

**Table S1** Clinical characteristics of the patients and control individuals in this study

|                   | Breast cancer pat (n=144) | Benign breast lesion (n=72) | Healthy women (n=43) |
|-------------------|---------------------------|-----------------------------|----------------------|
| Age               |                           |                             |                      |
| <40               | 27 (18.75%)               | 45 (62.5%)                  | 25 (58.1%)           |
| >40               | 117 (71.25%)              | 27 (37.5%)                  | 18 (41.9%)           |
| TNM stage         |                           |                             |                      |
| 0                 | 16 (11.11%)               |                             |                      |
| I                 | 41 (28.47%)               |                             |                      |
| II                | 70 (48.61%)               |                             |                      |
| III               | 14 (9.72%)                |                             |                      |
| IV                | 3 (2.09%)                 |                             |                      |
| Molecular Subtype |                           |                             |                      |
| ER/PR+ Her2+      | 94 (65.28%)               |                             |                      |
| ER/PR+ Her2-      | 19 (13.19%)               |                             |                      |
| ER/PR- Her2+      | 26 (18.06%)               |                             |                      |
| ER/PR- Her-       | 5 (3.47%)                 |                             |                      |

Data are n, n (%). Benign breast= patients with benign breast lesions. ER= estrogen receptor. PR= progesterone receptor. Her2= human epidermal growth factor receptor-2.

**Table S2** Primers of the candidate mRNAs

| ID              | Gene name | Direction | Sequence                 |
|-----------------|-----------|-----------|--------------------------|
| ENSG00000196126 | HLA-DRB1  | F         | CGGGGTTGGTGAGAGCTTC      |
| ENSG00000196126 | HLA-DRB1  | R         | AACCACCTGACTTCAATGCTG    |
| ENSG00000113249 | HAVCR1    | F         | TGGCAGATTCTGTAGCTGGTT    |
| ENSG00000113249 | HAVCR1    | R         | AGAGAACATGAGCCTCTATTCCA  |
| ENSG00000101336 | HCK       | F         | AGGGCTACATCCCAAGCAAC     |
| ENSG00000101336 | HCK       | R         | GGTCTCGCTATCCCGGATCA     |
| ENSG00000159189 | C1QC      | F         | AGGATGGGTACGACGGACTG     |
| ENSG00000159189 | C1QC      | R         | GTAAGCCGGTTCTCCCTTC      |
| ENSG00000138792 | ENPEP     | F         | CTTGACCAGATCGTGTGACTC    |
| ENSG00000138792 | ENPEP     | R         | GGCAGTCGAAAGTTTTTCCAC    |
| ENSG00000102265 | TIMP1     | F         | AGAGTGTCTGCGGATACTTCC    |
| ENSG00000102265 | TIMP1     | R         | CCAACAGTGTAGGTCTTGGTG    |
| ENSG00000135218 | CD36      | F         | CTTTGGCTTAATGAGACTGGGAC  |
| ENSG00000135218 | CD36      | R         | GCAACAAACATCACCACACCA    |
| ENSG00000167601 | AXL       | F         | CCGTGGACCTACTCTGGCT      |
| ENSG00000167601 | AXL       | R         | CCTTGGCGTTATGGGCTTC      |
| ENSG00000162692 | VCAM1     | F         | CAGTAAGGCAGGCTGTAAAAGA   |
| ENSG00000162692 | VCAM1     | R         | TGGAGCTGGTAGACCCTCG      |
| ENSG00000277443 | MARCKS    | F         | AGCCCGGTAGAGAAGGAGG      |
| ENSG00000277443 | MARCKS    | R         | TTGGGCGAAGAAGTCGAGGA     |
| ENSG00000153071 | DAB2      | F         | GTAGAAACAAGTGCAACCAATGG  |
| ENSG00000153071 | DAB2      | R         | GCCTTTGAACCTTGCTAAGAGA   |
| ENSG00000145824 | CXCL14    | F         | CGCTACAGCGACGTGAAGAA     |
| ENSG00000145824 | CXCL14    | R         | GTTCCAGCGTTGTACCAC       |
| ENSG00000124564 | SLC17A3   | F         | TTCCGGCTATATCACAGCAACT   |
| ENSG00000124564 | SLC17A3   | R         | AAAACCTGGAATACCTTGGAGCAA |

F, forward; R, reverse.

**Table S3** The information of the candidate mRNAs

| ID              | Gene symbol | Threshold |
|-----------------|-------------|-----------|
| ENSG00000196126 | HLA-DRB1    | 0.0761    |
| ENSG00000113249 | HAVCR1      | 0.0087    |
| ENSG00000101336 | HCK         | 0.1857    |
| ENSG00000159189 | C1QC        | 0.0320    |
| ENSG00000138792 | ENPEP       | 0.8527    |
| ENSG00000102265 | TIMP1       | 4.0924    |
| ENSG00000135218 | CD36        | 0.1564    |
| ENSG00000167601 | AXL         | 0.5521    |
| ENSG00000162692 | VCAM1       | 0.3120    |
| ENSG00000277443 | MARCKS      | 23.635    |
| ENSG00000153071 | DAB2        | 0.3238    |
| ENSG00000145824 | CXCL14      | 1.5475    |

Threshold, threshold for discretization.

**Table S4** mRNAs with significantly different levels

| Gene name       | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------------|-------------|-----------------|-------------------|---------|-------|
| <i>MGST1</i>    | 34.5897     | 7.7859          | 2.15141           | 0.04090 | UP    |
| <i>IL32</i>     | 115.7640    | 26.1449         | 2.14658           | 0.00387 | UP    |
| <i>TYROBP</i>   | 74.3656     | 6.6454          | 3.48420           | 0.05503 | UP    |
| <i>NR1H4</i>    | 21.5002     | 4.9453          | 2.12022           | 0.02336 | UP    |
| <i>CD74</i>     | 1,299.6700  | 234.3350        | 2.47150           | 0.00387 | UP    |
| <i>BIRC3</i>    | 36.1028     | 5.9446          | 2.60245           | 0.01979 | UP    |
| <i>ABCC2</i>    | 17.1771     | 3.3030          | 2.37864           | 0.03281 | UP    |
| <i>TYMP</i>     | 139.0980    | 18.6753         | 2.89690           | 0.00387 | UP    |
| <i>VIM</i>      | 774.3680    | 129.8420        | 2.57626           | 0.17049 | UP    |
| <i>RNASET2</i>  | 160.0510    | 32.7181         | 2.29037           | 0.03042 | UP    |
| <i>TNFRSF1B</i> | 34.0887     | 5.0395          | 2.75794           | 0.04966 | UP    |
| <i>TMSB10</i>   | 1,215.1100  | 171.8940        | 2.82149           | 0.04691 | UP    |
| <i>CP</i>       | 194.8690    | 10.1819         | 4.25842           | 0.00387 | UP    |
| <i>COL23A1</i>  | 45.6279     | 4.1415          | 3.46168           | 0.02953 | UP    |
| <i>CYBA</i>     | 223.5060    | 36.4210         | 2.61747           | 0.00387 | UP    |
| <i>SPAG4</i>    | 21.7187     | 4.3063          | 2.33441           | 0.05329 | UP    |
| <i>VMP1</i>     | 245.0230    | 49.6675         | 2.30255           | 0.01081 | UP    |
| <i>SCARB1</i>   | 52.7990     | 8.6930          | 2.60258           | 0.00387 | UP    |
| <i>CST7</i>     | 7.2377      | 1.1294          | 2.67994           | 0.08862 | UP    |

**Table S4** (continued)

Table S4 (continued)

| Gene name       | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------------|-------------|-----------------|-------------------|---------|-------|
| <i>LRP2</i>     | 121.4210    | 26.8485         | 2.17711           | 0.00387 | UP    |
| <i>SLC13A1</i>  | 10.0110     | 1.1220          | 3.15748           | 0.00880 | UP    |
| <i>PTHLH</i>    | 35.8913     | 8.1662          | 2.13590           | 0.13504 | UP    |
| <i>RGS1</i>     | 92.5057     | 13.0560         | 2.82483           | 0.00387 | UP    |
| <i>LYZ</i>      | 74.2059     | 6.6488          | 3.48038           | 0.15323 | UP    |
| <i>ANGPT2</i>   | 16.7873     | 4.1744          | 2.00772           | 0.18836 | UP    |
| <i>TREM2</i>    | 12.1972     | 2.2135          | 2.46214           | 0.18519 | UP    |
| <i>SCD</i>      | 38.7496     | 4.4269          | 3.12981           | 0.00387 | UP    |
| <i>HSD3B7</i>   | 33.1037     | 5.7032          | 2.53715           | 0.04691 | UP    |
| <i>HMOX1</i>    | 65.8378     | 7.2898          | 3.17497           | 0.00655 | UP    |
| <i>APOL1</i>    | 64.0178     | 10.8307         | 2.56335           | 0.00655 | UP    |
| <i>TRIB3</i>    | 11.4874     | 2.3127          | 2.31239           | 0.03797 | UP    |
| <i>HCK</i>      | 13.5973     | 1.5610          | 3.12280           | 0.00387 | UP    |
| <i>SAMHD1</i>   | 32.0403     | 6.2232          | 2.36416           | 0.13040 | UP    |
| <i>PGK1</i>     | 376.8790    | 81.8157         | 2.20365           | 0.03857 | UP    |
| <i>TIMP1</i>    | 195.7460    | 30.0243         | 2.70478           | 0.05077 | UP    |
| <i>FLT1</i>     | 90.9207     | 12.1466         | 2.90406           | 0.01399 | UP    |
| <i>SLC39A14</i> | 102.0160    | 18.0885         | 2.49565           | 0.00387 | UP    |
| <i>IL27RA</i>   | 6.5332      | 1.6080          | 2.02254           | 0.01847 | UP    |
| <i>RPS19</i>    | 873.0180    | 210.2250        | 2.05408           | 0.01399 | UP    |
| <i>TFEC</i>     | 20.7651     | 4.8100          | 2.11004           | 0.00387 | UP    |
| <i>SERPINE1</i> | 50.3593     | 4.6348          | 3.44167           | 0.00387 | UP    |
| <i>DDX58</i>    | 24.4537     | 4.3609          | 2.48735           | 0.04691 | UP    |
| <i>CUBN</i>     | 80.2910     | 16.9641         | 2.24275           | 0.02839 | UP    |
| <i>CCND1</i>    | 206.9760    | 41.8340         | 2.30672           | 0.00387 | UP    |
| <i>VWF</i>      | 122.6810    | 14.2104         | 3.10990           | 0.13066 | UP    |
| <i>OAS2</i>     | 48.1845     | 8.3937          | 2.52119           | 0.05784 | UP    |
| <i>GAPDH</i>    | 950.8090    | 191.5090        | 2.31175           | 0.01081 | UP    |
| <i>SOD2</i>     | 404.4800    | 75.9547         | 2.41286           | 0.00387 | UP    |
| <i>VEGFA</i>    | 630.8220    | 134.3110        | 2.23165           | 0.00387 | UP    |
| <i>LOX</i>      | 72.3050     | 4.1616          | 4.11887           | 0.00387 | UP    |
| <i>SPARC</i>    | 770.9060    | 140.2420        | 2.45864           | 0.00387 | UP    |
| <i>HAVCR1</i>   | 38.1773     | 2.7356          | 3.80277           | 0.00387 | UP    |
| <i>CDH6</i>     | 112.4060    | 18.9697         | 2.56694           | 0.00387 | UP    |
| <i>HHLA2</i>    | 22.8002     | 2.3831          | 3.25814           | 0.00387 | UP    |
| <i>FN1</i>      | 267.0040    | 65.2055         | 2.03379           | 0.00387 | UP    |
| <i>STAT1</i>    | 178.0350    | 41.4442         | 2.10292           | 0.03493 | UP    |
| <i>CD2</i>      | 10.8305     | 2.2044          | 2.29662           | 0.04758 | UP    |
| <i>SPP1</i>     | 812.8540    | 90.5374         | 3.16641           | 0.00387 | UP    |
| <i>NEK6</i>     | 47.4071     | 9.6699          | 2.29353           | 0.00387 | UP    |
| <i>IFIT3</i>    | 43.8293     | 8.9774          | 2.28752           | 0.16260 | UP    |
| <i>TGFBI</i>    | 373.7460    | 43.1515         | 3.11457           | 0.00387 | UP    |
| <i>TNFSF10</i>  | 98.9841     | 21.1184         | 2.22869           | 0.00387 | UP    |
| <i>CXCR4</i>    | 50.6256     | 10.3437         | 2.29111           | 0.00387 | UP    |
| <i>PRDX4</i>    | 55.1117     | 13.1479         | 2.06752           | 0.07979 | UP    |
| <i>F13A1</i>    | 36.1219     | 8.6722          | 2.05841           | 0.00655 | UP    |
| <i>SLC17A3</i>  | 101.0000    | 6.4453          | 3.96995           | 0.00387 | UP    |
| <i>SLC17A1</i>  | 27.5621     | 4.5971          | 2.58389           | 0.05285 | UP    |
| <i>C3</i>       | 378.1060    | 25.2771         | 3.90289           | 0.00387 | UP    |
| <i>IFI6</i>     | 603.1450    | 34.4075         | 4.13171           | 0.04654 | UP    |
| <i>YEATS4</i>   | 5.6763      | 1.2113          | 2.22844           | 0.17163 | UP    |
| <i>KDR</i>      | 55.5592     | 13.3704         | 2.05498           | 0.01560 | UP    |
| <i>BBOX1</i>    | 43.8473     | 10.6625         | 2.03994           | 0.07588 | UP    |
| <i>CD68</i>     | 57.9979     | 8.7557          | 2.72771           | 0.10405 | UP    |
| <i>EGLN3</i>    | 155.8510    | 18.4840         | 3.07582           | 0.00387 | UP    |
| <i>APOE</i>     | 686.9700    | 140.1040        | 2.29375           | 0.00387 | UP    |
| <i>ACE2</i>     | 20.3463     | 4.0708          | 2.32137           | 0.06906 | UP    |
| <i>PNCK</i>     | 100.9930    | 21.3009         | 2.24527           | 0.04379 | UP    |
| <i>IDO1</i>     | 14.0941     | 3.4760          | 2.01960           | 0.13096 | UP    |
| <i>ACLY</i>     | 80.4375     | 18.0181         | 2.15842           | 0.04758 | UP    |
| <i>TOP2A</i>    | 5.1601      | 1.2244          | 2.07535           | 0.02109 | UP    |
| <i>LRRC41</i>   | 71.1989     | 13.7816         | 2.36911           | 0.00655 | UP    |
| <i>TRIM22</i>   | 131.7450    | 27.5914         | 2.25546           | 0.04889 | UP    |
| <i>IGJ</i>      | 125.3110    | 23.6890         | 2.40322           | 0.16472 | UP    |
| <i>XAF1</i>     | 174.3120    | 34.6746         | 2.32973           | 0.00387 | UP    |
| <i>EPST11</i>   | 43.5537     | 7.2816          | 2.58048           | 0.02439 | UP    |
| <i>POSTN</i>    | 70.4546     | 7.0390          | 3.32325           | 0.06247 | UP    |
| <i>LDHA</i>     | 334.3750    | 61.5788         | 2.44096           | 0.01399 | UP    |
| <i>CYP2J2</i>   | 22.2407     | 3.5815          | 2.63457           | 0.04691 | UP    |
| <i>HAVCR2</i>   | 37.5046     | 5.5127          | 2.76624           | 0.01399 | UP    |
| <i>CD36</i>     | 48.2074     | 7.1444          | 2.75436           | 0.00387 | UP    |
| <i>UGT2A3</i>   | 28.1931     | 4.1780          | 2.75446           | 0.00387 | UP    |
| <i>HILPDA</i>   | 96.2785     | 10.8342         | 3.15161           | 0.05609 | UP    |

Table S4 (continued)

Table S4 (continued)

| Gene name | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------|-------------|-----------------|-------------------|---------|-------|
| AGT       | 22.2476     | 4.7454          | 2.22907           | 0.01241 | UP    |
| LCP1      | 60.6637     | 14.3829         | 2.07648           | 0.00387 | UP    |
| MYC       | 29.9008     | 7.0586          | 2.08273           | 0.01081 | UP    |
| DDX60     | 27.9295     | 5.8466          | 2.25612           | 0.16313 | UP    |
| MMP7      | 200.7670    | 16.7297         | 3.58504           | 0.11052 | UP    |
| IFI44L    | 117.8210    | 15.4851         | 2.92764           | 0.00387 | UP    |
| IFI44     | 105.6320    | 15.0976         | 2.80666           | 0.00387 | UP    |
| ENPEP     | 82.4968     | 8.7917          | 3.23012           | 0.00387 | UP    |
| CLEC18B   | 29.7152     | 6.4688          | 2.19964           | 0.05503 | UP    |
| IFITM3    | 251.9190    | 58.0880         | 2.11665           | 0.07426 | UP    |
| SLC2A5    | 52.8797     | 8.1676          | 2.69473           | 0.00387 | UP    |
| RGS5      | 601.9250    | 77.4167         | 2.95887           | 0.06298 | UP    |
| RIT1      | 25.8044     | 5.7346          | 2.16986           | 0.01712 | UP    |
| DEGS1     | 38.0363     | 8.7927          | 2.11300           | 0.10001 | UP    |
| NAT8      | 117.6200    | 23.4551         | 2.32615           | 0.00387 | UP    |
| IGFBP3    | 514.7070    | 95.0231         | 2.43740           | 0.00387 | UP    |
| TMEM27    | 26.8905     | 4.2198          | 2.67184           | 0.16585 | UP    |
| PLIN2     | 243.6360    | 15.5610         | 3.96872           | 0.00387 | UP    |
| ADM       | 112.9750    | 23.0466         | 2.29338           | 0.01712 | UP    |
| PDK1      | 31.2311     | 7.3189          | 2.09328           | 0.04889 | UP    |
| GJA1      | 34.8822     | 7.6521          | 2.18856           | 0.00387 | UP    |
| PLOD2     | 97.0631     | 17.6757         | 2.45715           | 0.00880 | UP    |
| ENPP3     | 80.3724     | 1.4419          | 5.80067           | 0.00387 | UP    |
| SLC16A1   | 26.0676     | 5.6168          | 2.21444           | 0.01847 | UP    |
| SLC28A1   | 54.6315     | 11.5184         | 2.24579           | 0.04829 | UP    |
| ARSE      | 20.2463     | 3.9607          | 2.35384           | 0.00387 | UP    |
| MX1       | 144.4400    | 25.5713         | 2.49788           | 0.00387 | UP    |
| FCER1G    | 32.3932     | 6.3239          | 2.35680           | 0.17569 | UP    |
| C1QC      | 154.9240    | 20.7497         | 2.90040           | 0.00387 | UP    |
| CCDC58    | 13.5701     | 2.9137          | 2.21954           | 0.18766 | UP    |
| LY6E      | 166.3090    | 30.0716         | 2.46740           | 0.01399 | UP    |
| VCAM1     | 156.3420    | 19.3755         | 3.01240           | 0.00387 | UP    |
| CTSS      | 114.5150    | 13.3406         | 3.10164           | 0.06727 | UP    |
| DTX3L     | 24.3202     | 5.0667          | 2.26304           | 0.08130 | UP    |
| CTSB      | 321.0000    | 76.5537         | 2.06803           | 0.00387 | UP    |
| ABCA1     | 45.3039     | 10.2325         | 2.14647           | 0.00387 | UP    |
| CYBB      | 42.1811     | 5.3641          | 2.97519           | 0.09977 | UP    |
| CLDN2     | 33.5532     | 8.2297          | 2.02754           | 0.14757 | UP    |
| FOLR2     | 17.5791     | 4.1882          | 2.06945           | 0.01560 | UP    |
| C2        | 27.0740     | 5.6498          | 2.26065           | 0.00655 | UP    |
| B2M       | 3,895.9300  | 950.3010        | 2.03551           | 0.10296 | UP    |
| NNMT      | 356.3260    | 17.6845         | 4.33264           | 0.00387 | UP    |
| AXL       | 30.4549     | 5.9746          | 2.34976           | 0.00387 | UP    |
| SERPINF2  | 76.1275     | 13.5064         | 2.49477           | 0.03336 | UP    |
| ANGPTL4   | 152.3840    | 3.0577          | 5.63914           | 0.00387 | UP    |
| FTH1      | 771.5220    | 192.6340        | 2.00185           | 0.05193 | UP    |
| COL3A1    | 134.2320    | 30.8072         | 2.12339           | 0.03431 | UP    |
| SLC16A4   | 32.4636     | 7.2820          | 2.15642           | 0.05609 | UP    |
| LGALS9    | 41.0111     | 9.6804          | 2.08288           | 0.01399 | UP    |
| CD52      | 24.5403     | 1.8522          | 3.72788           | 0.11660 | UP    |
| CD14      | 81.9753     | 16.0484         | 2.35276           | 0.00387 | UP    |
| UGT2B7    | 64.1100     | 15.1784         | 2.07853           | 0.00387 | UP    |
| FGG       | 129.9220    | 4.8828          | 4.73380           | 0.00387 | UP    |
| FGA       | 87.4698     | 9.4040          | 3.21743           | 0.03135 | UP    |
| FGB       | 173.7940    | 8.5157          | 4.35111           | 0.00387 | UP    |
| SMPDL3A   | 21.0100     | 3.7245          | 2.49595           | 0.00387 | UP    |
| PARP14    | 87.4088     | 20.3591         | 2.10211           | 0.02109 | UP    |
| C1QB      | 203.3510    | 19.9941         | 3.34633           | 0.00387 | UP    |
| C1QA      | 161.5500    | 15.1561         | 3.41402           | 0.00387 | UP    |
| KCNE3     | 34.8466     | 8.2107          | 2.08545           | 0.02336 | UP    |
| BNIP3     | 78.9625     | 12.9485         | 2.60839           | 0.10042 | UP    |
| SAMD9L    | 34.4323     | 8.3936          | 2.03640           | 0.00387 | UP    |
| C5orf46   | 49.1221     | 4.4939          | 3.45032           | 0.18606 | UP    |
| HLA-DQB1  | 66.0857     | 3.7285          | 4.14768           | 0.02336 | UP    |
| TMEM45A   | 15.0556     | 3.7100          | 2.02081           | 0.12693 | UP    |
| HIST1H1B  | 39.8999     | 5.8602          | 2.76736           | 0.00387 | UP    |
| MAP7D2    | 19.7461     | 1.5418          | 3.67886           | 0.06906 | UP    |
| PROS1     | 27.4218     | 5.1654          | 2.40838           | 0.03573 | UP    |
| USP18     | 10.8937     | 2.0081          | 2.43957           | 0.00387 | UP    |
| NDUFA4L2  | 224.3770    | 31.0639         | 2.85262           | 0.01847 | UP    |
| IFITM1    | 184.1950    | 29.0650         | 2.66388           | 0.03281 | UP    |
| ISG15     | 202.5720    | 12.7281         | 3.99235           | 0.00387 | UP    |
| RAB42     | 13.4298     | 1.8708          | 2.84368           | 0.14176 | UP    |

Table S4 (continued)

Table S4 (continued)

| Gene name        | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|------------------|-------------|-----------------|-------------------|---------|-------|
| <i>HLA-DRB1</i>  | 160.2480    | 9.2275          | 4.11823           | 0.00387 | UP    |
| <i>AKR1C3</i>    | 39.7805     | 9.0105          | 2.14237           | 0.01081 | UP    |
| <i>HLA-DQA1</i>  | 65.7906     | 3.6522          | 4.17104           | 0.10644 | UP    |
| <i>HIST1H2AI</i> | 24.5722     | 1.3992          | 4.13436           | 0.11101 | UP    |
| <i>SERPINA1</i>  | 417.0610    | 46.2690         | 3.17214           | 0.00387 | UP    |
| <i>NMB</i>       | 11.7954     | 2.3717          | 2.31426           | 0.07136 | UP    |
| <i>HIST1H4K</i>  | 29.9046     | 3.4400          | 3.11989           | 0.15371 | UP    |
| <i>HLA-DRB5</i>  | 80.5012     | 4.9194          | 4.03247           | 0.00387 | UP    |
| <i>FCGR3A</i>    | 45.7923     | 7.9537          | 2.52540           | 0.01399 | UP    |
| <i>HLA-DRA</i>   | 501.8820    | 99.8957         | 2.32885           | 0.05503 | UP    |
| <i>C4orf47</i>   | 6.9326      | 1.2848          | 2.43190           | 0.09874 | UP    |
| <i>CFI</i>       | 101.4710    | 17.9410         | 2.49974           | 0.00387 | UP    |
| <i>HLA-A</i>     | 564.7830    | 135.6480        | 2.05782           | 0.06343 | UP    |
| <i>IFI30</i>     | 129.4920    | 18.5807         | 2.80098           | 0.01560 | UP    |
| <i>HLA-DPA1</i>  | 279.3960    | 48.7119         | 2.51997           | 0.03135 | UP    |
| <i>HLA-B</i>     | 1,034.6100  | 223.9470        | 2.20785           | 0.02109 | UP    |
| <i>ECSCR</i>     | 24.8675     | 2.8480          | 3.12622           | 0.13220 | UP    |
| <i>IGLL5</i>     | 29.8796     | 5.3009          | 2.49484           | 0.06906 | UP    |
| <i>CYP26B1</i>   | 3.0910      | 18.7295         | -2.59918          | 0.01241 | DOWN  |
| <i>SLC22A16</i>  | 1.3694      | 13.3725         | -3.28765          | 0.00655 | DOWN  |
| <i>HOXA11</i>    | 2.0416      | 8.7784          | -2.10427          | 0.19448 | DOWN  |
| <i>MPO</i>       | 1.3813      | 6.9210          | -2.32496          | 0.09227 | DOWN  |
| <i>SOX8</i>      | 1.0108      | 6.3433          | -2.64969          | 0.04517 | DOWN  |
| <i>YBX2</i>      | 1.7081      | 7.5189          | -2.13813          | 0.06153 | DOWN  |
| <i>ABCC8</i>     | 5.6162      | 30.5069         | -2.44148          | 0.00387 | DOWN  |
| <i>TAC1</i>      | 1.2663      | 8.2021          | -2.69542          | 0.08011 | DOWN  |
| <i>DLX6</i>      | 1.6756      | 11.0378         | -2.71972          | 0.03737 | DOWN  |
| <i>DNAH9</i>     | 2.8928      | 12.4486         | -2.10546          | 0.01081 | DOWN  |
| <i>SCN4A</i>     | 2.3984      | 22.0327         | -3.19950          | 0.06454 | DOWN  |
| <i>PAX6</i>      | 4.1243      | 33.3219         | -3.01424          | 0.00387 | DOWN  |
| <i>DLEC1</i>     | 1.8712      | 9.4119          | -2.33049          | 0.05960 | DOWN  |
| <i>CELSR3</i>    | 1.6305      | 8.1060          | -2.31366          | 0.03042 | DOWN  |
| <i>HHATL</i>     | 1.1667      | 12.4337         | -3.41373          | 0.03336 | DOWN  |
| <i>PRSS3</i>     | 1.0359      | 17.7452         | -4.09848          | 0.00387 | DOWN  |
| <i>DPF1</i>      | 1.3298      | 6.8195          | -2.35844          | 0.03857 | DOWN  |
| <i>SYT7</i>      | 1.4839      | 9.2377          | -2.63819          | 0.01081 | DOWN  |
| <i>STMN4</i>     | 1.6734      | 10.9329         | -2.70782          | 0.01081 | DOWN  |
| <i>SRCIN1</i>    | 1.7379      | 8.0918          | -2.21914          | 0.05960 | DOWN  |
| <i>ATP1A2</i>    | 4.7962      | 27.1310         | -2.49997          | 0.01241 | DOWN  |
| <i>PLEKHB1</i>   | 5.9779      | 33.4537         | -2.48444          | 0.00387 | DOWN  |
| <i>CPS1</i>      | 3.4790      | 25.2046         | -2.85694          | 0.02225 | DOWN  |
| <i>KCNG1</i>     | 1.8623      | 8.4383          | -2.17988          | 0.05193 | DOWN  |
| <i>CYP46A1</i>   | 2.1301      | 9.0161          | -2.08162          | 0.00880 | DOWN  |
| <i>RTN4R</i>     | 1.6590      | 9.7312          | -2.55234          | 0.02225 | DOWN  |
| <i>MYO16</i>     | 1.6216      | 12.5611         | -2.95352          | 0.04758 | DOWN  |
| <i>ZBPB</i>      | 2.1409      | 13.8069         | -2.68913          | 0.10405 | DOWN  |
| <i>TG</i>        | 2.8836      | 23.0669         | -2.99988          | 0.00387 | DOWN  |
| <i>LMO3</i>      | 4.4808      | 26.2613         | -2.55110          | 0.00387 | DOWN  |
| <i>CBLN4</i>     | 1.3598      | 6.7726          | -2.31630          | 0.01081 | DOWN  |
| <i>KCNH2</i>     | 1.3715      | 8.1734          | -2.57522          | 0.04013 | DOWN  |
| <i>ITIH1</i>     | 1.6599      | 10.5544         | -2.66870          | 0.06678 | DOWN  |
| <i>CAMK2B</i>    | 1.9588      | 11.6774         | -2.57568          | 0.00387 | DOWN  |
| <i>PSD</i>       | 2.3896      | 15.0884         | -2.65859          | 0.02109 | DOWN  |
| <i>RIMBP2</i>    | 3.4553      | 16.2699         | -2.23532          | 0.03857 | DOWN  |
| <i>DGAT2</i>     | 2.0967      | 10.8469         | -2.37109          | 0.02109 | DOWN  |
| <i>SEZ6</i>      | 2.3938      | 26.9105         | -3.49079          | 0.03281 | DOWN  |
| <i>SLC6A16</i>   | 1.4369      | 6.4578          | -2.16807          | 0.02839 | DOWN  |
| <i>AHRR</i>      | 2.2393      | 10.1016         | -2.17345          | 0.03655 | DOWN  |
| <i>ATP2C2</i>    | 2.6490      | 23.7868         | -3.16663          | 0.00387 | DOWN  |
| <i>SNCAIP</i>    | 3.1894      | 18.9072         | -2.56760          | 0.02109 | DOWN  |
| <i>BCAS1</i>     | 2.0446      | 18.0461         | -3.14180          | 0.00387 | DOWN  |
| <i>NTN1</i>      | 1.1803      | 6.2401          | -2.40248          | 0.01979 | DOWN  |
| <i>ROPN1</i>     | 1.6090      | 14.1842         | -3.14001          | 0.01241 | DOWN  |
| <i>SNAP91</i>    | 1.1722      | 6.7117          | -2.51750          | 0.00880 | DOWN  |
| <i>STAG3</i>     | 3.2438      | 18.7223         | -2.52898          | 0.00387 | DOWN  |
| <i>SYT1</i>      | 1.6259      | 7.3649          | -2.17942          | 0.01241 | DOWN  |
| <i>REEP1</i>     | 2.3510      | 9.7789          | -2.05640          | 0.08263 | DOWN  |
| <i>PITX1</i>     | 2.1058      | 11.4884         | -2.44777          | 0.10296 | DOWN  |
| <i>SPTB</i>      | 2.7678      | 14.2011         | -2.35917          | 0.04187 | DOWN  |
| <i>FGF10</i>     | 1.2978      | 10.5327         | -3.02080          | 0.16675 | DOWN  |
| <i>FRMPD1</i>    | 1.1134      | 5.5981          | -2.32995          | 0.12207 | DOWN  |
| <i>TRIP13</i>    | 1.2535      | 7.4873          | -2.57845          | 0.15824 | DOWN  |
| <i>MYO3B</i>     | 2.0613      | 9.1637          | -2.15236          | 0.09102 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name  | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|------------|-------------|-----------------|-------------------|---------|-------|
| ASIC4      | 1.1837      | 9.8864          | -3.06211          | 0.00387 | DOWN  |
| SPEG       | 6.2169      | 32.2467         | -2.37488          | 0.00387 | DOWN  |
| MOV10L1    | 1.5093      | 6.6611          | -2.14185          | 0.05767 | DOWN  |
| PPP2R2C    | 1.8533      | 7.8806          | -2.08823          | 0.02839 | DOWN  |
| SLC12A1    | 109.5020    | 529.6760        | -2.27416          | 0.00387 | DOWN  |
| WSCD2      | 3.5772      | 15.9689         | -2.15835          | 0.00387 | DOWN  |
| ADD2       | 1.9214      | 11.2586         | -2.55083          | 0.00387 | DOWN  |
| CACNG5     | 1.7344      | 12.3678         | -2.83405          | 0.16106 | DOWN  |
| AMPH       | 2.1427      | 10.3787         | -2.27614          | 0.01560 | DOWN  |
| RBFOX1     | 1.3333      | 8.2257          | -2.62512          | 0.00387 | DOWN  |
| MYH7B      | 2.8458      | 13.5848         | -2.25507          | 0.06642 | DOWN  |
| TP73       | 2.1191      | 11.3227         | -2.41767          | 0.03655 | DOWN  |
| KCNN2      | 1.4442      | 9.5661          | -2.72762          | 0.00387 | DOWN  |
| TCF7       | 7.1703      | 31.8537         | -2.15135          | 0.03493 | DOWN  |
| PKP1       | 2.3617      | 11.2197         | -2.24816          | 0.03281 | DOWN  |
| PGR        | 1.7933      | 8.1755          | -2.18868          | 0.00387 | DOWN  |
| SERTAD4    | 1.4107      | 7.1556          | -2.34263          | 0.01241 | DOWN  |
| GRHL2      | 3.1650      | 15.9456         | -2.33289          | 0.00880 | DOWN  |
| HAL        | 1.9254      | 16.5661         | -3.10499          | 0.01241 | DOWN  |
| SLCO1A2    | 1.8682      | 9.5488          | -2.35369          | 0.00387 | DOWN  |
| GCKR       | 1.4177      | 8.5367          | -2.59013          | 0.13203 | DOWN  |
| IGSF9      | 1.1180      | 11.3487         | -3.34352          | 0.02225 | DOWN  |
| HSD17B2    | 2.6034      | 14.9055         | -2.51737          | 0.06454 | DOWN  |
| PHACTR3    | 1.5533      | 7.0366          | -2.17957          | 0.05767 | DOWN  |
| SULT2B1    | 1.2391      | 6.8556          | -2.46800          | 0.05710 | DOWN  |
| SLC4A11    | 2.3926      | 17.5294         | -2.87313          | 0.03336 | DOWN  |
| F11        | 4.8720      | 23.2757         | -2.25624          | 0.09481 | DOWN  |
| C20orf26   | 1.5857      | 8.6946          | -2.45501          | 0.01847 | DOWN  |
| RPH3A      | 1.4390      | 9.1772          | -2.67299          | 0.00387 | DOWN  |
| CHGB       | 1.6753      | 10.4980         | -2.64760          | 0.13787 | DOWN  |
| NOS1       | 2.8431      | 12.9713         | -2.18978          | 0.07087 | DOWN  |
| OTUB2      | 1.0897      | 8.0401          | -2.88332          | 0.00655 | DOWN  |
| LAMB4      | 1.0852      | 5.9786          | -2.46188          | 0.04437 | DOWN  |
| MYO15A     | 2.2216      | 14.9373         | -2.74924          | 0.00387 | DOWN  |
| PITPNM3    | 1.7085      | 8.8208          | -2.36821          | 0.00655 | DOWN  |
| ZFX4       | 2.6046      | 14.7363         | -2.50025          | 0.00387 | DOWN  |
| CPA1       | 1.0046      | 4.2923          | -2.09512          | 0.03336 | DOWN  |
| TGM1       | 4.6901      | 29.7509         | -2.66525          | 0.03493 | DOWN  |
| TBX15      | 1.0859      | 6.3469          | -2.54711          | 0.02537 | DOWN  |
| GABRP      | 1.3165      | 6.5651          | -2.31813          | 0.01847 | DOWN  |
| NXPE1      | 1.0773      | 6.0652          | -2.49319          | 0.06153 | DOWN  |
| EPB41L4B   | 1.0017      | 4.0771          | -2.02513          | 0.15744 | DOWN  |
| P2RX6      | 1.2233      | 8.8644          | -2.85727          | 0.01847 | DOWN  |
| SEPT3      | 1.0069      | 5.5181          | -2.45421          | 0.01560 | DOWN  |
| PVALB      | 2.1664      | 8.9013          | -2.03873          | 0.17987 | DOWN  |
| KCTD17     | 7.3519      | 29.9049         | -2.02419          | 0.00387 | DOWN  |
| KCNK10     | 1.1417      | 7.7489          | -2.76283          | 0.01399 | DOWN  |
| COCH       | 2.3752      | 17.8996         | -2.91383          | 0.13596 | DOWN  |
| C14orf166B | 1.4759      | 14.9637         | -3.34184          | 0.16675 | DOWN  |
| CHGA       | 3.1319      | 25.0115         | -2.99748          | 0.03655 | DOWN  |
| ASB2       | 3.1718      | 17.1568         | -2.43540          | 0.01081 | DOWN  |
| SLC8A3     | 1.8012      | 17.9564         | -3.31744          | 0.00387 | DOWN  |
| TCL1A      | 1.6218      | 8.0747          | -2.31584          | 0.05329 | DOWN  |
| DHRS2      | 1.8375      | 12.3589         | -2.74971          | 0.00387 | DOWN  |
| CPNE6      | 3.5985      | 16.8268         | -2.22530          | 0.02537 | DOWN  |
| VSX1       | 2.7529      | 14.5057         | -2.39758          | 0.06298 | DOWN  |
| SALL4      | 1.1544      | 5.1732          | -2.16396          | 0.02336 | DOWN  |
| BMP7       | 2.6634      | 13.2424         | -2.31380          | 0.03573 | DOWN  |
| COL20A1    | 1.5632      | 18.1895         | -3.54053          | 0.00387 | DOWN  |
| SNPH       | 2.3343      | 10.2750         | -2.13805          | 0.01560 | DOWN  |
| BPI        | 1.1603      | 4.8070          | -2.05064          | 0.13242 | DOWN  |
| EPPIN      | 1.0667      | 16.4687         | -3.94846          | 0.00387 | DOWN  |
| CELF4      | 1.6587      | 8.7628          | -2.40136          | 0.00387 | DOWN  |
| ST8SIA5    | 2.5903      | 12.3899         | -2.25800          | 0.01847 | DOWN  |
| NOL4       | 1.9652      | 12.7326         | -2.69581          | 0.01560 | DOWN  |
| VGLL1      | 1.1705      | 13.9529         | -3.57538          | 0.05024 | DOWN  |
| CBLN1      | 1.2237      | 10.7122         | -3.12996          | 0.07803 | DOWN  |
| CCDC113    | 3.3417      | 13.9269         | -2.05920          | 0.03655 | DOWN  |
| NDRG4      | 5.9939      | 36.3870         | -2.60186          | 0.00387 | DOWN  |
| HAS3       | 2.0123      | 12.3935         | -2.62268          | 0.09506 | DOWN  |
| SMPD3      | 4.3455      | 25.1374         | -2.53224          | 0.00387 | DOWN  |
| ACSBG1     | 2.8344      | 19.8809         | -2.81025          | 0.00655 | DOWN  |
| IGDCC4     | 1.8913      | 13.1482         | -2.79744          | 0.04517 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------|-------------|-----------------|-------------------|---------|-------|
| FAM189A1  | 1.7313      | 9.5470          | -2.46322          | 0.07588 | DOWN  |
| TRPA1     | 2.5965      | 12.9199         | -2.31498          | 0.16726 | DOWN  |
| SLC17A7   | 1.1830      | 5.7142          | -2.27208          | 0.08535 | DOWN  |
| SLC1A6    | 1.3937      | 7.1954          | -2.36814          | 0.00880 | DOWN  |
| CRX       | 2.3051      | 14.7386         | -2.67668          | 0.02109 | DOWN  |
| MAG       | 1.1945      | 5.0030          | -2.06634          | 0.17581 | DOWN  |
| PON3      | 1.3881      | 9.8221          | -2.82292          | 0.01560 | DOWN  |
| RNF32     | 2.2291      | 9.3946          | -2.07536          | 0.00655 | DOWN  |
| VIPR2     | 1.1126      | 6.4818          | -2.54251          | 0.08828 | DOWN  |
| EVX1      | 1.6654      | 16.6538         | -3.32192          | 0.05024 | DOWN  |
| GCK       | 1.0033      | 6.6846          | -2.73605          | 0.02439 | DOWN  |
| LHX6      | 1.8979      | 10.8063         | -2.50943          | 0.00387 | DOWN  |
| TNFSF8    | 3.8578      | 15.6345         | -2.01890          | 0.03042 | DOWN  |
| RLN2      | 1.0839      | 5.3215          | -2.29567          | 0.14980 | DOWN  |
| TYRP1     | 3.3192      | 14.6539         | -2.14239          | 0.07175 | DOWN  |
| CDH23     | 3.4339      | 14.2238         | -2.05038          | 0.00655 | DOWN  |
| TLX1      | 2.7712      | 19.7351         | -2.83220          | 0.04585 | DOWN  |
| KAZALD1   | 2.4044      | 13.1076         | -2.44663          | 0.03493 | DOWN  |
| NEURL1    | 1.1953      | 8.5713          | -2.84213          | 0.05548 | DOWN  |
| DKK1      | 2.7194      | 17.5987         | -2.69409          | 0.08324 | DOWN  |
| SORCS1    | 1.6492      | 11.3797         | -2.78665          | 0.01560 | DOWN  |
| KRT23     | 1.9558      | 17.4160         | -3.15460          | 0.05329 | DOWN  |
| RUNDC3A   | 1.5347      | 6.3144          | -2.04067          | 0.08571 | DOWN  |
| ALDH3A1   | 1.7514      | 8.2470          | -2.23539          | 0.00880 | DOWN  |
| ASIC2     | 1.9295      | 9.2204          | -2.25657          | 0.07543 | DOWN  |
| HSD17B1   | 1.2412      | 9.1455          | -2.88131          | 0.03431 | DOWN  |
| DLX4      | 1.9551      | 21.0465         | -3.42826          | 0.01560 | DOWN  |
| PPY       | 1.5227      | 19.2818         | -3.66252          | 0.10109 | DOWN  |
| MPP2      | 2.2560      | 12.8531         | -2.51031          | 0.00387 | DOWN  |
| VTN       | 1.4886      | 9.7736          | -2.71492          | 0.05193 | DOWN  |
| CWH43     | 1.6644      | 9.9599          | -2.58115          | 0.17937 | DOWN  |
| CPZ       | 2.5058      | 10.2586         | -2.03347          | 0.07662 | DOWN  |
| GLRB      | 1.1574      | 6.0959          | -2.39696          | 0.07175 | DOWN  |
| HGFAC     | 1.2056      | 6.1539          | -2.35172          | 0.11269 | DOWN  |
| DDX25     | 1.8371      | 7.7307          | -2.07317          | 0.14461 | DOWN  |
| TECTA     | 1.5405      | 7.6739          | -2.31659          | 0.03281 | DOWN  |
| B3GAT1    | 3.2185      | 17.8649         | -2.47267          | 0.01712 | DOWN  |
| CCKBR     | 1.5801      | 14.2872         | -3.17662          | 0.04889 | DOWN  |
| HPX       | 2.9717      | 19.2018         | -2.69189          | 0.03737 | DOWN  |
| PVRL1     | 3.9675      | 21.3114         | -2.42533          | 0.00387 | DOWN  |
| C11orf21  | 3.3580      | 13.7685         | -2.03568          | 0.08742 | DOWN  |
| PTPN5     | 2.2642      | 10.9707         | -2.27660          | 0.04654 | DOWN  |
| ASIC1     | 1.5180      | 6.3586          | -2.06653          | 0.02439 | DOWN  |
| TSPAN11   | 1.5624      | 10.4252         | -2.73824          | 0.00387 | DOWN  |
| CYP27B1   | 5.4071      | 43.3834         | -3.00421          | 0.02756 | DOWN  |
| GLI1      | 1.6937      | 8.2106          | -2.27733          | 0.11729 | DOWN  |
| AKAP3     | 2.3294      | 15.0954         | -2.69610          | 0.04305 | DOWN  |
| GPR133    | 3.9680      | 17.3906         | -2.13182          | 0.02439 | DOWN  |
| GNB3      | 3.1877      | 20.6205         | -2.69351          | 0.02225 | DOWN  |
| CDCA3     | 2.5949      | 11.3840         | -2.13326          | 0.02439 | DOWN  |
| ST8SIA1   | 7.4267      | 32.0619         | -2.11007          | 0.02225 | DOWN  |
| AICDA     | 1.1071      | 7.3120          | -2.72345          | 0.12317 | DOWN  |
| RSPH4A    | 1.3133      | 5.5700          | -2.08443          | 0.10001 | DOWN  |
| OPRM1     | 1.3901      | 13.0415         | -3.22983          | 0.00387 | DOWN  |
| TULP1     | 1.8726      | 11.6949         | -2.64281          | 0.05784 | DOWN  |
| SLC26A8   | 1.0385      | 5.7549          | -2.47026          | 0.06393 | DOWN  |
| MDGA1     | 5.4986      | 22.2251         | -2.01505          | 0.00387 | DOWN  |
| RBM24     | 1.4389      | 7.9709          | -2.46980          | 0.06503 | DOWN  |
| HDGFL1    | 3.8513      | 19.8409         | -2.36506          | 0.06873 | DOWN  |
| EYA4      | 2.4780      | 13.4675         | -2.44223          | 0.01399 | DOWN  |
| PRPH2     | 1.2076      | 5.0632          | -2.06796          | 0.01081 | DOWN  |
| PRSS16    | 5.0080      | 22.3533         | -2.15817          | 0.00655 | DOWN  |
| TBX18     | 1.6055      | 9.9133          | -2.62637          | 0.01081 | DOWN  |
| PCDHB7    | 2.1932      | 10.1851         | -2.21535          | 0.03431 | DOWN  |
| GRM6      | 2.6070      | 13.0461         | -2.32315          | 0.11234 | DOWN  |
| HRG       | 2.1675      | 11.5697         | -2.41622          | 0.08904 | DOWN  |
| FGF12     | 2.5953      | 19.6215         | -2.91846          | 0.01241 | DOWN  |
| ROPN1B    | 1.4841      | 16.2465         | -3.45246          | 0.00387 | DOWN  |
| KIAA1257  | 1.5640      | 6.3923          | -2.03109          | 0.09524 | DOWN  |
| PEX5L     | 2.4132      | 13.0085         | -2.43047          | 0.04305 | DOWN  |
| ARHGEF26  | 1.7920      | 7.3565          | -2.03746          | 0.10644 | DOWN  |
| VIPR1     | 3.2698      | 21.1596         | -2.69406          | 0.00387 | DOWN  |
| SLC30A3   | 1.8057      | 7.3100          | -2.01733          | 0.06393 | DOWN  |

Table S4 (continued)



Table S4 (continued)

| Gene name  | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|------------|-------------|-----------------|-------------------|---------|-------|
| TLX2       | 3.0187      | 17.7044         | -2.55210          | 0.15362 | DOWN  |
| TACR1      | 1.1881      | 11.0960         | -3.22327          | 0.00655 | DOWN  |
| KCNJ13     | 1.4961      | 7.1352          | -2.25374          | 0.17633 | DOWN  |
| OTX1       | 1.8918      | 22.6628         | -3.58250          | 0.00655 | DOWN  |
| SLC9A2     | 1.4050      | 7.3091          | -2.37914          | 0.01081 | DOWN  |
| MLPH       | 3.7539      | 18.5709         | -2.30659          | 0.00387 | DOWN  |
| KIAA1324   | 3.5714      | 20.5783         | -2.52658          | 0.00655 | DOWN  |
| MYCL       | 3.2674      | 13.8523         | -2.08391          | 0.07175 | DOWN  |
| ST6GALNAC5 | 1.3174      | 13.4860         | -3.35575          | 0.05233 | DOWN  |
| MFAP2      | 2.0810      | 12.9023         | -2.63227          | 0.02225 | DOWN  |
| PLA2G2D    | 1.3414      | 6.0283          | -2.16800          | 0.04013 | DOWN  |
| ARTN       | 1.7037      | 11.9966         | -2.81591          | 0.00880 | DOWN  |
| PTCH2      | 1.4983      | 7.1732          | -2.25928          | 0.08442 | DOWN  |
| PROX1      | 3.0944      | 26.2106         | -3.08242          | 0.01081 | DOWN  |
| CENPF      | 3.0876      | 13.6576         | -2.14514          | 0.06819 | DOWN  |
| MUC5B      | 1.6494      | 17.3875         | -3.39801          | 0.02109 | DOWN  |
| CA14       | 1.1448      | 7.1664          | -2.64618          | 0.06393 | DOWN  |
| ATP10B     | 2.6125      | 24.5740         | -3.23365          | 0.00387 | DOWN  |
| CNR1       | 2.1611      | 13.0003         | -2.58870          | 0.03493 | DOWN  |
| TRPM6      | 1.0751      | 6.6481          | -2.62850          | 0.00880 | DOWN  |
| PPP4R4     | 1.3387      | 6.3430          | -2.24429          | 0.11234 | DOWN  |
| ESRRB      | 2.6412      | 16.5489         | -2.64748          | 0.01560 | DOWN  |
| CRHR1      | 1.2838      | 12.0311         | -3.22824          | 0.01241 | DOWN  |
| HOXB1      | 1.1317      | 7.3255          | -2.69442          | 0.16140 | DOWN  |
| GRIA2      | 1.5235      | 9.5850          | -2.65335          | 0.02537 | DOWN  |
| TP53AIP1   | 1.2891      | 9.2807          | -2.84783          | 0.04187 | DOWN  |
| CHRNA2     | 1.0421      | 12.4937         | -3.58370          | 0.00387 | DOWN  |
| ADRA1A     | 3.6376      | 20.3181         | -2.48170          | 0.00880 | DOWN  |
| TNFRSF8    | 1.2974      | 5.5470          | -2.09608          | 0.09506 | DOWN  |
| TSHZ3      | 5.6430      | 26.2028         | -2.21518          | 0.00880 | DOWN  |
| LHX4       | 1.7595      | 7.8812          | -2.16326          | 0.15857 | DOWN  |
| GJA8       | 2.3815      | 13.7966         | -2.53437          | 0.02537 | DOWN  |
| CCRL2      | 4.1546      | 17.6842         | -2.08966          | 0.02109 | DOWN  |
| CSMD2      | 1.5428      | 14.2744         | -3.20979          | 0.00387 | DOWN  |
| HPCA       | 1.6793      | 6.7798          | -2.01339          | 0.15857 | DOWN  |
| TBX22      | 1.2173      | 6.5946          | -2.43761          | 0.19961 | DOWN  |
| LDB3       | 1.5266      | 8.5554          | -2.48649          | 0.02336 | DOWN  |
| KIAA1045   | 1.6337      | 6.6800          | -2.03167          | 0.04141 | DOWN  |
| SFTPA1     | 1.5541      | 15.5298         | -3.32086          | 0.01712 | DOWN  |
| PLP1       | 2.8596      | 21.2227         | -2.89173          | 0.00387 | DOWN  |
| FAM124B    | 1.6522      | 9.9380          | -2.58856          | 0.05233 | DOWN  |
| CTCF       | 1.0134      | 6.6880          | -2.72240          | 0.00387 | DOWN  |
| WFDC3      | 1.2385      | 9.7831          | -2.98169          | 0.00387 | DOWN  |
| KCNS1      | 1.1899      | 9.7758          | -3.03837          | 0.02756 | DOWN  |
| SLC12A5    | 1.7113      | 7.6786          | -2.16573          | 0.06678 | DOWN  |
| GDAP1L1    | 1.3788      | 7.1787          | -2.38035          | 0.09328 | DOWN  |
| CHST8      | 1.4334      | 6.9560          | -2.27888          | 0.17068 | DOWN  |
| PSG8       | 1.1794      | 12.2851         | -3.38081          | 0.00387 | DOWN  |
| GRM4       | 1.7398      | 16.7494         | -3.26716          | 0.00387 | DOWN  |
| PACSIN1    | 1.9015      | 15.2759         | -3.00609          | 0.01081 | DOWN  |
| KLHL31     | 1.6047      | 6.6500          | -2.05101          | 0.14461 | DOWN  |
| C1orf61    | 3.3538      | 25.5598         | -2.93001          | 0.00387 | DOWN  |
| PAX1       | 1.5205      | 9.1687          | -2.59213          | 0.06954 | DOWN  |
| BFSP1      | 1.0077      | 6.1079          | -2.59967          | 0.07244 | DOWN  |
| F10        | 2.6213      | 11.0462         | -2.07518          | 0.15149 | DOWN  |
| SIX1       | 1.1772      | 9.7699          | -3.05303          | 0.02648 | DOWN  |
| AVPR2      | 2.2449      | 10.5280         | -2.22952          | 0.16933 | DOWN  |
| BEST3      | 1.1173      | 12.1637         | -3.44456          | 0.00387 | DOWN  |
| SYNGR3     | 1.2633      | 8.8668          | -2.81119          | 0.06557 | DOWN  |
| PKMYT1     | 4.9335      | 22.8218         | -2.20974          | 0.05077 | DOWN  |
| RASL11B    | 2.9672      | 12.6358         | -2.09037          | 0.14501 | DOWN  |
| GNAZ       | 2.7866      | 12.5731         | -2.17375          | 0.03573 | DOWN  |
| C22orf23   | 1.0953      | 5.0876          | -2.21567          | 0.08504 | DOWN  |
| KRT17      | 2.7583      | 25.8195         | -3.22659          | 0.07288 | DOWN  |
| KCNC1      | 1.3781      | 14.8700         | -3.43169          | 0.00387 | DOWN  |
| AIPL1      | 1.0249      | 4.9249          | -2.26465          | 0.09505 | DOWN  |
| FOXA1      | 2.4016      | 18.1722         | -2.91964          | 0.05285 | DOWN  |
| CDO1       | 3.0122      | 21.8974         | -2.86186          | 0.00387 | DOWN  |
| CHRNA10    | 2.2441      | 9.1800          | -2.03236          | 0.19597 | DOWN  |
| SYT5       | 2.0525      | 9.1108          | -2.15022          | 0.05819 | DOWN  |
| TNNI3      | 1.1990      | 7.9130          | -2.72243          | 0.00655 | DOWN  |
| PRRG3      | 1.4845      | 10.0943         | -2.76545          | 0.00655 | DOWN  |
| KCNA5      | 1.7083      | 8.1784          | -2.25923          | 0.01241 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name       | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------------|-------------|-----------------|-------------------|---------|-------|
| <i>DPP6</i>     | 4.6969      | 25.6340         | -2.44829          | 0.00387 | DOWN  |
| <i>KIF1A</i>    | 4.0325      | 33.4428         | -3.05196          | 0.00387 | DOWN  |
| <i>OLFM1</i>    | 4.7566      | 21.0473         | -2.14564          | 0.01712 | DOWN  |
| <i>TNNT3</i>    | 1.5253      | 7.3747          | -2.27352          | 0.16066 | DOWN  |
| <i>CYP2E1</i>   | 3.5714      | 18.0379         | -2.33646          | 0.03493 | DOWN  |
| <i>MNX1</i>     | 2.8898      | 15.2360         | -2.39844          | 0.01712 | DOWN  |
| <i>DUSP9</i>    | 10.8989     | 44.8771         | -2.04180          | 0.02225 | DOWN  |
| <i>AOC2</i>     | 1.2349      | 5.7629          | -2.22236          | 0.04829 | DOWN  |
| <i>TNS4</i>     | 1.1484      | 6.3839          | -2.47480          | 0.09527 | DOWN  |
| <i>ABHD12B</i>  | 1.4253      | 8.5695          | -2.58797          | 0.03737 | DOWN  |
| <i>C19orf57</i> | 2.4076      | 9.8930          | -2.03884          | 0.06393 | DOWN  |
| <i>SLC6A11</i>  | 1.0407      | 9.3343          | -3.16497          | 0.04141 | DOWN  |
| <i>BCAN</i>     | 1.4117      | 12.2677         | -3.11934          | 0.02109 | DOWN  |
| <i>CRP</i>      | 1.2323      | 9.1689          | -2.89544          | 0.01847 | DOWN  |
| <i>HAPLN2</i>   | 1.3365      | 5.7609          | -2.10781          | 0.18026 | DOWN  |
| <i>CHIT1</i>    | 4.1886      | 21.1536         | -2.33638          | 0.02109 | DOWN  |
| <i>LGR6</i>     | 1.4803      | 15.4746         | -3.38598          | 0.00387 | DOWN  |
| <i>TMCC2</i>    | 1.8130      | 7.2575          | -2.00108          | 0.02336 | DOWN  |
| <i>UNC79</i>    | 1.0639      | 4.9754          | -2.22542          | 0.09661 | DOWN  |
| <i>GSTM5</i>    | 1.9951      | 15.6517         | -2.97180          | 0.01399 | DOWN  |
| <i>SYT6</i>     | 2.5998      | 11.2324         | -2.11119          | 0.02439 | DOWN  |
| <i>CD101</i>    | 2.0976      | 13.4868         | -2.68471          | 0.05784 | DOWN  |
| <i>CRB1</i>     | 1.4409      | 8.2433          | -2.51630          | 0.01081 | DOWN  |
| <i>RAX</i>      | 2.9534      | 22.9234         | -2.95636          | 0.12028 | DOWN  |
| <i>MTNR1B</i>   | 1.1313      | 11.9263         | -3.39807          | 0.07203 | DOWN  |
| <i>SPOCD1</i>   | 2.4917      | 12.3777         | -2.31254          | 0.02336 | DOWN  |
| <i>ELF5</i>     | 1.8151      | 18.6713         | -3.36273          | 0.05548 | DOWN  |
| <i>PRPH</i>     | 1.5892      | 7.5234          | -2.24314          | 0.08862 | DOWN  |
| <i>AMHR2</i>    | 1.1524      | 7.1074          | -2.62464          | 0.02839 | DOWN  |
| <i>FAM186B</i>  | 1.4815      | 9.1388          | -2.62494          | 0.08862 | DOWN  |
| <i>FAIM2</i>    | 1.5631      | 9.1221          | -2.54493          | 0.00387 | DOWN  |
| <i>KCNH3</i>    | 1.1557      | 5.6944          | -2.30076          | 0.10529 | DOWN  |
| <i>EGR4</i>     | 1.0223      | 6.9752          | -2.77037          | 0.07979 | DOWN  |
| <i>SLC9A5</i>   | 1.2194      | 5.6401          | -2.20955          | 0.04691 | DOWN  |
| <i>GPR55</i>    | 1.2118      | 9.1052          | -2.90952          | 0.00387 | DOWN  |
| <i>PAX3</i>     | 1.6292      | 11.8382         | -2.86120          | 0.01241 | DOWN  |
| <i>WNT10A</i>   | 2.1429      | 8.7279          | -2.02604          | 0.01241 | DOWN  |
| <i>ARHGEF4</i>  | 2.5924      | 23.6024         | -3.18659          | 0.00387 | DOWN  |
| <i>STAB2</i>    | 1.5959      | 10.8391         | -2.76382          | 0.05233 | DOWN  |
| <i>USP44</i>    | 1.8601      | 10.9929         | -2.56311          | 0.01399 | DOWN  |
| <i>NACAD</i>    | 1.0641      | 4.8078          | -2.17569          | 0.00880 | DOWN  |
| <i>NKX2-1</i>   | 1.0262      | 10.0430         | -3.29079          | 0.07015 | DOWN  |
| <i>ZFHX2</i>    | 2.1674      | 9.6776          | -2.15869          | 0.12362 | DOWN  |
| <i>MYCBPAP</i>  | 2.0527      | 9.0242          | -2.13624          | 0.01979 | DOWN  |
| <i>TBR1</i>     | 1.0277      | 7.6811          | -2.90187          | 0.02225 | DOWN  |
| <i>ERMN</i>     | 1.7316      | 7.4747          | -2.10993          | 0.08230 | DOWN  |
| <i>GATA4</i>    | 2.6139      | 13.7017         | -2.39009          | 0.01979 | DOWN  |
| <i>IL36RN</i>   | 1.4774      | 15.3358         | -3.37576          | 0.05024 | DOWN  |
| <i>LMX1B</i>    | 1.3683      | 5.9877          | -2.12967          | 0.10001 | DOWN  |
| <i>TFAP2A</i>   | 6.1128      | 31.6387         | -2.37179          | 0.00387 | DOWN  |
| <i>TRIM29</i>   | 5.9229      | 47.7608         | -3.01146          | 0.00387 | DOWN  |
| <i>POU2F3</i>   | 1.2640      | 5.6271          | -2.15439          | 0.04654 | DOWN  |
| <i>ARHGAP20</i> | 1.1767      | 6.8398          | -2.53925          | 0.05329 | DOWN  |
| <i>DUOX1</i>    | 1.2547      | 8.0837          | -2.68765          | 0.00387 | DOWN  |
| <i>STRA6</i>    | 3.7422      | 17.6031         | -2.23388          | 0.00387 | DOWN  |
| <i>CYP19A1</i>  | 1.4324      | 10.4002         | -2.86016          | 0.00387 | DOWN  |
| <i>SEMA6D</i>   | 7.2832      | 29.1548         | -2.00110          | 0.02756 | DOWN  |
| <i>GCOM1</i>    | 1.4337      | 12.1360         | -3.08144          | 0.00655 | DOWN  |
| <i>TRIM54</i>   | 2.8293      | 12.3398         | -2.12480          | 0.12319 | DOWN  |
| <i>CILP</i>     | 1.3552      | 5.7343          | -2.08111          | 0.03431 | DOWN  |
| <i>FGF5</i>     | 1.0508      | 6.9476          | -2.72505          | 0.07587 | DOWN  |
| <i>BMPR1B</i>   | 2.2124      | 10.4904         | -2.24539          | 0.06503 | DOWN  |
| <i>EGF</i>      | 9.8888      | 95.8034         | -3.27622          | 0.00387 | DOWN  |
| <i>COL2A1</i>   | 3.2159      | 28.8945         | -3.16749          | 0.02225 | DOWN  |
| <i>INHBE</i>    | 1.2711      | 6.7488          | -2.40859          | 0.10296 | DOWN  |
| <i>TMEM132B</i> | 2.1504      | 12.9887         | -2.59459          | 0.04013 | DOWN  |
| <i>SSTR1</i>    | 1.2080      | 5.0159          | -2.05392          | 0.02953 | DOWN  |
| <i>REM2</i>     | 1.1855      | 5.3649          | -2.17803          | 0.18441 | DOWN  |
| <i>TSSK4</i>    | 1.3100      | 5.6949          | -2.12007          | 0.16215 | DOWN  |
| <i>SLC24A4</i>  | 2.0213      | 8.5046          | -2.07296          | 0.05548 | DOWN  |
| <i>DUOXA1</i>   | 2.0167      | 14.7525         | -2.87091          | 0.00387 | DOWN  |
| <i>DUOX2</i>    | 1.5116      | 6.5155          | -2.10778          | 0.13976 | DOWN  |
| <i>DISP2</i>    | 1.6165      | 23.4003         | -3.85556          | 0.04691 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------|-------------|-----------------|-------------------|---------|-------|
| CYP11A1   | 1.6835      | 10.6518         | -2.66160          | 0.01979 | DOWN  |
| ADAMTS17  | 3.4815      | 17.1040         | -2.29654          | 0.00387 | DOWN  |
| LMAN1L    | 1.8280      | 8.1517          | -2.15685          | 0.15479 | DOWN  |
| NTRK3     | 5.6003      | 23.1753         | -2.04902          | 0.00387 | DOWN  |
| MYLK3     | 2.0101      | 14.2163         | -2.82220          | 0.02756 | DOWN  |
| ADAD2     | 1.3984      | 7.5160          | -2.42620          | 0.07941 | DOWN  |
| MYOCD     | 1.6679      | 8.6995          | -2.38294          | 0.03737 | DOWN  |
| RASL10B   | 2.1628      | 13.3325         | -2.62397          | 0.00387 | DOWN  |
| LRRC46    | 1.1009      | 4.5133          | -2.03557          | 0.15139 | DOWN  |
| GNAL      | 2.4257      | 11.6784         | -2.26737          | 0.12166 | DOWN  |
| ADCYAP1   | 1.2738      | 5.3063          | -2.05862          | 0.16494 | DOWN  |
| SLC13A5   | 1.0771      | 7.2507          | -2.75090          | 0.00387 | DOWN  |
| MAPK4     | 4.0253      | 16.1400         | -2.00349          | 0.13870 | DOWN  |
| CBLN2     | 1.3881      | 14.8844         | -3.42267          | 0.00387 | DOWN  |
| PNMT      | 1.0353      | 5.5386          | -2.41941          | 0.13596 | DOWN  |
| ARL5C     | 1.1026      | 9.1422          | -3.05161          | 0.03573 | DOWN  |
| KLK3      | 1.7818      | 16.8417         | -3.24067          | 0.00655 | DOWN  |
| MMEL1     | 2.7267      | 15.5663         | -2.51322          | 0.05784 | DOWN  |
| C1orf222  | 1.0937      | 5.8727          | -2.42486          | 0.00880 | DOWN  |
| PRDM16    | 5.5053      | 24.0705         | -2.12838          | 0.04758 | DOWN  |
| FHAD1     | 2.9305      | 14.8649         | -2.34268          | 0.00387 | DOWN  |
| GPR161    | 3.9586      | 16.6552         | -2.07290          | 0.03205 | DOWN  |
| ADCY10    | 1.6242      | 8.9589          | -2.46359          | 0.19484 | DOWN  |
| SUSD4     | 5.7278      | 26.4717         | -2.20840          | 0.00387 | DOWN  |
| CRNN      | 1.7262      | 12.2304         | -2.82480          | 0.16782 | DOWN  |
| AQP10     | 1.0819      | 4.6760          | -2.11165          | 0.17153 | DOWN  |
| FLG       | 1.1428      | 8.8859          | -2.95899          | 0.06125 | DOWN  |
| CNIH3     | 5.1366      | 21.1800         | -2.04382          | 0.05459 | DOWN  |
| OSR1      | 1.6861      | 13.1300         | -2.96109          | 0.03737 | DOWN  |
| REG3G     | 1.9374      | 12.9047         | -2.73572          | 0.07979 | DOWN  |
| ANKRD53   | 1.3107      | 12.2109         | -3.21979          | 0.05503 | DOWN  |
| DQX1      | 1.8794      | 7.9892          | -2.08779          | 0.17123 | DOWN  |
| ST6GAL2   | 1.9272      | 10.5922         | -2.45845          | 0.02839 | DOWN  |
| CNGA3     | 1.0163      | 10.7642         | -3.40486          | 0.04379 | DOWN  |
| TMEFF2    | 1.2330      | 8.8040          | -2.83594          | 0.13576 | DOWN  |
| DLX1      | 1.1416      | 12.7442         | -3.48065          | 0.00387 | DOWN  |
| UNC80     | 1.2158      | 8.1445          | -2.74392          | 0.00655 | DOWN  |
| TRPM8     | 1.2504      | 11.2201         | -3.16560          | 0.00387 | DOWN  |
| ESPNL     | 1.3227      | 9.1291          | -2.78699          | 0.00880 | DOWN  |
| GADL1     | 1.6114      | 9.2660          | -2.52367          | 0.06153 | DOWN  |
| ACKR2     | 1.7010      | 12.6614         | -2.89600          | 0.00387 | DOWN  |
| FAM198A   | 2.5663      | 13.5646         | -2.40210          | 0.02336 | DOWN  |
| SLC22A14  | 1.4825      | 8.2974          | -2.48464          | 0.06298 | DOWN  |
| TAGLN3    | 1.9045      | 11.6918         | -2.61804          | 0.03336 | DOWN  |
| NR1I2     | 1.1137      | 6.3257          | -2.50592          | 0.03336 | DOWN  |
| TMEM108   | 1.1791      | 14.0857         | -3.57853          | 0.00387 | DOWN  |
| MUC4      | 2.0909      | 13.0009         | -2.63641          | 0.00387 | DOWN  |
| ECE2      | 1.7953      | 9.7745          | -2.44478          | 0.10717 | DOWN  |
| VWA5B2    | 1.6520      | 11.9582         | -2.85570          | 0.05924 | DOWN  |
| RNF175    | 1.3105      | 9.5195          | -2.86083          | 0.01979 | DOWN  |
| CDH18     | 2.7142      | 14.8307         | -2.45000          | 0.02839 | DOWN  |
| GABRB2    | 1.3512      | 6.1523          | -2.18693          | 0.06727 | DOWN  |
| CPLX2     | 1.8329      | 14.6904         | -3.00271          | 0.00387 | DOWN  |
| MLIP      | 1.3868      | 17.7006         | -3.67399          | 0.00387 | DOWN  |
| FAXC      | 1.0252      | 4.2803          | -2.06180          | 0.07426 | DOWN  |
| TRIM50    | 1.5346      | 10.9963         | -2.84104          | 0.08695 | DOWN  |
| ASB10     | 1.0502      | 8.4709          | -3.01190          | 0.08295 | DOWN  |
| PXDNL     | 1.2045      | 8.0889          | -2.74749          | 0.00880 | DOWN  |
| ST18      | 2.5225      | 34.7950         | -3.78594          | 0.00387 | DOWN  |
| RSPO2     | 1.1349      | 8.5042          | -2.90563          | 0.01241 | DOWN  |
| FAM135B   | 2.5607      | 13.2629         | -2.37280          | 0.00655 | DOWN  |
| CDKN2B    | 8.5338      | 35.8029         | -2.06882          | 0.11588 | DOWN  |
| ACTL7B    | 1.1751      | 7.9945          | -2.76620          | 0.01979 | DOWN  |
| RGR       | 1.2349      | 6.7846          | -2.45791          | 0.03857 | DOWN  |
| HTR7      | 1.1403      | 6.6041          | -2.53392          | 0.06393 | DOWN  |
| SYT8      | 1.9311      | 10.3322         | -2.41962          | 0.01560 | DOWN  |
| KLHL35    | 1.1152      | 4.8428          | -2.11849          | 0.14453 | DOWN  |
| DRD2      | 1.0163      | 9.6847          | -3.25244          | 0.00387 | DOWN  |
| GRIK4     | 1.6957      | 8.6911          | -2.35763          | 0.09163 | DOWN  |
| ADAM33    | 1.2617      | 7.6260          | -2.59551          | 0.05784 | DOWN  |
| KIRREL3   | 1.4454      | 9.7097          | -2.74791          | 0.00880 | DOWN  |
| FAM57B    | 1.3186      | 7.6954          | -2.54496          | 0.14547 | DOWN  |
| HMGA2     | 1.9395      | 10.9656         | -2.49921          | 0.00387 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name              | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|------------------------|-------------|-----------------|-------------------|---------|-------|
| <i>PCDH15</i>          | 1.3704      | 7.0431          | -2.36159          | 0.00387 | DOWN  |
| <i>CDH8</i>            | 2.7232      | 14.5363         | -2.41628          | 0.00655 | DOWN  |
| <i>LYPD6B</i>          | 1.8429      | 7.7467          | -2.07157          | 0.04379 | DOWN  |
| <i>CNDP1</i>           | 1.3604      | 5.8316          | -2.09987          | 0.11443 | DOWN  |
| <i>CACNA2D4</i>        | 7.0745      | 29.6657         | -2.06810          | 0.00387 | DOWN  |
| <i>MAT1A</i>           | 1.3854      | 6.4889          | -2.22767          | 0.17123 | DOWN  |
| <i>AKR1C2</i>          | 2.0456      | 10.2319         | -2.32245          | 0.01081 | DOWN  |
| <i>DPYSL4</i>          | 1.4058      | 14.7352         | -3.38984          | 0.05233 | DOWN  |
| <i>GABRA2</i>          | 2.2435      | 10.0330         | -2.16091          | 0.01241 | DOWN  |
| <i>TMEM163</i>         | 2.3896      | 10.7040         | -2.16328          | 0.18784 | DOWN  |
| <i>RIT2</i>            | 1.5442      | 12.0062         | -2.95886          | 0.15202 | DOWN  |
| <i>SH2D6</i>           | 2.7231      | 11.0224         | -2.01713          | 0.10746 | DOWN  |
| <i>TRIM36</i>          | 3.2235      | 14.8853         | -2.20719          | 0.02225 | DOWN  |
| <i>GRIA4</i>           | 1.4076      | 7.0618          | -2.32679          | 0.00387 | DOWN  |
| <i>TCTEX1D1</i>        | 1.6870      | 14.2003         | -3.07341          | 0.06247 | DOWN  |
| <i>HHEX</i>            | 5.0962      | 20.8967         | -2.03579          | 0.09947 | DOWN  |
| <i>GRM1</i>            | 1.9980      | 20.6552         | -3.36990          | 0.00387 | DOWN  |
| <i>ZIC1</i>            | 1.3839      | 11.7494         | -3.08582          | 0.03336 | DOWN  |
| <i>LGI2</i>            | 1.5657      | 6.9949          | -2.15953          | 0.02109 | DOWN  |
| <i>ACOXL</i>           | 1.5742      | 9.9141          | -2.65485          | 0.00387 | DOWN  |
| <i>PTPRR</i>           | 1.1400      | 5.0026          | -2.13360          | 0.08742 | DOWN  |
| <i>SCN3A</i>           | 1.3961      | 6.8391          | -2.29238          | 0.04379 | DOWN  |
| <i>PLEKHG4B</i>        | 1.1928      | 5.8255          | -2.28804          | 0.01560 | DOWN  |
| <i>HS3ST3A1</i>        | 3.6377      | 19.2828         | -2.40622          | 0.02439 | DOWN  |
| <i>AK5</i>             | 1.9971      | 9.6128          | -2.26708          | 0.00387 | DOWN  |
| <i>CABYR</i>           | 1.7796      | 7.2546          | -2.02739          | 0.07175 | DOWN  |
| <i>JPH3</i>            | 1.1456      | 9.9048          | -3.11199          | 0.02648 | DOWN  |
| <i>CDH12</i>           | 1.0736      | 5.4910          | -2.35458          | 0.06906 | DOWN  |
| <i>CERS3</i>           | 1.5683      | 11.8336         | -2.91563          | 0.02648 | DOWN  |
| <i>CHODL</i>           | 1.0773      | 4.5535          | -2.07962          | 0.03336 | DOWN  |
| <i>PDE1C</i>           | 12.1834     | 49.7045         | -2.02847          | 0.00655 | DOWN  |
| <i>EME1</i>            | 2.0895      | 12.2115         | -2.54702          | 0.04141 | DOWN  |
| <i>CNTNAP5</i>         | 2.4244      | 13.2283         | -2.44794          | 0.11729 | DOWN  |
| <i>GRIA1</i>           | 1.4931      | 10.8842         | -2.86589          | 0.00387 | DOWN  |
| <i>FMN2</i>            | 2.1708      | 12.4225         | -2.51669          | 0.02648 | DOWN  |
| <i>GPR61</i>           | 1.3359      | 9.5198          | -2.83309          | 0.02336 | DOWN  |
| <i>CLDN8</i>           | 4.2627      | 23.5310         | -2.46471          | 0.02439 | DOWN  |
| <i>PPP2R2B</i>         | 3.5623      | 14.9878         | -2.07292          | 0.00387 | DOWN  |
| <i>UNC5D</i>           | 1.9130      | 8.1266          | -2.08679          | 0.11052 | DOWN  |
| <i>GAREML</i>          | 2.1216      | 10.2975         | -2.27909          | 0.12182 | DOWN  |
| <i>RADIL</i>           | 1.0107      | 8.3482          | -3.04610          | 0.01712 | DOWN  |
| <i>EXTL1</i>           | 1.2214      | 8.5849          | -2.81331          | 0.09896 | DOWN  |
| <i>ESYT3</i>           | 2.7009      | 13.2869         | -2.29848          | 0.01712 | DOWN  |
| <i>C2orf62</i>         | 2.8931      | 12.4324         | -2.10344          | 0.11111 | DOWN  |
| <i>CD1E</i>            | 1.3944      | 6.5149          | -2.22412          | 0.00655 | DOWN  |
| <i>PLA2G2F</i>         | 1.4016      | 10.0959         | -2.84863          | 0.09632 | DOWN  |
| <i>FGF17</i>           | 1.4966      | 8.9430          | -2.57906          | 0.08011 | DOWN  |
| <i>ACTC1</i>           | 1.2520      | 5.0388          | -2.00883          | 0.17903 | DOWN  |
| <i>SCUBE1</i>          | 2.2452      | 12.2665         | -2.44981          | 0.00387 | DOWN  |
| <i>IRX6</i>            | 1.4938      | 9.6994          | -2.69894          | 0.03205 | DOWN  |
| <i>CELF3</i>           | 1.0083      | 8.4344          | -3.06436          | 0.03857 | DOWN  |
| <i>RGL4</i>            | 1.6133      | 11.7842         | -2.86881          | 0.05960 | DOWN  |
| <i>FAM131B</i>         | 1.2662      | 10.1259         | -2.99945          | 0.00387 | DOWN  |
| <i>FNDC5</i>           | 1.2590      | 16.3353         | -3.69764          | 0.00880 | DOWN  |
| <i>TMPRSS3</i>         | 2.4442      | 11.6124         | -2.24823          | 0.02839 | DOWN  |
| <i>FCRL3</i>           | 2.8201      | 12.9180         | -2.19554          | 0.03281 | DOWN  |
| <i>LY6K</i>            | 1.6708      | 11.0794         | -2.72923          | 0.04013 | DOWN  |
| <i>RECQL4</i>          | 3.5721      | 15.7277         | -2.13849          | 0.02336 | DOWN  |
| <i>NPHS1</i>           | 4.7907      | 19.9849         | -2.06060          | 0.18285 | DOWN  |
| <i>GRIN2C</i>          | 1.1117      | 8.5862          | -2.94922          | 0.00880 | DOWN  |
| <i>CCDC155</i>         | 3.8395      | 26.7289         | -2.79940          | 0.01560 | DOWN  |
| <i>CD300LG</i>         | 1.6037      | 15.1192         | -3.23687          | 0.02109 | DOWN  |
| <i>SHANK1</i>          | 1.1576      | 14.9095         | -3.68706          | 0.00655 | DOWN  |
| <i>TREML1</i>          | 1.0299      | 7.7564          | -2.91285          | 0.06393 | DOWN  |
| <i>RNASEK-C17orf49</i> | 1.3188      | 8.0372          | -2.60743          | 0.16202 | DOWN  |
| <i>CCDC78</i>          | 1.5015      | 6.5305          | -2.12078          | 0.02537 | DOWN  |
| <i>C16orf59</i>        | 1.9151      | 13.8582         | -2.85528          | 0.00655 | DOWN  |
| <i>ZG16B</i>           | 1.6312      | 11.9623         | -2.87446          | 0.03939 | DOWN  |
| <i>ITIH3</i>           | 4.3097      | 25.4460         | -2.56179          | 0.00880 | DOWN  |
| <i>CYP4A22</i>         | 1.6425      | 8.9790          | -2.45071          | 0.12062 | DOWN  |
| <i>SLC1A7</i>          | 1.5262      | 10.1497         | -2.73341          | 0.15362 | DOWN  |
| <i>KNCN</i>            | 1.2904      | 10.6202         | -3.04091          | 0.06594 | DOWN  |
| <i>PDPN</i>            | 2.1410      | 8.8707          | -2.05075          | 0.04654 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------|-------------|-----------------|-------------------|---------|-------|
| MATN1     | 1.4755      | 8.0907          | -2.45511          | 0.09977 | DOWN  |
| WNT4      | 2.0055      | 15.2043         | -2.92245          | 0.07468 | DOWN  |
| FCGR3B    | 1.9261      | 9.3866          | -2.28491          | 0.12985 | DOWN  |
| AXDND1    | 2.1052      | 10.5149         | -2.32044          | 0.17297 | DOWN  |
| KLHDC8A   | 3.9796      | 19.1271         | -2.26494          | 0.02839 | DOWN  |
| C1orf145  | 1.4398      | 5.8743          | -2.02854          | 0.11921 | DOWN  |
| LRRTM1    | 2.3003      | 9.6762          | -2.07262          | 0.19084 | DOWN  |
| KCNF1     | 1.5538      | 9.1001          | -2.55008          | 0.00387 | DOWN  |
| MSX1      | 2.1096      | 9.2171          | -2.12732          | 0.03797 | DOWN  |
| NIPAL1    | 3.5056      | 18.9018         | -2.43081          | 0.14841 | DOWN  |
| SPTA1     | 2.1646      | 18.9242         | -3.12804          | 0.02225 | DOWN  |
| EFHB      | 1.3828      | 9.6010          | -2.79554          | 0.07401 | DOWN  |
| CADPS     | 2.6169      | 36.1534         | -3.78822          | 0.00387 | DOWN  |
| PRRT3     | 1.3919      | 6.2608          | -2.16927          | 0.11443 | DOWN  |
| CXCL3     | 2.5405      | 11.2573         | -2.14771          | 0.18335 | DOWN  |
| TGM4      | 1.6454      | 13.7988         | -3.06801          | 0.02756 | DOWN  |
| GRIK3     | 4.0564      | 17.0625         | -2.07256          | 0.05819 | DOWN  |
| MFI2      | 4.9025      | 25.0917         | -2.35563          | 0.00655 | DOWN  |
| CDC25A    | 1.6653      | 8.5203          | -2.35516          | 0.02109 | DOWN  |
| BSN       | 1.0191      | 9.1517          | -3.16681          | 0.00387 | DOWN  |
| CAMKV     | 1.1050      | 13.6353         | -3.62525          | 0.00387 | DOWN  |
| MST1R     | 2.3718      | 10.9886         | -2.21197          | 0.04691 | DOWN  |
| GRM2      | 1.0613      | 10.2071         | -3.26563          | 0.00387 | DOWN  |
| PITX2     | 4.0647      | 26.7912         | -2.72053          | 0.01847 | DOWN  |
| HAND2     | 1.8211      | 14.3861         | -2.98179          | 0.08467 | DOWN  |
| TMEM155   | 1.3588      | 6.5494          | -2.26906          | 0.06153 | DOWN  |
| RANBP3L   | 4.2740      | 22.3698         | -2.38788          | 0.17549 | DOWN  |
| GPR98     | 3.4751      | 14.4260         | -2.05353          | 0.07426 | DOWN  |
| C5orf63   | 4.3913      | 19.7241         | -2.16725          | 0.02648 | DOWN  |
| HTR4      | 1.4608      | 14.5327         | -3.31448          | 0.00387 | DOWN  |
| TIGD6     | 3.2856      | 13.2230         | -2.00880          | 0.14943 | DOWN  |
| TERT      | 1.3342      | 5.5405          | -2.05409          | 0.19590 | DOWN  |
| ACSL6     | 4.2795      | 25.2395         | -2.56018          | 0.00387 | DOWN  |
| RAET1E    | 1.0594      | 4.9446          | -2.22264          | 0.03737 | DOWN  |
| MYOZ3     | 1.9292      | 16.3702         | -3.08501          | 0.00387 | DOWN  |
| KIF6      | 1.5083      | 6.9385          | -2.20173          | 0.04889 | DOWN  |
| TMEM74    | 1.2513      | 10.6958         | -3.09556          | 0.11138 | DOWN  |
| OSR2      | 2.1348      | 15.0057         | -2.81336          | 0.01847 | DOWN  |
| BAALC     | 1.2758      | 10.4114         | -3.02873          | 0.00655 | DOWN  |
| DCSTAMP   | 1.5551      | 13.6720         | -3.13619          | 0.03573 | DOWN  |
| C9orf24   | 1.2131      | 5.2559          | -2.11521          | 0.09505 | DOWN  |
| ZMAT4     | 2.0473      | 9.9057          | -2.27455          | 0.05960 | DOWN  |
| C8orf34   | 1.6779      | 8.9162          | -2.40978          | 0.00880 | DOWN  |
| TRPV6     | 3.5452      | 16.2657         | -2.19788          | 0.01560 | DOWN  |
| C7orf34   | 1.4653      | 7.7891          | -2.41032          | 0.18663 | DOWN  |
| WNK2      | 4.2902      | 24.2634         | -2.49968          | 0.00387 | DOWN  |
| SLITRK5   | 1.6962      | 7.7627          | -2.19427          | 0.08194 | DOWN  |
| FAT3      | 3.1207      | 15.3502         | -2.29833          | 0.00655 | DOWN  |
| LRFN5     | 1.7496      | 20.2469         | -3.53263          | 0.01241 | DOWN  |
| ZNF488    | 2.4674      | 14.3617         | -2.54117          | 0.04187 | DOWN  |
| TSHR      | 2.1019      | 9.9055          | -2.23651          | 0.07588 | DOWN  |
| TMEM63C   | 1.3230      | 6.4443          | -2.28418          | 0.10588 | DOWN  |
| AMER2     | 1.0689      | 9.6523          | -3.17472          | 0.05385 | DOWN  |
| PPP1R36   | 1.6052      | 6.9752          | -2.11945          | 0.15171 | DOWN  |
| E2F7      | 1.3620      | 5.5400          | -2.02415          | 0.02336 | DOWN  |
| NELL1     | 3.6122      | 17.6026         | -2.28484          | 0.05879 | DOWN  |
| C1QL3     | 1.1942      | 5.7844          | -2.27607          | 0.00655 | DOWN  |
| KCNC2     | 2.0068      | 12.6553         | -2.65674          | 0.03737 | DOWN  |
| CMTM5     | 1.5715      | 12.9596         | -3.04380          | 0.02336 | DOWN  |
| GLB1L3    | 1.4587      | 12.3495         | -3.08172          | 0.00880 | DOWN  |
| ADAMTS15  | 2.9024      | 12.2789         | -2.08088          | 0.00387 | DOWN  |
| LRTM2     | 2.0096      | 9.2701          | -2.20567          | 0.08324 | DOWN  |
| TMEM100   | 1.0870      | 5.8643          | -2.43165          | 0.06954 | DOWN  |
| NETO1     | 1.8968      | 13.7028         | -2.85284          | 0.03857 | DOWN  |
| CYB5R2    | 2.8021      | 27.2247         | -3.28034          | 0.00387 | DOWN  |
| SERPINB7  | 1.0036      | 4.9096          | -2.29041          | 0.07979 | DOWN  |
| BEAN1     | 2.1149      | 15.8687         | -2.90752          | 0.00387 | DOWN  |
| CPLX4     | 1.2655      | 5.3562          | -2.08153          | 0.18026 | DOWN  |
| ZCCHC18   | 1.9948      | 8.1566          | -2.03172          | 0.11371 | DOWN  |
| YPEL4     | 1.9571      | 8.0327          | -2.03720          | 0.11225 | DOWN  |
| PLIN1     | 3.0015      | 12.9594         | -2.11022          | 0.17451 | DOWN  |
| GREM1     | 1.6957      | 9.7799          | -2.52791          | 0.06153 | DOWN  |
| MS4A14    | 1.8211      | 7.6889          | -2.07799          | 0.19970 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name       | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------------|-------------|-----------------|-------------------|---------|-------|
| <i>EPB42</i>    | 1.1762      | 7.9643          | -2.75947          | 0.16802 | DOWN  |
| <i>TCP10L2</i>  | 1.2342      | 8.7963          | -2.83338          | 0.01979 | DOWN  |
| <i>TMEM92</i>   | 1.6376      | 7.4292          | -2.18165          | 0.01712 | DOWN  |
| <i>ISLR2</i>    | 2.2529      | 10.4272         | -2.21051          | 0.01979 | DOWN  |
| <i>LOXHD1</i>   | 1.8385      | 13.5908         | -2.88605          | 0.00387 | DOWN  |
| <i>IGF2</i>     | 1.5055      | 8.7953          | -2.54646          | 0.14461 | DOWN  |
| <i>RBFOX3</i>   | 2.6353      | 30.4001         | -3.52803          | 0.00387 | DOWN  |
| <i>PROCA1</i>   | 3.6641      | 15.1827         | -2.05090          | 0.00387 | DOWN  |
| <i>CORO6</i>    | 2.2124      | 9.6548          | -2.12564          | 0.05960 | DOWN  |
| <i>AQP2</i>     | 34.4014     | 314.3140        | -3.19167          | 0.19405 | DOWN  |
| <i>ANKRD33</i>  | 1.1989      | 7.8403          | -2.70916          | 0.02953 | DOWN  |
| <i>TTYH1</i>    | 1.7639      | 7.8649          | -2.15665          | 0.00387 | DOWN  |
| <i>PSCA</i>     | 2.3018      | 15.3477         | -2.73719          | 0.07047 | DOWN  |
| <i>TRPV3</i>    | 1.2606      | 8.7779          | -2.79975          | 0.05960 | DOWN  |
| <i>KLK1</i>     | 1.1769      | 10.1195         | -3.10409          | 0.05924 | DOWN  |
| <i>KLK2</i>     | 2.8110      | 25.1975         | -3.16415          | 0.00387 | DOWN  |
| <i>KLK11</i>    | 1.1479      | 8.1591          | -2.82935          | 0.03939 | DOWN  |
| <i>MGAT5B</i>   | 1.6848      | 10.5701         | -2.64930          | 0.01081 | DOWN  |
| <i>SCARA3</i>   | 3.6710      | 14.6887         | -2.00045          | 0.02439 | DOWN  |
| <i>SCARA5</i>   | 1.7970      | 7.4509          | -2.05186          | 0.17751 | DOWN  |
| <i>PNOC</i>     | 1.7439      | 8.0888          | -2.21361          | 0.10990 | DOWN  |
| <i>HR</i>       | 3.0898      | 15.6785         | -2.34323          | 0.03336 | DOWN  |
| <i>SFTPC</i>    | 1.0818      | 8.4815          | -2.97083          | 0.01847 | DOWN  |
| <i>PHYHIP</i>   | 1.9280      | 15.4350         | -3.00107          | 0.00387 | DOWN  |
| <i>CHRM1</i>    | 1.2075      | 7.3837          | -2.61230          | 0.11820 | DOWN  |
| <i>GDNF</i>     | 1.0794      | 22.1578         | -4.35951          | 0.00387 | DOWN  |
| <i>VWA3B</i>    | 1.2658      | 8.2473          | -2.70392          | 0.00387 | DOWN  |
| <i>KCTD19</i>   | 1.4027      | 6.3071          | -2.16879          | 0.08504 | DOWN  |
| <i>LRP1B</i>    | 1.4032      | 5.9362          | -2.08086          | 0.08467 | DOWN  |
| <i>CXXC4</i>    | 1.7086      | 7.1277          | -2.06067          | 0.09137 | DOWN  |
| <i>SHOX2</i>    | 1.4123      | 9.4855          | -2.74767          | 0.08742 | DOWN  |
| <i>ATOH8</i>    | 4.3953      | 19.5524         | -2.15331          | 0.01560 | DOWN  |
| <i>STXBP6</i>   | 4.0774      | 20.0143         | -2.29530          | 0.03042 | DOWN  |
| <i>GRM5</i>     | 1.7480      | 11.2137         | -2.68147          | 0.03135 | DOWN  |
| <i>IL13</i>     | 1.7191      | 12.2524         | -2.83332          | 0.12143 | DOWN  |
| <i>SH3TC2</i>   | 2.6061      | 15.0426         | -2.52911          | 0.00387 | DOWN  |
| <i>C22orf15</i> | 1.0505      | 10.0300         | -3.25512          | 0.10971 | DOWN  |
| <i>UMOD</i>     | 322.0180    | 1,581.1700      | -2.29578          | 0.10074 | DOWN  |
| <i>GP2</i>      | 6.2821      | 27.1751         | -2.11296          | 0.12404 | DOWN  |
| <i>CTNND2</i>   | 1.1562      | 6.9836          | -2.59464          | 0.00387 | DOWN  |
| <i>KCNAB3</i>   | 2.0300      | 9.9246          | -2.28955          | 0.06125 | DOWN  |
| <i>NSG2</i>     | 1.1870      | 7.2905          | -2.61865          | 0.00655 | DOWN  |
| <i>SERPINA6</i> | 3.2618      | 17.6907         | -2.43926          | 0.05233 | DOWN  |
| <i>FOXD4</i>    | 1.4778      | 9.3829          | -2.66657          | 0.00655 | DOWN  |
| <i>MRGPRX1</i>  | 1.4045      | 10.0331         | -2.83665          | 0.17521 | DOWN  |
| <i>SEMA3E</i>   | 2.0254      | 9.9708          | -2.29952          | 0.16392 | DOWN  |
| <i>VSTM2A</i>   | 1.4024      | 20.0056         | -3.83439          | 0.02336 | DOWN  |
| <i>SGCD</i>     | 1.4361      | 5.8962          | -2.03765          | 0.01560 | DOWN  |
| <i>GPR37</i>    | 1.8776      | 9.0453          | -2.26829          | 0.01399 | DOWN  |
| <i>PSG6</i>     | 3.3034      | 20.6101         | -2.64133          | 0.00387 | DOWN  |
| <i>CEACAM3</i>  | 2.3413      | 16.0010         | -2.77277          | 0.02953 | DOWN  |
| <i>FPR2</i>     | 1.7499      | 7.2168          | -2.04408          | 0.18356 | DOWN  |
| <i>C8orf74</i>  | 1.0361      | 11.7999         | -3.50950          | 0.00655 | DOWN  |
| <i>ALK</i>      | 1.9375      | 13.7053         | -2.82250          | 0.04090 | DOWN  |
| <i>PROL1</i>    | 1.0237      | 8.7535          | -3.09603          | 0.08828 | DOWN  |
| <i>NPTX1</i>    | 2.0137      | 8.7358          | -2.11706          | 0.08194 | DOWN  |
| <i>KRT15</i>    | 1.4240      | 10.9587         | -2.94411          | 0.00387 | DOWN  |
| <i>KRT13</i>    | 3.3453      | 24.1010         | -2.84888          | 0.03737 | DOWN  |
| <i>KSR2</i>     | 1.4306      | 10.6844         | -2.90081          | 0.00387 | DOWN  |
| <i>COL24A1</i>  | 1.3502      | 8.8503          | -2.71255          | 0.03281 | DOWN  |
| <i>PCDHB1</i>   | 1.0385      | 7.9833          | -2.94250          | 0.01847 | DOWN  |
| <i>NINJ2</i>    | 2.3774      | 11.1801         | -2.23346          | 0.08595 | DOWN  |
| <i>LGALS9C</i>  | 1.3688      | 8.0950          | -2.56410          | 0.05879 | DOWN  |
| <i>FOXB1</i>    | 1.8784      | 15.5277         | -3.04729          | 0.12859 | DOWN  |
| <i>REG3A</i>    | 1.2930      | 19.2338         | -3.89483          | 0.01241 | DOWN  |
| <i>REG1B</i>    | 1.2173      | 6.4894          | -2.41443          | 0.05548 | DOWN  |
| <i>ABCG4</i>    | 2.4646      | 17.9363         | -2.86349          | 0.05710 | DOWN  |
| <i>PRSS27</i>   | 2.0389      | 9.4991          | -2.22001          | 0.07175 | DOWN  |
| <i>C2orf54</i>  | 2.1172      | 10.9529         | -2.37105          | 0.13576 | DOWN  |
| <i>AGXT</i>     | 2.2997      | 16.4344         | -2.83720          | 0.02648 | DOWN  |
| <i>CARNS1</i>   | 1.0983      | 6.3471          | -2.53084          | 0.08790 | DOWN  |
| <i>SNX32</i>    | 1.7688      | 13.2596         | -2.90619          | 0.02756 | DOWN  |
| <i>OVOL1</i>    | 1.9558      | 11.6182         | -2.57058          | 0.04437 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name     | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|---------------|-------------|-----------------|-------------------|---------|-------|
| AQPEP         | 1.3292      | 8.4646          | -2.67093          | 0.04691 | DOWN  |
| MRGPRF        | 2.9806      | 18.5720         | -2.63948          | 0.02537 | DOWN  |
| ARPP21        | 1.8205      | 18.7284         | -3.36279          | 0.00387 | DOWN  |
| RP11-683L23.1 | 1.2271      | 15.0884         | -3.62014          | 0.03737 | DOWN  |
| SLC2A14       | 1.8558      | 10.1889         | -2.45688          | 0.00655 | DOWN  |
| DAB1          | 1.1783      | 9.7049          | -3.04196          | 0.00387 | DOWN  |
| CCDC36        | 4.0788      | 18.7375         | -2.19971          | 0.14532 | DOWN  |
| C2orf70       | 1.3119      | 7.4850          | -2.51234          | 0.11750 | DOWN  |
| GPR113        | 1.1564      | 6.9420          | -2.58577          | 0.11389 | DOWN  |
| XCR1          | 1.7973      | 7.9867          | -2.15179          | 0.10867 | DOWN  |
| HSPB7         | 2.2056      | 12.5944         | -2.51354          | 0.09797 | DOWN  |
| PHOSPHO1      | 1.3907      | 5.6388          | -2.01958          | 0.09551 | DOWN  |
| TUBB8         | 1.2534      | 8.4242          | -2.74868          | 0.07047 | DOWN  |
| CBX2          | 3.4815      | 16.4630         | -2.24143          | 0.00655 | DOWN  |
| C9orf131      | 1.7134      | 11.1189         | -2.69807          | 0.03205 | DOWN  |
| SLC16A11      | 1.8512      | 9.1467          | -2.30481          | 0.11778 | DOWN  |
| GALNTL6       | 2.1232      | 14.7362         | -2.79506          | 0.03042 | DOWN  |
| IGDCC3        | 1.1649      | 5.0227          | -2.10824          | 0.14787 | DOWN  |
| SLC26A9       | 2.2187      | 9.2199          | -2.05506          | 0.03939 | DOWN  |
| MFSD4         | 11.0637     | 57.6549         | -2.38161          | 0.04585 | DOWN  |
| TMEM81        | 2.2897      | 9.3406          | -2.02837          | 0.02336 | DOWN  |
| BRSK2         | 1.1687      | 7.0507          | -2.59289          | 0.00387 | DOWN  |
| AMZ1          | 1.4375      | 6.8645          | -2.25557          | 0.16933 | DOWN  |
| ZIC4          | 1.5568      | 24.3535         | -3.96748          | 0.00387 | DOWN  |
| DES           | 5.5612      | 61.8504         | -3.47530          | 0.16766 | DOWN  |
| SPSB4         | 2.2703      | 21.7403         | -3.25942          | 0.01081 | DOWN  |
| RAG2          | 1.6527      | 17.8718         | -3.43481          | 0.00387 | DOWN  |
| CADM2         | 1.2702      | 7.5653          | -2.57436          | 0.12166 | DOWN  |
| FAM182B       | 3.4270      | 22.6674         | -2.72561          | 0.09524 | DOWN  |
| GAL3ST3       | 2.2305      | 10.7924         | -2.27461          | 0.19405 | DOWN  |
| GRAMD2        | 2.6725      | 11.0085         | -2.04235          | 0.00387 | DOWN  |
| CHRNA7        | 1.2036      | 6.6043          | -2.45604          | 0.14581 | DOWN  |
| SCUBE2        | 1.8694      | 9.3307          | -2.31938          | 0.00387 | DOWN  |
| UBQLNL        | 1.7561      | 9.8823          | -2.49247          | 0.15231 | DOWN  |
| UBQLN3        | 2.1374      | 14.3828         | -2.75044          | 0.09505 | DOWN  |
| P2RY2         | 1.9212      | 8.6559          | -2.17169          | 0.07662 | DOWN  |
| GPR156        | 1.2504      | 9.7542          | -2.96360          | 0.00387 | DOWN  |
| EIF4E1B       | 1.0420      | 7.6232          | -2.87105          | 0.03281 | DOWN  |
| DOK7          | 3.6909      | 22.3180         | -2.59616          | 0.02225 | DOWN  |
| PLEKHD1       | 1.2216      | 6.0927          | -2.31826          | 0.07047 | DOWN  |
| AMIGO3        | 1.3284      | 6.0563          | -2.18879          | 0.18898 | DOWN  |
| AIM1L         | 1.8656      | 15.0620         | -3.01317          | 0.00387 | DOWN  |
| LRRTM4        | 1.2171      | 7.6152          | -2.64539          | 0.02336 | DOWN  |
| OR51B6        | 1.2648      | 12.1611         | -3.26532          | 0.13406 | DOWN  |
| OR4K13        | 1.0587      | 11.5990         | -3.45365          | 0.17521 | DOWN  |
| OR4N2         | 3.9325      | 28.6419         | -2.86460          | 0.18898 | DOWN  |
| AC110781.3    | 1.0994      | 8.1111          | -2.88322          | 0.13175 | DOWN  |
| DIRAS1        | 1.6990      | 7.9708          | -2.23002          | 0.16538 | DOWN  |
| GRIN1         | 1.0131      | 12.2730         | -3.59859          | 0.00387 | DOWN  |
| SOX11         | 1.1683      | 5.0523          | -2.11256          | 0.05710 | DOWN  |
| FUT2          | 1.2230      | 6.4629          | -2.40177          | 0.11528 | DOWN  |
| LY6H          | 1.1356      | 6.2145          | -2.45223          | 0.11417 | DOWN  |
| CLVS1         | 2.3005      | 22.7880         | -3.30824          | 0.02839 | DOWN  |
| FBXO39        | 1.0596      | 4.9721          | -2.23030          | 0.15494 | DOWN  |
| C10orf71      | 1.5094      | 11.3935         | -2.91613          | 0.00387 | DOWN  |
| NIM1K         | 1.6495      | 8.9009          | -2.43188          | 0.08718 | DOWN  |
| OR2G2         | 1.1885      | 7.9495          | -2.74175          | 0.19116 | DOWN  |
| NHLH2         | 1.0085      | 6.1672          | -2.61241          | 0.02336 | DOWN  |
| C12orf68      | 1.4851      | 7.1343          | -2.26420          | 0.00880 | DOWN  |
| PRSS42        | 2.2940      | 11.7986         | -2.36267          | 0.04966 | DOWN  |
| CA8           | 1.4914      | 14.1672         | -3.24781          | 0.00655 | DOWN  |
| FAM132B       | 3.1436      | 13.4003         | -2.09177          | 0.03737 | DOWN  |
| CD300LB       | 1.4374      | 7.6091          | -2.40425          | 0.05819 | DOWN  |
| TRIML2        | 1.2696      | 10.1401         | -2.99761          | 0.00387 | DOWN  |
| C12orf42      | 2.2124      | 9.1356          | -2.04586          | 0.01712 | DOWN  |
| GGN           | 2.0205      | 12.9871         | -2.68433          | 0.04829 | DOWN  |
| C17orf96      | 1.1737      | 6.1578          | -2.39132          | 0.02439 | DOWN  |
| GATA2         | 6.4189      | 33.2709         | -2.37388          | 0.03493 | DOWN  |
| MKRN3         | 1.5590      | 11.1192         | -2.83434          | 0.00387 | DOWN  |
| LBX2          | 1.6758      | 7.1746          | -2.09805          | 0.11820 | DOWN  |
| TPPP2         | 1.1848      | 6.7381          | -2.50772          | 0.04141 | DOWN  |
| LRRC3B        | 1.6815      | 13.1190         | -2.96383          | 0.04141 | DOWN  |
| MRGPRX3       | 1.0861      | 9.9607          | -3.19713          | 0.12207 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name        | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|------------------|-------------|-----------------|-------------------|---------|-------|
| <i>ITLN1</i>     | 1.1105      | 5.9767          | -2.42809          | 0.14270 | DOWN  |
| <i>NRXN1</i>     | 3.4001      | 22.3314         | -2.71544          | 0.00387 | DOWN  |
| <i>GPBAR1</i>    | 1.2928      | 10.7516         | -3.05595          | 0.06153 | DOWN  |
| <i>TH</i>        | 2.2495      | 15.3266         | -2.76836          | 0.02537 | DOWN  |
| <i>SLC9A4</i>    | 2.6837      | 13.3339         | -2.31284          | 0.03281 | DOWN  |
| <i>PLD5</i>      | 1.6598      | 11.8960         | -2.84143          | 0.02336 | DOWN  |
| <i>KCNE1</i>     | 2.8083      | 14.1199         | -2.32998          | 0.02336 | DOWN  |
| <i>PRR26</i>     | 2.1317      | 8.8073          | -2.04672          | 0.16260 | DOWN  |
| <i>RNF182</i>    | 2.2348      | 11.4437         | -2.35632          | 0.07886 | DOWN  |
| <i>GSX2</i>      | 1.7144      | 9.0542          | -2.40087          | 0.14668 | DOWN  |
| <i>CXCR2</i>     | 1.0059      | 9.5426          | -3.24586          | 0.01081 | DOWN  |
| <i>CHRM2</i>     | 1.7820      | 18.8644         | -3.40407          | 0.00387 | DOWN  |
| <i>PENK</i>      | 2.0170      | 20.6810         | -3.35801          | 0.00387 | DOWN  |
| <i>TMEM132C</i>  | 1.1870      | 5.7916          | -2.28667          | 0.08790 | DOWN  |
| <i>CCDC108</i>   | 2.1087      | 11.1786         | -2.40633          | 0.04236 | DOWN  |
| <i>SOX2</i>      | 1.4039      | 9.5569          | -2.76708          | 0.17049 | DOWN  |
| <i>OR6T1</i>     | 1.1590      | 14.6323         | -3.65819          | 0.14980 | DOWN  |
| <i>OR52H1</i>    | 1.1320      | 6.8029          | -2.58732          | 0.12319 | DOWN  |
| <i>ATG9B</i>     | 3.0314      | 14.8863         | -2.29595          | 0.03573 | DOWN  |
| <i>OR8H2</i>     | 1.0857      | 5.9950          | -2.46516          | 0.19857 | DOWN  |
| <i>BAI1</i>      | 1.8399      | 7.8108          | -2.08581          | 0.12143 | DOWN  |
| <i>FTMT</i>      | 1.0155      | 6.4860          | -2.67514          | 0.19213 | DOWN  |
| <i>RGMA</i>      | 2.5927      | 18.6495         | -2.84660          | 0.00387 | DOWN  |
| <i>HHIPL1</i>    | 1.0056      | 5.3393          | -2.40866          | 0.01081 | DOWN  |
| <i>GABRG3</i>    | 1.2511      | 7.3951          | -2.56339          | 0.03939 | DOWN  |
| <i>KCNK4</i>     | 1.0932      | 10.1171         | -3.21013          | 0.02109 | DOWN  |
| <i>NXPH3</i>     | 1.3061      | 8.5497          | -2.71061          | 0.09929 | DOWN  |
| <i>OR10G7</i>    | 1.1384      | 11.0636         | -3.28075          | 0.19484 | DOWN  |
| <i>OR4Q3</i>     | 1.2128      | 11.7693         | -3.27861          | 0.16782 | DOWN  |
| <i>KCNB2</i>     | 1.0361      | 8.5278          | -3.04100          | 0.02839 | DOWN  |
| <i>BRICD5</i>    | 6.0436      | 27.7794         | -2.20055          | 0.08904 | DOWN  |
| <i>RGS6</i>      | 2.5201      | 17.0502         | -2.75824          | 0.00387 | DOWN  |
| <i>GRID1</i>     | 1.0636      | 6.7717          | -2.67063          | 0.14906 | DOWN  |
| <i>GPR97</i>     | 1.1178      | 6.4381          | -2.52602          | 0.03797 | DOWN  |
| <i>SLC25A18</i>  | 1.5111      | 6.2176          | -2.04079          | 0.08862 | DOWN  |
| <i>C21orf90</i>  | 1.1019      | 6.0760          | -2.46318          | 0.09481 | DOWN  |
| <i>C19orf59</i>  | 1.1668      | 7.7963          | -2.74022          | 0.11138 | DOWN  |
| <i>BEGAIN</i>    | 2.0072      | 11.3704         | -2.50201          | 0.01241 | DOWN  |
| <i>CSMD1</i>     | 2.3762      | 12.5067         | -2.39600          | 0.00387 | DOWN  |
| <i>C2CD4C</i>    | 1.3300      | 6.0671          | -2.18958          | 0.01241 | DOWN  |
| <i>OR52L1</i>    | 1.0449      | 8.5290          | -3.02896          | 0.16399 | DOWN  |
| <i>SSTR3</i>     | 1.2874      | 7.6012          | -2.56181          | 0.01979 | DOWN  |
| <i>MEX3B</i>     | 1.8757      | 8.3602          | -2.15608          | 0.04654 | DOWN  |
| <i>PCBP3</i>     | 6.9221      | 34.0061         | -2.29651          | 0.00387 | DOWN  |
| <i>CCR3</i>      | 1.0621      | 14.4286         | -3.76389          | 0.00387 | DOWN  |
| <i>MARCH11</i>   | 2.5567      | 14.4958         | -2.50326          | 0.16228 | DOWN  |
| <i>ASCL2</i>     | 1.6185      | 7.0308          | -2.11907          | 0.04236 | DOWN  |
| <i>TRAIIP</i>    | 1.7204      | 9.3775          | -2.44648          | 0.01399 | DOWN  |
| <i>AIFM3</i>     | 3.3657      | 16.4446         | -2.28862          | 0.08230 | DOWN  |
| <i>SCN5A</i>     | 1.0490      | 9.7146          | -3.21111          | 0.01081 | DOWN  |
| <i>ARSI</i>      | 1.4029      | 8.4650          | -2.59305          | 0.03042 | DOWN  |
| <i>NPB</i>       | 1.3047      | 6.4250          | -2.30000          | 0.18129 | DOWN  |
| <i>TMPRSS2</i>   | 12.0821     | 49.1996         | -2.02577          | 0.06594 | DOWN  |
| <i>TBX1</i>      | 2.9917      | 13.1834         | -2.13970          | 0.16585 | DOWN  |
| <i>CNTN2</i>     | 1.5366      | 8.1021          | -2.39859          | 0.05767 | DOWN  |
| <i>KCNJ12</i>    | 1.7432      | 12.4800         | -2.83983          | 0.00880 | DOWN  |
| <i>GOLGA6L4</i>  | 1.3134      | 6.7130          | -2.35370          | 0.04585 | DOWN  |
| <i>OLIG1</i>     | 1.2981      | 5.4216          | -2.06231          | 0.13203 | DOWN  |
| <i>TACSTD2</i>   | 13.3267     | 57.1704         | -2.10095          | 0.01712 | DOWN  |
| <i>KRTAP19-1</i> | 1.3714      | 11.3690         | -3.05142          | 0.18980 | DOWN  |
| <i>PKP3</i>      | 2.9119      | 15.8907         | -2.44814          | 0.04437 | DOWN  |
| <i>C21orf88</i>  | 1.4727      | 5.9452          | -2.01331          | 0.15192 | DOWN  |
| <i>ROBO2</i>     | 2.7206      | 13.8227         | -2.34505          | 0.06153 | DOWN  |
| <i>NT5C1B</i>    | 1.3720      | 10.4913         | -2.93485          | 0.03042 | DOWN  |
| <i>SLC24A3</i>   | 1.4530      | 5.8704          | -2.01439          | 0.04013 | DOWN  |
| <i>INPP5J</i>    | 4.4583      | 19.3608         | -2.11856          | 0.03939 | DOWN  |
| <i>MFSD6L</i>    | 1.2327      | 6.8051          | -2.46485          | 0.00387 | DOWN  |
| <i>SFTPA2</i>    | 1.0339      | 8.7939          | -3.08846          | 0.05784 | DOWN  |
| <i>SHC4</i>      | 1.1732      | 8.3681          | -2.83450          | 0.03135 | DOWN  |
| <i>NTF3</i>      | 1.9387      | 11.8294         | -2.60926          | 0.04236 | DOWN  |
| <i>SYN3</i>      | 1.8961      | 17.9251         | -3.24089          | 0.11729 | DOWN  |
| <i>ADARB2</i>    | 2.5824      | 23.3592         | -3.17719          | 0.00387 | DOWN  |
| <i>KCNQ5</i>     | 1.6685      | 21.0549         | -3.65751          | 0.00880 | DOWN  |

Table S4 (continued)



Table S4 (continued)

| Gene name     | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|---------------|-------------|-----------------|-------------------|---------|-------|
| ADAMTSL5      | 2.1026      | 10.2644         | -2.28742          | 0.02109 | DOWN  |
| NAT8L         | 2.4407      | 13.8808         | -2.50773          | 0.02225 | DOWN  |
| TAS2R60       | 1.4757      | 10.3619         | -2.81186          | 0.18511 | DOWN  |
| KLHL34        | 1.0456      | 6.6467          | -2.66838          | 0.00387 | DOWN  |
| KRT5          | 3.7927      | 22.1922         | -2.54876          | 0.00655 | DOWN  |
| TEX38         | 1.1905      | 10.3122         | -3.11469          | 0.13394 | DOWN  |
| KDM4D         | 1.1826      | 5.7779          | -2.28856          | 0.02953 | DOWN  |
| GABRA5        | 1.2402      | 9.4133          | -2.92418          | 0.02109 | DOWN  |
| GLDN          | 3.0892      | 18.0341         | -2.54541          | 0.00387 | DOWN  |
| MYT1L         | 3.0669      | 31.2526         | -3.34913          | 0.00387 | DOWN  |
| C5orf38       | 2.6566      | 18.4211         | -2.79371          | 0.07543 | DOWN  |
| CLCNKA        | 6.7145      | 55.5415         | -3.04822          | 0.02109 | DOWN  |
| OR9Q2         | 1.0552      | 10.8214         | -3.35832          | 0.19590 | DOWN  |
| FAM86B1       | 1.0040      | 5.3156          | -2.40441          | 0.11805 | DOWN  |
| MPPED1        | 1.8774      | 14.7388         | -2.97284          | 0.01081 | DOWN  |
| KRT16         | 1.5228      | 11.7834         | -2.95196          | 0.14980 | DOWN  |
| ZACN          | 3.1807      | 12.8009         | -2.00883          | 0.16251 | DOWN  |
| PNLIPRP1      | 1.3514      | 8.0312          | -2.57120          | 0.00387 | DOWN  |
| LCE2A         | 1.4268      | 18.8615         | -3.72461          | 0.12512 | DOWN  |
| RP11-195F19.5 | 4.8957      | 22.6202         | -2.20802          | 0.12045 | DOWN  |
| MAGI2         | 4.0559      | 19.8056         | -2.28781          | 0.06557 | DOWN  |
| KCNJ11        | 1.7359      | 9.3888          | -2.43526          | 0.03042 | DOWN  |
| C1orf170      | 1.1533      | 5.6068          | -2.28137          | 0.18164 | DOWN  |
| DNAH17        | 1.2105      | 7.0580          | -2.54361          | 0.02537 | DOWN  |
| TTC24         | 1.6328      | 7.1148          | -2.12349          | 0.11443 | DOWN  |
| LCN10         | 2.2743      | 15.3972         | -2.75920          | 0.03797 | DOWN  |
| COL25A1       | 3.4429      | 23.8886         | -2.79464          | 0.05077 | DOWN  |
| SKOR1         | 1.1642      | 5.3976          | -2.21295          | 0.11956 | DOWN  |
| SHISA6        | 1.5443      | 14.2848         | -3.20949          | 0.00387 | DOWN  |
| KLRG2         | 1.7199      | 16.6187         | -3.27243          | 0.14604 | DOWN  |
| GPR179        | 1.3001      | 6.4091          | -2.30149          | 0.05077 | DOWN  |
| MSANTD1       | 2.2561      | 12.8789         | -2.51311          | 0.04187 | DOWN  |
| KRT77         | 1.2158      | 7.7884          | -2.67936          | 0.13208 | DOWN  |
| FAM180A       | 1.1002      | 9.1746          | -3.05985          | 0.05193 | DOWN  |
| S100A14       | 2.4532      | 11.2759         | -2.20053          | 0.17163 | DOWN  |
| FAM179A       | 1.7811      | 8.2454          | -2.21079          | 0.09527 | DOWN  |
| TBC1D28       | 1.6264      | 8.9268          | -2.45649          | 0.03336 | DOWN  |
| PAX5          | 1.2856      | 7.6305          | -2.56936          | 0.00387 | DOWN  |
| KIF19         | 1.5426      | 7.9070          | -2.35780          | 0.10529 | DOWN  |
| CTSE          | 1.3829      | 6.2008          | -2.16481          | 0.15824 | DOWN  |
| GREB1         | 3.0744      | 13.3222         | -2.11545          | 0.01560 | DOWN  |
| NOXO1         | 1.5005      | 6.3186          | -2.07415          | 0.16241 | DOWN  |
| FAM72A        | 1.9547      | 15.8243         | -3.01716          | 0.00387 | DOWN  |
| SLC30A10      | 1.5309      | 10.6327         | -2.79605          | 0.03857 | DOWN  |
| SLC6A17       | 1.2404      | 7.5932          | -2.61391          | 0.00655 | DOWN  |
| RP11-366L20.2 | 2.0139      | 12.1623         | -2.59438          | 0.05329 | DOWN  |
| FBXL22        | 1.6416      | 8.2167          | -2.32348          | 0.10466 | DOWN  |
| OR8S1         | 1.4798      | 11.7795         | -2.99279          | 0.09411 | DOWN  |
| GYPE          | 1.0226      | 7.8264          | -2.93610          | 0.10971 | DOWN  |
| FAM177B       | 1.5329      | 12.3834         | -3.01411          | 0.09855 | DOWN  |
| COL4A6        | 2.3819      | 14.0278         | -2.55814          | 0.03042 | DOWN  |
| DLGAP2        | 2.0235      | 9.6370          | -2.25172          | 0.15529 | DOWN  |
| OR2T6         | 1.1627      | 20.0800         | -4.11027          | 0.13952 | DOWN  |
| MB            | 1.2400      | 7.5334          | -2.60293          | 0.04013 | DOWN  |
| ANTXRL        | 1.1390      | 7.5966          | -2.73766          | 0.05924 | DOWN  |
| PEG3          | 3.4848      | 14.6126         | -2.06809          | 0.00387 | DOWN  |
| TMEM239       | 1.3876      | 6.3350          | -2.19078          | 0.18010 | DOWN  |
| DCAF12L2      | 1.0234      | 8.4256          | -3.04146          | 0.16976 | DOWN  |
| NTRK1         | 2.1268      | 9.1867          | -2.11083          | 0.16258 | DOWN  |
| ARC           | 1.2319      | 8.0989          | -2.71682          | 0.02756 | DOWN  |
| ZNF536        | 2.4901      | 16.3905         | -2.71859          | 0.03205 | DOWN  |
| RYR2          | 1.5535      | 8.3104          | -2.41936          | 0.03042 | DOWN  |
| TAT           | 1.0287      | 8.5594          | -3.05666          | 0.04187 | DOWN  |
| ABCA4         | 1.2329      | 15.5451         | -3.65632          | 0.00387 | DOWN  |
| MT-ND6        | 530.3260    | 22,334.5000     | -5.39625          | 0.00387 | DOWN  |
| MT-CO2        | 636.0730    | 5,042.6300      | -2.98691          | 0.03205 | DOWN  |
| MT-CYB        | 1,043.8400  | 14,942.2000     | -3.83942          | 0.00387 | DOWN  |
| SMOC1         | 1.8984      | 8.9622          | -2.23910          | 0.08130 | DOWN  |
| COLGALT2      | 1.5137      | 7.7851          | -2.36260          | 0.04236 | DOWN  |
| EPS8L3        | 4.8180      | 32.7555         | -2.76524          | 0.07378 | DOWN  |
| MT-ND2        | 1,025.0800  | 11,556.8000     | -3.49493          | 0.01081 | DOWN  |
| APCDD1L       | 1.8150      | 7.2664          | -2.00129          | 0.12116 | DOWN  |
| GRIN3A        | 1.0027      | 9.1362          | -3.18776          | 0.00387 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name   | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-------------|-------------|-----------------|-------------------|---------|-------|
| MT-ND5      | 730.9050    | 10,246.7000     | -3.80933          | 0.00387 | DOWN  |
| BRINP2      | 1.1426      | 8.0815          | -2.82227          | 0.09527 | DOWN  |
| PAX9        | 2.7461      | 18.3078         | -2.73700          | 0.02439 | DOWN  |
| DUSP27      | 1.4671      | 8.7790          | -2.58109          | 0.02109 | DOWN  |
| CES1        | 1.9708      | 9.1446          | -2.21417          | 0.05077 | DOWN  |
| MT-ND4      | 39.4311     | 4,131.4700      | -6.71118          | 0.12022 | DOWN  |
| MT-ND1      | 799.0490    | 6,561.9900      | -3.03778          | 0.04187 | DOWN  |
| MT-ATP6     | 677.6510    | 7,392.9900      | -3.44754          | 0.00880 | DOWN  |
| C1orf95     | 1.9609      | 8.4744          | -2.11159          | 0.00387 | DOWN  |
| TCP10       | 1.3872      | 12.9789         | -3.22596          | 0.00387 | DOWN  |
| CAPN8       | 2.3052      | 10.3725         | -2.16982          | 0.04437 | DOWN  |
| CENPW       | 1.0746      | 5.7700          | -2.42478          | 0.19064 | DOWN  |
| HSD3B1      | 1.2478      | 14.4836         | -3.53701          | 0.02839 | DOWN  |
| HSD3B2      | 1.5398      | 6.4124          | -2.05816          | 0.10677 | DOWN  |
| SAMD13      | 1.0206      | 5.9732          | -2.54906          | 0.05329 | DOWN  |
| NEU4        | 2.6974      | 12.5380         | -2.21666          | 0.05609 | DOWN  |
| NPY4R       | 1.3809      | 13.3205         | -3.26999          | 0.17219 | DOWN  |
| COL11A2     | 1.9754      | 9.7104          | -2.29740          | 0.05077 | DOWN  |
| PRRT1       | 2.1848      | 15.7600         | -2.85073          | 0.00387 | DOWN  |
| SP5         | 1.5658      | 8.3764          | -2.41948          | 0.17049 | DOWN  |
| CSHL1       | 1.4613      | 9.1288          | -2.64318          | 0.02839 | DOWN  |
| KRTAP5-10   | 1.3248      | 9.4194          | -2.82982          | 0.19671 | DOWN  |
| TRIM31      | 1.2338      | 14.0165         | -3.50599          | 0.00387 | DOWN  |
| C5orf60     | 1.4031      | 8.3857          | -2.57932          | 0.01847 | DOWN  |
| PSG5        | 1.2016      | 10.6864         | -3.15273          | 0.00387 | DOWN  |
| LRRC10B     | 1.1943      | 5.1378          | -2.10497          | 0.04585 | DOWN  |
| PCDHGA1     | 2.3688      | 9.5591          | -2.01270          | 0.18429 | DOWN  |
| PCDHA5      | 2.3824      | 10.1467         | -2.09054          | 0.14461 | DOWN  |
| PCDHA2      | 1.4505      | 9.3862          | -2.69404          | 0.08011 | DOWN  |
| PRSS1       | 1.5583      | 14.9059         | -3.25788          | 0.08666 | DOWN  |
| CCNI2       | 3.1212      | 17.4700         | -2.48472          | 0.15362 | DOWN  |
| MUC12       | 1.0936      | 7.3007          | -2.73891          | 0.01081 | DOWN  |
| KRT6A       | 2.1158      | 16.2543         | -2.94154          | 0.05024 | DOWN  |
| SERPINB5    | 1.1846      | 6.8852          | -2.53913          | 0.04829 | DOWN  |
| ZDHHC11B    | 1.7757      | 8.0244          | -2.17598          | 0.19291 | DOWN  |
| C3orf72     | 1.1782      | 9.5382          | -3.01717          | 0.06906 | DOWN  |
| TMEM200C    | 1.8587      | 9.5679          | -2.36389          | 0.05077 | DOWN  |
| VGLL3       | 1.9752      | 12.0393         | -2.60767          | 0.02537 | DOWN  |
| PRSS50      | 1.3241      | 7.1207          | -2.42702          | 0.17431 | DOWN  |
| DIO2        | 3.0417      | 13.2519         | -2.12323          | 0.01399 | DOWN  |
| C17orf51    | 2.9122      | 17.4716         | -2.58485          | 0.00387 | DOWN  |
| KRTAP3-1    | 2.0845      | 19.4546         | -3.22237          | 0.13853 | DOWN  |
| CCDC19      | 2.2564      | 12.8781         | -2.51282          | 0.13040 | DOWN  |
| ASIC3       | 2.6110      | 11.3970         | -2.12596          | 0.05924 | DOWN  |
| OR2F1       | 1.2892      | 16.6556         | -3.69150          | 0.18441 | DOWN  |
| ATP6V1G2    | 1.5561      | 11.6176         | -2.90027          | 0.16106 | DOWN  |
| PPM1N       | 1.3000      | 5.8772          | -2.17663          | 0.08535 | DOWN  |
| PRCD        | 3.0234      | 16.0721         | -2.41032          | 0.01241 | DOWN  |
| IQCJ        | 1.4319      | 14.8175         | -3.37128          | 0.03573 | DOWN  |
| NUTM2D      | 1.4907      | 9.4296          | -2.66124          | 0.05144 | DOWN  |
| TBC1D26     | 1.9726      | 8.9793          | -2.18653          | 0.12927 | DOWN  |
| AP000974.1  | 1.7410      | 7.0348          | -2.01463          | 0.06125 | DOWN  |
| HMX1        | 1.0239      | 7.6265          | -2.89695          | 0.13796 | DOWN  |
| GCGR        | 4.7686      | 26.2124         | -2.45861          | 0.15536 | DOWN  |
| TTC34       | 1.8101      | 8.8655          | -2.29216          | 0.08263 | DOWN  |
| HTR5A-AS1   | 1.3346      | 7.7682          | -2.54117          | 0.19689 | DOWN  |
| TAS2R41     | 1.4647      | 7.8757          | -2.42677          | 0.19687 | DOWN  |
| C1orf229    | 1.2856      | 5.8539          | -2.18702          | 0.03573 | DOWN  |
| ADRA2B      | 1.9165      | 7.9237          | -2.04774          | 0.04013 | DOWN  |
| REXO1L11P   | 9.6644      | 84.6481         | -3.13073          | 0.00387 | DOWN  |
| CKMT1A      | 1.0104      | 8.6133          | -3.09166          | 0.10296 | DOWN  |
| C5orf66     | 2.3976      | 17.2659         | -2.84825          | 0.01560 | DOWN  |
| PRRT4       | 1.2766      | 8.6891          | -2.76688          | 0.03797 | DOWN  |
| ZNF469      | 1.2850      | 8.1171          | -2.65915          | 0.00387 | DOWN  |
| AC104809.3  | 1.9570      | 13.4865         | -2.78483          | 0.02439 | DOWN  |
| OR2T7       | 3.5054      | 20.6900         | -2.56129          | 0.01847 | DOWN  |
| CTB-58E17.5 | 1.1962      | 9.1993          | -2.94303          | 0.15873 | DOWN  |
| C14orf144   | 1.6183      | 8.4079          | -2.37729          | 0.19041 | DOWN  |
| CASP16      | 1.1202      | 6.2886          | -2.48896          | 0.11921 | DOWN  |
| C1orf233    | 1.1972      | 5.6246          | -2.23214          | 0.03797 | DOWN  |
| PROB1       | 1.7245      | 7.5133          | -2.12330          | 0.02336 | DOWN  |
| SFTA3       | 1.4605      | 14.1962         | -3.28101          | 0.00387 | DOWN  |
| IQCF3       | 2.7249      | 17.7870         | -2.70653          | 0.05144 | DOWN  |

Table S4 (continued)

Table S4 (continued)

| Gene name             | Cancer_FPKM | Non-cancer_FPKM | log2(fold change) | FDR     | Trend |
|-----------------------|-------------|-----------------|-------------------|---------|-------|
| <i>CYP21A2</i>        | 3.0739      | 14.3148         | -2.21935          | 0.14817 | DOWN  |
| <i>PSG1</i>           | 1.9864      | 13.4196         | -2.75609          | 0.00880 | DOWN  |
| <i>TMEM253</i>        | 1.2096      | 9.3437          | -2.94946          | 0.09524 | DOWN  |
| <i>TMEM229A</i>       | 1.0733      | 6.8050          | -2.66450          | 0.18519 | DOWN  |
| <i>C5orf58</i>        | 1.8844      | 12.7191         | -2.75481          | 0.12011 | DOWN  |
| <i>WASH4P</i>         | 2.9614      | 12.5209         | -2.08000          | 0.01399 | DOWN  |
| <i>FAM203A</i>        | 1.5045      | 8.3537          | -2.47317          | 0.12960 | DOWN  |
| <i>C8orf56</i>        | 2.1215      | 11.9896         | -2.49862          | 0.16441 | DOWN  |
| <i>PATE4</i>          | 2.1381      | 21.3311         | -3.31856          | 0.05385 | DOWN  |
| <i>OR2W3</i>          | 2.5016      | 13.9134         | -2.47553          | 0.16472 | DOWN  |
| <i>GATSL3</i>         | 6.0146      | 35.4995         | -2.56127          | 0.01560 | DOWN  |
| <i>C2orf61</i>        | 1.1734      | 8.0924          | -2.78585          | 0.09193 | DOWN  |
| <i>LCE1F</i>          | 1.1307      | 11.8595         | -3.39080          | 0.08718 | DOWN  |
| <i>TNFRSF13B</i>      | 2.4431      | 18.2838         | -2.90380          | 0.02439 | DOWN  |
| <i>TDGF1</i>          | 2.1974      | 15.1549         | -2.78591          | 0.01081 | DOWN  |
| <i>CDRT1</i>          | 1.8032      | 9.7092          | -2.42882          | 0.09506 | DOWN  |
| <i>ARHGDI3</i>        | 1.5602      | 8.1089          | -2.37775          | 0.14885 | DOWN  |
| <i>ERVW-1</i>         | 1.2929      | 12.4272         | -3.26487          | 0.02756 | DOWN  |
| <i>PSG11</i>          | 1.3175      | 18.9324         | -3.84499          | 0.00387 | DOWN  |
| <i>PSG4</i>           | 1.9314      | 24.3538         | -3.65642          | 0.00387 | DOWN  |
| <i>PTCHD4</i>         | 2.1240      | 8.5641          | -2.01151          | 0.03336 | DOWN  |
| <i>RP11-766F14.2</i>  | 1.0138      | 5.9778          | -2.55987          | 0.01712 | DOWN  |
| <i>ATP6V1E2</i>       | 2.7996      | 11.2994         | -2.01296          | 0.12859 | DOWN  |
| <i>LINC00923</i>      | 3.0587      | 14.9941         | -2.29340          | 0.18381 | DOWN  |
| <i>RP11-1102P16.1</i> | 1.1963      | 5.1457          | -2.10474          | 0.16026 | DOWN  |
| <i>EIF5AL1</i>        | 1.1979      | 5.4828          | -2.19446          | 0.02439 | DOWN  |
| <i>NOX5</i>           | 1.1329      | 7.2134          | -2.67067          | 0.03135 | DOWN  |
| <i>PCDHA3</i>         | 1.9929      | 11.4911         | -2.52756          | 0.15642 | DOWN  |
| <i>C21orf119</i>      | 3.3372      | 14.7841         | -2.14733          | 0.03431 | DOWN  |
| <i>SALL3</i>          | 2.2937      | 9.7002          | -2.08031          | 0.04187 | DOWN  |
| <i>OVCH1-AS1</i>      | 1.4554      | 8.8108          | -2.59784          | 0.13358 | DOWN  |
| <i>RP11-347C12.3</i>  | 1.2235      | 5.3860          | -2.13824          | 0.14086 | DOWN  |
| <i>CLEC5A</i>         | 2.0959      | 15.3091         | -2.86873          | 0.08324 | DOWN  |
| <i>RP11-204N11.1</i>  | 1.9637      | 16.8874         | -3.10433          | 0.14998 | DOWN  |
| <i>C16orf95</i>       | 2.8051      | 14.2367         | -2.34350          | 0.07203 | DOWN  |
| <i>RP11-77K12.1</i>   | 1.0649      | 8.2597          | -2.95544          | 0.19643 | DOWN  |
| <i>UBBP4</i>          | 1.3371      | 7.1485          | -2.41857          | 0.09193 | DOWN  |
| <i>PTGES3L</i>        | 1.0802      | 4.4050          | -2.02789          | 0.12960 | DOWN  |
| <i>AC004466.1</i>     | 2.4625      | 13.5172         | -2.45659          | 0.18831 | DOWN  |
| <i>AC093677.1</i>     | 1.3382      | 21.4097         | -3.99991          | 0.12182 | DOWN  |
| <i>AC010327.2</i>     | 1.0732      | 8.6130          | -3.00460          | 0.14266 | DOWN  |
| <i>KRBOX1</i>         | 1.8851      | 9.3947          | -2.31723          | 0.12317 | DOWN  |