**Supplemental materials**

**Table S1** Real-time PCR primers used for all testing genes.

|  |  |
| --- | --- |
| Genes | qRT-PCR primers (5’ to 3’) |
| CTNNB1 | CACAAGCAGAGTGCTGAAGGTG (F) |
|  | GATTCCTGAGAGTCCAAAGACAG (R) |
| MYC | CCTGGTGCTCCATGAGGAGAC (F) |
|  | CAGACTCTGACCTTTTGCCAGG (R) |
| CAD | TAGTCCTTGGCTCTGGCGTCTA (F) |
|  | TAGTCGGTGCTGACTGTCTCTG (R) |
| SMARCA4 | CAAAGACAAGCACATCCTCGCC (F) |
|  | GCCACATAGTGCGTGTTGAGCA (R) |
| SRSF1 | TATCCGCGACATCGACCTCAAG (F) |
|  | AAACTCCACCCGCAGACGGTAC (R) |
| SRSF4 | CAGATTAGTTGAAGACAAGCCAGG (F) |
|  | CACTTCGGCTTCTGCTCTTACG (R) |
| DHX8 | TGTTGGACGAGGCACATGAGAG (F) |
|  | TCACTGCATCCAAGGTGGCTGA (R) |
| DHX9 | AGCTGTGGCTACAGCGTTCGAT (F) |
|  | CTGATTCCTCGAATGCCTGCTTC (R) |
| HNRNPU | GAGATTGCTGCCCGAAAGAAGC (F) |
|  | TTCGCTGGAAGCCTGCAAACAG (R) |
| HNRNPM | GCTTCAGAAGGTGCTCCTCATG (F) |
|  | CTGAACCAGCATGTGGCAGATG (R) |
| GAPDH | GAAGATGGTGATGGGATTT (F) |
|  | GAAGGTGAAGGTCGGAGTC (R) |

F: Forward primer; R: Reverse primer

**Table S2** Opposite expression DEGs in monosomies and trisomies, DEGs upregulated in monosomies while downregulated in trisomies.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Genes name | | | | | | | | | | |
| ABCF1 | ACTN4 | ADD1 | ANXA11 | ANXA6 | AP3D1 | APLP2 | ARHGAP36 | ARHGEF16 | ATG9A | ATP1A1 |
| BAG3 | BAZ2A | BCL7A | BIN1 | BMS1 | BRD2 | BRD4 | C1QTNF9 | CANT1 | CARM1 | CCNF |
| CDCA5 | CDH1 | CDK11B | CDT1 | CDYL | CES2 | CHD1L | CHD4 | CHD8 | CHERP | CLASRP |
| CNOT3 | CRKL | CSNK1D | CSTF2T | CTDNEP1 | CTNNB1 | CTR9 | CTSD | CTTN | DAZAP1 | DCTN1 |
| DDB1 | DDRGK1 | DDX23 | DDX27 | DDX46 | DHX8 | DHX9 | DLAT | DNM2 | DROSHA | DVL3 |
| E2F8 | EEF2 | EFTUD2 | EIF4ENIF1 | EIF4H | EMC1 | EPG5 | EPS15L1 | EPS8L2 | ERC1 | ESPL1 |
| ESRP1 | EZR | FAM222B | FAM98A | FBL | FBXO34 | FBXO46 | FGFR3 | FTSJ3 | FUS | GAR1 |
| GAS7 | GATA3 | GLYR1 | GTF2F1 | GTF3C2 | HNRNPA1 | HNRNPA2B1 | HNRNPH1 | HNRNPM | HNRNPR | HNRNPU |
| HPS4 | HSFX1 | HSPA9 | INPP5A | INPPL1 | INTS5 | IRF7 | IWS1 | JUND | KHSRP | KIF2C |
| KRI1 | KRT8 | LENG8 | LIG1 | LIG3 | LIMK2 | LIN28A | LMNB2 | LRRC1 | LUZP1 | MAEA |
| MARK2 | MCM3 | MCM7 | MED1 | MED24 | MEGF8 | MEPCE | METTL13 | MFN2 | MIDN | MON1B |
| MYC | MYCN | NASP | NAT10 | NCAPD2 | NCL | NCOA3 | NCOA6 | NCOR2 | NFS1 | NLRP7 |
| NOP2 | NUDCD3 | NUP205 | PAF1 | PARP1 | PCDH1 | PCDHB2 | PDAP1 | PDGFA | PEX14 | PHC2 |
| PHF23 | PIGO | PIGS | POLR3E | PPFIBP2 | PPM1G | PPRC1 | PREP | PRKACA | PRRC2A | PTBP1 |
| SAFB | SARS2 | SART1 | SCAF4 | SCAF8 | SCYL1 | SF3B2 | SKIV2L | SLC2A1 | SLC35E2B | SLC4A11 |
| SLC4A2 | SLC9A1 | SLIT2 | SMARCA4 | SMARCAL1 | SMARCD2 | SMPD1 | SNX27 | SPTBN1 | SRRM2 | SRSF1 |
| SRSF4 | SSRP1 | ST14 | STK35 | SUN2 | SURF6 | SUSD2 | SVOP | TACC3 | TCF25 | TCHP |
| TFAP2C | TFCP2L1 | TOP2A | TRAF7 | TRIP10 | TSPAN14 | TTC30A | TTC7B | TUT1 | TXNRD1 | U2AF2 |
| UBAP2 | UNG | USP36 | UTRN | VIL1 | VPS16 | WDR59 | WDR60 | WEE1 | WFS1 | YLPM1 |
| YTHDF1 | ZC3H7A | ZDHHC7 | ZFP36L2 | ZNF526 | ZNF75A | ZYX |  |  |  |  |

**Table S2** 0pposite expression DEGs in monosomies and trisomies(continuous). DEGs downregulated in monosomies while upregulatedin trisomies.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Genes name | | | | | | | | | | |
| ABHD5 | ADCY6 | AGBL4 | AIFM3 | AMZ1 | ANO3 | ARHGEF6 | BAALC | BEAN1 | C17orf67 | CACNB1 |
| CAGE1 | CHIA | COL16A1 | COL26A1 | CRYAB | CYP2R1 | DGKB | EIF2A | ERGIC2 | EYA1 | FER1L5 |
| GALNT5 | GATA4 | GFY | GIN1 | GNAT2 | GRIA1 | GTF2H2 | HIST1H2BM | HOXC6 | HSPB6 | IFI35 |
| IGDCC4 | IL12RB2 | IL17RE | ING3 | INSC | IQSEC2 | LHX8 | LRRC17 | LYPD1 | MFSD8 | MGARP |
| MN1 | MORN4 | MRPS22 | MUCL1 | MYH15 | MYLK2 | MYNN | MYO16 | NKIRAS1 | NOG | OMG |
| OPLAH | OVOL3 | PBK | PDE4B | PMF1-BGLAP | PRSS48 | RARRES3 | RBMS3 | ROR2 | RPGRIP1 | SAMD3 |
| SCFD1 | SH3TC2 | SLC9A9 | SLIT3 | SMTNL2 | SV2B | SYT9 | TEX29 | THBS2 | THPO | THRSP |
| THSD7B | TIAF1 | TMEM106A | TMEM178B | TMEM200A | TRPA1 | TSC22D3 | TSHZ3 | TTC36 | UPB1 | WNT5A |
| ZBTB16 | ZNF479 |  |  |  |  |  |  |  |  |  |

DEG: differentially expression genes.

**Table S3** KEGG pathway analysis of differentially expressed genes in monosomies.

|  |  |  |
| --- | --- | --- |
| KEEG Term | Count | P-value |
| Tight junction | 36 | 1.15E-04 |
| Spliceosome | 32 | 0.001 |
| Central carbon metabolism in cancer | 19 | 0.002 |
| HTLV-I infection | 52 | 0.003 |
| RNA transport | 37 | 0.005 |
| Adherens junction | 19 | 0.006 |
| Hippo signaling pathway | 33 | 0.006 |
| Endometrial cancer | 15 | 0.008 |
| Lysine degradation | 15 | 0.008 |
| Insulin resistance | 25 | 0.009 |
| Lysosome | 27 | 0.01 |
| Inositol phosphate metabolism | 18 | 0.012 |
| Chronic myeloid leukemia | 18 | 0.014 |
| Glycosylphosphatidylinositol(GPI)-anchor biosynthesis | 9 | 0.014 |
| Thyroid hormone signaling pathway | 25 | 0.017 |
| Endocytosis | 48 | 0.02 |
| Phosphatidylinositol signaling system | 22 | 0.021 |
| Notch signaling pathway | 13 | 0.024 |
| Pathways in cancer | 68 | 0.025 |
| Basal cell carcinoma | 14 | 0.03 |
| Insulin signaling pathway | 28 | 0.03 |
| Fc gamma R-mediated phagocytosis | 19 | 0.031 |
| Neurotrophin signaling pathway | 25 | 0.031 |
| Acute myeloid leukemia | 14 | 0.034 |
| Sulfur relay system | 5 | 0.036 |
| Focal adhesion | 38 | 0.043 |
| Prostate cancer | 19 | 0.046 |
| Protein processing in endoplasmic reticulum | 32 | 0.047 |
| Wnt signaling pathway | 27 | 0.049 |

KEEG：Kyoto Encyclopedia of Genes and Genomes

**Table S4** KEGG pathway analysis of differentially expressed genes in the overlapping DEGs.

|  |  |  |
| --- | --- | --- |
| KEEG Term | Count | P-value |
| Spliceosome | 14 | 2.10E-06 |
| Thyroid hormone signaling pathway | 10 | 4.27E-04 |
| Gastric acid secretion | 7 | 0.003 |
| Bile secretion | 6 | 0.012 |
| Pathogenic Escherichia coli infection | 5 | 0.018 |
| Regulation of actin cytoskeleton | 10 | 0.025 |
| Base excision repair | 4 | 0.027 |
| Ribosome biogenesis in eukaryotes | 6 | 0.030 |
| DNA replication | 4 | 0.034 |
| Proteoglycans in cancer | 9 | 0.046 |

KEEG：Kyoto Encyclopedia of Genes and Genomes