

## **SUPPLEMENTAL DATA**

**Table S1. Genes in each pathway selected for analysis.**

|           | <b>Gene</b> | <b>Chr</b> | <b>Start</b> | <b>End</b> | <b>bp</b> | <b>Pathway</b> |
|-----------|-------------|------------|--------------|------------|-----------|----------------|
| <b>1</b>  | AKR1C1      | 10         | 5000044      | 5022159    | 22115     | COX            |
| <b>2</b>  | AKR1C2      | 10         | 5029967      | 5060207    | 30240     | COX            |
| <b>3</b>  | AKR1C3      | 10         | 5077549      | 5149878    | 72329     | COX            |
| <b>4</b>  | CXCL8       | 4          | 74606223     | 74609433   | 3210      | COX            |
| <b>5</b>  | CYP19A1     | 15         | 51500254     | 51630807   | 130553    | COX            |
| <b>6</b>  | FIGF        | 23         | 15363713     | 15402498   | 38785     | COX            |
| <b>7</b>  | IL12A       | 3          | 159706537    | 159713806  | 7269      | COX            |
| <b>8</b>  | IL12B       | 5          | 158741791    | 158757481  | 15690     | COX            |
| <b>9</b>  | IL12RB1     | 19         | 18170411     | 18197697   | 27286     | COX            |
| <b>10</b> | IL12RB2     | 1          | 67773047     | 67862583   | 89536     | COX            |
| <b>11</b> | MGST1       | 12         | 16500076     | 16517343   | 17267     | COX            |
| <b>12</b> | MGST2       | 4          | 140586922    | 140661899  | 74977     | COX            |
| <b>13</b> | MGST3       | 1          | 165600098    | 165631033  | 30935     | COX            |
| <b>14</b> | MMP1        | 11         | 102660651    | 102668891  | 8240      | COX            |
| <b>15</b> | MMP2        | 16         | 55512883     | 55540603   | 27720     | COX            |
| <b>16</b> | MMP3        | 11         | 102706532    | 102714320  | 7788      | COX            |
| <b>17</b> | MMP9        | 20         | 44637547     | 44645200   | 7653      | COX            |
| <b>18</b> | PPARA       | 22         | 46546424     | 46639653   | 93229     | COX            |
| <b>19</b> | PPARD       | 6          | 35310335     | 35395955   | 85620     | COX            |
| <b>20</b> | PPARG       | 3          | 12328867     | 12475855   | 146988    | COX            |
| <b>21</b> | PTGDR       | 14         | 52734431     | 52743442   | 9011      | COX            |
| <b>22</b> | PTGDR2      | 11         | 60618413     | 60623444   | 5031      | COX            |
| <b>23</b> | PTGDS       | 9          | 139871956    | 139879887  | 7931      | COX            |
| <b>24</b> | PTGER1      | 19         | 14583278     | 14586174   | 2896      | COX            |
| <b>25</b> | PTGER2      | 14         | 52781113     | 52795324   | 14211     | COX            |
| <b>26</b> | PTGER3      | 1          | 71318036     | 71513491   | 195455    | COX            |
| <b>27</b> | PTGER4      | 5          | 40679600     | 40693837   | 14237     | COX            |
| <b>28</b> | PTGES       | 9          | 132500610    | 132515326  | 14716     | COX            |
| <b>29</b> | PTGES2      | 9          | 130882972    | 130890741  | 7769      | COX            |
| <b>30</b> | PTGFR       | 1          | 78769568     | 79005434   | 235866    | COX            |
| <b>31</b> | PTGIR       | 19         | 47123726     | 47128354   | 4628      | COX            |
| <b>32</b> | PTGIS       | 20         | 48123992     | 48184683   | 60691     | COX            |
| <b>33</b> | PTGS1       | 9          | 125133359    | 125157982  | 24623     | COX            |
| <b>34</b> | PTGS2       | 1          | 186640923    | 186649559  | 8636      | COX            |
| <b>35</b> | TBXA2R      | 19         | 3594504      | 3606658    | 12154     | COX            |
| <b>36</b> | TBXAS1      | 7          | 139476850    | 139720125  | 243275    | COX            |
| <b>37</b> | TIMP3       | 22         | 33197687     | 33259030   | 61343     | COX            |
| <b>38</b> | VEGFA       | 6          | 43737921     | 43754224   | 16303     | COX            |
| <b>39</b> | VEGFB       | 11         | 64002266     | 64006258   | 3992      | COX            |
| <b>40</b> | VEGFC       | 4          | 177604689    | 177713881  | 109192    | COX            |

**\*\* No Omni1M SNPs available**

|           | <b>Gene</b> | <b>Chr</b> | <b>Start</b> | <b>End</b> | <b>bp</b> | <b>Pathway</b> |
|-----------|-------------|------------|--------------|------------|-----------|----------------|
| <b>1</b>  | CCL11       | 17         | 32612761     | 32615143   | 2382      | cyto           |
| <b>2</b>  | CCL13       | 17         | 32683471     | 32685629   | 2158      | cyto           |
| <b>3</b>  | CCL14       | 17         | 34310327     | 34313764   | 3437      | cyto           |
| <b>4</b>  | CCL15       | 17         | 34310692     | 34328590   | 17898     | cyto           |
| <b>5</b>  | CCL16       | 17         | 34303529     | 34308532   | 5003      | cyto           |
| <b>6</b>  | CCL17       | 16         | 57438679     | 57449974   | 11295     | cyto           |
| <b>7</b>  | CCL18       | 17         | 34391640     | 34399392   | 7752      | cyto           |
| <b>8</b>  | CCL19       | 9          | 34689564     | 34691274   | 1710      | cyto           |
| <b>9</b>  | CCL2        | 17         | 32582313     | 32584222   | 1909      | cyto           |
| <b>10</b> | CCL20       | 2          | 228678558    | 228682272  | 3714      | cyto           |
| <b>11</b> | CCL21       | 9          | 34709002     | 34710121   | 1119      | cyto           |
| <b>12</b> | CCL22       | 16         | 57392684     | 57400102   | 7418      | cyto           |
| <b>13</b> | CCL23       | 17         | 34340097     | 34345005   | 4908      | cyto           |
| <b>14</b> | CCL24       | 7          | 75440983     | 75452674   | 11691     | cyto           |
| <b>15</b> | CCL25       | 19         | 8117651      | 8127534    | 9883      | cyto           |
| <b>16</b> | CCL26       | 7          | 75398851     | 75419214   | 20363     | cyto           |
| <b>17</b> | CCL27       | 9          | 34661893     | 34662689   | 796       | cyto           |
| <b>18</b> | CCL28       | 5          | 43376747     | 43412493   | 35746     | cyto           |
| <b>19</b> | CCL3        | 17         | 34415602     | 34417515   | 1913      | cyto           |
| <b>20</b> | CCL3L1      | 17         | 34522271     | 34625748   | 103477    | cyto           |
| <b>21</b> | CCL3L3      | 17         | 34522271     | 34625748   | 103477    | cyto           |
| <b>22</b> | CCL4        | 17         | 34431220     | 34433665   | 2445      | cyto           |
| <b>23</b> | CCL4L1      | 17         | 34538310     | 34540048   | 1738      | cyto           |
| <b>24</b> | CCL4L2      | 17         | 34639793     | 34641846   | 2053      | cyto           |
| <b>25</b> | CCL5        | 17         | 34198495     | 34207797   | 9302      | cyto           |
| <b>26</b> | CCL7        | 17         | 32597240     | 32599261   | 2021      | cyto           |
| <b>27</b> | CCL8        | 17         | 32646055     | 32648421   | 2366      | cyto           |
| <b>28</b> | CD40LG      | 23         | 135730352    | 135742549  | 12197     | cyto           |
| <b>29</b> | CD70        | 19         | 6583311      | 6591163    | 7852      | cyto           |
| <b>30</b> | CRP         | 1          | 159682079    | 159684379  | 2300      | cyto           |
| <b>31</b> | CXCL8       | 4          | 74606223     | 74609433   | 3210      | cyto           |
| <b>32</b> | CXCR1       | 2          | 219027568    | 219031718  | 4150      | cyto           |
| <b>33</b> | CXCR2       | 2          | 218990012    | 219001976  | 11964     | cyto           |
| <b>34</b> | EDA         | 23         | 68835911     | 69259319   | 423408    | cyto           |
| <b>35</b> | FASLG       | 1          | 172628154    | 172636014  | 7860      | cyto           |
| <b>36</b> | IFNA1       | 9          | 21440440     | 21441315   | 875       | cyto           |
| <b>37</b> | IFNA10      | 9          | 21206180     | 21207142   | 962       | cyto           |
| <b>38</b> | IFNA11P     | 9          | 21398613     | 21399138   | 525       | cyto           |
| <b>39</b> | IFNA12P     | 9          | 21403245     | 21403554   | 309       | cyto           |
| <b>40</b> | IFNA13      | 9          | 21367371     | 21368075   | 704       | cyto           |
| <b>41</b> | IFNA14      | 9          | 21239201     | 21239978   | 777       | cyto           |

|    |         |    |           |           |       |      |
|----|---------|----|-----------|-----------|-------|------|
| 42 | IFNA16  | 9  | 21216372  | 21217310  | 938   | cyto |
| 43 | IFNA17  | 9  | 21227254  | 21228240  | 986   | cyto |
| 44 | IFNA2   | 9  | 21384254  | 21385396  | 1142  | cyto |
| 45 | IFNA20P | 9  | 21321299  | 21321826  | 527   | cyto |
| 46 | IFNA21  | 9  | 21165636  | 21166659  | 1023  | cyto |
| 47 | IFNA22P | 9  | 21277687  | 21278562  | 875   | cyto |
| 48 | IFNA4   | 9  | 21186617  | 21187598  | 981   | cyto |
| 49 | IFNA5   | 9  | 21304325  | 21305311  | 986   | cyto |
| 50 | IFNA6   | 9  | 21349834  | 21351377  | 1543  | cyto |
| 51 | IFNA7   | 9  | 21201468  | 21202204  | 736   | cyto |
| 52 | IFNA8   | 9  | 21409146  | 21410184  | 1038  | cyto |
| 53 | IFNAR1  | 21 | 34696782  | 34732168  | 35386 | cyto |
| 54 | IFNAR2  | 21 | 34602206  | 34656082  | 53876 | cyto |
| 55 | IFNB1   | 9  | 21077104  | 21077943  | 839   | cyto |
| 56 | IFNG    | 12 | 68548549  | 68553523  | 4974  | cyto |
| 57 | IFNGR1  | 6  | 137518621 | 137540586 | 21965 | cyto |
| 58 | IFNGR2  | 21 | 34757299  | 34851655  | 94356 | cyto |
| 59 | IFNK    | 9  | 27524312  | 27526496  | 2184  | cyto |
| 60 | IFNL1   | 19 | 39786965  | 39789312  | 2347  | cyto |
| 61 | IFNL2   | 19 | 39759157  | 39760732  | 1575  | cyto |
| 62 | IFNL3   | 19 | 39734272  | 39735916  | 1644  | cyto |
| 63 | IFNLR1  | 1  | 24480647  | 24513765  | 33118 | cyto |
| 64 | IFNNP1  | 9  | 21058770  | 21059322  | 552   | cyto |
| 65 | IFNW1   | 9  | 21140631  | 21142144  | 1513  | cyto |
| 66 | IFNWP15 | 9  | 21178509  | 21179597  | 1088  | cyto |
| 67 | IFNWP18 | 9  | 21209191  | 21209898  | 707   | cyto |
| 68 | IFNWP19 | 9  | 21455438  | 21456067  | 629   | cyto |
| 69 | IFNWP2  | 9  | 21420233  | 21420812  | 579   | cyto |
| 70 | IFNWP5  | 9  | 21230820  | 21231852  | 1032  | cyto |
| 71 | IFNWP9  | 9  | 21190145  | 21191243  | 1098  | cyto |
| 72 | IL10    | 1  | 206940947 | 206945839 | 4892  | cyto |
| 73 | IL10RA  | 11 | 117857106 | 117872196 | 15090 | cyto |
| 74 | IL10RB  | 21 | 34638663  | 34669539  | 30876 | cyto |
| 75 | IL11    | 19 | 55875757  | 55881814  | 6057  | cyto |
| 76 | IL11RA  | 9  | 34652182  | 34661884  | 9702  | cyto |
| 77 | IL12A   | 3  | 159706537 | 159713806 | 7269  | cyto |
| 78 | IL12B   | 5  | 158741791 | 158757481 | 15690 | cyto |
| 79 | IL12RB1 | 19 | 18170411  | 18197697  | 27286 | cyto |
| 80 | IL12RB2 | 1  | 67773047  | 67862583  | 89536 | cyto |
| 81 | IL13    | 5  | 131991955 | 131996802 | 4847  | cyto |
| 82 | IL13RA1 | 23 | 117861535 | 117928502 | 66967 | cyto |
| 83 | IL13RA2 | 23 | 114238538 | 114254540 | 16002 | cyto |
| 84 | IL15    | 4  | 142557752 | 142655140 | 97388 | cyto |
| 85 | IL15RA  | 10 | 5991038   | 6020150   | 29112 | cyto |

|     |          |    |           |           |         |      |
|-----|----------|----|-----------|-----------|---------|------|
| 86  | IL16     | 15 | 81489219  | 81606399  | 117180  | cyto |
| 87  | IL17A    | 6  | 52051185  | 52055436  | 4251    | cyto |
| 88  | IL17B    | 5  | 148753830 | 148783765 | 29935   | cyto |
| 89  | IL17C    | 16 | 88705001  | 88706884  | 1883    | cyto |
| 90  | IL17D    | 13 | 21276266  | 21297237  | 20971   | cyto |
| 91  | IL17F    | 6  | 52101479  | 52109335  | 7856    | cyto |
| 92  | IL17RA   | 22 | 17565844  | 17596583  | 30739   | cyto |
| 93  | IL17RB   | 3  | 53880607  | 53899827  | 19220   | cyto |
| 94  | IL17RC   | 3  | 9958758   | 9975314   | 16556   | cyto |
| 95  | IL17RD   | 3  | 57124010  | 57204334  | 80324   | cyto |
| 96  | IL17RE   | 3  | 9944296   | 9958086   | 13790   | cyto |
| 97  | IL18     | 11 | 112013976 | 112034840 | 20864   | cyto |
| 98  | IL18BP   | 11 | 71709587  | 71716761  | 7174    | cyto |
| 99  | IL18R1   | 2  | 102927989 | 103015218 | 87229   | cyto |
| 100 | IL18RAP  | 2  | 103035149 | 103069025 | 33876   | cyto |
| 101 | IL19     | 1  | 206972215 | 207016325 | 44110   | cyto |
| 102 | IL1A     | 2  | 113531492 | 113542167 | 10675   | cyto |
| 103 | IL1B     | 2  | 113587328 | 113594480 | 7152    | cyto |
| 104 | IL1F10   | 2  | 113825547 | 113833427 | 7880    | cyto |
| 105 | IL1R1    | 2  | 102681004 | 102796334 | 115330  | cyto |
| 106 | IL1R2    | 2  | 102608306 | 102645006 | 36700   | cyto |
| 107 | IL1RAP   | 3  | 190231840 | 190375843 | 144003  | cyto |
| 108 | IL1RAPL1 | 23 | 28605516  | 29974840  | 1369324 | cyto |
| 109 | IL1RAPL2 | 23 | 103810996 | 105011822 | 1200826 | cyto |
| 110 | IL1RL1   | 2  | 102927962 | 102968497 | 40535   | cyto |
| 111 | IL1RL2   | 2  | 102803433 | 102856462 | 53029   | cyto |
| 112 | IL1RN    | 2  | 113864791 | 113891593 | 26802   | cyto |
| 113 | IL2      | 4  | 123372625 | 123377880 | 5255    | cyto |
| 114 | IL20     | 1  | 207038699 | 207042568 | 3869    | cyto |
| 115 | IL20RA   | 6  | 137321108 | 137366298 | 45190   | cyto |
| 116 | IL20RB   | 3  | 136665072 | 136729927 | 64855   | cyto |
| 117 | IL21     | 4  | 123533783 | 123542224 | 8441    | cyto |
| 118 | IL21R    | 16 | 27413686  | 27462115  | 48429   | cyto |
| 119 | IL22     | 12 | 68642025  | 68647284  | 5259    | cyto |
| 120 | IL22RA1  | 1  | 24446261  | 24469611  | 23350   | cyto |
| 121 | IL22RA2  | 6  | 137464968 | 137494785 | 29817   | cyto |
| 122 | IL23A    | 12 | 56732659  | 56734193  | 1534    | cyto |
| 123 | IL23R    | 1  | 67632083  | 67725662  | 93579   | cyto |
| 124 | IL24     | 1  | 207070788 | 207077484 | 6696    | cyto |
| 125 | IL25     | 14 | 23842018  | 23845612  | 3594    | cyto |
| 126 | IL26     | 12 | 68595129  | 68619571  | 24442   | cyto |
| 127 | IL27     | 16 | 28510683  | 28518155  | 7472    | cyto |
| 128 | IL27RA   | 19 | 14142262  | 14164026  | 21764   | cyto |
| 129 | IL2RA    | 10 | 6041829   | 6104333   | 62504   | cyto |

|     |         |    |           |           |        |      |
|-----|---------|----|-----------|-----------|--------|------|
| 130 | IL2RB   | 22 | 37515126  | 37571094  | 55968  | cyto |
| 131 | IL2RG   | 23 | 70327254  | 70331958  | 4704   | cyto |
| 132 | IL3     | 5  | 131396222 | 131398897 | 2675   | cyto |
| 133 | IL31    | 12 | 122656577 | 122658746 | 2169   | cyto |
| 134 | IL31RA  | 5  | 55147207  | 55218678  | 71471  | cyto |
| 135 | IL32    | 16 | 3115313   | 3119668   | 4355   | cyto |
| 136 | IL33    | 9  | 6215809   | 6257983   | 42174  | cyto |
| 137 | IL34    | 16 | 70680468  | 70694585  | 14117  | cyto |
| 138 | IL36A   | 2  | 113763038 | 113766221 | 3183   | cyto |
| 139 | IL36B   | 2  | 113779668 | 113810444 | 30776  | cyto |
| 140 | IL36G   | 2  | 113735596 | 113743249 | 7653   | cyto |
| 141 | IL36RN  | 2  | 113816215 | 113822321 | 6106   | cyto |
| 142 | IL37    | 2  | 113670548 | 113676459 | 5911   | cyto |
| 143 | IL3RA   | 23 | 1455509   | 1501581   | 46072  | cyto |
| 144 | IL4     | 5  | 132009678 | 132018368 | 8690   | cyto |
| 145 | IL4R    | 16 | 27325247  | 27376099  | 50852  | cyto |
| 146 | IL5     | 5  | 131877136 | 131892530 | 15394  | cyto |
| 147 | IL5RA   | 3  | 3111233   | 3168297   | 57064  | cyto |
| 148 | IL6     | 7  | 22765503  | 22771621  | 6118   | cyto |
| 149 | IL6R    | 1  | 154377669 | 154441926 | 64257  | cyto |
| 150 | IL6RP1  | 9  | 92843463  | 92845018  | 1555   | cyto |
| 151 | IL6ST   | 5  | 55230923  | 55290772  | 59849  | cyto |
| 152 | IL6STP1 | 17 | 15686308  | 15694947  | 8639   | cyto |
| 153 | IL7     | 8  | 79645009  | 79717758  | 72749  | cyto |
| 154 | IL7R    | 5  | 35852797  | 35879705  | 26908  | cyto |
| 155 | IL9     | 5  | 135227935 | 135231516 | 3581   | cyto |
| 156 | IL9R    | 23 | 155227246 | 155251689 | 24443  | cyto |
| 157 | IL9RP1  | 9  | 141032081 | 141036062 | 3981   | cyto |
| 158 | IL9RP2  | 10 | 126334    | 132205    | 5871   | cyto |
| 159 | IL9RP3  | 16 | 78928     | 86491     | 7563   | cyto |
| 160 | IL9RP4  | 18 | 79721     | 88561     | 8840   | cyto |
| 161 | JAK1    | 1  | 65298912  | 65432187  | 133275 | cyto |
| 162 | JAK2    | 9  | 4985033   | 5128183   | 143150 | cyto |
| 163 | JAK3    | 19 | 17935595  | 17958870  | 23275  | cyto |
| 164 | LTA     | 6  | 31539876  | 31542101  | 2225   | cyto |
| 165 | LTB     | 6  | 31548335  | 31550202  | 1867   | cyto |
| 166 | SOCS1   | 16 | 11348262  | 11350036  | 1774   | cyto |
| 167 | SOCS2   | 12 | 93963598  | 93969978  | 6380   | cyto |
| 168 | SOCS3   | 17 | 76352864  | 76356158  | 3294   | cyto |
| 169 | SOCS4   | 14 | 55493844  | 55516206  | 22362  | cyto |
| 170 | SOCS5   | 2  | 46926091  | 46990268  | 64177  | cyto |
| 171 | SOCS6   | 18 | 67956168  | 67997436  | 41268  | cyto |
| 172 | SOCS7   | 17 | 36508005  | 36556015  | 48010  | cyto |
| 173 | STAT1   | 2  | 191829084 | 191885686 | 56602  | cyto |

|     |          |    |           |           |        |      |
|-----|----------|----|-----------|-----------|--------|------|
| 174 | STAT2    | 12 | 56735384  | 56753909  | 18525  | cyto |
| 175 | STAT3    | 17 | 40465342  | 40540513  | 75171  | cyto |
| 176 | STAT4    | 2  | 191894302 | 192016322 | 122020 | cyto |
| 177 | STAT5A   | 17 | 40439565  | 40463961  | 24396  | cyto |
| 178 | STAT5B   | 17 | 40351186  | 40428725  | 77539  | cyto |
| 179 | STAT6    | 12 | 57489195  | 57505161  | 15966  | cyto |
| 180 | TGFB1    | 19 | 41836651  | 41859816  | 23165  | cyto |
| 181 | TGFB2    | 1  | 218519577 | 218617961 | 98384  | cyto |
| 182 | TGFB3    | 14 | 76424442  | 76448092  | 23650  | cyto |
| 183 | TGFBR1   | 9  | 101867412 | 101916585 | 49173  | cyto |
| 184 | TGFBR2   | 3  | 30647994  | 30735634  | 87640  | cyto |
| 185 | TMEM173  | 5  | 138855119 | 138862520 | 7401   | cyto |
| 186 | TNF      | 6  | 31543344  | 31546113  | 2769   | cyto |
| 187 | TNFSF10  | 3  | 172223298 | 172241297 | 17999  | cyto |
| 188 | TNFSF11  | 13 | 43136872  | 43182149  | 45277  | cyto |
| 189 | TNFSF12  | 17 | 7452208   | 7461207   | 8999   | cyto |
| 190 | TNFSF13  | 17 | 7461609   | 7464925   | 3316   | cyto |
| 191 | TNFSF13B | 13 | 108903588 | 108959385 | 55797  | cyto |
| 192 | TNFSF14  | 19 | 6664568   | 6670599   | 6031   | cyto |
| 193 | TNFSF15  | 9  | 117551600 | 117568406 | 16806  | cyto |
| 194 | TNFSF18  | 1  | 173009100 | 173020103 | 11003  | cyto |
| 195 | TNFSF4   | 1  | 173152873 | 173176452 | 23579  | cyto |
| 196 | TNFSF8   | 9  | 117656003 | 117692697 | 36694  | cyto |
| 197 | TNFSF9   | 19 | 6531010   | 6535939   | 4929   | cyto |
| 198 | TRADD    | 16 | 67188083  | 67193812  | 5729   | cyto |
|     |          |    |           |           |        |      |
| 1   | BTN1A1   | 6  | 26501449  | 26510650  | 9201   | ox   |
| 2   | BTN2A1   | 6  | 26458150  | 26476849  | 18699  | ox   |
| 3   | BTN2A2   | 6  | 26383324  | 26395102  | 11778  | ox   |
| 4   | BTN2A3P  | 6  | 26421619  | 26430816  | 9197   | ox   |
| 5   | BTN3A1   | 6  | 26402465  | 26415444  | 12979  | ox   |
| 6   | BTN3A2   | 6  | 26365459  | 26378546  | 13087  | ox   |
| 7   | BTN3A3   | 6  | 26440700  | 26453643  | 12943  | ox   |
| 8   | BTNL10   | 1  | 228698060 | 228699699 | 1639   | ox   |
| 9   | BTNL2    | 6  | 32362513  | 32374900  | 12387  | ox   |
| 10  | BTNL3    | 5  | 180415845 | 180433727 | 17882  | ox   |
| 11  | BTNL8    | 5  | 180326077 | 180377906 | 51829  | ox   |
| 12  | BTNL9    | 5  | 180467225 | 180488523 | 21298  | ox   |
| 13  | CAT      | 11 | 34460487  | 34493609  | 33122  | ox   |
| 14  | CYBA     | 16 | 88709698  | 88717457  | 7759   | ox   |
| 15  | CYBB     | 23 | 37639264  | 37672714  | 33450  | ox   |
| 16  | CYBRD1   | 2  | 172378757 | 172414643 | 35886  | ox   |
| 17  | CYP1A1   | 15 | 75011883  | 75017951  | 6068   | ox   |
| 18  | CYP1A2   | 15 | 75041184  | 75048941  | 7757   | ox   |

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|----|--------|----|-----------|-----------|--------|----|
| 19 | FOS    | 14 | 75745531  | 75748932  | 3401   | OX |
| 20 | FOSB   | 19 | 45971253  | 45978414  | 7161   | OX |
| 21 | FOSL1  | 11 | 65659692  | 65667997  | 8305   | OX |
| 22 | FOSL2  | 2  | 28615315  | 28640179  | 24864  | OX |
| 23 | GCLC   | 6  | 53362139  | 53481768  | 119629 | OX |
| 24 | GPX1   | 3  | 49394609  | 49396033  | 1424   | OX |
| 25 | GPX2   | 14 | 65405870  | 65409446  | 3576   | OX |
| 26 | GPX3   | 5  | 150400163 | 150408549 | 8386   | OX |
| 27 | GPX4   | 19 | 1103966   | 1106778   | 2812   | OX |
| 28 | GPX5   | 6  | 28493702  | 28502729  | 9027   | OX |
| 29 | GSR    | 8  | 30535584  | 30585352  | 49768  | OX |
| 30 | GSTA1  | 6  | 52656462  | 52668708  | 12246  | OX |
| 31 | GSTA2  | 6  | 52614897  | 52628367  | 13470  | OX |
| 32 | GSTA3  | 6  | 52761437  | 52774483  | 13046  | OX |
| 33 | GSTA4  | 6  | 52842751  | 52860176  | 17425  | OX |
| 34 | GSTA5  | 6  | 52696453  | 52710986  | 14533  | OX |
| 35 | GSTA6P | 6  | 52670244  | 52678260  | 8016   | OX |
| 36 | GSTA7P | 6  | 52604261  | 52609957  | 5696   | OX |
| 37 | GSTM1  | 1  | 110230436 | 110236367 | 5931   | OX |
| 38 | GSTM2  | 1  | 110210644 | 110252171 | 41527  | OX |
| 39 | GSTM3  | 1  | 110276554 | 110283660 | 7106   | OX |
| 40 | GSTM4  | 1  | 110198703 | 110217458 | 18755  | OX |
| 41 | GSTM5  | 1  | 110254877 | 110260888 | 6011   | OX |
| 42 | GSTO1  | 10 | 105995114 | 106027215 | 32101  | OX |
| 43 | GSTO2  | 10 | 106028631 | 106059176 | 30545  | OX |
| 44 | GSTO3P | 3  | 130546482 | 130547277 | 795    | OX |
| 45 | GSTP1  | 11 | 67351066  | 67354131  | 3065   | OX |
| 46 | GSTT1  | 22 | 24340736  | 24384680  | 43944  | OX |
| 47 | GSTT2  | 22 | 24322339  | 24326106  | 3767   | OX |
| 48 | GSTT2B | 22 | 24299601  | 24303373  | 3772   | OX |
| 49 | GSTZ1  | 14 | 77787230  | 77797939  | 10709  | OX |
| 50 | HIF1A  | 14 | 62162119  | 62214976  | 52857  | OX |
| 51 | HMOX1  | 22 | 35776354  | 35790207  | 13853  | OX |
| 52 | HPGDS  | 4  | 95219686  | 95264027  | 44341  | OX |
| 53 | JDP2   | 14 | 75894509  | 75939402  | 44893  | OX |
| 54 | JUN    | 1  | 59246465  | 59249785  | 3320   | OX |
| 55 | JUNB   | 19 | 12902310  | 12904124  | 1814   | OX |
| 56 | JUND   | 19 | 18390563  | 18392432  | 1869   | OX |
| 57 | MAOA   | 23 | 43515467  | 43606068  | 90601  | OX |
| 58 | MAPK1  | 22 | 22108789  | 22221970  | 113181 | OX |
| 59 | MAPK10 | 4  | 86936276  | 87515284  | 579008 | OX |
| 60 | MAPK11 | 22 | 50702142  | 50709196  | 7054   | OX |
| 61 | MAPK12 | 22 | 50683879  | 50700254  | 16375  | OX |
| 62 | MAPK13 | 6  | 36095586  | 36107842  | 12256  | OX |

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|-----|--------|----|-----------|-----------|--------|----|
| 63  | MAPK14 | 6  | 35995488  | 36079013  | 83525  | OX |
| 64  | MAPK15 | 8  | 144798429 | 144804631 | 6202   | OX |
| 65  | MAPK3  | 16 | 30125426  | 30134827  | 9401   | OX |
| 66  | MAPK4  | 18 | 48086484  | 48258196  | 171712 | OX |
| 67  | MAPK6  | 15 | 52311417  | 52358462  | 47045  | OX |
| 68  | MAPK7  | 17 | 19281034  | 19286857  | 5823   | OX |
| 69  | MAPK8  | 10 | 49514698  | 49647403  | 132705 | OX |
| 70  | MAPK9  | 5  | 179660594 | 179719071 | 58477  | OX |
| 71  | MGST1  | 12 | 16500076  | 16517343  | 17267  | OX |
| 72  | MGST2  | 4  | 140586922 | 140661899 | 74977  | OX |
| 73  | MGST3  | 1  | 165600098 | 165631033 | 30935  | OX |
| 74  | MT1X   | 16 | 56710102  | 56718108  | 8006   | OX |
| 75  | NFE2   | 12 | 54685900  | 54694791  | 8891   | OX |
| 76  | NFE2L1 | 17 | 46125686  | 46138906  | 13220  | OX |
| 77  | NFE2L2 | 2  | 178092323 | 178257425 | 165102 | OX |
| 78  | NFE2L3 | 7  | 26191860  | 26226745  | 34885  | OX |
| 79  | NFIL3  | 9  | 94171327  | 94186144  | 14817  | OX |
| 80  | NFIX   | 19 | 13106584  | 13209610  | 103026 | OX |
| 81  | NFKB1  | 4  | 103422486 | 103538459 | 115973 | OX |
| 82  | NFKB2  | 10 | 104154229 | 104162281 | 8052   | OX |
| 83  | NFKBIA | 14 | 35870717  | 35873952  | 3235   | OX |
| 84  | NFKBIB | 19 | 39390615  | 39399531  | 8916   | OX |
| 85  | NFKBID | 19 | 36379143  | 36393185  | 14042  | OX |
| 86  | NFKBIE | 6  | 44225919  | 44233500  | 7581   | OX |
| 87  | NFKBIZ | 3  | 101546835 | 101579866 | 33031  | OX |
| 88  | NOX4   | 11 | 89057524  | 89225392  | 167868 | OX |
| 89  | NQO1   | 16 | 69743304  | 69760707  | 17403  | OX |
| 90  | SOD1   | 21 | 33031935  | 33041244  | 9309   | OX |
| 91  | SOD2   | 6  | 160100148 | 160114353 | 14205  | OX |
| 92  | SOD3   | 4  | 24797085  | 24802464  | 5379   | OX |
| 93  | SP1    | 12 | 53773979  | 53810221  | 36242  | OX |
| 94  | SP2    | 17 | 45973516  | 46006323  | 32807  | OX |
| 95  | SP3    | 2  | 174771187 | 174830430 | 59243  | OX |
| 96  | SP4    | 7  | 21467652  | 21554440  | 86788  | OX |
| 97  | SP5    | 2  | 171571861 | 171574588 | 2727   | OX |
| 98  | SP6    | 17 | 45922280  | 45933240  | 10960  | OX |
| 99  | SP7    | 12 | 53720362  | 53729537  | 9175   | OX |
| 100 | SP8    | 7  | 20823906  | 20826508  | 2602   | OX |
| 101 | SP9    | 2  | 175199674 | 175203220 | 3546   | OX |
| 102 | STAP1  | 4  | 68424446  | 68473055  | 48609  | OX |
| 103 | STAT1  | 2  | 191829084 | 191885686 | 56602  | OX |
| 104 | STAT2  | 12 | 56735384  | 56753909  | 18525  | OX |
| 105 | STAT3  | 17 | 40465342  | 40540513  | 75171  | OX |
| 106 | STAT4  | 2  | 191894302 | 192016322 | 122020 | OX |

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|-----|----------|----|-----------|-----------|--------|--------|
| 107 | STAT5A   | 17 | 40439565  | 40463961  | 24396  | ox     |
| 108 | STAT5B   | 17 | 40351186  | 40428725  | 77539  | ox     |
| 109 | STAT6    | 12 | 57489195  | 57505161  | 15966  | ox     |
| 110 | TP53     | 17 | 7565257   | 7590856   | 25599  | ox     |
| 111 | TXN      | 9  | 113006091 | 113018920 | 12829  | ox     |
| 112 | TXN2     | 22 | 36863083  | 36878077  | 14994  | ox     |
| 113 | TXNRD1   | 12 | 104609559 | 104744062 | 134503 | ox     |
| 114 | TXNRD2   | 22 | 19863040  | 19929341  | 66301  | ox     |
| 115 | TXNRD3   | 3  | 126326337 | 126375056 | 48719  | ox     |
| 116 | UGT1A6   | 2  | 234600253 | 234681949 | 81696  | ox     |
| 117 | XDH      | 2  | 31557187  | 31637581  | 80394  | ox     |
|     |          |    |           |           |        |        |
| 1   | HLA-A    | 6  | 29910247  | 29913661  | 3414   | immune |
| 2   | HLA-B    | 6  | 31321649  | 31324989  | 3340   | immune |
| 3   | HLA-C    | 6  | 31236526  | 31239907  | 3381   | immune |
| 4   | HLA-DMA  | 6  | 32916391  | 32920900  | 4509   | immune |
| 5   | HLA-DMB  | 6  | 32902406  | 32908847  | 6441   | immune |
| 6   | HLA-DOA  | 6  | 32971959  | 32977389  | 5430   | immune |
| 7   | HLA-DOB  | 6  | 32780540  | 32784825  | 4285   | immune |
| 8   | HLA-DPA1 | 6  | 33032346  | 33048555  | 16209  | immune |
| 9   | HLA-DPA2 | 6  | 33059259  | 33061091  | 1832   | immune |
| 10  | HLA-DPA3 | 6  | 33098974  | 33099120  | 146    | immune |
| 11  | HLA-DPB1 | 6  | 33043703  | 33057473  | 13770  | immune |
| 12  | HLA-DPB2 | 6  | 33080228  | 33101269  | 21041  | immune |
| 13  | HLA-DQA1 | 6  | 32605169  | 32612152  | 6983   | immune |
| 14  | HLA-DQA2 | 6  | 32709156  | 32714664  | 5508   | immune |
| 15  | HLA-DQB1 | 6  | 32627241  | 32634466  | 7225   | immune |
| 16  | HLA-DQB2 | 6  | 32723837  | 32731330  | 7493   | immune |
| 17  | HLA-DRA  | 6  | 32407619  | 32412823  | 5204   | immune |
| 18  | HLA-DRB1 | 6  | 32546546  | 32557613  | 11067  | immune |
| 19  | HLA-DRB5 | 6  | 32485120  | 32498064  | 12944  | immune |
| 20  | HLA-DRB6 | 6  | 32520490  | 32527779  | 7289   | immune |
| 21  | HLA-DRB9 | 6  | 32427597  | 32427866  | 269    | immune |
| 22  | HLA-E    | 6  | 30457183  | 30461982  | 4799   | immune |
| 23  | HLA-F    | 6  | 29691117  | 29695073  | 3956   | immune |
| 24  | HLA-G    | 6  | 29794756  | 29798899  | 4143   | immune |
| 25  | LTA      | 6  | 31539876  | 31542101  | 2225   | immune |
| 26  | LTB      | 6  | 31548335  | 31550202  | 1867   | immune |
| 27  | MICA     | 6  | 31367561  | 31383090  | 15529  | immune |
| 28  | MICB     | 6  | 31462054  | 31478901  | 16847  | immune |
| 29  | TAP1     | 6  | 32812986  | 32821755  | 8769   | immune |
| 30  | TAP2     | 6  | 32789610  | 32806547  | 16937  | immune |
| 31  | TAPBP    | 6  | 33267471  | 33282164  | 14693  | immune |
| 32  | TNF      | 6  | 31543344  | 31546113  | 2769   | immune |

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| 1  | AGER   | 6  | 32148745  | 32152099  | 3354   | nfkb |
| 2  | BCL10  | 1  | 85731464  | 85743771  | 12307  | nfkb |
| 3  | BCL3   | 19 | 45250962  | 45263301  | 12339  | nfkb |
| 4  | BIRC2  | 11 | 102217966 | 102249394 | 31428  | nfkb |
| 5  | BIRC3  | 11 | 102188194 | 102208448 | 20254  | nfkb |
| 6  | CASP4  | 11 | 104813594 | 104840163 | 26569  | nfkb |
| 7  | CCL2   | 17 | 32582313  | 32584222  | 1909   | nfkb |
| 8  | CCL3   | 17 | 34415602  | 34417515  | 1913   | nfkb |
| 9  | CCL5   | 17 | 34198495  | 34207797  | 9302   | nfkb |
| 10 | CD200  | 3  | 112051915 | 112081659 | 29744  | nfkb |
| 11 | CD27   | 12 | 6554051   | 6560884   | 6833   | nfkb |
| 12 | CD40   | 20 | 44746911  | 44758502  | 11591  | nfkb |
| 13 | CD40LG | 23 | 135730352 | 135742549 | 12197  | nfkb |
| 14 | CD70   | 19 | 6583311   | 6591163   | 7852   | nfkb |
| 15 | CDC37  | 19 | 10501809  | 10514271  | 12462  | nfkb |
| 16 | CFB    | 6  | 31913721  | 31919861  | 6140   | nfkb |
| 17 | CFLAR  | 2  | 201980827 | 202029033 | 48206  | nfkb |
| 18 | CHUK   | 10 | 101948055 | 101989376 | 41321  | nfkb |
| 19 | CXCL1  | 4  | 74735110  | 74736959  | 1849   | nfkb |
| 20 | CXCL2  | 4  | 74962764  | 74965010  | 2246   | nfkb |
| 21 | DDX58  | 9  | 32455300  | 32526322  | 71022  | nfkb |
| 22 | F3     | 1  | 94994781  | 95007356  | 12575  | nfkb |
| 23 | FAS    | 10 | 90749226  | 90775542  | 26316  | nfkb |
| 24 | FASLG  | 1  | 172628154 | 172636014 | 7860   | nfkb |
| 25 | FKBP5  | 6  | 35541362  | 35696358  | 154996 | nfkb |
| 26 | ICAM1  | 19 | 10381517  | 10397291  | 15774  | nfkb |
| 27 | IFNB1  | 9  | 21077104  | 21077943  | 839    | nfkb |
| 28 | IKBKB  | 8  | 42128829  | 42189965  | 61136  | nfkb |
| 29 | IKBKE  | 1  | 206643791 | 206670223 | 26432  | nfkb |
| 30 | IKBKG  | 23 | 153769414 | 153796782 | 27368  | nfkb |
| 31 | IL12B  | 5  | 158741791 | 158757481 | 15690  | nfkb |
| 32 | IL1B   | 2  | 113587328 | 113594480 | 7152   | nfkb |
| 33 | IL6    | 7  | 22765503  | 22771621  | 6118   | nfkb |
| 34 | IRAK1  | 23 | 153275951 | 153285431 | 9480   | nfkb |
| 35 | IRAK2  | 3  | 10206549  | 10285427  | 78878  | nfkb |
| 36 | IRAK3  | 12 | 66582978  | 66648392  | 65414  | nfkb |
| 37 | IRAK4  | 12 | 44152747  | 44183346  | 30599  | nfkb |
| 38 | IRF1   | 5  | 131817301 | 131826490 | 9189   | nfkb |
| 39 | IRF3   | 19 | 50162829  | 50169132  | 6303   | nfkb |
| 40 | IRF7   | 11 | 612555    | 615999    | 3444   | nfkb |
| 41 | LTA    | 6  | 31539876  | 31542101  | 2225   | nfkb |
| 42 | LTB    | 6  | 31548335  | 31550202  | 1867   | nfkb |
| 43 | MAP3K7 | 6  | 91223292  | 91296764  | 73472  | nfkb |

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|----|---------|----|-----------|-----------|--------|------|
| 44 | MCC     | 5  | 112357796 | 112824527 | 466731 | nfkb |
| 45 | MMP9    | 20 | 44637547  | 44645200  | 7653   | nfkb |
| 46 | MUL1    | 1  | 20825943  | 20834654  | 8711   | nfkb |
| 47 | MYD88   | 3  | 38179969  | 38184513  | 4544   | nfkb |
| 48 | NFKB1   | 4  | 103422486 | 103538459 | 115973 | nfkb |
| 49 | NFKB2   | 10 | 104154229 | 104162281 | 8052   | nfkb |
| 50 | NFKBIA  | 14 | 35870717  | 35873952  | 3235   | nfkb |
| 51 | NFKBIB  | 19 | 39390615  | 39399531  | 8916   | nfkb |
| 52 | NFKBID  | 19 | 36379143  | 36393185  | 14042  | nfkb |
| 53 | NFKBIE  | 6  | 44225919  | 44233500  | 7581   | nfkb |
| 54 | NFKBIZ  | 3  | 101546835 | 101579866 | 33031  | nfkb |
| 55 | NGFR    | 17 | 47572655  | 47592379  | 19724  | nfkb |
| 56 | NKAP    | 23 | 119059014 | 119077735 | 18721  | nfkb |
| 57 | NKAPL   | 6  | 28227098  | 28228736  | 1638   | nfkb |
| 58 | NKIRAS1 | 3  | 23933151  | 23988082  | 54931  | nfkb |
| 59 | NKIRAS2 | 17 | 40169038  | 40177659  | 8621   | nfkb |
| 60 | NKRF    | 23 | 118722300 | 118739858 | 17558  | nfkb |
| 61 | NOS2    | 17 | 26083792  | 26127555  | 43763  | nfkb |
| 62 | RELA    | 11 | 65421070  | 65430443  | 9373   | nfkb |
| 63 | RELB    | 19 | 45504695  | 45541452  | 36757  | nfkb |
| 64 | RIPK1   | 6  | 3064092   | 3115421   | 51329  | nfkb |
| 65 | SELE    | 1  | 169691781 | 169703220 | 11439  | nfkb |
| 66 | SELP    | 1  | 169558037 | 169599380 | 41343  | nfkb |
| 67 | SELPLG  | 12 | 109015686 | 109027670 | 11984  | nfkb |
| 68 | SIKE1   | 1  | 115312100 | 115323306 | 11206  | nfkb |
| 69 | SOD2    | 6  | 160100148 | 160114353 | 14205  | nfkb |
| 70 | SPAG9   | 17 | 49039535  | 49198226  | 158691 | nfkb |
| 71 | TAB1    | 22 | 39795746  | 39913596  | 117850 | nfkb |
| 72 | TAB2    | 6  | 149639063 | 149732749 | 93686  | nfkb |
| 73 | TAB3    | 23 | 30845559  | 30993201  | 147642 | nfkb |
| 74 | TANK    | 2  | 161993419 | 162092732 | 99313  | nfkb |
| 75 | TBK1    | 12 | 64845900  | 64895886  | 49986  | nfkb |
| 76 | TBKBP1  | 17 | 45772630  | 45789427  | 16797  | nfkb |
| 77 | TICAM1  | 19 | 4815939   | 4831737   | 15798  | nfkb |
| 78 | TICAM2  | 5  | 114914340 | 114961870 | 47530  | nfkb |
| 79 | TIRAP   | 11 | 126152960 | 126168740 | 15780  | nfkb |
| 80 | TLR1    | 4  | 38792298  | 38858438  | 66140  | nfkb |
| 81 | TLR10   | 4  | 38773860  | 38784611  | 10751  | nfkb |
| 82 | TLR2    | 4  | 154624015 | 154627238 | 3223   | nfkb |
| 83 | TLR3    | 4  | 186990306 | 187006255 | 15949  | nfkb |
| 84 | TLR4    | 9  | 120466610 | 120479149 | 12539  | nfkb |
| 85 | TLR6    | 4  | 38828223  | 38858438  | 30215  | nfkb |
| 86 | TLR8    | 23 | 12924739  | 12941288  | 16549  | nfkb |
| 87 | TLR9    | 3  | 52255096  | 52260179  | 5083   | nfkb |

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|-----|-----------|----|-----------|-----------|--------|------|
| 88  | TNF       | 6  | 31543344  | 31546113  | 2769   | nfkb |
| 89  | TNFAIP3   | 6  | 138188351 | 138204449 | 16098  | nfkb |
| 90  | TNFRSF10A | 8  | 23048064  | 23082639  | 34575  | nfkb |
| 91  | TNFRSF10B | 8  | 22877653  | 22926692  | 49039  | nfkb |
| 92  | TNFRSF10C | 8  | 22941868  | 22974950  | 33082  | nfkb |
| 93  | TNFRSF10D | 8  | 22993101  | 23021543  | 28442  | nfkb |
| 94  | TNFRSF11A | 18 | 59992520  | 60054899  | 62379  | nfkb |
| 95  | TNFRSF12A | 16 | 3070313   | 3072384   | 2071   | nfkb |
| 96  | TNFRSF13B | 17 | 16836379  | 16875402  | 39023  | nfkb |
| 97  | TNFRSF13C | 22 | 42321045  | 42322822  | 1777   | nfkb |
| 98  | TNFRSF14  | 1  | 2487078   | 2497061   | 9983   | nfkb |
| 99  | TNFRSF17  | 16 | 12058964  | 12061925  | 2961   | nfkb |
| 100 | TNFRSF18  | 1  | 1138888   | 1142071   | 3183   | nfkb |
| 101 | TNFRSF1A  | 12 | 6437924   | 6451261   | 13337  | nfkb |
| 102 | TNFRSF1B  | 1  | 12227060  | 12269285  | 42225  | nfkb |
| 103 | TNFRSF21  | 6  | 47199268  | 47277641  | 78373  | nfkb |
| 104 | TNFRSF4   | 1  | 1146706   | 1149518   | 2812   | nfkb |
| 105 | TNFRSF8   | 1  | 12123434  | 12204264  | 80830  | nfkb |
| 106 | TNFRSF9   | 1  | 7979907   | 8000926   | 21019  | nfkb |
| 107 | TNFSF10   | 3  | 172223298 | 172241297 | 17999  | nfkb |
| 108 | TNFSF11   | 13 | 43136872  | 43182149  | 45277  | nfkb |
| 109 | TNFSF13   | 17 | 7461609   | 7464925   | 3316   | nfkb |
| 110 | TNFSF13B  | 13 | 108903588 | 108959385 | 55797  | nfkb |
| 111 | TNFSF14   | 19 | 6664568   | 6670599   | 6031   | nfkb |
| 112 | TNFSF4    | 1  | 173152873 | 173176452 | 23579  | nfkb |
| 113 | TNFSF8    | 9  | 117656003 | 117692697 | 36694  | nfkb |
| 114 | TOLLIP    | 11 | 1295601   | 1330852   | 35251  | nfkb |
| 115 | TONSL     | 8  | 145654163 | 145669871 | 15708  | nfkb |
| 116 | TRAF1     | 9  | 123664671 | 123691047 | 26376  | nfkb |
| 117 | TRAF2     | 9  | 139776364 | 139821059 | 44695  | nfkb |
| 118 | TRAF3     | 14 | 103243816 | 103372628 | 128812 | nfkb |
| 119 | TRAF4     | 17 | 27071036  | 27077974  | 6938   | nfkb |
| 120 | TRAF5     | 1  | 211499957 | 211548288 | 48331  | nfkb |
| 121 | TRAF6     | 11 | 36510723  | 36531822  | 21099  | nfkb |
| 122 | TRAF7     | 16 | 2205766   | 2228130   | 22364  | nfkb |
| 123 | TRAIP     | 3  | 49866034  | 49894007  | 27973  | nfkb |
| 124 | TRIM25    | 17 | 54965270  | 54991409  | 26139  | nfkb |
| 125 | VCAM1     | 1  | 101185305 | 101204601 | 19296  | nfkb |

**Table S2. Gene-level associations with risk of EA.**

|           | <b>Gene</b> |                                                        | <b>Variants<sup>a</sup></b> | <b>PCs<sup>b</sup></b> | <b>P<sup>c</sup></b> | <b>q<sup>d</sup></b> |
|-----------|-------------|--------------------------------------------------------|-----------------------------|------------------------|----------------------|----------------------|
| <b>1</b>  | MGST1       | Microsomal glutathione S-transferase 1                 | 36                          | 3                      | 0.07                 | 0.39                 |
| <b>2</b>  | TBXAS1      | Thromboxane A synthase 1 (platelet)                    | 176                         | 5                      | 0.17                 | 0.39                 |
| <b>3</b>  | IL12RB2     | Interleukin 12 receptor, beta 2                        | 29                          | 3                      | 0.21                 | 0.39                 |
| <b>4</b>  | PTGER1      | Prostaglandin E receptor 1 (subtype EP1), 42kDa        | 10                          | 3                      | 0.22                 | 0.39                 |
| <b>5</b>  | PTGER3      | Prostaglandin E receptor 3 (subtype EP3)               | 185                         | 4                      | 0.22                 | 0.39                 |
| <b>6</b>  | MMP2        | Matrix metalloproteinase 2                             | 25                          | 3                      | 0.25                 | 0.39                 |
| <b>7</b>  | PPARG       | Peroxisome proliferator-activated receptor gamma       | 121                         | 3                      | 0.27                 | 0.39                 |
| <b>8</b>  | PPARD       | Peroxisome proliferator-activated receptor delta       | 67                          | 3                      | 0.48                 | 0.60                 |
| <b>9</b>  | IL12B       | Interleukin 12B                                        | 31                          | 3                      | 0.77                 | 0.85                 |
| <b>10</b> | CYP19A1     | Cytochrome P450, family 19, subfamily A, polypeptide 1 | 50                          | 3                      | 0.91                 | 0.91                 |

<sup>a</sup>Total number of SNPs selected for analysis of the indicated gene; <sup>b</sup>Gene-level principal components (PCs) included in the logistic regression model; <sup>c</sup>Likelihood ratio P value; <sup>d</sup>False discovery rate (FDR) q value.

**Table S3. Assessment of *MGST1* SNPs (n=14, Table 4) and risk of EA**

|    | SNP       | Chr | Position | Alleles <sup>a</sup> | Controls |                  | EA cases |                  | OR <sup>c</sup> | 95% CI      | P     | q <sup>d</sup> |
|----|-----------|-----|----------|----------------------|----------|------------------|----------|------------------|-----------------|-------------|-------|----------------|
|    |           |     |          |                      | N        | MAF <sup>b</sup> | N        | MAF <sup>b</sup> |                 |             |       |                |
| 1  | rs4149195 | 12  | 16512128 | G/A                  | 3206     | 0.109            | 2495     | 0.12             | 1.17            | (1.03-1.32) | 0.016 | 0.04           |
| 2  | rs2239676 | 12  | 16500448 | G/C                  | 3206     | 0.096            | 2495     | 0.111            | 1.17            | (1.03-1.33) | 0.018 | 0.04           |
| 3  | rs3852575 | 12  | 16516260 | T/C                  | 3206     | 0.304            | 2495     | 0.331            | 1.11            | (1.02-1.21) | 0.019 | 0.04           |
| 4  | rs4149204 | 12  | 16515062 | C/T                  | 3206     | 0.307            | 2495     | 0.334            | 1.11            | (1.02-1.20) | 0.020 | 0.04           |
| 5  | rs3759207 | 12  | 16516710 | C/T                  | 3206     | 0.31             | 2495     | 0.335            | 1.10            | (1.01-1.20) | 0.023 | 0.04           |
| 6  | rs4149207 | 12  | 16517491 | T/C                  | 3206     | 0.307            | 2495     | 0.332            | 1.10            | (1.01-1.20) | 0.023 | 0.04           |
| 7  | rs7312090 | 12  | 16515945 | T/C                  | 3206     | 0.304            | 2495     | 0.331            | 1.10            | (1.01-1.20) | 0.024 | 0.04           |
| 8  | rs4149208 | 12  | 16517581 | T/C                  | 3206     | 0.307            | 2495     | 0.332            | 1.10            | (1.01-1.20) | 0.025 | 0.04           |
| 9  | rs4149203 | 12  | 16514921 | T/C                  | 3206     | 0.308            | 2495     | 0.334            | 1.10            | (1.01-1.19) | 0.034 | 0.05           |
| 10 | rs2975138 | 12  | 16501551 | A/G                  | 3206     | 0.237            | 2495     | 0.253            | 1.10            | (1.00-1.21) | 0.041 | 0.06           |
| 11 | rs4149187 | 12  | 16500071 | G/C                  | 3206     | 0.098            | 2495     | 0.111            | 1.14            | (1.00-1.29) | 0.047 | 0.06           |
| 12 | rs2239675 | 12  | 16500265 | G/A                  | 3206     | 0.172            | 2495     | 0.185            | 1.09            | (0.98-1.21) | 0.114 | 0.13           |
| 13 | rs4149186 | 12  | 16498700 | C/A                  | 3206     | 0.215            | 2495     | 0.228            | 1.07            | (0.97-1.18) | 0.174 | 0.19           |
| 14 | rs2239677 | 12  | 16500680 | A/G                  | 3206     | 0.021            | 2495     | 0.024            | 1.18            | (0.90-1.54) | 0.232 | 0.23           |

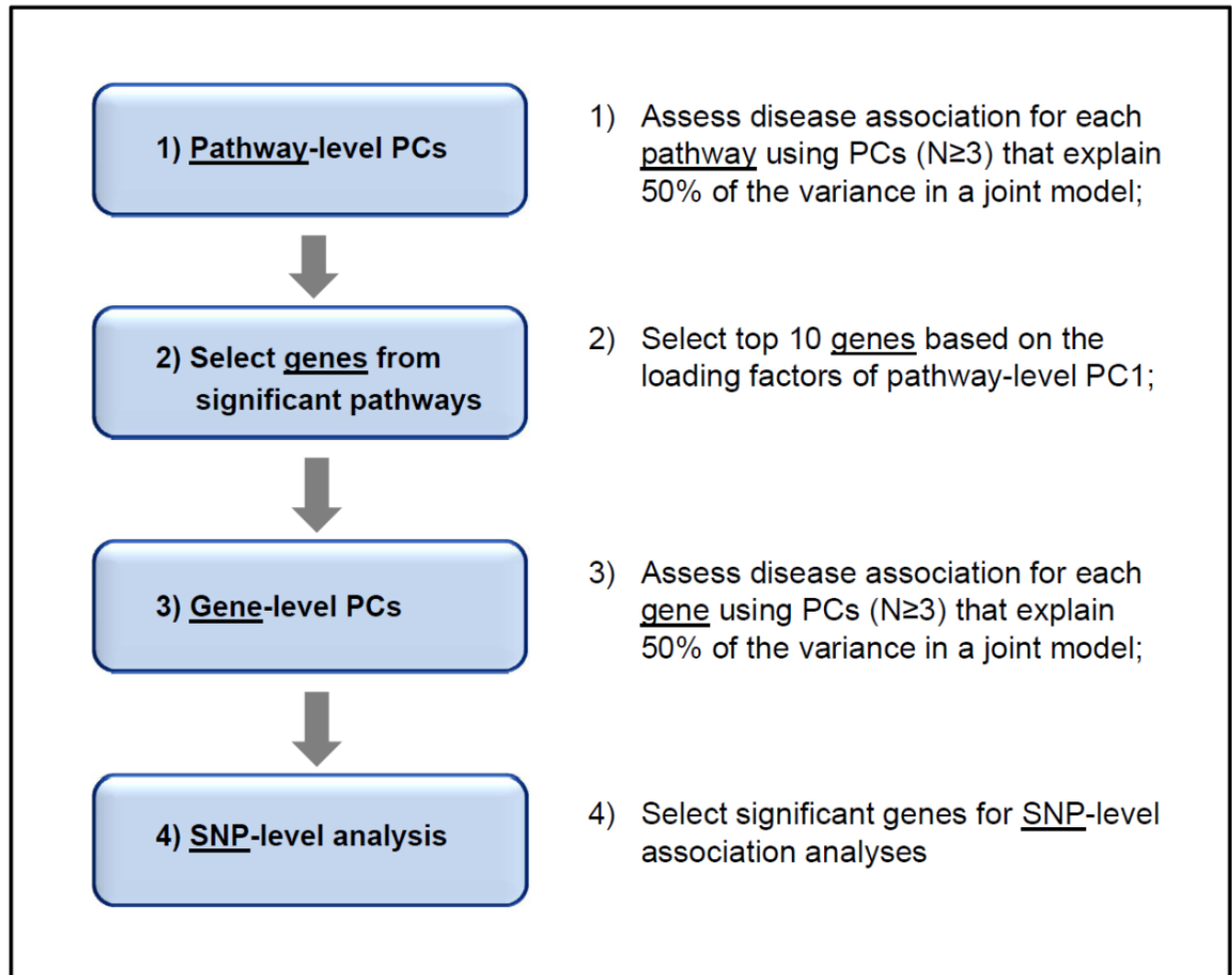
<sup>a</sup>Minor/major alleles, <sup>b</sup>Minor allele frequency, <sup>c</sup>Odds ratio, adjusted for age, sex, PC<sub>AIM,1</sub>-PC<sub>AIM,4</sub> using additive model (per-allele), <sup>d</sup>False discovery rate (FDR)

**Table S4. Functional annotations for top *MGST1* SNPs associated with risk of BE.**

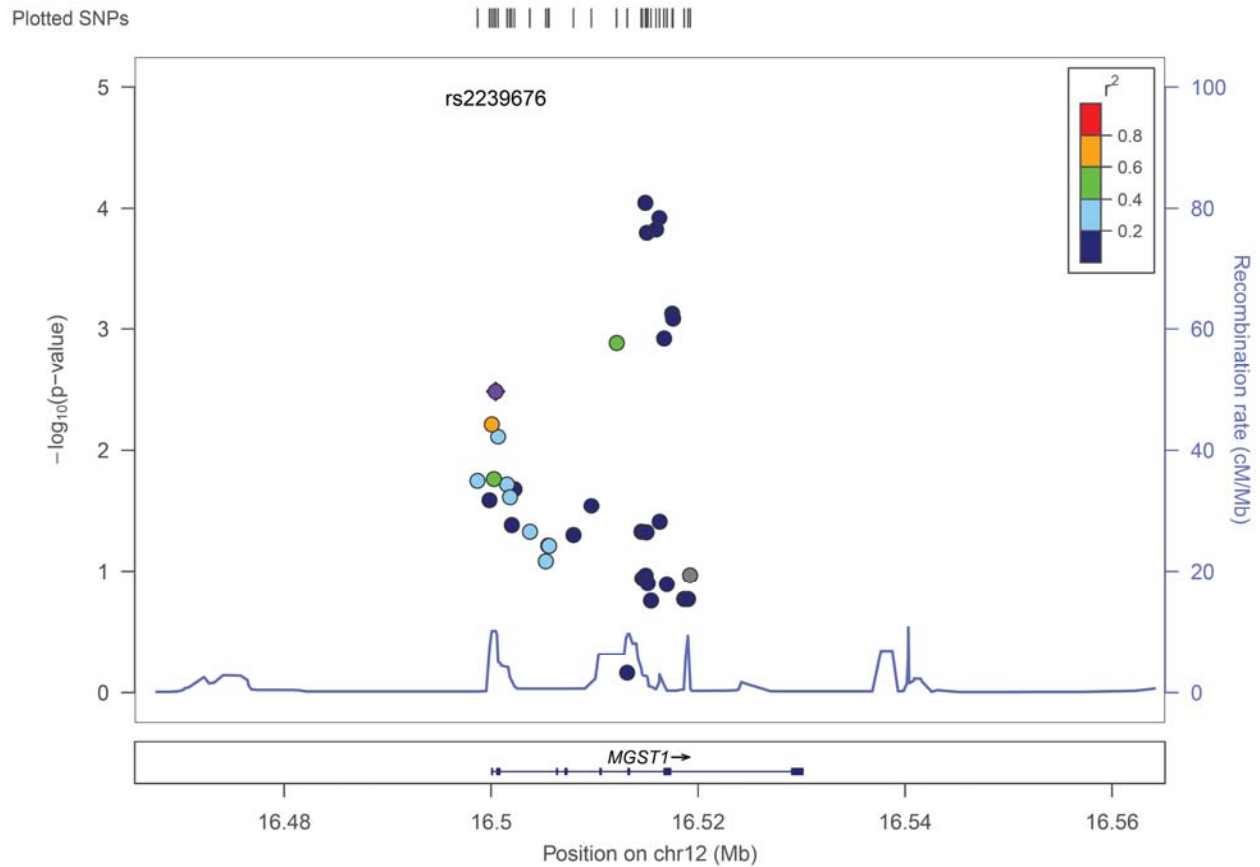
| SNP       | dbSNP <sup>a</sup> | Motifs <sup>b</sup>                       | eQTL <sup>c</sup>                                                                        | DNase <sup>d</sup>  |
|-----------|--------------------|-------------------------------------------|------------------------------------------------------------------------------------------|---------------------|
| rs4149203 | INT                | Pou5f1, Sox                               | Whole_blood ( <i>MGST1</i> ),<br>Cerebellum ( <i>MPPE1</i> ),<br>Adrenal (RP11-424M22.3) | Fetal Adrenal Gland |
| rs3852575 | INT                | BRCA1, Foxp1, Hic1,<br>NF-I, RREB-1, TATA | Whole blood ( <i>MGST1</i> ),<br>Cerebellum ( <i>MPPE1</i> ),<br>Adrenal (RP11-424M22.3) | .                   |
| rs7312090 | INT                | .                                         | Whole blood ( <i>MGST1</i> ),<br>Cerebellum ( <i>MPPE1</i> ),<br>Adrenal (RP11-424M22.3) | .                   |
| rs4149204 | INT                | NRSF, Sin3Ak-20                           | Whole blood ( <i>MGST1</i> ),<br>Cerebellum ( <i>MPPE1</i> ),<br>Adrenal (RP11-424M22.3) | .                   |

<sup>a</sup>dbSNP functional annotation (INT: intronic), <sup>b</sup>Predicted binding motifs altered, <sup>c</sup>Expression quantitative trait locus (eQTL), <sup>d</sup>DNase hypersensitivity (ENCODE). Annotations extracted from HaploReg v4 (<http://www.broadinstitute.org/mammals/haploreg>).

Figure S1. Overview of principal components-based approach for pathway-level and gene-level association analyses.



**Figure S2. Regional association plot for n=36 genotyped SNPs at the *MGST1* gene locus.** The top-ranked variant among a cluster of six 5' SNPs associated with risk of BE (FDR  $q < 0.05$ ) is shown in solid purple. SNPs are ordered by genomic location. The color scheme indicates LD between the top-ranked SNP and other SNPs in the region using  $r^2$  values calculated from the 1000 Genomes Project. The y axis shows  $-\log_{10}(P)$  values computed from 3295 BE cases and 3204 controls. The recombination rate from CEU (Utah residents of Northern and Western European ancestry) HapMap data (right y axis) is shown in light blue.



**Figure S3. NIH Roadmap Epigenome Atlas characterization of the *MGST1* genomic locus.** Multiple transcript variants for *MGST1* are indicated (nc, non-coding). Patterns of DNA methylation (Bisulfite-Seq) and key histone modifications (H3K27me3, H3K4me3, H3K9me3) in esophageal tissue are displayed. The locus is segmented into regions of “integrative chromatin states” based on a Hidden Markov Model (HMM)-based algorithm trained on 127 epigenomes (<http://www.roadmapepigenomics.org/>). Red: Active TSS, Orange Red: Flanking Active TSS, LimeGreen: Transcr. at gene 5' and 3', Green: Strong transcription, DarkGreen: Weak transcription, GreenYellow: Genic enhancers, Yellow: Enhancers, Medium Aquamarine: ZNF genes & repeats, PaleTurquoise: Heterochromatin, IndianRed: Bivalent/Poised TSS, DarkSalmon: Flanking Bivalent TSS/Enh, DarkKhaki: Bivalent Enhancer, Silver: Repressed PolyComb, Gainsboro: Weak Repressed PolyComb, White: Quiescent/Low.

