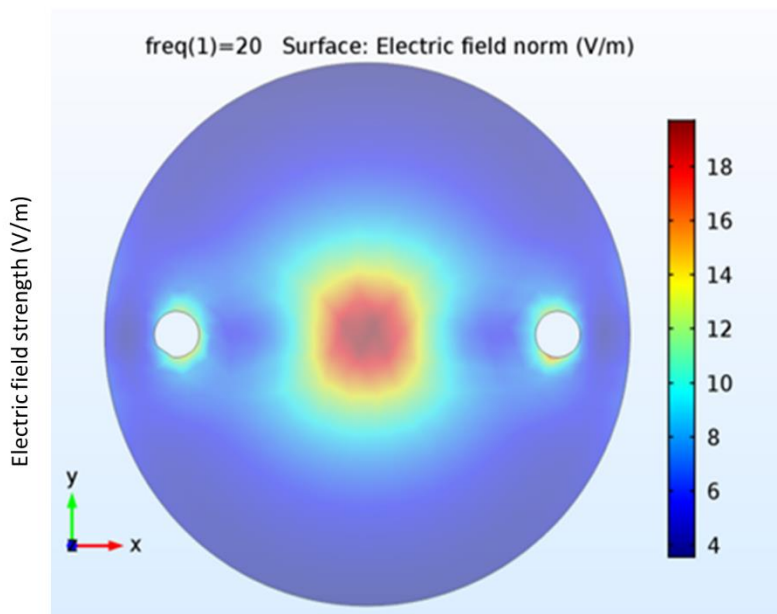
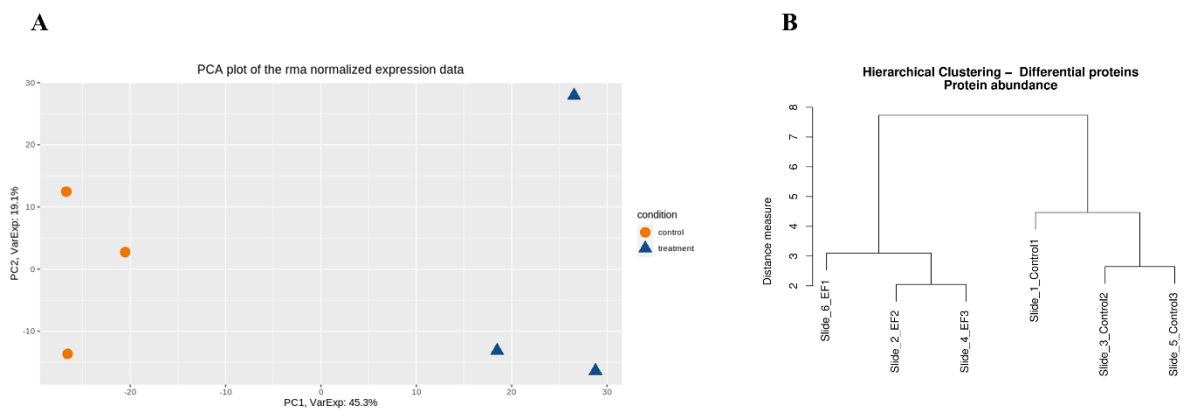


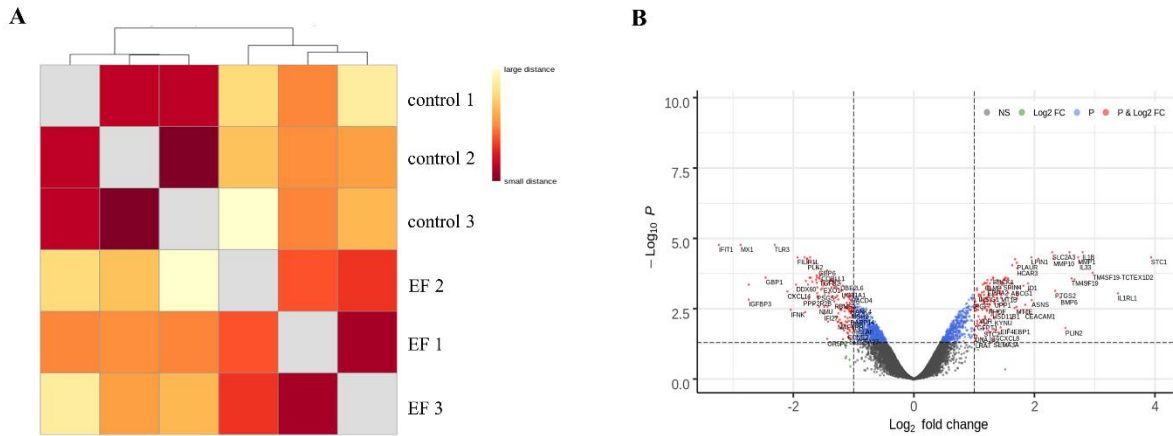
Supplementary information



Supplementary Figure S1: Distribution of applied AC EF strength in a 6-well plate during hTCEpi cell stimulation. (electric potential: 200 mV; frequency: 20 Hz; wave form). Simulated by finite element method and the color-coding of the scale bar defines the range of values.



Supplementary Figure S2: Analysis of the gene and protein array data. (A) represents principal component analysis of the RMA normalized microarray data. (B) represents hierarchical clustering of the protein extracts based on differentially expressed proteins.



Supplementary Figure S3: Analysis of the gene array data. (A) represents the clustering heat map of the calibrated samples. (B) represents Volcano plot of the differentially expressed genes. X-axis shows the measured fold changes in the expression whereas the y-axis shows the significance of the change in terms of negative log (base 10) of the p-value. The threshold used to select the differentially expressed genes is 2 for expression change and 0.05 for significance.

Supplementary Table S1

Gene array data:

| <u>upregulated during AC EF stimulation</u> | | <u>downregulated during AC EF stimulation</u> | |
|---|--------------------|---|--------------------|
| <u>Gene Symbol</u> | <u>Fold Change</u> | <u>Gene Symbol</u> | <u>Fold Change</u> |
| MMP1 | 48.87 | SAMM50 | -2 |
| STC1 | 47.51 | PGAP1 | -2 |
| PAPL | 45.43 | PRODH | -2 |
| HBEGF | 34.58 | CEP97 | -2 |
| IL1B | 33.7 | EML1 | -2 |
| TM4SF19 | 27.27 | IRX2 | -2 |
| TRIB3 | 22.69 | FETUB | -2.01 |
| MMP10 | 20.93 | METAP1D | -2.01 |
| TM4SF19-TCTEX1D2 | 20.69 | ZMYM3 | -2.01 |
| PTGS2 | 20.3 | TGFBR3 | -2.01 |
| SLC2A3 | 19.33 | ZMAT3 | -2.01 |
| IL1RL1 | 19.2 | FAM111A | -2.01 |
| RAC2 | 14.32 | LRRC1 | -2.01 |
| PLAUR | 13.05 | OR5P3 | -2.01 |
| BMP6 | 12.01 | EFNA5 | -2.01 |
| ID1 | 11.59 | NCAPG | -2.01 |
| PRDM1 | 11.1 | LDAH | -2.01 |
| SERPINB1 | 10.96 | RFC5 | -2.02 |
| IL33 | 10.62 | FAM46B | -2.02 |
| LPIN1; MIR548S | 10.61 | AGPS | -2.02 |
| MT1E | 10.52 | USP54 | -2.02 |
| CEACAM1 | 10.35 | VKORC1 | -2.02 |

| | | | |
|-------------|------|--------------------|-------|
| ETV5 | 10.3 | PIGK | -2.02 |
| GK | 9.85 | TMEM14C | -2.02 |
| MT1B; MT1CP | 9.66 | GPR137B | -2.02 |
| MT1F | 9.06 | PCDH18 | -2.02 |
| MT1G | 8.84 | ORC1 | -2.02 |
| HCAR3 | 8.73 | LRRC8D | -2.02 |
| PSAT1 | 8.68 | SLURP1 | -2.03 |
| PRR9 | 8.64 | PIK3IP1 | -2.03 |
| TMEM2 | 8.64 | LIMK2 | -2.03 |
| ACSS2 | 8.58 | TTC21B | -2.03 |
| VEGFA | 8.55 | C10orf99 | -2.03 |
| IL24 | 8.52 | GSR | -2.03 |
| HCAR2 | 8.41 | HAUS4; MIR4707 | -2.03 |
| SLC2A14 | 8.01 | MSRB1 | -2.03 |
| PRSS22 | 7.93 | FYCO1 | -2.04 |
| MT1A | 7.85 | PHF21A | -2.04 |
| PLIN2 | 7.8 | SYT14 | -2.04 |
| ANTXR2 | 7.61 | FANCD2 | -2.04 |
| TFPI2 | 7.44 | CCNF | -2.04 |
| MT1L | 7.43 | ECI2 | -2.04 |
| CHAC1 | 7.42 | TMEM14B | -2.05 |
| LIPE | 7.4 | ARL6IP5 | -2.05 |
| STK10 | 7.33 | IGSF3 | -2.05 |
| MT1X | 7.07 | TMCO4 | -2.05 |
| ABCG1 | 7.03 | COMMD3-BMI1; BMI1 | -2.05 |
| HSD17B2 | 6.98 | MTX3 | -2.05 |
| ASNS | 6.87 | DIAPH3 | -2.05 |
| TXNRD1 | 6.86 | FBXO5 | -2.05 |
| IRAK2 | 6.83 | GOLGA8K; ULK4P1 | -2.05 |
| DDIT4 | 6.81 | HIST2H4B; HIST2H4A | -2.06 |
| FAM107B | 6.7 | C14orf1 | -2.06 |
| TSC22D1 | 6.64 | GSTO2 | -2.06 |
| MXD1 | 6.6 | ARSI | -2.06 |
| MVD | 6.55 | LMBRD2 | -2.06 |
| GDF15 | 6.35 | AURKA | -2.06 |
| TRIB1 | 6.3 | KIF23 | -2.06 |
| MT1H | 6.25 | ZDHHC24 | -2.06 |
| PHLDA1 | 6.15 | TNFAIP8L1 | -2.06 |
| CLDN4 | 6.1 | RAD51B | -2.07 |
| OVOL1 | 6.04 | CNTNAP2 | -2.07 |
| PNLIPRP3 | 5.95 | PIK3C2B | -2.07 |
| FDPS | 5.94 | GALNT10 | -2.07 |
| FAM84B | 5.93 | RAB2A | -2.07 |
| MT2A | 5.89 | ATG4C | -2.07 |
| ITGA2 | 5.85 | PRKCQ | -2.07 |
| SLC7A11 | 5.81 | GSN | -2.07 |
| RBCK1 | 5.77 | GADD45A | -2.07 |
| ACOT7 | 5.7 | CNDP2 | -2.07 |

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|----------------|------|------------------|-------|
| SPRY4 | 5.69 | ZNF658 | -2.08 |
| ATF4 | 5.68 | LAP3 | -2.08 |
| FAM83A | 5.66 | FTO | -2.08 |
| IER3 | 5.59 | C1orf233 | -2.08 |
| UPP1 | 5.56 | IGFBP6 | -2.09 |
| PITPNC1 | 5.53 | JAG2 | -2.09 |
| KYNU | 5.51 | UQCC2 | -2.09 |
| TMPRSS4 | 5.5 | MGST3 | -2.09 |
| CXCL8 | 5.49 | DPCD | -2.09 |
| CEMIP | 5.39 | DSEL | -2.09 |
| SPIN4 | 5.3 | ALDH4A1 | -2.09 |
| FOSL1 | 5.26 | KRT9 | -2.09 |
| FERMT1 | 5.21 | AIG1 | -2.09 |
| EREG | 5.07 | ASB8 | -2.1 |
| SDR9C7 | 5.04 | EBAG9 | -2.1 |
| ERN1 | 5.03 | PNPT1 | -2.1 |
| C3 | 5.02 | FRMD4A | -2.1 |
| PDE7A | 5 | SLC39A10 | -2.1 |
| PHLDA2 | 4.99 | CEP19 | -2.1 |
| ARID3B | 4.98 | FAM234A; ARHGDIG | -2.1 |
| NT5E | 4.93 | MAP3K12 | -2.1 |
| ARG2 | 4.93 | MCOLN3 | -2.1 |
| EPHA2 | 4.85 | CYB5R1 | -2.11 |
| LRP8 | 4.84 | INPP5D | -2.11 |
| SDCBP2 | 4.81 | C5orf28 | -2.11 |
| HEPHL1 | 4.76 | CLEC7A | -2.12 |
| ARHGEF2 | 4.76 | SUOX | -2.12 |
| RHCG | 4.76 | PAM | -2.12 |
| GFPT2 | 4.73 | HMG3 | -2.12 |
| CEACAM5 | 4.65 | KIF20A | -2.12 |
| XDH | 4.65 | CASP14 | -2.12 |
| BMP2 | 4.63 | CCNB2 | -2.12 |
| SMOC1 | 4.63 | CRISPLD1 | -2.12 |
| NAV3 | 4.63 | EPHA4 | -2.12 |
| AQP3 | 4.6 | LMNB1 | -2.12 |
| HSPB8 | 4.54 | DST | -2.12 |
| GPAT3 | 4.53 | MACC1 | -2.13 |
| TMCC3; MIR7844 | 4.5 | DCP1B | -2.13 |
| HAS3 | 4.44 | MMP19 | -2.13 |
| SPRY2 | 4.43 | IRF9 | -2.13 |
| DUSP1 | 4.42 | PLD1 | -2.13 |
| BHLHE40 | 4.42 | CDC7 | -2.13 |
| CLMP | 4.41 | TENM2 | -2.13 |
| KCNK1 | 4.38 | ZNFX1 | -2.13 |
| TNFRSF10A | 4.35 | MKI67 | -2.13 |
| SOD2 | 4.29 | BACE1 | -2.14 |
| DUSP10 | 4.28 | SERPINE1 | -2.14 |
| MT1M | 4.28 | RFX2 | -2.14 |

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|---------------|------|-----------------|-------|
| DAB2 | 4.27 | ZNF385B | -2.14 |
| KDM7A | 4.26 | NSMCE1 | -2.14 |
| ARSJ | 4.25 | PAN2; CNPY2 | -2.14 |
| CNFN | 4.2 | NAV2 | -2.14 |
| SLITRK6 | 4.2 | PKD2 | -2.14 |
| DUSP6 | 4.17 | ACKR3 | -2.14 |
| CBS | 4.17 | TNS3 | -2.14 |
| OSMR | 4.16 | ACER1 | -2.14 |
| FAM214B | 4.15 | ASAH1 | -2.14 |
| CRY1 | 4.12 | SLC48A1 | -2.15 |
| RHOF | 4.07 | IFIT5 | -2.15 |
| EIF4EBP1 | 4.06 | DPYD | -2.15 |
| RORA | 4 | SRD5A1 | -2.15 |
| AKIRIN2 | 3.98 | EFNB2 | -2.15 |
| MMP9 | 3.94 | STAT2 | -2.15 |
| ITGB8 | 3.92 | KIF20B | -2.15 |
| ITPRIP | 3.92 | PPIC | -2.16 |
| MT1IP | 3.9 | HIST1H3C | -2.16 |
| INSIG1 | 3.88 | EGLN3 | -2.16 |
| NPC1 | 3.87 | VGLL1 | -2.16 |
| DDIT3 | 3.85 | ZNF462 | -2.16 |
| PPIF | 3.83 | PIGC | -2.16 |
| DUSP4 | 3.83 | DHFR; DHFRP1 | -2.16 |
| GRPEL2 | 3.81 | VSNL1 | -2.17 |
| FHL1 | 3.79 | WDR76 | -2.17 |
| SNX9 | 3.78 | PALMD | -2.17 |
| PTPRE | 3.77 | TPD52L1 | -2.17 |
| PLAT | 3.76 | CDCA3 | -2.17 |
| LDLR; MIR6886 | 3.73 | IARS2 | -2.17 |
| CRCT1 | 3.72 | LYPLAL1 | -2.18 |
| IL1A | 3.68 | PHKB | -2.18 |
| PNP | 3.64 | GOLM1 | -2.18 |
| GPCPD1 | 3.64 | NPL | -2.18 |
| PLCXD1 | 3.63 | FAM89A; MIR1182 | -2.18 |
| NCF2 | 3.62 | SH3D19 | -2.18 |
| MTHFD2 | 3.6 | UNC93B1 | -2.18 |
| NR4A1 | 3.57 | DHFR | -2.18 |
| GRB7 | 3.57 | RAB30 | -2.19 |
| NRIP1 | 3.55 | CLDN1 | -2.19 |
| GJB4 | 3.55 | TCTN1 | -2.19 |
| TMC7 | 3.53 | CHPT1 | -2.19 |
| C20orf197 | 3.5 | KIF18A | -2.2 |
| PCSK9 | 3.48 | THSD1 | -2.2 |
| PNPLA3 | 3.47 | TMEM9B | -2.21 |
| ARFGAP3 | 3.46 | OVCH2 | -2.21 |
| NET1 | 3.45 | CCDC109B | -2.21 |
| SEMA7A | 3.45 | GSTK1 | -2.21 |
| GARS | 3.42 | WWOX | -2.21 |

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|-----------------|------|----------------------|-------|
| FAM43A | 3.38 | DHX58 | -2.21 |
| KLK9 | 3.38 | EPHB2 | -2.21 |
| TBX3 | 3.37 | TPM2 | -2.21 |
| SMTN | 3.37 | SGK1 | -2.21 |
| MBD1 | 3.35 | PDLIM1 | -2.22 |
| ADGRE2 | 3.33 | TNFRSF21 | -2.22 |
| ZNF460 | 3.32 | EPB41L4B | -2.22 |
| STK17B | 3.31 | GALNT5 | -2.22 |
| SULT2B1 | 3.29 | TK1 | -2.23 |
| FLG | 3.28 | DNAJC6 | -2.23 |
| ADAM19 | 3.25 | PORCN | -2.23 |
| CCNA1 | 3.25 | FKBP5 | -2.24 |
| FASN | 3.25 | KRT14 | -2.24 |
| UBALD2 | 3.24 | TMEM237 | -2.24 |
| KLHL21 | 3.24 | ARRDC3 | -2.24 |
| P2RX4 | 3.23 | ENPP1 | -2.24 |
| CBS | 3.23 | PUS10 | -2.25 |
| INHBA | 3.23 | OR5P2 | -2.25 |
| FOXD1 | 3.16 | PRODH; LOC102724788; | -2.25 |
| MAOA | 3.16 | ACADSB | -2.25 |
| PFKFB4; MIR6823 | 3.16 | ZNF138 | -2.25 |
| PLAU | 3.14 | SLC25A27 | -2.25 |
| TNFSF9 | 3.13 | ZC3HAV1 | -2.25 |
| KIAA0040 | 3.12 | MELK | -2.26 |
| SHMT2 | 3.12 | DUSP14 | -2.26 |
| EFTUD1 | 3.11 | DERA | -2.26 |
| TMEM39A | 3.09 | MAPK10 | -2.26 |
| E2F7 | 3.08 | ATRAID | -2.26 |
| LRRRC8C | 3.07 | ZNF626 | -2.26 |
| TFRC | 3.07 | CCPG1; MIR628 | -2.26 |
| BCAR1 | 3.06 | TMEM254 | -2.26 |
| SLC2A6 | 3.06 | TCTN2 | -2.27 |
| SPRED2 | 3.06 | CLU; MIR6843 | -2.27 |
| FA2H | 3.05 | OAS3 | -2.27 |
| DNAJB9 | 3.04 | HELLS | -2.27 |
| PGF | 3.03 | SFXN5 | -2.27 |
| TGFA | 3.02 | SLC29A1 | -2.27 |
| FOXN2 | 3.02 | CD81 | -2.27 |
| EDEM1 | 3.01 | NRP1 | -2.27 |
| EDNRA | 3 | AIM1 | -2.28 |
| NCF1 | 2.99 | HIST1H3I | -2.28 |
| ATF3 | 2.99 | STARD13 | -2.28 |
| TMEM2 | 2.99 | ACPP | -2.29 |
| IL1RN | 2.99 | ITM2C | -2.29 |
| SEC24D | 2.99 | ESCO2 | -2.29 |
| KDM6B | 2.99 | HACD2 | -2.29 |
| TGM5 | 2.98 | PLK1 | -2.29 |
| ANKRD22 | 2.97 | TLL1 | -2.3 |

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|--------------------|------|------------------------|-------|
| PRELID3B; ATP5E | 2.97 | PDPR | -2.3 |
| CYB5R2 | 2.96 | HMG2 | -2.3 |
| DNAJB5 | 2.96 | TM7SF3 | -2.3 |
| ACSL3 | 2.95 | NMI | -2.3 |
| STC2 | 2.94 | CALD1 | -2.3 |
| MB21D1 | 2.94 | SYT8 | -2.3 |
| DEFB103A; DEFB103B | 2.94 | F2RL2 | -2.3 |
| MREG | 2.93 | KIF13A | -2.3 |
| TBC1D20 | 2.93 | CKAP2 | -2.31 |
| TRIM8 | 2.92 | RMI2 | -2.31 |
| GFPT1 | 2.92 | KRT1 | -2.31 |
| IVL | 2.91 | AASS | -2.31 |
| PHF1 | 2.91 | SMO | -2.31 |
| LPIN1 | 2.89 | ID3 | -2.31 |
| SLC6A14 | 2.89 | ABCC2 | -2.31 |
| CTH | 2.88 | BCAM | -2.32 |
| ADAM8 | 2.87 | YTHDC1 | -2.32 |
| ARPC1B | 2.86 | OLFML3 | -2.32 |
| EMP3 | 2.85 | MAL2 | -2.32 |
| UBASH3B | 2.85 | CDC25C | -2.32 |
| SLC16A3; MIR6787 | 2.85 | CIT; MIR1178 | -2.32 |
| ZFAND5 | 2.84 | SH3BGRL | -2.32 |
| SLC2A6 | 2.84 | MLLT3 | -2.32 |
| ABHD3 | 2.81 | PCDH7 | -2.33 |
| FBXL12 | 2.81 | ADAR | -2.33 |
| HSPA13 | 2.8 | GANC | -2.33 |
| DHRS9 | 2.8 | DLEU2; MIR15A; MIR16-1 | -2.33 |
| CDYL | 2.79 | PBK | -2.33 |
| PLEK2 | 2.78 | HIST2H2BF | -2.33 |
| PLA2G4E | 2.77 | IL17RE | -2.33 |
| SRPX2 | 2.76 | CLSPN | -2.34 |
| FAM83G | 2.76 | NLRP10 | -2.34 |
| EIF2B2 | 2.73 | TMEM107; SNORD118 | -2.34 |
| RASA3 | 2.73 | HEG1 | -2.34 |
| NIPAL1 | 2.72 | SLC23A2 | -2.34 |
| DUSP16 | 2.72 | KIF11 | -2.34 |
| SLC20A1 | 2.72 | SLC39A2 | -2.34 |
| IER2 | 2.71 | NALCN | -2.35 |
| CPEB4 | 2.7 | MANEA | -2.35 |
| IRF2BPL | 2.7 | MMP13 | -2.35 |
| ANGPTL4 | 2.69 | SLC5A1 | -2.36 |
| PLCXD1 | 2.69 | AMZ2 | -2.36 |
| CHL1 | 2.67 | FAM129A | -2.36 |
| SOX9 | 2.67 | TRIM59 | -2.37 |
| CHST11 | 2.67 | CCNA2 | -2.37 |
| SC5D | 2.67 | IFI44 | -2.37 |
| ABCA12 | 2.66 | PRR5L | -2.37 |
| PSME4 | 2.66 | ZNF845 | -2.38 |

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|----------------|------|-----------|-------|
| TRIM27 | 2.66 | FBXW7 | -2.38 |
| PMEPA1 | 2.65 | DEPDC4 | -2.38 |
| XPOT | 2.65 | BMPR1B | -2.39 |
| AVPI1 | 2.65 | BSCL2 | -2.39 |
| CLCF1 | 2.65 | NCAPG2 | -2.39 |
| NUAK2 | 2.65 | C8orf34 | -2.39 |
| DUSP16 | 2.64 | MUC7 | -2.4 |
| FHDC1 | 2.64 | BTG2 | -2.4 |
| NFKB2 | 2.64 | NLRP10 | -2.41 |
| FAM210A | 2.63 | EPHA3 | -2.41 |
| DSCAM | 2.63 | LXN | -2.42 |
| PGM3 | 2.63 | MCM3 | -2.42 |
| PRNP | 2.62 | KIAA1644 | -2.43 |
| IL1R2 | 2.62 | ALG8 | -2.43 |
| GJB5 | 2.62 | NLRP2 | -2.44 |
| IFRD1 | 2.62 | WNK1 | -2.44 |
| ARL4C | 2.62 | INPP5D | -2.44 |
| CMTM7 | 2.61 | GATA3 | -2.44 |
| CSF3 | 2.6 | FOXM1 | -2.44 |
| FLG2 | 2.6 | GTF2H5 | -2.44 |
| IARS | 2.6 | TYMS | -2.45 |
| ODC1; SNORA80B | 2.6 | GJA1 | -2.45 |
| ME1 | 2.59 | ISG15 | -2.45 |
| ASB1 | 2.59 | MBNL2 | -2.45 |
| MAP3K9 | 2.59 | MXRA5 | -2.46 |
| LRAT | 2.58 | EAF2 | -2.46 |
| RNF19B | 2.58 | TMEM123 | -2.47 |
| CCL20 | 2.58 | TACC3 | -2.47 |
| SMOX | 2.57 | HACD3 | -2.47 |
| LIPG | 2.57 | PRICKLE1 | -2.47 |
| NIPA1 | 2.57 | NCAPH | -2.48 |
| NFKBIA | 2.57 | PSG6 | -2.48 |
| ALDH1A3 | 2.57 | LPAR6 | -2.48 |
| SREBF1 | 2.57 | VPS36 | -2.48 |
| TMEM2 | 2.56 | RALGPS1 | -2.48 |
| SEMA4B | 2.55 | HIST1H2BF | -2.49 |
| C10orf55 | 2.55 | FIGN | -2.49 |
| CYP1B1 | 2.55 | CRYAB | -2.49 |
| DAPP1 | 2.54 | LAPTM4B | -2.49 |
| SQSTM1 | 2.54 | TMEM27 | -2.49 |
| MSANTD3-TMEFF1 | 2.53 | ALG6 | -2.49 |
| WDR45; PRAF2 | 2.53 | INPP5D | -2.49 |
| WARS | 2.52 | GPSM2 | -2.49 |
| ACSL1 | 2.52 | PIK3C2B | -2.5 |
| TARS | 2.52 | CYP2J2 | -2.5 |
| ATP2B1 | 2.52 | POLH | -2.52 |
| SOCS2 | 2.52 | TPRG1 | -2.52 |
| MPRIP | 2.51 | CDK1 | -2.52 |

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|---------------|------|------------------------|-------|
| ACLY | 2.51 | HSD17B11 | -2.52 |
| PPARD | 2.51 | BLOC1S1 | -2.52 |
| EGR3 | 2.49 | DDX58 | -2.52 |
| GLRX | 2.49 | CSPG5 | -2.53 |
| YOD1 | 2.49 | PSG9 | -2.53 |
| SEMA3A | 2.49 | BNIP1 | -2.53 |
| NCAM1 | 2.49 | TP53 | -2.53 |
| PHGDH | 2.49 | HIST1H2AL; HIST1H2BN | -2.53 |
| SLFN5 | 2.49 | EPHA4 | -2.54 |
| WSB1 | 2.48 | BUB1 | -2.54 |
| MARS; MIR6758 | 2.48 | BRCA1 | -2.54 |
| ARL5B | 2.48 | PNPO | -2.55 |
| HPCAL1 | 2.48 | HIST2H2AB | -2.55 |
| DEDD2 | 2.48 | NGFRAP1 | -2.55 |
| HERPUD1 | 2.46 | SLC16A2 | -2.55 |
| ATG2A | 2.46 | HIST1H1C | -2.56 |
| ZAK; pk | 2.46 | C1QL1 | -2.56 |
| GMPPB | 2.45 | SOX6; MIR6073 | -2.57 |
| SHROOM3 | 2.45 | SLC2A12 | -2.57 |
| CARS | 2.45 | HIST2H2AA4; HIST2H2AA3 | -2.57 |
| HSD11B1 | 2.45 | KRT13 | -2.58 |
| MIR22HG | 2.45 | DZIP3 | -2.58 |
| SLC37A2 | 2.45 | TMEM14A | -2.58 |
| TRPV3 | 2.44 | SIDT2 | -2.59 |
| ABCA1 | 2.44 | DEGS1 | -2.59 |
| SQSTM1 | 2.43 | PIGS | -2.59 |
| CA12 | 2.43 | PSG4 | -2.6 |
| SKIL | 2.42 | CBR1 | -2.6 |
| FMNL2 | 2.42 | UPK3B | -2.6 |
| C9orf72 | 2.42 | EPHX1 | -2.6 |
| RNF24 | 2.41 | RBL1 | -2.61 |
| ALAS1 | 2.41 | HIST1H4C | -2.61 |
| ITGA5 | 2.4 | FOXN3 | -2.62 |
| RANBP9 | 2.39 | IFITM2 | -2.62 |
| SEMA6A | 2.39 | RRM2 | -2.63 |
| IDI1 | 2.39 | B4GALT4 | -2.63 |
| ABL2 | 2.39 | PLEKHF2 | -2.63 |
| KRT18 | 2.38 | BRE | -2.63 |
| JUND | 2.38 | RAD51 | -2.63 |
| PYGB | 2.38 | FZD1 | -2.63 |
| CSRNP1 | 2.38 | IRAK1BP1 | -2.64 |
| LPXN | 2.38 | INPP5D | -2.64 |
| RASA3 | 2.38 | DNAL1 | -2.64 |
| CPNE8 | 2.38 | DLL1 | -2.64 |
| CLDN12 | 2.37 | HIST1H1D | -2.64 |
| SAV1 | 2.36 | HIST1H2BL | -2.65 |
| ADGRE5 | 2.35 | STARD5 | -2.65 |
| TDP2 | 2.35 | KCND2 | -2.66 |

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|---------------|------|---------------------|-------|
| CYP27B1 | 2.34 | HIST1H4K | -2.66 |
| PARD6B | 2.34 | HIST1H2BH | -2.66 |
| DOCK4 | 2.34 | TRIM69 | -2.67 |
| LHFPL2 | 2.34 | MEIS1 | -2.68 |
| CDCP1 | 2.32 | GRIA3 | -2.68 |
| PGD | 2.32 | NIPAL3 | -2.68 |
| SPDYA | 2.32 | HCFC1R1 | -2.69 |
| LOC643802 | 2.32 | DLGAP5 | -2.69 |
| HMOX1 | 2.32 | LFNG; MIR4648 | -2.69 |
| POLR3D | 2.32 | USP18 | -2.71 |
| SARS | 2.32 | HIST1H2AJ | -2.72 |
| MEX3C | 2.31 | NREP | -2.72 |
| CYTH1 | 2.31 | FAM198B | -2.72 |
| EID3 | 2.31 | MYO3B | -2.73 |
| LBH | 2.31 | CENPM | -2.73 |
| LYAR | 2.31 | POGZ | -2.73 |
| CTNS | 2.3 | CXADR | -2.74 |
| CSGALNACT2 | 2.3 | LGALS1 | -2.74 |
| GNE | 2.29 | PRSS12 | -2.74 |
| FZD8; MIR4683 | 2.29 | VCL | -2.76 |
| NCR3LG1 | 2.28 | MSH2 | -2.76 |
| FEZ1 | 2.28 | HIST1H2AM; HIST1H3J | -2.76 |
| AARS | 2.28 | MMP2 | -2.77 |
| ZNF805 | 2.28 | TRANK1 | -2.78 |
| CEBPB | 2.28 | BDH2 | -2.78 |
| PMM2 | 2.27 | NNT | -2.78 |
| YARS | 2.27 | WDR66 | -2.78 |
| SPINK1 | 2.27 | E2F8 | -2.79 |
| OSBP2 | 2.27 | HMGB2 | -2.79 |
| SLC4A7 | 2.26 | CBX5; MIR3198-2 | -2.79 |
| SLC2A6 | 2.26 | CSRP2 | -2.8 |
| ELK3 | 2.26 | TMEM255A | -2.8 |
| PNPLA8 | 2.26 | CXCL16 | -2.81 |
| ENTPD3 | 2.26 | LAMP3 | -2.81 |
| MXD1 | 2.26 | UGT1A1 | -2.81 |
| SREK1IP1 | 2.26 | PLSCR1 | -2.81 |
| MST1R | 2.26 | HIST1H3B | -2.82 |
| ITGB4 | 2.26 | KIAA1107 | -2.83 |
| MAFF | 2.25 | BLNK | -2.83 |
| CEBPA | 2.25 | KIAA0101; CSNK1G1 | -2.83 |
| SQRDL | 2.24 | SLC47A2 | -2.83 |
| HAUS6 | 2.24 | SLC16A9 | -2.84 |
| FBXO33 | 2.24 | LCP1 | -2.84 |
| TNFRSF25 | 2.24 | CERS6 | -2.84 |
| HR | 2.23 | MICAL3 | -2.86 |
| DUSP5 | 2.23 | S1PR5 | -2.86 |
| DUSP16 | 2.22 | ARL15 | -2.86 |
| PPP1R15A | 2.22 | EPGN | -2.87 |

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|--------------------|------|-----------|-------|
| SEC24A | 2.22 | FADS3 | -2.87 |
| TUBGCP3 | 2.21 | WNT10A | -2.88 |
| KBTBD2 | 2.21 | EIF2AK2 | -2.88 |
| TRIOBP; NOL12 | 2.21 | SHTN1 | -2.89 |
| TRIML2 | 2.21 | TXNIP | -2.91 |
| SETBP1 | 2.21 | CCL28 | -2.91 |
| HMGCS1 | 2.21 | CCNE2 | -2.91 |
| IER5 | 2.21 | DDX60L | -2.92 |
| NAMPT | 2.21 | FGFR3 | -2.93 |
| CYTH2 | 2.2 | SSBP2 | -2.93 |
| PLEKHM1; MIR4315-1 | 2.2 | KDM2B | -2.93 |
| ZNF165 | 2.2 | SLC6A11 | -2.95 |
| TOP1 | 2.2 | ZSCAN31 | -2.95 |
| DEFB103A | 2.2 | SLC6A2 | -2.96 |
| TMEM189 | 2.19 | EBPL | -2.96 |
| MED8 | 2.19 | MLLT3 | -2.97 |
| UGDH | 2.19 | HIST1H2AG | -2.99 |
| ARFIP2 | 2.19 | PCNA | -3 |
| ZFAND1 | 2.19 | VAV3 | -3 |
| ZBTB10 | 2.19 | MX2 | -3.01 |
| JOSD1 | 2.19 | FAM26E | -3.01 |
| LYN | 2.19 | CCBE1 | -3.01 |
| TMED5 | 2.19 | SKP2 | -3.01 |
| GPX2 | 2.18 | IFT74 | -3.02 |
| RGS12 | 2.18 | TMEM138 | -3.05 |
| ATP2C2 | 2.18 | ARV1 | -3.06 |
| RAB31 | 2.18 | CYP39A1 | -3.06 |
| KLF7 | 2.18 | PROS1 | -3.06 |
| FGF2 | 2.17 | LGR4 | -3.06 |
| ULK1 | 2.17 | B4GALNT2 | -3.07 |
| NRBF2 | 2.17 | DTL | -3.07 |
| WNT5A | 2.17 | OR5P2 | -3.07 |
| IFRD2 | 2.17 | SCD5 | -3.09 |
| PTPN12 | 2.17 | SLC26A2 | -3.09 |
| RNF144B | 2.16 | CD86 | -3.12 |
| GTPBP2 | 2.16 | MAFTRR | -3.13 |
| SNRK | 2.16 | SLC9A9 | -3.14 |
| EIF2AK3 | 2.16 | HIST1H3F | -3.15 |
| NTN4 | 2.16 | SLC29A3 | -3.19 |
| SCML1 | 2.15 | LYPD6B | -3.19 |
| DUSP16 | 2.15 | ETS2 | -3.22 |
| SH2D3A | 2.15 | TLR5 | -3.23 |
| PRKAG2 | 2.15 | CRABP2 | -3.23 |
| TIMM22 | 2.15 | KRT77 | -3.23 |
| ZNF432 | 2.14 | STIL | -3.26 |
| COQ10B | 2.14 | CAV1 | -3.26 |
| NFAT5 | 2.14 | NR2F2 | -3.27 |
| ILF2 | 2.14 | ENDOD1 | -3.29 |

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|--------------------|------|------------------------|-------|
| VPS37B | 2.13 | MCM5 | -3.31 |
| C15orf57; MRPL42P5 | 2.13 | IFIT3 | -3.31 |
| SLC30A1 | 2.13 | ERG | -3.31 |
| G0S2 | 2.13 | MOB3B | -3.33 |
| ARHGEF18 | 2.13 | RBMS3 | -3.33 |
| TOM1L1 | 2.13 | HIST1H2BI | -3.34 |
| MIR17HG; MIR17 | 2.12 | IFIH1 | -3.35 |
| BAK1 | 2.12 | MCM6 | -3.36 |
| RNASE7 | 2.12 | VWA5A | -3.4 |
| RELL2 | 2.12 | STEAP4 | -3.41 |
| DHCR7 | 2.12 | IFITM3 | -3.44 |
| CRLF3 | 2.12 | STMN1; MIR3917 | -3.45 |
| SMIM15 | 2.12 | SESN3 | -3.49 |
| SHB | 2.11 | GSTM4 | -3.49 |
| GJB3 | 2.11 | MFAP5 | -3.5 |
| SH3PXD2B | 2.11 | SPOCD1 | -3.5 |
| RPS6KA3 | 2.11 | FGFR2 | -3.51 |
| QKI | 2.11 | TRAM2 | -3.52 |
| ENTPD6 | 2.11 | ZNF608 | -3.52 |
| YDJC | 2.11 | HIST1H4J | -3.53 |
| HK2 | 2.1 | HACD4 | -3.55 |
| SPIRE1 | 2.1 | RNF141 | -3.57 |
| NDEL1 | 2.1 | RAB7B | -3.57 |
| STK17A | 2.1 | NID1 | -3.58 |
| ARCN1 | 2.1 | TOP2A | -3.6 |
| NANS | 2.1 | HIST1H3H | -3.6 |
| MAP2K1 | 2.1 | CACNG4 | -3.61 |
| RSL24D1 | 2.1 | HIST2H2AA3; HIST2H2AA4 | -3.61 |
| ST3GAL1 | 2.1 | GPR1 | -3.62 |
| IL36G | 2.09 | SPOCK1 | -3.62 |
| SH3KBP1 | 2.09 | NUSAP1 | -3.63 |
| CDC42EP2 | 2.09 | CYBRD1 | -3.67 |
| LPAR3 | 2.09 | DTX3L | -3.67 |
| SLC52A2 | 2.09 | DKK3 | -3.69 |
| SMG9 | 2.09 | EFEMP1 | -3.69 |
| VIM | 2.09 | SYNPO | -3.71 |
| PIGA | 2.09 | FAM171B | -3.74 |
| TIPARP | 2.09 | CYP4B1 | -3.74 |
| NFIL3 | 2.09 | IFFO2 | -3.77 |
| ZFAND2A | 2.09 | HIST1H1B | -3.77 |
| UGCG | 2.09 | PAQR7 | -3.77 |
| UBE2R2 | 2.08 | ERP27 | -3.77 |
| TNIP1 | 2.08 | EXO1 | -3.78 |
| PELI1 | 2.08 | BCL11A | -3.8 |
| HSD17B12 | 2.08 | PHACTR2 | -3.82 |
| RAPH1 | 2.08 | VIT | -3.82 |
| LTBR | 2.08 | HIST1H2BM | -3.84 |
| MARVELD2 | 2.08 | ENC1 | -3.85 |

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|----------------|------|------------------------|-------|
| ARF4 | 2.08 | ANLN | -3.89 |
| CXXC1 | 2.08 | SAMHD1 | -3.9 |
| ATG101 | 2.08 | PARP14 | -3.91 |
| EIF2A | 2.08 | ENAH | -3.92 |
| HMGA2 | 2.08 | HIST1H2AI | -3.93 |
| CPT1A | 2.07 | KANK4 | -3.95 |
| TMEM135 | 2.07 | SP100 | -3.96 |
| DCBLD2 | 2.07 | MAF | -3.99 |
| PPP1R18 | 2.07 | MATN2 | -3.99 |
| RICTOR | 2.07 | FAM111B | -4.01 |
| PGM1 | 2.06 | HIST1H2AB | -4.04 |
| PTPN9 | 2.06 | ADAMTS1 | -4.05 |
| LONRF1 | 2.06 | DAPK1 | -4.06 |
| PPP1R10 | 2.06 | ABI3BP | -4.08 |
| MFSD2A | 2.06 | C1S | -4.1 |
| SLC33A1 | 2.06 | ACSF2 | -4.11 |
| GRB10 | 2.06 | WNT4 | -4.12 |
| ITGB5 | 2.05 | CPA4 | -4.12 |
| ARHGEF4 | 2.05 | KITLG | -4.13 |
| ABHD17C | 2.05 | C21orf91; C21orf91-OT1 | -4.13 |
| VASP | 2.05 | ELAVL2 | -4.14 |
| LSS | 2.05 | IFI44L | -4.17 |
| TIPARP | 2.04 | CTSV | -4.22 |
| DOC2A | 2.04 | HIST1H3G | -4.24 |
| EHD4 | 2.04 | EPSTI1 | -4.25 |
| ACAT2 | 2.04 | GBP6 | -4.26 |
| SAMD8 | 2.04 | HIST1H3A | -4.32 |
| MPHOSPH6 | 2.04 | FAM134B | -4.32 |
| LAMB3; MIR4260 | 2.04 | S1PR1 | -4.33 |
| SEC23A | 2.03 | C1orf21 | -4.33 |
| USP2 | 2.03 | GBP2 | -4.38 |
| DYRK3 | 2.03 | UBE2L6 | -4.4 |
| MAP4K4 | 2.03 | KMO | -4.59 |
| SLC39A7 | 2.03 | COBLL1 | -4.61 |
| B3GNT3 | 2.03 | CROT | -4.65 |
| GAREM1 | 2.03 | MTUS1 | -4.72 |
| AVL9 | 2.03 | PPP2R2B | -4.72 |
| MET | 2.03 | FRK | -4.73 |
| PXN | 2.03 | C1R | -4.76 |
| PTAFR | 2.02 | SP110 | -4.76 |
| RTTN | 2.02 | CA2 | -4.78 |
| MYD88 | 2.02 | ADM | -4.92 |
| LIF | 2.02 | GLIPR1 | -4.95 |
| CAB39L | 2.02 | NPNT | -4.99 |
| MBOAT2 | 2.01 | CYB561A3 | -4.99 |
| SPRED1 | 2.01 | SAMD9L | -5.13 |
| C1QTNF1 | 2.01 | NMU | -5.16 |
| STK40 | 2.01 | CYR61 | -5.21 |

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|--------------|------|--------------------|--------|
| MID1IP1 | 2.01 | EPPK1 | -5.27 |
| PREB | 2.01 | HIST2H3A; HIST2H3C | -5.29 |
| SRP19; ZRSR1 | 2 | FAT4 | -5.3 |
| EMP1 | 2 | CTGF | -5.36 |
| GMEB1 | 2 | MAP2 | -5.48 |
| MESDC1 | 2 | TRIM22 | -5.51 |
| | | HIST2H3A | -5.6 |
| | | LOX | -5.72 |
| | | OTUD1 | -5.72 |
| | | SEMA5A | -5.74 |
| | | WFDC12 | -5.76 |
| | | IFNK | -5.91 |
| | | EDN1 | -6.07 |
| | | SAMD9 | -6.08 |
| | | BBOX1 | -6.38 |
| | | PARP9 | -6.51 |
| | | SCARA3 | -6.58 |
| | | TGFB2; TGFB2-OT1 | -6.6 |
| | | TPM1 | -6.65 |
| | | IFI27 | -6.8 |
| | | TNFSF10 | -6.92 |
| | | OAS2 | -6.97 |
| | | IFITM1 | -7.15 |
| | | MYL9 | -7.24 |
| | | FBXO32 | -7.55 |
| | | CCDC80; LINC01279 | -7.88 |
| | | STAT1 | -8.01 |
| | | TLR3 | -8.02 |
| | | OAS1 | -8.27 |
| | | DDX60 | -8.53 |
| | | FILIP1L | -8.62 |
| | | PLK2 | -8.97 |
| | | OLFML2A | -9.52 |
| | | PSG5 | -10.16 |
| | | TAGLN | -10.71 |
| | | GBP1 | -11.06 |
| | | CXCL14 | -15.76 |
| | | IGFBP3 | -19.59 |
| | | IFI6 | -20.11 |
| | | IFIT1 | -26.22 |
| | | MX1 | -36.58 |

Supplementary Table S2

Antibody array data:

| <u>upregulated</u> | | <u>downregulated</u> | |
|---------------------------------|---------------|---------------------------------|---------------|
| <u>during AC EF stimulation</u> | | <u>during AC EF stimulation</u> | |
| <u>Protein</u> | <u>log FC</u> | <u>Protein</u> | <u>log FC</u> |
| TP53 | 0.32 | ENTPD1 | -0.26 |
| PDCD1LG2 | 0.35 | IL10 | -0.25 |
| APP | 0.31 | TNFRSF9 | -0.28 |
| CASP3 | 0.31 | S100P | -0.39 |
| CFLAR | 0.52 | HMGA1 | -0.42 |
| AKT3 | 0.52 | VCAM1 | -0.31 |
| ETS1 | 0.30 | CASP3 | -0.20 |
| NT5E | 0.43 | ACTN1 | -0.23 |
| ATM | 0.78 | S100B | -0.33 |
| NBN | 0.31 | BECN1 | -0.38 |
| IDO1 | 0.33 | CDC25C | -0.21 |
| JAK3 | 1.23 | APBA1 | -0.23 |
| SOX9 | 0.46 | GP1BA | -1.03 |
| VTN | 0.00 | CD47 | -0.26 |
| CXCL13 | 0.31 | MPO | -0.40 |
| FOS | 0.62 | CD38 | -0.26 |
| CD14 | 0.66 | SELE | -0.24 |
| CD28 | 0.45 | IL37 | -0.21 |
| CD44 | 0.44 | IFNG | -0.40 |
| PTPRC | 0.96 | IL10 | -0.67 |
| CD53 | 0.36 | CCL5 | -0.46 |
| ENG | 0.35 | CD86 | -0.22 |
| PRTN3 | 0.30 | HGF | -0.33 |
| CD44 | 0.33 | CSF2 | -0.23 |
| CD44 | 0.39 | IL7R | -0.22 |
| CD47 | 0.85 | AKT3 | -0.25 |
| B3GAT1 | 0.30 | RNF141 | -0.24 |
| IGLC1 | 1.13 | TMEM54 | -0.20 |
| IL2RA | 0.61 | UNC93B1 | -0.20 |
| MAPK1 | 0.67 | UXS1 | -0.24 |
| ISOC2 | 0.35 | TNFSF10 | -0.25 |
| NAA50 | 0.32 | MAPK9 | -0.36 |
| RP9 | 0.91 | AQP1 | -0.26 |
| DYNC1I2 | 0.60 | PIGT | -0.27 |
| ERBB2 | 0.31 | FGF2 | -0.20 |
| CHL1 | 0.39 | IL10 | -0.26 |
| RANBP2 | 0.36 | IL15 | -0.22 |
| FABP5 | 0.73 | HSPB1 | -0.24 |
| PIGK | 0.40 | ANXA1 | -0.24 |
| PIGK | 0.35 | GSTM1 | -0.21 |
| GLO1 | 0.46 | RAC1 | -0.23 |
| GLO1 | 0.45 | MBD1 | -0.24 |

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|----------|------|---------|-------|
| GSTM1 | 0.66 | FABP2 | -0.42 |
| ODC1 | 0.33 | S100A2 | -0.24 |
| ODC1 | 0.49 | PDLIM1 | -0.23 |
| S100A4 | 0.34 | HSPD1 | -0.86 |
| MDH1 | 0.30 | MUC17 | -0.24 |
| DDIT3 | 0.37 | TACSTD2 | -0.39 |
| HSPD1 | 0.61 | OTUB1 | -0.37 |
| FAF1 | 0.47 | AOX1 | -0.44 |
| IDO1 | 0.85 | AGR2 | -0.26 |
| CASP9 | 0.30 | S100A6 | -0.53 |
| MMP7 | 0.39 | ICAM1 | -0.49 |
| MUC2 | 0.81 | EIF2B1 | -0.23 |
| SORL1 | 0.94 | HSP90B1 | -0.24 |
| FLOT1 | 0.47 | TIMP2 | -0.28 |
| MMP1 | 0.41 | KDR | -0.23 |
| RAD51C | 0.90 | AMFR | -0.60 |
| CUL2 | 0.68 | SPINT2 | -0.37 |
| RHBDF1 | 0.35 | TNF | -0.38 |
| ECHS1 | 0.40 | SORL1 | -0.27 |
| COL15A1 | 0.32 | THOC1 | -0.25 |
| ENO1 | 0.96 | PDCD2 | -0.54 |
| MMP12 | 0.42 | CNN2 | -0.41 |
| MAPK4 | 0.37 | | |
| CCR7 | 0.85 | | |
| ERBB2 | 0.59 | | |
| GRB10 | 0.47 | | |
| CHL1 | 0.38 | | |
| CCKBR | 0.52 | | |
| CCR7 | 0.29 | | |
| CFLAR | 0.50 | | |
| IRF4 | 0.27 | | |
| SERPINA9 | 0.25 | | |
| CCND2 | 0.23 | | |
| STAT3 | 0.24 | | |
| SH3BP5 | 0.20 | | |
| PAX5 | 0.21 | | |
| CHEK2 | 0.25 | | |
| VTCN1 | 0.29 | | |
| FABP2 | 0.23 | | |
| THBS3 | 0.21 | | |
| KLK3 | 0.26 | | |
| ICAM1 | 0.23 | | |
| FAS | 0.40 | | |
| CD99 | 0.21 | | |
| ENG | 0.20 | | |
| CCL11 | 0.21 | | |
| IFNG | 0.21 | | |
| IL7 | 0.21 | | |

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|---------|------|
| NTF4 | 0.24 |
| ITGA5 | 0.29 |
| SELP | 0.29 |
| CCL8 | 0.02 |
| MAP2K4 | 0.30 |
| UBE2T | 0.23 |
| PGAM5 | 0.20 |
| MAPK12 | 0.23 |
| TNFSF14 | 0.21 |
| CDC34 | 0.27 |
| NME2 | 0.27 |
| BCL2L2 | 0.22 |
| ANXA1 | 0.25 |
| ODC1 | 0.29 |
| PPP2R5D | 0.24 |
| GSTM1 | 0.25 |
| S100A2 | 0.25 |
| PSMD4 | 0.27 |
| TOP1 | 0.27 |
| OGG1 | 0.24 |
| NME1 | 0.21 |
| CHKA | 0.22 |
| TDP2 | 0.25 |
| NCOR1 | 0.26 |
| CD302 | 0.22 |
| BNIP3 | 0.26 |
| CDKN1C | 0.24 |
| IGFBP7 | 0.28 |
| DKK3 | 0.24 |
| ODC1 | 0.25 |
| TAF12 | 0.24 |
| ARHGAP6 | 0.26 |
| HSPA1A | 0.21 |
| MET | 0.20 |
| MMP10 | 0.29 |
| SF3B4 | 0.26 |
| CAV3 | 0.28 |
| PI3 | 0.29 |
| PTPRCAP | 0.20 |
| HMMR | 0.22 |
| PIR | 0.20 |
| MIF | 0.26 |
| GCHFR | 0.33 |
| MUC5B | 0.20 |
| SLC16A6 | 0.24 |
| CCT7 | 0.25 |
| RPL10A | 0.36 |