**Supplementary Materials**

**High-risk histological subtype-related FAM83A hijacked FOXM1 transcriptional regulation to promote malignant progression in lung adenocarcinoma**

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**Supplementary Table 4:** Differentially expressed mRNA between high FAM83A expression patients (top 15%) and low FAM83A expression patients (bottom 15%) from GSE30219.

**Supplementary Figure S1: FAM83A expression in patients with different clinicopathological information and the efficiency of sgFAM83A and the overexpression of FAM83A.**



Figure S1: FAM83A expression in patients with different clinicopathological information and the efficiency of sgFAM83A and the overexpression of FAM83A. FAM83A mRNA expression distribution between pathology subtype (A) Tumor stage (B), lymph node stage (C) and TNM stage (D). (E) The mRNA expression of FAM83A in 48 pairs of LUAD tissue and matched adjacent tissue. (F) The WesternBlots revealed the expression of FAM83A after knockdown or overexpression.

**Supplementary Figure S2: The statistical results of colony formation assay, EdU assay, Transwell and Matrigel assay in vitro.**

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Figure S2: The statistical results of colony formation assay, EdU assay, Transwell and Matrigel assay in vitro. (A) Colony formation assays of A549 and PC9 cells with FAM83A knockdown or overexpression. (B) EdU assays of A549 and PC9 cells with FAM83A knockdown or overexpression. (C-D) Transwell assay and Matrigel of A549 and PC9 cells with FAM83A knockdown or overexpression. \*p<0.05, \*\*p< 0.01, \*\*\*p<0.001 (Student’s t test).

**Supplementary Figure S3: FAM83A regulates cell cycle dependent on FOXM1.**



Figure S3: FAM83A regulates cell cycle dependent on FOXM1. (A-B) Colony formation revealed that cell proliferation affected by FAM83A knockdown or overexpression was reversed by cotransfection with FOXM1 knockdown or overexpression in A549 Cell line. (C) Colony formation revealed that the efficacy of Palbociclib was more significant after FAM83A overexpression in A549 cell line. \*p<0.05, \*\*p< 0.01, \*\*\*p<0.001 (Student’s t test).

**Supplementary Table 1 Primer sets, Sequences of siRNAs and sgRNA sets**

|  |
| --- |
| **Primer sets** |
| CDC6 | Forward | 5’-CAGAAAAGCATTACACAGCTGT-3’ |
| Reverse | 5’-GAAAATGACTGGTAGCCTGTTG-3’ |
| CDC20 | Forward | 5’-CAACTCTTTGTAACCCAGAACG-3’ |
| Reverse | 5’-CCTTTCCAAACACATTCGGATT-3’ |
| FOXM1 | Forward | 5’-GATCTGCGAGATTTTGGTACAC-3’ |
| Reverse | 5’-CTGCAGAAGAAAGAGGAGCTAT-3’ |
| CDKN3 | Forward | 5'-GCCCAGTTCAATACAAACAAGT-3' |
| Reverse | 5'-CAACCTGGAAGAGCACATAAAC-3' |
| CDK2 | Forward | 5’-CCAGGAGTTACTTCTATGCCTGA-3’ |
| Reverse | 5’-TTCATCCAGGGGAGGTACAAC-3’ |
| CDK4 | Forward | 5’-ATGGCTACCTCTCGATATGAGC-3’ |
| Reverse | 5’-CATTGGGGACTCTCACACTCT-3’ |
| CDC16. | Forward | 5’-TCAAAGTGCTCTATTTTGGGCA-3’ |
| Reverse | 5’-TTGTCCAGTTTTCGTGACCGA-3’ |
| GAPDH | Forward | 5’-GGAGCGAGATCCCTCCAAAAT-3’ |
| Reverse | 5’-GGCTGTTGTCATACTTCTCATGG-3’  |
| FOXM1-promoter Region 1 | Forward | 5’-gcagggagagagagagagga-3’ |
| Reverse | 5’-ttatcttccagggcccttgg-3‘ |
| FOXM1-promoter Region 2 | Forward | 5’-tggagtgtggtgtgagttga-3’ |
| Reverse | 5’-acatccaactgttctgccct-3’ |
| FOXM1-promoter Region 3 | Forward | 5’-caaatgtgggctgggcatag-3‘ |
| Reverse | 5’-gtgcagtggtgtgatcatgg-3‘ |
| FOXM1-promoter Region 4 | Forward | 5’-gagggagagtttggggacg-3‘ |
| Reverse | 5’-tgtgggaaaatggggtacga-3‘ |
| **Sequences of siRNAs** |
| siFOXM1-1 | gagagtgaaaacgcagattcat |
| siFOXM1-2 | gagtgaaaacgcagattcataat  |
| siFOXM1-3 | cgcagattcataatgaaaactag  |
| **Sequences of sgRNA** |
| sgFAM83A | AACGAACACCCCACGCTTGT |

**Supplementary Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
|   | Low\_risk | Medium\_risk | High\_risk |
| FAM83A | 2.11611 | 3.570744 | 3.944706 |
| UBE2C | 3.043474 | 3.856284 | 4.911044 |
| MMP12 | 1.66319 | 2.70543 | 3.727645 |
| BIRC5 | 1.948913 | 2.707255 | 3.667252 |
| CDC20 | 2.597576 | 3.324649 | 4.268468 |
| TPX2 | 2.442066 | 3.168673 | 4.088058 |
| MYBL2 | 2.541142 | 3.301796 | 4.199036 |
| MELK | 1.243889 | 1.892465 | 2.764526 |
| ANLN | 1.546669 | 2.320616 | 3.170854 |
| TK1 | 3.892719 | 4.369283 | 5.211939 |
| TOP2A | 2.970899 | 3.498229 | 4.333127 |
| RRM2 | 1.995265 | 2.834526 | 3.640282 |
| CTD-2510F5.4 | 1.450102 | 2.119725 | 2.916867 |
| CXCL10 | 3.169774 | 3.925463 | 4.71772 |
| FOXM1 | 1.654058 | 2.290511 | 3.083241 |
| CENPW | 2.083654 | 2.676056 | 3.465894 |
| CDCA5 | 1.624798 | 2.132678 | 2.920844 |
| KIF2C | 1.619741 | 2.207636 | 2.990877 |
| TRIP13 | 1.458802 | 2.152192 | 2.925133 |
| AURKB | 1.481733 | 2.170192 | 2.941833 |
| CCNA2 | 1.818546 | 2.381697 | 3.155358 |
| SLC2A1 | 2.841228 | 4.252606 | 4.987803 |
| CDKN3 | 1.401091 | 1.914991 | 2.689966 |
| CEP55 | 1.65811 | 2.376089 | 3.128769 |
| KIF4A | 1.298449 | 1.794866 | 2.550565 |
| DLGAP5 | 1.242569 | 1.832343 | 2.579262 |
| AQP5 | 4.30069 | 4.059804 | 2.471137 |
| C16orf89 | 8.346816 | 6.168708 | 4.556315 |
| PGC | 6.602273 | 5.226336 | 3.724602 |
| SCGB3A2 | 7.714709 | 6.535484 | 5.078562 |
| NAPSA | 9.775395 | 8.346368 | 6.903734 |
| SCGB3A1 | 7.180003 | 6.142235 | 4.736851 |
| MSLN | 4.63393 | 5.996614 | 4.710069 |
| AGR3 | 4.81879 | 5.477283 | 4.176896 |
| SFTPB | 11.89518 | 10.23596 | 8.830026 |
| CLIC6 | 4.906859 | 5.240847 | 3.93478 |
| BPIFA1 | 1.631172 | 4.689105 | 3.557979 |
| MUC5B | 1.262187 | 3.729414 | 2.586127 |
| SCGB1A1 | 5.551854 | 5.40696 | 4.165062 |
| SFTA2 | 8.426079 | 7.505625 | 6.235308 |
| SPINK1 | 3.801724 | 4.892646 | 3.716985 |
| PPP1R1B | 2.878073 | 3.437833 | 2.250771 |
| CXCL14 | 3.039464 | 4.830844 | 3.747218 |
| AQP3 | 7.460532 | 7.178253 | 6.011945 |
| PIGR | 7.305856 | 6.502608 | 5.314392 |
| CEACAM6 | 8.843895 | 8.840071 | 7.721098 |
| SFTPA2 | 9.045773 | 8.666073 | 7.549465 |
| HPGD | 3.572269 | 3.96163 | 2.903886 |
| SFTPA1 | 9.132847 | 8.38492 | 7.275854 |
| CRYM | 3.190577 | 2.727139 | 1.657264 |
| SLC44A4 | 5.697507 | 5.503866 | 4.447117 |
| SFTPC | 8.746604 | 5.281286 | 4.842013 |
| MS4A15 | 4.506748 | 2.045614 | 1.487749 |
| AGER | 6.376327 | 3.859182 | 3.505936 |
| SUSD2 | 6.560648 | 4.31269 | 3.47175 |
| GGTLC1 | 5.101158 | 3.00091 | 2.006934 |
| CYP4B1 | 5.955857 | 4.058246 | 2.997341 |
| SFTPD | 8.21768 | 6.131505 | 5.474495 |
| CYP2B7P | 6.479637 | 4.561488 | 3.606175 |
| FOLR1 | 7.902989 | 6.100646 | 5.00344 |
| WIF1 | 4.261514 | 2.252377 | 1.595308 |
| SLC26A9 | 4.65375 | 2.95491 | 1.903692 |
| ZNF385B | 3.378054 | 1.403515 | 1.16392 |
| WFDC12 | 2.377305 | 0.351612 | 0.259472 |
| SFTA1P | 5.593265 | 3.917336 | 3.148769 |
| SLC22A3 | 4.797178 | 3.268893 | 2.39651 |
| GFRA3 | 4.090492 | 2.440513 | 1.931081 |
| CES1 | 5.836745 | 3.982877 | 3.88902 |
| SLC22A31 | 6.459799 | 5.038206 | 4.095792 |
| MYBPHL | 2.990251 | 1.306638 | 0.893688 |
| AQP4 | 4.717792 | 3.106748 | 2.634681 |
| ATP13A4 | 4.019927 | 2.454071 | 1.905594 |
| CIT | 4.65837 | 3.205719 | 2.489807 |

**Supplementary Table 3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | logFC | AveExpr | t | P.Value | adj.P.Val | B |
| ENSG00000147689 | 7.50635 | 11.1046 | 37.08501 | 8.92E-60 | 4.85E-55 | 115.1453 |
| ENSG00000204949 | 4.894128 | 6.972431 | 30.24135 | 9.89E-52 | 2.69E-47 | 100.4877 |
| ENSG00000253258 | 2.135857 | 4.89912 | 18.5413 | 6.21E-34 | 1.12E-29 | 64.66803 |
| ENSG00000141526 | 2.229542 | 12.97373 | 11.76339 | 1.71E-20 | 2.32E-16 | 35.68738 |
| ENSG00000104140 | 3.665131 | 9.568327 | 10.76794 | 2.40E-18 | 2.60E-14 | 30.97064 |
| ENSG00000185567 | 3.287528 | 11.21342 | 10.73178 | 2.87E-18 | 2.60E-14 | 30.79804 |
| ENSG00000172927 | 4.282612 | 8.137566 | 10.13016 | 5.84E-17 | 3.97E-13 | 27.91668 |
| ENSG00000164520 | 2.060933 | 6.226748 | 9.807057 | 2.95E-16 | 1.23E-12 | 26.36418 |
| ENSG00000099812 | 2.205328 | 11.26248 | 9.673338 | 5.77E-16 | 2.09E-12 | 25.72113 |
| ENSG00000167767 | 2.405696 | 10.85349 | 9.540886 | 1.12E-15 | 3.59E-12 | 25.08406 |
| ENSG00000153294 | 2.958267 | 7.024016 | 9.452321 | 1.75E-15 | 5.05E-12 | 24.65808 |
| ENSG00000145113 | 3.490723 | 11.2439 | 9.204043 | 6.08E-15 | 1.46E-11 | 23.46429 |
| ENSG00000115641 | 2.00499 | 11.00502 | 9.200272 | 6.19E-15 | 1.46E-11 | 23.44616 |
| ENSG00000019186 | 4.505548 | 9.970767 | 9.024567 | 1.49E-14 | 3.12E-11 | 22.60206 |
| ENSG00000188910 | 3.494038 | 8.090345 | 8.799596 | 4.60E-14 | 8.33E-11 | 21.52279 |
| ENSG00000167772 | 2.815618 | 10.6265 | 8.78285 | 5.00E-14 | 8.76E-11 | 21.44254 |
| ENSG00000088002 | 2.548675 | 8.986324 | 8.702125 | 7.47E-14 | 1.23E-10 | 21.05589 |
| ENSG00000135480 | 2.265548 | 14.70304 | 8.668906 | 8.82E-14 | 1.41E-10 | 20.89689 |
| ENSG00000131746 | 3.630505 | 9.553487 | 8.551684 | 1.58E-13 | 2.20E-10 | 20.3363 |
| ENSG00000163053 | 2.597522 | 9.498587 | 8.464363 | 2.44E-13 | 3.02E-10 | 19.91929 |
| ENSG00000165474 | 2.622699 | 9.79498 | 8.440189 | 2.75E-13 | 3.14E-10 | 19.80394 |
| ENSG00000148344 | 2.667594 | 10.47062 | 8.438681 | 2.77E-13 | 3.14E-10 | 19.79675 |
| ENSG00000158825 | 3.124345 | 8.692316 | 8.423272 | 3.00E-13 | 3.32E-10 | 19.72325 |
| ENSG00000185008 | -2.35558 | 7.549151 | -8.31815 | 5.05E-13 | 4.99E-10 | 19.22228 |
| ENSG00000196167 | -2.87455 | 8.643411 | -8.22116 | 8.16E-13 | 7.78E-10 | 18.76094 |
| ENSG00000179913 | 2.551619 | 10.26009 | 8.1297 | 1.28E-12 | 1.11E-09 | 18.32664 |
| ENSG00000069011 | 2.962564 | 8.812413 | 8.069441 | 1.73E-12 | 1.47E-09 | 18.04095 |
| ENSG00000111879 | -2.07504 | 8.436753 | -8.04716 | 1.93E-12 | 1.60E-09 | 17.93541 |
| ENSG00000163993 | 4.778221 | 11.10938 | 8.045794 | 1.94E-12 | 1.60E-09 | 17.92894 |
| ENSG00000141527 | 2.087683 | 8.321273 | 8.024798 | 2.15E-12 | 1.70E-09 | 17.82954 |
| ENSG00000175592 | 2.617791 | 8.566546 | 8.010424 | 2.31E-12 | 1.79E-09 | 17.76152 |
| ENSG00000166920 | 2.475601 | 10.36101 | 7.962043 | 2.93E-12 | 2.21E-09 | 17.53274 |
| ENSG00000167644 | 2.567505 | 10.6584 | 7.936468 | 3.33E-12 | 2.44E-09 | 17.4119 |
| ENSG00000164509 | 2.052889 | 6.18453 | 7.838598 | 5.38E-12 | 3.52E-09 | 16.9502 |
| ENSG00000138759 | -2.29452 | 9.08424 | -7.80836 | 6.24E-12 | 3.90E-09 | 16.80778 |
| ENSG00000058085 | 2.474359 | 12.91894 | 7.799188 | 6.53E-12 | 4.03E-09 | 16.76462 |
| ENSG00000136002 | 2.214653 | 8.279939 | 7.72899 | 9.20E-12 | 5.32E-09 | 16.43454 |
| ENSG00000143512 | 3.053788 | 7.050732 | 7.71952 | 9.64E-12 | 5.46E-09 | 16.39006 |
| ENSG00000117394 | 2.184399 | 12.79359 | 7.676208 | 1.19E-11 | 6.35E-09 | 16.18679 |
| ENSG00000205420 | 4.83933 | 8.731524 | 7.610317 | 1.64E-11 | 7.84E-09 | 15.87805 |
| ENSG00000147257 | -2.5367 | 9.470706 | -7.59339 | 1.78E-11 | 8.29E-09 | 15.79885 |
| ENSG00000133134 | -2.03031 | 8.372743 | -7.3902 | 4.79E-11 | 1.93E-08 | 14.8514 |
| ENSG00000120875 | 2.38001 | 11.38032 | 7.374629 | 5.16E-11 | 2.05E-08 | 14.77905 |
| ENSG00000228742 | 2.29845 | 6.102007 | 7.316485 | 6.84E-11 | 2.53E-08 | 14.50931 |
| ENSG00000186832 | 3.11193 | 7.493466 | 7.255647 | 9.17E-11 | 3.26E-08 | 14.2277 |
| ENSG00000101938 | -2.48937 | 8.761439 | -7.21036 | 1.14E-10 | 3.85E-08 | 14.01852 |
| ENSG00000150893 | -2.39937 | 8.773454 | -7.0987 | 1.95E-10 | 6.05E-08 | 13.50435 |
| ENSG00000137825 | 2.441367 | 7.790584 | 7.08519 | 2.08E-10 | 6.35E-08 | 13.4423 |
| ENSG00000159708 | -2.00171 | 6.815338 | -7.07933 | 2.14E-10 | 6.49E-08 | 13.41538 |
| ENSG00000101213 | 2.03034 | 9.949825 | 6.952362 | 3.92E-10 | 1.08E-07 | 12.83422 |
| ENSG00000173267 | 2.255065 | 9.027624 | 6.886592 | 5.36E-10 | 1.37E-07 | 12.53449 |
| ENSG00000157890 | -2.02257 | 6.341735 | -6.8703 | 5.79E-10 | 1.47E-07 | 12.4604 |
| ENSG00000141338 | -2.02981 | 7.89472 | -6.86088 | 6.05E-10 | 1.53E-07 | 12.41756 |
| ENSG00000125775 | 2.247699 | 9.624011 | 6.810576 | 7.68E-10 | 1.81E-07 | 12.18925 |
| ENSG00000225329 | -2.57051 | 6.916549 | -6.78329 | 8.74E-10 | 2.00E-07 | 12.06565 |
| ENSG00000259974 | -2.69916 | 7.915863 | -6.71616 | 1.20E-09 | 2.64E-07 | 11.76229 |
| ENSG00000196878 | 2.120667 | 13.78677 | 6.715033 | 1.21E-09 | 2.64E-07 | 11.75718 |
| ENSG00000173237 | 2.309497 | 5.700888 | 6.642498 | 1.69E-09 | 3.41E-07 | 11.43061 |
| ENSG00000181143 | 3.477471 | 9.21906 | 6.6382 | 1.73E-09 | 3.43E-07 | 11.4113 |
| ENSG00000171243 | -2.14046 | 6.041066 | -6.57216 | 2.36E-09 | 4.33E-07 | 11.11516 |
| ENSG00000165197 | -2.10877 | 6.958979 | -6.50594 | 3.21E-09 | 5.48E-07 | 10.81933 |
| ENSG00000147697 | 2.131854 | 7.800102 | 6.483851 | 3.55E-09 | 5.82E-07 | 10.7209 |
| ENSG00000138271 | 2.709531 | 7.1932 | 6.480181 | 3.62E-09 | 5.83E-07 | 10.70456 |
| ENSG00000172264 | -2.44041 | 8.918493 | -6.46793 | 3.83E-09 | 6.05E-07 | 10.65002 |
| ENSG00000248323 | 2.05181 | 7.146915 | 6.448147 | 4.20E-09 | 6.55E-07 | 10.56207 |
| ENSG00000167656 | 2.924236 | 6.516329 | 6.40991 | 5.01E-09 | 7.44E-07 | 10.39236 |
| ENSG00000111700 | 2.427145 | 5.4498 | 6.317709 | 7.67E-09 | 1.03E-06 | 9.984791 |
| ENSG00000088926 | -2.03968 | 5.733738 | -6.31301 | 7.84E-09 | 1.04E-06 | 9.964095 |
| ENSG00000166923 | 2.307874 | 10.0345 | 6.24127 | 1.09E-08 | 1.31E-06 | 9.648719 |
| ENSG00000123999 | 3.036844 | 6.997895 | 6.196813 | 1.34E-08 | 1.52E-06 | 9.454045 |
| ENSG00000124466 | 2.391147 | 9.03638 | 6.171818 | 1.50E-08 | 1.66E-06 | 9.34485 |
| ENSG00000165973 | -2.77231 | 6.013793 | -6.1301 | 1.81E-08 | 1.93E-06 | 9.163024 |
| ENSG00000114248 | -2.07185 | 6.624411 | -6.12621 | 1.84E-08 | 1.95E-06 | 9.146089 |
| ENSG00000160886 | 2.719193 | 7.033162 | 6.115169 | 1.94E-08 | 2.03E-06 | 9.098075 |
| ENSG00000196616 | -3.05284 | 9.253513 | -6.10426 | 2.04E-08 | 2.09E-06 | 9.050649 |
| ENSG00000122133 | 3.179808 | 7.167518 | 5.991743 | 3.39E-08 | 3.15E-06 | 8.563867 |
| ENSG00000174564 | 2.197395 | 7.461563 | 5.938431 | 4.31E-08 | 3.79E-06 | 8.334637 |
| ENSG00000080031 | 2.234258 | 8.550661 | 5.914164 | 4.80E-08 | 4.16E-06 | 8.230608 |
| ENSG00000120211 | 2.83358 | 5.542832 | 5.867303 | 5.92E-08 | 4.92E-06 | 8.030276 |
| ENSG00000165092 | -2.01814 | 11.83125 | -5.8491 | 6.42E-08 | 5.28E-06 | 7.952637 |
| ENSG00000131910 | -2.22071 | 6.400059 | -5.8475 | 6.47E-08 | 5.30E-06 | 7.945848 |
| ENSG00000102854 | 3.203593 | 12.14594 | 5.83219 | 6.93E-08 | 5.61E-06 | 7.880653 |
| ENSG00000205426 | 2.77274 | 7.031498 | 5.788281 | 8.42E-08 | 6.56E-06 | 7.694154 |
| ENSG00000058335 | -2.24375 | 8.494245 | -5.78377 | 8.59E-08 | 6.67E-06 | 7.675014 |
| ENSG00000107984 | 2.828181 | 8.212114 | 5.771529 | 9.07E-08 | 6.97E-06 | 7.623175 |
| ENSG00000108924 | -2.05987 | 8.476055 | -5.73392 | 1.07E-07 | 7.99E-06 | 7.464178 |
| ENSG00000204019 | 2.491873 | 5.984783 | 5.732092 | 1.08E-07 | 8.04E-06 | 7.456481 |
| ENSG00000206073 | 2.093388 | 5.369028 | 5.723192 | 1.12E-07 | 8.28E-06 | 7.418935 |
| ENSG00000115457 | -2.12705 | 12.19275 | -5.72291 | 1.13E-07 | 8.28E-06 | 7.417759 |
| ENSG00000084110 | 2.366061 | 8.01958 | 5.717597 | 1.15E-07 | 8.46E-06 | 7.395348 |
| ENSG00000146013 | -2.36578 | 7.316157 | -5.71357 | 1.17E-07 | 8.52E-06 | 7.378399 |
| ENSG00000007402 | -2.38513 | 9.914613 | -5.63029 | 1.69E-07 | 1.14E-05 | 7.028783 |
| ENSG00000206075 | 2.887402 | 7.80527 | 5.569636 | 2.21E-07 | 1.39E-05 | 6.775752 |
| ENSG00000060718 | 2.384992 | 9.383943 | 5.556583 | 2.34E-07 | 1.45E-05 | 6.721483 |
| ENSG00000137440 | 2.072956 | 7.202407 | 5.543139 | 2.48E-07 | 1.52E-05 | 6.665659 |
| ENSG00000127249 | -2.37474 | 9.240388 | -5.52605 | 2.67E-07 | 1.62E-05 | 6.594809 |
| ENSG00000124664 | 2.1658 | 9.851256 | 5.521374 | 2.72E-07 | 1.64E-05 | 6.575427 |
| ENSG00000275216 | 2.421435 | 6.006757 | 5.503467 | 2.94E-07 | 1.76E-05 | 6.501329 |
| ENSG00000154975 | -2.01865 | 5.099373 | -5.49498 | 3.05E-07 | 1.81E-05 | 6.466242 |
| ENSG00000115919 | 2.304422 | 10.39871 | 5.482802 | 3.22E-07 | 1.89E-05 | 6.415971 |
| ENSG00000087128 | 2.537569 | 7.221718 | 5.48006 | 3.26E-07 | 1.90E-05 | 6.404657 |
| ENSG00000167653 | 3.014278 | 7.583637 | 5.404918 | 4.50E-07 | 2.43E-05 | 6.09578 |
| ENSG00000148702 | -2.53483 | 8.037145 | -5.32258 | 6.41E-07 | 3.22E-05 | 5.759951 |
| ENSG00000167755 | 2.667364 | 6.525789 | 5.316844 | 6.57E-07 | 3.28E-05 | 5.736644 |
| ENSG00000148346 | 2.38182 | 11.53746 | 5.31066 | 6.75E-07 | 3.34E-05 | 5.711546 |
| ENSG00000268104 | 2.16224 | 10.97999 | 5.262819 | 8.27E-07 | 3.93E-05 | 5.517928 |
| ENSG00000198183 | 3.619243 | 8.461576 | 5.244842 | 8.93E-07 | 4.15E-05 | 5.445423 |
| ENSG00000164161 | -2.11997 | 7.779827 | -5.23101 | 9.46E-07 | 4.34E-05 | 5.389732 |
| ENSG00000227471 | 2.055589 | 6.496271 | 5.199133 | 1.08E-06 | 4.80E-05 | 5.261687 |
| ENSG00000142973 | -2.74642 | 10.06526 | -5.156 | 1.30E-06 | 5.50E-05 | 5.089111 |
| ENSG00000185479 | 2.133052 | 5.971464 | 5.143535 | 1.37E-06 | 5.72E-05 | 5.039412 |
| ENSG00000116031 | -2.11636 | 6.962793 | -5.11713 | 1.53E-06 | 6.22E-05 | 4.934334 |
| ENSG00000156076 | -2.49165 | 7.925864 | -5.11681 | 1.53E-06 | 6.22E-05 | 4.933035 |
| ENSG00000057149 | 2.586163 | 6.28336 | 5.060876 | 1.93E-06 | 7.34E-05 | 4.711466 |
| ENSG00000144331 | -2.02705 | 8.26263 | -5.04227 | 2.09E-06 | 7.78E-05 | 4.63806 |
| ENSG00000124882 | 2.357082 | 7.457817 | 4.989307 | 2.60E-06 | 9.20E-05 | 4.430002 |
| ENSG00000163220 | 2.132967 | 12.57168 | 4.931265 | 3.30E-06 | 0.000111 | 4.203464 |
| ENSG00000074410 | 2.021145 | 10.26846 | 4.911731 | 3.58E-06 | 0.000119 | 4.127576 |
| ENSG00000170561 | -2.18676 | 8.854347 | -4.85112 | 4.59E-06 | 0.000142 | 3.893249 |
| ENSG00000146374 | 2.081735 | 7.907657 | 4.841549 | 4.77E-06 | 0.000147 | 3.856419 |
| ENSG00000066405 | -2.95661 | 9.254803 | -4.76429 | 6.52E-06 | 0.000188 | 3.560676 |
| ENSG00000099994 | -2.14875 | 11.29995 | -4.73628 | 7.29E-06 | 0.000205 | 3.454155 |
| ENSG00000112936 | -2.15733 | 10.57457 | -4.72901 | 7.51E-06 | 0.000209 | 3.426572 |
| ENSG00000188505 | 2.058373 | 7.293326 | 4.704354 | 8.29E-06 | 0.000227 | 3.333247 |
| ENSG00000196611 | 2.193914 | 9.964349 | 4.665411 | 9.68E-06 | 0.000253 | 3.186446 |
| ENSG00000021826 | 3.517551 | 9.387474 | 4.644857 | 1.05E-05 | 0.000268 | 3.109274 |
| ENSG00000137699 | 2.340764 | 9.269883 | 4.552004 | 1.52E-05 | 0.000354 | 2.763356 |
| ENSG00000204305 | -2.00015 | 10.16988 | -4.40211 | 2.72E-05 | 0.000555 | 2.214521 |
| ENSG00000117983 | 3.127142 | 12.21617 | 4.316927 | 3.76E-05 | 0.000715 | 1.90805 |
| ENSG00000153446 | -2.57765 | 11.18359 | -4.31069 | 3.85E-05 | 0.000728 | 1.885786 |
| ENSG00000165376 | -2.27149 | 7.957435 | -4.28121 | 4.31E-05 | 0.000794 | 1.780753 |
| ENSG00000128422 | 2.120063 | 10.73512 | 4.222627 | 5.38E-05 | 0.000945 | 1.573512 |
| ENSG00000171885 | -2.33519 | 10.11803 | -4.06269 | 9.74E-05 | 0.001498 | 1.017819 |
| ENSG00000168484 | -3.53144 | 12.2324 | -4.018 | 0.000115 | 0.001687 | 0.865228 |
| ENSG00000171564 | 3.353238 | 7.873026 | 3.995512 | 0.000124 | 0.001796 | 0.788922 |
| ENSG00000160182 | 2.608998 | 7.161368 | 3.992447 | 0.000126 | 0.00181 | 0.778546 |
| ENSG00000171560 | 3.505123 | 10.06274 | 3.973626 | 0.000135 | 0.001904 | 0.71494 |
| ENSG00000187908 | -2.42143 | 11.16713 | -3.92088 | 0.000163 | 0.002205 | 0.537853 |
| ENSG00000161798 | -2.27533 | 8.559755 | -3.87787 | 0.00019 | 0.002488 | 0.394679 |
| ENSG00000101210 | 2.347207 | 9.244942 | 3.875124 | 0.000192 | 0.002506 | 0.385594 |
| ENSG00000161055 | -2.56144 | 10.39325 | -3.76633 | 0.000282 | 0.003365 | 0.02888 |
| ENSG00000162896 | -2.31576 | 12.78273 | -3.72302 | 0.000328 | 0.003786 | -0.11105 |
| ENSG00000215182 | 2.798983 | 8.610219 | 3.705831 | 0.000348 | 0.003973 | -0.16623 |
| ENSG00000104760 | 2.062843 | 7.57742 | 3.209128 | 0.001796 | 0.013897 | -1.67536 |
| ENSG00000130294 | -2.07062 | 7.779121 | -3.19983 | 0.001849 | 0.01418 | -1.70197 |
| ENSG00000171557 | 2.65092 | 10.81373 | 3.186409 | 0.001929 | 0.014628 | -1.74027 |
| ENSG00000151632 | 2.267472 | 11.07773 | 2.971499 | 0.003722 | 0.024185 | -2.3356 |
| ENSG00000096088 | -2.03425 | 10.11781 | -2.71789 | 0.00776 | 0.042147 | -2.99328 |

**Supplementary Table 4**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | logFC | AveExpr | t | P.Value | adj.P.Val | B |
| ZNF385B | -3.5072 | 6.223957 | -4.48943 | 0.000152 | 0.014618 | 1.004733 |
| HSD17B6 | -3.03031 | 7.983271 | -6.66976 | 6.72E-07 | 0.002181 | 6.005243 |
| APOH | -2.96621 | 6.260801 | -3.82277 | 0.000823 | 0.032786 | -0.55814 |
| SUSD2 | -2.96443 | 8.135912 | -4.41844 | 0.000182 | 0.016034 | 0.837307 |
| ADH1B | -2.82817 | 8.366762 | -3.99684 | 0.000531 | 0.026614 | -0.15306 |
| PLA2G1B | -2.7869 | 5.982491 | -4.30354 | 0.000244 | 0.018711 | 0.566563 |
| CYP4B1 | -2.64395 | 7.451238 | -3.98231 | 0.000551 | 0.026993 | -0.18698 |
| HLF | -2.4632 | 5.974891 | -4.50817 | 0.000145 | 0.014067 | 1.048944 |
| LRRK2 | -2.41753 | 7.942786 | -3.64686 | 0.001279 | 0.041259 | -0.96386 |
| CHRDL1 | -2.30371 | 7.735639 | -3.89241 | 0.000691 | 0.030029 | -0.39644 |
| AQP4 | -2.28356 | 4.995689 | -4.37792 | 0.000202 | 0.017047 | 0.741778 |
| BEX5 | -2.22486 | 7.140637 | -4.98415 | 4.32E-05 | 0.008352 | 2.170636 |
| MIR29B2CHG | -2.13306 | 6.748487 | -4.04116 | 0.000475 | 0.024987 | -0.04945 |
| CLIC5 | -2.07656 | 6.791658 | -3.8465 | 0.000776 | 0.031694 | -0.50311 |
| ACADL | -2.04539 | 5.170785 | -4.29652 | 0.000248 | 0.018865 | 0.550046 |
| FREM2 | -1.99789 | 5.066204 | -4.21415 | 0.000306 | 0.020586 | 0.356272 |
| FGFR2 | -1.9844 | 7.269489 | -4.91237 | 5.19E-05 | 0.00887 | 2.001872 |
| ATP13A4 | -1.96363 | 5.532273 | -3.76235 | 0.000958 | 0.035478 | -0.69797 |
| TMED6 | -1.91048 | 4.996513 | -3.53112 | 0.001705 | 0.047326 | -1.22831 |
| TNIK | -1.87493 | 5.798069 | -5.60853 | 8.98E-06 | 0.004157 | 3.625129 |
| P3H2 | -1.84497 | 7.218063 | -3.89431 | 0.000688 | 0.030011 | -0.39203 |
| ANKRD29 | -1.83424 | 4.827566 | -4.89968 | 5.36E-05 | 0.008908 | 1.972001 |
| CACHD1 | -1.77801 | 6.69633 | -3.53798 | 0.001676 | 0.046945 | -1.2127 |
| MMP28 | -1.75787 | 5.156962 | -3.56828 | 0.001555 | 0.045128 | -1.14366 |
| METTL7A | -1.70247 | 10.08218 | -5.25504 | 2.18E-05 | 0.006353 | 2.80513 |
| RNASE1 | -1.67166 | 11.41242 | -3.73164 | 0.001035 | 0.036781 | -0.76885 |
| CLIC3 | -1.62075 | 7.087731 | -3.93036 | 0.000628 | 0.028853 | -0.30813 |
| IL33 | -1.61145 | 6.452657 | -3.80656 | 0.000857 | 0.033544 | -0.59571 |
| ZMAT1 | -1.60563 | 5.167032 | -3.68138 | 0.001173 | 0.039434 | -0.8846 |
| FCN3 | -1.59829 | 6.922481 | -3.67683 | 0.001187 | 0.039707 | -0.89505 |
| CBX7 | -1.59748 | 7.407482 | -6.20949 | 2.04E-06 | 0.0025 | 4.990222 |
| ZNF204P | -1.57323 | 6.450878 | -4.14333 | 0.000366 | 0.022155 | 0.189934 |
| FMO2 | -1.5353 | 7.120677 | -3.88728 | 0.0007 | 0.03015 | -0.40838 |
| CAPN3 | -1.53276 | 6.275608 | -3.77866 | 0.00092 | 0.03482 | -0.66026 |
| IL6R | -1.52107 | 7.065008 | -5.03998 | 3.75E-05 | 0.007602 | 2.301733 |
| CEBPA | -1.51636 | 7.92269 | -4.23428 | 0.000291 | 0.02042 | 0.403594 |
| FOSL1 | 1.500622 | 5.360305 | 4.119063 | 0.00039 | 0.02258 | 0.133015 |
| TNFAIP6 | 1.525119 | 6.463796 | 3.542266 | 0.001659 | 0.046746 | -1.20294 |
| CDK5R1 | 1.532095 | 4.670629 | 5.457199 | 1.31E-05 | 0.005085 | 3.275381 |
| PITX1 | 1.534855 | 5.565464 | 4.481566 | 0.000155 | 0.014845 | 0.986186 |
| NAMPT | 1.551761 | 8.398909 | 5.087694 | 3.33E-05 | 0.007471 | 2.413664 |
| RHOV | 1.567405 | 6.171414 | 5.695013 | 7.24E-06 | 0.003872 | 3.824016 |
| FA2H | 1.601792 | 6.991847 | 3.689474 | 0.00115 | 0.039257 | -0.86598 |
| SLC39A4 | 1.621684 | 8.352162 | 6.099703 | 2.66E-06 | 0.002779 | 4.743995 |
| HMGB3P1 | 1.623563 | 7.071127 | 4.461987 | 0.000163 | 0.015012 | 0.940004 |
| CDCA5 | 1.629292 | 6.547109 | 4.47381 | 0.000158 | 0.014911 | 0.96789 |
| KRT19 | 1.631786 | 10.74924 | 4.232653 | 0.000292 | 0.02042 | 0.399769 |
| KIF18B | 1.633964 | 6.685371 | 4.310203 | 0.00024 | 0.018499 | 0.582257 |
| GINS1 | 1.637072 | 6.784128 | 3.652828 | 0.00126 | 0.040941 | -0.95018 |
| ZWINT | 1.641516 | 8.20353 | 3.859469 | 0.000751 | 0.031289 | -0.473 |
| UBE2T | 1.643599 | 7.567756 | 3.990564 | 0.000539 | 0.026728 | -0.16771 |
| SLC7A5 | 1.647216 | 7.529477 | 4.544071 | 0.000132 | 0.013273 | 1.133645 |
| KRT8 | 1.659623 | 10.72729 | 5.236483 | 2.28E-05 | 0.006353 | 2.761817 |
| HHIPL2 | 1.676858 | 5.184715 | 3.806264 | 0.000858 | 0.033544 | -0.59639 |
| HJURP | 1.687443 | 6.238167 | 4.07544 | 0.000435 | 0.023648 | 0.030786 |
| F3 | 1.705984 | 8.844579 | 4.137666 | 0.000372 | 0.022155 | 0.17665 |
| CHEK1 | 1.708381 | 5.124329 | 4.333115 | 0.000226 | 0.018088 | 0.636219 |
| SLC16A3 | 1.733765 | 7.939482 | 5.169702 | 2.70E-05 | 0.006795 | 2.605727 |
| FSCN1 | 1.741169 | 6.869804 | 4.708489 | 8.71E-05 | 0.01101 | 1.521532 |
| FOXM1 | 1.744852 | 6.300893 | 3.787628 | 0.000899 | 0.034357 | -0.63952 |
| TK1 | 1.753084 | 7.844462 | 4.270054 | 0.000266 | 0.019626 | 0.487747 |
| KCNMB4 | 1.754101 | 5.949562 | 6.103959 | 2.64E-06 | 0.002779 | 4.753568 |
| MB | 1.769104 | 6.433879 | 3.70343 | 0.00111 | 0.038542 | -0.83386 |
| BUB1B | 1.778896 | 6.919321 | 3.490246 | 0.001887 | 0.04988 | -1.32114 |
| MCM10 | 1.780586 | 5.46398 | 3.805154 | 0.00086 | 0.033554 | -0.59896 |
| KIF14 | 1.783116 | 6.418671 | 3.678779 | 0.001181 | 0.039607 | -0.89057 |
| STEAP1 | 1.800264 | 8.060228 | 3.795605 | 0.000881 | 0.034113 | -0.62107 |
| DSP | 1.837128 | 10.61839 | 4.892538 | 5.46E-05 | 0.008908 | 1.955195 |
| AURKB | 1.844725 | 5.774406 | 3.894627 | 0.000687 | 0.030011 | -0.3913 |
| CENPU | 1.846108 | 7.78128 | 4.399469 | 0.000191 | 0.016479 | 0.792584 |
| UCK2 | 1.878298 | 7.321157 | 4.658541 | 9.89E-05 | 0.011821 | 1.40372 |
| KIF4A | 1.896503 | 6.231345 | 3.579128 | 0.001514 | 0.044593 | -1.11889 |
| SMKR1 | 1.917905 | 5.051831 | 4.350546 | 0.000216 | 0.017711 | 0.677281 |
| CPE | 1.926866 | 9.201221 | 4.200727 | 0.000317 | 0.020586 | 0.324723 |
| MAD2L1 | 1.950577 | 6.535168 | 3.85463 | 0.00076 | 0.031355 | -0.48424 |
| CTHRC1 | 1.952925 | 10.44736 | 3.761715 | 0.00096 | 0.035478 | -0.69944 |
| TRIP13 | 1.954161 | 7.165608 | 4.233176 | 0.000292 | 0.02042 | 0.400998 |
| CCNA2 | 1.988187 | 5.825039 | 3.889038 | 0.000697 | 0.03015 | -0.4043 |
| TPX2 | 2.012906 | 7.184408 | 3.609081 | 0.001405 | 0.043041 | -1.05043 |
| HMGB3 | 2.034403 | 9.449466 | 4.665532 | 9.71E-05 | 0.011782 | 1.42021 |
| CDKN3 | 2.0515 | 6.828897 | 3.612964 | 0.001391 | 0.042741 | -1.04154 |
| S100A9 | 2.066541 | 9.724734 | 3.68991 | 0.001148 | 0.039257 | -0.86498 |
| CDC20 | 2.072122 | 6.975562 | 3.530939 | 0.001706 | 0.047326 | -1.22872 |
| CDC6 | 2.076033 | 5.643449 | 4.334556 | 0.000225 | 0.018088 | 0.639613 |
| KISS1R | 2.095702 | 6.365852 | 3.681169 | 0.001174 | 0.039434 | -0.88508 |
| NUF2 | 2.102877 | 6.026033 | 3.758567 | 0.000967 | 0.035586 | -0.70671 |
| FHL2 | 2.114266 | 8.920521 | 4.577755 | 0.000121 | 0.01289 | 1.213122 |
| MELK | 2.124798 | 7.487447 | 3.830952 | 0.000806 | 0.032345 | -0.53918 |
| CENPA | 2.139931 | 6.616565 | 3.995215 | 0.000533 | 0.026614 | -0.15684 |
| SCIN | 2.171651 | 6.260947 | 3.768343 | 0.000944 | 0.035158 | -0.68412 |
| KRT80 | 2.183869 | 6.722566 | 5.129916 | 2.99E-05 | 0.007168 | 2.512598 |
| RRM2 | 2.186245 | 8.525707 | 3.640099 | 0.001301 | 0.041446 | -0.97938 |
| GJB2 | 2.1917 | 7.430823 | 3.514084 | 0.001779 | 0.048379 | -1.26704 |
| CEP55 | 2.205101 | 6.610619 | 3.863284 | 0.000744 | 0.031084 | -0.46415 |
| DKK1 | 2.259413 | 5.24645 | 3.650287 | 0.001268 | 0.041137 | -0.95601 |
| UHRF1 | 2.298684 | 7.480961 | 5.149939 | 2.84E-05 | 0.007058 | 2.55948 |
| NEK2 | 2.333697 | 6.367865 | 3.879034 | 0.000715 | 0.030425 | -0.42755 |
| MUC16 | 2.359408 | 5.4834 | 5.078557 | 3.40E-05 | 0.007471 | 2.392242 |
| ANLN | 2.363885 | 6.327064 | 3.992029 | 0.000537 | 0.026693 | -0.16429 |
| UBE2C | 2.414979 | 8.331269 | 3.934107 | 0.000622 | 0.028684 | -0.29939 |
| PBK | 2.467486 | 6.558893 | 3.848629 | 0.000771 | 0.03168 | -0.49817 |
| KRT7 | 2.49188 | 9.929189 | 4.828256 | 6.42E-05 | 0.00937 | 1.803838 |
| DUSP4 | 2.642886 | 7.809963 | 4.621576 | 0.000109 | 0.012389 | 1.316513 |
| CYP24A1 | 2.891716 | 5.556325 | 4.267287 | 0.000267 | 0.019626 | 0.481237 |
| SLC16A14 | 2.985996 | 7.957735 | 4.587134 | 0.000119 | 0.012686 | 1.23525 |
| MMP1 | 3.218919 | 7.478566 | 4.087684 | 0.000422 | 0.023162 | 0.059465 |
| S100P | 3.306936 | 9.798964 | 3.601498 | 0.001432 | 0.043352 | -1.06777 |
| FAM83A | 4.976712 | 6.709143 | 25.64563 | 5.89E-19 | 1.23E-14 | 26.30686 |