**Supplemental Table S1.** **Differential expression of all autophagy genes in human colon cancer tissue and normal control tissues**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Gene** | **Fold-regulation-Combined Tumor** | ***P* value** | | **q value** | **Fold-regulation-Early Tumor** | [***P* value**](javascript:showLegend('pvalue')) | | **Fold-regulation-Late Tumor** | | ***P***  **value** | |
| [*AKT1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=207) | -1.21 | 0.38 | 0.51 | | -1.28 | 0.36 | -1.14 | | 0.50 | |
| [*AMBRA1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=55626) | -1.46 | 0.05 | 0.15 | | -1.24 | 0.29 | -1.71 | | 0.02 | |
| [*APP*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=351) | -1.52 | 0.13 | 0.26 | | -1.92 | 0.10 | -1.20 | | 0.33 | |
| [*ATG10*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=83734) | -1.32 | 0.25 | 0.41 | | -1.36 | 0.33 | -1.28 | | 0.46 | |
| [*ATG12*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=9140) | -1.11 | 0.90 | 0.95 | | 1.13 | 0.65 | -1.38 | | 0.46 | |
| [*ATG16L1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=55054) | 1.11 | 0.56 | 0.67 | | 1.36 | 0.12 | -1.10 | | 0.58 | |
| [*ATG16L2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=89849) | -3.79 | 0.03 | 0.12 | | -2.89 | 0.19 | -4.98 | | 0.07 | |
| [*ATG3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=64422) | -1.46 | 0.08 | 0.19 | | -1.48 | 0.24 | -1.43 | | 0.08 | |
| [*ATG4A*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=115201) | -2.25 | 0.02 | 0.10 | | -2.31 | 0.09 | -2.20 | | 0.08 | |
| [*ATG4B*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=23192) | -1.22 | 0.50 | 0.62 | | -1.13 | 0.62 | -1.30 | | 0.58 | |
| [*ATG4C*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=84938) | -2.31 | 0.01 | 0.08 | | -2.40 | 0.07 | -2.22 | | 0.06 | |
| [*ATG4D*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=84971) | -2.22 | 0.01 | 0.08 | | -2.14 | 0.10 | -2.30 | | 0.05 | |
| [*ATG5*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=9474) | -1.47 | 0.06 | 0.16 | | -1.34 | 0.19 | -1.60 | | 0.14 | |
| [*ATG7*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=10533) | -1.36 | 0.17 | 0.30 | | -1.23 | 0.42 | -1.50 | | 0.23 | |
| [*ATG9A*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=79065) | -1.59 | 0.06 | 0.16 | | -1.19 | 0.41 | -2.13 | | 0.01 | |
| [*ATG9B*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=285973) | 8.39 | 0.06 | 0.16 | | 18.00 | 0.01 | 3.91 | | 0.22 | |
| [*BAD*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=572) | -1.91 | 0.02 | 0.09 | | -2.14 | 0.07 | -1.70 | | 0.08 | |
| [*BAK1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=578) | -1.45 | 0.38 | 0.51 | | -1.66 | 0.52 | -1.28 | | 0.37 | |
| [*BAX*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=581) | 1.23 | 0.31 | 0.46 | | 1.37 | 0.20 | 1.10 | | 0.79 | |
| [*BCL2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=596) | -3.89 | 0.01 | 0.08 | | -3.21 | 0.12 | -4.70 | | 0.03 | |
| [*BCL2L1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=598) | 1.25 | 0.27 | 0.44 | | 1.67 | 0.06 | -1.07 | | 0.80 | |
| [*BECN1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=8678) | -1.32 | 0.29 | 0.45 | | -1.07 | 0.88 | -1.62 | | 0.07 | |
| [*BID*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=637) | 1.10 | 0.48 | 0.60 | | 1.26 | 0.27 | -1.04 | | 0.84 | |
| [*BNIP3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=664) | -1.61 | 0.66 | 0.74 | | 1.57 | 0.44 | -4.07 | | 0.05 | |
| [*CASP3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=836) | -2.05 | 0.02 | 0.10 | | -1.58 | 0.17 | -2.65 | | 0.04 | |
| [*CASP8*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=841) | -1.03 | 0.96 | 0.96 | | 1.26 | 0.24 | -1.33 | | 0.39 | |
| [*CDKN1B*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1027) | -1.16 | 0.51 | 0.62 | | -1.10 | 0.75 | -1.21 | | 0.45 | |
| [*CDKN2A*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1029) | 1.38 | 0.37 | 0.51 | | -1.05 | 0.58 | 2.01 | | 0.38 | |
| [*CLN3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1201) | -1.65 | 0.10 | 0.23 | | -1.39 | 0.44 | -1.96 | | 0.04 | |
| [*CTSB*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1508) | -1.40 | 0.43 | 0.56 | | -1.12 | 0.96 | -1.75 | | 0.16 | |
| [*CTSD*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1509) | -2.63 | 0.0008 | 0.08 | | -2.08 | 0.02 | -3.31 | | 0.01 | |
| [*CTSS*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1520) | -2.16 | 0.01 | 0.08 | | -1.78 | 0.11 | -2.64 | | 0.05 | |
| [*CXCR4*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7852) | -2.09 | 0.63 | 0.72 | | -1.87 | 0.93 | -2.34 | | 0.21 | |
| [*DAPK1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1612) | -2.59 | 0.14 | 0.26 | | -3.93 | 0.05 | -1.71 | | 0.46 | |
| [*DRAM1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=55332) | 1.07 | 0.63 | 0.72 | | 1.14 | 0.53 | -1.00 | | 0.83 | |
| [*DRAM2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=128338) | -1.60 | 0.06 | 0.17 | | -1.37 | 0.29 | -1.86 | | 0.07 | |
| [*EIF2AK3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=9451) | -1.79 | 0.08 | 0.20 | | -1.43 | 0.35 | -2.24 | | 0.07 | |
| [*EIF4G1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1981) | -1.04 | 0.79 | 0.88 | | 1.20 | 0.27 | -1.30 | | 0.62 | |
| [*ESR1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=2099) | -4.05 | 0.01 | 0.08 | | -3.18 | 0.08 | -5.15 | | 0.05 | |
| [*FADD*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=8772) | -1.66 | 0.01 | 0.08 | | -2.01 | 0.02 | -1.37 | | 0.12 | |
| [*FAS*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=355) | -2.44 | 0.10 | 0.23 | | -2.96 | 0.15 | -2.00 | | 0.24 | |
| [*GAA*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=2548) | -3.11 | 0.01 | 0.08 | | -4.39 | 0.03 | -2.21 | | 0.11 | |
| [*GABARAP*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=11337) | -2.12 | 0.0003 | 0.08 | | -2.09 | 0.03 | -2.15 | | 0.04 | |
| [*GABARAPL1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=23710) | -1.89 | 0.11 | 0.23 | | -1.48 | 0.44 | -2.40 | | 0.09 | |
| [*GABARAPL2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=11345) | -1.99 | 0.02 | 0.10 | | -1.82 | 0.13 | -2.18 | | 0.07 | |
| [*HDAC1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3065) | -1.67 | 0.03 | 0.11 | | -1.46 | 0.20 | -1.91 | | 0.04 | |
| [*HDAC6*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=10013) | -1.53 | 0.23 | 0.39 | | -1.26 | 0.66 | -1.85 | | 0.11 | |
| [*HGS*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=9146) | -1.19 | 0.93 | 0.95 | | -1.34 | 0.75 | -1.06 | | 0.87 | |
| [*HSP90AA1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3320) | 1.26 | 0.25 | 0.41 | | 1.13 | 0.38 | 1.40 | | 0.20 | |
| [*HSPA8*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3312) | -1.02 | 0.93 | 0.95 | | -1.16 | 0.40 | 1.11 | | 0.35 | |
| [*HTT*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3064) | -1.79 | 0.03 | 0.11 | | -1.37 | 0.15 | -2.33 | | 0.01 | |
| [*IFNG*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3458) | -9.31 | 0.03 | 0.11 | | -6.90 | 0.19 | -12.57 | | 0.03 | |
| [*IGF1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3479) | -5.84 | 0.01 | 0.08 | | -2.39 | 0.09 | -14.27 | | 0.04 | |
| [*INS*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3630) | -1.00 | 0.87 | 0.93 | | 1.11 | 0.25 | -1.11 | | 0.18 | |
| [*IRGM*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=345611) | -1.00 | 0.12 | 0.93 | | 1.11 | 0.25 | -1.11 | | 0.18 | |
| [*LAMP1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=3916) | -1.20 | 0.12 | 0.24 | | -1.11 | 0.27 | -1.29 | | 0.13 | |
| [*MAP1LC3A*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=84557) | -2.07 | 0.51 | 0.62 | | -1.61 | 0.98 | -2.64 | | 0.06 | |
| [*MAP1LC3B*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=81631) | -1.38 | 0.15 | 0.27 | | -1.38 | 0.32 | -1.38 | | 0.26 | |
| [*MAPK14*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=1432) | -1.49 | 0.07 | 0.17 | | -1.34 | 0.25 | -1.66 | | 0.14 | |
| [*MAPK8*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5599) | -1.32 | 0.33 | 0.46 | | -1.11 | 0.76 | -1.57 | | 0.19 | |
| [*MTOR*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=2475) | -1.58 | 0.33 | 0.46 | | -1.31 | 0.79 | -1.90 | | 0.10 | |
| [*NFKB1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=4790) | -1.72 | 0.02 | 0.10 | | -1.39 | 0.15 | -2.11 | | 0.04 | |
| [*NPC1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=4864) | -1.31 | 0.32 | 0.46 | | -1.08 | 0.86 | -1.58 | | 0.11 | |
| [*PIK3C3*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5289) | -1.97 | 0.05 | 0.15 | | -1.95 | 0.15 | -1.98 | | 0.13 | |
| [*PIK3CG*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5294) | -10.58 | 0.01 | 0.08 | | -7.97 | 0.09 | -14.06 | | 0.07 | |
| [*PIK3R4*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=30849) | -1.34 | 0.32 | 0.46 | | -1.12 | 0.75 | -1.59 | | 0.17 | |
| [*PRKAA1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5562) | -1.66 | 0.03 | 0.11 | | -1.47 | 0.17 | -1.87 | | 0.08 | |
| [*PTEN*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5728) | -2.43 | 0.01 | 0.08 | | -2.67 | 0.06 | -2.20 | | 0.07 | |
| [*RAB24*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=53917) | -2.24 | 0.14 | 0.26 | | -2.58 | 0.35 | -1.94 | | 0.22 | |
| [*RB1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=5925) | -1.35 | 0.13 | 0.26 | | -1.45 | 0.01 | -1.26 | | 0.48 | |
| [*RGS19*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=10287) | -3.19 | 0.01 | 0.08 | | -2.65 | 0.07 | -3.83 | | 0.04 | |
| [*RPS6KB1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=6198) | -1.20 | 0.84 | 0.92 | | -1.18 | 0.83 | -1.23 | | 0.87 | |
| [*SNCA*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=6622) | -1.88 | 0.47 | 0.60 | | -1.14 | 0.26 | -3.10 | | 0.05 | |
| [*SQSTM1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=8878) | 1.32 | 0.15 | 0.27 | | 1.31 | 0.23 | 1.32 | | 0.08 | |
| [*TGFB1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7040) | -2.01 | 0.01 | 0.08 | | -1.92 | 0.08 | -2.10 | | 0.03 | |
| [*TGM2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7052) | 1.14 | 0.39 | 0.52 | | 2.23 | 0.14 | -1.71 | | 0.62 | |
| [*TMEM74*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=157753) | -3.45 | 0.05 | 0.15 | | -3.24 | 0.18 | -3.68 | | 0.16 | |
| [*TNF*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7124) | -4.59 | 0.01 | 0.08 | | -4.10 | 0.07 | -5.14 | | 0.05 | |
| [*TNFSF10*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=8743) | -3.05 | 0.01 | 0.08 | | -2.12 | 0.12 | -4.39 | | 0.04 | |
| [*TP53*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7157) | -1.57 | 0.43 | 0.56 | | -2.95 | 0.04 | 1.20 | | 0.49 | |
| [*ULK1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=8408) | -1.10 | 0.91 | 0.95 | | 1.08 | 0.71 | -1.30 | | 0.54 | |
| [*ULK2*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=9706) | -1.72 | 0.16 | 0.28 | | -1.52 | 0.49 | -1.94 | | 0.09 | |
| [*UVRAG*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=7405) | -1.26 | 0.61 | 0.72 | | -1.21 | 0.73 | -1.31 | | 0.62 | |
| [*WIPI1*](http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene&cmd=Retrieve&dopt=Graphics&list_uids=55062) | -1.76 | 0.17 | 0.30 | | -1.46 | 0.50 | -2.11 | | 0.14 | |