

**Supplemental Table 1. List of antibodies used.**

| <b>Antibody</b>                           | <b>Vendor</b>  | <b>Catalog Number</b> | <b>Dilution</b> |
|---|----------------|-----------------------|-----------------|
| Alpha6-PE                                 | BD Biosciences | 561894                | 1:100           |
| Donkey anti-Goat IgG<br>Alexa Fluor 488   | ThermoFisher   | A-11055               | 1:1000          |
| Donkey anti-Rabbit<br>IgG Alexa Fluor 546 | ThermoFisher   | A10040                | 1:1000          |
| Goat anti-Mouse IgG<br>Alexa Fluor 546    | ThermoFisher   | A-11003               | 1:1000          |
| Goat anti-Rabbit IgG<br>Alexa Fluor 488   | ThermoFisher   | A-11008               | 1:1000          |
| Goat anti-Rabbit IgG<br>Alexa Fluor 488   | ThermoFisher   | A-21206               | 1:1000          |
| Goat anti-Rabbit IgG<br>Alexa Fluor 546   | ThermoFisher   | A-11010               | 1:1000          |
| Donkey anti-Goat IgG<br>Alexa Fluor 488   | ThermoFisher   | A-11055               | 1:500           |
| Donkey anti-Goat IgG<br>Alexa Fluor 647   | ThermoFisher   | A-21447               | 1:500           |
| Cathepsin K                               | Abcam          | ab19027               | 1:1000 (WB)     |
| Cathepsin K                               | Abcam          | ab207086              | 1:500 (IHC)     |
| Cathepsin K                               | ABclonal       | A1782                 | 1:100 (FC)      |
| CD200-APC                                 | Biolegend      | 123809                | 1:100           |
| CD200R1                                   | R&D Systems    | AF2554                | 1:25            |
| CD200R1                                   | Biolegend      | 329302                | 1:100           |
| CD11b-PE                                  | Biolegend      | 101207                | 1:100           |
| CD3e-PerCP/Cy5.5                          | Biolegend      | 100327                | 1:100           |
| CD200-PerCP/Cy5.5                         | BD Biosciences | 46-5200-80            | 1:100           |
| CD45-Alexa Fluor 647                      | Biolegend      | 368538                | 1:100           |
| CD45-PE/Cy7                               | Biolegend      | 103114                | 1:100           |
| CD34-Alexa Fluor 647                      | BD Biosciences | 560230                | 1:100           |
| CD8a-Alexa Fluor 488                      | Biolegend      | 100723                | 1:200           |
| CD69-PE                                   | Biolegend      | 104507                | 1:200           |
| IFN- $\gamma$ - APC                       | Biolegend      | 505809                | 1:100           |
| TNF- $\alpha$ -PE/Cy7                     | Biolegend      | 279985                | 1:100           |
| Ly-6C-Alexa Fluor<br>647                  | Biolegend      | 128010                | 1:100           |
| Ly-6G-PerCP                               | Biolegend      | 127654                | 1:75            |
| I-Ab – PerCP/Cy5.5                        | Biolegend      | 116415                | 1:100           |
| F4/80                                     | Biolegend      | 123119                | 1:100           |

|                      |                              |              |         |
|----------------------|------------------------------|--------------|---------|
| CD3e                 | Biolegend                    | 100314       | 1:100   |
| CD28                 | Biolegend                    | 102116       | 1:500   |
| Collagen type I      | Rockland<br>Immunochemicals  | 600-401-103S | 1:2000  |
| Collagen 2A1         | Santa Cruz<br>Biotechnology  | sc-52658     | 1:50    |
| Cytokeratin AE1      | Santa Cruz<br>Biotechnology  | sc-58719     | 1:50    |
| Keratin 14           | Biolegend                    | 905301       | 1:10000 |
| Arginase 1           | Cell Signlaing<br>Technology | 93668        | 1:100   |
| Goat Anti-Rabbit-HRP | Abcam                        | ab6721       | 1:20000 |

**Supplemental Table 2. Oligonucleotide primer sequences.**

| <b>Primer</b>               | <b>Sequence (5'→3')</b>  |
|-----------------------------|--------------------------|
| CtsK Forward                | CGTGCAGCAGAAAGGAGGCA     |
| CtsK Reverse                | GTCCTACCCGCGCCACTGCT     |
| Gapdh Forward               | AATGGTGAAGGTCGGTGTG      |
| Gapdh Reverse               | GTGGAGTCATACTGGAACATGTAC |
| CD200r1 Forward             | CTGTTGTTCTGTGTTGTTTGATTG |
| CD200r1 Reverse             | GGCGGAAAACCAGAAAACC      |
| CD200 Intron 3 Forward (P1) | TGTATAGCAAGCTTCCA        |
| CD200 Exon 3 Reverse (P2)   | CTGGGTCACCACTTCCA        |
| CD200 RT-PCR Forward        | CAGAGCTGGGACTCTGGAAC     |
| CD200 RT-PCR Reverse        | AGGAACAGCTTGCCTTACCC     |

**Supplemental Table 3. Top 20 DEGs in EpiKO cSCC**

| Gene                 | baseMean   | log2FoldChange | padj     |
|----------------------|------------|----------------|----------|
| <b>Upregulated</b>   |            |                |          |
| Ace                  | 2031.41683 | 2.54268172     | 3.00E-32 |
| Lyve1                | 2092.51612 | 3.10773853     | 2.23E-29 |
| Slco2a1              | 312.42265  | 3.54211162     | 1.29E-22 |
| Add2                 | 137.451803 | 3.87257209     | 1.16E-20 |
| Itgal                | 1801.66514 | 1.8615811      | 2.00E-19 |
| Ptprn                | 153.046577 | 2.99844922     | 4.24E-17 |
| Nos2                 | 317.445788 | 3.55782389     | 4.56E-17 |
| Itga1                | 174.00141  | 2.62392153     | 2.49E-15 |
| Scara3               | 153.48501  | 2.88840386     | 2.04E-14 |
| Vsig4                | 647.100877 | 2.09424183     | 5.62E-14 |
| Gpc6                 | 75.7085964 | 4.4164469      | 8.49E-14 |
| Nid1                 | 829.512669 | 2.38998396     | 1.94E-13 |
| Mtap                 | 1598.72753 | 1.43719084     | 6.48E-13 |
| Itih5                | 62.5431435 | 3.9396332      | 2.30E-12 |
| Ccl6                 | 11805.8064 | 2.68927212     | 2.33E-12 |
| Krt8                 | 1710.75447 | 2.93085486     | 2.58E-12 |
| Col6a3               | 2043.0774  | 1.50669334     | 2.58E-12 |
| Sema7a               | 735.58727  | 1.9953263      | 2.83E-12 |
| Inhba                | 126.332794 | 2.66527523     | 2.99E-12 |
| Fam5c                | 50.646017  | 4.54424677     | 8.11E-12 |
| <b>Downregulated</b> |            |                |          |
| Slc9b2               | 604.43944  | -4.5731413     | 8.96E-61 |
| Ctsk                 | 4607.99813 | -4.4159046     | 9.57E-56 |
| Cyp2s1               | 496.25983  | -4.3185489     | 8.52E-43 |
| Cd207                | 459.5474   | -4.7917136     | 6.03E-32 |
| Atp6v0d2             | 1409.52438 | -3.2105366     | 8.11E-26 |
| Cd109                | 1681.83682 | -2.6454775     | 1.19E-25 |
| Traf1                | 639.676781 | -2.281235      | 2.13E-25 |
| Cspg4                | 2885.66296 | -2.8361295     | 1.52E-23 |
| Abcb4                | 356.879433 | -2.8156602     | 1.93E-22 |
| Fxyd2                | 449.685693 | -3.1076302     | 6.51E-21 |
| Cadm1                | 1315.6203  | -1.9753696     | 8.61E-19 |
| Nfatc1               | 3920.99169 | -1.5894495     | 2.03E-17 |
| Mefv                 | 922.220388 | -1.6975013     | 3.14E-17 |
| Itm2a                | 236.40905  | -3.9545276     | 4.24E-17 |
| Tjp2                 | 233.676189 | -2.4250347     | 6.43E-17 |
| Anpep                | 3519.91502 | -1.4578421     | 6.71E-16 |
| Steap4               | 79.6309861 | -3.8592618     | 1.41E-14 |
| Pltp                 | 8826.06813 | -1.6792455     | 2.02E-14 |
| Bdh2                 | 136.704799 | -3.1416956     | 3.82E-14 |
| Abl2                 | 2306.9576  | -1.3784462     | 4.89E-14 |

| Lineage marker        | baseMean   | log2FoldChange | lfcSE      | stat       | pvalue     | padj       |
|-----------------------|------------|----------------|------------|------------|------------|------------|
| <b>Myeloid</b>        |            |                |            |            |            |            |
| Itgam                 | 30913.9198 | 0.41183644     | 0.19445254 | 2.11792785 | 0.03418118 | 0.28369944 |
| Cd200r1               | 580.95161  | 1.41286409     | 0.3102262  | 4.55430298 | 5.26E-06   | 0.00026822 |
| <b>MDSC</b>           |            |                |            |            |            |            |
| Arg1                  | 22486.7228 | 1.42545028     | 0.59394486 | 2.39997074 | 0.01639638 | 0.17124801 |
| Vegfa                 | 5983.90244 | 0.38290433     | 0.27537092 | 1.39050387 | 0.16437592 | 0.69811673 |
| Stat3                 | 4727.24997 | -0.031945      | 0.14170889 | -0.2254268 | 0.82164723 | 0.99892002 |
| Cebpb                 | 11893.8329 | 0.24250106     | 0.23890656 | 1.01504561 | 0.31008409 | 0.90060883 |
| S100a8                | 202.071908 | -0.5865599     | 0.69121045 | -0.8485982 | 0.39610492 | 0.95210941 |
| S100a9                | 239.508937 | -1.0373235     | 0.69791257 | -1.486323  | 0.13719371 | 0.64494374 |
| Cybb                  | 10747.2711 | 0.09301071     | 0.17002676 | 0.54703571 | 0.5843542  | 0.99663777 |
| Il10                  | 122.56215  | -0.0581982     | 0.31269295 | -0.1861192 | 0.85235131 | 0.99892002 |
| Tgfb1                 | 6875.25173 | 0.36108206     | 0.17035974 | 2.11952696 | 0.03404596 | 0.28369944 |
| Il4ra                 | 13704.3187 | 0.48923368     | 0.14959427 | 3.27040388 | 0.00107394 | 0.02097385 |
| <b>Macrophage</b>     |            |                |            |            |            |            |
| Itgax                 | 1292.73129 | 0.31774802     | 0.39317004 | 0.80816945 | 0.41899304 | 0.95942384 |
| Ly6c1                 | 40.119596  | -1.5100994     | 0.5713606  | -2.6429883 | 0.00821779 | 0.10443305 |
| Cx3cr1                | 24945.0156 | 0.43719707     | 0.26119954 | 1.67380488 | 0.09416895 | 0.52613536 |
| H2-M2                 | 267.654957 | -1.4100148     | 0.69896791 | -2.0172812 | 0.04366617 | 0.32968673 |
| Csf1r                 | 62069.9178 | -0.1886765     | 0.23321968 | -0.8090076 | 0.4185108  | 0.95942384 |
| Ly6g6c                | 9.27255221 | -0.2687008     | 0.39138927 | -0.6865309 | 0.49237837 | 0.98672722 |
|                       |            |                |            |            |            |            |
| <b>T cell/NK cell</b> |            |                |            |            |            |            |
| Cd3e                  | 0.57953451 | -0.1876664     | 0.33692588 | -0.5569962 | 0.57753002 | NA         |
| Klrb1c                | 92.776446  | -0.0469036     | 0.51053721 | -0.0918711 | 0.92680046 | 0.99892002 |

**Supplemental Table 4. RNA-Seq reads (baseMean) of immune lineage markers expressed by tumor-infiltrating Cd200r+ cells.**