**S6 Table. Gene essentiality information of Reaction Gene combinations in *Leishmania major* predicted using our proposed pipeline**

|  |
| --- |
| **Abbreviation** |
| E, Essential gene |
| N, Non-essential gene |
| UD, Undetermined (Not Known) |

#Experimental Gene Essentiality Information ( Jones,N.G. et al. (2018) ACS Infect. Dis., 4, 467–477.)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **GeneReaction** | **Experiment#** | **Predicted** |  | **GeneReaction** | **Experiment#** | **Predicted** |  | **GeneReaction** | **Experiment#** | **Predicted** |
| MTHFD|LmjF.26.0320 | E | E | ACOAD8m|LmjF.27.0930 | UD | N | FACOAL180|LmjF.01.0510 | UD | N |
| DHFOR2|LmjF.06.0860 | E | E | ACOAD9m|LmjF.06.0880 | UD | N | FACOAL181|LmjF.13.0420 | UD | N |
| DHFOR2a|LmjF.06.0860 | E | E | ACOAD9m|LmjF.28.2510 | UD | N | FACOAL181|LmjF.03.0230 | UD | N |
| DHFR|LmjF.06.0860 | E | E | ACODA|LmjF.07.0270 | UD | N | FACOAL181|LmjF.01.0530 | UD | N |
| DHFRa|LmjF.06.0860 | E | E | ACODA|LmjF.20.1560 | UD | N | FACOAL181|LmjF.01.0490 | UD | N |
| ADNCYC|LmjF.28.0090 | E | E | ACODA|LmjF.30.1380 | UD | N | FACOAL181|LmjF.01.0510 | UD | N |
| GUACYC|LmjF.28.0090 | E | E | ACODA|LmjF.31.1810 | UD | N | FACOAL181|LmjF.01.0470 | UD | N |
| MTHFC|LmjF.26.0320 | E | E | ACODA|LmjF.20.1550 | UD | N | FACOAL181|LmjF.01.0520 | UD | N |
| PIN3K\_LM|LmjF.34.4530 | E | E | ACODA|LmjF.20.1570 | UD | N | FACOAL181|LmjF.01.0500 | UD | N |
| THFOAi|LmjF.06.0860 | E | E | ACODA|LmjF.31.1130 | UD | N | FACOAL182|LmjF.01.0520 | UD | N |
| THFOCi|LmjF.06.0860 | E | E | ACONTm|LmjF.18.0510 | UD | N | FACOAL182|LmjF.01.0510 | UD | N |
| TMDS|LmjF.06.0860 | E | E | ACS2m|LmjF.23.0710 | UD | N | FACOAL182|LmjF.01.0470 | UD | N |
| TRYR|LmjF.05.0350 | E | E | ACS2m|LmjF.23.0540 | UD | N | FACOAL182|LmjF.01.0500 | UD | N |
| TYRTRS|LmjF.14.1370 | E | E | ACSm|LmjF.23.0710 | UD | N | FACOAL182|LmjF.13.0420 | UD | N |
| TYRTRS|LmjF.14.1370 | E | E | ACSm|LmjF.23.0540 | UD | N | FACOAL182|LmjF.01.0490 | UD | N |
| NDPKn5|LmjF.32.2950 | UD | E | ADA|LmjF.35.2160 | UD | N | FACOAL182|LmjF.03.0230 | UD | N |
| NDPKn6|LmjF.35.3870 | UD | E | ADA|LmjF.33.0235 | UD | N | FACOAL182|LmjF.01.0530 | UD | N |
| NDPKn6|LmjF.32.2950 | UD | E | ADAer|LmjF.33.0235 | UD | N | FACOAL2|LmjF.01.0520 | UD | N |
| NDPKn7|LmjF.32.2950 | UD | E | ADAer|LmjF.35.2160 | UD | N | FACOAL2|LmjF.01.0470 | UD | N |
| NDPKn7|LmjF.35.3870 | UD | E | ADAg|LmjF.35.2160 | UD | N | FACOAL2|LmjF.01.0510 | UD | N |
| NDPKn8|LmjF.32.2950 | UD | E | ADAg|LmjF.33.0235 | UD | N | FACOAL2|LmjF.01.0500 | UD | N |
| NDPKn8|LmjF.35.3870 | UD | E | ADAm|LmjF.33.0235 | UD | N | FACOAL2|LmjF.01.0490 | UD | N |
| NDPKn9|LmjF.35.3870 | UD | E | ADAm|LmjF.35.2160 | UD | N | FACOAL2|LmjF.03.0230 | UD | N |
| NDPKn9|LmjF.32.2950 | UD | E | ADK1|LmjF.34.0110 | UD | N | FACOAL2|LmjF.01.0530 | UD | N |
| NICRNTK|LmjF.29.2150 | UD | E | ADK1|LmjF.34.0120 | UD | N | FACOAL2|LmjF.13.0420 | UD | N |
| NICRNTK|LmjF.30.0600 | UD | E | ADK1|LmjF.04.0960 | UD | N | FAS100COAr|LmjF.14.0640 | UD | N |
| NICRNTK|LmjF.30.0370 | UD | E | ADK1f|LmjF.21.1250 | UD | N | FAS100COAr|LmjF.14.0650 | UD | N |
| NICRNTK|LmjF.32.1810 | UD | E | ADK1f|LmjF.16.0020 | UD | N | FAS100COAr|LmjF.14.0660 | UD | N |
| NICRNTK|LmjF.07.0170 | UD | E | ADK1g|LmjF.36.1360 | UD | N | FAS120COAr|LmjF.14.0670 | UD | N |
| NICRNTK|LmjF.11.0250 | UD | E | ADK1g|LmjF.25.2370 | UD | N | FAS140COAr|LmjF.14.0670 | UD | N |
| NICRNTK|LmjF.27.0100 | UD | E | ADMDCi|LmjF.30.3120 | UD | N | FAS160COAr|LmjF.14.0680 | UD | N |
| NICRNTK|LmjF.13.0780 | UD | E | ADMDCi|LmjF.30.3110 | UD | N | FAS160COAr|LmjF.14.0700 | UD | N |
| NICRNTK|LmjF.36.4250 | UD | E | ADNCYC|LmjF.17.0190 | UD | N | FAS160COAr|LmjF.14.0705 | UD | N |
| NO3R|LmjF.30.0610 | UD | E | ADNCYC|LmjF.17.0235 | UD | N | FAS160COAr|LmjF.14.0690 | UD | N |
| NPHPPH|LmjF.31.2340 | UD | E | ADNCYC|LmjF.05.1220 | UD | N | FAS180COAr|LmjF.14.0705 | UD | N |
| NPHPPH|LmjF.31.2340 | UD | E | ADNCYC|LmjF.17.0237 | UD | N | FAS180COAr|LmjF.14.0690 | UD | N |
| NTRLASE|LmjF.26.2280 | UD | E | ADNCYC|LmjF.17.0230 | UD | N | FAS180COAr|LmjF.14.0680 | UD | N |
| NTRLASE|LmjF.26.2280 | UD | E | ADNCYC|LmjF.36.3180 | UD | N | FAS180COAr|LmjF.14.0700 | UD | N |
| NTRLASE4|LmjF.26.2280 | UD | E | ADNCYC|LmjF.17.0200 | UD | N | FAS203COA|LmjF.32.1160 | UD | N |
| NTRLASE4|LmjF.26.2280 | UD | E | ADNK1c|LmjF.34.3600 | UD | N | FAS204COA|LmjF.32.1160 | UD | N |
| OCCOADm|LmjF.28.2510 | UD | E | ADNK1c|LmjF.30.0890 | UD | N | FAS224COA|LmjF.05.1170 | UD | N |
| OCCOADm|LmjF.06.0880 | UD | E | ADNK1c|LmjF.30.0880 | UD | N | FAS224COAr|LmjF.14.0710 | UD | N |
| OCDMAT8m|LmjF.05.0520 | UD | E | ADNK1er|LmjF.30.0890 | UD | N | FAS224COAr|LmjF.14.0740 | UD | N |
| OCMAT3m|LmjF.05.0520 | UD | E | ADNK1er|LmjF.30.0880 | UD | N | FAS224COAr|LmjF.14.0730 | UD | N |
| OCOAT1r\_m|LmjF.33.2340 | UD | E | ADNK1er|LmjF.34.3600 | UD | N | FAS224COAr|LmjF.14.0720 | UD | N |
| OCOAT1r\_m|LmjF.30.1930 | UD | E | ADNK1g|LmjF.34.3600 | UD | N | FAS225COA|LmjF.05.1170 | UD | N |
| OCOAT1r\_m|LmjF.30.1940 | UD | E | ADNK1g|LmjF.30.0890 | UD | N | FAS60COAr|LmjF.14.0660 | UD | N |
| ODH1mi|LmjF.21.1430 | UD | E | ADNK1g|LmjF.30.0880 | UD | N | FAS60COAr|LmjF.14.0650 | UD | N |
| ODH2mi|LmjF.21.1430 | UD | E | ADNK1m|LmjF.30.0890 | UD | N | FAS60COAr|LmjF.14.0640 | UD | N |
| ODHmi|LmjF.21.1430 | UD | E | ADNK1m|LmjF.30.0880 | UD | N | FAS80COAr|LmjF.14.0650 | UD | N |
| OHPHM|LmjF.35.4250 | UD | E | ADNK1m|LmjF.34.3600 | UD | N | FAS80COAr|LmjF.14.0660 | UD | N |
| OMPDCg|LmjF.16.0550 | UD | E | ADPT2|LmjF.26.0140 | UD | N | FAS80COAr|LmjF.14.0640 | UD | N |
| ORNDC|LmjF.12.0280 | UD | E | ADPTr|LmjF.26.0140 | UD | N | FBAg|LmjF.36.1260 | UD | N |
| ORPTg|LmjF.16.0550 | UD | E | ADSL1r|LmjF.04.0460 | UD | N | FBP26|LmjF.36.0150 | UD | N |
| P5CDm\_i|LmjF.03.0200 | UD | E | ADSL2r|LmjF.04.0460 | UD | N | FBP26|LmjF.07.0760 | UD | N |
| P5CDr|LmjF.03.0200 | UD | E | ADSS\_i|LmjF.13.1190 | UD | N | FCLT|LmjF.17.1460 | UD | N |
| P5CRr|LmjF.13.1680 | UD | E | AGDC|LmjF.36.0040 | UD | N | FERCOAL|LmjF.19.0985 | UD | N |
| P5CRrm|LmjF.13.1680 | UD | E | AGMT|LmjF.23.0070 | UD | N | FERCOAL|LmjF.19.1005 | UD | N |
| PAPA\_LM|LmjF.19.1350 | UD | E | AGPATi\_LM|LmjF.32.1960 | UD | N | FRDg|LmjF.35.1180 | UD | N |
| PAPA\_LM|LmjF.18.0440 | UD | E | AGPATim\_LM|LmjF.32.1960 | UD | N | FRDm|LmjF.35.1190 | UD | N |
| PAPAm\_LM|LmjF.19.1350 | UD | E | AHC|LmjF.36.3910 | UD | N | FRDm|LmjF.35.0830 | UD | N |
| PAPAm\_LM|LmjF.18.0440 | UD | E | AHSERL2|LmjF.35.3230 | UD | N | FTHFLr|LmjF.30.2600 | UD | N |
| PDHe1|LmjF.18.1380 | UD | E | AHSERL5i|LmjF.36.3590 | UD | N | FUMg|LmjF.29.1960 | UD | N |
| PDHe1|LmjF.35.0050 | UD | E | AKAGPP\_LM|LmjF.19.1350 | UD | N | FUMm|LmjF.24.0320 | UD | N |
| PDHe1|LmjF.25.1710 | UD | E | AKAGPP\_LM|LmjF.18.0440 | UD | N | G3PDcm|LmjF.28.0240 | UD | N |
| PDHe2|LmjF.36.2660 | UD | E | AKGDE1B|LmjF.36.3470 | UD | N | G3PDcm|LmjF.20.0430 | UD | N |
| PDHe2|LmjF.21.0550 | UD | E | AKGDE1B|LmjF.27.0880 | UD | N | G3PDg|LmjF.10.0510 | UD | N |
| PDHe3|LmjF.31.2650 | UD | E | AKGDE2B|LmjF.28.2420 | UD | N | G5SDr|LmjF.32.3140 | UD | N |
| PDHe3|LmjF.32.3310 | UD | E | AKGDe1|LmjF.36.3470 | UD | N | G6PDAr|LmjF.32.3260 | UD | N |
| PDHe3|LmjF.29.1830 | UD | E | AKGDe1|LmjF.27.0880 | UD | N | G6PDH1|LmjF.34.0080 | UD | N |
| PDHe3|LmjF.31.2640 | UD | E | AKGDe2|LmjF.28.2420 | UD | N | G6PDHg|LmjF.34.0080 | UD | N |
| PDHe3|LmjF.31.2640 | UD | E | ALAR|LmjF.23.1480 | UD | N | GALKx|LmjF.35.2740 | UD | N |
| PETOHM\_LM|LmjF.31.2290 | UD | E | ALATA\_L|LmjF.12.0630 | UD | N | GALS3a|LmjF.18.0090 | UD | N |
| PETOHMm\_LM|LmjF.31.2290 | UD | E | ALATA\_Lm|LmjF.12.0630 | UD | N | GAPD|LmjF.35.4750 | UD | N |
| PFK26|LmjF.03.0800 | UD | E | ALATRSi|LmjF.22.1540 | UD | N | GAPDg|LmjF.36.2350 | UD | N |
| PFK26|LmjF.26.0310 | UD | E | ALA\_Dt6|LmjF.22.0230 | UD | N | GAPDg|LmjF.30.2980 | UD | N |
| PFKg|LmjF.29.2510 | UD | E | ALA\_Dt6|LmjF.14.0320 | UD | N | GAPDg|LmjF.30.2970 | UD | N |
| PGCDr|LmjF.03.0030 | UD | E | ALA\_Dt6|LmjF.27.0670 | UD | N | GCCa|LmjF.26.0030 | UD | N |
| PGDH|LmjF.35.3340 | UD | E | ALA\_Dt6|LmjF.11.0520 | UD | N | GCCb|LmjF.36.3800 | UD | N |
| PGI1|LmjF.12.0530 | UD | E | ALA\_Lt6|LmjF.11.0520 | UD | N | GCCb|LmjF.36.3810 | UD | N |
| PGI2|LmjF.12.0530 | UD | E | ALA\_Lt6|LmjF.22.0230 | UD | N | GCCbm|LmjF.36.3800 | UD | N |
| PGI3|LmjF.12.0530 | UD | E | ALA\_Lt6|LmjF.14.0320 | UD | N | GCCbm|LmjF.36.3810 | UD | N |
| PGK|LmjF.20.0110 | UD | E | ALA\_Lt6|LmjF.27.0670 | UD | N | GHMT|LmjF.14.1320 | UD | N |
| PGK|LmjF.20.0110 | UD | E | ALCD19|LmjF.23.0360 | UD | N | GHMT|LmjF.28.2370 | UD | N |
| PGK|LmjF.20.0100 | UD | E | ALCD19|LmjF.30.2090 | UD | N | GK1|LmjF.36.2260 | UD | N |
| PGK|LmjF.30.3380 | UD | E | ALCD3|LmjF.23.0360 | UD | N | GK1|LmjF.33.1090 | UD | N |
| PGKg|LmjF.20.0100 | UD | E | ALDD19m|LmjF.25.1120 | UD | N | GK1er|LmjF.33.1090 | UD | N |
| PGKg|LmjF.30.3380 | UD | E | ALDD20m|LmjF.25.1120 | UD | N | GK1er|LmjF.36.2260 | UD | N |
| PGKg|LmjF.20.0110 | UD | E | ALDD2xm|LmjF.25.1120 | UD | N | GLCAt2|LmjF.33.0290 | UD | N |
| PGKg|LmjF.20.0110 | UD | E | ALDD32m|LmjF.25.1120 | UD | N | GLCAt2|LmjF.36.6280 | UD | N |
| PGL|LmjF.26.2700 | UD | E | ALDD4xm|LmjF.25.1120 | UD | N | GLCAt2|LmjF.36.6290 | UD | N |
| PGLg|LmjF.26.2700 | UD | E | ALDD6xm|LmjF.25.1120 | UD | N | GLCAt2|LmjF.36.6300 | UD | N |
| PGM|LmjF.33.2110 | UD | E | ALDD8xr\_m|LmjF.25.1120 | UD | N | GLCBt2|LmjF.36.6300 | UD | N |
| PGM|LmjF.36.4070 | UD | E | ALDOXm|LmjF.25.1120 | UD | N | GLCBt2|LmjF.36.6290 | UD | N |
| PGM|LmjF.28.2220 | UD | E | ALDR|LmjF.31.2880 | UD | N | GLCBt2|LmjF.36.6280 | UD | N |
| PGM|LmjF.36.6650 | UD | E | AMPDg|LmjF.13.0980 | UD | N | GLCBt2|LmjF.33.0290 | UD | N |
| PGM|LmjF.08.0060 | UD | E | AMPDg|LmjF.32.2550 | UD | N | GLNS\_i|LmjF.06.0370 | UD | N |
| PGMT|LmjF.21.0640 | UD | E | AMPDg|LmjF.04.0280 | UD | N | GLNTRS|LmjF.15.1440 | UD | N |
| PHCYT\_LM|LmjF.26.1620 | UD | E | AMPDg|LmjF.35.4800 | UD | N | GLNTRSm\_i|LmjF.15.1440 | UD | N |
| PHCYTm\_LM|LmjF.26.1620 | UD | E | APIND|LmjF.27.0090 | UD | N | GLNt|LmjF.27.0670 | UD | N |
| PHETA1|LmjF.35.0820 | UD | E | APINM|LmjF.27.0090 | UD | N | GLNt|LmjF.14.0320 | UD | N |
| PHETA1|LmjF.36.2360 | UD | E | APase|LmjF.25.1960 | UD | N | GLNt|LmjF.22.0230 | UD | N |
| PHETA1m|LmjF.24.0370 | UD | E | ARGNg|LmjF.35.1480 | UD | N | GLNt|LmjF.11.0520 | UD | N |
| PHETRS|LmjF.32.0870 | UD | E | ARGSSr|LmjF.23.0260 | UD | N | GLU5K|LmjF.26.2710 | UD | N |
| PHETRS|LmjF.19.1040 | UD | E | ARGTRS|LmjF.27.1310 | UD | N | GLUCYSL|LmjF.18.1660 | UD | N |
| PHEt6|LmjF.22.0230 | UD | E | ARGt|LmjF.14.0320 | UD | N | GLUDx [m]|LmjF.15.1010 | UD | N |
| PHEt6|LmjF.14.0320 | UD | E | ARGt|LmjF.22.0230 | UD | N | GLUDy|LmjF.28.2910 | UD | N |
| PHEt6|LmjF.27.0670 | UD | E | ARGt|LmjF.27.0670 | UD | N | GLUKg|LmjF.36.2320 | UD | N |
| PHEt6|LmjF.11.0520 | UD | E | ARGt|LmjF.11.0520 | UD | N | GLUKg|LmjF.21.0250 | UD | N |
| PI45BPP\_LM|LmjF.35.0040 | UD | E | ARMT|LmjF.12.1270 | UD | N | GLUKg|LmjF.21.0240 | UD | N |
| PI45BPP\_LM|LmjF.30.2950 | UD | E | ARMT|LmjF.03.0600 | UD | N | GLUTRS|LmjF.30.3240 | UD | N |
| PI4P5K\_LM|LmjF.34.3090 | UD | E | ASAT|LmjF.31.1780 | UD | N | GLUTRSm|LmjF.30.3240 | UD | N |
| PIN3K\_LM|LmjF.24.2010 | UD | E | ASCBPm|LmjF.34.0070 | UD | N | GLUt6|LmjF.11.0520 | UD | N |
| PIN3K\_LM|LmjF.02.0120 | UD | E | ASNN|LmjF.15.0390 | UD | N | GLUt6|LmjF.27.0670 | UD | N |
| PIN3K\_LM|LmjF.20.1120 | UD | E | ASNNg|LmjF.36.4430 | UD | N | GLUt6|LmjF.14.0320 | UD | N |
| PIN3K\_LM|LmjF.30.1850 | UD | E | ASNS3|LmjF.26.0830 | UD | N | GLUt6|LmjF.22.0230 | UD | N |
| PIN3K\_LM|LmjF.34.3940 | UD | E | ASNTRS|LmjF.34.2340 | UD | N | GLYCKr|LmjF.02.0500 | UD | N |
| PIN4K\_LM|LmjF.34.3590 | UD | E | ASNTRS|LmjF.34.2340 | UD | N | GLYKg|LmjF.35.3080 | UD | N |
| PINOS\_LM|LmjF.26.2480 | UD | E | ASNt6|LmjF.11.0520 | UD | N | GLYOX1|LmjF.12.0220 | UD | N |
| PIt6|LmjF.03.0500 | UD | E | ASNt6|LmjF.14.0320 | UD | N | GLYPATm|LmjF.25.0020 | UD | N |
| PIt6|LmjF.10.0030 | UD | E | ASNt6|LmjF.22.0230 | UD | N | GLYPATm|LmjF.05.0180 | UD | N |
| PIt6|LmjF.10.1300 | UD | E | ASNt6|LmjF.27.0670 | UD | N | GLYPHATm|LmjF.05.0180 | UD | N |
| PItm|LmjF.05.0290 | UD | E | ASPCT|LmjF.16.0540 | UD | N | GLYPHATm|LmjF.25.0020 | UD | N |
| PItm|LmjF.35.4420 | UD | E | ASPTA1|LmjF.35.0820 | UD | N | GLYTRS|LmjF.36.3840 | UD | N |
| PItm|LmjF.35.4430 | UD | E | ASPTA1m|LmjF.24.0370 | UD | N | GLYt6|LmjF.14.0320 | UD | N |
| PLAc\_LM|LmjF.35.3020 | UD | E | ASPTA3|LmjF.35.0820 | UD | N | GLYt6|LmjF.22.0230 | UD | N |
| PLAe\_LM|LmjF.35.3020 | UD | E | ASPTA4|LmjF.35.0820 | UD | N | GLYt6|LmjF.27.0670 | UD | N |
| PMANM|LmjF.36.1960 | UD | E | ASPTA5m|LmjF.24.0370 | UD | N | GLYt6|LmjF.11.0520 | UD | N |
| PMANMg|LmjF.34.3780 | UD | E | ASPTRS|LmjF.21.0895 | UD | N | GMPS2|LmjF.22.0110 | UD | N |
| PMETM\_LM|LmjF.31.3120 | UD | E | ASPTRS|LmjF.30.0460 | UD | N | GPAM\_LM|LmjF.34.1090 | UD | N |
| PMETMm\_LM|LmjF.31.3120 | UD | E | ASPt6|LmjF.14.0320 | UD | N | GPAMm\_LM|LmjF.34.1090 | UD | N |
| PMEVK|LmjF.15.1460 | UD | E | ASPt6|LmjF.22.0230 | UD | N | GPDDA1|LmjF.28.2100 | UD | N |
| PMEVKx|LmjF.15.1460 | UD | E | ASPt6|LmjF.27.0670 | UD | N | GPDDA1|LmjF.36.5960 | UD | N |
| PNS1|LmjF.29.2800 | UD | E | ASPt6|LmjF.11.0520 | UD | N | GPDDA2|LmjF.36.5960 | UD | N |
| PNS2|LmjF.29.2800 | UD | E | ATPM|LmjF.36.4630 | UD | N | GPDDA2|LmjF.28.2100 | UD | N |
| PNS3|LmjF.29.2800 | UD | E | ATPS|LmjF.18.1510 | UD | N | GRTT|LmjF.22.1360 | UD | N |
| PNS4|LmjF.29.2800 | UD | E | ATPS|LmjF.18.1520 | UD | N | GRTTx|LmjF.22.1360 | UD | N |
| PNTK|LmjF.28.0140 | UD | E | ATPS3v|LmjF.18.0560 | UD | N | GSADHm|LmjF.03.0200 | UD | N |
| PNTK2|LmjF.28.0140 | UD | E | ATPS3v|LmjF.23.0340 | UD | N | GTHP|LmjF.26.0810 | UD | N |
| PPA|LmjF.03.0910 | UD | E | ATPS3v|LmjF.30.3660 | UD | N | GTHP|LmjF.26.0820 | UD | N |
| PPA\_1|LmjF.31.1220 | UD | E | ATPS3v|LmjF.35.0700 | UD | N | GTHP|LmjF.36.3010 | UD | N |
| PPA\_1v|LmjF.11.0210 | UD | E | ATPS3v|LmjF.21.1800 | UD | N | GTHP|LmjF.26.0800 | UD | N |
| PPCDC|LmjF.30.1540 | UD | E | ATPS3v|LmjF.21.1790 | UD | N | GTHPm|LmjF.26.0820 | UD | N |
| PPCKg|LmjF.27.1805 | UD | E | ATPS3v|LmjF.21.1340 | UD | N | GTHPm|LmjF.26.0810 | UD | N |
| PPCKg|LmjF.27.1810 | UD | E | ATPS3v|LmjF.23.1510 | UD | N | GTHPm|LmjF.26.0800 | UD | N |
| PPCOACm|LmjF.28.0490 | UD | E | ATPS3v|LmjF.28.2430 | UD | N | GTHPm|LmjF.36.3010 | UD | N |
| PPCOACm|LmjF.01.0050 | UD | E | ATPS3v|LmjF.34.3670 | UD | N | GTHPx|LmjF.36.3010 | UD | N |
| PPDKg|LmjF.11.1000 | UD | E | ATPS3v|LmjF.05.1140 | UD | N | GTHPx|LmjF.26.0800 | UD | N |
| PPPGO|LmjF.06.1280 | UD | E | ATPS3v|LmjF.36.3100 | UD | N | GTHPx|LmjF.26.0820 | UD | N |
| PROTRS|LmjF.18.1210 | UD | E | ATPS3v|LmjF.12.0520 | UD | N | GTHPx|LmjF.26.0810 | UD | N |
| PROt6|LmjF.27.0670 | UD | E | ATPS3v|LmjF.28.1160 | UD | N | GTHS|LmjF.14.0910 | UD | N |
| PROt6|LmjF.22.0230 | UD | E | ATPS3v|LmjF.23.0130 | UD | N | GUACYC|LmjF.17.0190 | UD | N |
| PROt6|LmjF.14.0320 | UD | E | ATPSm|LmjF.30.3600 | UD | N | GUACYC|LmjF.05.1220 | UD | N |
| PROt6|LmjF.11.0520 | UD | E | ATPSm|LmjF.25.1180 | UD | N | GUACYC|LmjF.17.0235 | UD | N |
| PRPPSi|LmjF.08.0510 | UD | E | ATPSm|LmjF.25.1170 | UD | N | GUACYC|LmjF.17.0230 | UD | N |
| PRPPSi|LmjF.08.1130 | UD | E | ATPSm|LmjF.21.1770 | UD | N | GUACYC|LmjF.17.0237 | UD | N |
| PRPPSig|LmjF.36.5390 | UD | E | ATPSm|LmjF.05.0500 | UD | N | GUACYC|LmjF.36.3180 | UD | N |
| PRPPSig|LmjF.33.1930 | UD | E | ATPSm|LmjF.21.0740 | UD | N | GUACYC|LmjF.17.0200 | UD | N |
| PSD\_LM|LmjF.35.4590 | UD | E | ATPSm|LmjF.24.0630 | UD | N | GUAD|LmjF.29.0867 | UD | N |
| PSDm\_LM|LmjF.35.4590 | UD | E | ATPSm|LmjF.05.0510 | UD | N | GUAPRTr|LmjF.26.0140 | UD | N |
| PSUDS|LmjF.26.0420 | UD | E | ATPSm|LmjF.26.0460 | UD | N | H3MS|LmjF.36.5360 | UD | N |
| PSUDS|LmjF.36.1660 | UD | E | BNZPPH|LmjF.25.1960 | UD | N | H3MS2m|LmjF.29.2350 | UD | N |
| PSUDS|LmjF.30.1550 | UD | E | BTCOADm|LmjF.06.0880 | UD | N | HACD1m|LmjF.36.1140 | UD | N |
| PTHK|LmjF.28.0140 | UD | E | BTCOADm|LmjF.28.2510 | UD | N | HACD1m|LmjF.26.1550 | UD | N |
| PTROPACE|LmjF.25.0020 | UD | E | BTMAT1m|LmjF.05.0520 | UD | N | HACD2m|LmjF.36.1140 | UD | N |
| PTROPACE|LmjF.05.0180 | UD | E | BTNL1|LmjF.31.1070 | UD | N | HACD2m|LmjF.26.1550 | UD | N |
| PUNP8I|LmjF.29.2800 | UD | E | C14STRr|LmjF.32.2320 | UD | N | HACD3m|LmjF.36.1140 | UD | N |
| PYDAMK|LmjF.30.1250 | UD | E | C24STRer|LmjF.33.0680 | UD | N | HACD3m|LmjF.26.1550 | UD | N |
| PYDXK|LmjF.30.1250 | UD | E | C3STDH1r|LmjF.06.0350 | UD | N | HACD4m|LmjF.36.1140 | UD | N |
| PYDXNK|LmjF.30.1250 | UD | E | C3STDH2r|LmjF.06.0350 | UD | N | HACD4m|LmjF.26.1550 | UD | N |
| PYK|LmjF.35.0020 | UD | E | C4STMO1r|LmjF.36.2540 | UD | N | HACD5m|LmjF.36.1140 | UD | N |
| PYK|LmjF.35.0030 | UD | E | C4STMO2r|LmjF.36.2540 | UD | N | HACD5m|LmjF.26.1550 | UD | N |
| PYRZAMn|LmjF.26.0210 | UD | E | C5STDSr|LmjF.31.0590 | UD | N | HACD6m|LmjF.26.1550 | UD | N |
| PYRZAMn|LmjF.34.2140 | UD | E | C8STIr|LmjF.29.2140 | UD | N | HACD6m|LmjF.36.1140 | UD | N |
| RAFFH|LmjF.23.0870 | UD | E | CA2abc|LmjF.04.0010 | UD | N | HACD7m|LmjF.26.1550 | UD | N |
| RAFFH|LmjF.27.2340 | UD | E | CDAL|LmjF.16.0590 | UD | N | HACD7m|LmjF.36.1140 | UD | N |
| RAFFH|LmjF.23.0880 | UD | E | CDGPTm\_LM|LmjF.07.0200 | UD | N | HACD8m|LmjF.36.1140 | UD | N |
| RAFFH|LmjF.04.0310 | UD | E | CDPDSP\_LM|LmjF.14.1200 | UD | N | HACD8m|LmjF.26.1550 | UD | N |
| RBK\_Dg|LmjF.36.0060 | UD | E | CDPDSPm\_LM|LmjF.14.1200 | UD | N | HACD9g|LmjF.24.2030 | UD | N |
| RBLKg|LmjF.36.0060 | UD | E | CHLPCTD|LmjF.18.1330 | UD | N | HACD9g|LmjF.33.2600 | UD | N |
| RNDR1(n)|LmjF.28.0890 | UD | E | CHLSTIr|LmjF.16.1340 | UD | N | HACD9m|LmjF.26.1550 | UD | N |
| RNDR1(n)|LmjF.27.2050 | UD | E | CHOLK|LmjF.35.1470 | UD | N | HACD9m|LmjF.36.1140 | UD | N |
| RNDR1(n)|LmjF.22.1290 | UD | E | CLPNSm\_LM|LmjF.34.2110 | UD | N | HACOADm|LmjF.26.1550 | UD | N |
| RNDR2(n)|LmjF.28.0890 | UD | E | CPPPGO|LmjF.06.1270 | UD | N | HACOADm|LmjF.36.1140 | UD | N |
| RNDR2(n)|LmjF.27.2050 | UD | E | CSm|LmjF.18.0680 | UD | N | HBCOADm|LmjF.36.1140 | UD | N |
| RNDR2(n)|LmjF.22.1290 | UD | E | CSm|LmjF.18.0670 | UD | N | HBCOAE|LmjF.26.1550 | UD | N |
| RNDR3(n)|LmjF.28.0890 | UD | E | CTL2|LmjF.14.0460 | UD | N | HBUR1m|LmjF.24.2030 | UD | N |
| RNDR3(n)|LmjF.27.2050 | UD | E | CTL2|LmjF.32.2640 | UD | N | HBUR1m|LmjF.27.2440 | UD | N |
| RNDR3(n)|LmjF.22.1290 | UD | E | CTL2|LmjF.32.2640 | UD | N | HCYSMT|LmjF.36.6310 | UD | N |
| RNDR4(n)|LmjF.22.1290 | UD | E | CTPS1n|LmjF.20.0560 | UD | N | HDCOADm|LmjF.06.0880 | UD | N |
| RNDR4(n)|LmjF.28.0890 | UD | E | CTPS2n|LmjF.20.0560 | UD | N | HDCOADm|LmjF.28.2510 | UD | N |
| RNDR4(n)|LmjF.27.2050 | UD | E | CYOO6m|LmjF.28.2680 | UD | N | HDDR5m|LmjF.24.2030 | UD | N |
| RPE|LmjF.33.1570 | UD | E | CYOO6m|LmjF.31.1570 | UD | N | HDDR5m|LmjF.27.2440 | UD | N |
| RPEg|LmjF.35.3680 | UD | E | CYOO6m|LmjF.12.0670 | UD | N | HDER4m|LmjF.24.2030 | UD | N |
| RPI|LmjF.28.1970 | UD | E | CYOO6m|LmjF.04.1130 | UD | N | HDER4m|LmjF.27.2440 | UD | N |
| S6PFH|LmjF.23.0870 | UD | E | CYOO6m|LmjF.03.0100 | UD | N | HDMAT7m|LmjF.05.0520 | UD | N |
| S6PFH|LmjF.27.2340 | UD | E | CYOO6m|LmjF.26.1710 | UD | N | HEMAT2m|LmjF.05.0520 | UD | N |
| S6PFH|LmjF.23.0880 | UD | E | CYOO6m|LmjF.25.1130 | UD | N | HEMEASm|LmjF.28.2680 | UD | N |
| S6PFH|LmjF.04.0310 | UD | E | CYOO6m|LmjF.36.6995 | UD | N | HEMEOSm|LmjF.23.1520 | UD | N |
| SAM24MTr|LmjF.36.2380 | UD | E | CYOO6m|LmjF.20.0840 | UD | N | HEX4g|LmjF.21.0250 | UD | N |
| SBPP1r|LmjF.32.2290 | UD | E | CYOO6m|LmjF.03.0740 | UD | N | HEX4g|LmjF.21.0240 | UD | N |
| SBPP3|LmjF.19.1350 | UD | E | CYOO6m|LmjF.23.0370 | UD | N | HEX7g|LmjF.21.0240 | UD | N |
| SBPP3|LmjF.18.0440 | UD | E | CYOO6m|LmjF.21.1710 | UD | N | HEX7g|LmjF.21.0250 | UD | N |
| SBTD\_D|LmjF.33.0520 | UD | E | CYOR\_u6m|LmjF.35.1380 | UD | N | HEXg|LmjF.36.2320 | UD | N |
| SERAT|LmjF.34.2850 | UD | E | CYOR\_u6m|LmjF.07.0060 | UD | N | HEXg|LmjF.21.0250 | UD | N |
| SERTRS|LmjF.11.0100 | UD | E | CYOR\_u6m|LmjF.35.1540 | UD | N | HEXg|LmjF.21.0240 | UD | N |
| SERt6|LmjF.11.0520 | UD | E | CYOR\_u6m|LmjF.31.2580 | UD | N | HHDR7m|LmjF.24.2030 | UD | N |
| SERt6|LmjF.22.0230 | UD | E | CYSBS|LmjF.17.0250 | UD | N | HHDR7m|LmjF.27.2440 | UD | N |
| SERt6|LmjF.14.0320 | UD | E | CYSS|LmjF.36.3590 | UD | N | HHYR2m|LmjF.27.2440 | UD | N |
| SERt6|LmjF.27.0670 | UD | E | CYSTL|LmjF.32.2640 | UD | N | HHYR2m|LmjF.24.2030 | UD | N |
| SGPL12r|LmjF.30.2350 | UD | E | CYSTL|LmjF.32.2640 | UD | N | HIACL|LmjF.29.0600 | UD | N |
| SHSL1|LmjF.35.3230 | UD | E | CYSTL|LmjF.14.0460 | UD | N | HIBHrm|LmjF.32.3670 | UD | N |
| SHSL2r|LmjF.35.3230 | UD | E | CYSTRS|LmjF.12.0250 | UD | N | HIBHrm|LmjF.32.3660 | UD | N |
| SHSL4r|LmjF.35.3230 | UD | E | CYSTS|LmjF.17.0250 | UD | N | HIBHrm|LmjF.32.3650 | UD | N |
| SINCOAL|LmjF.19.1005 | UD | E | CYSt6|LmjF.11.0520 | UD | N | HISTRS|LmjF.30.0630 | UD | N |
| SINCOAL|LmjF.19.0985 | UD | E | CYSt6|LmjF.22.0230 | UD | N | HISt6|LmjF.11.0520 | UD | N |
| SLCBK1|LmjF.18.0440 | UD | E | CYSt6|LmjF.14.0320 | UD | N | HISt6|LmjF.14.0320 | UD | N |
| SLCBK1|LmjF.19.1350 | UD | E | CYSt6|LmjF.27.0670 | UD | N | HISt6|LmjF.22.0230 | UD | N |
| SLCYSS|LmjF.36.3590 | UD | E | CYTD1|LmjF.17.0360 | UD | N | HISt6|LmjF.27.0670 | UD | N |
| SO4t6|LmjF.28.1690 | UD | E | CYTDK1|LmjF.31.2470 | UD | N | HKAm|LmjF.25.2010 | UD | N |
| SPHK21r|LmjF.32.2290 | UD | E | CYTDK2|LmjF.31.2470 | UD | N | HMGCOARi|LmjF.30.3190 | UD | N |
| SPHPLr|LmjF.30.2350 | UD | E | CYTDK3|LmjF.31.2470 | UD | N | HMGCOARi\_x|LmjF.30.3190 | UD | N |
| SPMS|LmjF.04.0580 | UD | E | CYTDK4|LmjF.31.2470 | UD | N | HOCR3m|LmjF.27.2440 | UD | N |
| SQLMer|LmjF.13.1620 | UD | E | CYTDK5|LmjF.31.2470 | UD | N | HOCR3m|LmjF.24.2030 | UD | N |
| SQLS|LmjF.31.2940 | UD | E | CYTDK6|LmjF.31.2470 | UD | N | HODR8m|LmjF.27.2440 | UD | N |
| SQLSg|LmjF.31.2940 | UD | E | CYTDK7|LmjF.31.2470 | UD | N | HODR8m|LmjF.24.2030 | UD | N |
| SRTMT|LmjF.12.1270 | UD | E | CYTDK8|LmjF.31.2470 | UD | N | HOXPRx|LmjF.30.0180 | UD | N |
| SRTMT|LmjF.23.1200 | UD | E | CYTDK9|LmjF.31.2470 | UD | N | HP5CDm|LmjF.03.0200 | UD | N |
| SSALym|LmjF.36.1760 | UD | E | CaATPAC|LmjF.07.0630 | UD | N | HPDOAi|LmjF.34.4330 | UD | N |
| STFH|LmjF.04.0310 | UD | E | CaATPAC|LmjF.07.0650 | UD | N | HPDOCi|LmjF.34.4330 | UD | N |
| STFH|LmjF.23.0870 | UD | E | DADAr|LmjF.35.2160 | UD | N | HPROa|LmjF.13.1680 | UD | N |
| STFH|LmjF.23.0880 | UD | E | DADAr|LmjF.33.0235 | UD | N | HPROam|LmjF.13.1680 | UD | N |
| STFH|LmjF.27.2340 | UD | E | DADK|LmjF.34.0110 | UD | N | HPROxm|LmjF.03.0200 | UD | N |
| SUCD1rm|LmjF.24.1630 | UD | E | DADK|LmjF.04.0960 | UD | N | HPROym|LmjF.03.0200 | UD | N |
| SUCD2\_u6m|LmjF.15.0990 | UD | E | DADK|LmjF.34.0120 | UD | N | HSD|LmjF.07.0260 | UD | N |
| SUCOGDPm|LmjF.36.2950 | UD | E | DADKf|LmjF.21.1250 | UD | N | HSK|LmjF.30.3080 | UD | N |
| SUCOGDPm|LmjF.25.2140 | UD | E | DADKf|LmjF.16.0020 | UD | N | HTDR6m|LmjF.24.2030 | UD | N |
| SUCOGDPm|LmjF.25.2130 | UD | E | DADKg|LmjF.36.1360 | UD | N | HTDR6m|LmjF.27.2440 | UD | N |
| SUCR1|LmjF.23.0880 | UD | E | DADKg|LmjF.25.2370 | UD | N | HXCOADm|LmjF.06.0880 | UD | N |
| SUCR1|LmjF.23.0870 | UD | E | DAGAT\_LM|LmjF.09.1040 | UD | N | HXCOADm|LmjF.28.2510 | UD | N |
| SUCR1|LmjF.27.2340 | UD | E | DAGCPT\_LM|LmjF.36.5900 | UD | N | HXPRTg|LmjF.21.0845 | UD | N |
| SUCR1|LmjF.04.0310 | UD | E | DAGCPTm\_LM|LmjF.36.5900 | UD | N | I14BP1P|LmjF.31.2920 | UD | N |
| TA6PK|LmjF.02.0030 | UD | E | DAGK\_LM|LmjF.16.1290 | UD | N | ICDHym|LmjF.33.2550 | UD | N |
| TA6PK|LmjF.25.2440 | UD | E | DAGK\_LM|LmjF.35.5370 | UD | N | ICDHym|LmjF.10.0290 | UD | N |
| TAL|LmjF.16.0760 | UD | E | DAGKm\_LM|LmjF.16.1290 | UD | N | ILETAm|LmjF.27.2030 | UD | N |
| TCAFCOAL|LmjF.19.0985 | UD | E | DAGKm\_LM|LmjF.35.5370 | UD | N | ILETRS|LmjF.18.1220 | UD | N |
| TCAFCOAL|LmjF.19.1005 | UD | E | DCCOADm|LmjF.28.2510 | UD | N | ILETRS|LmjF.36.5620 | UD | N |
| TCINCOAL|LmjF.19.1005 | UD | E | DCCOADm|LmjF.06.0880 | UD | N | ILETRS|LmjF.36.5620 | UD | N |
| TCINCOAL|LmjF.19.0985 | UD | E | DCYTD1|LmjF.17.0360 | UD | N | ILEt6|LmjF.35.4410 | UD | N |
| TDCOADm|LmjF.06.0880 | UD | E | DDCOADm|LmjF.06.0880 | UD | N | IMPDg|LmjF.17.0725 | UD | N |
| TDCOADm|LmjF.28.2510 | UD | E | DDCOADm|LmjF.28.2510 | UD | N | IMPDg|LmjF.19.1560 | UD | N |
| TDPGDH|LmjF.26.2230 | UD | E | DDMAT5m|LmjF.05.0520 | UD | N | INDPYRD|LmjF.34.3250 | UD | N |
| THDSTIL|LmjF.27.0090 | UD | E | DEMAT4m|LmjF.05.0520 | UD | N | IPCS\_LM|LmjF.35.4990 | UD | N |
| THFAT|LmjF.36.3810 | UD | E | DESAT180\_9|LmjF.14.0510 | UD | N | IPDDI|LmjF.35.5330 | UD | N |
| THFAT|LmjF.36.3800 | UD | E | DESAT180\_9|LmjF.24.2250 | UD | N | IPDDIg|LmjF.35.5330 | UD | N |
| THFATm|LmjF.36.3810 | UD | E | DESAT181\_12|LmjF.33.3270 | UD | N | IPDPUPT|LmjF.13.0020 | UD | N |
| THFATm|LmjF.36.3800 | UD | E | DESAT182\_15|LmjF.10.0010 | UD | N | IPP5P|LmjF.11.1010 | UD | N |
| THFGLUS|LmjF.36.2610 | UD | E | DESAT182\_6|LmjF.36.6950 | UD | N | IPP5P2|LmjF.11.1010 | UD | N |
| THRA|LmjF.01.0480 | UD | E | DESAT183\_6|LmjF.36.6950 | UD | N | KEPTATm|LmjF.25.0020 | UD | N |
| THRLAD|LmjF.01.0480 | UD | E | DESAT203\_5|LmjF.07.1090 | UD | N | KEPTATm|LmjF.05.0180 | UD | N |
| THRS|LmjF.14.0350 | UD | E | DESAT204\_5|LmjF.07.1090 | UD | N | KYNASE1|LmjF.26.2240 | UD | N |
| THRTRS|LmjF.35.1410 | UD | E | DESAT224\_4|LmjF.14.1340 | UD | N | KYNASE2|LmjF.26.2240 | UD | N |
| THRt6|LmjF.11.0520 | UD | E | DESAT225\_4|LmjF.14.1340 | UD | N | KYNASE3|LmjF.26.2240 | UD | N |
| THRt6|LmjF.27.0670 | UD | E | DGK1|LmjF.36.2260 | UD | N | LCAD|LmjF.36.5180 | UD | N |
| THRt6|LmjF.22.0230 | UD | E | DGK1|LmjF.33.1090 | UD | N | LCAD|LmjF.30.2900 | UD | N |
| THRt6|LmjF.14.0320 | UD | E | DGK1er|LmjF.33.1090 | UD | N | LDH\_D|LmjF.27.2020 | UD | N |
| TKT1|LmjF.24.2060 | UD | E | DGK1er|LmjF.36.2260 | UD | N | LDH\_D|LmjF.29.0280 | UD | N |
| TKT1g|LmjF.24.2060 | UD | E | DHAK|LmjF.10.0420 | UD | N | LDH\_Dg|LmjF.29.0280 | UD | N |
| TKT2|LmjF.24.2060 | UD | E | DHCRD1|LmjF.26.1700 | UD | N | LDH\_Dg|LmjF.27.2020 | UD | N |
| TKT2g|LmjF.24.2060 | UD | E | DHCRD1|LmjF.26.1690 | UD | N | LEUTAm|LmjF.27.2030 | UD | N |
| TMDK1m|LmjF.21.1210 | UD | E | DHCRD1|LmjF.26.1670 | UD | N | LEUTRS|LmjF.13.1100 | UD | N |
| TNMT|LmjF.12.1270 | UD | E | DHCRD1|LmjF.26.1680 | UD | N | LEUTRS|LmjF.13.1100 | UD | N |
| TNMT|LmjF.23.1200 | UD | E | DHCRD2|LmjF.26.1690 | UD | N | LEUt6|LmjF.35.4410 | UD | N |
| TPIg|LmjF.24.0850 | UD | E | DHCRD2|LmjF.26.1700 | UD | N | LGTHL1|LmjF.35.3010 | UD | N |
| TROPACE|LmjF.05.0180 | UD | E | DHCRD2|LmjF.26.1670 | UD | N | LGTHL1|LmjF.35.3010 | UD | N |
| TROPACE|LmjF.25.0020 | UD | E | DHCRD2|LmjF.26.1680 | UD | N | LGTHL1m|LmjF.35.3010 | UD | N |
| TRPTRS|LmjF.29.0060 | UD | E | DHORD1|LmjF.16.0530 | UD | N | LGTHL1m|LmjF.35.3010 | UD | N |
| TRPTRS|LmjF.23.0300 | UD | E | DHORTS|LmjF.16.0580 | UD | N | LNSTLSr|LmjF.06.0650 | UD | N |
| TRPabc|LmjF.35.5350 | UD | E | DHPEG|LmjF.30.2090 | UD | N | LPS2\_LM|LmjF.31.2460 | UD | N |
| TRPabc|LmjF.36.6830 | UD | E | DKMD2K|LmjF.34.4600 | UD | N | LPS2\_LM|LmjF.31.0840 | UD | N |
| TRPabc|LmjF.31.1800 | UD | E | DKMD2K|LmjF.20.0970 | UD | N | LPS2\_LM|LmjF.31.0830 | UD | N |
| TRPabc|LmjF.27.1580 | UD | E | DM5ATm|LmjF.25.0020 | UD | N | LPS\_LM|LmjF.31.2460 | UD | N |
| TRPabc|LmjF.33.1420 | UD | E | DM5ATm|LmjF.05.0180 | UD | N | LPS\_LM|LmjF.31.0840 | UD | N |
| TRPabc|LmjF.36.0420 | UD | E | DMATT|LmjF.22.1360 | UD | N | LPS\_LM|LmjF.31.0830 | UD | N |
| TRPabc|LmjF.31.1820 | UD | E | DMATTx|LmjF.22.1360 | UD | N | LSTO1r|LmjF.23.1300 | UD | N |
| TRPabc|LmjF.35.5360 | UD | E | DMQMT|LmjF.35.4250 | UD | N | LSTO2r|LmjF.23.1300 | UD | N |
| TRPabc|LmjF.31.1790 | UD | E | DNMPPAn|LmjF.24.2280 | UD | N | LYSPLpc\_LM|LmjF.24.1840 | UD | N |
| TRPabc|LmjF.27.0680 | UD | E | DNMPPAn|LmjF.10.0170 | UD | N | LYSPLpe\_LM|LmjF.24.1840 | UD | N |
| TRYP|LmjF.15.1120 | UD | E | DNMPPAn|LmjF.13.0500 | UD | N | LYSTRS|LmjF.15.0230 | UD | N |
| TRYP|LmjF.15.1060 | UD | E | DNMPPAn|LmjF.32.1530 | UD | N | LYSTRS|LmjF.30.0130 | UD | N |
| TRYP|LmjF.15.1160 | UD | E | DNMPPAn|LmjF.34.2610 | UD | N | LYSt6|LmjF.11.0520 | UD | N |
| TRYP|LmjF.15.1080 | UD | E | DNTPPAn|LmjF.32.1530 | UD | N | LYSt6|LmjF.27.0670 | UD | N |
| TRYP|LmjF.15.1100 | UD | E | DNTPPAn|LmjF.34.2610 | UD | N | LYSt6|LmjF.14.0320 | UD | N |
| TRYP|LmjF.15.1140 | UD | E | DNTPPAn|LmjF.24.2280 | UD | N | LYSt6|LmjF.22.0230 | UD | N |
| TRYPg|LmjF.15.1040 | UD | E | DNTPPAn|LmjF.10.0170 | UD | N | MALCODC|LmjF.07.0730 | UD | N |
| TRYPm|LmjF.23.0040 | UD | E | DNTPPAn|LmjF.13.0500 | UD | N | MALT1|LmjF.18.0090 | UD | N |
| TRYS|LmjF.27.1870 | UD | E | DPCOAK|LmjF.22.1530 | UD | N | MAN1PT1|LmjF.23.0110 | UD | N |
| TRYS|LmjF.23.0460 | UD | E | DPMVD|LmjF.18.0020 | UD | N | MAN6PI|LmjF.32.1580 | UD | N |
| TRYS|LmjF.36.4300 | UD | E | DPMVDx|LmjF.18.0020 | UD | N | MAT6m|LmjF.05.0520 | UD | N |
| TYRTA|LmjF.36.2360 | UD | E | DRBKr|LmjF.27.0420 | UD | N | MCC|LmjF.31.3130 | UD | N |
| TYRTA|LmjF.35.0820 | UD | E | DRPAr|LmjF.06.1070 | UD | N | MCC|LmjF.11.0590 | UD | N |
| TYRTA2|LmjF.35.0820 | UD | E | DSATer|LmjF.31.1780 | UD | N | MCMAT2m|LmjF.33.2720 | UD | N |
| TYRTA2|LmjF.36.2360 | UD | E | DTDPG4Ex|LmjF.33.2300 | UD | N | MCMAT3m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.31.1800 | UD | E | DTMPK|LmjF.10.0060 | UD | N | MCMAT4m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.27.1580 | UD | E | DURIK1m|LmjF.21.1210 | UD | N | MCMAT5m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.33.1420 | UD | E | DUTPDPm|LmjF.06.0560 | UD | N | MCMAT6m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.36.0420 | UD | E | DUTPDPn|LmjF.06.0560 | UD | N | MCMAT7m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.31.1820 | UD | E | EAPT\_LM|LmjF.36.5900 | UD | N | MCMAT8m|LmjF.33.2720 | UD | N |
| TYRabc|LmjF.31.1790 | UD | E | EBP1r|LmjF.16.1340 | UD | N | MDH|LmjF.28.2860 | UD | N |
| TYRabc|LmjF.35.5360 | UD | E | EBP2r|LmjF.16.1340 | UD | N | MDHg|LmjF.19.0710 | UD | N |
| TYRabc|LmjF.27.0680 | UD | E | ECAPLH|LmjF.26.2700 | UD | N | MDHm|LmjF.34.0150 | UD | N |
| TYRabc|LmjF.35.5350 | UD | E | ECOAH13g|LmjF.18.0580 | UD | N | MDHm|LmjF.34.0160 | UD | N |
| TYRabc|LmjF.36.6830 | UD | E | ECOAH13g|LmjF.32.3680 | UD | N | MDHm|LmjF.34.0140 | UD | N |
| UAGDPr|LmjF.33.2520 | UD | E | ECOAH13g|LmjF.33.2600 | UD | N | MDHm|LmjF.34.0130 | UD | N |
| UDPDPS|LmjF.13.0020 | UD | E | ECOAH13m|LmjF.35.0360 | UD | N | MDRPD|LmjF.28.1840 | UD | N |
| UDPG4Ex|LmjF.33.2300 | UD | E | ECOAH13m|LmjF.29.2310 | UD | N | ME1x|LmjF.24.0770 | UD | N |
| UDPGALM|LmjF.18.0200 | UD | E | ECOAH13m|LmjF.26.1550 | UD | N | METAT|LmjF.30.3520 | UD | N |
| UPPRTr|LmjF.34.1040 | UD | E | ECOAH14g|LmjF.18.0580 | UD | N | METAT|LmjF.30.3500 | UD | N |
| URIK1|LmjF.31.2470 | UD | E | ECOAH14g|LmjF.32.3680 | UD | N | METS|LmjF.07.0090 | UD | N |
| URIK2|LmjF.31.2470 | UD | E | ECOAH14g|LmjF.33.2600 | UD | N | METTRSm|LmjF.21.0810 | UD | N |
| URIK3|LmjF.31.2470 | UD | E | ECOAH14m|LmjF.26.1550 | UD | N | METt6|LmjF.14.0320 | UD | N |
| URIK4|LmjF.31.2470 | UD | E | ECOAH14m|LmjF.29.2310 | UD | N | METt6|LmjF.22.0230 | UD | N |
| URIK5|LmjF.31.2470 | UD | E | ECOAH14m|LmjF.35.0360 | UD | N | METt6|LmjF.27.0670 | UD | N |
| URIK6|LmjF.31.2470 | UD | E | ECOAH15g|LmjF.33.2600 | UD | N | METt6|LmjF.11.0520 | UD | N |
| URIK7|LmjF.31.2470 | UD | E | ECOAH15g|LmjF.18.0580 | UD | N | MEVK|LmjF.31.0560 | UD | N |
| URIK8|LmjF.31.2470 | UD | E | ECOAH15g|LmjF.32.3680 | UD | N | MEVKx|LmjF.31.0560 | UD | N |
| URIK9|LmjF.31.2470 | UD | E | ECOAH15m|LmjF.29.2310 | UD | N | MFAPS\_LM|LmjF.31.3120 | UD | N |
| URIRHn|LmjF.18.0480 | UD | E | ECOAH15m|LmjF.26.1550 | UD | N | MFAPSm\_LM|LmjF.31.3120 | UD | N |
| VALTAm|LmjF.27.2030 | UD | E | ECOAH15m|LmjF.35.0360 | UD | N | MGLYCL\_LM|LmjF.31.1140 | UD | N |
| VALTRS|LmjF.30.3130 | UD | E | ECOAH16m|LmjF.35.0360 | UD | N | MI1PP|LmjF.17.1390 | UD | N |
| VALt6|LmjF.35.4410 | UD | E | ECOAH16m|LmjF.26.1550 | UD | N | MI1PSB|LmjF.14.1360 | UD | N |
| XANMT|LmjF.23.1200 | UD | E | ECOAH16m|LmjF.29.2310 | UD | N | MI3PP|LmjF.17.1390 | UD | N |
| XANMT|LmjF.12.1270 | UD | E | ECOAH17m|LmjF.35.0360 | UD | N | MI4PP|LmjF.17.1390 | UD | N |
| XPRTgr|LmjF.21.0850 | UD | E | ECOAH17m|LmjF.26.1550 | UD | N | MMEm|LmjF.26.0020 | UD | N |
| XYLKg|LmjF.36.0260 | UD | E | ECOAH17m|LmjF.29.2310 | UD | N | MMMm|LmjF.27.0300 | UD | N |
| TYRTRS|LmjF.14.1370 | E | N | ECOAH1m|LmjF.26.1550 | UD | N | MSTa|LmjF.05.0970 | UD | N |
| FBPg|LmjF.04.1160 | N | N | ECOAH1m|LmjF.29.2310 | UD | N | MTAP|LmjF.05.0830 | UD | N |
| GALU|LmjF.18.0990 | N | N | ECOAH1m|LmjF.35.0360 | UD | N | MTHFC|LmjF.30.2600 | UD | N |
| GF6PTAr|LmjF.06.0950 | N | N | ECOAH2m|LmjF.26.1550 | UD | N | MTHPTGHM|LmjF.31.0010 | UD | N |
| ST14DMr|LmjF.11.1100 | N | N | ECOAH2m|LmjF.29.2310 | UD | N | MTRI|LmjF.36.4930 | UD | N |
| MTHFD|LmjF.30.2600 | UD | N | ECOAH2m|LmjF.35.0360 | UD | N | NADH2-u6cm|LmjF.17.0270 | UD | N |
| DHAPAx\_LM|LmjF.34.1090 | UD | N | ECOAH3m|LmjF.29.2310 | UD | N | NADH2-u6cm|LmjF.27.0740 | UD | N |
| DHFS|LmjF.36.2610 | UD | N | ECOAH3m|LmjF.26.1550 | UD | N | NADH2-u6cm|LmjF.05.0980 | UD | N |
| MTHFR|LmjF.36.6390 | UD | N | ECOAH3m|LmjF.35.0360 | UD | N | NADH2-u6cm|LmjF.18.1480 | UD | N |
| MTHFR1|LmjF.36.6390 | UD | N | ECOAH4m|LmjF.26.1550 | UD | N | NADH2-u6cm|LmjF.36.5380 | UD | N |
| PHE4MOi|LmjF.28.1280 | UD | N | ECOAH4m|LmjF.29.2310 | UD | N | NADH2-u6cm|LmjF.27.0290 | UD | N |
| PHE4MOi2|LmjF.28.1280 | UD | N | ECOAH4m|LmjF.35.0360 | UD | N | NADHDH|LmjF.18.1480 | UD | N |
| SERPTr|LmjF.34.3740 | UD | N | ECOAH5m|LmjF.35.0360 | UD | N | NADHDH|LmjF.27.0740 | UD | N |
| SERPTr|LmjF.35.0320 | UD | N | ECOAH5m|LmjF.26.1550 | UD | N | NADHDH|LmjF.05.0980 | UD | N |
| 14BP1P2|LmjF.31.2920 | UD | N | ECOAH5m|LmjF.29.2310 | UD | N | NADHDH|LmjF.17.0270 | UD | N |
| 2MBDTm|LmjF.05.0180 | UD | N | ECOAH6m|LmjF.35.0360 | UD | N | NADHDH|LmjF.27.0290 | UD | N |
| 2MBDTm|LmjF.25.0020 | UD | N | ECOAH6m|LmjF.26.1550 | UD | N | NADK|LmjF.06.0460 | UD | N |
| 2MPTm|LmjF.05.0180 | UD | N | ECOAH6m|LmjF.29.2310 | UD | N | NADS2i|LmjF.32.1670 | UD | N |
| 2MPTm|LmjF.25.0020 | UD | N | ECOAH7m|LmjF.26.1550 | UD | N | NCATD|LmjF.27.0090 | UD | N |
| 3ANTHMT|LmjF.12.1270 | UD | N | ECOAH7m|LmjF.29.2310 | UD | N | NCHEXH|LmjF.26.0210 | UD | N |
| 3ANTHMT|LmjF.23.1200 | UD | N | ECOAH7m|LmjF.35.0360 | UD | N | NCHEXH|LmjF.34.2140 | UD | N |
| 3DSPHRr|LmjF.35.0330 | UD | N | ECOAH9m|LmjF.29.2310 | UD | N | NCTPPRT|LmjF.33.0960 | UD | N |
| 3MBTm|LmjF.05.0180 | UD | N | ECOAH9m|LmjF.26.1550 | UD | N | NDPK1|LmjF.35.3870 | UD | N |
| 3MBTm|LmjF.25.0020 | UD | N | ECOAH9m|LmjF.35.0360 | UD | N | NDPK1|LmjF.32.2950 | UD | N |
| 4COUCOAL|LmjF.19.1005 | UD | N | ENO|LmjF.32.3760 | UD | N | NDPK10|LmjF.32.2950 | UD | N |
| 4COUCOAL|LmjF.19.0985 | UD | N | ENO|LmjF.14.1160 | UD | N | NDPK10|LmjF.35.3870 | UD | N |
| 4HGLSDm|LmjF.03.0200 | UD | N | ENPHE1|LmjF.36.5910 | UD | N | NDPK2|LmjF.32.2950 | UD | N |
| 4HTHRS|LmjF.14.0350 | UD | N | EPPP2|LmjF.01.0310 | UD | N | NDPK2|LmjF.35.3870 | UD | N |
| 5OPROS|LmjF.18.1040 | UD | N | EPPP2v|LmjF.01.0310 | UD | N | NDPK3|LmjF.35.3870 | UD | N |
| A1E|LmjF.35.0970 | UD | N | ETAPCT|LmjF.32.0890 | UD | N | NDPK3|LmjF.32.2950 | UD | N |
| A1E|LmjF.23.0430 | UD | N | ETAPCTm|LmjF.32.0890 | UD | N | NDPK4|LmjF.35.3870 | UD | N |
| A1Eg|LmjF.35.0980 | UD | N | ETHAMK|LmjF.27.1420 | UD | N | NDPK4|LmjF.32.2950 | UD | N |
| A1Eg|LmjF.34.3380 | UD | N | ETHAPT\_LM|LmjF.36.5900 | UD | N | NDPK5|LmjF.35.3870 | UD | N |
| ACACT10m\_i|LmjF.31.1640 | UD | N | ETHAPTm\_LM|LmjF.36.5900 | UD | N | NDPK5|LmjF.32.2950 | UD | N |
| ACACT10m\_i|LmjF.31.1630 | UD | N | FACOAL1|LmjF.03.0230 | UD | N | NDPK6|LmjF.32.2950 | UD | N |
| ACACT10m\_i|LmjF.23.0690 | UD | N | FACOAL1|LmjF.01.0490 | UD | N | NDPK6|LmjF.35.3870 | UD | N |
| ACACT1rm|LmjF.31.1640 | UD | N | FACOAL1|LmjF.01.0530 | UD | N | NDPK7|LmjF.32.2950 | UD | N |
| ACACT1rm|LmjF.31.1630 | UD | N | FACOAL1|LmjF.13.0420 | UD | N | NDPK7|LmjF.35.3870 | UD | N |
| ACACT1rm|LmjF.23.0690 | UD | N | FACOAL1|LmjF.01.0470 | UD | N | NDPK8|LmjF.35.3870 | UD | N |
| ACACT2rm|LmjF.31.1640 | UD | N | FACOAL1|LmjF.01.0510 | UD | N | NDPK8|LmjF.32.2950 | UD | N |
| ACACT2rm|LmjF.23.0690 | UD | N | FACOAL1|LmjF.01.0520 | UD | N | NDPK9|LmjF.35.3870 | UD | N |
| ACACT2rm|LmjF.31.1630 | UD | N | FACOAL1|LmjF.01.0500 | UD | N | NDPK9|LmjF.32.2950 | UD | N |
| ACACT3rm|LmjF.31.1640 | UD | N | FACOAL140|LmjF.13.0420 | UD | N | NDPKn1|LmjF.32.2950 | UD | N |
| ACACT3rm|LmjF.23.0690 | UD | N | FACOAL140|LmjF.01.0490 | UD | N | NDPKn1|LmjF.35.3870 | UD | N |
| ACACT3rm|LmjF.31.1630 | UD | N | FACOAL140|LmjF.03.0230 | UD | N | NDPKn10|LmjF.35.3870 | UD | N |
| ACACT4rm|LmjF.31.1630 | UD | N | FACOAL140|LmjF.01.0530 | UD | N | NDPKn10|LmjF.32.2950 | UD | N |
| ACACT4rm|LmjF.23.0690 | UD | N | FACOAL140|LmjF.01.0500 | UD | N | NDPKn2|LmjF.35.3870 | UD | N |
| ACACT4rm|LmjF.31.1640 | UD | N | FACOAL140|LmjF.01.0510 | UD | N | NDPKn2|LmjF.32.2950 | UD | N |
| ACACT5rm|LmjF.31.1630 | UD | N | FACOAL140|LmjF.01.0470 | UD | N | NDPKn3|LmjF.35.3870 | UD | N |
| ACACT5rm|LmjF.23.0690 | UD | N | FACOAL140|LmjF.01.0520 | UD | N | NDPKn3|LmjF.32.2950 | UD | N |
| ACACT5rm|LmjF.31.1640 | UD | N | FACOAL160|LmjF.03.0230 | UD | N | NDPKn4|LmjF.35.3870 | UD | N |
| ACACT6rm|LmjF.31.1640 | UD | N | FACOAL160|LmjF.01.0530 | UD | N | NDPKn4|LmjF.32.2950 | UD | N |
| ACACT6rm|LmjF.23.0690 | UD | N | FACOAL160|LmjF.01.0490 | UD | N | NDPKn5|LmjF.35.3870 | UD | N |
| ACACT6rm|LmjF.31.1630 | UD | N | FACOAL160|LmjF.13.0420 | UD | N |  |  |  |
| ACACT7rm|LmjF.31.1640 | UD | N | FACOAL160|LmjF.01.0520 | UD | N |  |  |  |
| ACACT7rm|LmjF.23.0690 | UD | N | FACOAL160|LmjF.01.0510 | UD | N |  |  |  |
| ACACT7rm|LmjF.31.1630 | UD | N | FACOAL160|LmjF.01.0470 | UD | N |  |  |  |
| ACCOACrm|LmjF.31.2970 | UD | N | FACOAL160|LmjF.01.0500 | UD | N |  |  |  |
| ACGAM6PSi|LmjF.28.3005 | UD | N | FACOAL180|LmjF.13.0420 | UD | N |  |  |  |
| ACGAMPM|LmjF.07.0805 | UD | N | FACOAL180|LmjF.03.0230 | UD | N |  |  |  |
| ACMAT1m|LmjF.33.2720 | UD | N | FACOAL180|LmjF.01.0530 | UD | N |  |  |  |
| ACOAD10m|LmjF.06.0880 | UD | N | FACOAL180|LmjF.01.0490 | UD | N |  |  |  |
| ACOAD10m|LmjF.28.2510 | UD | N | FACOAL180|LmjF.01.0500 | UD | N |  |  |  |
| ACOAD11m|LmjF.06.0880 | UD | N | FACOAL180|LmjF.01.0520 | UD | N |  |  |  |
| ACOAD11m|LmjF.28.2510 | UD | N | FACOAL180|LmjF.01.0470 | UD | N |  |  |  |
|  |  |  |  |  |  |  |  |  |  |