

| |
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| gene |
| ABCA1 |
| ABCA10 |
| ABCA12 |
| ABCA13 |
| ABCA2 |
| ABCA3 |
| ABCA4 |
| ABCA5 |
| ABCA6 |
| ABCA7 |
| ABCA8 |
| ABCA9 |
| ABCB1 |
| ABCB10 |
| ABCB11 |
| ABCB4 |
| ABCB5 |
| ABCB6 |
| ABCB7 |
| ABCB8 |
| ABCB9 |
| ABCC1 |
| ABCC10 |
| ABCC11 |

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| ABCC12 |
| ABCC13 |
| ABCC2 |
| ABCC3 |
| ABCC4 |
| ABCC5 |
| ABCC6 |
| ABCC8 |
| ABCC9 |
| ABCD1 |
| ABCD2 |
| ABCD3 |
| ABCD4 |
| ABCE1 |
| ABCF1 |
| ABCF2 |
| ABCF3 |
| ABCG1 |
| ABCG2 |
| ABCG4 |
| ABCG5 |
| ABCG8 |
| AADAT |
| ACY1 |
| ACY1L |

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|---------|
| ACY3 |
| ADC |
| ADI1 |
| AGPS |
| AGXT |
| AGXT2 |
| AGXT2L1 |
| AGXT2L2 |
| ASNS |
| ASNSD1 |
| ASPA |
| ASPG |
| ASRGL1 |
| CCBL1 |
| CCBL2 |
| CRYM |
| DAO |
| DDO |
| GCAT |
| GCDH |
| GPT |
| GPT2 |
| ILVBL |
| LGSN |
| PCBD1 |

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|---------|
| PCBD2 |
| SCCPDH |
| SCLY |
| SDS |
| SDSL |
| SEPHS1 |
| SEPHS2 |
| THNSL1 |
| THNSL2 |
| TMLHE |
| CHI3L1 |
| CHI3L2 |
| CHIA |
| CHID1 |
| CHIT1 |
| CMAS |
| GFPT1 |
| GFPT2 |
| GNE |
| GNPDA1 |
| GNPDA2 |
| GNPNAT1 |
| GNPTAB |
| GNPTG |
| NAGK |

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|---------|
| NANP |
| NANS |
| NPL |
| PGM3 |
| RENBP |
| UAP1 |
| UAP1L1 |
| LDHA |
| LDHAL6A |
| LDHAL6B |
| LDHB |
| LDHC |
| LDHD |
| ATP13A1 |
| ATP13A2 |
| ATP13A3 |
| ATP13A4 |
| ATP13A5 |
| MMAB |
| MMACHC |
| MMADHC |
| MTRR |
| BCAT1 |
| BCAT2 |
| BCKDHA |

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|---------|
| BCKDHB |
| DBT |
| HIBADH |
| HIBCH |
| IVD |
| MCCC1 |
| MCCC2 |
| GCH1 |
| PTS |
| QDPR |
| SPR |
| BAAT |
| CYP27A1 |
| CYP7A1 |
| CYP7B1 |
| CYP8B1 |
| HSD3B7 |
| FBP1 |
| FBP2 |
| G6PC |
| G6PC2 |
| G6PC3 |
| GBE1 |
| GYG1 |
| GYG2 |

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| GYS1 |
| GYS2 |
| PCK1 |
| PCK2 |
| UGP2 |
| CYP51A1 |
| DHCR24 |
| DHCR7 |
| EBP |
| EBPL |
| FDFT1 |
| FDPS |
| HSD17B7 |
| LBR |
| LCAT |
| LSS |
| NSDHL |
| SC4MOL |
| SC5DL |
| SQLE |
| TM7SF2 |
| AACS |
| ACOT1 |
| ACOT11 |
| ACOT12 |

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|---------|
| ACOT2 |
| ACOT4 |
| ACOT6 |
| ACOT7 |
| ACOT8 |
| ACOT9 |
| COASY |
| PANK1 |
| PANK2 |
| PANK3 |
| PANK4 |
| PPCDC |
| PPCS |
| AHCY |
| AHCYL1 |
| AHCYL2 |
| BBOX1 |
| BTD |
| CEL |
| CRAT |
| CUBN |
| CYP24A1 |
| CYP27B1 |
| DAK |
| FLAD1 |

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| FOLH1 |
| GPHN |
| HLCS |
| MOCOS |
| MOCS1 |
| MOCS2 |
| MOCS3 |
| NAGS |
| RFK |
| THTPA |
| TPK1 |
| VKORC1 |
| VKORC1L1 |
| MT-ND1 |
| MT-ND2 |
| MT-ND3 |
| MT-ND4 |
| MT-ND4L |
| MT-ND5 |
| MT-ND6 |
| NDUFA1 |
| NDUFA10 |
| NDUFA11 |
| NDUFA12 |
| NDUFA13 |

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|----------|
| NDUFA2 |
| NDUFA3 |
| NDUFA4 |
| NDUFA4L |
| NDUFA4L2 |
| NDUFA5 |
| NDUFA6 |
| NDUFA7 |
| NDUFA8 |
| NDUFA9 |
| NDUFAB1 |
| NDUFAB1 |
| NDUFAB2 |
| NDUFB1 |
| NDUFB10 |
| NDUFB11 |
| NDUFB2 |
| NDUFB3 |
| NDUFB4 |
| NDUFB5 |
| NDUFB6 |
| NDUFB7 |
| NDUFB8 |
| NDUFB9 |
| NDUFC1 |

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| NDUFC2 |
| NDUFS1 |
| NDUFS2 |
| NDUFS3 |
| NDUFS4 |
| NDUFS5 |
| NDUFS6 |
| NDUFS7 |
| NDUFS8 |
| NDUFV1 |
| NDUFV2 |
| NDUFV3 |
| SDHA |
| SDHB |
| SDHC |
| SDHD |
| CYC1 |
| CYCS |
| MT-CYB |
| UCRC |
| UQCR |
| UQCRB |
| UQCRC1 |
| UQCRC2 |
| UQCRFS1 |

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|---------|
| UQCRH |
| UQCRQ |
| COX1 |
| COX10 |
| COX11 |
| COX15 |
| COX16 |
| COX17 |
| COX18 |
| COX19 |
| COX2 |
| COX3 |
| COX4I1 |
| COX4I2 |
| COX5A |
| COX5B |
| COX6A1 |
| COX6A2 |
| COX6B1 |
| COX6B2 |
| COX6C |
| COX7A1 |
| COX7A2 |
| COX7A2L |
| COX7B |

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|---------|
| COX7B2 |
| COX7C |
| COX8A |
| COX8C |
| CKB |
| CKBE |
| CKM |
| CKMT1A |
| CKMT1B |
| CKMT2 |
| GAMT |
| GATM |
| ADO |
| CBS |
| CD01 |
| CSAD |
| CTH |
| NFS1 |
| PCYOX1 |
| PCYOX1L |
| SUOX |
| AADAC |
| AADACL1 |
| AADACL2 |
| AADACL3 |

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|---------|
| AADACL4 |
| AKR7L |
| BCHE |
| CAT |
| CES1 |
| CES2 |
| CES3 |
| CES7 |
| DHDH |
| DPEP1 |
| DPEP2 |
| DPEP3 |
| EPHX1 |
| EPHX2 |
| FM01 |
| FM02 |
| FM03 |
| FM04 |
| FM05 |
| SOD1 |
| SOD2 |
| SOD3 |
| TPMT |
| UGT1A1 |
| UGT1A10 |

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|---------|
| UGT1A3 |
| UGT1A4 |
| UGT1A5 |
| UGT1A6 |
| UGT1A7 |
| UGT1A8 |
| UGT1A9 |
| UGT2A1 |
| UGT2A2 |
| UGT2A3 |
| UGT2B10 |
| UGT2B11 |
| UGT2B15 |
| UGT2B17 |
| UGT2B28 |
| UGT2B4 |
| UGT2B7 |
| UGT3A1 |
| UGT3A2 |
| ACAA1 |
| ACAA2 |
| ACACA |
| ACACB |
| ACAD10 |
| ACAD11 |

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| ACAD8 |
| ACAD9 |
| ACADL |
| ACADM |
| ACADS |
| ACADSB |
| ACADVL |
| ACAT1 |
| ACAT2 |
| ACBD3 |
| ACBD4 |
| ACBD5 |
| ACBD6 |
| ACBD7 |
| ACOX1 |
| ACOX2 |
| ACOX3 |
| ACOXL |
| ACSBG1 |
| ACSBG2 |
| ACSF2 |
| ACSF3 |
| ACSL1 |
| ACSL3 |
| ACSL4 |

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|---------|
| ACSL5 |
| ACSL6 |
| ACSM1 |
| ACSM2A |
| ACSM2B |
| ACSM3 |
| ACSM4 |
| ACSM5 |
| ACSS1 |
| ACSS2 |
| ACSS3 |
| CLYBL |
| CPT1A |
| CPT1B |
| CPT1C |
| CPT2 |
| CYP4A11 |
| CYP4A22 |
| CYP4B1 |
| CYP4F11 |
| CYP4F12 |
| CYP4F2 |
| CYP4F22 |
| CYP4F3 |
| CYP4F8 |

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|---------|
| CYP4V2 |
| CYP4X1 |
| CYP4Z1 |
| DCI |
| DECR1 |
| DECR2 |
| DGAT1 |
| DGAT2 |
| DGAT2L3 |
| DGAT2L4 |
| DGAT2L6 |
| DGAT2L7 |
| ECH1 |
| ECHDC1 |
| ECHDC2 |
| ECHDC3 |
| ECHS1 |
| EHHADH |
| ELOVL1 |
| ELOVL2 |
| ELOVL3 |
| ELOVL4 |
| ELOVL5 |
| ELOVL6 |
| ELOVL7 |

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| ETFA |
| ETFB |
| ETFDH |
| FA2H |
| FAAH |
| FAAH2 |
| FADS1 |
| FADS2 |
| FADS3 |
| FAR1 |
| FAR2 |
| FASN |
| GPSN2 |
| HACL1 |
| HADH |
| HADHA |
| HADHB |
| LIPC |
| LIPF |
| LIPG |
| LIPH |
| LIPI |
| LIPJ |
| LIPK |
| LIPM |

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|----------|
| LIPN |
| LPL |
| LPPR2 |
| MCAT |
| MECR |
| MGLL |
| MLYCD |
| MTTP |
| OLAH |
| OXSM |
| PECI |
| PECR |
| PHYH |
| PHYHD1 |
| PNLIP |
| PNLIPRP1 |
| PNLIPRP2 |
| PNLIPRP3 |
| PNPLA1 |
| PNPLA2 |
| PNPLA3 |
| PNPLA4 |
| PNPLA5 |
| PNPLA6 |
| PNPLA7 |

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|----------|
| PNPLA8 |
| SCD |
| SCD5 |
| SCP2 |
| SDR16C6 |
| SDR39U1 |
| SDR42E1 |
| SDR9C7 |
| DHFR |
| DHFRL1 |
| FPGS |
| MTHFD1 |
| MTHFD1L |
| MTHFD2 |
| MTHFD2L |
| MTHFR |
| MTHFS |
| MTHFSD |
| SHMT1 |
| SHMT2 |
| ALDH18A1 |
| ALDH5A1 |
| GAD1 |
| GAD2 |
| GADL1 |

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|-------|
| GLS |
| GLS2 |
| GLUD1 |
| GLUD2 |
| GLUL |
| OAT |
| GCLC |
| GCLM |
| GPX1 |
| GPX2 |
| GPX3 |
| GPX4 |
| GPX5 |
| GPX6 |
| GPX7 |
| GPX8 |
| GSR |
| GSS |
| GSTA1 |
| GSTA2 |
| GSTA3 |
| GSTA4 |
| GSTA5 |
| GSTCD |
| GSTK1 |

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|--------|
| GSTM1 |
| GSTM2 |
| GSTM3 |
| GSTM4 |
| GSTM5 |
| GSTO1 |
| GSTO2 |
| GSTP1 |
| GSTT1 |
| GSTT2 |
| HAGH |
| HAGHL |
| MGST1 |
| MGST2 |
| MGST3 |
| A4GALT |
| A4GNT |
| ABO |
| ALG1 |
| ALG10 |
| ALG10B |
| ALG11 |
| ALG12 |
| ALG13 |
| ALG14 |

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|----------|
| ALG2 |
| ALG3 |
| ALG5 |
| ALG6 |
| ALG8 |
| ALG9 |
| B3GALNT1 |
| B3GALNT2 |
| B3GALT1 |
| B3GALT2 |
| B3GALT4 |
| B3GALT5 |
| B3GALT6 |
| B3GALTL |
| B3GAT1 |
| B3GAT2 |
| B3GAT3 |
| B3GNT1 |
| B3GNT2 |
| B3GNT3 |
| B3GNT4 |
| B3GNT5 |
| B3GNT6 |
| B3GNT7 |
| B3GNT8 |

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| B3GNT9 |
| B3GNTL1 |
| B4GALNT1 |
| B4GALNT2 |
| B4GALNT3 |
| B4GALNT4 |
| B4GALT1 |
| B4GALT2 |
| B4GALT3 |
| B4GALT4 |
| B4GALT5 |
| B4GALT6 |
| B4GALT7 |
| C1GALT1 |
| CTBS |
| DAD1 |
| DDOST |
| DHDDS |
| DOLK |
| DOLPP1 |
| DPAGT1 |
| FN3K |
| FN3KRP |
| FUT1 |
| FUT10 |

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|---------|
| FUT11 |
| FUT2 |
| FUT3 |
| FUT4 |
| FUT5 |
| FUT6 |
| FUT7 |
| FUT8 |
| FUT9 |
| GALE |
| GALNT1 |
| GALNT10 |
| GALNT11 |
| GALNT12 |
| GALNT13 |
| GALNT14 |
| GALNT2 |
| GALNT3 |
| GALNT4 |
| GALNT5 |
| GALNT6 |
| GALNT7 |
| GALNT8 |
| GALNT9 |
| GALNTL1 |

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| GALNTL2 |
| GALNTL4 |
| GALNTL5 |
| GALNTL6 |
| GANAB |
| GANC |
| GBA |
| GBA2 |
| GBA3 |
| GBGT1 |
| GCNT1 |
| GCNT2 |
| GCNT3 |
| GCNT4 |
| GCNT6 |
| GCNT7 |
| GCS1 |
| GLT1D1 |
| GLT25D1 |
| GLT25D2 |
| GLT6D1 |
| GLT8D1 |
| GLT8D2 |
| GLT8D3 |
| GLT8D4 |

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|---------|
| GTDC1 |
| GYLTL1B |
| HAS1 |
| HAS2 |
| HAS3 |
| LARGE |
| LYCAT |
| MFNG |
| MGAT1 |
| MGAT2 |
| MGAT3 |
| MGAT4A |
| MGAT4B |
| MGAT4C |
| MGAT5 |
| MGAT5B |
| NAGA |
| NAGPA |
| POFUT1 |
| POFUT2 |
| POMGNT1 |
| POMT1 |
| POMT2 |
| ST3GAL1 |
| ST3GAL2 |

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| ST3GAL3 |
| ST3GAL4 |
| ST3GAL5 |
| ST3GAL6 |
| ST6GAL1 |
| ST6GAL2 |
| ST6GALNAC1 |
| ST6GALNAC2 |
| ST6GALNAC3 |
| ST6GALNAC4 |
| ST6GALNAC5 |
| ST6GALNAC6 |
| ST8SIA1 |
| ST8SIA2 |
| ST8SIA3 |
| ST8SIA4 |
| ST8SIA5 |
| ST8SIA6 |
| WBSCR17 |
| XYLT1 |
| XYLT2 |
| DPM1 |
| DPM2 |
| DPM3 |
| GPLD1 |

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| PIGA |
| PIGB |
| PIGC |
| PIGF |
| PIGG |
| PIGH |
| PIGK |
| PIGL |
| PIGM |
| PIGN |
| PIGO |
| PIGP |
| PIGQ |
| PIGS |
| PIGT |
| PIGU |
| PIGV |
| PIGW |
| PIGX |
| PIGY |
| PIGZ |
| AGA |
| EDEM1 |
| EDEM2 |
| EDEM3 |

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| FLJ21865 |
| FUCA1 |
| FUCA2 |
| GALNS |
| GLA |
| GLB1 |
| GLB1L |
| GLB1L2 |
| GLB1L3 |
| GNS |
| GUSB |
| HEXA |
| HEXB |
| HEXDC |
| HYAL1 |
| HYAL2 |
| HYAL3 |
| HYAL4 |
| IDS |
| IDUA |
| LYG1 |
| LYZ |
| LYZL1 |
| LYZL2 |
| LYZL4 |

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|--------|
| LYZL6 |
| MAN1A1 |
| MAN1A2 |
| MAN1B1 |
| MAN1C1 |
| MAN2A1 |
| MAN2A2 |
| MAN2B1 |
| MAN2B2 |
| MAN2C1 |
| MANBA |
| MANBAL |
| MANEA |
| MANEAL |
| NAGLU |
| NEU1 |
| NEU2 |
| NEU3 |
| NEU4 |
| CHPF |
| CHPF2 |
| CHST1 |
| CHST10 |
| CHST11 |
| CHST12 |

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| CHST13 |
| CHST14 |
| CHST2 |
| CHST3 |
| CHST4 |
| CHST5 |
| CHST6 |
| CHST7 |
| CHST8 |
| CHST9 |
| CHSY1 |
| CHSY3 |
| CSGALNACT1 |
| CSGALNACT2 |
| GAL3ST1 |
| GAL3ST2 |
| GAL3ST3 |
| GAL3ST4 |
| SGSH |
| SULF1 |
| SULF2 |
| UST |
| AMT |
| BHMT |
| BHMT2 |

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|--------|
| DMGDH |
| GCSH |
| GLDC |
| SARDH |
| ADPGK |
| ALDOA |
| ALDOB |
| ALDOC |
| BPGM |
| DLAT |
| ENO1 |
| ENO2 |
| ENO3 |
| GAPDH |
| GAPDHS |
| GCK |
| GPI |
| HK1 |
| HK2 |
| HK3 |
| HKDC1 |
| PDHA1 |
| PDHA2 |
| PDHB |
| PDHX |

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| PFKFB1 |
| PFKFB2 |
| PFKFB3 |
| PFKFB4 |
| PFKL |
| PFKM |
| PFKP |
| PGAM1 |
| PGAM2 |
| PGAM4 |
| PGAM5 |
| PGK1 |
| PGK2 |
| PGM1 |
| PGM2 |
| PGM2L1 |
| PGM5 |
| PKLR |
| PKM2 |
| TPI1 |
| GLO1 |
| GLOD4 |
| GLOD5 |
| HAO1 |
| HAO2 |

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| EXT1 |
| EXT2 |
| EXT3 |
| EXTL1 |
| EXTL2 |
| EXTL3 |
| GLCE |
| HGSNAT |
| HPSE |
| HPSE2 |
| HS2ST1 |
| HS3ST1 |
| HS3ST2 |
| HS3ST3A1 |
| HS3ST3B1 |
| HS3ST4 |
| HS3ST5 |
| HS3ST6 |
| HS6ST1 |
| HS6ST2 |
| HS6ST3 |
| NDST1 |
| NDST2 |
| NDST3 |
| NDST4 |

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| AMDHD1 |
| AMDHD2 |
| FTCD |
| HAL |
| HDC |
| HNMT |
| URO1 |
| AANAT |
| ACE |
| ACE2 |
| ALOX12 |
| ALOX12B |
| ALOX15 |
| ALOX15B |
| ALOX5 |
| ALOX5AP |
| ALOXE3 |
| AOF1 |
| AOF2 |
| ASMT |
| ASMTL |
| CYP20A1 |
| DIO1 |
| DIO2 |
| DIO3 |

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| HPGD |
| IYD |
| LNPEP |
| LTA4H |
| LTC4S |
| MME |
| MMEL1 |
| PGDS |
| PTGDS |
| PTGES |
| PTGES2 |
| PTGES3 |
| PTGIS |
| PTGR1 |
| PTGR2 |
| PTGS1 |
| PTGS2 |
| TBXAS1 |
| TPO |
| CDIPT |
| FIG4 |
| IMPA1 |
| IMPA2 |
| IMPAD1 |
| INPP1 |

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|--------|
| INPP4A |
| INPP4B |
| INPP5A |
| INPP5B |
| INPP5D |
| INPP5E |
| INPP5F |
| INPP5J |
| INPP5K |
| INPPL1 |
| IP6K1 |
| IP6K2 |
| IP6K3 |
| IPMK |
| IPPK |
| ISYNA1 |
| ITPK1 |
| ITPKA |
| ITPKB |
| ITPKC |
| MINPP1 |
| MIOX |
| PGAP1 |
| PI4K2A |
| PI4K2B |

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| PI4KA |
| PI4KB |
| PIK3C2A |
| PIK3C2B |
| PIK3C2G |
| PIK3C3 |
| PIK3CA |
| PIK3CB |
| PIK3CD |
| PIK3CG |
| PIK3R1 |
| PIK3R2 |
| PIK3R3 |
| PIK3R4 |
| PIK3R5 |
| PIK3R6 |
| PIP4K2A |
| PIP4K2B |
| PIP4K2C |
| PIP5K1A |
| PIP5K1B |
| PIP5K1C |
| PIP5K3 |
| PIP5KL1 |
| PTEN |

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|--------|
| SYNJ1 |
| SYNJ2 |
| ATP11A |
| ATP11B |
| ATP11C |
| ATP12A |
| ATP1A1 |
| ATP1A2 |
| ATP1A3 |
| ATP1A4 |
| ATP1B1 |
| ATP1B2 |
| ATP1B3 |
| ATP1B4 |
| ATP2A1 |
| ATP2A2 |
| ATP2A3 |
| ATP2B1 |
| ATP2B2 |
| ATP2B3 |
| ATP2B4 |
| ATP2C1 |
| ATP2C2 |
| ATP3 |
| ATP4A |

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|----------|
| ATP4B |
| ATP7A |
| ATP7B |
| BEST1 |
| BEST2 |
| BEST3 |
| BEST4 |
| BSND |
| C14orf68 |
| C20orf59 |
| C6orf192 |
| CACNA1A |
| CACNA1B |
| CACNA1C |
| CACNA1D |
| CACNA1E |
| CACNA1F |
| CACNA1G |
| CACNA1H |
| CACNA1I |
| CACNA1S |
| CACNA2D1 |
| CACNA2D2 |
| CACNA2D3 |
| CACNA2D4 |

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| CACNB1 |
| CACNB2 |
| CACNB3 |
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| GABRQ |

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| GRIA3 |
| GRIA4 |
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| GRIK1 |
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| GRIK4 |
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| GRIN2B |
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| GRIN2D |
| GRIN3A |

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| HTR3E |
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| KCNS3 |
| KCNT1 |
| KCNT2 |

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| KCTD9 |
| P2RX1 |

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| P2RX2 |
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| SCN10A |
| SCN11A |
| SCN1A |
| SCN1B |
| SCN2A |
| SCN2B |
| SCN3A |
| SCN3B |
| SCN4A |
| SCN4B |
| SCN5A |
| SCN7A |
| SCN8A |
| SCN9A |
| SCNN1A |
| SCNN1B |
| SCNN1D |
| SCNN1G |
| SLC11A1 |

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| SLC13A5 |
| SLC24A1 |
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| SLC3A2 |
| SLC40A1 |
| SLC41A1 |
| SLC41A2 |

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| SLC41A3 |
| VDAC1 |
| VDAC2 |
| VDAC3 |
| ZACN |
| HEPH |
| LGICZ1 |
| LST-3TM12 |
| MAGT1 |
| MCOLN1 |
| MCOLN2 |
| MCOLN3 |
| MMAA |
| NALCN |
| NIPA1 |
| OCA2 |
| ORAI1 |
| ORAI2 |
| ORAI3 |
| PKD1 |
| PKD2 |
| PKD2L1 |
| RYR1 |
| RYR2 |
| RYR3 |

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| SLC22A24 |
| SLC25A25 |
| SLC31A1 |
| SLC31A2 |
| SLN |
| TCN1 |
| TCN2 |
| TF |
| TRPA1 |
| TRPC1 |
| TRPC3 |
| TRPC4 |
| TRPC5 |
| TRPC6 |
| TRPC7 |
| TRPM1 |
| TRPM2 |
| TRPM3 |
| TRPM4 |
| TRPM5 |
| TRPM6 |
| TRPM7 |
| TRPM8 |
| TRPV1 |
| TRPV2 |

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| TRPV3 |
| TRPV4 |
| TRPV5 |
| TRPV6 |
| TTYH1 |
| TTYH2 |
| TTYH3 |
| BDH1 |
| BDH2 |
| OXCT1 |
| OXCT2 |
| ACLY |
| ACO1 |
| ACO2 |
| CS |
| D2HGDH |
| DLST |
| FH |
| HCCS |
| IDH1 |
| IDH2 |
| IDH3A |
| IDH3B |
| IDH3G |
| L2HGDH |

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| MDH1 |
| MDH1B |
| MDH2 |
| ME1 |
| ME2 |
| ME3 |
| OGDH |
| OGDHL |
| PC |
| SUCLA2 |
| SUCLG1 |
| SUCLG2 |
| AASDH |
| AASDHPPT |
| AASS |
| PIPOX |
| AGPAT1 |
| AGPAT2 |
| AGPAT3 |
| AGPAT4 |
| AGPAT5 |
| AGPAT6 |
| AGPAT9 |
| CDS1 |
| CDS2 |

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| CEPT1 |
| CHKA |
| CHKB |
| CHPT1 |
| CLC |
| CRLS1 |
| CROT |
| DAGLA |
| DAGLB |
| DGKA |
| DGKB |
| DGKD |
| DGKE |
| DGKG |
| DGKH |
| DGKI |
| DGKK |
| DGKQ |
| DGKZ |
| ETNK1 |
| ETNK2 |
| GDE1 |
| GK |
| GK2 |
| GK5 |

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| GNPAT |
| GPAM |
| GPD1 |
| GPD1L |
| GPD2 |
| LPCAT1 |
| LPCAT2 |
| LPCAT3 |
| LPCAT4 |
| LPGAT1 |
| LPIN1 |
| LPIN2 |
| LPIN3 |
| LYPLA1 |
| LYPLA2 |
| LYPLAL1 |
| MBOAT1 |
| MBOAT2 |
| MBOAT4 |
| MBOAT7 |
| MOGAT1 |
| MOGAT2 |
| MOGAT3 |
| NAPE-PLD |
| PAP2D |

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| PCYT1A |
| PCYT1B |
| PCYT2 |
| PEMT |
| PGS1 |
| PHOSPHO1 |
| PISD |
| PLA1A |
| PLA2G10 |
| PLA2G12A |
| PLA2G12B |
| PLA2G15 |
| PLA2G16 |
| PLA2G1B |
| PLA2G2A |
| PLA2G2C |
| PLA2G2D |
| PLA2G2E |
| PLA2G2F |
| PLA2G3 |
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| PLA2G4B |
| PLA2G4C |
| PLA2G4D |
| PLA2G4E |

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| PLA2G5 |
| PLA2G6 |
| PLA2G7 |
| PLB1 |
| PLCB1 |
| PLCB2 |
| PLCB3 |
| PLCB4 |
| PLCD1 |
| PLCD3 |
| PLCD4 |
| PLCE1 |
| PLCG1 |
| PLCG2 |
| PLCH1 |
| PLCH2 |
| PLCL1 |
| PLCL2 |
| PLCXD1 |
| PLCXD2 |
| PLCXD3 |
| PLCZ1 |
| PLD1 |
| PLD2 |

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| PLD4 |
| PLD5 |
| PLD6 |
| PPAP2A |
| PPAP2B |
| PPAP2C |
| PPAPDC1A |
| PPAPDC1B |
| PPAPDC2 |
| PPAPDC3 |
| PRG2 |
| PTDSS1 |
| PTDSS2 |
| MAT1A |
| MAT2A |
| MAT2B |
| MSRA |
| MSRB2 |
| MSRB3 |
| MTR |
| SEPX1 |
| HMGCR |
| HMGCS1 |
| HMGCS2 |

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| IDI1 |
| IDI2 |
| MVD |
| MVK |
| PMVK |
| ABHD1 |
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| ABHD11 |
| ABHD12 |
| ABHD12B |
| ABHD13 |
| ABHD14A |
| ABHD14B |
| ABHD2 |
| ABHD3 |
| ABHD4 |
| ABHD5 |
| ABHD6 |
| ABHD7 |
| ABHD8 |
| ABHD9 |
| ABP1 |
| ACYP1 |
| ACYP2 |
| ADH1A |

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| ADH1B |
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| AKR1A1 |
| AKR1B1 |
| AKR1B10 |
| AKR1C1 |
| AKR1C2 |
| AKR1C3 |
| AKR1CL2 |
| AKR7A2 |
| AKR7A3 |
| ALDH16A1 |
| ALDH1A1 |
| ALDH1A2 |
| ALDH1A3 |
| ALDH1B1 |
| ALDH1L1 |
| ALDH1L2 |
| ALDH2 |
| ALDH3A1 |

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| ALDH3B2 |
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| ALDH7A1 |
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| ALDH9A1 |
| AOC2 |
| AOC3 |
| ARSA |
| ARSB |
| ARSD |
| ARSE |
| ARSF |
| ARSG |
| ARSH |
| ARSI |
| ARSJ |
| ARSK |
| AUH |
| CA1 |
| CA10 |
| CA11 |
| CA12 |
| CA13 |

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| CA14 |
| CA2 |
| CA3 |
| CA4 |
| CA5A |
| CA5B |
| CA6 |
| CA7 |
| CA8 |
| CA9 |
| CBR1 |
| CBR3 |
| CBR4 |
| DLD |
| GGH |
| GGT1 |
| GGT2 |
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| GGT6 |
| GGT7 |
| GGTLC1 |
| GGTLC2 |
| GOT1 |
| GOT1L1 |
| GOT2 |

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| GSTZ1 |
| HMGCL |
| HMGCLL1 |
| LPPR4 |
| MAK10 |
| MAOA |
| MAOB |
| NAT1 |
| NAT10 |
| NAT11 |
| NAT12 |
| NAT13 |
| NAT14 |
| NAT15 |
| NAT2 |
| NAT5 |
| NAT6 |
| NAT8 |
| NAT8B |
| NAT8L |
| NAT9 |
| POR |
| ZADH2 |
| BST1 |
| C9ORF95 |

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| DUOX1 |
| DUOX2 |
| NADK |
| NADSYN1 |
| NAPRT1 |
| NMNAT1 |
| NMNAT2 |
| NMNAT3 |
| NNMT |
| NNT |
| NOX1 |
| NOX3 |
| NOX4 |
| NOX5 |
| NQO1 |
| NQO2 |
| QPRT |
| ABAT |
| ACHE |
| CHAT |
| CHDH |
| COMT |
| COMTD1 |
| DBH |
| DDC |

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| NAALAD2 |
| NAALADL1 |
| NAALADL2 |
| PNMT |
| SRR |
| TH |
| TPH1 |
| TPH2 |
| BPNT1 |
| CANT1 |
| DCK |
| ENPP1 |
| ENPP2 |
| ENPP3 |
| ENPP4 |
| ENPP5 |
| ENPP6 |
| ENPP7 |
| ENTPD1 |
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| ENTPD6 |
| ENTPD7 |

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| ENTPD8 |
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| NME1 |
| NME2 |
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| NME5 |
| NME6 |
| NME7 |
| NT5C |
| NT5C1A |
| NT5C1B |
| NT5C2 |
| NT5C3 |
| NT5C3L |
| NT5DC1 |
| NT5DC2 |
| NT5DC3 |
| NT5DC4 |
| NT5E |
| NT5M |
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| NUDT11 |
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| NUDT4 |
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| NUDT6 |
| NUDT7 |
| NUDT8 |
| NUDT9 |
| RRM1 |
| RRM2 |
| RRM2B |
| TGDS |
| UGDH |
| UXS1 |
| A1CF |

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| ACN9 |
| AOAH |
| APEH |
| AS3MT |
| BPHL |
| CMBL |
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| CNDP2 |
| DDHD1 |
| DDHD2 |
| ENOPH1 |
| ENOSF1 |
| EPX |
| ESD |
| FXN |
| GDPD1 |
| GDPD2 |
| GDPD3 |
| GDPD4 |
| GDPD5 |
| GLYAT |
| GLYATL1 |
| GLYATL2 |
| GNMT |
| HISPPD1 |

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| HISPPD2A |
| IAH1 |
| LIAS |
| LIPT1 |
| MOSC1 |
| MOSC2 |
| MPO |
| NIT1 |
| NIT2 |
| PAM |
| PON1 |
| PON2 |
| PON3 |
| PPA1 |
| PPA2 |
| PTER |
| THEM2 |
| THEM4 |
| THEM5 |
| UEVLD |
| WVOX |
| GLTP |
| CTNS |
| DIRC2 |
| FLVCR1 |

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| FLVCR2 |
| MCART1 |
| MCART2 |
| MCART6 |
| MFSD1 |
| MFSD10 |
| MFSD11 |
| MFSD2 |
| MFSD3 |
| MFSD4 |
| MFSD5 |
| MFSD7 |
| MFSD8 |
| MFSD9 |
| OSTalpha |
| OSTbeta |
| STRA6 |
| TAP1 |
| TAP2 |
| TMCO3 |
| TMEM104 |
| TPCN1 |
| TPCN2 |
| DERA |
| G6PD |

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| PGD |
| PGLS |
| RPE |
| RPIA |
| TALDO1 |
| TKT |
| TKTL1 |
| TKTL2 |
| DCT |
| DDT |
| TYR |
| TYRP1 |
| AMACR |
| AMD1 |
| MTAP |
| ODC1 |
| PAOX |
| SAT1 |
| SAT2 |
| SATL1 |
| SMOX |
| SMS |
| SRM |
| ALAD |
| ALAS1 |

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| ALAS2 |
| BLVRA |
| BLVRB |
| CPOX |
| FECH |
| HMBS |
| HMOX1 |
| HMOX2 |
| PPOX |
| UROD |
| UROS |
| ALDH4A1 |
| PRODH |
| PRODH2 |
| PYCR1 |
| PYCR2 |
| PYCRL |
| MCEE |
| MUT |
| PCCA |
| PCCB |
| ATP5A1 |
| ATP5B |
| ATP5C1 |
| ATP5C2 |

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| ATP5D |
| ATP5E |
| ATP5F1 |
| ATP5G1 |
| ATP5G2 |
| ATP5G3 |
| ATP5H |
| ATP5I |
| ATP5J |
| ATP5J2 |
| ATP5L |
| ATP5L2 |
| ATP5O |
| ATP5S |
| ATP5SL |
| ATP6 |
| ATP6AP1 |
| ATP6AP2 |
| ATP6VOA1 |
| ATP6VOA2 |
| ATP6VOA4 |
| ATP6VOB |
| ATP6VOC |
| ATP6VOD1 |
| ATP6VOD2 |

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| ATP6VOE2 |
| ATP6V1A |
| ATP6V1B1 |
| ATP6V1B2 |
| ATP6V1C1 |
| ATP6V1C2 |
| ATP6V1D |
| ATP6V1E1 |
| ATP6V1E2 |
| ATP6V1F |
| ATP6V1G1 |
| ATP6V1G2 |
| ATP6V1G3 |
| ATP6V1H |
| HVCN1 |
| TCIRG1 |
| UCP1 |
| UCP2 |
| UCP3 |
| ADA |
| ADAD1 |
| ADAD2 |
| ADAL |
| ADK |

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|--------|
| ADSL |
| ADSS |
| ADSSL1 |
| AK1 |
| AK2 |
| AK3 |
| AK3L1 |
| AK5 |
| AK7 |
| AMPD1 |
| AMPD2 |
| AMPD3 |
| APRT |
| ATIC |
| CECR1 |
| DGUOK |
| FHIT |
| GART |
| GDA |
| GMPR |
| GMPR2 |
| GMPS |
| GUK1 |
| HPRT1 |
| IMPDH1 |

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| IMPDH2 |
| NP |
| PAICS |
| PFAS |
| PPAT |
| PRPS1 |
| PRPS1L1 |
| PRPS2 |
| PRPSAP1 |
| PRPSAP2 |
| XDH |
| CAD |
| CDA |
| CDADC1 |
| CMPK |
| CTPS |
| CTPS2 |
| DCTD |
| DHODH |
| DPYD |
| DPYS |
| DPYSL2 |
| DPYSL3 |
| DPYSL4 |
| DPYSL5 |

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| DTYMK |
| DUT |
| TK1 |
| TK2 |
| TYMP |
| TYMS |
| UCK1 |
| UCK2 |
| UCKL1 |
| UMPS |
| UPB1 |
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| DDAH2 |
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| NOS3 |
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| CYB5D2 |
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| CYB5RL |
| CYBA |
| CYBASC3 |
| CYBB |
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| DHRS4L2 |
| DHRS7 |
| DHRS7B |
| DHRS7C |
| DHRS9 |

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| FDXR |
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| FOXRED2 |
| FRRS1 |
| GLRX |
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| GLRX3 |
| GLRX5 |
| GRXCR1 |
| GRXCR2 |
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| ISCA2 |
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| MICAL3 |
| NDOR1 |
| NMRAL1 |

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| PYROXD1 |
| TXNRD1 |
| TXNRD2 |
| TXNRD3 |
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| PSAT |
| PSPH |
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| GUCY2F |
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| NPR3 |
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| OAS3 |
| OASL |
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| PDE12 |
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| PDE1B |
| PDE1C |
| PDE2A |
| PDE3A |
| PDE3B |

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| PDE4D |
| PDE5A |
| PDE6A |
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| PDE6C |
| PDE6D |
| PDE6G |
| PDE6H |
| PDE7A |
| PDE7B |
| PDE8A |
| PDE8B |
| PDE9A |
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| ACCN4 |
| ACCN5 |
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| AQP11 |

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| AQP9 |
| ASNA1 |
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| ATP10D |
| ATP8 |
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| ATP8A2 |
| ATP8B1 |
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| FOLR2 |

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| NPC2 |
| PCTP |

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| RHBG |
| RHCG |
| SFXN1 |
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| SFXN3 |
| SFXN4 |
| SFXN5 |
| SPNS1 |
| STAR |
| STARD10 |
| STARD13 |
| STARD3 |
| STARD3NL |
| STARD4 |
| STARD5 |
| STARD6 |
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| STARD8 |
| STARD9 |
| SV2A |
| SV2B |
| SV2C |
| SVOP |
| CERK |

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| CERKL |
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| DEGS2 |
| GALC |
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| LASS2 |
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| LASS4 |
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| LASS6 |
| SGMS1 |
| SGMS2 |
| SGPL1 |
| SGPP1 |
| SGPP2 |
| SMPD1 |
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| SMPD3 |
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| SMPDL3A |
| SMPDL3B |
| SPHK1 |
| SPHK2 |
| SPTLC1 |
| SPTLC2 |

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| SPTLC3 |
| UGCG |
| UGCGL1 |
| UGCGL2 |
| UGT8 |
| ACER1 |
| ACER2 |
| ACER3 |
| ASAH1 |
| ASAH2 |
| ASAH2B |
| ASAH2C |
| ASAHL |
| KDSR |
| AKR1C4 |
| AKR1D1 |
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| CYP11A1 |
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| CYP1A2 |
| CYP1B1 |

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| CYP2C9 |
| CYP2D6 |
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| CYP2F1 |
| CYP2J2 |
| CYP2R1 |
| CYP2S1 |
| CYP2U1 |
| CYP2W1 |
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| CYP46A1 |
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| HSD3B1 |
| HSD3B2 |
| HSDL1 |
| HSDL2 |
| KL |
| KLB |
| LIPA |
| LIPE |
| SOAT1 |
| SOAT2 |
| SRD5A1 |

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| SRD5A3 |
| AGK |
| AGL |
| AMY1A |
| AMY1B |
| AMY1C |
| AMY2A |
| AMY2B |
| C9ORF103 |
| CRYL1 |
| FPGT |
| FUK |
| GAA |
| GALK1 |
| GALK2 |
| GALM |
| GALT |
| GFOD1 |
| GFOD2 |
| GLYCTK |
| GMDS |
| GMPPA |
| GMPPB |

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| GRHPR |
| H6PD |
| HYI |
| KHK |
| LALBA |
| LCT |
| LCTL |
| MGAM |
| MPI |
| PMM1 |
| PMM2 |
| PYGB |
| PYGL |
| PYGM |
| RBKS |
| SI |
| SIAE |
| SORD |
| TREH |
| TSTA3 |
| DSE |
| DSEL |
| GALNAC4S-6ST |
| MPST |
| PAPSS1 |

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| PAPSS2 |
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| SULT2A1 |
| SULT2B1 |
| SULT4A1 |
| SULT6B1 |
| TST |
| ACMSD |
| AFMID |
| HAAO |
| IDO1 |
| IDO2 |
| INMT |
| KMO |
| KYNU |

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| TDO2 |
| FAH |
| FAHD1 |
| FAHD2A |
| FAHD2B |
| HGD |
| HPD |
| HPDL |
| PAH |
| TAT |
| CABC1 |
| COQ10A |
| COQ10B |
| COQ2 |
| COQ3 |
| COQ4 |
| COQ5 |
| COQ6 |
| COQ7 |
| COQ9 |
| PDSS1 |
| PDSS2 |
| SQRDL |
| AGMAT |
| ARG1 |

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| ARG2 |
| ASL |
| ASS1 |
| CPS1 |
| OTC |
| BCM01 |
| BCO2 |
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| CYP26C1 |
| LRAT |
| RDH10 |
| RDH11 |
| RDH12 |
| RDH13 |
| RDH14 |
| RDH16 |
| RDH5 |
| RDH8 |
| RETSAT |
| RPE65 |
| SDR16C5 |
| PDXK |
| PDXP |
| PHOSPH02 |

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| PNPO |
| DCXR |
| XYLB |