

**Supplementary Table 3.** Biological functions of the genes with altered up-regulated expression by a factor of at least 1.5-fold in HeLa spheroid cells compared with HeLa monolayer cells, as determined by WebGestalt (Gene Set Analysis Toolkit).

| Category           | Function          | Gene Symbol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | No. of molecules |
|--------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Biological Process | Translation       | KARS, RPL26, RPL9, MRPL42, MTIF2, EIF1AX, RPL6, EIF4G2, RPL5, EEF1A1, PAIP1, RPS3A, DENR, EEF1B2, IGF2BP3, SRP9, EIF2S2, IARS, RPS7, EIF2S3, ITGA2, DARS2, SELT, MRPL1, RPL26L1, EEF1E1, MRPL3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 27               |
| Biological Process | Metabolic Process | PTP4A1, ST13, EIF1AX, NPM1, PPIL1, GLUD1, EXT1, NT5C3, SLC20A1, MOCS2, PRNP, MTRR, F3, SNX6, CYP51A1, AASDHPPT, SNRPD1, EDEM1, LMAN2L, MAN2A1, ARNT2, TRAPPC2, SMARCE1, PTPRK, UBE2F, TRNT1, CD55, RPL9, ZNF195, OSBP2, SKIV2L2, PBK, GMFB, ZNF673, CAV1, SERPINB4, MCFD2, ODC1, LIPA, TTRAP, GNAI3, CBFB, PLCXD2, HSPE1, PDSS1, ATP5F1, TAF9B, SMN2, TRMT5, OGT, MRPL1, ZC3H8, FBXL3, HDAC2, NDUFV2, HMGB1, SERPINE2, PPP1R2, POP4, TGFB2, RPL5, IGF2BP3, RNF141, SUB1, EIF2S2, LSM5, MSH2, RFX5, UBE3C, SC5DL, CASP1, PPA1, SERBP1, ASF1A, NT5E, TRAK2, SMS, IMPA1, CYP26B1, SELI, RPL26, GTF2H3, CREG1, ELL2, SF3B14, RDH10, ERO1L, RPL6, PSMA1, MAP4K3, UFM1, FRG1, EIF4G2, CYB5B, HMGN2, TFF1, SRP9, PTPRF, ADSS, NT5C2, NAP1L1, SYNCRIP, HIF1A, RBMX, PRPS2, GNPAT, C2orf3, SLC16A1, UMPS, SMARCA5, PNPT1, MRPL3, CCNE2, PLA2G4A, NDUFC2, SPRED1, KARS, SQRDL, DUSP6, PSMA2, BZW1, FTH1, PUS7, PHLD1, PAIP1, DENR, EEF1B2, CD46, PSMA6, TDG, AHCTF1, ASNS, CAP1, DUS4L, IARS, CBR4, UCHL5, SOCS6, ACSL4, LMAN1, EGLN3, RPL26L1, F2R, PRMT3, IGFBP3, SOAT1, C1D, MTIF2, MTMR6, YWHAQ, MRPS35, GLO1, ZMPSTE24, SDHD, EDN2, UBE2V2, RPS7, RP6-213H19.1, ITGA2, C1orf27, ADAT1, DARS2, PTPLAD1, PPP1CB, TAF9, PPIL3, ECHDC1, EEF1E1, UBE2N, CDC40, INSIG2, MRPL42, DMD, UTP14A, SLC25A12, SPCS2, RPE, | 223              |

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|                    |                            | RBL2, SCYL2, EEF1A1, ADH5, TTC1, PHTF2, CTSC, PGM3, LYPLA1, SELT, XRN2, WWP1, CSDA, ITGA1, PRPF40A, STAMBPL1, COPS2, PSAT1, POLK, SMARCAD1, GCLC, GATAD1, GGH, MTMR12, IFNAR1, TGDS, RPS3A, POLR3G, TIMP3, PRDX3, PGK1, EIF2S3, NEIL3, TPRKB, ORC5L, ZNF277, RYK, RNF138, GLRX, SFRS3, CACYBP, PSME3, NDFIP1, PTGES, GCSH, USP16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |
| Biological Process | Cellular Metabolic Process | PTP4A1, ST13, EIF1AX, NPM1, PPIL1, GLUD1, EXT1, NT5C3, SLC20A1, MOCS2, MTRR, SNX6, CYP51A1, SNRPD1, EDEM1, LMAN2L, MAN2A1, ARNT2, TRAPPC2, SMARCE1, PTPRK, UBE2F, TRNT1, RPL9, ZNF195, OSBP2, SKIV2L2, PBK, GMFB, ZNF673, CAV1, MCFD2, ODC1, LIPA, TTRAP, GNAI3, CBFB, HSPE1, PDSS1, ATP5F1, TAF9B, SMN2, TRMT5, OGT, MRPL1, ZC3H8, FBXL3, HDAC2, NDUFV2, HMGB1, PPP1R2, POP4, TGFB2, RPL5, IGF2BP3, RNF141, SUB1, EIF2S2, LSM5, MSH2, RFX5, UBE3C, SC5DL, PPA1, SERBP1, ASF1A, NT5E, TRAK2, SMS, IMPA1, CYP26B1, SELI, RPL26, GTF2H3, CREG1, ELL2, SF3B14, ERO1L, RPL6, PSMA1, MAP4K3, UFM1, FRG1, EIF4G2, CYB5B, HMGN2, SRP9, PTPRF, ADSS, NT5C2, NAP1L1, SYNCRIP, HIF1A, RBMX, PRPS2, GNPAT, C2orf3, SLC16A1, UMPS, SMARCA5, PNPT1, MRPL3, CCNE2, PLA2G4A, NDUFC2, SPRED1, KARS, DUSP6, PSMA2, BZW1, PUS7, PHLDA1, PAIP1, DENR, EEF1B2, PSMA6, TDG, AHCTF1, ASNS, CAP1, DUS4L, IARS, UCHL5, SOCS6, ACSL4, LMAN1, RPL26L1, F2R, IGFBP3, SOAT1, C1D, MTIF2, TMR6, YWHAQ, MRPS35, GLO1, ZMPSTE24, SDHD, EDN2, UBE2V2, RPS7, RP6-213H19.1, ITGA2, ADAT1, DARS2, PTPLAD1, PPP1CB, TAF9, PPIL3, EEF1E1, UBE2N, CDC40, INSIG2, MRPL42, DMD, UTP14A, SLC25A12, SPCS2, RBL2, SCYL2, EEF1A1, ADH5, TTC1, PHTF2, PGM3, LYPLA1, SELT, XRN2, WWP1, CSDA, ITGA1, PRPF40A, STAMBPL1, COPS2, PSAT1, POLK, SMARCAD1, GCLC, GATAD1, GGH, MTMR12, IFNAR1, TGDS, RPS3A, POLR3G, TIMP3, PRDX3, PGK1, EIF2S3, NEIL3, ORC5L, ZNF277, RYK, RNF138, GLRX, SFRS3, CACYBP, PSME3, NDFIP1, PTGES, GCSH, USP16 | 202 |
| Biological Process | Translational              | SRP9, RPL26, RPL9, RPS7, RPL6, SELT, RPL26L1, EEF1A1, RPL5,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 11  |

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|                    | elongation                              | RPS3A, EEF1B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |
| Biological Process | Cellular protein metabolic process      | PTP4A1, KARS, ST13, DUSP6, PSMA2, EIF1AX, PPIL1, MOCS2, PAIP1, DENR, EEF1B2, PSMA6, IARS, EDEM1, LMAN2L, UCHL5, SOCS6, MAN2A1, LMAN1, RPL26L1, F2R, IGFBP3, PTPRK, UBE2F, RPL9, PBK, MTIF2, GMFB, MTMR6, CAV1, LIPA, HSPE1, ZMPSTE24, UBE2V2, RPS7, RP6-213H19.1, ITGA2, DARS2, OGT, PTPLAD1, PPP1CB, MRPL1, TAF9, FBXL3, PPIL3, EEF1E1, UBE2N, HDAC2, MRPL42, SPCS2, TGFBF2, SCYL2, EEF1A1, RPL5, IGF2BP3, ADH5, TTC1, EIF2S2, SELT, WWP1, ITGA1, UBE3C, TRAK2, RPL26, STAMBPL1, GCLC, ERO1L, RPL6, PSMA1, MAP4K3, UFM1, EIF4G2, RPS3A, PTPRF, SRP9, TIMP3, EIF2S3, RYK, RNF138, CACYBP, PSME3, NDFIP1, MRPL3, USP16 | 84 |
| Biological process | RNA processing                          | RPL26, TRNT1, CDC40, C1D, SKIV2L2, UTP14A, SF3B14, NPM1, PPIL1, POP4, PUS7, FRG1, RPL5, SNRPD1, DUS4L, SYNCRIP, LSM5, SMN2, TRMT5, RPS7, RBMX, ADAT1, XRN2, SFRS3, MRPL1, PPIL3, PNPT1, PRPF40A                                                                                                                                                                                                                                                                                                                                                                                                                       | 28 |
| Biological process | Healing during inflammatory response    | CD44, F2R, HIF1A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3  |
| Biological process | Translational initiation                | EIF2S2, EIF2S3, MTIF2, EIF1AX, EIF4G2, PAIP1, DENR, RPS3A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8  |
| Biological process | Regulation of anatomical structure size | GCLC, DSTN, ACTR3, NPM1, TMEM123, CAV1, CAPZA2, NTS, TAF9B, DCBLD2, EDN2, TMSL3, TMSL2, CAPZA1, XRN2, CD44, ITGA1, TAF9, NRP1, F2R, IGFBP3                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 21 |
| Biological process | Response to stress                      | PLA2G4A, HMGB1, INSIG2, NPM1, TLR10, PRNP, F3, ADH5, CD46, ASNS, TDG, HIGD1A, EDEM1, KCNN4, PRKRIR, SOCS6, MSH2, ARNT2, CD44, LMAN1, EGLN3, ERFFI1, CSDA, F2R, CASP1, ASF1A, NT5E, PTPRK, FAIM3, GTF2H3, CD55, CYSLTR1, POLK, GCLC, ERO1L, MRPS35, MAP4K3, CAV1, LIPA, TTRAP, ANGPTL4, HSPE1, POLR3G, DCBLD2, TFF1, TIMP3, UBE2V2, HIF1A, PRDX3, NEIL3, ITGA2, IL8, PTPLAD1, ANXA2, NRP1, TAF9, NDFIP1, EEF1E1, UBE2N, HDAC2                                                                                                                                                                                          |    |
| Molecular function | RNA binding                             | EIF1AX, NPM1, POP4, PUS7, RPL5, PAIP1, IGF2BP3, PSMA6,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 36 |

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|                    |                                      | DAZAP1, SNRPD1, EIF2S2, LSM5, SERBP1, SRP72, TRNT1, RPL26, RPL9, C1D, STAU2, SF3B14, RPL6, PSMA1, XPOT, RPS3A, THUMPD3, SRP9, SMN2, SYNCRIP, RPS7, RBMX, ADAT1, SFRS3, MRPL1, DDX10, MRPL3, PNPT1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
| Molecular function | Protein binding                      | ST13, ACTG1, LGR4, BTBD7, NPM1, GLUD1, EXT1, MOCS2, PRNP, F3, SNX6, AASDHPPT, SNRPD1, SNX4, EDEM1, TMSL2, ARNT2, TRAPPC2, SMARCE1, STC1, PTPRK, UBE2F, ACTR6, SKIV2L2, PBK, DSTN, AP1S2, GMFB, CAV1, SERPINB4, ODC1, NTS, TTRAP, GNAI3, CBFB, HSPE1, PDSS1, ATP5F1, TAF9B, SASH1, SMN2, TMED10, LRRC40, IL8, OGT, ACTB, NRP1, FBXL3, HDAC2, NXT2, HMGB1, PPP1R2, TXNDC9, POP4, TGFB2, RPL5, MYO5C, IGF2BP3, RNF141, SUB1, EIF2S2, LSM5, KCNN4, COPS3, COL6A1, CAPZA1, MSH2, RFX5, UBE3C, CASP1, CAV2, TMED2, SERBP1, ASF1A, TRAK2, IMPA1, RPL26, GTF2H3, SH2D2A, CREG1, SF3B14, ERO1L, PSMA1, MAP4K3, SNAP25, CAPZA2, UFM1, LIN7C, EIF4G2, ANGPTL4, THUMPD3, HMGN2, BCAR3, TFF1, SRP9, PTPRF, NT5C2, NAP1L1, SYNCRIP, HIF1A, RBMX, CD47, GNPAT, C2orf3, SLC16A1, MAL2, BTBD10, SMARCA5, CCNE2, SPRED1, TOMM20, SCAMP1, DUSP6, PSMA2, BZW1, ACTR3, FTH1, ACTG2, TLR10, PHLDA1, PAIP1, EEF1B2, PHC2, PSMA6, TDG, ASNS, D164, CAP1, KCTD16, HIGD1A, ABCD3, UCHL5, PRKRIR, SOCS6, APIP, LMAN1, EGLN3, F2R, PERP, IGFBP3, C1D, OSTM1, YWHAQ, C14orf166, SMYD2, LXN, MAGI3, DCBLD2, EDN2, UBE2V2, RPS7, RP6-213H19.1, ITGA2, LAMB1, PTPLAD1, PPP1CB, GRB10, ANXA2, TAF9, PPIL3, EEF1E1, UBE2N, HIATL1, INSIG2, DMD, UTP14A, SLC25A12, RPE, RBL2, EEF1A1, CDR2, VPS26A, CD58, ADH5, TTC1, CLIC4, ADD3, TMSL3, CBWD2, CTSC, XRN2, WWP1, CD44, ITGA1, CSDA, ERFFI1, C15orf41, MPHOSPH6, PRPF40A, RIN2, COPS2, CTNNA1, GCLC, SMARCA1, PDE2A, IFNAR1, TGDS, RNF13, RPS3A, TIMP3, TWSG1, PRDX3, EIF2S3, TPRKB, ORC5L, ZNF277, RYK, RNF138, GLRX, SFRS3, CACYBP, PSME3, NDFIP1, USP16 | 214 |
| Molecular function | Translation factor activity, nucleic | GTF2H3, EIF2S2, EIF2S3, MTIF2, EIF1AX, EIF4G2, EEF1A1, EEF1B2, DENR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 9   |

|                    |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |
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|                    | acid binding                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |
| Molecular function | Nitric-oxide synthase binding | ACTB, CAV1, DMD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3   |
| Molecular function | 5'-nucleotidase activity      | NT5C2, NT5C3, NT5E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3   |
| Molecular function | Binding                       | <p>ACTG1, LGR4, EIF1AX, NPM1, GLUD1, NT5C3, MOCS2, SNX6, SNRPD1, SNX4, EDEM1, MAN2A1, TRAPPC2, SMARCE1, STC1, UBE2F, SRP72, TRNT1, RPL9, PBK, DSTN, AP1S2, ZNF673, SERPINB4, MCFD2, TTRAP, GNAI3, CBFB, HSPE1, SASH1, TMED10, LRRC40, OGT, MRPL1, FBXL3, NRP1, HDAC2, NXT2, NDUFV2, HMGB1, ATAD1, TXNDC9, POP4, TGFBF2, IGF2BP3, ANXA10, EIF2S2, COPS3, AIM1, MSH2, CASP1, PPA1, CAV2, TMED2, SERBP1, ASF1A, TRAK2, RPL26, GTF2H3, TEX10, SF3B14, RDH10, ERO1L, SNAP25, CAPZA2, ANGPTL4, HMGN2, ADSS, PTPRF, SRP9, NT5C2, HIF1A, RBMX, GNPAT, C2orf3, MAL2, SMARCA5, MRPL3, PLA2G4A, SPRED1, KARS, SCAMP1, DUSP6, BZW1, ACTR3, FTH1, PHC2, TDG, AHCTF1, ASNS, CD164, ABCD3, UCHL5, SOCS6, ACSL4, PERP, C1D, MTIF2, SMYD2, XPOT, MAGI3, ZMPSTE24, SDHD, DCBLD2, AMZ2, RPS7, RP6-213H19.1, LAMB1, C1orf27, PTPLAD1, PPP1CB, GRB10, ANXA2, TAF9, UBE2N, INSIG2, DMD, UTP14A, SLC25A12, RPE, RBL2, EEF1A1, CD58, PHTF2, CLIC4, ADD3, CBWD2, CTSC, XRN2, WWP1, ERFFI1, CSDA, ITGA1, C15orf41, MPHOSPH6, PRPF40A, STAMBPL1, PSAT1, CTNNAL1, POLK, TIMP3, EIF2S3, PGK1, PRDX3, TPRKB, ORC5L, RNF138, RYK, GLRX, PSME3, USP16, ST13, BTBD7, SMOC1, EXT1, F3, MTRR, PRNP, CYP51A1, AASDHPPT, NT5DC1, LMAN2L, TMSL2, ARNT2, SLC39A10, PTPRK, ACTR6, ZNF195, SKIV2L2, STAU2, GMFB, ARMC1, CAV1, NTS, ODC1, TAF9B, ATP5F1, PDSS1, PI4K2B, SMN2, IL8, ACTB, GNL3L, ZC3H8, PPP1R2, SERPINE2, RPL5, MYO5C, RNF141, SUB1, C1GALT1, TSNAX, DAZAP1, LSM5, KCNN4, COL6A1, CAPZA1, RFX5, UBE3C, SC5DL, NT5E, CYP26B1, FOLR3, IMPA1, SELI, CREG1, SH2D2A, RPL6, PSMA1, MAP4K3, UFM1, CYB5B, EIF4G2, LIN7C, THUMPD3, TFF1, BCAR3, NAP1L1,</p> | 295 |

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|                    |                                        | SYNCRIP, CD47, PRPS2, RAB31, SLC16A1, BTBD10, DDX10, PNPT1, ZFAND1, CCNE2, TOMM20, PSMA2, TLR10, ACTG2, PUS7, PHLDA1, PAIP1, EEF1B2, DENR, PSMA6, IARS, DUS4L, CAP1, HIGD1A, KCTD16, CBR4, PRKRIR, APIP, EGLN3, LMAN1, F2R, PRMT3, IGFBP3, SOAT1, OSTM1, YWHAQ, GLO1, C14orf166, LXN, EDN2, UBE2V2, ITGA2, ADAT1, DARS2, PPIL3, EEF1E1, ANXA3, HIATL1, SPOCK1, SCYL2, CDR2, VPS26A, ADH5, TTC1, TMSL3, PGM3, FAM82B, SELT, CD44, RIN2, COPS2, GCLC, SMARCAD1, GATAD1, PDE2A, IFNAR1, TGDS, RNF13, RPS3A, TMEM38B, TWSG1, NEIL3, ZNF277, SFRS3, CACYBP, NDFIP1, GCSH                                                                                                                                                                                  |     |
| Molecular function | Nucleotidase activity                  | NT5C2, NT5C3, NT5E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3   |
| Molecular function | Magnesium ion binding                  | IMPA1, SELI, TRNT1, POLK, GCLC, NT5C3, TTRAP, TGFB2, ADSS, NT5C2, C1GALT1, AASDHPPT, RP6-213H19.1, NT5DC1, ITGA2, PRPS2, PGM3, MSH2, ACSL4, ITGA1, PPA1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 21  |
| Molecular function | Translation initiation factor activity | EIF2S2, EIF4G2, EIF2S3, MTIF2, EIF1AX, DENR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6   |
| Molecular function | Coenzyme binding                       | ADH5, SOAT1, NDUFV2, DUS4L, GCLC, CBR4, ERO1L, GLUD1, TGDS, GCSH, MTRR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 11  |
| Cellular component | Cytoplasm                              | PTP4A1, TMED7, ST13, ACTG1, EIF1AX, NPM1, GLUD1, EXT1, NT5C3, MOCS2, PRNP, MTRR, SNX6, CYP51A1, AASDHPPT, SNRPD1, YIPF4, SNX4, EDEM1, LMAN2L, TMSL2, MAN2A1, COX4NB, TRAPPC2, SRP72, FAIM3, ACTR6, TRNT1, RPL9, GPRC5A, STAU2, DSTN, AP1S2, CAV1, SERPINB4, MCFD2 ODC1, NTS, LIPA, GNAI3, HSPE1, ATP5F1, PI4K2B, SMN2, TRMT5, TMED10, OGT, ACTB, MRPS28, MRPL1, FBXL3, HDAC2, NXT2, NDUFV2, RPL5, IGF2BP3, ANXA10, DAZAP1, TSNAX, EIF2S2, COPS3, SC5DL, CASP1, PPA1, CAV2, TMED2, SERBP1, NT5E, TRAK2, SMS, IMPA1, CYP26B1, RPL26, MMD, SH2D2A, RDH10, ERO1L, RPL6, PSMA1, VEZT, SNAP25, CAPZA2, UFM1, EIF4G2, CYB5B, HMGN2, SRP9, PTPRF, ADSS, NT5C2, NAP1L1, SYNCRIP, HIF1A, GNPAT, UMPS, MAL2, FAM5C, PNPT1, MRPL3, CCNE2, PLA2G4A, ASAM, NDUFC2, | 208 |

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|                    |                    | <p>KARS, TOMM20, SQRDL, SCAMP1, DUSP6, PSMA2, BZW1, ACTR3, FTH1, PLEK2, ACTG2, PHLDA1, PAIP1, EEF1B2, MRPL50, PSMA6, AHCTF1, ASNS, CD164, CAP1, IARS, ABCD3, CBR4, SOCS6, APIP, ACSL4, LMAN1, EGLN3, RPL26L1, F2R, PRMT3, PERP, SOAT1, C1D, OSTM1, MTIF2, MTMR6, YWHAQ, MRPS35, GLO1, C14orf166, LXN, XPOT, ZMPSTE24, SDHD, UBE2V2, RPS7, RP6, 213H19.1, ITGA2, LAMB1, DARS2, PPP1CB, GRB10, ANXA2, EEF1E1, UBE2N, ANXA3, INSIG2, MRPL42, DMD, SLC25A12, SPCS2, CNIH, RPE, SCYL2, EEF1A1, CDR2, VPS26A, ADH5, MED5, PHTF2, CLIC4, ADD3, TMSL3, CTSC, FAM82B, LYPLA1, CD44, ITGA1, CSDA, ERRFI1, MPHOSPH6, RIN2, COPS2, CTNNAL1, GCLC, GGH, MTMR12, TMEM50A, FNDC3A, RNF13, RPS3A, TIMP3, TMEM38B, PRDX3, PGK1, EIF2S3, TPRKB, GLRX, CACYBP, PSME3, NDFIP1, PTGES, GCSH, USP16</p>                                                                                                                                                                                                                                                                                                                                    |     |
| Cellular component | Intracellular part | <p>PTP4A1, TMED7, ACTG1, EIF1AX, NPM1, GLUD1, NT5C3, MOCS2, SNX6, SNRPD1, SNX4, NOL11, EDEM1, MAN2A1, COX4NB, TRAPPC2, SMARCE1, SEH1L, SRP72, TRNT1, RPL9, GPRC5A, DSTN, AP1S2, SERPINB4, MCFD2, TTRAP, GNAI3, CBF3, HSPE1, TMED10, OGT, MRPS28, MRPL1, FBXL3, HDAC2, NXT2, NDUFV2, HMGB1, TATDN3, POP4, IGF2BP3, ANXA10, EIF2S2, COPS3, MSH2, CASP1, PPA1, CAV2, TMED2, SERBP1, ASF1A, TRAK2, SMS, RPL26, GTF2H3, MMD, ELL2, TEX10, SF3B14, RDH10, ERO1L, VEZT, SNAP25, CAPZA2, FRG1, ANGPTL4, HMGN2, ADSS, PTPRF, SRP9, NT5C2, HIF1A, RBMX, GNPAT, C2orf3, UMPS, MAL2, FAM5C, SMARCA5, MRPL3, PLA2G4A, ASAM, SPRED1, KARS, SCAMP1, DUSP6, BZW1, ACTR3, FTH1, PLEK2, PHC2, TDG, AHCTF1, ASNS, CD164, ABCD3, UCHL5, SOCS6, ACSL4, RPL26L1, PERP, C1D, MTIF2, XPOT, MAGI3, ZMPSTE24, SDHD, RPS7, RP6-213H19.1, LAMB1, PPP1CB, GRB10, ANXA2, TAF9, UBE2N, INSIG2, DEPDC1, DMD, UTP14A, SLC25A12, RPE, RBL2, EEF1A1, TMED5, PHTF2, CLIC4, ADD3, CTSC, LYPLA1, WWP1, XRN2, ERRFI1, CSDA, ITGA1, MPHOSPH6, PRPF40A, CTNNAL1, POLK, MTMR12, TIMP3, EIF2S3, PGK1, PRDX3, TPRKB, ORC5L, GLRX, PSME3, USP16, ST13, PPIL1,</p> | 266 |

|                    |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |
|--------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                    |                        | EXT1, MTRR, PRNP, CYP51A1, AASDHPPT, YIPF4, LMAN2L, TMSL2, ARNT2, ACTR6, FAIM3, ZNF195, SKIV2L2, STAU2, CAV1, LIPA, NTS, ODC1, TAF9B, ATP5F1, PI4K2B, SMN2, TRMT5, ACTB, GNL3L, ZC3H8, RPL5, MYO5C, SUB1, TSNAX, DAZAP1, LSM5, CAPZA1, NARG2, RFX5, UBE3C, SC5DL, NT5E, CYP26B1, IMPA1, CREG1, SH2D2A, RPL6, PSMA1, UFM1, CYB5B, EIF4G2, NAP1L1, SYNCRIP, BTBD10, PNPT1, CCNE2, NDUFC2, TOMM20, SQRDL, PSMA2, ACTG2, PHLDA1, PAIP1, EEF1B2, MRPL50, PSMA6, IARS, CAP1, CBR4, PRKRIR, APIP, EGLN3, LMAN1, F2R, PRMT3, IGFBP3, SOAT1, OSTM1, YWHAQ, MTMR6, GLO1, MRPS35, C14orf166, LXN, UBE2V2, ITGA2, DARS2, EEF1E1, PPIL3, ANXA3, CDC40, MRPL42, SPCS2, CNIH, SCYL2, VPS26A, CDR2, ADH5, TMSL3, FAM82B, CD44, RIN2, COPS2, SMARCAD1, GCLC, GGH, TMEM50A, FNDC3A, RNF13, POLR3G, RPS3A, TMEM38B, NEIL3, ZNF277, SFRS3, CACYBP, NDFIP1, PTGES, GCSH |     |
| Cellular component | Macromolecular complex | NDUFC2, TOMM20, GNG11, PSMA2, ACTR3, NPM1, PPIL1, FTH1, MOCS2, EEF1B2, MRPL50, PSMA6, AHCTF1, SNRPD1, KCTD16, HIGD1A, UCHL5, ARNT2, RPL26L1, SMARCE1, SEH1L, IGFBP3, SRP72, C1D, RPL9, SKIV2L2, STAU2, AP1S2, YWHAQ, MRPS35, CAV1, XPOT, ATP5F1, TAF9B, SMN2, UBE2V2, RPS7, ITGA2, LAMB1, OGT, PPP1CB, ACTB, MRPS28, ANXA2, MRPL1, TAF9, FBXL3, PPIL3, UBE2N, HDAC2, NDUFV2, CDC40, INSIG2, MRPL42, DMD, UTP14A, SPCS2, POP4, TGFBR2, RBL2, RPL5, EEF1A1, VPS26A, MYO5C, SUB1, EIF2S2, CLIC4, LSM5, KCNN4, COPS3, CAPZA1, MSH2, FAM82B, WWP1, CD44, UBE3C, ITGA1, ULBP2, CAV2, ASF1A, GTF2H3, RPL26, COPS2, CREG1, ELL2, GCLC, RPL6, PSMA1, CAPZA2, SNAP25, FRG1, EIF4G2, RPS3A, POLR3G, SRP9, NAP1L1, SYNCRIP, HIF1A, PRDX3, RBMX, ORC5L, SMARCA5, PSME3, MRPL3, GCSH                                                                             | 105 |
| Cellular component | Intracellular          | PTP4A1, TMED7, ACTG1, EIF1AX, NPM1, GLUD1, NT5C3, MOCS2, SNX6, SNRPD1, SNX4, NOL11, EDEM1, MAN2A1, COX4NB, TRAPPC2, SMARCE1, SEH1L, SRP72, TRNT1, RPL9, GPRC5A, DSTN, AP1S2, ZNF673, SERPINB4, MCFD2, TTRAP, GNAI3, CBFB, HSPE1,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 272 |

|                    |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |
|--------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|                    |                           | <p>TMED10, OGT, MRPS28, MRPL1, FBXL3, HDAC2, NXT2, NDUFV2, HMGB1, TATDN3, POP4, IGF2BP3, ANXA10, EIF2S2, COPS3, MSH2, CASP1, PPA1, CAV2, TMED2, SERBP1, ASF1A, TRAK2, SMS, RPL26, GTF2H3, MMD, ELL2, TEX10, SF3B14, RDH10, ERO1L, VEZT, SNAP25, CAPZA2, FRG1, ANGPTL4, HMG2N, ADSS, PTPRF, SRP9, NT5C2, HIF1A, RBMX, GNPAT, C2orf3, C6orf62, UMPS, MAL2, FAM5C, SMARCA5, MRPL3, PLA2G4A, ASAM, SPRED1, KARS, SCAMP1, DUSP6, BZW1, ACTR3, FTH1, PLEK2, PHC2, TDG, AHCTF1, ASNS, CD164, ABCD3, UCHL5, SOCS6, ACSL4, RPL26L1, PERP, C1D, MTIF2, XPOT, MAGI3, ZMPSTE24, SDHD, RPS7, RP6-213H19.1, LAMB1, PPP1CB, GRB10, ANXA2, TAF9, UBE2N, INSIG2, DEPDC1, DMD, UTP14A, SLC25A12, RPE, RBL2, EEF1A1, ADD3, CLIC4, TMED5, PHTF2, CTSC, LYPLA1, WWP1, XRN2, ERFF1, CSDA, ITGA1,MPHOSPH6, PRPF40A, DEPDC1B, CTNNAL1, POLK, MTMR12, TIMP3, EIF2S3, PGK1, PRDX3, TPRKB, ORC5L, RNF138, GLRX, PSME3, USP16, ST13, PPIL1, EXT1, MTRR, PRNP, CYP51A1, AASDHPPT, YIPF4, LMAN2L, TMSL2, ARNT2, ACTR6, FAIM3, ZNF195, SKIV2L2, STAU2, GMFB, CAV1, LIPA, NTS, ODC1, TAF9B, ATP5F1, PI4K2B, SMN2, TRMT5, ACTB, GNL3L, ZC3H8, RPL5, MYO5C, SUB1, TSNAX, DAZAP1, LSM5, CAPZA1, NARG2, RFX5, UBE3C, SC5DL, NT5E, CYP26B1, IMPA1, CREG1, SH2D2A, RPL6, PSMA1, UFM1, CYB5B, EIF4G2, BCAR3, NAP1L1, SYNCRIP, BTBD10, PNPT1, CCNE2, NDUFC2, TOMM20, SQRDL, PSMA2, ACTG2, PHLDA1, PAIP1, EEF1B2, MRPL50, PSMA6, IARS, CAP1, CBR4, PRKRIR, APIP, EGLN3, LMAN1, F2R, PRMT3, IGFBP3, SOAT1, OSTM1, YWHAQ, MTMR6, GLO1, MRPS35, C14orf166, LXN, UBE2V2, ITGA2, DARS2, EEF1E1, PPIL3, ANXA3, CDC40, MRPL42, SPCS2, CNIH, SCYL2, VPS26A, CDR2, ADH5, TMSL3, FAM82B, CD44, RIN2, COPS2, SMARCA1, GCLC, GGH, TMEM50A, FNDC3A, RNF13, RPS3A, POLR3G, TMEM38B, NEIL3, ZNF277, SFRS3, CACYBP, NDFIP1, PTGES, GCSH</p> |    |
| Cellular component | Ribonucleoprotein complex | <p>SRP72, RPL26, CDC40, RPL9, MRPL42, SKIV2L2, UTP14A, RPL6, PSMA1, NPM1, MRPS35, PPIL1, POP4, FRG1, RPL5, RPS3A, MRPL50,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 31 |

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|--------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                    |                  | SRP9, SNRPD1, SYNCRIP, LSM5, SMN2, RPS7, RBMX, ACTB, MRPS28, MRPL1, RPL26L1, TAF9, PPIL3, MRPL3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |
| Cellular component | Cytoplasmic part | PTP4A1, TMED7, ACTG1, EIF1AX, NPM1, GLUD1, EXT1, NT5C3, MOCS2, PRNP, MTRR, CYP51A1, AASDHPPT, SNRPD1, YIPF4, EDEM1, LMAN2L, MAN2A1, COX4NB, TRAPPC2, SRP72, TRNT1, RPL9, GPRC5A, STAU2, DSTN, AP1S2, CAV1, MCFD2, ODC1, NTS, LIPA, GNAI3, HSPE1, ATP5F1, SMN2, TMED10, OGT, ACTB, MRPS28, MRPL1, NDUFV2, RPL5, ANXA10, TSNAX, EIF2S2, SC5DL, PPA1, CAV2, TMED2, SERBP1, SMS, CYP26B1, RPL26, MMD, RDH10, ERO1L, RPL6, VEZT, SNAP25 CAPZA2, EIF4G2, CYB5B, SRP9, PTPRF, NT5C2, NAP1L1, SYNCRIP, GNPAT, MAL2, PNPT1, MRPL3, PLA2G4A, CCNE2, KARS, NDUFC2, TOMM20, SCAMP1, SQRTL, ACTR3, FTH1, PHLDA1, EEF1B2, MRPL50, ASNS, CD164, PSMA6, IARS, CAP1, ABCD3, CBR4, ACSL4, RPL26L1, LMAN1, F2R, PERP, SOAT1, MTIF2, OSTM1, MRPS35, C14orf166, ZMPSTE24, SDHD, RPS7, RP6-213H19.1, LAMB1, ITGA2, DARS2, PPP1CB, ANXA2, EEF1E1, INSIG2, DMD, MRPL42, SLC25A12, SPCS2, CNIH, RPE, SCYL2, EEF1A1, VPS26A, ADH5, TMED5, PHTF2, CLIC4, ADD3, CTSC, LYPLA1, CD44, ITGA1, GCLC, GGH, TMEM50A, FNDC3A, RPS3A, TMEM38B, PRDX3, EIF2S3, TPRKB, GLRX, NDFIP1, GCSH | 142 |
| Cellular component | Cell fraction    | ASAM, PLA2G4A, KARS, DMD, DUSP6, ACTG1, SPCS2, ADH5, CYP51A1, CLIC4, ASNS, IARS, SLC16A6, ACSL4, LMAN1, ITGA1, CAV2, TMED2, NT5E, SOAT1, CYP26B1, FOLR3, CD55, MMD, SH2D2A, CYSLTR1, RDH10, ERO1L, YWHAQ, GLO1, SNAP25, CAV1, FNDC3A, LIN7C, CYB5B, GNAI3, NTS, ZMPSTE24, PTPRF, SYNCRIP, TMED10, RYK, SLC16A1, ACTB, ANXA2, PTGES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 46  |
| Cellular component | Zymogen granule  | PLA2G4A, SCAMP1, TMED10, GNAI3, TMED2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5   |
| Cellular component | Nuclear part     | CCNE2, HMGB1, CDC40, DUSP6, UTP14A, NPM1, PPIL1, POP4, PHLDA1, RBL2, RPL5, SUB1, DAZAP1, ADD3, AHCTF1, TDG, SNRPD1, NOL11, COPS3, PRKRIR, MSH2, XRN2, ARNT2, SMARCE1, MPHOSPH6, SEH1L, ASF1A, PRPF40A, GTF2H3, RPL9, C1D, COPS2,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 63  |

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|--------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|                    |                    | CREG1, SKIV2L2, ELL2, SMARCAD1, STAU2, TEX10, MTMR6, FRG1, TTRAP, XPOT, RPS3A, POLR3G, TAF9B, NAP1L1, TMEM38B, SYNCRIP, SMN2, HIF1A, RPS7, RBMX, ORC5L, OGT, PPP1CB, GNL3L, ACTB, CACYBP, SMARCA5, TAF9, PTGES, PPIL3, HDAC2 |    |
| Cellular component | Vesicular fraction | SOAT1, CYP26B1, CYP51A1, PTPRF, SYNCRIP, DMD, TMED10, ERO1L, RDH10, SPCS2, ACSL4, FNDC3A, LMAN1, CYB5B, PTGES, TMED2                                                                                                         | 16 |