

Solasonine induces apoptosis and inhibits proliferation of bladder cancer cells by suppressing NRP1 expression

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Supplementary Materials

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Supplementary Table S1: Potential target genes of solasonine. There were 286 potential targets identified from PharmMapper (Norm fit > 0.3), 5 targets from TargetNet server, and 16 human target proteins from SEA database. After removal of three overlapped genes, a total of 304 unique target genes were obtained in the merged union.

PharmMapper Database

| Num | Database | Symbol | Norm Fit | Name |
|-----|-------------|---------|----------|--|
| 1 | PharmMapper | CSDE1 | 0.830 | Cold shock domain-containing protein E1 |
| 2 | PharmMapper | RGS6 | 0.816 | Regulator of G-protein signaling 6 |
| 3 | PharmMapper | APPL1 | 0.797 | DCC-interacting protein 13-alpha |
| 4 | PharmMapper | POT1 | 0.783 | Protection of telomeres protein 1 |
| 5 | PharmMapper | F2 | 0.783 | Prothrombin |
| 6 | PharmMapper | RARG | 0.778 | Retinoic acid receptor gamma |
| 7 | PharmMapper | NF2 | 0.718 | Merlin |
| 8 | PharmMapper | CUL1 | 0.715 | Cullin-1 |
| 9 | PharmMapper | HK2 | 0.675 | Hexokinase-2 |
| 10 | PharmMapper | EP300 | 0.668 | Histone acetyltransferase p300 |
| 11 | PharmMapper | USP19 | 0.666 | Ubiquitin carboxyl-terminal hydrolase 19 |
| 12 | PharmMapper | SH3YL1 | 0.663 | SH3 domain-containing YSC84-like protein 1 |
| 13 | PharmMapper | ACBD7 | 0.660 | Acyl-CoA-binding domain-containing protein 7 |
| 14 | PharmMapper | CAMK4 | 0.643 | Calcium/calmodulin-dependent protein kinase type IV |
| 15 | PharmMapper | INADL | 0.643 | InaD-like protein |
| 16 | PharmMapper | RRM1 | 0.635 | Ribonucleoside-diphosphate reductase large subunit |
| 17 | PharmMapper | XRCC6 | 0.632 | ATP-dependent DNA helicase 2 subunit 1 |
| 18 | PharmMapper | HSD17B4 | 0.631 | Peroxisomal multifunctional enzyme type 2 |
| 19 | PharmMapper | PIP4K2C | 0.629 | Phosphatidylinositol-5-phosphate 4-kinase type-2 gamma |
| 20 | PharmMapper | MMP2 | 0.625 | 72 kDa type IV collagenase |
| 21 | PharmMapper | IQUB | 0.622 | IQ and ubiquitin-like domain-containing protein |
| 22 | PharmMapper | HIBCH | 0.612 | 3-hydroxyisobutyryl-CoA hydrolase, mitochondrial |
| 23 | PharmMapper | ARHGAP5 | 0.605 | Rho GTPase-activating protein 5 |
| 24 | PharmMapper | ACADVL | 0.591 | Very long-chain specific acyl-CoA dehydrogenase, mitochondrial |
| 25 | PharmMapper | PTPRE | 0.585 | Receptor-type tyrosine-protein phosphatase epsilon |
| 26 | PharmMapper | HBEGF | 0.580 | Proheparin-binding EGF-like growth factor |

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|----|-------------|--------|-------|--|
| 27 | PharmMapper | HMGCS1 | 0.575 | Hydroxymethylglutaryl-CoA synthase, cytoplasmic |
| 28 | PharmMapper | AR | 0.573 | Androgen receptor |
| 29 | PharmMapper | HMOX1 | 0.571 | Heme oxygenase 1 |
| 30 | PharmMapper | VAV3 | 0.569 | Guanine nucleotide exchange factor VAV3 |
| 31 | PharmMapper | DMC1 | 0.568 | Meiotic recombination protein DMC1/LIM15 homolog |
| 32 | PharmMapper | ZEB2 | 0.560 | Zinc finger E-box-binding homeobox 2 |
| 33 | PharmMapper | YARS | 0.556 | Tyrosyl-tRNA synthetase, cytoplasmic |
| 34 | PharmMapper | ZBTB43 | 0.555 | Zinc finger and BTB domain-containing protein 43 |
| 35 | PharmMapper | NME3 | 0.555 | Nucleoside diphosphate kinase 3 |
| 36 | PharmMapper | GALM | 0.553 | Aldose 1-epimerase |
| 37 | PharmMapper | NR1I3 | 0.552 | Nuclear receptor subfamily 1 group I member 3 |
| 38 | PharmMapper | BTK | 0.552 | Tyrosine-protein kinase BTK |
| 39 | PharmMapper | MUC1 | 0.552 | Mucin-1 |
| 40 | PharmMapper | IMPDH1 | 0.550 | Inosine-5-monophosphate dehydrogenase 1 |
| 41 | PharmMapper | MARK1 | 0.548 | Serine/threonine-protein kinase MARK1 |
| 42 | PharmMapper | DOK2 | 0.547 | Docking protein 2 |
| 43 | PharmMapper | SUB1 | 0.543 | Activated RNA polymerase II transcriptional coactivator p15 |
| 44 | PharmMapper | ACAT2 | 0.543 | Acetyl-CoA acetyltransferase, cytosolic |
| 45 | PharmMapper | VEGFB | 0.542 | Vascular endothelial growth factor B |
| 46 | PharmMapper | FABP3 | 0.541 | Fatty acid-binding protein, heart |
| 47 | PharmMapper | KLK1 | 0.538 | Kallikrein-1 |
| 48 | PharmMapper | RND1 | 0.538 | Rho-related GTP-binding protein Rho6 |
| 49 | PharmMapper | TIMM9 | 0.536 | Mitochondrial import inner membrane translocase subunit Tim9 |
| 50 | PharmMapper | HBB | 0.532 | Hemoglobin subunit beta |
| 51 | PharmMapper | MAP3K3 | 0.531 | Mitogen-activated protein kinase kinase kinase 3 |
| 52 | PharmMapper | CDK5R1 | 0.530 | Cyclin-dependent kinase 5 activator 1 |
| 53 | PharmMapper | ITPKC | 0.523 | Inositol-trisphosphate 3-kinase C |
| 54 | PharmMapper | DFFA | 0.520 | DNA fragmentation factor subunit alpha |
| 55 | PharmMapper | PDK3 | 0.509 | [Pyruvate dehydrogenase [lipoamide]] kinase isozyme 3, mitochondrial |
| 56 | PharmMapper | ACADSB | 0.508 | Short/branched chain specific acyl-CoA dehydrogenase, mitochondrial |
| 57 | PharmMapper | RBP5 | 0.506 | Retinol-binding protein 5 |
| 58 | PharmMapper | ZNF462 | 0.502 | Zinc finger protein 462 |

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|----|-------------|----------|-------|---|
| 59 | PharmMapper | NMRK1 | 0.500 | Nicotinamide riboside kinase 1 |
| 60 | PharmMapper | ESR1 | 0.500 | Estrogen receptor |
| 61 | PharmMapper | HSCB | 0.496 | Co-chaperone protein HscB, mitochondrial |
| 62 | PharmMapper | PUS10 | 0.495 | Putative tRNA pseudouridine synthase Pus10 |
| 63 | PharmMapper | RAC1 | 0.495 | Ras-related C3 botulinum toxin substrate 1 |
| 64 | PharmMapper | PTPRF | 0.494 | Receptor-type tyrosine-protein phosphatase F |
| 65 | PharmMapper | SH2B2 | 0.490 | SH2B adapter protein 2 |
| 66 | PharmMapper | HCK | 0.490 | Tyrosine-protein kinase HCK |
| 67 | PharmMapper | CIAO1 | 0.490 | Probable cytosolic iron-sulfur protein assembly protein CIAO1 |
| 68 | PharmMapper | FCGR2A | 0.489 | Low affinity immunoglobulin gamma Fc region receptor II-a |
| 69 | PharmMapper | EPHA3 | 0.489 | Ephrin type-A receptor 3 |
| 70 | PharmMapper | PTK2B | 0.487 | Protein tyrosine kinase 2 beta |
| 71 | PharmMapper | TRIM21 | 0.485 | 52 kDa Ro protein |
| 72 | PharmMapper | NDUFAB1 | 0.484 | Acyl carrier protein, mitochondrial |
| 73 | PharmMapper | AMY1B | 0.484 | Alpha-amylase 1 |
| 74 | PharmMapper | CRYM | 0.484 | Mu-crystallin homolog |
| 75 | PharmMapper | DTYMK | 0.482 | Thymidylate kinase |
| 76 | PharmMapper | PPP2R1A | 0.482 | Serine/threonine-protein phosphatase 2A 65 kDa regulatory subunit A alpha isoform |
| 77 | PharmMapper | MTAP | 0.481 | S-methyl-5-thioadenosine phosphorylase |
| 78 | PharmMapper | KMT5A | 0.481 | Histone-lysine N-methyltransferase SETD8 |
| 79 | PharmMapper | LARS | 0.481 | Leucyl-tRNA synthetase, cytoplasmic |
| 80 | PharmMapper | IGF1R | 0.479 | Insulin-like growth factor 1 receptor |
| 81 | PharmMapper | FLNB | 0.479 | Filamin-B |
| 82 | PharmMapper | HDAC7 | 0.479 | Histone deacetylase 7 |
| 83 | PharmMapper | ALOX12 | 0.474 | Arachidonate 12-lipoxygenase, 12S-type |
| 84 | PharmMapper | ZFP28 | 0.474 | Zinc finger protein 28 homolog |
| 85 | PharmMapper | WWP1 | 0.474 | NEDD4-like E3 ubiquitin-protein ligase WWP1 |
| 86 | PharmMapper | HSP90AB1 | 0.472 | Heat shock protein HSP 90-beta |
| 87 | PharmMapper | KIF11 | 0.472 | Kinesin-like protein KIF11 |
| 88 | PharmMapper | GC | 0.471 | Vitamin D-binding protein |
| 89 | PharmMapper | MATK | 0.468 | Megakaryocyte-associated tyrosine-protein kinase |
| 90 | PharmMapper | DCXR | 0.464 | L-xylulose reductase |

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|-----|-------------|---------|-------|--|
| 91 | PharmMapper | ACPP | 0.463 | Prostatic acid phosphatase |
| 92 | PharmMapper | GTF2F2 | 0.461 | General transcription factor IIF subunit 2 |
| 93 | PharmMapper | ITSN1 | 0.459 | Intersectin-1 |
| 94 | PharmMapper | F3 | 0.458 | Tissue factor |
| 95 | PharmMapper | ACVR2B | 0.458 | Activin receptor type-2B |
| 96 | PharmMapper | SNX22 | 0.457 | Sorting nexin-22 |
| 97 | PharmMapper | CLK1 | 0.456 | Dual specificity protein kinase CLK1 |
| 98 | PharmMapper | SENP2 | 0.456 | Sentrin-specific protease 2 |
| 99 | PharmMapper | CSF2RB | 0.456 | Cytokine receptor common subunit beta |
| 100 | PharmMapper | MSN | 0.455 | Moesin |
| 101 | PharmMapper | MEMO1 | 0.454 | Protein MEMO1 |
| 102 | PharmMapper | KYNU | 0.453 | Kynureninase |
| 103 | PharmMapper | SF3B6 | 0.452 | Pre-mRNA branch site protein p14 |
| 104 | PharmMapper | GSTT2B | 0.451 | Glutathione S-transferase theta-2 |
| 105 | PharmMapper | RAB26 | 0.451 | Ras-related protein Rab-26 |
| 106 | PharmMapper | MAPK6 | 0.450 | Mitogen-activated protein kinase 6 |
| 107 | PharmMapper | BMP1 | 0.450 | Bone morphogenetic protein 1 |
| 108 | PharmMapper | PAPSS1 | 0.449 | Bifunctional 3-phosphoadenosine 5-phosphosulfate synthetase 1 |
| 109 | PharmMapper | PYGL | 0.446 | Glycogen phosphorylase, liver form |
| 110 | PharmMapper | MSH2 | 0.446 | DNA mismatch repair protein Msh2 |
| 111 | PharmMapper | POU2F1 | 0.446 | POU domain, class 2, transcription factor 1 |
| 112 | PharmMapper | GTF2I | 0.446 | General transcription factor II-I |
| 113 | PharmMapper | SKP1 | 0.444 | S-phase kinase-associated protein 1 |
| 114 | PharmMapper | PC | 0.444 | Pyruvate carboxylase, mitochondrial |
| 115 | PharmMapper | ZCWPW1 | 0.443 | Zinc finger CW-type PWWP domain protein 1 |
| 116 | PharmMapper | DHPS | 0.443 | Deoxyhypusine synthase |
| 117 | PharmMapper | ACSM2A | 0.443 | Acyl-coenzyme A synthetase ACSM2A, mitochondrial |
| 118 | PharmMapper | ASAP1 | 0.443 | Arf-GAP with SH3 domain, ANK repeat and PH domain-containing protein 1 |
| 119 | PharmMapper | NCOA3 | 0.443 | Nuclear receptor coactivator 3 |
| 120 | PharmMapper | TTR | 0.442 | Transthyretin |
| 121 | PharmMapper | CSNK1G2 | 0.442 | Casein kinase I isoform gamma-2 |
| 122 | PharmMapper | PDK2 | 0.441 | [Pyruvate dehydrogenase [lipoamide]] kinase isozyme 2, mitochondrial |

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|-----|-------------|----------|-------|---|
| 123 | PharmMapper | ADH1C | 0.437 | Alcohol dehydrogenase 1C |
| 124 | PharmMapper | ITPK1 | 0.437 | Inositol-tetrakisphosphate 1-kinase |
| 125 | PharmMapper | BPI | 0.436 | Bactericidal permeability-increasing protein |
| 126 | PharmMapper | HAT1 | 0.436 | Histone acetyltransferase type B catalytic subunit |
| 127 | PharmMapper | HPD | 0.436 | 4-hydroxyphenylpyruvate dioxygenase |
| 128 | PharmMapper | PAH | 0.435 | Phenylalanine-4-hydroxylase |
| 129 | PharmMapper | B2M | 0.434 | Beta-2-microglobulin |
| 130 | PharmMapper | SULT1A1 | 0.433 | Sulfotransferase 1A1 |
| 131 | PharmMapper | NT5C3A | 0.431 | Cytosolic 5-nucleotidase 3 |
| 132 | PharmMapper | PDF | 0.431 | Peptide deformylase, mitochondrial |
| 133 | PharmMapper | HDX | 0.430 | Highly divergent homeobox |
| 134 | PharmMapper | MYSM1 | 0.429 | Histone H2A deubiquitinase MYSM1 |
| 135 | PharmMapper | NUP214 | 0.427 | Nuclear pore complex protein Nup214 |
| 136 | PharmMapper | PANK1 | 0.426 | Pantothenate kinase 1 |
| 137 | PharmMapper | MAGEA4 | 0.426 | Melanoma-associated antigen 4 |
| 138 | PharmMapper | NSUN5 | 0.426 | Putative methyltransferase NSUN5 |
| 139 | PharmMapper | LRBA | 0.425 | Lipopolysaccharide-responsive and beige-like anchor protein |
| 140 | PharmMapper | SART3 | 0.425 | Squamous cell carcinoma antigen recognized by T-cells 3 |
| 141 | PharmMapper | TXNDC12 | 0.424 | Thioredoxin domain-containing protein 12 |
| 142 | PharmMapper | FABP7 | 0.424 | Fatty acid-binding protein, brain |
| 143 | PharmMapper | BCR | 0.423 | Breakpoint cluster region protein |
| 144 | PharmMapper | CYP2R1 | 0.422 | Vitamin D 25-hydroxylase |
| 145 | PharmMapper | PSAP | 0.422 | Proactivator polypeptide |
| 146 | PharmMapper | YWHAQ | 0.422 | 14-3-3 protein theta |
| 147 | PharmMapper | SMG5 | 0.421 | Protein SMG5 |
| 148 | PharmMapper | SMG7 | 0.419 | Protein SMG7 |
| 149 | PharmMapper | WEE1 | 0.418 | Wee1-like protein kinase |
| 150 | PharmMapper | AASDHPPT | 0.418 | L-aminoadipate-semialdehyde dehydrogenase-phosphopantetheinyl transferase |
| 151 | PharmMapper | TLR4 | 0.418 | Toll-like receptor 4 |
| 152 | PharmMapper | CYP7A1 | 0.416 | Cytochrome P450 7A1 |
| 153 | PharmMapper | IFNGR1 | 0.416 | Interferon-gamma receptor alpha chain |
| 154 | PharmMapper | FAS | 0.416 | Tumor necrosis factor receptor superfamily member 6 |

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|-----|-------------|-----------|-------|--|
| 155 | PharmMapper | PEX5 | 0.413 | Peroxisomal targeting signal 1 receptor |
| 156 | PharmMapper | PA2G4 | 0.412 | Proliferation-associated protein 2G4 |
| 157 | PharmMapper | EXOSC9 | 0.411 | Exosome complex exonuclease RRP45 |
| 158 | PharmMapper | RBBP6 | 0.410 | Retinoblastoma-binding protein 6 |
| 159 | PharmMapper | PHF24 | 0.410 | Protein KIAA1045 |
| 160 | PharmMapper | ACACB | 0.410 | Acetyl-CoA carboxylase 2 |
| 161 | PharmMapper | ATXN3 | 0.410 | Ataxin-3 |
| 162 | PharmMapper | HNRNPA2B1 | 0.409 | Heterogeneous nuclear ribonucleoproteins A2/B1 |
| 163 | PharmMapper | ERBB4 | 0.406 | Receptor tyrosine-protein kinase erbB-4 |
| 164 | PharmMapper | ITGB3 | 0.405 | Integrin beta-3 |
| 165 | PharmMapper | SMAP1 | 0.404 | Stromal membrane-associated protein 1 |
| 166 | PharmMapper | ADRBK1 | 0.402 | Beta-adrenergic receptor kinase 1 |
| 167 | PharmMapper | MYBPC3 | 0.401 | Myosin-binding protein C, cardiac-type |
| 168 | PharmMapper | GAD2 | 0.399 | Glutamate decarboxylase 2 |
| 169 | PharmMapper | PCYT2 | 0.398 | Ethanolamine-phosphate cytidyltransferase |
| 170 | PharmMapper | FAP | 0.397 | Seprase |
| 171 | PharmMapper | SEC23A | 0.396 | Protein transport protein Sec23A |
| 172 | PharmMapper | PARN | 0.395 | Poly(A)-specific ribonuclease PARN |
| 173 | PharmMapper | SMURF2 | 0.395 | E3 ubiquitin-protein ligase SMURF2 |
| 174 | PharmMapper | ADH7 | 0.395 | Alcohol dehydrogenase class 4 mu/sigma chain |
| 175 | PharmMapper | RPA3 | 0.394 | Replication protein A 14 kDa subunit |
| 176 | PharmMapper | ANXA6 | 0.393 | Annexin A6 |
| 177 | PharmMapper | MAGI2 | 0.392 | Membrane-associated guanylate kinase, WW and PDZ domain-containing protein 2 |
| 178 | PharmMapper | HLA-DRB1 | 0.391 | HLA class II histocompatibility antigen, DRB1-1 beta chain |
| 179 | PharmMapper | CD1A | 0.390 | T-cell surface glycoprotein CD1a |
| 180 | PharmMapper | NFATC1 | 0.390 | Nuclear factor of activated T-cells, cytoplasmic 1 |
| 181 | PharmMapper | ALK | 0.390 | ALK tyrosine kinase receptor |
| 182 | PharmMapper | MDH1 | 0.389 | Malate dehydrogenase, cytoplasmic |
| 183 | PharmMapper | CYP2E1 | 0.389 | Cytochrome P450 2E1 |
| 184 | PharmMapper | B3GAT2 | 0.388 | Galactosylgalactosylxylosylprotein 3-beta-glucuronosyltransferase 2 |
| 185 | PharmMapper | PPARG | 0.387 | Peroxisome proliferator-activated receptor gamma |
| 186 | PharmMapper | DGKA | 0.387 | Diacylglycerol kinase alpha |

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|-----|-------------|----------|-------|--|
| 187 | PharmMapper | ATP7B | 0.386 | Copper-transporting ATPase 2 |
| 188 | PharmMapper | PGK1 | 0.386 | Phosphoglycerate kinase 1 |
| 189 | PharmMapper | MMP1 | 0.385 | Interstitial collagenase |
| 190 | PharmMapper | COL4A3BP | 0.384 | Collagen type IV alpha-3-binding protein |
| 191 | PharmMapper | DAPK2 | 0.383 | Death-associated protein kinase 2 |
| 192 | PharmMapper | SHFM1 | 0.383 | 26S proteasome complex subunit DSS1 |
| 193 | PharmMapper | S100A6 | 0.383 | Protein S100-A6 |
| 194 | PharmMapper | CSNK1G1 | 0.383 | Casein kinase I isoform gamma-1 |
| 195 | PharmMapper | NOTCH1 | 0.382 | Neurogenic locus notch homolog protein 1 |
| 196 | PharmMapper | SERPINA5 | 0.382 | Plasma serine protease inhibitor |
| 197 | PharmMapper | GALNT10 | 0.382 | Polypeptide N-acetylgalactosaminyltransferase 10 |
| 198 | PharmMapper | NAE1 | 0.381 | NEDD8-activating enzyme E1 regulatory subunit |
| 199 | PharmMapper | ZIC3 | 0.380 | Zinc finger protein ZIC 3 |
| 200 | PharmMapper | MECR | 0.380 | Trans-2-enoyl-CoA reductase, mitochondrial |
| 201 | PharmMapper | IDE | 0.379 | Insulin-degrading enzyme |
| 202 | PharmMapper | ODC1 | 0.379 | Ornithine decarboxylase |
| 203 | PharmMapper | RARA | 0.378 | Retinoic acid receptor alpha |
| 204 | PharmMapper | PNMT | 0.378 | Phenylethanolamine N-methyltransferase |
| 205 | PharmMapper | HMBOX1 | 0.377 | Homeobox-containing protein 1 |
| 206 | PharmMapper | TJP1 | 0.377 | Tight junction protein ZO-1 |
| 207 | PharmMapper | AOC3 | 0.375 | Membrane primary amine oxidase |
| 208 | PharmMapper | CSTF2 | 0.374 | Cleavage stimulation factor 64 kDa subunit |
| 209 | PharmMapper | YY1 | 0.374 | Transcriptional repressor protein YY1 |
| 210 | PharmMapper | CANT1 | 0.370 | Soluble calcium-activated nucleotidase 1 |
| 211 | PharmMapper | CA8 | 0.370 | Carbonic anhydrase-related protein |
| 212 | PharmMapper | IFNG | 0.370 | Interferon gamma |
| 213 | PharmMapper | ANG | 0.365 | Angiogenin |
| 214 | PharmMapper | ACY1 | 0.365 | Aminoacylase-1 |
| 215 | PharmMapper | SNX1 | 0.362 | Sorting nexin-1 |
| 216 | PharmMapper | C8A | 0.360 | Complement component C8 alpha chain |
| 217 | PharmMapper | CTCF | 0.360 | Transcriptional repressor CTCF |
| 218 | PharmMapper | TAF13 | 0.359 | Transcription initiation factor TFIID subunit 13 |

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|-----|-------------|-----------|-------|---|
| 219 | PharmMapper | GSG2 | 0.359 | Serine/threonine-protein kinase haspin |
| 220 | PharmMapper | GGPS1 | 0.358 | Geranylgeranyl pyrophosphate synthetase |
| 221 | PharmMapper | BTRC | 0.357 | F-box/WD repeat-containing protein 1A |
| 222 | PharmMapper | TNFAIP8L2 | 0.356 | Tumor necrosis factor, alpha-induced protein 8-like protein 2 |
| 223 | PharmMapper | NBEA | 0.355 | Neurobeachin |
| 224 | PharmMapper | MYBPC1 | 0.355 | Myosin-binding protein C, slow-type |
| 225 | PharmMapper | STK4 | 0.355 | Serine/threonine-protein kinase 4 |
| 226 | PharmMapper | ECI2 | 0.355 | Peroxisomal 3,2-trans-enoyl-CoA isomerase |
| 227 | PharmMapper | EPS8L2 | 0.354 | Epidermal growth factor receptor kinase substrate 8-like protein 2 |
| 228 | PharmMapper | DPP4 | 0.351 | Dipeptidyl peptidase 4 |
| 229 | PharmMapper | ARHGEF1 | 0.349 | Rho guanine nucleotide exchange factor 1 |
| 230 | PharmMapper | APEX1 | 0.349 | DNA-(apurinic or apyrimidinic site) lyase |
| 231 | PharmMapper | B3GAT3 | 0.348 | Galactosylgalactosylxylosylprotein 3-beta-glucuronosyltransferase 3 |
| 232 | PharmMapper | ARF6 | 0.347 | ADP-ribosylation factor 6 |
| 233 | PharmMapper | PGC | 0.346 | Gastricsin |
| 234 | PharmMapper | XIAP | 0.346 | Baculoviral IAP repeat-containing protein 4 |
| 235 | PharmMapper | UEVLD | 0.346 | Ubiquitin-conjugating enzyme E2 variant 3 |
| 236 | PharmMapper | ECHS1 | 0.346 | Enoyl-CoA hydratase, mitochondrial |
| 237 | PharmMapper | ALB | 0.346 | Serum albumin |
| 238 | PharmMapper | PRKCB | 0.345 | Protein kinase C beta type |
| 239 | PharmMapper | FHIT | 0.345 | Bis(5-adenosyl)-triphosphatase |
| 240 | PharmMapper | GART | 0.342 | Trifunctional purine biosynthetic protein adenosine-3 |
| 241 | PharmMapper | UTRN | 0.342 | Utrophin |
| 242 | PharmMapper | PAFAH1B2 | 0.342 | Platelet-activating factor acetylhydrolase IB subunit beta |
| 243 | PharmMapper | STK16 | 0.338 | Serine/threonine-protein kinase 16 |
| 244 | PharmMapper | DFNB31 | 0.338 | Whirlin |
| 245 | PharmMapper | IMPA2 | 0.337 | Inositol monophosphatase 2 |
| 246 | PharmMapper | C1R | 0.335 | Complement C1r subcomponent |
| 247 | PharmMapper | ITPA | 0.334 | Inosine triphosphate pyrophosphatase |
| 248 | PharmMapper | YWHAH | 0.331 | 14-3-3 protein eta |
| 249 | PharmMapper | SFMBT2 | 0.331 | Scm-like with four MBT domains protein 2 |
| 250 | PharmMapper | OXSR1 | 0.329 | Serine/threonine-protein kinase OSR1 |

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|-----|-------------|----------|-------|--|
| 251 | PharmMapper | RTN4IP1 | 0.329 | Reticulon-4-interacting protein 1, mitochondrial |
| 252 | PharmMapper | HMGB3 | 0.329 | High mobility group protein B3 |
| 253 | PharmMapper | OAT | 0.328 | Ornithine aminotransferase, mitochondrial |
| 254 | PharmMapper | ERI1 | 0.328 | 3-5 exoribonuclease 1 |
| 255 | PharmMapper | SFN | 0.328 | 14-3-3 protein sigma |
| 256 | PharmMapper | STARD13 | 0.328 | StAR-related lipid transfer protein 13 |
| 257 | PharmMapper | G6PD | 0.327 | Glucose-6-phosphate 1-dehydrogenase |
| 258 | PharmMapper | DSG2 | 0.327 | Desmoglein-2 |
| 259 | PharmMapper | THBS2 | 0.327 | Thrombospondin-2 |
| 260 | PharmMapper | DCTD | 0.327 | Deoxycytidylate deaminase |
| 261 | PharmMapper | PDK4 | 0.325 | [Pyruvate dehydrogenase [lipoamide]] kinase isozyme 4, mitochondrial |
| 262 | PharmMapper | FN1 | 0.324 | Fibronectin |
| 263 | PharmMapper | CHKA | 0.324 | Choline kinase alpha |
| 264 | PharmMapper | SMTN | 0.323 | Smoothelin |
| 265 | PharmMapper | VPS26A | 0.322 | Vacuolar protein sorting-associated protein 26A |
| 266 | PharmMapper | ZNF292 | 0.320 | Zinc finger protein 292 |
| 267 | PharmMapper | SEMA4D | 0.320 | Semaphorin-4D |
| 268 | PharmMapper | CLCN5 | 0.319 | Chloride channel protein 5 |
| 269 | PharmMapper | GRHPR | 0.318 | Glyoxylate reductase/hydroxypyruvate reductase |
| 270 | PharmMapper | NMT1 | 0.318 | Glycylpeptide N-tetradecanoyltransferase 1 |
| 271 | PharmMapper | GRK6 | 0.318 | G protein-coupled receptor kinase 6 |
| 272 | PharmMapper | WARS | 0.318 | Tryptophanyl-tRNA synthetase, cytoplasmic |
| 273 | PharmMapper | RUVBL1 | 0.318 | RuvB-like 1 |
| 274 | PharmMapper | SLK | 0.317 | STE20-like serine/threonine-protein kinase |
| 275 | PharmMapper | HSD17B10 | 0.316 | 3-hydroxyacyl-CoA dehydrogenase type-2 |
| 276 | PharmMapper | NDC80 | 0.315 | Kinetochore protein NDC80 homolog |
| 277 | PharmMapper | KIAA0430 | 0.315 | Limkain-b1 |
| 278 | PharmMapper | PARP3 | 0.315 | Poly [ADP-ribose] polymerase 3 |
| 279 | PharmMapper | RBM39 | 0.315 | RNA-binding protein 39 |
| 280 | PharmMapper | SYT13 | 0.313 | Synaptotagmin-13 |
| 281 | PharmMapper | ETF1 | 0.311 | Eukaryotic peptide chain release factor subunit 1 |
| 282 | PharmMapper | SPEF1 | 0.307 | Sperm flagellar protein 1 |

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|-----|-------------|-------|-------|--|
| 283 | PharmMapper | HADH | 0.306 | Hydroxyacyl-coenzyme A dehydrogenase, mitochondrial |
| 284 | PharmMapper | NCBP1 | 0.301 | Nuclear cap-binding protein subunit 1 |
| 285 | PharmMapper | PDHA1 | 0.301 | Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial |
| 286 | PharmMapper | CD74 | 0.300 | HLA class II histocompatibility antigen gamma chain |

TargetNet Database

| Num | Database | Symbol | Probability | Name |
|-----|-----------|---------|-------------|---------------------------------|
| 1 | TargetNet | CYP17A1 | 1 | Steroid 17-alpha-hydroxylase |
| 2 | TargetNet | HSP90 | 1 | Heat shock protein HSP 90-alpha |
| 3 | TargetNet | AR | 0.999 | Androgen receptor |
| 4 | TargetNet | SLC5A1 | 0.995 | Sodium/glucose cotransporter 1 |
| 5 | TargetNet | HTR1E | 0.933 | 5-hydroxytryptamine receptor 1E |

SEA Database

| Num | Database | Symbol | MaxTC | Name |
|-----|----------|----------|-------|---|
| 1 | SEA | DHCR24 | 0.31 | Delta(24)-sterol reductase |
| 2 | SEA | AMY2A | 0.29 | Pancreatic alpha-amylase |
| 3 | SEA | NPC1 | 0.31 | NPC intracellular cholesterol transporter 1 |
| 4 | SEA | CYP17A1 | 0.32 | Steroid 17-alpha-hydroxylase/17,20 lyase |
| 5 | SEA | IL2 | 0.69 | Interleukin-2 |
| 6 | SEA | NPC1L1 | 0.31 | NPC1-like intracellular cholesterol transporter 1 |
| 7 | SEA | EBP | 0.41 | 3-beta-hydroxysteroid-Delta(8),Delta(7)-isomerase |
| 8 | SEA | ABCC4 | 0.32 | Multidrug resistance-associated protein 4 |
| 9 | SEA | G6PD | 0.31 | Glucose-6-phosphate 1-dehydrogenase |
| 10 | SEA | SERPINA6 | 0.29 | Corticosteroid-binding globulin |
| 11 | SEA | GLI1 | 0.29 | Zinc finger protein GLI1 |
| 12 | SEA | POLA1 | 0.33 | DNA polymerase alpha catalytic subunit |
| 13 | SEA | SRD5A2 | 0.32 | 3-oxo-5-alpha-steroid 4-dehydrogenase 2 |
| 14 | SEA | NR1H3 | 0.32 | Oxysterols receptor LXR-alpha |
| 15 | SEA | SHH | 0.29 | Sonic hedgehog protein |
| 16 | SEA | SHBG | 0.29 | Sex hormone-binding globulin |

Abbreviations: MaxTC, Max Tanimoto Coefficient

Supplementary Table S2: Canonical pathway analysis by IPA for solasonine. The canonical pathway analysis by IPA shows the enrichment of the potential target genes of solasonine in the canonical signaling pathway. Through IPA canonical pathway analysis of the potential target genes of solasonine, 494 remarkably (p-value ≤ 0.05) enriched canonical pathways were obtained.

| Ingenuity Canonical Pathways | $-\log(p\text{-value})$ | Ratio | Molecules |
|---|-------------------------|-------|--|
| HIPPO signaling | 6.66 | 0.12 | BTRC,CUL1,NF2,PATJ,PPP2R1A,SFN,SKP1,STK4,YWHAH,YWHAQ |
| Cell Cycle: G2/M DNA Damage Checkpoint Regulation | 6.44 | 0.16 | BTRC,CUL1,EP300,SFN,SKP1,WEE1,YWHAH,YWHAQ |
| Isoleucine Degradation I | 5.60 | 0.29 | ACADSB,ACAT2,ECHS1,HSD17B10,HSD17B4 AR,B2M,CSF2RB,EP300,ESR1,GTF2F2,HLA- |
| Glucocorticoid Receptor Signaling | 5.24 | 0.04 | DRB1,HSP90AB1,IFNG,MMP1,MMP2,NCOA3,NDUFAB1,NFATC1,PC,PDK4,PPARG ,RAC1,RARA,RARG,TAF13,YWHAH |
| Epithelial Adherens Junction Signaling | 5.01 | 0.07 | ACVR2B,IGF1R,MAGI2,NF2,NOTCH1,PPP2R1A,RAC1,SFN,STK4,YWHAH,YWHA Q |
| Tryptophan Degradation III (Eukaryotic) | 4.80 | 0.21 | ACAT2,HADH,HSD17B10,HSD17B4,KYNU |
| Neuroinflammation Signaling Pathway | 4.66 | 0.05 | ACVR2B,B2M,FAS,GAD2,HLA- |
| IL-15 Production | 4.39 | 0.08 | DRB1,HMOX1,IDE,IFNG,IFNGR1,KLK1,MAPK6,NFATC1,RAC1,TLR4,XIAP |
| Fc γ Receptor-mediated Phagocytosis in Macrophages and Monocytes | 4.38 | 0.09 | ALK,BTK,CLK1,EPHA3,ERBB4,HCK,IGF1R,MATK,PTK2B |
| Hepatic Fibrosis / Hepatic Stellate Cell Activation | 4.19 | 0.06 | ARF6,FCGR2A,HCK,HMOX1,PRKCB,PTK2B,RAC1,VAV3 |
| Fatty Acid β -oxidation I | 4.16 | 0.16 | CERT1,CYP2E1,FAS,FN1,IFNG,IFNGR1,IGF1R,MMP1,MMP2,TLR4,VEGFB |
| Glutaryl-CoA Degradation | 4.15 | 0.24 | ECHS1,ECI2,HADH,HSD17B10,HSD17B4 |
| Valine Degradation I | 3.85 | 0.20 | ACAT2,HADH,HSD17B10,HSD17B4 |
| Cyclins and Cell Cycle Regulation | 3.85 | 0.08 | ACADSB,ECHS1,HIBCH,HSD17B4 |
| Role of Tissue Factor in Cancer | 3.73 | 0.07 | BTRC,CUL1,HDAC7,PA2G4,PPP2R1A,SKP1,WEE1 |
| LPS/IL-1 Mediated Inhibition of RXR Function | 3.63 | 0.05 | F2,F3,HBEGF,HCK,ITGB3,MMP1,PTK2B,RAC1 |
| Pancreatic Adenocarcinoma Signaling | 3.51 | 0.06 | CYP2E1,CYP2R1,CYP7A1,FABP3,FABP7,GSTT2/GSTT2B,HMGCS1,NR1I3,RARA,S ULT1A1,TLR4 |
| Reelin Signaling in Neurons | 3.48 | 0.06 | CYP2E1,HBEGF,HDAC7,HMOX1,NOTCH1,PA2G4,RAC1,VEGFB |
| RAR Activation | 3.47 | 0.05 | ARHGEF1,CDK5R1,HCK,PAFAH1B2,PDK2,PDK3,PDK4,RAC1 |
| | | | ADH1C,ADH7,CSF2RB,EP300,MMP1,PRKCB,RAC1,RARA,RARG,RBP5 |

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| Gαq Signaling | 3.34 | 0.05 | BTK,CAMK4,GRK2,HMOX1,NFATC1,PRKCB,PTK2B,RAC1,RND1 |
| Sumoylation Pathway | 3.32 | 0.07 | AR,EP300,FAS,RAC1,RND1,SENP2,XIAP |
| Iron homeostasis signaling pathway | 3.30 | 0.06 | BMP1,BTRC,CIAO1,CUL1,HBB,HMOX1,HSCB,SKP1 |
| IL-12 Signaling and Production in Macrophages | 3.28 | 0.06 | ALB,ALOX12,EP300,IFNG,IFNGR1,PPARG,PRKCB,TLR4 |
| HIF1α Signaling | 3.28 | 0.05 | APEX1,CAMK4,EP300,HK2,HMOX1,MMP1,MMP2,PRKCB,RAC1,VEGFB |
| Sperm Motility | 3.25 | 0.05 | ALK,BTK,CAMK4,CLK1,EPHA3,ERBB4,HCK,IGF1R,MATK,PRKCB,PTK2B |
| WNT/β-catenin Signaling | 3.24 | 0.05 | ACVR2B,APPL1,BTRC,CSNK1G1,CSNK1G2,EP300,PPP2R1A,RARA,RARG |
| ERK/MAPK Signaling | 3.13 | 0.05 | ESR1,ITGB3,NFATC1,PPARG,PPP2R1A,PRKCB,PTK2B,RAC1,YWHAH,YWHAQ |
| Urate Biosynthesis/Inosine 5'-phosphate Degradation | 3.08 | 0.21 | ACP3,IMPDH1,NT5C3A |
| Role of Osteoblasts, Osteoclasts and Chondrocytes in Rheumatoid Arthritis | 3.04 | 0.05 | BMP1,CAMK4,CSNK1G1,CSNK1G2,IFNG,ITGB3,MMP1,NFATC1,PTK2B,XIAP |
| Aryl Hydrocarbon Receptor Signaling | 3.02 | 0.05 | EP300,ESR1,FAS,GSTT2/GSTT2B,HSP90AB1,NCOA3,RARA,RARG |
| Colorectal Cancer Metastasis Signaling | 3.00 | 0.04 | APPL1,GRK2,IFNG,IFNGR1,MMP1,MMP2,MSH2,RAC1,RND1,TLR4,VEGFB |
| Telomere Extension by Telomerase | 2.99 | 0.20 | HNRNPA2B1,POT1,XRCC6 |
| Neuregulin Signaling | 2.98 | 0.06 | CDK5R1,ERBB4,HBEGF,HSP90AB1,ITGB3,MATK,PRKCB |
| Production of Nitric Oxide and Reactive Oxygen Species in Macrophages | 2.93 | 0.05 | ALB,IFNG,IFNGR1,MAP3K3,PPP2R1A,PRKCB,RAC1,RND1,TLR4 |
| Leukocyte Extravasation Signaling | 2.92 | 0.05 | ARHGAP5,BTK,MMP1,MMP2,MSN,PRKCB,PTK2B,RAC1,VAV3 |
| Superpathway of Geranylgeranyldiphosphate Biosynthesis I (via Mevalonate) | 2.83 | 0.18 | ACAT2,GGPS1,HMGCS1 |
| LXR/RXR Activation | 2.82 | 0.06 | ALB,CYP7A1,ECHS1,GC,HADH,TLR4,TTR |
| HOTAIR Regulatory Pathway | 2.80 | 0.05 | AR,EP300,ESR1,MMP1,MMP2,TLR4,XIAP,YY1 |
| GP6 Signaling Pathway | 2.80 | 0.06 | BTK,CAMK4,CERT1,ITGB3,PRKCB,RAC1,VAV3 |
| Mitotic Roles of Polo-Like Kinase | 2.77 | 0.08 | HSP90AB1,KIF11,PPP2R1A,SLK,WEE1 |
| Antigen Presentation Pathway | 2.76 | 0.11 | B2M,CD74,HLA-DRB1,IFNG |
| p70S6K Signaling | 2.70 | 0.05 | BTK,F2,PPP2R1A,PRKCB,SFN,YWHAH,YWHAQ |
| Purine Nucleotides Degradation II (Aerobic) | 2.68 | 0.16 | ACP3,IMPDH1,NT5C3A |
| Cell Cycle: G1/S Checkpoint Regulation | 2.65 | 0.07 | BTRC,CUL1,HDAC7,PA2G4,SKP1 |
| IL-8 Signaling | 2.65 | 0.04 | HBEGF,HMOX1,ITGB3,MMP2,PRKCB,PTK2B,RAC1,RND1,VEGFB |
| RHOGDI Signaling | 2.58 | 0.04 | ARHGAP5,ARHGEF1,EP300,ESR1,ITGB3,MSN,PIP4K2C,RAC1,RND1 |

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| PI3K Signaling in B Lymphocytes | 2.55 | 0.05 | BTK,CAMK4,NFATC1,PRKCB,RAC1,TLR4,VAV3 |
| MSP-ROn Signaling In Cancer Cells Pathway | 2.55 | 0.05 | CSF2RB,KLK1,PTK2B,SFN,VEGFB,YWHAH,YWHAQ |
| Virus Entry via Endocytic Pathways | 2.51 | 0.06 | B2M,FLNB,ITGB3,ITSN1,PRKCB,RAC1 |
| NAD Salvage Pathway II | 2.49 | 0.14 | ACP3,NMRK1,NT5C3A |
| Pyrimidine Deoxyribonucleotides De Novo Biosynthesis I | 2.49 | 0.14 | DTYMK,NME3,RRM1 |
| iNOS Signaling | 2.45 | 0.09 | CAMK4,IFNG,IFNGR1,TLR4 |
| Caveolar-mediated Endocytosis Signaling | 2.44 | 0.07 | ALB,B2M,FLNB,ITGB3,ITSN1 |
| Glycoaminoglycan-protein Linkage Region Biosynthesis | 2.43 | 0.29 | B3GAT2,B3GAT3 |
| VDR/RXR Activation | 2.39 | 0.06 | EP300,IFNG,NCOA3,PRKCB,YY1 |
| Protein Ubiquitination Pathway | 2.38 | 0.04 | B2M,BTRC,CUL1,HSCB,HSP90AB1,IFNG,SKP1,SMURF2,USP19,XIAP |
| Neuroprotective Role of THOP1 in Alzheimer's Disease | 2.37 | 0.05 | C1R,DPP4,FAP,IDE,IFNG,KLK1 |
| Xenobiotic Metabolism Signaling | 2.37 | 0.04 | CAMK4,EP300,GSTT2/GSTT2B,HMOX1,HSP90AB1,MAP3K3,NR1I3,PPP2R1A,PRKCB,SULT1A1 |
| Phosphatidylethanolamine Biosynthesis II | 2.31 | 0.25 | CHKA,PCYT2 |
| Natural Killer Cell Signaling | 2.28 | 0.04 | B2M,FCGR2A,IFNG,MAP3K3,NFATC1,PTK2B,RAC1,VAV3 |
| ILK Signaling | 2.28 | 0.04 | FLNB,FN1,ITGB3,MUC1,PPP2R1A,RAC1,RND1,VEGFB |
| Inhibition of ARE-Mediated mRNA Degradation Pathway | 2.20 | 0.04 | EXOSC9,MAPK6,PARN,PPP2R1A,SFN,YWHAH,YWHAQ |
| Superpathway of Cholesterol Biosynthesis | 2.19 | 0.11 | ACAT2,GGPS1,HMGCS1 |
| RHOA Signaling | 2.17 | 0.05 | ARHGAP5,ARHGEF1,IGF1R,MSN,PIP4K2C,PTK2B |
| CSDE1 Signaling Pathway | 2.17 | 0.07 | CSDE1,FABP7,FN1,RAC1 |
| Serotonin Degradation | 2.14 | 0.07 | ADH1C,ADH7,B3GAT3,SULT1A1 |
| Protein Kinase A Signaling | 2.13 | 0.03 | APEX1,CAMK4,FLNB,NFATC1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,SFN,YWHAH,YWHAQ |
| Molecular Mechanisms of Cancer | 2.13 | 0.03 | ARHGAP5,BMP1,EP300,FAS,HAT1,HDAC7,ITGB3,NOTCH1,PA2G4,PRKCB,RAC1,RND1,XIAP |
| Senescence Pathway | 2.12 | 0.03 | ACVR2B,CAMK4,EP300,MAPK6,NFATC1,PDHA1,PDK2,PDK3,PDK4,PPP2R1A |
| FXR/RXR Activation | 2.12 | 0.05 | ALB,CYP7A1,GC,PPARG,RARA,TTR |

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| RANK Signaling in Osteoclasts | 2.12 | 0.06 | CAMK4,MAP3K3,NFATC1,PTK2B,XIAP |
| Retinoic acid Mediated Apoptosis Signaling | 2.12 | 0.07 | IFNG,PARP3,RARA,RARG |
| Noradrenaline and Adrenaline Degradation | 2.11 | 0.10 | ADH1C,ADH7,PNMT |
| MSP-RON Signaling Pathway | 2.09 | 0.07 | CSF2RB,IFNG,KLK1,TLR4 |
| Crosstalk between Dendritic Cells and Natural Killer Cells | 2.08 | 0.05 | CSF2RB,FAS,HLA-DRB1,IFNG,TLR4 |
| Xenobiotic Metabolism CAR Signaling Pathway | 2.03 | 0.04 | EP300,GSTT2/GSTT2B,HSP90AB1,NR1I3,PPP2R1A,PRKCB,SULT1A1 |
| Ketogenesis | 2.02 | 0.18 | ACAT2,HMGCS1 |
| Glycogen Degradation II | 2.02 | 0.18 | MTAP,PYGL |
| Purine Nucleotides De Novo Biosynthesis II | 2.02 | 0.18 | GART,IMPDH1 |
| Retinoate Biosynthesis I | 1.99 | 0.09 | ADH1C,ADH7,RBP5 |
| Role of Macrophages, Fibroblasts and Endothelial Cells in Rheumatoid Arthritis | 1.95 | 0.03 | CAMK4,CSNK1G1,CSNK1G2,FN1,MMP1,NFATC1,PRKCB,RAC1,TLR4,VEGFB |
| Tumor Microenvironment Pathway | 1.94 | 0.04 | FAS,FN1,ITGB3,MMP1,MMP2,RAC1,VEGFB |
| Hepatic Fibrosis Signaling Pathway | 1.94 | 0.03 | ACVR2B,CAMK4,CSNK1G1,CSNK1G2,ITGB3,MMP1,PPARG,PRKCB,RAC1,RND1,TLR4,VEGFB |
| HER-2 Signaling in Breast Cancer | 1.92 | 0.04 | ARF6,HBEGF,HCK,ITGB3,MMP2,NUP214,PRKCB,XIAP |
| Xenobiotic Metabolism General Signaling Pathway | 1.92 | 0.04 | EP300,GSTT2/GSTT2B,HMOX1,MAP3K3,NR1I3,PRKCB |
| Coagulation System | 1.92 | 0.09 | F2,F3,SERPINA5 |
| Glycogen Degradation III | 1.88 | 0.15 | MTAP,PYGL |
| Mevalonate Pathway I | 1.88 | 0.15 | ACAT2,HMGCS1 |
| Guanosine Nucleotides Degradation III | 1.88 | 0.15 | ACP3,NT5C3A |
| Opioid Signaling Pathway | 1.88 | 0.03 | CAMK4,EP300,GRK2,GRK6,HCK,MAPK6,PRKCB,RAC1,RGS6 |
| Acute Phase Response Signaling | 1.87 | 0.04 | ALB,C1R,F2,FN1,HMOX1,RBP5,TTR |
| Acyl Carrier Protein Metabolism | 1.86 | 1.00 | AASDHPPT |
| GNRH Signaling | 1.86 | 0.04 | CAMK4,HBEGF,MAP3K3,MMP2,PRKCB,PTK2B,RAC1 |
| Osteoarthritis Pathway | 1.85 | 0.03 | FN1,ITGB3,MMP1,NOTCH1,PPARG,RAC1,TLR4,VEGFB |
| TEC Kinase Signaling | 1.84 | 0.03 | BTK,FAS,GTF2I,HCK,ITGB3,PRKCB,PTK2B,RAC1,RND1,TLR4,VAV3 |
| tRNA Charging | 1.82 | 0.08 | LARS1,WARS1,YARS1 |
| Inhibition of Matrix Metalloproteases | 1.82 | 0.08 | MMP1,MMP2,THBS2 |

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| Glioma Invasiveness Signaling | 1.79 | 0.06 | ITGB3,MMP2,RAC1,RND1 |
| Sirtuin Signaling Pathway | 1.78 | 0.03 | APEX1,G6PD,MAPK6,NDUFAB1,PDHA1,PGK1,PPARG,TIMM9,XRCC6 |
| ERK5 Signaling | 1.77 | 0.06 | MAP3K3,SFN,YWHAH,YWHAQ |
| Axonal Guidance Signaling | 1.76 | 0.03 | BMP1,EPHA3,ITGB3,ITSN1,MMP1,MMP2,MYSM1,NFATC1,PRKCB,RAC1,RND1,SEMA4D,VEGFB |
| Actin Cytoskeleton Signaling | 1.75 | 0.03 | ARHGEF1,F2,FN1,ITGB3,MATK,MSN,RAC1,VAV3 |
| Estrogen Biosynthesis | 1.74 | 0.07 | CYP2E1,HSD17B10,HSD17B4 |
| Role of WNT/GSK-3 β Signaling in the Pathogenesis of Influenza | 1.73 | 0.05 | CSNK1G1,CSNK1G2,IFNG,NCOA3 |
| PI3K/AKT Signaling | 1.72 | 0.04 | CSF2RB,HSP90AB1,ITGB3,PPP2R1A,SFN,YWHAH,YWHAQ |
| Extrinsic Prothrombin Activation Pathway | 1.71 | 0.13 | F2,F3 |
| Adenosine Nucleotides Degradation II | 1.71 | 0.13 | ACP3,NT5C3A |
| Bladder Cancer Signaling | 1.69 | 0.04 | HDAC7,MMP1,MMP2,PA2G4,VEGFB |
| MSP-RON Signaling In Macrophages Pathway | 1.69 | 0.04 | HLA-DRB1,IFNG,IFNGR1,KLK1,TLR4 |
| Macropinocytosis Signaling | 1.69 | 0.05 | ARF6,ITGB3,PRKCB,RAC1 |
| Estrogen-Dependent Breast Cancer Signaling | 1.67 | 0.05 | ESR1,HSD17B10,HSD17B4,IGF1R |
| Estrogen Receptor Signaling | 1.67 | 0.03 | EP300,ESR1,HSP90AB1,IGF1R,MMP1,MMP2,NCOA3,NDUFAB1,NOTCH1,PRKCB,VEGFB |
| Granzyme A Signaling | 1.66 | 0.12 | APEX1,EP300 |
| HMGB1 Signaling | 1.65 | 0.04 | HAT1,IFNG,IFNGR1,RAC1,RND1,TLR4 |
| Th1 Pathway | 1.65 | 0.04 | HLA-DRB1,IFNG,IFNGR1,NFATC1,NOTCH1 |
| BEX2 Signaling Pathway | 1.62 | 0.05 | KLK1,MMP2,PPP2R1A,VEGFB |
| 1D-myo-inositol Hexakisphosphate Biosynthesis II (Mammalian) | 1.61 | 0.11 | ITPK1,ITPKC |
| Phospholipase C Signaling | 1.58 | 0.03 | ARHGEF1,BTK,CAMK4,EP300,FCGR2A,HDAC7,HMOX1,ITGB3,NFATC1,PRKCB,RAC1,RND1 |
| Glioma Signaling | 1.58 | 0.04 | CAMK4,HDAC7,IGF1R,PA2G4,PRKCB |
| NRF2-mediated Oxidative Stress Response | 1.58 | 0.03 | CYP2E1,CYP2R1,EP300,GSTT2/GSTT2B,HMOX1,HSP90AB1,PRKCB |
| Ephrin A Signaling | 1.58 | 0.06 | EPHA3,RAC1,VAV3 |
| S-methyl-5'-thioadenosine Degradation II | 1.57 | 0.50 | MTAP |
| Sulfate Activation for Sulfonation | 1.57 | 0.50 | PAPSS1 |

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| Putrescine Biosynthesis III | 1.57 | 0.50 | ODC1 |
| Glutamate Dependent Acid Resistance | 1.57 | 0.50 | GAD2 |
| Th1 and Th2 Activation Pathway | 1.56 | 0.04 | ACVR2B,HLA-DRB1,IFNG,IFNGR1,NFATC1,NOTCH1 |
| TR/RXR Activation | 1.55 | 0.05 | CAMK4,CYP7A1,EP300,NCOA3 |
| Erythropoietin Signaling Pathway | 1.55 | 0.04 | CSF2RB,HBB,IFNG,PRKCB,RAC1,XIAP |
| Androgen Signaling | 1.55 | 0.04 | AR,CAMK4,EP300,GTF2F2,PRKCB,TAF13 |
| Atherosclerosis Signaling | 1.53 | 0.04 | ALB,ALOX12,F3,IFNG,MMP1 |
| Nicotine Degradation III | 1.51 | 0.06 | ADH7,B3GAT3,CYP2E1 |
| Chondroitin Sulfate Biosynthesis | 1.47 | 0.06 | B3GAT2,B3GAT3,SULT1A1 |
| Tight Junction Signaling | 1.45 | 0.03 | CSTF2,MAGI2,PATJ,PPP2R1A,RAC1,TJP1 |
| Role of PKR in Interferon Induction and Antiviral Response | 1.45 | 0.04 | FAS,HSP90AB1,IFNG,IFNGR1,TLR4 |
| Melatonin Degradation I | 1.44 | 0.06 | B3GAT3,CYP2E1,SULT1A1 |
| NUR77 Signaling in T Lymphocytes | 1.44 | 0.03 | B2M,CAMK4,EP300,HDAC7,HLA-DRB1,MAP3K3,NFATC1,PRKCB |
| Gα12/13 Signaling | 1.44 | 0.04 | ARHGEF1,BTK,F2,PTK2B,VAV3 |
| Non-Small Cell Lung Cancer Signaling | 1.41 | 0.04 | FHIT,HDAC7,PA2G4,STK4 |
| Superpathway of D-myo-inositol (1,4,5)-trisphosphate Metabolism | 1.41 | 0.09 | IMPA2,ITPKC |
| Dermatan Sulfate Biosynthesis | 1.40 | 0.05 | B3GAT2,B3GAT3,SULT1A1 |
| Nicotine Degradation II | 1.40 | 0.05 | ADH7,B3GAT3,CYP2E1 |
| Death Receptor Signaling | 1.40 | 0.04 | DFFA,FAS,PARP3,XIAP |
| Hepatic Cholestasis | 1.39 | 0.03 | CYP7A1,ESR1,IFNG,PRKCB,RARA,TLR4 |
| RAC Signaling | 1.39 | 0.04 | CDK5R1,ITGB3,PIP4K2C,PTK2B,RAC1 |
| 5-aminoimidazole Ribonucleotide Biosynthesis I | 1.39 | 0.33 | GART |
| 1,25-dihydroxyvitamin D3 Biosynthesis | 1.39 | 0.33 | CYP2R1 |
| D-glucuronate Degradation I | 1.39 | 0.33 | DCXR |
| Hypusine Biosynthesis | 1.39 | 0.33 | DHPS |
| Geranylgeranyldiphosphate Biosynthesis | 1.39 | 0.33 | GGPS1 |
| Biotin-carboxyl Carrier Protein Assembly | 1.39 | 0.33 | ACACB |
| 1D-myo-inositol Hexakisphosphate Biosynthesis V (from Ins(1,3,4)P3) | 1.39 | 0.33 | ITPK1 |

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| Tyrosine Biosynthesis IV | 1.39 | 0.33 | PAH |
| Fatty Acid β -oxidation III (Unsaturated, Odd Number) | 1.39 | 0.33 | ECI2 |
| Tumoricidal Function of Hepatic Natural Killer Cells | 1.37 | 0.08 | DFFA,FAS |
| Hereditary Breast Cancer Signaling | 1.37 | 0.04 | EP300,HDAC7,MSH2,SFN,WEE1 |
| VEGF Signaling | 1.35 | 0.04 | PRKCB,PTK2B,SFN,VEGFB |
| Superpathway of Melatonin Degradation | 1.35 | 0.05 | B3GAT3,CYP2E1,SULT1A1 |
| Gluconeogenesis I | 1.34 | 0.08 | MDH1,PGK1 |
| Semaphorin Signaling in Neurons | 1.33 | 0.05 | RAC1,RND1,SEMA4D |
| Role of JAK1, JAK2 and TYK2 in Interferon Signaling | 1.31 | 0.08 | IFNG,IFNGR1 |
| Clathrin-mediated Endocytosis Signaling | 1.31 | 0.03 | ALB,ARF6,F2,ITGB3,RAC1,VEGFB |
| Adrenomedullin signaling pathway | 1.29 | 0.03 | CAMK4,MAPK6,MATK,MMP2,PPARG,PTK2B |
| Ethanol Degradation II | 1.28 | 0.07 | ADH1C,ADH7 |
| PD-1, PD-L1 cancer immunotherapy pathway | 1.28 | 0.04 | B2M,HLA-DRB1,IFNG,IFNGR1 |
| Retinoate Biosynthesis II | 1.27 | 0.25 | RBP5 |
| Pentose Phosphate Pathway (Oxidative Branch) | 1.27 | 0.25 | G6PD |
| Heme Degradation | 1.27 | 0.25 | HMOX1 |
| Catecholamine Biosynthesis | 1.27 | 0.25 | PNMT |
| Phenylethylamine Degradation I | 1.27 | 0.25 | AOC3 |
| Glutathione Redox Reactions II | 1.27 | 0.25 | TXNDC12 |
| Arginine Degradation I (Arginase Pathway) | 1.27 | 0.25 | OAT |
| Trans, trans-farnesyl Diphosphate Biosynthesis | 1.27 | 0.25 | GGPS1 |
| Phenylalanine Degradation I (Aerobic) | 1.27 | 0.25 | PAH |
| Telomerase Signaling | 1.26 | 0.04 | HDAC7,HSP90AB1,POT1,PPP2R1A |
| IGF-1 Signaling | 1.26 | 0.04 | IGF1R,SFN,YWHAH,YWHAQ |
| Induction of Apoptosis by HIV1 | 1.26 | 0.05 | DFFA,FAS,XIAP |
| PTEN Signaling | 1.26 | 0.03 | IGF1R,ITGB3,MAGI2,RAC1,YWHAH |
| Paxillin Signaling | 1.24 | 0.04 | ARF6,ITGB3,PTK2B,RAC1 |

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| eNOS Signaling | 1.24 | 0.03 | CAMK4,ESR1,HSP90AB1,PRKCB,VEGFB |
| Oxidative Ethanol Degradation III | 1.23 | 0.07 | CYP2E1,CYP2R1 |
| Cardiac Hypertrophy Signaling (Enhanced) | 1.23 | 0.02 | ACVR2B,APEX1,CAMK4,CSF2RB,EP300,HDAC7,IFNG,IGF1R,ITGB3,MAP3K3,NFATC1,PRKCB |
| Heparan Sulfate Biosynthesis | 1.21 | 0.05 | B3GAT2,B3GAT3,SULT1A1 |
| mTOR Signaling | 1.21 | 0.03 | HMOX1,PPP2R1A,PRKCB,RAC1,RND1,VEGFB |
| Prostate Cancer Signaling | 1.20 | 0.04 | AR,HDAC7,HSP90AB1,PA2G4 |
| Thrombin Signaling | 1.20 | 0.03 | ARHGEF1,CAMK4,F2,PRKCB,RAC1,RND1 |
| Integrin Signaling | 1.20 | 0.03 | ARF6,ARHGAP5,ASAP1,ITGB3,RAC1,RND1 |
| Ovarian Cancer Signaling | 1.20 | 0.03 | HDAC7,MMP2,MSH2,PA2G4,VEGFB |
| Regulation of Actin-based Motility by Rho | 1.19 | 0.04 | ITGB3,PIP4K2C,RAC1,RND1 |
| B Cell Receptor Signaling | 1.19 | 0.02 | BTK,CAMK4,FCGR2A,MAP3K3,NFATC1,PRKCB,PTK2B,RAC1,VAV3 |
| Agrin Interactions at Neuromuscular Junction | 1.18 | 0.04 | ERBB4,RAC1,UTRN |
| Proline Biosynthesis II (from Arginine) | 1.18 | 0.20 | OAT |
| Tetrahydrofolate Salvage from 5,10-methenyltetrahydrofolate | 1.18 | 0.20 | GART |
| NAD Salvage Pathway III | 1.18 | 0.20 | NMRK1 |
| Lysine Degradation II | 1.18 | 0.20 | AASDHPPT |
| Myo-inositol Biosynthesis | 1.18 | 0.20 | IMPA2 |
| Lysine Degradation V | 1.18 | 0.20 | AASDHPPT |
| Galactose Degradation I (Leloir Pathway) | 1.18 | 0.20 | GALM |
| Lactose Degradation III | 1.18 | 0.20 | PSAP |
| Tyrosine Degradation I | 1.18 | 0.20 | HPD |
| Glutamate Degradation III (via 4-aminobutyrate) | 1.18 | 0.20 | GAD2 |
| Thyroid Hormone Metabolism II (via Conjugation and/or Degradation) | 1.15 | 0.06 | B3GAT3,SULT1A1 |
| GM-CSF Signaling | 1.15 | 0.04 | CSF2RB,HCK,PRKCB |
| Nitric Oxide Signaling in the Cardiovascular System | 1.15 | 0.04 | CAMK4,HSP90AB1,PRKCB,VEGFB |
| Signaling by Rho Family GTPases | 1.14 | 0.03 | ARHGEF1,ITGB3,MSN,PIP4K2C,PTK2B,RAC1,RND1 |
| Airway Inflammation in Asthma | 1.13 | 0.06 | IFNG,IFNGR1 |

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| Pyrimidine Ribonucleotides Interconversion | 1.13 | 0.06 | CANT1,NME3 |
| Phagosome Formation | 1.12 | 0.02 | ARF6,FCGR2A,FN1,HCK,HMOX1,HTR1A,ITGB3,MAPK6,PIP4K2C,PRKCB,PTK2B,RAC1,TLR4,VAV3 |
| Ephrin B Signaling | 1.12 | 0.04 | ITSN1,RAC1,VAV3 |
| Cholecystokinin/Gastrin-mediated Signaling | 1.11 | 0.03 | PRKCB,PTK2B,RAC1,RND1 |
| PAK Signaling | 1.11 | 0.03 | EPHA3,ITGB3,PTK2B,RAC1 |
| Fc Epsilon RI Signaling | 1.10 | 0.03 | BTK,PRKCB,RAC1,VAV3 |
| Arginine Biosynthesis IV | 1.10 | 0.17 | OAT |
| Trehalose Degradation II (Trehalase) | 1.10 | 0.17 | HK2 |
| Arginine Degradation VI (Arginase 2 Pathway) | 1.10 | 0.17 | OAT |
| Acetyl-CoA Biosynthesis I (Pyruvate Dehydrogenase Complex) | 1.10 | 0.17 | PDHA1 |
| Tryptophan Degradation to 2-amino-3-carboxymuconate Semialdehyde | 1.10 | 0.17 | KYNU |
| Pyrimidine Ribonucleotides De Novo Biosynthesis | 1.08 | 0.06 | CANT1,NME3 |
| MIF-mediated Glucocorticoid Regulation | 1.06 | 0.06 | CD74,TLR4 |
| Interferon Signaling | 1.06 | 0.06 | IFNG,IFNGR1 |
| Complement System | 1.06 | 0.06 | C1R,C8A |
| Ferroptosis Signaling Pathway | 1.05 | 0.03 | ALOX12,ARF6,DPP4,HMOX1 |
| Chemokine Signaling | 1.05 | 0.04 | CAMK4,PRKCB,PTK2B |
| Phosphatidylcholine Biosynthesis I | 1.04 | 0.14 | CHKA |
| Aspartate Degradation II | 1.04 | 0.14 | MDH1 |
| IL-3 Signaling | 1.03 | 0.04 | CSF2RB,PRKCB,RAC1 |
| Xenobiotic Metabolism AHR Signaling Pathway | 1.03 | 0.04 | EP300,GSTT2/GSTT2B,HSP90AB1 |
| Xenobiotic Metabolism PXR Signaling Pathway | 1.02 | 0.03 | EP300,GSTT2/GSTT2B,HSP90AB1,PRKCB,SULT1A1 |
| 14-3-3-mediated Signaling | 1.02 | 0.03 | PRKCB,SFN,YWHAH,YWHAQ |
| Dopamine-DARPP32 Feedback in cAMP Signaling | 1.02 | 0.03 | CAMK4,CSNK1G1,CSNK1G2,PPP2R1A,PRKCB |

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| Role of BRCA1 in DNA Damage Response | 1.01 | 0.04 | IFNG,MSH2,POU2F1 |
| Systemic Lupus Erythematosus In T Cell Signaling Pathway | 0.99 | 0.02 | B2M,CAMK4,ESR1,FAS,HLA-DRB1,MSN,PPP2R1A,RAC1,RND1 |
| PPAR α /RXR α Activation | 0.99 | 0.03 | ACVR2B,EP300,HSP90AB1,NCOA3,PRKCB |
| fMLP Signaling in Neutrophils | 0.99 | 0.03 | CAMK4,NFATC1,PRKCB,RAC1 |
| Sucrose Degradation V (Mammalian) Ketolysis | 0.98 | 0.13 | GALM |
| | 0.98 | 0.13 | ACAT2 |
| HGF Signaling | 0.98 | 0.03 | ITGB3,MAP3K3,PRKCB,RAC1 |
| Apelin Adipocyte Signaling Pathway | 0.98 | 0.04 | GSTT2/GSTT2B,MAPK6,RAC1 |
| Intrinsic Prothrombin Activation Pathway | 0.97 | 0.05 | F2,KLK1 |
| PEDF Signaling | 0.97 | 0.04 | FAS,PPARG,RAC1 |
| Adipogenesis pathway | 0.96 | 0.03 | HAT1,HDAC7,PPARG,SENP2 |
| Th2 Pathway | 0.96 | 0.03 | ACVR2B,HLA-DRB1,IFNG,NOTCH1 |
| LPS-stimulated MAPK Signaling | 0.96 | 0.04 | PRKCB,RAC1,TLR4 |
| BMP signaling pathway | 0.96 | 0.04 | BMP1,CAMK4,XIAP |
| Citrulline Biosynthesis | 0.93 | 0.11 | OAT |
| Glucocorticoid Biosynthesis | 0.93 | 0.11 | CYP17A1 |
| GDP-glucose Biosynthesis | 0.93 | 0.11 | HK2 |
| MIF Regulation of Innate Immunity | 0.92 | 0.05 | CD74,TLR4 |
| Coronavirus Pathogenesis Pathway | 0.89 | 0.03 | AR,EP300,HDAC7,IFNG,PA2G4 |
| Actin Nucleation by ARP-WASP Complex | 0.89 | 0.03 | ITGB3,RAC1,RND1 |
| Glucose and Glucose-1-phosphate Degradation | 0.89 | 0.10 | HK2 |
| NAD Phosphorylation and Dephosphorylation | 0.89 | 0.10 | ACP3 |
| Pentose Phosphate Pathway | 0.89 | 0.10 | G6PD |
| Synaptogenesis Signaling Pathway | 0.89 | 0.02 | CAMK4,EPHA3,HCK,ITSN1,RAC1,SYT13,THBS2 |
| nNOS Signaling in Neurons | 0.88 | 0.04 | CAMK4,PRKCB |
| PFKFB4 Signaling Pathway | 0.88 | 0.04 | HK2,NCOA3 |
| Cardiac Hypertrophy Signaling | 0.87 | 0.02 | CAMK4,EP300,IGF1R,MAP3K3,RAC1,RND1 |
| Agranulocyte Adhesion and Diapedesis | 0.87 | 0.03 | AOC3,FN1,MMP1,MMP2,MSN |
| ERBB Signaling | 0.87 | 0.03 | ERBB4,HBEGF,PRKCB |
| Small Cell Lung Cancer Signaling | 0.86 | 0.03 | FHIT,HDAC7,PA2G4 |

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| Semaphorin Neuronal Repulsive Signaling Pathway | 0.86 | 0.03 | ITGB3,RAC1,RND1,SEMA4D |
| Ephrin Receptor Signaling | 0.86 | 0.03 | EPHA3,ITGB3,ITSN1,RAC1,VEGFB |
| Dilated Cardiomyopathy Signaling Pathway | 0.85 | 0.03 | CAMK4,DSG2,MAP3K3,MYBPC3 |
| NAD biosynthesis II (from tryptophan) | 0.85 | 0.09 | KYNU |
| Sertoli Cell-Sertoli Cell Junction Signaling | 0.84 | 0.02 | ITGB3,MAGI2,MAP3K3,RAC1,TJP1 |
| Salvage Pathways of Pyrimidine Ribonucleotides | 0.84 | 0.03 | GRK6,MAPK6,NME3 |
| TGF- β Signaling | 0.84 | 0.03 | ACVR2B,EP300,SMURF2 |
| T Cell Receptor Signaling | 0.83 | 0.02 | B2M,CAMK4,HLA-DRB1,IFNG,NFATC1,PTK2B,RAC1,VAV3 |
| Amyloid Processing | 0.83 | 0.04 | CDK5R1,MARK1 |
| FAT10 Cancer Signaling Pathway | 0.83 | 0.04 | ACVR2B,IFNG |
| p53 Signaling | 0.82 | 0.03 | EP300,FAS,SFN |
| Cleavage and Polyadenylation of Pre-mRNA | 0.82 | 0.08 | CSTF2 |
| UDP-N-acetyl-D-galactosamine Biosynthesis II | 0.82 | 0.08 | HK2 |
| Necroptosis Signaling Pathway | 0.80 | 0.03 | FAS,PYGL,TIMM9,TLR4 |
| Bile Acid Biosynthesis, Neutral Pathway | 0.79 | 0.08 | CYP7A1 |
| Apoptosis Signaling | 0.79 | 0.03 | DFFA,FAS,XIAP |
| Systemic Lupus Erythematosus In B Cell Signaling Pathway | 0.78 | 0.02 | BTK,CAMK4,FCGR2A,HCK,IFNG,IFNGR1,NFATC1,PRKCB,RAC1 |
| α -Adrenergic Signaling | 0.77 | 0.03 | CAMK4,PRKCB,PYGL |
| PPAR Signaling | 0.77 | 0.03 | EP300,HSP90AB1,PPARG |
| G-Protein Coupled Receptor Signaling | 0.76 | 0.02 | APEX1,CAMK4,GRK2,HTR1A,PRKCB,PTK2B |
| DNA Double-Strand Break Repair by Non-Homologous End Joining | 0.76 | 0.07 | XRCC6 |
| Androgen Biosynthesis | 0.76 | 0.07 | CYP17A1 |
| Choline Biosynthesis III | 0.76 | 0.07 | HMOX1 |
| Phenylalanine Degradation IV (Mammalian, via Side Chain) | 0.76 | 0.07 | HPD |
| Aldosterone Signaling in Epithelial Cells | 0.75 | 0.03 | HSCB,HSP90AB1,PIP4K2C,PRKCB |
| Role of NFAT in Cardiac Hypertrophy | 0.75 | 0.02 | CAMK4,EP300,HDAC7,IGF1R,PRKCB |

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| Superpathway of Citrulline Metabolism | 0.73 | 0.07 | OAT |
| Methylglyoxal Degradation III | 0.73 | 0.07 | CYP2E1 |
| Germ Cell-Sertoli Cell Junction Signaling | 0.71 | 0.02 | MAP3K3,RAC1,RND1,TJP1 |
| CDK5 Signaling | 0.71 | 0.03 | CDK5R1,MAPK6,PPP2R1A |
| Polyamine Regulation in Colon Cancer | 0.70 | 0.03 | ODC1,PPARG |
| Granzyme B Signaling | 0.70 | 0.06 | DFFA |
| Mismatch Repair in Eukaryotes | 0.70 | 0.06 | MSH2 |
| Pregnenolone Biosynthesis | 0.70 | 0.06 | CYP2E1 |
| Glioblastoma Multiforme Signaling | 0.70 | 0.02 | IGF1R,NF2,RAC1,RND1 |
| Airway Pathology in Chronic Obstructive Pulmonary Disease | 0.70 | 0.03 | IFNG,MMP1,MMP2 |
| Superpathway of Inositol Phosphate Compounds | 0.70 | 0.02 | ITPK1,ITPKC,PIP4K2C,PPP2R1A,PTPRF |
| Amyotrophic Lateral Sclerosis Signaling | 0.69 | 0.03 | RAC1,VEGFB,XIAP |
| Sphingosine-1-phosphate Signaling | 0.68 | 0.03 | PTK2B,RAC1,RND1 |
| D-myo-inositol (1,4,5)-trisphosphate Degradation | 0.68 | 0.06 | IMPA2 |
| FAK Signaling | 0.67 | 0.03 | ASAP1,ITGB3,RAC1 |
| PXR/RXR Activation | 0.67 | 0.03 | CYP7A1,NR1I3 |
| D-myo-inositol (1,3,4)-trisphosphate Biosynthesis | 0.66 | 0.06 | ITPKC |
| Histidine Degradation VI | 0.66 | 0.06 | CYP2E1 |
| Renin-Angiotensin Signaling | 0.65 | 0.03 | PRKCB,PTK2B,RAC1 |
| Pyridoxal 5'-phosphate Salvage Pathway | 0.65 | 0.03 | GRK6,MAPK6 |
| ERBB4 Signaling | 0.64 | 0.03 | ERBB4,PRKCB |
| IL-17 Signaling | 0.64 | 0.02 | HSP90AB1,IFNG,MMP2,VEGFB |
| The Visual Cycle | 0.64 | 0.05 | RBP5 |
| DNA damage-induced 14-3-3 蠅 Signaling | 0.64 | 0.05 | SFN |
| Role of Lipids/Lipid Rafts in the Pathogenesis of Influenza | 0.62 | 0.05 | IFNG |
| Ubiquinol-10 Biosynthesis (Eukaryotic) | 0.62 | 0.05 | CYP2E1 |
| Inflammasome pathway | 0.62 | 0.05 | TLR4 |

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| Synaptic Long Term Potentiation | 0.61 | 0.02 | CAMK4,EP300,PRKCB |
| Melatonin Signaling | 0.61 | 0.03 | CAMK4,PRKCB |
| Growth Hormone Signaling | 0.60 | 0.03 | IGF1R,PRKCB |
| D-myo-inositol-5-phosphate Metabolism | 0.59 | 0.02 | ITPK1,PIP4K2C,PPP2R1A,PTPRF |
| IL-10 Signaling | 0.59 | 0.03 | FCGR2A,HMOX1 |
| Netrin Signaling | 0.59 | 0.03 | NFATC1,RAC1 |
| Hypoxia Signaling in the Cardiovascular System | 0.59 | 0.03 | EP300,HSP90AB1 |
| G Beta Gamma Signaling | 0.59 | 0.02 | BTK,HBEGF,PRKCB |
| IL-7 Signaling Pathway | 0.58 | 0.03 | IFNG,NFATC1 |
| CCR3 Signaling in Eosinophils | 0.58 | 0.02 | CAMK4,PRKCB,RAC1 |
| Role of NFAT in Regulation of the Immune Response | 0.57 | 0.02 | BTK,CAMK4,CSNK1G1,CSNK1G2,FCGR2A,HLA-DRB1,NFATC1 |
| Regulation Of The Epithelial Mesenchymal Transition By Growth Factors Pathway | 0.57 | 0.02 | MMP1,MMP2,RAC1,ZEB2 |
| Role of MAPK Signaling in Inhibiting the Pathogenesis of Influenza | 0.57 | 0.03 | IFNG,TLR4 |
| Differential Regulation of Cytokine Production in Intestinal Epithelial Cells by IL-17A and IL-17F | 0.57 | 0.04 | IFNG |
| Dopamine Degradation | 0.57 | 0.04 | SULT1A1 |
| Glutathione Redox Reactions I | 0.57 | 0.04 | GSTT2/GSTT2B |
| Gap Junction Signaling | 0.56 | 0.02 | CSNK1G1,CSNK1G2,PRKCB,TJP1 |
| GDNF Family Ligand-Receptor Interactions | 0.55 | 0.03 | DOK2,RAC1 |
| STAT3 Pathway | 0.55 | 0.02 | CSF2RB,IGF1R,RAC1 |
| White Adipose Tissue Browning Pathway | 0.55 | 0.02 | PPARG,RARA,RARG |
| Bupropion Degradation | 0.55 | 0.04 | CYP2E1 |
| TCA Cycle II (Eukaryotic) | 0.55 | 0.04 | MDH1 |
| Glycolysis I | 0.55 | 0.04 | PGK1 |
| Maturity Onset Diabetes of Young (MODY) Signaling | 0.55 | 0.03 | APPL1,EP300 |
| 3-phosphoinositide Biosynthesis | 0.54 | 0.02 | ITPK1,PIP4K2C,PPP2R1A,PTPRF |

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| NF-κB Activation by Viruses | 0.54 | 0.03 | ITGB3,PRKCB |
| Renal Cell Carcinoma Signaling | 0.54 | 0.03 | EP300,RAC1 |
| Role of Hypercytokinemia/hyperchemokine- mia in the Pathogenesis of Influenza | 0.52 | 0.03 | IFNG,TLR4 |
| Estrogen-mediated S-phase Entry | 0.52 | 0.04 | ESR1 |
| D-myo-inositol (1,4,5)-Trisphosphate Biosynthesis | 0.52 | 0.04 | PIP4K2C |
| Glutathione-mediated Detoxification | 0.52 | 0.04 | GSTT2/GSTT2B |
| Apelin Liver Signaling Pathway | 0.52 | 0.04 | FAS |
| Calcium Signaling | 0.50 | 0.02 | CAMK4,EP300,HDAC7,NFATC1 |
| VEGF Family Ligand-Receptor Interactions | 0.50 | 0.02 | PRKCB,VEGFB |
| Role of p14/p19ARF in Tumor Suppression | 0.50 | 0.04 | RAC1 |
| Role of Pattern Recognition Receptors in Recognition of Bacteria and Viruses | 0.49 | 0.02 | IFNG,PRKCB,TLR4 |
| Factors Promoting Cardiogenesis in Vertebrates | 0.49 | 0.02 | ACVR2B,BMP1,PRKCB |
| Huntington's Disease Signaling | 0.49 | 0.02 | CDK5R1,EP300,HDAC7,IGF1R,PRKCB |
| Autophagy | 0.49 | 0.02 | CAMK4,DAPK2,PPP2R1A,TLR4 |
| Prolactin Signaling | 0.48 | 0.02 | EP300,PRKCB |
| Sonic Hedgehog Signaling | 0.48 | 0.03 | GRK2 |
| Phagosome Maturation | 0.48 | 0.02 | B2M,HLA-DRB1,RAC1 |
| Lipid Antigen Presentation by CD1 | 0.47 | 0.02 | ARF6,B2M,CD1A,PSAP |
| TNFR2 Signaling | 0.46 | 0.03 | XIAP |
| Acetone Degradation I (to Methylglyoxal) | 0.46 | 0.03 | CYP2E1 |
| Acute Myeloid Leukemia Signaling | 0.46 | 0.02 | CSF2RB,RARA |
| IL-4 Signaling | 0.46 | 0.02 | HLA-DRB1,NFATC1 |
| PKC ̢ Signaling in T Lymphocytes | 0.45 | 0.02 | HLA-DRB1,MAP3K3,NFATC1,POU2F1,RAC1,VAV3 |
| Role of JAK2 in Hormone-like Cytokine Signaling | 0.45 | 0.03 | SH2B2 |
| Melanocyte Development and Pigmentation Signaling | 0.43 | 0.02 | EP300,SH2B2 |

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| cAMP-mediated signaling | 0.43 | 0.02 | APEX1,CAMK4,GRK2,HTR1A |
| Nucleotide Excision Repair Pathway | 0.42 | 0.03 | RPA3 |
| NF-κB Signaling | 0.41 | 0.02 | BTRC,EP300,IGF1R,MAP3K3,PRKCB,TLR4 |
| Apelin Cardiomyocyte Signaling Pathway | 0.41 | 0.02 | MAPK6,PRKCB |
| CXCR4 Signaling | 0.41 | 0.02 | PRKCB,RAC1,RND1 |
| B Cell Development | 0.41 | 0.03 | HLA-DRB1 |
| TWEAK Signaling | 0.41 | 0.03 | XIAP |
| Mitochondrial Dysfunction | 0.41 | 0.02 | HSD17B10,NDUFAB1,PDHA1 |
| Neuropathic Pain Signaling In Dorsal Horn Neurons | 0.40 | 0.02 | CAMK4,PRKCB |
| Cell Cycle Regulation by BTG Family Proteins | 0.40 | 0.03 | PPP2R1A |
| Notch Signaling | 0.40 | 0.03 | NOTCH1 |
| Type I Diabetes Mellitus Signaling | 0.40 | 0.02 | FAS,GAD2,HLA-DRB1,IFNG,IFNGR1 |
| IL-17A Signaling in Fibroblasts | 0.39 | 0.03 | MMP1 |
| NER (Nucleotide Excision Repair, Enhanced Pathway) | 0.39 | 0.02 | EP300,RPA3 |
| D-myo-inositol (1,4,5,6)-Tetrakisphosphate Biosynthesis | 0.38 | 0.02 | ITPK1,PPP2R1A,PTPRF |
| D-myo-inositol (3,4,5,6)-tetrakisphosphate Biosynthesis | 0.38 | 0.02 | ITPK1,PPP2R1A,PTPRF |
| Cardiac β-adrenergic Signaling | 0.38 | 0.02 | APEX1,GRK2,PPP2R1A |
| Retinol Biosynthesis | 0.37 | 0.03 | RBP5 |
| Granulocyte Adhesion and Diapedesis | 0.37 | 0.02 | MMP1,MMP2,MSN |
| Chronic Myeloid Leukemia Signaling | 0.37 | 0.02 | HDAC7,PA2G4 |
| Antioxidant Action of Vitamin C | 0.37 | 0.02 | CSF2RB,HMOX1 |
| Mechanisms of Viral Exit from Host Cells | 0.37 | 0.02 | PRKCB |
| Allograft Rejection Signaling | 0.37 | 0.02 | B2M,FAS,HLA-DRB1,IFNG |
| April Mediated Signaling | 0.36 | 0.02 | NFATC1 |
| Dermatan Sulfate Biosynthesis (Late Stages) | 0.36 | 0.02 | SULT1A1 |
| Serotonin Receptor Signaling | 0.36 | 0.02 | HTR1A |
| B Cell Activating Factor Signaling | 0.35 | 0.02 | NFATC1 |

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| Oncostatin M Signaling | 0.35 | 0.02 | MMP1 |
| Role of RIG1-like Receptors in Antiviral Innate Immunity | 0.34 | 0.02 | EP300 |
| tRNA Splicing | 0.34 | 0.02 | APEX1 |
| Chondroitin Sulfate Biosynthesis (Late Stages) | 0.34 | 0.02 | SULT1A1 |
| BER (Base Excision Repair) Pathway | 0.34 | 0.02 | APEX1 |
| Calcium-induced T Lymphocyte Apoptosis | 0.34 | 0.02 | CAMK4,EP300,HLA-DRB1,PRKCB |
| Role of OCT4 in Mammalian Embryonic Stem Cell Pluripotency | 0.34 | 0.02 | RARA |
| 3-phosphoinositide Degradation | 0.34 | 0.02 | ITPK1,PPP2R1A,PTPRF |
| Endothelin-1 Signaling | 0.33 | 0.02 | HMOX1,MAPK6,PRKCB |
| Synaptic Long Term Depression | 0.32 | 0.02 | IGF1R,PPP2R1A,PRKCB |
| NGF Signaling | 0.32 | 0.02 | MAP3K3,RAC1 |
| nNOS Signaling in Skeletal Muscle Cells | 0.32 | 0.02 | CAMK4 |
| Regulation of IL-2 Expression in Activated and Anergic T Lymphocytes | 0.31 | 0.02 | CAMK4,NFATC1,RAC1,VAV3 |
| Insulin Secretion Signaling Pathway | 0.31 | 0.02 | HCK,PC,PDHA1,PRKCB |
| Primary Immunodeficiency Signaling | 0.31 | 0.02 | BTK |
| Spliceosomal Cycle | 0.31 | 0.02 | SF3B6 |
| Systemic Lupus Erythematosus Signaling | 0.31 | 0.01 | C8A,CAMK4,FCGR2A,HNRNPA2B1,KLK1,NFATC1 |
| Regulation of the Epithelial-Mesenchymal Transition Pathway | 0.31 | 0.02 | MMP2,NOTCH1,ZEB2 |
| MYC Mediated Apoptosis Signaling | 0.30 | 0.02 | FAS |
| TNFR1 Signaling | 0.30 | 0.02 | XIAP |
| Assembly of RNA Polymerase II Complex | 0.30 | 0.02 | TAF13 |
| Endocannabinoid Developing Neuron Pathway | 0.30 | 0.02 | MAPK6,RAC1 |
| UVC-Induced MAPK Signaling | 0.30 | 0.02 | PRKCB |
| Role of Cytokines in Mediating Communication between Immune Cells | 0.29 | 0.02 | IFNG |
| Stearate Biosynthesis I (Animals) | 0.29 | 0.02 | CYP2E1 |

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| UVB-Induced MAPK Signaling | 0.29 | 0.02 | PRKCB |
| P2Y Purigenic Receptor Signaling Pathway | 0.28 | 0.02 | ITGB3,PRKCB |
| Lymphotoxin β Receptor Signaling | 0.28 | 0.02 | EP300 |
| Transcriptional Regulatory Network in Embryonic Stem Cells | 0.28 | 0.02 | ZIC3 |
| FAT10 Signaling Pathway | 0.28 | 0.02 | IFNG |
| CD27 Signaling in Lymphocytes | 0.27 | 0.02 | MAP3K3 |
| SPINK1 Pancreatic Cancer Pathway | 0.27 | 0.02 | KLK1 |
| Cell Cycle Control of Chromosomal Replication | 0.27 | 0.02 | RPA3 |
| Altered T Cell and B Cell Signaling in Rheumatoid Arthritis | 0.27 | 0.01 | FAS,HLA-DRB1,IFNG,TLR4 |
| Role of CHK Proteins in Cell Cycle Checkpoint Control | 0.26 | 0.02 | PPP2R1A |
| Breast Cancer Regulation by Stathmin1 | 0.26 | 0.01 | ARHGEF1,CAMK4,HTR1A,MMP2,PPP2R1A,PRKCB,RAC1,VEGFB |
| Role of IL-17A in Arthritis | 0.26 | 0.02 | MMP1 |
| T Cell Exhaustion Signaling Pathway | 0.26 | 0.01 | ACVR2B,HLA-DRB1,IFNG,NFATC1,PPP2R1A |
| EIF2 Signaling | 0.26 | 0.01 | IGF1R,WARS1,XIAP |
| Heparan Sulfate Biosynthesis (Late Stages) | 0.25 | 0.02 | SULT1A1 |
| PCP (Planar Cell Polarity) Pathway | 0.25 | 0.02 | RAC1 |
| Apelin Endothelial Signaling Pathway | 0.25 | 0.01 | CAMK4,PRKCB |
| IL-2 Signaling | 0.25 | 0.02 | PTK2B |
| Phospholipases | 0.24 | 0.02 | HMOX1 |
| Thrombopoietin Signaling | 0.24 | 0.02 | PRKCB |
| Role of PI3K/AKT Signaling in the Pathogenesis of Influenza | 0.24 | 0.02 | IFNG |
| WNT/Ca ⁺ pathway | 0.24 | 0.02 | NFATC1 |
| Endocannabinoid Cancer Inhibition Pathway | 0.24 | 0.01 | MMP2,VEGFB |
| NAD Signaling Pathway | 0.23 | 0.01 | NMRK1,PARP3 |
| Corticotropin Releasing Hormone Signaling | 0.23 | 0.01 | CAMK4,PRKCB |
| Glutamate Receptor Signaling | 0.23 | 0.02 | CAMK4 |
| Eicosanoid Signaling | 0.23 | 0.02 | ALOX12 |

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|---|------|------|-------------------------------|
| Remodeling of Epithelial Adherens Junctions | 0.22 | 0.02 | ARF6 |
| Role of JAK1 and JAK3 in γ c Cytokine Signaling | 0.22 | 0.01 | PTK2B |
| Basal Cell Carcinoma Signaling | 0.21 | 0.01 | BMP1 |
| TREM1 Signaling | 0.20 | 0.01 | TLR4 |
| Ceramide Signaling | 0.00 | 0.01 | PPP2R1A |
| Fc γ RIIB Signaling in B Lymphocytes | 0.00 | 0.01 | BTK |
| CCR5 Signaling in Macrophages | 0.00 | 0.01 | CAMK4,FAS,PRKCB,PTK2B |
| Cytotoxic T Lymphocyte-mediated Apoptosis of Target Cells | 0.00 | 0.01 | B2M,DFFA,FAS |
| CTLA4 Signaling in Cytotoxic T Lymphocytes | 0.00 | 0.01 | B2M,PPP2R1A |
| T Helper Cell Differentiation | 0.00 | 0.01 | HLA-DRB1,IFNG,IFNGR1 |
| CD28 Signaling in T Helper Cells | 0.00 | 0.01 | CAMK4,HLA-DRB1,NFATC1,RAC1 |
| Dendritic Cell Maturation | 0.00 | 0.01 | B2M,CD1A,FCGR2A,HLA-DRB1,TLR4 |
| Angiopoietin Signaling | 0.00 | 0.01 | DOK2 |
| Cellular Effects of Sildenafil (Viagra) | 0.00 | 0.01 | CAMK4 |
| Relaxin Signaling | 0.00 | 0.01 | APEX1 |
| ICOS-ICOSL Signaling in T Helper Cells | 0.00 | 0.01 | CAMK4,HLA-DRB1,NFATC1,RAC1 |
| Human Embryonic Stem Cell Pluripotency | 0.00 | 0.01 | BMP1,ZIC3 |
| ATM Signaling | 0.00 | 0.01 | PPP2R1A |
| Role of NANOG in Mammalian Embryonic Stem Cell Pluripotency | 0.00 | 0.01 | BMP1 |
| CREB Signaling in Neurons | 0.00 | 0.01 | CAMK4,EP300,HTR1A,IGF1R,PRKCB |
| Autoimmune Thyroid Disease Signaling | 0.00 | 0.01 | FAS,HLA-DRB1 |
| Thyroid Cancer Signaling | 0.00 | 0.01 | ALK |
| Graft-versus-Host Disease Signaling | 0.00 | 0.01 | FAS,HLA-DRB1,IFNG |
| Type II Diabetes Mellitus Signaling | 0.00 | 0.01 | PPARG,PRKCB |
| Communication between Innate and Adaptive Immune Cells | 0.00 | 0.01 | B2M,HLA-DRB1,IFNG,TLR4 |
| CDC42 Signaling | 0.00 | 0.01 | B2M,HLA-DRB1,ITGB3 |
| AMPK Signaling | 0.00 | 0.01 | ACACB,EP300,PPP2R1A |

| | | | |
|--|------|------|----------------------|
| Regulation of eIF4 and p70S6K Signaling | 0.00 | 0.01 | ITGB3,PPP2R1A |
| Role of MAPK Signaling in the Pathogenesis of Influenza | 0.00 | 0.01 | IFNG |
| Antiproliferative Role of TOB in T Cell Signaling | 0.00 | 0.01 | CUL1,SKP1 |
| OX40 Signaling Pathway | 0.00 | 0.01 | B2M,HLA-DRB1 |
| Mouse Embryonic Stem Cell Pluripotency | 0.00 | 0.01 | XIAP |
| Gαi Signaling | 0.00 | 0.01 | HTR1A |
| Gαs Signaling | 0.00 | 0.01 | HCK |
| Regulation of Cellular Mechanics by Calpain Protease | 0.00 | 0.01 | ITGB3 |
| UVA-Induced MAPK Signaling | 0.00 | 0.01 | PARP3 |
| Oxidative Phosphorylation | 0.00 | 0.01 | NDUFAB1 |
| Unfolded protein response | 0.00 | 0.01 | PPARG |
| Toll-like Receptor Signaling | 0.00 | 0.01 | TLR4 |
| SAPK/JNK Signaling | 0.00 | 0.01 | MAP3K3,NFATC1,RAC1 |
| FGF Signaling | 0.00 | 0.01 | RAC1 |
| GABA Receptor Signaling | 0.00 | 0.01 | GAD2 |
| Insulin Receptor Signaling | 0.00 | 0.01 | PTPRF |
| Dopamine Receptor Signaling | 0.00 | 0.01 | PPP2R1A |
| p38 MAPK Signaling | 0.00 | 0.01 | FAS |
| PDGF Signaling | 0.00 | 0.01 | PRKCB |
| GPCR-Mediated Nutrient Sensing in Enteroendocrine Cells | 0.00 | 0.01 | PRKCB |
| Gustation Pathway | 0.00 | 0.01 | HTR1A,SLC5A1 |
| Th17 Activation Pathway | 0.00 | 0.01 | HSP90AB1,IFNG,NFATC1 |
| Endocannabinoid Neuronal Synapse Pathway | 0.00 | 0.01 | MAPK6 |
| BAG2 Signaling Pathway | 0.00 | 0.01 | ATXN3 |
| Regulation Of The Epithelial Mesenchymal Transition In Development Pathway | 0.00 | 0.01 | NOTCH1 |
| Kinetochore Metaphase Signaling Pathway | 0.00 | 0.01 | NDC80 |

Supplementary Table S3: Disease and functional analysis by IPA for solasonine. The disease and functional analysis by IPA was performed to evaluate the correlation between solasonine and other diseases or functions. Through IPA disease and functional analysis of the potential target genes of solasonine, 500 remarkably diseases or functions annotation involved in 103 categories (p-value ≤ 0.05 , sorted by p-value) were obtained.

| No | Diseases or Functions Annotation | Categories | p-value | Molecules number | Molecules list |
|----|----------------------------------|--|----------|------------------|--|
| 1 | Necrosis | Cell Death and Survival | 1.13E,21 | 107 | ACVR2B,ALB,ALK,ALOX12,ANG,APEX1,APPL1,AR,ATP7B,ATXN3,B2M,BPI,BTK,BTRC,CAMK4,CD74,CDK5R1,CHKA,CSF2RB,CTCF,CUL1,CYP2E1,DAPK2,DCTD,DFFA,DPP4,DSG2,DTYMK,EP300,ERBB4,ESR1,F2,F3,FABP3,FABP7,FAP,FAS,FHIT,FLNB,FN1,G6PD,GALNT10,GART,GGPS1,GRK2,GRK6,GTGF2F2,HAT1,HBB,HBEGF,HCK,HK2,HMGCS1,HMOX1,HSD17B10,HSP90AB1,IDE,IFNG,IGF1R,IQUB,ITGB3,ITPK1,ITSN1,KIF11,MMP2,MSH2,MSN,MUC1,NAE1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NOTCH1,PA2G4,PDHA1,PDK2,PEX5,POT1,PPARG,PPP2R1A,PRKCB,PTK2B,PUS10,RAC1,RARA,RARG,RBBP6,RRM1,S100A6,SEMA4D,SFN,SKP1,SMURF2,SNX1,STK4,TLR4,TNFAIP8L2,VAV3,WEE1,XIAP,XRCC6,YARS1,YWHAH,YWHAQ,YY1 |
| 2 | Apoptosis | Cell Death and Survival | 2.37E,19 | 97 | ACVR2B,ALB,ALK,ALOX12,APEX1,APPL1,AR,ARHGEF1,B2M,BPI,BTK,BTRC,CD74,CDK5R1,CHKA,CSF2RB,CTCF,CUL1,CYP2E1,DAPK2,DFFA,DPP4,DSG2,DTYMK,EP300,ERBB4,ESR1,F2,F3,FAP,FAS,FHIT,FLNB,FN1,G6PD,GALNT10,GRK2,HAT1,HBB,HBEGF,HCK,HK2,HMOX1,HSD17B10,HSP90AB1,IDE,IFNG,IGF1R,ITGB3,ITPK1,ITSN1,KIF11,KMT5A,MAGEA4,MMP2,MSH2,MSN,MUC1,NAE1,NCOA3,NDC80,NF2,NFATC1,NOTCH1,ODC1,PA2G4,PDHA1,PDK4,PEX5,POT1,PPARG,PPP2R1A,PRKCB,PTK2B,PUS10,RAC1,RARA,RARG,RBBP6,RRM1,S100A6,SEMA4D,SFN,SLK,SMURF2,SNX1,STK4,SUB1,TJP1,TLR4,VAV3,WEE1,XIAP,XRCC6,YARS1,YWHAQ,YY1 |
| 3 | Cell death of tumor cell lines | Cell Death and Survival | 5.24E,17 | 86 | ACVR2B,ALB,ALK,ALOX12,ANG,APEX1,APPL1,AR,B2M,BTK,BTRC,CAMK4,CD74,CDK5R1,CHKA,CSF2RB,CTCF,CUL1,CYP2E1,DAPK2,DCTD,DFFA,DPP4,DSG2,DTYMK,EP300,ERBB4,ESR1,FABP7,FAP,FAS,FHIT,FLNB,FN1,G6PD,GALNT10,GRK2,HAT1,HBEGF,HCK,HK2,HMGCS1,HMOX1,HSP90AB1,IDE,IFNG,IGF1R,IQUB,ITGB3,ITPK1,KIF11,MSH2,MSN,MUC1,NCOA3,NDC80,NF2,NOTCH1,PA2G4,PDHA1,PDK2,PEX5,POT1,PPARG,PPP2R1A,PRKCB,PTK2B,PUS10,RAC1,RARA,RARG,RBBP6,RRM1,S100A6,SFN,SMURF2,SNX1,STK4,TLR4,VAV3,WEE1,XIAP,XRCC6,YARS1,YWHAH,YY1 |
| 4 | Lymphatic system tumor | Cancer,Organismal Injury and Abnormalities | 7.41E,15 | 104 | ALB,ALK,ALOX12,ANXA6,AR,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAP,FAS,FCGR2A,FHIT,FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTGF2F2,GTGF2I,HASPIN,HAT1,HCK,HDAC7,HLADRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MARK1,MMP1,MMP2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 5 | Lymphoid cancer | Cancer,Organismal Injury and Abnormalities | 1.02E,14 | 103 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAP,FAS,FCGR2A,FHIT,FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTGF2F2,GTGF2I,HASPIN,HAT1,HCK,HDAC7,HLADRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MARK1,MMP1,MMP2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 6 | Ductal breast carcinoma | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.20E,14 | 54 | ACACB,AR,BTK,CAMK4,CSNK1G1,CTCF,DAPK2,DPP4,EP300,EPHA3,ERBB4,ESR1,FAP,FLNB,FN1,GRK2,GRK6,HDAC7,HSP90AB1,IGF1R,ITPKC,KIF11,KMT5A,MAPK6,MARK1,MMP2,MSH2,MSN,NCOA3,NDC80,NF2,NFATC1,NOTCH1,OXSR1,PARP3,PDK3,PDK4,PHF24,POU2F1,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RBBP6,RBM39,RRM1,SEN2,SLK,SMURF2,TLR4,VAV3,ZEB2 |
| 7 | Advanced stage tumor | Cancer,Organismal Injury and Abnormalities | 1.52E,14 | 54 | ALB,ALK,AOC3,AR,B2M,BCR,BMP1,BTK,C1R,CD74,CSF2RB,CYP17A1,DPP4,DSG2,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HCK,HLA,DRB1,HMOX1,HSP90AB1,HTR1A,IFNG,IGF1R,IMPDH1,MMP1,MMP2,MSH2,MUC1,NF2,NOTCH1,NR1I3,PARP3,PGC,PPP2R1A,PTK2B,RAC1,RARA,RARG,RRM1,SH2B2,SKP1,TLR4,VAV3,VEGFB |

| | | | | | |
|----|-------------------------------|--|----------|-----|--|
| 8 | Lymphoproliferative disorder | Hematological Disease, Immunological Disease | 2.30E,14 | 102 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,F2,F3,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MARK1,MMP1,MMP2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 9 | Apoptosis of tumor cell lines | Cell Death and Survival | 2.70E,14 | 70 | ACVR2B,ALB,ALK,ALOX12,AR,B2M,BTK,BTRC,CD74,CDK5R1,CHKA,CSF2RB,CTCF,CYP2E1,DAPK2,DFFA,DPP4,DSG2,DTYMK,EP300,ERBB4,ESR1,FAP,FAS,FHIT,FLNB, FN1,G6PD,GALNT10,GRK2,HAT1,HBEGF,HCK,HK2,HMOX1,HSP90AB1,IDE,IFNG,IGF1R,ITGB3,ITPK1,KIF11,MSH2,MSN,MUC1,NCOA3,NDC80,NOTCH1,PA2G4,PDHA1,PEX5,POT1,PPARG,PRKCB,PTK2B,PUS10,RAC1,RARG,RBBP6,RRM1,S100A6,SFN,SMURF2,SNX1,STK4,TLR4,WEE1,XIAP,XRCC6,YY1 |
| 10 | Breast adenocarcinoma | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 2.93E,14 | 55 | ACACB,AR,BTK,CAMK4,CSNK1G1,CTCF,DAPK2,DPP4,EP300,EPHA3,ERBB4,ESR1,FAP,FLNB, FN1,GGPS1,GRK2,GRK6,HDAC7,HSP90AB1,IGF1R,ITPK1,KIF11,KMT5A,MAPK6,MARK1,MMP2,MSH2,MSN,NCOA3,NDC80,NF2,NFATC1,NOTCH1,OXSR1,PARP3,PDK3,PDK4,PHF24,POU2F1,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RBBP6,RBM39,RRM1,SENP2,SLK,SMURF2,TLR4,VAV3,ZEB2 |
| 11 | Lymphoma | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 3.30E,14 | 72 | ALK,ANXA6,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,CD1A,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECI2,EP300,EPHA3,ERBB4,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GTF2I,HAT1,HCK,HDAC7,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,MMP1,MMP2,MUC1,NCBP1,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RARA,RARG,RRM1,SEM1,SLC5A1,SNX1,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 12 | Lymphocytic cancer | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 5.17E,14 | 101 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,F2,F3,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MARK1,MMP1,MMP2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 13 | Advanced malignant tumor | Cancer, Organismal Injury and Abnormalities | 5.18E,14 | 53 | ALB,ALK,AOC3,AR,B2M,BCR,BTK,C1R,CD74,CSF2RB,CYP17A1,DPP4,DSG2,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A, FN1,GAD2,GART,GGPS1,HCK,HLA,DRB1,HMOX1,HSP90AB1,HTR1A,IFNG,IGF1R,IMPDH1,MMP1,MMP2,MSH2,MUC1,NF2,NOTCH1,NR1I3,PARP3,PGC,PPP2R1A,PTK2B,RAC1,RARA,RARG,RRM1,SH2B2,SKP1,TLR4,VAV3,VEGFB |
| 14 | Lymphocytic neoplasm | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 5.56E,14 | 101 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,F2,F3,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MARK1,MMP1,MMP2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 15 | Hematologic cancer of cells | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 5.71E,14 | 94 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECI2,EP300,EPHA3,ERBB4,F2,F3,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,LRBA,MAGI2,MMP1,MMP2,MUC1,NCBP1,NCOA3,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PC,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 16 | Neoplasia of leukocytes | Cancer, Hematological Disease, Immunological | 5.76E,14 | 99 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C1R,C8A,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,DGKA,DPP4,ECI2,EP300,EPHA3,ERBB4,F2,F3,FAP,FAS,FCGR2A,FHIT, FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HLA,DR |

| | | | | | |
|----|------------------------------|--|-----------|-----|--|
| | | Disease, Organismal Injury and Abnormalities | | | B1, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IMPDH1, IQUB, ITGB3, ITPK1, LRBA, MAGI2, MMP1, MMP2, MUC1, NAE1, NCBP1, NCOA3, NDC80, NFATC1, NOTCH1, NT5C3A, NUP214, ODC1, PC, PGC, PGK1, POT1, POU2F1, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RRM1, SEM1, SH2B2, SLC5A1, SMG5, SNX1, SYT13, TAF13, THBS2, TJP1, TLR4, TXNDC12, VAV3, XIAP, XRCC6, ZEB2, ZNF292 |
| 17 | Tumorigenesis of lymphocytes | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 5.98E, 14 | 96 | ALB, ALK, ALOX12, ANXA6, ARHGAP5, ARHGEF1, ATXN3, B2M, BCR, BTK, C1R, C8A, CD1A, CD74, CDK5R1, CIAO1, CLK1, CSDE1, CSF2RB, CSNK1G2, CSTF2, CTCF, DGKA, DPP4, ECI2, EP300, EPHA3, ERBB4, FAP, FAS, FCGR2A, FHIT, FN1, GAD2, GART, GGPS1, GRHPR, GRK2, GTF2F2, GTF2I, HASPIN, HAT1, HCK, HDAC7, HLA, DRB1, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IMPDH1, IQUB, ITGB3, ITPK1, LRBA, MAGI2, MMP1, MMP2, MUC1, NAE1, NCBP1, NDC80, NFATC1, NOTCH1, NT5C3A, NUP214, ODC1, PC, PGC, PGK1, POT1, POU2F1, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RRM1, SEM1, SH2B2, SLC5A1, SMG5, SNX1, SYT13, TAF13, THBS2, TJP1, TLR4, TXNDC12, VAV3, XIAP, XRCC6, ZEB2, ZNF292 |
| 18 | Viral Infection | Infectious Diseases | 1.49E, 13 | 84 | ACACB, ACADSB, ACP3, ADH1C, ADH7, ALB, ALOX12, ANXA6, AR, ARF6, B2M, BCR, BMP1, BPI, BTRC, C1R, C8A, CANT1, CD74, CLK1, CSF2RB, CTCF, CYP17A1, CYP2E1, DAPK2, DHPS, DPP4, DSG2, EP300, ESR1, ETF1, F2, F3, FAS, FCGR2A, FN1, G6PD, GGPS1, GRK2, GRK6, GTF2I, HBB, HCK, HIBCH, HLA, DRB1, HMGC1, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, KIF11, LARS1, MDH1, MSH2, NBEA, NCOA3, NF2, NFATC1, NMT1, NUP214, OXSR1, PANK1, PPARG, PRKCB, PTK2B, PYGL, RAC1, RARA, RARG, RND1, RRM1, SART3, SERPINA5, SF3B6, SUB1, TLR4, TRIM21, WWP1, XIAP, ZEB2, ZNF292 |
| 19 | Non-Hodgkin lymphoma | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 2.81E, 13 | 67 | ALK, ANXA6, ARHGEF1, ATXN3, B2M, BCR, BTK, C1R, CD1A, CLK1, CSDE1, CSF2RB, CSTF2, CTCF, DGKA, DPP4, ECI2, EP300, EPHA3, ERBB4, FAS, FCGR2A, FHIT, FN1, GGPS1, GTF2I, HAT1, HCK, HDAC7, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IMPDH1, IQUB, ITGB3, MMP1, MMP2, MUC1, NCBP1, NFATC1, NOTCH1, NT5C3A, ODC1, PC, PGK1, POT1, POU2F1, PRKCB, PTK2B, PTPRE, PTPRF, RAC1, RARA, RARG, RRM1, SEM1, SLC5A1, SNX1, THBS2, TJP1, TLR4, TXNDC12, VAV3, XIAP, XRCC6, ZNF292 |
| 20 | Myeloid or lymphoid neoplasm | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 3.58E, 13 | 126 | ALB, ALK, ALOX12, AMY1C (includes others), ANXA6, APEX1, ARHGAP5, ARHGEF1, ATXN3, B2M, BCR, BMP1, BTK, BTRC, C1R, C8A, CANT1, CD1A, CD74, CDK5R1, CIAO1, CLK1, CSDE1, CSF2RB, CSNK1G2, CSTF2, CTCF, CYP2E1, CYP2R1, DGKA, DPP4, ECHS1, ECI2, EP300, EPHA3, ERBB4, ESR1, ETF1, F2, F3, FAP, FAS, FCGR2A, FHIT, FN1, GAD2, GART, GGPS1, GRHPR, GRK2, GTF2F2, GTF2I, HASPIN, HAT1, HCK, HDAC7, HLA, DRB1, HMGB3, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IGF1R, IMPDH1, IQUB, ITGB3, ITPK1, KLK1, KMT5A, LRBA, MAGEA4, MAGI2, MARK1, MMP1, MMP2, MSH2, MUC1, NAE1, NCBP1, NCOA3, NDC80, NFATC1, NOTCH1, NT5C3A, NUP214, ODC1, PA2G4, PC, PDHA1, PDK3, PDK4, PGC, PGK1, POT1, POU2F1, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RRM1, SEM1, SH2B2, SLC5A1, SMG5, SMG7, SMTN, SNX1, STK4, SYT13, TAF13, THBS2, TJP1, TLR4, TXNDC12, UEVLD, VAV3, VEGFB, WEE1, XIAP, XRCC6, ZEB2, ZNF292 |
| 21 | Neoplasia of blood cells | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 4.88E, 13 | 124 | ALB, ALK, ALOX12, AMY1C (includes others), ANXA6, APEX1, ARHGAP5, ARHGEF1, ATXN3, B2M, BCR, BMP1, BTK, BTRC, C1R, C8A, CANT1, CD1A, CD74, CDK5R1, CIAO1, CLK1, CSDE1, CSF2RB, CSNK1G2, CSTF2, CTCF, CYP2E1, CYP2R1, DGKA, DPP4, ECI2, EP300, EPHA3, ERBB4, ESR1, ETF1, F2, F3, FAP, FAS, FCGR2A, FHIT, FN1, GAD2, GART, GGPS1, GRHPR, GRK2, GTF2F2, GTF2I, HASPIN, HAT1, HCK, HDAC7, HLA, DRB1, HMGB3, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IGF1R, IMPDH1, IQUB, ITGB3, ITPK1, KLK1, KMT5A, LRBA, MAGEA4, MAGI2, MMP1, MMP2, MSH2, MUC1, NAE1, NCBP1, NCOA3, NDC80, NFATC1, NOTCH1, NT5C3A, NUP214, ODC1, PA2G4, PC, PDHA1, PDK3, PDK4, PGC, PGK1, POT1, POU2F1, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RRM1, SEM1, SH2B2, SLC5A1, SMG5, SMG7, SMTN, SNX1, STK4, SYT13, TAF13, THBS2, TJP1, TLR4, TXNDC12, UEVLD, VAV3, VEGFB, WEE1, XIAP, XRCC6, ZEB2, ZNF292 |
| 22 | Cell viability | Cell Death and Survival | 9.55E, 13 | 65 | ACVR2B, ALB, ALK, ALOX12, APEX1, AR, ARF6, ATP7B, BCR, BTK, BTRC, CAMK4, CD74, CHKA, DGKA, DOK2, DPP4, DTYMK, EP300, ERBB4, ESR1, F2, FAS, FHIT, FN1, GRK2, GRK6, HBB, HBEGF, HCK, HK2, HMGC1, HMOX1, HSP90AB1, IFNG, IGF1R, ITGB3, KIF11, MSH2, NAE1, NDC80, NME3, NOTCH1, NT5C3A, PDHA1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, RAC1, RBM39, RRM1, RUVBL1, S100A6, SEM1, SEMA4D, SFN, SKP1, THBS2, TLR4, TRIM21, WEE1, XIAP, XRCC6 |
| 23 | Cell survival | Cell Death and Survival | 1.07E, 12 | 66 | ACVR2B, ALB, ALK, ALOX12, APEX1, AR, ARF6, ATP7B, BCR, BTK, BTRC, CAMK4, CD74, CHKA, CSF2RB, DGKA, DOK2, DPP4, DTYMK, EP300, ERBB4, ESR1, F2, FAS, FHIT, FN1, GRK2, GRK6, HBB, HBEGF, HCK, HK2, HMGC1, H |

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|----|--|---|----------|-----|--|
| | | | | | MOX1,HSP90AB1,IFNG,IGF1R,ITGB3,KIF11,MSH2,NAE1,NDC80,NME3,NOTCH1,NT5C3A,PDHA1,PPARG,PP2R1A,PRKCB,PTK2B,PTPRE,RAC1,RBM39,RRM1,RUVBL1,S100A6,SEM1,SEMA4D,SFN,SKP1,THBS2,TLR4,TRIM21,WEE1,XIAP,XRCC6 |
| 24 | Hematologic cancer | Cancer,Hematological Disease,Organismal Injury and Abnormalities | 1.11E,12 | 124 | ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,APEX1,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,BTRC,C1R,C8A,CANT1,CD1A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CYP2E1,CYP2R1,DGKA,DPP4,ECHS1,ECI2,EP300,EPHA3,ERBB4,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,FHIT,FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HCK,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,KLK1,KMT5A,LRBA,MAGEA4,MAGI2,MARK1,MMP1,MMP2,MSH2,MUC1,NAE1,NCBP1,NCOA3,NDC80,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PA2G4,PC,PDHA1,PK3,PK4,PGC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SMG7,SMTN,SNX1,STK4,SYT13,TAF13,THBS2,TJP1,TLR4,TXNDC12,UEVLD,VAV3,VEGFB,WEE1,XIAP,XRCC6,ZEB2,ZNF292 |
| 25 | Phosphorylation of protein | Post,Translational Modification | 1.35E,12 | 34 | ALK,ANG,AR,BCR,BTK,CAMK4,CD74,CSNK1G2,DAPK2,ERBB4,F2,FAS,FCGR2A,FN1,HASPIN,HCK,HLA,DRB1,IFNG,IGF1R,ITGB3,MAP3K3,MARK1,MATK,OXSR1,PRKCB,PSAP,PTK2B,RAC1,RARA,SEMA4D,SLK,STK16,STK4,WARS1 |
| 26 | Cell proliferation of tumor cell lines | Cellular Development,Cellular Growth and Proliferation | 1.91E,12 | 85 | AASDHPPT,ACP3,ALK,ANG,ANXA6,APEX1,AR,BTK,CD74,CDK5R1,CHKA,CSF2RB,CSTF2,CTCF,DAPK2,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,ERBB4,ESR1,F2,F3,FAS,FHIT,FN1,G6PD,GALNT10,HASPIN,HAT1,HBEGF,HCK,HK2,HMGCS1,HMOX1,HNRNPA2B1,IDE,IFNG,IGF1R,ITGB3,MAPK6,MATK,MEMO1,MMP1,MMP2,MTAP,MUC1,NCOA3,NF2,NFATC1,NOTCH1,NT5C3A,PA2G4,PC,PDK4,PGK1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RARA,RARG,RBBP6,RRM1,S100A6,SEMA4D,SFN,SMURF2,SNX1,STARD13,STK4,TLR4,TRIM21,UTRN,VAV3,XIAP,XRCC6,YWHAQ,YY1,ZEB2 |
| 27 | Metastasis | Cancer,Organismal Injury and Abnormalities | 1.97E,12 | 46 | ALB,ALK,AOC3,AR,B2M,BTK,C1R,CSF2RB,CYP17A1,DSG2,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HLADRB1,HMOX1,HSP90AB1,HTR1A,IGF1R,IMPDH1,MMP1,MMP2,MSH2,MUC1,NF2,NOTCH1,NR1I3,PARP3,PGC,PPP2R1A,PTK2B,RAC1,RARA,RARG,RRM1,SH2B2,TLR4,VEGFB |
| 28 | Head and neck cancer | Cancer,Organismal Injury and Abnormalities | 1.99E,12 | 256 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CANT1,CD1A,CD74,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLADRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 29 | Dermatitis | Dermatological Diseases and Conditions,Inflammatory Disease,Inflammatory Response,Organismal Injury and Abnormalities | 1.99E,12 | 29 | ACADVL,CD1A,CD74,CSF2RB,CYP17A1,DHPS,DPP4,GRK2,HBB,HCK,HLA,DRB1,HTR1A,IDE,IFNG,KLK1,MMP1,MSN,ODC1,PDK4,PPARG,PRKCB,PSAP,RARA,RARG,RRM1,RUVBL1,SFN,TLR4,XRCC6 |

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|----|--------------------------------|--|----------|-----|---|
| 30 | Inflammation of organ | Inflammatory Response, Organismal Injury and Abnormalities | 2.00E,12 | 51 | ACADVL,ALB,ALK,ALOX12,AR,CD1A,CD74,CSF2RB,CYP17A1,CYP2E1,DHPS,DPP4,EP300,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GC,GRK2,HBB,HCK,HLADRB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,ITGB3,KLK1,MMP1,MSN,MUC1,ODC1,PKD4,PPARG,PRKCB,PSAP,RAC1,RARA,RARG,RRM1,RUVBL1,SFN,SMURF2,TAF13,TLR4,XRCC6 |
| 31 | Advanced malignant solid tumor | Cancer, Organismal Injury and Abnormalities | 2.27E,12 | 45 | ALB,ALK,AOC3,AR,B2M,BCR,BTK,C1R,CSF2RB,CYP17A1,DPP4,DSG2,EP300,EPAH3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HMOX1,HSP90AB1,IGF1R,IMPDH1,MMP2,MSH2,MUC1,NF2,NOTCH1,NR1I3,PARP3,PGC,PPP2R1A,PTK2B,RAC1,RARA,RARG,RRM1,SKP1,VAV3,VEGFB |
| 32 | Cell death of tumor cells | Cancer, Cell Death and Survival, Organismal Injury and Abnormalities, Tumor Morphology | 2.98E,12 | 22 | ALB,AR,ATP7B,B2M,BTK,CD74,F2,FAS,FHIT,GRK6,HBEGF,HMOX1,IFNG,IGF1R,MUC1,NCOA3,NOTCH1,PPARG,PTK2B,RAC1,RARA,XIAP |
| 33 | Invasive tumor | Cancer, Organismal Injury and Abnormalities | 3.55E,12 | 54 | ALB,ALK,AOC3,AR,B2M,BTK,C1R,CSF2RB,CYP17A1,DSG2,EP300,EPAH3,ERBB4,ESR1,F2,F3,FAP,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HLA,DRB1,HMOX1,HSP90AB1,HTR1A,IGF1R,IMPDH1,MMP1,MMP2,MSH2,MUC1,MYBPC3,NF2,NOTCH1,NR1I3,PARP3,PKD4,PGC,PPP2R1A,PTK2B,PTPRE,PTPRF,RAC1,RARA,RARG,RBM39,RRM1,SH2B2,THBS2,TLR4,VEGFB,YWHAQ |
| 34 | Mature lymphocytic neoplasm | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 3.94E,12 | 79 | ALK,ALOX12,ANXA6,ARHGFE1,ATXN3,B2M,BCR,BTK,C1R,CD1A,CD74,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,DPP4,ECI2,EP300,EPAH3,ERBB4,FAS,FCGR2A,FHIT,FN1,GAD2,GART,GGPS1,GRHPR,GT2F2,GTF2I,HAT1,HCK,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,MAGI2,MMP1,MMP2,MUC1,NAE1,NCBP1,NDC80,NFATC1,NOTCH1,NT5C3A,ODC1,PC,PGK1,POT1,POU2F1,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RARA,RARG,RRM1,SEM1,SLC5A1,SNX1,TAF13,THBS2,TJP1,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 35 | Neck neoplasm | Cancer, Organismal Injury and Abnormalities | 4.43E,12 | 243 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EPAH3,EP8L2,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FAS,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLADRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNP A2B1,HPD,HSCB,HSD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPK1,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFA B1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PKD2,PKD3,PKD4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SENP2,SER PINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,SNX2,SPEF1,STAR D13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VPS 26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 36 | Non-melanoma solid tumor | Cancer, Organismal Injury and Abnormalities | 4.52E,12 | 285 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPAH3,EP8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1 |

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| | | | | | ,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,CLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TFNFAIP8L2,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 37 | Neoplasia of cells | Cancer,Organismal Injury and Abnormalities | 4.70E,12 | 178 | ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATXN3,B2M,BCR,BMP1,BPI,BTK,BTRC,CIR,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CIAO1,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,CYP2R1,CYP7A1,DGKA,DOK2,DPP4,DSG2,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,FHIT,FN1,GAD2,GALM,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMGB3,HMOX1,HNRNPA2B1,HSCB,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,CLK1,KMT5A,LRBA,MAGEA4,MAGI2,MAPK6,MATK,MDH1,MECR,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,NAE1,NCBP1,NCOA3,ND C80,NDUFAB1,NF2,NFATC1,NOTCH1,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PANK1,PARP3,PATJ,PC,PDHA1,PDK2,PDK3,PDK4,PGC,PGK1,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RGS6,RRM1,SEM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SFN,SH2B2,SLC5A1,SLK,SMG5,SMG7,SMTN,SNX1,STK4,SYT13,TAF13,THBS2,TJP1,TLR4,TTR,TXNDC12,UEVLD,VAV3,VEGFB,WEE1,WWP1,XIAP,XRCC6,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 38 | Development of adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 5.89E,12 | 186 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AOC3,APPL1,AR,ARF6,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CANT1,CD1A,CERT1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP7A1,DCTD,DGKA,DOK2,DPP4,DTYMK,ECHS1,EP300,EPHA3,ERBB4,ESR1,ETF1,F2,F3,FAP,FCGR2A,FLNB,FN1,G6PD,GAD2,GART,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEGF,HCK,HDX,HLA,DRB1,HMGB3,HNRNPA2B1,HPD,HS D17B4,HSP90AB1,HTR1A,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,CLK1,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,MYSM1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PAH,PANK1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PIP4K2C,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMG5,SMG7,SMTN,SMURF2,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,UTRN,VAV3,WHRN,WWP1,XIAP,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 39 | B ₂ cell neoplasm | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 7.76E,12 | 83 | ALB,ALK,ALOX12,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C8A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,DPP4,ECI2,EP300,EPHA3,ERBB4,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,GRHPR,GRK2,GTF2F2,GTF2I,HASPIN,HAT1,HDAC7,HLA,DRB1,HMOX1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MAGI2,MMP2,MUC1,NAE1,NCBP1,NDC80,NFATC1,NOTCH1,NUP214,PC,PGC,PGK1,POT1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |
| 40 | B cell cancer | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 8.06E,12 | 78 | ALB,ALK,ANXA6,ARHGAP5,ARHGEF1,ATXN3,B2M,BCR,BTK,C8A,CD74,CDK5R1,CIAO1,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,ECI2,EP300,EPHA3,ERBB4,FAS,FCGR2A,FN1,GART,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HAT1,HDAC7,HLA,DRB1,HMOX1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,LRBA,MMP2,MUC1,NAE1,NCBP1,NDC80,NFATC1,NOTCH1,NUP214,PC,PGC,PGK1,POT1,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RRM1,SEM1,SH2B2,SLC5A1,SMG5,SNX1,SYT13,TAF13,THBS2,TLR4,TXNDC12,VAV3,XIAP,XRCC6,ZEB2,ZNF292 |

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| 41 | Cancer of secretory structure | Cancer, Organismal Injury and Abnormalities | 1.07E,11 | 256 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACP3,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CANT1,CD1A,CD74,CDK5R1,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EPA3,EP300,ERBB4,ER11,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 42 | Thyroid cancer | Cancer, Endocrine System Disorders, Organismal Injury and Abnormalities | 1.13E,11 | 240 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EP300,EP300,ERBB4,ER11,ESR1,ETF1,F2,F3,FAP,FAS,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 43 | Breast or ovarian cancer | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 1.15E,11 | 136 | ACACB,ALB,ALK,ANG,AOC3,AR,ARF6,ARHGEF1,ASAP1,B2M,BCR,BMP1,BTK,CA8,CAMK4,CANT1,CD74,CERT1,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CYP17A1,CYP2E1,DAPK2,DPP4,EP300,EPA3,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FAS,FLNB,FN1,GAD2,GALNT10,GART,GC,GGPS1,GRK2,GRK6,HAT1,HBB,HBEGF,HCK,HDAC7,HLA,DRB1,HMGCS1,HMOX1,HNRNPA2B1,HSP90AB1,HTR1A,IFNGR1,IGF1R,IMPDH1,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,NR1I3,NT5C3A,ODC1,OXSR1,PAFAH1B2,PARP3,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RRM1,RTN4IP1,S100A6,SEN2,SERPINA5,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,THBS2,TLR4,TTR,USP19,UTRN,VAV3,WEE1,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZNF462 |
| 44 | Multiple cancers | Cancer, Organismal Injury and Abnormalities | 1.43E,11 | 139 | ACACB,ALB,ALK,ANG,AOC3,AR,ARF6,ARHGEF1,ASAP1,B2M,BCR,BMP1,BTK,CA8,CAMK4,CANT1,CD74,CERT1,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CYP17A1,CYP2E1,DAPK2,DPP4,EP300,EPA3,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FAS,FLNB,FN1,GAD2,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,HAT |

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| | | | | | 1,HBB,HBEGF,HCK,HDAC7,HLA,DRB1,HMGCS1,HMOX1,HNRNPA2B1,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KMT5A,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,NR1I3,NT5C3A,ODC1,OXSR1,PAFAH1B2,PARP3,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RRM1,RTN4IP1,S100A6,SENP2,SERPINA5,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,THBS2,TLR4,TTR,USP19,UTRN,VAV3,WEE1,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZNF462 |
| 45 | Tumorigenesis of reproductive tract | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.44E,11 | 177 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,ANG,AOC3,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GART,GC,GRHR,GRK2,GTF2I,HBB,HBEGF,HCK,HDA C7,HDX,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,PANK1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SENP2,SERPINA5,SF3B6,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TR,UEVLD,UTRN,VAV3,VEGFB,WEE1,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 46 | Female genital neoplasm | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.63E,11 | 177 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,ANG,AOC3,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GART,GC,GRHR,GRK2,GTF2I,HBB,HBEGF,HCK,HDA C7,HDX,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,PANK1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SENP2,SERPINA5,SF3B6,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TR,UEVLD,UTRN,VAV3,VEGFB,WEE1,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 47 | Recurrent cancer | Cancer,Organismal Injury and Abnormalities | 1.79E,11 | 24 | ALB,ALK,AR,BTK,CSF2RB,CYP17A1,ERBB4,ESR1,F3,GART,GGPS1,HCK,HDAC7,HSP90AB1,IGF1R,IMPDH1,NOTCH1,ODC1,PARP3,PTK2B,RARA,RARG,RRM1,VEGFB |
| 48 | Progression of malignant tumor | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 1.99E,11 | 20 | ALK,AR,BTK,CSF2RB,CYP17A1,EP300,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,NOTCH1,ODC1,PARP3,PTK2B,RARA,RARG,RRM1,VEGFB |
| 49 | Non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.01E,11 | 104 | ADH1C,ADH7,ALB,ALK,ALOX12,ANXA6,APEX1,AR,B2M,BTK,BTRC,C8A,CAMK4,CD1A,CERT1,CLK1,CSNK1G2,CTCF,CUL1,CYP17A1,CYP2E1,DGKA,DOK2,DPP4,EP300,EPHA3,ERBB4,ESR1,F2,F3,FAP,FAS,FHIT, FN1,GAD2,GART,GGPS1,GRHR,GRK6,HASPIN,HCK,HDX,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IGF1R,ITPKC,KIF11,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MATK,MDH1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,NBEA,NCOA3,NDC80,NMT1,NOTCH1,NT5C3A,OAT,OXSR1,PAH,PANK1,PARP3,PATJ, PDK4,PGC,PIP4K2C,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RGS6,RRM1,SEMA4D,SENP2,SERPINA5,SFN,SLK,SMG7,STK4,SULT1A1,TLR4,TTR,WWP1,ZCWPW1,ZNF292 |
| 50 | Head and neck carcinoma | Cancer,Organismal Injury and Abnormalities | 2.03E,11 | 248 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3, BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CD74,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA, |

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| | | | | | DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,CLK1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 51 | Communication of cells | Cell,To,Cell Signaling and Interaction | 2.88E,11 | 50 | ACVR2B,ALK,APPL1,AR,ARHGEF1,ATXN3,BCR,BTK,BTRC,CAMK4,CSNK1G2,DAPK2,DOK2,ERBB4,ESR1,F2,FAS,FLNB,GRK2,GRK6,HASPIN,HBEGF,HLA,DRB1,HMOX1,HTR1A,IFNG,IFNGR1,IGF1R,ITPK1,ITSN1,MAGI2,MAP3K3,MAPK6,MARK1,NAE1,NFATC1,NOTCH1,NR1I3,OXSR1,PPARG,PSAP,PTK2B,RAC1,RARA,RGS6,S100A6,SFN,STK4,THBS2,VAV3 |
| 52 | Metastatic solid tumor | Cancer,Organismal Injury and Abnormalities | 2.94E,11 | 39 | ALB,ALK,AOC3,AR,B2M,C1R,CSF2RB,CYP17A1,DSG2,EPHA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HMOX1,HSP90AB1,IGF1R,IMPDH1,MMP2,MSH2,MUC1,NF2,NOTCH1,NR1I3,PARP3,PGC,PPP2R1A,PTK2B,RAC1,RARA,RARG,RRM1,VEGFB |
| 53 | Non,hematological solid tumor | Cancer,Organismal Injury and Abnormalities | 3.15E,11 | 285 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGCS1,HMGCS2,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,CLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 54 | Head and neck tumor | Cancer,Organismal Injury and Abnormalities | 3.38E,11 | 264 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CANT1,CD1A,CD74,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX |

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| | | | | | 1, HMGB3, HMGC1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MECR, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NDUFAB1, NF2, NFATC1, NME3, NMRK1, NMT1, NOTCH1, NR1I3, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDF, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, PIP4K2C, PNMT, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RPA3, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEM1, SEMA4D, SENP2, SERPINA5, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SNX22, SPEF1, STARD13, STK4, SUB1, SULT1A1, SYT13, TAF13, THBS2, TIMM9, TJP1, TLR4, TNFAIP8L2, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XIAP, XRCC6, YWHAQ, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 55 | HIV infection | Infectious Diseases | 3.44E,11 | 43 | ACACB, ACADSB, ACP3, ALB, ALOX12, AR, ARF6, B2M, BCR, BMP1, C1R, CANT1, CD74, CSF2RB, DAPK2, DHPS, DPP4, EP300, ESR1, ETF1, FAS, FCGR2A, FN1, GGPS1, GRK2, HIBCH, HMGC1, IFNG, IMPDH1, IQUB, LARS1, NF2, NMT1, NUP214, PANK1, PPARG, RARA, RARG, RND1, RRM1, SUB1, XIAP, ZNF292 |
| 56 | Mature B, cell lymphoma | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 3.89E,11 | 39 | ALK, ANXA6, ARHGEF1, B2M, BCR, BTK, CLK1, CSF2RB, CTCF, ECI2, EP300, EPHA3, ERBB4, FAS, FCGR2A, FN1, GTF2I, HAT1, HMOX1, HSP90AB1, IFNG, IMPDH1, IQUB, ITGB3, MMP2, NOTCH1, PC, PGK1, PRKCB, PTK2B, PTPRE, PTPRF, RAC1, RRM1, SLC5A1, SNX1, TXNDC12, XIAP, XRCC6 |
| 57 | Nonpituitary endocrine tumor | Cancer, Endocrine System Disorders, Organismal Injury and Abnormalities | 4.16E,11 | 241 | AASDHPPT, ACACB, ACADSB, ACADVL, ACAT2, ACBD7, ACVR2B, ACY1, ADH7, ALK, ALOX12, AMY1C (includes others), ANXA6, AOC3, APPL1, AR, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B3GAT2, B3GAT3, BCR, BMP1, BPI, BTK, BTRC, C8A, CA8, CANT1, CD1A, CHKA, CIAO1, CLCN5, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP2R1, CYP7A1, DAPK2, DCTD, DCXR, DFFA, DGKA, DHPS, DM C1, DOK2, DPP4, DSG2, DTYMK, EP300, EPS8L2, ERBB4, ERI1, ESR1, ETF1, F2, F3, FAP3, FAP, FAS, FLNB, FN1, G6P D, GAD2, GALM, GALNT10, GART, GC, GRHPR, GRK2, GRK6, GSTT2, GSTT2B, GTF2F2, GTF2I, HADH, HASPIN, HAT1, HBEGF, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMBOX1, HMGB3, HMGC1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B4, HSP90AB1, IDE, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MECR, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NDUFAB1, NF2, NFATC1, NME3, NMRK1, NOTCH1, NR1I3, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDF, PDHA1, PDK3, PDK4, PEX5, PGK1, PHF24, PIP4K2C, PNMT, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RPA3, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEM1, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMTN, SMURF2, SNX1, SNX22, SPEF1, STARD13, STK4, SUB1, SULT1A1, SYT13, TAF13, THBS2, TJP1, TLR4, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, VPS26A, WEE1, WHRN, WWP1, XRCC6, YWHAQ, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 58 | Cancer of cells | Cancer, Organismal Injury and Abnormalities | 4.32E,11 | 161 | ALB, ALK, ALOX12, ANXA6, AOC3, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATXN3, B2M, BCR, BPI, BTK, BTRC, C1R, C8A, CAMK4, CD1A, CD74, CDK5R1, CERT1, CIAO1, CLK1, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP2E1, CYP7A1, DGKA, DOK2, DPP4, DSG2, ECI2, EP300, EPHA3, EPS8L2, ERBB4, F2, F3, FAP, FAS, FCGR2A, FHIT, FN1, GAD2, GALM, GART, GGPS1, GRHPR, GRK2, GTF2F2, GTF2I, HASPIN, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HLA, DRB1, HMOX1, HNRNPA2B1, HSCB, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, KLK1, KMT5A, LRBA, MAGI2, MAPK6, MATK, MDH1, MECR, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, NAE1, NCBP1, NCOA3, NDC80, NDUFAB1, NF2, NFATC1, NOTCH1, NT5C3A, NUP214, OAT, ODC1, OXSR1, PANK1, PARP3, PATJ, PC, PDK2, PDK4, PGC, PGK1, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RGS6, RRM1, SEM1, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SLC5A1, SLK, SMG5, SMG7, SMTN, SNX1, STK4, SYT13, TAF13, THBS2, TJP1, TLR4, TTR, TXNDC12, VAV3, WWP1, XIAP, XRCC6, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |

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| 59 | Relapsed malignant solid tumor | Cancer,Organismal Injury and Abnormalities | 4.53E,11 | 20 | ALB,ALK,AR,BTK,CSF2RB,CYP17A1,ERBB4,ESR1,F3,GART,HDAC7,HSP90AB1,IGF1R,IMPDH1,ODC1,PARP3,PTK2B,RARA,RARG,RRM1 |
| 60 | Lymphoreticular neoplasm | Cancer,Organismal Injury and Abnormalities | 4.65E,11 | 101 | ALK,AMY1C (includes others),ANXA6,APEX1,ARHGEF1,ATXN3,B2M,BCR,BMP1,BTK,BTRC,C1R,CANT1,CD1A,CD74,CLK1,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CYP2E1,CYP2R1,DGKA,DPP4,ECI2,EP300,EPHA3,ERBB4,ESR1,ETF1,F3,FAP,FAS,FCGR2A,FGIT,FN1,GAD2,GART,GGPS1,GTF2I,HAT1,HCK,HDAC7,HLA,DRB1,HMGB3,HMOX1,HN RNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,KLK1,KMT5A,MAGEA4,MMP1,MMP2,MSH2,MUC 1,NCBP1,NFATC1,NOTCH1,NT5C3A,NUP214,ODC1,PA2G4,PC,PDHA1,PDK3,PDK4,PGK1,POT1,POU2F1,PR KCB,PTK2B,PTPRE,PTPRF,RAC1,RARA,RARG,RRM1,SEM1,SH2B2,SLC5A1,SMG7,SMTN,SNX1,STK4,THBS 2,TJP1,TLR4,TXNDC12,UEVLD,VAV3,VEGFB,WEE1,XIAP,XRCC6,ZNF292 |
| 61 | Breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 4.76E,11 | 107 | ACACB,ALB,ALK,ANG,AR,ARHGEF1,BCR,BMP1,BTK,CAMK4,CANT1,CERT1,CLK1,CSDE1,CSF2RB,CSNK 1G1,CTCF,CYP17A1,CYP2E1,DAPK2,DPP4,EP300,EPHA3,ERBB4,ESR1,EXOSC9,FABP7,FAP,FAS,FLNB,FN1, GALNT10,GGPS1,GRK2,GRK6,HAT1,HBB,HBEGF,HCK,HDAC7,HLA,DRB1,HMGCS1,HMOX1,HSP90AB1,IG F1R,IMPDH1,ITGB3,ITPKC,KIF11,KMT5A,MAGEA4,MAPK6,MARF1,MARK1,MMP1,MMP2,MSH2,MSN,MU C1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,ODC1,OXSR1,PAFAH1B2,PARP3,PC,PDK3, PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RARG,RBBP6,RBM39,RR M1,S100A6,SENP2,SERPINA5,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,TLR4,TTR,USP19,UTRN,VAV3,W EE1,YWHAQ,YY1,ZEB2,ZNF462 |
| 62 | Progressive malignant solid tumor | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 5.25E,11 | 18 | ALK,AR,BTK,CSF2RB,CYP17A1,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,ODC1,PARP3,PTK2B,RARA,RAR G,RRM1,VEGFB |
| 63 | B,cell lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 5.78E,11 | 53 | ALK,ANXA6,ARHGEF1,ATXN3,B2M,BCR,BTK,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,ECI2,EP300,EPH A3,ERBB4,FAS,FCGR2A,FN1,GTF2I,HAT1,HDAC7,HMOX1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,MMP2,M UC1,NCBP1,NFATC1,NOTCH1,NUP214,PC,PGK1,POT1,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RRM1,SEM1,SL C5A1,SNX1,THBS2,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 64 | Thyroid carcinoma | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities | 6.07E,11 | 238 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,B3GAT3,BCR,BMP1, BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CHIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSN K1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DM C1,DOK2,DPP4,DSG2,DTYMK,EP300,EPS8L2,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FLNB,FN1,G6PD,GAD2,GA LM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF, HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,H SD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT 5A,KYNU,LRBA,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN ,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NP E3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,P ARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PP ARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6, RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH 3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A 1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XRCC6, YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 65 | Pelvic tumor | Cancer,Organismal Injury and Abnormalities | 6.25E,11 | 213 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ADH7,ALB,ALK,ANG,ANXA6,AOC3,APEX1,A PPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C1R,C8A,CA8,CA NT1,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,D CTD,DGKA,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,F AS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HBB, |

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| | | | | | HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAFF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,WWP1,XIAP,YWHAQ,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 66 | Extracranial solid tumor | Cancer,Organismal Injury and Abnormalities | 6.96E,11 | 286 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACP3,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CLAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPHA3,EPSS8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX2,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 67 | Urinary tract cancer | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 8.13E,11 | 94 | ACACB,ALB,ALK,AOC3,AR,ARHGAP5,ASAP1,ATXN3,B2M,BCR,BMP1,BTK,BTRC,CANT1,CSF2RB,CSTF2,CTCF,CUL1,CYP17A1,DGKA,DHPS,DOK2,ECHS1,EP300,EPHA3,EPSS8L2,ERBB4,ESR1,FAP,FN1,G6PD,GART,GGPS1,GRHPR,HBB,HIBCH,HLA,DRB1,HMOX1,HNRNPA2B1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,KMT5A,KYNU,MAGEA4,MAGI2,MARF1,MMP2,MSH2,MTAP,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,NUP214,ODC1,PA2G4,PAH,PANK1,PDK4,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RRM1,SLC5A1,SMG7,SMTN,SULT1A1,THBS2,TJP1,TLR4,UTRN,XIAP,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 68 | Urinary tract tumor | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 8.77E,11 | 95 | ACACB,ALB,ALK,AOC3,AR,ARHGAP5,ASAP1,ATXN3,B2M,BCR,BMP1,BTK,BTRC,CANT1,CSF2RB,CSTF2,CTCF,CUL1,CYP17A1,DGKA,DHPS,DOK2,ECHS1,EP300,EPHA3,EPSS8L2,ERBB4,ESR1,FAP,FN1,G6PD,GART,GGPS1,GRHPR,HBB,HIBCH,HLA,DRB1,HMOX1,HNRNPA2B1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,KMT5A,KYNU,MAGEA4,MAGI2,MARF1,MMP2,MSH2,MTAP,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,NUP214,ODC1,PA2G4,PAH,PANK1,PDK4,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RRM1,SLC5A1,SMG7,SMTN,SULT1A1,THBS2,TJP1,TLR4,UTRN,XIAP,YY1,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 69 | Formation of solid tumor | Cancer,Organismal Injury and Abnormalities | 9.85E,11 | 259 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CDK5R1,CERT1,CHKA,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,D |

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| | | | | | GKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMP1,IMP2,IMP3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 70 | Mammary tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 9.85E,11 | 108 | ACACB,ALB,ALK,ANG,AR,ARHGEF1,ASAP1,BCR,BMP1,BTK,CAMK4,CANT1,CERT1,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CYP17A1,CYP2E1,DAPK2,DPP4,EP300,EPHA3,ERBB4,ESR1,EXOSC9,FABP7,FAP,FAS,FLNB,FN1,GALNT10,GGPS1,GRK2,GRK6,HAT1,HBB,HBEGF,HCK,HDAC7,HLA,DRB1,HMGCS1,HMOX1,HSP90AB1,IGF1R,IMP1,IMP2,IMP3,MAPK6,MARF1,MARK1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,ODC1,OXSR1,PAFAH1B2,PARP3,PC,PDK3,PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RARG,RBBP6,RBM39,RRM1,S100A6,SENP2,SERPINA5,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,TLR4,TTR,USP19,UTRN,VAV3,WEE1,YWHAQ,YY1,ZEB2,ZNF462 |
| 71 | Genital tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.03E,10 | 205 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C1R,C8A,CA8,CANT1,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMP1,IMP2,IMP3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 72 | Nonhematologic malignant neoplasm | Cancer,Organismal Injury and Abnormalities | 1.16E,10 | 284 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMP2,IMP3,IMP4,IMP5,IMP6,IMP7,IMP8,IMP9,IMP10,IMP11,IMP12,IMP13,IMP14,IMP15,IMP16,IMP17,IMP18,IMP19,IMP20,IMP21,IMP22,IMP23,IMP24,IMP25,IMP26,IMP27,IMP28,IMP29,IMP30,IMP31,IMP32,IMP33,IMP34,IMP35,IMP36,IMP37,IMP38,IMP39,IMP40,IMP41,IMP42,IMP43,IMP44,IMP45,IMP46,IMP47,IMP48,IMP49,IMP50,IMP51,IMP52,IMP53,IMP54,IMP55,IMP56,IMP57,IMP58,IMP59,IMP60,IMP61,IMP62,IMP63,IMP64,IMP65,IMP66,IMP67,IMP68,IMP69,IMP70,IMP71,IMP72,IMP73,IMP74,IMP75,IMP76,IMP77,IMP78,IMP79,IMP80,IMP81,IMP82,IMP83,IMP84,IMP85,IMP86,IMP87,IMP88,IMP89,IMP90,IMP91,IMP92,IMP93,IMP94,IMP95,IMP96,IMP97,IMP98,IMP99,IMP100,IMP101,IMP102,IMP103,IMP104,IMP105,IMP106,IMP107,IMP108,IMP109,IMP110,IMP111,IMP112,IMP113,IMP114,IMP115,IMP116,IMP117,IMP118,IMP119,IMP120,IMP121,IMP122,IMP123,IMP124,IMP125,IMP126,IMP127,IMP128,IMP129,IMP130,IMP131,IMP132,IMP133,IMP134,IMP135,IMP136,IMP137,IMP138,IMP139,IMP140,IMP141,IMP142,IMP143,IMP144,IMP145,IMP146,IMP147,IMP148,IMP149,IMP150,IMP151,IMP152,IMP153,IMP154,IMP155,IMP156,IMP157,IMP158,IMP159,IMP160,IMP161,IMP162,IMP163,IMP164,IMP165,IMP166,IMP167,IMP168,IMP169,IMP170,IMP171,IMP172,IMP173,IMP174,IMP175,IMP176,IMP177,IMP178,IMP179,IMP180,IMP181,IMP182,IMP183,IMP184,IMP185,IMP186,IMP187,IMP188,IMP189,IMP190,IMP191,IMP192,IMP193,IMP194,IMP195,IMP196,IMP197,IMP198,IMP199,IMP200,IMP201,IMP202,IMP203,IMP204,IMP205,IMP206,IMP207,IMP208,IMP209,IMP210,IMP211,IMP212,IMP213,IMP214,IMP215,IMP216,IMP217,IMP218,IMP219,IMP220,IMP221,IMP222,IMP223,IMP224,IMP225,IMP226,IMP227,IMP228,IMP229,IMP230,IMP231,IMP232,IMP233,IMP234,IMP235,IMP236,IMP237,IMP238,IMP239,IMP240,IMP241,IMP242,IMP243,IMP244,IMP245,IMP246,IMP247,IMP248,IMP249,IMP250,IMP251,IMP252,IMP253,IMP254,IMP255,IMP256,IMP257,IMP258,IMP259,IMP260,IMP261,IMP262,IMP263,IMP264,IMP265,IMP266,IMP267,IMP268,IMP269,IMP270,IMP271,IMP272,IMP273,IMP274,IMP275,IMP276,IMP277,IMP278,IMP279,IMP280,IMP281,IMP282,IMP283,IMP284,IMP285,IMP286,IMP287,IMP288,IMP289,IMP290,IMP291,IMP292,IMP293,IMP294,IMP295,IMP296,IMP297,IMP298,IMP299,IMP300,IMP301,IMP302,IMP303,IMP304,IMP305,IMP306,IMP307,IMP308,IMP309,IMP310,IMP311,IMP312,IMP313,IMP314,IMP315,IMP316,IMP317,IMP318,IMP319,IMP320,IMP321,IMP322,IMP323,IMP324,IMP325,IMP326,IMP327,IMP328,IMP329,IMP330,IMP331,IMP332,IMP333,IMP334,IMP335,IMP336,IMP337,IMP338,IMP339,IMP340,IMP341,IMP342,IMP343,IMP344,IMP345,IMP346,IMP347,IMP348,IMP349,IMP350,IMP351,IMP352,IMP353,IMP354,IMP355,IMP356,IMP357,IMP358,IMP359,IMP360,IMP361,IMP362,IMP363,IMP364,IMP365,IMP366,IMP367,IMP368,IMP369,IMP370,IMP371,IMP372,IMP373,IMP374,IMP375,IMP376,IMP377,IMP378,IMP379,IMP380,IMP381,IMP382,IMP383,IMP384,IMP385,IMP386,IMP387,IMP388,IMP389,IMP390,IMP391,IMP392,IMP393,IMP394,IMP395,IMP396,IMP397,IMP398,IMP399,IMP400,IMP401,IMP402,IMP403,IMP404,IMP405,IMP406,IMP407,IMP408,IMP409,IMP410,IMP411,IMP412,IMP413,IMP414,IMP415,IMP416,IMP417,IMP418,IMP419,IMP420,IMP421,IMP422,IMP423,IMP424,IMP425,IMP426,IMP427,IMP428,IMP429,IMP430,IMP431,IMP432,IMP433,IMP434,IMP435,IMP436,IMP437,IMP438,IMP439,IMP440,IMP441,IMP442,IMP443,IMP444,IMP445,IMP446,IMP447,IMP448,IMP449,IMP450,IMP451,IMP452,IMP453,IMP454,IMP455,IMP456,IMP457,IMP458,IMP459,IMP460,IMP461,IMP462,IMP463,IMP464,IMP465,IMP466,IMP467,IMP468,IMP469,IMP470,IMP471,IMP472,IMP473,IMP474,IMP475,IMP476,IMP477,IMP478,IMP479,IMP480,IMP481,IMP482,IMP483,IMP484,IMP485,IMP486,IMP487,IMP488,IMP489,IMP490,IMP491,IMP492,IMP493,IMP494,IMP495,IMP496,IMP497,IMP498,IMP499,IMP500,IMP501,IMP502,IMP503,IMP504,IMP505,IMP506,IMP507,IMP508,IMP509,IMP510,IMP511,IMP512,IMP513,IMP514,IMP515,IMP516,IMP517,IMP518,IMP519,IMP520,IMP521,IMP522,IMP523,IMP524,IMP525,IMP526,IMP527,IMP528,IMP529,IMP530,IMP531,IMP532,IMP533,IMP534,IMP535,IMP536,IMP537,IMP538,IMP539,IMP540,IMP541,IMP542,IMP543,IMP544,IMP545,IMP546,IMP547,IMP548,IMP549,IMP550,IMP551,IMP552,IMP553,IMP554,IMP555,IMP556,IMP557,IMP558,IMP559,IMP560,IMP561,IMP562,IMP563,IMP564,IMP565,IMP566,IMP567,IMP568,IMP569,IMP570,IMP571,IMP572,IMP573,IMP574,IMP575,IMP576,IMP577,IMP578,IMP579,IMP580,IMP581,IMP582,IMP583,IMP584,IMP585,IMP586,IMP587,IMP588,IMP589,IMP590,IMP591,IMP592,IMP593,IMP594,IMP595,IMP596,IMP597,IMP598,IMP599,IMP600,IMP601,IMP602,IMP603,IMP604,IMP605,IMP606,IMP607,IMP608,IMP609,IMP610,IMP611,IMP612,IMP613,IMP614,IMP615,IMP616,IMP617,IMP618,IMP619,IMP620,IMP621,IMP622,IMP623,IMP624,IMP625,IMP626,IMP627,IMP628,IMP629,IMP630,IMP631,IMP632,IMP633,IMP634,IMP635,IMP636,IMP637,IMP638,IMP639,IMP640,IMP641,IMP642,IMP643,IMP644,IMP645,IMP646,IMP647,IMP648,IMP649,IMP650,IMP651,IMP652,IMP653,IMP654,IMP655,IMP656,IMP657,IMP658,IMP659,IMP660,IMP661,IMP662,IMP663,IMP664,IMP665,IMP666,IMP667,IMP668,IMP669,IMP670,IMP671,IMP672,IMP673,IMP674,IMP675,IMP676,IMP677,IMP678,IMP679,IMP680,IMP681,IMP682,IMP683,IMP684,IMP685,IMP686,IMP687,IMP688,IMP689,IMP690,IMP691,IMP692,IMP693,IMP694,IMP695,IMP696,IMP697,IMP698,IMP699,IMP700,IMP701,IMP702,IMP703,IMP704,IMP705,IMP706,IMP707,IMP708,IMP709,IMP710,IMP711,IMP712,IMP713,IMP714,IMP715,IMP716,IMP717,IMP718,IMP719,IMP720,IMP721,IMP722,IMP723,IMP724,IMP725,IMP726,IMP727,IMP728,IMP729,IMP730,IMP731,IMP732,IMP733,IMP734,IMP735,IMP736,IMP737,IMP738,IMP739,IMP740,IMP741,IMP742,IMP743,IMP744,IMP745,IMP746,IMP747,IMP748,IMP749,IMP750,IMP751,IMP752,IMP753,IMP754,IMP755,IMP756,IMP757,IMP758,IMP759,IMP760,IMP761,IMP762,IMP763,IMP764,IMP765,IMP766,IMP767,IMP768,IMP769,IMP770,IMP771,IMP772,IMP773,IMP774,IMP775,IMP776,IMP777,IMP778,IMP779,IMP780,IMP781,IMP782,IMP783,IMP784,IMP785,IMP786,IMP787,IMP788,IMP789,IMP790,IMP791,IMP792,IMP793,IMP794,IMP795,IMP796,IMP797,IMP798,IMP799,IMP800,IMP801,IMP802,IMP803,IMP804,IMP805,IMP806,IMP807,IMP808,IMP809,IMP810,IMP811,IMP812,IMP813,IMP814,IMP815,IMP816,IMP817,IMP818,IMP819,IMP820,IMP821,IMP822,IMP823,IMP824,IMP825,IMP826,IMP827,IMP828,IMP829,IMP830,IMP831,IMP832,IMP833,IMP834,IMP835,IMP836,IMP837,IMP838,IMP839,IMP840,IMP841,IMP842,IMP843,IMP844,IMP845,IMP846,IMP847,IMP848,IMP849,IMP850,IMP851,IMP852,IMP853,IMP854,IMP855,IMP856,IMP857,IMP858,IMP859,IMP860,IMP861,IMP862,IMP863,IMP864,IMP865,IMP866,IMP867,IMP868,IMP869,IMP870,IMP871,IMP872,IMP873,IMP874,IMP875,IMP876,IMP877,IMP878,IMP879,IMP880,IMP881,IMP882,IMP883,IMP884,IMP885,IMP886,IMP887,IMP888,IMP889,IMP890,IMP891,IMP892,IMP893,IMP894,IMP895,IMP896,IMP897,IMP898,IMP899,IMP900,IMP901,IMP902,IMP903,IMP904,IMP905,IMP906,IMP907,IMP908,IMP909,IMP910,IMP911,IMP912,IMP913,IMP914,IMP915,IMP916,IMP917,IMP918,IMP919,IMP920,IMP921,IMP922,IMP923,IMP924,IMP925,IMP926,IMP927,IMP928,IMP929,IMP930,IMP931,IMP932,IMP933,IMP934,IMP935,IMP936,IMP937,IMP938,IMP939,IMP940,IMP941,IMP942,IMP943,IMP944,IMP945,IMP946,IMP947,IMP948,IMP949,IMP950,IMP951,IMP952,IMP953,IMP954,IMP955,IMP956,IMP957,IMP958,IMP959,IMP960,IMP961,IMP962,IMP963,IMP964,IMP965,IMP966,IMP967,IMP968,IMP969,IMP970,IMP971,IMP972,IMP973,IMP974,IMP975,IMP976,IMP977,IMP978,IMP979,IMP980,IMP981,IMP982,IMP983,IMP984,IMP985,IMP986,IMP987,IMP988,IMP989,IMP990,IMP991,IMP992,IMP993,IMP994,IMP995,IMP996,IMP997,IMP998,IMP999,IMP1000 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|----|---------------------|---|----------|-----|--|
| | | | | | PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STAR13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TFNFAIP8L2,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 73 | Endocrine cancer | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities | 1.22E,10 | 244 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EP300,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FAS,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHR,GRK2,GRK6,GSTT2/GSTT2B,GTFF2,GTFF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STAR13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 74 | Clear cell neoplasm | Cancer,Organismal Injury and Abnormalities | 1.37E,10 | 53 | ACACB,ALB,ALK,AR,ASAP1,ATXN3,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPAH3,ERBB4,FAP,FN1,GAD2,GRHR,HBB,HLA,DRB1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PARP3,PDK4,PPP2R1A,PTPRE,PYGL,RARA,RBP5,RRM1,SMG7,SMTN,SULT1A1,TJP1,TLR4,ZCWPW1,ZNF292,ZNF462 |
| 75 | Gonadal tumor | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 1.38E,10 | 82 | ALB,ALK,ANG,AOC3,AR,ARF6,ARHGFE1,ASAP1,B2M,BCR,CA8,CD74,CLK1,CSF2RB,CSNK1G1,CSTF2,CTCF,DPP4,EP300,EPAH3,ESR1,F2,FAP,FAS,FN1,GAD2,GART,GC,HBEGF,HCK,HNRNPA2B1,HSP90AB1,HTR1A,IFNGR1,IMPDH1,ITPA,ITSN1,MAGEA4,MAGI2,MAP3K3,MMP1,MMP2,MSH2,MUC1,NBEA,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,ODC1,PARP3,PC,PDK4,PGC,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRF,PYGL,RAC1,RARG,RBM39,RRM1,RTN4IP1,SERPINA5,SFMBT2,SH3YL1,SKP1,SMTN,SYT13,TAF13,THBS2,TLR4,TTR,UTRN,VAV3,VEGFB,WWP1,XIAP,ZEB2 |
| 76 | Signal transduction | Cell,To,Cell Signaling and Interaction | 1.39E,10 | 47 | ACVR2B,ALK,APPL1,AR,ARHGFE1,BCR,BTK,BTRC,CAMK4,CSNK1G2,DAPK2,DOK2,ERBB4,ESR1,F2,FAS,FLNB,GRK2,GRK6,HASPIN,HBEGF,HLA,DRB1,HMOX1,HTR1A,IFNG,IFNGR1,IGF1R,ITPK1,ITSN1,MAP3K3,MAPK6,MARK1,NAE1,NFATC1,NR1I3,OXSR1,PPARG,PSAP,PTK2B,RAC1,RARA,RGS6,S100A6,SFN,STK4,THBS2,VAV3 |
| 77 | Incidence of tumor | Cancer,Organismal Injury and Abnormalities | 1.51E,10 | 238 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CDK5R1,CERT1,CHKA,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPAH3,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,PHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRHR,GRK2,GRK6,GTFF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,M |

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| | | | | | TAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,WWP1,XIAP,XRCC6,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 78 | Metastatic carcinoma | Cancer,Organismal Injury and Abnormalities | 1.53E,10 | 22 | ALB,ALK,AR,B2M,CYP17A1,ERBB4,ESR1,F3,FAS,FN1,GART,GGPS1,HSP90AB1,IGF1R,MMP2,MUC1,NR1I3,PARP3,PGC,PTK2B,RAC1,RRM1 |
| 79 | Cell death of cancer cells | Cancer,Cell Death and Survival,Organismal Injury and Abnormalities,Tumor Morphology | 1.55E,10 | 19 | ALB,AR,ATP7B,B2M,BTK,CD74,FAS,FHIT,GRK6,HMOX1,IFNG,IGF1R,MUC1,NCOA3,PPARG,PTK2B,RAC1,RARA,XIAP |
| 80 | Mature T,cell or NK,cell neoplasm | Cancer,Hematological Disease,Organismal Injury and Abnormalities | 1.65E,10 | 36 | ALK,B2M,C1R,CD1A,CLK1,CTCF,DPP4,EP300,EPHA3,ERBB4,FAS,FHIT,FN1,GTF2I,HCK,HDAC7,HNRNPA2B1,HSP90AB1,IMPDH1,MMP1,MMP2,MUC1,NFATC1,NOTCH1,NT5C3A,ODC1,POT1,POU2F1,PRKCB,PTPRE,RARA,RARG,RRM1,TAF13,TJP1,TLR4 |
| 81 | Malignant solid tumor | Cancer,Organismal Injury and Abnormalities | 1.74E,10 | 286 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACP3,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIL101,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 82 | Cell viability of tumor cell lines | Cell Death and Survival | 1.75E,10 | 53 | ACVR2B,ALB,ALK,ALOX12,APEX1,AR,ATP7B,BCR,BTK,BTRC,CHKA,DGKA,DOK2,DPP4,EP300,ERBB4,ESR1,FAS,FHIT,FN1,GRK2,GRK6,HBB,HBEGF,HCK,HK2,HMOX1,HSP90AB1,IFNG,IGF1R,ITGB3,KIF11,MSH2,NAE1,NDC80,NME3,NOTCH1,NT5C3A,PDHA1,PPP2R1A,PTK2B,PTPRE,RAC1,RBM39,RRM1,RUVBL1,S100A6,SEM1,SFN,TRIM21,WEE1,XIAP,XRCC6 |
| 83 | B,cell non,Hodgkin lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.93E,10 | 51 | ALK,ANXA6,ARHGEF1,ATXN3,B2M,BCR,BTK,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,ECI2,EP300,EPHA3,ERBB4,FAS,FCGR2A,FN1,GTF2I,HAT1,HDAC7,HMOX1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,MMP2,NCBP1,NFATC1,NOTCH1,PC,PGK1,POT1,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RRM1,SEM1,SLC5A1,SNX1,THBS2,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 84 | Breast or gynecological cancer | Cancer,Organismal Injury and | 2.01E,10 | 194 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,ANG,AOC3,APPL1,AR,ARF6,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CERT1,CLCN5,CLK1,CSDE1, |

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| | | Abnormalities, Reproductive System Disease | | | CSF2RB, CSNK1G1, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DHPS, DMC1, DOK2, DPP4, DTYMK, EP300, EPHA3, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FABP7, FAP, FAS, FCGR2A, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GC, GGPS1, GRHRP, GRK2, GRK6, GTF2I, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HLA, DRB1, HMBOX1, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IFNGR1, IGF1R, IMPDH1, IQUB, ITGB3, ITPA, ITPKC, ITSN1, KIF11, KMT5A, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MDH1, MEMO1, MMP1, MMP2, MSH2, MSN, MUC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1I3, NT5C3A, NUP214, OAT, ODC1, OXSR1, PAFAH1B2, PANK1, PARN, PARP3, PATJ, PC, PDK3, PDK4, PGC, PGK1, PHF24, POU2F1, PPARG, PPP2R1A, PRKCB, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, S100A6, SART3, SENP2, SERPINA5, SF3B6, SFMBT2, SH3YL1, SKP1, SLC5A1, SLK, SMG5, SMG7, SMTN, SMURF2, SNX1, STK4, SUB1, SULT1A1, SYT13, THBS2, TJP1, TLR4, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, WEE1, WWP1, XIAP, YWHAQ, YY1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 85 | T, cell non, Hodgkin lymphoma | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 2.10E,10 | 34 | ALK, B2M, C1R, CD1A, CLK1, CTCF, DPP4, EP300, EPHA3, ERBB4, FAS, FHIT, FN1, GTF2I, HCK, HDAC7, HNRNPA2B1, HSP90AB1, IMPDH1, MMP1, MMP2, MUC1, NFATC1, NOTCH1, NT5C3A, ODC1, POT1, POU2F1, PRKCB, RARA, RARG, RRM1, TJP1, TLR4 |
| 86 | Ovarian tumor | Cancer, Endocrine System Disorders, Organismal Injury and Abnormalities, Reproductive System Disease | 2.11E,10 | 79 | ALB, ALK, ANG, AOC3, AR, ARF6, ARHGEF1, ASAP1, B2M, BCR, CA8, CD74, CLK1, CSF2RB, CSNK1G1, CSTF2, CTCF, DPP4, EP300, EPHA3, ESR1, F2, FAP, FAS, FN1, GAD2, GART, GC, HBEGF, HCK, HNRNPA2B1, HSP90AB1, HTR1A, IFNGR1, IMPDH1, ITPA, ITSN1, MAGEA4, MAGI2, MAP3K3, MMP1, MMP2, MSH2, MUC1, NBEA, NCOA3, NF2, NOTCH1, NR1I3, NT5C3A, ODC1, PARP3, PC, PDK4, PGC, POU2F1, PPARG, PPP2R1A, PRKCB, PTPRF, PYGL, RBM39, RRM1, RTN4IP1, SERPINA5, SFMBT2, SH3YL1, SKP1, SMTN, SYT13, THBS2, TLR4, TTR, UTRN, VAV3, VEGFB, WWP1, XIAP, ZEB2 |
| 87 | Recurrent malignant solid tumor | Cancer, Organismal Injury and Abnormalities | 2.23E,10 | 20 | ALB, ALK, AR, BTK, CSF2RB, CYP17A1, ERBB4, ESR1, F3, GART, HDAC7, HSP90AB1, IGF1R, IMPDH1, ODC1, PARP3, PTK2B, RARA, RARG, RRM1 |
| 88 | Frequency of tumor | Cancer, Organismal Injury and Abnormalities | 2.31E,10 | 234 | AASDHPPT, ACACB, ACADSB, ACADVL, ACBD7, ACY1, ADH1C, ADH7, ALB, ALK, ALOX12, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CDK5R1, CERT1, CHKA, CLCN5, CLK1, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DCXR, DFFA, DGKA, DHPS, DOK2, DPP4, DSG2, DTYMK, ECHS1, EP300, EPHA3, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FABP3, FABP7, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GGPS1, GRHRP, GRK2, GRK6, GTF2I, HSPIN, HBB, HBEGF, HCK, HDAC7, HDX, HIBCH, HLA, DRB1, HMBOX1, HMGB3, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPDH1, IQUB, ITGB3, ITPA, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1I3, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, PIP4K2C, POU2F1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEMA4D, SENP2, SERPINA5, SF3B6, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, STK4, SUB1, SULT1A1, SYT13, TAF13, THBS2, TJP1, TLR4, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, VEGFB, WEE1, WHRN, WWP1, XIAP, XRCC6, YY1, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 89 | Breast or pancreatic cancer | Cancer, Organismal Injury and Abnormalities | 2.34E,10 | 160 | ACACB, ACAT2, ALB, ALK, ANG, AOC3, APPL1, AR, ARF6, ARHGEF1, ASAP1, ATP7B, B2M, BCR, BMP1, BPI, BTK, BTRC, CA8, CAMK4, CANT1, CD74, CDK5R1, CERT1, CHKA, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G1, CSTF2, CTCF, CYP17A1, CYP2E1, DAPK2, DCTD, DFFA, DPP4, EP300, EPHA3, ERBB4, ESR1, EXOSC9, F2, F3, FABP7, FAP, FAS, FLNB, FN1, GAD2, GALNT10, GART, GC, GGPS1, GRHRP, GRK2, GRK6, GTF2I, HAT1, HBB, HBEGF, HCK, HDAC7, HLA, DRB1, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSP90AB1, HTR1A, IFNGR1, IGF1R, IMPDH1, ITGB3, ITPA, ITPKC, ITSN1, KIF11, KMT5A, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MMP1, MMP2, MSH2, MSN, MUC1, MYBPC1, MYBPC3, NAE1, NBEA, NCOA3, NDC80, NF2, NFATC1, NOTCH1, NR1I3, NT5C3A, NUP214, ODC1, OXSR1, PA2G4, PAFAH1B2, PARP3, PC, PDHA1, PDK3, PDK4, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RRM1, RTN4IP1, S100A6, SENP2, SERP |

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| | | | | | INA5,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,THBS2,TJP1,TLR4,TTR,USP19,UTRN,VAV3,WEE1,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 90 | Advanced stage carcinoma | Cancer,Organismal Injury and Abnormalities | 2.60E,10 | 26 | ALB,ALK,AR,B2M,BCR,CYP17A1,DPP4,ERBB4,ESR1,F3,FAS,FN1,GART,GGPS1,HSP90AB1,IGF1R,MMP2,MUC1,NR1I3,PARP3,PGC,PTK2B,RRM1,SKP1,VAV3,VEGFB |
| 91 | Mature T,cell neoplasm | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 2.68E,10 | 35 | ALK,B2M,C1R,CD1A,CLK1,CTCF,DPP4,EP300,EPAH3,ERBB4,FAS,FHIT,FN1,GTF2I,HCK,HDAC7,HNRNPA2B1,HSP90AB1,MMP1,MMP2,MUC1,NFATC1,NOTCH1,NT5C3A,ODC1,POT1,POU2F1,PRKCB,PTPRE,RARA,RRM1,ARG,RRM1,TAF13,TJP1,TLR4 |
| 92 | Endocrine gland tumor | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities | 2.70E,10 | 245 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EP300,ERBB4,ERI1,ESR1,ETF1,F2,F3,FABP3,FAP,FAS,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PK3,PK4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PPAR,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 93 | Tumorigenesis of epithelial neoplasm | Cancer,Organismal Injury and Abnormalities | 2.74E,10 | 233 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CDK5R1,CERT1,CHKA,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPAH3,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PK3,PK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STAR D13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,WWP1,XIAP,XRCC6,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 94 | Clear,cell adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 3.21E,10 | 52 | ACACB,ALB,ALK,AR,ASAP1,ATXN3,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPAH3,ERBB4,FAP,FN1,GRHPR,HBB,HLA,DRB1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PARP3,PK4,PPP2R1A,PTPRE,PYGL,RARA,RBP5,RRM1,SMG7,SMTN,SULT1A1,TJP1,TLR4,ZCWPW1,ZNF292,ZNF462 |

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| 95 | Organismal death | Organismal Survival | 3.21E,10 | 40 | ALK,AOC3,AR,CD74,CLK1,DPP4,ECHS1,ESR1,F2,FABP7,FAP,FHIT,FN1,HBEGF,HSP90AB1,IFNG,IFNGR1,IGF1R,ITGB3,MDH1,MMP2,MSN,MUC1,NAE1,NCOA3,NDC80,NOTCH1,ODC1,OXSR1,PDHA1,PGK1,PPARG,RAC1,RARA,RARG,STARD13,STK4,THBS2,VAV3,ZEB2 |
| 96 | Mature B cell malignant tumor | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 3.27E,10 | 58 | ALK,ANXA6,ARHGFE1,ATXN3,B2M,BCR,BTK,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,ECI2,EP300,EPH A3,ERBB4,FAS,FCGR2A,FN1,GART,GGPS1,GRHPR,GTF2I,HAT1,HLA,DRB1,HMOX1,HSP90AB1,IFNG,IMP DH1,IQUB,ITGB3,ITPK1,MMP2,NAE1,NCBP1,NDC80,NFATC1,NOTCH1,PC,PGK1,POT1,PRKCB,PTK2B,PTP RE,PTPRF,RAC1,RARA,RRM1,SEM1,SLC5A1,SNX1,THBS2,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 97 | Allergy | Immunological Disease | 3.51E,10 | 26 | ACADVL,AR,C1R,CD1A,CD74,CSF2RB,DPP4,ESR1,FAS,G6PD,GRK2,HBB,HCK,HLA,DRB1,HTR1A,IDE,IFN G,KLK1,MSN,PDK4,PPARG,PRKCB,PSAP,RUVBL1,TLR4,XRCC6 |
| 98 | Apoptosis of tumor cells | Cancer,Cell Death and Survival,Organismal Injury and Abnormalities,Tumor Morphology | 3.75E,10 | 17 | ALB,AR,B2M,BTK,F2,FAS,FHIT,HBEGF,HMOX1,IFNG,IGF1R,MUC1,NCOA3,NOTCH1,RAC1,RARA,XIAP |
| 99 | Epithelial neoplasm | Cancer,Organismal Injury and Abnormalities | 3.87E,10 | 281 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK, ALOX12,AMY1C (includes others),ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3 GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIAO1, CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,C YP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPH A3,EP300,EPH A3,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD, GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN, HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMGCS1,HMOX1,HNR NPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQU B,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,M ARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MY SM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NS UN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,P CYT2,PDF,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1 A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6, RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SF N,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,S TK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN, VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,Z FP28,ZIC3,ZNF292,ZNF462 |
| 100 | Stage IV malignant tumor | Cancer,Organismal Injury and Abnormalities | 4.22E,10 | 19 | ALB,ALK,AR,BTK,CSF2RB,CYP17A1,ERBB4,ESR1,FCGR2A,FN1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,R ARA,RARG,RRM1,VEGFB |
| 101 | Malignant genitourinary solid tumor | Cancer,Organismal Injury and Abnormalities | 4.34E,10 | 225 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1, AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C1R,C8A,CA8,C AMK4,CANT1,CD1A,CD74,CERT1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,C YP2E1,CYP7A1,DAPK2,DCTD,DGKA,DHPS,DMC1,DOK2,DPP4,DTYMK,ECHS1,EP300,EPA3,EP300,EPH B4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC, GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMB OX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPD H1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6, MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1, NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,OD C1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,P OU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP |

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| | | | | | 5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,WEE1,WHRN,WWP1,XIAP,YWHAQ,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 102 | Pelvic cancer | Cancer,Organismal Injury and Abnormalities | 4.34E,10 | 209 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ADH7,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C1R,C8A,CA8,CA8,CA8,CAMK4,CANT1,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DGKA,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPA3,EPS8L2,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEFG,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WHRN,WWP1,XIAP,YWHAQ,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 103 | Genitourinary tumor | Cancer,Organismal Injury and Abnormalities | 4.55E,10 | 227 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CERT1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DGKA,DHPS,DMC1,DOK2,DPP4,DTYMK,ECHS1,EP300,EPA3,EPS8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HAT1,HBB,HBEFG,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,CLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,WWP1,XIAP,YWHAQ,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 104 | Renal lesion | Organismal Injury and Abnormalities, Renal and Urological Disease | 4.87E,10 | 64 | ACACB,ALB,AR,ASAP1,ATXN3,B2M,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPA3,ERBB4,ESR1,FAP,FN1,G6PD,GGPS1,GRHPR,HBB,HIBCH,HLA,DRB1,HMOX1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,CLK1,MMP2,MSH2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PDK4,PPARG,PPP2R1A,PRKCB,PTPRE,PYGL,RARA,RARG,RBP5,RRM1,SMG7,SMTN,SMURF2,SULT1A1,TJP1,TLR4,UTRN,YY1,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 105 | Development of malignant tumor | Cancer,Organismal Injury and Abnormalities | 5.34E,10 | 232 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CDK5R1,CERT1,CHKA,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPA3,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEFG,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,CLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT |

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| | | | | | T,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PKD3,PKD4,PEX5,PGC,PGK1,PHF24,PIP4K2C,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STAR13,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WE1,WHRN,WWP1,XIAP,XRCC6,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 106 | Endocrine carcinoma | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities | 6.05E,10 | 242 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACVR2B,ACY1,ADH7,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APPL1,AR,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C8A,CA8,CANT1,CD1A,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,EP300,EP300,ERBB4,ERI1,ESR1,ETF1,F2,F3,FAP,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HSP90AB1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDF,PDHA1,PKD3,PKD4,PEX5,PGK1,PHF24,PIP4K2C,PNMT,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STAR13,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3,VPS26A,WE1,WHRN,WWP1,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 107 | Ovarian cancer | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 6.13E,10 | 77 | ALB,ALK,ANG,AOC3,AR,ARF6,ARHGFE1,ASAP1,B2M,BCR,CA8,CD74,CLK1,CSF2RB,CSNK1G1,CSTF2,CTCF,DPP4,EP300,EPAH3,ESR1,F2,FAP,FAS,FN1,GAD2,GART,GC,HBEGF,HCK,HNRNPA2B1,HSP90AB1,HTR1A,IFNGR1,ITPA,ITSN1,MAGEA4,MAGI2,MAP3K3,MMP1,MMP2,MSH2,MUC1,NBEA,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,ODC1,PARP3,PC,PKD4,PGC,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRF,PYGL,RBM39,RRM1,RTN4IP1,SERPINA5,SFMBT2,SH3YL1,SKP1,SMTN,SYT13,THBS2,TLR4,TTR,UTRN,VAV3,WWP1,XIAP,ZEB2 |
| 108 | Development of carcinoma | Cancer,Organismal Injury and Abnormalities | 6.54E,10 | 231 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CDK5R1,CERT1,CHKA,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPAH3,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FBP1,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PKD3,PKD4,PEX5,PGC,PGK1,PHF24,PIP4K2C,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STAR13,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WE1,WHRN,WWP1,XIAP,XRCC6,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 109 | Renal tumor | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 7.57E,10 | 63 | ACACB,ALB,AR,ASAP1,ATXN3,B2M,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPAH3,ERBB4,ESR1,FAP,FN1,G6PD,GGPS1,GRHPR,HBB,HIBCH,HLA,DRB1,HMOX1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MSH2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PKD4,PPAR |

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| | | | | | G,PPP2R1A,PRKCB,PTPRE,PYGL,RARA,RARG,RBP5,RRM1,SMG7,SMTN,SULT1A1,TJP1,TLR4,UTRN,YY1,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 110 | Development of genital tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 7.77E,10 | 169 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,AOC3,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAPI,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CD1A,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPA3,ERBB4,ESR1,ETF1,F2,F3,FAP7,FABP7,FAP,P,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GART,GRHPR,GRK2,ITPA,ITPKC,ITSN1,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,PANK1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,POU2F1,PPARG,PPP2R1A,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SENP2,SERPINA5,SF3B6,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,UEVLD,UTRN,VAV3,WEE1,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 111 | Genitourinary adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 8.97E,10 | 196 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ALB,ALK,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAPI,ATP7B,ATXN3,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CAMK4,CANT1,CD1A,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DMC1,DOK2,DPP4,DTYMK,ECHS1,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,F2,F3,FAP,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KLK1,KMT5A,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,MYSM1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 112 | Infection by RNA virus | Infectious Diseases | 9.48E,10 | 55 | ACACB,ACADSB,ACP3,ADH1C,ADH7,ALB,ALOX12,AR,ARF6,B2M,BCR,BMP1,C1R,C8A,CANT1,CD74,CSF2RB,CTCF,DAPK2,DHPS,DPP4,EP300,ESR1,ETF1,F2,FAS,FCGR2A,FN1,GGPS1,GRK2,HBB,HIBCH,HLA,DRB1,HMGCS1,IFNG,IGF1R,IMPDH1,IQUB,ITGB3,LARS1,NBEA,NF2,NMT1,NUP214,PANK1,PPARG,PRKCB,RARA,RARG,RND1,RRM1,SUB1,TLR4,XIAP,ZNF292 |
| 113 | Renal cancer | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 1.00E,09 | 62 | ACACB,ALB,AR,ASAPI,ATXN3,B2M,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPA3,ERBB4,ESR1,FAP,FN1,G6PD,GGPS1,GRHPR,HBB,HIBCH,HLA,DRB1,HMOX1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MSH2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PDK4,PPARG,PPP2R1A,PRKCB,PTPRE,PYGL,RARA,RARG,RBP5,RRM1,SMG7,SMTN,SULT1A1,TJP1,TLR4,UTRN,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 114 | Systemic autoimmune syndrome | Immunological Disease | 1.26E,09 | 59 | ADH1C,ALB,ALOX12,ANG,AR,ASAPI,B2M,BPI,C1R,CD1A,CD74,CDK5R1,CSF2RB,CYP2E1,CYP2R1,DPP4,ECI2,ESR1,EXOSC9,FAS,FCGR2A,FN1,GC,HCK,HDAC7,HLA,DRB1,HMOX1,IDE,IFNG,IGF1R,IMPDH1,ITPA,MMP1,MMP2,MTAP,MUC1,NF2,PGK1,PPARG,PRKCB,PTK2B,PTPRE,PTPRF,RARA,RARG,RGS6,S100A6,SF3B6,SLC5A1,SMG7,TAF13,TIMM9,TJP1,TLR4,TRIM21,VEGFB,WARS1,XIAP,XRCC6 |
| 115 | Genital tract cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.32E,09 | 200 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAPI,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C1R,C8A,CA8,CANT1,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,F2,F3,FAP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NC |

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| | | | | | BP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PKK3,PKK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZFP28,ZIC3,ZNF462 |
| 116 | Advanced extracranial solid tumor | Cancer,Organismal Injury and Abnormalities | 1.33E,09 | 35 | ALB,ALK,AOC3,AR,B2M,BCR,BTK,C1R,CYP17A1,DPP4,DSG2,ERBB4,ESR1,F3,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,HMOX1,HSP90AB1,IGF1R,MMP2,MUC1,NR1I3,PARP3,PGC,PTK2B,RAC1,RARG,RRM1,SKP1,VA V3,VEGFB |
| 117 | Carcinoma | Cancer,Organismal Injury and Abnormalities | 1.63E,09 | 280 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,B3GAT3,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CERT1,CHKA,CIAO1,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPH A3,EP8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GSTT2/GSTT2B,GTF2F2,GTF2I,HADH,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2 B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITG B3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NDUFAB1,NF2,NFATC1,NME3,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,N T5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,P DF,PDHA1,PKK2,PKK3,PKK4,PEX5,PGC,PGK1,PHF24,PIP4K2C,PNMT,POT1,POU2F1,PPARG,PPP2R1A,PRK CB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1, RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH2 B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SPEF1,STARD13,STK16,ST K4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,TXNDC12,UEVLD,USP19,UTRN,VAV3, VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28, ZIC3,ZNF292,ZNF462 |
| 118 | Mature B,cell neoplasm | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.69E,09 | 65 | ALK,ALOX12,ANXA6,ARHGEF1,ATXN3,B2M,BCR,BTK,CD74,CLK1,CSDE1,CSF2RB,CSTF2,CTCF,DGKA,D PP4,ECI2,EP300,EPA3,ERBB4,FAS,FCGR2A,FN1,GAD2,GART,GGPS1,GRHPR,GTF2F2,GTF2I,HAT1,HLA,DR B1,HMOX1,HSP90AB1,IFNG,IMPDH1,IQUB,ITGB3,ITPK1,MAGI2,MMP2,NAE1,NCBP1,NDC80,NFATC1,N OTCH1,PC,PGK1,POT1,PRKCB,PTK2B,PTPRE,PTPRF,RAC1,RARA,RRM1,SEM1,SLC5A1,SNX1,TAF13,THBS 2,TXNDC12,VAV3,XIAP,XRCC6,ZNF292 |
| 119 | Anogenital cancer | Cancer,Organismal Injury and Abnormalities | 1.74E,09 | 214 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACP3,ACY1,ALB,ALK,ANG,ANXA6,AOC3,APEX1,APPL1, AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C1R,C8A,CA8,CAMK4, CANT1,CD1A,CD74,CERT1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1, CYP7A1,DAPK2,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,EXOSC 9,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2, GRK6,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX 1,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPA,ITPKC,IT SN1,KIF11,KMT5A,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1 ,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NDC80,NF2,NFATC1,N MRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PAFAH1B2,PANK1,PAPSS1,PARN,PARP 3,PATJ,PC,PKK3,PKK4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PY GL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEMA4D,SENP 2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,ST K4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,WEE1,WHR N,WWP1,XIAP,YWHAQ,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |

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| 120 | Cell death of breast cancer cell lines | Cell Death and Survival | 1.90E,09 | 27 | AR,B2M,BTK,BTRC,CTCF,EP300,ESR1,FAS,FHIT,FN1,HK2,HMOX1,HSP90AB1,IFNG,IGF1R,IQUB,KIF11,MSH2,MUC1,NCOA3,NOTCH1,PA2G4,PDHA1,PPARG,RAC1,SFN,XIAP |
| 121 | Cell proliferation of breast cancer cell lines | Cellular Development,Cellular Growth and Proliferation | 2.25E,09 | 34 | AR,CHKA,CTCF,DTYMK,EP300,ERBB4,ESR1,F3,FAS,FN1,HAT1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MAPK6,MATK,MEMO1,MTAP,NCOA3,PA2G4,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,RAC1,RARA,SFN,TRIM21,UTRN,YWHAQ,YY1 |
| 122 | Stage IV solid tumor | Cancer,Organismal Injury and Abnormalities | 2.30E,09 | 17 | ALB,ALK,AR,BTK,CSF2RB,CYP17A1,ERBB4,ESR1,FCGR2A,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RARA,RARG,RRM1 |
| 123 | Female genital tract cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 2.57E,09 | 168 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,ANG,AOC3,APPL1,AR,ARF6,ARHGFE1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,BTRC,C8A,CA8,CD1A,CD74,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPA3,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GART,GC,GRHPR,GRK2,GTF2I,HBB,HBEGF,HCK,HDX,HMBOX1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNGR1,IGF1R,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,PANK1,PARN,PARP3,PATJ,PC,PDK3,PGK1,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SAR,ST3,SENP2,SERPINA5,SF3B6,SFMBT2,SH3YL1,SKP1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,UTRN,VAV3,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 124 | Cell movement | Cellular Movement | 2.88E,09 | 71 | ALB,ALOX12,AOC3,APPL1,AR,ARF6,ARHGFE1,ASAP1,BTK,CD74,CERT1,CUL1,DAPK2,DGKA,DOK2,DPP4,ERBB4,ESR1,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,GC,GRK6,GTF2I,HBEGF,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,MAPK6,MATK,MMP1,MMP2,MSN,MUC1,NCOA3,NF2,NFATC1,NOTCH1,PA2G4,PATJ,PPARG,PRKCB,PTK2B,PTPRF,RAC1,RARG,RUVBL1,SEMA4D,SERPINA5,SFN,SLK,STARD13,STK4,THBS2,TJP1,TLR4,VAV3,VEGFB,WARS1,XIAP,YARS1,YY1,ZEB2 |
| 125 | Transactivation of RNA | Gene Expression | 2.89E,09 | 27 | ACACB,APPL1,AR,ARHGFE1,BCR,BTRC,CIAO1,DPP4,EP300,ERBB4,ESR1,GTF2I,IFNG,ITSN1,NCOA3,NFATC1,NOTCH1,NR1I3,POU2F1,PPARG,RAC1,RARA,RARG,SUB1,XIAP,YWHAQ,YY1 |
| 126 | Invasion of tumor cell lines | Cellular Movement | 3.13E,09 | 46 | APEX1,AR,ARF6,ASAP1,CD74,CDK5R1,CTCF,DGKA,DPP4,ERBB4,ESR1,F2,F3,FAP,FAS,FHIT,FN1,HBEGF,HMOX1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,ITGB3,MAPK6,MATK,MMP1,MMP2,MUC1,NCOA3,NOTCH1,PA2G4,PPARG,PTK2B,RAC1,RARG,RUVBL1,S100A6,SFN,SMURF2,TJP1,VEGFB,VPS26A,XIAP,YWHAQ,YY1,ZEB2 |
| 127 | Refractory tumor | Cancer,Organismal Injury and Abnormalities | 3.68E,09 | 20 | ALB,ALK,AR,BCR,BTK,ERBB4,ESR1,GART,GGPS1,HCK,HDAC7,HMOX1,HSP90AB1,IMPDH1,PARP3,PTK2B,RARA,RARG,RRM1,VEGFB |
| 128 | Renal cell carcinoma | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 3.75E,09 | 57 | ACACB,ALB,AR,ASAP1,ATXN3,B2M,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPA3,ERBB4,ESR1,FAP,FN1,G6PD,GGPS1,GRHPR,HBB,HLA,DRB1,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MSH2,MUC1,MYBPC1,NCOA3,NF2,NOTCH1,NR1I3,NUP214,PANK1,PDK4,PPARG,PPP2R1A,PTPRE,PYGL,RARA,RBP5,RRM1,SMG7,SMTN,SULT1A1,TJP1,TLR4,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 129 | Progressive metastatic solid tumor | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 4.17E,09 | 14 | ALK,AR,CSF2RB,CYP17A1,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1,VEGFB |
| 130 | Ductal carcinoma | Cancer,Organismal Injury and Abnormalities | 4.67E,09 | 106 | ACACB,ACAT2,ACY1,ADH1C,ALB,ALK,APPL1,AR,ATP7B,BPI,BTK,BTRC,CAMK4,CDK5R1,CHKA,CLK1,CRYM,CSDE1,CSNK1G1,CSTF2,CTCF,DAPK2,DCTD,DDFA,DPP4,DSG2,EP300,EPA3,EP8L2,ERBB4,ESR1,F2,F3,FAP,FLNB,FN1,GC,GRHPR,GRK2,GRK6,GTF2I,HCK,HDAC7,HLA,DRB1,HMGCS1,HPD,HSP90AB1,IFNGR1,IGF1R,ITPKC,ITSN1,KIF11,KMT5A,LRBA,MAGI2,MAPK6,MARK1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,NUP214,OXSR1,PA2G4,PARP3,PC,PDHA1,PDK3,PDK4,PGK1,PHF24,POT1,POU2F1,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RBBP6,RBM39,RRM1,SENP2,SFN,SH2B2,SLK,SMURF2,TJP1,TLR4,TRIM21,UEVLD,UTRN,VAV3,WEE1,ZEB2,ZFP28,ZNF292 |
| 131 | Renal clear cell adenocarcinoma | Cancer,Organismal Injury and | 5.31E,09 | 48 | ACACB,ALB,AR,ASAP1,ATXN3,BTRC,CANT1,CSF2RB,CTCF,CYP17A1,ECHS1,EP300,EPA3,ERBB4,FAP,FN1,GRHPR,HBB,HLA,DRB1,HSD17B4,IGF1R,IMPDH1,ITGB3,KIF11,KLK1,MMP2,MUC1,MYBPC1,NCOA3,N |

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| | | Abnormalities, Renal and Urological Disease | | | F2, NOTCH1, NR1I3, NUP214, PANK1, PDK4, PPP2R1A, PTPRE, PYGL, RARA, RBP5, SMG7, SMTN, SULT1A1, TJP1, TLR4, ZCWPW1, ZNF292, ZNF462 |
| 132 | Binding of tumor cell lines | Cell, To, Cell Signaling and Interaction | 5.54E,09 | 27 | AR, ARHGEF1, DPP4, DSG2, ESR1, F2, F3, FAS, FCGR2A, FN1, GRK6, HCK, IFNG, IGF1R, ITGB3, MMP2, MUC1, NOTCH1, PPARG, PTK2B, RAC1, SERPINA5, SNX1, TJP1, TLR4, UTRN, ZEB2 |
| 133 | Invasion of cells | Cellular Movement | 6.07E,09 | 48 | APEX1, AR, ARF6, ASAP1, CD74, CDK5R1, CTCF, DGKA, DPP4, ERBB4, ESR1, F2, F3, FAP, FAS, FHIT, FN1, HBEGF, HMOX1, HNRNPA2B1, HSP90AB1, IFNG, IGF1R, ITGB3, MAPK6, MATK, MMP1, MMP2, MUC1, NCOA3, NOTCH1, PA2G4, PPARG, PTK2B, RAC1, RARG, RUVBL1, S100A6, SFN, SMURF2, THBS2, TJP1, VEGFB, VPS26A, XIAP, YWHAQ, YY1, ZEB2 |
| 134 | Anemia | Cardiovascular Disease, Hematological Disease, Organismal Injury and Abnormalities | 6.60E,09 | 24 | ACADVL, ALK, AR, CSF2RB, DPP4, EP300, ESR1, F3, FAS, FCGR2A, G6PD, GRHPR, HBB, HMOX1, IFNG, IMPDH1, ITPA, KLK1, NT5C3A, PTPRE, RARA, RARG, RRM1, TAF13 |
| 135 | Genitourinary carcinoma | Cancer, Organismal Injury and Abnormalities | 7.05E,09 | 213 | AASDHPPT, ACACB, ACADSB, ACADVL, ACBD7, ACY1, ALB, ALK, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BTK, BTRC, C8A, CA8, CAMK4, CANT1, CD1A, CLCN5, CLK1, CSDE1, CSF2RB, CSNK1G1, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DGKA, DHPS, DMC1, DOK2, DPP4, DTYMK, ECHS1, EP300, EPHA3, EPS8L2, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FAP, FAS, FCGR2A, FLNB, FN1, G6PD, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GRK6, GTF2I, HASPIN, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HLA, DRB1, HMBOX1, HMGB3, HMGS1, HNRNPA2B1, HSD17B4, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IMPDH1, IQUB, ITGB3, ITPA, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1I3, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPS1, PARN, PARP3, PATJ, PC, PDK3, PDK4, PGC, PGK1, PHF24, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SENP2, SERPINA5, SF3B6, SFMBT2, SFN, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, STK4, SUB1, SULT1A1, SYT13, THBS2, TJP1, TLR4, TRIM21, UEVLD, USP19, UTRN, VAV3, WEE1, WHRN, WWP1, XIAP, YWHAQ, YY1, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 136 | Migration of cells | Cellular Movement | 8.58E,09 | 65 | ALB, ALOX12, AOC3, APPL1, AR, ARF6, ARHGEF1, ASAP1, BTK, CD74, CUL1, DAPK2, DOK2, DPP4, ESR1, F2, F3, FAP, FAS, FHIT, FLNB, FN1, GRK6, HBEGF, HMOX1, HNRNPA2B1, IFNG, IGF1R, ITGB3, MAPK6, MATK, MMP1, MMP2, MSN, MUC1, NCOA3, NF2, NFATC1, NOTCH1, PA2G4, PATJ, PPARG, PRKCB, PTK2B, PTPRF, RAC1, RARG, RUVBL1, SEMA4D, SERPINA5, SFN, SLK, STARD13, STK4, THBS2, TJP1, TLR4, VAV3, VEGFB, WARS1, XIAP, YARS1, YY1, ZEB2 |
| 137 | Breast or ovarian carcinoma | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 9.68E,09 | 113 | ACACB, ALB, ALK, AR, ARF6, ARHGEF1, ASAP1, B2M, BCR, BTK, CA8, CAMK4, CLK1, CSDE1, CSF2RB, CSNK1G1, CSTF2, CTCF, DAPK2, DPP4, EP300, EPHA3, ERBB4, ESR1, EXOSC9, F2, FAP, FLNB, FN1, GALNT10, GART, GGPS1, GRK2, GRK6, HAT1, HBEGF, HCK, HDAC7, HLA, DRB1, HMGS1, HNRNPA2B1, HSP90AB1, HTR1A, IFNGR1, IGF1R, ITGB3, ITPA, ITPKC, ITSN1, KIF11, KMT5A, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MMP2, MSH2, MSN, MUC1, MYBPC3, NBEA, NCOA3, NDC80, NF2, NFATC1, NOTCH1, NR1I3, NT5C3A, ODC1, OXSR1, PAFAH1B2, PARP3, PC, PDK3, PDK4, PGC, PHF24, POU2F1, PPARG, PPP2R1A, PRKCB, PTPRE, PTPRF, PYGL, RAC1, RARA, RBBP6, RBM39, RRM1, RTN4IP1, SENP2, SERPINA5, SFMBT2, SH3YL1, SKP1, SLC5A1, SLK, SMG7, SMTN, SMURF2, SYT13, THBS2, TLR4, USP19, UTRN, VAV3, WEE1, WWP1, YWHAQ, ZEB2, ZNF462 |
| 138 | Cytolysis | Cell Death and Survival | 1.05E,08 | 17 | ALB, B2M, C8A, DPP4, F3, FAS, FCGR2A, G6PD, HBB, HMOX1, IFNG, IMPDH1, ITPA, MSH2, MUC1, NT5C3A, TLR4 |
| 139 | Refractory malignant tumor | Cancer, Organismal Injury and Abnormalities | 1.12E,08 | 19 | ALB, ALK, AR, BCR, BTK, ERBB4, ESR1, GART, HCK, HDAC7, HMOX1, HSP90AB1, IMPDH1, PARP3, PTK2B, RARA, RARG, RRM1, VEGFB |
| 140 | Cell death of pancreatic cancer cell lines | Cell Death and Survival | 1.17E,08 | 13 | BTRC, FAS, FHIT, FN1, HBEGF, IFNG, IGF1R, NOTCH1, PDK2, RRM1, SFN, VAV3, XIAP |
| 141 | Melanoma | Cancer, Organismal Injury and Abnormalities | 1.23E,08 | 222 | ACACB, ACADSB, ACSM2A, ADH7, ALB, ALK, ALOX12, AMY1C (includes others), ANG, AOC3, APEX1, APPL1, AR, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CD74, CHKA, CIAO1, CLCN5, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP2R1, CYP7A1, DAPK2, DCTD, DFFA, DGKA, DHPS, D |

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| | | | | | MC1,DOK2,DPP4,DSG2,ECI2,EP300,EPA3,EP8L2,ERBB4,ESR1,EXOSC9,F2,F3,FABP3,FAP,FAS,FCGR2A, FHIT,FLNB, FN1, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GTF2I, HADH, HASPIN, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HK2, HLA, DRB1, HMGC1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPA, ITPK1, ITPKC, ITSN1, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MARF1, MARK1, MATK, MDH1, MECR, MEMO1, MMP1, MMP2, MSH2, MSN, MUC1, MYBPC1, MYBPC3, NBEA, NCBP1, NCOA3, NF2, NFATC1, NOTCH1, NR1I3, NSUN5, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RBP5, RGS6, RND1, RPA3, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEM1, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, STARD13, STK4, SULT1A1, SYT13, TAF13, THBS2, TIMM9, TJP1, TLR4, TRIM21, USP19, UTRN, VAV3, VEGFB, WHRN, WWP1, XIAP, XRCC6, YY1, ZCWPW1, ZEB2, ZFP28, ZNF292, ZNF462 |
| 142 | Metastatic adenocarcinoma | Cancer, Organismal Injury and Abnormalities | 1.31E,08 | 16 | ALB, ALK, AR, CYP17A1, ERBB4, ESR1, F3, FAS, GART, HSP90AB1, IGF1R, MUC1, NR1I3, PARP3, PTK2B, RRM1 |
| 143 | Plasma cell dyscrasia | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 1.36E,08 | 35 | ANXA6, B2M, BCR, BTK, CLK1, CSF2RB, ECI2, EP300, FAS, FN1, GART, GGPS1, GRHPR, GTF2I, HAT1, HLA, DRB1, HMOX1, HSP90AB1, IFNG, IMPDH1, ITGB3, ITPK1, MMP2, NAE1, NDC80, NFATC1, PRKCB, PTK2B, PTPRE, PTPRF, RAC1, RARA, RRM1, SNX1, XRCC6 |
| 144 | Lung tumor | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 1.50E,08 | 135 | ACAT2, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, APEX1, AR, ARHGAP5, ARHGEF1, B2M, B3GAT2, BMP1, BTBK, BTRC, C8A, CA8, CAMK4, CD1A, CERT1, CLCN5, CLK1, CSF2RB, CSNK1G2, CTCF, CUL1, CYP17A1, CYP2E1, DGKA, DOK2, DPP4, DSG2, EP300, EPA3, ERBB4, ESR1, F2, F3, FAP, FAS, FHIT, FN1, GAD2, GALNT10, GART, GGPS1, GRHPR, GRK6, GTF2I, HASPIN, HCK, HDX, HK2, HMGB3, HMOX1, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IQUB, ITPKC, KIF11, KYNU, LRBA, MAGEA4, MAGI2, MAPK6, MATK, MDH1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, NBEA, NCOA3, NDC80, NF2, NMT1, NOTCH1, NT5C3A, OAT, ODC1, OXSR1, PAH, PANK1, PARP3, PATJ, PDHA1, PDK4, PEX5, PGC, PGK1, PIP4K2C, POT1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RGS6, RRM1, SEMA4D, SENP2, SERPINA5, SFN, SKP1, SLK, SMG7, SMURF2, STK4, SULT1A1, THBS2, TJP1, TLR4, TTR, TXNDC12, UTRN, VAV3, WWP1, ZCWPW1, ZNF292 |
| 145 | Chronic inflammatory disorder | Inflammatory Disease | 1.54E,08 | 52 | ALB, ALK, ALOX12, ANG, ASAP1, B2M, BTK, CD1A, CD74, CSF2RB, CYP2E1, DPP4, EP300, ERI1, ESR1, F2, F3, FAS, FCGR2A, FN1, G6PD, GC, GGPS1, GRHPR, HBEGF, HCK, HDAC7, HLA, DRB1, HMOX1, IDE, IFNG, IFNGR1, IGF1R, IMPDH1, ITGB3, ITPA, MMP1, MMP2, MTAP, MUC1, PGK1, PPARG, PTK2B, PTPRE, RGS6, RRM1, SF3B6, SMG7, TAF13, TJP1, TLR4, XIAP |
| 146 | Adenocarcinoma | Cancer, Organismal Injury and Abnormalities | 1.85E,08 | 258 | AASDHPPT, ACACB, ACADSB, ACADVL, ACAT2, ACBD7, ACSM2A, ACVR2B, ACY1, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CD74, CDK5R1, CERT1, CHKA, CLCN5, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DCXR, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, DTYMK, ECHS1, EP300, EPA3, EP8L2, ERBB4, ESR1, ET F1, EXOSC9, F2, F3, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GRK6, GTF2I, HADH, HASPIN, HBB, HBEGF, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMOX1, HMGB3, HMGC1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPA, ITPK1, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, MECR, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1I3, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PGC, PGK1, PHF24, PIP4K2C, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEMA4D, SENP2, SERPINA5, SF3B6, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, STK4, SUB1, SULT1A1, SYT13 |

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| | | | | | , THBS2, TJP1, TLR4, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XIAP, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 147 | Lung cancer | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 2.01E,08 | 134 | ACAT2, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, APEX1, AR, ARHGAP5, ARHGEF1, B2M, B3GAT2, BMP1, BTK, BTRC, C8A, CA8, CAMK4, CD1A, CERT1, CLCN5, CLK1, CSF2RB, CSNK1G2, CTCF, CUL1, CYP17A1, CYP2E1, DGKA, DOK2, DPP4, DSG2, EP300, EPHA3, ERBB4, ESR1, F2, F3, FAP, FAS, FHIT, FN1, GAD2, GALNT10, GART, GGPS1, GRHPR, GRK6, GTF2I, HASPIN, HCK, HDX, HK2, HMGB3, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IQUB, ITPKC, KIF11, KYNU, LRBA, MAGEA4, MAGI2, MAPK6, MATK, MDH1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, NBEA, NCOA3, NDC80, NF2, NMT1, NOTCH1, NT5C3A, OAT, ODC1, OXSR1, PAH, PANK1, PARP3, PATJ, PDHA1, PDK4, PEX5, PGC, PGK1, PIP4K2C, POT1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RGS6, RRM1, SEMA4D, SENP2, SERPINA5, SFN, SKP1, SLK, SMG7, SMURF2, STK4, SULT1A1, THBS2, TJP1, TLR4, TTR, TXNDC12, UTRN, VAV3, WWP1, ZCWPW1, ZNF292 |
| 148 | Recurrent carcinoma | Cancer, Organismal Injury and Abnormalities | 2.16E,08 | 14 | ALB, ALK, AR, CYP17A1, ERBB4, ESR1, F3, GART, HSP90AB1, IGF1R, IMPDH1, PARP3, PTK2B, RRM1 |
| 149 | Apoptosis of breast cancer cell lines | Cell Death and Survival | 2.34E,08 | 23 | AR, B2M, BTK, BTRC, CTCF, EP300, ESR1, FAS, FHIT, FN1, HK2, HMOX1, IFNG, IGF1R, KIF11, MUC1, NCOA3, PA2G4, PDHA1, PPARG, RAC1, SFN, XIAP |
| 150 | Acne vulgaris | Dermatological Diseases and Conditions, Inflammatory Disease, Organismal Injury and Abnormalities | 2.36E,08 | 7 | AR, DHPS, ESR1, G6PD, ODC1, RARA, RARG |
| 151 | Apoptosis of cancer cells | Cancer, Cell Death and Survival, Organismal Injury and Abnormalities, Tumor Morphology | 2.77E,08 | 14 | ALB, AR, B2M, BTK, FAS, FHIT, HMOX1, IFNG, IGF1R, MUC1, NCOA3, RAC1, RARA, XIAP |
| 152 | Interaction of DNA | Cell Cycle | 2.96E,08 | 24 | ALB, APEX1, AR, BTK, CYP2E1, EP300, ESR1, F2, F3, FN1, HCK, IFNG, MAP3K3, MUC1, NOTCH1, NR1I3, PARP3, POU2F1, PPARG, RAC1, RARA, STK4, TLR4, XRCC6 |
| 153 | Lung carcinoma | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 3.13E,08 | 131 | ACAT2, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, APEX1, AR, ARHGAP5, ARHGEF1, B2M, B3GAT2, BMP1, BTK, BTRC, C8A, CA8, CAMK4, CD1A, CERT1, CLCN5, CLK1, CSF2RB, CSNK1G2, CTCF, CUL1, CYP17A1, CYP2E1, DGKA, DOK2, DPP4, DSG2, EP300, EPHA3, ERBB4, ESR1, F2, F3, FAP, FAS, FHIT, FN1, GAD2, GALNT10, GART, GGPS1, GRHPR, GRK6, GTF2I, HASPIN, HCK, HDX, HK2, HMGB3, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IQUB, ITPKC, KIF11, KYNU, LRBA, MAGEA4, MAGI2, MAPK6, MATK, MDH1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, NBEA, NCOA3, NDC80, NMT1, NOTCH1, NT5C3A, OAT, ODC1, OXSR1, PAH, PANK1, PARP3, PATJ, PDHA1, PDK4, PEX5, PGC, PGK1, PIP4K2C, POT1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RGS6, RRM1, SEMA4D, SENP2, SERPINA5, SFN, SLK, SMG7, SMURF2, STK4, SULT1A1, THBS2, TJP1, TLR4, TTR, TXNDC12, VAV3, WWP1, ZCWPW1, ZNF292 |
| 154 | Binding of lipid | Lipid Metabolism, Small Molecule Biochemistry | 3.24E,08 | 9 | BPI, ESR1, F2, FAS, HSP90AB1, NF2, PSAP, RARA, TLR4 |
| 155 | Extrapneumonic malignant tumor | Cancer, Organismal Injury and Abnormalities | 3.33E,08 | 277 | AASDHPPT, ACACB, ACADSB, ACADVL, ACAT2, ACBD7, ACP3, ACSM2A, ACVR2B, ACY1, ADH1C, ADH7, ALB, ALK, ALOX12, AMY1C (includes others), ANG, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CD74, CDK5R1, CERT1, CHKA, CIAO1, CLCN5, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP2R1, CYP7A1, DAPK2, DCTD, DCXR, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, DTYMK, ECHS1, EC12, EP300, EPHA3, EPS8L2, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FAP7, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GRK6, GTF2F2, GTF2I, HADH, HASPIN, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMBOX1, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPA, ITPK1, ITPKC, ITS1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, ME |

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| | | | | | CR, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NDC80, NF2, NFATC1, NME3, NMRK1, NMT1, NOTCH1, NR1I3, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, PIP4K2C, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, S100A6, SART3, SEC23A, SEM1, SEMA4D, SENP2, SERPINA5, SF3B6, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, STK4, SUB1, SULT1A1, SYT13, TAF13, THBS2, TIMM9, TJP1, TLR4, TNFAIP8L2, TRIM21, TTR, TXNDC12, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XIAP, XRCC6, YWHAH, YWHAQ, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 156 | Apoptosis of prostate cancer cells | Cancer, Cell Death and Survival, Organismal Injury and Abnormalities, Tumor Morphology | 3.42E,08 | 4 | AR, NCOA3, RARA, XIAP |
| 157 | Glucose metabolism disorder | Metabolic Disease, Organismal Injury and Abnormalities | 3.43E,08 | 44 | ACAT2, ALB, APPL1, AR, B2M, BPI, CYP2E1, CYP2R1, DPP4, ECHS1, ESR1, F2, F3, FAS, FCGR2A, FN1, GC, GGPS1, HADH, HBB, HK2, HMBX1, HTR1A, IDE, IFNG, IGF1R, IMPDH1, ITGB3, KIF11, MAGI2, NOTCH1, PDK4, PPARG, PRKCB, RAC1, SLC5A1, SMURF2, SUB1, TAF13, THBS2, TLR4, UTRN, VEGFB, ZEB2 |
| 158 | T, cell malignant neoplasm | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 3.43E,08 | 38 | ALK, B2M, C1R, CD1A, CLK1, CTCF, DPP4, ECHS1, EP300, EPHA3, ERBB4, FAS, FHIT, FN1, GTF2I, HCK, HDAC7, HNRNPA2B1, HSP90AB1, IMPDH1, MARK1, MMP1, MMP2, MUC1, NFATC1, NOTCH1, NT5C3A, ODC1, POT1, POU2F1, PRKCB, PTPRE, RARA, RARG, RRM1, TAF13, TJP1, TLR4 |
| 159 | Advanced uterine cancer | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 3.77E,08 | 10 | ALK, AOC3, AR, ESR1, F3, GAD2, GART, HSP90AB1, PARP3, RRM1 |
| 160 | Cell movement of tumor cell lines | Cellular Movement | 4.08E,08 | 51 | ALOX12, APPL1, AR, ARF6, ARHGEF1, CERT1, DPP4, ESR1, F2, F3, FABP7, FHIT, FLNB, FN1, GC, GRK6, HBEGF, HMOX1, HNRNPA2B1, IFNG, IGF1R, ITGB3, MAPK6, MATK, MMP1, MMP2, MSN, MUC1, NCOA3, NF2, NOTCH1, PA2G4, PPARG, PRKCB, PTK2B, RAC1, RARG, RUVBL1, SEMA4D, SERPINA5, SFN, STARD13, THBS2, TLR4, VAV3, VEGFB, WARS1, XIAP, YARS1, YY1, ZEB2 |
| 161 | Stage I, II cancer | Cancer, Organismal Injury and Abnormalities | 4.56E,08 | 17 | ALB, ALK, B2M, BTK, CSF2RB, ERBB4, ESR1, FN1, GART, GGPS1, HSP90AB1, MUC1, PGC, RARA, RARG, RRM1, ZEB2 |
| 162 | Metabolism of nucleic acid component or derivative | Nucleic Acid Metabolism | 4.80E,08 | 23 | ACACB, ACP3, CYP2E1, DCTD, F2, FHIT, G6PD, GRK2, HMOX1, HTR1A, IFNG, IMPDH1, ITPA, KYNU, MTAP, NMRK1, NT5C3A, PAPSS1, PDHA1, PGK1, PRKCB, SNX1, SULT1A1 |
| 163 | Respiratory system tumor | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 4.95E,08 | 141 | ACAT2, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, APEX1, AR, ARHGAP5, ARHGEF1, B2M, B3GAT2, BMP1, BTK, BTRC, C8A, CA8, CAMK4, CD1A, CERT1, CLCN5, CLK1, CSF2RB, CSNK1G2, CTCF, CUL1, CYP17A1, CYP2E1, CYP2R1, DGKA, DOK2, DPP4, DSG2, EP300, EPHA3, ERBB4, ESR1, F2, F3, FAP, FAS, FHIT, FN1, GAD2, GALNT10, GART, GGPS1, GRHPR, GRK6, GTF2I, HASPIN, HCK, HDX, HK2, HMGB3, HMOX1, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IQUB, ITPKC, KIF11, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAPK6, MATK, MDH1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, NBEA, NCOA3, NDC80, NF2, NMT1, NOTCH1, NT5C3A, OAT, ODC1, OXSR1, PAH, PANK1, PARP3, PATJ, PDHA1, PDK2, PDK4, PEX5, PGC, PGK1, PIP4K2C, POT1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RGS6, RRM1, SEMA4D, SENP2, SERPINA5, SFN, SKP1, SLK, SMG7, SMURF2, STK4, SULT1A1, THBS2, TJP1, TLR4, TTR, TXNDC12, UTRN, VAV3, WWP1, ZCWPW1, ZNF292, ZNF462 |
| 164 | Binding of mononuclear leukocytes | Cell, To, Cell Signaling and Interaction, Hematological System Development and Function | 5.26E,08 | 13 | AOC3, ARHGEF1, BPI, F2, FAS, FN1, IFNG, ITGB3, MSN, PPARG, PTK2B, RAC1, TLR4 |

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|-----|--|--|----------|-----|---|
| 165 | Cellular homeostasis | Cellular Function and Maintenance | 5.65E,08 | 45 | ARF6,ATP7B,ATXN3,B2M,BTK,CLCN5,CUL1,CYP2E1,DAPK2,EP300,F2,F3,FAS,FN1,GC,GRK2,HK2,HLA,DRB1,HMOX1,HSD17B10,IFNG,ITPK1,ITSN1,MMP1,MSH2,NDUFAB1,NOTCH1,PAFAH1B2,PAPSS1,PKD2,PKD4,PEX5,PIP4K2C,PPARG,PSAP,PTK2B,PYGL,RAC1,SKP1,THBS2,TRIM21,USP19,VPS26A,XIAP,YWHAQ |
| 166 | Pelvic adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 5.87E,08 | 178 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ALB,ALK,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGAF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,C8A,CA8,CANT1,CD1A,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,EPSS8L2,ERBB4,ESR1,ETFF1,F2,F3,FAP,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRK2,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSN,MUC1,MYBPC1,MYBP3,MYSM1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PKD3,PKD4,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SARTR3,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,STK4,SUB1,SYT13,THBS2,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 167 | Extraadrenal retroperitoneal tumor | Cancer,Organismal Injury and Abnormalities | 5.96E,08 | 116 | ACACB,ACAT2,ALB,ALK,ALOX12,APPL1,AR,ARHGAP5,ASAP1,ATP7B,ATXN3,B2M,BPI,BTRC,CANT1,CD74,CDK5R1,CHKA,CLK1,CRYM,CSDE1,CSF2RB,CSTF2,CTCF,CYP17A1,DCTD,DFFA,DOK2,DPP4,ECHS1,EP300,EPAH3,ERBB4,ESR1,F2,F3,FAP,FLNB,FN1,G6PD,GART,GC,GGPS1,GRHPR,GTF2I,HBB,HBEGF,HCK,HBCH,HLA,DRB1,HMGCS1,HMOX1,HPD,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,ITSN1,KIF11,KLK1,LRBA,MAGI2,MARK1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NUP214,PA2G4,PANK1,PARP3,PC,PDHA1,PKD4,PGC,PGK1,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RRM1,S100A6,SEC23A,SERPINA5,SFN,SMG7,SMTN,SULT1A1,TJP1,TLR4,UTRN,VAV3,VEGFB,WEE1,YY1,ZCWPW1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 168 | Synthesis of lipid | Lipid Metabolism,Small Molecule Biochemistry | 6.00E,08 | 32 | ACACB,ACAT2,ALB,ALOX12,ANG,CD74,CERT1,CHKA,CSNK1G2,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DGKA,DPP4,ECHS1,F2,FAS,FCGR2A,FN1,G6PD,GGPS1,HMGCS1,HSD17B10,HSD17B4,IFNG,NCOA3,PCYT2,PK4,PIP4K2C,PPARG,RAC1 |
| 169 | Stage III cancer | Cancer,Organismal Injury and Abnormalities | 6.13E,08 | 17 | ALB,ALK,BTK,CSF2RB,ERBB4,ESR1,FN1,GART,GGPS1,HMOX1,HSP90AB1,IGF1R,MUC1,PARP3,RARA,RARG,RRM1 |
| 170 | Malignant soft tissue neoplasm | Cancer,Organismal Injury and Abnormalities | 6.14E,08 | 211 | ACACB,ACADSB,ACSM2A,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGAF1,ASAP1,ATP7B,ATXN3,B2M,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CHKA,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECI2,EP300,EPHA3,EPSS8L2,ERBB4,ESR1,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HK2,HLA,DRB1,HMGCS1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NSUN5,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PKD2,PKD3,PKD4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,STARD13,STK4,SULT1A1,SYT13,THBS2,TIMM9,TJP1,TLR4,TRIM21,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,XRCC6,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 171 | Malignant neoplasm of respiratory system | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 6.23E,08 | 140 | ACAT2,ADH1C,ADH7,ALB,ALK,ALOX12,ANXA6,APEX1,AR,ARHGAP5,ARHGAF1,B2M,B3GAT2,BMP1,BTK,BTRC,C8A,CA8,CAMK4,CD1A,CERT1,CLCN5,CLK1,CSF2RB,CSNK1G2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,DGKA,DOK2,DPP4,DSG2,EP300,EPAH3,ERBB4,ESR1,F2,F3,FAP,FAS,FHIT,FN1,GAD2,GALNT10,GART,GGPS1,GRHPR,GRK6,GTF2I,HASPIN,HCK,HDX,HK2,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IQUB,ITPKC,KIF11,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MATK, |

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|-----|-----------------------------------|--|----------|-----|--|
| | | | | | MDH1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,NBEA,NCOA3,NDC80,NF2,NMT1,NOTCH1,NT5C3A,OAT,ODC1,OXSR1,PAH,PANK1,PARP3,PATJ,PDHA1,PK2,PK4,PEX5,PGC,PGK1,PIP4K2C,POT1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RGS6,RRM1,SEMA4D,SEN2,SERPINA5,SFN,SKP1,SLK,SMG7,SMURF2,STK4,SULT1A1,THBS2,TJP1,TLR4,TTR,TXNDC12,UTRN,VAV3,WWP1,ZCWPW1,ZNF292,ZNF462 |
| 172 | Primary immunodeficiency disorder | Immunological Disease | 6.30E,08 | 15 | ARHGEF1,BTK,CA8,CD74,FAS,FCGR2A,G6PD,GRHR,IFNGR1,LRBA,MSN,PPARG,TAF13,TLR4,XIAP |
| 173 | Serous ovarian adenocarcinoma | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 6.37E,08 | 19 | ALK,AR,B2M,BCR,CTCF,DPP4,EP300,EPA3,HSP90AB1,MUC1,NOTCH1,PARP3,PK4,PPP2R1A,RRM1,SKP1,THBS2,TLR4,VAV3 |
| 174 | Breast carcinoma | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 6.47E,08 | 83 | ACACB,ALK,AR,ARHGEF1,BCR,BTK,CAMK4,CLK1,CSDE1,CSNK1G1,CTCF,DAPK2,DPP4,EP300,EPA3,ERBB4,ESR1,EXOSC9,FAP,FLNB,FN1,GALNT10,GGPS1,GRK2,GRK6,HAT1,HDAC7,HLA,DRB1,HMGCS1,HSP90AB1,IGF1R,ITGB3,ITPKC,KIF11,KMT5A,MAGEA4,MAPK6,MARF1,MARK1,MMP2,MSH2,MSN,MUC1,MYBPC3,NBEA,NCOA3,NDC80,NF2,NFATC1,NOTCH1,OXSR1,PAFAH1B2,PARP3,PC,PK3,PK4,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PTPRF,RAC1,RARA,RBBP6,RBM39,RRM1,SEN2,SERPINA5,SLC5A1,SLK,SMG7,SMTN,SMURF2,SYT13,TLR4,USP19,VAV3,WEE1,YWHAQ,ZEB2,ZNF462 |
| 175 | Abdominal adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 6.59E,08 | 253 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHR,GRK2,GRK6,GTF2I,HADH,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMP1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1H3,NSUN5,N25C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PK2,PK3,PK4,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 176 | Diabetes mellitus | Endocrine System Disorders,Gastrointestinal Disease,Metabolic Disease,Organismal Injury and Abnormalities | 6.98E,08 | 41 | ALB,APPL1,AR,B2M,BPI,CYP2E1,CYP2R1,DPP4,ECHS1,ESR1,F3,FAS,FCGR2A,FN1,GC,GGPS1,HADH,HBB,HK2,HMBOX1,HTR1A,IDE,IFNG,IGF1R,IMP1,ITGB3,KIF11,MAGI2,NOTCH1,PK4,PPARG,PRKCB,RAC1,SLC5A1,SMURF2,TAF13,THBS2,TLR4,UTRN,VEGFB,ZEB2 |
| 177 | Rheumatic Disease | Connective Tissue Disorders,Inflammatory Disease,Organismal Injury and Abnormalities,Skeletal and Muscular Disorders | 7.23E,08 | 54 | ALB,ALOX12,ANG,AR,ASAP1,B2M,BPI,C1R,CD1A,CD74,CDK5R1,CSF2RB,CYP2E1,DPP4,ESR1,FAS,FCGR2A,FN1,GGPS1,HBB,HCK,HDAC7,HLA,DRB1,HMOX1,IDE,IFNG,IGF1R,IMP1,ITPA,MAP3K3,MMP1,MMP2,MTAP,NF2,NFATC1,PGK1,PPARG,PRKCB,PTK2B,PTPRE,RAC1,RGS6,RRM1,S100A6,SF3B6,SMG7,TAF13,TIMM9,TJP1,TLR4,TRIM21,WARS1,XIAP,XRCC6 |

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|-----|--|---|----------|-----|--|
| 178 | Bladder cancer | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 7.39E,08 | 59 | ACACB,ALB,ALK,AOC3,AR,ARHGAP5,BCR,BMP1,BTK,CSF2RB,CSTF2,CTCF,CUL1,DGKA,DHPS,DOK2,EP300,EPHA3,EP8L2,ERBB4,FAP,FN1,GART,GRHPR,HNRNPA2B1,HSP90AB1,KMT5A,KYNU,MAGEA4,MAGI2,MARF1,MMP2,MTAP,NCOA3,NF2,NOTCH1,NT5C3A,ODC1,PA2G4,PAH,PDK4,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRF,RARA,RARG,RBBP6,RBM39,RRM1,SLC5A1,THBS2,TLR4,UTRN,XIAP,ZCWPW1,ZEB2 |
| 179 | Metastatic non-small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 7.73E,08 | 14 | ALB,ALK,B2M,ERBB4,FAS,FN1,GART,GGPS1,HSP90AB1,IGF1R,PARP3,PGC,PTK2B,RRM1 |
| 180 | Connective or soft tissue tumor | Cancer,Organismal Injury and Abnormalities | 7.94E,08 | 214 | ACACB,ACADSB,ACSM2A,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CHKA,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECI2,EP300,EPHA3,EP8L2,ERBB4,ESR1,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HK2,HLA,DRB1,HMGCS1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NSUN5,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEM1,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,STARD13,STK4,SULT1A1,SYT13,TAI1,THBS2,TIMM9,TJP1,TLR4,TRIM21,USP19,UTRN,VAV3,WEE1,WHRN,WWP1,XIAP,XRCC6,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 181 | Neuroblastoma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 8.33E,08 | 14 | ALK,AR,CSF2RB,CTCF,EP300,FAP,FCGR2A,HSP90AB1,IDE,IGF1R,PGK1,RARA,RARG,UTRN |
| 182 | Advanced adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 8.61E,08 | 19 | ALB,ALK,AR,BCR,DPP4,ERBB4,ESR1,F3,FAS,GART,HSP90AB1,IGF1R,MUC1,NR1I3,PARP3,PTK2B,RRM1,SKP1,VAV3 |
| 183 | Pelvic carcinoma | Cancer,Organismal Injury and Abnormalities | 8.65E,08 | 195 | AASDHPPT,ACACB,ACADSB,ACADVL,ACBD7,ACY1,ADH7,ALB,ALK,ANXA6,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BMP1,BTK,BTRC,C8A,CA8,CANT1,CD1A,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DGKA,DHPS,DMC1,DOK2,DPP4,DTYMK,EP300,EPHA3,EP8L2,ERBB4,ESR1,ETF1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GRHPR,GRK2,GTF2I,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HLA,DRB1,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IQUB,ITGB3,ITPA,ITPKC,ITSN1,KIF11,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PDK3,PDK4,PGC,PGK1,PHF24,POU2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMTN,SMURF2,STK4,SUB1,SYT13,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,YY1,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 184 | Atopic dermatitis | Dermatological Diseases and Conditions,Immunological Disease,Inflammatory Disease,Inflammatory Response,Organismal Injury and Abnormalities | 9.04E,08 | 19 | ACADVL,CD1A,CD74,CSF2RB,GRK2,HBB,HCK,HLA,DRB1,HTR1A,IDE,KLK1,MSN,PDK4,PPARG,PRKCB,PSAP,RUVBL1,TLR4,XRCC6 |

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|-----|---------------------------------|--|----------|-----|---|
| 185 | Binding of leukocytes | Cell,To,Cell Signaling and Interaction,Hematologic al System Development and Function | 9.17E,08 | 17 | AOC3,ARHGEF1,BPI,F2,F3,FAS,FCGR2A,FN1,IFNG,ITGB3,MSN,PPARG,PTK2B,RAC1,SEMA4D,TLR4,UTRN |
| 186 | Cell death of kidney cell lines | Cell Death and Survival,Organismal Injury and Abnormalities,Renal and Urological Disease | 9.36E,08 | 20 | AR,ATXN3,F2,F3,FAS,GRK2,HK2,IFNG,IGF1R,NDUFAB1,NF2,PEX5,PPARG,PRKCB,RAC1,STK4,TNFAIP8L2, XIAP,YWHAQ,YY1 |
| 187 | Refractory solid tumor | Cancer,Organismal Injury and Abnormalities | 9.48E,08 | 15 | ALB,ALK,AR,BTK,ERBB4,GART,GGPS1,HDAC7,HMOX1,HSP90AB1,IMPDH1,PARP3,PTK2B,RRM1,VEGFB |
| 188 | Primary neoplasm | Cancer,Organismal Injury and Abnormalities | 9.54E,08 | 29 | ALB,ALK,B2M,BTK,CDK5R1,CSF2RB,CSNK1G2,CTCF,DOK2,EP300,ERBB4,ESR1,FN1,GART,HDAC7,HSP90 AB1,IGF1R,MUC1,NF2,ODC1,PARP3,PPARG,PPP2R1A,RAC1,RARA,RARG,RRM1,SEMA4D,VEGFB |
| 189 | Expression of RNA | Gene Expression | 9.55E,08 | 63 | ACVR2B,ANG,APEX1,AR,ATXN3,BTK,BTRC,CAMK4,CD74,CDK5R1,CIAO1,CRYM,CTCF,DHPS,EP300,ERB B4,ESR1,ETF1,F2,F3,FAS,FN1,GTF2F2,GTF2I,HBB,HDAC7,HLA,DRB1,HMBOX1,HNRNPA2B1,IFNG,KMT5A, MAP3K3,MSH2,MSN,MYSM1,NCBP1,NCOA3,NFATC1,NOTCH1,NR1I3,PA2G4,PC,POU2F1,PPARG,PRKCB, RAC1,RARA,RARG,RBBP6,SART3,SEMA4D,SFMBT2,SMURF2,SUB1,TAF13,TLR4,WARS1,XRCC6,YWHAH, YWHAQ,YY1,ZEB2,ZIC3 |
| 190 | Skin lesion | Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 9.87E,08 | 209 | ACACB,ACADSB,ACSM2A,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,BCR,BMP1,BPI,BTK, BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CHKA,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G2,CSTF2,C TCF,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DFFA,DGKA,DHPS,DMC1,DOK2,PPP4,DSG2,ECI2,EP300,EP HA3,EP38L2,ERBB4,ESR1,F2,F3,FABP3,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,G ART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HK2,HLA,DRB1, HMGC51,HNRNPA2B1,HPD,HSCB,HSD17B10,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB 3,ITPK1,ITPKC,ITSN1,KYNU,LRBA,MAGEA4,MAGI2,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1, MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NSUN5,N UP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDK2,PD K3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYG L,RAC1,RARA,RARG,RBBP6,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEM A4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,ST ARD13,STK4,SULT1A1,SYT13,THBS2,TIMM9,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,WHRN,WWP 1,XIAP,XRCC6,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 191 | Abdominal neoplasm | Cancer,Organismal Injury and Abnormalities | 1.00E,07 | 269 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACP3,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB, ALK,ALOX12,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2 M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,C LK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DC TD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPA3,EP38L2,ERBB4, ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GAL NT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2F2,GTF2I,HADH,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX, HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGC51,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4, HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11, KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEM O1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NF ATC1,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH, PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,PO U2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6, RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEMA4D,SENP2,SERPINA5,SE |

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| | | | | | 3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX22,SP EF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJPI,TLR4,TNFAIP8L2,TRIM21,TTR,UEV LD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43, ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 192 | Hypersensitive reaction | Immunological Disease | 1.01E,07 | 21 | ACADVL,CD1A,CD74,CSF2RB,FCGR2A,GRK2,HBB,HCK,HLA,DRB1,HTR1A,IDE,IFNG,KLK1,MSN,PDK4,PP ARG,PRKCB,PSAP,RUVBL1,TLR4,XRCC6 |
| 193 | Uterine tumor | Cancer,Organismal Injury and Abnormalities,Reproduc tive System Disease | 1.01E,07 | 148 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,AOC3,APPL1,AR,ARHGAP5,ATP7B,B2M,B3GAT2,B CR,BTK,BTRC,C8A,CA8,CD1A,CLCN5,CSDE1,CSF2RB,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DMC1,DO K2,DPP4,DTYMK,EP300,EPAH3,ERBB4,ESR1,ETF1,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GA RT,GRHPR,GRK2,GTF2I,HBB,HDAC7,HDX,HMBOX1,HMGB3,HMOX1,HPD,HSD17B10,HSD17B4,HSP90AB1 ,HTR1A,IFNG,IGF1R,IQUB,ITGB3,ITPKC,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1, MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NF2,NFATC1,NMR K1,NMT1,NOTCH1,NT5C3A,NUP214,OAT,PANK1,PARN,PARP3,PATJ,PDK3,PDK4,PGK1,PPARG,PPP2R1A,P TPRE,PTPRF,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RUVBL1,S100A6,SART3,SEN2,SEPI NA5,SF3B6,SH3YL1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2, TJPI,TLR4,TRIM21,UEVLD,UTRN,VAV3,WEE1,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 194 | Waldenstr 枚 m macroglobulinemia | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.03E,07 | 20 | ANXA6,BTK,CLK1,CSF2RB,ECI2,EP300,FN1,GTF2I,HAT1,HMOX1,IMPDH1,ITGB3,MMP2,PRKCB,PTK2B,PT PRF,RAC1,RRM1,SNX1,XRCC6 |
| 195 | Stage I cancer | Cancer,Organismal Injury and Abnormalities | 1.12E,07 | 14 | ALK,B2M,CSF2RB,ERBB4,ESR1,FN1,GART,GGPS1,HSP90AB1,MUC1,PGC,RARA,RARG,RRM1 |
| 196 | Nervous system neoplasm | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 1.24E,07 | 190 | ACACB,ACADSB,ACADVL,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,BTK, C1R,C8A,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,D GKA,DOK2,DPP4,DSG2,EP300,EPAH3,EPS8L2,ERBB4,ESR1,F2,F3,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,G6PD,G AD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HBEGF,HDX,HIBCH,HK2,HLA,DRB1,HMB OX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,IMP DH1,ITGB3,ITPK1,ITSN1,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MS H2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1, NR1I3,NSUN5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA 1,PDK4,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS 10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEMA4D,S ENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS 2,TIMM9,TJPI,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,XIAP,XRCC6,YWHAH, YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 197 | Cutaneous melanoma | Cancer,Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 1.27E,07 | 204 | ACACB,ACADSB,ACSM2A,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,BCR,BMP1,BPI,BTK ,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CHKA,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G2,CSTF2,C TCF,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECI2,EP300,EP HA3,EPS8L2,ERBB4,ESR1,F2,F3,FABP3,FAP,FAS,FCGR2A, FHIT,FLNB,FN1,GAD2,GALM,GALNT10,GART,G C,GGPS1,GRHPR,GRK2,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HK2,HLA,DRB1,HMGCS1,HN RNPA2B1,HPD,HSCB,HSD17B10,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPK C,ITSN1,KYNU,LRBA,MAGEA4,MAGI2,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2, MSN,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NSUN5,NUP214,OAT,O DC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PSK2,PDK3,PDK4,PEX5 ,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA, RARG,RBBP6,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEM1,SEMA4D,SEN2,SE RPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,STARD13,STK4,S |

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| | | | | | ULT1A1,SYT13,THBS2,TIMM9,TJP1,TLR4,TRIM21,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,XRCC6,ZCWPW1,ZEB2,ZNF292,ZNF462 |
| 198 | Production of hydrogen peroxide | Free Radical Scavenging,Small Molecule Biochemistry | 1.28E,07 | 8 | AOC3,F2,FAS,FCGR2A,HBB,IFNG,RAC1,TLR4 |
| 199 | Liver cancer | Cancer,Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 1.29E,07 | 137 | ACACB,ACADSB,ACADVL,ACY1,ALB,ALK,ANG,APEX1,AR,ARHGAP5,ASAP1,ATXN3,B2M,B3GAT2,BCR,BTK,BTRC,C1R,C8A,CANT1,CD1A,CDK5R1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CYP7A1,DGKA,ECHS1,ECI2,EP300,EPHA3,EP8L2,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FLNB,FN1,GC,GGPS1,GRHPR,GTF2F2,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,KMT5A,KYNU,MAGI2,MAPK6,MARF1,MDH1,MECR,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NUP214,PAH,PATJ,PC,PCYT2,PDHA1,PK3,PK4,PEX5,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTPRE,PTPRF,PYGL,RAC1,RARA,RBBP6,RRM1,SART3,SEC23A,SFMBT2,SLK,SMG7,SMURF2,STARD13,SULT1A1,THBS2,TJP1,TNFAIP8L2,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZIC3,ZNF292,ZNF462 |
| 200 | Adult solid tumor | Cancer,Organismal Injury and Abnormalities | 1.40E,07 | 15 | AR,B2M,CSF2RB,DPP4,EP300,FAS,FHIT,GGPS1,HNRNPA2B1,HTR1A,IMPDH1,NOTCH1,POT1,PRKCB,RRM1 |
| 201 | Low,grade lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.50E,07 | 35 | ANXA6,ATXN3,BTK,CLK1,CSDE1,CSF2RB,CSTF2,DGKA,ECI2,EP300,ERBB4,FN1,GTF2I,HAT1,HMOX1,HS90AB1,IFNG,IMPDH1,ITGB3,MMP2,NCBP1,NFATC1,NOTCH1,POT1,PRKCB,PTK2B,PTPRF,RAC1,RRM1,SEM1,SNX1,THBS2,VAV3,XRCC6,ZNF292 |
| 202 | Hepatobiliary system cancer | Cancer,Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 1.54E,07 | 143 | ACACB,ACADSB,ACADVL,ACY1,ADH1C,ALB,ALK,ANG,APEX1,AR,ARHGAP5,ASAP1,ATXN3,B2M,B3GAT2,BCR,BTK,BTRC,C1R,C8A,CANT1,CD1A,CDK5R1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CYP7A1,DGKA,DSG2,ECHS1,ECI2,EP300,EPHA3,EP8L2,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FLNB,FN1,GC,GGPS1,GRHPR,GTF2F2,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,KIF11,KMT5A,KYNU,MAGI2,MAPK6,MARF1,MDH1,MECR,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NUP214,PA2G4,PAH,PATJ,PC,PCYT2,PDHA1,PK3,PK4,PEX5,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTPRE,PTPRF,PYGL,RAC1,RARA,RBBP6,RRM1,SART3,SEC23A,SFMBT2,SH2B2,SLK,SMG7,SMURF2,STARD13,SULT1A1,THBS2,TJP1,TLR4,TNFAIP8L2,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZIC3,ZNF292,ZNF462 |
| 203 | Skin cancer | Cancer,Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 1.61E,07 | 208 | ACACB,ACADSB,ACSM2A,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CHKA,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECI2,EP300,EPHA3,EP8L2,ERBB4,ESR1,F2,F3,FABP3,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2I,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HDX,HK2,HLA,DRB1,HMGCS1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSP90AB1,HTR1A,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KYNU,LRBA,MAGEA4,MAGI2,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NSUN5,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PK2,PK3,PK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RBBP6,RBP5,RGS6,RND1,RPA3,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMI,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,STARD13,STK4,SULT1A1,SYT13,THBS2,TIMM9,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,WHRN,WWP1,XIAP,XRCC6,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 204 | Metastatic uterine cancer | Cancer,Organismal Injury and | 1.83E,07 | 9 | ALK,AOC3,AR,ESR1,F3,GAD2,GART,HSP90AB1,RRM1 |

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| | | Abnormalities, Reproductive System Disease | | | |
| 205 | Steroid metabolism | Lipid Metabolism, Small Molecule Biochemistry, Vitamin and Mineral Metabolism | 1.93E,07 | 15 | ACACB, ACAT2, CYP17A1, CYP2E1, CYP2R1, CYP7A1, G6PD, GC, GGPS1, HMGCS1, HSD17B10, HSD17B4, IFNG, SULT1A1, YWHAH |
| 206 | Female genital tract adenocarcinoma | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 2.06E,07 | 147 | AASDHPPT, ACACB, ACADSB, ACBD7, ACY1, ALB, ALK, AOC3, APPL1, AR, ARF6, ARHGEF1, ASAP1, ATP7B, B2M, B3GAT2, BCR, BTK, C8A, CA8, CD1A, CLCN5, CLK1, CSDE1, CSF2RB, CSNK1G1, CSTF2, CTCF, CUL1, CYP7A1, DCTD, DOK2, DPP4, DTYMK, EP300, EPHA3, ERBB4, ESR1, ETF1, F2, F3, FAP, FCGR2A, FLNB, FN1, G6PD, GAD2, GART, GRK2, GTF2I, HBB, HBEGF, HCK, HDX, HMBOX1, HMGB3, HNRNPA2B1, HPD, HSD17B4, HSP90AB1, HTR1A, IGF1R, IQUB, ITGB3, ITPA, ITPKC, ITS1, KIF11, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MDH1, MEMO1, MMP1, MSN, MUC1, MYBPC3, MYSM1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1I3, NT5C3A, NUP214, OAT, ODC1, PANK1, PARN, PARP3, PATJ, PC, PDK3, PDK4, PGC, PGK1, POU2F1, PPARG, PPP2R1A, PTPRE, PTPRF, PYGL, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SENP2, SF3B6, SFMBT2, SH3YL1, SKP1, SLC5A1, SLK, SMG5, SMTN, SMURF2, STK4, SUB1, SYT13, THBS2, TLR4, TRIM21, UEVLD, UTRN, VAV3, WWP1, XIAP, YY1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 207 | Embryonal tumor | Cancer, Organismal Injury and Abnormalities | 2.20E,07 | 36 | ALK, AR, CSF2RB, CTCF, EP300, EPHA3, ERBB4, FAP, FAP7, FAP, FCGR2A, FN1, GART, GGPS1, HNRNPA2B1, HSP90AB1, IDE, IFNG, IGF1R, ITGB3, MSH2, NAE1, NBEA, NF2, PA2G4, PGK1, PRKCB, RAC1, RARA, RARG, RRM1, TAF13, THBS2, TLR4, UTRN, VAV3, ZEB2 |
| 208 | Refractory malignant solid tumor | Cancer, Organismal Injury and Abnormalities | 2.25E,07 | 14 | ALB, ALK, AR, BTK, ERBB4, GART, HDAC7, HMOX1, HSP90AB1, IMPDH1, PARP3, PTK2B, RRM1, VEGFB |
| 209 | Malignant solid organ tumor | Cancer, Organismal Injury and Abnormalities | 2.27E,07 | 209 | ACACB, ACADSB, ACSM2A, ADH7, ALB, ALK, ALOX12, AMY1C (includes others), ANG, AOC3, APEX1, APPL1, AR, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CD74, CHKA, CLCN5, CRYM, CSDE1, CSF2RB, CSNK1G2, CSTF2, CTCF, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, ECI2, EP300, EPHA3, EPS8L2, ERBB4, ESR1, F2, F3, FAPB3, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GRK6, GTF2I, HASPIN, HAT1, HBB, HBEGF, HCK, HDAC7, HDX, HK2, HLA, DRB1, HMGCS1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSP90AB1, HTR1A, IFNG, IFNGR1, IGF1R, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITS1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MARF1, MARK1, MATK, MDH1, MECP, MEMO1, MMP1, MMP2, MSH2, MSN, MUC1, MYBPC1, MYBPC3, NBEA, NCBP1, NCOA3, NF2, NFATC1, NOTCH1, NR1I3, NSUN5, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PYGL, RAC1, RARA, RARG, RBBP6, RBP5, RGS6, RND1, RPA3, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEM1, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, STARD13, STK4, SULT1A1, SYT13, THBS2, TIMM9, TJP1, TLR4, TRIM21, UEVLD, USP19, UTRN, VAV3, WHRN, WWP1, XIAP, XRCC6, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZNF292, ZNF462 |
| 210 | Binding of DNA | Cell Cycle, Gene Expression | 2.48E,07 | 22 | ALB, APEX1, AR, BTK, CYP2E1, EP300, ESR1, F2, F3, FN1, HCK, IFNG, MAP3K3, MUC1, NOTCH1, NR1I3, POU2F1, PPARG, RAC1, RARA, STK4, TLR4 |
| 211 | Peripheral vascular disease | Cardiovascular Disease, Organismal Injury and Abnormalities | 2.64E,07 | 26 | ALB, AOC3, AR, B2M, C1R, CA8, CSF2RB, DHPS, ESR1, F2, FAPB3, FAS, FCGR2A, HBB, HCK, HIBCH, HLA, DRB1, HTR1A, IGF1R, ITGB3, MARK1, PAH, PPARG, PRKCB, PYGL, SUB1 |
| 212 | Adhesion of T lymphocytes | Cell, mediated Immune Response, Cell, To, Cell Signaling and Interaction, Cellular Movement, Hematological System Development and Function, Immune Cell Trafficking | 2.76E,07 | 9 | AOC3, ARHGEF1, F2, FAS, FN1, IFNG, PTK2B, RAC1, TLR4 |

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|-----|---------------------------------------|--|----------|-----|---|
| 213 | Transport of molecule | Molecular Transport | 2.97E,07 | 45 | ALB,ANG,ANXA6,APPL1,ARF6,ATP7B,B2M,CD74,CERT1,CHKA,CLCN5,CRYM,CUL1,CYP2E1,F2,FABP3,FAS,FCGR2A,FN1,GAD2,GC,HBB,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,MSN,NCBP1,NUP214,PPARG,PRKCB,PSAP,SKP1,SLC5A1,SMG5,SMG7,SNX1,STK4,TIMM9,TTR,USP19,WARS1,WWP1,YWHAH |
| 214 | Transcription | Gene Expression | 3.06E,07 | 59 | ACVR2B,ANG,APEX1,AR,ATXN3,BTK,BTRC,CAMK4,CD74,CDK5R1,CIAO1,CRYM,CTCF,EP300,ERBB4,ESR1,F2,F3,FN1,GTF2F2,GTF2I,HBB,HDAC7,HLA,DRB1,HMBOX1,HNRNPA2B1,IFNG,KMT5A,MAP3K3,MSN,MYSM1,NCBP1,NCOA3,NFATC1,NOTCH1,NR1I3,PA2G4,PC,POU2F1,PPARG,PRKCB,RAC1,RARA,RARG,RBBP6,SART3,SEMA4D,SFMBT2,SMURF2,SUB1,TAF13,TLR4,WARS1,XRCC6,YWHAH,YWHAQ,YY1,ZEB2,ZIC3 |
| 215 | Binding of T lymphocytes | Cell,To,Cell Signaling and Interaction,Hematological System Development and Function | 3.10E,07 | 10 | AOC3,ARHGEF1,F2,FAS,FN1,IFNG,MSN,PTK2B,RAC1,TLR4 |
| 216 | Malignant neoplasm of retroperitoneum | Cancer,Organismal Injury and Abnormalities | 3.17E,07 | 106 | ACACB,ACAT2,ALB,ALK,APPL1,AR,ASAP1,ATP7B,ATXN3,B2M,BPI,BTRC,CANT1,CD74,CDK5R1,CHKA,CLK1,CRYM,CSDE1,CSF2RB,CSTF2,CTCF,CYP17A1,DCTD,DDFA,DPP4,ECHS1,EP300,EPAH3,ERBB4,ESR1,F2,F3,FAP,FLNB,FN1,G6PD,GC,GGPS1,GRHPR,GTF2I,HBB,HBEGF,HCK,HIBCH,HLA,DRB1,HMGCS1,HMOX1,HPD,HSD17B4,HSP90AB1,IGF1R,IMPDH1,ITGB3,ITSN1,KIF11,KLK1,LRBA,MAGI2,MARK1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NR1I3,NUP214,PA2G4,PANK1,PARP3,PC,PDHA1,PDK4,PGK1,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTPRE,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RRM1,S100A6,SFN,SMG7,SMTN,SULT1A1,TJP1,TLR4,UTRN,WEE1,ZCWPW1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 217 | Differentiation of tumor cell lines | Cellular Development | 3.33E,07 | 18 | CDK5R1,CHKA,CTCF,DPP4,ERBB4,ESR1,FABP7,FN1,HMOX1,HNRNPA2B1,IFNG,IGF1R,KMT5A,MUC1,NOTCH1,PPARG,RARA,RARG |
| 218 | Abdominal cancer | Cancer,Organismal Injury and Abnormalities | 3.33E,07 | 266 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACP3,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCDT,DCXR,DDFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPAH3,EP38L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2F2,GTF2I,HADH,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B4,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQB4,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YWHAQ,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 219 | Prostatic tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 3.58E,07 | 117 | ACACB,ACADVL,ACP3,ALB,ALK,ANXA6,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,B2M,BCR,BTK,C1R,CANT1,CD74,CLK1,CSDE1,CSNK1G1,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DMC1,EP300,EPAH3,EP38L2,ERBB4,ESR1,F2,FABP7,FAP,FAS,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,HASPIN,HDAC7,HLA,DRB1,HMGB3,HMOX1,HSP90AB1,IFNG,IFNGR1,ITGB3,KMT5A,LRBA,MAGI2,MAPK6,MARF1,MARK1,MATK,MDH1,MMP1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NUP214,ODC1,OXSR1,PAPSS1,PARP3,PC,PDK3,PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RARA,RARG,RRM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SLK,SMAP1,STK4,TAF13,THBS2,TLR4,TRIM21,TTR,USP19,UTRN,VEGFB,WHRN,XIAP,YWHAQ,YY1,ZEB2,ZNF292,ZNF462 |

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|-----|---|---|----------|-----|---|
| 220 | Angiogenesis | Cardiovascular System Development and Function, Organismal Development | 3.59E,07 | 30 | ANG,BPI,DGKA,DSG2,F2,F3,FLNB, FN1,GTF2I,HBEGF,HK2,HMOX1,IFNG,ITGB3,KLK1,MMP2,NFATC1,NO TCH1,PATJ,PGK1,PPARG,RAC1,STARD13,THBS2,TJP1,TLR4,VEGFB,WARS1,YARS1,YY1 |
| 221 | Metabolism of terpenoid | Lipid Metabolism, Small Molecule Biochemistry, Vitamin and Mineral Metabolism | 3.66E,07 | 17 | ACACB,ACAT2,ADH7,CYP17A1,CYP2E1,CYP2R1,CYP7A1,G6PD,GC,GGPS1,HMGCS1,HSD17B10,HSD17B4, IFNG,SULT1A1,TTR,YWHAH |
| 222 | Migration of mononuclear leukocytes | Cellular Movement, Hematological System Development and Function, Immune Cell Trafficking | 3.75E,07 | 15 | AOC3,ARHGEF1,CD74,DPP4,F2,FAS, FN1,IFNG,ITGB3,MSN,PPARG,PTK2B,RAC1,SEMA4D,TLR4 |
| 223 | Cell death of embryonic cell lines | Cell Death and Survival, Embryonic Development | 4.02E,07 | 18 | AR,ATXN3,F2,FAS,GRK2,HK2,IFNG,IGF1R,NDUFAB1,NF2,PEX5,PPARG,PRKCB,STK4,TNFAIP8L2,XIAP,Y WHAQ,YY1 |
| 224 | Oxidation of fatty acid | Energy Production, Lipid Metabolism, Small Molecule Biochemistry | 4.27E,07 | 10 | ACADVL,ADH1C,A LOX12,ECHS1,HADH,HSD17B10,HSD17B4,MECR,PKD4,PPARG |
| 225 | Cell movement of endothelial cell lines | Cardiovascular System Development and Function, Cellular Movement | 4.37E,07 | 11 | ESR1,F3, FN1,GTF2I,MMP2,PATJ,PPARG,PTK2B,TLR4,VEGFB,YARS1 |
| 226 | Progressive adenocarcinoma | Cancer, Organismal Injury and Abnormalities, Tumor Morphology | 4.37E,07 | 11 | ALK,AR,CYP17A1,ERBB4,ESR1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 227 | Progressive neurological disorder | Neurological Disease | 4.68E,07 | 50 | ADH1C,ALB,ANG,AR,BCR,BTK,C1R,CD74,CDK5R1,ERBB4,ESR1,F2,F3,FABP3,FAS,FCGR2A,FHIT,GAD2,G ART,GC,GGPS1,HDAC7,HLA,DRB1,HMOX1,HNRNPA2B1,HSP90AB1,HTR1A,IDE,IFNG,IGF1R,IMPDH1,ITG B3,MDH1,MMP1,MMP2,NAE1,NOTCH1,NUP214,ODC1,PPARG,PRKCB,PSAP,PTPRE,RRM1,S100A6,SMTN,T AF13,TLR4,TTR,XIAP |
| 228 | Liver carcinoma | Cancer, Gastrointestinal Disease, Hepatic System Disease, Organismal Injury and Abnormalities | 4.70E,07 | 133 | ACACB,ACADSB,ACADVL,ACY1,ALB,ALK,APEX1,AR,ARHGAP5,ASAP1,ATXN3,B2M,B3GAT2,BCR,BTK, BTRC,C1R,C8A,CANT1,CD1A,CDK5R1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CYP7A1,DGKA,ECH S1,ECI2,EP300,EPA3,EP8L2,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FLNB, FN1,GC,GGPS1,GRHPR,GTF2F2, HBB,HCK,HDAC7,HDX,HIBCH,HK2,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSP90AB1,HTR1A,IDE,IF NGR1,IGF1R,IMPDH1,IQUB,KMT5A,KYNU,MAGI2,MAPK6,MARF1,MDH1,MECR,MMP2,MSH2,MUC1,MYB PC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NUP214,PATJ,PC,PCYT2,PDHA1,P DK3,PKD4,PEX5,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTPRE,PTPRF,PYGL,RAC1,RA RA,RBBP6,RRM1,SART3,SEC23A,SFMBT2,SLK,SMG7,SMURF2,STARD13,SULT1A1,THBS2,TJP1,TRIM21,U EVLD,USP19,VAV3,VEGFB,WEE1,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZIC3,ZNF292,ZNF4 62 |
| 229 | Microtubule dynamics | Cellular Assembly and Organization, Cellular Function and Maintenance | 4.81E,07 | 30 | AR,ARF6,ASAP1,ATXN3,BTK,CAMK4,CDK5R1,EPA3,ERBB4,ESR1,F2,F3,FAS,FHIT, FN1,GRK2,HCK,IFNG, ITGB3,KIF11,MATK,MSN,NF2,PRKCB,PTPRF,RAC1,SEMA4D,SLK,SPEF1,TLR4 |
| 230 | Progression of carcinoma | Cancer, Organismal Injury and Abnormalities, Tumor Morphology | 4.84E,07 | 12 | ALK,AR,CYP17A1,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |

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|-----|-----------------------------------|--|----------|-----|--|
| 231 | Binding of lymphatic system cells | Cell,To,Cell Signaling and Interaction | 5.22E,07 | 11 | AOC3,ARHGEF1,F2,FAS, FN1,IFNG,ITGB3,MSN,PTK2B,RAC1,TLR4 |
| 232 | Metabolic bone disease | Connective Tissue Disorders, Metabolic Disease, Organismal Injury and Abnormalities, Skeletal and Muscular Disorders | 5.25E,07 | 10 | ALB,BMP1,C1R,CLCN5,CYP2R1,ESR1,GGPS1,HNRNPA2B1,NOTCH1,PEX5 |
| 233 | Cytostasis | Cellular Growth and Proliferation | 5.61E,07 | 15 | ALK,CUL1,ESR1,FABP7,FAS,FHIT,GRK2,IFNG,IGF1R,NF2,NME3,NOTCH1,RAC1,RARA,RARG |
| 234 | Hepatobiliary carcinoma | Cancer, Gastrointestinal Disease, Organismal Injury and Abnormalities | 5.86E,07 | 139 | ACACB,ACADSB,ACADVL,ACY1,ADH1C,ALB,ALK,APEX1,AR,ARHGAP5,ASAP1,ATXN3,B2M,B3GAT2,B CR,BTK,BTRC,C1R,C8A,CANT1,CD1A,CDK5R1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CYP7A1,DG KA,DSG2,ECHS1,ECI2,EP300,EPA3,EP8L2,ERBB4,ESR1,EXOSC9,F2,FABP7,FAP,FLNB, FN1,GC,GGPS1,G RHPR,GTF2F2,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSP90AB 1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,KIF11,KMT5A,KYNU,MAGI2,MAPK6,MARF1,MDH1,MECR,M MP2,MSH2,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NUP214,PA 2G4,PATJ,PC,PCYT2,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP, PTPRE,PTPRF,PYGL,RAC1,RARA,RBBP6,RRM1,SART3,SEC23A,SFMBT2,SH2B2,SLK,SMG7,SMURF2,STAR D13,SULT1A1,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,VA V3,VEGFB,WEE1,WWP1,XRCC6,YWHAH,YY1, ZBTB43,ZCWPW1,ZEB2,ZIC3,ZNF292,ZNF462 |
| 235 | Prostate cancer | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 5.89E,07 | 116 | ACACB,ACADVL,ACP3,ALB,ALK,ANXA6,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,B2M,BCR,BTK,C1R,CA NT1,CD74,CLK1,CSDE1,CSNK1G1,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DMC1,EP300,EPA3,EP8L2,ER BB4,ESR1,F2,FABP7,FAP,FAS,FLNB, FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,HASPIN,HDAC7,HLA,D RB1,HMGB3,HMOX1,HSP90AB1,IFNG,IFNGR1,ITGB3,KMT5A,LRBA,MAGI2,MAPK6,MARF1,MARK1,MAT K,MDH1,MMP1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NUP214,ODC 1,OXSR1,PAPSS1,PARP3,PC,PDK3,PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPR E,PTPRF,PYGL,RARA,RARG,RRM1,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SLK,SMAP1,STK4,TAF 13,THBS2,TLR4,TRIM21,TTR,USP19,UTRN,WHRN,XIAP,YWHAQ,YY1,ZEB2,ZNF292,ZNF462 |
| 236 | Adhesion of immune cells | Cell,To,Cell Signaling and Interaction, Hematologic System Development and Function, Immune Cell Trafficking | 5.93E,07 | 15 | AOC3,ARHGEF1,F2,F3,FAS,FCGR2A, FN1,IFNG,MSN,PPARG,PTK2B,RAC1,SEMA4D,TLR4,UTRN |
| 237 | Liquid tumor | Cancer, Organismal Injury and Abnormalities | 6.04E,07 | 84 | ALB,ALK,ALOX12,AMY1C (includes others),APEX1,ARHGAP5,B2M,BCR,BMP1,BTK,BTRC,C8A,CANT1,CD1A,CD74,CDK5R1,CIAO1,CSF2RB,CT CF,CYP2E1,CYP2R1,DPP4,EP300,EPA3,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,GAD2,GRK2,GTF2F2,HASPIN, HCK,HLA,DRB1,HMGB3,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,ITGB3,KLK1,KMT5A,LRBA,MAGE A4,MAGI2,MMP2,MSH2,NCOA3,NOTCH1,NT5C3A,NUP214,PA2G4,PDHA1,PDK3,PDK4,PGC,POT1,PRKCB,P TK2B,PTPRE,PYGL,RAC1,RARA,RARG,RRM1,SH2B2,SMG5,SMG7,SMTN,STK4,SYT13,TAF13,TJP1,TLR4,T XNDC12,UEVLD,VEGFB,WEE1,XIAP,ZEB2 |
| 238 | Chemotaxis | Cellular Movement | 6.24E,07 | 22 | CD74,CERT1,DAPK2,DGKA,DPP4,ERBB4,FAS, FN1,HBEGF,IFNG,ITGB3,MMP2,NOTCH1,PPARG,PRKCB,PT K2B,RAC1,SEMA4D,THBS2,TLR4,WARS1,YARS1 |
| 239 | Organization of cytoskeleton | Cellular Assembly and Organization, Cellular Function and Maintenance | 6.50E,07 | 35 | AR,ARF6,ASAP1,ATXN3,BTK,CAMK4,CDK5R1,EPA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FHIT, FN1,GRK2,H CK,IFNG,ITGB3,KIF11,MATK,MSN,NDC80,NF2,PARP3,PRKCB,PTPRF,RAC1,RND1,SEMA4D,SLK,SPEF1,TJ P1,TLR4 |
| 240 | Transcription of RNA | Gene Expression | 7.02E,07 | 53 | ACVR2B,ANG,APEX1,AR,ATXN3,BTK,BTRC,CAMK4,CD74,CDK5R1,CIAO1,CRYM,CTCF,EP300,ERBB4,ES R1,F2, FN1,GTF2F2,GTF2L,HBB,HDAC7,HLA,DRB1,HMBOX1,HNRNPA2B1,IFNG,KMT5A,MAP3K3,MYSM1, |

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| | | | | | NCBP1,NCOA3,NFATC1,NOTCH1,NR1I3,PA2G4,POU2F1,PPARG,PRKCB,RAC1,RARA,RARG,RBBP6,SEMA4D,SMURF2,SUB1,TAF13,TLR4,XRCC6,YWHAH,YWHAQ,YY1,ZEB2,ZIC3 |
| 241 | Apoptosis of pancreatic cancer cell lines | Cell Death and Survival | 7.10E,07 | 10 | BTRC,FAS,FHIT,FN1,HBEGF,IFNG,IGF1R,NOTCH1,RRM1,SFN |
| 242 | Necrosis of epithelial tissue | Cell Death and Survival,Organismal Injury and Abnormalities | 7.24E,07 | 23 | AR,ATXN3,BPI,F2,FAS,GRK2,HK2,IFNG,IGF1R,ITSN1,NDUFAB1,NF2,NOTCH1,PEX5,PPARG,PRKCB,RAC1,STK4,TLR4,TNFAIP8L2,XIAP,YWHAQ,YY1 |
| 243 | Intraabdominal organ tumor | Cancer,Organismal Injury and Abnormalities | 7.35E,07 | 264 | AASDHPPT,ACACB,ACADSB,ACADVL,ACAT2,ACBD7,ACSM2A,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CA8,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,DTYMK,ECHS1,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ERI1,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2F2,GTF2I,HADH,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDI1,IQUB,ITGB3,ITPA,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MEMO1,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SNX2,SPEF1,STARD13,STK16,STK4,SUB1,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XIAP,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 244 | Male genital neoplasm | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 7.43E,07 | 118 | ACACB,ACADVL,ACP3,ALB,ALK,ANXA6,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,B2M,BCR,BTK,C1R,CANT1,CD74,CLK1,CSDE1,CSNK1G1,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DMC1,EP300,EPHA3,EPS8L2,ERBB4,ESR1,F2,FABP7,FAP,FAS,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,HASPIN,HDAC7,HLA,DRB1,HMGB3,HMOX1,HSP90AB1,IFNG,IFNGR1,ITGB3,KMT5A,LRBA,MAGI2,MAPK6,MARF1,MARK1,MATK,MDH1,MMP1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NUP214,ODC1,OXSR1,PAPSS1,PARP3,PC,PDK3,PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEMA4D,SEN2,SERPINA5,SF3B6,SFMBT2,SFN,SLK,SMAP1,STK4,TAF13,THBS2,TLR4,TRIM21,TTR,USP19,UTRN,VEGFB,WHRN,XIAP,YWHAQ,YY1,ZEB2,ZNF292,ZNF462 |
| 245 | Endometrioid carcinoma | Cancer,Organismal Injury and Abnormalities | 7.68E,07 | 135 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,AOC3,APPL1,AR,ARHGEF1,ASAP1,ATP7B,B2M,B3GAT2,BCR,BTK,C8A,CA8,CD1A,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DOK2,DPP4,DTYMK,EP300,EPHA3,ERBB4,ESR1,ETF1,FAP,FCGR2A,FLNB,FN1,G6PD,GAD2,GRK2,GTF2I,HBEGF,HDX,HMBOX1,HMGB3,HNRNPA2B1,HPD,HSD17B4,HSP90AB1,HTR1A,IGF1R,IQUB,ITGB3,ITPA,ITPKC,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MSN,MYBPC3,MYSM1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NR1I3,NT5C3A,NUP214,OAT,ODC1,PANK1,PARN,PARP3,PATJ,PC,PDK3,PGK1,POU2F1,PPARG,PPP2R1A,PTPRE,PTPRF,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEN2,SF3B6,SFMBT2,SH3YL1,SLC5A1,SLK,SMG5,SMTN,SMURF2,STK4,SUB1,SYT13,THBS2,TLR4,TRIM21,UEVLD,UTRN,VAV3,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 246 | Primary tumor | Cancer,Organismal Injury and Abnormalities | 7.72E,07 | 25 | ALB,ALK,B2M,BTK,CDK5R1,CSF2RB,CSNK1G2,DOK2,ERBB4,ESR1,FN1,GART,HSP90AB1,IGF1R,MUC1,NF2,PARP3,PPARG,PPP2R1A,RAC1,RARA,RARG,RRM1,SEMA4D,VEGFB |
| 247 | Female genital tract serous carcinoma | Cancer,Organismal Injury and | 7.83E,07 | 24 | ALK,AOC3,AR,B2M,BCR,CTCF,DPP4,EP300,EPHA3,F3,HBB,HSP90AB1,KIF11,MUC1,NOTCH1,PARP3,PDK4,PPP2R1A,RRM1,SKP1,SMTN,THBS2,TLR4,VAV3 |

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| | | Abnormalities, Reproductive System Disease | | | |
| 248 | Pelvic serous carcinoma | Cancer, Organismal Injury and Abnormalities | 7.83E,07 | 24 | ALK,AOC3,AR,B2M,BCR,CTCF,DPP4,EP300,EPA3,F3,HBB,HSP90AB1,KIF11,MUC1,NOTCH1,PARP3,PKK4,PPP2R1A,RRM1,SKP1,SMTN,THBS2,TLR4,VAV3 |
| 249 | Central nervous system solid tumor | Cancer, Neurological Disease, Organismal Injury and Abnormalities | 7.96E,07 | 186 | ACACB,ACADSB,ACADVL,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,BTK,C1R,C8A,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK2,DPP4,DSG2,EP300,EPA3,EP8L2,ERBB4,ESR1,F2,FABP7,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HBEGF,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,ITGB3,ITPK1,ITSN1,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,M TAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NR1I3,NSU N5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PDK4,PG C,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,R AC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2, SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFA IP8L2,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,XIAP,XRCC6,YWHAH,YWHAQ,ZBTB43,ZCWPW1 ,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 250 | Abnormality of skin morphology | Dermatological Diseases and Conditions, Organismal Injury and Abnormalities | 7.98E,07 | 22 | ALOX12,B2M,CD74,FABP7,FN1,G6PD,HBB,HLA,DRB1,IDE,IFNG,IGF1R,IMPDH1,MMP1,ODC1,PPARG,PRK CB,RAC1,RARA,RARG,RBBP6,RRM1,SART3 |
| 251 | Lung squamous cell carcinoma | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 8.20E,07 | 45 | ALK,ANXA6,AR,B2M,BTK,C8A,CAMK4,CERT1,CLK1,CUL1,CYP2E1,EP300,EPA3,ERBB4,FAP,FN1,GART, HASPIN,HDX,HNRNPA2B1,HSP90AB1,IGF1R,ITPKC,MAPK6,MATK,MDH1,NOTCH1,OXSR1,PANK1,PARP3 ,PATJ,PDK4,PPARG,PPP2R1A,PTK2B,PTPRE,PTPRF,RGS6,RRM1,SENP2,SLK,STK4,TLR4,TTR,WWP1 |
| 252 | Cell movement of mononuclear leukocytes | Cellular Movement, Hematological System Development and Function, Immune Cell Trafficking | 8.31E,07 | 17 | AOC3,ARHGEF1,CD74,DPP4,F2,FAS,FN1,IFNG,ITGB3,MSN,PPARG,PRKCB,PTK2B,RAC1,SEMA4D,TLR4,Y ARS1 |
| 253 | Production of superoxide | Free Radical Scavenging | 8.42E,07 | 9 | F2,FAS,FCGR2A,G6PD,HBB,IFNG,PRKCB,RAC1,TLR4 |
| 254 | Malignant neoplasm of male genital organ | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 8.44E,07 | 117 | ACACB,ACADVL,ACP3,ALB,ALK,ANXA6,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,B2M,BCR,BTK,C1R,CAN T1,CD74,CLK1,CSDE1,CSNK1G1,CUL1,CYP17A1,CYP2E1,CYP7A1,DCTD,DMC1,EP300,EPA3,EP8L2,ER BB4,ESR1,F2,FABP7,FAP,FAS,FLNB,FN1,GAD2,GALM,GALNT10,GART,GC,GGPS1,HASPIN,HDAC7,HLA,D RB1,HMGB3,HMOX1,HSP90AB1,IFNG,IFNGR1,ITGB3,KMT5A,LRBA,MAGI2,MAPK6,MARF1,MARK1,MAT K,MDH1,MMP1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NBEA,NCOA3,NF2,NFATC1,NOTCH1,NUP214,ODC 1,OXSR1,PAPSS1,PARP3,PC,PDK3,PDK4,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPR E,PTPRF,PYGL,RAC1,RARA,RARG,RRM1,SEMA4D,SENP2,SERPINA5,SF3B6,SFMBT2,SFN,SLK,SMAP1,ST K4,TAF13,THBS2,TLR4,TRIM21,TTR,USP19,UTRN,WHRN,XIAP,YWHAQ,YY1,ZEB2,ZNF292,ZNF462 |
| 255 | Progressed metastatic solid tumor | Cancer, Organismal Injury and Abnormalities, Tumor Morphology | 8.71E,07 | 11 | ALK,AR,CYP17A1,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1,VEGFB |
| 256 | Primary solid tumor | Cancer, Organismal Injury and Abnormalities | 8.99E,07 | 25 | ALB,ALK,B2M,BTK,CDK5R1,CSF2RB,CSNK1G2,DOK2,ERBB4,ESR1,FN1,GART,HSP90AB1,IGF1R,MUC1,N F2,PARP3,PPARG,PPP2R1A,RAC1,RARA,RARG,RRM1,SEMA4D,VEGFB |
| 257 | Infection of cells | Infectious Diseases | 9.27E,07 | 36 | ACACB,ACADSB,ACP3,ARF6,B2M,BCR,BMP1,C1R,CANT1,CD74,DAPK2,DPP4,EP300,ETF1,F2,FAS,FN1,GR K2,HIBCH,HMGCS1,IFNG,IQUB,LARS1,NF2,NMT1,NUP214,PANK1,PRKCB,RAC1,RARA,RND1,SUB1,TLR4, TRIM21,XIAP,ZNF292 |

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| 258 | Abdominal carcinoma | Cancer, Organismal Injury and Abnormalities | 9.32E,07 | 260 | AASDHPPT, ACACB, ACADSB, ACADVL, ACAT2, ACBD7, ACSM2A, ACVR2B, ACY1, ADH1C, ADH7, ALB, ALK, ALOX12, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CA8, CAMK4, CANT1, CD1A, CD74, CDK5R1, CHKA, CLCN5, CLK1, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCTD, DCXR, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, DTYMK, ECHS1, ECI2, EP300, EPHA3, EPS8L2, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FABP7, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALM, GALNT10, GART, GC, GGSI1, GRHR, GRK2, GRK6, GTF2F2, GTF2I, HADH, HASPIN, HBB, HBEGF, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMBOX1, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPA, ITPK1, ITPKC, ITSN1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, MECP1, MEMO1, MMP1, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NR1H3, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PRR3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEMA4D, SENP2, SERPINA5, SF3B6, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, STK4, SUB1, SULT1A1, SYT13, TAF13, THBS2, TJP1, TLR4, TRIM21, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XIAP, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 259 | Myelodysplastic syndrome or leukemia | Cancer, Hematological Disease, Organismal Injury and Abnormalities | 9.80E,07 | 82 | ALB, ALK, ALOX12, AMY1C (includes others), APEX1, ARHGAP5, B2M, BCR, BTK, BTRC, C8A, CANT1, CD1A, CD74, CDK5R1, CIAO1, CSF2RB, CTCF, CYP2E1, CYP2R1, DPP4, EP300, EPHA3, ESR1, ETF1, F2, F3, FAP, FAS, FCGR2A, GAD2, GRK2, GTF2F2, HASPIN, HCK, HLA, DRB1, HNRNPA2B1, HSP90AB1, IFNG, IGF1R, IMPDH1, ITGB3, KLK1, KMT5A, LRBA, MAGEA4, MAGI2, MMP2, MSH2, NCOA3, NOTCH1, NT5C3A, NUP214, PA2G4, PDHA1, PDK3, PDK4, PGC, POT1, PRKCB, PTK2B, PTPRE, PYGL, RAC1, RARA, RARG, RRM1, SH2B2, SMG5, SMG7, SMTN, STK4, SYT13, TAF13, TJP1, TLR4, TXNDC12, UEVLD, VEGFB, WEE1, XIAP, ZEB2 |
| 260 | Cell viability of breast cancer cell lines | Cell Death and Survival | 9.98E,07 | 17 | APEX1, BTRC, EP300, ERBB4, FN1, IGF1R, ITGB3, KIF11, NME3, NT5C3A, PDHA1, PTK2B, PTPRE, RRM1, RUVBL1, SEM1, SFN |
| 261 | Glycolysis of tumor cell lines | Carbohydrate Metabolism, Cellular Function and Maintenance | 1.03E,06 | 8 | ESR1, HK2, IGF1R, ITGB3, NCOA3, PDHA1, PDK4, SENP2 |
| 262 | Cell death of colorectal cancer cell lines | Cell Death and Survival | 1.03E,06 | 21 | BTK, DAPK2, DFFA, DSG2, DTYMK, EP300, FAS, HMOX1, IFNG, MUC1, NF2, NOTCH1, PPARG, RAC1, SFN, SMURF2, SNX1, TLR4, WEE1, XIAP, YWHAH |
| 263 | High, risk neoplasia | Cancer, Organismal Injury and Abnormalities | 1.03E,06 | 13 | ALB, ALK, AR, BTK, CSF2RB, CYP17A1, ERBB4, ESR1, HSP90AB1, IMPDH1, RARA, RARG, RRM1 |
| 264 | Adult T cell leukemia | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 1.04E,06 | 10 | B2M, CD1A, FAS, HNRNPA2B1, IMPDH1, NOTCH1, POT1, PRKCB, RARA, RRM1 |
| 265 | Non, Hodgkin cutaneous lymphoma | Cancer, Dermatological Diseases and Conditions, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 1.07E,06 | 14 | CTCF, DPP4, EPHA3, FAS, HSP90AB1, NOTCH1, ODC1, POT1, PRKCB, PTPRE, RARA, RARG, RRM1, TLR4 |
| 266 | Fibrosis | Organismal Injury and Abnormalities | 1.12E,06 | 26 | ALB, AR, B2M, BMP1, FAS, FN1, GRHR, HBEGF, HMGB3, HMGCS1, IFNG, IFNGR1, IMPDH1, ITGB3, MMP1, MYBPC1, NMT1, NOTCH1, PAH, PARN, PPARG, PTPRE, SERPINA5, SMURF2, STK4, TLR4 |

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| 267 | Cell movement of blood cells | Cellular Movement | 1.18E,06 | 25 | ALB,AOC3,ARHGEF1,CD74,DAPK2,DOK2,DPP4,F2,FAS,FCGR2A,FN1,HMOX1,IFNG,ITGB3,MMP1,MSN,PA2G4,PPARG,PRKCB,PTK2B,RAC1,SEMA4D,STK4,TLR4,YARS1 |
| 268 | Lymphocytic leukemia | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.20E,06 | 48 | ALB,ALK,ALOX12,ARHGAP5,B2M,BTK,C8A,CD1A,CD74,CDK5R1,CIAO1,CTCF,DPP4,EP300,F2,F3,FAS,FCGR2A,GAD2,GRK2,GTF2F2,HASPIN,HCK,HNRNPA2B1,HSP90AB1,IFNG,IMPDH1,ITGB3,LRBA,MAGI2,NCOA3,NOTCH1,PGC,POT1,PRKCB,PTK2B,PTPRE,PYGL,RARA,RRM1,SH2B2,SMG5,SYT13,TAF13,TLR4,TXNDC12,XIAP,ZEB2 |
| 269 | Cleavage of RNA | RNA Post,Transcriptional Modification | 1.24E,06 | 5 | ANG,APEX1,HBB,IFNG,SEN2 |
| 270 | Ruffling | Cell Morphology | 1.26E,06 | 7 | ARF6,FCGR2A,GRK2,HMOX1,IQUB,NF2,RAC1 |
| 271 | Binding of breast cancer cell lines | Cell,To,Cell Signaling and Interaction | 1.26E,06 | 10 | ARHGEF1,ESR1,FN1,GRK6,IGF1R,ITGB3,MMP2,SERPINA5,SNX1,TJP1 |
| 272 | Adhesion of mononuclear leukocytes | Cell,To,Cell Signaling and Interaction,Hematological System Development and Function,Immune Cell Trafficking | 1.26E,06 | 10 | AOC3,ARHGEF1,F2,FAS,FN1,IFNG,PPARG,PTK2B,RAC1,TLR4 |
| 273 | Migration of tumor cell lines | Cellular Movement | 1.36E,06 | 43 | ALOX12,APPL1,AR,ARF6,ARHGEF1,DPP4,ESR1,F2,F3,FABP7,FHIT,FLNB,FN1,GRK6,HBEGF,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,MAPK6,MATK,MMP1,MMP2,MSN,MUC1,NCOA3,NF2,NOTCH1,PTK2B,RAC1,RARG,RUVBL1,SEMA4D,SERPINA5,SFN,THBS2,TLR4,VAV3,VEGFB,XIAP,YY1,ZEB2 |
| 274 | Liver lesion | Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 1.39E,06 | 152 | ACACB,ACADSB,ACADVL,ACY1,ALB,ALK,ANG,APEX1,AR,ARHGAP5,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BTK,BTRC,C1R,C8A,CANT1,CD1A,CDK5R1,CLCN5,CLK1,CSDE1,CSF2RB,CSNK1G1,CTCF,CUL1,CYP2E1,CYP7A1,DGKA,ECHS1,ECI2,EP300,EPA3,EP8L2,ERBB4,ERI1,ESR1,EXOSC9,F2,FABP7,FAP,FAS,FCGR2A,FLNB,FN1,GALNT10,GC,GGPS1,GRHPR,GTF2F2,GTF2I,HADH,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,KMT5A,KYNU,MAGI2,MAPK6,MARF1,MDH1,MECR,MMP2,MSH2,MSN,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NT5C3A,NUP214,PAH,PATJ,PC,PCYT2,PDHA1,PDK3,PDK4,PEX5,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTPRE,PTPRF,PYGL,RAC1,RARA,RBBP6,RRM1,SART3,SEC23A,SERPINA5,SFMBT2,SLK,SMG7,SMURF2,SNX22,STARD13,SULT1A1,THBS2,TJP1,TLR4,TNFAIP8L2,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZIC3,ZNF292,ZNF462 |
| 275 | Acne | Dermatological Diseases and Conditions,Inflammatory Disease,Organismal Injury and Abnormalities | 1.51E,06 | 10 | AR,DHPS,ESR1,G6PD,MMP1,MMP2,ODC1,RARA,RARG,TLR4 |
| 276 | Lymphocyte migration | Cellular Movement,Hematological System Development and Function,Immune Cell Trafficking | 1.51E,06 | 13 | AOC3,ARHGEF1,CD74,DPP4,F2,FAS,FN1,IFNG,ITGB3,MSN,PTK2B,RAC1,TLR4 |
| 277 | Stage IIIA,IV breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.53E,06 | 8 | ALB,AR,ERBB4,ESR1,GGPS1,HSP90AB1,PARP3,RRM1 |
| 278 | Allergy of skin | Dermatological Diseases and Conditions,Immunologic | 1.53E,06 | 8 | AR,C1R,DPP4,ESR1,G6PD,IFNG,PRKCB,TLR4 |

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| | | al Disease,Organismal Injury and Abnormalities | | | |
| 279 | Early stage tumor | Cancer,Organismal Injury and Abnormalities | 1.56E,06 | 17 | ALB,ALK,B2M,BTK,CD74,CSF2RB,ERBB4,ESR1,FN1,GART,GGPS1,HSP90AB1,MUC1,PGC,RARA,RARG,RRM1 |
| 280 | Sickle cell anemia | Cardiovascular Disease,Connective Tissue Disorders,Hematological Disease,Hereditary Disorder,Organismal Injury and Abnormalities | 1.65E,06 | 10 | F3,GRHPR,HBB,HMOX1,IFNG,IMPDH1,KLK1,PTPRE,RRM1,TAF13 |
| 281 | Leukemia | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.73E,06 | 79 | ALB,ALK,ALOX12,AMY1C (includes others),APEX1,ARHGAP5,B2M,BCR,BTK,BTRC,C8A,CANT1,CD1A,CD74,CDK5R1,CIAO1,CSF2RB,CTCF,CYP2E1,CYP2R1,DPP4,EP300,EPA3,ESR1,ETF1,F2,F3,FAP,FAS,FCGR2A,GAD2,GRK2,GTF2F2,HASPIN,HCK,HLA,DRB1,HNRNPA2B1,HSP90AB1,IFNG,IGF1R,IMPDH1,ITGB3,KLK1,KMT5A,LRBA,MAGEA4,MAGI2,MSH2,NCOA3,NOTCH1,NT5C3A,NUP214,PA2G4,PDHA1,PDK3,PGC,POT1,PRKCB,PTK2B,PTPRE,PYGL,RAC1,RARA,RARG,RRM1,SH2B2,SMG5,SMG7,SMTN,SYT13,TAF13,TJP1,TLR4,TXNDC12,UEVLD,VEGFB,WEE1,XIAP,ZEB2 |
| 282 | Incorporation of thymidine | DNA Replication, Recombination, and Repair,Nucleic Acid Metabolism,Small Molecule Biochemistry | 1.76E,06 | 7 | ANG,AR,FAS,FN1,HBEGF,IGF1R,THBS2 |
| 283 | Stage IIIB,IV recurrent non,small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 1.76E,06 | 7 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,RRM1 |
| 284 | Hemolysis | Cell Death and Survival,Connective Tissue Disorders,Hematological Disease,Organismal Injury and Abnormalities | 1.78E,06 | 11 | ALB,C8A,DPP4,FAS,FCGR2A,G6PD,HBB,HMOX1,IMPDH1,ITPA,NT5C3A |
| 285 | Accumulation of lipid | Lipid Metabolism,Molecular Transport,Small Molecule Biochemistry | 1.80E,06 | 10 | ARF6,ECHS1,FABP7,FAS,HDAC7,HMOX1,NCOA3,PAFAH1B2,PPARG,PSAP |
| 286 | Ovarian adenocarcinoma | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 1.82E,06 | 60 | ALB,ALK,AR,ARF6,ARHGEF1,ASAP1,B2M,BCR,CA8,CLK1,CSF2RB,CSNK1G1,CSTF2,CTCF,DPP4,EP300,EPHA3,F2,GART,HBEGF,HCK,HNRNPA2B1,HSP90AB1,HTR1A,ITPA,ITSN1,MAGEA4,MAGI2,MAP3K3,MUC1,NBEA,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,ODC1,PARP3,PC,PDK4,PGC,POU2F1,PPARG,PPP2R1A,PTPRF,PYGL,RBM39,RRM1,RTN4IP1,SFMBT2,SH3YL1,SKP1,SMTN,SYT13,THBS2,TLR4,UTRN,VAV3,WWP1,ZEB2 |
| 287 | Colony formation | Cellular Growth and Proliferation | 1.86E,06 | 27 | ALK,AR,BTK,CSF2RB,CTCF,ERBB4,ESR1,FAS,HCK,HNRNPA2B1,IFNG,IGF1R,MSH2,MUC1,NCOA3,NOTCH1,PDHA1,PDK4,PPARG,PPP2R1A,PRKCB,RARG,SEMA4D,SFN,STK4,VEGFB,XIAP |
| 288 | Cell cycle progression | Cell Cycle | 1.88E,06 | 35 | ALK,AR,BTRC,CAMK4,CDK5R1,EP300,ESR1,F2,FAS,GRK2,HASPIN,HBEGF,HMOX1,IFNG,IGF1R,KIF11,MA TK,NAE1,NDC80,NF2,NOTCH1,PPARG,PPP2R1A,PRKCB,RAC1,RARA,RBBP6,RRM1,RUVBL1,SFN,TLR4,TRIM21,WEE1,XIAP,XRCC6 |

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| 289 | Hereditary connective tissue disorder | Connective Tissue Disorders,Hereditary Disorder,Organismal Injury and Abnormalities | 1.89E,06 | 34 | ADH1C,ALB,B3GAT3,BMP1,C1R,CANT1,CLCN5,CYP2R1,EP300,ESR1,FLNB,FN1,GC,GGPS1,HBB,HNRNPA2B1,IFNGR1,IMPDH1,KIF11,KYNU,MMP1,MMP2,MTAP,MUC1,MYBPC1,NOTCH1,PEX5,PPARG,PTPRF,PUS10,RARG,RRM1,THBS2,ZNF462 |
| 290 | Cell movement of leukemia cell lines | Cellular Movement | 1.92E,06 | 13 | ARHGEF1,F2,FLNB,FN1,GC,MATK,NOTCH1,PPARG,PRKCB,PTK2B,RAC1,WARS1,YARS1 |
| 291 | Fatty acid metabolism | Lipid Metabolism,Small Molecule Biochemistry | 1.97E,06 | 22 | ACACB,ACADSB,ALB,ALOX12,CD74,CERT1,CHKA,CYP2E1,ECHS1,F2,FABP3,FAS,FCGR2A,FN1,G6PD,IFNG,ITGB3,MECR,MSN,PDK4,PPARG,PSAP |
| 292 | Formation of colorectal cancer cell lines | Cellular Development,Cellular Growth and Proliferation | 1.98E,06 | 8 | FN1,IFNG,NOTCH1,PDK4,PPP2R1A,RARG,VEGFB,XIAP |
| 293 | Cell proliferation of carcinoma cell lines | Cellular Development,Cellular Growth and Proliferation | 2.01E,06 | 29 | AASDHPPT,ALK,AR,CDK5R1,CSTF2,DAPK2,ECHS1,EP300,F3,FAS,FHIT,HK2,HMOX1,HNRNPA2B1,IFNG,IGF1R,MMP1,MUC1,NCOA3,NOTCH1,PDK4,PPARG,PRKCB,PTK2B,PTPRF,RAC1,S100A6,STK4,YY1 |
| 294 | Apoptosis of lymphoma cell lines | Cell Death and Survival | 2.04E,06 | 13 | ALB,ALK,BTK,FAS,FN1,HCK,IFNG,IGF1R,MUC1,NOTCH1,PPARG,RAC1,XIAP |
| 295 | Metastatic cervical neoplasm | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 2.07E,06 | 7 | ALK,AOC3,F3,GAD2,GART,HSP90AB1,RRM1 |
| 296 | Cholangiocarcinoma | Cancer,Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 2.07E,06 | 11 | ACY1,ADH1C,ALB,ALK,FAP,GC,HPD,HSP90AB1,MMP2,PGK1,RRM1 |
| 297 | Recurrent pelvic tumor | Cancer,Organismal Injury and Abnormalities | 2.22E,06 | 9 | ALK,AR,CYP17A1,ESR1,F3,GART,HSP90AB1,PARP3,RRM1 |
| 298 | Ovarian carcinoma | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 2.22E,06 | 62 | ALB,ALK,AR,ARF6,ARHGEF1,ASAP1,B2M,BCR,CA8,CLK1,CSF2RB,CSNK1G1,CSTF2,CTCF,DPP4,EP300,EPHA3,ESR1,F2,GART,HBEGF,HCK,HNRNPA2B1,HSP90AB1,HTR1A,IFNGR1,ITPA,ITSN1,MAGEA4,MAGI2,MAP3K3,MUC1,NBEA,NCOA3,NF2,NOTCH1,NR1I3,NT5C3A,ODC1,PARP3,PC,PDK4,PGC,POU2F1,PPARG,PPP2R1A,PTPRF,PYGL,RBM39,RRM1,RTN4IP1,SFMBT2,SH3YL1,SKP1,SMTN,SYT13,THBS2,TLR4,UTRN,VAV3,WWP1,ZEB2 |
| 299 | Autophosphorylation of protein | Post,Translational Modification | 2.23E,06 | 11 | ALK,DAPK2,ERBB4,HCK,IGF1R,MAP3K3,OXSR1,PTK2B,SLK,STK16,STK4 |
| 300 | Cell death of epithelial cell lines | Cell Death and Survival,Organismal Injury and Abnormalities | 2.41E,06 | 18 | AR,ATXN3,F2,FAS,GRK2,HK2,IFNG,IGF1R,NDUFAB1,NF2,PEX5,PPARG,PRKCB,STK4,TNFAIP8L2,XIAP,YWHAQ,YY1 |
| 301 | Stage IV non,squamous lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.45E,06 | 9 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 302 | Cell death of lymphoma cell lines | Cell Death and Survival | 2.45E,06 | 14 | ALB,ALK,BTK,FAS,FN1,HCK,IFNG,IGF1R,MUC1,NOTCH1,PPARG,PRKCB,RAC1,XIAP |
| 303 | Stage I,IV non,small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.47E,06 | 12 | ALB,ALK,B2M,ERBB4,FN1,GART,HSP90AB1,IGF1R,PARP3,PGC,PTK2B,RRM1 |
| 304 | Nonsquamous non,small cell lung carcinoma | Cancer,Organismal Injury and | 2.55E,06 | 72 | ADH1C,ADH7,ALB,ALK,ALOX12,AR,B2M,BTK,CD1A,CERT1,CSNK1G2,CTCF,DGKA,DOK2,EP300,EPHA3,ERBB4,ESR1,F3,FN1,GAD2,GART,GRK6,HASPIN,HCK,HMGB3,HPD,HSD17B4,HSP90AB1,HTR1A,IGF1R,IT |

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| | | Abnormalities,Respiratory Disease | | | PKC,KIF11,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MATK,MMP1,MSH2,MSN,MUC1,NBEA,NDC80,NMT1,NOTCH1,NT5C3A,OAT,OXSR1,PAH,PARP3,PATJ,PKD4,PIP4K2C,PPP2R1A,PRKCB,PTK2B,PTPRE,PYGL,RARA,RRM1,SEMA4D,SERPINA5,SFN,SLK,SMG7,STK4,TLR4,TTR,ZCWPW1,ZNF292 |
| 305 | Breast or colorectal cancer | Cancer,Organismal Injury and Abnormalities | 2.56E,06 | 179 | ACACB,ACADVL,ADH7,ALB,ALK,ANG,AOC3,APEX1,APPL1,AR,ARHGAP5,ARHGEF1,B2M,BCR,BMP1,BPI,BTK,C1R,CAMK4,CANT1,CDK5R1,CERT1,CLK1,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCXR,DDFA,DGKA,DHPS,DOK2,DPP4,DSG2,ECHS1,EP300,EPHA3,ERBB4,ESR1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GGPS1,GRK2,GRK6,HASPIN,HAT1,HBB,HBEGF,HCK,HDAC7,HIBCH,HLA,DRB1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,IQUB,ITGB3,ITPKC,ITSN1,KIF11,KMT5A,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MMP1,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC3,NAE1,NBEA,NCOA3,NDC80,NF2,NFATC1,NMT1,NOTCH1,NT5C3A,NUP214,ODC1,OXSR1,PAFAH1B2,PANK1,PAPSS1,PARP3,PATJ,PC,PCYT2,PK3,PK4,PEX5,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RND1,RRM1,RUVBL1,S100A6,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK4,SYT13,THBS2,TLR4,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,WEE1,WHRN,XRCC6,YWHAQ,YY1,ZEB2,ZFP28,ZNF292,ZNF462 |
| 306 | Benign lesion | Organismal Injury and Abnormalities | 2.57E,06 | 38 | ALK,AR,BCR,CLCN5,CSF2RB,CYP17A1,EP300,ERBB4,ESR1,F2,FABP3,FAS,FN1,GGPS1,HDAC7,HSD17B10,HSP90AB1,IGF1R,IMPDH1,MDH1,MMP1,MMP2,MSH2,MSN,MUC1,NOTCH1,ODC1,PKD4,PPARG,PRKCB,RARA,RRM1,RUVBL1,S100A6,TAF13,UTRN,WEE1,ZEB2 |
| 307 | Metastatic malignant neoplasm of prostate | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 2.58E,06 | 11 | AR,CYP17A1,ESR1,GGPS1,HSP90AB1,MMP2,MSH2,PARP3,PPP2R1A,RARG,RRM1 |
| 308 | Colony formation of cells | Cellular Development,Cellular Growth and Proliferation | 2.62E,06 | 25 | ALK,AR,CTCF,ERBB4,ESR1,FAS,HCK,HNRNPA2B1,IFNG,IGF1R,MSH2,MUC1,NCOA3,NOTCH1,PDHA1,PK4,PPARG,PPP2R1A,PRKCB,RARG,SEMA4D,SFN,STK4,VEGFB,XIAP |
| 309 | Stage IV advanced non-small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.70E,06 | 9 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 310 | HER2 negative progesterone receptor negative breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 2.72E,06 | 14 | AR,CERT1,ERBB4,ESR1,FAS,HCK,HSP90AB1,MAGEA4,MMP2,MUC1,PARP3,PPARG,RRM1,WEE1 |
| 311 | Cell viability of lung cancer cell lines | Cell Death and Survival | 2.73E,06 | 13 | ALK,FHIT,FN1,HBEGF,HCK,HK2,HMOX1,IGF1R,KIF11,MSH2,NOTCH1,PTK2B,RRM1 |
| 312 | Repair of DNA | DNA Replication, Recombination, and Repair | 2.79E,06 | 20 | APEX1,ATXN3,BTRC,EP300,G6PD,HAT1,HMOX1,IFNG,IGF1R,MSH2,MYSM1,NAE1,PARP3,RAC1,RARA,RP A3,RRM1,USP19,WEE1,XRCC6 |
| 313 | Remodeling of actin cytoskeleton | Cellular Assembly and Organization | 2.80E,06 | 6 | ARHGEF1,F2,MSN,PTK2B,RAC1,TLR4 |
| 314 | Stage IIIB,IV nonsquamous non-small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.85E,06 | 8 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,RRM1 |
| 315 | Astrocytoma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 2.86E,06 | 146 | ACADVL,ACVR2B,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BMP1,BPI,C1R,C8A,CLCN5,CSD E1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DGKA,DOK2,DPP4,DSG2,EP300,EPHA3,EP300,EPS8L2,ERBB4,ESR1,F2,FABP7,FAS,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HDX,HIBC |

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|-----|---|---|----------|-----|---|
| | | | | | H,HLA,DRB1,HMBOX1,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,ITGB3,ITSN1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MARF1,MATK,MSH2,MSN,MTAP,MUC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NSUN5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PGK1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBP5,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS2,TJP1,TLR4,TFNFIIP8L2,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,YWHAH,YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 316 | Cell movement of leukocytes | Cellular Movement,Hematological System Development and Function,Immune Cell Trafficking | 2.99E,06 | 20 | ALB,AOC3,ARHGEF1,CD74,DAPK2,DPP4,F2,FAS,FN1,IFNG,ITGB3,MSN,PPARG,PRKCB,PTK2B,RAC1,SEMA4D,STK4,TLR4,YARS1 |
| 317 | Anoikis | Cell Death and Survival | 2.99E,06 | 10 | DAPK2,FAS,FN1,IGF1R,ITGB3,NCOA3,NOTCH1,PKD4,SNX1,XIAP |
| 318 | Neoplasia of lymphoid organ | Cancer,Immunological Disease,Organismal Injury and Abnormalities | 3.02E,06 | 14 | BTK,EP300,ERBB4,ESR1,GART,GTF2I,HSP90AB1,IGF1R,MMP2,NOTCH1,NT5C3A,RRM1,TXNDC12,XIAP |
| 319 | Leukocyte migration | Cellular Movement,Immune Cell Trafficking | 3.12E,06 | 24 | ALB,AOC3,ARHGEF1,CD74,DAPK2,DOK2,DPP4,F2,FAS,FN1,HMOX1,IFNG,ITGB3,MMP1,MSN,PA2G4,PPARG,PRKCB,PTK2B,RAC1,SEMA4D,STK4,TLR4,YARS1 |
| 320 | Psoriasis | Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 3.33E,06 | 28 | ACP3,ATXN3,CDK5R1,CYP2E1,DPP4,ETF1,FABP7,FCGR2A,FN1,HBB,HMOX1,IFNG,IFNGR1,KLK1,KYNU,MAPK6,MMP1,MMP2,ODC1,PPARG,PRKCB,PSAP,RARA,RARG,SFN,SUB1,TLR4,YWHAQ |
| 321 | Glioma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 3.33E,06 | 181 | ACACB,ACADSB,ACADVL,ACVR2B,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,C1R,C8A,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK2,DPP4,DSG2,EP300,EPAH3,EP8L2,ERBB4,ESR1,F2,FABP7,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HBEGF,HDX,HIBCH,HK2,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,ITGB3,ITPK1,ITSN1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NR1I3,NSUN5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PKD4,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS2,TIMM9,TJP1,TLR4,TFNFIIP8L2,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,XIAP,XRCC6,YWHAH,YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 322 | Familial encephalopathy | Hereditary Disorder,Neurological Disease,Organismal Injury and Abnormalities | 3.34E,06 | 58 | ADH1C,ALB,ANG,ARF6,ARHGEF1,ATP7B,ATXN3,CA8,CDK5R1,CERT1,CRYM,CTCF,CYP7A1,ECHS1,EP300,ERBB4,ESR1,EXOSC9,F3,FAS,FCGR2A,G6PD,HADH,HMBOX1,HMOX1,HNRNPA2B1,HSD17B10,HTR1A,IFNG,IFNGR1,ITPA,MECR,MMP1,MSH2,NBEA,NDUFAB1,NF2,NR1I3,NUP214,PCYT2,PDHA1,PGK1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,RAC1,RTN4IP1,SMTN,SUB1,TAF13,XIAP,XRCC6,ZEB2,ZIC3,ZNF292 |
| 323 | Proliferation of prostate cancer cell lines | Cellular Development,Cellular Growth and Proliferation | 3.39E,06 | 21 | ACP3,AR,CD74,EP300,F2,HBEGF,HMOX1,IFNG,IGF1R,MMP2,NCOA3,NOTCH1,PA2G4,PKD4,PPARG,PPP2R1A,RAC1,RARG,STK4,VAV3,YWHAQ |
| 324 | Adhesion of peripheral blood leukocytes | Cell,To,Cell Signaling and Interaction,Hematological System Development | 3.43E,06 | 6 | F2,F3,IFNG,PPARG,PTK2B,RAC1 |

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| | | and Function,Immune Cell Trafficking | | | |
| 325 | Progressive recurrent neoplasm | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 3.52E,06 | 10 | ALK,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 326 | Squamous,cell carcinoma | Cancer,Organismal Injury and Abnormalities | 3.58E,06 | 118 | ALB,ALK,ANXA6,AOC3,AR,ARF6,ARHGAP5,ARHGFE1,ASAP1,ATXN3,B2M,BCR,BPI,BTK,BTRC,C8A,CA MK4,CD74,CERT1,CLK1,CSF2RB,CSNK1G1,CTCF,CUL1,CYP2E1,CYP7A1,DGKA,DOK2,DPP4,DSG2,EP300,EPHA3,EP8L2,ERBB4,F3,FAP,FAS,FCGR2A,FHIT,FN1,GALM,GART,GRHPR,HASPIN,HBB,HBEGF,HDX,HL A,DRB1,HNRNPA2B1,HSCB,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,IQUB,ITPKC,KLK1,KMT5A,M AGI2,MAPK6,MATK,MDH1,MECR,MSH2,MSN,MTAP,MUC1,MYBPC1,NCOA3,NDUFAB1,NF2,NFATC1,NO TCH1,NT5C3A,NUP214,OAT,OXSR1,PANK1,PARP3,PATJ,PKD2,PKD4,PGC,PGK1,POT1,POU2F1,PPARG,PPP 2R1A,PSAP,PTK2B,PTPRE,PTPRF,RAC1,RARG,RBBP6,RGS6,RRM1,SEMA4D,SEN2,SERPINA5,SFMBT2,SH 2B2,SLK,SMG7,SMTN,STK4,TJP1,TLR4,TTR,VAV3,WWP1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 327 | Metastasis of primitive neuroectodermal tumor | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 3.79E,06 | 7 | ALK,CSF2RB,ERBB4,FCGR2A,HSP90AB1,RARA,RARG |
| 328 | Primary carcinoma | Cancer,Organismal Injury and Abnormalities | 4.04E,06 | 13 | CDK5R1,DOK2,ERBB4,ESR1,HSP90AB1,IGF1R,MUC1,NF2,PARP3,PPARG,RAC1,RRM1,VEGFB |
| 329 | Hemoglobinopathy | Connective Tissue Disorders,Hematological Disease,Organismal Injury and Abnormalities | 4.22E,06 | 11 | F3,GGPS1,GRHPR,HBB,HMOX1,IFNG,IMPDH1,KLK1,PTPRE,RRM1,TAF13 |
| 330 | Vasculogenesis | Cardiovascular System Development and Function,Organismal Development | 4.25E,06 | 24 | ANG,BPI,DGKA,DSG2,F2,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,KLK1,MMP2,NFATC1,NOTCH1,PATJ,PPARG ,RAC1,STARD13,THBS2,TLR4,VEGFB,YARS1,YY1 |
| 331 | Stage III epithelial cancer | Cancer,Organismal Injury and Abnormalities | 4.46E,06 | 10 | ALB,ALK,ERBB4,ESR1,GART,HSP90AB1,IGF1R,MUC1,PARP3,RRM1 |
| 332 | Pancreatobiliary tumor | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 4.47E,06 | 99 | ACACB,ACAT2,ACY1,ADH1C,ALB,ALK,ALOX12,APPL1,AR,ARHGAP5,ATP7B,BCR,BPI,BTRC,CD74,CDK5 R1,CHKA,CLK1,CRYM,CSDE1,CSF2RB,CSTF2,CTCF,DCTD,DFFA,DOK2,DPP4,DSG2,EP300,EPHA3,EP8L2, ERBB4,ESR1,F2,F3,FAP,FLNB,FN1,GART,GC,GRHPR,GTF2I,HBEGF,HCK,HLA,DRB1,HMGCS1,HPD,HSP90 AB1,IFNGR1,IGF1R,ITSN1,KIF11,LRBA,MAGI2,MARK1,MMP2,MSH2,MUC1,MYBPC1,MYBPC3,NAE1,NBE A,NF2,NFATC1,NOTCH1,NUP214,PA2G4,PARP3,PC,PDHA1,PKD4,PGC,PGK1,POT1,POU2F1,PPP2R1A,PRKC B,RARA,RBBP6,RBM39,RRM1,S100A6,SEC23A,SERPINA5,SFN,SH2B2,SMURF2,TJP1,TLR4,TRIM21,UEVLD ,UTRN,VAV3,VEGFB,WEE1,YY1,ZEB2,ZFP28,ZNF292 |
| 333 | Stage IV metastatic non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 4.50E,06 | 8 | ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 334 | Non,insulin,dependent diabetes mellitus | Endocrine System Disorders,Gastrointestinal Disease,Organismal Injury and Abnormalities | 4.51E,06 | 21 | ALB,AR,BPI,CYP2E1,DPP4,ECHS1,ESR1,GGPS1,HK2,HMBOX1,HTR1A,IDE,IGF1R,IMPDH1,KIF11,PPARG,R AC1,SLC5A1,TAF13,THBS2,VEGFB |
| 335 | Invasion of breast cancer cell lines | Cellular Movement | 4.62E,06 | 20 | ARF6,ASAP1,DGKA,ESR1,F2,FAS,FN1,HSP90AB1,ITGB3,MATK,MMP1,MMP2,MUC1,PTK2B,RAC1,RUVBL1 ,SMURF2,TJP1,VPS26A,ZEB2 |
| 336 | Diabetic complication | Endocrine System Disorders,Gastrointestinal | 4.62E,06 | 20 | AR,B2M,DPP4,ESR1,F3,FAS,FN1,HBB,IGF1R,IMPDH1,ITGB3,MAGI2,NOTCH1,PKD4,PPARG,PRKCB,SMUR F2,UTRN,VEGFB,ZEB2 |

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| | | al Disease, Metabolic Disease, Organismal Injury and Abnormalities | | | |
| 337 | Entry into interphase | Cell Cycle | 4.75E,06 | 9 | EP300,F2, FN1, HBEGF, HMOX1, IGF1R, NCOA3, TRIM21, WEE1 |
| 338 | Connective tissue tumor | Cancer, Organismal Injury and Abnormalities | 4.81E,06 | 52 | ACACB, ALB, ALK, ANG, AR, CSF2RB, CYP7A1, DHPS, ERBB4, ESR1, F2, FABP7, FAP, FN1, GART, GGPS1, HMGCS1, HSD17B4, HSP90AB1, IFNGR1, IGF1R, IMPDH1, KMT5A, MAPK6, MMP1, MMP2, MSH2, NAE1, NBEA, NCBP1, NF2, NOTCH1, PARP3, PDK4, PEX5, PGK1, PHF24, PPARG, PPP2R1A, PRKCB, RARA, RARG, RRM1, SEC23A, SEMA4D, SLK, TJP1, TLR4, UTRN, WWP1, XIAP, ZIC3 |
| 339 | Adult T, cell non, Hodgkin lymphoma | Cancer, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 4.83E,06 | 11 | B2M, DPP4, EP300, FAS, FHIT, HNRNPA2B1, IMPDH1, NOTCH1, POT1, PRKCB, RRM1 |
| 340 | Liver tumor | Cancer, Gastrointestinal Disease, Hepatic System Disease, Organismal Injury and Abnormalities | 4.88E,06 | 147 | ACACB, ACADSB, ACADVL, ACY1, ALB, ALK, ANG, APEX1, AR, ARHGAP5, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BTK, BTRC, C1R, C8A, CANT1, CD1A, CDK5R1, CLCN5, CLK1, CSDE1, CSF2RB, CSNK1G1, CTCF, CUL1, CYP7A1, DGKA, ECHS1, ECI2, EP300, EPHA3, EPS8L2, ERBB4, ERI1, ESR1, EXOSC9, F2, FABP7, FAP, FLNB, FN1, GALNT10, GC, GGPS1, GRHR, GTF2F2, GTF2I, HADH, HBB, HCK, HDAC7, HDX, HIBCH, HK2, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPDH1, IQUB, KMT5A, KYNU, MAGI2, MAPK6, MARF1, MDH1, MECR, MMP2, MSH2, MSN, MUC1, MYBPC1, MYBPC3, NAE1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMT1, NOTCH1, NT5C3A, NUP214, PAH, PATJ, PC, PCYT2, PDHA1, PDK3, PDK4, PEX5, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTPRE, PTPRF, PYGL, RAC1, RARA, RBBP6, RRM1, SART3, SEC23A, SFMBT2, SLK, SMG7, SMURF2, SNX22, STARD13, SULT1A1, THBS2, TJP1, TNFAIP8L2, TRIM21, UEVLD, USP19, UTRN, VAV3, VEGFB, WEE1, WWP1, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZIC3, ZNF292, ZNF462 |
| 341 | Uterine cancer | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 5.07E,06 | 139 | AASDHPPT, ACACB, ACADSB, ACBD7, ACY1, ALB, ALK, AOC3, APPL1, AR, ATP7B, B2M, B3GAT2, BCR, BTK, BTRC, C8A, CA8, CD1A, CLCN5, CSDE1, CSF2RB, CSTF2, CTCF, CUL1, CYP7A1, DCTD, DHPS, DMC1, DOK2, DPP4, DTYMK, EP300, EPHA3, ERBB4, ESR1, ETF1, F3, FABP7, FAP, FAS, FCGR2A, FLNB, FN1, G6PD, GAD2, GART, GRHR, GRK2, GTF2I, HBB, HDX, HMBOX1, HMGB3, HMOX1, HPD, HSD17B4, HSP90AB1, HTR1A, IGF1R, IQUB, ITGB3, ITPKC, KIF11, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MDH1, MEMO1, MMP1, MMP2, MSH2, MSN, MUC1, MYBPC3, MYSM1, NAE1, NBEA, NCBP1, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NT5C3A, NUP214, OAT, PANK1, PARN, PARP3, PATJ, PDK3, PGK1, PPP2R1A, PTPRE, PTPRF, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RUVBL1, SART3, SENP2, SERPINA5, SF3B6, SH3YL1, SLC5A1, SLK, SMG5, SMTN, SMURF2, SNX1, STK4, SUB1, SULT1A1, SYT13, THBS2, TJP1, TLR4, TRIM21, UEVLD, UTRN, VAV3, WWP1, XIAP, YY1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 342 | Inflammation of joint | Connective Tissue Disorders, Inflammatory Disease, Inflammatory Response, Organismal Injury and Abnormalities, Skeletal and Muscular Disorders | 5.08E,06 | 39 | ALB, ALOX12, ANG, AR, ASAP1, B2M, CD1A, CD74, CSF2RB, DPP4, FAS, FCGR2A, FN1, GGPS1, HBB, HCK, HDAC7, HLA, DRB1, HMOX1, IDE, IFNG, IMPDH1, MAP3K3, MMP1, MMP2, MTAP, NFATC1, PGK1, PPARG, PRKCB, PTK2B, PTPRE, RGS6, SF3B6, SMG7, TAF13, TJP1, TLR4, XIAP |
| 343 | Apoptosis of carcinoma cell lines | Cell Death and Survival | 5.44E,06 | 20 | ALK, AR, DAPK2, EP300, FAS, FHIT, FN1, G6PD, HK2, HMOX1, IFNG, IGF1R, MSH2, NCOA3, NOTCH1, PPARG, RAC1, RRM1, TLR4, XIAP |
| 344 | Cutaneous T, cell lymphoma | Cancer, Dermatological Diseases and Conditions, Hematological Disease, Immunological Disease, Organismal Injury and Abnormalities | 5.50E,06 | 12 | CTCF, DPP4, EPHA3, FAS, NOTCH1, ODC1, POT1, PRKCB, RARA, RARG, RRM1, TLR4 |

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| 345 | Stage IIIB cancer | Cancer,Organismal Injury and Abnormalities | 5.61E,06 | 10 | ALB,ALK,ERBB4,ESR1,FN1,GART,GGPS1,HSP90AB1,IGF1R,RRM1 |
| 346 | Bladder carcinoma | Cancer,Organismal Injury and Abnormalities,Renal and Urological Disease | 5.84E,06 | 51 | ACACB,ALB,ALK,AOC3,AR,ARHGAP5,BCR,BMP1,BTK,CSTF2,CTCF,CUL1,DGKA,DHPS,DOK2,EP300,EPH A3,EP8L2,ERBB4,GRHPR,HNRNPA2B1,HSP90AB1,KMT5A,KYNU,MAGEA4,MAGI2,MARF1,MMP2,MTAP, NCOA3,NF2,NOTCH1,NT5C3A,PA2G4,PAH,PK4,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRF,RARA,RARG,RB BP6,RBM39,RRM1,SLC5A1,TLR4,XIAP,ZCWPW1,ZEB2 |
| 347 | Undifferentiated malignant neoplasm | Cancer,Organismal Injury and Abnormalities | 6.01E,06 | 26 | ALK,AMY1C (includes others),AR,DSG2,EPHA3,ERBB4,FN1,GALNT10,GART,GRK2,HASPIN,HSP90AB1,IGF1R,IMPDH1,MMP1,MS H2,PARP3,PDK4,PGK1,PTK2B,RRM1,SLK,STK4,TLR4,YY1,ZEB2 |
| 348 | High grade astrocytoma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 6.02E,06 | 144 | ACADVL,ACVR2B,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BMP1,BPI,C1R,C8A,CLCN5,CSD E1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DGKA,DOK2,DPP4,DSG2,EP300,EPHA3,EP8L2,ERBB4,E SR1,F2,FABP7,FAS,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HDX,HIB C,H,HLA,DRB1,HMBOX1,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,ITG B3,ITSN1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MARF1,MATK,MSH2,MSN,MTAP,MUC1,MYBPC3,NBEA, NCBP1,NCOA3,NF2,NFATC1,NMT1,NOTCH1,NSUN5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1 ,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PGK1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PUS10,PYGL, RAC1,RARA,RARG,RBBP6,RBP5,RRM1,RTN4IP1,SART3,SEMA4D,SEN2,SERPINA5,SFMBT2,SH2B2,SH3 Y L1,SLC5A1,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS2,TJP1,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VPS2 6A,WEE1,WHRN,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 349 | Export of molecule | Molecular Transport | 6.06E,06 | 14 | ALB,ATP7B,CRYM,FAS,HMOX1,HNRNPA2B1,MSN,NCBP1,NUP214,PPARG,PRKCB,SMG5,SMG7,TTR |
| 350 | Non,traumatic arthropathy | Connective Tissue Disorders,Organismal Injury and Abnormalities,Skeletal and Muscular Disorders | 6.12E,06 | 37 | ALB,ALOX12,ANG,AR,ASAP1,B2M,CD1A,CD74,CSF2RB,DPP4,FAS,FCGR2A,FN1,GGPS1,HBB,HCK,HDAC7 ,HLA,DRB1,HMOX1,IDE,IFNG,IMPDH1,MMP1,MMP2,MTAP,NFATC1,PGK1,PPARG,PTK2B,PTPRE,RGS6,SF 3B6,SMG7,TAF13,TJP1,TLR4,XIAP |
| 351 | Unresectable malignant solid tumor | Cancer,Organismal Injury and Abnormalities | 6.18E,06 | 12 | ALK,CSF2RB,ERBB4,ESR1,FN1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1,VEGFB |
| 352 | Peritoneal tumor | Cancer,Organismal Injury and Abnormalities | 6.20E,06 | 9 | ALB,ALK,ESR1,GART,HSP90AB1,IFNGR1,PARP3,RRM1,XIAP |
| 353 | Outgrowth of cells | Cellular Growth and Proliferation | 6.20E,06 | 9 | AR,ESR1,FN1,IFNG,ITGB3,MMP2,NOTCH1,PSAP,PTK2B |
| 354 | Metabolism of nucleotide | Nucleic Acid Metabolism,Small Molecule Biochemistry | 6.49E,06 | 17 | DCTD,F2,FHIT,G6PD,GRK2,HMOX1,HTR1A,IFNG,IMPDH1,ITPA,KYNU,NMRK1,PAPSS1,PDHA1,PRKCB,SN X1,SULT1A1 |
| 355 | Immunodeficiency | Immunological Disease | 6.49E,06 | 19 | ARHGEF1,B2M,BTK,C8A,CA8,CD74,DAPK2,FAS,FCGR2A,G6PD,GRHPR,IFNGR1,LRBA,MSN,PPARG,STK4, TAF13,TLR4,XIAP |
| 356 | Cell death of carcinoma cell lines | Cell Death and Survival | 6.50E,06 | 22 | ALK,AR,DAPK2,EP300,FABP7,FAS,FHIT,FN1,G6PD,HK2,HMOX1,IFNG,IGF1R,ITGB3,MSH2,NCOA3,NOTCH 1,PPARG,RAC1,RRM1,TLR4,XIAP |
| 357 | Stage IIIA,IV invasive breast cancer | Cancer,Organismal Injury and Abnormalities,Reproduc tive System Disease | 6.57E,06 | 7 | ALB,AR,ERBB4,ESR1,HSP90AB1,PARP3,RRM1 |
| 358 | Brain lesion | Neurological Disease,Organismal Injury and Abnormalities | 6.59E,06 | 177 | ACACB,ACADSB,ACADVL,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,C1R,C8A, CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK 2,DPP4,DSG2,EP300,EPHA3,EP8L2,ERBB4,ESR1,F2,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART, GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HN RNPA2B1,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPDH1,ITGB3,ITPK1,ITSN1,KMT5A |

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| | | | | | ,KYN,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NR1I3,NSUN5,NUP214,ODC1,OXSR1,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PDK4,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,XIAP,XRCC6,YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 359 | Interphase | Cell Cycle | 6.71E,06 | 30 | AASDHPPT,AR,BTRC,CHKA,CUL1,DPP4,EP300,F2,FAS,FHIT,FN1,HBEGF,HMOX1,IFNG,IGF1R,KIF11,MSH2,NAE1,NCOA3,NOTCH1,PPARG,PPP2R1A,RBBP6,RPA3,SART3,SFN,SKP1,TRIM21,WEE1,YWHAQ |
| 360 | Digestive system cancer | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 7.14E,06 | 251 | ACACB,ACADSB,ACADVL,ACAT2,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECHS1,ECI2,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FAP,BP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GC,GGPS1,GRHPR,GRK2,GRK6,GTF2F2,GTF2I,HADH,HASPIN,HBB,HBEGF,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDPH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYN,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MDH1,MECR,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,S100A6,SART3,SEC23A,SEMA4D,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TNFAIP8L2,TRIM21,TTR,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 361 | Large intestine carcinoma | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 7.26E,06 | 218 | ACACB,ACADSB,ACADVL,ACSM2A,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECHS1,EP300,EPHA3,EPS8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FAP,FAS,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRHPR,GRK2,GRK6,GTF2I,HADH,HASPIN,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPA2,IMPDPH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KMT5A,KYN,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PAFAH1B2,PANK1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PDK2,PDK3,PDK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SERPINA5,SF3B6,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WHRN,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 362 | Metabolism of reactive oxygen species | Free Radical Scavenging | 7.35E,06 | 18 | ALB,AOC3,CYP2E1,F2,FAS,FCGR2A,G6PD,HBB,HK2,IFNG,ITGB3,ITSN1,MUC1,PDK4,PRKCB,RAC1,S100A6,TLR4 |
| 363 | Metastatic progressive tumor | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 7.53E,06 | 10 | ALK,AR,ERBB4,ESR1,GART,HSP90AB1,IGF1R,PTK2B,RRM1,VEGFB |

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| 364 | Invasive mammary tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 7.67E,06 | 19 | ALB,ALK,AR,CSF2RB,ERBB4,ESR1,FAP,FAS,FN1,HSP90AB1,MMP2,MYBPC3,PARP3,PK4,PTPRE,PTPRF,RBM39,RRM1,YWHAQ |
| 365 | Cell movement of granulocytes | Cellular Movement,Hematological System Development and Function,Immune Cell Trafficking | 7.77E,06 | 12 | ALB,DAPK2,DPP4,FAS,FN1,IFNG,ITGB3,PPARG,PRKCB,RAC1,TLR4,YARS1 |
| 366 | Organization of cytoplasm | Cellular Assembly and Organization,Cellular Function and Maintenance | 8.02E,06 | 36 | AR,ARF6,ASAP1,ATXN3,BTK,CAMK4,CDK5R1,EPHA3,ERBB4,ESR1,F2,F3,FAS,FCGR2A,FHIT,FN1,GRK2,HCK,HSD17B10,IFNG,ITGB3,KIF11,MATK,MSN,NDC80,NF2,PARP3,PRKCB,PTPRF,RAC1,RND1,SEMA4D,SLK,SPEF1,TJP1,TLR4 |
| 367 | Follicular lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 8.10E,06 | 10 | B2M,BTK,EP300,FAS,FCGR2A,HSP90AB1,IFNG,NOTCH1,RRM1,XIAP |
| 368 | Colony formation of tumor cell lines | Cellular Development,Cellular Growth and Proliferation | 8.30E,06 | 21 | ALK,AR,CTCF,ERBB4,ESR1,HCK,HNRNPA2B1,IFNG,IGF1R,MUC1,NCOA3,NOTCH1,PDHA1,PK4,PPP2R1A,PRKCB,RARG,SFN,STK4,VEGFB,XIAP |
| 369 | Central nervous system cancer | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 8.38E,06 | 179 | ACACB,ACADSB,ACADVL,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,BTK,C1R,C8A,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK2,DPP4,DSG2,EP300,EPHA3,EP8L2,ERBB4,ESR1,F2,FABP7,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,HADH,HASPIN,HAT1,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,ITGB3,ITPK1,ITSN1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NR1I3,NSUN5,NUP214,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PK4,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,TAF13,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VEGFB,VP S26A,WEE1,WHRN,XRCC6,YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 370 | Growth of malignant tumor | Cancer,Organismal Injury and Abnormalities | 8.44E,06 | 13 | AR,BTK,ESR1,FHIT,IFNG,IGF1R,MUC1,NOTCH1,ODC1,PRKCB,PTK2B,RUVBL1,XIAP |
| 371 | Recurrent nonsquamous non-small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 8.50E,06 | 7 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,RRM1 |
| 372 | Lung adenocarcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 8.54E,06 | 70 | ADH1C,ADH7,ALK,ALOX12,AR,B2M,BTK,CD1A,CERT1,CSNK1G2,CTCF,DGKA,DOK2,EP300,EPHA3,ERBB4,ESR1,F3,FN1,GAD2,GART,GRK6,HASPIN,HCK,HMGB3,HPD,HSD17B4,HSP90AB1,HTR1A,IGF1R,ITPKC,KIF11,KYNU,LRBA,MAGEA4,MAGI2,MAPK6,MATK,MMP1,MSH2,MSN,MUC1,NBEA,NDC80,NMT1,NOTCH1,NT5C3A,OAT,OXSR1,PAH,PATJ,PK4,PIP4K2C,PPP2R1A,PRKCB,PTK2B,PTPRE,PYGL,RARA,RRM1,SEMA4D,SERPINA5,SFN,SLK,SMG7,STK4,TLR4,TTR,ZCWPW1,ZNF292 |
| 373 | Stage IV advanced solid tumor | Cancer,Organismal Injury and Abnormalities | 8.65E,06 | 11 | ALB,ALK,BTK,ERBB4,ESR1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 374 | Recurrent advanced cancer | Cancer,Organismal Injury and Abnormalities | 8.71E,06 | 9 | ALB,ALK,AR,ERBB4,ESR1,GART,HSP90AB1,PTK2B,RRM1 |

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| 375 | Uterine corpus cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 9.21E,06 | 11 | AR,CTCF,EP300,EPA3,ERBB4,HSP90AB1,NOTCH1,PPP2R1A,RAC1,RRM1,TLR4 |
| 376 | Inflammation of absolute anatomical region | Inflammatory Response | 9.25E,06 | 30 | ALB,ALK,ALOX12,AR,CSF2RB,CYP17A1,CYP2E1,DHPS,EP300,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GC,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,ITGB3,MUC1,PPARG,RAC1,RARA,SMURF2,TAF13,TLR4 |
| 377 | Locally advanced non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 9.35E,06 | 8 | ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 378 | Brain tumor | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 9.37E,06 | 176 | ACACB,ACADSB,ACADVL,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),AOC3,APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BCR,BMP1,BPI,C1R,C8A,CLCN5,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK2,DPP4,DSG2,EP300,EPA3,EP38L2,ERBB4,ESR1,F2,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GT2F2I,HADH,HASPIN,HAT1,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGB3,HMGCS1,HMOX1,HNRNPA2B1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNGR1,IGF1R,IMPDH1,ITGB3,ITPK1,ITSN1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NR1H3,NSUN5,NUP214,ODC1,OXSRI,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PDK4,PGC,PGK1,PHF24,PIP4K2C,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PSAP,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAC1,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,THBS2,TIMM9,TJP1,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,XIAP,XRCC6,YWHAQ,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 379 | Primitive neuroectodermal tumor | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 9.79E,06 | 15 | ALK,AR,CSF2RB,CTCF,EP300,ERBB4,FAP,FCGR2A,HSP90AB1,IDE,IGF1R,PGK1,RARA,RARG,UTRN |
| 380 | Unresectable advanced cancer | Cancer,Organismal Injury and Abnormalities | 9.79E,06 | 11 | ALK,ERBB4,ESR1,FN1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1,VEGFB |
| 381 | Synthesis of reactive oxygen species | Free Radical Scavenging | 1.01E,05 | 17 | ALB,AOC3,CYP2E1,F2,FAS,FCGR2A,G6PD,HBB,HK2,IFNG,ITGB3,ITSN1,MUC1,PRKCB,RAC1,S100A6,TLR4 |
| 382 | Grade 3,4 tumor | Cancer,Organismal Injury and Abnormalities | 1.02E,05 | 154 | ACACB,ACADVL,ACVR2B,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BMP1,BPI,C1R,C8A,CLCN5,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DMC1,DOK2,DPP4,DSG2,EP300,EPA3,EP38L2,ERBB4,ESR1,F2,FABP7,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GT2F2I,HADH,HASPIN,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGCS1,HMOX1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFNG,IFNGR1,IGF1R,ITGB3,ITSN1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MARF1,MATK,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NSUN5,NUP214,ODC1,OXSRI,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PSAP,PTK2B,PUS10,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SENP2,SERPINA5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,THBS2,TJP1,TLR4,TNFAIP8L2,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,XRCC6,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 383 | Cell death of neuroblastoma cell lines | Cell Death and Survival | 1.08E,05 | 12 | ANG,APPL1,AR,CAMK4,DPP4,FAS,IDE,IFNG,IGF1R,PRKCB,RARG,S100A6 |
| 384 | Aggregation of cells | Cell,To,Cell Signaling and Interaction | 1.08E,05 | 12 | ALB,ALOX12,BTK,CANT1,DSG2,F2,FCGR2A,HNRNPA2B1,IGF1R,ITGB3,SEMA4D,TLR4 |
| 385 | Early stage solid tumor | Cancer,Organismal Injury and Abnormalities | 1.11E,05 | 15 | ALB,ALK,B2M,CSF2RB,ERBB4,ESR1,FN1,GART,GGPS1,HSP90AB1,MUC1,PGC,RARA,RARG,RRM1 |

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| 386 | Inflammation of body cavity | Inflammatory Response | 1.12E,05 | 29 | ALB,ALK,ALOX12,AR,CSF2RB,CYP2E1,DHPS,EP300,ESR1,F2,F3,FAS,FCGR2A,FN1,GAD2,GC,IDE,IFNG,IFNGR1,IGF1R,IMPDH1,ITGB3,MUC1,PPARG,RAC1,RARA,SMURF2,TAF13,TLR4 |
| 387 | Stage I non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 1.14E,05 | 8 | ALK,B2M,ERBB4,FN1,GART,HSP90AB1,PGC,RRM1 |
| 388 | Metastatic recurrent cancer | Cancer,Organismal Injury and Abnormalities | 1.14E,05 | 8 | ALB,AR,CYP17A1,ERBB4,ESR1,GGPS1,HSP90AB1,RRM1 |
| 389 | Benign pelvic disease | Organismal Injury and Abnormalities,Reproductive System Disease | 1.16E,05 | 28 | APEX1,AR,ATP7B,CLCN5,ESR1,FAS,FN1,HSD17B10,HSD17B4,HSP90AB1,IGF1R,ITGB3,MDH1,MMP1,MMP2,MUC1,PKK4,PPARG,PRKCB,RAC1,RRM1,S100A6,TAF13,THBS2,UTRN,WEE1,XRCC6,YWHAH |
| 390 | Metabolism of DNA | DNA Replication, Recombination, and Repair | 1.19E,05 | 16 | APEX1,CUL1,DFFA,EP300,FAS,IFNG,IGF1R,KMT5A,MSH2,NAE1,PGK1,RBBP6,RPA3,SUB1,WEE1,XRCC6 |
| 391 | Benign Tumors | Cancer,Organismal Injury and Abnormalities | 1.22E,05 | 35 | ALK,AR,BCR,CLCN5,CSF2RB,EP300,ERBB4,ESR1,FABP3,FAS,FN1,GGPS1,HDAC7,HSD17B10,HSP90AB1,IGF1R,IMPDH1,MDH1,MMP2,MSH2,MSN,MUC1,NOTCH1,ODC1,PKK4,PPARG,PRKCB,RARA,RRM1,RUVBL1,S100A6,TAF13,UTRN,WEE1,ZEB2 |
| 392 | Large intestine adenocarcinoma | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 1.23E,05 | 216 | ACACB,ACADSB,ACADVL,ACSM2A,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CSDE1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP7A1,DAPK2,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECHS1,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FAP,FAS,FHIT,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRHPR,GRK2,GRK6,GTF2I,HADH,HASPIN,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PAFAH1B2,PANK1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PKK2,PKK3,PKK4,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SERPINA5,SF3B6,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,SYT13,THBS2,TJPI,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WHRN,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 393 | Peripheral T,cell lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.23E,05 | 16 | ALK,C1R,CLK1,EPA3,ERBB4,FN1,GTF2I,HDAC7,HSP90AB1,MMP1,MMP2,NFATC1,NT5C3A,POU2F1,RRM1,TJPI |
| 394 | Development of tumor cell lines | Cellular Development,Cellular Growth and Proliferation | 1.24E,05 | 22 | ALK,AR,CTCF,ERBB4,ESR1,FN1,HCK,HNRNPA2B1,IFNG,IGF1R,MUC1,NCOA3,NOTCH1,PDHA1,PKK4,PPP2R1A,PRKCB,RARG,SFN,STK4,VEGFB,XIAP |
| 395 | Activation of cells | Cell,To,Cell Signaling and Interaction | 1.24E,05 | 23 | ALB,BPI,BTK,CD1A,DGKA,DPP4,F2,F3,FAS,FCGR2A,FN1,GC,HBEGF,IFNG,ITGB3,MMP1,MMP2,PPARG,PRKCB,PTK2B,SEMA4D,TLR4,VAV3 |
| 396 | Peritoneal cavity cancer | Cancer,Organismal Injury and Abnormalities | 1.25E,05 | 8 | ALB,ALK,ESR1,GART,HSP90AB1,IFNGR1,PARP3,RRM1 |
| 397 | Development of cytoplasm | Cellular Assembly and Organization | 1.27E,05 | 18 | ANG,AR,ARF6,CD74,DGKA,F2,FCGR2A,FHIT,FN1,HCK,ITGB3,NF2,NFATC1,NOTCH1,PTK2B,RAC1,STK4,XIAP |
| 398 | Digestive organ tumor | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 1.29E,05 | 253 | ACACB,ACADSB,ACADVL,ACAT2,ACSM2A,ACVR2B,ACY1,ADH1C,ADH7,ALB,ALK,ALOX12,ANG,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CLK1,CRYM,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCTD,DCXR,DFFA,DGK |

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|-----|---|--|----------|-----|---|
| | | | | | A, DHPS, DMC1, DOK2, DPP4, DSG2, ECHS1, ECI2, EP300, EPHA3, EPS8L2, ERBB4, ERI1, ESR1, ETF1, EXOSC9, F2, F3, FABP7, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALM, GALNT10, GART, GC, GGPS1, GRHPR, GRK2, GRK6, GTF2F2, GTF2I, HADH, HASPIN, HBB, HBEGF, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITS1, KIF11, KLK1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MDH1, MECP, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, NAE1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, S100A6, SART3, SEC23A, SEMA4D, SERPINA5, SF3B6, SFMBT2, SFN, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SNX22, SPEF1, STARD13, STK16, STK4, SULT1A1, SYT13, TAF13, THBS2, TJP1, TLR4, TNFAIP8L2, TRIM21, TTR, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 399 | Cell cycle progression of tumor cell lines | Cell Cycle | 1.30E,05 | 17 | AR, CAMK4, EP300, ESR1, HBEGF, HMOX1, IGF1R, NOTCH1, PPARG, RAC1, RARA, RRM1, SFN, TLR4, WEE1, XIAP, XRCC6 |
| 400 | HER2 negative hormone receptor negative breast cancer | Cancer, Organismal Injury and Abnormalities, Reproductive System Disease | 1.31E,05 | 13 | AR, CERT1, ERBB4, ESR1, FAS, HCK, HSP90AB1, MMP2, MUC1, PARP3, PPARG, RRM1, WEE1 |
| 401 | Glioma cancer | Cancer, Neurological Disease, Organismal Injury and Abnormalities | 1.32E,05 | 176 | ACACB, ACADSB, ACADVL, ACVR2B, ADH7, ALB, ALK, ALOX12, AMY1C (includes others), AOC3, APEX1, APPL1, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B3GAT2, BCR, BMP1, BPI, C1R, C8A, CLCN5, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP2E1, DAPK2, DCXR, DGKA, DOK2, DPP4, DSG2, EP300, EPHA3, EPS8L2, ERBB4, ESR1, F2, FABP7, FAS, FCGR2A, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GRK2, GRK6, GTF2I, HADH, HASPIN, HAT1, HDX, HIBCH, HLA, DRB1, HMBOX1, HMGCS1, HMOX1, HNRNPA2B1, HSD17B10, HSD17B4, HSP90AB1, IDE, IFNG, IFNGR1, IGF1R, ITGB3, ITPK1, ITS1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MARF1, MATK, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, NBEA, NCBP1, NCOA3, NF2, NFATC1, NME3, NMT1, NOTCH1, NR1I3, NSUN5, NUP214, ODC1, OXSR1, PA2G4, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PATJ, PC, PCYT2, PDHA1, PDK4, PGC, PGK1, PHF24, PIP4K2C, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RRM1, RTN4IP1, SART3, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SH3YL1, SLC5A1, SLK, SMG5, SMURF2, SNX1, STARD13, SUB1, TAF13, THBS2, TIMM9, TJP1, TLR4, TNFAIP8L2, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, XRCC6, YWHAQ, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 402 | Interphase of tumor cell lines | Cell Cycle | 1.34E,05 | 23 | AASDHPPT, AR, BTRC, CHKA, DPP4, EP300, F2, FAS, FHIT, HMOX1, IFNG, IGF1R, KIF11, MSH2, NAE1, NCOA3, NOTCH1, PPARG, SART3, SFN, TRIM21, WEE1, YWHAQ |
| 403 | Brain glioma | Cancer, Neurological Disease, Organismal Injury and Abnormalities | 1.37E,05 | 174 | ACACB, ACADSB, ACADVL, ACVR2B, ADH7, ALB, ALK, ALOX12, AMY1C (includes others), AOC3, APEX1, APPL1, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B3GAT2, BCR, BMP1, BPI, C1R, C8A, CLCN5, CRYM, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP2E1, DAPK2, DCXR, DGKA, DOK2, DPP4, DSG2, EP300, EPHA3, EPS8L2, ERBB4, ESR1, F2, FAS, FCGR2A, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GRK2, GRK6, GTF2I, HADH, HASPIN, HAT1, HDX, HIBCH, HLA, DRB1, HMBOX1, HMGB3, HMGCS1, HMOX1, HNRNPA2B1, HSD17B10, HSD17B4, HSP90AB1, IDE, IFNGR1, IGF1R, ITGB3, ITPK1, ITS1, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MARF1, MATK, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, NBEA, NCBP1, NCOA3, NF2, NFATC1, NME3, NMT1, NOTCH1, NR1I3, NSUN5, NUP214, ODC1, OXSR1, PAFAH1B2, PAH, PANK1, PAPSS1, PARN, PATJ, PC, PCYT2, PDHA1, PDK4, PGC, PGK1, PHF24, PIP4K2C, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PSAP, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAC1, RARA, RARG, RBBP6, RBM39, RBP5, RGS6, RRM1, RTN4IP1, SART3, SEMA4D, SENP2, SERPINA5, SFMBT2, SH2B2, SH3YL1, SLC5A1, SLK, SMG5, SMURF2, SNX1, STARD13, SUB1, THBS2, TIMM9, TJP1, TLR4, TNFAIP8L2, USP19, UTRN, VAV3, VEGFB, VPS26A, WEE1, WHRN, XIAP, XRCC6, YWHAQ, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |

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| 404 | Stage IIIA cancer | Cancer,Organismal Injury and Abnormalities | 1.37E,05 | 8 | ALB,ALK,ERBB4,ESR1,GART,GGPS1,HSP90AB1,RRM1 |
| 405 | Colony formation of colorectal cancer cell lines | Cellular Development,Cellular Growth and Proliferation | 1.38E,05 | 7 | IFNG,NOTCH1,PKD4,PPP2R1A,RARG,VEGFB,XIAP |
| 406 | Bile duct adenocarcinoma | Cancer,Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 1.38E,05 | 16 | ACY1,ADH1C,ALB,ALK,EP8L2,FAP,GC,HPD,HSP90AB1,MMP2,NOTCH1,PGK1,POU2F1,RRM1,SH2B2,TLR4 |
| 407 | Gastrointestinal carcinoma | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 1.38E,05 | 230 | ACACB,ACADSB,ACADVL,ACSM2A,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECHS1,EP300,EPA3,EP8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GRHR,GRK2,GRK6,GTF2I,HADH,HASPIN,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PKD2,PKD3,PKD4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SERPINA5,SF3B6,SFMBT2,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,UEVLD,USP19,UTRN,VAV3,VEGFB,VPS26A,WEE1,WHRN,WWP1,XRCC6,YWHAH,YY1,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 408 | Adult T,cell leukemia/lymphoma | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 1.41E,05 | 9 | B2M,DPP4,EP300,FAS,FHIT,HNRNPA2B1,NOTCH1,POT1,PRKCB |
| 409 | Cell viability of carcinoma cell lines | Cell Death and Survival | 1.41E,05 | 15 | ALK,APEX1,FHIT,FN1,HBEGF,HCK,HK2,HMOX1,IGF1R,KIF11,MSH2,NOTCH1,PTK2B,RRM1,SFN |
| 410 | Stage IV secondary tumor | Cancer,Organismal Injury and Abnormalities | 1.49E,05 | 11 | ALB,ALK,AR,ERBB4,ESR1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 411 | Apoptosis of colorectal cancer cell lines | Cell Death and Survival | 1.50E,05 | 17 | BTK,DAPK2,DFFA,DSG2,DTYMK,EP300,FAS,IFNG,MUC1,NOTCH1,PPARG,RAC1,SFN,SMURF2,SNX1,TLR4,XIAP |
| 412 | Stage III,IV breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 1.50E,05 | 10 | ALB,AR,ERBB4,ESR1,FN1,GGPS1,HMOX1,HSP90AB1,PARP3,RRM1 |
| 413 | Metastatic gastrointestinal carcinoma | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 1.50E,05 | 10 | ALB,ALK,ERBB4,FAS,GART,HSP90AB1,MMP2,PARP3,RAC1,RRM1 |
| 414 | Muscle tumor | Cancer,Organismal Injury and Abnormalities,Skeletal and Muscular Disorders | 1.51E,05 | 31 | ACACB,ALK,AR,CLCN5,CSF2RB,CYP7A1,ERBB4,ESR1,FAP,FAS,FN1,HSD17B10,HSP90AB1,IGF1R,KMT5A,MDH1,MMP2,MSH2,NOTCH1,PKD4,PPARG,PRKCB,RRM1,S100A6,SEC23A,SLK,TAF13,TJP1,TLR4,UTRN,WEE1 |
| 415 | Stage I epithelial cancer | Cancer,Organismal Injury and Abnormalities | 1.52E,05 | 9 | ALK,B2M,ERBB4,FN1,GART,HSP90AB1,MUC1,PGC,RRM1 |

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| 416 | Replication of virus | Infectious Diseases | 1.53E,05 | 24 | B2M,CANT1,CLK1,CYP17A1,CYP2E1,DAPK2,ESR1,G6PD,GRK2,GRK6,HCK,IFNG,KIF11,MDH1,MSH2,NCOA3,NUP214,OXSR1,PTK2B,SERPINA5,SF3B6,TLR4,TRIM21,ZEB2 |
| 417 | Ruffling of plasma membrane | Cell Morphology | 1.55E,05 | 4 | ARF6,HMOX1,IQUB,NF2 |
| 418 | Stage IIIB locally advanced non,small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 1.61E,05 | 6 | ALK,ERBB4,GART,HSP90AB1,IGF1R,RRM1 |
| 419 | Advanced nonsquamous non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 1.64E,05 | 9 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 420 | Transformation of tumor cell lines | Cancer | 1.65E,05 | 8 | ARF6,ERBB4,HNRNPA2B1,IGF1R,MATK,RAC1,SFN,STARD13 |
| 421 | Serous neoplasm | Cancer,Organismal Injury and Abnormalities | 1.66E,05 | 40 | ALB,ALK,AOC3,AR,ARF6,B2M,BCR,CA8,CSF2RB,CTCF,DPP4,EP300,EPHA3,F2,F3,GART,HBB,HCK,HDAC7,HSP90AB1,HTR1A,ITSN1,KIF11,MAGEA4,MAP3K3,MUC1,NF2,NOTCH1,NT5C3A,PARP3,PK4,PGC,PPP2R1A,PYGL,RRM1,SKP1,SMTN,THBS2,TLR4,VAV3 |
| 422 | Familial cardiovascular disease | Cardiovascular Disease,Hereditary Disorder,Organismal Injury and Abnormalities | 1.68E,05 | 24 | ACADVL,ACVR2B,B3GAT3,CA8,DPP4,DSG2,ECI2,F2,FAS,HTR1A,IMPDH1,ITGB3,ITPKC,KYNU,MYBPC3,NOTCH1,PPARG,RRM1,STK4,TIMM9,TJP1,TTR,WWP1,ZIC3 |
| 423 | Adhesion of tumor cell lines | Cell,To,Cell Signaling and Interaction | 1.71E,05 | 18 | ARHGEF1,DSG2,F2,FN1,GRK6,IFNG,IGF1R,ITGB3,MMP2,MUC1,NOTCH1,PPARG,PTK2B,RAC1,SNX1,TJP1,UTRN,ZEB2 |
| 424 | Proliferation of blood cells | Cellular Development,Cellular Growth and Proliferation | 1.75E,05 | 19 | ACP3,ARF6,BCR,CD74,CSF2RB,DGKA,DPP4,FAS,FN1,HLA,DRB1,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,MSH2,MSN,SEMA4D,VAV3 |
| 425 | X,linked hereditary disease | Hereditary Disorder,Organismal Injury and Abnormalities | 1.77E,05 | 24 | AR,BMP1,BTK,CD74,CLCN5,CYP17A1,DAPK2,ESR1,FCGR2A,G6PD,HLA,DRB1,HMGB3,HSD17B10,MSN,PDHA1,PDK3,PGK1,TAF13,TLR4,UTRN,WHRN,XIAP,ZIC3,ZNF462 |
| 426 | Neuromuscular disease | Neurological Disease,Skeletal and Muscular Disorders | 1.90E,05 | 37 | ADH1C,ALB,ARHGEF1,BCR,BTK,CD74,CDK5R1,CRYM,ESR1,F3,FAS,FCGR2A,FHIT,GGPS1,HADH,HDAC7,HLA,DRB1,HMOX1,HTR1A,IFNG,IMPDH1,ITGB3,MDH1,NBEA,NDUFAB1,PGK1,PPARG,PRKCB,PSAP,PTK2B,PTPRE,RRM1,SMTN,SUB1,TLR4,XIAP,XRCC6 |
| 427 | Metastatic squamous cell carcinoma | Cancer,Organismal Injury and Abnormalities | 1.91E,05 | 9 | ALK,ERBB4,F3,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 428 | Rheumatoid arthritis | Connective Tissue Disorders,Immunological Disease,Inflammatory Disease,Inflammatory Response,Organismal Injury and Abnormalities,Skeletal and Muscular Disorders | 1.95E,05 | 32 | ALB,ALOX12,ANG,ASAP1,B2M,CD1A,CD74,CSF2RB,DPP4,FCGR2A,FN1,HCK,HDAC7,HLA,DRB1,HMOX1,IDE,IFNG,IMPDH1,MMP1,MMP2,MTAP,PGK1,PPARG,PTK2B,PTPRE,RGS6,SF3B6,SMG7,TAF13,TJP1,TLR4,XIAP |
| 429 | Quantity of cells | Tissue Morphology | 1.95E,05 | 22 | ALK,AOC3,AR,ARF6,ATXN3,ESR1,FAS,FN1,GAD2,HBB,HMOX1,IFNG,IFNGR1,IGF1R,NOTCH1,PPARG,RAC1,SFN,THBS2,VAV3,VEGFB,XIAP |
| 430 | Cell spreading of blood cells | Cell Morphology,Cellular Movement | 1.96E,05 | 5 | ALB,FCGR2A,FN1,PTK2B,RAC1 |
| 431 | Locally advanced malignant tumor | Cancer,Organismal Injury and Abnormalities | 1.98E,05 | 11 | ALK,AR,ERBB4,ESR1,GART,GGPS1,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |

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| 432 | Cytostasis of tumor cell lines | Cellular Growth and Proliferation | 1.98E,05 | 11 | ALK,ESR1,FABP7,FHIT,GRK2,IFNG,IGF1R,NF2,NME3,NOTCH1,RARG |
| 433 | Proliferation of lung cancer cell lines | Cellular Development,Cellular Growth and Proliferation | 2.04E,05 | 19 | AASDHPPT,ALK,CSTF2,DOK2,F3,FHIT,HK2,HMOX1,HNRNPA2B1,IFNG,IGF1R,MMP1,MUC1,NCOA3,NOTCH1,PK4,PPARG,PRKCB,RAC1 |
| 434 | Movement Disorders | Neurological Disease | 2.08E,05 | 38 | ADH1C,ALB,AR,ARHGEF1,ATP7B,ATXN3,BCR,CA8,CD74,CDK5R1,CRYM,DHPS,ESR1,F3,FAS,FCGR2A,HA DH,HMOX1,HTR1A,IFNG,IFNGR1,MDH1,MECR,MYBPC1,NBEA,NDUFAB1,PGK1,PPARG,PRKCB,PSAP,PT K2B,PTPRE,RTN4IP1,SMTN,SUB1,TLR4,XIAP,XRCC6 |
| 435 | Aggregation of blood platelets | Cell,To,Cell Signaling and Interaction,Hematologic al System Development and Function,Inflammatory Response | 2.15E,05 | 8 | ALB,ALOX12,BTK,CANT1,F2,FCGR2A,ITGB3,TLR4 |
| 436 | Binding of monocytes | Cell,To,Cell Signaling and Interaction,Hematologic al System Development and Function,Inflammatory Response | 2.15E,05 | 6 | BPI,F2,FN1,ITGB3,PPARG,RAC1 |
| 437 | Adhesion of PBMCs | Cell,To,Cell Signaling and Interaction,Hematologic al System Development and Function,Immune Cell Trafficking,Inflammatory Response | 2.22E,05 | 4 | F2,F3,IFNG,PPARG |
| 438 | Apoptosis of leukemia cell lines | Cell Death and Survival | 2.25E,05 | 17 | ALK,B2M,CHKA,CSF2RB,DFFA,DPP4,FAS,FN1,HCK,HMOX1,MSN,MUC1,NOTCH1,PRKCB,RAC1,STK4,XIAP |
| 439 | Cell death of leukemia cell lines | Cell Death and Survival | 2.29E,05 | 19 | ALK,B2M,CHKA,CSF2RB,DFFA,DPP4,FAS,FN1,HCK,HMOX1,IFNG,MSN,MUC1,NOTCH1,PRKCB,RAC1,ST K4,WEE1,XIAP |
| 440 | Stage IIIC cancer | Cancer,Organismal Injury and Abnormalities | 2.34E,05 | 8 | ALB,ESR1,FN1,GART,GGPS1,HSP90AB1,MUC1,RRM1 |
| 441 | Recurrent non,small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.34E,05 | 8 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PTK2B,RRM1 |
| 442 | Invasive breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 2.34E,05 | 18 | ALB,AR,CSF2RB,ERBB4,ESR1,FAP,FAS,FN1,HSP90AB1,MMP2,MYBPC3,PARP3,PK4,PTPRE,PTPRF,RBM3 9,RRM1,YWHAQ |
| 443 | Vascular tumor | Cancer,Cardiovascular Disease,Organismal Injury and Abnormalities | 2.35E,05 | 15 | ALK,AR,BCR,CSF2RB,ESR1,HSP90AB1,IGF1R,MSH2,MSN,NOTCH1,PPARG,RARA,RARG,TJP1,ZEB2 |
| 444 | Glycolysis of cells | Carbohydrate Metabolism | 2.35E,05 | 10 | ESR1,HK2,IGF1R,ITGB3,NCOA3,NUP214,PDHA1,PK4,PGK1,SENP2 |

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| 445 | Cell movement of neutrophils | Cellular Movement,Hematological System Development and Function,Immune Cell Trafficking,Inflammatory Response | 2.35E,05 | 10 | ALB,DAPK2,DPP4,FAS,FN1,IFNG,ITGB3,PRKCB,RAC1,TLR4 |
| 446 | Stage IV epithelial cancer | Cancer,Organismal Injury and Abnormalities | 2.35E,05 | 10 | ALB,ALK,ERBB4,ESR1,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 447 | Progressive metastatic carcinoma | Cancer,Organismal Injury and Abnormalities,Tumor Morphology | 2.37E,05 | 9 | ALK,ERBB4,ESR1,F3,GART,HSP90AB1,IGF1R,PTK2B,RRM1 |
| 448 | Quantity of tumor cell lines | Tissue Morphology | 2.38E,05 | 14 | ALK,AR,ARF6,ESR1,FAS,FN1,HMOX1,IFNG,IGF1R,NOTCH1,RAC1,SFN,VAV3,VEGFB |
| 449 | Acute leukemia | Cancer,Hematological Disease,Immunological Disease,Organismal Injury and Abnormalities | 2.44E,05 | 66 | ALB,ALK,AMY1C (includes others),APEX1,ARHGAP5,BCR,BTK,BTRC,C8A,CANT1,CD1A,CD74,CDK5R1,CIAO1,CSF2RB,CTCF,CYP2E1,CYP2R1,EP300,EPA3,ESR1,ETF1,F2,F3,FAP,FAS,GRK2,HASPIN,HCK,HLA,DRB1,HSP90AB1,IFNG,IGF1R,IMPDH1,ITGB3,KLK1,KMT5A,LRBA,MAGEA4,MSH2,NCOA3,NOTCH1,NT5C3A,NUP214,PA2G4,PDHA1,PK3,PGC,PTK2B,PYGL,RAC1,RARA,RARG,RRM1.SH2B2,SMG5,SMG7,SMTN,SYT13,TJP1,TLR4,UEVLD,VEGFB,WEE1,XIAP,ZEB2 |
| 450 | Proliferation of cancer cells | Cancer,Cellular Development,Cellular Growth and Proliferation,Organismal Injury and Abnormalities,Tumor Morphology | 2.46E,05 | 12 | AR,BTK,ESR1,FHIT,IFNG,IGF1R,MUC1,NOTCH1,ODC1,PTK2B,RUVBL1,XIAP |
| 451 | TP53 mutation negative malignant solid tumor | Cancer,Organismal Injury and Abnormalities | 2.48E,05 | 3 | AR,BTK,CYP17A1 |
| 452 | Arrest in G0/G1 phase transition of carcinoma cell lines | Cell Cycle | 2.48E,05 | 3 | AASDHPPT,FHIT,IFNG |
| 453 | Benign facial lentiginoses | Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 2.48E,05 | 3 | ODC1,RARA,RARG |
| 454 | Mottled facial hypopigmentation | Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 2.48E,05 | 3 | ODC1,RARA,RARG |
| 455 | Mottled facial hyperpigmentation | Dermatological Diseases and Conditions,Organismal Injury and Abnormalities | 2.48E,05 | 3 | ODC1,RARA,RARG |
| 456 | Efflux of L,triiodothyronine | Amino Acid Metabolism,Molecular Transport,Small Molecule Biochemistry | 2.48E,05 | 3 | ALB,CRYM,TTR |

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| 457 | Ovarian serous tumor | Cancer,Endocrine System Disorders,Organismal Injury and Abnormalities,Reproductive System Disease | 2.48E,05 | 34 | ALB,ALK,AR,ARF6,B2M,BCR,CA8,CSF2RB,CTCF,DPP4,EP300,EPA3,F2,GART,HCK,HSP90AB1,HTR1A,ITSN1,MAGEA4,MAP3K3,MUC1,NF2,NOTCH1,NT5C3A,PARP3,PKD4,PGC,PPP2R1A,PYGL,RRM1,SKP1,THBS2,TLR4,VAV3 |
| 458 | Hematopoiesis of mononuclear leukocytes | Cellular Development,Cellular Growth and Proliferation,Hematological System Development and Function,Hematopoiesis,Lymphoid Tissue Structure and Development,Tissue Development | 2.50E,05 | 13 | BTK,CD74,CSF2RB,FAS,HLA,DRB1,IFNG,ITGB3,MSN,NOTCH1,PPARG,RAC1,RARA,TLR4 |
| 459 | Biliary tract adenocarcinoma | Cancer,Gastrointestinal Disease,Hepatic System Disease,Organismal Injury and Abnormalities | 2.57E,05 | 17 | ACY1,ADH1C,ALB,ALK,BCR,EP8L2,FAP,GC,HPD,HSP90AB1,MMP2,NOTCH1,PGK1,POU2F1,RRM1,SH2B2,TLR4 |
| 460 | Graft,vs,host disease | Immunological Disease | 2.65E,05 | 7 | BTK,CSF2RB,DPP4,FCGR2A,FN1,IMPDH1,RRM1 |
| 461 | Cell death of stomach cancer cell lines | Cell Death and Survival | 2.77E,05 | 8 | ALB,ALOX12,CD74,FAS,HK2,IGF1R,PRKCB,TLR4 |
| 462 | Stage III non,small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 2.77E,05 | 8 | ALB,ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,RRM1 |
| 463 | Secretion of molecule | Molecular Transport | 2.80E,05 | 14 | ANG,ARF6,CD74,CYP2E1,F2,FCGR2A,FN1,GAD2,IFNG,IGF1R,PPARG,PRKCB,STK4,USP19 |
| 464 | Anaplastic carcinoma | Cancer,Organismal Injury and Abnormalities | 2.84E,05 | 24 | ALK,AMY1C (includes others),AR,DSG2,EPA3,ERBB4,FN1,GALNT10,GART,GRK2,HASPIN,HSP90AB1,IGF1R,MMP1,MSH2,PARP3,PGK1,PTK2B,RRM1,SLK,STK4,TLR4,YY1,ZEB2 |
| 465 | Transitional,cell carcinoma | Cancer,Organismal Injury and Abnormalities | 2.91E,05 | 18 | AR,CTCF,EP300,EPA3,ERBB4,FN1,GART,HSP90AB1,MMP2,NCOA3,NF2,NOTCH1,PARP3,PPP2R1A,PRKCB,RARA,RRM1,TLR4 |
| 466 | Aggregation of blood cells | Cell,To,Cell Signaling and Interaction,Hematological System Development and Function | 2.93E,05 | 9 | ALB,ALOX12,BTK,CANT1,F2,FCGR2A,ITGB3,SEMA4D,TLR4 |
| 467 | Sarcoma | Cancer,Organismal Injury and Abnormalities | 2.93E,05 | 47 | ACACB,ALK,ANG,AR,CSF2RB,CYP7A1,DHPS,ERBB4,ESR1,F2,FABP7,FAP,FN1,GGPS1,HMGCS1,HSD17B4,HSP90AB1,IGF1R,KMT5A,MAPK6,MMP1,MMP2,MSH2,NAE1,NBEA,NCBP1,NF2,NOTCH1,PARP3,PKD4,PEX5,PGK1,PHF24,PPARG,PPP2R1A,PRKCB,RARA,RARG,RRM1,SEC23A,SEMA4D,SLK,TJP1,TLR4,UTRN,WPI1,ZIC3 |
| 468 | Permeability of vascular system | Cardiovascular System Development and Function,Tissue Morphology | 2.94E,05 | 7 | ARF6,F2,IFNG,IQUB,MMP2,PTK2B,RAC1 |
| 469 | Blastoma | Cancer,Organismal Injury and Abnormalities | 2.98E,05 | 23 | CSF2RB,EP300,EPA3,ERBB4,FABP7,FN1,GART,HNRNPA2B1,HSP90AB1,IDE,IFNG,ITGB3,MSH2,NBEA,PA2G4,PRKCB,RAC1,RRM1,TAF13,THBS2,TLR4,VAV3,ZEB2 |

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| 470 | Thrombus | Cardiovascular Disease,Hematological Disease,Organismal Injury and Abnormalities | 3.00E,05 | 10 | ALOX12,AR,ESR1,F2,F3,ITGB3,MMP2,RRM1,SERPINA5,VEGFB |
| 471 | Interphase of lung cancer cell lines | Cell Cycle | 3.00E,05 | 8 | AASDHPPT,BTRC,EP300,FHIT,HMOX1,IFNG,NOTCH1,SART3 |
| 472 | Concentration of lipid | Lipid Metabolism,Molecular Transport,Small Molecule Biochemistry | 3.05E,05 | 15 | ACACB,ALB,ARF6,BCR,CERT1,CHKA,CYP7A1,EP300,F2,FAS,HMOX1,IFNG,PPARG,PSAP,RAC1 |
| 473 | Amyloidosis | Metabolic Disease,Organismal Injury and Abnormalities | 3.05E,05 | 29 | ALB,AR,B2M,C1R,CD74,CDK5R1,ESR1,F3,FCGR2A,GAD2,GC,GGPS1,HMOX1,HNRNPA2B1,HTR1A,IDE,MP1,MMP2,NAE1,NOTCH1,PPARG,PRKCB,PSAP,PTPRE,SMTN,TAF13,TLR4,TTR,XIAP |
| 474 | Cell death of immune cells | Cell Death and Survival | 3.14E,05 | 16 | BTK,CAMK4,FAS,FN1,HBB,IFNG,NFATC1,NOTCH1,PPARG,PRKCB,RAC1,SEMA4D,TLR4,VAV3,XIAP,YY1 |
| 475 | Endometrium tumor | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 3.17E,05 | 129 | AASDHPPT,ACACB,ACADSB,ACBD7,ACY1,ALB,ALK,AOC3,APPL1,AR,ATP7B,B2M,B3GAT2,BCR,BTK,C8A,CA8,CD1A,CLCN5,CSDE1,CSF2RB,CSTF2,CTCF,CUL1,CYP7A1,DCTD,DHPS,DOK2,DPP4,DTYMK,EP300,EPHA3,ERBB4,ESR1,ETF1,FABP7,FAP,FCGR2A,FLNB,FN1,G6PD,GAD2,GRK2,GTF2I,HBB,HDAC7,HDX,HMBOX1,HMGB3,HPD,HSD17B4,HSP90AB1,HTR1A,IGF1R,IQUB,ITGB3,ITPKC,KIF11,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MDH1,MEMO1,MMP1,MMP2,MSH2,MSN,MYBPC3,MYSM1,NAE1,NBEA,NCBP1,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NT5C3A,NUP214,OAT,PANK1,PARN,PARP3,PATJ,PDK3,PGK1,PPP2R1A,PTPRE,PTPRF,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RUVBL1,SART3,SEN2,SF3B6,SH3YL1,SLC5A1,SLK,SMG5,SMTN,SMURF2,SNX1,STK4,SUB1,SULT1A1,SYT13,THBS2,TJP1,TLR4,TRIM21,UEVLD,UTRN,VAV3,WWP1,XIAP,YY1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |
| 476 | Recurrent advanced non-small cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 3.23E,05 | 6 | ALK,ERBB4,GART,HSP90AB1,PTK2B,RRM1 |
| 477 | Evans stage IVS neuroblastoma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 3.23E,05 | 6 | ALK,CSF2RB,FCGR2A,HSP90AB1,RARA,RARG |
| 478 | Serous adenocarcinoma | Cancer,Organismal Injury and Abnormalities | 3.27E,05 | 39 | ALB,ALK,AOC3,AR,ARF6,B2M,BCR,CA8,CSF2RB,CTCF,DPP4,EP300,EPHA3,F2,F3,GART,HBB,HCK,HSP90AB1,HTR1A,ITSN1,KIF11,MAGEA4,MAP3K3,MUC1,NF2,NOTCH1,NT5C3A,PARP3,PDK4,PGC,PPP2R1A,PYGL,RRM1,SKP1,SMTN,THBS2,TLR4,VAV3 |
| 479 | Formation of cytoskeleton | Cellular Assembly and Organization | 3.28E,05 | 15 | AR,ARF6,F2,FCGR2A,FHIT,FN1,HCK,ITGB3,NF2,NFATC1,NOTCH1,PTK2B,RAC1,STK4,XIAP |
| 480 | Advanced,stage chronic kidney disease | Organismal Injury and Abnormalities,Renal and Urological Disease | 3.36E,05 | 9 | AR,F2,FCGR2A,IMPDH1,PPARG,PRKCB,SLC5A1,SMURF2,TTR |
| 481 | Grade 3,4 glioma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 3.36E,05 | 151 | ACACB,ACADVL,ACVR2B,ADH7,ALB,ALK,ALOX12,AMY1C (includes others),APEX1,APPL1,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B3GAT2,BMP1,BPL,C1R,C8A,CLCN5,CSD E1,CSF2RB,CSNK1G2,CSTF2,CTCF,CUL1,CYP2E1,DAPK2,DCXR,DGKA,DOK2,DPP4,DSG2,EP300,EPHA3,EP S8L2,ERBB4,ESR1,F2,FABP7,FAS,FCGR2A,FLNB,FN1,G6PD,GAD2,GALNT10,GART,GRK2,GRK6,GTF2I,H ADH,HASPIN,HDX,HIBCH,HLA,DRB1,HMBOX1,HMGCS1,HMOX1,HSD17B10,HSD17B4,HSP90AB1,IDE,IFN GR1,IGF1R,ITGB3,ITSN1,KMT5A,KYNU,LRBA,MAGI2,MAP3K3,MARF1,MATK,MSH2,MSN,MTAP,MUC1,M YBPC3,NBEA,NCBP1,NCOA3,NF2,NFATC1,NME3,NMT1,NOTCH1,NSUN5,NUP214,ODC1,OXSR1,PAFAH1B 2,PAH,PANK1,PAPSS1,PARN,PATJ,PC,PCYT2,PDHA1,PGC,PGK1,PHF24,POU2F1,PPARG,PPP2R1A,PSAP,PT K2B,PUS10,PYGL,RARA,RARG,RBBP6,RBM39,RBP5,RGS6,RRM1,RTN4IP1,SART3,SEMA4D,SEN2,SERPIN A5,SFMBT2,SH2B2,SH3YL1,SLC5A1,SLK,SMG5,SMURF2,SNX1,STARD13,SUB1,THBS2,TJP1,TLR4,TNFAIP 8L2,USP19,UTRN,VAV3,VPS26A,WEE1,WHRN,XRCC6,ZBTB43,ZCWPW1,ZEB2,ZFP28,ZIC3,ZNF292,ZNF462 |

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| 482 | Granuloma | Inflammatory Disease, Organismal Injury and Abnormalities | 3.39E,05 | 11 | AMY1C (includes others), G6PD, GRHPR, HBEGF, HLA, DRB1, IFNG, IFNGR1, IMPDH1, KLK1, PTPRE, TAF13 |
| 483 | Gastrointestinal adenocarcinoma | Cancer, Gastrointestinal Disease, Organismal Injury and Abnormalities | 3.57E,05 | 220 | ACACB, ACADSB, ACADVL, ACSM2A, ACVR2B, ACY1, ADH7, ALB, ALK, ALOX12, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CAMK4, CANT1, CD1A, CD74, CDK5R1, CHKA, CLCN5, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCXR, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, ECHS1, EP300, EPHA3, EPS8L2, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FAP, FAS, FHIT, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GRHR, GRK2, GRK6, GTF2I, HADH, HASPIN, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMGB3, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITSN1, KIF11, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MECR, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, NAE1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PAFAH1B2, PAH, PANK1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRE, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEMA4D, SERPINA5, SF3B6, SFMBT2, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, SULT1A1, SYT13, THBS2, TJP1, TLR4, TRIM21, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WHRN, WWP1, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 484 | Unresectable advanced non-small cell lung carcinoma | Cancer, Organismal Injury and Abnormalities, Respiratory Disease | 3.59E,05 | 7 | ALK, ERBB4, GART, HSP90AB1, IGF1R, PARP3, PTK2B |
| 485 | Advanced squamous cell cancer | Cancer, Organismal Injury and Abnormalities | 3.59E,05 | 9 | ALK, ERBB4, F3, GART, HSP90AB1, IGF1R, PARP3, PTK2B, RRM1 |
| 486 | Stage IV metastatic solid tumor | Cancer, Organismal Injury and Abnormalities | 3.59E,05 | 9 | ALK, ERBB4, ESR1, GART, HSP90AB1, IGF1R, PARP3, PTK2B, RRM1 |
| 487 | Malignant neoplasm of large intestine | Cancer, Gastrointestinal Disease, Organismal Injury and Abnormalities | 3.59E,05 | 223 | ACACB, ACADSB, ACADVL, ACSM2A, ACVR2B, ACY1, ADH7, ALB, ALK, ALOX12, ANXA6, AOC3, APEX1, APPL1, AR, ARF6, ARHGAP5, ARHGEF1, ASAP1, ATP7B, ATXN3, B2M, B3GAT2, BCR, BMP1, BPI, BTK, BTRC, C1R, C8A, CAMK4, CANT1, CD1A, CD74, CDK5R1, CHKA, CLCN5, CSDE1, CSF2RB, CSNK1G1, CSNK1G2, CSTF2, CTCF, CUL1, CYP17A1, CYP2E1, CYP7A1, DAPK2, DCXR, DFFA, DGKA, DHPS, DMC1, DOK2, DPP4, DSG2, ECHS1, EP300, EPHA3, EPS8L2, ERBB4, ESR1, ETF1, EXOSC9, F2, F3, FAP, FAS, FCGR2A, FHIT, FLNB, FN1, G6PD, GAD2, GALNT10, GART, GRHR, GRK2, GRK6, GTF2I, HADH, HASPIN, HCK, HDAC7, HDX, HIBCH, HK2, HLA, DRB1, HMGB3, HMOX1, HNRNPA2B1, HPD, HSCB, HSD17B10, HSD17B4, HSP90AB1, HTR1A, IDE, IFNG, IFNGR1, IGF1R, IMPA2, IMPDH1, IQUB, ITGB3, ITPK1, ITPKC, ITSN1, KIF11, KMT5A, KYNU, LRBA, MAGEA4, MAGI2, MAP3K3, MAPK6, MARF1, MARK1, MATK, MECR, MMP2, MSH2, MSN, MTAP, MUC1, MYBPC1, MYBPC3, NAE1, NBEA, NCBP1, NCOA3, NF2, NFATC1, NMRK1, NMT1, NOTCH1, NSUN5, NT5C3A, NUP214, OAT, ODC1, OXSR1, PAFAH1B2, PANK1, PAPSS1, PARN, PARP3, PATJ, PC, PCYT2, PDHA1, PDK2, PDK3, PDK4, PEX5, PGC, PGK1, PHF24, POT1, POU2F1, PPARG, PPP2R1A, PRKCB, PTK2B, PTPRF, PUS10, PYGL, RAB26, RAC1, RARA, RARG, RBBP6, RBM39, RGS6, RND1, RRM1, RTN4IP1, RUVBL1, SART3, SEC23A, SEMA4D, SERPINA5, SF3B6, SFMBT2, SH2B2, SH3YL1, SKP1, SLC5A1, SLK, SMAP1, SMG5, SMG7, SMTN, SMURF2, SNX1, SPEF1, STARD13, STK16, STK4, SYT13, TAF13, THBS2, TJP1, TLR4, TRIM21, TR, UEVLD, USP19, UTRN, VAV3, VEGFB, VPS26A, WHRN, WWP1, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 488 | BRCA1 mutation positive cancer | Cancer, Organismal Injury and Abnormalities | 3.67E,05 | 6 | ESR1, GART, HSP90AB1, PARP3, RARG, RRM1 |
| 489 | Angioedema | Dermatological Diseases and Conditions, Immunologic | 3.67E,05 | 6 | AR, C1R, DPP4, ESR1, G6PD, TLR4 |

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| | | al Disease,Organismal Injury and Abnormalities | | | |
| 490 | BRCA1 mutation positive solid tumor | Cancer,Organismal Injury and Abnormalities | 3.67E,05 | 6 | ESR1,GART,HSP90AB1,PARP3,RARG,RRM1 |
| 491 | Cell transformation | Cancer | 3.68E,05 | 13 | ARF6,CHKA,EP300,ERBB4,HNRNPA2B1,IGF1R,MATK,NCOA3,NOTCH1,ODC1,RAC1,SFN,STARD13 |
| 492 | Smooth muscle tumor | Cancer,Organismal Injury and Abnormalities,Skeletal and Muscular Disorders | 3.70E,05 | 18 | AR,CLCN5,ERBB4,ESR1,FAS,FN1,HSD17B10,HSP90AB1,IGF1R,MDH1,MMP2,PK4,PPARG,RRM1,S100A6,TAF13,UTRN,WEE1 |
| 493 | Synthesis of steroid | Lipid Metabolism,Small Molecule Biochemistry,Vitamin and Mineral Metabolism | 3.76E,05 | 12 | ACACB,ACAT2,ALOX12,CYP17A1,CYP2R1,CYP7A1,G6PD,GGPS1,HMGCS1,HSD17B10,HSD17B4,IFNG |
| 494 | Glioblastoma | Cancer,Neurological Disease,Organismal Injury and Abnormalities | 3.77E,05 | 22 | CSF2RB,EP300,EPHA3,ERBB4,FABP7,FN1,GART,HNRNPA2B1,HSP90AB1,IDE,IFNG,ITGB3,MSH2,NBEA,PA2G4,PRKCB,RAC1,RRM1,TAF13,TLR4,VAV3,ZEB2 |
| 495 | Advanced breast cancer | Cancer,Organismal Injury and Abnormalities,Reproductive System Disease | 3.79E,05 | 10 | ALK,AR,CYP17A1,ERBB4,ESR1,GGPS1,HSP90AB1,MUC1,PARP3,RRM1 |
| 496 | Alzheimer disease | Metabolic Disease,Neurological Disease,Organismal Injury and Abnormalities,Psychological Disorders | 3.81E,05 | 28 | ALB,AR,C1R,CD74,CDK5R1,ESR1,F3,FCGR2A,GAD2,GC,GGPS1,HMOX1,HNRNPA2B1,HTR1A,IDE,MMP1,MMP2,NAE1,NOTCH1,PPARG,PRKCB,PSAP,PTPRE,SMTN,TAF13,TLR4,TTR,XIAP |
| 497 | EGFR or ROS1 mutation positive non,small cell lung carcinoma | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 3.82E,05 | 8 | ALK,ERBB4,GART,HSP90AB1,IGF1R,MUC1,PTK2B,SFN |
| 498 | Metastatic squamous cell lung cancer | Cancer,Organismal Injury and Abnormalities,Respiratory Disease | 3.82E,05 | 8 | ALK,ERBB4,GART,HSP90AB1,IGF1R,PARP3,PTK2B,RRM1 |
| 499 | Gastrointestinal tract cancer | Cancer,Gastrointestinal Disease,Organismal Injury and Abnormalities | 3.87E,05 | 235 | ACACB,ACADSB,ACADVL,ACSM2A,ACVR2B,ACY1,ADH7,ALB,ALK,ALOX12,ANXA6,AOC3,APEX1,APPL1,AR,ARF6,ARHGAP5,ARHGEF1,ASAP1,ATP7B,ATXN3,B2M,B3GAT2,BCR,BMP1,BPI,BTK,BTRC,C1R,C8A,CAMK4,CANT1,CD1A,CD74,CDK5R1,CHKA,CLCN5,CSDE1,CSF2RB,CSNK1G1,CSNK1G2,CSTF2,CTCF,CUL1,CYP17A1,CYP2E1,CYP2R1,CYP7A1,DAPK2,DCXR,DFFA,DGKA,DHPS,DMC1,DOK2,DPP4,DSG2,ECHS1,EP300,EPHA3,EP8L2,ERBB4,ESR1,ETF1,EXOSC9,F2,F3,FABP7,FAP,FAS,FCGR2A,FHIT,FLNB,FN1,G6PD,GAD2,GALM,GALNT10,GART,GRHPR,GRK2,GRK6,GTF21,HADH,HASPIN,HBB,HCK,HDAC7,HDX,HIBCH,HK2,HLA,DRB1,HMGB3,HMOX1,HNRNPA2B1,HPD,HSCB,HSD17B10,HSD17B4,HSP90AB1,HTR1A,IDE,IFNG,IFNGR1,IGF1R,IMPA2,IMPDH1,IQUB,ITGB3,ITPK1,ITPKC,ITSN1,KIF11,KLK1,KMT5A,KYNU,LRBA,MAGEA4,MAGI2,MAP3K3,MAPK6,MARF1,MARK1,MATK,MECR,MMP2,MSH2,MSN,MTAP,MUC1,MYBPC1,MYBPC3,NAE1,NBEA,NCBP1,NCOA3,NF2,NFATC1,NMRK1,NMT1,NOTCH1,NSUN5,NT5C3A,NUP214,OAT,ODC1,OXSR1,PA2G4,PAFAH1B2,PAH,PANK1,PAPSS1,PARN,PARP3,PATJ,PC,PCYT2,PDHA1,PK2,PK3,PK4,PEX5,PGC,PGK1,PHF24,POT1,POU2F1,PPARG,PPP2R1A,PRKCB,PTK2B,PTPRE,PTPRF,PUS10,PYGL,RAB26,RAC1,RARA,RARG,RBBP6,RBM39,RGS6,RND1,RRM1,RTN4IP1,RUVBL1,SART3,SEC23A,SEMA4D,SERPINA5,SF3B6,SFMBT2,SFN,SH2B2,SH3YL1,SKP1,SLC5A1,SLK,SMAP1,SMG5,SMG7,SMTN,SMURF2,SNX1,SPEF1,STARD13,STK16,STK4,SULT1A1,SYT13,TAF13,THBS2,TJP1,TLR4,TRIM21,TTR,UEVLD,USP19,UTRN,VAV |

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|-----|----------------------|---|----------|----|--|
| | | | | | 3, VEGFB, VPS26A, WEE1, WHRN, WWP1, XRCC6, YWHAH, YY1, ZBTB43, ZCWPW1, ZEB2, ZFP28, ZIC3, ZNF292, ZNF462 |
| 500 | Mixed cell carcinoma | Cancer, Organismal Injury and Abnormalities | 3.99E,05 | 39 | ALK, AR, ARHGEF1, ASAP1, CLK1, CSNK1G1, CSTF2, DPP4, EPHA3, ERBB4, F3, GART, HBEGF, HNRNPA2B1, HSP90AB1, ITPA, MAGI2, NBEA, NCOA3, NF2, NR1I3, ODC1, PARP3, PC, PDK4, POU2F1, PPARG, PPP2R1A, PTPRF, RBM39, RRM1, RTN4IP1, SFMBT2, SH3YL1, SMTN, SYT13, UTRN, WWP1, ZEB2 |

Supplementary Table S4: Upstream analysis by IPA for solasonine. The upstream analysis by IPA was performed to predict the upstream regulatory factors for potential target genes of solasonine. The prediction of upstream regulators were sorted by increasing of p-value (p-value ≤ 0.05).

| Upstream Regulator | Molecule Type | p-value | Target Molecules in Dataset of Solasonine Related Genes |
|--------------------|-----------------------------------|----------|---|
| ERK | group | 2.85E-07 | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PDK4 |
| EGFR | kinase | 3.98E-06 | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,MMP1,PTPRE,XIAP,ZEB2 |
| ERK1/2 | group | 4.67E-06 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PTPRE |
| TNF | cytokine | 8.89E-06 | CD74,CYP17A1,DPP4,F3,FAS,FN1,HBEGF,HMOX1,IFNGR1,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NFATC1,NOTCH1,PPARG,TJP1,TLR4,XIAP |
| PCGEM1 | other | 2.58E-05 | CANT1,G6PD,HK2,PDHA1,PDK4,PGK1 |
| mir-122 | microRNA | 3.13E-05 | CTCF,CYP7A1,G6PD,GALNT10,IGF1R,MAP3K3,MARK1,SEMA4D,VAV3,WARS1,YARS1 |
| let-7 | microRNA | 3.51E-05 | AR,FN1,HK2,IGF1R,ITGB3,MAPK6,PA2G4,STARD13,TLR4 |
| SIRT1 | transcription regulator | 3.61E-05 | EP300,FN1,HMOX1,MMP2,NMRK1,PDK4,RAC1 |
| TWIST1 | transcription regulator | 4.98E-05 | AR,FAS,FN1,MMP1,MMP2,ZEB2 |
| WAC | other | 5.41E-05 | G6PD,PDK4,PPARG |
| SP1 | transcription regulator | 5.43E-05 | AR,CYP17A1,ESR1,FN1,HBB,HBEGF,HK2,HMOX1,IFNGR1,IGF1R,ITGB3,MMP2,RARA,ZEB2 |
| IFNG | cytokine | 6.23E-05 | CAMK4,DPP4,FAS,GART,GRK2,IFNG,ITGB3,MMP1,MMP2,MUC1,PPARG,SERPINA5,SMTN,TJP1,TLR4,ZEB2 |
| BMP7 | growth factor | 7.68E-05 | BMP1,ESR1,FN1,IGF1R,MMP2,MSN,ZEB2 |
| BACH1 | transcription regulator | 7.97E-05 | HMOX1,MMP1,NDUFAB1,PDK2,PDK3,PDK4 |
| TGFB1 | growth factor | 8.05E-05 | ALB,BMP1,F3,FAP,FAS,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,NDC80,SMTN,SMURF2,ZEB2 |
| P38 MAPK | group | 8.18E-05 | DGKA,F3,FAS,FN1,HMOX1,ITGB3,MMP1,MMP2,MSH2,RARA |
| CG | complex | 1.30E-04 | ACP3,AR,C1R,FAS,HK2,IFNGR1,ITGB3,MMP1,MMP2,SMURF2,XIAP |
| RNF40 | enzyme | 1.48E-04 | G6PD,PDK4,PPARG |
| NFkB (complex) | complex | 1.95E-04 | CTCF,F3,FAS,HMOX1,IFNG,KYNU,MMP1,MMP2,MSH2,NOTCH1,SEN2,XIAP |
| E2F1 | transcription regulator | 2.00E-04 | AR,EXOSC9,FAS,MSH2,NCOA3,NDC80,NOTCH1,PA2G4,RPA3,RRM1,VEGFB |
| ESRRG | ligand-dependent nuclear receptor | 2.11E-04 | HK2,KLK1,MDH1,PDHA1,PDK4 |
| JNK | group | 2.68E-04 | BTRC,IFNG,MMP1,MMP2,MSH2,RARA,XIAP |
| VEGFA | growth factor | 3.02E-04 | CD1A,F3,ITGB3,MMP2,NOTCH1 |
| MBD2 | transcription regulator | 3.02E-04 | DPP4,ESR1,G6PD,MMP2,XIAP |
| DEF6 | other | 3.11E-04 | FN1,MMP2,ZEB2 |

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|---------------------------------------|-------------------------|----------|---|
| Akt | group | 3.29E-04 | F3,IGF1R,MMP2,MUC1,NOTCH1,PKD4,TJP1 |
| SFN | other | 3.32E-04 | DSG2,F3,PKD4,TJP1 |
| TP63 | transcription regulator | 3.36E-04 | F3,FAS,FN1,G6PD,HBEGF,HK2,NOTCH1,SFN,SMURF2,THBS2,WEE1,ZEB2 |
| ERBB2 | kinase | 3.77E-04 | AR,BMP1,ERBB4,F3,FN1,GART,IFNG,MMP1,MUC1,NDC80,PGK1,PPARG,PTPRF,RRM1,SMTN |
| TCR | complex | 3.90E-04 | ALOX12,ARHGEF1,HADH,HSD17B10,IFNG,MARF1,MDH1,ODC1,PA2G4,PGK1,TLR4 |
| IKBKE | kinase | 4.18E-04 | PDHA1,PKD3,PKD4,PGK1,PYGL |
| GPI | enzyme | 4.23E-04 | FN1,RAC1,ZEB2 |
| PAX3-FOXO1 | fusion gene/product | 4.83E-04 | ALK,CLCN5,HMOX1,IGF1R,IMPA2,PPP2R1A,XRCC6 |
| EGR1 | transcription regulator | 5.13E-04 | CDK5R1,F3,FN1,HBEGF,PPARG |
| TAL1 | transcription regulator | 5.35E-04 | CD1A,DSG2,HBB,HMGB3,LRBA,MUC1,NOTCH1,PTK2B,XRCC6,YARS1 |
| RFX5 | transcription regulator | 5.59E-04 | B2M,CD74,HLA-DRB1 |
| miR-615-3p (miRNAs w/seed CCGAGCC) | mature microRNA | 5.91E-04 | AR,PPARG |
| mir-17 | microRNA | 6.12E-04 | AR,ESR1,FAS,NCOA3 |
| mir-322 | microRNA | 7.19E-04 | FN1,IGF1R,SMURF2 |
| OLR1 | transmembrane receptor | 7.19E-04 | MMP1,RARA,RARG |
| JUN | transcription regulator | 7.83E-04 | ALOX12,FN1,HK2,HMOX1,IFNG,MMP1,MMP2,VAV3,ZEB2 |
| mir-15 | microRNA | 8.01E-04 | AR,BTRC,IFNG,WEE1 |
| PRKAA1 | kinase | 8.21E-04 | EPHA3,FN1,IGF1R,MAGEA4,TJP1 |
| WT1 | transcription regulator | 9.63E-04 | BTK,ESR1,HBEGF,IGF1R,ODC1,TRIM21,WARS1 |
| CCND1 | transcription regulator | 1.01E-03 | AR,ERI1,ITGB3,KIF11,MAGI2,NCOA3,PAH,UTRN,ZFP28,ZNF462 |
| IL1B | cytokine | 1.09E-03 | ACP3,BTRC,CYP7A1,DPP4,F3,FAS,IFNG,MMP1,MUC1,PPARG,TLR4 |
| TP53 | transcription regulator | 1.10E-03 | AR,DGKA,ESR1,FAS,FN1,GART,HK2,HMGCS1,HMOX1,IGF1R,MMP2,MSH2,NDC80,NOTCH1,PANK1,PRKCB,RBBP6,SFN,SMURF2,TJP1,YWHAH |
| SREBF2 | transcription regulator | 1.12E-03 | FABP7,GTF2I,PPARG |
| RELA | transcription regulator | 1.16E-03 | B2M,CERT1,CTCF,FAS,FN1,IFNG,MMP1,PPARG,STK4,XIAP |
| MOAP1 | other | 1.17E-03 | G6PD,HMOX1 |
| mir-192 | microRNA | 1.17E-03 | IGF1R,ZEB2 |
| mir-503 | microRNA | 1.17E-03 | IGF1R,SMURF2 |
| DYSF | other | 1.17E-03 | FN1,ITGB3 |
| CDK19 | kinase | 1.25E-03 | DCXR,FAS,HBEGF,HMGCS1,HMOX1,NOTCH1,SFN |
| IL15 | cytokine | 1.25E-03 | G6PD,GALM,HK2,HMOX1,IFNG,IGF1R,PGK1 |

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|---------|-----------------------------------|----------|---|
| RXRA | ligand-dependent nuclear receptor | 1.35E-03 | CYP7A1,HMOX1,PPARG,RARA,RARG |
| ITGAV | transmembrane receptor | 1.36E-03 | ITGB3,MMP1,MMP2 |
| ITGB3 | transmembrane receptor | 1.36E-03 | ITGB3,MMP1,MMP2 |
| WNT5A | cytokine | 1.38E-03 | FN1,HMOX1,ITGB3,MMP1,SEMA4D,TLR4 |
| PRMT1 | enzyme | 1.45E-03 | ALOX12,FN1,PK4,ZEB2 |
| HRAS | enzyme | 1.57E-03 | DTYMK,FAS,HMOX1,PRKCB,RRM1 |
| MTOR | kinase | 1.65E-03 | ACACB,AR,CHKA,HK2,IFNG,MUC1 |
| IGF1 | growth factor | 1.70E-03 | F3,FN1,IGF1R,SFN,XIAP |
| PKM | kinase | 1.70E-03 | HK2,MMP2,PC,PDHA1,PK4 |
| HNF4A | transcription regulator | 1.74E-03 | CYP7A1,MSN,NR1H3,PPARG,RARA,RARG |
| c-Src | group | 1.93E-03 | CYP7A1,HMOX1 |
| KIF26A | other | 1.93E-03 | RAC1,VAV3 |
| PRKCB | kinase | 1.93E-03 | FN1,MMP2 |
| SENP2 | peptidase | 1.93E-03 | HK2,PGK1 |
| ICAM1 | transmembrane receptor | 1.95E-03 | IFNG,NOTCH1,ZEB2 |
| CSF3 | cytokine | 1.95E-03 | PPARG,PRKCB,RARA |
| MMP2 | peptidase | 1.95E-03 | CSF2RB,PPP2R1A,TJP1 |
| PCGF2 | transcription regulator | 1.95E-03 | FN1,NOTCH1,ZEB2 |
| SMAD2 | transcription regulator | 1.97E-03 | FN1,MMP2,RAC1,XIAP |
| GATA3 | transcription regulator | 1.97E-03 | ECHS1,ESR1,IFNG,TJP1 |
| EPO | cytokine | 2.29E-03 | MMP2,PRKCB,TJP1 |
| COL18A1 | other | 2.41E-03 | F3,FN1,ITGB3,MMP1,MMP2 |
| PGR | ligand-dependent nuclear receptor | 2.64E-03 | ESR1,F3,FN1,HBEGF,MATK,MUC1,PNMT,SERPINA5 |
| LGALS1 | other | 2.66E-03 | FN1,IFNGR1,MMP1 |
| CXCL8 | cytokine | 2.86E-03 | AR,CD74,MMP2,RAC1 |
| FGF2 | growth factor | 2.86E-03 | F3,HK2,MMP1,PPARG |
| NCF1 | enzyme | 2.87E-03 | F3,FN1 |
| mir-548 | microRNA | 2.87E-03 | AR,MMP2 |
| AXL | kinase | 2.87E-03 | MMP1,MMP2 |
| PTBP3 | other | 2.87E-03 | FN1,ZEB2 |
| COMMD1 | transporter | 2.87E-03 | ATP7B,IFNG |

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| NFIC | transcription regulator | 2.87E-03 | CYP17A1,FABP7 |
| PI3K (complex) | complex | 2.92E-03 | CDK5R1,HBEGF,IGF1R,NOTCH1,TLR4 |
| Lh | complex | 3.00E-03 | ACP3,AR,HK2,MAPK6,MMP2,PGK1,PPP2R1A,PTPRE,PTPRF |
| IRF8 | transcription regulator | 3.07E-03 | B2M,CD74,TLR4 |
| CDK4 | kinase | 3.11E-03 | ERI1,KIF11,MAGI2,PAH,UTRN,ZFP28,ZNF462 |
| CDH1 | other | 3.12E-03 | ERBB4,FN1,MMP1,XIAP |
| SPP1 | cytokine | 3.31E-03 | FN1,IFNG,MECR,MMP2,PPARG |
| RNA polymerase II | complex | 3.38E-03 | B2M,CYP7A1,ESR1,HBB,MMP2,NCOA3,SFN |
| EBI3 | cytokine | 3.52E-03 | B2M,FAS,NFATC1 |
| JUNB | transcription regulator | 3.69E-03 | FN1,HK2,HMOX1,MMP1 |
| Mmp | group | 3.99E-03 | FAS,TJP1 |
| KLF17 | transcription regulator | 3.99E-03 | FN1,TJP1 |
| MIA | other | 3.99E-03 | FN1,ITGB3 |
| LOXL2 | enzyme | 3.99E-03 | ESR1,FN1 |
| miR-491-5p (and other miRNAs w/seed GUGGGGA) | mature microRNA | 3.99E-03 | AR,MMP2 |
| BANCR | other | 3.99E-03 | MMP1,MMP2 |
| OCN | other | 3.99E-03 | MMP1,MMP2 |
| mir-24 | microRNA | 3.99E-03 | IFNG,PSAP |
| NR1D1 | ligand-dependent nuclear receptor | 3.99E-03 | MDH1,TLR4 |
| mir-19 | microRNA | 4.01E-03 | ESR1,F3,PSAP |
| CCN2 | growth factor | 4.01E-03 | ESR1,FN1,MMP2 |
| RUNX1 | transcription regulator | 4.32E-03 | ALB,ALOX12,EP300,ITGB3 |
| CDK9 | kinase | 4.53E-03 | G6PD,PDK4,PPARG |
| mir-181 | microRNA | 4.53E-03 | AR,IFNG,NOTCH1 |
| ANXA2 | other | 5.10E-03 | ANG,FAS,MMP1 |
| CSF2 | cytokine | 5.18E-03 | CD1A,CSF2RB,MMP1,RARA,TLR4,XIAP |
| CD4 | transmembrane receptor | 5.27E-03 | F3,IFNG |
| DDR2 | kinase | 5.27E-03 | MMP1,MMP2 |
| ERP29 | transporter | 5.27E-03 | TJP1,ZEB2 |
| ERBB4 | kinase | 5.27E-03 | ERBB4,PGK1 |

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| XBP1 | transcription regulator | 5.40E-03 | ESR1,NCOA3,S100A6,XRCC6 |
| SMARCA4 | transcription regulator | 5.53E-03 | CD74,CLK1,F3,FAS,FCGR2A,FLNB,FN1,HBB,IFNG,MMP1,MMP2,MUC1,S100A6,YY1 |
| TRIM37 | enzyme | 5.71E-03 | CUL1,PEX5,SFN |
| F7 | peptidase | 5.71E-03 | AR,F3,HBEGF |
| UPF1 | enzyme | 5.71E-03 | HBB,SMG5,SMG7 |
| Hsp90 | group | 5.79E-03 | AR,ESR1,GRK6,IFNG |
| TRPS1 | transcription regulator | 6.35E-03 | FN1,KIF11,MMP2 |
| HIF1A | transcription regulator | 6.58E-03 | CHKA,ERBB4,FN1,HK2,IFNG,ITGB3,MMP2,MUC1,NAE1 |
| BMI1 | transcription regulator | 6.64E-03 | CUL1,FAS,HK2,SFN |
| FZD8 | G-protein coupled receptor | 6.71E-03 | FN1,TJP1 |
| E2F5 | transcription regulator | 6.71E-03 | PA2G4,VEGFB |
| TPM3 | other | 6.71E-03 | MMP1,MMP2 |
| mir-132 | microRNA | 6.71E-03 | EP300,IFNG |
| mir-634 | microRNA | 6.71E-03 | AR,XIAP |
| ETV1 | transcription regulator | 6.71E-03 | ITGB3,MMP1 |
| MCAM | other | 6.71E-03 | FN1,MMP2 |
| VTN | other | 6.71E-03 | F3,SFN |
| NPC1 | transporter | 8.31E-03 | HDAC7,TLR4 |
| DCLK1 | kinase | 8.31E-03 | NOTCH1,ZEB2 |
| RASSF1 | other | 8.31E-03 | ESR1,MMP2 |
| miR-7a-5p (and other miRNAs w/seed GGAAGAC) | mature microRNA | 8.31E-03 | IGF1R,KMT5A |
| SRSF1 | other | 8.31E-03 | FN1,RAC1 |
| AKT2 | kinase | 8.31E-03 | ESR1,RAC1 |
| GFI1B | transcription regulator | 8.31E-03 | CSDE1,ITSN1 |
| CSF1 | cytokine | 8.55E-03 | FAS,FN1,NFATC1 |
| ESR2 | ligand-dependent nuclear receptor | 8.60E-03 | FN1,IGF1R,MMP1,RARA,VAV3 |
| Gsk3 | group | 9.37E-03 | ESR1,IGF1R,XIAP |
| DLX6-AS1 | other | 1.01E-02 | NOTCH1,WEE1 |
| IDH2 | enzyme | 1.01E-02 | FN1,ZEB2 |
| NRBP2 | kinase | 1.01E-02 | EP300,NOTCH1 |

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| IGFBP5 | other | 1.01E-02 | F3,SFN |
| CD209 | other | 1.01E-02 | MMP2,TJP1 |
| LINC-ROR | other | 1.01E-02 | FAS,NOTCH1 |
| FABP2 | transporter | 1.01E-02 | ACACB,PPARG |
| DDX3X | enzyme | 1.01E-02 | AR,RAC1 |
| POSTN | other | 1.01E-02 | MMP2,VEGFB |
| ECM1 | transporter | 1.01E-02 | MUC1,ZEB2 |
| HEIH | other | 1.02E-02 | FAS,MMP2,VEGFB |
| CCN1 | other | 1.02E-02 | FN1,ITGB3,SENP2 |
| NEUROG1 | transcription regulator | 1.02E-02 | FABP3,FAP,FN1,ITGB3 |
| EGLN | group | 1.12E-02 | HK2,PDK3,PYGL,SH2B2,ZNF292 |
| BCOR | transcription regulator | 1.20E-02 | CD74,TLR4 |
| PLK1 | kinase | 1.20E-02 | ESR1,SFN |
| NR6A1 | ligand-dependent nuclear receptor | 1.20E-02 | BMP1,TLR4 |
| IL3 | cytokine | 1.21E-02 | CD1A,FCGR2A,MMP1 |
| miR-145-5p (and other miRNAs w/seed UCCAGUU) | mature microRNA | 1.21E-02 | DFFA,MMP1,MUC1 |
| BRAF | kinase | 1.21E-02 | BTRC,MMP1,XIAP |
| IL27 | cytokine | 1.21E-02 | B2M,FAS,IFNG,NFATC1 |
| STAT3 | transcription regulator | 1.26E-02 | ESR1,FN1,HK2,HMOX1,MMP2,MUC1,NOTCH1,PGK1 |
| POU5F1 | transcription regulator | 1.29E-02 | DFFA,FAS,IGF1R,MMP2,WEE1,ZEB2 |
| WWTR1 | transcription regulator | 1.31E-02 | DTYMK,FN1,RRM1 |
| IGF1R | transmembrane receptor | 1.31E-02 | ESR1,IGF1R,RAC1 |
| TCF12 | transcription regulator | 1.31E-02 | FN1,LRBA,XRCC6 |
| MYCN | transcription regulator | 1.31E-02 | APEX1,HK2,PA2G4 |
| CDKN1A | kinase | 1.35E-02 | FN1,MMP1,PSAP,RRM1 |
| IL18 | cytokine | 1.35E-02 | FAS,IFNG,MMP1,TLR4 |
| SAA | group | 1.40E-02 | F3,MMP1 |
| MDGA2 | other | 1.40E-02 | FAS,MSH2 |
| MED16 | transcription regulator | 1.40E-02 | MMP1,MMP2 |
| APOA1 | transporter | 1.40E-02 | CHKA,TLR4 |

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|------------------------------------|-------------------------|----------|----------|
| MS4A1 | other | 1.40E-02 | HK2,XIAP |
| IL7 | cytokine | 1.40E-02 | FAS,IFNG |
| Dgk | group | 1.41E-02 | CYP17A1 |
| Pdgf (complex) | complex | 1.41E-02 | MMP1 |
| ATP synthase | complex | 1.41E-02 | IFNG |
| DIS3L2 | enzyme | 1.41E-02 | RAC1 |
| BLVRA | enzyme | 1.41E-02 | CERT1 |
| FBXL17 | other | 1.41E-02 | HMOX1 |
| PROM1 | other | 1.41E-02 | DSG2 |
| S100A3 | transporter | 1.41E-02 | RARA |
| RBMY1A1 (includes others) | other | 1.41E-02 | AR |
| VPS36 | other | 1.41E-02 | ESR1 |
| USP12 | peptidase | 1.41E-02 | AR |
| LAYN | other | 1.41E-02 | IFNG |
| PABIR1 | other | 1.41E-02 | WEE1 |
| LECT2 | other | 1.41E-02 | PPARG |
| SMG6 | enzyme | 1.41E-02 | HBB |
| S100A14 | other | 1.41E-02 | MMP2 |
| KIR | group | 1.41E-02 | IFNG |
| XDH | enzyme | 1.41E-02 | F3 |
| SELL | transmembrane receptor | 1.41E-02 | IFNG |
| CD6 | transmembrane receptor | 1.41E-02 | IFNG |
| HLTF | transcription regulator | 1.41E-02 | HBB |
| CGB3 (includes others) | other | 1.41E-02 | MMP2 |
| IFNGR1 | transmembrane receptor | 1.41E-02 | FAS |
| GNB5 | enzyme | 1.41E-02 | XIAP |
| miR-155-3p (miRNAs w/seed UCCUACA) | mature microRNA | 1.41E-02 | AR |
| miR-223-5p (miRNAs w/seed GUGUAUU) | mature microRNA | 1.41E-02 | AR |
| mir-448 | microRNA | 1.41E-02 | AR |

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|--|-----------------|----------|----|
| mir-567 | microRNA | 1.41E-02 | AR |
| miR-509-3p (miRNAs w/seed GAUUGGU) | mature microRNA | 1.41E-02 | AR |
| miR-92a-2-5p (miRNAs w/seed GGUGGGG) | mature microRNA | 1.41E-02 | AR |
| miR-488-5p (miRNAs w/seed CCAGUA) | mature microRNA | 1.41E-02 | AR |
| mir-488 | microRNA | 1.41E-02 | AR |
| miR-29a-5p (miRNAs w/seed CUGAUUU) | mature microRNA | 1.41E-02 | AR |
| miR-93-3p (miRNAs w/seed CUGCUGA) | mature microRNA | 1.41E-02 | AR |
| mir-544 | microRNA | 1.41E-02 | AR |
| miR-299a-3p (and other miRNAs w/seed AUGUGGG) | mature microRNA | 1.41E-02 | AR |
| miR-28-3p (and other miRNAs w/seed ACUAGAU) | mature microRNA | 1.41E-02 | AR |
| mir-365 | microRNA | 1.41E-02 | AR |
| mir-541 | microRNA | 1.41E-02 | AR |
| miR-1273h-5p (and other miRNAs w/seed UGGGAGG) | mature microRNA | 1.41E-02 | AR |
| miR-129-1-3p (and other miRNAs w/seed AGCCCUU) | mature microRNA | 1.41E-02 | AR |
| miR-767 (and other miRNAs w/seed GCACCAU) | mature microRNA | 1.41E-02 | AR |
| mir-631 | microRNA | 1.41E-02 | AR |

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| miR-744-3p (miRNAs w/seed UGUUGCC) | mature microRNA | 1.41E-02 | AR |
| miR-876-3p (miRNAs w/seed GGUGGUU) | mature microRNA | 1.41E-02 | AR |
| miR-501-3p (and other miRNAs w/seed AUGCACC) | mature microRNA | 1.41E-02 | AR |
| mir-646 | microRNA | 1.41E-02 | AR |
| miR-367-5p (miRNAs w/seed CUGUUGC) | mature microRNA | 1.41E-02 | AR |
| miR-149-3p (and other miRNAs w/seed GGGAGGG) | mature microRNA | 1.41E-02 | AR |
| mir-552 | microRNA | 1.41E-02 | AR |
| mir-298 | microRNA | 1.41E-02 | AR |
| mir-493 | microRNA | 1.41E-02 | IGF1R |
| miR-541-3p (and other miRNAs w/seed GGUGGGC) | mature microRNA | 1.41E-02 | AR |
| mir-586 | microRNA | 1.41E-02 | AR |
| mir-644 | microRNA | 1.41E-02 | AR |
| miR-486-3p (and other miRNAs w/seed GGGGCAG) | mature microRNA | 1.41E-02 | AR |
| PPP2R5E | phosphatase | 1.41E-02 | FN1 |
| DNAJB2 | other | 1.41E-02 | ATXN3 |
| GBP1 | enzyme | 1.41E-02 | MMP1 |
| COL5A1 | other | 1.41E-02 | FN1 |
| BCAR1 | enzyme | 1.41E-02 | ESR1 |
| HTRA2 | peptidase | 1.41E-02 | XIAP |
| KIR2DS2 (includes others) | transmembrane receptor | 1.41E-02 | IFNG |
| SLC2A1 | transporter | 1.41E-02 | MMP2 |

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|---------------------|-----------------------------------|----------|---|
| RYK | kinase | 1.41E-02 | FN1 |
| PSMC3IP | transcription regulator | 1.41E-02 | CYP17A1 |
| ASH2L | transcription regulator | 1.41E-02 | ESR1 |
| ALDH1A3 | enzyme | 1.41E-02 | RRM1 |
| PLPP3 | phosphatase | 1.41E-02 | FN1 |
| SNCG | other | 1.41E-02 | IGF1R |
| MXD4 | transcription regulator | 1.41E-02 | ODC1 |
| B4GALT5 | enzyme | 1.41E-02 | NOTCH1 |
| KIR2DL1/KIR2DL3 | other | 1.41E-02 | IFNG |
| ICAM3 | transmembrane receptor | 1.41E-02 | PPARG |
| CAPNS1 | peptidase | 1.41E-02 | MMP2 |
| KIF4A | other | 1.41E-02 | AR |
| ARL6IP5 | other | 1.41E-02 | ITGB3 |
| PTPN9 | phosphatase | 1.41E-02 | MMP2 |
| PES1 | other | 1.41E-02 | HMOX1 |
| GPX4 | enzyme | 1.41E-02 | MMP1 |
| CD226 | other | 1.41E-02 | IFNG |
| MRC1 | transmembrane receptor | 1.41E-02 | IFNG |
| KLRB1 | transmembrane receptor | 1.41E-02 | IFNG |
| RANBP2 | enzyme | 1.41E-02 | FN1 |
| NBN | other | 1.41E-02 | XIAP |
| mir-297 | microRNA | 1.41E-02 | AR |
| CTD_2245E153 | other | 1.41E-02 | PC |
| SOCS2 | other | 1.41E-02 | IFNG |
| protein phosphatase | complex | 1.41E-02 | ESR1 |
| ATF3 | transcription regulator | 1.42E-02 | DCTD,IFNG,MSH2,RRM1 |
| PI3K (family) | group | 1.43E-02 | ESR1,HMOX1,MMP2,TJP1,XIAP |
| AR | ligand-dependent nuclear receptor | 1.46E-02 | AR,IGF1R,MMP2,MUC1,PGC,SMTN,TLR4,WEE1 |
| BRCA1 | transcription regulator | 1.49E-02 | ESR1,FHIT,HBB,XRCC6 |
| ETV5 | transcription regulator | 1.52E-02 | FN1,MMP2,TJP1 |
| OGA | enzyme | 1.53E-02 | FLNB,FN1,G6PD,GTF2F2,HMGCS1,MAP3K3,PDHA1,S100A6 |
| MEG3 | other | 1.62E-02 | FN1,ZEB2 |

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|---------------------------------------|-------------------------|----------|-------------------------------------|
| SULF2 | enzyme | 1.62E-02 | MMP2,VEGFB |
| GALNT6 | enzyme | 1.62E-02 | DPP4,FN1 |
| IFT88 | other | 1.62E-02 | ACAT2,MMP2 |
| LCK | kinase | 1.62E-02 | IFNG,PPARG |
| PTP4A3 | phosphatase | 1.62E-02 | FN1,ITGB3 |
| SMAD7 | transcription regulator | 1.62E-02 | IFNG,XIAP |
| miR-296-5p (miRNAs w/seed GGGCCCC) | mature microRNA | 1.62E-02 | KLK1,MMP1 |
| MXI1 | transcription regulator | 1.62E-02 | APEX1,LARS1 |
| ABL1 | kinase | 1.62E-02 | FAS,MMP1 |
| TXNIP | other | 1.62E-02 | G6PD,PGK1 |
| CFLAR | other | 1.62E-02 | HMOX1,XIAP |
| MAX | transcription regulator | 1.64E-02 | APEX1,BCR,CSDE1 |
| MET | kinase | 1.64E-02 | FN1,HMOX1,MMP2 |
| FOXA2 | transcription regulator | 1.75E-02 | ALB,RARA,RARG |
| CCN5 | growth factor | 1.75E-02 | ESR1,FN1,MUC1 |
| IDH1 | enzyme | 1.85E-02 | FN1,ZEB2 |
| mir-218 | microRNA | 1.85E-02 | VAV3,ZEB2 |
| SPARC | other | 1.85E-02 | FN1,NOTCH1 |
| EIF4E | translation regulator | 1.85E-02 | ESR1,XIAP |
| IFN Beta | group | 1.88E-02 | CD74,FN1,IFNG |
| ERG | transcription regulator | 1.88E-02 | AR,BCR,FLNB,IGF1R,POU2F1,UTRN |
| KDM1A | enzyme | 1.94E-02 | CRYM,CYP7A1,HBB,IGF1R,RUVBL1,SMURF2 |
| mir-155 | microRNA | 2.00E-02 | HK2,IFNG,WEE1 |
| IKZF1 | transcription regulator | 2.07E-02 | B2M,FN1,TLR4,TNFAIP8L2,UEVLD |
| DPH5 | enzyme | 2.09E-02 | EP300,IFNG |
| PAX5 | transcription regulator | 2.09E-02 | FN1,MMP2 |
| C3 | peptidase | 2.09E-02 | FN1,IFNG |
| CLU | other | 2.09E-02 | ATP7B,MMP2 |
| SOX9 | transcription regulator | 2.09E-02 | AR,PPARG |
| PRDM1 | transcription regulator | 2.09E-02 | ESR1,IFNG |
| KLRC4- KLRK1/KLRK1 | transmembrane receptor | 2.09E-02 | IFNG,PPARG |

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|---------------------|-----------------------------------|----------|-----------------------------------|
| Ap1 | complex | 2.14E-02 | F3,MMP1,MMP2 |
| mir-21 | microRNA | 2.14E-02 | FAS,FN1,MSH2 |
| FAS | transmembrane receptor | 2.14E-02 | FAS,MMP1,RND1 |
| PPARG | ligand-dependent nuclear receptor | 2.17E-02 | FN1,MUC1,PDK4,PPARG |
| CD44 | other | 2.17E-02 | EP300,FAS,FN1,XIAP |
| IL4 | cytokine | 2.22E-02 | CD1A,IFNG,MMP1,MUC1,PPARG |
| SMAD4 | transcription regulator | 2.22E-02 | CYP17A1,FAP,IFNG,RAC1,XIAP |
| STAT5a/b | group | 2.27E-02 | IFNG,RARA,XIAP |
| MAP2K1 | kinase | 2.27E-02 | F3,MMP1,MMP2 |
| HMOX1 | enzyme | 2.27E-02 | HMOX1,ITGB3,THBS2 |
| NCOA3 | transcription regulator | 2.27E-02 | HMOX1,NCOA3,PPARG |
| IL22 | cytokine | 2.35E-02 | IFNG,MUC1 |
| FGFR1 | kinase | 2.35E-02 | HK2,SFN |
| CTBP1 | enzyme | 2.35E-02 | MUC1,RAC1 |
| DDIT3 | transcription regulator | 2.35E-02 | FN1,IFNG |
| PAK1 | kinase | 2.35E-02 | F3,FN1 |
| IL10 | cytokine | 2.36E-02 | CD1A,IFNG,MUC1,TLR4 |
| SREBF1 | transcription regulator | 2.37E-02 | ALOX12,FABP3,FABP7,HMOX1,OAT |
| RBM5 | other | 2.41E-02 | ITPA,NCOA3,XIAP |
| mir-8 | microRNA | 2.56E-02 | MMP1,RAC1,ZEB2 |
| PKNOX2 | transcription regulator | 2.62E-02 | ESR1,FAS |
| NPPB | other | 2.62E-02 | ACAT2,HMGCS1 |
| TWIST2 | transcription regulator | 2.62E-02 | FN1,ZEB2 |
| HNF1B | transcription regulator | 2.62E-02 | ALB,SLC5A1 |
| NPC2 | transporter | 2.62E-02 | PPARG,TLR4 |
| MBD1 | transcription regulator | 2.62E-02 | DPP4,ESR1 |
| KLF11 | transcription regulator | 2.62E-02 | FABP3,PDK4 |
| MUC1 | other | 2.71E-02 | CD1A,MUC1,NOTCH1 |
| E2F4 | transcription regulator | 2.78E-02 | EXOSC9,HMGB3,MSH2,NDC80,RPA3,RRM1 |
| Alpha 1 antitrypsin | group | 2.81E-02 | MMP2 |
| Ras homolog | group | 2.81E-02 | TJP1 |
| Ikb | group | 2.81E-02 | MMP1 |

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|----------------------------|-------------------------|----------|---------|
| CK1 | group | 2.81E-02 | XIAP |
| Rbp | group | 2.81E-02 | PPARG |
| BTN3A1 | other | 2.81E-02 | IFNG |
| SLC48A1 | transporter | 2.81E-02 | IGF1R |
| SNX27 | other | 2.81E-02 | PPARG |
| VSIR | other | 2.81E-02 | IFNG |
| Integrin alpha V beta 3 | complex | 2.81E-02 | MMP1 |
| BTBD7 | other | 2.81E-02 | MMP2 |
| CNEP1R1 | other | 2.81E-02 | IFNG |
| DENND1A | other | 2.81E-02 | CYP17A1 |
| ESRP2 | other | 2.81E-02 | ZEB2 |
| ZNF385B | other | 2.81E-02 | FAS |
| FOXG1 | transcription regulator | 2.81E-02 | NCOA3 |
| Vla-4 | complex | 2.81E-02 | F3 |
| FAS-AS1 | other | 2.81E-02 | FAS |
| Ferritin | complex | 2.81E-02 | HBB |
| VTRNA2-1 | other | 2.81E-02 | IFNG |
| CABIN1 | other | 2.81E-02 | MMP2 |
| MXD1 | transcription regulator | 2.81E-02 | ODC1 |
| CD244 | transmembrane receptor | 2.81E-02 | IFNG |
| IBSP | other | 2.81E-02 | ITGB3 |
| PMEPA1 | other | 2.81E-02 | AR |
| NUP98 | transporter | 2.81E-02 | YWHAH |
| TAC4 | other | 2.81E-02 | MMP2 |
| SP100 | transcription regulator | 2.81E-02 | MMP1 |
| ARID5B | transcription regulator | 2.81E-02 | IFNG |
| LAMA3 | other | 2.81E-02 | MMP1 |
| LY96 | transmembrane receptor | 2.81E-02 | TLR4 |
| PIAS2 | transcription regulator | 2.81E-02 | MUC1 |
| mir-708 | microRNA | 2.81E-02 | AR |

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|--|------------------------|----------|--------|
| miR-16-1-3p (miRNAs w/seed CAGUAUU) | mature microRNA | 2.81E-02 | WEE1 |
| miR-675-3p (miRNAs w/seed UGUAUGC) | mature microRNA | 2.81E-02 | TJP1 |
| miR-424-3p (miRNAs w/seed AAAACGU) | mature microRNA | 2.81E-02 | WEE1 |
| mir-368 | microRNA | 2.81E-02 | AR |
| miR-292-3p (and other miRNAs w/seed AGUGCCG) | mature microRNA | 2.81E-02 | AR |
| miR-128-3p (and other miRNAs w/seed CACAGUG) | mature microRNA | 2.81E-02 | WEE1 |
| mir-346 | microRNA | 2.81E-02 | BTK |
| miR-4728-3p (miRNAs w/seed AUGCUGA) | mature microRNA | 2.81E-02 | ESR1 |
| MIR4728 | microRNA | 2.81E-02 | ESR1 |
| miR-758-5p (and other miRNAs w/seed GGUUGAC) | mature microRNA | 2.81E-02 | AR |
| EGFL7 | other | 2.81E-02 | NOTCH1 |
| KAT6A | enzyme | 2.81E-02 | ESR1 |
| MTBP | other | 2.81E-02 | ODC1 |
| PDE4A | enzyme | 2.81E-02 | FN1 |
| FCGR1A | transmembrane receptor | 2.81E-02 | F3 |
| CDC14A | phosphatase | 2.81E-02 | WEE1 |
| NCSTN | peptidase | 2.81E-02 | NOTCH1 |
| VPS35 | transporter | 2.81E-02 | PPARG |
| USP14 | peptidase | 2.81E-02 | AR |
| PDCD6IP | other | 2.81E-02 | ESR1 |
| BCAN | other | 2.81E-02 | ITGB3 |

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|---------|-----------------------------------|----------|---------------------------|
| DRD5 | G-protein coupled receptor | 2.81E-02 | IFNG |
| BRD8 | transcription regulator | 2.81E-02 | PPARG |
| SOX10 | transcription regulator | 2.81E-02 | NOTCH1 |
| PTGS1 | enzyme | 2.81E-02 | MMP2 |
| TRADD | other | 2.81E-02 | AR |
| SLAMF6 | transmembrane receptor | 2.81E-02 | IFNG |
| CD276 | other | 2.81E-02 | IFNG |
| BMP5 | growth factor | 2.81E-02 | CYP17A1 |
| PPP1CA | phosphatase | 2.81E-02 | AR |
| PARP2 | enzyme | 2.81E-02 | FAS |
| ENTPD1 | enzyme | 2.81E-02 | IFNG |
| HP | peptidase | 2.81E-02 | HMOX1 |
| NDFIP2 | other | 2.81E-02 | IFNG |
| PTK2B | kinase | 2.81E-02 | IFNG |
| ANGPTL4 | other | 2.81E-02 | MMP1 |
| BRD2 | kinase | 2.81E-02 | HMOX1 |
| DGKA | kinase | 2.81E-02 | WEE1 |
| CCR5 | G-protein coupled receptor | 2.81E-02 | F3 |
| RAMAC | other | 2.81E-02 | RUVBL1 |
| LGALS9 | other | 2.81E-02 | IFNG |
| NOS1AP | other | 2.81E-02 | RAC1 |
| IL12RB2 | transmembrane receptor | 2.81E-02 | IFNG |
| EIF4A1 | translation regulator | 2.81E-02 | MUC1 |
| NCOA4 | transcription regulator | 2.81E-02 | AR |
| HNRNPAB | enzyme | 2.81E-02 | HBB |
| THRB | ligand-dependent nuclear receptor | 2.87E-02 | IGF1R,MMP1,PPARG |
| STAT1 | transcription regulator | 2.88E-02 | C1R,FAS,MUC1,TRIM21,WARS1 |
| CLDN7 | other | 2.88E-02 | ASAP1,F3,MMP2,MUC1,SF3B6 |
| RICTOR | other | 2.90E-02 | HK2,RAC1 |
| mir-27 | microRNA | 2.90E-02 | ESR1,PSAP |
| mir-146 | microRNA | 2.90E-02 | IFNG,TLR4 |
| JARID2 | transcription regulator | 2.90E-02 | PPARG,ZEB2 |

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|-----------------|-----------------------------------|----------|--|
| SFPQ | other | 2.90E-02 | AR,CYP17A1 |
| NFKBIA | transcription regulator | 2.90E-02 | MSH2,XIAP |
| TCF7 | transcription regulator | 2.90E-02 | PPARG,RARA |
| NR3C1 | ligand-dependent nuclear receptor | 2.93E-02 | BTK,CUL1,DAPK2,FN1,IGF1R,NFATC1,NMT1,NR1I3,PRKCB,PTK2B,YWHAH |
| TLR4 | transmembrane receptor | 3.01E-02 | IFNG,MMP1,RAC1,TLR4 |
| ESRRA | transcription regulator | 3.06E-02 | HK2,HMOX1,PNMT,PPARG,RARA |
| F2 | peptidase | 3.20E-02 | FN1,MMP1 |
| SDCBP | enzyme | 3.20E-02 | MMP2,RAC1 |
| C5 | cytokine | 3.20E-02 | FN1,MMP1 |
| PML-RARA | fusion gene/product | 3.20E-02 | F3,HMOX1 |
| EML4-ALK | fusion gene/product | 3.24E-02 | CERT1,MMP1,MMP2,PPARG |
| TREM1 | transmembrane receptor | 3.32E-02 | F3,FABP3,HBEGF,MMP1,PPARG,SFMBT2 |
| Secretase gamma | complex | 3.50E-02 | NOTCH1,PTPRF |
| Tlr | group | 3.50E-02 | IFNG,NOTCH1 |
| JUND | transcription regulator | 3.50E-02 | F3,HMOX1 |
| SOX11 | transcription regulator | 3.64E-02 | CUL1,EP300,ERBB4,FAS,HMGB3 |
| SAFB | other | 3.71E-02 | B2M,CD74,HMOX1 |
| FSH | complex | 3.79E-02 | ACP3,HK2,MAPK6,MMP2,PGK1,PPP2R1A,PTPRE,PTPRF |
| POU2F1 | transcription regulator | 3.82E-02 | APEX1,ESR1 |
| TFEB | transcription regulator | 3.82E-02 | PSAP,VPS26A |
| IRF4 | transcription regulator | 3.88E-02 | B2M,IFNG,STK4,SUB1 |
| MAP2K1/2 | group | 3.90E-02 | CYP7A1,HK2,RRM1 |
| FOS | transcription regulator | 4.01E-02 | FN1,HK2,MMP1,VAV3 |
| IRF1 | transcription regulator | 4.08E-02 | B2M,IFNG,ODC1 |
| KLF5 | transcription regulator | 4.08E-02 | NOTCH1,PPARG,RARA |
| SRC (family) | group | 4.14E-02 | FN1,ITGB3 |
| HLX | transcription regulator | 4.14E-02 | IFNG,KYNU |
| CCL2 | cytokine | 4.14E-02 | MMP1,MMP2 |
| RAF1 | kinase | 4.14E-02 | FAS,MMP1 |
| MIF | cytokine | 4.14E-02 | MMP1,MMP2 |
| FFAR3 | G-protein coupled receptor | 4.18E-02 | PPARG |
| HSP | group | 4.18E-02 | IFNG |

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| PI3K 纬 | group | 4.18E-02 | IFNG |
| MIR100HG | other | 4.18E-02 | FN1 |
| CREB3L3 | transcription regulator | 4.18E-02 | CYP7A1 |
| CCDC134 | other | 4.18E-02 | IFNG |
| NDUFAF3 | other | 4.18E-02 | ESR1 |
| MMS19 | transcription regulator | 4.18E-02 | CIAO1 |
| FFAR2 | G-protein coupled receptor | 4.18E-02 | PPARG |
| NAA30 | enzyme | 4.18E-02 | FAS |
| ASCL1 | transcription regulator | 4.18E-02 | CDK5R1 |
| KLHL42 | other | 4.18E-02 | FN1 |
| CIAO2B | other | 4.18E-02 | CIAO1 |
| FBXL16 | other | 4.18E-02 | NCOA3 |
| MAGEA3/MAGEA6 | other | 4.18E-02 | IFNG |
| gelatinase | group | 4.18E-02 | TJPI |
| MEN1 | transcription regulator | 4.18E-02 | AR |
| POLG | enzyme | 4.18E-02 | AR |
| HEY2 | transcription regulator | 4.18E-02 | SMTN |
| AP2M1 | other | 4.18E-02 | CD74 |
| STAT4 | transcription regulator | 4.18E-02 | IFNG |
| SH2D1A | other | 4.18E-02 | IFNG |
| COL3A1 | other | 4.18E-02 | FN1 |
| TAF4 | transcription regulator | 4.18E-02 | AR |
| TIMP2 | other | 4.18E-02 | MMP2 |
| FBLN2 | other | 4.18E-02 | MMP2 |
| ARHGAP31 | other | 4.18E-02 | ZEB2 |
| miR-222-5p (miRNAs w/seed UCAGUAG) | mature microRNA | 4.18E-02 | AR |
| mir-147 | microRNA | 4.18E-02 | AR |
| mir-95 | microRNA | 4.18E-02 | AR |
| miR-132-3p (and other miRNAs w/seed AACAGUC) | mature microRNA | 4.18E-02 | EP300 |

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| miR-346 (and other miRNAs w/seed GUCUGCC) | mature microRNA | 4.18E-02 | BTK |
| miR-1-3p (and other miRNAs w/seed GGAAUGU) | mature microRNA | 4.18E-02 | ESR1 |
| HGS | other | 4.18E-02 | ESR1 |
| PTGDR | G-protein coupled receptor | 4.18E-02 | IFNG |
| EPHB4 | kinase | 4.18E-02 | AR |
| CEACAM3 | other | 4.18E-02 | IFNG |
| DDR1 | kinase | 4.18E-02 | MMP1 |
| KCNMA1 | ion channel | 4.18E-02 | MMP2 |
| PRKCQ | kinase | 4.18E-02 | IFNG |
| CD86 | transmembrane receptor | 4.18E-02 | IFNG |
| GFER | enzyme | 4.18E-02 | NR1I3 |
| MAP3K5 | kinase | 4.18E-02 | MSH2 |
| HTRA1 | peptidase | 4.18E-02 | MMP1 |
| RBP4 | other | 4.18E-02 | RARA |
| PAX2 | transcription regulator | 4.18E-02 | ITGB3 |
| ITGB6 | other | 4.18E-02 | MMP2 |
| USP19 | peptidase | 4.18E-02 | ATXN3 |
| AJUBA | transcription regulator | 4.18E-02 | WEE1 |
| C8orf44-SGK3/SGK3 | kinase | 4.18E-02 | ESR1 |
| SENPI | peptidase | 4.18E-02 | MMP2 |
| CD48 | other | 4.18E-02 | IFNG |
| TGFBR3 | kinase | 4.18E-02 | FN1 |
| RECQL | enzyme | 4.18E-02 | HBB |
| CCNA1 | other | 4.18E-02 | MMP2 |
| XCL1 | cytokine | 4.18E-02 | IFNG |
| CD247 | transmembrane receptor | 4.18E-02 | IFNG |
| CRLF1 | other | 4.18E-02 | IFNG |
| EXOC7 | transporter | 4.18E-02 | ZEB2 |
| G3BP2 | enzyme | 4.18E-02 | SART3 |

| | | | |
|------------------|-----------------------------------|----------|--|
| TFE3 | transcription regulator | 4.18E-02 | VPS26A |
| SMAD6 | transcription regulator | 4.18E-02 | IFNG |
| GADD45GIP1 | other | 4.18E-02 | HMOX1 |
| ACTG1-MITF | fusion gene/product | 4.18E-02 | APEX1 |
| EP300 | transcription regulator | 4.29E-02 | AR,CHKA,FN1,MMP1 |
| CST5 | other | 4.30E-02 | ACAT2,ANXA6,ARF6,HNRNPA2B1,KIF11,MSN,NCBP1,NF2 |
| MAPK9 | kinase | 4.47E-02 | PPARG,RAC1,SEM1 |
| PIM1 | kinase | 4.48E-02 | IFNG,IGF1R |
| RAC1 | enzyme | 4.48E-02 | MMP1,RAC1 |
| Interferon alpha | group | 4.64E-02 | BCR,CSF2RB,IFNG,NF2,NT5C3A,SLC5A1,TLR4 |
| PPARA | ligand-dependent nuclear receptor | 4.67E-02 | CYP7A1,EP300,PDK4 |
| SP3 | transcription regulator | 4.73E-02 | CYP17A1,ESR1,IGF1R,MMP2 |
| SMAD3 | transcription regulator | 4.73E-02 | FN1,IFNG,RAC1,XIAP |
| CAV1 | transmembrane receptor | 4.82E-02 | HK2,TJP1 |

Supplementary Table S5: The causal regulatory network analysis by IPA for solasonine. The causal regulatory network analysis by IPA was performed to explore the causal network these predicted upstream regulators may be involved in and their correspondent master regulators. Master regulators were predicted and sorted by increasing of p-value (p-value ≤ 0.05).

| Master regulator | Molecule type | p-value | Network bias-corrected p-value | Participating regulators | Target molecules in dataset of solasonine related genes | Number of target molecules-connected regulators | Number of target molecules |
|--|-------------------------|----------|--------------------------------|--|---|---|----------------------------|
| DDX5 | enzyme | 8.91E-14 | 1.00E-04 | DDX5,ERK1/2,let-7,MMP2,MMP9,NFkB (complex) | AR,B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MAPK6,MDH1,MMP1,MMP2,MSH2,NDUFB1,NOTCH1,PA2G4,PPP2R1A,PTPRE,SENP2,STARD13,TJP1,TLR4,XIAP | 6 | 31 |
| let-7 | microRNA | 1.79E-13 | 2.00E-04 | ERK1/2,let-7,MMP2,MMP9,NFkB (complex) | AR,B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MAPK6,MMP1,MMP2,MSH2,NOTCH1,PA2G4,PPP2R1A,PTPRE,SENP2,STARD13,TJP1,TLR4,XIAP | 5 | 29 |
| TIMP2 | other | 2.33E-12 | 5.00E-04 | Akt,ERK1/2,GSK3B,MMP2,PI3K (family),RELA,TIMP2 | B2M,CERT1,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKD4,PPARG,PPP2R1A,PTPRE,RAC1,STK4,XIAP | 7 | 26 |
| miR-491-5p (and other miRNAs w/seed GUGGGGA) | mature microRNA | 3.36E-12 | 4.00E-04 | ERK1/2,Hsp90,miR-491-5p (and other miRNAs w/seed GUGGGGA),MMP2,MMP9,NFkB (complex) | AR,B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,GRK6,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PPP2R1A,PTPRE,SENP2,TJP1,XIAP | 6 | 25 |
| RASGRP1 | other | 5.94E-12 | 6.00E-04 | ERK,ERK1/2,Jnk,KRAS,RASGRP1 | B2M,BTRC,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PC,PKD4,PTPRE,RARA,XIAP,YY1 | 5 | 23 |
| RAF1 | kinase | 8.66E-12 | 1.40E-03 | ADCY,CHUK,ERK,ERK1/2,IKBKB,Jnk,MAPK1,RAF1,RB1,RELA,Src | AR,B2M,BTRC,CDK5R1,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NFATC1,NOTCH1,ODC1,PKD4,PPARG,PTPRE,RARA,STK4,TRIM21,XIAP,ZEB2 | 11 | 32 |
| PDPN | other | 9.63E-12 | 1.20E-03 | ERK,ERK1/2,MMP2,MMP9,P38 MAPK,PDPN,RHOA,RHOC,Tgf beta | B2M,CDK5R1,CSF2RB,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP2,MSH2,MUC1,ODC1,PDHA1,PKD4,PPP2R1A,PTPRE,RARA,TJP1,XIAP | 7 | 24 |
| ARHGAP35 | transcription regulator | 1.03E-11 | 1.20E-03 | ARHGAP35,ERK,ERK1/2,MMP2,MMP9,P38 MAPK,RHOA,RHOC,Tgf beta | B2M,CDK5R1,CSF2RB,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP2,MSH2,MUC1,ODC1,PDHA1,PKD4,PPP2R1A,PTPRE,RARA,TJP1,XIAP | 7 | 24 |

| | | | | | | | |
|---------|-------------------------|----------|----------|--|---|----|----|
| TNFSF11 | cytokine | 1.22E-11 | 8.00E-04 | ERK1/2,NFkB (complex),STAT1,TNFSF11 | B2M,C1R,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NFATC1,NOTCH1,PTPRE,SENP2,TRIM21,WARS1,XIAP | 4 | 25 |
| RPTOR | other | 1.48E-11 | 1.00E-03 | Akt,EIF4E,ERK1/2,MTOR,RAC1,RHOA,RPTOR,SREBF1,SREBF2,TFEB | AR,B2M,CHKA,CYP17A1,CYP7A1,ESR1,F3,FABP3,FABP7,FN1,GTF2I,HBEGF,HK2,IFNG,IGF1R,MMP1,NOTCH1,PDHA1,PKD4,PPARG,PSAP,PTPRE,TJP1,VPS26A,XIAP | 9 | 25 |
| IKBKE | kinase | 3.00E-11 | 5.00E-03 | Akt,ERK1/2,GSK3B,IKBKE,IRF3,MAP2K1/2,NFkB (complex),P38 MAPK,RELA | B2M,CERT1,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,IFNG,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,PDHA1,PKD3,PKD4,PGK1,PPARG,PTPRE,PYGL,RAC1,RARA,RRM1,SENP2,STK4,TJP1,XIAP | 9 | 30 |
| ARRB1 | transcription regulator | 3.18E-11 | 1.90E-03 | ADCY,AKT1,ARRB1,EGFR,ERK,ERK1/2,IGF1R,Jnk,MAPK1,NR3C1,Ras homolog,RELA | B2M,BTRC,CDK5R1,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,HBB,HK2,HMOX1,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NFATC1,NR1I3,ODC1,PKD4,PPARG,PTPRE,RAC1,RARA,STK4,TJP1,TRIM21,XIAP,ZEB2 | 11 | 33 |
| LCK | kinase | 3.48E-11 | 3.30E-03 | DGKA,ERK,ERK1/2,Jnk,LCK,Mapk,NFkB (complex),PTPN6 | B2M,BTRC,CDK5R1,CTCF,CYP17A1,CYP7A1,ESR1,FN1,HK2,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,NR1I3,ODC1,PKD4,PPARG,PTPRE,RARA,SENP2,WEE1 | 8 | 26 |
| RHOC | enzyme | 3.53E-11 | 2.00E-04 | ERK,MMP2,MMP9,P38 MAPK,RHOA,RHOC | CDK5R1,CSF2RB,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PDHA1,PKD4,PPP2R1A,RARA,TJP1 | 5 | 20 |
| LYN | kinase | 4.81E-11 | 3.20E-03 | EGFR,ERK1/2,LYN,MAPK8,NFkB (complex),RAC1,STAT1 | AR,B2M,C1R,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,HNRNPA2B1,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PTPRE,RARA,SENP2,TRIM21,WARS1,ZEB2 | 6 | 27 |
| IL31 | other | 5.03E-11 | 5.30E-03 | Akt,ERK1/2,Hsp27,IL31,JAK1,JAK2,Jnk,MAPK,MAPK8,MAPK9,P38 MAPK,PI3K (complex),STAT1,STAT3 | B2M,BTRC,C1R,CD1A,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,NR1I3,PKD4,PGK1,PPARG,PTPRE,RAC1,RARA,SEM1,TJP1,TRIM21,WARS1,XIAP | 13 | 31 |
| IL15 | cytokine | 5.11E-11 | 4.00E-03 | Akt,ERK1/2,IL15,JAK1,Jnk,P38 MAPK,STAT1,STAT5a/b,TERT | AR,B2M,BTRC,C1R,CYP17A1,CYP7A1,DGKA,ESR1,FAS,G6PD,GALM,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PKD4,PGK1,PTPRE,RARA,TJP1,TRIM21,WARS1,XIAP | 9 | 30 |
| PF4 | cytokine | 8.45E-11 | 2.70E-03 | ERK1/2,Jnk,P38 MAPK,PF4,PI3K (complex) | B2M,BTRC,CD1A,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RARA,XIAP | 5 | 22 |
| RICTOR | other | 8.65E-11 | 1.50E-03 | Akt,AKT1,AKT2,FOXO1,MTOR,RAC1,RHOA,RICTOR,SREBF1,SREBF2,STAT1,TYK2 | AR,C1R,CAMK4,CHKA,ESR1,F3,FABP3,FABP7,FAS,GTF2I,HK2,HMOX1,IFNG,IGF1R,KIF11,MMP1,MMP2,MUC1,NOTCH1,PDHA1,PKD4,PPARG,RAC1,TJP1,TRIM21,WARS1 | 12 | 26 |

| | | | | | | | |
|---------|----------------------------|----------|----------|--|---|----|----|
| CHRNA7 | transmembrane receptor | 9.58E-11 | 1.63E-02 | Akt,CEBPB,CHRNA7,EGFR,ERK,FOXO1,GSK3B,Hsp27,IRF3,KAT5,MMP2,MYC,NFkB (complex),NR3C1,P38 MAPK,PGR,PPARGC1A,RELA,SREBF2,STAT1,TP63,YAP1,YBX1 | ALB,APEX1,BCR,CAMK4,CD1A,CDK5R1,CERT1,CSF2RB,CYP7A1,DGKA,DTYMK,F3,FABP7,FAP,FAS,FN1,GTF2I,HBB,HK2,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,KIF11,KYNU,MATK,MMP1,MSH2,MUC1,NFATC1,NOTCH1,NR1I3,ODC1,PK4,PGK1,PNMT,PPP2R1A,PTPRE,RAC1,RARA,RRM1,SEN2,SERPINA5,SFN,STK4,THBS2,TJP1,WEE1 | 23 | 49 |
| SUPT20H | other | 1.01E-10 | 1.85E-02 | Akt,CEBPB,EGFR,Hsp27,Jnk,KAT5,MAP3K7,MAPK9,MMP2,MTOR,NFkB (complex),NR3C1,P38 MAPK,PGR,PPARGC1A,RELA,RHOA,SP1,SREBF1,STAT1,SUPT20H,TP63,YAP1 | ALB,APEX1,BTRC,C1R,CD1A,CERT1,CHKA,CSF2RB,CTCF,CYP7A1,DGKA,DTYMK,F3,FABP3,FABP7,FAS,FN1,HBEGF,HMOX1,HNRNPA2B1,IFNG,ITGB3,KYNU,MATK,MMP1,MMP2,MSH2,MUC1,NFATC1,NR1I3,PDHA1,PK4,PNMT,PPARG,PPP2R1A,PTPRE,RAC1,RARA,RRM1,SEM1,SEN2,SERPINA5,SFN,STK4,THBS2,TRIM21,WARS1,WEE1 | 21 | 48 |
| GNL1 | other | 1.36E-10 | 2.90E-03 | Akt,CCND1,CDKN1A,ERK1/2,GNL1,Hsp70,Jnk,MAPK9,NFE2L2,NFkB (complex),RB1,RELA | AR,B2M,BTRC,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,G6PD,HBEGF,HK2,ITGB3,KYNU,MMP1,MSH2,MUC1,NCOA3,NOTCH1,PK4,PPARG,PTPRE,RAC1,RRM1,SEM1,SEN2,STK4,TJP1,XIAP,ZEB2 | 10 | 32 |
| ARRB2 | other | 1.54E-10 | 5.50E-03 | ADCY,Akt,ARRB2,EGFR,ERK,IGF1R,Jnk,NOS2,P38 MAPK,RELA | AR,BTRC,CDK5R1,CERT1,CTCF,DGKA,FN1,HBEGF,HK2,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NFATC1,NOTCH1,ODC1,PPARG,PTPRE,RAC1,RARA,STK4,TJP1,TLR4,ZEB2 | 9 | 27 |
| PIP5K1C | kinase | 1.61E-10 | 7.40E-03 | Akt,EGFR,ERK,ERK1/2,FOXO1,HIF1A,IRF3,Jnk,MAP2K1/2,Mapk,MAPK1,MTOR,P38 MAPK,PGR,PIP5K1C,RELA,RHOA,SREBF2,STAT1,YBX1 | AR,B2M,BTRC,C1R,CAMK4,CDK5R1,CERT1,CHKA,CYP17A1,CYP7A1,DGKA,ERBB4,ESR1,F3,FABP7,GTF2I,HBB,HK2,HNRNPA2B1,IFNG,IGF1R,KIF11,MATK,MMP1,MMP2,MUC1,NAE1,NOTCH1,NR1I3,ODC1,PDHA1,PK4,PNMT,PTPRE,RARA,RRM1,SERPINA5,STK4,TJP1,TRIM21,WARS1,XIAP,ZEB2 | 19 | 43 |
| CCN1 | other | 1.66E-10 | 8.90E-03 | Akt,CCN1,ERK1/2,JUN,LRP6,MMP2,NFkB (complex) | B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PK4,PPP2R1A,PTPRE,SEN2,TJP1,XIAP | 7 | 26 |
| ACKR3 | G-protein coupled receptor | 1.82E-10 | 2.10E-03 | ACKR3,EGFR,ERK,ERK1/2 | AR,B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HK2,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PK4,PTPRE,XIAP,ZEB2 | 3 | 21 |
| WNT5A | cytokine | 1.93E-10 | 8.40E-03 | Akt,AR,CEBPB,EGFR,ERK1/2,ESR1,FOXO1,HSF1,Hsp27,IRF3,Jnk,KAT5,MMP2,MTOR,MYC,NR3C1,P38 MAPK,PGR,RELA,RHOA,SIRT1,SREBF2,TFEB,TP63,WNT5A,YBX1 | ALB,APEX1,AR,B2M,BCR,BTRC,CAMK4,CD1A,CERT1,CHKA,CSF2RB,CYP17A1,DGKA,EP300,F3,FABP7,FAP,FAS,FN1,GTF2I,HBB,HMOX1,HNRNPA2B1,HSP90AB1,IGF1R,ITGB3,KIF11,MATK,MMP1,MSH2,MUC1,NFATC1,NMRK1,NOTCH1,NR1I3,ODC1,PDHA1,PK4,PNMT,PPP2R1A,PSAP,PTPRE,RARA,SEMA4D,SERPINA5,SMTN,STK4,THBS2,TJP1,TLR4,TTR,VPS26A,XIAP | 26 | 53 |

| | | | | | | | |
|---------------------------|------------------------|----------|----------|---|---|----|----|
| KRAS | enzyme | 2.28E-10 | 7.60E-03 | Akt,ATM,ERK,ERK1/2,KRAS,NFkB (complex) | B2M,CDK5R1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,HK2,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PC,PTPRE,SEN2,TJP1,XIAP,YY1 | 6 | 26 |
| LILRB4 | other | 2.32E-10 | 2.98E-02 | Akt,AR,CEBPB,CHUK,CTNNB1,EGFR,FOXO1,GLI1,GSK3B,Hsp27,IKBKB,IRF3,Jnk,KAT5,LILRB4,MMP2,MTOR,NFkB (complex),NFKBIA,NR3C1,P38 MAPK,PGR,PPARGC1A,RELA,SP1,SREBF2,STAT1,STAT3,TP63,TP73,YAP1,YBX1 | ALB,ANG,ANXA6,APEX1,BTRC,C1R,CAMK4,CD1A,CERT1,CHKA,CSF2RB,CYP7A1,DTYMK,FABP7,FAS,FN1,G6PD,GTF21,HBB,HBEGF,HMOX1,HNRNPA2B1,IFNG,IGF1R,IMPA2,ITGB3,KIF11,KLK1,KYNU,MATK,MMP1,MMP2,MSH2,MUC1,NFATC1,NOTCH1,NR1I3,PAH,PK4,PGK1,PNMT,PPP2R1A,PTPRE,PTPRF,RAC1,RARA,RRM1,S100A6,SEN2,SERPINA5,SFN,SMTN,STK4,THBS2,TJP1,TLR4,TRIM21,WARS1,WEE1 | 30 | 59 |
| CD6 | transmembrane receptor | 2.53E-10 | 2.50E-03 | CD6,ERK1/2,Jnk,P38 MAPK | B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 4 | 20 |
| MED28 | other | 2.53E-10 | 2.50E-03 | ERK1/2,Jnk,MED28,P38 MAPK | B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 3 | 20 |
| RNF40 | enzyme | 2.97E-10 | 1.30E-03 | Akt,ERK,RNF40 | CDK5R1,ESR1,F3,FAS,G6PD,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PK4,PPARG,TJP1 | 3 | 17 |
| Pro-inflammatory Cytokine | group | 3.27E-10 | 7.90E-03 | ERK1/2,MTOR,NFkB (complex),P38 MAPK,Pro-inflammatory Cytokine,SMPD1,SMPD2 | AR,B2M,CHKA,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,PTPRE,RARA,SEN2,XIAP | 4 | 24 |
| S100A9 | other | 3.39E-10 | 6.00E-03 | ERK1/2,Jnk,P38 MAPK,S100A9,TERT | AR,B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 5 | 21 |
| CCN6 | growth factor | 3.40E-10 | 2.16E-02 | Akt,AKT1,AKT2,CCN6,CEBPB,ERBB2,ERK,FOXO1,Hsp27,IRF3,Jnk,KAT5,MAP3K7,MAPK1,MAPK9,MMP2,MTOR,NFkB (complex),NR3C1,P38 MAPK,PGR,PPARGC1A,RELA,RHOA,SREBF1,STAT1,TP63,YAP1 | ALB,APEX1,BMP1,BTRC,C1R,CAMK4,CD1A,CDK5R1,CERT1,CHKA,CSF2RB,CYP7A1,DGKA,DTYMK,ERBB4,ESR1,F3,FABP3,FABP7,FAS,FN1,GART,HBB,HMOX1,ITGB3,KIF11,KYNU,MATK,MMP1,MMP2,MSH2,NFATC1,NR1I3,ODC1,PDHA1,PK4,PGK1,PNMT,PPP2R1A,PTPRF,RAC1,RARA,RRM1,SEM1,SEN2,SERPINA5,SFN,SMTN,STK4,THBS2,TRIM21,WEE1 | 26 | 52 |
| INS | other | 4.09E-10 | 8.10E-03 | Akt,AKT1,ERK,ERK1/2,GATA2,Gsk3,INS,INSR,Jnk,Mapk,MAPK1,MTOR,PI3K (complex),RPS6KB1,YAP1 | B2M,BTRC,CDK5R1,CHKA,CYP17A1,CYP7A1,DTYMK,EPHA3,ESR1,F3,FAS,FN1,HBB,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,NR1I3,ODC1,PPARG,PTPRE,RARA,RRM1,TJP1,TRIM21,XIAP,ZIC3 | 15 | 32 |
| IFNG | cytokine | 4.51E-10 | 3.33E-02 | Akt,ERK1/2,IFNG,IRF1,JAK2,MMP2,MTOR,NFkB (complex),P38 MAPK,PRKAA1,RELA,STAT1,STAT3,TP73 | C1R,CAMK4,CERT1,CHKA,CSF2RB,CTCF,CYP17A1,CYP7A1,DGKA,DPP4,EPHA3,ESR1,FAS,G6PD,GART,GRK2,HK2,ITGB3,KYNU,MAGEA4,MMP1,MMP2,MUC1,NOTCH1,ODC1,PK4,PGK1,PPARG,PPP2R1A,PTPRE,RARA,SEN2,SERPINA5,SFN,STK4,TJP1,TLR4,TRIM21,WARS1,XIAP,ZEB2 | 14 | 41 |

| | | | | | | | |
|-----------------|------------------------|----------|----------|---|---|----|----|
| PTPRK | phosphatase | 4.69E-10 | 1.00E-03 | EGFR,ERK,PTPRK | AR,CDK5R1,ESR1,F3,FAS,HBEGF,HK2,HNRNPA2B1,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PTPRE,XIAP,ZEB2 | 2 | 17 |
| G protein alpai | group | 4.69E-10 | 2.94E-02 | ADCY,AR,CEBPA,EGFR,ERK,ERK1/2,FOXO1,G protein alpai,GPIIB-IIIa,HIF1A,Jnk,MAP2K1/2,Mapk,MAPK1,MED1,MMP2,MTOR,NFkB (complex),P38MAPK,PGR,RELA,RHOA,SP1,STAT3,STK4 | ALB,AR,B2M,BTRC,CAMK4,CDK5R1,CHKA,CSF2RB,CYP17A1,CYP7A1,DGKA,DTYMK,EPHA3,ERBB4,ESR1,F3,FN1,HBB,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,ITGB3,KIF11,KYNU,MATK,MMP1,MMP2,NAE1,NFATC1,NR1I3,ODC1,PDHA1,PGK1,PNMT,PPP2R1A,PTPRE,RARA,RRM1,SEN2,SERPINA5,SMTN,STK4,TLR4,TRIM21,WEE1,XIAP,ZEB2 | 22 | 49 |
| EDA | cytokine | 5.13E-10 | 1.00E-03 | EDA,EGFR,ERK | AR,CDK5R1,ESR1,F3,FAS,HBEGF,HK2,HNRNPA2B1,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PTPRE,XIAP,ZEB2 | 2 | 17 |
| OGT | enzyme | 5.18E-10 | 1.21E-02 | Akt,ERK1/2,NFkB (complex),OGT,PRKAA,RELA,SREBF1,YAP1 | AR,B2M,CERT1,CYP17A1,CYP7A1,DTYMK,ESR1,F3,FABP3,FABP7,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,KYNU,MMP2,MSH2,MUC1,NOTCH1,PKK4,PPARG,PTPRE,RRM1,SEN2,STK4,TJP1,XIAP | 8 | 29 |
| mir-27 | microRNA | 5.40E-10 | 5.00E-03 | ERK1/2,mir-27,NFkB (complex) | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PSAP,PTPRE,SEN2,XIAP | 3 | 21 |
| PLAUR | transmembrane receptor | 5.98E-10 | 4.40E-03 | AKT1,ERK,ERK1/2,MAPK1,MMP2,PLAUR | AR,B2M,CDK5R1,CSF2RB,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBB,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PPP2R1A,PTPRE,TJP1,TRIM21,XIAP | 5 | 25 |
| ANXA6 | ion channel | 6.12E-10 | 1.10E-03 | ANXA6,EGFR,ERK | AR,CDK5R1,ESR1,F3,FAS,HBEGF,HK2,HNRNPA2B1,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PTPRE,XIAP,ZEB2 | 2 | 17 |
| SOS1 | other | 6.15E-10 | 5.90E-03 | ERK1/2,NFkB (complex),RAC1,RHOA,SOS1 | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PDHA1,PTPRE,SEN2,XIAP | 4 | 21 |
| RAD51AP1-DYRK4 | fusion gene/product | 6.20E-10 | 2.03E-02 | Akt,ATR,CEBPA,EGFR,ERBB2,ERK,ERK1/2,ESR1,FOXO1,GSK3B,IKBKB,Jnk,MAP2K1/2,MAPK1,MED1,MMP2,NFkB (complex),RAD51AP1-DYRK4,SREBF2,STAT1,STAT5a/b,YBX1 | ALB,AR,B2M,BMP1,BTRC,C1R,CAMK4,CDK5R1,CSF2RB,CYP17A1,CYP7A1,DGKA,DTYMK,EPHA3,ERBB4,ESR1,F3,FABP7,FAP,FN1,GART,GTF2I,HBB,HBEGF,HK2,HNRNPA2B1,IGF1R,KIF11,KYNU,MSH2,MUC1,NOTCH1,ODC1,PKK4,PGK1,PPARG,PPP2R1A,PTPRE,PTPRF,RAC1,RARA,RBM39,SEN2,SMTN,TJP1,TRIM21,WARS1 | 21 | 47 |
| BDNF | growth factor | 6.63E-10 | 9.60E-03 | Akt,BDNF,ERK1/2,NFkB (complex),RELA,Src | B2M,CERT1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PKK4,PPARG,PTPRE,SEN2,STK4,TJP1,XIAP | 5 | 25 |
| INHBA | growth factor | 6.68E-10 | 1.71E-02 | Akt,CEBPA,CEBPB,EGFR,ERK1/2,ERN1,GSK3B,Hsp27,INHBA,Jnk,KAT5,MED1,MK | ALB,ANG,APEX1,B2M,BCR,BTRC,CD1A,CYP17A1,CYP7A1,DGKA,DTYMK,EPHA3,ERBB4,ESR1,F3,FABP7,FAP,FAS,GTF2I,HBB,HBEGF,HK2,HMO | 24 | 49 |

| | | | | | | | |
|--------------------|----------------------------------|----------|----------|---|---|----|----|
| | | | | YC,NR3C1,P38 MAPK,PGR,SMAD2,SMAD3,SREBF2,STAT3,TFEB,TP63,YAP1,YBX1 | X1,HNRNPA2B1,IFNG,ITGB3,MATK,MSH2,MUC1,NFATC1,NOTCH1,NR1I3,ODC1,PK4,PGK1,PNMT,PSAP,PTPRE,RAC1,RARA,RRM1,SERPINA5,SFN,THBS2,TJP1,VAV3,VPS26A,WEE1,XIAP | | |
| PP2A | complex | 6.89E-10 | 4.80E-03 | Akt,ERK1/2,MAPK8,Nfkb (complex),PP2A,PRKAA,STAT5a/b | AR,B2M,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KYNU,MSH2,MUC1,NOTCH1,PK4,PTPRE,RARA,SENP2,TJP1,XIAP | 6 | 23 |
| G protein alpha | group | 7.00E-10 | 8.00E-04 | ADCY,EGFR,ERK1/2,G protein alpha | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,NFATC1,PTPRE,XIAP,ZEB2 | 3 | 18 |
| ERRFI1 | other | 7.35E-10 | 3.90E-03 | Akt,EGFR,ERRFI1,FOXO1,GSK3B,MET | AR,CAMK4,ESR1,F3,FN1,HK2,HMOX1,HNRNPA2B1,IFNG,IGF1R,KIF11,MMP1,MUC1,NOTCH1,PK4,PTPRE,RAC1,TJP1,XIAP,ZEB2 | 5 | 20 |
| CXCR4 | G-protein coupled receptor | 7.68E-10 | 8.10E-03 | Akt,AKT1,CXCR4,ERK1/2,Jnk,MAPK1,P38 MAPK,Ras homolog,RHOA,ZAP70 | AR,B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBB,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PDHA1,PK4,PTPRE,RARA,TJP1,TRIM21,XIAP | 10 | 27 |
| POSTN | other | 7.76E-10 | 3.50E-03 | Akt,EGFR,ERK,POSTN | AR,CDK5R1,ESR1,FAS,HBEGF,HK2,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,TJP1,VEGFB,XIAP,ZEB2 | 4 | 19 |
| WWOX | enzyme | 8.42E-10 | 5.50E-03 | ERBB4,ERK,GSK3B,Nfkb (complex),WWOX | CDK5R1,CTCF,ESR1,HBEGF,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PK4,PGK1,RAC1,SENP2,XIAP | 5 | 20 |
| SERPINC1 | enzyme | 9.37E-10 | 6.50E-03 | ERK1/2,F10,F2,Hsp27,JAK2,MAPK1,MAPK8,Nfkb (complex),P38 MAPK,PRKAA1,PRKCQ,PTK2B,RHOA,SERPINC1,SRC (family),VSIR | AR,B2M,CD1A,CTCF,CYP17A1,CYP7A1,DGKA,EPA3,ESR1,F3,FN1,HBB,HBEGF,HK2,HMOX1,IFNG,ITGB3,KYNU,MAGEA4,MMP1,MMP2,MSH2,NOTCH1,PDHA1,PTPRE,RARA,SENP2,TJP1,TRIM21,XIAP | 15 | 30 |
| SMAD7 | transcription regulator | 9.54E-10 | 2.18E-02 | Akt,AKT1,CASP8,CEBPB,ERBB2,ERK,ERK1/2,ERN1,FOXO1,Hsp27,IRF3,Jnk,KAT5,MAP2K3,MAP3K7,MAPK1,MAPK9,MeK,MMP2,MTOR,NR3C1,P38 MAPK,PDPK1,PGR,RELA,RHOA,SMAD2,SMAD7,SREBF1,STAT1,TP63,YAP1 | ALB,ANG,APEX1,B2M,BMP1,BTRC,C1R,CAMK4,CD1A,CDK5R1,CERT1,CHK1,CSF2RB,CYP17A1,DGKA,DTYMK,ERBB4,F3,FABP3,FABP7,FAS,GART,HBB,HMOX1,IFNG,ITGB3,KIF11,MATK,MMP1,MSH2,NFATC1,NR1I3,ODC1,PDHA1,PK4,PGK1,PNMT,PPP2R1A,PTPRF,RAC1,RARA,RRM1,SENP1,SERPINA5,SFN,SMTN,STK4,THBS2,TRIM21,WARS1,WEE1,XIAP | 28 | 52 |
| ADCY | group | 9.61E-10 | 3.40E-03 | ADCY,ERK,ERK1/2 | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NFATC1,ODC1,PK4,PTPRE | 3 | 18 |
| EVL | other | 9.63E-10 | 3.40E-03 | Akt,ERK1/2,EVL,Focal adhesion kinase,NANOG,P38 MAPK,PXN | B2M,CYP17A1,CYP7A1,DGKA,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MSH2,MUC1,NOTCH1,PK4,PTPRE,RARA,S100A6,TJP1,XIAP | 4 | 22 |

| | | | | | | | |
|---------|----------------------------|----------|----------|--|--|---|----|
| GAS6 | growth factor | 9.64E-10 | 6.30E-03 | Akt,AXL,EGFR,ERK,GAS6,MET,SRC (family) | AR,CDK5R1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,TJP1,XIAP,ZEB2 | 6 | 20 |
| STAB2 | transmembrane receptor | 9.64E-10 | 5.70E-03 | ERK1/2,NFkB (complex),STAB2 | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,SENP2,XIAP | 2 | 20 |
| RPSA | translation regulator | 9.95E-10 | 1.10E-03 | ERK,MAPK8,MMP2,RHOA,RPSA | CDK5R1,CSF2RB,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PDHA1,PDK4,PPP2R1A,RARA,TJP1 | 5 | 16 |
| IL36G | cytokine | 1.02E-09 | 9.60E-03 | ERK1/2,IL36G,Jnk,NFkB (complex) | B2M,BTRC,CD1A,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2 | 4 | 21 |
| HBEGF | growth factor | 1.02E-09 | 1.56E-02 | EGFR,ERBB2,ERBB4,ERK,ERK1/2,HBEGF,Mapk,P38 MAPK | AR,B2M,BMP1,CDK5R1,CYP17A1,CYP7A1,DGKA,ERBB4,ESR1,GART,HK2,HMOX1,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NR1I3,ODC1,PDK4,PGK1,PPARG,PTPRE,PTPRF,RARA,RRM1,SMTN,XIAP,ZEB2 | 8 | 31 |
| P2RY6 | G-protein coupled receptor | 1.03E-09 | 6.00E-03 | ERK1/2,NFkB (complex),P2RY6 | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,SENP2,XIAP | 2 | 20 |
| IL36B | cytokine | 1.09E-09 | 9.50E-03 | ERK1/2,IL36B,Jnk,NFkB (complex) | B2M,BTRC,CD1A,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2 | 4 | 21 |
| FURIN | peptidase | 1.15E-09 | 6.90E-03 | AKT1,ERK1/2,FURIN,MMP9,P38 MAPK,RELA,SMAD2,SMAD3 | B2M,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PPARG,PTPRE,RAC1,RARA,STK4,TJP1,XIAP | 7 | 24 |
| PTK2 | kinase | 1.22E-09 | 9.70E-03 | Akt,ERK,IGF1R,LCK,MAPK8,MET,PTEN,PTK2,RHOA,YAP1 | AR,CDK5R1,DTYMK,F3,FAS,FN1,HBEGF,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PDHA1,PPARG,RAC1,RARA,RRM1,TJP1 | 9 | 22 |
| PIP5K1C | kinase | 1.31E-09 | 1.80E-03 | Akt,EGFR,PIP5K1C | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,TJP1,XIAP,ZEB2 | 2 | 16 |
| ITGA3 | other | 1.31E-09 | 4.30E-03 | ERK,ERK1/2,ITGA3,RHOA,SRC | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PDHA1,PDK4,PTPRE | 4 | 18 |
| NOX5 | ion channel | 1.34E-09 | 1.00E-02 | Akt,ERK1/2,NOX5,P38 MAPK,RELA,STAT5a/b | B2M,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PDK4,PPARG,PTPRE,RARA,STK4,TJP1 | 5 | 24 |
| S1PR2 | G-protein coupled receptor | 1.42E-09 | 8.30E-03 | Akt,EGFR,ERK1/2,RELA,S1PR2 | AR,B2M,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HNRNPA2B1,MMP1,MMP2,MUC1,NOTCH1,PDK4,PPARG,PTPRE,STK4,TJP1,XIAP,ZEB2 | 4 | 23 |

| | | | | | | | |
|--------|-----------------------------------|----------|----------|--|---|----|----|
| VTN | other | 1.48E-09 | 5.60E-03 | Akt,ERK1/2,MTOR,VTN | AR,B2M,CHKA,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,MMP1,MMP2,MUC1,NOTCH1,PK4,PTPRE,SFN,TJP1 | 4 | 19 |
| NR5A2 | ligand-dependent nuclear receptor | 1.50E-09 | 2.52E-02 | ERK1/2,ERN1,FOXO1,NFkB (complex),NR5A2,PRKAA,SMAD2,SMAD3,SREBF1,SREBF2 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FABP3,FABP7,FAS,FGF1R,GTF2I,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PPARG,PTPRE,RAC1,SENP2,XIAP | 9 | 28 |
| PDE4A | enzyme | 1.52E-09 | 3.70E-03 | ERK1/2,P38 MAPK,PDE4A | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 3 | 18 |
| A2M | transporter | 1.53E-09 | 9.30E-03 | A2M,Akt,ERK1/2,MAP2K1/2,MMP2,P38 MAPK | B2M,CSF2RB,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PK4,PPP2R1A,PTPRE,RARA,RRM1,XIAP | 6 | 22 |
| MAP3K8 | kinase | 1.68E-09 | 1.10E-02 | CHUK,ERK1/2,MAP2K1,MAP3K8,NFkB (complex) | B2M,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,SENP2,XIAP | 4 | 21 |
| PRTN3 | peptidase | 1.97E-09 | 7.20E-03 | CXCL8,ERK1/2,IL1B,PRTN3 | ACP3,AR,B2M,BTRC,CD74,CYP17A1,CYP7A1,DPP4,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MUC1,PPARG,PTPRE,RAC1,TLR4 | 3 | 23 |
| VDAC1 | ion channel | 1.98E-09 | 1.62E-02 | CASP8,CASP9,ERK1/2,IL1B,Inflammasome (Nalp3, Asc, Casp1),MAPK8,NFkB (complex),P38 MAPK,VDAC1 | ACP3,B2M,BTRC,CTCF,CYP17A1,CYP7A1,DGKA,DPP4,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,PPARG,PTPRE,RARA,SENP2,TLR4,XIAP | 5 | 27 |
| BAX | transporter | 2.07E-09 | 1.83E-02 | BAX,CASP8,CASP9,ERK1/2,IRF3,MAPK8,NFkB (complex),P38 MAPK | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2,STK4,XIAP | 5 | 23 |
| LAIR1 | transmembrane receptor | 2.09E-09 | 4.90E-03 | ERK,LAIR1,MAPK9,P38 MAPK | CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PK4,PPARG,RAC1,RARA,SEM1 | 4 | 19 |
| HRAS | enzyme | 2.09E-09 | 8.40E-03 | CHUK,ERK,ERK1/2,HRAS,IKBKB | B2M,CDK5R1,CYP17A1,CYP7A1,DGKA,ESR1,FAS,FN1,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,NOTCH1,ODC1,PK4,PTPRE | 5 | 19 |
| SMPD2 | enzyme | 2.11E-09 | 9.10E-03 | ERK1/2,NFkB (complex),SMPD2 | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,SENP2,XIAP | 2 | 20 |
| KITLG | growth factor | 2.16E-09 | 2.82E-02 | Akt,ERK1/2,JUN,KITLG,Mapk,MAPK8,MTOR,P38 MAPK,RELA,RPS6KB1,STAT3,TERT | AR,B2M,CERT1,CHKA,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,NR1H3,PK4,PGK1,PPARG,PRKCB,PTPRE,RARA,STK4,TJP1 | 12 | 29 |

| | | | | | | | |
|----------|-----------|----------|----------|---|--|----|----|
| Ggtase I | complex | 2.16E-09 | 1.51E-02 | Akt,AKT1,AR,ERBB4,ERK1/2,FOXO1,Ggtase I,HTRA2,Jnk,LATS1,PLK1,RELA,STK3,STK4,YAP1 | B2M,BTRC,CAMK4,CERT1,CTCF,CYP17A1,CYP7A1,DTYMK,F3,FAS,FN1,HBEGF,HK2,HMOX1,KIF11,MSH2,MUC1,NOTCH1,PK4,PGK1,PPARG,PTPRE,RARA,RRM1,SFN,SMTN,TJP1,TLR4,WEE1,XIAP | 12 | 30 |
| PDE4D | enzyme | 2.21E-09 | 5.10E-03 | ERK1/2,P38 MAPK,PDE4D | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 3 | 18 |
| GALNT4 | enzyme | 2.29E-09 | 2.69E-02 | ERK1/2,ERN1,FOXO1,GALNT4,NFkB (complex),PRKAA,SMAD2,SMAD3 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,TJP1,XIAP | 8 | 25 |
| Mmp | group | 2.37E-09 | 1.61E-02 | EGFR,ERK,ERK1/2,Mmp,TGFB1 | ALB,AR,B2M,BMP1,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAP,FAS,HK2,HMOX1,HNRNPA2B1,IGF1R,ITGB3,MMP2,MUC1,ODC1,PK4,PTPRE,SMTN,SMURF2,TJP1,XIAP,ZEB2 | 5 | 26 |
| ITSN1 | other | 2.40E-09 | 1.14E-02 | ERK,ERK1/2,ITSN1,MAP2K1/2,P38 MAPK | B2M,CDK5R1,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PK4,PTPRE,RARA,RRM1 | 4 | 21 |
| CIB1 | other | 2.44E-09 | 3.40E-03 | Akt,CIB1,ERK,MAP3K5,PAK1 | CDK5R1,ESR1,F3,FAS,FN1,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,TJP1 | 4 | 16 |
| CDKN1A | kinase | 2.44E-09 | 1.15E-02 | CCND1,CDKN1A,ERK1/2,Jnk,MAPK9,NFkB (complex),RB1,RELA | AR,B2M,BTRC,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,FN1,G6PD,HBEGF,HK2,IGF1R,ITGB3,KYNU,MMP1,MSH2,NCOA3,NOTCH1,PPARG,PSAP,PTPRE,RAC1,RRM1,SEM1,SENP2,STK4,XIAP,ZEB2 | 9 | 29 |
| SULF2 | enzyme | 2.53E-09 | 1.99E-02 | Akt,CEBPA,ERK1/2,ERN1,Jnk,MED1,MM P2,NFkB (complex),SMAD2,SMAD3,SREBF2,STAT1,SULF2,YBX1 | ALB,ANG,B2M,BTRC,C1R,CSF2RB,CYP17A1,CYP7A1,DTYMK,EPA3,ESR1,F3,FABP7,FN1,GTF2I,HBB,HBEGF,HK2,IFNG,IGF1R,KYNU,MMP1,MSH2,MUC1,NOTCH1,PK4,PPP2R1A,PTPRE,RAC1,RARA,SENP2,TJP1,TRIM21,WARS1,XIAP | 13 | 35 |
| SYK/ZAP | group | 2.55E-09 | 4.60E-03 | ERK1/2,P38 MAPK,RPS6KB1,SYK/ZAP | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,PTPRE,RARA | 3 | 18 |
| RAP1A | enzyme | 2.55E-09 | 9.80E-03 | ERK,ERK1/2,P38 MAPK,RAC1,RAP1A | B2M,CDK5R1,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PK4,PTPRE,RARA | 4 | 20 |
| G6PD | enzyme | 2.59E-09 | 1.30E-02 | ERK1/2,G6PD,NFkB (complex),P38 MAPK,RELA | B2M,CERT1,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PPARG,PTPRE,RAC1,RARA,SENP2,STK4,XIAP | 5 | 24 |
| ADAM10 | peptidase | 2.70E-09 | 6.90E-03 | ADAM10,EGFR,ERK1/2,MDM2,P38 MAPK,Ras homolog | AR,B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HNRNPA2B1,IFNG,ITGB3,MMP1,MSH2,PTPRE,RARA,SFN,TJP1,XIAP,ZEB2 | 5 | 21 |

| | | | | | | | |
|---------|-------------------------|----------|----------|---|--|----|----|
| GAB1 | other | 2.70E-09 | 2.06E-02 | Akt,ERK,ERK1/2,GAB1,NFkB (complex),SRC | B2M,CDK5R1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,HK2,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PTPRE,SENP2,TJP1,XIAP | 5 | 23 |
| AGK | kinase | 2.73E-09 | 3.30E-03 | AGK,EGFR,ERK1/2 | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 2 | 17 |
| FCHSD2 | other | 2.74E-09 | 6.30E-03 | Akt,EGFR,ERK1/2,FCHSD2 | AR,B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1,XIAP,ZEB2 | 3 | 19 |
| PACSIN2 | transporter | 2.74E-09 | 6.30E-03 | Akt,EGFR,ERK1/2,PACSIN2 | AR,B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1,XIAP,ZEB2 | 3 | 19 |
| HMGB1 | transcription regulator | 2.90E-09 | 2.67E-02 | ERK1/2,HIF1A,HMGB1,IRF3,Jnk,MAPK8,P38 MAPK,RAC1 | B2M,BTRC,CYP17A1,CYP7A1,DGKA,ERBB4,ESR1,F3,FAS,HBEGF,HK2,HDRB1,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NAE1,PTPRE,RARA,STK4,XIAP | 8 | 25 |
| EREG | growth factor | 2.90E-09 | 2.40E-03 | Akt,EGFR,EREG | AR,ESR1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1,XIAP,ZEB2 | 3 | 16 |
| TLR10 | transmembrane receptor | 2.95E-09 | 7.60E-03 | ERK,Jnk,P38 MAPK,TLR10 | BTRC,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 3 | 18 |
| MAP3K20 | kinase | 2.95E-09 | 7.60E-03 | ERK,Jnk,MAP3K20,P38 MAPK | BTRC,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 3 | 18 |
| ADAM9 | peptidase | 2.95E-09 | 3.40E-03 | ADAM9,EGFR,ERK1/2 | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 2 | 17 |
| SNX1 | transporter | 2.95E-09 | 3.30E-03 | EGFR,ERK1/2,SNX1 | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 2 | 17 |
| GAPDH | enzyme | 2.99E-09 | 4.33E-02 | Akt,CEBPB,EGFR,EIF2AK2,GAPDH,Hsp27,IRF3,Jnk,KAT5,MMP2,MTOR,NFkB (complex),NR3C1,P38 MAPK,PGR,PPARGC1A,RPS6KB1,SP1,STAT1,STAT3,TP63,YAP1 | ALB,APEX1,BTRC,C1R,CD1A,CHKA,CSF2RB,CTCF,CYP7A1,DGKA,DTYMK,F3,FAS,FN1,HBEGF,HMOX1,HNRNPA2B1,ITGB3,KYNU,MATK,MMP1,MMP2,MSH2,MUC1,NFATC1,NR1I3,PKD4,PGK1,PNMT,PPARG,PPP2R1A,PTPRE,RARA,RRM1,SENP2,SERPINA5,SFN,STK4,THBS2,TRIM21,WARS1,WEE1,ZNF292 | 22 | 43 |
| HCG11 | other | 3.17E-09 | 7.60E-03 | ERK,HCG11,Jnk,P38 MAPK | BTRC,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 3 | 18 |
| CG | complex | 3.18E-09 | 2.90E-02 | ADCY,Akt,CG,EGFR,ERK1/2,MAPK1,MAPK8,Mek,MMP2,NFkB (complex) | ACP3,AR,B2M,C1R,CDK5R1,CSF2RB,CTCF,CYP7A1,FAS,FN1,HBB,HBEGF,HK2,HMOX1,HNRNPA2B1,IFNG,IFNGR1,ITGB3,KYNU,MMP1,MMP2,MS | 10 | 33 |

| | | | | | | | |
|---------|----------------------------|----------|----------|---|---|----|----|
| | | | | | H2,MUC1,NFATC1,PKD4,PPP2R1A,PTPRE,RARA,SENP2,SMURF2,TRIM21, XIAP,ZEB2 | | |
| FRY | other | 3.18E-09 | 2.28E-02 | ERBB4,ERK1/2,FRY,MYC,P38 MAPK,RELA,STK38,YAP1 | B2M,BCR,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,DTYMK,ESR1,F3,FAP,F AS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,ODC1,PG K1,PPARG,PTPRE,RARA,RRM1,STK4 | 6 | 28 |
| HTATIP2 | transcription regulator | 3.19E-09 | 3.70E-03 | EGFR,ERK1/2,HTATIP2 | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,I GF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 3 | 17 |
| GRP | growth factor | 3.19E-09 | 3.60E-03 | EGFR,ERK1/2,GRP | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,I GF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 2 | 17 |
| Gpcr | group | 3.19E-09 | 3.70E-03 | EGFR,ERK1/2,Gpcr,PRKD1 | AR,B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,I GF1R,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 3 | 17 |
| KL | enzyme | 3.20E-09 | 2.02E-02 | Akt,CEBPA,ERK1/2,FOXO1,GSK3B,Jnk,K L,MED1,MMP2,NFkB (complex),SREBF2,STAT1,YBX1 | ALB,B2M,BTRC,C1R,CAMK4,CSF2RB,CYP17A1,CYP7A1,DTYMK,EPAH3, ESR1,F3,FABP7,FN1,GTF2I,HBB,HBEGF,HK2,IGF1R,KIF11,KYNU,MMP1, MSH2,MUC1,NOTCH1,PKD4,PPP2R1A,PTPRE,RAC1,RARA,SENP2,TJP1,T RIM21,WARS1 | 12 | 34 |
| TFF2 | other | 3.43E-09 | 4.50E-03 | ERK1/2,Jnk,TFF2 | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1, MMP2,MSH2,PTPRE,RARA,XIAP | 2 | 16 |
| IL17RD | other | 3.44E-09 | 5.60E-03 | ERK,ERK1/2,IL17RD | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,IFNG,IGF1R,ITGB3, MMP1,MMP2,MUC1,ODC1,PKD4,PTPRE | 2 | 17 |
| TP63 | transcription regulator | 3.68E-09 | 1.72E-02 | Akt,ERK,ERK1/2,GSK3B,Jnk,STAT3,TP63 ,TP73,WWTR1 | B2M,BTRC,CDK5R1,CYP17A1,CYP7A1,DTYMK,ESR1,F3,FAS,G6PD,HBEG F,HK2,HMOX1,IGF1R,ITGB3,MSH2,NOTCH1,ODC1,PKD4,PGK1,PTPRE,R AC1,RARA,RRM1,SNF,THBS2,TJP1,WEE1,XIAP,ZEB2 | 9 | 30 |
| SAA | group | 3.68E-09 | 2.10E-02 | Akt,ERK1/2,NFkB (complex),P38 MAPK,SAA | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,ITG B3,KYNU,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,RARA,SENP2,TJP1, XIAP | 5 | 23 |
| SP4 | transcription regulator | 3.68E-09 | 1.09E-02 | Akt,ERK,ERK1/2,Mapk,NFkB (complex),PRKAA,RAS,SP4 | AR,B2M,CDK5R1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,HK2,HMOX1,IFN G,IGF1R,ITGB3,KYNU,MSH2,MUC1,NR1I3,ODC1,PTPRE,SENP2,TJP1,XIA P | 8 | 23 |
| CXCR2 | G-protein coupled receptor | 3.73E-09 | 4.70E-03 | CXCR2,ERK1/2,Jnk | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1, MMP2,MSH2,PTPRE,RARA,XIAP | 2 | 16 |

| | | | | | | | |
|-----------------------------|----------------------------------|----------|----------|--|--|----|----|
| KLHL42 | other | 3.81E-09 | 6.80E-03 | ERK,ERN1,KLHL42,NFkB (complex),PPP2R5E,SMAD2 | ANG,CDK5R1,CTCF,ESR1,FAS,FN1,HBEGF,HMOX1,ITGB3,KYNU,MMP2, MSH2,MUC1,NOTCH1,ODC1,PKD4,RAC1,SENP2,XIAP | 5 | 19 |
| PSMD14 | peptidase | 3.82E-09 | 2.58E-02 | 26s Proteasome,EGFR,ERK1/2,HIF1A,Jnk,JUN ,MMP2,NR3C1,PSMD14,STAT3 | AR,B2M,BTRC,CSF2RB,CYP17A1,CYP7A1,ERBB4,F3,FN1,HBEGF,HK2,H MOX1,HNRNPA2B1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NAE1,NFATC 1,NOTCH1,NR1I3,PGK1,PPP2R1A,PSAP,RARA,TJP1,XIAP,ZEB2 | 9 | 30 |
| DDR2 | kinase | 3.87E-09 | 1.15E-02 | DDR2,ERK1/2,JAK2,MAPT,MMP14,MMP 2,SRC,STAT1,STAT3 | B2M,C1R,CSF2RB,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1, IGF1R,MMP1,MMP2,MUC1,NOTCH1,PGK1,PPP2R1A,PTPRE,RARA,TJP1,T RIM21,WARS1 | 7 | 23 |
| ADCYAP1 | other | 3.93E-09 | 1.24E-02 | ADCYAP1,ERK,ERK1/2,P38 MAPK | B2M,CDK5R1,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1 R,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,PTPRE,RARA | 3 | 20 |
| Focal adhesion kinase | group | 4.06E-09 | 3.10E-03 | ERK1/2,Focal adhesion kinase,NANOG,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IFN GR1,IGF1R,ITGB3,MSH2,PTPRE,RARA,S100A6,XIAP | 3 | 19 |
| TP73-AS1 | other | 4.07E-09 | 4.81E-02 | Akt,CCAR2,ELAVL1,ERK,ERK1/2,FOXO 1,HSF1,IRF3,MMP2,MTOR,NFkB (complex),Notch,P38 MAPK,PI3K (family),RELA,RHOA,SIRT1,SREBF1,SRE BF2,STAT1,STAT3,TFEB,TP53,TP73-AS1 | AR,B2M,C1R,CAMK4,CDK5R1,CERT1,CHKA,CSF2RB,CTCF,CYP17A1,CY P7A1,DGKA,EP300,ESR1,F3,FABP3,FABP7,GART,GTF2I,HBEGF,HMOX1,H SP90AB1,IFNG,ITGB3,KIF11,KYNU,MMP2,MUC1,NDC80,NMRK1,PANK1, PDHA1,PKD4,PGK1,PPP2R1A,PRKCB,PSAP,SENP2,SFN,STK4,TJP1,TRIM2 1,TTR,VPS26A,WARS1,WEE1,XIAP,YWHAH,ZEB2 | 23 | 49 |
| PIK3CA | kinase | 4.16E-09 | 1.30E-02 | Akt,AKT1,ERK1/2,FOXO1,GSK3B,MTOR ,PI3K (family),PIK3CA | B2M,CAMK4,CHKA,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HMOX1, IFNG,IGF1R,KIF11,MMP1,MUC1,NOTCH1,PKD4,PTPRE,RAC1,TJP1,XIAP | 7 | 22 |
| CCR7 | G-protein coupled receptor | 4.20E-09 | 5.80E-03 | Akt,CCR7,ERK1/2,LCK,MAP2K1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,MMP1,MMP2,MU C1,NOTCH1,PKD4,PPARG,PTPRE,RRM1,TJP1 | 4 | 18 |
| P2RY1 | G-protein coupled receptor | 4.22E-09 | 2.70E-02 | DGKA,ERK,ERK1/2,NFkB (complex),P2RY1,P38 MAPK,PLC,RAC1,RAP1B,RELA | B2M,CDK5R1,CERT1,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,IFNG,IGF1R, ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,ODC1,PKD4,PPARG,PTPRE,R ARA,SENP2,STK4,WEE1,XIAP | 7 | 26 |
| GALNT2 | enzyme | 4.34E-09 | 8.10E-03 | Akt,EGFR,ERK1/2,GALNT2,SRC | AR,B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,MM P1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1,XIAP,ZEB2 | 4 | 19 |
| CGN | other | 4.44E-09 | 1.22E-02 | ARHGEF2,CGN,ERK1/2,NFkB (complex),RHOA,Tgf beta | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,I GF1R,KYNU,MMP2,MSH2,NOTCH1,PDHA1,PTPRE,SENP2,XIAP | 4 | 20 |
| DUSP6 | phosphatase | 4.53E-09 | 1.35E-02 | DUSP6,ERK,ERK1/2,PGR | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HK2,IFNG,IGF1R,ITGB 3,MATK,MMP1,MMP2,MUC1,ODC1,PKD4,PNMT,PTPRE,SERPINA5 | 3 | 21 |

| | | | | | | | |
|-----------|----------------------------|----------|----------|---|---|---|----|
| ELANE | peptidase | 4.63E-09 | 1.45E-02 | ELANE,ERK1/2,NFkB (complex),RELA | B2M,CERT1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PPARG,PTPRE,SENP2,STK4,XIAP | 4 | 22 |
| ZNF148 | transcription regulator | 4.63E-09 | 2.18E-02 | CASP8,ERK1/2,MAPK8,NFkB (complex),P38 MAPK,ZNF148 | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2,XIAP | 5 | 22 |
| VEGFB | growth factor | 4.66E-09 | 8.10E-03 | ERK1/2,FLT1,Jnk,Src (family),VEGFB | B2M,BTRC,CYP17A1,CYP7A1,ESR1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RARA,XIAP | 4 | 17 |
| HSP90AA1 | enzyme | 4.66E-09 | 9.00E-04 | c-Src,EGFR,HSP90AA1,LATS1 | AR,CYP7A1,ESR1,F3,FN1,HK2,HMOX1,HNRNPA2B1,IFNG,MMP1,MUC1,PTPRE,XIAP,ZEB2 | 4 | 14 |
| CD81 | other | 4.66E-09 | 2.30E-03 | CD81,ERK,MMP2,RAC1 | CDK5R1,CSF2RB,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKD4,PPP2R1A,TJP1 | 4 | 14 |
| PELI2 | enzyme | 4.80E-09 | 4.50E-03 | ERK,Jnk,PELI2 | BTRC,CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 2 | 15 |
| TGFA | growth factor | 4.80E-09 | 2.50E-03 | EGFR,MET,RPS6KB1,Src,TGFA | AR,ESR1,F3,FN1,HK2,HMOX1,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,PTPRE,XIAP,ZEB2 | 4 | 15 |
| SND1-BRAF | fusion gene/product | 4.83E-09 | 8.80E-03 | ERK,ERK1/2,MAP2K1/2,SND1-BRAF | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PKD4,PTPRE,RRM1 | 3 | 18 |
| DBH-AS1 | other | 4.83E-09 | 1.04E-02 | DBH-AS1,ERK,Jnk,P38 MAPK | BTRC,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 3 | 18 |
| CSNK2B | kinase | 4.88E-09 | 1.55E-02 | CSNK2B,ERK1/2,NFkB (complex),RELA | B2M,CERT1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,NOTCH1,PPARG,PTPRE,SENP2,STK4,XIAP | 3 | 22 |
| PTGER2 | G-protein coupled receptor | 4.88E-09 | 1.43E-02 | AKT1,EGFR,ERK1/2,PTGER2,RELA | AR,B2M,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,HNRNPA2B1,IGF1R,MMP1,MMP2,PPARG,PTPRE,STK4,XIAP,ZEB2 | 4 | 22 |
| MAP3K11 | kinase | 4.88E-09 | 2.07E-02 | ERK,ERK1/2,Jnk,JUN,MAP3K11,P38 MAPK | B2M,BTRC,CDK5R1,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,PTPRE,RARA,XIAP | 5 | 22 |
| NTRK2 | kinase | 4.93E-09 | 1.34E-02 | Akt,ERK,ERK1/2,NTRK2,RHOA | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HK2,IFNG,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PDHA1,PTPRE,TJP1 | 4 | 19 |
| MAP3K19 | kinase | 5.41E-09 | 7.20E-03 | ERK1/2,Jnk,MAP2K1/2,MAP3K19 | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,RRM1,XIAP | 3 | 17 |

| | | | | | | | |
|-------------|-------------------------------|-----------------|-----------------|--|---|----------|-----------|
| NF1 | other | 5.61E-09 | 2.10E-02 | ADCY,ERK1/2,GNAS,HIF1A,Jnk,JUN,MMP2,NF1 | B2M,BTRC,CSF2RB,CYP17A1,CYP7A1,ERBB4,ESR1, FN1 ,HBEGF,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,MUC1,NAE1,NFATC1,PPP2R1A,PTPRE,RARA,TJP1,XIAP | 6 | 24 |
| PDGFRB | kinase | 5.64E-09 | 1.19E-02 | Akt,AKT1,ERK1/2,JAK1 ,JAK2,PDGFRB,RAS,SMAD2,TYK2 | B2M,CYP17A1,CYP7A1,ESR1,F3, FN1 ,HBEGF,HK2,HMOX1,IFNG,MMP1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,RAC1,RARA,TJP1,XIAP | 9 | 20 |
| NRP1 | transmembrane receptor | 5.64E-09 | 1.41E-02 | Akt,EGFR,ERK,KDR,MET,NRP1,SMAD2,SMAD3 | AR,CDK5R1,ESR1,FAS, FN1 ,HBEGF,HK2,HMOX1,HNRNPA2B1,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,RAC1,TJP1,ZEB2 | 7 | 20 |
| INHBA | growth factor | 5.78E-09 | 1.01E-02 | Akt,ERK1/2,GSK3B,INHBA,P38MAPK,SMAD2,SMAD3 | B2M,CYP17A1,CYP7A1,DGKA,ERBB4,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,ITGB3,MSH2,MUC1,NOTCH1,PKK4,PTPRE,RAC1,RARA,TJP1, VAV3, XIAP | 7 | 23 |
| ANXA2 | other | 5.88E-09 | 2.96E-02 | Akt,ANXA2,ERK1/2,Jnk,P38MAPK, SRC,STAT3 | ANG,B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PKK4,PGK1,PTPRE,RARA,TJP1,XIAP | 7 | 24 |
| KIT | transmembrane receptor | 5.93E-09 | 1.02E-02 | AKT1,ERK,ERK1/2,KIT | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS, FN1 ,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PTPRE | 3 | 18 |
| IL21 | cytokine | 6.05E-09 | 4.35E-02 | ERK1/2,IL21,Mapk,NFkB (complex),RELA,STAT1,STAT3 | B2M,C1R,CERT1,CYP17A1,CYP7A1,ESR1,FAS, FN1 ,HBEGF,HK2,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,NR1I3,PGK1,PPARG,PTPRE,SENP2,STK4,TLR4,TRIM21,WARS1,XIAP | 7 | 28 |
| PRR7 | other | 6.10E-09 | 6.60E-03 | ERK1/2,Jnk,PRR7,ZAP70 | B2M,BTRC,CYP17A1,CYP7A1,ESR1, FN1 ,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 3 | 16 |
| IL6R | transmembrane receptor | 6.34E-09 | 1.42E-02 | ERK1/2,IL6R,MMP2,STAT1,STAT3 | B2M,C1R,CSF2RB,CYP17A1,CYP7A1,ESR1,FAS, FN1 ,HBEGF,HK2,HMOX1,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PGK1,PPP2R1A,PTPRE,TJP1,TRIM21,WARS1 | 4 | 22 |
| HTRA1 | peptidase | 6.60E-09 | 4.90E-03 | Akt,EGFR,HTRA1,Mapk | AR,ESR1,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,NR1I3,PKK4,PTPRE,TJP1,XIAP,ZEB2 | 4 | 16 |
| SAA1 | transporter | 6.70E-09 | 2.84E-02 | Akt,ERK1/2,Jnk,NFkB (complex),P38MAPK,SAA1 | B2M,BTRC,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,IFNG,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,PKK4,PPARG,PTPRE,RARA,SENP2,TJP1 | 6 | 23 |
| PRKCB | kinase | 6.75E-09 | 1.30E-02 | ERK1/2,Jnk,MAPK8,NCF1,PRKCB,RAS | B2M,BTRC,CYP17A1,CYP7A1,ESR1,F3, FN1 ,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 6 | 17 |

| | | | | | | | |
|---------------------------|----------------------------|----------|----------|---|---|----|----|
| F2 | peptidase | 6.93E-09 | 1.83E-02 | ERK1/2,F2,Hsp27,JAK2,MAPK1,MAPK8,NFkB (complex),P38 MAPK,PRKAA1,PRKCQ,PTK2B,RHOA,SRC (family),VSIR | AR,B2M,CD1A,CTCF,CYP17A1,CYP7A1,DGKA,EPHA3,ESR1,F3,FN1,HBB,HBEGF,HK2,HMOX1,IFNG,ITGB3,KYNU,MAGEA4,MMP1,MSH2,NOTCH1,PDHA1,PTPRE,RARA,SEN2,TJP1,TRIM21,XIAP | 14 | 29 |
| ITGA5 | transmembrane receptor | 7.07E-09 | 1.90E-02 | ERK1/2,ITGA5,NFkB (complex),P38 MAPK | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SEN2,XIAP | 3 | 21 |
| TDGF1 | growth factor | 7.26E-09 | 6.60E-03 | Akt,ERBB4,ERK1/2,GSK3B,TDGF1 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PTPRE,RAC1,TJP1 | 4 | 17 |
| myosin-light-chain kinase | group | 7.26E-09 | 1.29E-02 | ERK1/2,Jnk,MAP2K1,MAP2K1/2,myosin-light-chain kinase | B2M,BTRC,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,RRM1,XIAP | 4 | 18 |
| STK38 | kinase | 7.32E-09 | 2.76E-02 | ERK1/2,MYC,P38 MAPK,RELA,STK38,YAP1 | B2M,BCR,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,DTYMK,ESR1,F3,FAP,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,ODC1,PPARG,PTPRE,RARA,RRM1,STK4 | 5 | 27 |
| BCL2L1 | other | 7.43E-09 | 3.65E-02 | BAX,BCL2L1,CASP1,CASP8,CASP9,caspase,EIF2AK2,ERK1/2,IRF3,MAPK8,NFkB (complex),P38 MAPK | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SEN2,STK4,XIAP,ZNF292 | 8 | 24 |
| GHRL | growth factor | 7.80E-09 | 7.00E-03 | Akt,c-Src,ERK1/2,GHRL,MMP2 | B2M,CSF2RB,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HMOX1,MMP1,MMP2,MUC1,NOTCH1,PTPRE,PPP2R1A,PTPRE | 4 | 17 |
| F2R | G-protein coupled receptor | 8.22E-09 | 1.65E-02 | ERK1/2,F2R,LATS1,NFkB (complex),P38 MAPK,PI3K (complex),RELA,RHOA,YAP1 | B2M,CERT1,CTCF,CYP17A1,CYP7A1,DGKA,DTYMK,ESR1,F3,HBEGF,HK2,HMOX1,IGF1R,ITGB3,KYNU,MSH2,MUC1,PDHA1,PPARG,PTPRE,RARA,RRM1,SEN2,STK4,XIAP | 8 | 25 |
| TRIB2 | kinase | 8.25E-09 | 4.40E-02 | BAX,CASP8,CASP9,CEBPA,ERK1/2,IRF3,MAPK8,MMP14,MMP2,NFkB (complex),P38 MAPK,Src,STAT3,TRIB2 | ALB,B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MMP2,NOTCH1,PGK1,PPARG,PPP2R1A,PTPRE,RARA,SEN2,STK4,TJP1,XIAP | 9 | 28 |
| MCF2L | other | 8.86E-09 | 1.29E-02 | CDC42,ERK1/2,MCF2L,P38 MAPK,RHOA,Tgf beta | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP2,MSH2,PDHA1,PTPRE,RARA,XIAP | 4 | 18 |
| SELE | transmembrane receptor | 9.00E-09 | 8.70E-03 | ERK,Hsp27,P38 MAPK,SELE | CD1A,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PTPRE,RARA | 3 | 17 |
| PLCB3 | enzyme | 9.23E-09 | 2.80E-03 | ERK,KRAS,PLCB3 | CDK5R1,ESR1,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PTPRE,RARA | 2 | 14 |

| | | | | | | | |
|-------------------|-------------------------|----------|----------|--|---|---|----|
| PIK3C2A | kinase | 9.78E-09 | 4.47E-02 | ERK1/2,ERN1,FOXO1,NFkB (complex),PIK3C2A,PRKAA,SMAD2,SMAD3 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,XIAP | 7 | 24 |
| SCUBE3 | other | 9.78E-09 | 4.47E-02 | ERK1/2,ERN1,FOXO1,NFkB (complex),PRKAA,SCUBE3,SMAD2,SMAD3 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,XIAP | 8 | 24 |
| MIR100HG | other | 9.78E-09 | 4.47E-02 | ERK1/2,ERN1,FOXO1,MIR100HG,NFkB (complex),PRKAA,SMAD2,SMAD3 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,XIAP | 8 | 24 |
| ZAP70 | kinase | 1.01E-08 | 1.17E-02 | ERK1/2,P38 MAPK,ZAP70 | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 3 | 18 |
| SULF2 | enzyme | 1.01E-08 | 8.20E-03 | Akt,ERK1/2,SMAD2,SMAD3,SULF2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MUC1,NOTCH1,PKD4,PTPRE,RAC1,TJP1,XIAP | 4 | 18 |
| DEFB4A/DEFB4B | other | 1.04E-08 | 9.30E-03 | DEFB4A/DEFB4B,ERK1/2,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 2 | 17 |
| STK3 | kinase | 1.05E-08 | 5.60E-03 | AKT1,ERK1/2,Jnk,LATS1,STK3 | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,MSH2,MUC1,PTPRE,RARA,XIAP | 4 | 16 |
| HPSE | enzyme | 1.06E-08 | 2.18E-02 | Akt,EGFR,ERK,ERK1/2,HPSE | AR,B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,HNRNPA2B1,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,TJP1,XIAP,ZEB2 | 4 | 20 |
| CCAT1 | other | 1.06E-08 | 2.41E-02 | Akt,CCAT1,ERK1/2,MAP2K1/2,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PKD4,PTPRE,RARA,RRM1,TJP1 | 4 | 20 |
| TMSB4 | group | 1.08E-08 | 1.98E-02 | ERK,Jnk,P38 MAPK,TMSB4 | BTRC,CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKD4,RARA,XIAP | 3 | 18 |
| TSC22D1 | transcription regulator | 1.12E-08 | 4.77E-02 | ERK1/2,ERN1,FOXO1,NFkB (complex),PRKAA,SMAD2,SMAD3,TSC22D1 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,XIAP | 7 | 24 |
| ITCH | enzyme | 1.13E-08 | 1.07E-02 | CFLAR,ERK1/2,ITCH,Jnk,NFkB (complex),P38 MAPK | B2M,BTRC,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,HBEGF,HK2,HMOX1,IGF1R,ITGB3,KYNU,MSH2,NOTCH1,PTPRE,RARA,SENP2,XIAP | 5 | 20 |
| DEFB103A/DEFB103B | other | 1.14E-08 | 4.80E-03 | DEFB103A/DEFB103B,ERK1/2,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MSH2,PTPRE,RARA | 2 | 16 |

| | | | | | | | |
|---------------------------|----------------------------|----------|----------|--|---|---|----|
| IL33 | cytokine | 1.14E-08 | 4.35E-02 | ERK,ERK1/2,IL33,Jnk,NFkB (complex),P38 MAPK | B2M,BTRC,CDK5R1,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MUC1,NOTCH1,ODC1,PKK4,PTPRE,RARA,SENP2 | 6 | 23 |
| CHCHD2 | other | 1.17E-08 | 4.92E-02 | CHCHD2,ERK1/2,ERN1,FOXO1,NFkB (complex),PRKAA,SMAD2,SMAD3 | ANG,AR,B2M,CAMK4,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,KIF11,KYNU,MMP1,MMP2,MSH2,NOTCH1,PTPRE,RAC1,SENP2,XIAP | 7 | 24 |
| BMP6 | growth factor | 1.23E-08 | 5.70E-03 | BMP6,ERK1/2,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MSH2,PTPRE,RARA | 2 | 16 |
| PTAFR | G-protein coupled receptor | 1.25E-08 | 2.23E-02 | Akt,ERK1/2,P38 MAPK,PTAFR | B2M,CYP17A1,CYP7A1,DGKA,ESR1,FAS,HBEGF,HK2,HMOX1,ITGB3,MMP1,MMP2,MSH2,MUC1,NOTCH1,PKK4,PTPRE,RARA,TJP1 | 4 | 19 |
| IL32 | cytokine | 1.28E-08 | 3.67E-02 | CEBPA,EP300,ERK1/2,IL32,NFkB (complex),P38 MAPK | ALB,AR,B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PPARG,PTPRE,RARA,SENP2,XIAP | 5 | 24 |
| CRH | cytokine | 1.28E-08 | 9.70E-03 | CRH,ERK1/2,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 2 | 17 |
| FLT3 | kinase | 1.29E-08 | 2.05E-02 | ERK1/2,FLT3,JAK2,MAPT,MMP14,MMP2,SRC,STAT1,STAT3 | B2M,C1R,CSF2RB,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,MMP2,MUC1,NOTCH1,PGK1,PPP2R1A,PTPRE,RARA,TJP1,TRIM21,WARS1 | 6 | 22 |
| VHL | transcription regulator | 1.32E-08 | 1.42E-02 | ERK1/2,FGFR1,NFkB (complex),SPRY2,VHL | B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HMOX1,IFNG,IGF1R,KYNU,MSH2,NOTCH1,PGK1,PTPRE,SENP2,SFN,XIAP | 4 | 19 |
| WNT5A | cytokine | 1.33E-08 | 1.05E-02 | Akt,Jnk,MTOR,P38 MAPK,WNT5A | AR,BTRC,CHKA,DGKA,F3,FAS,FN1,HMOX1,IGF1R,ITGB3,MMP1,MSH2,MUC1,NOTCH1,PKK4,RARA,SEMA4D,TJP1,TLR4,XIAP | 5 | 20 |
| PEA15 | transporter | 1.34E-08 | 3.10E-03 | ERK1/2,Jnk,PEA15 | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MSH2,PTPRE,RARA,XIAP | 2 | 14 |
| CGB3 (includes others) | other | 1.47E-08 | 3.50E-03 | CGB3 (includes others),ERK1/2,MMP2 | B2M,CSF2RB,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PPP2R1A,PTPRE,TJP1 | 3 | 14 |
| FGF18 | growth factor | 1.47E-08 | 1.08E-02 | ERK1/2,FGF18,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 2 | 17 |
| FGFR4 | kinase | 1.47E-08 | 1.13E-02 | Akt,ERK1/2,FGFR4,MTOR,SRC | AR,B2M,CHKA,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,MMP1,MMP2,NOTCH1,PKK4,PTPRE,TJP1 | 4 | 17 |

| | | | | | | | |
|---------|---------------|----------|----------|--|--|---|----|
| RAS | group | 1.49E-08 | 1.84E-02 | Akt,ERK,ERK1/2,Mapk,NFkB (complex),PRKAA,RAS | AR,B2M,CDK5R1,CTCF,CYP17A1,CYP7A1,ESR1,F3,FN1,HK2,HMOX1,IFNG,ITGB3,KYNU,MSH2,MUC1,NR1I3,ODC1,PTPRE,SENP2,TJP1,XIAP | 7 | 22 |
| IL17F | cytokine | 1.49E-08 | 2.02E-02 | ERK,ERK1/2,IL17F,RELA | B2M,CDK5R1,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,FN1,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PPARG,PTPRE,STK4 | 3 | 20 |
| mir-155 | microRNA | 1.57E-08 | 1.92E-02 | Akt,ERK,Gsk3,mir-155,RELA | CDK5R1,CERT1,CTCF,ESR1,F3,HBEGF,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PPARG,STK4,TJP1,WEE1,XIAP | 5 | 20 |
| DNM2 | enzyme | 1.58E-08 | 1.06E-02 | Akt,DNM2,EGFR,ERK1/2,MMP2 | AR,B2M,CSF2RB,CYP17A1,CYP7A1,F3,FN1,HBEGF,HNRNPA2B1,IFNG,MMP2,MUC1,NOTCH1,PKK4,PPP2R1A,TJP1,XIAP,ZEB2 | 4 | 18 |
| SH2D1A | other | 1.61E-08 | 5.20E-03 | DGKA,ERK1/2,LCK,SH2D1A | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PPARG,PTPRE,WEE1 | 4 | 14 |
| PDGFB | growth factor | 1.73E-08 | 6.80E-03 | Akt,ERK,PDGFB,PDGFRB | CDK5R1,ESR1,F3,FAS,FN1,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 3 | 15 |
| TNFSF15 | cytokine | 1.74E-08 | 3.54E-02 | ERK1/2,Jnk,NFkB (complex),P38 MAPK,TNFSF15 | B2M,BTRC,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2 | 4 | 21 |
| CASP8 | peptidase | 1.74E-08 | 3.09E-02 | CASP8,ERK1/2,MAPK8,NFkB (complex),P38 MAPK | B2M,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2,XIAP | 4 | 21 |
| BTC | growth factor | 1.78E-08 | 8.70E-03 | Akt,BTC,ERBB4,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PKK4,PGK1,PTPRE,TJP1 | 3 | 16 |
| NPY | other | 1.78E-08 | 1.21E-02 | ERK,NPY,P38 MAPK | CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKK4,RARA | 2 | 16 |
| LAMA3 | other | 1.78E-08 | 1.21E-02 | ERK,LAMA3,P38 MAPK | CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKK4,RARA | 3 | 16 |
| TRAF7 | enzyme | 1.83E-08 | 1.82E-02 | CHUK,ERK1/2,Jnk,MAP2K1/2,NFkB (complex),P38 MAPK,TRAF7 | B2M,BTRC,CTCF,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,NOTCH1,PTPRE,RAC1,RARA,RRM1,SENP2 | 7 | 21 |
| IL36A | cytokine | 1.83E-08 | 3.66E-02 | ERK1/2,IL36A,Jnk,NFkB (complex),P38 MAPK | B2M,BTRC,CTCF,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PTPRE,RARA,SENP2 | 4 | 21 |
| DGKD | kinase | 1.87E-08 | 6.20E-03 | Akt,DGKD,EGFR | AR,ESR1,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,TJP1,XIAP,ZEB2 | 2 | 15 |
| MAP4K1 | kinase | 1.88E-08 | 6.50E-03 | ERK,Jnk,LCP2,MAP4K1,Mapk,NFkB (complex),PIK3R1,PLCG1 | AR,BTRC,CDK5R1,CTCF,ESR1,FAS,HBEGF,HMOX1,ITGB3,KYNU,MSH2,MUC1,NOTCH1,NR1I3,ODC1,PKK4,RARA,SENP2,XIAP | 5 | 19 |
| PGK1 | kinase | 1.92E-08 | 1.08E-02 | Akt,ERK,MTOR,PGK1 | AR,CDK5R1,CHKA,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 3 | 16 |

| | | | | | | | |
|--------|-------------------------|----------|----------|--|---|----|----|
| PI3K 纬 | group | 1.92E-08 | 1.11E-02 | Akt,ERK1/2,PI3K 纬 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IFNG,MMP1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,TJP1 | 3 | 16 |
| KLF5 | transcription regulator | 1.92E-08 | 5.80E-03 | DUSP1,ERK,KLF5,NOTCH1 | CDK5R1,CYP17A1,ESR1,FAS,HBEGF,HMOX1,IFNG,IGF1R,ITGB3,MMP2,MUC1,NOTCH1,ODC1,PKK4,PPARG,RARA | 4 | 16 |
| PIK3CG | kinase | 2.03E-08 | 2.06E-02 | Akt,ERK,ERK1/2,PIK3CG | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HK2,IFNG,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,TJP1 | 4 | 18 |
| EGR1 | transcription regulator | 2.10E-08 | 3.80E-03 | EGR1,ERK | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4,PPARG | 2 | 13 |
| Hsp90 | group | 2.12E-08 | 4.78E-02 | ERBB2,ERK,HSF1,Hsp90,Jnk,P38 MAPK,STAT1 | AR,BMP1,BTRC,C1R,CDK5R1,DGKA,ERBB4,ESR1,GART,GRK6,HBEGF,HMOX1,HSP90AB1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PKK4,PGK1,PPARG,PTPRF,RARA,RRM1,SMTN,TRIM21,TTR,WARS1,XIAP | 7 | 31 |
| RAP1B | enzyme | 2.20E-08 | 1.42E-02 | ERK1/2,P38 MAPK,RAC1,RAP1B | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RARA | 3 | 17 |
| KLB | enzyme | 2.24E-08 | 3.59E-02 | Akt,CEBPA,ERK,ERK1/2,FOXO1,FRS2,SK3B,Jnk,KLB,MAPK8,MED1,MMP2,MYC,P38 MAPK,SREBF2,TFEB,YBX1 | ALB,B2M,BCR,BTRC,CAMK4,CDK5R1,CSF2RB,CYP17A1,CYP7A1,DGKA,DTYMK,EPAH3,ESR1,F3,FABP7,FAP,FN1,GTF2I,HBB,HBEGF,HK2,IGF1R,KIF11,MMP1,MUC1,NOTCH1,PKK4,PPP2R1A,PSAP,PTPRE,RAC1,RARA,TJP1,VPS26A | 15 | 34 |
| NRAS | enzyme | 2.29E-08 | 2.38E-02 | Akt,ERK,ERK1/2,NRAS | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HK2,IFNG,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,PTPRE,TJP1 | 3 | 18 |
| TIMP3 | other | 2.30E-08 | 4.14E-02 | Akt,EGFR,ERK1/2,MET,NFkB (complex),RAF1,TIMP3 | AR,B2M,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,HNRNPA2B1,KYNU,MMP1,MSH2,MUC1,NOTCH1,PKK4,PTPRE,SENP2,TJP1,ZEB2 | 7 | 22 |
| FLCN | other | 2.30E-08 | 4.53E-02 | Akt,ERK1/2,FLCN,FOXO1,Gsk3,HSF1,MTOR,MTORC1,NR3C1,PRKAA,RHOA,RPS6KB1,SREBF1,SREBF2,TP53,YAP1 | AR,B2M,CAMK4,CHKA,CYP17A1,CYP7A1,DGKA,DTYMK,ESR1,F3,FABP3,FABP7,FAS,GART,GTF2I,HBEGF,HSP90AB1,IFNG,KIF11,MMP1,MMP2,MUC1,NDC80,NFATC1,NR1I3,PANK1,PDHA1,PKK4,PGK1,PPARG,PTPRE,RRM1,SFN,TJP1,TTR,XIAP,YWHAH | 14 | 37 |
| AGER | transmembrane receptor | 2.35E-08 | 2.94E-02 | AGER,EGFR,ERK,ERK1/2,Mapk,P38 MAPK | AR,B2M,CDK5R1,CYP17A1,CYP7A1,DGKA,F3,HMOX1,HNRNPA2B1,IFNG,IGF1R,ITGB3,MMP2,MSH2,MUC1,NR1I3,ODC1,PKK4,RARA,XIAP,ZEB2 | 6 | 21 |
| TRAF4 | other | 2.37E-08 | 6.20E-03 | Akt,EGFR,TRAF4 | AR,ESR1,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,TJP1,XIAP,ZEB2 | 2 | 15 |
| LIMS1 | other | 2.38E-08 | 1.17E-02 | AKT1,ERK1/2,LIMS1,MTOR | AR,B2M,CHKA,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,MMP1,MMP2,MUC1,PTPRE | 3 | 16 |

| | | | | | | | |
|--------|----------------------------|----------|----------|--|---|----|----|
| NOD1 | other | 2.38E-08 | 8.10E-03 | ERK1/2,Jnk,NOD1,P38 MAPK | B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,PTPRE,XIAP | 3 | 16 |
| S100B | other | 2.43E-08 | 2.02E-02 | Akt,GSK3B,NFkB (complex),RHOA,S100B | CTCF,F3,FAS,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PDHA1,PKD4,RAC1,SEN2,TJP1,XIAP | 4 | 18 |
| ADGRE5 | G-protein coupled receptor | 2.45E-08 | 3.80E-03 | ADGRE5,ERK,Ras homolog | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKD4,TJP1 | 2 | 12 |
| PEBP1 | other | 2.50E-08 | 1.00E-02 | ADCY,ERK,ERK1/2,PEBP1,RELA | B2M,CDK5R1,CERT1,CTCF,CYP17A1,CYP7A1,FAS,FN1,HBEGF,HK2,IGF1R,ITGB3,MUC1,NFATC1,ODC1,PKD4,PPARG,PTPRE,STK4 | 4 | 19 |
| C3 | peptidase | 2.50E-08 | 2.42E-02 | Akt,C3,C5AR2,ERK1/2,IRF3,MAPK8,PARP1 | B2M,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,RARA,STK4,TJP1 | 6 | 19 |
| P2RY2 | G-protein coupled receptor | 2.50E-08 | 4.91E-02 | Akt,CEBPA,ERK1/2,FOXO1,GSK3B,Jnk,MAPK8,MED1,MMP2,MYC,P2RY2,Rac,RAC1,RHOA,SREBF2,STAT1,YBX1 | ALB,B2M,BCR,BTRC,C1R,CAMK4,CSF2RB,CYP17A1,CYP7A1,DTYMK,EPHA3,ESR1,F3,FABP7,FAP,FN1,GTF21,HBB,HBEGF,HK2,IGF1R,KIF11,MMP1,MUC1,NOTCH1,ODC1,PDHA1,PKD4,PPP2R1A,PTPRE,RAC1,RARA,TJP1,TRIM21,WARS1 | 15 | 35 |
| TSLP | cytokine | 2.65E-08 | 4.84E-02 | ERK1/2,Jnk,P38 MAPK,STAT3,STAT5a/b,TSLP | B2M,BTRC,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IGF1R,ITGB3,MMP1,MMP2,MSH2,NOTCH1,PGK1,PTPRE,RARA,XIAP | 5 | 22 |
| Pdgfr | group | 2.74E-08 | 1.27E-02 | Akt,ERK,GSK3B,Pdgfr,PDGFRB | CDK5R1,ESR1,F3,FAS,FN1,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,RAC1,TJP1 | 4 | 16 |
| NMUR2 | G-protein coupled receptor | 2.74E-08 | 3.20E-03 | ADCY,ERK,NMUR2 | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,NFATC1,ODC1,PKD4 | 2 | 12 |
| IL10 | cytokine | 2.92E-08 | 2.66E-02 | ERK1/2,IL10,NFkB (complex),STAT1,STAT3,STAT5a/b | B2M,C1R,CD1A,CTCF,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,KYNU,MSH2,MUC1,PGK1,PTPRE,RARA,SEN2,TLR4,TRIM21,WARS1,XIAP | 6 | 24 |
| KLB | enzyme | 2.94E-08 | 1.04E-02 | Akt,ERK1/2,GSK3B,KLB | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IGF1R,MMP1,MUC1,NOTCH1,PKD4,PTPRE,RAC1,TJP1 | 3 | 16 |
| RASSF1 | other | 2.94E-08 | 1.94E-02 | ERK1/2,Jnk,RAC1,RASSF1 | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 4 | 16 |
| MADD | other | 2.96E-08 | 8.30E-03 | ERK,MADD,MAP2K1/2,RAS | CDK5R1,CYP7A1,ESR1,FAS,HBEGF,HK2,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKD4,RRM1 | 3 | 14 |

| | | | | | | | |
|---------------|----------------------------------|----------|----------|--|--|---|----|
| NEU3 | enzyme | 2.99E-08 | 9.10E-03 | Akt,EGFR,NEU3,Ras homolog | AR,ESR1,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PD K4,PTPRE,TJP1,XIAP,ZEB2 | 4 | 15 |
| NMUR1 | G-protein coupled receptor | 3.05E-08 | 3.20E-03 | ADCY,ERK,NMUR1 | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,NFATC1,OD C1,PKK4 | 2 | 12 |
| AKT3 | kinase | 3.05E-08 | 3.60E-03 | AKT3,ERK | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4, RAC1 | 2 | 12 |
| Beta Arrestin | group | 3.09E-08 | 5.80E-03 | Beta Arrestin,ERK,SMAD2 | CDK5R1,ESR1,FAS,FN1,HBEGF,IFNG,ITGB3,MMP1,MUC1,ODC1,PKK4,R AC1,XIAP | 2 | 13 |
| mir-122 | microRNA | 3.13E-08 | 1.00E-04 | mir-122 | CTCF,CYP7A1,G6PD,GALNT10,IGF1R,MAP3K3,MARK1,SEMA4D,VAV3, WARS1,YARS1 | 1 | 11 |
| P2RY2 | G-protein coupled receptor | 3.15E-08 | 1.34E-02 | Akt,ERK1/2,P2RY2,RAC1,RHOA | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IGF1R,MMP1,MUC1,NO TCH1,PDHA1,PKK4,PTPRE,TJP1 | 4 | 16 |
| mir-9 | microRNA | 3.23E-08 | 1.04E-02 | Akt,ERK,mir-9,NTRK3 | AR,CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1 ,NOTCH1,ODC1,TJP1 | 3 | 15 |
| GRN | growth factor | 3.38E-08 | 1.39E-02 | Akt,ERK1/2,GRN,Mapk | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,NR1I3,PKK4,PTPRE,TJP1 | 3 | 16 |
| DAB2IP | other | 3.48E-08 | 1.42E-02 | Akt,c- Src,CTNNB1,DAB2IP,ERK,Jnk,MAP3K5, RPS6KB1 | BTRC,CDK5R1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HMOX1,IGF1R,ITGB3, MSH2,MUC1,NOTCH1,ODC1,RARA,TJP1,XIAP | 7 | 18 |
| ITGA2 | transmembra ne receptor | 3.48E-08 | 1.32E-02 | Akt,ERK,ITGA2,RHOA | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NO TCH1,ODC1,PDHA1,TJP1 | 3 | 15 |
| CDC37 | other | 3.49E-08 | 3.52E-02 | Akt,CDC37,ERK1/2,GSK3B,MAP2K1/2,R AF1,RB1 | B2M,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,MMP1,MMP2,MUC 1,NOTCH1,PKK4,PTPRE,RAC1,RRM1,TJP1,ZEB2 | 6 | 19 |
| SDCBP | enzyme | 3.49E-08 | 3.84E-02 | c-Src,ERK1/2,P38 MAPK,SDCBP,SMAD2,SMAD3 | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IFNG,IG F1R,ITGB3,MMP1,MMP2,MSH2,PTPRE,RAC1,RARA,XIAP | 6 | 20 |
| FGF1 | growth factor | 3.67E-08 | 2.63E-02 | Akt,ERK1/2,FGF1,FGFR1,GSK3B,Mek,RA F1,RAS,SRC | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,MM P1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,RAC1,SFN,TJP1 | 8 | 20 |
| PTPRS | phosphatase | 3.68E-08 | 1.72E-02 | EGFR,NFkB (complex),PTPRS | AR,CTCF,ESR1,F3,FAS,HK2,HMOX1,HNRNPA2B1,IFNG,KYNU,MMP2,MS H2,NOTCH1,PTPRE,SENP2,XIAP,ZEB2 | 2 | 17 |

| | | | | | | | |
|---|----------------------------|----------|----------|---|---|---|----|
| mir-24 | microRNA | 3.73E-08 | 5.60E-03 | ERK1/2, mir-24 | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, IFNG, IGF1R, MMP1, MMP2, PSAP, PTPRE | 2 | 13 |
| MGAT1 | enzyme | 3.73E-08 | 4.80E-03 | EGFR, MGAT1, SMAD2 | AR, ESR1, F3, FN1, HK2, HNRNPA2B1, IFNG, ITGB3, MMP1, MMP2, PTPRE, RAC1, ZEB2 | 3 | 13 |
| LTB4R | G-protein coupled receptor | 3.78E-08 | 3.40E-03 | ADCY, ERK, LTB4R | CDK5R1, ESR1, FAS, HBEGF, IFNG, ITGB3, MMP1, MMP2, MUC1, NFATC1, ODC1, PDK4 | 2 | 12 |
| miR-126a-5p (and other miRNAs w/seed AUUAUUA) | mature microRNA | 3.88E-08 | 1.52E-02 | Akt, ERK1/2, HBEGF, miR-126a-5p (and other miRNAs w/seed AUUAUUA) | AR, B2M, CYP17A1, CYP7A1, ESR1, F3, FN1, HBEGF, HK2, MMP1, MMP2, MUC1, NOTCH1, PDK4, PTPRE, TJP1 | 3 | 16 |
| ENAH | other | 3.88E-08 | 1.51E-02 | Akt, ENAH, ERK1/2, Mapk | B2M, CYP17A1, CYP7A1, ESR1, F3, FN1, HBEGF, HK2, MMP1, MMP2, MUC1, NOTCH1, NR1H3, PDK4, PTPRE, TJP1 | 3 | 16 |
| G protein beta gamma | complex | 3.92E-08 | 2.24E-02 | Akt, ERK1/2, G protein beta gamma, PI3K (family) | B2M, CYP17A1, CYP7A1, ESR1, F3, FN1, HBEGF, HK2, HMOX1, IGF1R, MMP1, MUC1, NOTCH1, PDK4, PTPRE, TJP1, XIAP | 3 | 17 |
| mir-126 | microRNA | 4.15E-08 | 1.56E-02 | Akt, ERK1/2, HBEGF, mir-126 | AR, B2M, CYP17A1, CYP7A1, ESR1, F3, FN1, HBEGF, HK2, MMP1, MMP2, MUC1, NOTCH1, PDK4, PTPRE, TJP1 | 3 | 16 |
| Cdk | group | 4.15E-08 | 1.64E-02 | Cdk, DAB2, ERK1/2, Jnk | B2M, BTRC, CYP17A1, CYP7A1, ESR1, HASPIN, HBEGF, HK2, IFNG, IGF1R, MMP1, MMP2, MSH2, PTPRE, RARA, XIAP | 3 | 16 |
| DRD2 | G-protein coupled receptor | 4.28E-08 | 1.73E-02 | ADCY, Akt, DRD2, ERK, MAPK1 | AR, CDK5R1, ESR1, F3, FAS, FN1, HBB, HBEGF, IFNG, IGF1R, ITGB3, MMP1, MMP2, MUC1, NFATC1, NOTCH1, ODC1, TJP1, TRIM21, XIAP | 4 | 20 |
| RNF41 | enzyme | 4.36E-08 | 1.08E-02 | Akt, ERBB3, ERK, RNF41 | CDK5R1, ESR1, F3, FAS, FN1, HBEGF, IFNG, IGF1R, ITGB3, MMP1, MMP2, MUC1, NOTCH1, ODC1, TJP1 | 3 | 15 |
| CSNK2A1 | kinase | 4.40E-08 | 2.36E-02 | CSNK2A1, ERK1/2, N-cor, NFkB (complex), P38 MAPK, RELA | B2M, CERT1, CYP7A1, DGKA, ESR1, F3, FN1, HBEGF, HK2, HMOX1, IFNG, IGF1R, ITGB3, KYNU, MSH2, NOTCH1, PPARG, PTPRE, RARA, SENP2, STK4, XIAP | 5 | 22 |
| IL1 | group | 4.44E-08 | 4.84E-02 | ERK1/2, IL1, Jnk, NFkB (complex), P38 MAPK | B2M, BTRC, CTCF, CYP17A1, CYP7A1, DGKA, ESR1, F3, FAS, HBEGF, HK2, IFNG, IGF1R, ITGB3, KYNU, MMP1, MMP2, NOTCH1, PTPRE, RARA, SENP2 | 5 | 21 |
| PTH | other | 4.48E-08 | 7.40E-03 | ERK, PTH, SMAD2 | CDK5R1, ESR1, FAS, FN1, HBEGF, IFNG, ITGB3, MMP1, MUC1, ODC1, PDK4, RAC1, XIAP | 2 | 13 |

| | | | | | | | |
|-----------|----------------------------|----------|----------|---|---|---|----|
| BDKRB1 | G-protein coupled receptor | 4.66E-08 | 5.90E-03 | BDKRB1,ERK,NOS2 | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PDK4,TLR4 | 2 | 12 |
| ACKR2 | G-protein coupled receptor | 4.66E-08 | 2.73E-02 | ACKR2,Akt,ERK1/2,FOXO1,GSK3B | B2M,CAMK4,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,KIF11,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,RAC1,TJP1 | 4 | 18 |
| CCL25 | cytokine | 4.66E-08 | 2.73E-02 | Akt,CCL25,ERK1/2,FOXO1,GSK3B | B2M,CAMK4,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,KIF11,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,RAC1,TJP1 | 4 | 18 |
| LINC00963 | other | 4.76E-08 | 1.71E-02 | Akt,ERK,LINC00963,MTOR | AR,CDK5R1,CHKA,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 3 | 16 |
| S100A7 | other | 4.83E-08 | 4.44E-02 | Akt,ERK,NFkB (complex),S100A7 | CDK5R1,CTCF,ESR1,F3,HBEGF,HMOX1,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,SENP2,TJP1,XIAP | 3 | 19 |
| GAS5 | other | 4.83E-08 | 2.21E-02 | Akt,AKT1,GAS5,GSK3B,MTOR,PI3K (family),RELA | AR,CERT1,CHKA,CTCF,ESR1,F3,FAS,HMOX1,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PDK4,PPARG,RAC1,STK4,TJP1,XIAP | 6 | 19 |
| PLC | group | 4.89E-08 | 4.99E-02 | DGKA,ERK,NFkB (complex),NFkB1,PLC,RELA | CDK5R1,CERT1,ESR1,FN1,HBEGF,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PDK4,PPARG,SENP2,STK4,WEE1,XIAP | 5 | 21 |
| IL27 | cytokine | 4.89E-08 | 3.16E-02 | ERK1/2,IL27,STAT1,STAT3 | B2M,C1R,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,IGF1R,MMP1,MMP2,MUC1,NFATC1,NOTCH1,PGK1,PTPRE,TRIM21,WARS1 | 4 | 21 |
| GIT1 | kinase | 5.03E-08 | 2.19E-02 | Akt,AKT1,AKT2,ERK1/2,GIT1,MMP2 | B2M,CSF2RB,CYP17A1,CYP7A1,F3,FN1,HBEGF,HK2,HMOX1,MMP1,MMP2,MUC1,NOTCH1,PDK4,PPP2R1A,PTPRE,RAC1 | 6 | 17 |
| GPR183 | G-protein coupled receptor | 5.05E-08 | 1.10E-02 | ERK,ERK1/2,GPR183 | B2M,CDK5R1,CYP17A1,CYP7A1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MUC1,ODC1,PDK4,PTPRE | 2 | 15 |
| DAB2 | other | 5.05E-08 | 1.47E-02 | DAB2,ERK1/2,Jnk | B2M,BTRC,CYP17A1,CYP7A1,ESR1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,MSH2,PTPRE,RARA,XIAP | 2 | 15 |
| TMEM175 | ion channel | 5.05E-08 | 7.10E-03 | CTSB,CTSD,ERK,GBA,P38 MAPK,RHOA,TMEM175 | CDK5R1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HMOX1,IFNG,MSH2,MUC1,ODC1,PDHA1,PDK4,RARA | 3 | 15 |
| PTPRB | phosphatase | 5.09E-08 | 1.64E-02 | Akt,ERK1/2,FGFR1,KDR,PTPRB | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,SFN,TJP1 | 4 | 16 |
| SNCG | other | 5.09E-08 | 1.82E-02 | Akt,ERK1/2,IGF1R,SNCG | B2M,CYP17A1,CYP7A1,F3,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,RAC1,TJP1 | 4 | 16 |

| | | | | | | | |
|---------|----------------------------|----------|----------|---|--|---|----|
| ACVRL1 | kinase | 5.50E-08 | 3.48E-02 | ACVRL1,ERK1/2,ERN1,MMP14,MMP2,SMAD2,Src,STAT3 | ANG,B2M,CSF2RB,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IGF1R,MMP2,NOTCH1,PGK1,PPP2R1A,PTPRE,RAC1,TJP1,TLR4,XIAP | 7 | 20 |
| H6PD | enzyme | 5.64E-08 | 3.53E-02 | Akt,CASP4,CHUK,DDIT3,EIF2AK3,ERK1/2,H6PD,HSPA5,IL1B,IRF3,SMAD2 | ACADVL,ACP3,ANG,B2M,BTRC,CYP17A1,DPP4,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MUC1,NOTCH1,PK4,PPARG,PTPRE,RAC1,STK4,TJP1,TLR4,XIAP | 9 | 24 |
| SLC37A4 | transporter | 5.64E-08 | 3.53E-02 | Akt,CASP4,CHUK,DDIT3,EIF2AK3,ERK1/2,HSPA5,IL1B,IRF3,SLC37A4,SMAD2 | ACADVL,ACP3,ANG,B2M,BTRC,CYP17A1,DPP4,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MUC1,NOTCH1,PK4,PPARG,PTPRE,RAC1,STK4,TJP1,TLR4,XIAP | 9 | 24 |
| GALR1 | G-protein coupled receptor | 5.85E-08 | 1.15E-02 | ERK,ERK1/2,GALR1 | B2M,CDK5R1,CYP17A1,CYP7A1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,ITGB3,MUC1,ODC1,PK4,PTPRE | 2 | 15 |
| GPNMB | enzyme | 5.86E-08 | 2.03E-02 | c-Src,ERK,GPNMB,HIF1A,KDR | CDK5R1,CYP7A1,ERBB4,ESR1,FAS,FN1,HBEGF,HK2,HMOX1,IFNG,ITGB3,MMP1,MMP2,MUC1,NAE1,NOTCH1,ODC1,PK4 | 4 | 18 |
| ST6GAL1 | enzyme | 6.08E-08 | 4.08E-02 | Akt,EGFR,RB1,RELA,ST6GAL1 | AR,CERT1,CTCF,ESR1,FAS,FN1,HK2,HNRNPA2B1,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PK4,PPARG,PTPRE,STK4,TJP1,XIAP,ZEB2 | 5 | 20 |
| TRIP6 | cytokine | 6.82E-08 | 3.36E-02 | ERK,NFkB (complex),TRIP6 | CDK5R1,CTCF,ESR1,HBEGF,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PK4,SENP2,XIAP | 2 | 17 |
| SENP2 | peptidase | 7.24E-08 | 3.17E-02 | Akt,NFkB (complex),SENP2 | CTCF,F3,FAS,HK2,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PK4,PGK1,TJP1,XIAP | 3 | 17 |
| CLTC | other | 7.24E-08 | 2.74E-02 | Akt,CLTC,NFkB (complex) | CD74,CTCF,F3,FAS,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PK4,SENP2,TJP1,XIAP | 3 | 17 |
| GADD45B | other | 7.24E-08 | 3.52E-02 | ERK,GADD45B,NFkB (complex) | CDK5R1,CTCF,ESR1,HBEGF,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PK4,SENP2,XIAP | 2 | 17 |
| BRAF | kinase | 7.39E-08 | 4.94E-02 | BRAF,ERK,ERK1/2,MAP2K1/2,Mek,MMP2,RAF1 | B2M,CDK5R1,CSF2RB,CYP17A1,CYP7A1,ESR1,FN1,HK2,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PK4,PPP2R1A,PTPRE,RRM1,TJP1 | 6 | 20 |
| IGFBP6 | other | 7.54E-08 | 2.84E-02 | ERK,IGFBP6,MAPK8,P38 MAPK | CDK5R1,DGKA,ESR1,F3,FN1,HBEGF,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PK4,RARA | 3 | 16 |
| CCL2 | cytokine | 7.69E-08 | 2.94E-02 | CCL2,ERK,ERK1/2,MAPK8 | B2M,CDK5R1,CYP17A1,CYP7A1,ESR1,FAS,FN1,HK2,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PK4,PTPRE,RARA | 4 | 17 |
| ZDHHC6 | enzyme | 7.85E-08 | 1.43E-02 | Akt,ERK,ZDHHC6 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 2 | 14 |

| | | | | | | | |
|-------------|------------------------|----------|----------|---|--|---|----|
| NTRK3 | kinase | 7.85E-08 | 1.43E-02 | Akt,ERK,NTRK3 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 2 | 14 |
| TLR8 | transmembrane receptor | 7.91E-08 | 4.79E-02 | ERK1/2,NFkB (complex),P38 MAPK,RELA,TLR8 | B2M,CERT1,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,IFNG,IGF1R,ITGB3,KYNU,MMP1,MMP2,NOTCH1,PPARG,PTPRE,RARA,SENP2,STK4,XIAP | 4 | 23 |
| CDH13 | other | 8.34E-08 | 1.90E-02 | Akt,CDH13,EGFR,GSK3B | AR,F3,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1,XIAP,ZEB2 | 3 | 15 |
| FLT3LG | cytokine | 8.48E-08 | 1.48E-02 | Akt,ERK,FLT3LG | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 2 | 14 |
| FGFR3-TACC3 | fusion gene/product | 8.48E-08 | 1.52E-02 | Akt,ERK,FGFR3-TACC3 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 2 | 14 |
| PPP2R5E | phosphatase | 8.57E-08 | 1.44E-02 | ERK,NFkB (complex),PPP2R5E | CDK5R1,CTCF,ESR1,FAS,FN1,HBEGF,HMOX1,ITGB3,KYNU,MSH2,MUC1,NOTCH1,ODC1,PKD4,SENP2,XIAP | 3 | 16 |
| TFF3 | other | 8.59E-08 | 2.18E-02 | Akt,EGFR,ERBB2,TFF3 | BMP1,ERBB4,ESR1,FN1,GART,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKD4,PGK1,PPARG,PTPRE,PTPRF,RRM1,SMTN,TJP1,XIAP,ZEB2 | 3 | 23 |
| IL5 | cytokine | 8.59E-08 | 4.85E-02 | Akt,ERK1/2,IL5,JAK2,Mapk,MAPK1,RAS,STAT5a/b | AR,B2M,CSF2RB,CYP17A1,CYP7A1,ESR1,F3,FN1,HBB,HBEGF,HK2,IFNG,MMP1,MMP2,MUC1,NOTCH1,NR1I3,PKD4,PTPRE,RARA,TJP1,TRIM21,XIAP | 8 | 23 |
| LGALS8 | other | 8.65E-08 | 2.31E-02 | ERK1/2,LGALS8,RELA | B2M,CERT1,CTCF,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PPARG,PTPRE,STK4 | 2 | 17 |
| CAT | enzyme | 8.65E-08 | 3.99E-02 | CAT,ERK,NFkB (complex) | CDK5R1,CTCF,ESR1,HBEGF,HMOX1,IFNG,ITGB3,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,ODC1,PKD4,SENP2,XIAP | 2 | 17 |
| ADTRP | enzyme | 8.94E-08 | 1.47E-02 | ADTRP,ERK1/2,F10,MAPK8,MMP2,MMP9,TFPI | B2M,CSF2RB,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PPP2R1A,PTPRE,RARA,TJP1 | 5 | 15 |
| KL | enzyme | 9.58E-08 | 1.69E-02 | Akt,ERK1/2,KL | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IGF1R,MMP1,MUC1,NOTCH1,PKD4,PTPRE,TJP1 | 2 | 15 |
| KDR | kinase | 9.73E-08 | 2.91E-02 | Akt,CASP1,ERK1/2,KDR,SRC (family) | B2M,CYP17A1,CYP7A1,ESR1,F3,HBEGF,HK2,IFNG,ITGB3,MMP1,MMP2,MUC1,NOTCH1,PKD4,PTPRE,TJP1 | 5 | 16 |
| FDPS | enzyme | 9.88E-08 | 1.61E-02 | Akt,ERK,FDPS | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 2 | 14 |

| | | | | | | | |
|---------|------------------------|----------|----------|--|--|---|----|
| SPINK7 | other | 1.03E-07 | 8.40E-03 | ERK,SPINK7,SRC | CDK5R1,ESR1,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,ODC1,PDK4 | 2 | 12 |
| ANGPT4 | growth factor | 1.03E-07 | 1.93E-02 | Akt,ANGPT4,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| PIK3R5 | kinase | 1.03E-07 | 1.93E-02 | Akt,ERK1/2,PIK3R5 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| MOSPD2 | other | 1.03E-07 | 1.93E-02 | Akt,ERK1/2,MOSPD2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| IL2RB | transmembrane receptor | 1.03E-07 | 1.93E-02 | Akt,ERK1/2,IL2RB | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| LCP2 | other | 1.03E-07 | 2.79E-02 | ERK,Jnk,LCP2,PIK3R1,RAC1 | AR,BTRC,CDK5R1,ESR1,FAS,HBEGF,ITGB3,MMP1,MMP2,MSH2,MUC1,ODC1,PDK4,RARA,XIAP | 4 | 15 |
| PRR14 | other | 1.07E-07 | 1.77E-02 | Akt,ERK,PRR14 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NO TCH1,ODC1,TJP1 | 2 | 14 |
| STAM | other | 1.10E-07 | 1.98E-02 | Akt,ERK1/2,STAM | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| CDH2 | other | 1.10E-07 | 1.99E-02 | Akt,CDH2,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| FGF7 | growth factor | 1.10E-07 | 2.19E-02 | Akt,ERK,FGF7,MAPK8 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NO TCH1,ODC1,RARA,TJP1 | 3 | 15 |
| CLEC4A | transmembrane receptor | 1.18E-07 | 2.08E-02 | Akt,CLEC4A,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| CLEC4C | other | 1.26E-07 | 2.19E-02 | Akt,CLEC4C,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| LAMTOR1 | other | 1.29E-07 | 3.64E-02 | AKT1,ERK1/2,Gsk3,LAMTOR1,MTOR,MTORC1,RHOA,RICTOR,RPS6KB1,SREBF1,SREBF2 | AR,B2M,CHKA,CYP17A1,CYP7A1,ESR1,FABP3,FABP7,FN1,GTF2I,HBEGF,HK2,HMOX1,IFNG,MMP2,MUC1,PDHA1,PPARG,PTPRE | 9 | 19 |
| IL1RAP | transmembrane receptor | 1.33E-07 | 2.14E-02 | Akt,ERK,IL1RAP | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NO TCH1,ODC1,TJP1 | 2 | 14 |
| CXCL13 | cytokine | 1.34E-07 | 2.21E-02 | Akt,CXCL13,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NO TCH1,PDK4,PTPRE,TJP1 | 2 | 15 |

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|-----------|------------------------|----------|----------|---|--|----|----|
| GNA11 | enzyme | 1.41E-07 | 3.15E-02 | Akt,AKT1,ERK1/2,GNA11,RHOA | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,HMOX1,MMP2,MUC1,NOTCH1,PDHA1,PKK4,PTPRE,TJP1 | 4 | 16 |
| COP1 | enzyme | 1.43E-07 | 2.04E-02 | Akt,COP1,ERK,SFN | CDK5R1,DSG2,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1 | 3 | 14 |
| PRKD3 | kinase | 1.54E-07 | 1.94E-02 | Akt,ERK,PRKD3,RPS6KB1 | CDK5R1,ESR1,F3,FAS,HBEGF,IFNG,IGF1R,ITGB3,MMP1,MMP2,MUC1,NOTCH1,ODC1,TJP1 | 3 | 14 |
| LINC00461 | other | 1.64E-07 | 2.63E-02 | Akt,ERK1/2,LINC00461 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PKK4,PTPRE,TJP1 | 2 | 15 |
| FXN | kinase | 1.64E-07 | 1.17E-02 | ERK1/2,FXN,P38 MAPK | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MSH2,PTPRE,RARA | 2 | 15 |
| ERK | group | 1.72E-07 | 9.70E-03 | ERK | CDK5R1,ESR1,FAS,HBEGF,IFNG,ITGB3,MMP1,MMP2,MUC1,ODC1,PKK4 | 1 | 11 |
| CUL5 | ion channel | 1.76E-07 | 3.48E-02 | Akt,CUL5,EGFR,ERBB2 | BMP1,ERBB4,ESR1,FN1,GART,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,PKK4,PGK1,PPARG,PTPRE,PTPRF,RRM1,SMTN,TJP1,XIAP,ZEB2 | 3 | 23 |
| LBP | transporter | 1.81E-07 | 4.01E-02 | IRF3,Jnk,LBP,P38 MAPK,STAT1,TYK2 | BTRC,C1R,DGKA,F3,FAS,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,MUC1,RARA,STK4,TRIM21,WARS1,XIAP | 5 | 17 |
| BTRC | enzyme | 1.81E-07 | 3.07E-02 | ATF4,BTRC,MDM2,MTOR,NFkB (complex),NFKB2,PHLPP1 | AR,CHKA,CTCF,FAS,FN1,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,PRKCB,SENP2,SFN | 6 | 17 |
| CD2 | transmembrane receptor | 1.91E-07 | 1.54E-02 | CD2,ERK1/2,Mapk,STAT5a/b | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,NR1I3,PTPRE,RARA | 4 | 14 |
| HP | peptidase | 1.91E-07 | 4.20E-03 | EGFR,HP | AR,ESR1,F3,HK2,HMOX1,HNRNPA2B1,IFNG,MMP1,PTPRE,XIAP,ZEB2 | 2 | 11 |
| BCAN | other | 1.91E-07 | 5.00E-03 | BCAN,EGFR | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,ITGB3,MMP1,PTPRE,XIAP,ZEB2 | 2 | 11 |
| SLC36A4 | transporter | 2.02E-07 | 1.94E-02 | Akt,AKT1,EPRS1,MTOR,MTORC1,PAK1,RHOA,RICTOR,RPS6KB1,SLC36A4,SREBF1,SREBF2 | AR,CHKA,F3,FABP3,FABP7,FN1,GTF2I,HK2,HMOX1,IFNG,MMP2,MUC1,NOTCH1,PDHA1,PKK4,PPARG,TJP1 | 10 | 17 |
| SLC36A1 | transporter | 2.02E-07 | 1.94E-02 | Akt,AKT1,EPRS1,MTOR,MTORC1,PAK1,RHOA,RICTOR,RPS6KB1,SLC36A1,SREBF1,SREBF2 | AR,CHKA,F3,FABP3,FABP7,FN1,GTF2I,HK2,HMOX1,IFNG,MMP2,MUC1,NOTCH1,PDHA1,PKK4,PPARG,TJP1 | 10 | 17 |
| ANXA5 | transporter | 2.05E-07 | 2.39E-02 | ANXA5,ERK1/2,MAP2K1/2,RAF1,RAS | B2M,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PTPRE,RRM1 | 4 | 14 |
| RBP4 | other | 2.15E-07 | 2.66E-02 | ERK1/2,P38 MAPK,RBP4 | B2M,CYP17A1,CYP7A1,DGKA,ESR1,F3,FAS,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,MSH2,PTPRE,RARA | 3 | 16 |

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|--------------------|-----------------------------------|----------|----------|---|--|----|----|
| PPP2R2A | phosphatase | 2.20E-07 | 1.95E-02 | AP2M1,ERK1/2,MAP2K1/2,PPP2R2A | B2M,CD74,CYP17A1,CYP7A1,ESR1,FAP,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PTPRE,RRM1 | 4 | 14 |
| LOC102724788/PRODH | enzyme | 2.26E-07 | 2.59E-02 | CTNNB1,EGFR,GSK3B,LOC102724788/PRODH | AR,ESR1,F3,FN1,HBEGF,HK2,HNRNPA2B1,IFNG,IGF1R,MMP1,MMP2,PTPRE,RAC1,XIAP,ZEB2 | 3 | 15 |
| SMO | G-protein coupled receptor | 2.26E-07 | 4.56E-02 | Akt,Mapk,NFKB1,PRKCB,RELA,SMO | CERT1,CTCF,F3,FAS,FN1,HBB,IFNG,IGF1R,MMP1,MMP2,MUC1,NOTCH1,NR1I3,PDK4,PPARG,STK4,TJP1 | 6 | 17 |
| ANO1 | ion channel | 2.34E-07 | 5.60E-03 | ANO1,EGFR | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,MMP1,NOTCH1,PTPRE,XIAP,ZEB2 | 2 | 11 |
| EGLN | group | 2.34E-07 | 5.70E-03 | AKT1,EGLN,Gsk3,GSK3B,MTOR,MTORC1,RHOA,RPS6KB1,SREBF1,SREBF2 | AR,CHKA,ESR1,FABP3,FABP7,GTF2I,HK2,HMOX1,IFNG,IGF1R,MUC1,PDHA1,PDK3,PPARG,PYGL,SH2B2,XIAP,ZNF292 | 9 | 18 |
| EPRS1 | enzyme | 2.34E-07 | 1.74E-02 | AKT1,EPRS1,Gsk3,GSK3B,MTOR,MTORC1,RHOA,RICTOR,SREBF1,SREBF2,STAT1,STAT6 | AR,C1R,CHKA,ESR1,FABP3,FABP7,FAS,FN1,GTF2I,HK2,HMOX1,IFNG,IGF1R,PDHA1,PPARG,TRIM21,WARS1,XIAP | 10 | 18 |
| EDNRB | G-protein coupled receptor | 2.41E-07 | 3.27E-02 | Akt,EDNRB,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| TNC | other | 2.41E-07 | 3.19E-02 | Akt,ERK1/2,TNC | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,TJP1 | 3 | 15 |
| mir-181 | microRNA | 2.57E-07 | 2.81E-02 | mir-181,MMP2,MMP9,NFkB (complex) | AR,CSF2RB,CTCF,FAS,HMOX1,IFNG,KYNU,MMP1,MMP2,MSH2,NOTCH1,PPP2R1A,SEN2,TJP1,XIAP | 4 | 15 |
| DLG1 | kinase | 2.57E-07 | 4.03E-02 | Akt,DLG1,ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,IGF1R,MMP1,MUC1,NOTCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| ITGA4 | transmembrane receptor | 2.57E-07 | 3.39E-02 | Akt,ERK1/2,ITGA4 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PDK4,PTPRE,TJP1 | 2 | 15 |
| AGT | growth factor | 2.58E-07 | 5.60E-03 | AGT,EGFR | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,MMP1,PPARG,PTPRE,XIAP,ZEB2 | 2 | 11 |
| mir-96 | microRNA | 2.58E-07 | 3.49E-02 | BCR-ABL1,GSK3B,mir-96,NFkB (complex),STAT1,STAT5a/b | C1R,CTCF,FN1,HMOX1,IFNG,IGF1R,KYNU,MMP1,MMP2,MSH2,MUC1,NOTCH1,RAC1,RARA,SEN2,TRIM21,WARS1,XIAP | 5 | 18 |
| RORA | ligand-dependent nuclear receptor | 2.71E-07 | 3.92E-02 | CYP19A1,Jnk,P38 MAPK,RORA,Sod | BTRC,DGKA,ESR1,F3,FAS,FN1,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,RARA,XIAP | 3 | 14 |

| | | | | | | | |
|--------|----------------------------|----------|----------|--|--|----|----|
| PLD2 | enzyme | 2.74E-07 | 3.01E-02 | Akt,ERK1/2,PLD2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MMP2,MUC1,NOTCH1,PTPRE,TJP1 | 2 | 15 |
| HSPB1 | other | 2.79E-07 | 2.05E-02 | ERK1/2,HSF1,HSPB1,Jnk | B2M,BTRC,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HSP90AB1,IFNG,IGF1R,MSH2,PGK1,PTPRE,RARA,TTR,XIAP | 3 | 17 |
| F7 | peptidase | 2.87E-07 | 4.53E-02 | AKT1,EIF4E,ERK1/2,F7,GSK3B,MAPK8,RPS6KB1 | AR,B2M,CYP17A1,CYP7A1,F3,FN1,HBEGF,HK2,HMOX1,MMP1,MMP2,MUC1,PTPRE,RAC1,RARA,XIAP | 7 | 16 |
| DICER1 | enzyme | 3.02E-07 | 1.27E-02 | DICER1,EGFR,MET | AR,ESR1,F3,FN1,HK2,HMOX1,HNRNPA2B1,IFNG,MMP1,MMP2,PTPRE,XIAP,ZEB2 | 3 | 13 |
| GRB7 | other | 3.03E-07 | 1.39E-02 | ERK1/2,GRB7,RAS | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PTPRE | 2 | 12 |
| SHC4 | other | 3.03E-07 | 1.39E-02 | ERK1/2,RAS,SHC4 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PTPRE | 2 | 12 |
| OPA1 | enzyme | 3.21E-07 | 3.46E-02 | Akt,ERK1/2,GLB1,LIPE,OPA1,PI3K (complex),Pkc(s),PNPLA2 | B2M,CYP17A1,CYP7A1,ESR1,F3,FN1,HBEGF,HK2,MMP1,MUC1,NOTCH1,PC,PTPRE,TJP1,XIAP | 5 | 16 |
| ORAI1 | ion channel | 3.50E-07 | 4.82E-02 | CD3E,ERK1/2,LCK,MAP2K1,ORAI1,PTPN6,RAF1 | B2M,CYP17A1,CYP7A1,ESR1,F3,FAS,FN1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PPARG,PTPRE | 6 | 15 |
| MARK4 | kinase | 3.50E-07 | 1.39E-02 | AKT1,Gsk3,GSK3B,MARK4,MTOR,MTORC1,RHOA,RICTOR,RPS6KB1,SREBF1,SREBF2,TEAD,YAP/TAZ | AR,CHKA,ESR1,FABP3,FABP7,FN1,GTF2I,HK2,HMOX1,IFNG,IGF1R,MUC1,PDHA1,PPARG,XIAP | 10 | 15 |
| FLT1 | kinase | 3.51E-07 | 2.13E-02 | ERK1/2,FLT1,Ras homolog,SRC (family) | B2M,CYP17A1,CYP7A1,ESR1,HBEGF,HK2,IGF1R,ITGB3,MMP1,MMP2,NOTCH1,PTPRE,TJP1 | 4 | 13 |
| HTR7 | G-protein coupled receptor | 3.58E-07 | 1.16E-02 | ADCY,ERK1/2,HTR7 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,NFATC1,PTPRE | 2 | 12 |
| PHB | transcription regulator | 3.59E-07 | 4.21E-02 | AR,CTNNB1,ERK1/2,MMP2,NFkB (complex),PHB | B2M,CSF2RB,CTCF,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IFNG,KYNU,MMP2,MSH2,NOTCH1,PPP2R1A,PTPRE,SEN2,SMTN,TJP1,TLR4,WEE1,XIAP | 6 | 23 |
| HMMR | transmembrane receptor | 3.78E-07 | 2.31E-02 | ERK1/2,HMMR,SMAD2 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PTPRE,RAC1,XIAP | 3 | 13 |
| TRIO | kinase | 4.06E-07 | 5.00E-02 | Jnk,P38 MAPK,RAC1,RHOA,TRIO | BTRC,DGKA,F3,FAS,FN1,HMOX1,IFNG,ITGB3,MMP1,MMP2,MSH2,PDHA1,RARA,XIAP | 4 | 14 |

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|----------|----------------------------|----------|----------|---|---|---|----|
| mir-223 | microRNA | 4.58E-07 | 1.05E-02 | EGFR, mir-223, SP3 | AR, ESR1, F3, HK2, HMGCS1, HNRNPA2B1, IFNG, IGF1R, MMP1, PTPRE, XIAP, ZEB2 | 3 | 12 |
| ELF3 | transcription regulator | 4.58E-07 | 1.57E-02 | ELF3, ERK1/2 | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, IGF1R, MMP1, MMP2, PPAR G, PTPRE | 2 | 12 |
| BCR-ABL1 | fusion gene/product | 4.93E-07 | 3.88E-02 | BCR-ABL1, GSK3B, NFkB (complex), STAT1, STAT5a/b | C1R, CTCF, HMOX1, IFNG, IGF1R, KYNU, MMP1, MMP2, MSH2, MUC1, NOTCH1, RAC1, RARA, SENP2, TRIM21, WARS1, XIAP | 4 | 17 |
| FPR1 | G-protein coupled receptor | 5.05E-07 | 3.46E-02 | EGFR, FPR1, Jnk | AR, BTRC, ESR1, F3, HK2, HNRNPA2B1, MMP1, MMP2, MSH2, PTPRE, RARA, XIAP, ZEB2 | 2 | 13 |
| PTPN12 | phosphatase | 5.49E-07 | 8.50E-03 | ABL1, EGFR, PTPN12 | AR, ESR1, F3, FAS, HK2, HNRNPA2B1, IFNG, MMP1, PTPRE, XIAP, ZEB2 | 2 | 11 |
| HCAR2 | G-protein coupled receptor | 5.82E-07 | 1.47E-02 | ERK1/2, HCAR2 | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, IGF1R, MMP1, MMP2, PTPRE, WEE1 | 2 | 12 |
| DPP4 | peptidase | 5.97E-07 | 3.71E-02 | DPP4, ERK1/2, P38 MAPK, PARP1 | B2M, CYP17A1, CYP7A1, DGKA, ESR1, F3, FAS, FN1, HBEGF, HK2, HMOX1, IGF1R, MSH2, PTPRE, RARA | 3 | 15 |
| PTPRE | phosphatase | 5.98E-07 | 4.30E-02 | Akt, ERK1/2, PTPRE | B2M, CYP17A1, CYP7A1, ESR1, F3, FN1, HBEGF, HK2, MMP1, MMP2, MUC1, NOTCH1, PDK4, TJP1 | 2 | 14 |
| mir-146 | microRNA | 6.01E-07 | 8.20E-03 | EGFR, mir-146 | AR, ESR1, F3, HK2, HNRNPA2B1, IFNG, MMP1, PTPRE, TLR4, XIAP, ZEB2 | 2 | 11 |
| TRPM2 | ion channel | 6.24E-07 | 2.23E-02 | AKT1, ERK1/2, PTK2B, TRPM2 | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, HMOX1, IFNG, IGF1R, MMP1, MMP2, PTPRE | 3 | 13 |
| ADAM15 | peptidase | 6.57E-07 | 9.60E-03 | ADAM15, EGFR, MMP9 | AR, ESR1, F3, HK2, HNRNPA2B1, IFNG, MMP1, PTPRE, TJP1, XIAP, ZEB2 | 3 | 11 |
| VEGFD | growth factor | 6.81E-07 | 2.00E-02 | ERK1/2, KDR, VEGFD | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, IGF1R, MMP1, MMP2, NOTCH1, PTPRE | 2 | 12 |
| TRIM37 | enzyme | 7.22E-07 | 3.58E-02 | NFkB (complex), TRIM37 | CTCF, CUL1, FAS, HMOX1, IFNG, KYNU, MMP1, MMP2, MSH2, NOTCH1, PEX5, SENP2, SFN, XIAP | 2 | 14 |
| RUNX1 | transcription regulator | 8.16E-07 | 3.91E-02 | NFkB (complex), RUNX1 | ALOX12, CTCF, EP300, FAS, HMOX1, IFNG, ITGB3, KYNU, MMP1, MMP2, MSH2, NOTCH1, SENP2, XIAP | 2 | 14 |
| DDIT3 | transcription regulator | 8.56E-07 | 2.68E-02 | DDIT3, ERK1/2 | B2M, CYP17A1, CYP7A1, ESR1, FN1, HBEGF, HK2, IFNG, IGF1R, MMP1, MMP2, PTPRE | 2 | 12 |
| RIPK3 | kinase | 8.68E-07 | 3.93E-02 | MAPKAPK2, MLKL, MMP2, MMP9, NFkB (complex), RIPK3 | CSF2RB, CTCF, FAS, HMOX1, IFNG, KYNU, MMP1, MMP2, MSH2, NOTCH1, PP2R1A, SENP2, TJP1, XIAP | 3 | 14 |

| | | | | | | | |
|--|----------------------------|----------|----------|---|---|---|----|
| PDK4 | kinase | 8.78E-07 | 3.33E-02 | ERK1/2,KRAS,PDK4 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PC,PTPRE,YY1 | 3 | 13 |
| CDH17 | transporter | 9.95E-07 | 3.07E-02 | CDH17,ERK1/2,ITGB1 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,ITGB3,MMP1,MMP2,PTPRE | 2 | 12 |
| NDFIP1 | other | 9.95E-07 | 3.54E-02 | Akt,Jnk,NDFIP1 | BTRC,F3,IFNG,IGF1R,MMP1,MSH2,MUC1,NOTCH1,PDK4,RARA,TJP1,XIAPP | 2 | 12 |
| AHSA1 | other | 1.00E-06 | 4.70E-02 | AHSA1,ERK1/2,MAP2K1/2,RAF1 | B2M,CYP17A1,CYP7A1,ESR1,FAS,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PTPRE,RRM1 | 3 | 13 |
| HES1 | transcription regulator | 1.00E-06 | 4.40E-02 | AKT1,ERK1/2,HES1,PRKAA | AR,B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,HMOX1,IGF1R,MMP1,MMP2,PTPRE | 3 | 13 |
| SNAPIN | other | 1.17E-06 | 3.93E-02 | P38 MAPK,SNAPIN,STAT1 | C1R,DGKA,F3,FAS,FN1,HMOX1,ITGB3,MMP1,MMP2,MSH2,MUC1,RARA,TRIM21,WARS1 | 2 | 14 |
| MTORC1 | complex | 1.24E-06 | 1.93E-02 | AKT1,Gsk3,GSK3B,MTOR,MTORC1,RHOA,RICTOR,RPS6KB1,SREBF1,SREBF2 | AR,CHKA,ESR1,FABP3,FABP7,GTF2I,HK2,HMOX1,IFNG,IGF1R,MUC1,PDHA1,PPARG,XIAP | 9 | 14 |
| CCR2 | G-protein coupled receptor | 1.39E-06 | 4.08E-02 | CCR2,ERK1/2,SMAD3 | B2M,CYP17A1,CYP7A1,ESR1,HBEGF,HK2,IFNG,IGF1R,MMP1,MMP2,PTPRE,RAC1,XIAP | 2 | 13 |
| EGFR | kinase | 1.40E-06 | 1.20E-02 | EGFR | AR,ESR1,F3,HK2,HNRNPA2B1,IFNG,MMP1,PTPRE,XIAP,ZEB2 | 1 | 10 |
| NTN1 | growth factor | 1.54E-06 | 3.94E-02 | Creb,ERK1/2,NTN1,RHOA | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PDHA1,PTPRE | 3 | 12 |
| ERK1/2 | group | 1.65E-06 | 2.75E-02 | ERK1/2 | B2M,CYP17A1,CYP7A1,ESR1,FN1,HBEGF,HK2,IGF1R,MMP1,MMP2,PTPRE | 1 | 11 |
| FGF8 | growth factor | 2.15E-06 | 3.38E-02 | FGF8,FGFR1,P38 MAPK | DGKA,F3,FAS,FN1,HK2,HMOX1,ITGB3,MMP1,MMP2,MSH2,RARA,SFN,SUB1 | 3 | 13 |
| miR-193a-3p (and other miRNAs w/seed ACUGGCC) | mature microRNA | 3.04E-06 | 3.75E-02 | Akt,miR-193a-3p (and other miRNAs w/seed ACUGGCC),MTOR | AR,CHKA,ERBB4,F3,IFNG,IGF1R,MMP2,MUC1,NOTCH1,PDK4,TJP1 | 3 | 11 |
| mir-193 | microRNA | 3.52E-06 | 3.97E-02 | Akt,mir-193,MTOR | AR,CHKA,ERBB4,F3,IFNG,IGF1R,MMP2,MUC1,NOTCH1,PDK4,TJP1 | 3 | 11 |
| ATF3 | transcription regulator | 6.57E-06 | 3.68E-02 | Akt,ATF3 | DCTD,F3,IFNG,IGF1R,MMP2,MSH2,MUC1,NOTCH1,PDK4,RRM1,TJP1 | 2 | 11 |

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|--------|-----------------------------------|----------|----------|------------------------|--|---|----|
| PCGEM1 | other | 2.24E-05 | 8.00E-04 | PCGEM1 | CANT1,G6PD,HK2,PDHA1,PDK4,PGK1 | 1 | 6 |
| DDX5 | enzyme | 2.38E-05 | 1.15E-02 | DDX5,let-7 | AR,FN1,HK2,IGF1R,ITGB3,MAPK6,MDH1,NDUFAB1,PA2G4,STARD13,TLR4 | 2 | 11 |
| FENDRR | other | 3.28E-05 | 2.24E-02 | FENDRR,MMP2,MMP9,STAT1 | C1R,CSF2RB,FAS,FN1,MUC1,PPP2R1A,TJP1,TRIM21,WARS1 | 4 | 9 |
| MCAM | other | 3.40E-05 | 3.20E-03 | MCAM,MMP2 | CSF2RB,FN1,MMP2,PPP2R1A,TJP1 | 2 | 5 |
| let-7 | microRNA | 3.51E-05 | 8.60E-03 | let-7 | AR,FN1,HK2,IGF1R,ITGB3,MAPK6,PA2G4,STARD13,TLR4 | 1 | 9 |
| ZFYVE9 | peptidase | 4.98E-05 | 2.67E-02 | ERN1,SMAD2,ZFYVE9 | ANG,FN1,MMP2,RAC1,TJP1,XIAP | 3 | 6 |
| WAC | other | 5.41E-05 | 1.20E-03 | WAC | G6PD,PDK4,PPARG | 1 | 3 |
| SP1 | transcription regulator | 7.55E-05 | 4.85E-02 | SP1 | ESR1,FN1,HBEGF,HK2,HMOX1,IGF1R,ITGB3,ZEB2 | 1 | 8 |
| ZFYVE9 | peptidase | 8.01E-05 | 3.66E-02 | SMAD2,ZFYVE9 | FN1,MMP2,RAC1,TJP1,XIAP | 2 | 5 |
| ESRRG | ligand-dependent nuclear receptor | 9.33E-05 | 2.40E-03 | ESRRG | HK2,KLK1,MDH1,PDHA1,PDK4 | 1 | 5 |
| ESRRA | transcription regulator | 1.10E-04 | 1.34E-02 | CYP19A1,ESRRA | ESR1,HK2,HMOX1,PNMT,PPARG,RARA | 2 | 6 |
| RNF40 | enzyme | 1.48E-04 | 5.00E-03 | RNF40 | G6PD,PDK4,PPARG | 1 | 3 |
| OLR1 | transmembrane receptor | 2.20E-04 | 2.30E-03 | OLR1 | MMP1,RARA,RARG | 1 | 3 |
| DDR2 | kinase | 2.39E-04 | 2.01E-02 | DDR2,MMP2 | CSF2RB,MMP1,MMP2,PPP2R1A,TJP1 | 2 | 5 |
| DEF6 | other | 3.11E-04 | 4.66E-02 | DEF6 | FN1,MMP2,ZEB2 | 1 | 3 |
| SFN | other | 3.32E-04 | 2.81E-02 | SFN | DSG2,F3,PDK4,TJP1 | 1 | 4 |
| PTGS1 | enzyme | 3.91E-04 | 1.52E-02 | MMP2,MMP9,PTGS1 | CSF2RB,MMP2,PPP2R1A,TJP1 | 3 | 4 |
| SRSF1 | other | 3.91E-04 | 2.31E-02 | EIF4E,EIF4EBP1,SRSF1 | ESR1,FN1,RAC1,XIAP | 2 | 4 |
| IKBKE | kinase | 4.18E-04 | 3.56E-02 | IKBKE | PDHA1,PDK3,PDK4,PGK1,PYGL | 1 | 5 |
| GPI | enzyme | 4.23E-04 | 2.62E-02 | GPI | FN1,RAC1,ZEB2 | 1 | 3 |
| WT1 | transcription regulator | 4.26E-04 | 2.84E-02 | WT1 | BTK,ESR1,HBEGF,IGF1R,ODC1,TRIM21,WARS1 | 1 | 7 |
| mir-17 | microRNA | 5.30E-04 | 2.33E-02 | mir-17 | AR,ESR1,FAS,NCOA3 | 1 | 4 |
| NKX2-1 | transcription regulator | 5.30E-04 | 2.53E-02 | MMP2,NKX2-1 | CSF2RB,MMP2,PPP2R1A,TJP1 | 2 | 4 |

| | | | | | | | |
|---------------------------------------|-------------------------|----------|----------|------------------------------------|---------------------------------------|---|---|
| SIM2 | transcription regulator | 5.30E-04 | 2.13E-02 | MMP2,SIM2 | CSF2RB,MMP2,PPP2R1A,TJP1 | 2 | 4 |
| ESRRA | transcription regulator | 5.66E-04 | 2.51E-02 | ESRRA | HK2,HMOX1,PNMT,PPARG,RARA | 1 | 5 |
| miR-615-3p (miRNAs w/seed CCGAGCC) | mature microRNA | 5.91E-04 | 5.20E-03 | miR-615-3p (miRNAs w/seed CCGAGCC) | AR,PPARG | 1 | 2 |
| PRKAA1 | kinase | 8.21E-04 | 1.88E-02 | PRKAA1 | EPHA3,FN1,IGF1R,MAGEA4,TJP1 | 1 | 5 |
| PAX3-FOXO1 | fusion gene/product | 8.85E-04 | 1.48E-02 | PAX3-FOXO1 | CLCN5,HMOX1,IGF1R,IMPA2,PPP2R1A,XRCC6 | 1 | 6 |
| SREBF2 | transcription regulator | 9.05E-04 | 8.80E-03 | SREBF2 | FABP7,GTF2I,PPARG | 1 | 3 |
| ETV5 | transcription regulator | 9.09E-04 | 3.82E-02 | ETV5,MMP2 | CSF2RB,FN1,PPP2R1A,TJP1 | 2 | 4 |
| CSF3 | cytokine | 1.12E-03 | 2.10E-02 | CSF3 | PPARG,PRKCB,RARA | 1 | 3 |
| PRKCB | kinase | 1.17E-03 | 3.51E-02 | PRKCB | FN1,MMP2 | 1 | 2 |
| mir-192 | microRNA | 1.17E-03 | 1.26E-02 | mir-192 | IGF1R,ZEB2 | 1 | 2 |
| DYSF | other | 1.17E-03 | 2.63E-02 | DYSF | FN1,ITGB3 | 1 | 2 |
| mir-503 | microRNA | 1.17E-03 | 2.15E-02 | mir-503 | IGF1R,SMURF2 | 1 | 2 |
| MOAP1 | other | 1.17E-03 | 9.80E-03 | MOAP1 | G6PD,HMOX1 | 1 | 2 |
| SEN2 | peptidase | 1.93E-03 | 1.80E-02 | SEN2 | HK2,PGK1 | 1 | 2 |
| KIF26A | other | 1.93E-03 | 1.06E-02 | KIF26A | RAC1,VAV3 | 1 | 2 |
| c-Src | group | 1.93E-03 | 1.64E-02 | c-Src | CYP7A1,HMOX1 | 1 | 2 |
| CDK9 | kinase | 1.95E-03 | 3.15E-02 | CDK9 | G6PD,PK4,PPARG | 1 | 3 |
| MMP2 | peptidase | 1.95E-03 | 1.37E-02 | MMP2 | CSF2RB,PPP2R1A,TJP1 | 1 | 3 |
| EPO | cytokine | 2.29E-03 | 3.28E-02 | EPO | MMP2,PRKCB,TJP1 | 1 | 3 |
| mir-24 | microRNA | 2.87E-03 | 2.68E-02 | mir-24 | IFNG,PSAP | 1 | 2 |
| Mmp | group | 3.99E-03 | 2.55E-02 | Mmp | FAS,TJP1 | 1 | 2 |
| NR1D1 | ligand-dependent | 3.99E-03 | 2.12E-02 | NR1D1 | MDH1,TLR4 | 1 | 2 |

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|--------------|-------------------------|----------|----------|--------------|----------------------------|--|---|---|
| | nuclear receptor | | | | | | | |
| BANCR | other | 3.99E-03 | 2.65E-02 | BANCR | MMP1,MMP2 | | 1 | 2 |
| RUNX1 | transcription regulator | 5.71E-03 | 4.75E-02 | RUNX1 | ALOX12,EP300,ITGB3 | | 1 | 3 |
| TRIM37 | enzyme | 5.71E-03 | 3.99E-02 | TRIM37 | CUL1,PEX5,SFN | | 1 | 3 |
| GATA3 | transcription regulator | 1.01E-02 | 3.94E-02 | GATA3 | ECHS1,TJP1 | | 1 | 2 |
| EGLN | group | 1.12E-02 | 4.19E-02 | EGLN | HK2,PDK3,PYGL,SH2B2,ZNF292 | | 1 | 5 |
| LY96 | transmembrane receptor | 1.41E-02 | 3.06E-02 | LY96 | TLR4 | | 1 | 1 |
| HLTF | transcription regulator | 1.41E-02 | 3.47E-02 | HLTF | HBB | | 1 | 1 |
| PKNOX1 | transcription regulator | 1.41E-02 | 3.08E-02 | PKNOX1 | FABP7 | | 1 | 1 |
| PROM1 | other | 1.41E-02 | 2.70E-02 | PROM1 | DSG2 | | 1 | 1 |
| SMG6 | enzyme | 1.41E-02 | 3.47E-02 | SMG6 | HBB | | 1 | 1 |
| PSMC3IP | transcription regulator | 1.41E-02 | 2.87E-02 | PSMC3IP | CYP17A1 | | 1 | 1 |
| S100A3 | transporter | 1.41E-02 | 2.86E-02 | S100A3 | RARA | | 1 | 1 |
| Dgk | group | 1.41E-02 | 2.87E-02 | Dgk | CYP17A1 | | 1 | 1 |
| ALDH1A3 | enzyme | 1.41E-02 | 2.44E-02 | ALDH1A3 | RRM1 | | 1 | 1 |
| BLVRA | enzyme | 1.41E-02 | 2.22E-02 | BLVRA | CERT1 | | 1 | 1 |
| CTD_2245E153 | other | 1.41E-02 | 2.51E-02 | CTD_2245E153 | PC | | 1 | 1 |
| GFER | enzyme | 1.41E-02 | 2.61E-02 | GFER | NR1I3 | | 1 | 1 |
| PABIR1 | other | 1.41E-02 | 2.57E-02 | PABIR1 | WEE1 | | 1 | 1 |
| NUP98 | transporter | 2.81E-02 | 2.73E-02 | NUP98 | YWHAH | | 1 | 1 |
| COMMD1 | transporter | 2.81E-02 | 4.97E-02 | COMMD1 | ATP7B | | 1 | 1 |
| mir-346 | microRNA | 2.81E-02 | 4.92E-02 | mir-346 | BTK | | 1 | 1 |
| CDC14A | phosphatase | 2.81E-02 | 2.57E-02 | CDC14A | WEE1 | | 1 | 1 |
| RAMAC | other | 2.81E-02 | 2.14E-02 | RAMAC | RUVBL1 | | 1 | 1 |

| | | | | | | | |
|--------|--------|----------|----------|--------|------|---|---|
| MAP3K5 | kinase | 4.18E-02 | 2.39E-02 | MAP3K5 | MSH2 | 1 | 1 |
|--------|--------|----------|----------|--------|------|---|---|

Supplementary Table S6: Toxicity analysis by IPA for solasonine. The toxicity analysis by IPA was performed to predict the toxicity of solasonine, by importing the dataset of potential targets of solasonine. The potential toxicity list was obtained and sorted by decreasing of $-\log(p\text{-value})$, $p\text{-value} \leq 0.05$.

| Ingenuity Toxicity Lists | $-\log(p\text{-value})$ | Ratio | Molecules |
|---|-------------------------|-------|---|
| Hepatic Fibrosis | 7.80 | 0.06 | ALB,ATP7B,B2M,CYP2E1,CYP7A1,ESR1,F2,FN1,GRHPR,IFNG,IMPDH1,MMP1,MMP2,NMT1,NOTCH1,PAH,PPARG,PTPRE,SERPINA5,THBS2,TLR4 |
| Liver Necrosis/Cell Death | 7.00 | 0.06 | AR,ARF6,ATP7B,CYP2E1,CYP7A1,ESR1,F3,FAS,GRK2,HBEGF,HK2,HMOX1,IFNG,IFNGR1,ITGB3,NR1I3,STK4,TLR4,XIAP |
| Renal Necrosis/Cell Death | 7.00 | 0.04 | ALB,AR,ATXN3,ERBB4,F2,F3,FAS,GRK2,HBEGF,HK2,HMOX1,IFNG,IGF1R,NDUFAB1,NF2,PEX5,PPARG,PRKCB,PTK2B,RAC1,SLK,STK4,TLR4,TNFAIP8L2,XIAP,YWHAQ,YY1 |
| Fatty Acid Metabolism | 7.00 | 0.11 | ACADSB,ACADVL,ACAT2,ADH1C,ADH7,CYP2E1,ECHS1,ECI2,HADH,HSD17B10,HSD17B4 |
| Cardiac Necrosis/Cell Death | 6.48 | 0.06 | AR,DPP4,DSG2,FAS,HK2,HMOX1,IFNG,MMP2,MYBPC3,PRKCB,PTK2B,RAC1,S100A6,STK4,THBS2,TLR4,VEGFB,XIAP |
| Cell Cycle: G2/M DNA Damage Checkpoint Regulation | 6.37 | 0.16 | BTRC,CUL1,EP300,SFN,SKP1,WEE1,YWHAH,YWHAQ |
| Cardiac Fibrosis | 5.67 | 0.06 | AR,DSG2,F3,FN1,HBEGF,HMOX1,IFNG,IGF1R,MYBPC3,PRKCB,STK4,THBS2,TLR4,UTRN,VAV3,VEGFB |
| Cardiac Hypertrophy | 4.80 | 0.04 | EP300,ESR1,FN1,HBB,HBEGF,HCK,ITGB3,MMP1,MMP2,MYBPC3,NOTCH1,PRKCB,RAC1,S100A6,TLR4,TTR,VAV3,VEGFB |
| Increases Liver Damage | 4.38 | 0.09 | CYP2E1,CYP7A1,F2,FAS,IFNG,IFNGR1,IGF1R,TLR4 |
| Liver Proliferation | 3.63 | 0.05 | CSF2RB,F2,FAS,HBEGF,IFNG,IFNGR1,IGF1R,ITGB3,NR1I3,ODC1,PPARG,RARA |
| LPS/IL-1 Mediated Inhibition of RXR Function | 3.59 | 0.05 | CYP2E1,CYP2R1,CYP7A1,FABP3,FABP7,GSTT2/GSTT2B,HMGCS1,NR1I3,RARA,SULT1A1,TLR4 |
| Increases Damage of Mitochondria | 3.55 | 0.30 | AR,FAS,IFNG |
| RAR Activation | 3.47 | 0.05 | ADH1C,ADH7,CSF2RB,EP300,MMP1,PRKCB,RAC1,RARA,RARG,RBP5 |
| Xenobiotic Metabolism Signaling | 3.45 | 0.04 | ADH1C,ADH7,CAMK4,CYP2E1,EP300,GSTT2/GSTT2B,HMOX1,HSP90AB1,MAP3K3,NR1I3,PPP2R1A,PRKCB,SULT1A1 |
| Increases Renal Damage | 3.40 | 0.07 | B2M,FCGR2A,GC,HCK,POU2F1,RAC1,TLR4 |
| Increases Cardiac Proliferation | 3.10 | 0.08 | ERBB4,HBEGF,HMOX1,NAE1,NOTCH1,RARA |
| Increases Glomerular Injury | 3.10 | 0.06 | B2M,ESR1,FCGR2A,HBEGF,IFNG,IFNGR1,SLK,SMURF2 |
| Aryl Hydrocarbon Receptor Signaling | 2.98 | 0.05 | EP300,ESR1,FAS,GSTT2/GSTT2B,HSP90AB1,NCOA3,RARA,RARG |
| LXR/RXR Activation | 2.81 | 0.06 | ALB,CYP7A1,ECHS1,GC,HADH,TLR4,TTR |
| Increases Liver Hepatitis | 2.81 | 0.07 | ESR1,FAS,IFNG,IFNGR1,TLR4,XIAP |

| | | | |
|--|------|------|---|
| Cell Cycle: G1/S Checkpoint Regulation | 2.65 | 0.07 | BTRC,CUL1,HDAC7,PA2G4,SKP1 |
| Renal Safety Biomarker Panel (PSTC) | 2.57 | 0.33 | ALB,B2M |
| VDR/RXR Activation | 2.39 | 0.06 | EP300,IFNG,NCOA3,PRKCB,YY1 |
| Increases Transmembrane Potential of Mitochondria and Mitochondrial Membrane | 2.32 | 0.08 | BCR,FAS,PPARG,RAC1 |
| Increases Renal Proliferation | 2.27 | 0.05 | CAMK4,CHKA,CSTF2,ESR1,NDUFAB1,PPP2R1A,TLR4 |
| FXR/RXR Activation | 2.12 | 0.05 | ALB,CYP7A1,GC,PPARG,RARA,TTR |
| Mechanism of Gene Regulation by Peroxisome Proliferators via PPAR α | 2.03 | 0.05 | EP300,HSD17B4,HSP90AB1,PPARG,PRKCB |
| Increases Renal Nephritis | 2.01 | 0.07 | FCGR2A,HBEGF,IFNG,IFNGR1 |
| Hepatic Stellate Cell Activation | 1.92 | 0.09 | CYP2E1,IFNG,TLR4 |
| Cytochrome P450 Panel - Substrate is a Sterol (Human) | 1.82 | 0.14 | CYP17A1,CYP7A1 |
| Cytochrome P450 Panel - Substrate is a Sterol (Mouse) | 1.82 | 0.14 | CYP17A1,CYP7A1 |
| Cytochrome P450 Panel - Substrate is a Sterol (Rat) | 1.82 | 0.14 | CYP17A1,CYP7A1 |
| Increases Cardiac Dysfunction | 1.77 | 0.06 | EP300,FAS,PRKCB,STK4 |
| Pro-Apoptosis | 1.71 | 0.07 | DAPK2,DFFA,FAS |
| Cholesterol Biosynthesis | 1.71 | 0.13 | ACAT2,HMGCS1 |
| NRF2-mediated Oxidative Stress Response | 1.57 | 0.03 | CYP2E1,CYP2R1,EP300,GSTT2/GSTT2B,HMOX1,HSP90AB1,PRKCB |
| TR/RXR Activation | 1.55 | 0.05 | CAMK4,CYP7A1,EP300,NCOA3 |
| Genes associated with Chronic Allograft Nephropathy (Human) | 1.48 | 0.10 | FN1,MMP2 |
| Increases Liver Steatosis | 1.47 | 0.04 | ATP7B,CYP2E1,HMOX1,NR1I3,PPARG |
| Increases Liver Hyperplasia/Hyperproliferation | 1.43 | 0.04 | FAS,IGF1R,NR1I3,ODC1,S100A6 |

| | | | |
|--|------|------|-----------------------------------|
| Decreases Transmembrane Potential of Mitochondria and Mitochondrial Membrane | 1.43 | 0.04 | B2M,DFFA,FAS,IFNG,MUC1 |
| Hepatic Cholestasis | 1.39 | 0.03 | CYP7A1,ESR1,IFNG,PRKCB,RARA,TLR4 |
| Reversible Glomerulonephritis Biomarker Panel (Rat) | 1.37 | 0.08 | HBB,KLK1 |
| Protection from Hypoxia-induced Renal Ischemic Injury (Rat) | 1.27 | 0.25 | HMOX1 |
| CAR/RXR Activation | 1.23 | 0.07 | NR1I3,SULT1A1 |
| Hypoxia-Inducible Factor Signaling | 1.16 | 0.04 | EP300,HSP90AB1,PRKCB |
| Decreases Depolarization of Mitochondria and Mitochondrial Membrane | 1.13 | 0.06 | CD74,FAS |
| Cytochrome P450 Panel - Substrate is a Vitamin (Human) | 1.10 | 0.17 | CYP2R1 |
| Cytochrome P450 Panel - Substrate is a Vitamin (Mouse) | 1.04 | 0.14 | CYP2R1 |
| Cytochrome P450 Panel - Substrate is a Vitamin (Rat) | 1.04 | 0.14 | CYP2R1 |
| PPAR α /RXR α Activation | 0.99 | 0.03 | ACVR2B,EP300,HSP90AB1,NCOA3,PRKCB |
| Negative Acute Phase Response Proteins | 0.98 | 0.13 | ALB |
| Primary Glomerulonephritis Biomarker Panel (Human) | 0.85 | 0.09 | HBEGF |
| Cytochrome P450 Panel - Substrate is a Xenobiotic (Mouse) | 0.82 | 0.08 | CYP2E1 |
| TGF- β Signaling | 0.81 | 0.03 | ACVR2B,EP300,SMURF2 |
| p53 Signaling | 0.81 | 0.03 | EP300,FAS,SFN |
| Cytochrome P450 Panel - Substrate is a Xenobiotic (Rat) | 0.79 | 0.08 | CYP2E1 |
| Decreases Respiration of Mitochondria | 0.79 | 0.08 | IFNG |
| Acute Renal Failure Panel (Rat) | 0.76 | 0.04 | HMOX1,SFN |

| | | | |
|--|------|------|--|
| Swelling of Mitochondria | 0.76 | 0.07 | FAS |
| Recovery from Ischemic Acute Renal Failure (Rat) | 0.76 | 0.07 | KLK1 |
| Long-term Renal Injury Anti-oxidative Response Panel (Rat) | 0.73 | 0.07 | HMOX1 |
| Renal Glomerulus Panel (Human) | 0.68 | 0.06 | TJP1 |
| PXR/RXR Activation | 0.67 | 0.03 | CYP7A1,NR1I3 |
| Cytochrome P450 Panel - Substrate is a Xenobiotic (Human) | 0.66 | 0.06 | CYP2E1 |
| Glutathione Depletion - Phase II Reactions | 0.64 | 0.05 | GSTT2/GSTT2B |
| Increases Bradycardia | 0.62 | 0.05 | RAC1 |
| NF-κB Signaling | 0.61 | 0.02 | BTRC,EP300,IGF1R,MAP3K3,MAPK6,PRKCB,TLR4 |
| Positive Acute Phase Response Proteins | 0.47 | 0.03 | HMOX1 |
| Anti-Apoptosis | 0.45 | 0.03 | XIAP |
| Mitochondrial Dysfunction | 0.41 | 0.02 | HSD17B10,NDUFAB1,PDHA1 |
| Oxidative Stress | 0.27 | 0.02 | CYP2E1 |

Supplementary Table S7: Potential therapeutic targets of solasonine for BC. By integrating the potential targets regulated by solasonine, and the genes associated with BC searched in databases of GeneCards, OMIM, TTD, PharmGKB, and DrugBank, a total of 191 genes overlapped were identified, which could be considered as the potential therapeutic targets of solasonine for BC.

| Num | Symbol | Gene Name | Source | | | | |
|-----|---------|--|-----------|------|-----|----------|----------|
| | | | GeneCards | OMIM | TTD | PharmGKB | DrugBank |
| 1 | CSDE1 | Cold shock domain-containing protein E1 | √ | | | | |
| 2 | RGS6 | Regulator of G-protein signaling 6 | √ | | | | |
| 3 | POT1 | Protection of telomeres protein 1 | √ | | | | |
| 4 | F2 | Prothrombin | √ | | | | |
| 5 | RARG | Retinoic acid receptor gamma | √ | | | | |
| 6 | NF2 | Merlin | √ | | | | |
| 7 | CUL1 | Cullin-1 | √ | | | | |
| 8 | HK2 | Hexokinase-2 | √ | | | | |
| 9 | EP300 | Histone acetyltransferase p300 | √ | √ | | | |
| 10 | RRM1 | Ribonucleoside-diphosphate reductase large subunit | √ | | | | √ |
| 11 | XRCC6 | ATP-dependent DNA helicase 2 subunit 1 | √ | | | | |
| 12 | HSD17B4 | Peroxisomal multifunctional enzyme type 2 | √ | | | | |
| 13 | MMP2 | 72 kDa type IV collagenase | √ | | | | |
| 14 | ACADVL | Very long-chain specific acyl-CoA dehydrogenase, mitochondrial | √ | | | | |
| 15 | HBEGF | Proheparin-binding EGF-like growth factor | √ | | | | |
| 16 | HMGCS1 | Hydroxymethylglutaryl-CoA synthase, cytoplasmic | √ | | | | |
| 17 | AR | Androgen receptor | √ | √ | √ | | |
| 18 | HMOX1 | Heme oxygenase 1 | √ | | | | |
| 19 | VAV3 | Guanine nucleotide exchange factor VAV3 | √ | | | | |
| 20 | ZEB2 | Zinc finger E-box-binding homeobox 2 | √ | | | | |
| 21 | NME3 | Nucleoside diphosphate kinase 3 | √ | | | | |
| 22 | BTK | Tyrosine-protein kinase BTK | √ | | | | |
| 23 | MUC1 | Mucin-1 | √ | | | | |
| 24 | MARK1 | Serine/threonine-protein kinase MARK1 | √ | | | | |
| 25 | VEGFB | Vascular endothelial growth factor B | √ | | | | |
| 26 | FABP3 | Fatty acid-binding protein, heart | √ | | | | |
| 27 | KLK1 | Kallikrein-1 | √ | | | | |
| 28 | RND1 | Rho-related GTP-binding protein Rho6 | √ | | | | |

| | | | | |
|----|----------|---|---|---|
| 29 | HBB | Hemoglobin subunit beta | √ | |
| 30 | MAP3K3 | Mitogen-activated protein kinase kinase kinase 3 | √ | |
| 31 | DFFA | DNA fragmentation factor subunit alpha | √ | |
| 32 | RBP5 | Retinol-binding protein 5 | √ | |
| 33 | ESR1 | Estrogen receptor | √ | √ |
| 34 | RAC1 | Ras-related C3 botulinum toxin substrate 1 | √ | |
| 35 | PTPRF | Receptor-type tyrosine-protein phosphatase F | √ | |
| 36 | HCK | Tyrosine-protein kinase HCK | √ | |
| 37 | FCGR2A | Low affinity immunoglobulin gamma Fc region receptor II-a | √ | |
| 38 | EPHA3 | Ephrin type-A receptor 3 | √ | |
| 39 | PTK2B | Protein tyrosine kinase 2 beta | √ | |
| 40 | TRIM21 | 52 kDa Ro protein | √ | |
| 41 | DTYMK | Thymidylate kinase | √ | |
| 42 | PPP2R1A | Serine/threonine-protein phosphatase 2A 65 kDa regulatory subunit A alpha isoform | √ | |
| 43 | MTAP | S-methyl-5-thioadenosine phosphorylase | √ | |
| 44 | IGF1R | Insulin-like growth factor 1 receptor | √ | |
| 45 | FLNB | Filamin-B | √ | |
| 46 | HDAC7 | Histone deacetylase 7 | √ | |
| 47 | ALOX12 | Arachidonate 12-lipoxygenase, 12S-type | √ | |
| 48 | WWP1 | NEDD4-like E3 ubiquitin-protein ligase WWP1 | √ | |
| 49 | HSP90AB1 | Heat shock protein HSP 90-beta | √ | |
| 50 | KIF11 | Kinesin-like protein KIF11 | √ | |
| 51 | GC | Vitamin D-binding protein | √ | |
| 52 | MATK | Megakaryocyte-associated tyrosine-protein kinase | √ | |
| 53 | DCXR | L-xylulose reductase | √ | |
| 54 | F3 | Tissue factor | √ | |
| 55 | ACVR2B | Activin receptor type-2B | √ | |
| 56 | CLK1 | Dual specificity protein kinase CLK1 | √ | |
| 57 | SEN2 | Sentrin-specific protease 2 | √ | |
| 58 | MSN | Moesin | √ | |
| 59 | SF3B6 | Pre-mRNA branch site protein p14 | √ | |
| 60 | RAB26 | Ras-related protein Rab-26 | √ | |
| 61 | BMP1 | Bone morphogenetic protein 1 | √ | |

| | | | | | |
|----|---------|--|---|---|---|
| 62 | PAPSS1 | Bifunctional 3-phosphoadenosine 5-phosphosulfate synthetase 1 | √ | | |
| 63 | PYGL | Glycogen phosphorylase, liver form | √ | | |
| 64 | MSH2 | DNA mismatch repair protein Msh2 | √ | √ | √ |
| 65 | POU2F1 | POU domain, class 2, transcription factor 1 | √ | | |
| 66 | GTF2I | General transcription factor II-I | √ | | |
| 67 | SKP1 | S-phase kinase-associated protein 1 | √ | | |
| 68 | DHPS | Deoxyhypusine synthase | √ | | |
| 69 | NCOA3 | Nuclear receptor coactivator 3 | √ | √ | |
| 70 | TTR | Transthyretin | √ | | |
| 71 | CSNK1G2 | Casein kinase I isoform gamma-2 | √ | | |
| 72 | PDK2 | [Pyruvate dehydrogenase [lipoamide]] kinase isozyme 2, mitochondrial | √ | | |
| 73 | ADH1C | Alcohol dehydrogenase 1C | √ | | |
| 74 | ITPK1 | Inositol-tetrakisphosphate 1-kinase | √ | | |
| 75 | BPI | Bactericidal permeability-increasing protein | √ | | |
| 76 | HPD | 4-hydroxyphenylpyruvate dioxygenase | √ | | |
| 77 | PAH | Phenylalanine-4-hydroxylase | √ | | |
| 78 | B2M | Beta-2-microglobulin | √ | | |
| 79 | SULT1A1 | Sulfotransferase 1A1 | √ | | |
| 80 | MAGEA4 | Melanoma-associated antigen 4 | √ | | √ |
| 81 | NSUN5 | Putative methyltransferase NSUN5 | √ | | |
| 82 | LRBA | Lipopolysaccharide-responsive and beige-like anchor protein | √ | | |
| 83 | SART3 | Squamous cell carcinoma antigen recognized by T-cells 3 | √ | | √ |
| 84 | BCR | Breakpoint cluster region protein | √ | | |
| 85 | PSAP | Proactivator polypeptide | √ | | |
| 86 | YWHAQ | 14-3-3 protein theta | √ | | |
| 87 | SMG5 | Protein SMG5 | √ | | |
| 88 | WEE1 | Wee1-like protein kinase | √ | | |
| 89 | TLR4 | Toll-like receptor 4 | √ | | |
| 90 | CYP7A1 | Cytochrome P450 7A1 | √ | | |
| 91 | IFNGR1 | Interferon-gamma receptor alpha chain | √ | | |
| 92 | FAS | Tumor necrosis factor receptor superfamily member 6 | √ | √ | |
| 93 | PEX5 | Peroxisomal targeting signal 1 receptor | √ | | |
| 94 | PA2G4 | Proliferation-associated protein 2G4 | √ | | |

| | | | | |
|-----|-----------|--|---|---|
| 95 | EXOSC9 | Exosome complex exonuclease RRP45 | √ | |
| 96 | ACACB | Acetyl-CoA carboxylase 2 | | √ |
| 97 | ATXN3 | Ataxin-3 | √ | |
| 98 | HNRNPA2B1 | Heterogeneous nuclear ribonucleoproteins A2/B1 | √ | |
| 99 | ERBB4 | Receptor tyrosine-protein kinase erbB-4 | √ | |
| 100 | ITGB3 | Integrin beta-3 | √ | |
| 101 | GAD2 | Glutamate decarboxylase 2 | √ | |
| 102 | PCYT2 | Ethanolamine-phosphate cytidylyltransferase | √ | |
| 103 | FAP | Seprase | √ | |
| 104 | PARN | Poly(A)-specific ribonuclease PARN | √ | |
| 105 | RPA3 | Replication protein A 14 kDa subunit | √ | |
| 106 | ANXA6 | Annexin A6 | √ | |
| 107 | MAGI2 | Membrane-associated guanylate kinase, WW and PDZ domain-containing protein 2 | √ | |
| 108 | HLA-DRB1 | HLA class II histocompatibility antigen, DRB1-1 beta chain | √ | |
| 109 | NFATC1 | Nuclear factor of activated T-cells, cytoplasmic 1 | √ | |
| 110 | ALK | ALK tyrosine kinase receptor | √ | |
| 111 | CYP2E1 | Cytochrome P450 2E1 | √ | |
| 112 | PPARG | Peroxisome proliferator-activated receptor gamma | √ | |
| 113 | ATP7B | Copper-transporting ATPase 2 | √ | √ |
| 114 | PGK1 | Phosphoglycerate kinase 1 | √ | |
| 115 | MMP1 | Interstitial collagenase | √ | |
| 116 | DAPK2 | Death-associated protein kinase 2 | √ | |
| 117 | S100A6 | Protein S100-A6 | √ | |
| 118 | NOTCH1 | Neurogenic locus notch homolog protein 1 | √ | |
| 119 | SERPINA5 | Plasma serine protease inhibitor | √ | |
| 120 | NAE1 | NEDD8-activating enzyme E1 regulatory subunit | √ | |
| 121 | ZIC3 | Zinc finger protein ZIC 3 | √ | |
| 122 | ODC1 | Ornithine decarboxylase | √ | |
| 123 | RARA | Retinoic acid receptor alpha | √ | |
| 124 | PNMT | Phenylethanolamine N-methyltransferase | √ | |
| 125 | TJP1 | Tight junction protein ZO-1 | √ | |
| 126 | AOC3 | Membrane primary amine oxidase | √ | |
| 127 | CSTF2 | Cleavage stimulation factor 64 kDa subunit | √ | |

| | | | | |
|-----|-----------|---|---|---|
| 128 | YY1 | Transcriptional repressor protein YY1 | ✓ | |
| 129 | IFNG | Interferon gamma | ✓ | |
| 130 | ANG | Angiogenin | ✓ | |
| 131 | ACY1 | Aminoacylase-1 | ✓ | |
| 132 | SNX1 | Sorting nexin-1 | ✓ | |
| 133 | CTCF | Transcriptional repressor CTCF | ✓ | |
| 134 | TAF13 | Transcription initiation factor TFIID subunit 13 | ✓ | |
| 135 | GGPS1 | Geranylgeranyl pyrophosphate synthetase | ✓ | |
| 136 | BTRC | F-box/WD repeat-containing protein 1A | ✓ | |
| 137 | TNFAIP8L2 | Tumor necrosis factor, alpha-induced protein 8-like protein 2 | ✓ | ✓ |
| 138 | NBEA | Neurobeachin | ✓ | |
| 139 | MYBPC1 | Myosin-binding protein C, slow-type | ✓ | |
| 140 | STK4 | Serine/threonine-protein kinase 4 | ✓ | |
| 141 | ECI2 | Peroxisomal 3,2-trans-enoyl-CoA isomerase | ✓ | ✓ |
| 142 | DPP4 | Dipeptidyl peptidase 4 | ✓ | |
| 143 | ARHGEF1 | Rho guanine nucleotide exchange factor 1 | ✓ | |
| 144 | APEX1 | DNA-(apurinic or apyrimidinic site) lyase | ✓ | |
| 145 | B3GAT3 | Galactosylgalactosylxylosylprotein 3-beta-glucuronosyltransferase 3 | ✓ | |
| 146 | ARF6 | ADP-ribosylation factor 6 | ✓ | |
| 147 | XIAP | Baculoviral IAP repeat-containing protein 4 | ✓ | |
| 148 | ECHS1 | Enoyl-CoA hydratase, mitochondrial | ✓ | |
| 149 | ALB | Serum albumin | ✓ | ✓ |
| 150 | PRKCB | Protein kinase C beta type | ✓ | |
| 151 | FHIT | Bis(5-adenosyl)-triphosphatase | ✓ | |
| 152 | GART | Trifunctional purine biosynthetic protein adenosine-3 | ✓ | |
| 153 | C1R | Complement C1r subcomponent | ✓ | |
| 154 | YWHAH | 14-3-3 protein eta | ✓ | |
| 155 | OXSR1 | Serine/threonine-protein kinase OSR1 | ✓ | |
| 156 | RTN4IP1 | Reticulon-4-interacting protein 1, mitochondrial | ✓ | |
| 157 | HMGB3 | High mobility group protein B3 | ✓ | |
| 158 | OAT | Ornithine aminotransferase, mitochondrial | ✓ | |
| 159 | SFN | 14-3-3 protein sigma | ✓ | |
| 160 | STARD13 | StAR-related lipid transfer protein 13 | ✓ | |

| | | | |
|-----|----------|--|---|
| 161 | G6PD | Glucose-6-phosphate 1-dehydrogenase | √ |
| 162 | DSG2 | Desmoglein-2 | √ |
| 163 | THBS2 | Thrombospondin-2 | √ |
| 164 | DCTD | Deoxycytidylate deaminase | √ |
| 165 | PDK4 | [Pyruvate dehydrogenase [lipoamide]] kinase isozyme 4, mitochondrial | √ |
| 166 | FN1 | Fibronectin | √ |
| 167 | CHKA | Choline kinase alpha | √ |
| 168 | SMTN | Smoothelin | √ |
| 169 | VPS26A | Vacuolar protein sorting-associated protein 26A | √ |
| 170 | SEMA4D | Semaphorin-4D | √ |
| 171 | CLCN5 | Chloride channel protein 5 | √ |
| 172 | GRHPR | Glyoxylate reductase/hydroxypyruvate reductase | √ |
| 173 | NMT1 | Glycylpeptide N-tetradecanoyltransferase 1 | √ |
| 174 | NDC80 | Kinetochore protein NDC80 homolog | √ |
| 175 | PARP3 | Poly [ADP-ribose] polymerase 3 | √ |
| 176 | RBM39 | RNA-binding protein 39 | √ |
| 177 | CD74 | HLA class II histocompatibility antigen gamma chain | √ |
| 178 | CYP17A1 | Steroid 17-alpha-hydroxylase | √ |
| 179 | SLC5A1 | Sodium/glucose cotransporter 1 | √ |
| 180 | DHCR24 | Delta(24)-sterol reductase | √ |
| 181 | AMY2A | Pancreatic alpha-amylase | √ |
| 182 | IL2 | Interleukin-2 | √ |
| 183 | NPC1L1 | NPC1-like intracellular cholesterol transporter 1 | √ |
| 184 | ABCC4 | Multidrug resistance-associated protein 4 | √ |
| 185 | SERPINA6 | Corticosteroid-binding globulin | √ |
| 186 | GLI1 | Zinc finger protein GLI1 | √ |
| 187 | POLA1 | DNA polymerase alpha catalytic subunit | √ |
| 188 | SRD5A2 | 3-oxo-5-alpha-steroid 4-dehydrogenase 2 | √ |
| 189 | NR1H3 | Oxysterols receptor LXR-alpha | √ |
| 190 | SHH | Sonic hedgehog protein | √ |
| 191 | SHBG | Sex hormone-binding globulin | √ |

Note: BC, Bladder Cancer; OMIM, Online Mendelian Inheritance in Man database; TTD, Therapeutic Target Database; PharmGKB, Pharmacogenomics Knowledgebase Database.

Supplementary Table S8: KEGG pathway and GO terms analyses for genes of solasonine targeting BC. Through KEGG enrichment of identified genes related to solasonine targeting BC, 3 remarkably enriched pathways were obtained (adj.P-value ≤ 0.05); through GO terms analysis, 692, 16 and 48 remarkably enriched biological process (BP), cellular component (CC) and molecular function (MF) terms were obtained respectively (adj.P-value ≤ 0.05).

| Group | ID | Description | GeneRatio | BgRatio | p-value | p.adjust | q-value | geneID |
|-------|------------|---|-----------|-----------|----------|----------|----------|---|
| KEGG | hsa05205 | Proteoglycans in cancer | 16/155 | 205/8093 | 1.71E-06 | 4.81E-04 | 4.04E-04 | MMP2/HBEGF/VAV3/ESR1/RAC1/IGF1R/FLNB/MSN/TLR4/FAS/ERBB4/ITGB3/ARHGEF1/PRKCB/FN1/SHH |
| KEGG | hsa04066 | HIF-1 signaling pathway | 9/155 | 109/8093 | 2.29E-04 | 2.66E-02 | 2.23E-02 | HK2/EP300/HMOX1/IGF1R/TLR4/IFNGR1/PGK1/IFNG/PRKCB |
| KEGG | hsa05135 | Yersinia infection | 10/155 | 137/8093 | 2.84E-04 | 2.66E-02 | 2.23E-02 | VAV3/RAC1/FCGR2A/PTK2B/TLR4/NFATC1/ARHGEF1/ARF6/FN1/IL2 |
| BP | GO:0008202 | steroid metabolic process | 19/189 | 329/18862 | 9.16E-10 | 3.43E-06 | 2.35E-06 | HSD17B4/ACADVL/HMGCS1/ESR1/GC/SULT1A1/CYP7A1/ACACB/CYP2E1/IFNG/GGPS1/YWHAH/G6PD/CYP17A1/DHCR24/NPC1L1/SERPINA6/SRD5A2/SHH |
| BP | GO:0035265 | organ growth | 13/189 | 168/18862 | 1.28E-08 | 1.60E-05 | 1.10E-05 | RARG/AR/ESR1/PSAP/ACACB/ERBB4/ANXA6/NOTCH1/YY1/STK4/G6PD/GLI1/SHH |
| BP | GO:0048608 | reproductive structure development | 18/189 | 407/18862 | 2.72E-08 | 1.89E-05 | 1.29E-05 | CSDE1/RARG/RRM1/HSD17B4/HMGCS1/AR/ESR1/HSP90AB1/SEN2/MSH2/PSAP/PPARG/NOTCH1/SERPINA5/ANG/STK4/GLI1/SRD5A2/SHH |
| BP | GO:0061458 | reproductive system development | 19/189 | 408/18862 | 3.06E-08 | 1.89E-05 | 1.29E-05 | CSDE1/RARG/RRM1/HSD17B4/HMGCS1/AR/ESR1/HSP90AB1/SEN2/MSH2/PSAP/PPARG/NOTCH1/SERPINA5/ANG/STK4/GLI1/SRD5A2/SHH |
| BP | GO:0018108 | peptidyl-tyrosine phosphorylation | 18/189 | 369/18862 | 3.56E-08 | 1.89E-05 | 1.29E-05 | NF2/HBEGF/BTK/HCK/EPHA3/PTK2B/PPP2R1A/IGF1R/MATK/CLK1/WEI1/ERBB4/ITGB3/ALK/IFNG/SEMA4D/CD74/IL2 |
| BP | GO:1901617 | organic hydroxy compound biosynthetic process | 15/189 | 251/18862 | 3.71E-08 | 1.89E-05 | 1.29E-05 | HSD17B4/HMGCS1/ZEB2/PTK2B/ALOX12/PAH/CYP7A1/ACACB/PNMT/IFNG/GGPS1/G6PD/DHCR24/NPC1L1/SRD5A2 |
| BP | GO:0018212 | peptidyl-tyrosine modification | 18/189 | 372/18862 | 4.03E-08 | 1.89E-05 | 1.29E-05 | NF2/HBEGF/BTK/HCK/EPHA3/PTK2B/PPP2R1A/IGF1R/MATK/CLK1/WEI1/ERBB4/ITGB3/ALK/IFNG/SEMA4D/CD74/IL2 |
| BP | GO:0050866 | negative regulation of cell activation | 13/189 | 200/18862 | 1.17E-07 | 4.87E-05 | 3.34E-05 | F2/HMOX1/BTK/ALOX12/BPI/HLA-DRB1/TNFAIP8L2/HMGB3/PARP3/CD74/IL2/NR1H3/SHH |
| BP | GO:0030850 | prostate gland development | 7/189 | 41/18862 | 1.53E-07 | 5.73E-05 | 3.93E-05 | RARG/AR/ESR1/PSAP/NOTCH1/GLI1/SHH |
| BP | GO:0060249 | anatomical structure homeostasis | 19/189 | 466/18862 | 2.43E-07 | 8.28E-05 | 5.68E-05 | POT1/XRCC6/RAC1/PTK2B/HSP90AB1/B2M/SMG5/TLR4/HNRNPA2B1/ITGB3/PARN/RPA3/NOTCH1/TJP1/APEX1/ALB/PDK4/PARP3/POLA1 |
| BP | GO:0060333 | interferon-gamma-mediated signaling pathway | 9/189 | 91/18862 | 3.25E-07 | 1.01E-04 | 6.96E-05 | HCK/TRIM21/HSP90AB1/B2M/IFNGR1/HLA-DRB1/PPARG/IFNG/NR1H3 |

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| BP | GO:0033002 | muscle cell proliferation | 13/189 | 222/18862 | 3.91E-07 | 1.13E-04 | 7.72E-05 | XRCC6/MMP2/HBEGF/HMOX1/ALOX12/ERBB4/PPARG/NOTCH1/IFNG/ANG/ABCC4/GLI1/SHH |
| BP | GO:0046777 | protein autophosphorylation | 13/189 | 226/18862 | 4.79E-07 | 1.28E-04 | 8.79E-05 | BTK/MAP3K3/HCK/PTK2B/IGF1R/CLK1/CSNK1G2/BCR/ERBB4/ALK/DAPK2/STK4/OXSR1 |
| BP | GO:0019217 | regulation of fatty acid metabolic process | 9/189 | 98/18862 | 6.15E-07 | 1.45E-04 | 9.94E-05 | ACADVL/FABP3/PDK2/CYP7A1/ACACB/PPARG/PDK4/CD74/NR1H3 |
| BP | GO:0019216 | regulation of lipid metabolic process | 17/189 | 402/18862 | 6.53E-07 | 1.45E-04 | 9.94E-05 | F2/ACADVL/HMGCS1/VAV3/FABP3/PTK2B/PDK2/PSAP/CYP7A1/ACACB/ALK/PPARG/IFNG/GGPS1/PDK4/CD74/NR1H3 |
| BP | GO:0010631 | epithelial cell migration | 16/189 | 357/18862 | 6.58E-07 | 1.45E-04 | 9.94E-05 | HBEGF/HMOX1/ZEB2/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/FAP/PPARG/NOTCH1/IFNG/DPP4/ARF6/STARD13 |
| BP | GO:0045088 | regulation of innate immune response | 15/189 | 315/18862 | 6.99E-07 | 1.45E-04 | 9.94E-05 | CUL1/EP300/XRCC6/MUC1/HCK/TRIM21/HSP90AB1/SKP1/TLR4/IFNGR1/PPARG/IFNG/BTRC/XIAP/NR1H3 |
| BP | GO:0090132 | epithelium migration | 16/189 | 360/18862 | 7.35E-07 | 1.45E-04 | 9.94E-05 | HBEGF/HMOX1/ZEB2/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/FAP/PPARG/NOTCH1/IFNG/DPP4/ARF6/STARD13 |
| BP | GO:0090130 | tissue migration | 16/189 | 365/18862 | 8.82E-07 | 1.65E-04 | 1.13E-04 | HBEGF/HMOX1/ZEB2/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/FAP/PPARG/NOTCH1/IFNG/DPP4/ARF6/STARD13 |
| BP | GO:0019395 | fatty acid oxidation | 9/189 | 105/18862 | 1.11E-06 | 1.97E-04 | 1.35E-04 | HSD17B4/ACADVL/FABP3/ALOX12/ACACB/PPARG/ECI2/ECHS1/PDK4 |
| BP | GO:0034440 | lipid oxidation | 9/189 | 110/18862 | 1.64E-06 | 2.79E-04 | 1.91E-04 | HSD17B4/ACADVL/FABP3/ALOX12/ACACB/PPARG/ECI2/ECHS1/PDK4 |
| BP | GO:0042180 | cellular ketone metabolic process | 13/189 | 254/18862 | 1.78E-06 | 2.90E-04 | 1.99E-04 | ACADVL/FABP3/PDK2/CYP7A1/ACACB/PPARG/ODC1/PDK4/NMT1/CD74/CYP17A1/SRD5A2/NR1H3 |
| BP | GO:0060736 | prostate gland growth | 4/189 | 10/18862 | 1.96E-06 | 3.05E-04 | 2.09E-04 | AR/ESR1/PSAP/SHH |
| BP | GO:0002695 | negative regulation of leukocyte activation | 11/189 | 182/18862 | 2.31E-06 | 3.46E-04 | 2.37E-04 | HMOX1/BTK/BPI/HLA-DRB1/TNFAIP8L2/HMGB3/PARP3/CD74/IL2/NR1H3/SHH |
| BP | GO:0002683 | negative regulation of immune system process | 16/189 | 403/18862 | 3.19E-06 | 4.59E-04 | 3.15E-04 | HMOX1/BTK/TRIM21/BPI/TLR4/HLA-DRB1/PPARG/RARA/TNFAIP8L2/DPP4/HMGB3/PARP3/CD74/IL2/NR1H3/SHH |
| BP | GO:0006694 | steroid biosynthetic process | 11/189 | 190/18862 | 3.50E-06 | 4.72E-04 | 3.24E-04 | HSD17B4/HMGCS1/CYP7A1/ACACB/IFNG/GGPS1/G6PD/CYP17A1/DHCR24/NPC1L1/SRD5A2 |

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| BP | GO:0042493 | response to drug | 15/189 | 359/18862 | 3.53E-06 | 4.72E-04 | 3.24E-04 | HMGCS1/HMOX1/VAV3/VEGFB/FABP3/PTK2B/HSP90AB1/B2M/ACACB/GAD2/CYP2E1/PPARG/APEX1/NPC1L1/ABCC4 |
| BP | GO:0060330 | regulation of response to interferon-gamma | 5/189 | 25/18862 | 4.33E-06 | 5.10E-04 | 3.50E-04 | HSP90AB1/IFNGR1/PPARG/IFNG/NR1H3 |
| BP | GO:0060334 | regulation of interferon-gamma-mediated signaling pathway | 5/189 | 25/18862 | 4.33E-06 | 5.10E-04 | 3.50E-04 | HSP90AB1/IFNGR1/PPARG/IFNG/NR1H3 |
| BP | GO:0060740 | prostate gland epithelium morphogenesis | 5/189 | 25/18862 | 4.33E-06 | 5.10E-04 | 3.50E-04 | RARG/AR/ESR1/NOTCH1/SHH |
| BP | GO:0048732 | gland development | 16/189 | 413/18862 | 4.36E-06 | 5.10E-04 | 3.50E-04 | RARG/HK2/HMGCS1/AR/HMOX1/ESR1/MSN/PSAP/ERBB4/NOTCH1/SERPINA5/ZIC3/BTRC/ARF6/GLI1/SHH |
| BP | GO:0034341 | response to interferon-gamma | 11/189 | 197/18862 | 4.96E-06 | 5.63E-04 | 3.86E-04 | HCK/TRIM21/HSP90AB1/B2M/TLR4/IFNGR1/HLA-DRB1/PPARG/IFNG/CD74/NR1H3 |
| BP | GO:0000723 | telomere maintenance | 10/189 | 161/18862 | 5.27E-06 | 5.77E-04 | 3.96E-04 | POT1/XRCC6/HSP90AB1/SMG5/HNRNPA2B1/PARN/RPA3/APEX1/PARP3/POLA1 |
| BP | GO:0002831 | regulation of response to biotic stimulus | 16/189 | 420/18862 | 5.39E-06 | 5.77E-04 | 3.96E-04 | CUL1/EP300/XRCC6/MUC1/HCK/TRIM21/HSP90AB1/SKP1/TLR4/IFNGR1/HLA-DRB1/PPARG/IFNG/BTRC/XIAP/NR1H3 |
| BP | GO:0060512 | prostate gland morphogenesis | 5/189 | 27/18862 | 6.47E-06 | 6.73E-04 | 4.61E-04 | RARG/AR/ESR1/NOTCH1/SHH |
| BP | GO:0050673 | epithelial cell proliferation | 16/189 | 428/18862 | 6.84E-06 | 6.85E-04 | 4.70E-04 | AR/HMOX1/VEGFB/ESR1/F3/B2M/TLR4/ITGB3/FAP/PPARG/NOTCH1/ANG/BTRC/SFN/GLI1/SHH |
| BP | GO:0043627 | response to estrogen | 7/189 | 71/18862 | 7.02E-06 | 6.85E-04 | 4.70E-04 | EP300/AR/HMOX1/ESR1/DTYMK/PPARG/RARA |
| BP | GO:0051972 | regulation of telomerase activity | 6/189 | 47/18862 | 7.13E-06 | 6.85E-04 | 4.70E-04 | POT1/HSP90AB1/HNRNPA2B1/PARN/PPARG/PARP3 |
| BP | GO:0006695 | cholesterol biosynthetic process | 7/189 | 72/18862 | 7.71E-06 | 7.05E-04 | 4.83E-04 | HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:1902653 | secondary alcohol biosynthetic process | 7/189 | 72/18862 | 7.71E-06 | 7.05E-04 | 4.83E-04 | HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:0045621 | positive regulation of lymphocyte differentiation | 8/189 | 101/18862 | 8.00E-06 | 7.13E-04 | 4.89E-04 | XRCC6/BTK/HLA-DRB1/RARA/IFNG/CD74/IL2/SHH |
| BP | GO:0010632 | regulation of epithelial cell migration | 13/189 | 293/18862 | 8.49E-06 | 7.39E-04 | 5.07E-04 | HBEGF/HMOX1/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/PPARG/NOTCH1/IFNG/ARF6/STARD13 |

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| BP | GO:1903829 | positive regulation of cellular protein localization | 13/189 | 295/18862 | 9.13E-06 | 7.77E-04 | 5.33E-04 | F2/EPHA3/HSP90AB1/MSN/YWHAQ/ERBB4/IFNG/ARF6/YWHAH/SFN/NMT1/NDC80/SHH |
| BP | GO:0007596 | blood coagulation | 14/189 | 342/18862 | 9.51E-06 | 7.91E-04 | 5.42E-04 | F2/VAV3/HBB/RAC1/ALOX12/F3/ITPK1/TLR4/ITGB3/FAP/SERPINA5/PRKCB/FN1/SHH |
| BP | GO:0045927 | positive regulation of growth | 12/189 | 253/18862 | 9.75E-06 | 7.94E-04 | 5.44E-04 | F2/HBEGF/PTK2B/EXOSC9/ACACB/ERBB4/NOTCH1/SFN/FN1/SEMA4D/IL2/GLI1 |
| BP | GO:0032200 | telomere organization | 10/189 | 174/18862 | 1.05E-05 | 8.22E-04 | 5.64E-04 | POT1/XRCC6/HSP90AB1/SMG5/HNRNPA2B1/PARN/RPA3/APEX1/PARP3/POLA1 |
| BP | GO:0007599 | hemostasis | 14/189 | 346/18862 | 1.08E-05 | 8.22E-04 | 5.64E-04 | F2/VAV3/HBB/RAC1/ALOX12/F3/ITPK1/TLR4/ITGB3/FAP/SERPINA5/PRKCB/FN1/SHH |
| BP | GO:0010634 | positive regulation of epithelial cell migration | 10/189 | 175/18862 | 1.10E-05 | 8.22E-04 | 5.64E-04 | HBEGF/HMOX1/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/IFNG/ARF6 |
| BP | GO:0008209 | androgen metabolic process | 5/189 | 30/18862 | 1.11E-05 | 8.22E-04 | 5.64E-04 | HSD17B4/ESR1/CYP17A1/SRD5A2/SHH |
| BP | GO:0050817 | coagulation | 14/189 | 347/18862 | 1.12E-05 | 8.22E-04 | 5.64E-04 | F2/VAV3/HBB/RAC1/ALOX12/F3/ITPK1/TLR4/ITGB3/FAP/SERPINA5/PRKCB/FN1/SHH |
| BP | GO:0071346 | cellular response to interferon-gamma | 10/189 | 177/18862 | 1.22E-05 | 8.66E-04 | 5.94E-04 | HCK/TRIM21/HSP90AB1/B2M/TLR4/IFNGR1/HLA-DRB1/PPARG/IFNG/NR1H3 |
| BP | GO:2000278 | regulation of DNA biosynthetic process | 8/189 | 107/18862 | 1.23E-05 | 8.66E-04 | 5.94E-04 | POT1/PTK2B/HSP90AB1/SMG5/HNRNPA2B1/PARN/PPARG/PARP3 |
| BP | GO:0016126 | sterol biosynthetic process | 7/189 | 78/18862 | 1.32E-05 | 9.12E-04 | 6.25E-04 | HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:0030098 | lymphocyte differentiation | 14/189 | 358/18862 | 1.59E-05 | 1.07E-03 | 7.36E-04 | EP300/XRCC6/BTK/PTK2B/MSH2/B2M/HLA-DRB1/RARA/YY1/IFNG/HMGB3/CD74/IL2/SHH |
| BP | GO:0022612 | gland morphogenesis | 8/189 | 111/18862 | 1.60E-05 | 1.07E-03 | 7.36E-04 | RARG/AR/ESR1/MSN/NOTCH1/BTRC/GLI1/SHH |
| BP | GO:0051222 | positive regulation of protein transport | 13/189 | 312/18862 | 1.66E-05 | 1.08E-03 | 7.40E-04 | RAC1/HSP90AB1/YWHAQ/TLR4/HLA-DRB1/IFNG/ANG/B3GAT3/ARF6/YWHAH/SFN/NMT1/SHH |
| BP | GO:0072521 | purine-containing compound metabolic process | 16/189 | 460/18862 | 1.67E-05 | 1.08E-03 | 7.40E-04 | HK2/EP300/HSD17B4/HMGCS1/NME3/MTAP/PAPSS1/TTR/PDK2/SULT1A1/ACACB/PGK1/IFNG/FHIT/GART/PDK4 |
| BP | GO:1903131 | mononuclear cell differentiation | 15/189 | 411/18862 | 1.77E-05 | 1.11E-03 | 7.62E-04 | EP300/XRCC6/BTK/PTK2B/MSH2/B2M/HLA-DRB1/PPARG/RARA/YY1/IFNG/HMGB3/CD74/IL2/SHH |

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| BP | GO:0010565 | regulation of cellular ketone metabolic process | 10/189 | 185/18862 | 1.79E-05 | 1.11E-03 | 7.62E-04 | ACADVL/FABP3/PDK2/CYP7A1/ACACB/PPARG/ODC1/PDK4/CD74/NR1H3 |
| BP | GO:0046320 | regulation of fatty acid oxidation | 5/189 | 33/18862 | 1.81E-05 | 1.11E-03 | 7.62E-04 | ACADVL/FABP3/ACACB/PPARG/PDK4 |
| BP | GO:1903706 | regulation of hemopoiesis | 15/189 | 415/18862 | 1.98E-05 | 1.20E-03 | 8.22E-04 | RARG/EP300/XRCC6/BTK/PTK2B/B2M/TLR4/HLA-DRB1/RARA/IFNG/PRKCB/HMGB3/CD74/IL2/SHH |
| BP | GO:0045834 | positive regulation of lipid metabolic process | 9/189 | 150/18862 | 2.07E-05 | 1.23E-03 | 8.45E-04 | F2/VAV3/FABP3/PTK2B/CYP7A1/PPARG/IFNG/CD74/NR1H3 |
| BP | GO:0046661 | male sex differentiation | 9/189 | 153/18862 | 2.43E-05 | 1.42E-03 | 9.73E-04 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/SRD5A2/SHH |
| BP | GO:0043542 | endothelial cell migration | 12/189 | 278/18862 | 2.49E-05 | 1.42E-03 | 9.73E-04 | HMOX1/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/FAP/PPARG/NOTCH1/DPP4/STARD13 |
| BP | GO:0006066 | alcohol metabolic process | 14/189 | 373/18862 | 2.50E-05 | 1.42E-03 | 9.73E-04 | ACADVL/HMGCS1/PTK2B/TTR/ADH1C/ITPK1/SULT1A1/CYP7A1/ACACB/GGPS1/G6PD/CHKA/DHCR24/NPC1L1 |
| BP | GO:0071897 | DNA biosynthetic process | 10/189 | 194/18862 | 2.69E-05 | 1.49E-03 | 1.02E-03 | POT1/PTK2B/HSP90AB1/SMG5/HNRNPA2B1/PARN/RPA3/PPARG/PARP3/POLA1 |
| BP | GO:0045428 | regulation of nitric oxide biosynthetic process | 6/189 | 59/18862 | 2.71E-05 | 1.49E-03 | 1.02E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:1904951 | positive regulation of establishment of protein localization | 13/189 | 328/18862 | 2.79E-05 | 1.52E-03 | 1.04E-03 | RAC1/HSP90AB1/YWHAQ/TLR4/HLA-DRB1/IFNG/ANG/B3GAT3/ARF6/YWHAH/SFN/NMT1/SHH |
| BP | GO:0080164 | regulation of nitric oxide metabolic process | 6/189 | 61/18862 | 3.28E-05 | 1.76E-03 | 1.20E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0019693 | ribose phosphate metabolic process | 15/189 | 435/18862 | 3.42E-05 | 1.80E-03 | 1.23E-03 | HK2/EP300/HSD17B4/HMGCS1/NME3/PAPSS1/PYGL/PDK2/SULT1A1/ACACB/PGK1/IFNG/GART/G6PD/PDK4 |
| BP | GO:0048660 | regulation of smooth muscle cell proliferation | 9/189 | 160/18862 | 3.46E-05 | 1.80E-03 | 1.23E-03 | XRCC6/MMP2/HBEGF/HMOX1/ALOX12/PPARG/IFNG/ANG/ABCC4 |
| BP | GO:0062012 | regulation of small molecule metabolic process | 15/189 | 437/18862 | 3.60E-05 | 1.85E-03 | 1.27E-03 | EP300/ACADVL/HMGCS1/FABP3/PTK2B/PDK2/CYP7A1/ACACB/PPARG/ODC1/IFNG/GGPS1/PDK4/CD74/NR1H3 |
| BP | GO:0045429 | positive regulation of nitric oxide biosynthetic process | 5/189 | 38/18862 | 3.68E-05 | 1.86E-03 | 1.28E-03 | HBB/PTK2B/HSP90AB1/TLR4/IFNG |

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| BP | GO:0048659 | smooth muscle cell proliferation | 9/189 | 162/18862 | 3.81E-05 | 1.90E-03 | 1.30E-03 | XRCC6/MMP2/HBEGF/HMOX1/ALOX12/PPARG/IFNG/ANG/ABCC4 |
| BP | GO:0046890 | regulation of lipid biosynthetic process | 10/189 | 203/18862 | 3.96E-05 | 1.95E-03 | 1.34E-03 | ACADVL/HMGCS1/FABP3/CYP7A1/ACACB/IFNG/GGPS1/PDK4/CD74/NR1H3 |
| BP | GO:1904407 | positive regulation of nitric oxide metabolic process | 5/189 | 39/18862 | 4.18E-05 | 2.03E-03 | 1.39E-03 | HBB/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0006631 | fatty acid metabolic process | 14/189 | 392/18862 | 4.30E-05 | 2.07E-03 | 1.42E-03 | HSD17B4/ACADVL/FABP3/ALOX12/PDK2/CYP7A1/ACACB/CYP2E1/PPARG/ECI2/ECHS1/PDK4/CD74/NR1H3 |
| BP | GO:0045637 | regulation of myeloid cell differentiation | 11/189 | 258/18862 | 6.09E-05 | 2.89E-03 | 1.98E-03 | RARG/EP300/PTK2B/B2M/TLR4/HLA-DRB1/RARA/IFNG/PRKCB/HMGB3/CD74 |
| BP | GO:0008584 | male gonad development | 8/189 | 134/18862 | 6.23E-05 | 2.92E-03 | 2.00E-03 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/SRD5A2 |
| BP | GO:0051251 | positive regulation of lymphocyte activation | 13/189 | 356/18862 | 6.48E-05 | 2.99E-03 | 2.05E-03 | XRCC6/VAV3/BTK/RAC1/MSH2/TLR4/HLA-DRB1/RARA/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0046546 | development of primary male sexual characteristics | 8/189 | 135/18862 | 6.56E-05 | 3.00E-03 | 2.05E-03 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/SRD5A2 |
| BP | GO:0034754 | cellular hormone metabolic process | 8/189 | 136/18862 | 6.91E-05 | 3.07E-03 | 2.11E-03 | HSD17B4/ESR1/TTR/ADH1C/SULT1A1/CYP17A1/SRD5A2/SHH |
| BP | GO:0045619 | regulation of lymphocyte differentiation | 9/189 | 175/18862 | 6.95E-05 | 3.07E-03 | 2.11E-03 | XRCC6/BTK/HLA-DRB1/RARA/IFNG/HMGB3/CD74/IL2/SHH |
| BP | GO:0007548 | sex differentiation | 11/189 | 262/18862 | 6.99E-05 | 3.07E-03 | 2.11E-03 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/ANG/CYP17A1/SRD5A2/SHH |
| BP | GO:0046425 | regulation of JAK-STAT cascade | 7/189 | 101/18862 | 7.06E-05 | 3.07E-03 | 2.11E-03 | F2/NF2/PTK2B/PPP2R1A/ERBB4/NOTCH1/IFNG |
| BP | GO:0002699 | positive regulation of immune effector process | 10/189 | 219/18862 | 7.49E-05 | 3.20E-03 | 2.19E-03 | HMOX1/BTK/MSH2/B2M/TLR4/HLA-DRB1/RARA/IFNG/CD74/IL2 |
| BP | GO:0046620 | regulation of organ growth | 7/189 | 102/18862 | 7.51E-05 | 3.20E-03 | 2.19E-03 | ACACB/ERBB4/NOTCH1/YY1/STK4/G6PD/GLI1 |
| BP | GO:0048708 | astrocyte differentiation | 6/189 | 72/18862 | 8.44E-05 | 3.55E-03 | 2.43E-03 | F2/TLR4/IFNGR1/NOTCH1/IFNG/SHH |
| BP | GO:0001818 | negative regulation of cytokine production | 13/189 | 367/18862 | 8.80E-05 | 3.66E-03 | 2.51E-03 | F2/HMOX1/BTK/RAC1/HDAC7/HSP90AB1/BPI/TLR4/HLA-DRB1/RARA/YY1/IFNG/FN1 |

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| BP | GO:0050920 | regulation of chemotaxis | 10/189 | 224/18862 | 9.03E-05 | 3.71E-03 | 2.54E-03 | VEGFB/RAC1/PTK2B/F3/DAPK2/NOTCH1/DPP4/OXSR1/SEMA4D/CD74 |
| BP | GO:0006809 | nitric oxide biosynthetic process | 6/189 | 73/18862 | 9.12E-05 | 3.71E-03 | 2.54E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:1903793 | positive regulation of anion transport | 15/189 | 478/18862 | 9.88E-05 | 3.98E-03 | 2.73E-03 | FABP3/RAC1/HSP90AB1/YWHAQ/TLR4/HLA-DRB1/IFNG/ANG/B3GAT3/ARF6/YWHAH/SFN/NMT1/NR1H3/SHH |
| BP | GO:0072332 | intrinsic apoptotic signaling pathway by p53 class mediator | 6/189 | 75/18862 | 1.06E-04 | 4.19E-03 | 2.87E-03 | EP300/MUC1/MSH2/PDK2/FHIT/CD74 |
| BP | GO:0050678 | regulation of epithelial cell proliferation | 13/189 | 374/18862 | 1.06E-04 | 4.19E-03 | 2.87E-03 | AR/HMOX1/VEGFB/F3/B2M/TLR4/ITGB3/PPARG/NOTCH1/ANG/SFN/GLI1/SHH |
| BP | GO:0060742 | epithelial cell differentiation involved in prostate gland development | 3/189 | 10/18862 | 1.13E-04 | 4.30E-03 | 2.95E-03 | AR/PSAP/NOTCH1 |
| BP | GO:0002700 | regulation of production of molecular mediator of immune response | 8/189 | 146/18862 | 1.14E-04 | 4.30E-03 | 2.95E-03 | HMOX1/BTK/MSH2/B2M/TLR4/PARP3/CD74/IL2 |
| BP | GO:0044013 | negative regulation of locomotion | 13/189 | 377/18862 | 1.15E-04 | 4.30E-03 | 2.95E-03 | NF2/HMOX1/RAC1/ERBB4/MAGI2/PPARG/NOTCH1/DPP4/APEX1/STAR D13/SEMA4D/CD74/SHH |
| BP | GO:0042113 | B cell activation | 12/189 | 326/18862 | 1.15E-04 | 4.30E-03 | 2.95E-03 | EP300/VAV3/BTK/PTK2B/MSH2/TLR4/YY1/PRKCB/HMGB3/PARP3/CD74/IL2 |
| BP | GO:0010594 | regulation of endothelial cell migration | 10/189 | 231/18862 | 1.16E-04 | 4.30E-03 | 2.95E-03 | HMOX1/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3/PPARG/NOTCH1/STARD13 |
| BP | GO:0044282 | small molecule catabolic process | 14/189 | 431/18862 | 1.18E-04 | 4.30E-03 | 2.95E-03 | HK2/HSD17B4/ACADVL/DCXR/HPD/PAH/SULT1A1/CYP7A1/ACACB/GAD2/PGK1/ECI2/ECHS1/OAT |
| BP | GO:0046394 | carboxylic acid biosynthetic process | 12/189 | 327/18862 | 1.19E-04 | 4.30E-03 | 2.95E-03 | HSD17B4/ACADVL/MTAP/ALOX12/PAH/CYP7A1/ACACB/CYP2E1/OAT/PDK4/CD74/NR1H3 |
| BP | GO:1904892 | regulation of STAT cascade | 7/189 | 110/18862 | 1.21E-04 | 4.30E-03 | 2.95E-03 | F2/NF2/PTK2B/PPP2R1A/ERBB4/NOTCH1/IFNG |
| BP | GO:1900739 | regulation of protein insertion into mitochondrial membrane involved in apoptotic signaling pathway | 4/189 | 26/18862 | 1.23E-04 | 4.30E-03 | 2.95E-03 | YWHAQ/YWHAH/SFN/NMT1 |

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| BP | GO:1900740 | positive regulation of protein insertion into mitochondrial membrane involved in apoptotic signaling pathway | 4/189 | 26/18862 | 1.23E-04 | 4.30E-03 | 2.95E-03 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0046209 | nitric oxide metabolic process | 6/189 | 77/18862 | 1.23E-04 | 4.30E-03 | 2.95E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0060420 | regulation of heart growth | 6/189 | 77/18862 | 1.23E-04 | 4.30E-03 | 2.95E-03 | ACACB/ERBB4/NOTCH1/YY1/G6PD/GLI1 |
| BP | GO:0002218 | activation of innate immune response | 8/189 | 148/18862 | 1.25E-04 | 4.30E-03 | 2.95E-03 | CUL1/EP300/XRCC6/MUC1/HCK/SKP1/TLR4/BTRC |
| BP | GO:0002285 | lymphocyte activation involved in immune response | 9/189 | 189/18862 | 1.25E-04 | 4.30E-03 | 2.95E-03 | PTK2B/MSH2/TLR4/HLA-DRB1/RARA/IFNG/PARP3/CD74/IL2 |
| BP | GO:0030336 | negative regulation of cell migration | 12/189 | 330/18862 | 1.29E-04 | 4.37E-03 | 3.00E-03 | NF2/HMOX1/RAC1/ERBB4/MAGI2/PPARG/NOTCH1/DPP4/APEX1/STAR D13/CD74/SHH |
| BP | GO:0072593 | reactive oxygen species metabolic process | 11/189 | 281/18862 | 1.30E-04 | 4.37E-03 | 3.00E-03 | F2/HK2/HBB/RAC1/PTK2B/ALOX12/HSP90AB1/TLR4/IFNG/G6PD/PDK4 |
| BP | GO:0008203 | cholesterol metabolic process | 8/189 | 149/18862 | 1.31E-04 | 4.37E-03 | 3.00E-03 | ACADVL/HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:2001057 | reactive nitrogen species metabolic process | 6/189 | 78/18862 | 1.32E-04 | 4.37E-03 | 3.00E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0007050 | cell cycle arrest | 10/189 | 235/18862 | 1.34E-04 | 4.40E-03 | 3.02E-03 | EP300/MUC1/HSP90AB1/MSH2/FAP/MAGI2/NOTCH1/IFNG/SFN/DHCR24 |
| BP | GO:2000377 | regulation of reactive oxygen species metabolic process | 9/189 | 192/18862 | 1.41E-04 | 4.59E-03 | 3.15E-03 | F2/HK2/HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG/G6PD |
| BP | GO:0015949 | nucleobase-containing small molecule interconversion | 4/189 | 27/18862 | 1.43E-04 | 4.60E-03 | 3.15E-03 | RRM1/NME3/DTYMK/DCTD |
| BP | GO:0008360 | regulation of cell shape | 8/189 | 151/18862 | 1.44E-04 | 4.60E-03 | 3.15E-03 | F2/RND1/RAC1/HCK/PTK2B/MSN/FN1/SEMA4D |
| BP | GO:0016053 | organic acid biosynthetic process | 12/189 | 335/18862 | 1.49E-04 | 4.65E-03 | 3.19E-03 | HSD17B4/ACADVL/MTAP/ALOX12/PAH/CYP7A1/ACACB/CYP2E1/OAT/PDK4/CD74/NR1H3 |
| BP | GO:0006163 | purine nucleotide metabolic process | 14/189 | 441/18862 | 1.50E-04 | 4.65E-03 | 3.19E-03 | HK2/EP300/HSD17B4/HMGCS1/NME3/PAPSS1/PDK2/SULT1A1/ACACB/P GK1/IFNG/FHIT/GART/PDK4 |

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| BP | GO:0010660 | regulation of muscle cell apoptotic process | 6/189 | 80/18862 | 1.52E-04 | 4.65E-03 | 3.19E-03 | HMOX1/PTK2B/ALOX12/PPARG/IFNG/STK4 |
| BP | GO:0038093 | Fc receptor signaling pathway | 10/189 | 239/18862 | 1.54E-04 | 4.65E-03 | 3.19E-03 | CUL1/VAV3/BTK/RAC1/HCK/FCGR2A/HSP90AB1/SKP1/NFATC1/BTRC |
| BP | GO:0046598 | positive regulation of viral entry into host cell | 3/189 | 11/18862 | 1.54E-04 | 4.65E-03 | 3.19E-03 | TRIM21/HLA-DRB1/CD74 |
| BP | GO:0051974 | negative regulation of telomerase activity | 3/189 | 11/18862 | 1.54E-04 | 4.65E-03 | 3.19E-03 | POT1/PPARG/PARP3 |
| BP | GO:0075294 | positive regulation by symbiont of entry into host | 3/189 | 11/18862 | 1.54E-04 | 4.65E-03 | 3.19E-03 | TRIM21/HLA-DRB1/CD74 |
| BP | GO:0051250 | negative regulation of lymphocyte activation | 8/189 | 153/18862 | 1.57E-04 | 4.71E-03 | 3.23E-03 | BTK/HLA-DRB1/TNFAIP8L2/HMGB3/PARP3/CD74/IL2/SHH |
| BP | GO:1902107 | positive regulation of leukocyte differentiation | 8/189 | 154/18862 | 1.64E-04 | 4.85E-03 | 3.33E-03 | XRCC6/BTK/HLA-DRB1/RARA/IFNG/CD74/IL2/SHH |
| BP | GO:1903708 | positive regulation of hemopoiesis | 8/189 | 154/18862 | 1.64E-04 | 4.85E-03 | 3.33E-03 | XRCC6/BTK/HLA-DRB1/RARA/IFNG/CD74/IL2/SHH |
| BP | GO:0046395 | carboxylic acid catabolic process | 10/189 | 243/18862 | 1.76E-04 | 5.15E-03 | 3.53E-03 | HSD17B4/ACADVL/DCXR/HPD/PAH/ACACB/GAD2/ECI2/ECHS1/OAT |
| BP | GO:0046165 | alcohol biosynthetic process | 8/189 | 156/18862 | 1.80E-04 | 5.22E-03 | 3.58E-03 | HMGCS1/PTK2B/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:0045806 | negative regulation of endocytosis | 5/189 | 53/18862 | 1.86E-04 | 5.36E-03 | 3.68E-03 | RAC1/EPHA3/ITGB3/ARF6/NR1H3 |
| BP | GO:0030168 | platelet activation | 8/189 | 157/18862 | 1.88E-04 | 5.37E-03 | 3.68E-03 | F2/VAV3/HBB/ALOX12/TLR4/ITGB3/PRKCB/FN1 |
| BP | GO:2000146 | negative regulation of cell motility | 12/189 | 345/18862 | 1.95E-04 | 5.43E-03 | 3.72E-03 | NF2/HMOX1/RAC1/ERBB4/MAGI2/PPARG/NOTCH1/DPP4/APEX1/STAR D13/CD74/SHH |
| BP | GO:1902652 | secondary alcohol metabolic process | 8/189 | 158/18862 | 1.96E-04 | 5.43E-03 | 3.72E-03 | ACADVL/HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:0002688 | regulation of leukocyte chemotaxis | 7/189 | 119/18862 | 1.98E-04 | 5.43E-03 | 3.72E-03 | VEGFB/RAC1/PTK2B/DAPK2/DPP4/OXSR1/CD74 |
| BP | GO:0007162 | negative regulation of cell adhesion | 11/189 | 295/18862 | 1.99E-04 | 5.43E-03 | 3.72E-03 | NF2/MUC1/RND1/ALOX12/HLA-DRB1/NOTCH1/TNFAIP8L2/SEMA4D/CD74/IL2/SHH |

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| BP | GO:0010657 | muscle cell apoptotic process | 6/189 | 84/18862 | 1.99E-04 | 5.43E-03 | 3.72E-03 | HMOX1/PTK2B/ALOX12/PPARG/IFNG/STK4 |
| BP | GO:0014031 | mesenchymal cell development | 6/189 | 84/18862 | 1.99E-04 | 5.43E-03 | 3.72E-03 | ERBB4/ANXA6/NOTCH1/FN1/SEMA4D/SHH |
| BP | GO:0002381 | immunoglobulin production involved in immunoglobulin mediated immune response | 5/189 | 54/18862 | 2.03E-04 | 5.48E-03 | 3.76E-03 | BTK/MSH2/HLA-DRB1/PARP3/IL2 |
| BP | GO:0042304 | regulation of fatty acid biosynthetic process | 5/189 | 54/18862 | 2.03E-04 | 5.48E-03 | 3.76E-03 | ACADVL/CYP7A1/PDK4/CD74/NR1H3 |
| BP | GO:0002696 | positive regulation of leukocyte activation | 13/189 | 401/18862 | 2.11E-04 | 5.65E-03 | 3.87E-03 | XRCC6/VAV3/BTK/RAC1/MSH2/TLR4/HLA-DRB1/RARA/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0050679 | positive regulation of epithelial cell proliferation | 9/189 | 203/18862 | 2.14E-04 | 5.69E-03 | 3.90E-03 | AR/HMOX1/VEGFB/F3/TLR4/ITGB3/NOTCH1/ANG/SHH |
| BP | GO:0001844 | protein insertion into mitochondrial membrane involved in apoptotic signaling pathway | 4/189 | 30/18862 | 2.18E-04 | 5.76E-03 | 3.95E-03 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0001755 | neural crest cell migration | 5/189 | 55/18862 | 2.22E-04 | 5.76E-03 | 3.95E-03 | ERBB4/ANXA6/FN1/SEMA4D/SHH |
| BP | GO:1903428 | positive regulation of reactive oxygen species biosynthetic process | 5/189 | 55/18862 | 2.22E-04 | 5.76E-03 | 3.95E-03 | HBB/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0030307 | positive regulation of cell growth | 8/189 | 161/18862 | 2.23E-04 | 5.76E-03 | 3.95E-03 | F2/HBEGF/PTK2B/EXOSC9/SFN/FN1/SEMA4D/IL2 |
| BP | GO:0002685 | regulation of leukocyte migration | 9/189 | 205/18862 | 2.30E-04 | 5.91E-03 | 4.05E-03 | HMOX1/VEGFB/RAC1/PTK2B/MSN/DAPK2/DPP4/OXSR1/CD74 |
| BP | GO:0051271 | negative regulation of cellular component movement | 12/189 | 352/18862 | 2.34E-04 | 5.97E-03 | 4.09E-03 | NF2/HMOX1/RAC1/ERBB4/MAGI2/PPARG/NOTCH1/DPP4/APEX1/STAR/D13/CD74/SHH |
| BP | GO:0002064 | epithelial cell development | 9/189 | 207/18862 | 2.47E-04 | 6.26E-03 | 4.29E-03 | RARG/HSD17B4/AR/ESR1/MSN/MAGI2/NOTCH1/TJP1/SFN |
| BP | GO:0009150 | purine ribonucleotide metabolic process | 13/189 | 408/18862 | 2.50E-04 | 6.28E-03 | 4.30E-03 | HK2/EP300/HSD17B4/HMGCS1/NME3/PAPSS1/PDK2/SULT1A1/ACACB/P GK1/IFNG/GART/PDK4 |

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| BP | GO:0031334 | positive regulation of protein complex assembly | 10/189 | 254/18862 | 2.51E-04 | 6.28E-03 | 4.30E-03 | ESR1/RAC1/HCK/PTK2B/MSN/TLR4/RPA3/MMP1/IFNG/ARF6 |
| BP | GO:0045582 | positive regulation of T cell differentiation | 6/189 | 88/18862 | 2.56E-04 | 6.36E-03 | 4.36E-03 | HLA-DRB1/RARA/IFNG/CD74/IL2/SHH |
| BP | GO:0010745 | negative regulation of macrophage derived foam cell differentiation | 3/189 | 13/18862 | 2.63E-04 | 6.41E-03 | 4.39E-03 | ITGB3/PPARG/NR1H3 |
| BP | GO:1903054 | negative regulation of extracellular matrix organization | 3/189 | 13/18862 | 2.63E-04 | 6.41E-03 | 4.39E-03 | FAP/NOTCH1/DPP4 |
| BP | GO:0016125 | sterol metabolic process | 8/189 | 165/18862 | 2.63E-04 | 6.41E-03 | 4.39E-03 | ACADVL/HMGCS1/CYP7A1/ACACB/GGPS1/G6PD/DHCR24/NPC1L1 |
| BP | GO:0050867 | positive regulation of cell activation | 13/189 | 412/18862 | 2.74E-04 | 6.59E-03 | 4.52E-03 | XRCC6/VAV3/BTK/RAC1/MSH2/TLR4/HLA-DRB1/RARA/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0007259 | JAK-STAT cascade | 8/189 | 166/18862 | 2.75E-04 | 6.59E-03 | 4.52E-03 | F2/NF2/PTK2B/PPP2R1A/ERBB4/NOTCH1/IFNG/IL2 |
| BP | GO:0090022 | regulation of neutrophil chemotaxis | 4/189 | 32/18862 | 2.82E-04 | 6.73E-03 | 4.61E-03 | RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0016054 | organic acid catabolic process | 10/189 | 258/18862 | 2.85E-04 | 6.75E-03 | 4.63E-03 | HSD17B4/ACADVL/DCXR/HPD/PAH/ACACB/GAD2/ECI2/ECHS1/OAT |
| BP | GO:0016049 | cell growth | 14/189 | 470/18862 | 2.88E-04 | 6.78E-03 | 4.65E-03 | F2/RARG/HBEGF/PTK2B/PPP2R1A/HSP90AB1/EXOSC9/PPARG/YY1/SFN/G6PD/FN1/SEMA4D/IL2 |
| BP | GO:1905477 | positive regulation of protein localization to membrane | 7/189 | 127/18862 | 2.95E-04 | 6.82E-03 | 4.68E-03 | EPHA3/YWHAQ/IFNG/ARF6/YWHAH/SFN/NMT1 |
| BP | GO:0007163 | establishment or maintenance of cell polarity | 9/189 | 212/18862 | 2.95E-04 | 6.82E-03 | 4.68E-03 | RND1/RAC1/PTK2B/HSP90AB1/MSN/WEE1/ARF6/NDC80/SHH |
| BP | GO:0008406 | gonad development | 9/189 | 212/18862 | 2.95E-04 | 6.82E-03 | 4.68E-03 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/ANG/SRD5A2 |
| BP | GO:0006633 | fatty acid biosynthetic process | 8/189 | 168/18862 | 2.98E-04 | 6.84E-03 | 4.69E-03 | ACADVL/ALOX12/CYP7A1/ACACB/CYP2E1/PDK4/CD74/NR1H3 |
| BP | GO:0002690 | positive regulation of leukocyte chemotaxis | 6/189 | 91/18862 | 3.08E-04 | 6.98E-03 | 4.79E-03 | VEGFB/RAC1/PTK2B/DAPK2/OXSR1/CD74 |

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| BP | GO:0034502 | protein localization to chromosome | 6/189 | 91/18862 | 3.08E-04 | 6.98E-03 | 4.79E-03 | POT1/ESR1/MSH2/CTCF/NDC80/PARP3 |
| BP | GO:0050730 | regulation of peptidyl-tyrosine phosphorylation | 10/189 | 262/18862 | 3.22E-04 | 7.19E-03 | 4.93E-03 | NF2/HBEGF/PTK2B/PPP2R1A/ERBB4/ITGB3/IFNG/SEMA4D/CD74/IL2 |
| BP | GO:0051099 | positive regulation of binding | 8/189 | 170/18862 | 3.22E-04 | 7.19E-03 | 4.93E-03 | EP300/TRIM21/HSP90AB1/B2M/PPARG/RARA/IFNG/STK4 |
| BP | GO:0030099 | myeloid cell differentiation | 13/189 | 419/18862 | 3.22E-04 | 7.19E-03 | 4.93E-03 | RARG/EP300/PTK2B/B2M/TLR4/HLA-DRB1/PPARG/RARA/IFNG/PRKCB/HMGB3/G6PD/CD74 |
| BP | GO:0045137 | development of primary sexual characteristics | 9/189 | 217/18862 | 3.50E-04 | 7.76E-03 | 5.32E-03 | CSDE1/RRM1/HSD17B4/HMGCS1/AR/ESR1/MSH2/ANG/SRD5A2 |
| BP | GO:0030888 | regulation of B cell proliferation | 5/189 | 61/18862 | 3.62E-04 | 7.90E-03 | 5.41E-03 | VAV3/BTK/TLR4/CD74/IL2 |
| BP | GO:0090181 | regulation of cholesterol metabolic process | 5/189 | 61/18862 | 3.62E-04 | 7.90E-03 | 5.41E-03 | ACADVL/HMGCS1/CYP7A1/ACACB/GGPS1 |
| BP | GO:0051091 | positive regulation of DNA-binding transcription factor activity | 10/189 | 266/18862 | 3.63E-04 | 7.90E-03 | 5.41E-03 | EP300/AR/BTK/ESR1/TRIM21/TLR4/ALK/PPARG/PRKCB/SHH |
| BP | GO:0009259 | ribonucleotide metabolic process | 13/189 | 425/18862 | 3.69E-04 | 7.95E-03 | 5.45E-03 | HK2/EP300/HSD17B4/HMGCS1/NME3/PAPSS1/PDK2/SULT1A1/ACACB/P GK1/IFNG/GART/PDK4 |
| BP | GO:0045785 | positive regulation of cell adhesion | 13/189 | 425/18862 | 3.69E-04 | 7.95E-03 | 5.45E-03 | VAV3/RAC1/PTK2B/HLA-DRB1/RARA/TJP1/IFNG/STK4/DPP4/FN1/CD74/IL2/SHH |
| BP | GO:0010595 | positive regulation of endothelial cell migration | 7/189 | 132/18862 | 3.73E-04 | 7.97E-03 | 5.46E-03 | HMOX1/MAP3K3/RAC1/PTK2B/HDAC7/ALOX12/ITGB3 |
| BP | GO:0032388 | positive regulation of intracellular transport | 9/189 | 219/18862 | 3.75E-04 | 7.97E-03 | 5.46E-03 | HSP90AB1/MSN/YWHAQ/IFNG/B3GAT3/YWHAH/SFN/NMT1/SHH |
| BP | GO:0051235 | maintenance of location | 11/189 | 319/18862 | 3.87E-04 | 8.19E-03 | 5.62E-03 | F2/HK2/PTK2B/SKP1/ACACB/ITGB3/ANXA6/PPARG/ATP7B/ALB/NR1H3 |
| BP | GO:0043534 | blood vessel endothelial cell migration | 8/189 | 175/18862 | 3.92E-04 | 8.19E-03 | 5.62E-03 | HMOX1/MAP3K3/PTK2B/HDAC7/ALOX12/PPARG/NOTCH1/STARD13 |
| BP | GO:0097696 | STAT cascade | 8/189 | 175/18862 | 3.92E-04 | 8.19E-03 | 5.62E-03 | F2/NF2/PTK2B/PPP2R1A/ERBB4/NOTCH1/IFNG/IL2 |

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| BP | GO:0010975 | regulation of neuron projection development | 13/189 | 428/18862 | 3.95E-04 | 8.21E-03 | 5.63E-03 | EP300/MARK1/PTPRF/EPHA3/PTK2B/B2M/MAGI2/ALK/ARF6/YWHAH/RTN4IP1/FN1/SEMA4D |
| BP | GO:1901030 | positive regulation of mitochondrial outer membrane permeabilization involved in apoptotic signaling pathway | 4/189 | 35/18862 | 4.01E-04 | 8.30E-03 | 5.69E-03 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0030258 | lipid modification | 10/189 | 270/18862 | 4.08E-04 | 8.30E-03 | 5.69E-03 | HSD17B4/ACADVL/FABP3/ALOX12/ACACB/CYP2E1/PPARG/ECI2/ECHS1/PDK4 |
| BP | GO:0045930 | negative regulation of mitotic cell cycle | 11/189 | 321/18862 | 4.08E-04 | 8.30E-03 | 5.69E-03 | CUL1/EP300/MUC1/MSH2/SKP1/WEE1/FAP/MAGI2/NAE1/SFN/NDC80 |
| BP | GO:0048010 | vascular endothelial growth factor receptor signaling pathway | 6/189 | 96/18862 | 4.11E-04 | 8.30E-03 | 5.69E-03 | VAV3/VEGFB/RAC1/PTK2B/ITGB3/PRKCB |
| BP | GO:0009263 | deoxyribonucleotide biosynthetic process | 3/189 | 15/18862 | 4.12E-04 | 8.30E-03 | 5.69E-03 | RRM1/DTYMK/DCTD |
| BP | GO:0071391 | cellular response to estrogen stimulus | 3/189 | 15/18862 | 4.12E-04 | 8.30E-03 | 5.69E-03 | AR/ESR1/RARA |
| BP | GO:0050773 | regulation of dendrite development | 6/189 | 97/18862 | 4.34E-04 | 8.69E-03 | 5.96E-03 | MARK1/ALK/ARF6/YWHAH/RTN4IP1/SEMA4D |
| BP | GO:0072330 | monocarboxylic acid biosynthetic process | 9/189 | 224/18862 | 4.42E-04 | 8.80E-03 | 6.03E-03 | HSD17B4/ACADVL/ALOX12/CYP7A1/ACACB/CYP2E1/PDK4/CD74/NR1H3 |
| BP | GO:0051148 | negative regulation of muscle cell differentiation | 5/189 | 64/18862 | 4.53E-04 | 8.97E-03 | 6.15E-03 | NFATC1/NOTCH1/YY1/G6PD/SHH |
| BP | GO:0090316 | positive regulation of intracellular protein transport | 8/189 | 179/18862 | 4.55E-04 | 8.97E-03 | 6.15E-03 | HSP90AB1/YWHAQ/IFNG/B3GAT3/YWHAH/SFN/NMT1/SHH |
| BP | GO:0030522 | intracellular receptor signaling pathway | 10/189 | 274/18862 | 4.58E-04 | 8.98E-03 | 6.15E-03 | RARG/EP300/AR/ESR1/TLR4/PPARG/RARA/XIAP/YWHAH/NR1H3 |
| BP | GO:0030010 | establishment of cell polarity | 7/189 | 137/18862 | 4.67E-04 | 9.05E-03 | 6.21E-03 | PTK2B/HSP90AB1/MSN/WEE1/ARF6/NDC80/SHH |
| BP | GO:0030183 | B cell differentiation | 7/189 | 137/18862 | 4.67E-04 | 9.05E-03 | 6.21E-03 | EP300/BTK/PTK2B/MSH2/YY1/HMGB3/IL2 |
| BP | GO:0022407 | regulation of cell-cell adhesion | 13/189 | 437/18862 | 4.80E-04 | 9.27E-03 | 6.36E-03 | NF2/RAC1/ALOX12/HLA-DRB1/NOTCH1/RARA/TJP1/IFNG/TNFAIP8L2/DPP4/CD74/IL2/SHH |

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| BP | GO:1903426 | regulation of reactive oxygen species biosynthetic process | 6/189 | 99/18862 | 4.84E-04 | 9.30E-03 | 6.37E-03 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0051051 | negative regulation of transport | 13/189 | 438/18862 | 4.91E-04 | 9.38E-03 | 6.43E-03 | HMOX1/RAC1/EPHA3/PTK2B/YWHAQ/ITGB3/NOTCH1/ARF6/PRKCB/OXSR1/CD74/NR1H3/SHH |
| BP | GO:0042176 | regulation of protein catabolic process | 12/189 | 383/18862 | 5.01E-04 | 9.47E-03 | 6.49E-03 | PTK2B/WWP1/HSP90AB1/MSN/RAB26/ATXN3/ODC1/IFNG/SNX1/BTRC/FHIT/SHH |
| BP | GO:0045591 | positive regulation of regulatory T cell differentiation | 3/189 | 16/18862 | 5.04E-04 | 9.47E-03 | 6.49E-03 | HLA-DRB1/IFNG/IL2 |
| BP | GO:0050921 | positive regulation of chemotaxis | 7/189 | 139/18862 | 5.09E-04 | 9.47E-03 | 6.49E-03 | VEGFB/RAC1/PTK2B/F3/DAPK2/OXSR1/CD74 |
| BP | GO:0055076 | transition metal ion homeostasis | 7/189 | 139/18862 | 5.09E-04 | 9.47E-03 | 6.49E-03 | CUL1/HMOX1/SKP1/B2M/ATP7B/IFNG/XIAP |
| BP | GO:0008630 | intrinsic apoptotic signaling pathway in response to DNA damage | 6/189 | 100/18862 | 5.11E-04 | 9.47E-03 | 6.49E-03 | EP300/HMOX1/MUC1/MSH2/SFN/CD74 |
| BP | GO:0060419 | heart growth | 6/189 | 100/18862 | 5.11E-04 | 9.47E-03 | 6.49E-03 | ACACB/ERBB4/NOTCH1/YY1/G6PD/GLI1 |
| BP | GO:0042593 | glucose homeostasis | 9/189 | 229/18862 | 5.18E-04 | 9.56E-03 | 6.55E-03 | HK2/RAC1/IGF1R/PYGL/PDK2/CYP7A1/HLA-DRB1/PPARG/PDK4 |
| BP | GO:0070482 | response to oxygen levels | 12/189 | 385/18862 | 5.25E-04 | 9.56E-03 | 6.55E-03 | HK2/EP300/MMP2/HMOX1/VEGFB/PTK2B/FAS/PPARG/PGK1/NOTCH1/ANG/DPP4 |
| BP | GO:1902105 | regulation of leukocyte differentiation | 10/189 | 279/18862 | 5.27E-04 | 9.56E-03 | 6.55E-03 | XRCC6/BTK/TLR4/HLA-DRB1/RARA/IFNG/HMGB3/CD74/IL2/SHH |
| BP | GO:0033865 | nucleoside bisphosphate metabolic process | 7/189 | 140/18862 | 5.31E-04 | 9.56E-03 | 6.55E-03 | HSD17B4/HMGCS1/PAPSS1/PDK2/SULT1A1/ACACB/PDK4 |
| BP | GO:0033875 | ribonucleoside bisphosphate metabolic process | 7/189 | 140/18862 | 5.31E-04 | 9.56E-03 | 6.55E-03 | HSD17B4/HMGCS1/PAPSS1/PDK2/SULT1A1/ACACB/PDK4 |
| BP | GO:0034032 | purine nucleoside bisphosphate metabolic process | 7/189 | 140/18862 | 5.31E-04 | 9.56E-03 | 6.55E-03 | HSD17B4/HMGCS1/PAPSS1/PDK2/SULT1A1/ACACB/PDK4 |
| BP | GO:0033500 | carbohydrate homeostasis | 9/189 | 230/18862 | 5.34E-04 | 9.56E-03 | 6.55E-03 | HK2/RAC1/IGF1R/PYGL/PDK2/CYP7A1/HLA-DRB1/PPARG/PDK4 |

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| BP | GO:1902106 | negative regulation of leukocyte differentiation | 6/189 | 101/18862 | 5.39E-04 | 9.56E-03 | 6.55E-03 | TLR4/RARA/HMGB3/CD74/IL2/SHH |
| BP | GO:2000379 | positive regulation of reactive oxygen species metabolic process | 6/189 | 101/18862 | 5.39E-04 | 9.56E-03 | 6.55E-03 | F2/HBB/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:0002040 | sprouting angiogenesis | 8/189 | 184/18862 | 5.46E-04 | 9.62E-03 | 6.59E-03 | HMOX1/VEGFB/MAP3K3/PTK2B/HDAC7/NOTCH1/TJP1/STARD13 |
| BP | GO:0006084 | acetyl-CoA metabolic process | 4/189 | 38/18862 | 5.52E-04 | 9.62E-03 | 6.59E-03 | HMGCS1/PDK2/ACACB/PDK4 |
| BP | GO:0010742 | macrophage derived foam cell differentiation | 4/189 | 38/18862 | 5.52E-04 | 9.62E-03 | 6.59E-03 | EP300/ITGB3/PPARG/NR1H3 |
| BP | GO:0090077 | foam cell differentiation | 4/189 | 38/18862 | 5.52E-04 | 9.62E-03 | 6.59E-03 | EP300/ITGB3/PPARG/NR1H3 |
| BP | GO:0051090 | regulation of DNA-binding transcription factor activity | 13/189 | 444/18862 | 5.57E-04 | 9.66E-03 | 6.62E-03 | EP300/AR/HMOX1/BTK/ESR1/HCK/TRIM21/TLR4/ALK/PPARG/BTRC/PRKCB/SHH |
| BP | GO:0046637 | regulation of alpha-beta T cell differentiation | 5/189 | 67/18862 | 5.59E-04 | 9.66E-03 | 6.62E-03 | HLA-DRB1/RARA/IFNG/IL2/SHH |
| BP | GO:0042116 | macrophage activation | 6/189 | 102/18862 | 5.68E-04 | 9.75E-03 | 6.68E-03 | BPI/TLR4/IFNGR1/IFNG/CD74/NR1H3 |
| BP | GO:0007249 | I-kappaB kinase/NF-kappaB signaling | 10/189 | 282/18862 | 5.73E-04 | 9.79E-03 | 6.71E-03 | HMOX1/BTK/MAP3K3/ESR1/TRIM21/TLR4/HLA-DRB1/BTRC/PRKCB/CD74 |
| BP | GO:0045765 | regulation of angiogenesis | 11/189 | 335/18862 | 5.83E-04 | 9.92E-03 | 6.80E-03 | HK2/HMOX1/VEGFB/PTK2B/F3/GTF2I/PPARG/PKG1/TJP1/PRKCB/THBS2 |
| BP | GO:0042063 | gliogenesis | 10/189 | 283/18862 | 5.89E-04 | 9.93E-03 | 6.81E-03 | F2/NF2/PTK2B/NSUN5/TLR4/IFNGR1/PPARG/NOTCH1/IFNG/SHH |
| BP | GO:0097193 | intrinsic apoptotic signaling pathway | 10/189 | 283/18862 | 5.89E-04 | 9.93E-03 | 6.81E-03 | CUL1/EP300/HMOX1/MUC1/MSH2/PDK2/DAPK2/FHIT/SFN/CD74 |
| BP | GO:0006576 | cellular biogenic amine metabolic process | 6/189 | 103/18862 | 5.98E-04 | 1.00E-02 | 6.87E-03 | DHPS/PAH/SULT1A1/ODC1/PNMT/CHKA |
| BP | GO:0034393 | positive regulation of smooth muscle cell apoptotic process | 3/189 | 17/18862 | 6.07E-04 | 1.00E-02 | 6.87E-03 | PPARG/IFNG/STK4 |

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| BP | GO:006074 | mammary gland alveolus development | 3/189 | 17/18862 | 6.07E-04 | 1.00E-02 | 6.87E-03 | AR/ESR1/ERBB4 |
| BP | GO:006137 | mammary gland lobule development | 3/189 | 17/18862 | 6.07E-04 | 1.00E-02 | 6.87E-03 | AR/ESR1/ERBB4 |
| BP | GO:000637 | transcription initiation from RNA polymerase II promoter | 8/189 | 187/18862 | 6.08E-04 | 1.00E-02 | 6.87E-03 | RARG/AR/ESR1/PPARG/NOTCH1/RARA/TAF13/NR1H3 |
| BP | GO:000244 | production of molecular mediator of immune response | 10/189 | 286/18862 | 6.39E-04 | 1.05E-02 | 7.19E-03 | HMOX1/BTK/MSH2/B2M/TLR4/HLA-DRB1/YY1/PARP3/CD74/IL2 |
| BP | GO:003210 | negative regulation of response to external stimulus | 12/189 | 394/18862 | 6.44E-04 | 1.05E-02 | 7.21E-03 | F2/TRIM21/ALOX12/FAP/HLA-DRB1/PPARG/NOTCH1/TNFAIP8L2/DPP4/SEMA4D/IL2/NR1H3 |
| BP | GO:002248 | negative regulation of cell-cell adhesion | 8/189 | 189/18862 | 6.52E-04 | 1.06E-02 | 7.27E-03 | NF2/ALOX12/HLA-DRB1/NOTCH1/TNFAIP8L2/CD74/IL2/SHH |
| BP | GO:190370 | negative regulation of hemopoiesis | 6/189 | 105/18862 | 6.62E-04 | 1.07E-02 | 7.36E-03 | TLR4/RARA/HMGB3/CD74/IL2/SHH |
| BP | GO:003089 | positive regulation of B cell proliferation | 4/189 | 40/18862 | 6.73E-04 | 1.08E-02 | 7.44E-03 | VAV3/TLR4/CD74/IL2 |
| BP | GO:190134 | regulation of vasculature development | 11/189 | 341/18862 | 6.75E-04 | 1.08E-02 | 7.44E-03 | HK2/HMOX1/VEGFB/PTK2B/F3/GTF2I/PPARG/PGK1/TJP1/PRKCB/THBS2 |
| BP | GO:005502 | regulation of cardiac muscle tissue growth | 5/189 | 70/18862 | 6.84E-04 | 1.10E-02 | 7.51E-03 | ERBB4/NOTCH1/YY1/G6PD/GLI1 |
| BP | GO:007099 | neuron death | 11/189 | 342/18862 | 6.91E-04 | 1.10E-02 | 7.55E-03 | HMOX1/PTK2B/HSP90AB1/MSH2/TLR4/FAS/NAE1/IFNG/XIAP/G6PD/DHCR24 |
| BP | GO:015015 | NA | 6/189 | 106/18862 | 6.96E-04 | 1.10E-02 | 7.57E-03 | RAC1/EPHA3/PTK2B/BCR/ARF6/FN1 |
| BP | GO:007027 | lymphocyte apoptotic process | 5/189 | 71/18862 | 7.30E-04 | 1.15E-02 | 7.91E-03 | BTK/DFFA/FAS/CD74/IL2 |
| BP | GO:005073 | positive regulation of peptidyl-tyrosine phosphorylation | 8/189 | 193/18862 | 7.47E-04 | 1.17E-02 | 8.03E-03 | HBEGF/PTK2B/ERBB4/ITGB3/IFNG/SEMA4D/CD74/IL2 |
| BP | GO:005086 | regulation of B cell activation | 8/189 | 193/18862 | 7.47E-04 | 1.17E-02 | 8.03E-03 | VAV3/BTK/MSH2/TLR4/HMGB3/PARP3/CD74/IL2 |
| BP | GO:190547 | regulation of protein localization to membrane | 8/189 | 194/18862 | 7.73E-04 | 1.21E-02 | 8.27E-03 | AR/EPHA3/YWHAQ/IFNG/ARF6/YWHAH/SFN/NMT1 |

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| BP | GO:0062197 | NA | 11/189 | 347/18862 | 7.79E-04 | 1.21E-02 | 8.29E-03 | XRCC6/MMP2/HMOX1/BTK/PDK2/TLR4/FAS/PPARG/APEX1/OXSR1/G6PD |
| BP | GO:0046390 | ribose phosphate biosynthetic process | 8/189 | 195/18862 | 7.99E-04 | 1.23E-02 | 8.42E-03 | NME3/PAPSS1/PYGL/PDK2/ACACB/GART/G6PD/PDK4 |
| BP | GO:0043535 | regulation of blood vessel endothelial cell migration | 7/189 | 150/18862 | 8.00E-04 | 1.23E-02 | 8.42E-03 | HMOX1/MAP3K3/HDAC7/ALOX12/PPARG/NOTCH1/STARD13 |
| BP | GO:0050777 | negative regulation of immune response | 7/189 | 150/18862 | 8.00E-04 | 1.23E-02 | 8.42E-03 | HMOX1/TRIM21/HLA-DRB1/PPARG/PARP3/IL2/NR1H3 |
| BP | GO:0032963 | collagen metabolic process | 6/189 | 109/18862 | 8.06E-04 | 1.23E-02 | 8.44E-03 | F2/MMP2/CYP7A1/FAP/PPARG/MMP1 |
| BP | GO:0048806 | genitalia development | 4/189 | 42/18862 | 8.12E-04 | 1.23E-02 | 8.44E-03 | AR/ESR1/SRD5A2/SHH |
| BP | GO:1902622 | regulation of neutrophil migration | 4/189 | 42/18862 | 8.12E-04 | 1.23E-02 | 8.44E-03 | RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0043122 | regulation of I-kappaB kinase/NF-kappaB signaling | 9/189 | 244/18862 | 8.15E-04 | 1.23E-02 | 8.44E-03 | HMOX1/MAP3K3/ESR1/TRIM21/TLR4/HLA-DRB1/BTRC/PRKCB/CD74 |
| BP | GO:0001558 | regulation of cell growth | 12/189 | 406/18862 | 8.36E-04 | 1.26E-02 | 8.62E-03 | F2/HBEGF/PTK2B/PPP2R1A/EXOSC9/PPARG/YY1/SFN/G6PD/FN1/SEMA4D/IL2 |
| BP | GO:0002902 | regulation of B cell apoptotic process | 3/189 | 19/18862 | 8.52E-04 | 1.27E-02 | 8.73E-03 | BTK/CD74/IL2 |
| BP | GO:0002697 | regulation of immune effector process | 13/189 | 465/18862 | 8.54E-04 | 1.27E-02 | 8.73E-03 | F2/HMOX1/BTK/MSH2/B2M/TLR4/HLA-DRB1/RARA/IFNG/C1R/PARP3/CD74/IL2 |
| BP | GO:0044843 | cell cycle G1/S phase transition | 10/189 | 298/18862 | 8.75E-04 | 1.30E-02 | 8.91E-03 | CUL1/EP300/MUC1/SEN2/WEE1/RPA3/APEX1/SFN/GLI1/POLA1 |
| BP | GO:0051054 | positive regulation of DNA metabolic process | 8/189 | 198/18862 | 8.82E-04 | 1.31E-02 | 8.95E-03 | POT1/PTK2B/HSP90AB1/MSH2/HNRNPA2B1/PARN/PARP3/IL2 |
| BP | GO:0070266 | apoptotic process | 4/189 | 43/18862 | 8.88E-04 | 1.31E-02 | 8.98E-03 | PYGL/ITPK1/TLR4/FAS |
| BP | GO:0051052 | regulation of DNA metabolic process | 11/189 | 353/18862 | 8.95E-04 | 1.31E-02 | 9.01E-03 | POT1/DFFA/PTK2B/HSP90AB1/MSH2/SMG5/HNRNPA2B1/PARN/PPARG/PARP3/IL2 |
| BP | GO:0006635 | fatty acid beta-oxidation | 5/189 | 75/18862 | 9.37E-04 | 1.36E-02 | 9.33E-03 | HSD17B4/ACADVL/ACACB/ECI2/ECHS1 |

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| BP | GO:0046902 | regulation of mitochondrial membrane permeability | 5/189 | 75/18862 | 9.37E-04 | 1.36E-02 | 9.33E-03 | HK2/YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:1902930 | regulation of alcohol biosynthetic process | 5/189 | 75/18862 | 9.37E-04 | 1.36E-02 | 9.33E-03 | HMGCS1/PTK2B/CYP7A1/ACACB/GGPS1 |
| BP | GO:0042771 | intrinsic apoptotic signaling pathway in response to DNA damage by p53 class mediator | 4/189 | 44/18862 | 9.69E-04 | 1.39E-02 | 9.50E-03 | EP300/MUC1/MSH2/CD74 |
| BP | GO:0046427 | positive regulation of JAK-STAT cascade | 4/189 | 44/18862 | 9.69E-04 | 1.39E-02 | 9.50E-03 | F2/PTK2B/ERBB4/NOTCH1 |
| BP | GO:0060421 | positive regulation of heart growth | 4/189 | 44/18862 | 9.69E-04 | 1.39E-02 | 9.50E-03 | ACACB/ERBB4/NOTCH1/GLI1 |
| BP | GO:1901028 | regulation of mitochondrial outer membrane permeabilization involved in apoptotic signaling pathway | 4/189 | 44/18862 | 9.69E-04 | 1.39E-02 | 9.50E-03 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0051098 | regulation of binding | 11/189 | 357/18862 | 9.81E-04 | 1.40E-02 | 9.57E-03 | EP300/HMOX1/PTPRF/TRIM21/HSP90AB1/SEN2/B2M/PPARG/RARA/IFNG/STK4 |
| BP | GO:0030539 | male genitalia development | 3/189 | 20/18862 | 9.96E-04 | 1.41E-02 | 9.64E-03 | AR/SRD5A2/SHH |
| BP | GO:0060444 | branching involved in mammary gland duct morphogenesis | 3/189 | 20/18862 | 9.96E-04 | 1.41E-02 | 9.64E-03 | AR/ESR1/BTRC |
| BP | GO:0090049 | regulation of cell migration involved in sprouting angiogenesis | 5/189 | 77/18862 | 1.06E-03 | 1.49E-02 | 1.02E-02 | HMOX1/MAP3K3/HDAC7/NOTCH1/STARD13 |
| BP | GO:0060326 | cell chemotaxis | 10/189 | 306/18862 | 1.07E-03 | 1.50E-02 | 1.03E-02 | HBEGF/VAV3/VEGFB/RAC1/PTK2B/DAPK2/NOTCH1/DPP4/OXSR1/CD74 |
| BP | GO:0031349 | positive regulation of defense response | 11/189 | 361/18862 | 1.07E-03 | 1.50E-02 | 1.03E-02 | CUL1/EP300/XRCC6/BTK/MUC1/HCK/SKP1/TLR4/IFNG/BTRC/IL2 |
| BP | GO:1901987 | regulation of cell cycle phase transition | 13/189 | 478/18862 | 1.10E-03 | 1.53E-02 | 1.05E-02 | CUL1/EP300/MUC1/PPP2R1A/SEN2/SKP1/WEE1/NAE1/BTRC/APEX1/SFN/NDC80/GLI1 |
| BP | GO:0007093 | mitotic cell cycle checkpoint | 7/189 | 159/18862 | 1.13E-03 | 1.56E-02 | 1.07E-02 | EP300/MUC1/MSH2/WEE1/NAE1/SFN/NDC80 |

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| BP | GO:0030100 | regulation of endocytosis | 8/189 | 206/18862 | 1.14E-03 | 1.57E-02 | 1.08E-02 | RAC1/EPHA3/B2M/ITGB3/MAGI2/PPARG/ARF6/NR1H3 |
| BP | GO:0031648 | protein destabilization | 4/189 | 46/18862 | 1.15E-03 | 1.57E-02 | 1.08E-02 | EP300/TRIM21/SEN2/BTRC |
| BP | GO:0048146 | positive regulation of fibroblast proliferation | 4/189 | 46/18862 | 1.15E-03 | 1.57E-02 | 1.08E-02 | ESR1/S100A6/FN1/CD74 |
| BP | GO:0060562 | epithelial tube morphogenesis | 10/189 | 309/18862 | 1.15E-03 | 1.57E-02 | 1.08E-02 | RARG/AR/ESR1/ALOX12/NOTCH1/ZIC3/BTRC/STK4/STARD13/SHH |
| BP | GO:0002429 | immune response-activating cell surface receptor signaling pathway | 13/189 | 481/18862 | 1.16E-03 | 1.57E-02 | 1.08E-02 | CUL1/EP300/VAV3/BTK/MUC1/RAC1/HCK/FCGR2A/HSP90AB1/SKP1/HLA-DRB1/BTRC/PRKCB |
| BP | GO:0002757 | immune response-activating signal transduction | 13/189 | 481/18862 | 1.16E-03 | 1.57E-02 | 1.08E-02 | CUL1/EP300/VAV3/BTK/MUC1/RAC1/HCK/FCGR2A/HSP90AB1/SKP1/HLA-DRB1/BTRC/PRKCB |
| BP | GO:0051960 | regulation of nervous system development | 12/189 | 422/18862 | 1.16E-03 | 1.57E-02 | 1.08E-02 | F2/RARG/NF2/B2M/NSUN5/PPARG/NOTCH1/IFNG/YWHAH/FN1/SEMA4D/SHH |
| BP | GO:0030111 | regulation of Wnt signaling pathway | 11/189 | 365/18862 | 1.17E-03 | 1.58E-02 | 1.08E-02 | ESR1/PPP2R1A/SEN2/CSNK1G2/NFATC1/NOTCH1/BTRC/STK4/XIAP/GLI1/SHH |
| BP | GO:0002312 | B cell activation involved in immune response | 5/189 | 79/18862 | 1.19E-03 | 1.59E-02 | 1.09E-02 | PTK2B/MSH2/TLR4/PARP3/IL2 |
| BP | GO:0048145 | regulation of fibroblast proliferation | 5/189 | 79/18862 | 1.19E-03 | 1.59E-02 | 1.09E-02 | ESR1/PPARG/S100A6/FN1/CD74 |
| BP | GO:0007159 | leukocyte cell-cell adhesion | 11/189 | 366/18862 | 1.20E-03 | 1.59E-02 | 1.09E-02 | RAC1/MSN/HLA-DRB1/RARA/IFNG/TNFAIP8L2/DPP4/SEMA4D/CD74/IL2/SHH |
| BP | GO:0050727 | regulation of inflammatory response | 11/189 | 366/18862 | 1.20E-03 | 1.59E-02 | 1.09E-02 | BTK/ESR1/HCK/TLR4/HLA-DRB1/PPARG/IFNG/TNFAIP8L2/XIAP/IL2/NR1H3 |
| BP | GO:0002833 | positive regulation of response to biotic stimulus | 9/189 | 258/18862 | 1.20E-03 | 1.59E-02 | 1.09E-02 | CUL1/EP300/XRCC6/MUC1/HCK/SKP1/TLR4/HLA-DRB1/BTRC |
| BP | GO:0008637 | apoptotic mitochondrial changes | 6/189 | 118/18862 | 1.22E-03 | 1.61E-02 | 1.10E-02 | HK2/YWHAQ/ERBB4/YWHAH/SFN/NMT1 |
| BP | GO:0010712 | regulation of collagen metabolic process | 4/189 | 47/18862 | 1.24E-03 | 1.61E-02 | 1.11E-02 | F2/CYP7A1/FAP/PPARG |

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|----|------------|---|-------|-----------|----------|----------|----------|--|
| BP | GO:003572 | interleukin-12-mediated signaling pathway | 4/189 | 47/18862 | 1.24E-03 | 1.61E-02 | 1.11E-02 | MTAP/MSN/HNRNPA2B1/IFNG |
| BP | GO:0120163 | negative regulation of cold-induced thermogenesis | 4/189 | 47/18862 | 1.24E-03 | 1.61E-02 | 1.11E-02 | ACVR2B/TLR4/NOTCH1/NR1H3 |
| BP | GO:0002703 | regulation of leukocyte mediated immunity | 8/189 | 209/18862 | 1.25E-03 | 1.61E-02 | 1.11E-02 | HMOX1/BTK/MSH2/B2M/TLR4/HLA-DRB1/PARP3/IL2 |
| BP | GO:0010833 | telomere maintenance via telomere lengthening | 5/189 | 80/18862 | 1.25E-03 | 1.61E-02 | 1.11E-02 | POT1/HSP90AB1/SMG5/HNRNPA2B1/PARN |
| BP | GO:0014032 | neural crest cell development | 5/189 | 80/18862 | 1.25E-03 | 1.61E-02 | 1.11E-02 | ERBB4/ANXA6/FN1/SEMA4D/SHH |
| BP | GO:0048144 | fibroblast proliferation | 5/189 | 80/18862 | 1.25E-03 | 1.61E-02 | 1.11E-02 | ESR1/PPARG/S100A6/FN1/CD74 |
| BP | GO:0001894 | tissue homeostasis | 9/189 | 260/18862 | 1.27E-03 | 1.63E-02 | 1.11E-02 | RAC1/PTK2B/B2M/TLR4/ITGB3/NOTCH1/TJP1/ALB/PDK4 |
| BP | GO:0002758 | innate immune response-activating signal transduction | 6/189 | 119/18862 | 1.27E-03 | 1.63E-02 | 1.11E-02 | CUL1/EP300/MUC1/HCK/SKP1/BTRC |
| BP | GO:0006006 | glucose metabolic process | 8/189 | 210/18862 | 1.29E-03 | 1.63E-02 | 1.12E-02 | HK2/EP300/DCXR/PDK2/ACACB/PGK1/G6PD/PDK4 |
| BP | GO:0010001 | glial cell differentiation | 8/189 | 210/18862 | 1.29E-03 | 1.63E-02 | 1.12E-02 | F2/NSUN5/TLR4/IFNGR1/PPARG/NOTCH1/IFNG/SHH |
| BP | GO:0009308 | amine metabolic process | 7/189 | 163/18862 | 1.30E-03 | 1.64E-02 | 1.13E-02 | DHPS/PAH/SULT1A1/ODC1/PNMT/AOC3/CHKA |
| BP | GO:0010888 | negative regulation of lipid storage | 3/189 | 22/18862 | 1.33E-03 | 1.67E-02 | 1.14E-02 | ITGB3/PPARG/NR1H3 |
| BP | GO:0022617 | extracellular matrix disassembly | 5/189 | 81/18862 | 1.33E-03 | 1.67E-02 | 1.14E-02 | MMP2/BMP1/FAP/MMP1/DPP4 |
| BP | GO:0045540 | regulation of cholesterol biosynthetic process | 4/189 | 48/18862 | 1.35E-03 | 1.67E-02 | 1.14E-02 | HMGCS1/CYP7A1/ACACB/GGPS1 |
| BP | GO:0051204 | protein insertion into mitochondrial membrane | 4/189 | 48/18862 | 1.35E-03 | 1.67E-02 | 1.14E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0106118 | regulation of sterol biosynthetic process | 4/189 | 48/18862 | 1.35E-03 | 1.67E-02 | 1.14E-02 | HMGCS1/CYP7A1/ACACB/GGPS1 |

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| BP | GO:1904894 | positive regulation of STAT cascade | 4/189 | 48/18862 | 1.35E-03 | 1.67E-02 | 1.14E-02 | F2/PTK2B/ERBB4/NOTCH1 |
| BP | GO:0050870 | positive regulation of T cell activation | 8/189 | 212/18862 | 1.37E-03 | 1.69E-02 | 1.16E-02 | RAC1/HLA-DRB1/RARA/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0072331 | signal transduction by p53 class mediator | 9/189 | 263/18862 | 1.38E-03 | 1.70E-02 | 1.16E-02 | EP300/MUC1/MSH2/PDK2/RPA3/TAF13/FHIT/SFN/CD74 |
| BP | GO:0009165 | nucleotide biosynthetic process | 9/189 | 264/18862 | 1.41E-03 | 1.73E-02 | 1.19E-02 | RRM1/NME3/DTYMK/PAPSS1/PDK2/ACACB/GART/DCTD/PDK4 |
| BP | GO:0019218 | regulation of steroid metabolic process | 6/189 | 122/18862 | 1.45E-03 | 1.76E-02 | 1.21E-02 | ACADVL/HMGCS1/CYP7A1/ACACB/IFNG/GGPS1 |
| BP | GO:0046638 | positive regulation of alpha-beta T cell differentiation | 4/189 | 49/18862 | 1.45E-03 | 1.76E-02 | 1.21E-02 | HLA-DRB1/RARA/IFNG/SHH |
| BP | GO:0071349 | cellular response to interleukin-12 | 4/189 | 49/18862 | 1.45E-03 | 1.76E-02 | 1.21E-02 | MTAP/MSN/HNRNPA2B1/IFNG |
| BP | GO:0071622 | regulation of granulocyte chemotaxis | 4/189 | 49/18862 | 1.45E-03 | 1.76E-02 | 1.21E-02 | RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0048638 | regulation of developmental growth | 10/189 | 319/18862 | 1.46E-03 | 1.76E-02 | 1.21E-02 | AR/ACACB/ERBB4/NOTCH1/YY1/STK4/G6PD/FN1/SEMA4D/GLI1 |
| BP | GO:0032092 | positive regulation of protein binding | 5/189 | 83/18862 | 1.48E-03 | 1.78E-02 | 1.22E-02 | EP300/TRIM21/HSP90AB1/B2M/STK4 |
| BP | GO:0048864 | stem cell development | 5/189 | 83/18862 | 1.48E-03 | 1.78E-02 | 1.22E-02 | ERBB4/ANXA6/FN1/SEMA4D/SHH |
| BP | GO:1903409 | reactive oxygen species biosynthetic process | 6/189 | 123/18862 | 1.51E-03 | 1.80E-02 | 1.24E-02 | HBB/RAC1/PTK2B/HSP90AB1/TLR4/IFNG |
| BP | GO:1901293 | nucleoside phosphate biosynthetic process | 9/189 | 267/18862 | 1.53E-03 | 1.82E-02 | 1.25E-02 | RRM1/NME3/DTYMK/PAPSS1/PDK2/ACACB/GART/DCTD/PDK4 |
| BP | GO:0002718 | regulation of cytokine production involved in immune response | 5/189 | 84/18862 | 1.56E-03 | 1.85E-02 | 1.27E-02 | HMOX1/BTK/B2M/TLR4/CD74 |
| BP | GO:0045668 | negative regulation of osteoblast differentiation | 4/189 | 50/18862 | 1.57E-03 | 1.85E-02 | 1.27E-02 | HDAC7/PPARG/NOTCH1/SEMA4D |
| BP | GO:0070671 | response to interleukin-12 | 4/189 | 50/18862 | 1.57E-03 | 1.85E-02 | 1.27E-02 | MTAP/MSN/HNRNPA2B1/IFNG |

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|----|------------|---|--------|-----------|----------|----------|----------|--|
| BP | GO:0038095 | Fc-epsilon receptor signaling pathway | 7/189 | 169/18862 | 1.60E-03 | 1.88E-02 | 1.29E-02 | CUL1/VAV3/BTK/RAC1/SKP1/NFATC1/BTRC |
| BP | GO:190190 | regulation of mitotic cell cycle phase transition | 12/189 | 439/18862 | 1.63E-03 | 1.89E-02 | 1.30E-02 | CUL1/EP300/MUC1/PPP2R1A/SEN2/SKP1/WEE1/NAE1/BTRC/APEX1/SFN/NDC80 |
| BP | GO:0010810 | regulation of cell-substrate adhesion | 8/189 | 218/18862 | 1.63E-03 | 1.89E-02 | 1.30E-02 | NF2/RAC1/EPHA3/PTK2B/ATXN3/NOTCH1/STK4/FN1 |
| BP | GO:0042445 | hormone metabolic process | 8/189 | 218/18862 | 1.63E-03 | 1.89E-02 | 1.30E-02 | HSD17B4/ESR1/TTR/ADH1C/SULT1A1/CYP17A1/SRD5A2/SHH |
| BP | GO:0071695 | anatomical structure maturation | 8/189 | 218/18862 | 1.63E-03 | 1.89E-02 | 1.30E-02 | MMP2/BTK/RND1/PTK2B/PPARG/ANG/G6PD/SEMA4D |
| BP | GO:0034109 | homotypic cell-cell adhesion | 5/189 | 85/18862 | 1.64E-03 | 1.89E-02 | 1.30E-02 | HBB/ALOX12/ITGB3/DSG2/FN1 |
| BP | GO:0042509 | regulation of tyrosine phosphorylation of STAT protein | 5/189 | 85/18862 | 1.64E-03 | 1.89E-02 | 1.30E-02 | NF2/PPP2R1A/ERBB4/IFNG/IL2 |
| BP | GO:0046889 | positive regulation of lipid biosynthetic process | 5/189 | 85/18862 | 1.64E-03 | 1.89E-02 | 1.30E-02 | FABP3/CYP7A1/IFNG/CD74/NR1H3 |
| BP | GO:0006909 | phagocytosis | 11/189 | 381/18862 | 1.65E-03 | 1.89E-02 | 1.30E-02 | VAV3/RAC1/HCK/FCGR2A/HSP90AB1/TLR4/ITGB3/PPARG/RARA/IFNG/NR1H3 |
| BP | GO:0043277 | apoptotic cell clearance | 4/189 | 51/18862 | 1.69E-03 | 1.92E-02 | 1.32E-02 | RAC1/ITGB3/RARA/NR1H3 |
| BP | GO:0043370 | regulation of CD4-positive, alpha-beta T cell differentiation | 4/189 | 51/18862 | 1.69E-03 | 1.92E-02 | 1.32E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0097300 | programmed necrotic cell death | 4/189 | 51/18862 | 1.69E-03 | 1.92E-02 | 1.32E-02 | PYGL/ITPK1/TLR4/FAS |
| BP | GO:0003002 | regionalization | 10/189 | 326/18862 | 1.71E-03 | 1.94E-02 | 1.33E-02 | RARG/EP300/AR/ACVR2B/SEN2/NOTCH1/ZIC3/YY1/GLI1/SHH |
| BP | GO:0032925 | regulation of activin receptor signaling pathway | 3/189 | 24/18862 | 1.72E-03 | 1.94E-02 | 1.33E-02 | ACVR2B/MAGI2/SHH |
| BP | GO:0090023 | positive regulation of neutrophil chemotaxis | 3/189 | 24/18862 | 1.72E-03 | 1.94E-02 | 1.33E-02 | RAC1/DAPK2/CD74 |
| BP | GO:0055072 | iron ion homeostasis | 5/189 | 86/18862 | 1.73E-03 | 1.95E-02 | 1.34E-02 | CUL1/HMOX1/SKP1/B2M/IFNG |

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|----|------------|---|--------|-----------|----------|----------|----------|---|
| BP | GO:0006979 | response to oxidative stress | 12/189 | 444/18862 | 1.79E-03 | 2.00E-02 | 1.37E-02 | MMP2/HMOX1/BTK/HBB/PTK2B/PDK2/TLR4/CYP2E1/APEX1/OXSR1/G6PD/DHCR24 |
| BP | GO:0008361 | regulation of cell size | 7/189 | 173/18862 | 1.83E-03 | 2.04E-02 | 1.40E-02 | RARG/VAV3/RAC1/HSP90AB1/MSN/FN1/SEMA4D |
| BP | GO:0002576 | platelet degranulation | 6/189 | 128/18862 | 1.85E-03 | 2.05E-02 | 1.40E-02 | VEGFB/PSAP/ITGB3/ALB/FN1/ABCC4 |
| BP | GO:0032479 | regulation of type I interferon production | 6/189 | 128/18862 | 1.85E-03 | 2.05E-02 | 1.40E-02 | EP300/XRCC6/TRIM21/TLR4/YY1/POLA1 |
| BP | GO:0045667 | regulation of osteoblast differentiation | 6/189 | 128/18862 | 1.85E-03 | 2.05E-02 | 1.40E-02 | HDAC7/ACVR2B/PPARG/NOTCH1/SEMA4D/GLI1 |
| BP | GO:0043254 | regulation of protein complex assembly | 12/189 | 446/18862 | 1.85E-03 | 2.05E-02 | 1.40E-02 | EP300/ESR1/RAC1/HCK/PTK2B/MSN/TLR4/PEX5/RPA3/MMP1/IFNG/ARF6 |
| BP | GO:0000082 | G1/S transition of mitotic cell cycle | 9/189 | 275/18862 | 1.87E-03 | 2.05E-02 | 1.40E-02 | CUL1/EP300/MUC1/SEN2/WEE1/RPA3/APEX1/SFN/POLA1 |
| BP | GO:0071214 | cellular response to abiotic stimulus | 10/189 | 330/18862 | 1.87E-03 | 2.05E-02 | 1.40E-02 | EP300/XRCC6/MMP2/RAC1/TLR4/FAS/MMP1/YY1/OXSR1/NMT1 |
| BP | GO:0104004 | cellular response to environmental stimulus | 10/189 | 330/18862 | 1.87E-03 | 2.05E-02 | 1.40E-02 | EP300/XRCC6/MMP2/RAC1/TLR4/FAS/MMP1/YY1/OXSR1/NMT1 |
| BP | GO:0001649 | osteoblast differentiation | 8/189 | 223/18862 | 1.88E-03 | 2.05E-02 | 1.40E-02 | HSD17B4/HDAC7/ACVR2B/PPARG/NOTCH1/SEMA4D/GLI1/SHH |
| BP | GO:0045089 | positive regulation of innate immune response | 8/189 | 223/18862 | 1.88E-03 | 2.05E-02 | 1.40E-02 | CUL1/EP300/XRCC6/MUC1/HCK/SKP1/TLR4/BTRC |
| BP | GO:0022409 | positive regulation of cell-cell adhesion | 9/189 | 276/18862 | 1.92E-03 | 2.05E-02 | 1.41E-02 | RAC1/HLA-DRB1/RARA/TJP1/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0031098 | stress-activated protein kinase signaling cascade | 9/189 | 276/18862 | 1.92E-03 | 2.05E-02 | 1.41E-02 | CUL1/MAP3K3/PTK2B/IGF1R/SKP1/TLR4/FAS/BTRC/STK4 |
| BP | GO:0007260 | tyrosine phosphorylation of STAT protein | 5/189 | 88/18862 | 1.92E-03 | 2.05E-02 | 1.41E-02 | NF2/PPP2R1A/ERBB4/IFNG/IL2 |
| BP | GO:0032606 | type I interferon production | 6/189 | 129/18862 | 1.92E-03 | 2.05E-02 | 1.41E-02 | EP300/XRCC6/TRIM21/TLR4/YY1/POLA1 |
| BP | GO:0000302 | response to reactive oxygen species | 8/189 | 224/18862 | 1.93E-03 | 2.05E-02 | 1.41E-02 | MMP2/HMOX1/BTK/HBB/PTK2B/PDK2/CYP2E1/APEX1 |

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| BP | GO:0001783 | B cell apoptotic process | 3/189 | 25/18862 | 1.94E-03 | 2.05E-02 | 1.41E-02 | BTK/CD74/IL2 |
| BP | GO:0008211 | glucocorticoid metabolic process | 3/189 | 25/18862 | 1.94E-03 | 2.05E-02 | 1.41E-02 | YWHAH/CYP17A1/SERPINA6 |
| BP | GO:0090151 | establishment of protein localization to mitochondrial membrane | 4/189 | 53/18862 | 1.95E-03 | 2.05E-02 | 1.41E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0045766 | positive regulation of angiogenesis | 7/189 | 175/18862 | 1.95E-03 | 2.05E-02 | 1.41E-02 | HK2/HMOX1/VEGFB/PTK2B/F3/TJP1/PRKCB |
| BP | GO:0048771 | tissue remodeling | 7/189 | 175/18862 | 1.95E-03 | 2.05E-02 | 1.41E-02 | MMP2/RAC1/PTK2B/ACVR2B/ITGB3/PDK4/IL2 |
| BP | GO:0051897 | positive regulation of protein kinase B signaling | 7/189 | 175/18862 | 1.95E-03 | 2.05E-02 | 1.41E-02 | HBEGF/ESR1/RAC1/IGF1R/HSP90AB1/F3/ERBB4 |
| BP | GO:1904018 | positive regulation of vasculature development | 7/189 | 175/18862 | 1.95E-03 | 2.05E-02 | 1.41E-02 | HK2/HMOX1/VEGFB/PTK2B/F3/TJP1/PRKCB |
| BP | GO:0060560 | developmental growth involved in morphogenesis | 8/189 | 225/18862 | 1.99E-03 | 2.09E-02 | 1.43E-02 | RARG/ESR1/HSP90AB1/MAGI2/NOTCH1/FN1/SEMA4D/SHH |
| BP | GO:0030595 | leukocyte chemotaxis | 8/189 | 226/18862 | 2.04E-03 | 2.14E-02 | 1.47E-02 | VAV3/VEGFB/RAC1/PTK2B/DAPK2/DPP4/OXSR1/CD74 |
| BP | GO:0072329 | monocarboxylic acid catabolic process | 6/189 | 131/18862 | 2.08E-03 | 2.16E-02 | 1.48E-02 | HSD17B4/ACADVL/DCXR/ACACB/ECI2/ECHS1 |
| BP | GO:0002712 | regulation of B cell mediated immunity | 4/189 | 54/18862 | 2.09E-03 | 2.16E-02 | 1.48E-02 | BTK/MSH2/PARP3/IL2 |
| BP | GO:0002889 | regulation of immunoglobulin mediated immune response | 4/189 | 54/18862 | 2.09E-03 | 2.16E-02 | 1.48E-02 | BTK/MSH2/PARP3/IL2 |
| BP | GO:0016447 | somatic recombination of immunoglobulin gene segments | 4/189 | 54/18862 | 2.09E-03 | 2.16E-02 | 1.48E-02 | MSH2/YY1/PARP3/IL2 |
| BP | GO:0046622 | positive regulation of organ growth | 4/189 | 54/18862 | 2.09E-03 | 2.16E-02 | 1.48E-02 | ACACB/ERBB4/NOTCH1/GLI1 |
| BP | GO:0014033 | neural crest cell differentiation | 5/189 | 90/18862 | 2.12E-03 | 2.17E-02 | 1.48E-02 | ERBB4/ANXA6/FN1/SEMA4D/SHH |

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| BP | GO:0014068 | positive regulation of phosphatidylinositol 3-kinase signaling | 5/189 | 90/18862 | 2.12E-03 | 2.17E-02 | 1.48E-02 | F2/IGF1R/ERBB4/FN1/SEMA4D |
| BP | GO:0090559 | regulation of membrane permeability | 5/189 | 90/18862 | 2.12E-03 | 2.17E-02 | 1.48E-02 | HK2/YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0006165 | nucleoside diphosphate phosphorylation | 6/189 | 132/18862 | 2.16E-03 | 2.20E-02 | 1.51E-02 | HK2/EP300/NME3/DTYMK/PGK1/IFNG |
| BP | GO:0019883 | antigen processing and presentation of endogenous antigen | 3/189 | 26/18862 | 2.17E-03 | 2.20E-02 | 1.51E-02 | B2M/HLA-DRB1/CD74 |
| BP | GO:0061082 | myeloid leukocyte cytokine production | 3/189 | 26/18862 | 2.17E-03 | 2.20E-02 | 1.51E-02 | HMOX1/TLR4/CD74 |
| BP | GO:0050810 | regulation of steroid biosynthetic process | 5/189 | 91/18862 | 2.22E-03 | 2.24E-02 | 1.54E-02 | HMGCS1/CYP7A1/ACACB/IFNG/GGPS1 |
| BP | GO:0045620 | negative regulation of lymphocyte differentiation | 4/189 | 55/18862 | 2.24E-03 | 2.24E-02 | 1.54E-02 | HMGB3/CD74/IL2/SHH |
| BP | GO:0097345 | mitochondrial outer membrane permeabilization | 4/189 | 55/18862 | 2.24E-03 | 2.24E-02 | 1.54E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0002687 | positive regulation of leukocyte migration | 6/189 | 133/18862 | 2.24E-03 | 2.24E-02 | 1.54E-02 | VEGFB/RAC1/PTK2B/DAPK2/OXSR1/CD74 |
| BP | GO:0046939 | nucleotide phosphorylation | 6/189 | 133/18862 | 2.24E-03 | 2.24E-02 | 1.54E-02 | HK2/EP300/NME3/DTYMK/PGK1/IFNG |
| BP | GO:0051402 | neuron apoptotic process | 8/189 | 230/18862 | 2.28E-03 | 2.28E-02 | 1.56E-02 | HMOX1/PTK2B/HSP90AB1/MSH2/FAS/NAE1/XIAP/G6PD |
| BP | GO:0055017 | cardiac muscle tissue growth | 5/189 | 92/18862 | 2.33E-03 | 2.32E-02 | 1.59E-02 | ERBB4/NOTCH1/YY1/G6PD/GLI1 |
| BP | GO:0010883 | regulation of lipid storage | 4/189 | 56/18862 | 2.39E-03 | 2.37E-02 | 1.62E-02 | ACACB/ITGB3/PPARG/NR1H3 |
| BP | GO:0003401 | axis elongation | 3/189 | 27/18862 | 2.43E-03 | 2.37E-02 | 1.62E-02 | ESR1/MAGI2/SHH |
| BP | GO:0035116 | embryonic hindlimb morphogenesis | 3/189 | 27/18862 | 2.43E-03 | 2.37E-02 | 1.62E-02 | RARG/NOTCH1/SHH |

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| BP | GO:0045606 | positive regulation of epidermal cell differentiation | 3/189 | 27/18862 | 2.43E-03 | 2.37E-02 | 1.62E-02 | NCOA3/NOTCH1/SFN |
| BP | GO:0071624 | positive regulation of granulocyte chemotaxis | 3/189 | 27/18862 | 2.43E-03 | 2.37E-02 | 1.62E-02 | RAC1/DAPK2/CD74 |
| BP | GO:0043123 | positive regulation of I-kappaB kinase/NF-kappaB signaling | 7/189 | 182/18862 | 2.43E-03 | 2.37E-02 | 1.62E-02 | HMOX1/MAP3K3/TRIM21/TLR4/HLA-DRB1/PRKCB/CD74 |
| BP | GO:0006869 | lipid transport | 12/189 | 461/18862 | 2.44E-03 | 2.37E-02 | 1.62E-02 | FABP3/PSAP/CYP7A1/ACACB/ITGB3/PPARG/SERPINA5/CHKA/NPC1L1/ABCC4/NR1H3/SHH |
| BP | GO:0002042 | cell migration involved in sprouting angiogenesis | 5/189 | 93/18862 | 2.44E-03 | 2.37E-02 | 1.62E-02 | HMOX1/MAP3K3/HDAC7/NOTCH1/STARD13 |
| BP | GO:0002367 | cytokine production involved in immune response | 5/189 | 93/18862 | 2.44E-03 | 2.37E-02 | 1.62E-02 | HMOX1/BTK/B2M/TLR4/CD74 |
| BP | GO:0014013 | regulation of gliogenesis | 5/189 | 93/18862 | 2.44E-03 | 2.37E-02 | 1.62E-02 | F2/NF2/PPARG/NOTCH1/SHH |
| BP | GO:0001503 | ossification | 11/189 | 401/18862 | 2.46E-03 | 2.38E-02 | 1.63E-02 | HSD17B4/MMP2/PTK2B/HDAC7/ACVR2B/BMP1/PPARG/NOTCH1/SEMA4D/GLI1/SHH |
| BP | GO:1903039 | positive regulation of leukocyte cell-cell adhesion | 8/189 | 234/18862 | 2.54E-03 | 2.45E-02 | 1.68E-02 | RAC1/HLA-DRB1/RARA/IFNG/DPP4/CD74/IL2/SHH |
| BP | GO:0003158 | endothelium development | 6/189 | 137/18862 | 2.60E-03 | 2.50E-02 | 1.72E-02 | ALOX12/ACVR2B/MSN/NOTCH1/TJP1/STARD13 |
| BP | GO:0045861 | negative regulation of proteolysis | 10/189 | 346/18862 | 2.64E-03 | 2.53E-02 | 1.74E-02 | F2/TRIM21/HSP90AB1/SERPINA5/XIAP/FHIT/SFN/DHCR24/SERPINA6/SHH |
| BP | GO:0038061 | NIK/NF-kappaB signaling | 7/189 | 185/18862 | 2.67E-03 | 2.55E-02 | 1.75E-02 | CUL1/EP300/HDAC7/SKP1/TLR4/ALK/BTRC |
| BP | GO:0001889 | liver development | 6/189 | 138/18862 | 2.69E-03 | 2.55E-02 | 1.75E-02 | HMGCS1/HMOX1/NOTCH1/ZIC3/ARF6/GLI1 |
| BP | GO:0010039 | response to iron ion | 3/189 | 28/18862 | 2.70E-03 | 2.55E-02 | 1.75E-02 | HMOX1/B2M/G6PD |
| BP | GO:0060603 | mammary gland duct morphogenesis | 3/189 | 28/18862 | 2.70E-03 | 2.55E-02 | 1.75E-02 | AR/ESR1/BTRC |
| BP | GO:0072376 | protein activation cascade | 3/189 | 28/18862 | 2.70E-03 | 2.55E-02 | 1.75E-02 | F2/F3/FN1 |

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| BP | GO:0072378 | blood coagulation, fibrin clot formation | 3/189 | 28/18862 | 2.70E-03 | 2.55E-02 | 1.75E-02 | F2/F3/FN1 |
| BP | GO:1903749 | positive regulation of establishment of protein localization to mitochondrion | 4/189 | 58/18862 | 2.72E-03 | 2.56E-02 | 1.76E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0001666 | response to hypoxia | 10/189 | 348/18862 | 2.75E-03 | 2.58E-02 | 1.77E-02 | HK2/EP300/MMP2/HMOX1/VEGFB/PTK2B/PGK1/NOTCH1/ANG/DPP4 |
| BP | GO:0050767 | regulation of neurogenesis | 10/189 | 348/18862 | 2.75E-03 | 2.58E-02 | 1.77E-02 | F2/NF2/B2M/PPARG/NOTCH1/IFNG/YWHAH/FN1/SEMA4D/SHH |
| BP | GO:0042100 | B cell proliferation | 5/189 | 96/18862 | 2.80E-03 | 2.62E-02 | 1.80E-02 | VAV3/BTK/TLR4/CD74/IL2 |
| BP | GO:0048661 | positive regulation of smooth muscle cell proliferation | 5/189 | 96/18862 | 2.80E-03 | 2.62E-02 | 1.80E-02 | MMP2/HBEGF/HMOX1/ALOX12/ABCC4 |
| BP | GO:0043030 | regulation of macrophage activation | 4/189 | 59/18862 | 2.89E-03 | 2.68E-02 | 1.84E-02 | BPI/TLR4/CD74/NR1H3 |
| BP | GO:0046718 | viral entry into host cell | 6/189 | 140/18862 | 2.89E-03 | 2.68E-02 | 1.84E-02 | TRIM21/WWP1/ITGB3/HLA-DRB1/DPP4/CD74 |
| BP | GO:0061008 | hepaticobiliary system development | 6/189 | 140/18862 | 2.89E-03 | 2.68E-02 | 1.84E-02 | HMGCS1/HMOX1/NOTCH1/ZIC3/ARF6/GLI1 |
| BP | GO:0050690 | regulation of defense response to virus by virus | 3/189 | 29/18862 | 2.99E-03 | 2.75E-02 | 1.89E-02 | RAC1/HCK/B2M |
| BP | GO:1902624 | positive regulation of neutrophil migration | 3/189 | 29/18862 | 2.99E-03 | 2.75E-02 | 1.89E-02 | RAC1/DAPK2/CD74 |
| BP | GO:0060759 | regulation of response to cytokine stimulus | 7/189 | 189/18862 | 3.00E-03 | 2.76E-02 | 1.89E-02 | HSP90AB1/TLR4/IFNGR1/PPARG/IFNG/CD74/NR1H3 |
| BP | GO:0032722 | positive regulation of chemokine production | 4/189 | 60/18862 | 3.07E-03 | 2.81E-02 | 1.93E-02 | HMOX1/TLR4/IFNG/CD74 |
| BP | GO:1902110 | positive regulation of mitochondrial membrane permeability involved in apoptotic process | 4/189 | 60/18862 | 3.07E-03 | 2.81E-02 | 1.93E-02 | YWHAQ/YWHAH/SFN/NMT1 |

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| BP | GO:1904356 | regulation of telomere maintenance via telomere lengthening | 4/189 | 60/18862 | 3.07E-03 | 2.81E-02 | 1.93E-02 | POT1/SMG5/HNRNPA2B1/PARN |
| BP | GO:1901605 | alpha-amino acid metabolic process | 7/189 | 191/18862 | 3.18E-03 | 2.90E-02 | 1.99E-02 | MTAP/HPD/PAH/GAD2/ODC1/GART/OAT |
| BP | GO:0002702 | positive regulation of production of molecular mediator of immune response | 5/189 | 99/18862 | 3.20E-03 | 2.91E-02 | 1.99E-02 | MSH2/B2M/TLR4/CD74/IL2 |
| BP | GO:0002824 | positive regulation of adaptive immune response based on somatic recombination of immune receptors built from immunoglobulin superfamily domains | 5/189 | 99/18862 | 3.20E-03 | 2.91E-02 | 1.99E-02 | BTK/MSH2/B2M/HLA-DRB1/IL2 |
| BP | GO:0048754 | branching morphogenesis of an epithelial tube | 6/189 | 143/18862 | 3.21E-03 | 2.91E-02 | 1.99E-02 | AR/ESR1/NOTCH1/BTRC/STK4/SHH |
| BP | GO:0046824 | positive regulation of nucleocytoplasmic transport | 4/189 | 61/18862 | 3.27E-03 | 2.94E-02 | 2.02E-02 | HSP90AB1/IFNG/SFN/SHH |
| BP | GO:1905330 | regulation of morphogenesis of an epithelium | 4/189 | 61/18862 | 3.27E-03 | 2.94E-02 | 2.02E-02 | AR/ESR1/ALOX12/SHH |
| BP | GO:0006221 | pyrimidine nucleotide biosynthetic process | 3/189 | 30/18862 | 3.29E-03 | 2.94E-02 | 2.02E-02 | NME3/DTYMK/DCTD |
| BP | GO:0045577 | regulation of B cell differentiation | 3/189 | 30/18862 | 3.29E-03 | 2.94E-02 | 2.02E-02 | BTK/HMGB3/IL2 |
| BP | GO:0060045 | positive regulation of cardiac muscle cell proliferation | 3/189 | 30/18862 | 3.29E-03 | 2.94E-02 | 2.02E-02 | ERBB4/NOTCH1/GLI1 |
| BP | GO:0030900 | forebrain development | 10/189 | 357/18862 | 3.30E-03 | 2.94E-02 | 2.02E-02 | NF2/RRM1/B2M/NSUN5/ERBB4/ALK/NOTCH1/GART/GLI1/SHH |
| BP | GO:0007044 | cell-substrate junction assembly | 5/189 | 100/18862 | 3.35E-03 | 2.98E-02 | 2.04E-02 | RAC1/EPHA3/PTK2B/BCR/FN1 |
| BP | GO:0009755 | hormone-mediated signaling pathway | 7/189 | 193/18862 | 3.37E-03 | 2.99E-02 | 2.05E-02 | RARG/EP300/AR/ESR1/PPARG/RARA/YWHAH |

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| BP | GO:0031589 | cell-substrate adhesion | 10/189 | 359/18862 | 3.43E-03 | 3.04E-02 | 2.08E-02 | NF2/RAC1/EPHA3/PTK2B/BCR/ATXN3/ITGB3/NOTCH1/STK4/FN1 |
| BP | GO:0045453 | bone resorption | 4/189 | 62/18862 | 3.46E-03 | 3.04E-02 | 2.09E-02 | RAC1/PTK2B/ITGB3/PDK4 |
| BP | GO:0070527 | platelet aggregation | 4/189 | 62/18862 | 3.46E-03 | 3.04E-02 | 2.09E-02 | HBB/ALOX12/ITGB3/FN1 |
| BP | GO:1902686 | mitochondrial outer membrane permeabilization involved in programmed cell death | 4/189 | 62/18862 | 3.46E-03 | 3.04E-02 | 2.09E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0046634 | regulation of alpha-beta T cell activation | 5/189 | 101/18862 | 3.49E-03 | 3.06E-02 | 2.09E-02 | HLA-DRB1/RARA/IFNG/IL2/SHH |
| BP | GO:1901214 | regulation of neuron death | 9/189 | 302/18862 | 3.49E-03 | 3.06E-02 | 2.09E-02 | HMOX1/PTK2B/HSP90AB1/MSH2/TLR4/NAE1/IFNG/G6PD/DHCR24 |
| BP | GO:0036293 | response to decreased oxygen levels | 10/189 | 360/18862 | 3.50E-03 | 3.06E-02 | 2.09E-02 | HK2/EP300/MMP2/HMOX1/VEGFB/PTK2B/PGK1/NOTCH1/ANG/DPP4 |
| BP | GO:0051896 | regulation of protein kinase B signaling | 8/189 | 247/18862 | 3.53E-03 | 3.07E-02 | 2.10E-02 | HBEGF/ESR1/RAC1/IGF1R/HSP90AB1/F3/ERBB4/MAGI2 |
| BP | GO:0045580 | regulation of T cell differentiation | 6/189 | 146/18862 | 3.56E-03 | 3.09E-02 | 2.12E-02 | HLA-DRB1/RARA/IFNG/CD74/IL2/SHH |
| BP | GO:1902806 | regulation of cell cycle G1/S phase transition | 7/189 | 195/18862 | 3.57E-03 | 3.09E-02 | 2.12E-02 | EP300/MUC1/SEN2/WEE1/APEX1/SFN/GLI1 |
| BP | GO:0033157 | regulation of intracellular protein transport | 8/189 | 248/18862 | 3.61E-03 | 3.12E-02 | 2.14E-02 | HSP90AB1/YWHAQ/IFNG/B3GAT3/YWHAH/SFN/NMT1/SHH |
| BP | GO:0034390 | smooth muscle cell apoptotic process | 3/189 | 31/18862 | 3.62E-03 | 3.12E-02 | 2.14E-02 | PPARG/IFNG/STK4 |
| BP | GO:0034391 | regulation of smooth muscle cell apoptotic process | 3/189 | 31/18862 | 3.62E-03 | 3.12E-02 | 2.14E-02 | PPARG/IFNG/STK4 |
| BP | GO:0071887 | leukocyte apoptotic process | 5/189 | 102/18862 | 3.64E-03 | 3.13E-02 | 2.15E-02 | BTK/DFFA/FAS/CD74/IL2 |
| BP | GO:0048662 | negative regulation of smooth muscle cell proliferation | 4/189 | 63/18862 | 3.67E-03 | 3.13E-02 | 2.15E-02 | HMOX1/PPARG/IFNG/ANG |

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| BP | GO:0061180 | mammary gland epithelium development | 4/189 | 63/18862 | 3.67E-03 | 3.13E-02 | 2.15E-02 | AR/ESR1/ERBB4/BTRC |
| BP | GO:0043393 | regulation of protein binding | 7/189 | 196/18862 | 3.67E-03 | 3.13E-02 | 2.15E-02 | EP300/PTPRF/TRIM21/HSP90AB1/SEN2/B2M/STK4 |
| BP | GO:0006352 | DNA-templated transcription, initiation | 8/189 | 249/18862 | 3.70E-03 | 3.15E-02 | 2.16E-02 | RARG/AR/ESR1/PPARG/NOTCH1/RARA/TAF13/NR1H3 |
| BP | GO:0019318 | hexose metabolic process | 8/189 | 250/18862 | 3.79E-03 | 3.20E-02 | 2.20E-02 | HK2/EP300/DCXR/PDK2/ACACB/PGK1/G6PD/PDK4 |
| BP | GO:1901991 | negative regulation of mitotic cell cycle phase transition | 8/189 | 250/18862 | 3.79E-03 | 3.20E-02 | 2.20E-02 | CUL1/EP300/MUC1/SKP1/WEE1/NAE1/SFN/NDC80 |
| BP | GO:0030593 | neutrophil chemotaxis | 5/189 | 103/18862 | 3.80E-03 | 3.20E-02 | 2.20E-02 | VAV3/RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0032526 | response to retinoic acid | 5/189 | 103/18862 | 3.80E-03 | 3.20E-02 | 2.20E-02 | RARG/EPHA3/PTK2B/PPARG/RARA |
| BP | GO:0090092 | regulation of transmembrane receptor protein serine/threonine kinase signaling pathway | 8/189 | 251/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | EP300/HSP90AB1/ACVR2B/MAGI2/PPARG/NOTCH1/XIAP/SHH |
| BP | GO:0002562 | somatic diversification of immune receptors via germline recombination within a single locus | 4/189 | 64/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | MSH2/YY1/PARP3/IL2 |
| BP | GO:0016444 | somatic cell DNA recombination | 4/189 | 64/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | MSH2/YY1/PARP3/IL2 |
| BP | GO:0016445 | somatic diversification of immunoglobulins | 4/189 | 64/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | MSH2/YY1/PARP3/IL2 |
| BP | GO:0035794 | positive regulation of mitochondrial membrane permeability | 4/189 | 64/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0071300 | cellular response to retinoic acid | 4/189 | 64/18862 | 3.88E-03 | 3.23E-02 | 2.21E-02 | RARG/EPHA3/PTK2B/PPARG |
| BP | GO:0007389 | pattern specification process | 11/189 | 426/18862 | 3.89E-03 | 3.23E-02 | 2.21E-02 | RARG/EP300/AR/ACVR2B/SEN2/ERBB4/NOTCH1/ZIC3/YY1/GLI1/SHH |

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| BP | GO:0002821 | positive regulation of adaptive immune response | 5/189 | 104/18862 | 3.96E-03 | 3.23E-02 | 2.22E-02 | BTK/MSH2/B2M/HLA-DRB1/IL2 |
| BP | GO:0010661 | positive regulation of muscle cell apoptotic process | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | PPARG/IFNG/STK4 |
| BP | GO:0010743 | regulation of macrophage derived foam cell differentiation | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | ITGB3/PPARG/NR1H3 |
| BP | GO:0038128 | ERBB2 signaling pathway | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | HBEGF/MATK/ERBB4 |
| BP | GO:0043372 | positive regulation of CD4-positive, alpha-beta T cell differentiation | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | HLA-DRB1/RARA/IFNG |
| BP | GO:0045684 | positive regulation of epidermis development | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | NCOA3/NOTCH1/SFN |
| BP | GO:0048384 | retinoic acid receptor signaling pathway | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | RARG/PPARG/RARA |
| BP | GO:1903902 | positive regulation of viral life cycle | 3/189 | 32/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | TRIM21/HLA-DRB1/CD74 |
| BP | GO:0002791 | regulation of peptide secretion | 9/189 | 308/18862 | 3.97E-03 | 3.23E-02 | 2.22E-02 | RAC1/TLR4/HLA-DRB1/IFNG/ANG/DPP4/ARF6/CD74/NR1H3 |
| BP | GO:0045862 | positive regulation of proteolysis | 10/189 | 367/18862 | 4.01E-03 | 3.26E-02 | 2.23E-02 | PTK2B/ALOX12/F3/SART3/FAS/ATXN3/PPARG/IFNG/BTRC/FN1 |
| BP | GO:0006090 | pyruvate metabolic process | 6/189 | 150/18862 | 4.06E-03 | 3.29E-02 | 2.25E-02 | HK2/EP300/PDK2/PGK1/IFNG/PDK4 |
| BP | GO:0050871 | positive regulation of B cell activation | 6/189 | 150/18862 | 4.06E-03 | 3.29E-02 | 2.25E-02 | VAV3/BTK/MSH2/TLR4/CD74/IL2 |
| BP | GO:0070265 | necrotic cell death | 4/189 | 65/18862 | 4.11E-03 | 3.31E-02 | 2.27E-02 | PYGL/ITPK1/TLR4/FAS |
| BP | GO:2000573 | positive regulation of DNA biosynthetic process | 4/189 | 65/18862 | 4.11E-03 | 3.31E-02 | 2.27E-02 | POT1/PTK2B/HSP90AB1/PARN |
| BP | GO:0006637 | acyl-CoA metabolic process | 5/189 | 105/18862 | 4.12E-03 | 3.31E-02 | 2.27E-02 | HSD17B4/HMGCS1/PDK2/ACACB/PDK4 |

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| BP | GO:0035383 | thioester metabolic process | 5/189 | 105/18862 | 4.12E-03 | 3.31E-02 | 2.27E-02 | HSD17B4/HMGCS1/PDK2/ACACB/PDK4 |
| BP | GO:0032535 | regulation of cellular component size | 10/189 | 370/18862 | 4.24E-03 | 3.34E-02 | 2.29E-02 | RARG/VAV3/RAC1/HCK/PTK2B/HSP90AB1/MSN/ARF6/FN1/SEMA4D |
| BP | GO:0010887 | negative regulation of cholesterol storage | 2/189 | 10/18862 | 4.26E-03 | 3.34E-02 | 2.29E-02 | PPARG/NR1H3 |
| BP | GO:0060513 | prostatic bud formation | 2/189 | 10/18862 | 4.26E-03 | 3.34E-02 | 2.29E-02 | AR/SHH |
| BP | GO:0060525 | prostate glandular acinus development | 2/189 | 10/18862 | 4.26E-03 | 3.34E-02 | 2.29E-02 | ESR1/NOTCH1 |
| BP | GO:1905461 | positive regulation of vascular associated smooth muscle cell apoptotic process | 2/189 | 10/18862 | 4.26E-03 | 3.34E-02 | 2.29E-02 | PPARG/STK4 |
| BP | GO:2000343 | positive regulation of chemokine (C-X-C motif) ligand 2 production | 2/189 | 10/18862 | 4.26E-03 | 3.34E-02 | 2.29E-02 | TLR4/CD74 |
| BP | GO:0007229 | integrin-mediated signaling pathway | 5/189 | 106/18862 | 4.29E-03 | 3.34E-02 | 2.29E-02 | VAV3/HCK/PTK2B/ITGB3/FN1 |
| BP | GO:0009062 | fatty acid catabolic process | 5/189 | 106/18862 | 4.29E-03 | 3.34E-02 | 2.29E-02 | HSD17B4/ACADVL/ACACB/ECI2/ECHS1 |
| BP | GO:0018958 | phenol-containing compound metabolic process | 5/189 | 106/18862 | 4.29E-03 | 3.34E-02 | 2.29E-02 | ZEB2/PAH/SULT1A1/CYP2E1/PNMT |
| BP | GO:0044774 | mitotic DNA integrity checkpoint | 5/189 | 106/18862 | 4.29E-03 | 3.34E-02 | 2.29E-02 | EP300/MUC1/MSH2/NAE1/SFN |
| BP | GO:0048259 | regulation of receptor-mediated endocytosis | 5/189 | 106/18862 | 4.29E-03 | 3.34E-02 | 2.29E-02 | RAC1/B2M/ITGB3/MAGI2/ARF6 |
| BP | GO:0010922 | positive regulation of phosphatase activity | 3/189 | 33/18862 | 4.33E-03 | 3.34E-02 | 2.29E-02 | HSP90AB1/MAGI2/IFNG |
| BP | GO:0045589 | regulation of regulatory T cell differentiation | 3/189 | 33/18862 | 4.33E-03 | 3.34E-02 | 2.29E-02 | HLA-DRB1/IFNG/IL2 |
| BP | GO:0050869 | negative regulation of B cell activation | 3/189 | 33/18862 | 4.33E-03 | 3.34E-02 | 2.29E-02 | BTK/HMGB3/PARP3 |

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| BP | GO:0051973 | positive regulation of telomerase activity | 3/189 | 33/18862 | 4.33E-03 | 3.34E-02 | 2.29E-02 | POT1/HSP90AB1/PARN |
| BP | GO:0055094 | response to lipoprotein particle | 3/189 | 33/18862 | 4.33E-03 | 3.34E-02 | 2.29E-02 | HMGCS1/TLR4/PPARG |
| BP | GO:0002294 | CD4-positive, alpha-beta T cell differentiation involved in immune response | 4/189 | 66/18862 | 4.34E-03 | 3.34E-02 | 2.29E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0030193 | regulation of blood coagulation | 4/189 | 66/18862 | 4.34E-03 | 3.34E-02 | 2.29E-02 | F2/ALOX12/F3/FAP |
| BP | GO:0046635 | positive regulation of alpha-beta T cell activation | 4/189 | 66/18862 | 4.34E-03 | 3.34E-02 | 2.29E-02 | HLA-DRB1/RARA/IFNG/SHH |
| BP | GO:1902108 | regulation of mitochondrial membrane permeability involved in apoptotic process | 4/189 | 66/18862 | 4.34E-03 | 3.34E-02 | 2.29E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0009952 | anterior/posterior pattern specification | 7/189 | 203/18862 | 4.44E-03 | 3.41E-02 | 2.34E-02 | RARG/EP300/ACVR2B/NOTCH1/ZIC3/YY1/SHH |
| BP | GO:0002526 | acute inflammatory response | 5/189 | 107/18862 | 4.47E-03 | 3.41E-02 | 2.34E-02 | F2/BTK/F3/PPARG/FN1 |
| BP | GO:0046632 | alpha-beta T cell differentiation | 5/189 | 107/18862 | 4.47E-03 | 3.41E-02 | 2.34E-02 | HLA-DRB1/RARA/IFNG/IL2/SHH |
| BP | GO:0044409 | entry into host | 6/189 | 153/18862 | 4.48E-03 | 3.41E-02 | 2.34E-02 | TRIM21/WWP1/ITGB3/HLA-DRB1/DPP4/CD74 |
| BP | GO:0002287 | alpha-beta T cell activation involved in immune response | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0002293 | alpha-beta T cell differentiation involved in immune response | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0033866 | nucleoside bisphosphate biosynthetic process | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | PAPSS1/PDK2/ACACB/PDK4 |
| BP | GO:0034030 | ribonucleoside bisphosphate biosynthetic process | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | PAPSS1/PDK2/ACACB/PDK4 |
| BP | GO:0034033 | purine nucleoside bisphosphate biosynthetic process | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | PAPSS1/PDK2/ACACB/PDK4 |

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| BP | GO:1900046 | regulation of hemostasis | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | F2/ALOX12/F3/FAP |
| BP | GO:1905953 | negative regulation of lipid localization | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | ITGB3/PPARG/NR1H3/SHH |
| BP | GO:2000514 | regulation of CD4-positive, alpha-beta T cell activation | 4/189 | 67/18862 | 4.58E-03 | 3.44E-02 | 2.36E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0002446 | neutrophil mediated immunity | 12/189 | 499/18862 | 4.59E-03 | 3.44E-02 | 2.36E-02 | F2/XRCC6/HBB/RAC1/FCGR2A/HSP90AB1/PYGL/TTR/BPI/B2M/PSAP/PA2G4 |
| BP | GO:0001938 | positive regulation of endothelial cell proliferation | 5/189 | 108/18862 | 4.65E-03 | 3.44E-02 | 2.36E-02 | HMOX1/VEGFB/F3/ITGB3/ANG |
| BP | GO:0002708 | positive regulation of lymphocyte mediated immunity | 5/189 | 108/18862 | 4.65E-03 | 3.44E-02 | 2.36E-02 | BTK/MSH2/B2M/HLA-DRB1/IL2 |
| BP | GO:0071156 | regulation of cell cycle arrest | 5/189 | 108/18862 | 4.65E-03 | 3.44E-02 | 2.36E-02 | EP300/MUC1/HSP90AB1/FAP/SFN |
| BP | GO:0043281 | regulation of cysteine-type endopeptidase activity involved in apoptotic process | 7/189 | 205/18862 | 4.69E-03 | 3.44E-02 | 2.36E-02 | ALOX12/F3/FAS/PPARG/XIAP/SFN/DHCR24 |
| BP | GO:0001819 | positive regulation of cytokine production | 11/189 | 437/18862 | 4.70E-03 | 3.44E-02 | 2.36E-02 | EP300/XRCC6/HMOX1/F3/B2M/TLR4/IFNGR1/RARA/IFNG/CD74/IL2 |
| BP | GO:0009112 | nucleobase metabolic process | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | RRM1/TTR/GART |
| BP | GO:0010543 | regulation of platelet activation | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | F2/ALOX12/TLR4 |
| BP | GO:0010614 | negative regulation of cardiac muscle hypertrophy | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | NOTCH1/YY1/G6PD |
| BP | GO:0035137 | hindlimb morphogenesis | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | RARG/NOTCH1/SHH |
| BP | GO:0043276 | anoikis | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | DAPK2/NOTCH1/PDK4 |
| BP | GO:0045922 | negative regulation of fatty acid metabolic process | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | ACADVL/CYP7A1/ACACB |

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| BP | GO:0048261 | negative regulation of receptor-mediated endocytosis | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | RAC1/ITGB3/ARF6 |
| BP | GO:0071402 | cellular response to lipoprotein particle stimulus | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | HMGCS1/TLR4/PPARG |
| BP | GO:0090050 | positive regulation of cell migration involved in sprouting angiogenesis | 3/189 | 34/18862 | 4.72E-03 | 3.44E-02 | 2.36E-02 | HMOX1/MAP3K3/HDAC7 |
| BP | GO:0002822 | regulation of adaptive immune response based on somatic recombination of immune receptors built from immunoglobulin superfamily domains | 6/189 | 155/18862 | 4.77E-03 | 3.47E-02 | 2.38E-02 | BTK/MSH2/B2M/HLA-DRB1/PARP3/IL2 |
| BP | GO:0007004 | telomere maintenance via telomerase | 4/189 | 68/18862 | 4.83E-03 | 3.50E-02 | 2.40E-02 | POT1/HSP90AB1/SMG5/PARN |
| BP | GO:0045685 | regulation of glial cell differentiation | 4/189 | 68/18862 | 4.83E-03 | 3.50E-02 | 2.40E-02 | F2/PPARG/NOTCH1/SHH |
| BP | GO:0051403 | stress-activated MAPK cascade | 8/189 | 261/18862 | 4.90E-03 | 3.54E-02 | 2.43E-02 | CUL1/MAP3K3/PTK2B/IGF1R/SKP1/TLR4/FAS/BTRC |
| BP | GO:0009132 | nucleoside diphosphate metabolic process | 6/189 | 156/18862 | 4.92E-03 | 3.55E-02 | 2.43E-02 | HK2/EP300/NME3/DTYMK/PGK1/IFNG |
| BP | GO:0072522 | purine-containing compound biosynthetic process | 7/189 | 208/18862 | 5.07E-03 | 3.61E-02 | 2.47E-02 | NME3/MTAP/PAPSS1/PDK2/ACACB/GART/PDK4 |
| BP | GO:0002706 | regulation of lymphocyte mediated immunity | 6/189 | 157/18862 | 5.07E-03 | 3.61E-02 | 2.47E-02 | BTK/MSH2/B2M/HLA-DRB1/PARP3/IL2 |
| BP | GO:1905710 | positive regulation of membrane permeability | 4/189 | 69/18862 | 5.08E-03 | 3.61E-02 | 2.47E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0045191 | regulation of isotype switching | 3/189 | 35/18862 | 5.12E-03 | 3.61E-02 | 2.47E-02 | MSH2/PARP3/IL2 |
| BP | GO:0003157 | endocardium development | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | NOTCH1/STK4 |

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| BP | GO:000658 | L-phenylalanine metabolic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HPD/PAH |
| BP | GO:000659 | L-phenylalanine catabolic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HPD/PAH |
| BP | GO:0006702 | androgen biosynthetic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | CYP17A1/SRD5A2 |
| BP | GO:0021936 | regulation of cerebellar granule cell precursor proliferation | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | GLI1/SHH |
| BP | GO:0032957 | inositol trisphosphate metabolic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | PTK2B/ITPK1 |
| BP | GO:0033197 | response to vitamin E | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HMGCS1/PPARG |
| BP | GO:0045060 | negative thymic T cell selection | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | CD74/SHH |
| BP | GO:0045348 | positive regulation of MHC class II biosynthetic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | TLR4/IFNG |
| BP | GO:0045657 | positive regulation of monocyte differentiation | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HLA-DRB1/CD74 |
| BP | GO:0071492 | cellular response to UV-A | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | MMP2/MMP1 |
| BP | GO:1900222 | negative regulation of amyloid-beta clearance | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | IFNGR1/IFNG |
| BP | GO:1902221 | erythrose 4-phosphate/phosphoenolpyruvate family amino acid metabolic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HPD/PAH |
| BP | GO:1902222 | erythrose 4-phosphate/phosphoenolpyruvate family amino acid catabolic process | 2/189 | 11/18862 | 5.18E-03 | 3.61E-02 | 2.47E-02 | HPD/PAH |
| BP | GO:0000075 | cell cycle checkpoint | 7/189 | 209/18862 | 5.20E-03 | 3.61E-02 | 2.48E-02 | EP300/MUC1/MSH2/WEE1/NAE1/SFN/NDC80 |

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| BP | GO:0051651 | maintenance of location in cell | 7/189 | 209/18862 | 5.20E-03 | 3.61E-02 | 2.48E-02 | F2/HK2/PTK2B/SKP1/ANXA6/ATP7B/ALB |
| BP | GO:0002286 | T cell activation involved in immune response | 5/189 | 111/18862 | 5.22E-03 | 3.62E-02 | 2.48E-02 | HLA-DRB1/RARA/IFNG/CD74/IL2 |
| BP | GO:0044106 | cellular amine metabolic process | 6/189 | 158/18862 | 5.23E-03 | 3.62E-02 | 2.48E-02 | DHPS/PAH/SULT1A1/ODC1/PNMT/CHKA |
| BP | GO:0035303 | regulation of dephosphorylation | 7/189 | 210/18862 | 5.34E-03 | 3.69E-02 | 2.53E-02 | PPP2R1A/HSP90AB1/SMG5/MAGI2/IFNG/B3GAT3/SEMA4D |
| BP | GO:0006879 | cellular iron ion homeostasis | 4/189 | 70/18862 | 5.35E-03 | 3.69E-02 | 2.53E-02 | CUL1/HMOX1/SKP1/IFNG |
| BP | GO:0051092 | positive regulation of NF-kappaB transcription factor activity | 6/189 | 159/18862 | 5.39E-03 | 3.71E-02 | 2.54E-02 | AR/BTK/TRIM21/TLR4/ALK/PRKCB |
| BP | GO:0021782 | glial cell development | 5/189 | 112/18862 | 5.42E-03 | 3.72E-02 | 2.55E-02 | NSUN5/TLR4/IFNGR1/IFNG/SHH |
| BP | GO:0014741 | negative regulation of muscle hypertrophy | 3/189 | 36/18862 | 5.54E-03 | 3.78E-02 | 2.59E-02 | NOTCH1/YY1/G6PD |
| BP | GO:0030224 | monocyte differentiation | 3/189 | 36/18862 | 5.54E-03 | 3.78E-02 | 2.59E-02 | HLA-DRB1/PPARG/CD74 |
| BP | GO:0032435 | negative regulation of proteasomal ubiquitin-dependent protein catabolic process | 3/189 | 36/18862 | 5.54E-03 | 3.78E-02 | 2.59E-02 | HSP90AB1/FHIT/SHH |
| BP | GO:0045066 | regulatory T cell differentiation | 3/189 | 36/18862 | 5.54E-03 | 3.78E-02 | 2.59E-02 | HLA-DRB1/IFNG/IL2 |
| BP | GO:1904358 | positive regulation of telomere maintenance via telomere lengthening | 3/189 | 36/18862 | 5.54E-03 | 3.78E-02 | 2.59E-02 | POT1/HNRNPA2B1/PARN |
| BP | GO:0050818 | regulation of coagulation | 4/189 | 71/18862 | 5.63E-03 | 3.82E-02 | 2.62E-02 | F2/ALOX12/F3/FAP |
| BP | GO:0021700 | developmental maturation | 8/189 | 268/18862 | 5.73E-03 | 3.88E-02 | 2.66E-02 | MMP2/BTK/RND1/PTK2B/PPARG/ANG/G6PD/SEMA4D |

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| BP | GO:190198 | negative regulation of cell cycle phase transition | 8/189 | 268/18862 | 5.73E-03 | 3.88E-02 | 2.66E-02 | CUL1/EP300/MUC1/SKP1/WEE1/NAE1/SFN/NDC80 |
| BP | GO:000223 | stimulatory C-type lectin receptor signaling pathway | 5/189 | 114/18862 | 5.83E-03 | 3.94E-02 | 2.70E-02 | CUL1/EP300/MUC1/SKP1/BTRC |
| BP | GO:0050863 | regulation of T cell activation | 9/189 | 327/18862 | 5.84E-03 | 3.94E-02 | 2.70E-02 | RAC1/HLA-DRB1/RARA/IFNG/TNFAIP8L2/DPP4/CD74/IL2/SHH |
| BP | GO:0014855 | striated muscle cell proliferation | 4/189 | 72/18862 | 5.91E-03 | 3.98E-02 | 2.73E-02 | ERBB4/NOTCH1/GLI1/SHH |
| BP | GO:1903747 | regulation of establishment of protein localization to mitochondrion | 4/189 | 72/18862 | 5.91E-03 | 3.98E-02 | 2.73E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0046621 | negative regulation of organ growth | 3/189 | 37/18862 | 5.99E-03 | 4.01E-02 | 2.75E-02 | YY1/STK4/G6PD |
| BP | GO:0048713 | regulation of oligodendrocyte differentiation | 3/189 | 37/18862 | 5.99E-03 | 4.01E-02 | 2.75E-02 | PPARG/NOTCH1/SHH |
| BP | GO:0090218 | positive regulation of lipid kinase activity | 3/189 | 37/18862 | 5.99E-03 | 4.01E-02 | 2.75E-02 | F2/VAV3/PTK2B |
| BP | GO:0002903 | negative regulation of B cell apoptotic process | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | CD74/IL2 |
| BP | GO:0006570 | tyrosine metabolic process | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | HPD/PAH |
| BP | GO:0009265 | 2'-deoxyribonucleotide biosynthetic process | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | DTYMK/DCTD |
| BP | GO:0038110 | interleukin-2-mediated signaling pathway | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | PTK2B/IL2 |
| BP | GO:0043383 | negative T cell selection | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | CD74/SHH |
| BP | GO:0046322 | negative regulation of fatty acid oxidation | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | ACADV1/ACACB |
| BP | GO:0046385 | deoxyribose phosphate biosynthetic process | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | DTYMK/DCTD |

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| BP | GO:0051095 | regulation of helicase activity | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | POT1/MSH2 |
| BP | GO:0051549 | positive regulation of keratinocyte migration | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | HBEGF/ARF6 |
| BP | GO:0060442 | branching involved in prostate gland morphogenesis | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | ESR1/SHH |
| BP | GO:0060601 | lateral sprouting from an epithelium | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | AR/SHH |
| BP | GO:0061052 | negative regulation of cell growth involved in cardiac muscle cell development | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | YY1/G6PD |
| BP | GO:0061430 | bone trabecula morphogenesis | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | MMP2/SEMA4D |
| BP | GO:0071801 | regulation of podosome assembly | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | HCK/MSN |
| BP | GO:0090085 | regulation of protein deubiquitination | 2/189 | 12/18862 | 6.17E-03 | 4.02E-02 | 2.76E-02 | TRIM21/SART3 |
| BP | GO:1903037 | regulation of leukocyte cell-cell adhesion | 9/189 | 330/18862 | 6.19E-03 | 4.02E-02 | 2.76E-02 | RAC1/HLA-DRB1/RARA/IFNG/TNFAIP8L2/DPP4/CD74/IL2/SHH |
| BP | GO:0002292 | T cell differentiation involved in immune response | 4/189 | 73/18862 | 6.21E-03 | 4.02E-02 | 2.76E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0031100 | animal organ regeneration | 4/189 | 73/18862 | 6.21E-03 | 4.02E-02 | 2.76E-02 | HMOX1/PPARG/NOTCH1/GLI1 |
| BP | GO:0005996 | monosaccharide metabolic process | 8/189 | 272/18862 | 6.25E-03 | 4.03E-02 | 2.77E-02 | HK2/EP300/DCXR/PDK2/ACACB/PGK1/G6PD/PDK4 |
| BP | GO:1903034 | regulation of response to wounding | 6/189 | 164/18862 | 6.25E-03 | 4.03E-02 | 2.77E-02 | F2/HBEGF/PTPRF/ALOX12/F3/FAP |
| BP | GO:0033044 | regulation of chromosome organization | 8/189 | 273/18862 | 6.38E-03 | 4.08E-02 | 2.80E-02 | POT1/MUC1/SART3/SMG5/HNRNPA2B1/PARN/CTCF/NDC80 |
| BP | GO:0043491 | protein kinase B signaling | 8/189 | 273/18862 | 6.38E-03 | 4.08E-02 | 2.80E-02 | HBEGF/ESR1/RAC1/IGF1R/HSP90AB1/F3/ERBB4/MAGI2 |

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| BP | GO:0002714 | positive regulation of B cell mediated immunity | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | BTK/MSH2/IL2 |
| BP | GO:0002891 | positive regulation of immunoglobulin mediated immune response | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | BTK/MSH2/IL2 |
| BP | GO:0009163 | nucleoside biosynthetic process | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | NME3/DTYMK/MTAP |
| BP | GO:0009595 | detection of biotic stimulus | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | TLR4/FAP/HLA-DRB1 |
| BP | GO:0042307 | positive regulation of protein import into nucleus | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | HSP90AB1/IFNG/SHH |
| BP | GO:0042401 | cellular biogenic amine biosynthetic process | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | PAH/ODC1/PNMT |
| BP | GO:0045923 | positive regulation of fatty acid metabolic process | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | PPARG/CD74/NR1H3 |
| BP | GO:0051154 | negative regulation of striated muscle cell differentiation | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | NOTCH1/YY1/G6PD |
| BP | GO:0097242 | amyloid-beta clearance | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | IGF1R/IFNGR1/IFNG |
| BP | GO:2000249 | regulation of actin cytoskeleton reorganization | 3/189 | 38/18862 | 6.46E-03 | 4.08E-02 | 2.80E-02 | HCK/PTK2B/TJP1 |
| BP | GO:0097529 | myeloid leukocyte migration | 7/189 | 218/18862 | 6.51E-03 | 4.11E-02 | 2.82E-02 | VAV3/VEGFB/RAC1/PTK2B/DAPK2/DPP4/CD74 |
| BP | GO:0048469 | cell maturation | 6/189 | 166/18862 | 6.62E-03 | 4.17E-02 | 2.86E-02 | BTK/RND1/PTK2B/PPARG/ANG/G6PD |
| BP | GO:0045787 | positive regulation of cell cycle | 10/189 | 395/18862 | 6.64E-03 | 4.18E-02 | 2.87E-02 | EP300/MUC1/TRIM21/HSP90AB1/FAP/RARA/APEX1/SFN/NDC80/GLI1 |
| BP | GO:0002220 | innate immune response activating cell surface receptor signaling pathway | 5/189 | 118/18862 | 6.73E-03 | 4.22E-02 | 2.89E-02 | CUL1/EP300/MUC1/SKP1/BTRC |
| BP | GO:0002761 | regulation of myeloid leukocyte differentiation | 5/189 | 118/18862 | 6.73E-03 | 4.22E-02 | 2.89E-02 | TLR4/HLA-DRB1/RARA/IFNG/CD74 |

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| BP | GO:0046916 | cellular transition metal ion homeostasis | 5/189 | 118/18862 | 6.73E-03 | 4.22E-02 | 2.89E-02 | CUL1/HMOX1/SKP1/ATP7B/IFNG |
| BP | GO:0002200 | somatic diversification of immune receptors | 4/189 | 75/18862 | 6.83E-03 | 4.25E-02 | 2.92E-02 | MSH2/YY1/PARP3/IL2 |
| BP | GO:0006278 | RNA-dependent DNA biosynthetic process | 4/189 | 75/18862 | 6.83E-03 | 4.25E-02 | 2.92E-02 | POT1/HSP90AB1/SMG5/PARN |
| BP | GO:0043536 | positive regulation of blood vessel endothelial cell migration | 4/189 | 75/18862 | 6.83E-03 | 4.25E-02 | 2.92E-02 | HMOX1/MAP3K3/HDAC7/ALOX12 |
| BP | GO:0009309 | amine biosynthetic process | 3/189 | 39/18862 | 6.94E-03 | 4.29E-02 | 2.94E-02 | PAH/ODC1/PNMT |
| BP | GO:0032660 | regulation of interleukin-17 production | 3/189 | 39/18862 | 6.94E-03 | 4.29E-02 | 2.94E-02 | TLR4/IFNG/IL2 |
| BP | GO:0045622 | regulation of T-helper cell differentiation | 3/189 | 39/18862 | 6.94E-03 | 4.29E-02 | 2.94E-02 | HLA-DRB1/RARA/IL2 |
| BP | GO:2000279 | negative regulation of DNA biosynthetic process | 3/189 | 39/18862 | 6.94E-03 | 4.29E-02 | 2.94E-02 | POT1/PPARG/PARP3 |
| BP | GO:2000516 | positive regulation of CD4-positive, alpha-beta T cell activation | 3/189 | 39/18862 | 6.94E-03 | 4.29E-02 | 2.94E-02 | HLA-DRB1/RARA/IFNG |
| BP | GO:0050868 | negative regulation of T cell activation | 5/189 | 119/18862 | 6.97E-03 | 4.30E-02 | 2.95E-02 | HLA-DRB1/TNFAIP8L2/CD74/IL2/SHH |
| BP | GO:0120254 | NA | 5/189 | 119/18862 | 6.97E-03 | 4.30E-02 | 2.95E-02 | HSD17B4/ALOX12/CYP2E1/CYP17A1/SRD5A2 |
| BP | GO:0050670 | regulation of lymphocyte proliferation | 7/189 | 221/18862 | 7.00E-03 | 4.30E-02 | 2.95E-02 | VAV3/BTK/TLR4/HLA-DRB1/CD74/IL2/SHH |
| BP | GO:0006805 | xenobiotic metabolic process | 5/189 | 120/18862 | 7.22E-03 | 4.34E-02 | 2.98E-02 | HSP90AB1/SULT1A1/CYP2E1/AOC3/ACY1 |
| BP | GO:0034605 | cellular response to heat | 5/189 | 120/18862 | 7.22E-03 | 4.34E-02 | 2.98E-02 | EP300/HMOX1/HSP90AB1/ATXN3/RPA3 |
| BP | GO:0050708 | regulation of protein secretion | 8/189 | 279/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | RAC1/TLR4/HLA-DRB1/IFNG/ANG/DPP4/ARF6/NR1H3 |

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| BP | GO:0002551 | mast cell chemotaxis | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | VEGFB/RAC1 |
| BP | GO:0003161 | cardiac conduction system development | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | NOTCH1/DSG2 |
| BP | GO:0032354 | response to follicle-stimulating hormone | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | HMGCS1/NOTCH1 |
| BP | GO:0038183 | bile acid signaling pathway | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | CYP7A1/ABCC4 |
| BP | GO:0042762 | regulation of sulfur metabolic process | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | PDK2/PDK4 |
| BP | GO:0048302 | regulation of isotype switching to IgG isotypes | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | MSH2/IL2 |
| BP | GO:0060841 | venous blood vessel development | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | ACVR2B/NOTCH1 |
| BP | GO:0070424 | regulation of nucleotide-binding oligomerization domain containing signaling pathway | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | TLR4/XIAP |
| BP | GO:0070486 | leukocyte aggregation | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | MSN/SEMA4D |
| BP | GO:0071352 | cellular response to interleukin-2 | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | PTK2B/IL2 |
| BP | GO:0071635 | negative regulation of transforming growth factor beta production | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | HSP90AB1/FN1 |
| BP | GO:1902947 | regulation of tau-protein kinase activity | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | HSP90AB1/IFNG |
| BP | GO:1904668 | positive regulation of ubiquitin protein ligase activity | 2/189 | 13/18862 | 7.24E-03 | 4.34E-02 | 2.98E-02 | SKP1/BTRC |
| BP | GO:0016064 | immunoglobulin mediated immune response | 7/189 | 223/18862 | 7.34E-03 | 4.38E-02 | 3.00E-02 | BTK/MSH2/HLA-DRB1/C1R/PARP3/CD74/IL2 |
| BP | GO:0032944 | regulation of mononuclear cell proliferation | 7/189 | 223/18862 | 7.34E-03 | 4.38E-02 | 3.00E-02 | VAV3/BTK/TLR4/HLA-DRB1/CD74/IL2/SHH |

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| BP | GO:0002819 | regulation of adaptive immune response | 6/189 | 170/18862 | 7.41E-03 | 4.39E-02 | 3.01E-02 | BTK/MSH2/B2M/HLA-DRB1/PARP3/IL2 |
| BP | GO:0048639 | positive regulation of developmental growth | 6/189 | 170/18862 | 7.41E-03 | 4.39E-02 | 3.01E-02 | ACACB/ERBB4/NOTCH1/FN1/SEMA4D/GLI1 |
| BP | GO:0009262 | deoxyribonucleotide metabolic process | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | RRM1/DTYMK/DCTD |
| BP | GO:0055023 | positive regulation of cardiac muscle tissue growth | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | ERBB4/NOTCH1/GLI1 |
| BP | GO:0060443 | mammary gland morphogenesis | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | AR/ESR1/BTRC |
| BP | GO:0072528 | pyrimidine-containing compound biosynthetic process | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | NME3/DTYMK/DCTD |
| BP | GO:1904591 | positive regulation of protein import | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | HSP90AB1/IFNG/SHH |
| BP | GO:2000008 | regulation of protein localization to cell surface | 3/189 | 40/18862 | 7.45E-03 | 4.39E-02 | 3.01E-02 | HSP90AB1/ERBB4/ARF6 |
| BP | GO:0016042 | lipid catabolic process | 9/189 | 340/18862 | 7.46E-03 | 4.39E-02 | 3.01E-02 | HSD17B4/ACADVL/FABP3/CYP7A1/ACACB/ALK/ECI2/ECHS1/YWHAH |
| BP | GO:0051205 | protein insertion into membrane | 4/189 | 77/18862 | 7.48E-03 | 4.40E-02 | 3.02E-02 | YWHAQ/YWHAH/SFN/NMT1 |
| BP | GO:0001659 | temperature homeostasis | 6/189 | 171/18862 | 7.61E-03 | 4.47E-02 | 3.06E-02 | ACADVL/IGF1R/ACVR2B/TLR4/NOTCH1/NR1H3 |
| BP | GO:0046651 | lymphocyte proliferation | 8/189 | 282/18862 | 7.70E-03 | 4.51E-02 | 3.09E-02 | VAV3/BTK/MSN/TLR4/HLA-DRB1/CD74/IL2/SHH |
| BP | GO:0019724 | B cell mediated immunity | 7/189 | 226/18862 | 7.87E-03 | 4.61E-02 | 3.16E-02 | BTK/MSH2/HLA-DRB1/C1R/PARP3/CD74/IL2 |
| BP | GO:0032689 | negative regulation of interferon-gamma production | 3/189 | 41/18862 | 7.98E-03 | 4.64E-02 | 3.18E-02 | TLR4/HLA-DRB1/RARA |
| BP | GO:0033574 | response to testosterone | 3/189 | 41/18862 | 7.98E-03 | 4.64E-02 | 3.18E-02 | AR/MTAP/MSN |
| BP | GO:0046596 | regulation of viral entry into host cell | 3/189 | 41/18862 | 7.98E-03 | 4.64E-02 | 3.18E-02 | TRIM21/HLA-DRB1/CD74 |

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| BP | GO:0007498 | mesoderm development | 5/189 | 123/18862 | 7.99E-03 | 4.64E-02 | 3.18E-02 | NF2/BTK/HCK/ITGB3/SHH |
| BP | GO:1990266 | neutrophil migration | 5/189 | 123/18862 | 7.99E-03 | 4.64E-02 | 3.18E-02 | VAV3/RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0061138 | morphogenesis of a branching epithelium | 6/189 | 173/18862 | 8.04E-03 | 4.66E-02 | 3.20E-02 | AR/ESR1/NOTCH1/BTRC/STK4/SHH |
| BP | GO:0032943 | mononuclear cell proliferation | 8/189 | 285/18862 | 8.18E-03 | 4.73E-02 | 3.24E-02 | VAV3/BTK/MSN/TLR4/HLA-DRB1/CD74/IL2/SHH |
| BP | GO:0032204 | regulation of telomere maintenance | 4/189 | 79/18862 | 8.18E-03 | 4.73E-02 | 3.24E-02 | POT1/SMG5/HNRNPA2B1/PARN |
| BP | GO:0009266 | response to temperature stimulus | 7/189 | 228/18862 | 8.24E-03 | 4.73E-02 | 3.24E-02 | EP300/ACADVL/HMOX1/HSP90AB1/ATXN3/RPA3/PPARG |
| BP | GO:2000045 | regulation of G1/S transition of mitotic cell cycle | 6/189 | 174/18862 | 8.26E-03 | 4.73E-02 | 3.24E-02 | EP300/MUC1/SEN2/WEE1/APEX1/SFN |
| BP | GO:0006721 | terpenoid metabolic process | 5/189 | 124/18862 | 8.26E-03 | 4.73E-02 | 3.24E-02 | HMGCS1/TTR/ADH1C/CYP2E1/GGPS1 |
| BP | GO:0051053 | negative regulation of DNA metabolic process | 5/189 | 124/18862 | 8.26E-03 | 4.73E-02 | 3.24E-02 | POT1/DFFA/MSH2/PPARG/PARP3 |
| BP | GO:0071621 | granulocyte chemotaxis | 5/189 | 124/18862 | 8.26E-03 | 4.73E-02 | 3.24E-02 | VAV3/RAC1/DAPK2/DPP4/CD74 |
| BP | GO:0003413 | chondrocyte differentiation involved in endochondral bone morphogenesis | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | RARG/ANXA6 |
| BP | GO:0010935 | regulation of macrophage cytokine production | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | TLR4/CD74 |
| BP | GO:0032966 | negative regulation of collagen biosynthetic process | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | CYP7A1/PPARG |
| BP | GO:0036295 | cellular response to increased oxygen levels | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | FAS/PPARG |
| BP | GO:0045059 | positive thymic T cell selection | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | CD74/SHH |

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| BP | GO:0048291 | isotype switching to IgG isotypes | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | MSH2/IL2 |
| BP | GO:0051547 | regulation of keratinocyte migration | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | HBEGF/ARF6 |
| BP | GO:0051917 | regulation of fibrinolysis | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | F2/FAP |
| BP | GO:0070141 | response to UV-A | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | MMP2/MMP1 |
| BP | GO:0070669 | response to interleukin-2 | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | PTK2B/IL2 |
| BP | GO:0097284 | hepatocyte apoptotic process | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | STK4/ARF6 |
| BP | GO:0097531 | mast cell migration | 2/189 | 14/18862 | 8.40E-03 | 4.73E-02 | 3.24E-02 | VEGFB/RAC1 |
| BP | GO:0042110 | T cell activation | 11/189 | 474/18862 | 8.45E-03 | 4.74E-02 | 3.25E-02 | RAC1/MSN/B2M/HLA-DRB1/RARA/IFNG/TNFAIP8L2/DPP4/CD74/IL2/SHH |
| BP | GO:0009152 | purine ribonucleotide biosynthetic process | 6/189 | 175/18862 | 8.48E-03 | 4.74E-02 | 3.25E-02 | NME3/PAPSS1/PDK2/ACACB/GART/PDK4 |
| BP | GO:0052126 | movement in host environment | 6/189 | 175/18862 | 8.48E-03 | 4.74E-02 | 3.25E-02 | TRIM21/WWP1/ITGB3/HLA-DRB1/DPP4/CD74 |
| BP | GO:0014002 | astrocyte development | 3/189 | 42/18862 | 8.53E-03 | 4.74E-02 | 3.25E-02 | TLR4/IFNGR1/IFNG |
| BP | GO:0031670 | cellular response to nutrient | 3/189 | 42/18862 | 8.53E-03 | 4.74E-02 | 3.25E-02 | HMOX1/PDK2/PPARG |
| BP | GO:0032965 | regulation of collagen biosynthetic process | 3/189 | 42/18862 | 8.53E-03 | 4.74E-02 | 3.25E-02 | F2/CYP7A1/PPARG |
| BP | GO:0045687 | positive regulation of glial cell differentiation | 3/189 | 42/18862 | 8.53E-03 | 4.74E-02 | 3.25E-02 | PPARG/NOTCH1/SHH |
| BP | GO:1901659 | glycosyl compound biosynthetic process | 3/189 | 42/18862 | 8.53E-03 | 4.74E-02 | 3.25E-02 | NME3/DTYMK/MTAP |
| BP | GO:0002705 | positive regulation of leukocyte mediated immunity | 5/189 | 125/18862 | 8.54E-03 | 4.74E-02 | 3.25E-02 | BTK/MSH2/B2M/HLA-DRB1/IL2 |

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| BP | GO:0071466 | cellular response to xenobiotic stimulus | 5/189 | 125/18862 | 8.54E-03 | 4.74E-02 | 3.25E-02 | HSP90AB1/SULT1A1/CYP2E1/AOC3/ACY1 |
| BP | GO:0007160 | cell-matrix adhesion | 7/189 | 230/18862 | 8.62E-03 | 4.77E-02 | 3.27E-02 | NF2/RAC1/EPHA3/PTK2B/BCR/ITGB3/FN1 |
| BP | GO:2000116 | regulation of cysteine-type endopeptidase activity | 7/189 | 230/18862 | 8.62E-03 | 4.77E-02 | 3.27E-02 | ALOX12/F3/FAS/PPARG/XIAP/SFN/DHCR24 |
| BP | GO:0044262 | cellular carbohydrate metabolic process | 8/189 | 288/18862 | 8.68E-03 | 4.80E-02 | 3.29E-02 | HK2/EP300/PTK2B/PYGL/PDK2/ITPK1/ACACB/PDK4 |
| BP | GO:0010921 | regulation of phosphatase activity | 6/189 | 176/18862 | 8.71E-03 | 4.80E-02 | 3.29E-02 | PPP2R1A/HSP90AB1/MAGI2/IFNG/B3GAT3/SEMA4D |
| BP | GO:0048762 | mesenchymal cell differentiation | 7/189 | 231/18862 | 8.82E-03 | 4.85E-02 | 3.33E-02 | EPHA3/ERBB4/ANXA6/NOTCH1/FN1/SEMA4D/SHH |
| BP | GO:0045471 | response to ethanol | 5/189 | 126/18862 | 8.82E-03 | 4.85E-02 | 3.33E-02 | PTK2B/CYP7A1/CYP2E1/G6PD/IL2 |
| BP | GO:0043367 | CD4-positive, alpha-beta T cell differentiation | 4/189 | 81/18862 | 8.92E-03 | 4.88E-02 | 3.35E-02 | HLA-DRB1/RARA/IFNG/IL2 |
| BP | GO:0050672 | negative regulation of lymphocyte proliferation | 4/189 | 81/18862 | 8.92E-03 | 4.88E-02 | 3.35E-02 | BTK/HLA-DRB1/IL2/SHH |
| BP | GO:0032386 | regulation of intracellular transport | 9/189 | 350/18862 | 8.93E-03 | 4.88E-02 | 3.35E-02 | HSP90AB1/MSN/YWHAQ/IFNG/B3GAT3/YWHAH/SFN/NMT1/SHH |
| BP | GO:0001936 | regulation of endothelial cell proliferation | 6/189 | 177/18862 | 8.94E-03 | 4.88E-02 | 3.35E-02 | HMOX1/VEGFB/F3/ITGB3/PPARG/ANG |
| BP | GO:0001959 | regulation of cytokine-mediated signaling pathway | 6/189 | 177/18862 | 8.94E-03 | 4.88E-02 | 3.35E-02 | HSP90AB1/IFNGR1/PPARG/IFNG/CD74/NR1H3 |
| BP | GO:0021762 | substantia nigra development | 3/189 | 43/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | YWHAQ/YWHAH/G6PD |
| BP | GO:0032620 | interleukin-17 production | 3/189 | 43/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | TLR4/IFNG/IL2 |
| BP | GO:0046189 | phenol-containing compound biosynthetic process | 3/189 | 43/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | ZEB2/PAH/PNMT |
| BP | GO:0061383 | trabecula morphogenesis | 3/189 | 43/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | MMP2/NOTCH1/SEMA4D |

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| BP | GO:2000273 | positive regulation of signaling receptor activity | 3/189 | 43/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | HBEGF/NCOA3/IFNG |
| BP | GO:0014066 | regulation of phosphatidylinositol 3-kinase signaling | 5/189 | 127/18862 | 9.11E-03 | 4.93E-02 | 3.38E-02 | F2/IGF1R/ERBB4/FN1/SEMA4D |
| BP | GO:0097305 | response to alcohol | 7/189 | 233/18862 | 9.22E-03 | 4.98E-02 | 3.42E-02 | HMGCS1/PTK2B/CYP7A1/CYP2E1/PPARG/G6PD/IL2 |
| CC | GO:0045177 | apical part of cell | 14/191 | 414/19520 | 1.47E-05 | 4.89E-03 | 4.01E-03 | NF2/MUC1/HSP90AB1/MSN/ITPK1/FAP/NOTCH1/TJP1/DPP4/DSG2/FN1/CLCN5/SLC5A1/NPC1L1 |
| CC | GO:0005667 | transcription factor complex | 12/191 | 365/19520 | 2.41E-05 | 4.89E-03 | 4.01E-03 | APEX1/EP300/XRCC6/HSP90AB1/NFATC1/POU2F1/PPARG/RARA/RARG/TAF13/YY1/NR1H3 |
| CC | GO:0031091 | platelet alpha granule | 6/191 | 91/19520 | 2.71E-04 | 4.07E-02 | 3.34E-02 | VEGFB/ITGB3/SERPINA5/ALB/THBS2/FN1 |
| CC | GO:0072562 | blood microparticle | 7/191 | 146/19520 | 5.94E-04 | 4.07E-02 | 3.34E-02 | F2/HBB/GC/MSN/ALB/C1R/FN1 |
| CC | GO:0031527 | filopodium membrane | 3/191 | 18/19520 | 6.75E-04 | 4.07E-02 | 3.34E-02 | NF2/ITGB3/ARF6 |
| CC | GO:0016324 | apical plasma membrane | 11/191 | 351/19520 | 7.06E-04 | 4.07E-02 | 3.34E-02 | MUC1/HSP90AB1/MSN/ITPK1/NOTCH1/DPP4/DSG2/FN1/SLC5A1/NPC1L1/ABCC4 |
| CC | GO:0005925 | focal adhesion | 12/191 | 416/19520 | 8.43E-04 | 4.07E-02 | 3.34E-02 | RAC1/HCK/PTK2B/FLNB/MSN/B2M/YWHAQ/ITGB3/FAP/ANXA6/DPP4/ARF6 |
| CC | GO:0030055 | cell-substrate junction | 12/191 | 423/19520 | 9.73E-04 | 4.07E-02 | 3.34E-02 | RAC1/HCK/PTK2B/FLNB/MSN/B2M/YWHAQ/ITGB3/FAP/ANXA6/DPP4/ARF6 |
| CC | GO:0031258 | lamellipodium membrane | 3/191 | 22/19520 | 1.24E-03 | 4.07E-02 | 3.34E-02 | ITGB3/FAP/DPP4 |
| CC | GO:0034774 | secretory granule lumen | 10/191 | 322/19520 | 1.31E-03 | 4.07E-02 | 3.34E-02 | XRCC6/VEGFB/HSP90AB1/PYGL/TTR/BPI/B2M/PA2G4/ALB/FN1 |
| CC | GO:0060205 | cytoplasmic vesicle lumen | 10/191 | 326/19520 | 1.44E-03 | 4.07E-02 | 3.34E-02 | XRCC6/VEGFB/HSP90AB1/PYGL/TTR/BPI/B2M/PA2G4/ALB/FN1 |
| CC | GO:0031983 | vesicle lumen | 10/191 | 328/19520 | 1.51E-03 | 4.07E-02 | 3.34E-02 | XRCC6/VEGFB/HSP90AB1/PYGL/TTR/BPI/B2M/PA2G4/ALB/FN1 |

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| CC | GO:0005775 | vacuolar lumen | 7/191 | 173/19520 | 1.60E-03 | 4.07E-02 | 3.34E-02 | GC/TTR/BPI/PSAP/PA2G4/DAPK2/CD74 |
| CC | GO:0001726 | ruffle | 7/191 | 175/19520 | 1.71E-03 | 4.07E-02 | 3.34E-02 | NF2/RAC1/TLR4/ITGB3/FAP/S100A6/ARF6 |
| CC | GO:0042611 | MHC protein complex | 3/191 | 25/19520 | 1.81E-03 | 4.07E-02 | 3.34E-02 | B2M/HLA-DRB1/CD74 |
| CC | GO:0031253 | cell projection membrane | 10/191 | 337/19520 | 1.84E-03 | 4.07E-02 | 3.34E-02 | NF2/RAC1/HSP90AB1/MSN/ITGB3/FAP/DPP4/ARF6/SLC5A1/NPC1L1 |
| MF | GO:0033293 | monocarboxylic acid binding | 8/191 | 71/18337 | 7.27E-07 | 4.13E-04 | 3.35E-04 | FABP3/PYGL/PSAP/ACACB/PPARG/SERPINA5/RARA/ALB |
| MF | GO:0004713 | protein tyrosine kinase activity | 10/191 | 135/18337 | 1.52E-06 | 4.31E-04 | 3.49E-04 | BTK/HCK/EPHA3/PTK2B/IGF1R/MATK/CLK1/WEE1/ERBB4/ALK |
| MF | GO:0043177 | organic acid binding | 8/191 | 114/18337 | 2.57E-05 | 1.83E-03 | 1.48E-03 | HMGCS1/FABP3/HBB/ACACB/GAD2/PPARG/SERPINA5/RARA |
| MF | GO:0042162 | telomeric DNA binding | 5/191 | 36/18337 | 3.37E-05 | 2.13E-03 | 1.73E-03 | POT1/XRCC6/SMG5/HNRNPA2B1/APEX1 |
| MF | GO:0033218 | amide binding | 14/191 | 391/18337 | 6.34E-05 | 3.04E-03 | 2.46E-03 | ACADVL/IGF1R/HSP90AB1/PSAP/TLR4/PEX5/ACACB/HLA-DRB1/NFATC1/PPARG/ANG/ECI2/CD74/DHCR24 |
| MF | GO:0003684 | damaged DNA binding | 6/191 | 66/18337 | 6.38E-05 | 3.04E-03 | 2.46E-03 | POT1/EP300/XRCC6/MSH2/RPA3/APEX1 |
| MF | GO:0016922 | nuclear receptor binding | 7/191 | 97/18337 | 6.94E-05 | 3.04E-03 | 2.46E-03 | RARG/EP300/ESR1/NCOA3/PPARG/PRKCB/YWHAH |
| MF | GO:0002020 | protease binding | 8/191 | 131/18337 | 6.94E-05 | 3.04E-03 | 2.46E-03 | F3/SART3/PSAP/ITGB3/FAP/SERPINA5/DPP4/FN1 |
| MF | GO:0005496 | steroid binding | 7/191 | 100/18337 | 8.43E-05 | 3.43E-03 | 2.78E-03 | AR/ESR1/GC/ANXA6/SERPINA6/NR1H3/SHBG |
| MF | GO:0005536 | glucose binding | 3/191 | 10/18337 | 1.26E-04 | 4.79E-03 | 3.88E-03 | HK2/PYGL/G6PD |
| MF | GO:0031406 | carboxylic acid binding | 9/191 | 184/18337 | 1.36E-04 | 4.79E-03 | 3.88E-03 | FABP3/PYGL/PSAP/ACACB/GAD2/PPARG/SERPINA5/RARA/ALB |
| MF | GO:0005539 | glycosaminoglycan binding | 10/191 | 228/18337 | 1.43E-04 | 4.79E-03 | 3.88E-03 | F2/HBEGF/VEGFB/PTPRF/ANXA6/SERPINA5/ANG/THBS2/FN1/SHH |

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| MF | GO:0016616 | oxidoreductase activity, acting on the CH-OH group of donors, NAD or NADP as acceptor | 7/191 | 120/18337 | 2.63E-04 | 7.88E-03 | 6.38E-03 | HSD17B4/DCXR/ADH1C/G6PD/GRHPR/ABCC4/SRD5A2 |
| MF | GO:0008201 | heparin binding | 8/191 | 164/18337 | 3.27E-04 | 9.32E-03 | 7.55E-03 | F2/HBEGF/VEGFB/PTPRF/SERPINA5/ANG/THBS2/FN1 |
| MF | GO:0005154 | epidermal growth factor receptor binding | 4/191 | 33/18337 | 3.68E-04 | 9.96E-03 | 8.07E-03 | HBEGF/VAV3/ERBB4/SNX1 |
| MF | GO:0004252 | serine-type endopeptidase activity | 8/191 | 168/18337 | 3.85E-04 | 9.96E-03 | 8.07E-03 | F2/MMP2/KLK1/F3/FAP/MMP1/DPP4/C1R |
| MF | GO:0097718 | disordered domain specific binding | 4/191 | 34/18337 | 4.14E-04 | 1.02E-02 | 8.23E-03 | RRM1/HSP90AB1/NCOA3/FN1 |
| MF | GO:0016614 | oxidoreductase activity, acting on CH-OH group of donors | 7/191 | 130/18337 | 4.28E-04 | 1.02E-02 | 8.23E-03 | HSD17B4/DCXR/ADH1C/G6PD/GRHPR/ABCC4/SRD5A2 |
| MF | GO:0000217 | DNA secondary structure binding | 4/191 | 36/18337 | 5.18E-04 | 1.18E-02 | 9.55E-03 | POT1/MSH2/YY1/HMGB3 |
| MF | GO:0061629 | RNA polymerase II sequence-specific DNA-binding transcription factor binding | 10/191 | 271/18337 | 5.67E-04 | 1.24E-02 | 1.01E-02 | RARG/EP300/ESR1/GTF2I/NCOA3/EXOSC9/PPARG/APEX1/PRKCB/YWHAH |
| MF | GO:0035257 | nuclear hormone receptor binding | 7/191 | 140/18337 | 6.67E-04 | 1.29E-02 | 1.05E-02 | RARG/EP300/ESR1/NCOA3/PPARG/PRKCB/YWHAH |
| MF | GO:0000400 | four-way junction DNA binding | 3/191 | 17/18337 | 6.79E-04 | 1.29E-02 | 1.05E-02 | MSH2/YY1/HMGB3 |
| MF | GO:0023026 | MHC class II protein complex binding | 3/191 | 17/18337 | 6.79E-04 | 1.29E-02 | 1.05E-02 | HSP90AB1/HLA-DRB1/CD74 |
| MF | GO:0070851 | growth factor receptor binding | 7/191 | 141/18337 | 6.96E-04 | 1.29E-02 | 1.05E-02 | HBEGF/VAV3/VEGFB/ERBB4/ITGB3/SNX1/IL2 |
| MF | GO:0019825 | oxygen binding | 4/191 | 39/18337 | 7.05E-04 | 1.29E-02 | 1.05E-02 | HBB/CYP2E1/ALB/CYP17A1 |
| MF | GO:0008022 | protein C-terminus binding | 8/191 | 185/18337 | 7.28E-04 | 1.29E-02 | 1.05E-02 | EP300/XRCC6/PTK2B/MSH2/YWHAQ/PPARG/TAF13/FN1 |
| MF | GO:0008236 | serine-type peptidase activity | 8/191 | 186/18337 | 7.54E-04 | 1.30E-02 | 1.05E-02 | F2/MMP2/KLK1/F3/FAP/MMP1/DPP4/C1R |

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| MF | GO:0017171 | serine hydrolase activity | 8/191 | 188/18337 | 8.09E-04 | 1.34E-02 | 1.08E-02 | F2/MMP2/KLK1/F3/FAP/MMP1/DPP4/C1R |
| MF | GO:0019842 | vitamin binding | 7/191 | 145/18337 | 8.21E-04 | 1.34E-02 | 1.08E-02 | RBP5/GC/PYGL/ACACB/GAD2/ALB/OAT |
| MF | GO:0035258 | steroid hormone receptor binding | 5/191 | 77/18337 | 1.25E-03 | 1.98E-02 | 1.61E-02 | EP300/ESR1/PPARG/PRKCB/YWHAH |
| MF | GO:0033613 | activating transcription factor binding | 5/191 | 78/18337 | 1.33E-03 | 2.04E-02 | 1.65E-02 | EP300/HDAC7/GTF2I/EXOSC9/PPARG |
| MF | GO:0019199 | transmembrane receptor protein kinase activity | 5/191 | 80/18337 | 1.49E-03 | 2.23E-02 | 1.80E-02 | EPHA3/IGF1R/ACVR2B/ERBB4/ALK |
| MF | GO:0001224 | RNA polymerase II transcription cofactor binding | 3/191 | 24/18337 | 1.92E-03 | 2.77E-02 | 2.24E-02 | AR/ESR1/NFATC1 |
| MF | GO:0008013 | beta-catenin binding | 5/191 | 85/18337 | 1.95E-03 | 2.77E-02 | 2.24E-02 | EP300/AR/ESR1/SKP1/BTRC |
| MF | GO:0051427 | hormone receptor binding | 7/191 | 173/18337 | 2.27E-03 | 3.15E-02 | 2.55E-02 | RARG/EP300/ESR1/NCOA3/PPARG/PRKCB/YWHAH |
| MF | GO:0001223 | transcription coactivator binding | 3/191 | 26/18337 | 2.42E-03 | 3.21E-02 | 2.60E-02 | AR/ESR1/NFATC1 |
| MF | GO:0023023 | MHC protein complex binding | 3/191 | 26/18337 | 2.42E-03 | 3.21E-02 | 2.60E-02 | HSP90AB1/HLA-DRB1/CD74 |
| MF | GO:0030170 | pyridoxal phosphate binding | 4/191 | 55/18337 | 2.57E-03 | 3.25E-02 | 2.63E-02 | PYGL/GAD2/ALB/OAT |
| MF | GO:0070279 | vitamin B6 binding | 4/191 | 55/18337 | 2.57E-03 | 3.25E-02 | 2.63E-02 | PYGL/GAD2/ALB/OAT |
| MF | GO:0005507 | copper ion binding | 4/191 | 60/18337 | 3.53E-03 | 4.37E-02 | 3.54E-02 | ATP7B/AOC3/ANG/ALB |
| MF | GO:0004714 | transmembrane receptor protein tyrosine kinase activity | 4/191 | 61/18337 | 3.75E-03 | 4.54E-02 | 3.68E-02 | EPHA3/IGF1R/ERBB4/ALK |
| MF | GO:0001530 | lipopolysaccharide binding | 3/191 | 32/18337 | 4.42E-03 | 4.84E-02 | 3.92E-02 | F2/BPI/TLR4 |
| MF | GO:0031490 | chromatin DNA binding | 5/191 | 103/18337 | 4.47E-03 | 4.84E-02 | 3.92E-02 | EP300/NOTCH1/RARA/CTCF/APEX1 |

| | | | | | | | | |
|----|------------|-------------------------------------|-------|----------|----------|----------|----------|----------------|
| MF | GO:0004300 | enoyl-CoA hydratase activity | 2/191 | 10/18337 | 4.60E-03 | 4.84E-02 | 3.92E-02 | HSD17B4/ECHS1 |
| MF | GO:0008239 | dipeptidyl-peptidase activity | 2/191 | 10/18337 | 4.60E-03 | 4.84E-02 | 3.92E-02 | FAP/DPP4 |
| MF | GO:0032356 | oxidized DNA binding | 2/191 | 10/18337 | 4.60E-03 | 4.84E-02 | 3.92E-02 | POT1/MSH2 |
| MF | GO:0043208 | glycosphingolipid binding | 2/191 | 10/18337 | 4.60E-03 | 4.84E-02 | 3.92E-02 | PSAP/IL2 |
| MF | GO:0098505 | G-rich strand telomeric DNA binding | 2/191 | 10/18337 | 4.60E-03 | 4.84E-02 | 3.92E-02 | POT1/HNRNPA2B1 |

Note: KEGG, Kyoto Encyclopedia of Genes and Genomes; GO, Gene Ontology; BC, Bladder Carcinoma; BP, biological process; CC, cellular component; MF, molecular function

Supplementary Table S9: Binding free energy during 200ns molecular docking simulation of NRP1 docking with solasonine.

| Binding free energy during 200ns MDS of NRP1 docking with solasonine. | | | | | | |
|--|----------------|----------------------|------------------|----------------------|----------------------|--|
| #Frame | Residue number | MMPBSA (kcal/mol) | MM (kcal/mol) | MM_VDW (kcal/mol) | MM_COU (kcal/mol) | |
| P~1PHE | 273 | 0.226 | 0.226 | 0 | 0.227 | |
| P~2LYS | 274 | 0.197 | 0.197 | 0 | 0.197 | |
| P~3CYS | 275 | -0.013 | -0.013 | 0 | -0.013 | |
| P~4MET | 276 | 0.004 | 0.004 | 0 | 0.005 | |
| P~5GLU | 277 | -0.204 | -0.204 | 0 | -0.203 | |
| P~6ALA | 278 | 0.016 | 0.016 | 0 | 0.017 | |
| P~7LEU | 279 | 0.017 | 0.017 | -0.001 | 0.018 | |
| P~8GLY | 280 | 0.016 | 0.016 | 0 | 0.017 | |
| P~9MET | 281 | 0.039 | 0.039 | -0.003 | 0.043 | |
| P~10GLU | 282 | -0.244 | -0.244 | -0.002 | -0.242 | |
| P~11SER | 283 | 0.005 | 0.005 | -0.001 | 0.006 | |
| P~12GLY | 284 | 0.018 | 0.018 | -0.001 | 0.018 | |
| P~13GLU | 285 | -0.155 | -0.155 | -0.001 | -0.154 | |
| P~14ILE | 286 | 0.003 | 0.003 | -0.002 | 0.005 | |
| P~15HIS | 287 | -0.051 | -0.051 | -0.002 | -0.05 | |
| P~16SER | 288 | -0.06 | -0.06 | -0.002 | -0.057 | |
| P~17ASP | 289 | -0.02 | -0.02 | -0.002 | -0.019 | |
| P~18GLN | 290 | 0.002 | 0.002 | -0.002 | 0.004 | |
| P~19ILE | 291 | 0.034 | 0.034 | -0.006 | 0.039 | |
| P~20THR | 292 | -0.038 | -0.038 | -0.006 | -0.031 | |
| P~21ALA | 293 | 0.103 | 0.103 | -0.015 | 0.118 | |
| P~22SER | 294 | 0.044 | 0.044 | -0.028 | 0.072 | |
| P~23SER | 295 | -0.498 | -0.498 | -0.117 | -0.381 | |
| P~24GLN | 296 | -0.018 | -0.018 | -0.157 | 0.138 | |
| P~25TYR | 297 | -8.053 | -8.053 | -10.726 | 2.673 | |
| P~26SER | 298 | -0.982 | -0.982 | -0.274 | -0.708 | |
| P~27THR | 299 | -0.303 | -0.303 | -0.054 | -0.25 | |

| | | | | | |
|---------|-----|---------|---------|--------|---------|
| P~28ASN | 300 | -0.173 | -0.173 | -0.209 | 0.036 |
| P~29TRP | 301 | -8.749 | -8.749 | -4.633 | -4.116 |
| P~30SER | 302 | -0.18 | -0.18 | -0.047 | -0.134 |
| P~31ALA | 303 | -0.069 | -0.069 | -0.017 | -0.052 |
| P~32GLU | 304 | 0.023 | 0.023 | -0.012 | 0.035 |
| P~33ARG | 305 | -0.353 | -0.353 | -0.054 | -0.299 |
| P~34SER | 306 | 0.02 | 0.02 | -0.012 | 0.033 |
| P~35ARG | 307 | 0.188 | 0.188 | -0.008 | 0.196 |
| P~36LEU | 308 | 0.031 | 0.031 | -0.004 | 0.035 |
| P~37ASN | 309 | 0.01 | 0.01 | -0.004 | 0.014 |
| P~38TYR | 310 | -0.06 | -0.06 | -0.016 | -0.044 |
| P~39PRO | 311 | -0.028 | -0.028 | -0.012 | -0.017 |
| P~40GLU | 312 | 0.448 | 0.448 | -0.041 | 0.489 |
| P~41ASN | 313 | -0.347 | -0.347 | -0.23 | -0.117 |
| P~42GLY | 314 | 0.016 | 0.016 | -0.066 | 0.083 |
| P~43TRP | 315 | -0.636 | -0.636 | -0.248 | -0.389 |
| P~44THR | 316 | -3.656 | -3.656 | -3.354 | -0.301 |
| P~45PRO | 317 | -7.554 | -7.554 | 1.018 | -8.572 |
| P~46GLY | 318 | -2.875 | -2.875 | -2.484 | -0.391 |
| P~47GLU | 319 | -6.382 | -6.382 | -3.703 | -2.679 |
| P~48ASP | 320 | -25.796 | -25.796 | -5.801 | -19.995 |
| P~49SER | 321 | -0.567 | -0.567 | -0.366 | -0.201 |
| P~50TYR | 322 | 0.156 | 0.156 | -0.077 | 0.233 |
| P~51ARG | 323 | 1.052 | 1.052 | -0.098 | 1.149 |
| P~52GLU | 324 | -1.804 | -1.804 | -0.18 | -1.623 |
| P~53TRP | 325 | -0.084 | -0.084 | -0.036 | -0.049 |
| P~54ILE | 326 | -0.047 | -0.047 | -0.023 | -0.024 |
| P~55GLN | 327 | -0.043 | -0.043 | -0.006 | -0.037 |
| P~56VAL | 328 | -0.019 | -0.019 | -0.003 | -0.016 |
| P~57ASP | 329 | -0.255 | -0.255 | -0.001 | -0.253 |
| P~58LEU | 330 | 0.009 | 0.009 | -0.001 | 0.01 |
| P~59GLY | 331 | 0.007 | 0.007 | 0 | 0.007 |
| P~60LEU | 332 | -0.012 | -0.012 | 0 | -0.012 |

| | | | | | |
|---------|-----|---------|---------|--------|--------|
| P~61LEU | 333 | 0.006 | 0.006 | 0 | 0.006 |
| P~62ARG | 334 | 0.194 | 0.194 | 0 | 0.195 |
| P~63PHE | 335 | 0 | 0 | 0 | 0 |
| P~64VAL | 336 | 0.011 | 0.011 | 0 | 0.012 |
| P~65THR | 337 | -0.011 | -0.011 | 0 | -0.011 |
| P~66ALA | 338 | 0.01 | 0.01 | -0.001 | 0.011 |
| P~67VAL | 339 | -0.002 | -0.002 | -0.002 | 0 |
| P~68GLY | 340 | -0.01 | -0.01 | -0.001 | -0.008 |
| P~69THR | 341 | 0.078 | 0.078 | -0.005 | 0.084 |
| P~70GLN | 342 | -0.079 | -0.079 | -0.013 | -0.066 |
| P~71GLY | 343 | 0.093 | 0.093 | -0.016 | 0.109 |
| P~72ALA | 344 | -0.122 | -0.122 | -0.076 | -0.046 |
| P~73ILE | 345 | -0.174 | -0.174 | -0.18 | 0.005 |
| P~74SER | 346 | -1.49 | -1.49 | -0.923 | -0.567 |
| P~75LYS | 347 | -1.244 | -1.244 | -0.311 | -0.934 |
| P~76GLU | 348 | -0.669 | -0.669 | -3.171 | 2.502 |
| P~77THR | 349 | -15.043 | -15.043 | -14.17 | -0.873 |
| P~78LYS | 350 | -2.967 | -2.967 | -2.719 | -0.248 |
| P~79LYS | 351 | -3.863 | -3.863 | -5.278 | 1.415 |
| P~80LYS | 352 | 0.149 | 0.149 | -0.293 | 0.442 |
| P~81TYR | 353 | -3.109 | -3.109 | -4.329 | 1.219 |
| P~82TYR | 354 | -0.115 | -0.115 | -0.063 | -0.052 |
| P~83VAL | 355 | 0.021 | 0.021 | -0.038 | 0.058 |
| P~84LYS | 356 | 1.13 | 1.13 | -0.022 | 1.152 |
| P~85THR | 357 | -0.085 | -0.085 | -0.009 | -0.076 |
| P~86TYR | 358 | 0.035 | 0.035 | -0.01 | 0.045 |
| P~87LYS | 359 | 0.716 | 0.716 | -0.006 | 0.722 |
| P~88ILE | 360 | -0.002 | -0.002 | -0.003 | 0.001 |
| P~89ASP | 361 | -0.72 | -0.72 | -0.002 | -0.718 |
| P~90VAL | 362 | -0.006 | -0.006 | -0.001 | -0.006 |
| P~91SER | 363 | 0.003 | 0.003 | -0.001 | 0.004 |
| P~92SER | 364 | 0.011 | 0.011 | 0 | 0.011 |
| P~93ASN | 365 | -0.008 | -0.008 | 0 | -0.007 |

| | | | | | |
|----------|-----|--------|--------|--------|--------|
| P~94GLY | 366 | -0.006 | -0.006 | 0 | -0.005 |
| P~95GLU | 367 | -0.227 | -0.227 | -0.001 | -0.226 |
| P~96ASP | 368 | -0.26 | -0.26 | 0 | -0.26 |
| P~97TRP | 369 | -0.009 | -0.009 | -0.002 | -0.006 |
| P~98ILE | 370 | -0.013 | -0.013 | -0.001 | -0.012 |
| P~99THR | 371 | 0.03 | 0.03 | -0.001 | 0.031 |
| P~100ILE | 372 | -0.016 | -0.016 | -0.001 | -0.015 |
| P~101LYS | 373 | 0.403 | 0.403 | -0.001 | 0.404 |
| P~102GLU | 374 | -0.448 | -0.448 | -0.001 | -0.448 |
| P~103GLY | 375 | -0.002 | -0.002 | 0 | -0.002 |
| P~104ASN | 376 | -0.001 | -0.001 | 0 | -0.001 |
| P~105LYS | 377 | 0.347 | 0.347 | 0 | 0.347 |
| P~106PRO | 378 | 0.02 | 0.02 | -0.001 | 0.02 |
| P~107VAL | 379 | -0.014 | -0.014 | -0.001 | -0.012 |
| P~108LEU | 380 | 0.036 | 0.036 | -0.004 | 0.04 |
| P~109PHE | 381 | -0.051 | -0.051 | -0.003 | -0.048 |
| P~110GLN | 382 | 0.021 | 0.021 | -0.003 | 0.024 |
| P~111GLY | 383 | 0.072 | 0.072 | -0.003 | 0.074 |
| P~112ASN | 384 | -0.067 | -0.067 | -0.008 | -0.059 |
| P~113THR | 385 | 0.017 | 0.017 | -0.006 | 0.023 |
| P~114ASN | 386 | -0.056 | -0.056 | -0.011 | -0.045 |
| P~115PRO | 387 | -0.032 | -0.032 | -0.027 | -0.005 |
| P~116THR | 388 | -0.03 | -0.03 | -0.01 | -0.021 |
| P~117ASP | 389 | -0.514 | -0.514 | -0.004 | -0.51 |
| P~118VAL | 390 | 0.015 | 0.015 | -0.003 | 0.018 |
| P~119VAL | 391 | -0.02 | -0.02 | -0.003 | -0.017 |
| P~120VAL | 392 | 0.009 | 0.009 | -0.001 | 0.011 |
| P~121ALA | 393 | 0.006 | 0.006 | -0.001 | 0.007 |
| P~122VAL | 394 | -0.023 | -0.023 | -0.001 | -0.022 |
| P~123PHE | 395 | 0.011 | 0.011 | -0.001 | 0.012 |
| P~124PRO | 396 | 0.014 | 0.014 | 0 | 0.015 |
| P~125LYS | 397 | 0.257 | 0.257 | 0 | 0.257 |
| P~126PRO | 398 | 0.002 | 0.002 | 0 | 0.002 |

| | | | | | |
|----------|-----|---------|---------|---------|---------|
| P~127LEU | 399 | -0.001 | -0.001 | 0 | -0.001 |
| P~128ILE | 400 | -0.007 | -0.007 | 0 | -0.006 |
| P~129THR | 401 | 0 | 0 | 0 | 0 |
| P~130ARG | 402 | 0.215 | 0.215 | -0.001 | 0.216 |
| P~131PHE | 403 | 0.001 | 0.001 | -0.001 | 0.002 |
| P~132VAL | 404 | 0.004 | 0.004 | -0.002 | 0.006 |
| P~133ARG | 405 | 0.66 | 0.66 | -0.006 | 0.666 |
| P~134ILE | 406 | -0.049 | -0.049 | -0.011 | -0.038 |
| P~135LYS | 407 | 1.257 | 1.257 | -0.022 | 1.279 |
| P~136PRO | 408 | -0.094 | -0.094 | -0.052 | -0.042 |
| P~137ALA | 409 | -0.084 | -0.084 | -0.018 | -0.066 |
| P~138THR | 410 | 0.04 | 0.04 | -0.029 | 0.069 |
| P~139TRP | 411 | -0.144 | -0.144 | -0.437 | 0.293 |
| P~140GLU | 412 | -1.756 | -1.756 | -0.126 | -1.63 |
| P~141THR | 413 | -0.789 | -0.789 | -0.905 | 0.116 |
| P~142GLY | 414 | -0.174 | -0.174 | -0.772 | 0.598 |
| P~143ILE | 415 | -1.382 | -1.382 | -1.058 | -0.324 |
| P~144SER | 416 | -0.102 | -0.102 | -0.259 | 0.157 |
| P~145MET | 417 | -0.165 | -0.165 | -0.05 | -0.115 |
| P~146ARG | 418 | 0.654 | 0.654 | -0.026 | 0.68 |
| P~147PHE | 419 | 0 | 0 | -0.008 | 0.009 |
| P~148GLU | 420 | -0.409 | -0.409 | -0.002 | -0.407 |
| P~149VAL | 421 | 0.006 | 0.006 | -0.001 | 0.007 |
| P~150TYR | 422 | -0.02 | -0.02 | -0.001 | -0.019 |
| P~151GLY | 423 | -0.001 | -0.001 | 0 | -0.001 |
| P~152CYS | 424 | -0.006 | -0.006 | 0 | -0.006 |
| P~153LYS | 425 | 0.161 | 0.161 | 0 | 0.162 |
| P~154ILE | 426 | 0.003 | 0.003 | 0 | 0.004 |
| P~155THR | 427 | -0.127 | -0.127 | 0 | -0.127 |
| Total | | -97.744 | -97.744 | -67.662 | -30.082 |

Note: P~, Protein; MMPBSA, molecular mechanics poisson boltzmann surface area; MM, molecular mechanics; VDW, van der Waals energies; COU, coulombic electrostatic interaction energy.