

**Table S4 All genes in the KEGG immune-related categories in Table S3**

“Best p (corrected)” is the significance of the best single-SNP p-value corrected for testing multiple SNPs in a gene (allowing for LD between SNPs). “Set based p” refers to a test of whether the average single-SNP chi-squared (allelic) association statistic is significantly high (again allowing for LD between SNPs).

| Gene ID number | Gene Symbol | Chr | No. of SNPs (Harold) | Most Sig Assoc p-value (Harold) | No. of SNPs (Lambert) | Most Sig Assoc p-value (Lambert) | Corrected best p (Harold) | Set-based p (Harold) | Simes-corrected p (Lambert) |
|----------------|-------------|-----|----------------------|---------------------------------|-----------------------|----------------------------------|---------------------------|----------------------|-----------------------------|
| 1378           | CR1         | 1   | 29                   | 0.00000832                      | 29                    | 0.00000103                       | 0.0002                    | 0.0003               | <0.0001                     |
| 2206           | MS4A2       | 11  | 11                   | 0.00005739                      | 10                    | 0.04515877                       | 0.0006                    | 0.0010               | 0.2109                      |
| 3123           | HLA-DRB1    | 6   | 18                   | 0.00015490                      | 12                    | 0.00012917                       | 0.0028                    | 0.0010               | 0.0011                      |
| 3122           | HLA-DRA     | 6   | 50                   | 0.00039210                      | 45                    | 0.00046277                       | 0.0190                    | 0.0420               | 0.0208                      |
| 3002           | GZMB        | 14  | 20                   | 0.00049510                      | 20                    | 0.04058881                       | 0.0099                    | 0.4565               | 0.2168                      |
| 1380           | CR2         | 1   | 21                   | 0.00052180                      | 21                    | 0.00020979                       | 0.0083                    | 0.0114               | 0.0044                      |
| 3112           | HLA-DOB     | 6   | 75                   | 0.00056360                      | 64                    | 0.00202924                       | 0.0210                    | 0.1399               | 0.1299                      |
| 3676           | ITGA4       | 2   | 26                   | 0.00064550                      | 25                    | 0.01336532                       | 0.0166                    | 0.3487               | 0.1856                      |
| 3674           | ITGA2B      | 17  | 3                    | 0.00083120                      | 3                     | 0.13378723                       | 0.0025                    | 0.0020               | 0.1831                      |
| 3117           | HLA-DQA1    | 6   | 24                   | 0.00093190                      | 14                    | 0.00662362                       | 0.0150                    | 0.0669               | 0.0927                      |
| 290            | ANPEP       | 15  | 19                   | 0.00098920                      | 20                    | 0.02098184                       | 0.0186                    | 0.2607               | 0.3402                      |
| 4311           | MME         | 3   | 28                   | 0.00136100                      | 28                    | 0.00659825                       | 0.0360                    | 0.1648               | 0.1363                      |
| 5799           | PTPRN2      | 7   | 234                  | 0.00187800                      | 225                   | 0.00587385                       | 0.3559                    | 0.5325               | 0.5941                      |
| 356            | FASLG       | 1   | 10                   | 0.00190300                      | 10                    | 0.28340265                       | 0.0170                    | 0.0060               | 0.9338                      |
| 1604           | CD55        | 1   | 4                    | 0.00197100                      | 4                     | 0.04281225                       | 0.0079                    | 0.0729               | 0.1285                      |
| 2815           | GP9         | 3   | 2                    | 0.00263700                      | 2                     | 0.67754722                       | 0.0053                    | 0.0010               | 0.7216                      |
| 929            | CD14        | 5   | 14                   | 0.00279200                      | 14                    | 0.06106207                       | 0.0220                    | 0.0260               | 0.3346                      |
| 948            | CD36        | 7   | 15                   | 0.00293200                      | 14                    | 0.27579400                       | 0.0431                    | 0.2348               | 0.9163                      |
| 3119           | HLA-DQB1    | 6   | 19                   | 0.00319500                      | 12                    | 0.00610550                       | 0.0400                    | 0.0190               | 0.0733                      |
| 4254           | KITLG       | 12  | 22                   | 0.00410900                      | 22                    | 0.26134846                       | 0.0866                    | 0.2138               | 0.9571                      |
| 945            | CD33        | 19  | 13                   | 0.00513400                      | 10                    | 0.00124969                       | 0.0490                    | 0.0459               | 0.0051                      |
| 3111           | HLA-DOA     | 6   | 68                   | 0.00518200                      | 67                    | 0.00097250                       | 0.1858                    | 0.5375               | 0.0362                      |
| 3821           | KLRC1       | 12  | 5                    | 0.00535200                      | 3                     | 0.55735761                       | 0.0190                    | 0.0450               | 0.6561                      |
| 3815           | KIT         | 4   | 31                   | 0.00564200                      | 29                    | 0.01679184                       | 0.1609                    | 0.7083               | 0.4870                      |
| 3655           | ITGA6       | 2   | 46                   | 0.00579500                      | 48                    | 0.10714733                       | 0.2346                    | 0.0509               | 0.9577                      |
| 3690           | ITGB3       | 17  | 28                   | 0.00592600                      | 28                    | 0.00912907                       | 0.0999                    | 0.0320               | 0.2406                      |
| 7038           | TG          | 8   | 94                   | 0.00693800                      | 91                    | 0.02051889                       | 0.4803                    | 0.7562               | 0.9224                      |
| 1436           | CSF1R       | 5   | 47                   | 0.00714200                      | 47                    | 0.09129442                       | 0.1988                    | 0.1479               | 0.9626                      |
| 3108           | HLA-DMA     | 6   | 42                   | 0.00797000                      | 39                    | 0.01987774                       | 0.2008                    | 0.4006               | 0.7752                      |
| 3382           | ICA1        | 7   | 71                   | 0.00836100                      | 65                    | 0.01378867                       | 0.3367                    | 0.1928               | 0.6065                      |
| 3566           | IL4R        | 16  | 28                   | 0.00844000                      | 27                    | 0.09647925                       | 0.1309                    | 0.1049               | 0.8491                      |
| 7173           | TPO         | 2   | 53                   | 0.00896400                      | 52                    | 0.01305678                       | 0.3157                    | 0.3876               | 0.4740                      |
| 3574           | IL7         | 8   | 19                   | 0.00927200                      | 18                    | 0.03908199                       | 0.0999                    | 0.1329               | 0.7035                      |
| 3568           | IL5RA       | 3   | 50                   | 0.00975200                      | 49                    | 0.00269213                       | 0.3457                    | 0.5914               | 0.1319                      |
| 926            | CD8B        | 2   | 8                    | 0.01035000                      | 6                     | 0.45551199                       | 0.0599                    | 0.0320               | 0.7079                      |
| 7253           | TSHR        | 14  | 59                   | 0.01100000                      | 55                    | 0.01926499                       | 0.4066                    | 0.6853               | 0.7070                      |
| 2322           | FLT3        | 13  | 25                   | 0.01187000                      | 24                    | 0.02856898                       | 0.2398                    | 0.0549               | 0.6857                      |
| 920            | CD4         | 12  | 29                   | 0.01408000                      | 28                    | 0.09531122                       | 0.2547                    | 0.3986               | 0.8686                      |
| 960            | CD44        | 11  | 59                   | 0.01440000                      | 52                    | 0.00167258                       | 0.5750                    | 0.4256               | 0.0870                      |
| 1791           | DNTT        | 10  | 16                   | 0.01554000                      | 16                    | 0.00337235                       | 0.2217                    | 0.1119               | 0.0242                      |
| 3105           | HLA-A       | 6   | 35                   | 0.01581000                      | 27                    | 0.05961366                       | 0.3506                    | 0.7253               | 0.6613                      |
| 942            | CD86        | 3   | 24                   | 0.01587000                      | 23                    | 0.05430495                       | 0.2587                    | 0.3077               | 0.5917                      |
| 3569           | IL6         | 7   | 17                   | 0.01614000                      | 17                    | 0.03573722                       | 0.1768                    | 0.2048               | 0.3321                      |
| 952            | CD38        | 4   | 15                   | 0.01636000                      | 16                    | 0.01198153                       | 0.2192                    | 0.5944               | 0.1211                      |
| 3134           | HLA-F       | 6   | 34                   | 0.01683000                      | 31                    | 0.01194847                       | 0.4385                    | 0.7203               | 0.1548                      |
| 3630           | INS         | 11  | 9                    | 0.01925000                      | 9                     | 0.21881893                       | 0.1605                    | 0.4725               | 0.9321                      |
| 940            | CD28        | 2   | 10                   | 0.01928000                      | 10                    | 0.42676902                       | 0.1079                    | 0.0540               | 0.8937                      |
| 3586           | IL10        | 1   | 18                   | 0.02042000                      | 17                    | 0.05432774                       | 0.2567                    | 0.2627               | 0.4084                      |
| 915            | CD3D        | 11  | 12                   | 0.02044000                      | 12                    | 0.37091404                       | 0.1608                    | 0.1349               | 0.9535                      |
| 917            | CD3G        | 11  | 11                   | 0.02044000                      | 11                    | 0.46522278                       | 0.1598                    | 0.1209               | 0.9535                      |
| 3118           | HLA-DQA2    | 6   | 45                   | 0.02065000                      | 39                    | 0.09014961                       | 0.2977                    | 0.1439               | 0.9681                      |
| 3672           | ITGA1       | 5   | 82                   | 0.02133000                      | 81                    | 0.01919898                       | 0.6583                    | 0.2887               | 0.8522                      |

|               |    |    |            |    |            |        |        |        |
|---------------|----|----|------------|----|------------|--------|--------|--------|
| 3127 HLA-DRB5 | 6  | 6  | 0.02194000 | 1  | 0.37595102 | 0.0919 | 0.1159 | 0.3760 |
| 921 CD5       | 11 | 16 | 0.02348000 | 15 | 0.10718791 | 0.2078 | 0.1528 | 0.8414 |
| 3578 IL9      | 5  | 20 | 0.02453000 | 21 | 0.00915057 | 0.3447 | 0.3816 | 0.1922 |
| 3106 HLA-B    | 6  | 49 | 0.02488000 | 35 | 0.01262295 | 0.5135 | 0.5025 | 0.3970 |
| 933 CD22      | 19 | 16 | 0.02507000 | 14 | 0.09611820 | 0.2667 | 0.2767 | 0.7340 |
| 909 CD1A      | 1  | 3  | 0.02652000 | 4  | 0.55040061 | 0.0775 | 0.5105 | 0.7124 |
| 3553 IL1B     | 2  | 11 | 0.02861000 | 10 | 0.14206944 | 0.2368 | 0.3896 | 0.9601 |
| 1441 CSF3R    | 1  | 18 | 0.02901000 | 21 | 0.00482631 | 0.4113 | 0.5714 | 0.1014 |
| 947 CD34      | 1  | 16 | 0.03003000 | 15 | 0.07140601 | 0.2967 | 0.1518 | 0.5246 |
| 966 CD59      | 11 | 26 | 0.03075000 | 26 | 0.00702604 | 0.3676 | 0.2318 | 0.1591 |
| 3567 IL5      | 5  | 7  | 0.03096000 | 7  | 0.31342208 | 0.1419 | 0.1658 | 0.7352 |
| 3559 IL2RA    | 10 | 55 | 0.03149000 | 57 | 0.02786500 | 0.6723 | 0.3457 | 0.5878 |
| 3109 HLA-DMB  | 6  | 42 | 0.03249000 | 39 | 0.01987774 | 0.7502 | 0.7373 | 0.7752 |
| 924 CD7       | 17 | 4  | 0.03317000 | 5  | 0.04539241 | 0.1039 | 0.1668 | 0.2270 |
| 2993 GYPA     | 4  | 8  | 0.03457000 | 7  | 0.20945345 | 0.1648 | 0.3177 | 0.7069 |
| 2208 FCER2    | 19 | 16 | 0.03468000 | 16 | 0.06860438 | 0.3716 | 0.2328 | 0.7179 |
| 3824 KLRD1    | 12 | 9  | 0.03523000 | 10 | 0.29028481 | 0.1908 | 0.2907 | 0.9409 |
| 6356 CCL11    | 17 | 13 | 0.03606000 | 14 | 0.11793748 | 0.2498 | 0.1109 | 0.9057 |
| 1493 CTLA4    | 2  | 7  | 0.03837000 | 7  | 0.31128871 | 0.1908 | 0.3247 | 0.7491 |
| 2057 EPOR     | 19 | 6  | 0.03869000 | 6  | 0.33823758 | 0.1608 | 0.0989 | 0.7172 |
| 5553 PRG2     | 11 | 7  | 0.04488000 | 8  | 0.00577245 | 0.1948 | 0.1329 | 0.0215 |
| 3458 IFNG     | 12 | 11 | 0.04749000 | 11 | 0.54338610 | 0.3027 | 0.2927 | 0.9920 |
| 2207 FCER1G   | 1  | 16 | 0.04880000 | 16 | 0.01237873 | 0.4086 | 0.3906 | 0.1981 |
| 3673 ITGA2    | 5  | 42 | 0.04960000 | 35 | 0.00962238 | 0.7333 | 0.3576 | 0.3368 |
| 1363 CPE      | 4  | 42 | 0.05574000 | 41 | 0.03624798 | N/A    | N/A    | 0.9691 |
| 2323 FLT3LG   | 19 | 6  | 0.05633000 | 7  | 0.04162714 | N/A    | N/A    | 0.1923 |
| 4049 LTA      | 6  | 31 | 0.05746000 | 32 | 0.00281555 | N/A    | N/A    | 0.0901 |
| 7124 TNF      | 6  | 30 | 0.05746000 | 30 | 0.01436683 | N/A    | N/A    | 0.3325 |
| 5551 PRF1     | 10 | 17 | 0.05896000 | 17 | 0.07987220 | N/A    | N/A    | 0.9920 |
| 3113 HLA-DPA1 | 6  | 45 | 0.06027000 | 41 | 0.00065736 | 0.7273 | 0.9391 | 0.0264 |
| 7037 TFRC     | 3  | 13 | 0.06187000 | 13 | 0.25401241 | N/A    | N/A    | 0.9920 |
| 3442 IFNA5    | 9  | 17 | 0.06325000 | 16 | 0.02064280 | N/A    | N/A    | 0.2038 |
| 3440 IFNA2    | 9  | 8  | 0.06513000 | 8  | 0.01933898 | N/A    | N/A    | 0.1547 |
| 3447 IFNA13   | 9  | 6  | 0.06513000 | 6  | 0.01933898 | N/A    | N/A    | 0.1160 |
| 3448 IFNA14   | 9  | 6  | 0.06615000 | 5  | 0.00086300 | N/A    | N/A    | 0.0026 |
| 3444 IFNA7    | 9  | 8  | 0.06615000 | 7  | 0.00493911 | N/A    | N/A    | 0.0310 |
| 3446 IFNA10   | 9  | 8  | 0.06615000 | 7  | 0.00493911 | N/A    | N/A    | 0.0310 |
| 3449 IFNA16   | 9  | 5  | 0.06615000 | 4  | 0.00493911 | N/A    | N/A    | 0.0177 |
| 3451 IFNA17   | 9  | 4  | 0.06615000 | 2  | 0.00885124 | N/A    | N/A    | 0.0177 |
| 6037 RNASE3   | 14 | 8  | 0.06885000 | 8  | 0.20545031 | N/A    | N/A    | 0.4905 |
| 3592 IL12A    | 3  | 18 | 0.06952000 | 17 | 0.06628503 | N/A    | N/A    | 0.6174 |
| 3554 IL1R1    | 2  | 43 | 0.07186000 | 43 | 0.02888423 | N/A    | N/A    | 0.4956 |
| 355 FAS       | 10 | 25 | 0.07276000 | 24 | 0.26920372 | 0.7493 | 0.8142 | 0.8927 |
| 1435 CSF1     | 1  | 19 | 0.07353000 | 19 | 0.13740343 | N/A    | N/A    | 0.8911 |
| 3107 HLA-C    | 6  | 57 | 0.07459000 | 44 | 0.06388657 | 0.8881 | 0.8452 | 0.9013 |
| 914 CD2       | 1  | 9  | 0.07875000 | 9  | 0.07729881 | N/A    | N/A    | 0.5336 |
| 2205 FCER1A   | 1  | 11 | 0.08126000 | 13 | 0.05865897 | N/A    | N/A    | 0.5376 |
| 2571 GAD1     | 2  | 18 | 0.08493000 | 16 | 0.00050333 | N/A    | N/A    | 0.0081 |
| 7066 THPO     | 3  | 5  | 0.08517000 | 5  | 0.08875561 | N/A    | N/A    | 0.4438 |
| 3329 HSPD1    | 2  | 3  | 0.08637000 | 3  | 0.38364166 | 0.2374 | 0.6194 | 0.6804 |
| 931 MS4A1     | 11 | 24 | 0.08650000 | 23 | 0.12154489 | N/A    | N/A    | 0.8264 |
| 930 CD19      | 16 | 2  | 0.08982000 | 4  | 0.10640629 | N/A    | N/A    | 0.4256 |
| 959 CD40LG    | 23 | 3  | 0.09183000 | 0  | N/A        | N/A    | N/A    | N/A    |
| 3593 IL12B    | 5  | 13 | 0.09580000 | 13 | 0.11838941 | N/A    | N/A    | 0.6010 |
| 913 CD1E      | 1  | 7  | 0.09867000 | 6  | 0.32966840 | N/A    | N/A    | 0.8234 |
| 7850 IL1R2    | 2  | 59 | 0.10030000 | 56 | 0.20282707 | N/A    | N/A    | 0.6313 |
| 3590 IL11RA   | 9  | 7  | 0.10160000 | 7  | 0.46757543 | N/A    | N/A    | 0.9188 |
| 3570 IL6R     | 1  | 11 | 0.10220000 | 11 | 0.34415290 | N/A    | N/A    | 0.9805 |
| 3135 HLA-G    | 6  | 55 | 0.10430000 | 53 | 0.01735612 | 0.8761 | 0.9351 | 0.6223 |
| 928 CD9       | 12 | 14 | 0.11410000 | 15 | 0.06722542 | N/A    | N/A    | 0.2943 |
| 2572 GAD2     | 10 | 20 | 0.11510000 | 19 | 0.15447453 | N/A    | N/A    | 0.9423 |
| 5798 PTPRN    | 2  | 11 | 0.11590000 | 10 | 0.08729293 | N/A    | N/A    | 0.5463 |

|                |    |               |                   |               |        |
|----------------|----|---------------|-------------------|---------------|--------|
| 912 CD1D       | 1  | 13 0.11680000 | 9 0.22921918      | 0.8010 0.7293 | 0.8915 |
| 3675 ITGA3     | 17 | 12 0.11730000 | 14 0.14216198 N/A | N/A           | 0.9018 |
| 2812 GP1BB     | 22 | 7 0.11820000  | 8 0.05363252 N/A  | N/A           | 0.4291 |
| 3115 HLA-DPB1  | 6  | 46 0.11850000 | 45 0.09173278     | 0.9101 0.9970 | 0.9528 |
| 951 CD37       | 19 | 1 0.12140000  | 2 0.38552809 N/A  | N/A           | 0.7711 |
| 8288 EPX       | 17 | 13 0.13460000 | 14 0.02932384 N/A | N/A           | 0.4105 |
| 1081 CGA       | 6  | 13 0.14150000 | 13 0.12184838 N/A | N/A           | 0.6930 |
| 2811 GP1BA     | 17 | 6 0.14260000  | 6 0.00034829 N/A  | N/A           | 0.0021 |
| 3678 ITGA5     | 12 | 7 0.15340000  | 7 0.10310150 N/A  | N/A           | 0.7217 |
| 3452 IFNA21    | 9  | 7 0.15820000  | 7 0.00876988 N/A  | N/A           | 0.0614 |
| 958 CD40       | 20 | 17 0.15979999 | 17 0.09267406 N/A | N/A           | 0.7753 |
| 3804 KIR2DL3   | 19 | 2 0.16150001  | 1 0.20415477 N/A  | N/A           | 0.2042 |
| 3575 IL7R      | 5  | 14 0.16400000 | 11 0.22960608 N/A | N/A           | 0.8440 |
| 3589 IL11      | 19 | 9 0.16410001  | 9 0.01685509 N/A  | N/A           | 0.1473 |
| 911 CD1C       | 1  | 3 0.17090000  | 3 0.64598477      | 0.4301 0.9071 | 0.8040 |
| 3133 HLA-E     | 6  | 20 0.17410000 | 18 0.00322623     | 0.9051 0.9830 | 0.0581 |
| 941 CD80       | 3  | 28 0.17500000 | 26 0.00641026 N/A | N/A           | 0.1667 |
| 3552 IL1A      | 2  | 11 0.17980000 | 11 0.29459554 N/A | N/A           | 1.0000 |
| 1440 CSF3      | 17 | 5 0.18179999  | 4 0.09773626 N/A  | N/A           | 0.3909 |
| 3445 IFNA8     | 9  | 10 0.19690000 | 9 0.00425091 N/A  | N/A           | 0.0206 |
| 2814 GP5       | 3  | 5 0.19810000  | 5 0.00222208 N/A  | N/A           | 0.0072 |
| 1437 CSF2      | 5  | 6 0.20160000  | 6 0.50366765 N/A  | N/A           | 0.9761 |
| 3562 IL3       | 5  | 4 0.20160000  | 4 0.50366765 N/A  | N/A           | 0.9761 |
| 916 CD3E       | 11 | 6 0.20800000  | 6 0.37091404 N/A  | N/A           | 0.7497 |
| 7252 TSHB      | 1  | 8 0.24640000  | 8 0.35953981 N/A  | N/A           | 0.7611 |
| 3812 KIR3DL2   | 19 | 7 0.26230001  | 6 0.73844284 N/A  | N/A           | 0.9528 |
| 925 CD8A       | 2  | 5 0.27030000  | 6 0.52926630 N/A  | N/A           | 0.6926 |
| 3684 ITGAM     | 16 | 13 0.28830001 | 12 0.00024742 N/A | N/A           | 0.0030 |
| 910 CD1B       | 1  | 3 0.28990000  | 2 0.33460322      | 0.5425 0.6244 | 0.6144 |
| 3439 IFNA1     | 9  | 6 0.30800000  | 8 0.00900719 N/A  | N/A           | 0.0721 |
| 3565 IL4       | 5  | 8 0.33350000  | 8 0.18047601 N/A  | N/A           | 0.8975 |
| 3596 IL13      | 5  | 6 0.33350000  | 6 0.18047601 N/A  | N/A           | 0.8732 |
| 3811 KIR3DL1   | 19 | 3 0.41630000  | 3 0.87536788 N/A  | N/A           | 0.9287 |
| 3441 IFNA4     | 9  | 9 0.42120001  | 9 0.00493911 N/A  | N/A           | 0.0395 |
| 2056 EPO       | 7  | 1 0.47380000  | 1 0.65327185 N/A  | N/A           | 0.6533 |
| 3443 IFNA6     | 9  | 4 0.47870001  | 5 0.01933898 N/A  | N/A           | 0.0519 |
| 3558 IL2       | 4  | 3 0.53250003  | 3 0.01913758 N/A  | N/A           | 0.0574 |
| 3581 IL9R      | 23 | 0 N/A         | 0 N/A             | N/A           | N/A    |
| 1438 CSF2RA    | 23 | 0 N/A         | 0 N/A             | N/A           | N/A    |
| 3563 IL3RA     | 23 | 0 N/A         | 0 N/A             | N/A           | N/A    |
| 3802 KIR2DL1   | 19 | 0 N/A         | 0 N/A             | N/A           | N/A    |
| 57292 KIR2DL5A | 19 | 0 N/A         | 0 N/A             | N/A           | N/A    |
| 2209 FCGR1A    | 1  | 0 N/A         | 0 N/A             | N/A           | N/A    |