

Supplementary Table S1. Correlation between the mutant p53-interacting partners and *PTTG3P*, *PTTG1* and *PTTG2*, based on data from StarBase v3.0 database.

| Gene | ID | <i>PTTG3P</i> | | <i>PTTG1</i> | | <i>PTTG2</i> | |
|---------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|
| | | Coefficient-R | <i>p</i> -value | Coefficient-R | <i>p</i> -value | Coefficient-R | <i>p</i> -value |
| NF-YA | ENSG00000001167 | -0.077 | 8.59e-2 | -0.210 | 2.09e-6 | -0.122 | 6.23e-3 |
| NF-YB | ENSG00000120837 | 0.176 | 7.12e-5 | 0.227 | 2.82e-7 | 0.094 | 3.59e-2 |
| NF-YC | ENSG00000066136 | 0.124 | 5.45e-3 | 0.124 | 5.40e-3 | 0.051 | 2.51e-1 |
| Sp1 | ENSG00000185591 | -0.014 | 7.50e-1 | -0.201 | 5.82e-6 | -0.072 | 1.07e-1 |
| Ets-1 | ENSG00000134954 | -0.096 | 3.14e-2 | -0.257 | 4.83e-9 | 0.034 | 4.46e-1 |
| VDR | ENSG00000111424 | -0.091 | 4.10e-2 | -0.216 | 1.03e-6 | 0.014 | 7.48e-1 |
| SREBP-2 | ENSG00000198911 | -0.064 | 1.53e-1 | -0.147 | 9.27e-4 | -0.073 | 1.01e-1 |
| TopBP1 | ENSG00000163781 | 0.067 | 1.36e-1 | 0.051 | 2.57e-1 | -0.020 | 6.57e-1 |
| Pin1 | ENSG00000127445 | 0.250 | 1.40e-8 | 0.571 | 9.56e-45 | 0.187 | 2.52e-5 |
| MRE11 | ENSG00000020922 | 0.063 | 1.56e-1 | -0.007 | 8.81e-1 | -0.024 | 5.93e-1 |
| PML | ENSG00000140464 | 0.072 | 1.05e-1 | 0.217 | 9.36e-7 | 0.166 | 1.85e-4 |
| p63 | ENSG00000073282 | -0.120 | 7.04e-3 | -0.283 | 1.08e-10 | -0.198 | 7.71e-6 |
| p73 | ENSG00000078900 | 0.104 | 2.03e-2 | 0.258 | 4.67e-9 | 0.097 | 3.02e-2 |

Supplementary Table S2. Correlation between transcriptionally activated genes by mutant p53 protein and *PTTG3P*, *PTTG1* and *PTTG2*, based on data from StarBase v3.0 database.

| Gene | ID | <i>PTTG3P</i> | | <i>PTTG1</i> | | <i>PTTG2</i> | |
|--------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|
| | | Coefficient-R | <i>p</i> -value | Coefficient-R | <i>p</i> -value | Coefficient-R | <i>p</i> -value |
| MYC | ENSG00000136997 | -0.046 | 3.06e-1 | -0.178 | 6.13e-5 | -0.196 | 1.01e-5 |
| CXCL1 | ENSG00000163739 | -0.087 | 5.26e-2 | 0.048 | 2.79e-1 | 0.007 | 8.84e-1 |
| MAP2K3 | ENSG00000034152 | -0.047 | 2.88e-1 | -0.058 | 1.92e-1 | 0.069 | 1.20e-1 |
| FOS | ENSG00000170345 | -0.100 | 2.56e-2 | -0.154 | 5.16e-4 | -0.120 | 6.94e-3 |
| PCNA | ENSG00000132646 | 0.038 | 3.99e-1 | 0.548 | 1.04e-40 | 0.183 | 3.71e-5 |
| MAD1L1 | ENSG00000002822 | 0.154 | 5.55e-4 | 0.275 | 3.78e-10 | 0.071 | 1.10e-1 |
| CCNE2 | ENSG00000175305 | 0.066 | 1.41e-1 | 0.013 | 7.77e-1 | -0.081 | 6.98e-2 |
| CCNA2 | ENSG00000145386 | 0.206 | 3.24e-6 | 0.370 | 9.85e-18 | 0.039 | 3.87e-1 |
| CCNB1 | ENSG00000134057 | 0.319 | 2.33e-13 | 0.619 | 2.09e-54 | 0.132 | 3.14e-3 |
| CCNB2 | ENSG00000157456 | 0.296 | 1.31e-11 | 0.579 | 3.36e-46 | 0.085 | 5.74e-2 |
| CDK1 | ENSG00000170312 | 0.299 | 7.36e-12 | 0.562 | 3.65e-43 | 0.157 | 4.02e-4 |
| CDC25C | ENSG00000158402 | 0.375 | 3.34e-18 | 0.722 | 4.65e-82 | 0.241 | 4.32e-8 |
| E2F5 | ENSG00000133740 | 0.089 | 4.74e-2 | 0.142 | 1.40e-3 | 0.118 | 8.07e-3 |
| ASNS | ENSG00000070669 | 0.097 | 2.92e-2 | 0.161 | 2.82e-4 | 0.024 | 5.94e-1 |
| IGF1R | ENSG00000140443 | -0.145 | 1.14e-3 | -0.323 | 1.14e-13 | -0.132 | 2.99e-3 |
| IGFBP3 | ENSG00000146674 | -0.059 | 1.86e-1 | -0.085 | 5.59e-2 | -0.012 | 7.87e-1 |
| EGFR | ENSG00000146648 | -0.145 | 1.10e-3 | -0.335 | 1.37e-14 | -0.213 | 1.47e-6 |
| MCM6 | ENSG00000076003 | 0.241 | 4.43e-8 | 0.351 | 4.83e-16 | 0.095 | 3.31e-2 |
| STMN1 | ENSG00000117632 | 0.351 | 5.86e-16 | 0.577 | 7.77e-46 | 0.216 | 1.09e-6 |
| EGR1 | ENSG00000120738 | -0.071 | 1.12e-1 | -0.136 | 2.28e-3 | -0.096 | 3.10e-2 |
| NFKB2 | ENSG00000077150 | 0.181 | 4.32e-5 | 0.374 | 4.59e-18 | 0.323 | 1.25e-13 |
| ABCB1 | ENSG00000085563 | -0.084 | 6.07e-2 | -0.180 | 5.12e-5 | 0.070 | 1.17e-1 |
| TIMM50 | ENSG00000105197 | 0.244 | 2.90e-8 | 0.484 | 7.49e-31 | 0.136 | 2.21e-3 |
| LGALS3 | ENSG00000131981 | 0.059 | 1.84e-1 | 0.133 | 2.80e-3 | 0.026 | 5.67e-1 |
| BCL2L1 | ENSG00000171552 | 0.051 | 2.54e-1 | 0.110 | 1.35e-2 | 0.062 | 1.67e-1 |
| IGF2 | ENSG00000167244 | -0.170 | 1.30e-4 | -0.424 | 2.73e-23 | -0.157 | 4.28e-4 |
| DUT | ENSG00000128951 | 0.324 | 1.05e-13 | 0.641 | 1.60e-59 | 0.232 | 1.50e-7 |
| ACAT2 | ENSG00000120437 | 0.084 | 6.14e-2 | 0.165 | 2.05e-4 | 0.029 | 5.10e-1 |
| HMGCS1 | ENSG00000112972 | -0.097 | 2.96e-2 | -0.293 | 2.01e-11 | -0.143 | 1.29e-3 |
| HMGCR | ENSG00000113161 | 0.082 | 6.64e-2 | -0.182 | 4.09e-5 | -0.101 | 2.40e-2 |
| MVK | ENSG00000110921 | 0.097 | 3.04e-2 | 0.264 | 1.88e-9 | 0.022 | 6.21e-1 |
| PMVK | ENSG00000163344 | 0.080 | 7.28e-2 | 0.327 | 5.98e-14 | 0.085 | 5.76e-2 |

| | | | | | | | |
|----------|-----------------|--------|----------|--------|----------|--------|---------|
| MVD | ENSG00000167508 | 0.007 | 8.81e-1 | 0.144 | 1.17e-3 | 0.005 | 9.03e-1 |
| IDI1 | ENSG00000067064 | 0.030 | 5.04e-1 | 0.078 | 8.08e-2 | -0.049 | 2.78e-1 |
| FDPS | ENSG00000160752 | 0.099 | 2.64e-2 | 0.192 | 1.44e-5 | -0.010 | 8.30e-1 |
| FDFT1 | ENSG00000079459 | 0.089 | 4.62e-2 | 0.116 | 9.19e-3 | -0.039 | 3.78e-1 |
| SQLE | ENSG00000104549 | -0.098 | 2.78e-2 | -0.249 | 1.64e-8 | -0.135 | 2.35e-3 |
| LSS | ENSG00000160285 | 0.000 | 9.98e-1 | -0.029 | 5.12e-1 | -0.044 | 3.20e-1 |
| CYP51A1 | ENSG00000001630 | -0.188 | 2.24e-5 | -0.441 | 2.63e-25 | -0.239 | 5.86e-8 |
| TM7SF2 | ENSG00000149809 | -0.079 | 7.70e-2 | -0.094 | 3.59e-2 | -0.040 | 3.69e-1 |
| SC4MOL | ENSG00000224339 | 0.039 | 3.80e-1 | 0.034 | 4.44e-1 | 0.092 | 3.97e-2 |
| NSDHL | ENSG00000147383 | 0.076 | 8.99e-2 | 0.242 | 3.96e-8 | -0.019 | 6.66e-1 |
| DHCR7 | ENSG00000172893 | -0.101 | 2.37e-2 | -0.118 | 8.29e-3 | -0.135 | 2.39e-3 |
| DHCR24 | ENSG00000116133 | -0.082 | 6.76e-2 | -0.149 | 8.10e-4 | -0.084 | 6.05e-2 |
| CYP24A1 | ENSG00000019186 | 0.015 | 7.38e-1 | 0.015 | 7.33e-1 | 0.088 | 4.82e-2 |
| MMP3 | ENSG00000149968 | -0.183 | 3.57e-5 | -0.291 | 3.19e-11 | -0.077 | 8.66e-2 |
| MMP13 | ENSG00000137745 | -0.193 | 1.29e-5 | -0.272 | 5.45e-10 | -0.067 | 1.34e-1 |
| ITGA6 | ENSG00000091409 | -0.136 | 2.23e-3 | -0.285 | 8.20e-11 | -0.191 | 1.69e-5 |
| PXN | ENSG00000089159 | -0.025 | 5.79e-1 | -0.135 | 2.48e-3 | -0.059 | 1.84e-1 |
| ARHGDI1 | ENSG00000141522 | -0.026 | 5.62e-1 | -0.043 | 3.33e-1 | -0.092 | 3.97e-2 |
| RANGAP1 | ENSG00000100401 | 0.110 | 1.34e-2 | 0.377 | 2.14e-18 | 0.166 | 1.94e-4 |
| DEPDC1 | ENSG00000024526 | 0.164 | 2.33e-4 | 0.262 | 2.39e-9 | -0.008 | 8.51e-1 |
| WDR67 | ENSG00000253410 | -0.106 | 1.78e-2 | -0.136 | 2.28e-3 | -0.049 | 2.76e-1 |
| TERT | ENSG00000164362 | 0.251 | 1.20e-8 | 0.294 | 1.68e-11 | 0.199 | 6.84e-6 |
| KIF20A | ENSG00000112984 | 0.237 | 7.55e-8 | 0.332 | 2.19e-14 | 0.103 | 2.06e-2 |
| EPB41L4B | ENSG00000095203 | -0.041 | 3.60e-1 | -0.153 | 5.58e-4 | -0.142 | 1.46e-3 |
| BUB1 | ENSG00000169679 | 0.162 | 2.68e-4 | 0.263 | 2.29e-9 | 0.002 | 9.56e-1 |
| NCAPH | ENSG00000121152 | 0.149 | 8.03e-4 | 0.241 | 4.63e-8 | 0.037 | 4.02e-1 |
| MIS18A | ENSG00000159055 | 0.335 | 1.22e-14 | 0.547 | 1.65e-40 | 0.163 | 2.56e-4 |
| CENPA | ENSG00000115163 | 0.256 | 6.04e-9 | 0.474 | 1.59e-29 | 0.083 | 6.26e-2 |
| CPSF6 | ENSG00000111605 | 0.161 | 3.03e-4 | 0.134 | 2.70e-3 | 0.021 | 6.39e-1 |
| FAM64A | ENSG00000129195 | 0.185 | 3.15e-5 | 0.381 | 8.77e-19 | 0.091 | 4.13e-2 |
| ID4 | ENSG00000172201 | -0.088 | 4.84e-2 | -0.088 | 4.79e-2 | -0.012 | 7.85e-1 |

Supplementary Table S3. HNSCC patients' survival depending on the low and high expression of mutant p53-interacting partners, based on data from StarBase v3.0 database.

| Gene | ID | Cases | Median | Coef | HR | p-value |
|------|----|-------|--------|------|----|---------|
|------|----|-------|--------|------|----|---------|

| | | | | | | |
|---------|-----------------|-----|-------|-------|------|-------|
| NF-YA | ENSG00000001167 | 495 | 7.88 | -0.12 | 0.89 | 0.38 |
| NF-YB | ENSG00000120837 | 495 | 4.31 | -0.22 | 0.81 | 0.12 |
| NF-YC | ENSG00000066136 | 495 | 7.69 | -0.05 | 0.95 | 0.72 |
| Sp1 | ENSG00000185591 | 495 | 13.64 | -0.03 | 0.97 | 0.85 |
| Ets-1 | ENSG00000134954 | 495 | 11.74 | -0.17 | 0.84 | 0.21 |
| VDR | ENSG00000111424 | 495 | 10.75 | 0.15 | 1.16 | 0.28 |
| SREBP-2 | ENSG00000198911 | 495 | 30.79 | -0.04 | 0.96 | 0.76 |
| TopBP1 | ENSG00000163781 | 495 | 8.75 | -0.05 | 0.95 | 0.69 |
| Pin1 | ENSG00000127445 | 495 | 7.96 | -0.31 | 0.73 | 0.023 |
| MRE11 | ENSG00000020922 | 495 | 2.66 | -0.16 | 0.85 | 0.24 |
| PML | ENSG00000140464 | 495 | 13.29 | 0.09 | 1.10 | 0.49 |
| p63 | ENSG00000073282 | 495 | 64.81 | -0.00 | 1.00 | 1 |
| p73 | ENSG00000078900 | 495 | 3.42 | -0.28 | 0.76 | 0.042 |

Supplementary Table S4. HNSCC patients' survival depending on the low and high expression of transcriptionally activated genes by mutant p53 protein, based on data from StarBase v3.0 database.

| Gene | ID | Cases | Median | coef | HR | p-value |
|--------|-----------------|-------|--------|-------|-------|---------|
| MYC | ENSG00000136997 | 495 | 64.63 | 0.25 | 1.29 | 0.065 |
| CXCL1 | ENSG00000163739 | 495 | 27.06 | 0.07 | 01.08 | 0.59 |
| MAP2K3 | ENSG00000034152 | 495 | 19.80 | 0.08 | 01.08 | 0.57 |
| FOS | ENSG00000170345 | 495 | 86.40 | -0.18 | 0.84 | 0.19 |
| PCNA | ENSG00000132646 | 495 | 86.65 | -0.05 | 0.95 | 0.7 |
| MAD1L1 | ENSG00000002822 | 495 | 5.47 | -0.02 | 0.98 | 0.87 |
| CCNE2 | ENSG00000175305 | 495 | 01.06 | -0.17 | 0.84 | 0.2 |
| CCNA2 | ENSG00000145386 | 495 | 14.31 | 0.10 | 1.10 | 0.48 |
| CCNB1 | ENSG00000134057 | 495 | 30.00 | -0.04 | 0.96 | 0.76 |
| CCNB2 | ENSG00000157456 | 495 | 13.69 | -0.03 | 0.97 | 0.82 |
| CDK1 | ENSG00000170312 | 495 | 12.38 | -0.02 | 0.98 | 0.91 |
| CDC25C | ENSG00000158402 | 495 | 1.68 | 0.15 | 1.16 | 0.27 |
| E2F5 | ENSG00000133740 | 495 | 0.62 | -0.02 | 0.98 | 0.87 |
| ASNS | ENSG00000070669 | 495 | 5.94 | 0.23 | 1.26 | 0.097 |
| IGF1R | ENSG00000140443 | 495 | 09.09 | 0.31 | 1.36 | 0.026 |
| IGFBP3 | ENSG00000146674 | 495 | 41.52 | 0.02 | 01.02 | 0.9 |
| EGFR | ENSG00000146648 | 495 | 23.91 | 0.20 | 1.22 | 0.15 |
| MCM6 | ENSG00000076003 | 495 | 15.63 | -0.08 | 0.92 | 0.56 |
| STMN1 | ENSG00000117632 | 495 | 26.73 | 0.07 | 01.08 | 0.59 |
| EGR1 | ENSG00000120738 | 495 | 63.90 | -0.05 | 0.95 | 0.72 |
| NFKB2 | ENSG00000077150 | 495 | 15.37 | 0.05 | 01.05 | 0.74 |
| ABC1 | ENSG00000085563 | 495 | 0.22 | -0.48 | 0.62 | 0.0004 |
| TIMM50 | ENSG00000105197 | 495 | 08.04 | 0.04 | 01.04 | 0.76 |
| LGALS3 | ENSG00000131981 | 495 | 78.20 | -0.30 | 0.74 | 0.031 |

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|----------|-----------------|-----|--------|-------|-------|--------|
| BCL2L1 | ENSG00000171552 | 495 | 27.99 | 0.05 | 01.05 | 0.74 |
| IGF2 | ENSG00000167244 | 495 | 6.40 | 0.09 | 1.10 | 0.5 |
| DUT | ENSG00000128951 | 495 | 13.08 | 0.03 | 01.03 | 0.82 |
| ACAT2 | ENSG00000120437 | 495 | 08.07 | 0.01 | 01.01 | 0.94 |
| HMGCS1 | ENSG00000112972 | 495 | 19.75 | 0.23 | 1.26 | 0.097 |
| HMGCR | ENSG00000113161 | 495 | 12.57 | 0.04 | 01.04 | 0.79 |
| MVK | ENSG00000110921 | 495 | 4.32 | -0.23 | 0.79 | 0.09 |
| PMVK | ENSG00000163344 | 495 | 37.97 | -0.12 | 0.89 | 0.4 |
| MVD | ENSG00000167508 | 495 | 10.24 | 0.17 | 1.19 | 0.21 |
| IDI1 | ENSG00000067064 | 495 | 14.36 | 0.16 | 1.18 | 0.24 |
| FDPS | ENSG00000160752 | 495 | 25.84 | 0.06 | 01.06 | 0.66 |
| FDFT1 | ENSG00000079459 | 495 | 20.94 | -0.11 | 0.90 | 0.43 |
| SQLE | ENSG00000104549 | 495 | 29.15 | 0.44 | 1.55 | 0.0015 |
| LSS | ENSG00000160285 | 495 | 9.62 | -0.13 | 0.88 | 0.35 |
| CYP51A1 | ENSG00000001630 | 495 | 1.37 | 0.11 | 1.11 | 0.44 |
| TM7SF2 | ENSG00000149809 | 495 | 4.15 | -0.18 | 0.84 | 0.19 |
| SC4MOL | ENSG00000224339 | 495 | 0.00 | 0.00 | 0.00 | 1 |
| NSDHL | ENSG00000147383 | 495 | 21.29 | 0.14 | 1.15 | 0.31 |
| DHCR7 | ENSG00000172893 | 495 | 20.40 | 0.28 | 1.33 | 0.042 |
| DHCR24 | ENSG00000116133 | 495 | 117.19 | 0.01 | 01.01 | 0.94 |
| CYP24A1 | ENSG00000019186 | 495 | 3.20 | -0.19 | 0.83 | 0.16 |
| MMP3 | ENSG00000149968 | 495 | 22.32 | 0.12 | 1.13 | 0.36 |
| MMP13 | ENSG00000137745 | 495 | 09.04 | 0.12 | 1.12 | 0.39 |
| ITGA6 | ENSG00000091409 | 495 | 117.73 | 0.17 | 1.19 | 0.2 |
| PXN | ENSG00000089159 | 495 | 21.09 | 0.28 | 1.33 | 0.039 |
| ARHGDI1 | ENSG00000141522 | 495 | 97.30 | 0.06 | 01.07 | 0.65 |
| RANGAP1 | ENSG00000100401 | 495 | 47.15 | 0.11 | 1.11 | 0.44 |
| DEPDC1 | ENSG00000024526 | 495 | 2.87 | 0.16 | 1.17 | 0.24 |
| WDR67 | ENSG00000253410 | 495 | 0.00 | 0.00 | 0.00 | 1 |
| TERT | ENSG00000164362 | 495 | 0.10 | -0.19 | 0.83 | 0.16 |
| KIF20A | ENSG00000112984 | 495 | 9.53 | 0.10 | 1.11 | 0.45 |
| EPB41L4B | ENSG00000095203 | 495 | 2.46 | -0.10 | 0.90 | 0.45 |
| BUB1 | ENSG00000169679 | 495 | 5.36 | 0.15 | 1.16 | 0.29 |
| NCAPH | ENSG00000121152 | 495 | 7.34 | 0.14 | 1.15 | 0.29 |
| MIS18A | ENSG00000159055 | 495 | 7.60 | 0.10 | 1.10 | 0.47 |
| CENPA | ENSG00000115163 | 495 | 5.74 | -0.01 | 0.99 | 0.93 |
| CPSF6 | ENSG00000111605 | 495 | 9.88 | -0.02 | 0.98 | 0.89 |
| FAM64A | ENSG00000129195 | 495 | 3.29 | 0.10 | 1.11 | 0.45 |
| ID4 | ENSG00000172201 | 495 | 2.82 | -0.02 | 0.98 | 0.86 |

Supplementary Table S5. List of positively and negatively correlated genes with *PTTG3P*, *PTTG1* or *PTTG2* involved in important cellular processes.

| Analyzed Gene | Type of Correlation | Process | Genes |
|---------------|---------------------|-----------------|---|
| <i>PTTG3P</i> | Positive | Cell cycle | SMC3, SMC4, SMC2, CDC20, PSMD9, CDC23, RCC1, CCDC99, FBXO5, GTSE1, TMPO, SKP1, ESCO2, C16orf75, PSME1, PSME2, KIF20A, DNA2, TP53, PIF1, RTEL1, SET, ANAPC16, CDCA5, NCAPG, CDCA8, AAAS, SKA1, NCAPH, SKA2, DSN1, BRIP1, NUP85, C14orf93, ATRIP, CEP78, PLK4, CDT1, NCAPH2, PLK1, CDC7, CDC6, ZWINT, DHFR, POLA1, TPX2, POLA2, RAD17, TOP2A, LIN54, FEN1, ORC1L, MLF1IP, NCAPG2, BRCA1, BRCA2, TUBA1B, XPO1, NUF2, UIMC1, TK1, NINL, NUDC, RMI1, KIF23, TUBG1, PSMA5, RAD51C, PSMA4, KIF2A, PSMA2, DMC1, KIF2C, SF11, PRIM2, PCNA, PRIM1, SSNA1, TYMS, CENPA, PSMC3IP, PPP2CA, PSMB7, PSMB4, RAD54L, CDKN2D, GINS1, MPP2, GINS2, NPM1, CDKN2C, CENPW, CDKN2A, GINS3, GINS4, RPA2, MLH1, PSMB9, NEDD1, CENPE, PSMC5, CENPF, APITD1, PSMC3, CENPH, CENPI, RPA3, CENPJ, CENPK, C21orf45, CENPL, CENPM, CENPN, B9D2, NCAPD3, CENPO, CENPQ, C12orf32, SPC24, MAD2L1, SPC25, ERCC6L, ZWILCH, DSCC1, GMNN, HJURP, BUB1B, PTTG1, PTTG2, RUVBL2, KNTC1, OIP5, NEK2, AZI1, CEP135, LIG1, VRK1, VRK2, CDC25C, CDC25A, CDC25B, CCNE2, NHP2, BLM, ORC3L, HMMR, PKMYT1, PMF1, CCNB2, CCNB1, CLSPN, CEP110, UBE2C, NDC80, KIF18A, UBE2S, CDK4, CDK2, CDK1, FGFR1OP, RAD9B, WRAP53, C19orf62, MCM7, MCM8, MCM10, FOXM1, CHTF18, CKS1B, LMNB1, SGOL2, SGOL1, EXO1, NUP62, MYBL2, WHSC1, POLE, RFC5, RFC3, RFC4, RFC1, H2AFZ, RFC2, H2AFX, H2AFV, HAUS5, MASTL, HAUS1, CCNA2, DBF4, ESPL1, MCM3, BIRC5, MCM4, MCM5, MCM6, ITGB3BP, MCM2, LIN9, AURKB, NSL1, PSMB10, AURKA, POLD3, CDC45, RBBP4, HAUS8, HAUS7, POLD1, E2F1, E2F2, NUP43, RBBP7, BUB3, POLR2I, BUB1, POLR2K, RRM2, CEP152, ORC6L, MND1, RAD51, POLE2 |
| | | Gene expression | CCNH, TACO1, UBE2D2, C1orf59, EHMT1, TTF1, COX6A1, UXT, PSMD9, LSM11, CDC23, TRIM28, RBMX2, MAGOH, C12orf62, SKP1, ZNF684, LIFR, THOC3, CDC25C, KCTD6, THOC7, C16orf75, SAP30, MED7, MSH2, CCNE2, FANCD2, SARNP, PSME1, PSME2, SNRPF, DNA2, TP53, SNRPB, SLBP, DNMT1, BLM, ANAPC16, C1orf77, CSTF3, SUPT4H1, AAAS, OSGEP, SFRS7, CCNB1, BRIP1, NUP85, PMAIP1, C14orf93, ATRIP, NR2C2AP, FANCI, PRELID1, SURF1, CBX5, UBE2C, CPSF3, UPF3B, FANCC, CNOT10, CDC7, SFRS2, SMARCA2, ESR1, SFRS3, C5orf35, TPX2, MOV10, CNOT6, UBE2S, CDK4, CDK2, CDK1, RAD17, PIN1, CALM3, CNOT8, RAD9B, ZNF530, TP73, EZH2, PHF19, COX7B, PHF1, SUV39H1, DPY30, BRCA1, COX7C, CASP6, EXO1, NUP62, CASP2, MYBL2, MYBL1, COX8A, RFC5, RFC3, RFC4, LRDD, RMI1, H2AFZ, PRMT1, RFC2, H2AFX, H2AFV, MED27, DDB2, CCNA2, PSMA5, OBFC2B, PSMA4, ZNF519, PSMA2, ZNF879, MTF2, BIRC5, BDP1, SLU7, ZNF473, PCNA, HDAC3, GTF3C5, GLS2, UHRF1, SRRT, TAF9, U2AF1, COX5A, AURKB, PSMB10, HDAC6, AURKA, PPP2CA, PSMB7, PSMB4, RBBP4, PABPN1, SAP30L, TIFA, E2F1, SAP18, E2F2, NUP43, RBBP7, POLR2I, E2F7, POLR2K, E2F8, MBD3, DDX39, NPM1, PCGF6, RRM2, |

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| | CDKN2A, ATAD2, RPA2, DEK, MLH1, TARBP2, PSMB9, PSMC5, RAD51, PSMC3, RPA3, CENPJ, CCNG1, FAS, TAF7, BAX, TAF5, RHEBL1, C12orf32 |
| Metabolism of RNA | RPP30, CWC27, THG1L, GLE1, RPS14, PSMD9, FBL, LSM11, SNRPD2, SNRPD1, MAGOH, TXNL4A, CDKAL1, THOC3, ZCRB1, THOC7, SARNP, NHP2, PSME1, PPIE, PSME2, PPIH, SNRPF, SNRNP25, SNRPC, SNRPA, SNRPB, SF4, SLBP, SET, C1orf77, CSTF3, AAAS, RNPC3, OSGEP, SFRS7, NUP85, ERI1, SMN2, C14orf93, RBM10, ZRSR2, PRPF38A, APOBEC3H, CPSF3, UPF3B, CNOT10, SFRS2, SFRS3, LSM3, LSM2, HNRNPL, HNRNPM, CNOT6, LSM6, LAS1L, HNRNPD, HNRNPC, CNOT8, APOBEC3B, RPS23, NXT1, C19orf61, PPWD1, PQBP1, XPO1, NUP62, BCAS2, UTP15, PSMA5, QTRT1, PSMA4, SYF2, HNRNPH1, PSMA2, DNAJC8, SLU7, SKIV2L2, DCP2, RBM22, TSEN34, ZNF473, URM1, SRRT, DDX20, RPS27L, SFRS13A, NOC4L, U2AF1, HSD17B10, PSMB10, PPP2CA, PSMB7, EXOSC5, PSMB4, EXOSC10, PABPN1, EXOSC9, EXOSC8, TIFA, NUP43, POLR2I, HNRNPA1, EXOSC2, RPL17, EXOSC1, POLR2K, HNRNPA0, SF3A3, DDX39, SF3A2, GPKOW, TPRKB, PSMB9, SNRNP40, PSMC5, PSMC3, HNRNPA2B1, PRPF31, B9D2, PPI3, RBMX |
| DNA repair | C19orf62, FEN1, DCLRE1C, WDR48, CCNH, OGG1, BRCA1, BRCA2, ALKBH2, EME1, EXO1, UIMC1, SUMO2, POLL, WHSC1, KPNA2, POLE, POLH, HMG1, GEN1, RFC5, TIPIN, RFC3, RFC4, RFC1, LIG1, H2AFZ, RMI1, RFC2, H2AFX, H2AFV, C16orf75, DDB2, MSH6, CCNA2, NEIL3, RAD51C, MSH2, MSH3, FANCD2, TIMELESS, PPIE, DNA2, TP53, DTL, C19orf40, RTEL1, INO80E, BLM, PCNA, UBA7, PNKP, UNG, RAD51AP1, POLD3, BRIP1, POLD1, USP1, CLSPN, POLR2I, ATRIP, POLR2K, MUTYH, FANCI, POLQ, XRCC4, EYA2, FANCL, MCRS1, FANCA, XRCC1, RPA2, FANCC, FANCB, MLH1, FANCG, MAD2L2, COPS3, PPP5C, APITD1, RAD51, KIAA0101, RPA3, POLE2, UBE2T, CDK2, POLE3, CDK1, ERCC8, RAD17, RAD9B, C12orf32 |
| DNA replication | ORC1L, MCM7, MCM8, GMNN, MCM10, PSMD9, CDC23, POLE, SKP1, RFC5, RFC3, RFC4, RFC1, LIG1, RFC2, PSMA5, CCNA2, PSMA4, DBF4, CCNE2, PSMA2, MCM3, PSME1, MCM4, PSME2, MCM5, DNA2, MCM6, MCM2, PRIM2, PCNA, ANAPC16, ORC3L, PRIM1, PSMB10, POLD3, PSMB7, PSMB4, CDC45, POLD1, E2F1, E2F2, C14orf93, GINS1, CDT1, GINS2, UBE2C, GINS3, GINS4, ORC6L, RPA2, CDC7, CDC6, PSMB9, POLA1, PSMC5, POLA2, PSMC3, UBE2S, RPA3, POLE2, CDK2, POLE3, CDK1 |
| Organelle biogenesis and maintenance | ATP5G2, ATP5G1, HSPB11, TUBA1B, CHCHD6, NEK2, NINL, AZI1, CEP135, KIF24, HAUS5, TUBG1, ATP5F1, WDR34, HAUS1, SFI1, HDAC3, ARL3, SSNA1, C1orf151, ATP5J, ATP5H, ATP5O, HDAC6, APOO, HAUS8, HAUS7, PDE6D, CCT8, CYC1, CEP78, PLK4, HSPA9, CEP110, PHF10, CEP152, PLK1, WDR19, SCLT1, IMMT, IFT122, NEDD1, CENPJ, CDK1, FGFR1OP, CALM3, DYNLRB1 |
| Chromatin organization | SUV420H2, SUV39H2, HDAC3, KDM3B, SUV39H1, TAF9, EHMT1, DPY30, NSL1, ING4, RBBP4, RUVBL2, SAP30L, |

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| | | SAP18, RBBP7, DMAP1, BRD8, WHSC1, C12orf41, MBD3, H2AFZ, PRMT1, MCRS1, H2AFX, H2AFV, C3orf75, ELP4, SMARCA2, NFKB2, SAP30, CDK4, PHF17 |
| | Programmed cell death | HMGB2, HMGB1, PSMB10, LMNB1, PSMD9, PSMB7, PSMB4, CASP6, E2F1, E2F2, PMAIP1, C14orf93, CLSPN, DFFB, TICAM2, CDKN2A, GZMB, TRAF2, GZMH, PSMB9, PSMA5, PSMC5, PSMA4, PSMC3, PSMA2, BCL2, PSME1, BAX, FAS, PSME2, TP53, DCP2, TP73 |
| | HIV viral infection | CCNH, TAF9, SUPT4H1, PSIP1, AAAS, PSMB10, PSMD9, PSMB7, PSMB4, XPO1, NUP85, NUP62, RCC1, C14orf93, NUP43, POLR2I, POLR2K, SKP1, NPM1, XRCC4, LIG1, APOBEC3G, PSMB9, PSMA5, PSMC5, PSMA4, CD8B, PSMC3, PSMA2, PSME1, TAF7, PSME2, TAF5, SLC25A5 |
| Negative | Developmental biology processes (keratinization) | PERP, PKP1, SPRR1A, SPRR1B, IVL, KRT6A, SPRR2D |
| | Signal transduction | SMOX, USP2, PKP1, PTK6, SDR9C7, NDEL1 |
| <i>PTTG1</i> | Positive | CCNH, ZWILCH, DSCC1, GMNN, HJURP, BUB1B, SMC4, SMC2, CDC20, PSMD9, CDC23, PTTG2, RUVBL2, CHEK2, STRA13, KNTC1, OIP5, NEK2, CCDC99, FBXO5, GTSE1, AZI1, TMPO, SKP1, LIG1, VRK1, ESCO2, CDC25C, CDC25A, C16orf75, RBX1, CDC25B, NHP2, PSME1, PSME2, KIF20A, PIF1, BLM, RTEL1, ANAPC16, PSMD13, CDCA5, ORC3L, NCAPG, CDCA8, HMMR, PKMYT1, PMF1, SKA1, SKA2, ANAPC11, CCNB2, CCNB1, DSN1, NUP85, GAR1, ATRIP, CEP78, PLK4, CDT1, CEP110, UBE2C, NCAPH2, H3F3A, CDC7, NDC80, ZWINT, DHFR, POLA1, TPX2, POLA2, KIF18A, UBE2S, CDK4, CDK2, CHMP2A, CDK1, RAD17, RAD9B, RAD9A, WRAP53, C19orf62, FEN1, ORC1L, MCM7, MLF1IP, NCAPG2, BRCA1, CHTF18, HIST2H2AC, CKS1B, LMNB1, TUBA1B, SGOL1, EXO1, NUF2, MYBL2, TK1, WHSC1, NINL, EMD, POLE, RFC5, NUDC, RFC3, RFC4, RMI1, H2AFZ, RFC2, H2AFX, H2AFV, KIF23, HAUS5, RANGAP1, HAUS1, CCNA2, PSMA5, RAD51C, PSMA4, PSMA2, MCM3, BIRC5, KIF2C, MCM5, MCM6, SFI1, ITGB3BP, MCM2, PCNA, PRIM1, SSNA1, TYMS, HDAC8, CENPA, AURKB, NSL1, PSMB10, AURKA, PSMC3IP, PSMB6, PSMB7, PSMB4, CDC45, HAUS8, PSMB3, HAUS7, POLD1, E2F1, RAD54L, RBBP7, BUB3, POLR2H, POLR2I, POLR2K, CDKN2D, GINS1, MPP2, GINS2, NPM1, CDKN2C, CENPW, RRM2, CDKN2A, CEP152, GINS4, RPA2, ORC6L, MND1, PPP2R3B, MLH1, FAM128B, FAM128A, PSMB9, POLE4, PSMC5, RAD51, APITD1, PSMC3, CENPH, RPA3, CENPJ, POLE2, CENPK, C21orf45, POLE3, CENPM, CENPN, B9D2, SPC24, MAD2L1, SPC25 |
| | Metabolism of RNA | RPL32, CCNH, RPL34, RPP30, RRP1, CWC27, THG1L, RPS15, RPS14, PSMD9, FBL, RPS19, SNRPD2, SNRPD1, MAGOH, RPL35, SNRPD3, SNRNP35, RPS11, TXNL4A, RPL39, RPS9, RPS8, RPL22, RPSA, THOC3, THOC4, THOC7, SF3B14, SARNP, RPP21, NHP2, PSME1, RPL24, PPIE, PSME2, SNRPE, PPIH, SNRPF, GEMIN7, SNRNP25, SNRPC, SNRPA, SNRPB, SF4, SLBP, C1orf77, PSMD13, CSTF3, OSGEP, SFRS7, NUP85, GAR1, RBM10, ZRSR2, RPL41, APOBEC3H, CPSF3, UPF3B, CNOT10, MAGOHB, LSM5, LSM4, SFRS3, LSM3, LSM2, ISG20, |

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| | <p>HNRNPL, HNRNPM, LSM7, LSM6, QARS, LAS1L, RPS20, CNOT8, RPS24, APOBEC3B, RPS23, DDX49, NXT1, C19orf61, PPWD1, PQBP1, SNRNP70, PSMA5, QTRT1, PSMA4, SYF2, HNRNPH1, PSMA2, DNAJC8, SLU7, DCP2, RBM22, TSEN34, ZNF473, BAT1, URM1, SRRT, RPL11, RPS27L, NOC4L, U2AF1, HSD17B10, LAGE3, PSMB10, PSMB6, REM1, PSMB7, EXOSC5, PSMB4, PABPN1, PSMB3, EXOSC9, EXOSC8, RPL15, POLR2H, RPL18, HNRNPA1, POLR2I, EXOSC2, RPL17, EXOSC1, POLR2K, HNRNPA0, SF3A3, DDX39, GPKOW, TPRKB, PSMB9, PSMC5, PSMC3, PRPF31, B9D2, RBMX, RPL26L1</p> |
| Cellular responses to external stimuli | <p>UBE2D2, RPL34, RRP1, NUDT2, TCIRG1, HIST2H2AC, LMNB1, RPS15, RPS14, PSMD9, TUBA1B, ROBLD3, CDC23, RPS19, GPBP1, RPL35, RPS11, RPL39, RPS9, GPX1, H2AFZ, RPS8, H2AFX, RPL22, H2AFV, COMMD3, RPSA, ETV2, RBX1, EEF1A1, PSMA5, CCNA2, PSMA4, DNAJC7, PSMA2, PSME1, RPL24, PSME2, ANAPC16, RPS19BP1, PSMD13, NPRL2, RPL11, RPS27L, PSMB10, ANAPC11, PSMB6, HBXIP, PSMB7, PRDX2, PSMB4, NUP85, PSMB3, E2F1, TCEB2, RPL15, RBBP7, RPL18, RPL17, CDKN2D, HSPA9, RPL41, CDKN2C, CDKN2A, UBE2C, H3F3A, RPA2, TBCB, EIF2S2, ATOX1, SOD1, PSMB9, PSMC5, PSMC3, CDK4, UBE2S, RPA3, CDK2, CDK1, RPS20, RHEBL1, RPS24, RPL26L1, EZH2, RPS23</p> |
| DNA repair | <p>FEN1, DCLRE1C, CCNH, OGG1, RRP1, BRCA1, HIST2H2AC, ALKBH2, EME1, EXO1, CHEK2, SUMO2, POLL, STRA13, WHSC1, POLE, HMG1, RFC5, TIPIN, RFC3, RFC4, LIG1, H2AFZ, RMI1, RFC2, H2AFX, H2AFV, SIRT6, C16orf75, RBX1, DDB2, CCNA2, NEIL3, RAD51C, FANCD2, TIMELESS, PPIE, DTL, RTEL1, INO80E, BLM, PCNA, PNKP, RAD51AP1, REM1, POLD1, USP1, POLR2H, POLR2I, ATRIP, POLR2K, MUTYH, FANCI, POLQ, XRCC4, MGMT, EYA2, FANCL, MCRS1, FANCA, XRCC1, RPA2, FANCC, FANCB, MLH1, FANCG, GIYD2, POLE4, MAD2L2, PPP5C, APITD1, RAD51, KIAA0101, RPA3, POLE2, UBE2T, CDK2, POLE3, CDK1, RAD17, RAD9B, RAD18, RAD9A</p> |
| DNA replication | <p>ORC1L, MCM7, GMNN, PSMD9, CDC23, POLE, SKP1, RFC5, RFC3, RFC4, LIG1, RFC2, RBX1, PSMA5, CCNA2, PSMA4, PSMA2, MCM3, PSME1, PSME2, MCM5, MCM6, MCM2, PCNA, ANAPC16, PSMD13, ORC3L, PRIM1, PSMB10, ANAPC11, PSMB6, PSMB7, PSMB4, CDC45, PSMB3, POLD1, E2F1, GINS1, CDT1, GINS2, UBE2C, GINS4, ORC6L, RPA2, CDC7, PSMB9, POLE4, POLA1, PSMC5, POLA2, PSMC3, UBE2S, RPA3, POLE2, CDK2, POLE3, CDK1</p> |
| Programmed cell death | <p>DIABLO, HMGB2, HMGB1, PSMB10, LMNB1, PSMB6, PSMD9, PSMB7, PSMB4, CASP6, PSMB3, E2F1, PMAIP1, DFFB, CDKN2A, BAD, GZMB, TRAF2, GZMH, PSMB9, PSMA5, PSMC5, PSMA4, PSMC3, PSMA2, PSME1, BAX, FAS, PSME2, DCP2, TP73, BIRC3</p> |
| Protein localization | <p>FH, NDUFB8, TIMM16, UBE2D2, COX17, TIMM10, HSCB, TAZ, ATP5G1, CHCHD4, HMGCL, TIMM17B, HACL1, SEC61B, CYC1, EMD, HSPA9, ACOT8, CAMLG, IDH3G, CHCHD10, GFER, COQ2, EIF3K, PXMP2, C18orf55, SLC25A5, MTCP1NB, ACOT4</p> |

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| | | Viral infection (HIV and influenza) | PSMD13, CCNH, TAF9, PSIP1, PSMB10, PSMB6, REM1, PSMD9, PSMB7, PSMB4, PSMB3, NUP85, TCEB2, POLR2H, POLR2I, POLR2K, SKP1, NPM1, XRCC4, LIG1, APOBEC3G, RDBP, RANGAP1, RBX1, PSMB9, PSMA5, PSMC5, PSMA4, CD8B, PSMC3, PSMA2, PSME1, CHMP2A, PSME2, SLC25A5 |
| | | Immune system | PGLYRP3, IRS1, RAB3D, CLTC, WASL, NPEPPS, PPP2R1B, CDH1, AP1G1, KIF5B, TOM1, QSOX1, LRRFIP1, KPNA3, IL6R, DSP, ACTR3, MAP2K4, ACTR2, TRIM62, GAB1, UBE4A, LRRC41, ENAH, ACLY, STIM1, IL1F5, TMBIM1, MYH9, DSG1, PKP1, PAFAH1B2, IL28RA, C16orf62, DYNC1I2, SEC23A, CAMK2D, NLRX1, CUL5, RASAL2, NOD2, PSEN1, HIF1A, PPL, PLD2, RNF217, MAPK3, VAT1, DYNC1H1, UBE2H, JUP, MYO5A, IGF2R, RAB10, SDC1, TRIP12, CALM1, EIF4G3 |
| | | Developmental biology | FURIN, WASL, PSEN1, EVPL, PPL, ABLIM1, SPTLC3, PERP, IL6R, KRT6C, MYH10, KRT6B, KRT6A, MAPK3, SPRR2D, ACTR3, DSP, SPAG9, ACTR2, ARHGEF12, JUP, GAB1, ENAH, EFNA3, MAFB, MYH9, DSG1, PKP1, DSG3, SPRR1A, SPRR1B, DSC2, IVL, CDK5R1 |
| | | Vesicle-mediated transport | DYNC1I2, SEC23A, CLTC, WASL, CYTH3, RABGEF1, GJA1, AP1G1, KIF5B, KIF1C, KIF1B, TBC1D16, SH3D19, ACTR3, ACTR2, DYNC1H1, DENND2C, MYO5A, IGF2R, RAB10, GJB2, KIF26B, MYH9, TRIP11, CALM1, PAFAH1B2 |
| | | Programmed cell death | CDH1, DSG1, PKP1, DSG3, MAPK3 |
| | | Cell-cell communication | JUP, CDH1, FBLIM1, WASL, PVRL1 |
| | | Cell cycle | ERCC6L, ZWILCH, GMNN, HJURP, BUB1B, SMC4, SMC2, CDC20, CDC23, PTTG1, RUVBL2, KNTC1, OIP5, NEK2, FBXO5, CCDC99, GTSE1, TMPO, NUP214, LIG1, CDC25C, CDC25A, C16orf75, NHP2, KIF20A, DNA2, BLM, ANAPC16, CDCA5, NCAPG, CDCA8, HMMR, PKMYT1, AAAS, PMF1, SKA1, SKA2, CCNB2, CCNB1, BRIP1, CLSPN, CEP78, PLK4, CDT1, CEP110, UBE2C, RCC2, PLK1, CDC7, ZWINT, DHFR, POLA1, TPX2, POLA2, KIF18A, CDK2, CDK1, RAD17, RAD9B, WRAP53, TOP2A, FEN1, ORC1L, MCM7, MLF1IP, NCAPG2, BRCA1, FOXM1, CKS1B, LMNB1, TUBA1B, SGOL2, SGOL1, EXO1, UIMC1, NUP62, MYBL2, TK1, WHSC1, POLE, RFC5, RFC3, RFC4, RFC1, H2AFZ, RFC2, RMI1, H2AFV, KIF23, HAUS5, HAUS1, CCNA2, RAD51C, ESPL1, MCM3, KIF2C, MCM5, MCM6, ITGB3BP, MCM2, PRIM2, PCNA, PRIM1, LIN9, TYMS, CENPA, NSL1, AURKB, AURKA, PSMC3IP, HAUS8, POLD1, E2F2, RAD54L, BUB3, RBBP7, BUB1, GINS1, GINS2, NPM1, RRM2, CDKN2C, CDKN2A, CEP152, GINS3, RPA2, MND1, CENPF, RAD51, APITD1, CENPH, CENPI, RPA3, POLE2, CENPJ, POLE3, CENPK, C21orf45, CENPL, CENPM, B9D2, CENPO, C12orf32, SPC24, SPC25, MAD2L1 |
| | | Gene expression (transcription) | SUV39H1, UBE2D2, BRCA1, COX7C, LSM11, CDC23, TRIM28, EXO1, NUP62, CASP2, MYBL2, MYBL1, NUP214, RFC5, RFC3, RFC4, H2AFZ, LRDD, RFC2, RMI1, H2AFV, THOC3, CDC25C, C16orf75, MED7, DDB2, SAP30, CCNA2, OBFC2B, FANCD2, ZNF879, DNA2, SLU7, ZNF473, SLBP, DNMT1, BLM, PCNA, |
| <i>PTTG2</i> | Positive | | |

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|----------|--|---|
| | | HDAC3, ANAPC16, GLS2, UHRF1, TAF9, U2AF1, AAAS, AURKB, OSGEP, AURKA, SFRS7, BRIP1, CCNB1, SAP30L, E2F2, RBBP7, E2F7, E2F8, FANCI, WWOX, NPM1, PCGF6, RRM2, CBX5, CDKN2A, UBE2C, ATAD2, RPA2, FANCC, CDC7, DEK, MOV10, TPX2, CNOT6, RAD51, RPA3, CENPJ, CCNG1, CDK2, CDK1, FAS, RAD17, CALM3, CNOT8, RAD9B, RHEBL1, C12orf32, PHF19, TP73, EZH2 |
| | DNA, repair | MDC1, FEN1, DCLRE1C, BRCA1, EME1, EXO1, UIMC1, WHSC1, POLE, POLH, HMG1, GEN1, RFC5, RFC3, RFC4, RFC1, LIG1, H2AFZ, RFC2, RMI1, H2AFV, C16orf75, DDB2, MSH6, CCNA2, NEIL3, RAD51C, MSH3, FANCD2, TIMELESS, DNA2, DTL, BLM, PCNA, PNKP, UNG, BRIP1, POLD1, USP1, CLSPN, FANCI, POLQ, FANCL, FANCA, XRCC1, RPA2, FANCC, FANCB, FANCG, PPP5C, APITD1, RAD51, KIAA0101, RPA3, POLE2, UBE2T, CDK2, POLE3, CDK1, RAD17, RAD9B, C12orf32, RAD18 |
| | Metabolism of RNA | ZNF473, SLBP, URM1, RPP30, PPWD1, U2AF1, AAAS, CWC27, OSGEP, THG1L, GLE1, SFRS7, EXOSC5, LSM11, EXOSC9, NUP62, HNRNPA1, RBM10, EXOSC1, HNRNPA0, APOBEC3C, SF3A3, NUP214, SF3A2, GPKOW, FUS, APOBEC3H, THOC3, HNRNPL, HNRNPM, CNOT6, HNRNPUL1, NHP2, PPIH, PRPF31, B9D2, SNRPC, CNOT8, SLU7, RBMX, SNRPA, DCP2, RPL26L1, APOBEC3B, RBM22 |
| | DNA replication | FEN1, PCNA, ORC1L, MCM7, ANAPC16, PRIM1, GMNN, CDC23, POLD1, E2F2, POLE, GINS1, RFC5, CDT1, GINS2, RFC3, RFC4, RFC1, LIG1, UBE2C, RFC2, GINS3, RPA2, CDC7, CCNA2, POLA1, POLA2, RPA3, POLE2, CDK2, POLE3, MCM3, CDK1, MCM5, DNA2, MCM6, MCM2 |
| | Organelle biogenesis and maintenance | PLK4, HDAC3, CEP110, CEP152, ARL3, PLK1, SCLT1, IMMT, KIF24, HAUS5, WDR34, HSPB11, HAUS1, APOO, TUBA1B, HAUS8, CHCHD6, CENPJ, CDK1, NEK2, CALM3, B9D2, CEP78 |
| Negative | Developmental biology processes (keratinization) | SPRR1B, IVL |

Supplementary Table S6. List of protein coding genes in the pathways which were the most significantly enriched in a group of patients with high expression of *PTTG3P*, *PTTG1* or *PTTG2*. Only results set with $p \leq 0.05$ and $FDR \leq 0.25$ were listed.

| Analyzed Gene | Process | Enriched Genes in a Group of Patients with High Expression of Analyzed Gene |
|---------------|---------------------------|--|
| <i>PTTG3P</i> | Peroxisome | ABCC5, YWHAH, DHCR24, CTBP1, ALB, MSH2, PRDX1, ERCC3, ESR2, ERCC1, TSPO, SLC25A17, SLC25A19, PRDX5, CDK7, HRAS, EPHX2, SOD1 |
| | DNA repair | SMAD5, ERCC2, ERCC5, GTF2F1, POLB, MPG, ERCC3, TSG101, TP53, ERCC1, GPX4, CCNO, DDB2, RAD51, POLL, FEN1, LIG1, GTF2B, PCNA, NME1, RPA3, ADA, ERCC8 |
| | Oxidative phosphorylation | CASP7, MTX2, ETFA, AIFM1, SLC25A5, RHOT2, GRPEL1, TIMM17A, HSPA9, TIMM8B, GPX4, SLC25A20, PRDX3, TIMM50, TIMM9, VDAC1, BAX, TIMM10, |

| | | |
|--------------|---------------------------|--|
| | | TOMM22, SLC25A3, CYCS |
| | DNA repair | ADA, POLD3, ERCC1, ERCC8, GTF2F1, GPX4, MPG, CCNO, GTF2B, NME1, POLL, DDB2, LIG1, PCNA, RAD51, FEN1, RPA3 |
| | MYC targets | HSPD1, COPS5, CDK2, CCT3, PRDX4, MCM2, CCT4, SET, KPNA2, HNRNPA2B1, RPS6, MCM5, CCNA2, CCT7, MAD2L1, SLC25A3, CDK4, PTGES3, HSPE1, PPIA, HNRNPD, NME1, VDAC1, PCNA, RUVBL2, NHP2, CDC20 |
| PTTG1 | Oxidative phosphorylation | LDHA, ETFA, GPI, TIMM8B, MGST3, TOMM22, CYCS, SLC25A5, GPX4, TIMM9, AIFM1, HSPA9, TIMM17A, TIMM10, SLC25A3, TIMM50, RHOT2, VDAC1, BAX |
| | E2F targets | MLH1, TOP2A, MKI67, DCLRE1B, BRCA1, XRCC6, UNG, CDKN2A, PRDX4, MCM2, CHEK2, KPNA2, PSIP1, MCM5, PLK1, MAD2L1, PLK4, H2AFX, CDK4, CDC25A, CDKN2C, AURKA, MCM3, HNRNPD, NME1, LMNB1, BIRC5, LIG1, PCNA, CDKN3, STMN1, RPA3, RAD51C, CKS2, CDK1, CDC20, CCNB2, AURKB, KIF2C, PTTG1 |
| | Oxidative phosphorylation | TIMM17A, CASP7, RHOT2, GRPEL1, COX10, LDHA, TIMM8B, MGST3, TOMM22, GPX4, CYCS, SLC25A3, GPI, SLC25A5, AIFM1, TIMM9, TIMM10, TIMM50, HSPA9, VDAC1, BAX |
| PTTG2 | E2F targets | XRCC6, TP53, MLH1, POLD3, CHEK2, TOP2A, CBX5, UNG, PRDX4, RFC1, DCLRE1B, MAD2L1, CDK4, CDKN2A, BRCA1, MCM2, PLK1, H2AFX, PSIP1, KPNA2, PLK4, AURKA, MKI67, NME1, CDC25A, MCM5, CKS2, RAD51C, PCNA, STMN1, BIRC5, MCM3, CDKN2C, LMNB1, CDK1, LIG1, CDC20, KIF2C, CDKN3, RPA3, CCNB2, AURKB, PTTG1 |
| | G2M checkpoint | CDK4, MCM2, E2F1, PLK1, EWSR1, H2AFX, KPNA2, EXO1, PLK4, PRC1, CCNA2, AURKA, MKI67, CDC25A, MCM5, CKS2, STMN1, RAD54L, BIRC5, CCNF, MCM3, CDKN2C, LMNB1, CDK1, CDC20, KIF2C, CDKN3, CCNB2, AURKB, PTTG1 |