787 | 51.32569 | 50.73337 | 64.0732  | 71.30544 | 82.09247 | 86.86928 | 92.96767 | 100      |
| Upp1     | 0        | 0.027383 | 0.084934 | 1.250522 | 12.71238 | 19.66011 | 16.78645 | 24.58336 | 23.67992 | 27.8079  | 41.56746 | 42.96237 | 49.26769 | 52.77142 | 62.0586  | 73.7289  | 82.52878 | 86.4088  | 90.95707 | 100      |
| Sod2     | 0        | 0.338352 | 1.339172 | 2.533878 | 9.354218 | 10.56786 | 19.94603 | 23.65561 | 23.18875 | 35.46994 | 37.34465 | 42.96751 | 47.24791 | 52.71535 | 57.82536 | 70.06979 | 81.17121 | 86.1242  | 90.81083 | 100      |
| Themis2  | 1.468327 | 0        | 2.794443 | 5.657156 | 9.453117 | 15.07486 | 15.26382 | 20.30462 | 21.70458 | 33.14328 | 38.57624 | 48.09282 | 46.02723 | 55.11344 | 65.69894 | 76.07098 | 83.7206  | 87.50418 | 97.67179 | 100      |
| Fcgr1    | 0.546744 | 0        | 1.634144 | 4.50734  | 10.25842 | 16.81131 | 17.66314 | 19.95477 | 23.92649 | 31.41642 | 38.58294 | 40.35856 | 48.74923 | 56.31151 | 69.32322 | 72.80952 | 75.05599 | 83.01186 | 93.89931 | 100      |
| Ctsh     | 0        | 0.190358 | 1.92798  | 6.750383 | 15.00913 | 17.50854 | 19.80769 | 22.7477  | 24.30651 | 28.77857 | 37.84157 | 46.58158 | 48.26468 | 57.68789 | 64.54448 | 72.65471 | 76.72187 | 84.82988 | 91.7095  | 100      |
| Sifn     | 0.126328 | 0.184833 | 0        | 2.783914 | 11.49971 | 17.68656 | 22.12297 | 18.68844 | 24.87852 | 31.19741 | 48.66464 | 46.76507 | 53.98026 | 63.6374  | 64.48565 | 67.87161 | 78.59989 | 84.9006  | 92.295   | 100      |
| Slc31a2  | 0        | 0.018731 | 1.927306 | 4.376059 | 8.998475 | 13.83451 | 18.84078 | 20.42263 | 24.17648 | 33.2346  | 38.83741 | 48.37773 | 52.11035 | 59.4504  | 56.79178 | 67.8775  | 78.01739 | 86.56272 | 95.16772 | 100      |
| Cxcl16   | 1.982508 | 1.018043 | 0        | 2.661129 | 6.525565 | 11.94017 | 14.88482 | 19.78378 | 22.52091 | 32.52901 | 40.82423 | 48.84798 | 51.31488 | 62.6566  | 62.85054 | 70.12271 | 79.09332 | 87.66343 | 93.26372 | 100      |
| Brd2     | 1.110689 | 0        | 6.421066 | 5.062302 | 11.27699 | 10.50536 | 13.76032 | 20.80778 | 20.60639 | 36.81018 | 40.28606 | 48.67373 | 45.33319 | 66.72255 | 60.53146 | 72.03743 | 85.04513 | 86.09412 | 92.61918 | 100      |
| AW112010 | 0        | 0.176392 | 0.296636 | 1.004021 | 6.431955 | 13.04521 | 15.03413 | 21.30032 | 25.25498 | 38.10838 | 39.52966 | 42.34278 | 49.23692 | 61.45681 | 67.99356 | 75.26202 | 77.03386 | 86.34079 | 91.90194 | 100      |
| Ifitm3   | 0        | 0.722885 | 2.121955 | 6.380726 | 7.941638 | 13.50676 | 15.64697 | 18.81228 | 23.96128 | 36.12795 | 38.40087 | 43.02074 | 50.4124  | 59.90232 | 65.76629 | 72.71984 | 79.78207 | 85.50231 | 92.99862 | 100      |
| Psm2     | 0        | 0.176621 | 5.26795  | 9.441032 | 7.756338 | 14.30132 | 18.62187 | 21.56111 | 30.10582 | 36.39624 | 43.62133 | 43.13546 | 51.60201 | 58.82445 | 65.90646 | 74.54682 | 81.22076 | 87.6584  | 91.53079 | 100      |
| Bst2     | 0.149236 | 0        | 3.215421 | 5.698425 | 8.663344 | 15.46635 | 17.93401 | 22.6652  | 29.17242 | 42.30724 | 40.36379 | 46.03653 | 53.28275 | 61.63257 | 66.37947 | 73.99077 | 84.32282 | 87.39851 | 92.8441  | 100      |
| Mnda     | 0.252018 | 0        | 1.079952 | 3.992963 | 8.576363 | 12.84142 | 19.31929 | 29.21037 | 35.96636 | 42.68421 | 47.37341 | 51.95573 | 59.1851  | 65.0475  | 72.77002 | 81.66986 | 87.56429 | 93.48018 | 100      |          |
| Lgals9   | 0        | 0.691555 | 3.318076 | 5.535682 | 8.615615 | 17.35005 | 17.14378 | 19.2216  | 31.21489 | 38.74705 | 39.97073 | 48.2148  | 52.05558 | 59.20392 | 64.71597 | 70.52737 | 80.46787 | 84.48616 | 91.35135 | 100      |
| Plac8    | 0.396959 | 1.119102 | 0.021438 | 0        | 4.965205 | 9.234879 | 9.082151 | 13.94158 | 30.32385 | 36.94508 | 55.96783 | 47.28048 | 59.78682 | 48.17302 | 51.69005 | 70.55058 | 90.53007 | 83.39712 | 99.66931 | 100      |
| Gclm     | 0        | 4.331113 | 9.601158 | 5.962329 | 6.608456 | 9.106113 | 12.51508 | 21.57756 | 31.132   | 35.86235 | 36.95331 | 35.57925 | 48.19366 | 43.71255 | 52.6128  | 74.69096 | 95.94906 | 92.15019 | 92.30985 | 100      |
| Arl5c    | 0        | 1.532176 | 3.139468 | 4.843905 | 8.518272 | 14.10795 | 5.555776 | 19.73645 | 28.61446 | 29.78756 | 32.17612 | 38.20594 | 43.1064  | 63.84761 | 65.55833 | 66.95748 | 86.61187 | 91.08114 | 92.09287 | 100      |
| Rmdn3    | 0        | 2.096702 | 5.411026 | 10.88846 | 16.89874 | 20.37578 | 17.25509 | 14.55281 | 34.93274 | 40.47354 | 37.69623 | 45.41339 | 38.60767 | 57.48678 | 61.64174 | 67.36008 | 83.16583 | 85.07007 | 92.95417 | 100      |
| BC094916 | 0        | 0.638277 | 2.37536  | 0.76313  | 7.256581 | 12.43593 | 9.62285  | 24.31866 | 33.21982 | 39.43241 | 32.71755 | 49.45077 | 40.54699 | 57.03425 | 58.58402 | 73.94847 | 83.33326 | 80.97591 | 95.11629 | 100      |
| Acp2     | 4.410985 | 2.523517 | 0        | 2.492471 | 13.04229 | 13.45775 | 13.64677 | 20.11397 | 30.08983 | 31.84649 | 28.4483  | 38.82643 | 39.64954 | 55.50454 | 54.2512  | 69.92233 | 80.7705  | 87.7577  | 95.78819 | 100      |
| Sell     | 0        | 0.062689 | 1.906388 | 4.389349 | 11.53753 | 24.7337  | 20.86614 | 19.68137 | 28.52684 | 30.44605 | 39.80467 | 42.91032 | 61.93361 | 53.78169 | 55.70779 | 59.17747 | 76.06002 | 88.43915 | 100      | 98.55918 |
| Oas1g    | 0        | 1.113132 | 2.954331 | 2.557016 | 11.13582 | 16.84961 | 13.09728 | 22.56488 | 34.25524 | 24.31016 | 40.9832  | 38.65684 | 55.14501 | 56.45829 | 61.64509 | 67.52615 | 75.89874 | 87.94279 | 95.66448 | 100      |
| Gpr18    | 0        | 1.637171 | 1.344424 | 3.202449 | 9.136146 | 19.09199 | 16.08933 | 18.60198 | 21.72456 | 35.02559 | 24.69203 | 50.11436 | 62.65924 | 53.63695 | 54.59226 | 74.78158 | 80.06962 | 85.85121 | 96.36806 | 100      |
| Gm13012  | 3.722272 | 3.28323  | 0        | 1.439144 | 4.84123  | 9.723871 | 6.53116  | 11.43796 | 29.46382 | 37.61889 | 27.21828 | 45.67889 | 57.35538 | 55.14811 | 49.11514 | 66.18786 | 77.87086 | 86.43783 | 95.208   | 100      |
| A530032D | 3.886533 | 5.293508 | 3.349562 | 1.524942 | 0        | 10.51699 | 31.26951 | 16.41666 | 28.14058 | 40.50333 | 59.2841  | 45.57785 | 32.25131 | 80.94348 | 74.99771 | 82.89229 | 88.01155 | 84.32618 | 100      | 97.53298 |
| Zbp1     | 0        | 0.344318 | 0.918153 | 3.406624 | 10.62568 | 11.9084  | 16.22139 | 21.12443 | 32.05348 | 41.02668 | 47.62529 | 50.48431 | 56.60167 | 71.86196 | 70.65556 | 79.20203 | 87.64577 | 89.84009 | 94.2884  | 100      |
| Aif1     | 0        | 0.322873 | 0.490992 | 1.30871  | 7.997858 | 15.75608 | 16.81743 | 26.07724 | 30.10277 | 45.70034 | 48.62869 | 50.42284 | 55.77604 | 72.14298 | 72.68147 | 75.9642  | 86.74024 | 90.97541 | 95.98286 | 100      |
| Lst1     | 0.256528 | 0.688845 | 0        | 4.206994 | 10.0989  | 17.86371 | 17.28488 | 27.02749 | 29.59281 | 44.07412 | 49.69759 | 48.14167 | 56.57798 | 69.26101 | 69.34021 | 76.01853 | 84.29279 | 90.714   | 94.90406 | 100      |
| Isg15    | 0.016856 | 0        | 0.572133 | 0.964193 | 14.27645 | 19.03959 | 26.5317  | 31.14105 | 38.46562 | 46.96177 | 48.72227 | 58.24232 | 62.66637 | 69.68953 | 76.87798 | 83.26307 | 89.24187 | 94.25435 | 100      |          |
| Rtp4     | 0.029075 | 0        | 0.649698 | 1.139994 | 11.27212 | 14.71709 | 18.2992  | 25.05949 | 34.30672 | 37.85341 | 50.83212 | 55.28396 | 56.47083 | 66.2146  | 71.70244 | 75.35715 | 84.21953 | 91.60951 | 94.5782  | 100      |
| Fam26f   | 0        | 0.302758 | 0.280833 | 1.789379 | 12.66982 | 19.75066 | 20.85006 | 27.64798 | 29.13482 | 39.52511 | 46.34182 | 50.34592 | 57.60409 | 68.7789  | 68.66946 | 77.51951 | 83.17659 | 91.82063 | 93.44967 | 100      |
| Gbp3     | 0        | 0.505045 | 1.540048 | 3.494441 | 11.22707 | 19.76353 | 22.27588 | 30.52375 | 31.48092 | 38.3271  | 44.34317 | 54.82691 | 55.47255 | 69.49481 | 69.3577  | 77.84731 | 83.8117  | 87.43498 | 93.09883 | 100      |
| Tspo     | 0        | 0.996768 | 4.302957 | 7.927031 | 12.11647 | 17.9788  | 21.7286  | 23.60052 | 35.46525 | 42.02328 | 44.64934 | 49.48689 | 55.08955 | 67.39237 | 70.12204 | 75.4302  | 85.56292 | 91.6103  | 94.73094 | 100      |
| Psm9     | 0        | 0.774886 | 4.270185 | 6.349656 | 10.56753 | 14.58584 | 20.62994 | 25.25258 | 32.40978 | 39.89437 | 46.75505 | 52.40176 | 54.20793 | 63.80054 | 69.25551 | 76.60403 | 82.85643 | 89.90544 | 95.60478 | 100      |
| Trim30c  | 0.295425 | 0        | 0.783072 | 2.08976  | 7.884862 | 12.97903 | 18.61821 | 22.72152 | 29.83729 | 49.95814 | 43.99227 | 64.65768 | 56.7936  | 65.94012 | 65.06297 | 79.7966  | 81       |          |          |          |

|           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| A530040E1 | 0        | 0.944882 | 0.570113 | 0.055154 | 9.277317 | 11.44754 | 17.80362 | 28.52499 | 29.87642 | 34.69561 | 54.03516 | 55.09068 | 71.36251 | 76.20355 | 74.17468 | 78.78455 | 91.886   | 96.07997 | 96.61966 | 100      |
| AC125149. | 0        | 0.304762 | 0.09638  | 2.128936 | 13.08531 | 18.6365  | 16.73921 | 31.02176 | 22.57999 | 39.67827 | 48.15548 | 56.75575 | 65.66699 | 65.13829 | 75.22032 | 74.3987  | 96.22775 | 92.05516 | 95.0511  | 100      |
| Gm4955    | 0        | 0.271804 | 0.281595 | 1.700537 | 10.55058 | 16.12445 | 17.72609 | 25.01687 | 35.38772 | 41.66306 | 54.73723 | 55.12313 | 68.39367 | 67.25883 | 77.29004 | 81.22884 | 80.32069 | 87.34575 | 94.59024 | 100      |
| Tgtp2     | 0        | 0.046307 | 0.243279 | 0.539136 | 13.44752 | 19.16638 | 24.75472 | 25.86378 | 37.73958 | 32.46398 | 59.24182 | 52.02114 | 57.31904 | 70.8155  | 77.41441 | 72.4318  | 88.62469 | 87.7108  | 93.91021 | 100      |
| Traf2     | 2.082941 | 0        | 8.123923 | 1.540312 | 25.83095 | 10.47772 | 33.3508  | 17.62442 | 22.65501 | 30.97985 | 48.06662 | 62.50879 | 53.42755 | 67.03287 | 57.89299 | 77.71368 | 84.88346 | 92.95081 | 96.01601 | 100      |
| Tgtp1     | 0        | 0.154769 | 0        | 1.345844 | 10.34006 | 18.98676 | 13.29084 | 29.14205 | 23.51167 | 49.44754 | 39.49622 | 73.18689 | 44.82239 | 60.84096 | 60.10876 | 74.52946 | 83.22959 | 84.13903 | 90.46429 | 100      |
| Lysmd2    | 0.430206 | 0.419832 | 0        | 0.916965 | 5.95836  | 12.96577 | 15.14932 | 23.24924 | 31.85398 | 40.67018 | 32.16247 | 64.21024 | 45.98032 | 67.81955 | 66.88236 | 66.94704 | 87.01774 | 77.892   | 88.97482 | 100      |
| Socs3     | 0.051207 | 0        | 1.736595 | 2.948749 | 12.61238 | 20.20968 | 22.39009 | 22.07181 | 33.53831 | 43.34103 | 35.97008 | 52.02569 | 45.20392 | 61.27833 | 71.1072  | 73.74371 | 77.90716 | 83.4447  | 91.94557 | 100      |
| Serpina3f | 0.043349 | 0.063443 | 0        | 1.1045   | 8.337809 | 11.58744 | 19.272   | 22.34957 | 34.38211 | 43.20553 | 31.13432 | 53.3706  | 49.16442 | 61.79071 | 70.48995 | 75.59137 | 88.62591 | 88.02358 | 92.44672 | 100      |
| Mxd1      | 0.554396 | 0.74432  | 1.40221  | 0        | 8.948127 | 18.04099 | 13.974   | 17.5216  | 36.16863 | 30.39229 | 44.68393 | 54.14827 | 50.4391  | 67.43038 | 54.05214 | 74.42063 | 70.70441 | 84.23806 | 94.42299 | 100      |
| Exoc3l4   | 5.482969 | 6.8463   | 8.353447 | 0        | 8.78704  | 19.91061 | 19.95951 | 23.89382 | 29.2803  | 35.57309 | 40.78106 | 61.57069 | 46.46756 | 63.96675 | 49.37181 | 75.39876 | 81.04747 | 86.09732 | 89.88577 | 100      |
| Lmo4      | 0.369898 | 0        | 3.242525 | 3.564442 | 7.405397 | 12.45193 | 14.56887 | 22.19479 | 25.89975 | 53.97462 | 49.17537 | 52.32567 | 55.03073 | 67.97069 | 55.02563 | 66.05652 | 82.65847 | 84.28782 | 91.44318 | 100      |
| Ccdc86    | 0        | 0.797128 | 0.951155 | 7.808498 | 9.464854 | 19.2004  | 19.05768 | 21.86201 | 37.99485 | 45.81996 | 48.25355 | 55.07602 | 37.70278 | 68.12783 | 55.442   | 73.46264 | 81.94137 | 89.6469  | 96.9893  | 100      |
| Cd180     | 3.810932 | 0        | 7.569252 | 6.094018 | 12.1676  | 18.1823  | 19.85146 | 29.18409 | 25.60521 | 45.70589 | 51.26857 | 48.51438 | 46.50454 | 61.65972 | 55.65824 | 78.4817  | 86.35433 | 88.86862 | 96.35769 | 100      |
| Glpr2     | 0        | 3.884882 | 5.293895 | 4.482493 | 13.81149 | 12.93582 | 22.76569 | 18.41795 | 24.42098 | 55.13284 | 25.99867 | 63.58379 | 57.27393 | 56.17054 | 86.18947 | 77.12857 | 97.34979 | 98.65625 | 98.50998 | 100      |
| Pou3f1    | 0.829986 | 0        | 9.635025 | 2.351682 | 23.18107 | 12.45444 | 23.05732 | 9.040629 | 27.84045 | 43.49923 | 46.58347 | 49.67487 | 64.24994 | 46.31227 | 69.78305 | 89.30278 | 81.43888 | 67.68675 | 93.46831 | 100      |
| Arid5a    | 0        | 1.164937 | 6.555905 | 3.241525 | 11.44627 | 15.36005 | 21.4344  | 14.35464 | 46.2148  | 57.20067 | 56.58893 | 55.47075 | 58.37362 | 63.99899 | 72.62182 | 71.46568 | 85.25655 | 89.47964 | 93.95051 | 100      |
| Pycd3     | 0        | 0.239675 | 0        | 0        | 11.26046 | 13.72647 | 22.08156 | 19.07383 | 32.13561 | 51.66772 | 51.2165  | 61.79158 | 41.44678 | 57.08002 | 83.2383  | 86.68921 | 79.20351 | 84.02761 | 91.58453 | 100      |
| Klrr1     | 0.533723 | 0.585714 | 0        | 1.698985 | 7.841528 | 12.19557 | 19.5005  | 14.30524 | 36.35334 | 47.91634 | 45.79501 | 40.67956 | 53.60355 | 59.72254 | 85.65336 | 73.64739 | 87.35477 | 90.38897 | 96.94149 | 100      |
| Gm4841    | 0        | 0        | 0        | 0        | 14.96033 | 14.0896  | 27.68438 | 31.79525 | 36.53238 | 52.60698 | 49.17414 | 43.73923 | 63.4417  | 58.3864  | 86.16697 | 82.23279 | 81.86428 | 84.0437  | 96.97987 | 100      |
| Hcar2     | 0.297692 | 3.715137 | 0        | 2.956457 | 7.203885 | 13.98861 | 21.64242 | 21.0074  | 17.03318 | 28.729   | 50.83636 | 39.27101 | 32.84233 | 67.42494 | 100      | 69.91841 | 72.04538 | 73.93546 | 75.30104 | 75.43249 |
| Saa3      | 0        | 0.027999 | 0.01407  | 0.804047 | 7.629064 | 13.88153 | 19.5505  | 18.09303 | 14.12339 | 23.78731 | 41.75143 | 44.40211 | 79.97732 | 63.68318 | 69.94156 | 72.55592 | 88.18746 | 91.33515 | 100      | 88.85571 |
| Ccl12     | 0.374988 | 0        | 10.13377 | 12.10752 | 9.046053 | 11.07234 | 17.52152 | 21.43704 | 24.46097 | 31.81066 | 42.9075  | 41.65027 | 72.65861 | 70.60716 | 100      | 77.02979 | 87.35166 | 95.6952  | 99.0313  | 90.74833 |
| Ccnd2     | 0        | 1.305799 | 6.252815 | 9.47113  | 16.3486  | 15.12533 | 27.08583 | 34.31602 | 37.97055 | 25.054   | 73.97541 | 59.99508 | 50.64782 | 52.40328 | 89.72899 | 68.9903  | 81.85688 | 100      | 95.24733 | 97.50287 |
| Bcl2a1d   | 0        | 1.670313 | 6.833761 | 4.524172 | 16.20052 | 11.93572 | 19.76008 | 22.30891 | 25.65983 | 43.90749 | 67.60407 | 42.21096 | 50.23679 | 63.95151 | 77.15175 | 73.72593 | 85.34642 | 99.82311 | 96.10894 | 100      |
| Sifn5     | 2.423214 | 1.987118 | 0        | 5.455692 | 14.12407 | 12.59815 | 29.35542 | 35.27343 | 32.4296  | 41.48987 | 65.03269 | 48.66164 | 50.72559 | 60.7293  | 63.44701 | 69.85989 | 86.83238 | 88.21508 | 94.21866 | 100      |
| Fam49a    | 0        | 1.896425 | 6.841253 | 7.898598 | 17.3982  | 22.23185 | 26.67395 | 24.85393 | 34.13837 | 29.94015 | 50.29389 | 60.91049 | 46.47194 | 54.49196 | 67.18695 | 70.91093 | 82.13803 | 94.52702 | 96.3728  | 100      |
| Oas1      | 0.000768 | 0        | 0.005422 | 1.182882 | 16.30733 | 21.27189 | 24.88922 | 29.81355 | 37.05854 | 31.84508 | 59.34182 | 56.76978 | 53.32565 | 56.75965 | 69.51156 | 72.54957 | 86.66778 | 89.07122 | 94.03839 | 100      |
| Gbp2b     | 0        | 0.082308 | 0        | 0.718567 | 15.20198 | 23.53216 | 22.85232 | 24.81113 | 40.17414 | 37.74501 | 57.15215 | 65.97483 | 50.26721 | 54.89443 | 66.02586 | 74.62155 | 79.40479 | 95.88502 | 92.40116 | 100      |
| Rab20     | 0        | 0.920935 | 2.828572 | 3.556964 | 17.99662 | 15.91974 | 13.34149 | 20.30945 | 28.68619 | 33.41647 | 60.75597 | 53.97393 | 46.69824 | 65.26503 | 70.12942 | 67.41951 | 77.06778 | 86.7058  | 93.50767 | 100      |
| Pou2f2    | 0        | 5.005184 | 3.981608 | 6.092343 | 11.31253 | 16.49812 | 14.98986 | 33.95623 | 28.14932 | 31.20352 | 53.90105 | 56.68511 | 51.68559 | 62.80468 | 64.83772 | 63.07624 | 73.74195 | 86.26714 | 100      | 97.27976 |
| Pcp4      | 0        | 0        | 0        | 1.357374 | 1.306487 | 7.154472 | 4.057189 | 6.011936 | 36.54367 | 31.89001 | 9.390178 | 27.84349 | 59.70305 | 100      | 68.42041 | 62.00335 | 93.10757 | 66.82774 | 84.22439 | 81.91991 |
| Bcl2l14   | 0        | 0.701906 | 2.445769 | 0        | 2.917616 | 1.683078 | 24.06238 | 15.93705 | 52.63403 | 42.86025 | 42.46401 | 62.70249 | 92.14123 | 78.97049 | 76.27434 | 47.34677 | 83.6847  | 100      | 98.72943 | 69.2719  |
| Dtd1      | 5.412063 | 0        | 1.559257 | 12.95558 | 15.28151 | 18.57489 | 29.09355 | 37.41703 | 47.65505 | 62.82974 | 56.42438 | 77.44848 | 76.57262 | 85.33947 | 80.84911 | 90.05004 | 100      | 99.41663 | 95.05992 | 96.55107 |
| Dnase1l3  | 0        | 0.377763 | 0.477809 | 3.510022 | 17.78    | 25.88025 | 20.96569 | 39.43031 | 49.05378 | 67.09074 | 52.95075 | 53.58183 | 65.40793 | 77.83589 | 91.4009  | 76.16076 | 89.21219 | 94.13253 | 93.23399 | 100      |
| Gm13822   | 0        | 0.684153 | 0        | 0        | 19.22088 | 19.08099 | 27.01457 | 45.9637  | 35.75411 | 54.61367 | 69.4173  | 53.26284 | 67.257   | 68.94811 | 76.2025  | 77.80802 | 81.55981 | 87.08936 | 91.95084 | 100      |
| H2-Oa     | 0.629178 | 2.054417 | 0        | 3.95682  | 10.94489 | 16.17076 | 21.64525 | 22.28767 | 23.82874 | 40.8636  | 76.96178 | 73.4311  | 68.61048 | 75.08415 | 98.00756 | 73.02302 | 94.33467 | 97.19175 | 92.15791 | 100      |
| Prrm1     | 0        | 0        | 0        | 2.130293 | 13.3634  | 15.12173 | 24.00868 | 15.68971 | 50.63009 | 32.55845 | 46.76802 | 74.27158 | 72.31391 | 64.80662 | 84.74232 | 84.71155 | 85.98777 | 91.85414 | 97.21854 | 100      |
| 3300005Dc | 87.05113 | 87.8833  | 96.22924 | 100      | 77.1763  | 63.86987 | 93.97841 | 76.57252 | 96.25616 | 68.77653 | 38.14743 | 21.81326 | 0        | 2.440073 | 1.649891 | 0        | 1.438892 | 1.993352 | 0.23653  | 0.436834 |
| Gpt2      | 90.17977 | 84.22318 | 100      | 99.16841 | 70.19506 | 63.59392 | 96.0807  | 78.3765  | 96.94039 | 85.49778 | 46.9437  | 15.19323 | 9.035702 | 4.419052 | 9.861565 | 4.049328 | 0        | 5.785887 | 4.334238 | 5.055226 |
| Flt1      | 80.41469 | 90.56119 | 99.38099 | 100      | 80.85929 | 89.50526 | 85.14641 | 72.40956 | 82.34432 | 68.60715 | 56.89886 | 25.06481 | 0        | 0        | 0.873847 | 1.228305 | 1.516185 | 1.684416 | 1.115942 | 0.460415 |
| Actn1     | 75.24305 | 80.06969 | 92.4003  | 100      | 78.35559 | 85.85702 | 85.75826 | 76.1986  | 92.22695 | 81.3158  | 64.66226 | 31.15902 | 4.235019 | 0        | 1.497437 | 1.689484 | 8.875733 | 9.20662  | 4.350265 | 5.555065 |
| Pkrkb     | 84.82468 | 88.86529 | 100      | 93.68425 | 72.87573 | 77.86895 | 73.8149  | 56.36223 | 86.92078 | 62.94405 | 49.6303  | 36.94928 | 0        | 1.130911 | 10.60414 | 10.97333 | 12.81186 | 10.79473 | 14.53094 | 10.4738  |
| Ptpre     | 75.9449  | 81.32218 | 95.82405 | 100      | 67.92785 | 75.9078  | 78.09528 | 68.55153 | 89.26273 | 64.94171 | 55.9512  | 23.0335  | 7.367707 | 0.380018 | 0        | 5.582015 | 11.63565 | 15.42567 | 11.82499 | 16.6868  |
| Ckap4     | 85.09215 | 84.31982 | 97.00936 | 100      | 68.70368 | 75.80095 | 90.24186 | 74.14866 | 82.99265 | 69.85786 | 47.21837 | 33.6194  | 15.19619 | 0        | 1.193775 | 1.242631 | 7.307594 | 7.268629 | 4.754432 | 4.772359 |
| Gpc1      | 84.47456 | 82.7539  | 91.06112 | 100      | 70.49953 | 70.82534 | 78.88123 | 62.68525 | 73.40691 | 62.48306 | 55.39083 | 23.26645 | 20.55274 | 0        | 5.240487 | 3.727984 | 6.05324  | 8.291301 | 7.344395 | 4.832663 |
| Anxa3     | 88.34458 | 83.75812 | 91.74286 | 100      | 72.28254 | 76.62476 | 83.83835 | 68.75711 | 77.86955 | 62.72025 | 50.78679 | 18.72218 | 18.34217 | 0        | 1.225489 | 5.441634 | 9.62825  | 14.15558 | 15.73517 | 15.41887 |
| Slc7a2    | 85.25786 | 89.73752 | 94.76594 | 100      | 74.84257 | 69.28382 | 78.22407 | 91.21104 | 78.07553 | 64.37721 | 16.80169 | 16.9306  | 0.317176 | 2.37943  | 0        | 7.666601 | 11.78632 | 10.80693 | 17.42116 | 19.69745 |
| Arhgap6   | 96.59011 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |

|          |          |          |          |          |          |          |          |           |          |          |          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ccl9     | 78.46697 | 83.01082 | 95.07579 | 100      | 82.65951 | 80.22463 | 87.00855 | 69.40789  | 63.53413 | 40.58365 | 36.4479  | 12.12152 | 1.848495 | 0.249445 | 3.170516 | 0        | 1.574445 | 4.619916 | 9.744381 | 10.19941 |          |
| Atp6v0d2 | 82.92631 | 79.18823 | 89.0892  | 100      | 81.03164 | 81.50579 | 88.57888 | 71.26311  | 73.58907 | 45.71534 | 42.84117 | 15.33582 | 8.433963 | 1.721636 | 1.380942 | 0        | 0.801334 | 0.74811  | 0.009827 | 0.054137 |          |
| Igf1     | 88.25829 | 85.70668 | 95.13734 | 100      | 77.0003  | 77.77639 | 89.81733 | 69.25026  | 72.99371 | 44.8345  | 37.56233 | 15.42242 | 11.8156  | 0.446128 | 0        | 3.442199 | 3.751312 | 4.017992 | 6.753159 | 8.43539  |          |
| Tmem26   | 85.18317 | 92.67886 | 96.28893 | 100      | 76.74417 | 73.70098 | 76.00924 | 62.29948  | 68.5011  | 57.12843 | 36.40194 | 13.03165 | 0        | 1.142861 | 0        | 0        | 0        | 0        | 0        | 0.101738 |          |
| Bhlhe40  | 78.8405  | 85.32574 | 98.48588 | 100      | 75.47502 | 67.71949 | 78.80565 | 59.96534  | 77.17224 | 63.92135 | 33.7644  | 25.21788 | 1.43303  | 5.615349 | 0.360197 | 0        | 5.636472 | 5.576576 | 4.860271 | 6.549605 |          |
| Wwvc1    | 80.85538 | 85.71552 | 100      | 97.82318 | 83.76128 | 66.41622 | 85.31844 | 55.3434   | 83.73947 | 46.3613  | 39.76755 | 8.804453 | 2.054425 | 0        | 3.282852 | 0.783716 | 0.485518 | 1.607786 | 1.260933 | 1.166559 |          |
| Crip1    | 75.01455 | 82.02916 | 93.20419 | 100      | 76.34883 | 69.41358 | 86.49648 | 72.13452  | 73.77464 | 43.23279 | 30.3163  | 3.398514 | 1.436549 | 0        | 0.137653 | 1.665804 | 7.228277 | 4.588615 | 2.208561 | 0.976398 |          |
| Plekhhf1 | 73.17505 | 78.98861 | 95.04256 | 100      | 88.62347 | 75.65623 | 86.47917 | 71.30001  | 79.46662 | 43.31369 | 30.39236 | 5.614471 | 0        | 2.55021  | 0        | 2.419278 | 0        | 2.084025 | 0.98561  | 2.036002 |          |
| Egr2     | 80.22184 | 86.76283 | 97.06314 | 100      | 64.79529 | 66.80023 | 72.54463 | 63.41417  | 93.16477 | 60.7398  | 52.25182 | 24.23192 | 12.77771 | 0        | 1.059581 | 1.488437 | 0        | 0.257931 | 0.453513 | 0.4194   |          |
| Rab3il1  | 82.34456 | 83.99563 | 100      | 97.35513 | 69.5794  | 71.61049 | 79.05178 | 65.90062  | 95.5312  | 54.41343 | 44.04087 | 31.54317 | 7.006038 | 6.50681  | 0        | 4.545385 | 6.796513 | 8.692513 | 7.630764 | 6.360766 |          |
| Lrrc32   | 82.98727 | 86.04329 | 100      | 98.52195 | 71.17948 | 71.70962 | 77.62412 | 64.27634  | 78.04272 | 41.80222 | 27.14543 | 26.85645 | 9.047546 | 0        | 0        | 0.904437 | 0        | 0        | 0        | 0.16955  |          |
| Atp6v0a1 | 81.05148 | 83.11527 | 96.87221 | 100      | 64.9547  | 66.10791 | 84.51796 | 57.33864  | 87.04491 | 51.41702 | 27.11098 | 27.05037 | 8.61206  | 1.53819  | 0        | 3.412725 | 4.360821 | 10.25443 | 11.42814 | 10.30961 |          |
| Ank      | 88.606   | 90.01935 | 96.43933 | 100      | 79.01925 | 72.80869 | 95.84914 | 82.13162  | 84.34871 | 29.07269 | 53.60958 | 33.43502 | 0        | 0        | 0        | 11.59869 | 3.02688  | 4.988027 | 6.290811 | 3.638997 |          |
| Mmp19    | 98.32477 | 96.53865 | 100      | 94.76754 | 71.35296 | 71.21139 | 94.51718 | 74.09152  | 84.17857 | 45.78469 | 33.14169 | 10.98975 | 6.642114 | 0        | 5.925285 | 3.949491 | 9.28679  | 8.911073 | 10.32183 | 13.72777 |          |
| Rras2    | 86.45624 | 92.32502 | 94.92488 | 100      | 84.48704 | 84.49516 | 85.84539 | 65.35958  | 95.16706 | 40.00223 | 36.59484 | 20.13373 | 2.78572  | 5.372138 | 3.111435 | 0        | 14.95472 | 9.554023 | 2.75093  | 3.351923 |          |
| Sgk1     | 73.67909 | 72.48335 | 81.32651 | 94.32216 | 73.73116 | 69.65024 | 90.32606 | 100       | 49.93409 | 51.63619 | 49.55192 | 12.52959 | 0        | 4.702559 | 16.10575 | 12.66998 | 9.973301 | 8.935714 | 7.290876 | 8.509104 |          |
| Mfge8    | 77.8931  | 65.50374 | 76.06939 | 100      | 68.57027 | 72.51145 | 63.95996 | 76.92709  | 53.76534 | 54.59155 | 18.25099 | 18.45951 | 3.017802 | 4.960996 | 8.081831 | 0        | 5.157944 | 7.753028 | 5.944663 | 5.361359 |          |
| Olfm1    | 60.84013 | 75.77997 | 100      | 86.91446 | 63.5966  | 66.6814  | 68.98227 | 65.42269  | 53.30697 | 55.42884 | 44.96907 | 29.17057 | 2.177642 | 1.236378 | 0        | 1.040628 | 4.021943 | 5.307958 | 2.141055 | 4.692023 |          |
| S100a4   | 74.91575 | 75.94636 | 91.22685 | 100      | 77.30349 | 83.75249 | 88.56663 | 71.78146  | 84.23641 | 49.36083 | 52.021   | 20.61005 | 12.75248 | 2.126765 | 0        | 1.849273 | 4.335054 | 5.620059 | 6.361584 | 7.40499  |          |
| Pparg    | 78.22407 | 74.63315 | 89.63438 | 100      | 77.54012 | 71.99509 | 93.64112 | 68.06964  | 86.58765 | 45.3678  | 41.20701 | 12.09288 | 14.28413 | 1.419701 | 0        | 2.981277 | 1.903409 | 4.999415 | 4.335079 | 5.391353 |          |
| Idh1     | 79.69434 | 82.44209 | 87.87943 | 100      | 73.86946 | 81.60163 | 86.47733 | 69.0679   | 86.47733 | 40.28778 | 40.73028 | 19.96792 | 10.72824 | 3.858835 | 0        | 14.42967 | 18.9944  | 18.65726 | 12.62323 | 13.31424 |          |
| Rhoc     | 83.83633 | 80.85812 | 94.09192 | 100      | 73.45442 | 75.59232 | 80.29685 | 64.70667  | 87.08106 | 51.13662 | 40.96532 | 21.12092 | 7.700239 | 3.249209 | 0        | 13.17533 | 11.13381 | 14.3979  | 19.64595 | 21.39052 |          |
| Nrp1     | 83.59305 | 81.54469 | 88.95561 | 100      | 69.86311 | 74.42008 | 79.32855 | 58.50562  | 80.30032 | 53.24547 | 34.99548 | 14.13461 | 10.66342 | 11.34201 | 0        | 12.74057 | 10.98747 | 13.84832 | 13.2166  | 11.03455 |          |
| F7       | 62.37939 | 63.50096 | 77.86033 | 100      | 76.31353 | 72.24998 | 91.68584 | 55.30641  | 86.62641 | 39.92833 | 37.32966 | 28.96461 | 11.67616 | 2.604603 | 0        | 8.180687 | 7.134457 | 5.494706 | 3.750404 | 6.374481 |          |
| Tceal8   | 62.78799 | 62.90579 | 79.85721 | 100      | 74.36362 | 72.82946 | 75.68603 | 74.45854  | 66.8503  | 48.49603 | 45.6947  | 25.5233  | 0        | 6.37559  | 2.92172  | 8.274396 | 6.354193 | 12.77157 | 13.2098  | 17.83669 |          |
| Clec4a2  | 56.53666 | 68.65819 | 82.10462 | 97.18682 | 75.75091 | 80.7521  | 90.87678 | 87.40526  | 100      | 44.24009 | 46.89269 | 15.86509 | 0        | 0.93156  | 2.609792 | 6.001997 | 6.877623 | 6.435637 | 9.018833 | 10.54185 |          |
| Itgax    | 75.48879 | 81.29545 | 91.53936 | 100      | 78.4383  | 82.18676 | 94.89315 | 83.37319  | 97.52388 | 55.88451 | 50.35585 | 25.84718 | 9.461241 | 0.578523 | 2.527339 | 0.065204 | 0.174863 | 0        | 0.396158 | 0.033972 |          |
| Daglb    | 69.92263 | 77.3691  | 88.66837 | 94.80023 | 71.57126 | 77.08816 | 98.09656 | 78.19072  | 100      | 50.78748 | 49.68834 | 39.05416 | 9.346718 | 6.537516 | 0.619951 | 0        | 6.052541 | 4.041108 | 4.064026 | 7.155576 |          |
| Arg1     | 65.43039 | 73.12526 | 82.12487 | 100      | 80.63382 | 83.6148  | 95.70914 | 82.27366  | 69.76937 | 69.01244 | 45.02751 | 21.7329  | 4.729907 | 6.201996 | 0.675148 | 0.970818 | 0        | 0.037311 | 0.026277 | 0.044536 |          |
| Fcrls    | 65.20634 | 67.38732 | 84.56563 | 96.4637  | 83.08777 | 79.64797 | 100      | 92.13528  | 84.31038 | 63.45122 | 38.88724 | 20.06383 | 12.65071 | 2.313936 | 2.590243 | 0        | 1.589393 | 1.13958  | 1.995281 | 2.251038 |          |
| Apex1    | 70.44985 | 75.06481 | 90.21732 | 100      | 87.94852 | 74.44314 | 84.93878 | 86.88758  | 83.02572 | 62.09171 | 45.7336  | 26.3367  | 20.87293 | 0        | 10.00225 | 5.934612 | 15.68501 | 7.928548 | 6.420668 | 9.273283 |          |
| Tcp11l2  | 71.70065 | 70.04798 | 78.49003 | 100      | 86.07354 | 73.70906 | 94.98424 | 64.2194   | 93.35845 | 73.19781 | 48.39157 | 14.45396 | 13.65994 | 0        | 6.983096 | 2.235574 | 9.78258  | 1.183958 | 3.294687 | 4.929354 |          |
| Jsrp1    | 79.97155 | 84.20918 | 84.96567 | 86.57037 | 69.08689 | 59.47172 | 85.1027  | 43.90065  | 100      | 62.25039 | 85.05752 | 20.58742 | 2.873629 | 2.302301 | 0        | 1.099774 | 0        | 0        | 0.445682 | 0.617402 |          |
| Ppp1r1a  | 63.19427 | 80.55966 | 100      | 85.82437 | 59.99899 | 65.64033 | 61.87233 | 51.80421  | 77.7411  | 51.4786  | 79.43598 | 45.56158 | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        |          |
| Tmem158  | 82.67691 | 79.21606 | 88.94511 | 100      | 72.43925 | 75.48497 | 66.59081 | 75.48497  | 60.56746 | 70.6534  | 45.03293 | 58.3933  | 29.76624 | 10.82537 | 0        | 6.007736 | 4.281274 | 1.349897 | 4.053913 | 4.736129 | 4.000653 |
| Ptgs1    | 74.87489 | 81.32587 | 96.55227 | 100      | 81.86071 | 85.28862 | 84.91156 | 73.65159  | 73.37263 | 49.51537 | 66.49243 | 41.34516 | 0        | 0        | 0        | 0        | 0        | 0        | 0.984467 | 1.211867 |          |
| Padi2    | 99.63795 | 94.32707 | 100      | 94.9827  | 77.66687 | 65.10736 | 69.50631 | 54.85296  | 77.01789 | 35.9881  | 66.73122 | 40.79597 | 8.569473 | 2.306088 | 16.95366 | 0        | 9.093838 | 7.002057 | 12.96551 | 5.560562 |          |
| Gm21967  | 96.4531  | 85.85807 | 93.10012 | 100      | 58.17395 | 74.29548 | 89.73301 | 76.2789   | 70.69371 | 48.74198 | 58.77258 | 42.87626 | 9.165237 | 0        | 16.44749 | 10.32461 | 10.61932 | 9.514144 | 9.096809 | 9.059768 |          |
| Ptprs    | 87.673   | 84.56848 | 91.46915 | 100      | 76.9496  | 74.30406 | 75.24187 | 60.3162   | 64.92794 | 39.10955 | 49.10635 | 41.40782 | 12.07865 | 0        | 6.719065 | 13.57192 | 18.09428 | 13.96182 | 17.48875 | 17.53459 |          |
| Itgb3    | 97.70475 | 91.40519 | 100      | 91.35508 | 76.36419 | 65.73111 | 82.7694  | 47.34428  | 60.37909 | 64.5996  | 56.21824 | 24.78936 | 11.52341 | 0        | 3.2047   | 0.958872 | 1.743824 | 2.05462  | 0.670826 | 0.160584 |          |
| Dusp4    | 87.7438  | 81.86369 | 91.69563 | 100      | 82.21467 | 64.22802 | 66.6454  | 39.22755  | 62.38443 | 52.32031 | 46.34863 | 4.78389  | 0.994113 | 0        | 6.417074 | 6.968823 | 5.142468 | 5.511157 | 6.365494 | 10.96389 |          |
| Rab4a    | 100      | 81.7369  | 90.33973 | 99.50517 | 68.69388 | 65.57636 | 49.49965 | 74.74616  | 63.71202 | 76.6858  | 50.34701 | 13.8847  | 19.57282 | 5.101509 | 0        | 1.084322 | 1.957607 | 5.53992  | 5.83938  | 8.759848 |          |
| Pdgfa    | 85.87764 | 82.65136 | 100      | 97.26018 | 70.75025 | 57.48389 | 72.96071 | 57.37503  | 70.61677 | 92.96399 | 48.22356 | 26.90468 | 13.49928 | 0.673739 | 0        | 12.0043  | 9.088848 | 4.638497 | 8.800613 | 7.808653 |          |
| Dcstamp  | 30.81175 | 46.54763 | 56.83183 | 56.29491 | 51.51814 | 65.17767 | 67.41033 | 71.09808  | 100      | 41.3424  | 74.91572 | 46.81348 | 2.901715 | 1.17398  | 0.792285 | 0        | 2.049682 | 3.748231 | 5.425979 | 3.365843 |          |
| Ocstamp  | 30.0911  | 44.54276 | 67.40917 | 61.12785 | 51.30134 | 61.48568 | 74.34133 | 75.34894  | 100      | 63.72898 | 47.94244 | 16.77678 | 0        | 0.924634 | 0.489866 | 6.346152 | 5.149188 | 7.6203   | 12.36222 | 10.43659 |          |
| Mmp12    | 32.10449 | 41.73087 | 52.22959 | 60.87953 | 53.22054 | 67.04349 | 82.80979 | 71.108309 | 100      | 75.58144 | 74.54094 | 34.84557 | 7.557602 | 0.09654  | 0.661245 | 0        | 0.002942 | 0.084335 | 0.07447  | 0.044419 |          |
| Mmp13    | 35.4561  | 53.08372 | 60.42499 | 74.08577 | 64.6976  | 56.90867 | 80.64073 | 68.29533  | 100      | 82.24943 | 74.6185  | 11.18084 | 3.940141 | 0.797698 | 2.31653  | 0        | 1.056591 | 1.253669 | 9.973003 | 0.622628 |          |
| Lat      | 64.50362 | 73.27607 | 78.74771 | 70.32606 | 59.39869 | 62.35448 | 59.64577 | 60.84888  | 83.16833 | 100      | 65.6718  | 45.25203 | 5.635009 | 0        | 1.557164 | 0        | 1.358131 | 0        | 1.76764  | 0.412472 |          |
| Spp1     | 33.89592 | 35.07113 | 55.4777  | 66.41394 | 71.13682 | 64.65737 | 78.94179 | 62.04557  | 81.65483 |          |          |          |          |          |          |          |          |          |          |          |          |

|           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Mgl2      | 46.32953 | 55.34625 | 72.78662 | 100      | 82.98759 | 83.7553  | 99.59791 | 93.78031 | 85.35882 | 58.249   | 69.31845 | 16.61392 | 8.36444  | 1.580319 | 0.089471 | 0        | 0.038976 | 0        | 0.012721 | 0.07054  |
| Cd9       | 37.18235 | 42.72696 | 67.53291 | 91.09617 | 83.56305 | 91.74683 | 100      | 81.0673  | 89.19217 | 65.30303 | 59.29703 | 24.60426 | 9.815058 | 3.625238 | 0        | 7.334681 | 10.66519 | 9.347633 | 7.713709 | 12.90008 |
| Anxa1     | 54.97585 | 57.50468 | 75.00279 | 89.24374 | 72.1838  | 87.46356 | 93.55931 | 82.9812  | 100      | 65.59573 | 57.49053 | 37.98094 | 15.20659 | 0        | 3.104866 | 5.095009 | 10.7494  | 11.87214 | 17.23499 | 18.44953 |
| Stmn1     | 59.72343 | 66.54172 | 98.67247 | 88.95074 | 63.04628 | 70.88848 | 100      | 34.76611 | 71.65534 | 20.15461 | 67.71184 | 5.557255 | 1.81141  | 2.121669 | 1.301592 | 0        | 3.738055 | 4.070314 | 3.598609 | 2.771029 |
| Ube2c     | 44.51567 | 55.98546 | 100      | 76.15703 | 69.66909 | 43.25625 | 86.43507 | 9.826329 | 42.92865 | 15.19228 | 50.90609 | 0        | 0        | 0        | 0        | 0        | 1.883221 | 0.529751 | 0        | 0.288032 |
| Bex1      | 88.5944  | 82.24902 | 90.85919 | 100      | 92.12833 | 80.23143 | 36.492   | 33.19396 | 18.86656 | 1.737821 | 5.01981  | 2.911336 | 0        | 0        | 0        | 0        | 0.387122 | 0        | 0        | 0        |
| Dbp       | 91.36425 | 87.30035 | 83.56345 | 100      | 73.31038 | 43.25098 | 52.70454 | 16.05812 | 30.61032 | 4.158351 | 3.850756 | 12.18153 | 6.105431 | 17.42049 | 8.077441 | 0        | 11.30285 | 13.25596 | 15.66109 | 11.66268 |
| Gda       | 79.26354 | 92.20041 | 95.47822 | 100      | 69.7228  | 61.16609 | 81.40213 | 61.38511 | 35.1567  | 20.32649 | 16.48187 | 6.99325  | 0        | 10.47897 | 18.78242 | 6.823356 | 17.37017 | 20.78002 | 25.27795 | 29.16713 |
| Gm2000    | 96.69366 | 88.64829 | 97.58052 | 100      | 72.49028 | 57.59116 | 73.75729 | 49.4847  | 46.24218 | 33.49238 | 22.12322 | 16.6656  | 4.461613 | 12.94123 | 0        | 12.84467 | 11.38949 | 16.66388 | 19.37646 | 15.33852 |
| Tmem65    | 100      | 89.09213 | 82.26748 | 93.50527 | 71.74655 | 57.85707 | 65.8764  | 50.93736 | 50.56287 | 39.48747 | 24.71129 | 8.015036 | 1.381647 | 12.53108 | 0        | 15.13473 | 14.73449 | 15.77374 | 17.45073 | 18.29401 |
| Rpl10-ps3 | 94.49809 | 91.76154 | 96.28985 | 100      | 70.69187 | 64.11903 | 71.33704 | 59.14473 | 55.21536 | 21.45213 | 29.91113 | 0.820395 | 5.715126 | 4.003684 | 0        | 11.35892 | 9.30821  | 16.79134 | 16.34486 | 18.31537 |
| Rpl14     | 93.86224 | 88.24941 | 97.01924 | 100      | 64.93692 | 58.90469 | 65.55122 | 52.04315 | 57.52175 | 27.89021 | 25.94462 | 10.58364 | 0        | 5.458241 | 4.749292 | 10.53537 | 16.04884 | 16.96179 | 16.45364 | 19.22021 |
| Rps4x     | 94.69043 | 89.97424 | 96.24439 | 100      | 65.72028 | 59.39266 | 66.72953 | 51.52871 | 54.44218 | 25.85712 | 24.01626 | 7.184086 | 0.194665 | 1.829275 | 0        | 6.798418 | 12.90962 | 14.1444  | 15.96432 | 18.30763 |
| Rpl21     | 96.34064 | 90.49092 | 96.6123  | 100      | 63.3932  | 59.2103  | 67.86773 | 49.14961 | 56.95267 | 31.08296 | 24.39836 | 9.855844 | 0        | 3.11075  | 2.15119  | 8.013442 | 13.68029 | 15.49718 | 14.66247 | 15.54328 |
| Rpl28     | 94.10409 | 89.55716 | 96.43646 | 100      | 64.79501 | 59.18146 | 65.25909 | 49.74507 | 56.71742 | 33.38666 | 23.11767 | 8.100668 | 0        | 0.995775 | 0.095272 | 7.740518 | 12.93401 | 14.44264 | 13.57036 | 15.90707 |
| Rps15a    | 93.77261 | 89.42921 | 98.45222 | 100      | 62.88215 | 59.37766 | 64.72433 | 46.53271 | 57.67691 | 33.42958 | 27.59012 | 8.531692 | 1.084891 | 2.778894 | 0        | 7.38762  | 13.08422 | 14.55961 | 17.71592 | 20.07383 |
| Rpl6      | 93.82227 | 88.56145 | 96.63568 | 100      | 65.63872 | 61.01816 | 68.09882 | 50.84909 | 56.56173 | 31.5619  | 27.55054 | 9.329859 | 0.208251 | 0        | 2.601578 | 9.691334 | 13.09296 | 15.97232 | 16.06025 | 18.91247 |
| Rps7      | 96.80122 | 89.9859  | 98.90306 | 100      | 63.32532 | 59.2509  | 68.01908 | 49.4566  | 55.54736 | 28.40905 | 26.14595 | 10.60786 | 0        | 0.466243 | 3.213258 | 7.719076 | 13.08284 | 14.60699 | 17.24252 | 19.02927 |
| Rps26     | 96.91228 | 92.04252 | 97.52183 | 100      | 65.1333  | 58.0917  | 67.53296 | 55.89797 | 59.18666 | 24.35531 | 31.15678 | 10.0127  | 0        | 4.959357 | 1.628849 | 6.701215 | 12.85159 | 14.83578 | 13.18302 | 13.49056 |
| Rpl3      | 95.05643 | 89.44717 | 98.72676 | 100      | 71.58688 | 63.10101 | 70.78989 | 53.58348 | 59.73795 | 30.5555  | 28.83033 | 10.07261 | 0        | 2.955537 | 2.993834 | 6.183837 | 10.63019 | 11.80759 | 12.05462 | 11.88664 |
| Rps18     | 97.47054 | 92.15981 | 98.48612 | 100      | 65.34882 | 60.9644  | 66.40162 | 52.43186 | 57.20849 | 32.43466 | 30.5985  | 9.525068 | 3.136652 | 2.65506  | 0        | 5.855099 | 10.02279 | 9.765258 | 9.895665 | 10.21894 |
| Rpl36a    | 96.02269 | 91.61533 | 96.30929 | 100      | 68.11427 | 60.30922 | 55.1029  | 51.34927 | 57.52796 | 33.61535 | 28.75383 | 11.45349 | 3.053908 | 4.032149 | 0        | 6.943303 | 10.40296 | 10.19472 | 9.9332   | 11.48836 |
| Mxd4      | 100      | 96.0884  | 97.46288 | 99.71074 | 62.23273 | 62.57532 | 67.65247 | 44.38516 | 60.63146 | 39.74164 | 22.10341 | 10.3393  | 0        | 10.16574 | 11.33019 | 8.625958 | 12.76027 | 13.97622 | 16.56295 | 16.53326 |
| Gm9493    | 98.30147 | 89.65947 | 99.436   | 100      | 60.96392 | 66.53539 | 77.92374 | 53.85438 | 63.05508 | 39.38538 | 29.56399 | 10.02506 | 4.750749 | 0        | 4.942125 | 11.72075 | 13.87151 | 13.43351 | 17.29705 | 18.66222 |
| Rps21     | 97.168   | 94.55506 | 94.9725  | 100      | 68.72925 | 64.00992 | 68.21184 | 50.96724 | 60.41844 | 40.03867 | 30.82115 | 10.87255 | 8.896574 | 8.959893 | 0        | 14.40728 | 16.12804 | 16.01207 | 13.63168 | 16.15732 |
| Rpl37a    | 97.27501 | 93.27669 | 96.54332 | 100      | 64.40343 | 59.25018 | 67.31221 | 50.90119 | 54.01732 | 34.14291 | 27.90307 | 7.267074 | 4.944352 | 5.285295 | 0        | 9.54238  | 13.66867 | 15.30547 | 18.39194 | 18.47198 |
| Rpl39     | 97.28951 | 91.3326  | 97.17805 | 100      | 64.89997 | 59.37205 | 67.947   | 53.13917 | 56.09205 | 33.20048 | 34.13535 | 9.590989 | 0        | 2.976487 | 2.359049 | 10.42571 | 15.6583  | 16.81179 | 18.3209  | 21.21907 |
| Rps17     | 93.39871 | 89.91719 | 96.85094 | 100      | 65.33512 | 60.08486 | 68.01122 | 51.71981 | 56.52346 | 41.79694 | 31.56729 | 8.717204 | 5.000742 | 2.818337 | 0        | 8.387604 | 13.97929 | 13.85474 | 13.84626 | 15.69129 |
| Rps8      | 91.8978  | 88.92991 | 96.19949 | 100      | 64.93543 | 60.38885 | 66.3542  | 52.03374 | 58.73942 | 37.10236 | 28.88884 | 10.79863 | 0        | 4.171999 | 0.611091 | 8.497669 | 14.82739 | 14.38979 | 14.27493 | 16.16878 |
| Rpl36     | 96.72441 | 91.63102 | 96.06029 | 100      | 64.70833 | 64.40617 | 69.40759 | 51.03121 | 57.51505 | 36.11946 | 31.50286 | 9.888492 | 0        | 1.099893 | 0.044673 | 7.613637 | 11.83564 | 13.71147 | 12.81666 | 13.76169 |
| Rpl37     | 97.82009 | 92.49376 | 97.63379 | 100      | 66.95002 | 59.99492 | 69.28013 | 50.97615 | 54.51418 | 35.16894 | 27.97867 | 11.80461 | 0.601994 | 0.617999 | 0        | 6.23623  | 11.94723 | 13.43086 | 14.73188 | 16.32248 |
| Cish      | 84.8482  | 83.48796 | 90.51808 | 100      | 78.71492 | 64.17248 | 75.44223 | 51.48106 | 57.36921 | 35.20087 | 19.44474 | 4.908325 | 0        | 6.306764 | 14.79427 | 14.75966 | 17.31969 | 19.29893 | 18.21459 | 18.31409 |
| Rcbtb2    | 93.65858 | 88.80909 | 89.48544 | 100      | 71.26269 | 70.18791 | 80.99616 | 56.67813 | 67.77981 | 36.03754 | 24.67437 | 6.392887 | 0.451937 | 4.827002 | 0        | 6.143706 | 9.28318  | 15.5111  | 14.13403 | 18.15476 |
| Klf9      | 88.85837 | 91.5094  | 100      | 92.98852 | 70.13772 | 69.6102  | 69.0703  | 54.34269 | 58.36589 | 43.2878  | 19.20662 | 5.828527 | 0        | 6.313145 | 9.133461 | 9.073434 | 8.136735 | 13.15304 | 13.57616 |          |
| Picalm    | 94.4149  | 92.47639 | 86.59711 | 100      | 67.66172 | 54.33072 | 68.87328 | 57.6024  | 61.33113 | 33.54139 | 37.44442 | 21.71477 | 0        | 12.84836 | 16.64111 | 16.37844 | 20.31528 | 14.47386 | 16.69191 | 19.3804  |
| Rps18-ps3 | 97.31153 | 93.86743 | 92.02101 | 100      | 73.32169 | 61.45295 | 70.39535 | 66.97809 | 62.80301 | 33.42369 | 13.18358 | 23.22266 | 19.41407 | 0        | 9.628381 | 17.04253 | 21.96893 | 23.15048 | 16.94043 | 18.93634 |
| Msx3      | 76.57485 | 83.74703 | 88.17478 | 100      | 72.99283 | 68.67664 | 79.6297  | 49.91569 | 45.55356 | 15.83965 | 8.296667 | 13.62422 | 0        | 6.409863 | 0        | 0        | 0        | 0        | 0        | 0        |
| Man1a     | 88.49893 | 86.05826 | 94.9319  | 100      | 88.17844 | 71.41539 | 71.62013 | 50.52895 | 52.46107 | 16.23117 | 19.4529  | 10.26262 | 2.905177 | 3.66826  | 0        | 5.96247  | 6.922301 | 6.168259 | 5.796843 | 8.005481 |
| Cd28      | 85.73124 | 86.72215 | 90.56055 | 100      | 84.82966 | 73.66046 | 79.95493 | 44.0556  | 46.73736 | 19.94849 | 18.51718 | 8.803189 | 0        | 8.19333  | 3.444489 | 4.011278 | 4.022089 | 11.41891 | 7.183994 | 7.265527 |
| Dnmt3aos  | 97.50758 | 84.90443 | 91.80036 | 100      | 77.3842  | 62.32388 | 80.04175 | 43.95646 | 47.5156  | 9.038098 | 26.23466 | 7.490303 | 12.13386 | 1.757237 | 3.973023 | 0        | 1.841447 | 0.59876  | 0.175509 | 0.636637 |
| Zfp36l1   | 96.4763  | 96.95608 | 91.99246 | 100      | 69.5441  | 57.18991 | 69.42297 | 47.64383 | 39.18505 | 17.97809 | 14.15534 | 5.873142 | 0        | 3.017187 | 11.29704 | 4.489292 | 9.021431 | 9.870231 | 7.40524  | 6.68541  |
| Il6st     | 98.83889 | 95.3141  | 96.60539 | 100      | 71.65116 | 71.63046 | 78.15272 | 50.50858 | 48.45473 | 21.80503 | 15.03251 | 9.075477 | 0        | 2.949356 | 6.377112 | 5.768865 | 9.408779 | 4.674083 | 10.12581 | 7.412164 |
| Flywch2   | 100      | 93.91259 | 89.32142 | 94.24783 | 74.06562 | 79.56474 | 78.0726  | 47.08739 | 41.73324 | 14.26058 | 10.82898 | 5.929064 | 0        | 2.145296 | 2.197696 | 3.184138 | 5.529698 | 7.366066 | 3.773565 | 4.455448 |
| PISD      | 100      | 87.70959 | 91.56856 | 89.85262 | 68.90595 | 63.48107 | 69.37041 | 32.87096 | 43.9082  | 10.05267 | 5.730091 | 13.72671 | 13.83694 | 15.87499 | 0        | 11.04579 | 17.73207 | 18.16333 | 15.20555 | 18.78977 |
| Sepp1     | 100      | 97.05941 | 89.87019 | 95.82567 | 75.42994 | 68.28786 | 67.66857 | 46.07143 | 43.9122  | 18.38183 | 23.82568 | 8.649994 | 0        | 12.14728 | 13.8888  | 13.76141 | 18.14069 | 19.29407 | 20.95348 | 21.26857 |
| Cnrip1    | 100      | 92.13221 | 98.02484 | 84.02732 | 73.53112 | 57.44383 | 74.52021 | 45.1929  | 31.73147 | 20.82987 | 18.55089 | 13.71532 | 0        | 18.34482 | 10.26985 | 14.23034 | 22.18652 | 19.15511 | 16.54319 | 17.9232  |
| Gm1673    | 94.39121 | 87.52894 | 100      | 84.15668 | 75.89132 | 56.42626 | 52.36764 | 43.43875 | 41.62973 | 17.4681  | 17.14162 | 1.752595 | 9.922614 | 7.997717 | 6.470293 | 5.713907 | 0        | 5.870146 | 8.077514 | 6.76056  |
| Csf2rb    | 100      | 90.72945 | 91.89501 | 95.13034 | 63.45279 | 55.76003 | 55.91732 | 41.34027 | 54.92636 | 16.98522 | 2.637382 | 11.42925 | 1.220245 | 5.902706 | 0        | 4.169916 | 11.65674 | 15.86757 | 17.94625 | 20.12426 |
| Abca1     | 100      | 88.13717 | 84.41944 | 87.80593 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |

|          |          |          |          |          |          |          |          |          |          |          |          |          |          |           |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|
| Dnmt3a   | 94.37951 | 84.65367 | 95.01067 | 100      | 67.23769 | 70.99668 | 66.1735  | 48.99702 | 82.9531  | 38.52173 | 31.82899 | 13.38604 | 7.154663 | 7.367717  | 4.468977 | 0        | 3.118937 | 8.07473  | 6.480446 | 5.643193 |
| Rpl22l1  | 88.99111 | 86.70522 | 93.39932 | 100      | 68.40923 | 61.8083  | 73.37127 | 59.67491 | 68.68255 | 35.92316 | 29.83851 | 19.09608 | 0        | 1.379054  | 2.49284  | 3.648876 | 7.012882 | 7.880276 | 7.904914 | 8.603559 |
| Rpl10a   | 96.32362 | 91.56377 | 97.98399 | 100      | 71.60623 | 68.36417 | 72.69391 | 57.33437 | 65.18653 | 41.17483 | 32.24557 | 16.04798 | 5.887465 | 1.615973  | 0        | 1.586909 | 3.2631   | 3.218281 | 3.210806 | 3.30579  |
| Cd300lb  | 96.72308 | 92.77577 | 100      | 97.84503 | 76.91599 | 72.06156 | 77.79328 | 58.80983 | 67.00194 | 42.93062 | 33.13613 | 12.18767 | 1.641521 | 3.647773  | 0        | 3.709234 | 7.981619 | 7.622056 | 6.145205 | 4.863031 |
| Cd300ld  | 93.6803  | 89.89022 | 92.07228 | 100      | 73.06412 | 70.09744 | 75.31932 | 66.47027 | 75.22512 | 43.91868 | 41.58589 | 16.53914 | 0        | 1.739319  | 0.899984 | 2.868754 | 2.592489 | 1.443116 | 3.211628 | 3.001106 |
| Rpl38    | 93.09462 | 90.47051 | 96.83143 | 100      | 70.36778 | 64.56222 | 71.75639 | 62.09515 | 70.86275 | 44.15147 | 42.344   | 14.7385  | 7.479535 | 1.522227  | 0        | 7.842062 | 9.473115 | 10.08875 | 8.611999 | 9.225752 |
| Lhfp12   | 95.86443 | 85.07315 | 94.81418 | 100      | 59.96681 | 54.75307 | 64.34322 | 42.66784 | 68.35503 | 56.7423  | 29.84688 | 10.46338 | 21.7484  | 15.45424  | 0        | 7.679436 | 5.520025 | 7.288588 | 2.489783 | 8.946818 |
| Fam132a  | 96.61744 | 92.88796 | 97.65865 | 100      | 70.55049 | 68.73977 | 68.11635 | 56.32354 | 79.20426 | 37.21009 | 32.61419 | 10.33604 | 24.51001 | 22.69432  | 0        | 17.50592 | 10.2283  | 12.61221 | 13.08596 | 11.41148 |
| Mafb     | 87.37282 | 84.8933  | 89.87625 | 100      | 62.88316 | 57.4886  | 61.68792 | 49.32672 | 43.78408 | 38.58854 | 27.61814 | 13.78388 | 0        | 11.52018  | 9.818069 | 9.429453 | 4.151258 | 8.549052 | 3.106416 | 4.285809 |
| Fosl2    | 73.32016 | 82.89693 | 88.2089  | 100      | 66.5496  | 65.06859 | 67.91086 | 50.57375 | 63.93713 | 32.5554  | 26.77797 | 10.90922 | 1.0035   | 2.776328  | 2.353807 | 0        | 5.606702 | 2.625772 | 3.282542 | 5.217029 |
| Cystm1   | 100      | 93.37453 | 91.4643  | 90.49165 | 53.78555 | 63.22746 | 70.35768 | 52.27773 | 69.25086 | 35.0632  | 21.99027 | 8.833822 | 1.155964 | 17.80698  | 5.163335 | 8.164011 | 1.373266 | 1.806906 | 1.849064 | 0        |
| Mcf2l    | 98.32988 | 90.96416 | 100      | 95.44388 | 69.17044 | 65.08984 | 77.74811 | 57.05103 | 60.69699 | 44.06561 | 16.89427 | 16.56025 | 0        | 4.021976  | 4.058203 | 4.741558 | 1.795015 | 5.199922 | 3.474111 | 3.217749 |
| Cblb     | 99.30343 | 87.29041 | 98.01855 | 100      | 66.20943 | 61.47183 | 69.94448 | 65.05021 | 57.54639 | 48.66196 | 25.4453  | 11.70918 | 13.62794 | 1.84097   | 2.501007 | 0        | 2.616612 | 1.985176 | 5.27092  | 6.329239 |
| Rpl12    | 97.61567 | 92.73073 | 97.36363 | 100      | 69.05256 | 62.77206 | 68.45359 | 53.95407 | 65.16537 | 34.11653 | 31.04192 | 11.54444 | 5.038802 | 0         | 0.891667 | 2.200837 | 4.14991  | 4.88634  | 6.166279 | 7.080028 |
| Mtss1    | 97.09787 | 94.6891  | 100      | 98.09486 | 63.87649 | 60.80354 | 71.52008 | 56.42818 | 57.88335 | 43.16414 | 33.44625 | 18.64667 | 10.01907 | 0         | 2.688841 | 9.184941 | 3.296863 | 6.538087 | 6.469093 | 9.806055 |
| Dut      | 90.81436 | 95.65254 | 100      | 93.96486 | 73.66287 | 59.72916 | 64.98054 | 52.59016 | 75.65036 | 34.82034 | 22.44814 | 12.51997 | 0.715573 | 9.664631  | 0        | 9.051527 | 7.06188  | 7.245518 | 5.823561 | 8.060586 |
| Plxnc1   | 97.94289 | 96.81828 | 98.56934 | 100      | 80.33618 | 71.42944 | 71.7771  | 50.81482 | 70.29464 | 26.95851 | 15.47907 | 7.63684  | 0        | 5.02466   | 1.277123 | 4.687772 | 16.24479 | 8.505438 | 8.736823 | 12.7131  |
| Smap2    | 98.90083 | 92.87228 | 92.83437 | 100      | 58.69136 | 64.01839 | 72.00251 | 41.27962 | 55.75802 | 34.50607 | 11.70956 | 6.640457 | 6.98565  | 3.144469  | 0        | 4.71085  | 5.905139 | 7.809609 | 13.36386 | 14.02454 |
| Rps12    | 100      | 95.44598 | 97.55694 | 99.04387 | 59.85569 | 55.59481 | 60.74544 | 42.11213 | 47.97276 | 30.828   | 22.26963 | 6.592727 | 0        | 4.430748  | 4.272947 | 8.418244 | 11.76335 | 14.71148 | 14.68328 | 17.55203 |
| Rpl10    | 91.88657 | 86.19601 | 92.33127 | 100      | 66.14525 | 60.73955 | 65.19951 | 50.80903 | 48.71711 | 25.07658 | 23.38259 | 7.664512 | 0        | 1.42834   | 1.63901  | 5.768231 | 10.37693 | 12.40051 | 11.78454 | 14.42361 |
| Rps28    | 99.35331 | 94.44907 | 100      | 99.66493 | 64.16758 | 59.89539 | 66.53926 | 45.15834 | 51.93801 | 26.18172 | 20.42038 | 8.347856 | 1.798467 | 0         | 0.046039 | 4.914402 | 9.123251 | 9.559434 | 9.058199 | 9.549318 |
| Rpl35    | 97.16058 | 91.64031 | 96.64797 | 100      | 63.0228  | 57.66539 | 65.2577  | 51.40656 | 54.08847 | 32.8976  | 28.39558 | 4.509621 | 0.672297 | 0         | 0.58817  | 5.817251 | 8.865821 | 10.94725 | 10.74683 | 11.65245 |
| Eef1a1   | 96.67489 | 89.96105 | 97.64928 | 100      | 61.6001  | 56.02568 | 64.66253 | 44.34991 | 52.76422 | 29.98011 | 21.73637 | 6.076176 | 0        | 3.826533  | 2.477167 | 6.413249 | 11.52125 | 11.5704  | 13.26371 | 15.03475 |
| Rps14    | 97.79895 | 92.09319 | 96.75853 | 100      | 63.80606 | 57.67687 | 64.53706 | 48.84607 | 51.23114 | 27.65487 | 22.76884 | 4.9908   | 0.263808 | 2.175442  | 0        | 4.979971 | 8.638237 | 12.00505 | 13.86548 | 15.09298 |
| Rpl32    | 98.67544 | 92.83946 | 98.18522 | 100      | 63.20116 | 58.40352 | 65.21378 | 49.03921 | 54.13326 | 30.98006 | 26.55979 | 6.996101 | 0.720264 | 2.600234  | 0        | 4.988052 | 11.60128 | 12.34521 | 13.21497 | 14.99982 |
| Rpl13    | 99.14056 | 93.16719 | 99.74231 | 100      | 61.75641 | 57.07886 | 66.98583 | 48.41653 | 53.89733 | 26.99725 | 24.42189 | 8.779166 | 2.741572 | 2.760083  | 0        | 5.73339  | 10.54951 | 12.00782 | 13.88637 | 14.40738 |
| Ahnak    | 89.69182 | 86.84188 | 94.3138  | 100      | 65.74698 | 64.36893 | 69.28751 | 53.47472 | 53.25141 | 18.78288 | 18.35603 | 17.5526  | 2.955068 | 5.799911  | 0        | 2.816618 | 5.407662 | 9.895812 | 10.67935 | 13.57016 |
| Vwf      | 94.31295 | 86.99994 | 91.75631 | 100      | 65.89676 | 66.13262 | 63.9715  | 41.36719 | 52.31735 | 26.19057 | 32.86319 | 13.54484 | 3.765135 | 9.288516  | 7.460266 | 0        | 7.134603 | 3.782733 | 2.554727 | 6.958637 |
| Rgs10    | 100      | 92.4287  | 94.34481 | 95.6535  | 64.53487 | 63.52814 | 70.11588 | 47.9024  | 55.95205 | 27.01842 | 29.93345 | 13.90901 | 2.761724 | 5.17698   | 7.3247   | 0        | 6.951975 | 8.169936 | 8.531412 | 5.042476 |
| Lyzl4    | 87.7512  | 88.40262 | 98.62598 | 100      | 88.89252 | 68.41571 | 81.27426 | 44.8512  | 53.12918 | 11.59252 | 51.31549 | 18.64315 | 0        | 0         | 0        | 0        | 2.18433  | 0        | 0.982529 | 2.867605 |
| Ramp1    | 74.14047 | 88.10616 | 94.27355 | 100      | 77.52344 | 69.25667 | 79.31116 | 76.56197 | 46.7415  | 26.89878 | 52.89012 | 21.65015 | 2.510829 | 5.873976  | 0        | 4.678204 | 1.185177 | 2.289135 | 1.160423 | 2.306366 |
| Gatm     | 77.45554 | 79.06388 | 86.87434 | 100      | 69.62081 | 76.69747 | 88.25324 | 64.01862 | 56.36692 | 31.09847 | 53.29188 | 6.458091 | 7.555569 | 0         | 3.702206 | 1.554725 | 7.367812 | 3.477036 | 2.811129 | 0.716991 |
| Mmp8     | 78.97141 | 81.03596 | 88.02439 | 100      | 79.2117  | 86.81107 | 78.45739 | 63.68499 | 57.75258 | 32.68424 | 51.429   | 10.7812  | 0        | 2.540089  | 3.397976 | 0        | 1.49925  | 4.491471 | 1.709824 | 1.358301 |
| Fn1      | 69.59436 | 79.34161 | 89.65201 | 100      | 68.9092  | 62.69948 | 73.8007  | 73.05193 | 42.23274 | 23.09347 | 21.35564 | 4.068428 | 1.32349  | 0.531374  | 0        | 0        | 0        | 0        | 0        | 0.047148 |
| Cbr2     | 71.10805 | 66.05002 | 96.66675 | 100      | 85.77121 | 82.80216 | 83.20244 | 62.27191 | 55.1873  | 27.92153 | 8.002899 | 0        | 0        | 0.3156101 | 2.139176 | 1.513523 | 1.86681  | 1.560505 | 2.72438  | 1.412663 |
| Tmem37   | 68.50211 | 71.00815 | 86.78072 | 100      | 81.4492  | 76.55372 | 80.47851 | 58.38589 | 57.37031 | 22.31247 | 27.15898 | 14.63461 | 0        | 6.673388  | 0.806927 | 4.091959 | 1.998426 | 4.212673 | 2.59782  | 3.90071  |
| Ccl6     | 77.50814 | 81.77755 | 94.10287 | 100      | 82.45805 | 68.80571 | 78.14876 | 63.51873 | 56.55807 | 21.17262 | 21.41892 | 10.31858 | 2.062561 | 0         | 1.510877 | 0.42146  | 0.852006 | 1.457849 | 1.439332 | 1.754538 |
| Mrc1     | 81.59759 | 81.58965 | 90.21181 | 100      | 81.67612 | 74.91746 | 77.00954 | 56.89066 | 54.27598 | 23.39987 | 20.66057 | 4.954446 | 0.976147 | 0.262568  | 0.183398 | 0        | 0.640455 | 0.132456 | 0.072543 |          |
| Rnase4   | 83.05179 | 79.3042  | 91.59273 | 100      | 79.87602 | 73.11725 | 77.76841 | 54.75799 | 51.71885 | 24.80747 | 22.34081 | 8.463078 | 1.852647 | 0.720569  | 0        | 0.484822 | 0.178227 | 1.896315 | 3.800592 | 1.981195 |
| Timp2    | 89.45308 | 85.53894 | 92.48158 | 100      | 80.39322 | 74.63956 | 83.56386 | 62.61116 | 55.99916 | 38.87516 | 24.95893 | 7.838509 | 0        | 1.304857  | 2.010956 | 4.604968 | 6.50356  | 6.609933 | 8.657628 | 9.198295 |
| Fcgr2b   | 78.44372 | 81.2335  | 87.39334 | 100      | 83.06471 | 68.11667 | 83.39519 | 61.25765 | 47.79841 | 42.18902 | 23.78049 | 6.880083 | 0        | 4.926074  | 6.637565 | 3.411728 | 2.548839 | 9.64315  | 11.89086 | 10.57036 |
| Dhrs3    | 80.94737 | 78.12481 | 93.72048 | 100      | 85.8465  | 82.12193 | 83.26157 | 64.41199 | 60.76089 | 31.02401 | 21.40449 | 16.82691 | 4.430814 | 4.1529    | 0        | 3.346888 | 4.525806 | 8.753617 | 7.734142 | 11.06343 |
| Aplp2    | 83.87595 | 79.7572  | 85.53171 | 100      | 82.11286 | 71.99366 | 85.28347 | 65.19036 | 61.49207 | 36.93569 | 26.77548 | 17.09601 | 0.421099 | 8.261284  | 0        | 8.286702 | 12.86824 | 12.83132 | 14.06243 | 15.76946 |
| Selenbp1 | 73.49242 | 80.32316 | 97.98132 | 100      | 86.56413 | 82.25278 | 85.25394 | 67.32074 | 71.85235 | 31.43361 | 27.41256 | 4.435855 | 0.029172 | 9.833335  | 0        | 15.10314 | 11.79276 | 14.08927 | 17.12123 | 25.05255 |
| Hfe      | 66.99736 | 75.04514 | 84.09913 | 100      | 82.53327 | 76.64297 | 89.10413 | 62.82918 | 68.19133 | 23.10115 | 16.76778 | 8.075565 | 1.072506 | 0         | 11.11007 | 3.574798 | 12.72581 | 10.67841 | 14.78307 | 14.47191 |
| Wbp5     | 68.933   | 70.75177 | 88.96445 | 100      | 83.58852 | 73.12759 | 67.83901 | 64.3146  | 51.71115 | 19.12514 | 21.4506  | 11.00621 | 0        | 4.934122  | 6.380281 | 9.431739 | 12.19231 | 11.53375 | 12.03972 | 14.8172  |
| Vkorc1   | 71.52275 | 74.34874 | 84.18813 | 100      | 82.45599 | 75.87938 | 85.90118 | 76.07075 | 53.72591 | 34.46786 | 31.5652  | 12.98154 | 0        | 2.965522  | 7.805798 | 11.69263 | 13.25662 | 10.81267 | 11.19812 | 12.34952 |
| Cldn11   | 70.75593 | 66.5801  | 79.77308 | 100      | 68.63523 | 69.34569 | 75.352   | 50.00055 | 89.7672  | 40.68976 | 6.101338 | 1.79782  | 0        | 0         | 0        | 0        | 0        | 0        | 0        | 0        |
| Pdia4    | 57.61538 | 63.99143 | 84.79561 | 100      |          |          |          |          |          |          |          |          |          |           |          |          |          |          |          |          |

[illegible]

**Supplemental Table s2. Gene ontology of BMDMs and ATMs.**

**Protein class**

|           | nucleic acid binding (PC00171) | hydrolase (PC00121) | transcription factor (PC00218) | transferase (PC00220) | enzyme modulator (PC00095) | transporter (PC00227) | cytoskeletal protein (PC00085) | oxidoreductase (PC00176) | signaling molecule (PC00207) | receptor (PC00197) | ligase (PC00142) | membrane traffic protein (PC00150) | transfer/carrier protein (PC00219) | calcium-binding protein (PC00060) | defense/immunity protein (PC00090) | chaperone (PC00072) | lyase (PC00144) | cell adhesion molecule (PC00069) | extracellular matrix protein (PC00102) | isomerase (PC00135) | ion receptor regulatory/adaptor protein (PC00226) | cell junction protein (PC00070) | structural protein (PC00211) | viral protein (PC00237) | storage protein (PC00210) | surfactant (PC00212) |
|-----------|--------------------------------|---------------------|--------------------------------|-----------------------|----------------------------|-----------------------|--------------------------------|--------------------------|------------------------------|--------------------|------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|---------------------|-----------------|----------------------------------|----------------------------------------|---------------------|---------------------------------------------------|---------------------------------|------------------------------|-------------------------|---------------------------|----------------------|
| M0 BMDM   | 1008                           | 681                 | 580                            | 567                   | 538                        | 262                   | 243                            | 241                      | 208                          | 205                | 193              | 159                                | 118                                | 103                               | 74                                 | 66                  | 65              | 53                               | 46                                     | 45                  | 37                                                | 21                              | 16                           | 4                       | 3                         | 1                    |
| M1 BMDM   | 974                            | 654                 | 554                            | 537                   | 516                        | 254                   | 231                            | 219                      | 202                          | 196                | 184              | 159                                | 123                                | 98                                | 77                                 | 65                  | 62              | 50                               | 45                                     | 42                  | 31                                                | 20                              | 13                           | 4                       | 4                         | 1                    |
| M2 BMDM   | 999                            | 682                 | 575                            | 559                   | 542                        | 262                   | 247                            | 239                      | 217                          | 208                | 193              | 160                                | 117                                | 105                               | 80                                 | 65                  | 63              | 60                               | 48                                     | 44                  | 38                                                | 23                              | 17                           | 4                       | 3                         | 1                    |
| lean ATM  | 1003                           | 712                 | 581                            | 567                   | 555                        | 270                   | 269                            | 257                      | 249                          | 248                | 184              | 164                                | 117                                | 116                               | 96                                 | 79                  | 74              | 67                               | 63                                     | 43                  | 35                                                | 26                              | 22                           | 4                       | 3                         | 1                    |
| obese ATM | 1010                           | 690                 | 584                            | 557                   | 548                        | 270                   | 243                            | 242                      | 228                          | 226                | 191              | 163                                | 115                                | 103                               | 88                                 | 65                  | 64              | 64                               | 44                                     | 44                  | 37                                                | 21                              | 19                           | 3                       | 3                         | 1                    |

**Gene type**

|           | protein_coding | antisense_RNA | bidirectional_promoter_lncRNA | lincRNA | processed_pseudogene | Other |
|-----------|----------------|---------------|-------------------------------|---------|----------------------|-------|
| M0 BMDM   | 10555          | 177           | 17                            | 205     | 24                   | 19    |
| M1 BMDM   | 10072          | 165           | 13                            | 181     | 20                   | 19    |
| M2 BMDM   | 10465          | 170           | 14                            | 186     | 23                   | 18    |
| lean ATM  | 10655          | 109           | 7                             | 137     | 18                   | 15    |
| obese ATM | 10614          | 130           | 11                            | 163     | 21                   | 20    |

# Cellular component

| M0 BMDM<br>GO term | Name                                                                   | log10 p-value |
|--------------------|------------------------------------------------------------------------|---------------|
| GO:0005739         | mitochondrion                                                          | -126.991      |
| GO:1902494         | catalytic complex                                                      | -104.658      |
| GO:0005730         | nucleolus                                                              | -91.0159      |
| GO:1990234         | transferase complex                                                    | -82.5331      |
| GO:0044429         | mitochondrial part                                                     | -79.1772      |
| GO:1990904         | ribonucleoprotein complex                                              | -73.3958      |
| GO:0031967         | organelle envelope                                                     | -70.9666      |
| GO:0031975         | envelope                                                               | -70.8729      |
| GO:0005694         | chromosome                                                             | -59.1124      |
| GO:0015630         | microtubule cytoskeleton                                               | -54.6421      |
| GO:0044427         | chromosomal part                                                       | -51.1612      |
| GO:0005774         | vacuolar membrane                                                      | -36.0004      |
| GO:0005773         | vacuole transferase complex, transferring phosphorus-containing groups | -35.6655      |
| GO:0061695         |                                                                        | -35.5331      |
| GO:0005768         | endosome                                                               | -25.8539      |
| GO:0005840         | ribosome                                                               | -23.4815      |
| GO:0005925         | focal adhesion                                                         | -22.3979      |
| GO:0005681         | spliceosomal complex                                                   | -21.3478      |
| GO:0005789         | endoplasmic reticulum membrane                                         | -21.2652      |

| M1 BMDM<br>GO term | Name                                                           | log10 p-value |
|--------------------|----------------------------------------------------------------|---------------|
| GO:0005739         | mitochondrion                                                  | -125.6576     |
| GO:1902494         | catalytic complex                                              | -104.5784     |
| GO:0005730         | nucleolus                                                      | -87.466       |
| GO:1990904         | ribonucleoprotein complex                                      | -84.2596      |
| GO:1990234         | transferase complex                                            | -80.9136      |
| GO:0044429         | mitochondrial part                                             | -80.1101      |
| GO:0031967         | organelle envelope                                             | -70.7033      |
| GO:0031975         | envelope                                                       | -70.6757      |
| GO:0005694         | chromosome                                                     | -40.9355      |
| GO:0005773         | vacuole                                                        | -40.8665      |
| GO:0015630         | microtubule cytoskeleton                                       | -38.9957      |
| GO:0005774         | membrane                                                       | -38.1772      |
| GO:0044427         | chromosomal part                                               | -35.4711      |
| GO:0061695         | transferase complex, transferring phosphorus-containing groups | -35.2314      |
| GO:0005768         | endosome                                                       | -29.9469      |
| GO:0005840         | ribosome                                                       | -27.5575      |
| GO:0005681         | spliceosomal complex                                           | -24.0482      |
| GO:0005925         | focal adhesion                                                 | -22.8297      |
| GO:0005794         | Golgi apparatus                                                | -21.4202      |
| GO:0000313         | organellar ribosome                                            | -20.9706      |
| GO:0005761         | mitochondrial ribosome                                         | -20.9706      |

| M2 BMDM<br>GO term | Name                                                                   | log10 p-value |
|--------------------|------------------------------------------------------------------------|---------------|
| GO:0005739         | mitochondrion                                                          | -130.1169     |
| GO:1902494         | catalytic complex                                                      | -105.433      |
| GO:0005730         | nucleolus                                                              | -90.7167      |
| GO:0044429         | mitochondrial part                                                     | -80.3605      |
| GO:1990234         | transferase complex                                                    | -80.3316      |
| GO:1990904         | ribonucleoprotein complex                                              | -74.8665      |
| GO:0031967         | organelle envelope                                                     | -72.3215      |
| GO:0031975         | envelope                                                               | -72.2321      |
| GO:0015630         | microtubule cytoskeleton                                               | -54.4597      |
| GO:0005694         | chromosome                                                             | -51.6716      |
| GO:0005773         | vacuole                                                                | -44.2277      |
| GO:0044427         | chromosomal part                                                       | -44.2277      |
| GO:0005774         | vacuolar membrane                                                      | -40.0269      |
| GO:0005773         | vacuole transferase complex, transferring phosphorus-containing groups | -38.767       |
| GO:0061695         |                                                                        | -34.3507      |
| GO:0005768         | endosome                                                               | -27.857       |
| GO:0005925         | focal adhesion                                                         | -24.4547      |
| GO:0005840         | ribosome                                                               | -23.9355      |
| GO:0005789         | endoplasmic reticulum membrane                                         | -22.4976      |
| GO:0005681         | spliceosomal complex                                                   | -21.7144      |

| lean ATM<br>GO term | Name                                                           | log10 p-value |
|---------------------|----------------------------------------------------------------|---------------|
| GO:0005739          | mitochondrion                                                  | -116.0782     |
| GO:1902494          | catalytic complex                                              | -90.0711      |
| GO:0005730          | nucleolus                                                      | -87.6594      |
| GO:1990234          | transferase complex                                            | -72.8058      |
| GO:0044429          | mitochondrial part                                             | -71.6211      |
| GO:0031967          | organelle envelope                                             | -71.6176      |
| GO:0031975          | envelope                                                       | -71.4966      |
| GO:1990904          | ribonucleoprotein complex                                      | -70.8642      |
| GO:0005694          | chromosome                                                     | -45.7162      |
| GO:0005773          | vacuole                                                        | -43.997       |
| GO:0015630          | microtubule cytoskeleton                                       | -41.8955      |
| GO:0044427          | chromosomal part                                               | -39.3902      |
| GO:0005774          | vacuolar membrane                                              | -37.5678      |
| GO:0005925          | focal adhesion                                                 | -34.9469      |
| GO:0061695          | transferase complex, transferring phosphorus-containing groups | -33.1984      |
| GO:0005794          | Golgi apparatus                                                | -31.54        |
| GO:0005768          | endosome                                                       | -28.2532      |
| GO:0005840          | ribosome                                                       | -23.6156      |

| obese ATM<br>GO term | Name                                                           | log10 p-value |
|----------------------|----------------------------------------------------------------|---------------|
| GO:0005739           | mitochondrion                                                  | -123.818      |
| GO:1902494           | catalytic complex                                              | -94.6326      |
| GO:0005730           | nucleolus                                                      | -91.2741      |
| GO:1990234           | transferase complex                                            | -77.3197      |
| GO:0044429           | mitochondrial part                                             | -76.7696      |
| GO:0031967           | organelle envelope                                             | -74.7167      |
| GO:0031975           | envelope                                                       | -74.6003      |
| GO:1990904           | ribonucleoprotein complex                                      | -73.9318      |
| GO:0005694           | chromosome                                                     | -58.0835      |
| GO:0015630           | microtubule cytoskeleton                                       | -52.1337      |
| GO:0044427           | chromosomal part                                               | -50.8153      |
| GO:0005773           | vacuole                                                        | -36.2924      |
| GO:0005774           | vacuolar membrane                                              | -35.5544      |
| GO:0061695           | transferase complex, transferring phosphorus-containing groups | -34.9626      |
| GO:0005768           | endosome                                                       | -25.9281      |
| GO:0005925           | focal adhesion                                                 | -25.2269      |
| GO:0005794           | Golgi apparatus                                                | -24.2314      |
| GO:0005840           | ribosome                                                       | -23.0186      |

# Molecular function

| M0 BMDM<br>GO term | Name                                          | log10 p-value |
|--------------------|-----------------------------------------------|---------------|
| GO:0003723         | RNA binding                                   | -145.6944     |
| GO:0019899         | enzyme binding                                | -77.845       |
| GO:0035639         | purine ribonucleoside triphosphate binding    | -49.5889      |
| GO:0032550         | purine ribonucleoside binding                 | -48.34        |
| GO:0044877         | macromolecular complex binding                | -29.5432      |
| GO:0016817         | hydrolase activity, acting on acid anhydrides | -29.2262      |

| M1 BMDM<br>GO term | Name                                        | log10 p-value |
|--------------------|---------------------------------------------|---------------|
| GO:0003723         | RNA binding                                 | -157.8908     |
| GO:0019899         | enzyme binding                              | -72.9259      |
| GO:0035639         | purine ribonucleoside triphosphate binding  | -41.3838      |
| GO:0032550         | purine ribonucleoside binding               | -40.6807      |
| GO:0016874         | ligase activity                             | -25.7627      |
| GO:0019787         | ubiquitin-like protein transferase activity | -25.6317      |

| M2 BMDM<br>GO term | Name                                       | log10 p-value |
|--------------------|--------------------------------------------|---------------|
| GO:0003723         | RNA binding                                | -145.7404     |
| GO:0019899         | enzyme binding                             | -79.7361      |
| GO:0035639         | purine ribonucleoside triphosphate binding | -46.7433      |
| GO:0032550         | purine ribonucleoside binding              | -45.5607      |
| GO:0016874         | ligase activity                            | -29.3978      |
| GO:0044877         | macromolecular complex binding             | -28.9431      |

| lean ATM<br>GO term | Name                                          | log10 p-value |
|---------------------|-----------------------------------------------|---------------|
| GO:0003723          | RNA binding                                   | -135.1858     |
| GO:0019899          | enzyme binding                                | -80.8268      |
| GO:0035639          | purine ribonucleoside triphosphate binding    | -47.8356      |
| GO:0032550          | purine ribonucleoside binding                 | -47.2197      |
| GO:0044877          | macromolecular complex binding                | -41.2733      |
| GO:0016817          | hydrolase activity, acting on acid anhydrides | -26.3809      |

| obese ATM<br>GO term | Name                                          | log10 p-value |
|----------------------|-----------------------------------------------|---------------|
| GO:0003723           | RNA binding                                   | -148.9788     |
| GO:0019899           | enzyme binding                                | -73.5467      |
| GO:0035639           | purine ribonucleoside triphosphate binding    | -52.8894      |
| GO:0032550           | purine ribonucleoside binding                 | -51.5638      |
| GO:0044877           | macromolecular complex binding                | -31.7905      |
| GO:0016817           | hydrolase activity, acting on acid anhydrides | -30.041       |

|            |                                                                                                                                                                                      |          |            |                                                                                                                      |          |            |                                                                                                                                                                                   |          |            |                                                                                                      |          |            |                                                                                                                                                                                                                                               |          |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|----------------------------------------------------------------------------------------------------------------------|----------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|------------------------------------------------------------------------------------------------------|----------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| GO:0016874 | ligase activity<br>ubiquitin-like<br>protein<br>transferase<br>activity                                                                                                              | -28.6813 | GO:0043021 | ribonucleoprotein complex<br>binding                                                                                 | -25.5196 | GO:0016817 | hydrolase<br>activity, acting<br>on acid<br>anhydrides<br>ubiquitin-like<br>protein<br>transferase<br>activity                                                                    | -27.7093 | GO:0016772 | transferase<br>activity,<br>transferring<br>phosphorus-<br>containing<br>groups                      | -25.6038 | GO:0016874 | ligase activity<br>ubiquitin-like<br>protein<br>transferase<br>activity                                                                                                                                                                       | -28.51   |
| GO:0019787 | ubiquitin-protein<br>transferase<br>activity                                                                                                                                         | -27.0813 | GO:0004842 | ubiquitin-protein<br>transferase<br>activity<br>hydrolase<br>activity, acting<br>on acid<br>anhydrides               | -25.0897 | GO:0019787 | ubiquitin-protein<br>transferase<br>activity                                                                                                                                      | -25.8139 | GO:0004842 | ubiquitin-protein<br>transferase<br>activity<br>ubiquitin-like<br>protein<br>transferase<br>activity | -24.266  | GO:0019787 | ubiquitin-protein<br>transferase<br>activity                                                                                                                                                                                                  | -26.3706 |
| GO:0004842 | ubiquitin-protein<br>transferase<br>activity<br>transferase<br>activity,<br>transferring<br>phosphorus-<br>containing<br>groups                                                      | -26.9151 | GO:0016817 | macromolecular<br>complex binding<br>transferase<br>activity,<br>transferring<br>phosphorus-<br>containing<br>groups | -24.9393 | GO:0004842 | ubiquitin-protein<br>transferase<br>activity<br>transferase<br>activity,<br>transferring<br>phosphorus-<br>containing<br>groups                                                   | -25.5575 | GO:0019787 | ligase activity                                                                                      | -23.9318 | GO:0004842 | ubiquitin-protein<br>transferase<br>activity<br>transferase<br>activity,<br>transferring<br>phosphorus-<br>containing<br>groups                                                                                                               | -26.2306 |
| GO:0016772 | ligase activity,<br>forming carbon-<br>nitrogen bonds                                                                                                                                | -26.3833 | GO:0044877 | ribonucleoprotein complex<br>binding<br>ligase activity,<br>forming carbon-<br>nitrogen bonds                        | -24.7249 | GO:0016772 | ribonucleoprotein complex<br>binding<br>ligase activity,<br>forming carbon-<br>nitrogen bonds                                                                                     | -24.9792 | GO:0016874 | transcription<br>cofactor activity<br>transcription<br>factor activity,<br>protein binding           | -21.5884 | GO:0016772 | ligase activity                                                                                                                                                                                                                               | -25.9172 |
| GO:0016879 | helicase activity<br>ribonucleoprotein complex<br>binding<br>UDP-N-<br>acetylmuramoyl<br>alanyl-D-<br>glutamyl-2,6-<br>diaminopimelate-<br>D-alanyl-D-<br>alanine ligase<br>activity | -24.451  | GO:0016772 | transcription<br>cofactor activity                                                                                   | -21.9987 | GO:0043021 | transcription<br>cofactor activity                                                                                                                                                | -24.7471 | GO:0004386 | ligase activity,<br>forming carbon-<br>nitrogen bonds                                                | -20.0227 | GO:0004386 | helicase activity<br>ligase activity,<br>forming carbon-<br>nitrogen bonds<br>ribonucleoprotein complex<br>binding<br>UDP-N-<br>acetylmuramoyl<br>alanyl-D-<br>glutamyl-2,6-<br>diaminopimelate-<br>D-alanyl-D-<br>alanine ligase<br>activity | -24.6655 |
| GO:0004386 | protein-glycine<br>ligase activity                                                                                                                                                   | -24.1971 | GO:0004386 | transcription<br>cofactor activity                                                                                   | -21.2846 | GO:0016879 | transcription<br>cofactor activity,<br>protein binding<br>UDP-N-<br>acetylmuramoyl<br>alanyl-D-<br>glutamyl-2,6-<br>diaminopimelate-<br>D-alanyl-D-<br>alanine ligase<br>activity | -23.218  | GO:0003712 | chromatin<br>binding                                                                                 | -19.9355 | GO:0016879 | protein-glycine<br>ligase activity                                                                                                                                                                                                            | -23.9101 |
| GO:0043021 | transcription<br>cofactor activity                                                                                                                                                   | -23.988  | GO:0016879 | transcription<br>cofactor activity                                                                                   | -20.2323 | GO:0004386 | transcription<br>cofactor activity                                                                                                                                                | -22.1012 | GO:0000988 | structural<br>constituent of<br>ribosome                                                             | -19.4935 | GO:0043021 | transcription<br>cofactor activity                                                                                                                                                                                                            | -21.0788 |
| GO:0008766 | transcription<br>cofactor activity                                                                                                                                                   | -20.5535 | GO:0003735 | transcription<br>cofactor activity                                                                                   | -20.1481 | GO:0003712 | transcription<br>cofactor activity                                                                                                                                                | -20.8908 | GO:0016879 | ligase activity,<br>forming carbon-<br>nitrogen bonds                                                | -18.2388 | GO:0008766 | transcription<br>cofactor activity                                                                                                                                                                                                            | -20.1035 |
| GO:0070735 | transcription<br>cofactor activity                                                                                                                                                   | -20.5535 | GO:0003712 | transcription<br>cofactor activity                                                                                   | -18.8908 | GO:0000988 | transcription<br>cofactor activity,<br>protein binding<br>UDP-N-<br>acetylmuramoyl<br>alanyl-D-<br>glutamyl-2,6-<br>diaminopimelate-<br>D-alanyl-D-<br>alanine ligase<br>activity | -19.9154 | GO:0004674 | protein<br>serine/threonine<br>kinase activity                                                       | -17.51   | GO:0070735 | protein-glycine<br>ligase activity                                                                                                                                                                                                            | -20.1035 |
| GO:0070738 | tubulin-glycine<br>ligase activity                                                                                                                                                   | -20.5535 | GO:0000988 | transcription<br>cofactor activity                                                                                   | -18.7474 | GO:0008766 | transcription<br>cofactor activity                                                                                                                                                | -19.225  | GO:0003682 | chromatin<br>binding                                                                                 | -16.6676 | GO:0070738 | transcription<br>cofactor activity                                                                                                                                                                                                            | -20.1035 |
| GO:0043774 | coenzyme F420-<br>2 alpha-glutamyl<br>ligase activity<br>ribosomal S6-<br>glutamic acid<br>ligase activity                                                                           | -20.5535 | GO:0032182 | transcription<br>cofactor activity,<br>protein binding                                                               | -18.4179 | GO:0070735 | transcription<br>cofactor activity                                                                                                                                                | -19.225  | GO:0003735 | structural<br>constituent of<br>ribosome                                                             | -16.382  | GO:0043774 | coenzyme F420-<br>2 alpha-glutamyl<br>ligase activity                                                                                                                                                                                         | -20.1035 |
| GO:0018169 | transcription<br>cofactor activity                                                                                                                                                   | -20.5535 | GO:0070740 | transcription<br>cofactor activity                                                                                   | -17.3854 | GO:0070738 | transcription<br>cofactor activity                                                                                                                                                | -19.225  | GO:0070740 | tubulin-glycine<br>ligase activity                                                                   | -15.6162 | GO:0018169 | transcription<br>cofactor activity                                                                                                                                                                                                            | -20.1035 |
| GO:0003712 | transcription<br>cofactor activity                                                                                                                                                   | -19.0907 | GO:0008766 | transcription<br>cofactor activity                                                                                   | -17.3402 | GO:0043774 | transcription<br>cofactor activity                                                                                                                                                | -19.225  | GO:0008766 | coenzyme F420-<br>2 alpha-glutamyl<br>ligase activity                                                | -15.6126 | GO:0004674 | transcription<br>cofactor activity                                                                                                                                                                                                            | -17.5817 |
| GO:0004674 | protein<br>serine/threonine<br>kinase activity                                                                                                                                       | -18.9642 | GO:0070738 | transcription<br>cofactor activity                                                                                   | -17.3402 | GO:0018169 | transcription<br>cofactor activity                                                                                                                                                | -19.225  | GO:0070738 | transcription<br>cofactor activity                                                                   | -15.6126 | GO:0003712 | transcription<br>cofactor activity                                                                                                                                                                                                            | -16.3757 |
| GO:0000988 | transcription<br>cofactor activity,<br>protein binding                                                                                                                               | -18.1774 | GO:0043774 | transcription<br>cofactor activity                                                                                   | -17.3402 | GO:0004674 | transcription<br>cofactor activity                                                                                                                                                | -17.9884 | GO:0043774 | coenzyme F420-<br>2 alpha-glutamyl<br>ligase activity                                                | -15.6126 | GO:0003735 | transcription<br>cofactor activity                                                                                                                                                                                                            | -16.3665 |

|            |                                   |          |
|------------|-----------------------------------|----------|
| GO:0032182 | ubiquitin-like<br>protein binding | -18.0397 |
| GO:0043130 | ubiquitin binding                 | -17.137  |

|            |                                    |          |
|------------|------------------------------------|----------|
| GO:0070735 | protein-glycine<br>ligase activity | -17.3402 |
| GO:0043130 | ubiquitin binding                  | -17.1444 |

|            |                                          |          |
|------------|------------------------------------------|----------|
| GO:0032182 | ubiquitin-like<br>protein binding        | -17.4878 |
| GO:0003735 | structural<br>constituent of<br>ribosome | -17.1374 |

|            |                                    |          |
|------------|------------------------------------|----------|
| GO:0070735 | protein-glycine<br>ligase activity | -15.6126 |
|------------|------------------------------------|----------|

|            |                                   |          |
|------------|-----------------------------------|----------|
| GO:0032182 | ubiquitin-like<br>protein binding | -16.0996 |
|------------|-----------------------------------|----------|

**Supplemental Table s3. The heatmap of normalized gene expression levels ATM (B vs. A).**

| MPI:     | 32.5~40  | 40~42.5  | 42.5~45  | 45~47.5  | 47.5~50  | 50~52.5  | 52.5~55  | 55~57.5  | 57.5~60  | 60~83    |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Pdpm     | 100      | 82.18489 | 69.92856 | 36.67234 | 10.33509 | 35.98128 | 36.94823 | 63.80928 | 15.23747 | 0        |
| Csf1     | 100      | 98.26826 | 52.41418 | 20.76507 | 15.14034 | 15.72593 | 0        | 90.91489 | 11.80287 | 41.93971 |
| Nr2f2    | 82.32451 | 100      | 58.6066  | 42.56    | 0        | 0        | 0        | 0        | 0        | 0        |
| Lgi2     | 100      | 92.16979 | 77.74644 | 35.86968 | 0        | 0        | 0        | 0        | 0        | 0        |
| Il1r1    | 100      | 88.15483 | 71.3827  | 36.44962 | 0        | 0        | 0        | 0        | 0        | 0        |
| Ndn      | 99.15665 | 100      | 67.16744 | 40.22888 | 0        | 12.26452 | 14.27172 | 9.906146 | 0        | 0        |
| Hspb8    | 100      | 90.8058  | 64.22557 | 36.48295 | 0        | 13.81475 | 22.76638 | 0        | 0        | 0        |
| Arhgap20 | 100      | 96.62504 | 56.32374 | 32.49827 | 0        | 19.84062 | 12.45301 | 0        | 0        | 0        |
| S100a16  | 100      | 83.99566 | 51.44082 | 53.5079  | 7.29212  | 0        | 9.708708 | 6.920095 | 1.871644 | 4.473604 |
| Meis2    | 100      | 84.57644 | 64.65139 | 51.02467 | 0        | 0        | 0        | 0        | 0        | 0        |
| Tshz2    | 92.27399 | 100      | 83.19274 | 47.03949 | 0        | 24.58928 | 0        | 13.265   | 14.53736 | 0        |
| Amotl1   | 86.44672 | 100      | 57.7261  | 57.31075 | 0        | 37.35328 | 0        | 0        | 0        | 0        |
| Pxdn     | 96.40134 | 100      | 62.44321 | 84.78579 | 0        | 0        | 22.10541 | 0        | 0        | 35.99992 |
| Adm      | 100      | 98.03677 | 87.10264 | 64.62442 | 15.39381 | 0        | 10.90221 | 32.00673 | 6.824056 | 22.44591 |
| Fermt2   | 100      | 83.06135 | 63.67709 | 73.20026 | 11.15417 | 0        | 7.088534 | 17.56324 | 0        | 0        |
| Adamts1  | 92.63805 | 100      | 67.32889 | 77.77511 | 27.60758 | 8.271097 | 0        | 12.71534 | 11.79856 | 0        |
| Dlc1     | 95.39878 | 100      | 68.30329 | 71.4936  | 16.50616 | 0        | 0        | 13.91386 | 12.92003 | 0        |
| Col4a2   | 88.24182 | 100      | 64.07992 | 63.92142 | 26.17418 | 15.67358 | 32.04632 | 14.26026 | 0        | 2.502032 |
| Col4a1   | 93.74039 | 100      | 65.63146 | 48.63124 | 12.78937 | 9.141556 | 5.550563 | 22.83299 | 0        | 0        |
| Igfbp7   | 91.60287 | 100      | 79.75644 | 53.44863 | 13.68751 | 1.469975 | 17.24918 | 18.36268 | 0        | 2.432609 |
| Fndc1    | 100      | 58.9155  | 31.07607 | 10.66162 | 11.17264 | 29.0896  | 0        | 0        | 0        | 0        |
| Prss23   | 100      | 54.14909 | 39.21762 | 14.59283 | 0        | 0        | 3.846607 | 1.324112 | 2.414724 | 0        |
| Fbn1     | 100      | 57.6243  | 17.65126 | 9.272451 | 0        | 3.917668 | 2.352933 | 6.076422 | 0        | 0        |
| Mfap5    | 100      | 64.64512 | 27.43699 | 11.60307 | 3.464319 | 0.242885 | 11.02619 | 0        | 0.782063 | 1.547368 |
| Col5a2   | 100      | 72.17159 | 41.70873 | 9.940327 | 0        | 0        | 20.43438 | 12.66161 | 4.209864 | 0        |
| Lhfp     | 100      | 77.98157 | 43.42333 | 0        | 0        | 10.77274 | 17.87539 | 12.60285 | 0        | 0        |
| Ptgis    | 100      | 68.72311 | 54.41082 | 4.78235  | 0        | 10.01498 | 21.30213 | 11.7293  | 0        | 0        |
| Sema3c   | 100      | 83.86259 | 37.99404 | 31.71377 | 0        | 0        | 8.511467 | 0        | 0        | 0        |
| Efemp1   | 100      | 79.91932 | 48.36045 | 13.89364 | 0        | 0        | 10.17827 | 4.782822 | 2.255129 | 0        |
| Islr     | 100      | 81.68001 | 55.96753 | 18.28579 | 0        | 0        | 5.334956 | 0        | 0        | 0        |
| Ntn1     | 100      | 83.86415 | 52.04226 | 18.71857 | 0        | 0        | 12.81443 | 0        | 0        | 0        |
| Ebf2     | 100      | 75.73721 | 38.46316 | 5.627289 | 0        | 0        | 13.55211 | 0        | 0        | 12.3392  |
| Dpt      | 100      | 85.46229 | 36.92046 | 8.375153 | 0        | 8.363049 | 11.52602 | 7.987428 | 2.575852 | 3.709239 |

|         |          |          |          |          |          |          |          |          |          |          |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Col1a2  | 100      | 77.36432 | 39.26587 | 7.32022  | 0.706245 | 2.390425 | 10.77673 | 4.836665 | 1.527212 | 0        |
| Pcolce2 | 100      | 82.4146  | 30.84865 | 10.23096 | 0        | 4.731947 | 8.126972 | 1.926038 | 0        | 0        |
| Adgrd1  | 100      | 73.98662 | 26.12934 | 20.51254 | 0        | 12.22377 | 0        | 5.188188 | 0        | 0        |
| Fstl1   | 100      | 69.61792 | 32.8046  | 16.00119 | 1.75836  | 5.317432 | 6.22958  | 12.4648  | 0        | 0        |
| Col1a1  | 100      | 71.32234 | 33.40723 | 10.71687 | 0        | 5.228007 | 3.151636 | 5.677367 | 0.995348 | 1.441631 |
| Dact1   | 100      | 77.47466 | 35.05719 | 13.79032 | 0        | 0        | 0        | 6.445683 | 0        | 0        |
| Igfbp6  | 100      | 74.5315  | 41.37901 | 14.03399 | 2.983209 | 14.4818  | 8.585658 | 6.733865 | 0.438993 | 0        |
| Dclk1   | 100      | 79.06067 | 41.51777 | 20.55537 | 11.74346 | 12.19494 | 7.518545 | 0        | 0        | 0        |
| Meg3    | 100      | 84.93824 | 41.3339  | 14.80793 | 3.828103 | 3.986081 | 0        | 7.649352 | 2.942031 | 0        |
| Loxl1   | 100      | 80.76085 | 37.52107 | 19.44508 | 9.940966 | 0        | 9.246349 | 8.343099 | 0        | 0        |
| Akap12  | 100      | 95.66322 | 37.87584 | 30.04743 | 27.6765  | 0        | 12.85347 | 8.906885 | 8.254235 | 11.67893 |
| Ackr3   | 100      | 92.43251 | 48.57431 | 24.76888 | 9.888728 | 0        | 9.1935   | 2.181237 | 0        | 5.681511 |
| Lama4   | 100      | 86.79102 | 50.92272 | 24.91603 | 14.36898 | 0        | 9.244696 | 12.11395 | 0        | 15.75032 |
| Prkcdpb | 100      | 73.85919 | 47.48782 | 36.29551 | 17.99341 | 0        | 17.49734 | 3.605006 | 17.68695 | 14.66999 |
| Sparc   | 100      | 73.62884 | 37.93381 | 33.68353 | 8.317068 | 0        | 10.91258 | 12.47932 | 0.183549 | 0.591278 |
| Ebf1    | 100      | 70.88405 | 39.48625 | 44.16492 | 10.44835 | 2.3405   | 19.06008 | 4.552401 | 5.015652 | 0        |
| Ptrf    | 100      | 61.31298 | 45.27882 | 51.61858 | 23.10666 | 18.94093 | 2.061962 | 1.799573 | 0.999143 | 0        |
| Fbln5   | 100      | 85.06775 | 38.05445 | 38.38902 | 52.48468 | 7.260433 | 12.359   | 13.67962 | 5.388183 | 0        |
| Cyr61   | 100      | 76.05    | 72.6661  | 40.41478 | 38.54662 | 0.883284 | 16.86148 | 25.20517 | 0        | 1.090802 |
| Smoc2   | 94.34707 | 100      | 93.84815 | 14.89683 | 0        | 0        | 10.0258  | 29.11059 | 0        | 0        |
| Figf    | 97.63445 | 100      | 84.74953 | 20.02771 | 0        | 0        | 0        | 12.35291 | 0        | 0        |
| Snhg18  | 100      | 96.0958  | 67.03919 | 10.8716  | 0        | 11.84871 | 19.72826 | 4.959166 | 23.65264 | 0        |
| Tcf21   | 99.14113 | 100      | 77.96168 | 6.334702 | 0        | 0        | 0        | 0        | 0        | 0        |
| C1qtnf2 | 100      | 99.86012 | 77.86943 | 0        | 0        | 0        | 0        | 0        | 0        | 0        |
| Steap4  | 75.05914 | 100      | 85.16673 | 0        | 0        | 8.476443 | 5.141244 | 44.87464 | 6.304784 | 8.980212 |
| Gpc3    | 68.38196 | 100      | 66.09071 | 16.62543 | 9.344685 | 9.712349 | 5.93352  | 11.38556 | 0        | 0        |
| Tril    | 61.08668 | 100      | 76.36992 | 11.54644 | 0        | 0        | 0        | 10.1843  | 0        | 0        |
| Svep1   | 57.92408 | 100      | 64.40148 | 29.78538 | 0        | 0        | 9.349303 | 12.22699 | 11.36089 | 0        |
| Abca8a  | 62.51421 | 100      | 65.1126  | 9.720672 | 0        | 0        | 17.61475 | 4.438691 | 14.89831 | 11.20464 |
| Sod3    | 76.73282 | 100      | 57.83471 | 0.549062 | 5.079877 | 20.70675 | 6.985079 | 0        | 9.306631 | 21.98949 |
| Eya2    | 70.73538 | 100      | 46.53141 | 0        | 0        | 0        | 0        | 15.50822 | 0        | 0        |
| Dnm1    | 100      | 88.35566 | 50.08058 | 12.73643 | 0        | 43.30254 | 0        | 0        | 19.38041 | 26.56166 |
| Camk2n1 | 95.99967 | 100      | 57.3202  | 28.19409 | 14.59155 | 33.14659 | 17.59238 | 15.03736 | 0        | 49.66815 |
| Gprc5b  | 100      | 99.82206 | 66.68645 | 35.06891 | 37.02418 | 38.64346 | 20.99648 | 0        | 9.555384 | 18.13396 |
| Lrrc17  | 91.60896 | 100      | 42.71966 | 11.94779 | 12.52195 | 0        | 21.41105 | 5.50026  | 0        | 0        |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Fxyd1    | 100      | 93.24363 | 65.22798 | 14.0415  | 4.56208  | 13.29902 | 17.68757 | 7.378357 | 0        | 0        |
| Adamts5  | 100      | 83.36695 | 53.12973 | 10.17116 | 3.775434 | 14.3543  | 8.899925 | 8.955877 | 0        | 0        |
| Clec3b   | 100      | 91.3817  | 51.53346 | 14.98702 | 1.666176 | 6.18512  | 12.0984  | 14.18898 | 0        | 0.261083 |
| Tnxb     | 100      | 97.92123 | 49.79456 | 9.965651 | 4.390883 | 16.59101 | 25.1159  | 11.95975 | 3.375233 | 0        |
| Ltbp1    | 91.46472 | 100      | 48.64408 | 7.16892  | 0        | 14.7455  | 9.147939 | 6.292572 | 0        | 0        |
| Tmem100  | 97.49138 | 100      | 56.31016 | 19.81181 | 0        | 0        | 0        | 0        | 0        | 0        |
| Gpr153   | 94.51976 | 100      | 47.76656 | 17.57119 | 0        | 0        | 0        | 0        | 0        | 0        |
| Scara5   | 97.79921 | 100      | 58.57013 | 18.9884  | 0        | 0        | 11.26052 | 10.16774 | 4.891758 | 0        |
| Medag    | 92.95058 | 100      | 54.23296 | 17.88758 | 0        | 0        | 8.384269 | 15.85516 | 10.21807 | 0        |
| Pla1a    | 100      | 84.85882 | 50.30566 | 20.89847 | 0        | 4.791504 | 10.76694 | 17.1075  | 10.05397 | 9.772677 |
| Cd248    | 100      | 84.86002 | 43.57475 | 21.64265 | 0        | 8.879022 | 7.93534  | 7.150319 | 6.622126 | 4.889179 |
| Nid1     | 100      | 88.13278 | 44.59761 | 22.84009 | 0        | 11.1164  | 11.46129 | 14.93048 | 4.307294 | 0        |
| Col6a1   | 100      | 91.18045 | 45.95406 | 1.245714 | 0        | 0        | 11.80783 | 17.02901 | 0        | 5.607552 |
| Col6a2   | 100      | 91.38342 | 47.32335 | 9.472085 | 0        | 3.138958 | 8.830861 | 9.433929 | 4.536182 | 0        |
| Ccdc80   | 100      | 87.94408 | 45.12995 | 9.741988 | 3.609915 | 0        | 4.417332 | 11.17305 | 5.418741 | 0        |
| Lum      | 100      | 94.64343 | 47.10432 | 7.704539 | 1.977383 | 2.163803 | 2.984119 | 7.309163 | 0.930989 | 0        |
| Col6a3   | 100      | 93.24074 | 52.11992 | 9.350866 | 0        | 0        | 0        | 13.1383  | 0        | 0        |
| Mxra8    | 100      | 93.66239 | 62.20217 | 21.27056 | 7.177726 | 0        | 19.93859 | 14.0438  | 5.544671 | 0        |
| Rarres2  | 99.69715 | 100      | 68.31822 | 17.3598  | 2.922097 | 3.044136 | 16.23794 | 19.16807 | 0        | 6.315389 |
| Nbl1     | 100      | 96.26944 | 61.93682 | 17.85459 | 0        | 9.328174 | 20.21147 | 15.81203 | 3.567938 | 9.87877  |
| Serpinh1 | 100      | 95.99558 | 67.50833 | 33.60816 | 1.892687 | 0        | 11.88331 | 23.77285 | 2.865168 | 8.013902 |
| Prelp    | 95.00858 | 100      | 65.26962 | 31.63597 | 0        | 0        | 24.22608 | 25.70766 | 0        | 0        |
| Dcn      | 80.79483 | 100      | 66.09718 | 8.43742  | 0.309053 | 1.590313 | 15.53214 | 18.57286 | 0        | 0.87604  |
| Dpep1    | 81.52023 | 100      | 72.38698 | 11.3465  | 0        | 0        | 18.84931 | 14.05476 | 1.792934 | 5.077315 |
| Cygb     | 86.18673 | 100      | 63.3002  | 12.84883 | 5.742338 | 5.976227 | 16.21207 | 13.3735  | 8.556011 | 0        |
| Pdgfra   | 86.09764 | 100      | 61.13233 | 14.92077 | 8.30271  | 0        | 18.75121 | 18.86081 | 0        | 9.144657 |
| Serping1 | 90.69063 | 100      | 60.25261 | 20.657   | 0.274125 | 4.952172 | 21.45752 | 19.32598 | 0        | 4.114498 |
| C1s1     | 84.9894  | 100      | 56.43434 | 24.11886 | 3.761326 | 11.08244 | 18.47255 | 22.61341 | 0        | 8.056465 |
| Serpine2 | 88.90904 | 100      | 60.4986  | 14.68515 | 18.05645 | 18.72496 | 15.18665 | 15.2782  | 0        | 7.284065 |
| Egfr     | 86.00332 | 100      | 56.66237 | 12.43144 | 13.0285  | 13.52845 | 22.26836 | 15.79281 | 0        | 0        |
| C3       | 98.13612 | 100      | 46.7928  | 19.67578 | 8.451296 | 0        | 1.122103 | 11.99747 | 14.73952 | 37.84358 |
| Gpx8     | 92.41848 | 100      | 60.62493 | 14.26665 | 0        | 0        | 12.51879 | 23.13606 | 8.026754 | 29.45001 |
| Sdc2     | 100      | 98.43079 | 64.51472 | 8.689006 | 0        | 0        | 0        | 11.1363  | 0        | 33.23728 |
| Npdc1    | 100      | 74.56493 | 56.11501 | 23.16774 | 0        | 0        | 15.98835 | 28.82218 | 10.37172 | 26.33175 |
| Itih5    | 100      | 79.06766 | 36.75278 | 29.26546 | 0        | 0        | 13.50394 | 11.53124 | 4.523635 | 17.57339 |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Bmp1     | 100      | 86.91612 | 40.31165 | 17.44399 | 0        | 0        | 21.78529 | 0        | 0        | 25.32478 |
| Col15a1  | 76.26153 | 100      | 88.3637  | 18.26349 | 19.10942 | 10.64039 | 22.86267 | 22.99379 | 0        | 0        |
| Ltbp4    | 84.75067 | 100      | 71.69256 | 38.81063 | 23.12403 | 23.9573  | 20.37447 | 24.58463 | 0        | 0        |
| Rbp1     | 72.8299  | 100      | 68.14256 | 29.01486 | 13.86852 | 14.39861 | 29.90225 | 11.67764 | 10.83891 | 0        |
| Tgfbr3   | 100      | 95.9951  | 59.24948 | 44.32128 | 20.48289 | 0        | 6.987173 | 17.35197 | 22.98143 | 12.10489 |
| Arhgap24 | 88.82245 | 100      | 75.0443  | 26.39403 | 27.54737 | 0        | 0        | 23.52109 | 21.95209 | 0        |
| Fkbp9    | 100      | 77.46718 | 49.98195 | 28.99844 | 9.035544 | 32.19843 | 13.54256 | 32.67229 | 0        | 5.606752 |
| Hspg2    | 100      | 75.37001 | 59.61541 | 32.81259 | 0        | 0        | 21.40995 | 27.29467 | 0        | 0        |
| Cd34     | 100      | 79.01395 | 45.81423 | 47.20733 | 0        | 17.81648 | 24.8175  | 22.62468 | 2.461242 | 6.908329 |
| Pcolce   | 99.02495 | 100      | 60.64351 | 19.744   | 33.31603 | 26.51637 | 9.744867 | 38.95253 | 8.535747 | 0        |
| Rnase4   | 93.34075 | 100      | 43.85577 | 11.13054 | 16.57721 | 34.05724 | 5.652221 | 27.41054 | 17.67235 | 0        |
| Ddr2     | 100      | 92.17391 | 44.55857 | 12.53363 | 0        | 7.198953 | 15.81951 | 24.60263 | 5.346194 | 0        |
| Gpm6b    | 88.83999 | 100      | 40.02577 | 5.279528 | 10.62365 | 11.03806 | 6.766391 | 29.68746 | 0        | 0        |
| Gfpt2    | 100      | 82.06172 | 37.16526 | 9.665433 | 0        | 19.4566  | 0        | 33.80816 | 0        | 7.660821 |
| Plat     | 100      | 90.67435 | 48.74403 | 19.66045 | 0        | 14.98651 | 0        | 19.93506 | 5.916314 | 0        |
| Loxl2    | 100      | 85.37036 | 52.85997 | 23.12262 | 0        | 17.7413  | 0        | 26.15286 | 0        | 0        |
| Ppic     | 100      | 86.85206 | 52.40447 | 30.60304 | 26.65365 | 8.082781 | 9.448919 | 33.75041 | 0        | 0        |
| Fbln2    | 100      | 91.5173  | 52.56562 | 22.65968 | 18.04988 | 0        | 8.9951   | 20.16422 | 0        | 0        |
| Lamc1    | 100      | 97.58061 | 55.1414  | 22.23202 | 30.11033 | 11.74263 | 8.084033 | 16.97452 | 7.076134 | 0        |
| Rbms3    | 100      | 85.90988 | 68.36223 | 15.19668 | 15.9119  | 16.50988 | 0        | 19.20781 | 0        | 0        |
| Ogn      | 100      | 92.68441 | 72.34098 | 15.63705 | 0        | 7.335215 | 14.35364 | 26.25465 | 2.778634 | 0        |
| Htra1    | 100      | 92.27386 | 63.60663 | 23.71457 | 0        | 6.648431 | 4.011548 | 23.07698 | 13.77467 | 0        |
| Retnla   | 77.36195 | 77.97646 | 54.1286  | 72.65691 | 100      | 49.521   | 34.52105 | 7.591049 | 8.550482 | 0        |
| Ltc4s    | 70.56655 | 85.65243 | 26.94504 | 29.37367 | 100      | 27.9398  | 3.718859 | 0        | 17.61484 | 15.78434 |
| Fn1      | 100      | 65.78052 | 22.49105 | 45.63887 | 52.23623 | 45.98917 | 40.78732 | 10.82254 | 12.79041 | 0        |
| Lyve1    | 66.51593 | 100      | 43.31569 | 20.96575 | 43.65871 | 11.17239 | 15.83421 | 4.689976 | 4.336839 | 0        |
| Fcna     | 81.89963 | 100      | 50.4942  | 15.00178 | 64.12288 | 54.62096 | 0        | 7.501926 | 5.934309 | 2.724707 |
| Vasn     | 96.45153 | 100      | 45.71009 | 17.8846  | 56.37035 | 47.30358 | 12.09971 | 15.81527 | 26.8966  | 0        |
| Sdpr     | 37.02844 | 47.77289 | 67.82265 | 100      | 48.93919 | 0        | 9.212111 | 6.335108 | 7.697976 | 0        |
| Wwtr1    | 43.19082 | 100      | 66.71939 | 98.80738 | 0        | 0        | 16.26322 | 11.34113 | 0        | 0        |
| Sparcl1  | 59.02069 | 100      | 81.10422 | 81.43226 | 24.91779 | 0        | 14.25527 | 18.53582 | 3.18797  | 4.590275 |
| G0s2     | 49.13638 | 95.76244 | 100      | 76.8098  | 9.328728 | 10.45883 | 8.951875 | 23.45949 | 15.01205 | 0        |
| Ehd2     | 99.70716 | 92.79785 | 87.35878 | 100      | 64.40544 | 30.94904 | 0        | 25.3776  | 0        | 32.59532 |
| Thbd     | 64.85732 | 81.78354 | 89.61171 | 100      | 56.86729 | 9.870403 | 0        | 15.3278  | 33.98918 | 59.0139  |
| Galnt15  | 94.43133 | 90.65191 | 100      | 68.95901 | 47.75589 | 28.20659 | 17.78164 | 32.63801 | 38.62102 | 0        |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Timp3    | 100      | 86.87479 | 82.84649 | 95.4088  | 36.7087  | 14.75922 | 11.84949 | 25.46439 | 0        | 0        |
| Tek      | 100      | 77.68303 | 66.09857 | 94.93122 | 45.37301 | 0        | 0        | 0        | 20.70469 | 0        |
| Ly6c1    | 99.5109  | 75.32526 | 76.08014 | 100      | 52.88826 | 0        | 5.317353 | 7.895367 | 3.333034 | 13.59331 |
| Ramp2    | 96.15954 | 85.06722 | 62.58809 | 100      | 40.59966 | 0        | 19.37429 | 10.37242 | 0        | 9.337496 |
| Osmr     | 75.72789 | 100      | 60.62344 | 78.0476  | 62.31283 | 0        | 0        | 18.09645 | 0        | 0        |
| Ablim1   | 100      | 94.43657 | 58.54751 | 62.72084 | 43.20367 | 19.6999  | 0        | 0.096897 | 11.4863  | 10.77472 |
| Nfib     | 88.56081 | 100      | 61.97441 | 70.15213 | 46.25175 | 8.047058 | 4.865463 | 6.456862 | 0        | 0        |
| Arhgap29 | 100      | 86.11023 | 60.21279 | 73.629   | 50.66785 | 21.83699 | 13.68077 | 9.460541 | 0        | 0        |
| Uaca     | 0        | 62.35102 | 64.48327 | 100      | 85.18568 | 0        | 0        | 32.09688 | 21.35127 | 50.06513 |
| Ctla2a   | 0        | 59.01549 | 85.44494 | 99.09552 | 67.95425 | 16.58817 | 41.68213 | 3.56699  | 12.44922 | 100      |
| Tgm3     | 0        | 43.16155 | 88.59755 | 98.66808 | 93.79593 | 66.29197 | 35.3027  | 32.16855 | 16.22957 | 100      |
| S1pr5    | 0        | 11.63853 | 82.68864 | 100      | 76.84965 | 27.43692 | 36.25321 | 24.35482 | 34.97483 | 86.44472 |
| Lims2    | 74.87007 | 58.73489 | 68.91339 | 84.08525 | 14.67276 | 100      | 0        | 12.92016 | 63.5949  | 84.19845 |
| Ednrb    | 67.55694 | 100      | 46.19301 | 67.30076 | 59.30459 | 78.5804  | 30.5406  | 0        | 57.80437 | 43.25277 |
| Hspb1    | 32.58289 | 32.18012 | 25.84352 | 35.73122 | 10.35402 | 1.451664 | 0.296183 | 1.979258 | 0        | 100      |
| Ets1     | 100      | 38.36461 | 52.40264 | 74.0651  | 36.24646 | 42.63871 | 0        | 20.11886 | 36.93835 | 54.38868 |
| Nckap1   | 100      | 66.74942 | 60.34652 | 47.26232 | 20.51091 | 21.26391 | 24.50787 | 17.37704 | 0        | 52.77086 |
| Ly6a     | 100      | 75.28457 | 58.78796 | 49.24026 | 35.72648 | 0        | 12.95446 | 19.15932 | 22.18776 | 47.88121 |
| H2-DMb2  | 79.60717 | 11.40729 | 0        | 23.30376 | 34.79888 | 32.81808 | 100      | 96.15112 | 67.70747 | 67.34005 |
| Siglecg  | 97.54203 | 33.48774 | 8.773002 | 0        | 23.62507 | 56.04583 | 100      | 83.53116 | 40.55625 | 39.17087 |
| Bub1b    | 82.12686 | 15.66523 | 1.47809  | 0        | 66.81171 | 32.29317 | 82.12686 | 100      | 78.73409 | 16.07477 |
| Cks1b    | 66.06775 | 12.14044 | 0        | 20.14031 | 79.26453 | 82.74926 | 99.38741 | 100      | 41.6668  | 18.07952 |
| Ero1lb   | 55.33594 | 8.478186 | 0        | 26.32085 | 55.54187 | 58.20386 | 88.27617 | 100      | 57.51682 | 54.18773 |
| Tacc3    | 43.28645 | 25.02782 | 0        | 9.579881 | 52.99374 | 61.64437 | 77.61296 | 100      | 63.60735 | 34.61883 |
| Smc4     | 44.94616 | 9.634048 | 0        | 25.1821  | 60.48766 | 70.47935 | 93.59745 | 100      | 62.21914 | 29.57171 |
| Anp32e   | 34.87804 | 14.8894  | 0        | 13.2393  | 50.75228 | 65.64564 | 97.17843 | 100      | 70.56645 | 36.11449 |
| Fcho1    | 53.14775 | 10.23177 | 0        | 25.87852 | 43.17975 | 54.49096 | 100      | 97.01732 | 71.25586 | 12.68491 |
| Smc2     | 46.00545 | 0        | 2.648633 | 15.43342 | 47.94527 | 41.28914 | 85.03126 | 100      | 55.19923 | 34.69273 |
| Map4k1   | 43.29362 | 2.490799 | 0        | 10.6323  | 48.20329 | 49.60716 | 91.14838 | 100      | 62.48038 | 19.72756 |
| Mtmr4    | 4.708605 | 12.47931 | 10.971   | 22.35147 | 40.57207 | 0        | 100      | 66.00966 | 25.76444 | 33.78665 |
| Cxcr3    | 0        | 12.34414 | 6.391244 | 6.111532 | 35.85231 | 54.00404 | 100      | 62.84716 | 6.520696 | 13.37804 |
| Tlr3     | 3.348811 | 3.318615 | 0.982413 | 0        | 48.83555 | 58.19441 | 100      | 50.53051 | 4.697238 | 9.943416 |
| Sigirr   | 0.108462 | 5.051949 | 0        | 1.664619 | 60.81614 | 34.17112 | 100      | 47.43005 | 3.911059 | 18.12323 |
| Kctd14   | 13.91857 | 0        | 11.22164 | 5.26937  | 45.57149 | 35.09998 | 100      | 63.10743 | 15.44183 | 11.62766 |
| Lsr      | 5.817738 | 8.528355 | 0        | 22.69745 | 50.25979 | 37.25026 | 100      | 65.58144 | 20.61018 | 21.26549 |

|               |          |          |          |          |          |          |          |          |          |          |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Btla          | 19.19979 | 1.759035 | 0        | 4.706269 | 23.68567 | 46.64837 | 100      | 61.13333 | 13.51681 | 9.711809 |
| Pdia5         | 21.85485 | 0        | 7.038603 | 4.247833 | 26.59893 | 59.14652 | 100      | 76.09387 | 19.09192 | 29.81555 |
| Clec9a        | 0        | 2.418785 | 4.386529 | 5.916695 | 40.08065 | 62.92658 | 100      | 62.30051 | 23.30302 | 18.76607 |
| Naaa          | 5.899179 | 5.36927  | 0        | 7.121274 | 46.18372 | 64.68505 | 100      | 77.55647 | 35.00593 | 20.31448 |
| Naga          | 8.57526  | 0        | 9.990025 | 7.276505 | 46.41191 | 68.83042 | 100      | 77.76842 | 31.94843 | 20.77051 |
| Nup210        | 31.4449  | 8.463688 | 0        | 5.570209 | 49.67412 | 56.11309 | 100      | 58.29559 | 29.33637 | 32.20301 |
| 6-Sep         | 20.50726 | 6.836624 | 0        | 5.140088 | 39.69692 | 56.57474 | 100      | 67.2764  | 25.68569 | 18.74518 |
| Wdfy4         | 20.52111 | 0        | 0.892067 | 13.8613  | 52.68084 | 64.65925 | 100      | 58.97397 | 30.26222 | 12.54103 |
| Kif23         | 28.22054 | 0        | 2.153718 | 17.19832 | 87.52528 | 69.83915 | 100      | 80.11189 | 34.00789 | 23.82619 |
| Hmgb2         | 30.7815  | 0        | 4.206227 | 26.74986 | 69.07267 | 73.04096 | 100      | 92.1614  | 38.51527 | 33.68007 |
| St3gal5       | 22.89343 | 0        | 7.964659 | 24.63258 | 61.87672 | 76.96809 | 100      | 64.29048 | 19.94467 | 12.56529 |
| H2afx         | 17.173   | 0.857082 | 0        | 14.80407 | 53.70669 | 70.52099 | 100      | 90.40948 | 27.91874 | 30.19021 |
| Tnni2         | 7.394872 | 10.57386 | 0        | 12.56614 | 64.36527 | 78.38875 | 100      | 74.15027 | 17.40607 | 24.32046 |
| Unc119b       | 36.09915 | 29.52565 | 17.98355 | 0        | 66.12369 | 73.96958 | 100      | 83.92727 | 26.92471 | 11.14109 |
| Racgap1       | 45.79793 | 18.18704 | 0        | 3.091541 | 57.30632 | 76.32421 | 96.522   | 100      | 31.05059 | 27.14321 |
| Pkp3          | 38.97861 | 20.1113  | 2.750558 | 0        | 51.99748 | 67.65457 | 100      | 72.98188 | 40.83146 | 36.23452 |
| Ap1s3         | 32.93385 | 0        | 1.592342 | 1.210218 | 56.25864 | 75.66002 | 100      | 88.67777 | 43.77619 | 22.29112 |
| Itpr1         | 33.49376 | 1.880318 | 0        | 5.817879 | 48.15807 | 71.51432 | 100      | 80.98751 | 45.03868 | 19.71433 |
| Mgl2          | 12.07258 | 15.81145 | 5.600157 | 16.38316 | 65.56278 | 56.91487 | 86.43484 | 100      | 26.22269 | 0        |
| Klrb1b        | 20.52462 | 3.886649 | 7.174558 | 0        | 50.97321 | 40.28689 | 87.34763 | 100      | 34.3818  | 22.10808 |
| Prss30        | 5.248936 | 0        | 24.36965 | 9.200177 | 66.73454 | 61.59552 | 76.89877 | 100      | 34.35306 | 25.35527 |
| Aurkb         | 34.83817 | 0        | 6.837471 | 36.58941 | 40.2371  | 71.63024 | 100      | 94.45977 | 30.68216 | 32.53748 |
| 2810417H13Rik | 24.63879 | 0        | 5.881184 | 42.69343 | 41.2012  | 52.62448 | 90.66541 | 100      | 38.75619 | 11.73228 |
| Top2a         | 40.91713 | 1.118788 | 7.055011 | 28.31954 | 47.48939 | 61.67953 | 95.5457  | 100      | 37.71595 | 0        |
| Spc24         | 48.05833 | 0        | 6.744371 | 21.1844  | 43.21174 | 50.2098  | 87.51242 | 100      | 36.44514 | 12.31972 |
| Me2           | 28.13855 | 2.481448 | 0        | 25.72393 | 49.21628 | 68.37048 | 100      | 73.04386 | 46.60546 | 21.4599  |
| Dctpp1        | 32.80445 | 6.110948 | 0        | 15.47989 | 45.60292 | 81.79144 | 100      | 79.60335 | 44.65955 | 24.40139 |
| Cysltr1       | 18.96329 | 19.60041 | 0        | 18.06274 | 42.93617 | 72.73572 | 100      | 84.84197 | 56.45309 | 7.550011 |
| Sesn2         | 15.92271 | 2.599561 | 0        | 2.760576 | 48.15622 | 65.59276 | 100      | 75.35092 | 47.50836 | 10.67565 |
| Kmo           | 10.61301 | 0        | 11.4411  | 0.992155 | 44.06569 | 58.64706 | 98.74778 | 100      | 45.39622 | 12.14413 |
| Cox6b2        | 17.74687 | 0        | 3.356199 | 2.747513 | 38.90357 | 72.30901 | 100      | 93.40089 | 32.55575 | 4.522661 |
| Zbtb46        | 18.02173 | 14.98337 | 0        | 21.46861 | 38.02784 | 52.78103 | 100      | 89.26955 | 33.3646  | 7.33377  |
| Olfm1         | 31.86405 | 13.46502 | 0        | 16.48999 | 45.73596 | 51.14475 | 100      | 89.94559 | 41.23505 | 20.78182 |
| Gm2a          | 13.49852 | 0        | 1.734367 | 19.23434 | 33.71642 | 48.10159 | 100      | 85.63119 | 45.04452 | 24.16668 |
| Itgb7         | 21.02376 | 0        | 15.35484 | 13.0054  | 32.85554 | 57.81745 | 100      | 81.34752 | 37.09612 | 14.6863  |

|               |          |          |          |          |          |          |          |          |          |          |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Impa2         | 24.52735 | 0        | 0.582039 | 15.70135 | 42.51268 | 64.04096 | 100      | 88.64862 | 34.02635 | 14.9631  |
| Sgsm3         | 0        | 11.49509 | 31.8388  | 35.42547 | 48.43098 | 80.2128  | 100      | 84.66598 | 31.61322 | 45.19113 |
| Gpr35         | 0        | 5.19889  | 28.8255  | 22.61809 | 56.90978 | 86.06485 | 93.96418 | 100      | 45.03377 | 60.64447 |
| Aldoc         | 24.60111 | 11.11225 | 8.281976 | 0        | 28.09706 | 97.007   | 98.37439 | 100      | 37.29919 | 18.32639 |
| Acss1         | 22.29472 | 2.530656 | 16.02806 | 38.05994 | 53.6408  | 88.63909 | 100      | 97.09742 | 45.62065 | 0        |
| Birc5         | 31.23071 | 0        | 3.252269 | 17.73307 | 61.39904 | 75.7346  | 82.74154 | 100      | 53.71684 | 32.55097 |
| Stmn1         | 28.6423  | 0        | 1.238555 | 24.03672 | 47.4433  | 75.98382 | 91.88352 | 100      | 47.62707 | 13.5025  |
| Nccrp1        | 0        | 0        | 11.56492 | 11.07616 | 45.98474 | 100      | 78.41427 | 50.29233 | 21.69643 | 16.48982 |
| A530099J19Rik | 0        | 5.490499 | 5.209793 | 0        | 32.29607 | 83.38105 | 100      | 67.5447  | 0        | 8.76785  |
| Cxx1b         | 0.516731 | 0.443319 | 0.701821 | 0        | 43.96796 | 89.19655 | 100      | 71.44667 | 12.96389 | 0.033903 |
| Arsb          | 20.09313 | 5.384484 | 0        | 4.292625 | 54.06264 | 69.89139 | 100      | 79.96318 | 18.50135 | 2.044774 |
| Xcr1          | 4.219558 | 0        | 1.848032 | 3.894996 | 47.56245 | 70.58009 | 100      | 67.92132 | 14.88115 | 9.751551 |
| Amica1        | 3.17301  | 0        | 1.997632 | 0.34338  | 46.37997 | 76.52953 | 100      | 76.79447 | 24.14085 | 8.839979 |
| Mycl          | 2.795466 | 0        | 0.740571 | 11.95933 | 40.49225 | 65.02566 | 100      | 84.18298 | 3.474262 | 6.180346 |
| 3-Sep         | 8.322933 | 1.466484 | 8.701938 | 9.608524 | 48.39347 | 60.64669 | 100      | 66.27992 | 3.25898  | 0        |
| Gcsam         | 0        | 7.391596 | 3.217534 | 0        | 56.84876 | 67.24126 | 100      | 73.621   | 0        | 8.042905 |
| Cd24a         | 48.89544 | 21.97533 | 14.57579 | 17.53342 | 48.62469 | 77.28832 | 100      | 55.24789 | 8.449698 | 0        |
| Fam149a       | 23.5552  | 25.9176  | 17.5184  | 0        | 43.92769 | 67.92952 | 100      | 65.24443 | 7.535984 | 19.86246 |
| Ifi205        | 22.88954 | 31.02235 | 15.36763 | 0        | 43.52501 | 53.98497 | 100      | 78.6423  | 7.765165 | 38.28657 |
| H2-Ob         | 46.79446 | 0.61702  | 0        | 5.153094 | 37.09588 | 51.50593 | 100      | 84.63082 | 25.50186 | 25.17473 |
| Hepacam2      | 33.25364 | 15.16978 | 9.988247 | 13.72219 | 46.7262  | 48.12192 | 100      | 75.32722 | 12.7008  | 0        |
| Ccdc69        | 46.11957 | 12.67602 | 11.24349 | 5.18961  | 37.38071 | 49.11321 | 100      | 91.03564 | 19.71886 | 0        |
| Oasl2         | 1.041064 | 5.499052 | 0        | 23.70939 | 60.61022 | 46.64951 | 28.63789 | 46.59546 | 100      | 94.14963 |
| Aif1          | 0        | 9.369559 | 4.39139  | 22.84239 | 47.52651 | 42.16726 | 52.97153 | 65.38274 | 100      | 90.37324 |
| Rtp4          | 0        | 12.23967 | 16.37027 | 38.85507 | 55.01678 | 46.41284 | 34.18303 | 54.68961 | 100      | 88.14229 |
| Ms4a6b        | 0        | 7.358298 | 21.10664 | 35.37216 | 54.91936 | 45.47413 | 46.62931 | 74.84539 | 100      | 79.51975 |
| Parp12        | 0        | 10.94079 | 9.112866 | 6.228937 | 38.70446 | 17.10265 | 44.76945 | 66.50827 | 100      | 80.7313  |
| Cxcl16        | 0        | 2.179617 | 1.080847 | 15.08381 | 22.85327 | 28.34371 | 45.04723 | 73.27736 | 92.30764 | 100      |
| Igtp          | 1.205599 | 0        | 10.80665 | 15.27563 | 38.84853 | 11.59768 | 42.4883  | 56.86491 | 81.06288 | 100      |
| Stat1         | 11.18246 | 0        | 15.75967 | 22.19197 | 37.50855 | 30.03926 | 43.50561 | 63.63856 | 91.71554 | 100      |
| Cd72          | 0        | 11.10392 | 6.900336 | 33.61333 | 20.22585 | 38.37501 | 20.33336 | 55.96884 | 100      | 97.28775 |
| Zbp1          | 4.545076 | 0        | 23.19656 | 40.11489 | 22.78124 | 19.95597 | 36.40649 | 63.09124 | 88.27134 | 100      |
| AW112010      | 0        | 5.38764  | 11.49805 | 21.84247 | 28.21996 | 39.02814 | 26.10122 | 28.60222 | 65.04073 | 100      |
| Ifi47         | 4.023177 | 0        | 7.137864 | 18.5002  | 22.20847 | 36.31305 | 29.44391 | 54.65555 | 75.28107 | 100      |
| Fam26f        | 0.619537 | 0        | 4.652167 | 24.26914 | 27.03445 | 25.77643 | 21.89738 | 49.16665 | 82.64113 | 100      |

|                |          |          |          |          |          |          |          |          |          |          |
|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Relb           | 5.125278 | 0        | 6.310177 | 6.052259 | 21.18817 | 24.23662 | 33.89925 | 48.00084 | 61.17437 | 100      |
| Cd40           | 18.22699 | 0        | 3.046442 | 5.053616 | 24.01958 | 21.77681 | 33.81875 | 45.58575 | 56.82083 | 100      |
| Tbc1d4         | 12.52139 | 9.182747 | 0        | 3.308294 | 16.85122 | 30.05162 | 41.35858 | 39.48528 | 48.81779 | 100      |
| Tmem123        | 20.21361 | 6.537935 | 0        | 3.629938 | 8.503719 | 25.712   | 31.70223 | 33.75815 | 52.83905 | 100      |
| Il21r          | 13.1103  | 0        | 8.305561 | 9.545784 | 7.156672 | 42.00611 | 32.2642  | 58.33403 | 55.36116 | 100      |
| Il4i1          | 0        | 12.84616 | 6.698482 | 8.799306 | 6.281698 | 22.08266 | 43.52603 | 53.27973 | 65.90921 | 100      |
| Rogdi          | 5.261211 | 2.437322 | 0        | 8.181167 | 11.56258 | 26.70972 | 34.36057 | 53.16886 | 70.67965 | 100      |
| Spint2         | 1.64184  | 0        | 10.33523 | 8.200539 | 20.11186 | 35.12858 | 59.80993 | 47.84617 | 45.46239 | 100      |
| Cpne2          | 9.097849 | 0        | 1.451731 | 3.43121  | 24.3876  | 52.24029 | 59.48264 | 60.22645 | 49.44466 | 100      |
| Irgm1          | 2.625258 | 0        | 10.04419 | 30.25656 | 21.80902 | 45.79291 | 48.92962 | 68.89772 | 56.17841 | 100      |
| Lrrk1          | 0        | 1.600126 | 6.35075  | 14.92841 | 35.21512 | 35.41214 | 52.4875  | 65.9508  | 69.0954  | 100      |
| Marcksl1       | 6.281804 | 11.45019 | 0        | 9.003522 | 26.03601 | 37.58024 | 46.1378  | 58.99896 | 56.33111 | 100      |
| Arhgap22       | 7.701469 | 6.078254 | 12.05796 | 0        | 30.34962 | 49.09508 | 69.02898 | 75.80077 | 71.77375 | 100      |
| Traf1          | 1.914371 | 0        | 10.28109 | 16.57597 | 23.80686 | 43.48863 | 60.1485  | 75.64586 | 66.64241 | 100      |
| Pyhin1         | 1.025964 | 0        | 6.272232 | 21.26058 | 31.71841 | 44.70663 | 74.40606 | 74.93569 | 66.79138 | 100      |
| St8sia6        | 4.546927 | 14.93331 | 0        | 21.19276 | 25.9787  | 27.33528 | 73.09425 | 62.04509 | 69.05649 | 100      |
| Fbrsl1         | 5.134999 | 18.22778 | 4.860532 | 0        | 17.61286 | 30.38854 | 67.86534 | 65.83403 | 60.32997 | 100      |
| Ass1           | 43.72247 | 7.38274  | 0        | 33.53069 | 12.95019 | 26.1794  | 72.67043 | 50.46491 | 54.85345 | 100      |
| Hmgn3          | 34.47767 | 7.972804 | 3.017859 | 0        | 11.91911 | 55.07544 | 60.79283 | 49.37429 | 32.88582 | 100      |
| Pla2g16        | 13.07398 | 7.73044  | 0        | 11.54875 | 17.36288 | 65.07363 | 78.89182 | 51.71957 | 47.27881 | 100      |
| Kynu           | 28.56319 | 0        | 26.92235 | 45.22091 | 28.08568 | 13.06922 | 67.90887 | 94.87295 | 100      | 45.27147 |
| Tspan13        | 4.700598 | 0        | 37.65371 | 52.75164 | 57.10683 | 50.34582 | 100      | 98.16369 | 79.54315 | 71.0951  |
| Mcemp1         | 0        | 12.03684 | 34.07773 | 49.79433 | 57.0829  | 59.53723 | 71.44236 | 100      | 91.84111 | 74.87432 |
| Gpr18          | 17.67284 | 0        | 16.15857 | 37.52261 | 42.72154 | 23.67859 | 55.52252 | 95.82329 | 100      | 79.83356 |
| 9930111J21Rik2 | 25.87687 | 0        | 18.2951  | 38.76776 | 60.78842 | 35.11452 | 65.81528 | 100      | 96.05962 | 66.51703 |
| Zbtb45         | 17.03772 | 0        | 13.81943 | 37.0729  | 36.68728 | 49.30486 | 73.73293 | 86.31547 | 100      | 80.2698  |
| Cd180          | 7.332506 | 0        | 6.389206 | 33.37794 | 46.42487 | 57.54753 | 72.94947 | 92.41346 | 100      | 81.96931 |
| H2-M3          | 0        | 21.72293 | 16.5656  | 33.52984 | 45.9682  | 38.30978 | 77.89234 | 94.44341 | 100      | 82.17999 |
| Ms4a4c         | 0        | 2.002819 | 17.73899 | 38.05183 | 50.90073 | 41.27582 | 73.71225 | 100      | 99.33179 | 96.82658 |
| Ms4a6c         | 0        | 5.301633 | 18.74627 | 36.05755 | 43.80718 | 49.3773  | 65.46038 | 95.70355 | 100      | 81.51029 |
| Nmral1         | 17.03707 | 4.328068 | 0        | 10.0073  | 79.18795 | 30.225   | 100      | 87.46099 | 78.93612 | 65.79603 |
| Vrk2           | 6.400652 | 3.558229 | 0        | 16.81666 | 65.99965 | 43.4565  | 100      | 78.57041 | 97.8611  | 94.82751 |
| Taf6           | 0        | 21.32945 | 3.159313 | 11.69296 | 57.58097 | 35.06459 | 97.5713  | 100      | 92.5301  | 82.72864 |
| Cenpl          | 26.20098 | 16.55925 | 0        | 12.68932 | 57.19958 | 19.83989 | 67.2537  | 100      | 47.2229  | 76.92685 |
| Il18           | 35.40031 | 5.590375 | 0        | 23.53965 | 53.03824 | 21.90441 | 100      | 73.53965 | 66.52467 | 78.80457 |

|               |          |          |          |          |          |          |          |          |          |          |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Vrk3          | 24.24887 | 0        | 0.084355 | 8.463707 | 38.51812 | 23.93497 | 92.49008 | 100      | 79.76941 | 78.42339 |
| Phf11a        | 0.018021 | 0        | 8.860584 | 16.6737  | 28.4679  | 31.36889 | 100      | 78.35788 | 53.08988 | 81.29694 |
| Sass6         | 4.188697 | 0        | 32.08565 | 11.27953 | 47.06241 | 49.56874 | 100      | 88.59129 | 69.55956 | 84.76719 |
| Selplg        | 4.536112 | 0        | 1.521516 | 11.87736 | 50.99205 | 49.34091 | 85.47481 | 100      | 78.57418 | 87.38245 |
| Phf11b        | 1.079955 | 0        | 9.176397 | 17.97586 | 46.38593 | 57.1929  | 87.58054 | 76.36021 | 72.86245 | 100      |
| Tap1          | 4.577596 | 0        | 5.383085 | 12.00339 | 34.00132 | 44.39859 | 87.79911 | 81.5077  | 74.02673 | 100      |
| Mnda          | 3.545145 | 0        | 3.333346 | 17.30108 | 46.99499 | 46.34042 | 88.88505 | 86.89089 | 62.73139 | 100      |
| Pmaip1        | 20.92783 | 0        | 9.414419 | 22.4775  | 42.2507  | 72.64409 | 100      | 93.30203 | 58.42043 | 67.11036 |
| Orai1         | 21.14774 | 0        | 6.381951 | 8.819606 | 36.38094 | 71.03414 | 100      | 92.79607 | 61.95146 | 73.03035 |
| Tmpo          | 19.93968 | 0        | 11.18991 | 26.39843 | 39.4343  | 54.12679 | 90.68791 | 100      | 61.01608 | 70.36224 |
| Lsp1          | 15.72662 | 0        | 5.907708 | 21.63447 | 44.56426 | 59.9852  | 100      | 90.60622 | 46.04743 | 56.30981 |
| Def6          | 23.20706 | 0        | 2.796338 | 23.53564 | 44.32443 | 61.44259 | 100      | 85.68523 | 63.06629 | 62.15988 |
| Rrad          | 20.19761 | 18.08567 | 6.180829 | 0        | 35.9157  | 38.15455 | 100      | 84.52792 | 74.80977 | 64.47038 |
| Isyna1        | 19.18858 | 16.85937 | 0        | 1.235594 | 34.56566 | 64.92899 | 100      | 87.73111 | 69.96169 | 68.41614 |
| 2310040G24Rik | 12.63312 | 10.61339 | 16.8701  | 0        | 44.49361 | 46.61161 | 100      | 81.77638 | 51.45303 | 69.76176 |
| Parp8         | 0        | 9.081918 | 6.859909 | 9.219602 | 41.71037 | 44.27257 | 100      | 85.32072 | 65.8906  | 51.64627 |
| Cntrl         | 14.81037 | 8.119131 | 0        | 21.58899 | 42.46869 | 45.2015  | 100      | 77.25255 | 62.99907 | 61.71243 |
| Pold1         | 62.78539 | 0        | 15.39654 | 7.8882   | 12.90085 | 71.73742 | 95.0746  | 92.08531 | 85.65059 | 100      |
| Mrps27        | 30.36794 | 13.73917 | 0        | 19.92386 | 15.49632 | 60.38778 | 100      | 86.01205 | 73.434   | 77.07974 |
| Asnsd1        | 35.64993 | 12.64248 | 0        | 11.28106 | 29.1539  | 47.84465 | 100      | 92.1265  | 80.58135 | 85.90436 |
| Eif2ak2       | 4.416953 | 7.751623 | 0        | 19.00387 | 57.33918 | 94.81344 | 60.62092 | 70.61796 | 100      | 78.72668 |
| Fdps          | 5.548814 | 9.206666 | 0        | 16.40314 | 18.24333 | 65.72932 | 70.9974  | 55.86184 | 100      | 76.79394 |
| Card11        | 34.42822 | 4.512322 | 0        | 11.24329 | 28.82315 | 60.48101 | 57.80706 | 84.3338  | 100      | 72.92494 |
| Ccdc130       | 15.09154 | 10.0554  | 0        | 18.44676 | 30.09611 | 73.59598 | 43.18501 | 73.90274 | 100      | 73.12419 |
| Tor3a         | 16.8934  | 0        | 4.426428 | 16.49776 | 38.78654 | 50.48015 | 38.56141 | 60.69518 | 81.37428 | 100      |
| Icosl         | 9.019394 | 0        | 10.27186 | 9.319475 | 37.83979 | 72.70654 | 56.18015 | 74.04157 | 70.00237 | 100      |
| Mx1           | 0        | 10.58793 | 11.7159  | 7.801379 | 33.87975 | 54.73326 | 60.04825 | 62.23548 | 79.5902  | 100      |
| Psme2         | 9.953613 | 0.717917 | 0        | 13.59366 | 28.60065 | 50.65924 | 56.20914 | 60.37163 | 72.96221 | 100      |
| Tmem176a      | 2.428434 | 5.899345 | 0        | 16.01871 | 46.19978 | 42.79    | 59.31602 | 87.56073 | 100      | 81.65474 |
| Tmem176b      | 8.840061 | 6.646195 | 0        | 17.02848 | 48.4373  | 47.13783 | 54.54202 | 91.40145 | 100      | 73.26778 |
| Slamf8        | 1.566115 | 1.511781 | 0        | 20.72963 | 29.26085 | 52.02856 | 61.76096 | 78.58861 | 100      | 92.46502 |
| Tapbp         | 9.640463 | 0        | 4.295158 | 15.18832 | 36.73826 | 47.80735 | 64.31789 | 70.09216 | 81.53635 | 100      |
| H2-T23        | 9.534794 | 0        | 0.02773  | 18.88954 | 42.3597  | 36.88875 | 66.93971 | 76.36417 | 86.4345  | 100      |
| Slc31a2       | 1.075159 | 0        | 13.56334 | 4.34772  | 23.34442 | 57.02601 | 100      | 94.89857 | 99.746   | 98.04483 |
| Slamf7        | 0        | 7.328077 | 10.73184 | 24.42006 | 44.13917 | 50.13248 | 92.73452 | 95.92241 | 87.53052 | 100      |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ppil2    | 0        | 13.79603 | 12.9183  | 16.43609 | 34.85181 | 59.1273  | 92.54678 | 89.95468 | 89.69208 | 100      |
| Traf2    | 0        | 17.12878 | 13.94911 | 15.64575 | 46.1892  | 58.16269 | 74.56492 | 80.74325 | 99.41446 | 100      |
| Cd86     | 11.96363 | 0        | 7.983946 | 17.81032 | 48.41762 | 57.36789 | 75.52024 | 85.02189 | 90.53815 | 100      |
| Coro1b   | 10.35659 | 0        | 7.122004 | 20.45753 | 39.41018 | 49.34659 | 71.01451 | 85.27568 | 95.39551 | 100      |
| Tbc1d8   | 14.11703 | 0        | 29.06625 | 21.99272 | 39.48377 | 59.72246 | 85.9992  | 57.10423 | 66.17684 | 100      |
| Apobec3  | 28.41637 | 0        | 10.62491 | 19.07624 | 31.84962 | 67.11152 | 73.8152  | 84.17402 | 69.31499 | 100      |
| Mthfd2   | 26.2357  | 0        | 8.267914 | 12.72307 | 33.34072 | 86.96096 | 91.60405 | 83.46308 | 60.55714 | 100      |
| Cadm1    | 0        | 0.306244 | 10.19583 | 31.36155 | 38.24588 | 81.71111 | 81.55158 | 95.58745 | 100      | 90.29238 |
| Sp110    | 0.122302 | 0        | 13.48077 | 19.38617 | 43.95734 | 78.65314 | 80.73576 | 94.61346 | 90.84269 | 100      |
| Scimp    | 0        | 15.37987 | 12.23165 | 44.73758 | 49.55651 | 71.78543 | 96.56717 | 95.73671 | 87.60601 | 100      |
| Irf9     | 0        | 8.155543 | 10.12041 | 25.8367  | 57.35377 | 60.56003 | 94.22139 | 98.32231 | 99.20032 | 100      |
| Psmb8    | 9.77463  | 0        | 6.383427 | 24.20775 | 46.44197 | 66.14421 | 94.11475 | 92.60936 | 88.20436 | 100      |
| Mpeg1    | 4.75961  | 0        | 5.967132 | 24.92337 | 53.75067 | 72.28285 | 88.96767 | 95.3239  | 100      | 94.91089 |
| Slc25a10 | 19.64989 | 15.18675 | 0        | 32.71703 | 50.75176 | 91.68019 | 85.32271 | 96.79274 | 98.61887 | 100      |
| Eif2b2   | 22.13729 | 0        | 4.830625 | 15.46232 | 47.22937 | 96.33873 | 80.28449 | 92.18239 | 100      | 93.92913 |
| Sh3bp1   | 20.1651  | 6.342668 | 0        | 10.80944 | 59.654   | 78.78    | 99.32436 | 100      | 94.98708 | 97.75667 |
| Dapp1    | 26.35423 | 13.40757 | 0        | 16.2217  | 58.57022 | 77.97126 | 100      | 86.1769  | 92.05047 | 84.57074 |
| GltP     | 10.84845 | 6.448641 | 0        | 20.39708 | 49.98474 | 81.13614 | 86.79513 | 98.66136 | 100      | 82.80216 |
| Sdf2l1   | 27.101   | 6.391686 | 0        | 28.93083 | 47.42496 | 78.81143 | 98.74854 | 100      | 97.87549 | 89.88061 |
| Tmem150b | 9.745417 | 0        | 11.10252 | 42.02258 | 33.99497 | 82.28955 | 98.18424 | 100      | 62.13425 | 86.58947 |
| Slc46a3  | 0        | 6.820097 | 18.2326  | 29.77783 | 51.1563  | 70.13143 | 100      | 84.77539 | 78.65807 | 75.99525 |
| Psmb9    | 9.060234 | 0        | 9.535961 | 27.94628 | 41.97609 | 68.65701 | 100      | 97.87487 | 72.90912 | 92.19195 |
| Trpv2    | 1.059527 | 0        | 14.63472 | 29.97269 | 48.98104 | 76.49758 | 94.09886 | 95.30042 | 80.39303 | 100      |
| Hn1l     | 29.29102 | 6.600509 | 0        | 16.96535 | 35.1041  | 78.33438 | 93.69327 | 100      | 76.91991 | 90.98276 |
| Cnn2     | 16.51541 | 0        | 4.518006 | 10.9247  | 43.69846 | 76.12459 | 99.55618 | 100      | 69.37213 | 85.28483 |
| Fuca2    | 21.392   | 0        | 2.084397 | 12.80695 | 33.22096 | 76.38881 | 100      | 86.35354 | 79.39622 | 88.22841 |
| Gdi2     | 17.86918 | 0        | 0.583392 | 15.18279 | 38.73533 | 72.31896 | 100      | 93.5178  | 82.95369 | 77.62484 |
| Cd83     | 9.411787 | 0        | 2.055582 | 14.24316 | 44.20766 | 66.02077 | 86.50189 | 100      | 90.78784 | 90.88314 |
| Irf5     | 8.667492 | 1.345177 | 0        | 21.38307 | 37.91896 | 74.68013 | 89.42089 | 100      | 88.13962 | 95.68567 |
| SyngR2   | 9.3547   | 2.624636 | 0        | 17.18655 | 31.29451 | 58.55842 | 89.42661 | 100      | 79.36565 | 88.82016 |
| Ifi30    | 15.93555 | 3.461038 | 0        | 7.918327 | 33.68264 | 60.91463 | 84.42408 | 99.61018 | 85.72568 | 100      |
| Fgl2     | 13.96589 | 7.342346 | 0        | 3.248234 | 40.09671 | 60.20417 | 100      | 99.93642 | 89.20379 | 90.20103 |
| Avpi1    | 31.33226 | 0.158569 | 0        | 13.46472 | 46.31763 | 59.92266 | 96.18257 | 100      | 88.53144 | 96.5006  |
| Tap2     | 14.77746 | 0        | 3.614682 | 18.19991 | 33.87966 | 67.70349 | 100      | 84.349   | 77.698   | 99.64764 |
| Psme1    | 6.884772 | 0        | 0.318997 | 17.7913  | 44.11558 | 56.9068  | 100      | 87.09136 | 78.00664 | 95.21725 |

|         |          |          |          |          |          |          |          |          |          |          |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hacd2   | 15.01148 | 0        | 0.65286  | 8.804477 | 41.77643 | 55.83016 | 100      | 87.16127 | 70.86921 | 85.99082 |
| Tspan33 | 7.486746 | 0        | 2.453921 | 11.91725 | 50.89271 | 76.19167 | 100      | 85.12275 | 87.68683 | 79.89171 |
| Ranbp3  | 14.14575 | 11.25588 | 0        | 5.561936 | 29.71684 | 75.0581  | 100      | 86.42433 | 91.53402 | 83.74111 |
| Nudt14  | 32.76807 | 0        | 1.721646 | 22.70203 | 36.5179  | 46.2022  | 100      | 96.83422 | 95.90116 | 73.35654 |
| Sp100   | 10.25807 | 0        | 7.988054 | 28.39325 | 44.11652 | 46.18487 | 97.84608 | 100      | 85.78481 | 70.03    |
| Mboat7  | 20.29709 | 0        | 0.824416 | 40.60166 | 28.46196 | 49.70068 | 93.00369 | 100      | 86.27386 | 74.64848 |
| Ciita   | 9.588059 | 0        | 6.690282 | 16.30864 | 39.75943 | 59.85738 | 80.55245 | 100      | 78.11738 | 55.05838 |
| H2-Ab1  | 12.70613 | 4.919727 | 0        | 16.56794 | 49.89105 | 60.54376 | 91.49003 | 100      | 90.11931 | 64.26891 |
| Cd74    | 12.63097 | 2.774782 | 0        | 20.06704 | 50.19527 | 63.21521 | 89.93415 | 100      | 92.17672 | 69.77967 |
| H2-Aa   | 10.66548 | 3.293797 | 0        | 16.18351 | 48.93033 | 60.20428 | 86.85114 | 100      | 93.23483 | 72.55926 |
| H2-Eb1  | 13.69382 | 4.565754 | 0        | 16.74382 | 49.03449 | 59.15048 | 86.55398 | 100      | 94.96454 | 69.34678 |
| Ccnd1   | 0.630076 | 2.644584 | 0        | 18.67723 | 44.36999 | 47.60797 | 83.73379 | 100      | 92.62007 | 67.29947 |
| Fam105a | 0        | 1.05534  | 5.488224 | 21.04812 | 44.85996 | 50.51796 | 83.11599 | 100      | 92.48985 | 57.18082 |
| Tmem173 | 0.088826 | 0        | 0.982488 | 29.02188 | 53.51517 | 62.61081 | 100      | 96.52273 | 90.38495 | 73.20446 |
| Cd48    | 3.774913 | 0        | 3.418922 | 35.69291 | 55.22099 | 68.76145 | 90.34751 | 100      | 91.98785 | 70.00898 |
| Abhd17a | 21.9456  | 7.614105 | 0        | 14.48385 | 55.49272 | 53.76788 | 94.55225 | 100      | 81.41877 | 66.97006 |
| H2-DMb1 | 16.34565 | 7.590319 | 0        | 17.25706 | 52.97669 | 66.34619 | 92.07809 | 100      | 86.81515 | 53.02142 |
| H2-DMa  | 25.43825 | 9.606308 | 0        | 19.45458 | 56.13435 | 62.67882 | 96.26981 | 100      | 82.92407 | 54.18996 |
| Polr1e  | 18.3826  | 1.449338 | 0        | 23.04806 | 45.55263 | 47.9265  | 89.93989 | 94.43425 | 93.1229  | 100      |
| Sdccag8 | 18.83725 | 9.653735 | 0        | 29.32487 | 45.63382 | 40.97039 | 91.43655 | 100      | 96.50531 | 86.79933 |
| Tifab   | 21.34048 | 0        | 18.58893 | 27.71755 | 54.04658 | 54.11603 | 82.53338 | 100      | 96.81205 | 88.40111 |
| Trim12c | 34.32335 | 0        | 6.623925 | 31.62236 | 72.15384 | 53.7977  | 91.11032 | 100      | 97.84974 | 87.26885 |
| Coro2a  | 39.71505 | 0        | 3.899254 | 33.83397 | 57.75967 | 76.67403 | 88.86015 | 100      | 74.4367  | 85.24889 |
| Ndufaf6 | 43.25339 | 0        | 9.101355 | 31.05025 | 57.24628 | 52.78051 | 94.93028 | 100      | 77.0102  | 92.18673 |
| Nsmce1  | 24.19931 | 6.769607 | 0        | 14.62955 | 45.71279 | 59.86319 | 83.23074 | 100      | 77.63852 | 70.99529 |
| Tubb5   | 36.59027 | 4.404767 | 0        | 19.30554 | 40.92371 | 62.16357 | 87.04396 | 100      | 72.5362  | 77.6843  |
| Ptcd2   | 24.78538 | 0.774334 | 0        | 16.98349 | 47.67114 | 63.15115 | 79.41997 | 97.59127 | 100      | 77.63336 |
| Rpa1    | 47.91936 | 5.821048 | 0        | 21.98968 | 45.62265 | 68.67539 | 84.0139  | 100      | 93.62149 | 73.59952 |
| Mical1  | 0        | 7.797614 | 17.53481 | 21.18623 | 29.2734  | 45.7932  | 99.88424 | 100      | 52.44148 | 49.41383 |
| Flt3    | 0        | 1.791663 | 1.312583 | 1.641646 | 29.71568 | 58.27185 | 93.9953  | 100      | 50.85296 | 50.65438 |
| Klrd1   | 6.323829 | 0        | 5.318309 | 3.244922 | 15.55081 | 50.9642  | 84.25231 | 100      | 47.82449 | 43.64464 |
| H2-Oa   | 8.520562 | 2.417463 | 0        | 11.61684 | 24.65971 | 40.78641 | 100      | 95.09138 | 61.74441 | 55.97542 |
| Fh1     | 10.56114 | 8.463004 | 0        | 2.80486  | 21.13191 | 54.55984 | 85.72909 | 100      | 67.01216 | 58.49285 |
| Aaas    | 0        | 13.52019 | 10.91718 | 8.928815 | 37.71274 | 61.77879 | 100      | 88.97474 | 60.27699 | 29.32472 |
| Trappc5 | 2.19188  | 9.935544 | 0        | 14.37453 | 28.57785 | 59.76966 | 88.97196 | 100      | 64.03305 | 40.97369 |

|               |          |          |          |          |          |          |          |          |          |          |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Mcm7          | 7.469799 | 0        | 4.50275  | 30.40998 | 26.3833  | 66.68802 | 100      | 84.63606 | 73.94533 | 28.7527  |
| Lig1          | 0        | 9.134068 | 0.735939 | 29.59771 | 21.15269 | 46.16542 | 100      | 91.71296 | 66.39464 | 26.95411 |
| Mcm4          | 31.21671 | 20.92407 | 0        | 31.89984 | 25.32032 | 59.627   | 100      | 89.40218 | 51.61117 | 46.34492 |
| Dnajc9        | 20.38024 | 6.047997 | 0        | 29.8827  | 28.39788 | 68.69978 | 100      | 99.74307 | 64.87351 | 32.15554 |
| Mcm5          | 24.36147 | 5.135952 | 0        | 24.20741 | 11.69179 | 68.06752 | 100      | 95.77608 | 61.07547 | 23.84665 |
| 1700025G04Rik | 14.8587  | 12.71343 | 0        | 11.70096 | 35.94396 | 50.27749 | 100      | 82.63074 | 45.65957 | 29.94118 |
| Ccdc102a      | 15.99547 | 21.46244 | 0        | 11.92685 | 26.13    | 49.51401 | 100      | 73.23314 | 43.1313  | 31.06136 |
| Dpp4          | 22.92439 | 0        | 3.39442  | 1.133476 | 19.62287 | 41.94482 | 100      | 76.17881 | 42.94417 | 39.19097 |
| Bloc1s2       | 23.16505 | 0        | 4.989988 | 6.434679 | 30.5313  | 52.43427 | 100      | 75.46264 | 53.06292 | 42.15829 |
| Prim2         | 27.14051 | 0        | 3.663528 | 11.72044 | 34.02152 | 50.44661 | 100      | 66.03229 | 58.42619 | 31.42987 |
| Cd209a        | 5.011557 | 2.242881 | 0        | 1.646182 | 23.57906 | 34.94621 | 89.32585 | 100      | 46.74161 | 10.07726 |
| Parvg         | 8.323313 | 0        | 3.071898 | 1.128424 | 12.31476 | 59.42462 | 100      | 97.04163 | 40.30466 | 21.40423 |
| Trit1         | 0.312375 | 34.94467 | 21.00727 | 19.40867 | 0        | 47.11415 | 90.18222 | 100      | 88.27314 | 56.48907 |
| Clec10a       | 7.278783 | 16.87378 | 0        | 7.096097 | 13.35356 | 58.58065 | 71.30928 | 100      | 70.94462 | 37.15915 |
| 6330416G13Rik | 13.45249 | 24.99415 | 22.91997 | 25.12253 | 0        | 79.69388 | 70.36525 | 100      | 76.79051 | 31.4207  |
| Ddr1          | 21.27783 | 8.209176 | 22.68308 | 0        | 13.32203 | 47.26878 | 57.75267 | 100      | 58.67334 | 60.55404 |
| Bex6          | 31.3278  | 0        | 12.54123 | 1.988615 | 40.87275 | 47.84062 | 94.09414 | 100      | 80.68899 | 46.08574 |
| Fgd2          | 23.9394  | 1.637272 | 0        | 5.668316 | 33.32727 | 62.45344 | 100      | 94.60027 | 71.74896 | 41.15863 |
| Dynlt1f       | 25.37736 | 0.206666 | 0        | 3.168443 | 36.64456 | 65.92088 | 98.62667 | 100      | 73.24827 | 57.10421 |
| Amz1          | 31.3369  | 0        | 11.81621 | 23.69471 | 38.51273 | 56.88157 | 71.48896 | 100      | 63.10197 | 40.97497 |
| Incenp        | 24.87585 | 0        | 6.632481 | 16.96716 | 40.08752 | 79.52671 | 76.19749 | 100      | 70.06729 | 53.54474 |
| Rrm1          | 29.54154 | 11.75835 | 0        | 15.22762 | 42.45721 | 75.29483 | 77.26659 | 100      | 70.5529  | 36.10729 |
| Timeless      | 31.44875 | 0        | 3.948561 | 17.28344 | 23.16517 | 74.56547 | 100      | 46.02679 | 67.98365 | 9.088718 |
| Pnp0          | 18.34295 | 24.14482 | 0        | 0.230924 | 48.12679 | 51.22863 | 100      | 88.10984 | 85.24354 | 21.26759 |
| Casp6         | 13.96858 | 29.9241  | 12.29873 | 0        | 38.32683 | 77.17606 | 100      | 90.92082 | 68.13246 | 29.41153 |
| Atp6v0a2      | 29.56956 | 24.70189 | 0        | 8.137066 | 23.95358 | 68.54771 | 100      | 81.63661 | 69.74353 | 35.66493 |
| Uhrf1         | 28.27943 | 8.020042 | 17.64337 | 32.58219 | 34.64347 | 55.08049 | 100      | 84.99966 | 81.12142 | 0        |
| Tk1           | 12.0097  | 0        | 3.207433 | 15.58577 | 51.84985 | 34.40359 | 100      | 97.66661 | 63.35253 | 9.926088 |
| Rnase6        | 11.18861 | 0        | 17.19464 | 30.33043 | 44.88357 | 64.72873 | 100      | 72.28609 | 37.07185 | 35.7297  |
| Ppt1          | 0.187228 | 0        | 4.344565 | 8.929343 | 34.51222 | 59.06409 | 100      | 74.64348 | 40.79446 | 37.09585 |
| Cst3          | 0.778619 | 0        | 4.410665 | 13.70842 | 43.00642 | 64.29748 | 100      | 73.26912 | 33.13058 | 35.5766  |
| Ppm1m         | 15.51061 | 1.929966 | 0        | 17.25758 | 42.29536 | 62.15611 | 100      | 83.44987 | 40.60269 | 32.34188 |
| Plbd1         | 2.645453 | 0        | 4.142935 | 14.4629  | 44.04024 | 67.00942 | 100      | 86.31011 | 42.15907 | 27.93753 |
| Vrk1          | 7.607673 | 0        | 5.313163 | 13.99687 | 31.21611 | 70.07693 | 100      | 83.20828 | 38.19331 | 29.42067 |
| Dynlt1a       | 0        | 2.23253  | 4.238432 | 19.35716 | 53.81412 | 80.23522 | 100      | 83.84403 | 52.61696 | 29.15469 |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ffar4    | 10.06232 | 5.116613 | 0        | 16.84927 | 60.82256 | 77.10036 | 100      | 82.0864  | 43.48999 | 50.58827 |
| Anxa6    | 19.98613 | 11.43516 | 0        | 15.71999 | 51.1648  | 73.81978 | 100      | 82.0299  | 48.75911 | 48.24919 |
| BC035044 | 8.379845 | 0        | 2.388858 | 17.18677 | 54.30253 | 64.91662 | 100      | 75.10548 | 51.31699 | 39.4533  |
| Cbfa2t3  | 16.8825  | 0        | 14.07993 | 22.01695 | 55.52964 | 60.8583  | 100      | 83.06999 | 47.06088 | 41.77217 |
| Slc25a20 | 13.53097 | 0        | 3.323944 | 22.98414 | 38.4599  | 57.43343 | 100      | 50.21948 | 44.14149 | 44.25736 |
| Irf8     | 1.039297 | 0        | 6.321221 | 10.11035 | 39.89419 | 70.52991 | 100      | 80.38549 | 41.47646 | 53.67481 |
| Cldnd1   | 0        | 12.47546 | 0.008067 | 13.02745 | 36.49568 | 66.37204 | 100      | 75.21704 | 49.49869 | 65.35096 |
| P2ry14   | 4.501528 | 0        | 13.7689  | 0.967989 | 30.27592 | 72.28124 | 100      | 49.73974 | 60.47441 | 68.99441 |
| Rnaseh1  | 17.7522  | 13.35644 | 0        | 12.90347 | 36.24918 | 67.32683 | 100      | 67.87502 | 73.76077 | 49.17762 |
| Slc25a38 | 26.52076 | 0        | 11.64491 | 3.978611 | 24.04467 | 64.21163 | 100      | 59.15413 | 76.0506  | 44.06889 |
| Pafah1b3 | 41.83819 | 7.630652 | 0        | 1.328189 | 37.3298  | 81.32563 | 100      | 76.10091 | 40.53192 | 59.50617 |
| Got2     | 35.753   | 0        | 0.887088 | 13.115   | 38.19484 | 82.26193 | 100      | 77.4936  | 55.76445 | 68.75758 |
| Khk      | 26.69621 | 0        | 7.291138 | 15.09818 | 45.99311 | 59.53533 | 100      | 67.01426 | 61.80054 | 49.19998 |
| Dock10   | 25.30019 | 0        | 6.848964 | 16.18842 | 50.69333 | 54.94972 | 100      | 79.07736 | 61.68909 | 52.42229 |
| Pak1     | 12.53152 | 3.392721 | 0        | 1.968561 | 42.85853 | 59.12597 | 100      | 72.06872 | 64.30537 | 52.58474 |
| Rab32    | 11.45304 | 0        | 4.487725 | 10.12517 | 39.12159 | 63.76622 | 100      | 77.42544 | 55.42288 | 56.92638 |
| H2afy    | 14.4738  | 0.696192 | 0        | 12.54325 | 38.33773 | 66.51144 | 100      | 87.47966 | 57.23591 | 42.57713 |
| Cnp      | 26.68884 | 2.220586 | 0        | 11.46006 | 46.30582 | 64.83939 | 100      | 83.98338 | 64.03992 | 35.85321 |
| Ppp1r11  | 26.97742 | 14.31672 | 0        | 18.88192 | 50.10795 | 72.67254 | 100      | 85.85492 | 64.78182 | 56.82096 |
| Dek      | 36.33526 | 3.579274 | 0        | 16.36671 | 36.43371 | 71.79367 | 100      | 88.7326  | 56.90412 | 52.78178 |
| Napsa    | 15.72672 | 0        | 29.41463 | 40.24256 | 48.30879 | 48.27792 | 100      | 95.13341 | 52.51658 | 34.04272 |
| Tyms     | 0        | 9.209071 | 9.964341 | 31.28264 | 47.82444 | 71.8267  | 100      | 99.22708 | 59.86    | 27.77284 |
| St3gal4  | 6.84751  | 10.90044 | 0        | 35.49981 | 42.67109 | 59.50677 | 100      | 90.18322 | 61.02175 | 36.29135 |
| Klhl6    | 30.55868 | 7.183939 | 0        | 33.58497 | 49.9283  | 71.34816 | 100      | 95.80505 | 54.45235 | 35.75349 |
| Nrm      | 27.17901 | 3.022204 | 0        | 34.14165 | 48.86303 | 55.22484 | 98.16041 | 100      | 70.6615  | 35.1128  |
| Camk1d   | 19.0894  | 0        | 0.94165  | 19.66985 | 56.32542 | 64.44231 | 100      | 97.94373 | 66.17392 | 33.47042 |
| Ppfia4   | 0        | 1.408176 | 18.22705 | 25.9199  | 48.89355 | 69.26914 | 96.89133 | 100      | 84.1463  | 43.65802 |
| Hfe      | 7.789749 | 0        | 22.60007 | 42.489   | 50.4424  | 59.59124 | 100      | 95.99959 | 67.55359 | 54.56941 |
| B4galt4  | 0        | 20.52571 | 10.12732 | 49.52135 | 58.2191  | 60.29509 | 89.21143 | 100      | 62.07898 | 54.42398 |
| Slc35c2  | 0        | 1.914535 | 1.565621 | 36.92299 | 55.34395 | 62.54795 | 97.32201 | 100      | 45.8901  | 49.6689  |
| Cdca8    | 31.08539 | 11.021   | 0        | 13.4855  | 75.65782 | 51.74997 | 93.39266 | 100      | 48.68278 | 55.39171 |
| Fnbp1    | 25.64276 | 12.59179 | 0        | 23.969   | 64.40751 | 57.70137 | 100      | 75.69881 | 37.64916 | 42.63355 |
| Tbc1d9   | 9.34513  | 4.247378 | 0        | 16.36445 | 74.71834 | 61.8125  | 100      | 84.90766 | 38.39744 | 39.21417 |
| Lmnbl1   | 25.34042 | 1.539133 | 0        | 9.504327 | 59.68211 | 56.77177 | 95.68318 | 100      | 43.66101 | 41.51553 |
| Runx3    | 22.96571 | 2.220727 | 0        | 15.98125 | 50.08265 | 65.8567  | 80.74147 | 100      | 38.1418  | 53.92851 |

|          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Bcl11a   | 33.93603 | 0        | 15.73486 | 16.04488 | 34.10175 | 53.23589 | 100      | 94.12441 | 35.69288 | 45.64378 |
| Sdad1    | 26.48739 | 8.975096 | 0        | 22.78818 | 35.92008 | 38.15472 | 91.89755 | 100      | 49.40574 | 44.60049 |
| P2ry10   | 55.01491 | 0        | 25.17476 | 2.451428 | 65.72951 | 81.13447 | 99.56234 | 100      | 39.87771 | 84.74689 |
| Tbc1d10c | 56.54917 | 0        | 12.01527 | 12.93416 | 42.34771 | 68.32746 | 100      | 58.02696 | 16.48556 | 71.78308 |
| Strbp    | 9.030406 | 8.932073 | 0        | 8.337992 | 24.77038 | 72.43487 | 100      | 65.40351 | 27.81117 | 88.96388 |
| Pfkip    | 13.48812 | 17.05169 | 0        | 11.70045 | 37.43727 | 78.79059 | 100      | 71.65197 | 41.02976 | 82.42227 |
| Tnfrsf18 | 22.40148 | 15.16367 | 6.157511 | 0        | 45.87219 | 51.88724 | 100      | 73.00075 | 14.78068 | 79.77914 |
| Gramd3   | 24.04577 | 1.590824 | 9.545644 | 0        | 29.84638 | 54.75349 | 100      | 74.01499 | 33.69727 | 90.34471 |
| Id2      | 14.64203 | 0        | 0.233119 | 4.5251   | 30.43555 | 65.67439 | 100      | 72.04806 | 23.96653 | 70.22598 |
| Ints4    | 51.47155 | 0        | 14.99778 | 22.86881 | 74.65962 | 81.53464 | 99.74337 | 96.77456 | 100      | 63.10696 |
| Shtn1    | 32.21232 | 16.24606 | 0        | 28.91852 | 69.33515 | 87.48658 | 95.46993 | 100      | 87.50547 | 77.76118 |
| Lrrc40   | 24.6403  | 16.46255 | 0        | 19.89417 | 76.92147 | 63.04299 | 100      | 78.51586 | 78.24394 | 79.69634 |
| Haus5    | 26.26726 | 16.61223 | 0        | 30.50334 | 52.56766 | 62.21348 | 100      | 78.51487 | 96.1775  | 58.73718 |
| Tdp1     | 32.87066 | 21.934   | 0        | 20.3804  | 73.36725 | 58.13615 | 79.74827 | 79.15877 | 100      | 55.30493 |
| Gna15    | 5.386383 | 4.075627 | 0        | 17.75446 | 63.48163 | 100      | 98.64531 | 76.82064 | 61.76309 | 53.21454 |
| Asf1b    | 11.32723 | 1.378883 | 0        | 33.90042 | 48.47063 | 80.52983 | 100      | 95.35446 | 63.29598 | 48.93227 |
| Fanci1   | 18.37638 | 0.811705 | 0        | 32.71034 | 47.96874 | 82.55102 | 100      | 85.57135 | 63.93142 | 46.54572 |
| Rpa2     | 13.78272 | 0        | 8.757864 | 25.51782 | 54.75597 | 78.9498  | 95.17939 | 100      | 62.15407 | 49.5093  |
| Commd8   | 12.19796 | 0        | 3.825421 | 22.89813 | 54.85877 | 84.69572 | 100      | 87.26026 | 67.61943 | 58.24216 |
| Dbnl     | 6.102353 | 0.20507  | 0        | 14.25625 | 42.902   | 71.79538 | 100      | 94.81404 | 75.14695 | 63.33153 |
| Pkib     | 4.187323 | 5.764269 | 0        | 7.812636 | 53.78478 | 75.79797 | 98.1365  | 100      | 74.25937 | 64.8849  |
| Ckb      | 1.477704 | 0        | 1.14714  | 3.500268 | 47.20129 | 75.29754 | 100      | 94.95963 | 70.10395 | 64.42012 |
| Klrk1    | 14.8191  | 0.294473 | 7.484285 | 0        | 51.19535 | 72.90257 | 100      | 97.92893 | 82.61129 | 56.06787 |
| Eefsec   | 13.00457 | 7.987356 | 3.726909 | 0        | 47.94287 | 77.37391 | 100      | 85.97738 | 85.58043 | 67.14586 |
| Ezh2     | 21.41839 | 10.77239 | 0        | 11.05492 | 61.07538 | 81.78706 | 100      | 96.31435 | 48.95195 | 76.27751 |
| Mtmt14   | 23.96078 | 10.75171 | 10.28766 | 0        | 54.87269 | 74.52005 | 81.9669  | 100      | 75.17651 | 70.93076 |
| H2afz    | 39.23678 | 3.401488 | 0        | 11.92594 | 53.15952 | 79.97804 | 95.65766 | 100      | 71.76772 | 72.2958  |
| Riok1    | 27.84769 | 33.99788 | 0        | 14.98786 | 17.09892 | 80.95823 | 75.15737 | 98.01932 | 100      | 67.63375 |
| Fen1     | 21.28905 | 13.07937 | 0        | 20.6416  | 37.16517 | 78.67805 | 87.43191 | 100      | 73.86033 | 66.33701 |
| Lpcat1   | 10.05427 | 15.4287  | 0        | 19.23439 | 30.9361  | 74.36069 | 80.02305 | 100      | 85.94996 | 84.02143 |
| Rfc5     | 12.36889 | 9.315387 | 0        | 15.82868 | 14.3943  | 81.66554 | 97.92229 | 100      | 86.83795 | 58.99063 |
| Zc3hc1   | 35.62963 | 0        | 8.919405 | 12.17972 | 26.12837 | 83.88982 | 90.88252 | 100      | 86.88899 | 57.94896 |
| Noc4l    | 13.47614 | 13.35102 | 0        | 25.31547 | 43.62455 | 100      | 93.7666  | 84.81559 | 93.42105 | 65.1675  |
| Mcm3     | 22.04859 | 0        | 0.065111 | 20.50467 | 27.93618 | 84.8747  | 100      | 80.97584 | 87.6175  | 47.82036 |
| Ccdc86   | 24.87742 | 5.094477 | 0        | 15.21223 | 24.84728 | 80.26434 | 100      | 69.18024 | 97.32557 | 66.56515 |

|         |          |          |          |          |          |          |          |          |          |          |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Mcm2    | 22.91027 | 0        | 4.216571 | 39.61966 | 51.94674 | 96.8632  | 100      | 83.66046 | 78.03085 | 50.37844 |
| Sla     | 30.26685 | 0        | 6.932172 | 26.36803 | 49.73735 | 79.26934 | 100      | 94.23772 | 94.62222 | 39.76726 |
| Tipin   | 32.11297 | 13.05414 | 0        | 28.72259 | 41.25142 | 88.85095 | 94.93463 | 100      | 83.9711  | 41.11541 |
| Orc6    | 35.99553 | 1.900219 | 0        | 33.76528 | 33.80458 | 100      | 72.25301 | 99.19899 | 72.21301 | 37.01408 |
| Pkmyt1  | 27.09996 | 20.27135 | 0        | 44.49488 | 49.79323 | 84.71765 | 87.63684 | 100      | 95.36362 | 30.61273 |
| Prim1   | 12.50831 | 0.41707  | 0        | 43.11487 | 38.03213 | 84.82474 | 84.48858 | 100      | 79.33947 | 31.19383 |
| Chaf1a  | 17.00451 | 13.71311 | 0        | 36.5835  | 38.9064  | 73.80065 | 84.54579 | 100      | 77.68801 | 26.34714 |
| Fgfr1op | 54.84267 | 19.74559 | 0        | 36.89482 | 21.73637 | 95.84144 | 100      | 91.37339 | 62.80717 | 49.51576 |
| Gatm    | 31.86314 | 6.011883 | 0        | 37.99994 | 32.68265 | 74.64325 | 85.47472 | 100      | 59.93702 | 71.25537 |
| Ppif    | 43.36986 | 11.03738 | 0        | 40.91629 | 31.70873 | 58.92838 | 80.60588 | 100      | 63.90298 | 63.53896 |
| Syce2   | 28.83197 | 14.41107 | 0        | 43.01142 | 12.33237 | 76.29078 | 100      | 99.11824 | 72.91949 | 71.71692 |
| Mcm6    | 51.15005 | 2.744583 | 0        | 31.86616 | 17.63    | 77.68278 | 100      | 97.77184 | 88.89207 | 77.98578 |

**Supplemental Table s4. List of the 500 PSGs.**

|                     |                    |                     |                    |                     |
|---------------------|--------------------|---------------------|--------------------|---------------------|
| ENSMUSG00000035042  | ENSMUSG00000052749 | ENSMUSG00000028691  | ENSMUSG00000074622 | ENSMUSG00000050002  |
| ENSMUSG000000061100 | ENSMUSG00000039899 | ENSMUSG00000030156  | ENSMUSG00000022353 | ENSMUSG00000039001  |
| ENSMUSG00000075602  | ENSMUSG00000044701 | ENSMUSG00000028832  | ENSMUSG00000069833 | ENSMUSG00000029614  |
| ENSMUSG00000040026  | ENSMUSG00000073409 | ENSMUSG00000059089  | ENSMUSG00000032870 | ENSMUSG00000085823  |
| ENSMUSG00000049723  | ENSMUSG00000050071 | ENSMUSG00000021756  | ENSMUSG00000023349 | ENSMUSG00000025794  |
| ENSMUSG00000019987  | ENSMUSG00000052270 | ENSMUSG0000004933   | ENSMUSG00000030595 | ENSMUSG00000001403  |
| ENSMUSG00000025498  | ENSMUSG00000078763 | ENSMUSG00000026581  | ENSMUSG00000047250 | ENSMUSG00000070031  |
| ENSMUSG00000034855  | ENSMUSG00000021591 | ENSMUSG00000028266  | ENSMUSG00000037997 | ENSMUSG00000054404  |
| ENSMUSG00000035692  | ENSMUSG00000000318 | ENSMUSG0000001930   | ENSMUSG00000019302 | ENSMUSG00000068606  |
| ENSMUSG00000075010  | ENSMUSG00000034641 | ENSMUSG00000024778  | ENSMUSG00000025150 | ENSMUSG00000022817  |
| ENSMUSG00000022126  | ENSMUSG00000026981 | ENSMUSG00000022831  | ENSMUSG00000057863 | ENSMUSG00000008348  |
| ENSMUSG00000079363  | ENSMUSG00000039236 | ENSMUSG00000029428  | ENSMUSG00000046727 | ENSMUSG00000087477  |
| ENSMUSG00000054072  | ENSMUSG00000060675 | ENSMUSG00000026012  | ENSMUSG0000004266  | ENSMUSG00000024754  |
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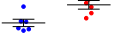
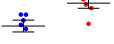
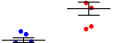
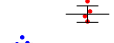
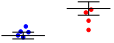
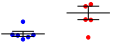
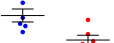
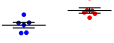
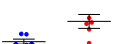
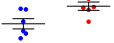
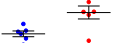
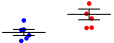
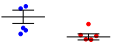
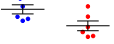
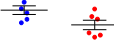
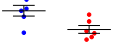
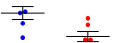
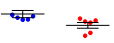
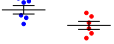
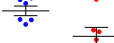
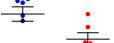
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**Supplemental Table s5. List of the 435 AMDSGs.**

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| ENSMUSG00000036390  | ENSMUSG00000056501  | ENSMUSG00000023367 | ENSMUSG00000033207 | ENSMUSG00000031444  |
| ENSMUSG00000040229  | ENSMUSG00000027331  | ENSMUSG00000032841 | ENSMUSG00000032122 | ENSMUSG00000074677  |
| ENSMUSG00000023505  | ENSMUSG00000041153  | ENSMUSG00000039908 | ENSMUSG00000026094 |                     |
| ENSMUSG00000028044  | ENSMUSG00000020205  | ENSMUSG00000071172 | ENSMUSG00000030365 |                     |
| ENSMUSG00000069516  | ENSMUSG00000040618  | ENSMUSG00000002274 | ENSMUSG00000003541 |                     |
| ENSMUSG00000027111  | ENSMUSG00000027882  | ENSMUSG00000020808 | ENSMUSG00000047534 |                     |
| ENSMUSG00000039109  | ENSMUSG00000048285  | ENSMUSG00000039197 | ENSMUSG00000029333 |                     |
| ENSMUSG00000025993  | ENSMUSG00000038943  | ENSMUSG00000026365 | ENSMUSG00000044786 |                     |
| ENSMUSG00000067212  | ENSMUSG00000027715  | ENSMUSG00000005410 | ENSMUSG00000035754 |                     |
| ENSMUSG00000028583  | ENSMUSG00000018012  | ENSMUSG00000027339 | ENSMUSG00000019773 |                     |
| ENSMUSG00000059824  | ENSMUSG00000024014  | ENSMUSG00000038412 | ENSMUSG00000002107 |                     |
| ENSMUSG00000029373  | ENSMUSG00000023150  | ENSMUSG00000028970 | ENSMUSG00000031367 |                     |
| ENSMUSG00000017716  | ENSMUSG00000040435  | ENSMUSG00000002058 | ENSMUSG00000059791 |                     |
| ENSMUSG00000046432  | ENSMUSG00000020101  | ENSMUSG00000022822 | ENSMUSG00000042015 |                     |
| ENSMUSG00000022150  | ENSMUSG00000042677  | ENSMUSG00000043157 | ENSMUSG00000044583 |                     |
| ENSMUSG00000025154  | ENSMUSG00000034156  | ENSMUSG00000025742 | ENSMUSG00000030346 |                     |
| ENSMUSG00000041058  | ENSMUSG00000034612  | ENSMUSG00000076431 | ENSMUSG00000027646 |                     |
| ENSMUSG00000053687  | ENSMUSG00000028792  | ENSMUSG00000029730 | ENSMUSG00000081769 |                     |
| ENSMUSG00000000982  | ENSMUSG00000018217  | ENSMUSG00000005043 | ENSMUSG00000057135 |                     |
| ENSMUSG00000006462  | ENSMUSG00000062078  | ENSMUSG00000021665 | ENSMUSG00000062753 |                     |
| ENSMUSG00000026228  | ENSMUSG00000098318  | ENSMUSG00000048277 | ENSMUSG00000030725 |                     |
| ENSMUSG00000078122  | ENSMUSG00000056498  | ENSMUSG00000037852 | ENSMUSG00000031511 |                     |
| ENSMUSG00000003032  | ENSMUSG00000056749  | ENSMUSG00000023015 | ENSMUSG00000034006 |                     |
| ENSMUSG00000047747  | ENSMUSG00000028312  | ENSMUSG00000026429 | ENSMUSG00000067924 |                     |
| ENSMUSG00000024177  | ENSMUSG00000022033  | ENSMUSG00000056069 | ENSMUSG00000040274 |                     |
| ENSMUSG00000026357  | ENSMUSG00000074607  | ENSMUSG00000041859 | ENSMUSG00000023021 |                     |
| ENSMUSG00000020914  | ENSMUSG00000019942  | ENSMUSG00000045817 | ENSMUSG00000060098 |                     |
| ENSMUSG00000070323  | ENSMUSG00000027009  | ENSMUSG00000005034 | ENSMUSG00000026683 |                     |
| ENSMUSG00000029860  | ENSMUSG00000020671  | ENSMUSG00000044783 | ENSMUSG00000038740 |                     |
| ENSMUSG00000036086  | ENSMUSG00000022788  | ENSMUSG00000003824 | ENSMUSG00000092564 |                     |
| ENSMUSG0000002985   | ENSMUSG00000037991  | ENSMUSG00000042029 | ENSMUSG00000030867 |                     |
| ENSMUSG00000038332  | ENSMUSG00000021143  | ENSMUSG00000005470 | ENSMUSG00000040592 |                     |
| ENSMUSG00000049422  | ENSMUSG00000021676  | ENSMUSG00000033033 | ENSMUSG00000067925 |                     |
| ENSMUSG00000027435  | ENSMUSG00000033446  | ENSMUSG00000046062 | ENSMUSG00000070691 |                     |
| ENSMUSG00000041135  | ENSMUSG00000030557  | ENSMUSG00000028873 | ENSMUSG00000041695 |                     |

|                    |                    |                    |                    |
|--------------------|--------------------|--------------------|--------------------|
| ENSMUSG00000031897 | ENSMUSG00000048200 | ENSMUSG00000007613 | ENSMUSG00000003779 |
| ENSMUSG00000053338 | ENSMUSG00000032322 | ENSMUSG00000030729 | ENSMUSG00000026687 |
| ENSMUSG00000022661 | ENSMUSG00000069515 | ENSMUSG00000042684 | ENSMUSG00000019876 |
| ENSMUSG00000055435 | ENSMUSG00000032515 | ENSMUSG00000027968 | ENSMUSG00000037503 |
| ENSMUSG00000031097 | ENSMUSG00000031652 | ENSMUSG00000075266 | ENSMUSG00000022744 |
| ENSMUSG00000049130 | ENSMUSG00000042870 | ENSMUSG00000027293 | ENSMUSG00000004221 |
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| ENSMUSG00000026605 | ENSMUSG00000034041 | ENSMUSG00000028551 | ENSMUSG00000047843 |
| ENSMUSG00000071042 | ENSMUSG00000035697 | ENSMUSG00000052837 | ENSMUSG00000036533 |
| ENSMUSG00000024084 | ENSMUSG00000017390 | ENSMUSG00000032254 | ENSMUSG00000001348 |
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| ENSMUSG00000002104 | ENSMUSG00000038368 | ENSMUSG00000021998 | ENSMUSG00000031216 |
| ENSMUSG00000063889 | ENSMUSG00000025511 | ENSMUSG00000026458 | ENSMUSG00000031821 |
| ENSMUSG00000064215 | ENSMUSG00000024190 | ENSMUSG00000029919 | ENSMUSG00000032067 |
| ENSMUSG00000020077 | ENSMUSG00000026170 | ENSMUSG00000004032 | ENSMUSG00000010663 |
| ENSMUSG00000004891 | ENSMUSG00000024539 | ENSMUSG00000044147 | ENSMUSG00000040723 |
| ENSMUSG00000025574 | ENSMUSG00000049091 | ENSMUSG00000076437 | ENSMUSG00000024056 |
| ENSMUSG00000032218 | ENSMUSG00000031596 | ENSMUSG00000070738 | ENSMUSG00000039145 |
| ENSMUSG00000018930 | ENSMUSG00000041126 | ENSMUSG00000029468 | ENSMUSG00000025747 |
| ENSMUSG00000060519 | ENSMUSG00000055447 | ENSMUSG00000033705 | ENSMUSG00000030707 |
| ENSMUSG00000035448 | ENSMUSG00000025408 | ENSMUSG00000028525 | ENSMUSG00000027316 |
| ENSMUSG00000047592 | ENSMUSG00000021822 | ENSMUSG00000030649 | ENSMUSG00000107355 |
| ENSMUSG00000026229 | ENSMUSG00000027737 | ENSMUSG00000028497 | ENSMUSG00000003382 |
| ENSMUSG00000094777 | ENSMUSG00000045328 | ENSMUSG00000054733 | ENSMUSG00000036777 |
| ENSMUSG00000026473 | ENSMUSG00000026986 | ENSMUSG00000026456 | ENSMUSG00000038633 |
| ENSMUSG00000033917 | ENSMUSG00000021880 | ENSMUSG00000038866 | ENSMUSG00000029516 |
| ENSMUSG00000018339 | ENSMUSG00000042286 | ENSMUSG00000038372 | ENSMUSG00000026245 |
| ENSMUSG00000032698 | ENSMUSG00000024404 | ENSMUSG00000018171 | ENSMUSG00000073468 |
| ENSMUSG00000024737 | ENSMUSG00000060131 | ENSMUSG00000024186 | ENSMUSG00000022439 |
| ENSMUSG00000026688 | ENSMUSG00000024962 | ENSMUSG00000001525 | ENSMUSG00000026786 |

**Supplemental Table s6. The 23 genes identified using MacSpectrum are significantly associated with obesity-induced phenotypes and diabetes.**

| Gene ID         | Correlation r (GSE32575) |       | No Dia v.s. Dia (GSE54350)                                                          |         | Functions related to metabolism, inflammation, and macrophage/monocyte regulation                                                          |
|-----------------|--------------------------|-------|-------------------------------------------------------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------|
|                 | BMI                      | IR    | Plot                                                                                | p-value |                                                                                                                                            |
| <i>PRKAG2</i>   | 0.59                     | 0.41  |    | 0.010   | Protein kinase AMP-activated non-catalytic subunit gamma 2, involved in glycogen metabolism                                                |
| <i>PNKP</i>     | 0.55                     | 0.47  |    | 0.014   | DNA repair in response to inflammation-associated oxidative damage                                                                         |
| <i>ERCC1</i>    | 0.52                     | 0.55  |    | 0.003   | Nucleotide excision repair of DNA lesions; deletion of this gene caused autoinflammation and degeneration of adipose tissue                |
| <i>CLIC1</i>    | 0.51                     | 0.46  |    | 0.011   | Regulating phagosomal acidification function of macrophages                                                                                |
| <i>DAGLB</i>    | 0.50                     | 0.36  |    | 0.008   | Lipase catalyzing the hydrolysis of diacylglycerol (DAG) to 2-arachidonoyl-glycerol (2-AG)                                                 |
| <i>TKT</i>      | 0.43                     | 0.35  |    | 0.024   | A thiamine-dependent enzyme which plays a role in the channeling of excess sugar phosphates to glycolysis in the pentose phosphate pathway |
| <i>HPS1</i>     | 0.43                     | 0.50  |    | 0.013   | Involved in regulation of macrophage accumulation and inflammation                                                                         |
| <i>RNASET2</i>  | 0.42                     | 0.36  |    | 0.004   | Extracellular ribonucleases; Inducing inflammation and macrophage polarization                                                             |
| <i>GPX1</i>     | 0.41                     | 0.44  |    | 0.032   | Glutathione peroxidase coping with reactive oxygen and nitrogen species; protection against type 2 diabetes in mice                        |
| <i>YIF1B</i>    | 0.37                     | 0.58  |    | 0.025   | Yip1 Interacting Factor Homolog B, Membrane Trafficking Protein                                                                            |
| <i>COMT</i>     | 0.36                     | 0.51  |   | 0.020   | Involved in macrophage-mediated regulation of adipocyte lipolysis                                                                          |
| <i>B3GNT8</i>   | 0.33                     | 0.41  |  | 0.019   | Protein glycosylation; involved in elongation of specific branch structures of multiantennary N-glycans                                    |
| <i>GPC3</i>     | -0.34                    | -0.41 |  | 0.028   | macrophage/monocyte lineage differentiation and recruitment                                                                                |
| <i>ADH1A</i>    | -0.36                    | -0.46 |  | 0.034   | Carbohydrate metabolism; catalyzing the oxidation of alcohols to aldehydes                                                                 |
| <i>UACA</i>     | -0.39                    | -0.39 |  | 0.043   | Regulation of stress-induced apoptosis through apoptosome up-regulation, LGALS3/galectin-3 down-regulation and NF-kappa-B inactivation     |
| <i>BDH2</i>     | -0.40                    | -0.51 |  | 0.038   | Ketone body metabolism, iron homeostasis and transport                                                                                     |
| <i>SLC9A3R2</i> | -0.41                    | -0.38 |  | 0.020   | Glucose / energy metabolism                                                                                                                |
| <i>RYK</i>      | -0.44                    | -0.43 |  | 0.018   | Coreceptor of Wnt proteins; involved in inflammatory Wnt5A signalling                                                                      |
| <i>SPARC</i>    | -0.46                    | -0.35 |  | 0.036   | Promoting inflammation and macrophage M1 polarization                                                                                      |
| <i>PRRX1</i>    | -0.47                    | -0.42 |  | 0.013   | Regulation of cell growth and differentiation, including adipogenesis                                                                      |
| <i>PPIC</i>     | -0.47                    | -0.36 |  | 0.024   | Regulation of immune response                                                                                                              |
| <i>TRIM2</i>    | -0.48                    | -0.44 |  | 0.039   | Potential involvement in interferon $\gamma$ signaling                                                                                     |
| <i>AMOTL2</i>   | -0.64                    | -0.49 |  | 0.027   | Regulation of cell proliferation and migration, involved in PPAR $\gamma$ signaling                                                        |