**S5 Table. Gene essentiality information of Reaction Gene combinations in *Leishmania donovani* 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** |
| 4COUCOAL|LdBPK\_303150 | E | E |   | DAGCPT|LdBPK\_281250 | UD | N |   | HINDOALDtm|LdBPK\_040960 | UD | N |
| DKMD2K|LdBPK\_160590 | E | E |   | DAGCPTm|LdBPK\_010490 | UD | N |   | HINDOALDtm|LdBPK\_340120 | UD | N |
| LACDtg|LdBPK\_341110 | E | E |   | DAGCPTm|LdBPK\_010510 | UD | N |   | HINDOALDtm|LdBPK\_340130 | UD | N |
| MLTHFtm|LdBPK\_040570 | E | E |   | DAGCPTm|LdBPK\_010520 | UD | N |   | HISt6|LdBPK\_060890 | UD | N |
| PMTCOAtm|LdBPK\_120105 | E | E |   | DAGCPTm|LdBPK\_010540 | UD | N |   | HISTRS|LdBPK\_343580 | UD | N |
| THRt6|LdBPK\_181500 | UD | E |   | DAGCPTm|LdBPK\_010550 | UD | N |   | HKAm|LdBPK\_180440 | UD | N |
| THRt6|LdBPK\_181510 | UD | E |   | DAGCPTm|LdBPK\_030220 | UD | N |   | HKAm|LdBPK\_191380 | UD | N |
| THYMDtm|LdBPK\_060910 | UD | E |   | DAGCPTm|LdBPK\_130300 | UD | N |   | HMGCOARx|LdBPK\_261530 | UD | N |
| THYMDtm|LdBPK\_070150 | UD | E |   | DAGCPTm|LdBPK\_281250 | UD | N |   | HMGCOARx|LdBPK\_292420 | UD | N |
| THYMDtm|LdBPK\_282700 | UD | E |   | DAGK|LdBPK\_010490 | UD | N |   | HMGCOARx|LdBPK\_350360 | UD | N |
| THYMDtm|LdBPK\_352780 | UD | E |   | DAGK|LdBPK\_010510 | UD | N |   | HMGCOAtg|LdBPK\_323110 | UD | N |
| TKT1g|LdBPK\_341170 | UD | E |   | DAGK|LdBPK\_010520 | UD | N |   | HMGCOAtg|LdBPK\_353910 | UD | N |
| TKT2g|LdBPK\_341170 | UD | E |   | DAGK|LdBPK\_010540 | UD | N |   | HMGS|LdBPK\_180580 | UD | N |
| TMDPP|LdBPK\_302920 | UD | E |   | DAGK|LdBPK\_010550 | UD | N |   | HMGS|LdBPK\_323830 | UD | N |
| TMDPP|LdBPK\_365410 | UD | E |   | DAGK|LdBPK\_030220 | UD | N |   | HMGS|LdBPK\_332740 | UD | N |
| TMDS|LdBPK\_120200 | UD | E |   | DAGK|LdBPK\_130300 | UD | N |   | HOCHL3m|LdBPK\_260200 | UD | N |
| TPIg|LdBPK\_362740 | UD | E |   | DAGK|LdBPK\_281250 | UD | N |   | HOCHL3m|LdBPK\_341900 | UD | N |
| TRNAGLNtm|LdBPK\_290920 | UD | E |   | DAGKm|LdBPK\_261530 | UD | N |   | HOCR3m|LdBPK\_292080 | UD | N |
| TRNAGLUtm|LdBPK\_230500 | UD | E |   | DAGKm|LdBPK\_332740 | UD | N |   | HPROa|LdBPK\_070930 | UD | N |
| TRNAGLUtm|LdBPK\_364510 | UD | E |   | DAGKm|LdBPK\_361200 | UD | N |   | HPROxm|LdBPK\_210300 | UD | N |
| TROPtm|LdBPK\_040440 | UD | E |   | DATPtn|LdBPK\_010310 | UD | N |   | HPROxm|LdBPK\_210310 | UD | N |
| TRPDOXtn|LdBPK\_323110 | UD | E |   | DCCOADm|LdBPK\_363750 | UD | N |   | HPROym|LdBPK\_283250 | UD | N |
| TRPDOXtn|LdBPK\_353910 | UD | E |   | DCTPtn|LdBPK\_331150 | UD | N |   | HSD|LdBPK\_321220 | UD | N |
| TRPDRDtn|LdBPK\_040270 | UD | E |   | DCTPtn|LdBPK\_362390 | UD | N |   | HSK|LdBPK\_140700 | UD | N |
| TRPDRDtn|LdBPK\_130870 | UD | E |   | DCYTD1|LdBPK\_240870 | UD | N |   | HTDR6m|LdBPK\_240310 | UD | N |
| TRPDRDtn|LdBPK\_322690 | UD | E |   | DCYTt|LdBPK\_366670 | UD | N |   | HXANt2|LdBPK\_354790 | UD | N |
| TRPDRDtn|LdBPK\_354860 | UD | E |   | DDMAT5m|LdBPK\_180690 | UD | N |   | HXANt2|LdBPK\_363990 | UD | N |
| TRPTRS|LdBPK\_311800 | UD | E |   | DDMAT5m|LdBPK\_180700 | UD | N |   | HXANt2|LdBPK\_364000 | UD | N |
| TRYPm|LdBPK\_241910 | UD | E |   | DDMAT5m5|LdBPK\_100310 | UD | N |   | HXANtg|LdBPK\_230580 | UD | N |
| TRYR|LdBPK\_241910 | UD | E |   | DDMAT5m5|LdBPK\_332680 | UD | N |   | HXANtg|LdBPK\_230880 | UD | N |
| TYRabc|LdBPK\_010470 | UD | E |   | DESAT224\_4|LdBPK\_340630 | UD | N |   | HXPRTg|LdBPK\_354660 | UD | N |
| TYRTA|LdBPK\_180440 | UD | E |   | DGDPter|LdBPK\_350840 | UD | N |   | HYDCOAtm|LdBPK\_350840 | UD | N |
| TYRTA|LdBPK\_191380 | UD | E |   | DGDPter|LdBPK\_362490 | UD | N |   | HYDCOAtm|LdBPK\_362490 | UD | N |
| TYRTA2|LdBPK\_120580 | UD | E |   | DGK1er|LdBPK\_210300 | UD | N |   | ICDHym|LdBPK\_261590 | UD | N |
| TYRTA2|LdBPK\_350840 | UD | E |   | DGK1er|LdBPK\_210310 | UD | N |   | IDPtn|LdBPK\_331150 | UD | N |
| TYRTA3|LdBPK\_260680 | UD | E |   | dGTPte|LdBPK\_140330 | UD | N |   | IDPtn|LdBPK\_362390 | UD | N |
| UAGDP|LdBPK\_050180 | UD | E |   | dGTPte|LdBPK\_271500 | UD | N |   | ILETAc|LdBPK\_180020 | UD | N |
| UAGDP|LdBPK\_250020 | UD | E |   | dGTPte|LdBPK\_310350 | UD | N |   | IMPDg|LdBPK\_251160 | UD | N |
| UDPDPS|LdBPK\_366170 | UD | E |   | dGTPte|LdBPK\_310360 | UD | N |   | IMZACtm|LdBPK\_050180 | UD | N |
| UDPGALtg|LdBPK\_230580 | UD | E |   | dGTPte|LdBPK\_311850 | UD | N |   | IMZACtm|LdBPK\_250020 | UD | N |
| UDPGALtg|LdBPK\_230880 | UD | E |   | dGTPte|LdBPK\_311860 | UD | N |   | IND3ACtm|LdBPK\_270310 | UD | N |
| UDPGtg|LdBPK\_181580 | UD | E |   | dGTPte|LdBPK\_322800 | UD | N |   | INDPYRD|LdBPK\_322440 | UD | N |
| UDPtn|LdBPK\_252480 | UD | E |   | dGTPte|LdBPK\_331510 | UD | N |   | INSter|LdBPK\_070240 | UD | N |
| UDPtn|LdBPK\_361410 | UD | E |   | dGTPte|LdBPK\_355070 | UD | N |   | INSter|LdBPK\_310010 | UD | N |
| UDPx|LdBPK\_241880 | UD | E |   | dGTPte|LdBPK\_355320 | UD | N |   | INStm|LdBPK\_060910 | UD | N |
| UDPx|LdBPK\_242110 | UD | E |   | dGTPte|LdBPK\_360450 | UD | N |   | INStm|LdBPK\_070150 | UD | N |
| UDPx|LdBPK\_272390 | UD | E |   | dGTPte|LdBPK\_364700 | UD | N |   | INStm|LdBPK\_282700 | UD | N |
| UMPK|LdBPK\_271940 | UD | E |   | dGTPte|LdBPK\_367150 | UD | N |   | INStm|LdBPK\_352780 | UD | N |
| UMPK|LdBPK\_290290 | UD | E |   | DHAPAx|LdBPK\_261530 | UD | N |   | IPDDI|LdBPK\_270740 | UD | N |
| URAtn|LdBPK\_323110 | UD | E |   | DHAPAx|LdBPK\_332740 | UD | N |   | IPDDI|LdBPK\_363630 | UD | N |
| URAtn|LdBPK\_353910 | UD | E |   | DHAPAx|LdBPK\_361200 | UD | N |   | IPP5P|LdBPK\_352790 | UD | N |
| UREAt|LdBPK\_360280 | UD | E |   | DHAPtg|LdBPK\_060580 | UD | N |   | ITPtn|LdBPK\_330250 | UD | N |
| UREAtg|LdBPK\_170410 | UD | E |   | DHCRD2|LdBPK\_141450 | UD | N |   | KYNASE1|LdBPK\_261670 | UD | N |
| UREAtg|LdBPK\_322210 | UD | E |   | DHDASCBtm|LdBPK\_060910 | UD | N |   | KYNASE1|LdBPK\_261680 | UD | N |
| URItn|LdBPK\_210990 | UD | E |   | DHDASCBtm|LdBPK\_070150 | UD | N |   | KYNASE3|LdBPK\_311800 | UD | N |
| VALt6|LdBPK\_050980 | UD | E |   | DHDASCBtm|LdBPK\_282700 | UD | N |   | LDH\_D|LdBPK\_030790 | UD | N |
| VALt6|LdBPK\_170320 | UD | E |   | DHDASCBtm|LdBPK\_352780 | UD | N |   | LDH\_D|LdBPK\_260300 | UD | N |
| VALt6|LdBPK\_181460 | UD | E |   | DHFOR2a|LdBPK\_340630 | UD | N |   | LDH\_L|LdBPK\_321660 | UD | N |
| VALt6|LdBPK\_270300 | UD | E |   | DHFRa|LdBPK\_230410 | UD | N |   | LEUt6|LdBPK\_282530 | UD | N |
| VALt6|LdBPK\_270590 | UD | E |   | DHNPTtn|LdBPK\_323110 | UD | N |   | LEUTAm|LdBPK\_180020 | UD | N |
| VALt6|LdBPK\_282170 | UD | E |   | DHNPTtn|LdBPK\_353910 | UD | N |   | LGLUtg|LdBPK\_323110 | UD | N |
| VALt6|LdBPK\_323370 | UD | E |   | DHORTS|LdBPK\_120200 | UD | N |   | LGLUtg|LdBPK\_353910 | UD | N |
| VALt6|LdBPK\_352010 | UD | E |   | DHPEG|LdBPK\_343530 | UD | N |   | LGTHL1m|LdBPK\_070870 | UD | N |
| VALt6|LdBPK\_365620 | UD | E |   | DHPEG|LdBPK\_350320 | UD | N |   | LGTHL1m|LdBPK\_360160 | UD | N |
| VALTAc|LdBPK\_161410 | UD | E |   | DITPtn|LdBPK\_323110 | UD | N |   | LINCOAe|LdBPK\_270430 | UD | N |
| VALTRS|LdBPK\_060350 | UD | E |   | DITPtn|LdBPK\_353910 | UD | N |   | LINCOAtm|LdBPK\_220013 | UD | N |
| VTm|LdBPK\_061330 | UD | E |   | DMATTx|LdBPK\_251160 | UD | N |   | LIPOAS2|LdBPK\_332430 | UD | N |
| XANt2|LdBPK\_331010 | UD | E |   | DNTPPAn|LdBPK\_340630 | UD | N |   | LIPOT|LdBPK\_171260 | UD | N |
| XANtg|LdBPK\_221110 | UD | E |   | DOLPMTcer|LdBPK\_301910 | UD | N |   | LIPOT|LdBPK\_180990 | UD | N |
| XANtg|LdBPK\_271970 | UD | E |   | DOLPMTcer|LdBPK\_301920 | UD | N |   | LPS|LdBPK\_140520 | UD | N |
| XANtg|LdBPK\_280980 | UD | E |   | DOLPMTcer|LdBPK\_332470 | UD | N |   | LPS|LdBPK\_242340 | UD | N |
| XMPtg|LdBPK\_365650 | UD | E |   | DOLPs|LdBPK\_261530 | UD | N |   | LSTO1r|LdBPK\_180580 | UD | N |
| XTSN2t|LdBPK\_070210 | UD | E |   | DPMVDx|LdBPK\_270090 | UD | N |   | LSTO1r|LdBPK\_323830 | UD | N |
| XTSN2t|LdBPK\_312650 | UD | E |   | DRBKr|LdBPK\_320940 | UD | N |   | LSTO1r|LdBPK\_332740 | UD | N |
| XTSN2t|LdBPK\_350100 | UD | E |   | DTDPGALtg|LdBPK\_010280 | UD | N |   | LYSPLpe|LdBPK\_333420 | UD | N |
| XTSN2t|LdBPK\_351540 | UD | E |   | DTDPGALtg|LdBPK\_040240 | UD | N |   | LYSTRS|LdBPK\_160960 | UD | N |
| XYLTRED\_D|LdBPK\_161340 | UD | E |   | DTDPGALtg|LdBPK\_150410 | UD | N |   | MALCOAter|LdBPK\_303560 | UD | N |
| XYLTRED\_D|LdBPK\_355060 | UD | E |   | DTDPGALtg|LdBPK\_260410 | UD | N |   | MALT1|LdBPK\_241880 | UD | N |
| ZYMSTt|LdBPK\_330530 | UD | E |   | DTDPGALtg|LdBPK\_261140 | UD | N |   | MALT1|LdBPK\_242110 | UD | N |
| ZYMSTter|LdBPK\_353280 | UD | E |   | DTDPGALtg|LdBPK\_301530 | UD | N |   | MALT1|LdBPK\_272390 | UD | N |
| TAG6Ptg|LdBPK\_160560 | E | N |   | DTDPGALtg|LdBPK\_301570 | UD | N |   | MAN1ptg|LdBPK\_365780 | UD | N |
| 2H3Mtm|LdBPK\_352200 | N | N |   | DTDPGALtg|LdBPK\_301940 | UD | N |   | MAN6PI|LdBPK\_340630 | UD | N |
| ADE34t|LdBPK\_281070 | N | N |   | DTDPGALtg|LdBPK\_361740 | UD | N |   | MANS|LdBPK\_322070 | UD | N |
| NDPKn7|LdBPK\_362480 | N | N |   | DTMPtm|LdBPK\_151120 | UD | N |   | MANt2|LdBPK\_300630 | UD | N |
| PHACGLYtm|LdBPK\_191590 | N | N |   | DTMPtm|LdBPK\_151140 | UD | N |   | MAT6m|LdBPK\_282600 | UD | N |
| PYRtm|LdBPK\_040440 | N | N |   | DTTPtn|LdBPK\_160030 | UD | N |   | MCMAT3m|LdBPK\_230410 | UD | N |
| UBQtm|LdBPK\_131090 | N | N |   | DTTPtn|LdBPK\_211490 | UD | N |   | MCMAT5m|LdBPK\_262730 | UD | N |
| 13DPGt|LdBPK\_323110 | UD | N |   | DUTPDPm|LdBPK\_353060 | UD | N |   | MCMAT7m|LdBPK\_242110 | UD | N |
| 13DPGt|LdBPK\_353910 | UD | N |   | EBP2r|LdBPK\_270090 | UD | N |   | MCMAT7m|LdBPK\_332740 | UD | N |
| 14BP1P2|LdBPK\_312980 | UD | N |   | ECAPLH|LdBPK\_030190 | UD | N |   | MCOATAm|LdBPK\_283090 | UD | N |
| 1ag3p\_tm|LdBPK\_050350 | UD | N |   | ECOAH13g|LdBPK\_180200 | UD | N |   | MDHg|LdBPK\_050180 | UD | N |
| 26D5MCOAtm|LdBPK\_330250 | UD | N |   | ECOAH14g|LdBPK\_332430 | UD | N |   | MDHg|LdBPK\_250020 | UD | N |
| 2H5Htm|LdBPK\_364860 | UD | N |   | ECOAH15g|LdBPK\_230300 | UD | N |   | MDRPD|LdBPK\_060370 | UD | N |
| 34HPPt2m|LdBPK\_231920 | UD | N |   | ECOAH16m|LdBPK\_271230 | UD | N |   | METS|LdBPK\_151490 | UD | N |
| 3ANTHMT|LdBPK\_355030 | UD | N |   | ECOAH2m|LdBPK\_150860 | UD | N |   | METt6|LdBPK\_141400 | UD | N |
| 3DSPHRr|LdBPK\_300650 | UD | N |   | ECOAH2m|LdBPK\_360240 | UD | N |   | METtm|LdBPK\_292910 | UD | N |
| 3HBACOAtm|LdBPK\_210980 | UD | N |   | ECOAH3m|LdBPK\_180440 | UD | N |   | MEVK|LdBPK\_261530 | UD | N |
| 3ISO3COAtm|LdBPK\_260120 | UD | N |   | ECOAH3m|LdBPK\_191380 | UD | N |   | MEVK|LdBPK\_292420 | UD | N |
| 3MBTm|LdBPK\_362670 | UD | N |   | ECOAH5m|LdBPK\_332860 | UD | N |   | MEVK|LdBPK\_350360 | UD | N |
| 3MGCOAtm|LdBPK\_242150 | UD | N |   | ECOAH7m|LdBPK\_332860 | UD | N |   | MGLYCL|LdBPK\_367290 | UD | N |
| 3PGt|LdBPK\_350330 | UD | N |   | ECOAH9m|LdBPK\_131420 | UD | N |   | MGRA|LdBPK\_330530 | UD | N |
| 4COUCOAL|LdBPK\_303160 | UD | N |   | ENO|LdBPK\_100150 | UD | N |   | MI1PP|LdBPK\_180090 | UD | N |
| 4HTHRS|LdBPK\_140710 | UD | N |   | ENO|LdBPK\_130390 | UD | N |   | MI4PP|LdBPK\_171260 | UD | N |
| 4HTHRS|LdBPK\_140740 | UD | N |   | ENO|LdBPK\_242370 | UD | N |   | MMEm|LdBPK\_261600 | UD | N |
| 4HTHRS|LdBPK\_140750 | UD | N |   | ENO|LdBPK\_321620 | UD | N |   | MMMm|LdBPK\_311150 | UD | N |
| 4HTHRS|LdBPK\_140760 | UD | N |   | ENO|LdBPK\_343280 | UD | N |   | MTAP|LdBPK\_151490 | UD | N |
| 5FOTHFtm|LdBPK\_292910 | UD | N |   | EPPP2v|LdBPK\_041170 | UD | N |   | MTHFD|LdBPK\_260310 | UD | N |
| 5MTAt|LdBPK\_353390 | UD | N |   | ETAPCT|LdBPK\_261530 | UD | N |   | MTHFR|LdBPK\_140970 | UD | N |
| 5mtryptatn|LdBPK\_040960 | UD | N |   | ETAPCT|LdBPK\_332740 | UD | N |   | MTHGXLtm|LdBPK\_061340 | UD | N |
| 5mtryptatn|LdBPK\_340120 | UD | N |   | ETAPCT|LdBPK\_361200 | UD | N |   | MTRI|LdBPK\_303290 | UD | N |
| 5mtryptatn|LdBPK\_340130 | UD | N |   | ETHAMK|LdBPK\_010490 | UD | N |   | NADHDH|LdBPK\_351480 | UD | N |
| 7dhchsterolte|LdBPK\_110520 | UD | N |   | ETHAMK|LdBPK\_010510 | UD | N |   | NADK|LdBPK\_240370 | UD | N |
| 7dhchsterolte|LdBPK\_131110 | UD | N |   | ETHAMK|LdBPK\_010520 | UD | N |   | NADK|LdBPK\_350840 | UD | N |
| A1E|LdBPK\_313080 | UD | N |   | ETHAMK|LdBPK\_010540 | UD | N |   | NADPH\_CYOR|LdBPK\_141280 | UD | N |
| ACACT1rm|LdBPK\_050970 | UD | N |   | ETHAMK|LdBPK\_010550 | UD | N |   | NADS2i|LdBPK\_240370 | UD | N |
| ACACT3rm|LdBPK\_322780 | UD | N |   | ETHAMK|LdBPK\_030220 | UD | N |   | NADS2i|LdBPK\_350840 | UD | N |
| ACACT4rm|LdBPK\_342710 | UD | N |   | ETHAMK|LdBPK\_130300 | UD | N |   | NADter|LdBPK\_281960 | UD | N |
| ACACT7rm|LdBPK\_352980 | UD | N |   | ETHAMK|LdBPK\_281250 | UD | N |   | NCAMt|LdBPK\_322200 | UD | N |
| ACCOACrm|LdBPK\_340630 | UD | N |   | ETHAPT|LdBPK\_261530 | UD | N |   | NDPK1|LdBPK\_210300 | UD | N |
| accoatm|LdBPK\_281390 | UD | N |   | ETHAPT|LdBPK\_332740 | UD | N |   | NDPK1|LdBPK\_210310 | UD | N |
| ACGAM6PSi|LdBPK\_211120 | UD | N |   | ETHAPT|LdBPK\_361200 | UD | N |   | NDPK10|LdBPK\_210300 | UD | N |
| ACGAM6PSi|LdBPK\_300470 | UD | N |   | EX\_5mta\_e|LdBPK\_231560 | UD | N |   | NDPK10|LdBPK\_210310 | UD | N |
| ACGAM6Ptg|LdBPK\_323110 | UD | N |   | EX\_a\_D\_glucose\_e|LdBPK\_350360 | UD | N |   | NDPK2|LdBPK\_181360 | UD | N |
| ACGAM6Ptg|LdBPK\_353910 | UD | N |   | EX\_ac\_e|LdBPK\_303230 | UD | N |   | NDPK2|LdBPK\_251790 | UD | N |
| ACGAMPM|LdBPK\_231880 | UD | N |   | EX\_AHCYS(e)|LdBPK\_110550 | UD | N |   | NDPK3|LdBPK\_210610 | UD | N |
| ACMAT1m|LdBPK\_361840 | UD | N |   | EX\_AHCYS(e)|LdBPK\_140320 | UD | N |   | NDPK3|LdBPK\_362790 | UD | N |
| ACOAD10m|LdBPK\_180440 | UD | N |   | EX\_AHCYS(e)|LdBPK\_310600 | UD | N |   | NDPK4|LdBPK\_291950 | UD | N |
| ACOAD10m|LdBPK\_191380 | UD | N |   | EX\_AHCYS(e)|LdBPK\_310610 | UD | N |   | NDPK4|LdBPK\_312710 | UD | N |
| ACOAD8m|LdBPK\_362670 | UD | N |   | EX\_ala\_D\_e|LdBPK\_130020 | UD | N |   | NDPK4|LdBPK\_312720 | UD | N |
| ACOAD9m|LdBPK\_180440 | UD | N |   | EX\_ala\_L\_e|LdBPK\_310580 | UD | N |   | NDPK4|LdBPK\_323510 | UD | N |
| ACOAD9m|LdBPK\_191380 | UD | N |   | EX\_arg\_L\_e|LdBPK\_131360 | UD | N |   | NDPK5|LdBPK\_292620 | UD | N |
| ACOAter|LdBPK\_353280 | UD | N |   | EX\_asn\_L\_e|LdBPK\_060670 | UD | N |   | NDPK7|LdBPK\_055450 | UD | N |
| ACPexch|LdBPK\_010050 | UD | N |   | EX\_asp\_L\_e|LdBPK\_130020 | UD | N |   | NDPK9|LdBPK\_230470 | UD | N |
| ACPexch|LdBPK\_280260 | UD | N |   | EX\_b\_D\_glucose\_e|LdBPK\_355300 | UD | N |   | NDPK9|LdBPK\_350990 | UD | N |
| ACRCOAtm|LdBPK\_260120 | UD | N |   | EX\_btn\_e|LdBPK\_190940 | UD | N |   | NDPKn10|LdBPK\_343160 | UD | N |
| ACSm|LdBPK\_300170 | UD | N |   | EX\_btn\_e|LdBPK\_190970 | UD | N |   | NDPKn10|LdBPK\_351000 | UD | N |
| ACt6|LdBPK\_151050 | UD | N |   | EX\_ca2\_e|LdBPK\_242200 | UD | N |   | NDPKn3|LdBPK\_141240 | UD | N |
| ACt6|LdBPK\_241700 | UD | N |   | EX\_co2\_e|LdBPK\_151510 | UD | N |   | NDPKn3|LdBPK\_323910 | UD | N |
| ACtm|LdBPK\_160760 | UD | N |   | EX\_cys\_L\_e|LdBPK\_111100 | UD | N |   | NDPKn5|LdBPK\_361320 | UD | N |
| ADAer|LdBPK\_353070 | UD | N |   | EX\_dAMP(e)|LdBPK\_110520 | UD | N |   | NDPKn9|LdBPK\_302990 | UD | N |
| ADAm|LdBPK\_353070 | UD | N |   | EX\_dAMP(e)|LdBPK\_131110 | UD | N |   | NDPKn9|LdBPK\_303000 | UD | N |
| ADE34t|LdBPK\_030090 | UD | N |   | EX\_dCMP(e)|LdBPK\_110520 | UD | N |   | NDPKn9|LdBPK\_354810 | UD | N |
| ADE34t|LdBPK\_030720 | UD | N |   | EX\_dCMP(e)|LdBPK\_131110 | UD | N |   | NH4tm|LdBPK\_230310 | UD | N |
| ADE34t|LdBPK\_041140 | UD | N |   | EX\_dGMP(e)|LdBPK\_060310 | UD | N |   | NICRNTK|LdBPK\_030190 | UD | N |
| ADE34t|LdBPK\_120620 | UD | N |   | EX\_dGMP(e)|LdBPK\_100360 | UD | N |   | NNAM|LdBPK\_283140 | UD | N |
| ADE34t|LdBPK\_200850 | UD | N |   | EX\_dGMP(e)|LdBPK\_100370 | UD | N |   | NOS|LdBPK\_030190 | UD | N |
| ADE34t|LdBPK\_212080 | UD | N |   | EX\_dGMP(e)|LdBPK\_100380 | UD | N |   | NPHPPH|LdBPK\_340630 | UD | N |
| ADE34t|LdBPK\_230420 | UD | N |   | EX\_dGMP(e)|LdBPK\_100390 | UD | N |   | NTRLASE4|LdBPK\_181220 | UD | N |
| ADE34t|LdBPK\_251170 | UD | N |   | EX\_dGMP(e)|LdBPK\_100400 | UD | N |   | NTRLASE4|LdBPK\_181230 | UD | N |
| ADE34t|LdBPK\_261690 | UD | N |   | EX\_dGMP(e)|LdBPK\_100410 | UD | N |   | O2t|LdBPK\_251980 | UD | N |
| ADE34t|LdBPK\_282880 | UD | N |   | EX\_dGMP(e)|LdBPK\_100420 | UD | N |   | OCCOADm|LdBPK\_120255 | UD | N |
| ADE34t|LdBPK\_311600 | UD | N |   | EX\_dGMP(e)|LdBPK\_190870 | UD | N |   | OCDMAT8m8|LdBPK\_180510 | UD | N |
| ADE34t|LdBPK\_367350 | UD | N |   | EX\_dGMP(e)|LdBPK\_241810 | UD | N |   | OCMAT3m|LdBPK\_261530 | UD | N |
| ADK1|LdBPK\_303120 | UD | N |   | EX\_dGMP(e)|LdBPK\_355160 | UD | N |   | OCMAT3m|LdBPK\_361200 | UD | N |
| ADK1g|LdBPK\_110100 | UD | N |   | EX\_DOLP(e)|LdBPK\_110550 | UD | N |   | OCMAT3m3|LdBPK\_350850 | UD | N |
| ADMDCi|LdBPK\_312410 | UD | N |   | EX\_DOLP(e)|LdBPK\_140320 | UD | N |   | OCMAT3m3|LdBPK\_351200 | UD | N |
| ADN1t|LdBPK\_050500 | UD | N |   | EX\_DOLP(e)|LdBPK\_310600 | UD | N |   | ODH1mi|LdBPK\_221210 | UD | N |
| ADN1t|LdBPK\_050510 | UD | N |   | EX\_DOLP(e)|LdBPK\_310610 | UD | N |   | ODH1mi|LdBPK\_281430 | UD | N |
| ADN1t|LdBPK\_052580 | UD | N |   | EX\_drib\_e|LdBPK\_221210 | UD | N |   | ODHmi|LdBPK\_221210 | UD | N |
| ADN1t|LdBPK\_210820 | UD | N |   | EX\_dTTP(e)|LdBPK\_110550 | UD | N |   | ODHmi|LdBPK\_281430 | UD | N |
| ADN1t|LdBPK\_212140 | UD | N |   | EX\_dTTP(e)|LdBPK\_140320 | UD | N |   | OHPHM|LdBPK\_302360 | UD | N |
| ADN1t|LdBPK\_240640 | UD | N |   | EX\_dTTP(e)|LdBPK\_310600 | UD | N |   | OMPDCg|LdBPK\_353060 | UD | N |
| ADN1t|LdBPK\_251210 | UD | N |   | EX\_dTTP(e)|LdBPK\_310610 | UD | N |   | ORNtg|LdBPK\_323110 | UD | N |
| ADN1t|LdBPK\_303660 | UD | N |   | EX\_dUTP(e)|LdBPK\_110550 | UD | N |   | ORNtg|LdBPK\_353910 | UD | N |
| ADNK1er|LdBPK\_010500 | UD | N |   | EX\_dUTP(e)|LdBPK\_140320 | UD | N |   | OROTtg|LdBPK\_211450 | UD | N |
| ADNK1m|LdBPK\_140350 | UD | N |   | EX\_dUTP(e)|LdBPK\_310600 | UD | N |   | ORPTg|LdBPK\_271940 | UD | N |
| ADPT2|LdBPK\_140350 | UD | N |   | EX\_dUTP(e)|LdBPK\_310610 | UD | N |   | ORPTg|LdBPK\_290290 | UD | N |
| ADSL1r|LdBPK\_351420 | UD | N |   | EX\_etha\_e|LdBPK\_190940 | UD | N |   | OXADPCOAtg|LdBPK\_181580 | UD | N |
| ADSS\_i|LdBPK\_353070 | UD | N |   | EX\_etha\_e|LdBPK\_190970 | UD | N |   | OXADPCOAtm|LdBPK\_210980 | UD | N |
| AGMT|LdBPK\_080210 | UD | N |   | EX\_fol\_e|LdBPK\_310580 | UD | N |   | P5CDr|LdBPK\_230860 | UD | N |
| AGPATi|LdBPK\_261530 | UD | N |   | EX\_h\_e|LdBPK\_313050 | UD | N |   | PALMER|LdBPK\_366570 | UD | N |
| AGPATi|LdBPK\_292420 | UD | N |   | EX\_h2o\_e|LdBPK\_190940 | UD | N |   | PAPAm|LdBPK\_367290 | UD | N |
| AGPATi|LdBPK\_323830 | UD | N |   | EX\_h2o\_e|LdBPK\_190970 | UD | N |   | PCter|LdBPK\_321750 | UD | N |
| AGPATi|LdBPK\_332740 | UD | N |   | EX\_hxan\_e|LdBPK\_362510 | UD | N |   | PCtm|LdBPK\_332040 | UD | N |
| AGPATi|LdBPK\_350360 | UD | N |   | EX\_hxan\_e|LdBPK\_362520 | UD | N |   | PCtm|LdBPK\_365630 | UD | N |
| AGPATi|LdBPK\_363440 | UD | N |   | EX\_inost\_e|LdBPK\_190940 | UD | N |   | PDHe2|LdBPK\_140660 | UD | N |
| AGPATim|LdBPK\_261530 | UD | N |   | EX\_inost\_e|LdBPK\_190970 | UD | N |   | PDHe2|LdBPK\_140670 | UD | N |
| AGPATim|LdBPK\_292420 | UD | N |   | EX\_mannan(e)|LdBPK\_310900 | UD | N |   | PDHe2|LdBPK\_140680 | UD | N |
| AGPATim|LdBPK\_323830 | UD | N |   | EX\_mannan(e)|LdBPK\_310910 | UD | N |   | PEPt|LdBPK\_211450 | UD | N |
| AGPATim|LdBPK\_332740 | UD | N |   | EX\_met\_L\_e|LdBPK\_161410 | UD | N |   | PERLLALDtm|LdBPK\_271770 | UD | N |
| AGPATim|LdBPK\_350360 | UD | N |   | EX\_nh4\_e|LdBPK\_355300 | UD | N |   | PERLLAtm|LdBPK\_230050 | UD | N |
| AGPATim|LdBPK\_363440 | UD | N |   | EX\_PELDo(e)|LdBPK\_110550 | UD | N |   | PFK26|LdBPK\_340630 | UD | N |
| AHC|LdBPK\_303290 | UD | N |   | EX\_PELDo(e)|LdBPK\_140320 | UD | N |   | PFKg|LdBPK\_140660 | UD | N |
| AHCYSter|LdBPK\_210890 | UD | N |   | EX\_PELDo(e)|LdBPK\_310600 | UD | N |   | PFKg|LdBPK\_140670 | UD | N |
| AHDTtn|LdBPK\_323110 | UD | N |   | EX\_PELDo(e)|LdBPK\_310610 | UD | N |   | PFKg|LdBPK\_140680 | UD | N |
| AHDTtn|LdBPK\_353910 | UD | N |   | EX\_pi\_e|LdBPK\_303230 | UD | N |   | PGI1|LdBPK\_060890 | UD | N |
| AHSERL5i|LdBPK\_261530 | UD | N |   | EX\_ppi\_e|LdBPK\_270090 | UD | N |   | PGI3|LdBPK\_060890 | UD | N |
| AHSERL5i|LdBPK\_292420 | UD | N |   | EX\_pro\_L\_e|LdBPK\_313050 | UD | N |   | PGKg|LdBPK\_060890 | UD | N |
| AHSERL5i|LdBPK\_350360 | UD | N |   | EX\_ptrc(e)|LdBPK\_110550 | UD | N |   | PGL|LdBPK\_320940 | UD | N |
| AKGDe1|LdBPK\_191490 | UD | N |   | EX\_ptrc(e)|LdBPK\_140320 | UD | N |   | PGLYPtm|LdBPK\_281390 | UD | N |
| AKGDE2B|LdBPK\_270090 | UD | N |   | EX\_ptrc(e)|LdBPK\_310600 | UD | N |   | PGMT|LdBPK\_060890 | UD | N |
| ALA\_Lt6|LdBPK\_366670 | UD | N |   | EX\_ptrc(e)|LdBPK\_310610 | UD | N |   | PGPPH|LdBPK\_010490 | UD | N |
| ALATA\_L|LdBPK\_230860 | UD | N |   | EX\_pyr\_e|LdBPK\_151510 | UD | N |   | PGPPH|LdBPK\_010510 | UD | N |
| ALATRSi|LdBPK\_260310 | UD | N |   | EX\_thym\_e|LdBPK\_231560 | UD | N |   | PGPPH|LdBPK\_010520 | UD | N |
| ALCD19|LdBPK\_230860 | UD | N |   | EX\_tyr\_L\_e|LdBPK\_221210 | UD | N |   | PGPPH|LdBPK\_010540 | UD | N |
| ALDD19m|LdBPK\_040300 | UD | N |   | EX\_urea\_e|LdBPK\_262240 | UD | N |   | PGPPH|LdBPK\_010550 | UD | N |
| ALDD19m|LdBPK\_040310 | UD | N |   | EX\_zymst\_e|LdBPK\_190940 | UD | N |   | PGPPH|LdBPK\_030220 | UD | N |
| ALDD19m|LdBPK\_231070 | UD | N |   | EX\_zymst\_e|LdBPK\_190970 | UD | N |   | PGPPH|LdBPK\_130300 | UD | N |
| ALDD19m|LdBPK\_272290 | UD | N |   | FA\_1|LdBPK\_044270 | UD | N |   | PGPPH|LdBPK\_281250 | UD | N |
| ALDD19m|LdBPK\_350640 | UD | N |   | FA\_2|LdBPK\_230310 | UD | N |   | PGtm|LdBPK\_080520 | UD | N |
| ALDD20m|LdBPK\_362070 | UD | N |   | FA\_3ACPH|LdBPK\_072500 | UD | N |   | PGtm|LdBPK\_081040 | UD | N |
| ALDD32m|LdBPK\_310620 | UD | N |   | FA\_3ACPH|LdBPK\_271710 | UD | N |   | PHACCOAtm|LdBPK\_300940 | UD | N |
| ALDD8xr\_m|LdBPK\_140660 | UD | N |   | FA\_4ACPH|LdBPK\_151050 | UD | N |   | PHACCOAtm|LdBPK\_300950 | UD | N |
| ALDD8xr\_m|LdBPK\_140670 | UD | N |   | FA\_4ACPH|LdBPK\_241700 | UD | N |   | PHACCOAtm|LdBPK\_343380 | UD | N |
| ALDD8xr\_m|LdBPK\_140680 | UD | N |   | FA160ACPH|LdBPK\_190710 | UD | N |   | PHCYTm|LdBPK\_071260 | UD | N |
| ALDOXm|LdBPK\_261670 | UD | N |   | FA180ACPtm|LdBPK\_353730 | UD | N |   | PHE4MOi2|LdBPK\_261600 | UD | N |
| ALDOXm|LdBPK\_261680 | UD | N |   | FA181ACPH|LdBPK\_340140 | UD | N |   | PHEMEtm|LdBPK\_070820 | UD | N |
| ALDR|LdBPK\_241880 | UD | N |   | FA181ACPH|LdBPK\_340150 | UD | N |   | PHETA1|LdBPK\_341170 | UD | N |
| ALDR|LdBPK\_242110 | UD | N |   | FA181ACPH|LdBPK\_340160 | UD | N |   | PHETRS|LdBPK\_282250 | UD | N |
| ALDR|LdBPK\_272390 | UD | N |   | FA181ACPH|LdBPK\_340170 | UD | N |   | PHETRS|LdBPK\_366220 | UD | N |
| ALINCOAe|LdBPK\_262730 | UD | N |   | FA182ACPtm|LdBPK\_331660 | UD | N |   | PI45BPP|LdBPK\_180090 | UD | N |
| AMETter|LdBPK\_366570 | UD | N |   | FA1ACPtm|LdBPK\_282100 | UD | N |   | PIN3K|LdBPK\_040300 | UD | N |
| AMPDg|LdBPK\_060760 | UD | N |   | FACOAL140|LdBPK\_332860 | UD | N |   | PIN3K|LdBPK\_040310 | UD | N |
| APIND|LdBPK\_040300 | UD | N |   | FACOAL180|LdBPK\_332860 | UD | N |   | PIN3K|LdBPK\_231070 | UD | N |
| APIND|LdBPK\_040310 | UD | N |   | FACOAL182|LdBPK\_332860 | UD | N |   | PIN3K|LdBPK\_272290 | UD | N |
| APIND|LdBPK\_231070 | UD | N |   | FAS100COAr|LdBPK\_340630 | UD | N |   | PIN3K|LdBPK\_350640 | UD | N |
| APIND|LdBPK\_272290 | UD | N |   | FAS140COAr|LdBPK\_340630 | UD | N |   | PIN4K|LdBPK\_040300 | UD | N |
| APIND|LdBPK\_350640 | UD | N |   | FAS180COAr|LdBPK\_340630 | UD | N |   | PIN4K|LdBPK\_040310 | UD | N |
| APINM|LdBPK\_252550 | UD | N |   | FAS204COA|LdBPK\_340630 | UD | N |   | PIN4K|LdBPK\_231070 | UD | N |
| ARGDC|LdBPK\_323460 | UD | N |   | FAS224COAr|LdBPK\_340630 | UD | N |   | PIN4K|LdBPK\_272290 | UD | N |
| ARGNg|LdBPK\_282250 | UD | N |   | FAS60COAr|LdBPK\_340630 | UD | N |   | PIN4K|LdBPK\_350640 | UD | N |
| ARGNg|LdBPK\_366220 | UD | N |   | FBP26|LdBPK\_340630 | UD | N |   | PIt2p|LdBPK\_200630 | UD | N |
| ARGSSgr|LdBPK\_030190 | UD | N |   | FBPg|LdBPK\_051160 | UD | N |   | PLAc|LdBPK\_071260 | UD | N |
| ARGtg|LdBPK\_221110 | UD | N |   | FCL|LdBPK\_302100 | UD | N |   | PLAPc|LdBPK\_141420 | UD | N |
| ARGtg|LdBPK\_271970 | UD | N |   | FETe|LdBPK\_262730 | UD | N |   | PMANMg|LdBPK\_241880 | UD | N |
| ARGtg|LdBPK\_280980 | UD | N |   | FOLt|LdBPK\_280140 | UD | N |   | PMANMg|LdBPK\_242110 | UD | N |
| ASAT|LdBPK\_313030 | UD | N |   | FORter|LdBPK\_170300 | UD | N |   | PMANMg|LdBPK\_272390 | UD | N |
| ASCt2|LdBPK\_070330 | UD | N |   | FRDg|LdBPK\_131420 | UD | N |   | PMETM|LdBPK\_101460 | UD | N |
| ASCt2|LdBPK\_110250 | UD | N |   | FRDPtg|LdBPK\_200630 | UD | N |   | PMEVK|LdBPK\_363230 | UD | N |
| ASCt2|LdBPK\_130670 | UD | N |   | FRDPtm|LdBPK\_171580 | UD | N |   | PMEVKx|LdBPK\_190350 | UD | N |
| ASCt2|LdBPK\_270100 | UD | N |   | FTHFLr|LdBPK\_302590 | UD | N |   | PMTCOAe|LdBPK\_061110 | UD | N |
| ASCt2|LdBPK\_292260 | UD | N |   | FUMg|LdBPK\_340070 | UD | N |   | PMTCOAter|LdBPK\_060480 | UD | N |
| ASCt2|LdBPK\_300370 | UD | N |   | FUMm|LdBPK\_361200 | UD | N |   | PNS1|LdBPK\_020470 | UD | N |
| ASCt2|LdBPK\_300620 | UD | N |   | G3PDcm|LdBPK\_261530 | UD | N |   | PNS3|LdBPK\_260040 | UD | N |
| ASCt2|LdBPK\_321900 | UD | N |   | G3PDcm|LdBPK\_332740 | UD | N |   | PNTK|LdBPK\_091100 | UD | N |
| ASCt2|LdBPK\_364460 | UD | N |   | G3PDcm|LdBPK\_361200 | UD | N |   | PNTO\_Rte|LdBPK\_322800 | UD | N |
| ASNN|LdBPK\_221390 | UD | N |   | G5SAm\_spt|LdBPK\_060350 | UD | N |   | PNTO\_Rte|LdBPK\_331510 | UD | N |
| ASNS3|LdBPK\_150440 | UD | N |   | G5SDrm|LdBPK\_330730 | UD | N |   | PNTO\_Rte|LdBPK\_355070 | UD | N |
| ASNt6|LdBPK\_354790 | UD | N |   | G6PDAg|LdBPK\_050180 | UD | N |   | PNTO\_Rte|LdBPK\_355320 | UD | N |
| ASNt6|LdBPK\_363990 | UD | N |   | G6PDAg|LdBPK\_250020 | UD | N |   | PNTO\_Rte|LdBPK\_360450 | UD | N |
| ASNt6|LdBPK\_364000 | UD | N |   | G6PDHg|LdBPK\_366160 | UD | N |   | PNTO\_Rte|LdBPK\_367150 | UD | N |
| ASNtg|LdBPK\_240790 | UD | N |   | G6Ptg|LdBPK\_160550 | UD | N |   | PNTOt2|LdBPK\_360060 | UD | N |
| ASPCT|LdBPK\_210700 | UD | N |   | GALKx|LdBPK\_241880 | UD | N |   | PPA\_1|LdBPK\_271330 | UD | N |
| ASPTA1m|LdBPK\_230860 | UD | N |   | GALKx|LdBPK\_242110 | UD | N |   | PPA\_1|LdBPK\_351480 | UD | N |
| ASPTA4|LdBPK\_340630 | UD | N |   | GALKx|LdBPK\_272390 | UD | N |   | PPATM|LdBPK\_260120 | UD | N |
| ASPtg|LdBPK\_111000 | UD | N |   | GALS3a|LdBPK\_241880 | UD | N |   | PPCDC|LdBPK\_030970 | UD | N |
| ASPTRS|LdBPK\_364650 | UD | N |   | GALS3a|LdBPK\_242110 | UD | N |   | PPCDC|LdBPK\_366160 | UD | N |
| ATPS|LdBPK\_070360 | UD | N |   | GALS3a|LdBPK\_272390 | UD | N |   | PPCKg|LdBPK\_262290 | UD | N |
| ATPSm|LdBPK\_141280 | UD | N |   | GAM6Ptg|LdBPK\_160540 | UD | N |   | PPDKg|LdBPK\_251160 | UD | N |
| BTCOAter|LdBPK\_353280 | UD | N |   | GAMNCt|LdBPK\_050980 | UD | N |   | PPit|LdBPK\_360060 | UD | N |
| BTCOAtm|LdBPK\_240370 | UD | N |   | GAMNCt|LdBPK\_170320 | UD | N |   | PPItg|LdBPK\_160580 | UD | N |
| BTMAT1m|LdBPK\_261530 | UD | N |   | GAMNCt|LdBPK\_181460 | UD | N |   | PPItm|LdBPK\_260030 | UD | N |
| BTMAT1m|LdBPK\_361200 | UD | N |   | GAMNCt|LdBPK\_270300 | UD | N |   | PPItn|LdBPK\_331150 | UD | N |
| BTMAT1m1|LdBPK\_351190 | UD | N |   | GAMNCt|LdBPK\_270590 | UD | N |   | PPItn|LdBPK\_362390 | UD | N |
| C14STRr|LdBPK\_150940 | UD | N |   | GAMNCt|LdBPK\_282170 | UD | N |   | PPM2|LdBPK\_180810 | UD | N |
| C14STRr|LdBPK\_171510 | UD | N |   | GAMNCt|LdBPK\_323370 | UD | N |   | PPM2|LdBPK\_240330 | UD | N |
| C3STDH1r|LdBPK\_150940 | UD | N |   | GAMNCt|LdBPK\_352010 | UD | N |   | PPM2|LdBPK\_366160 | UD | N |
| C3STDH1r|LdBPK\_171510 | UD | N |   | GAMNCtg|LdBPK\_323110 | UD | N |   | PPPGO|LdBPK\_312360 | UD | N |
| C3STDH2r|LdBPK\_302970 | UD | N |   | GAMNCtg|LdBPK\_353910 | UD | N |   | PRODXm|LdBPK\_210300 | UD | N |
| C3STDH2r|LdBPK\_350040 | UD | N |   | GAMNt|LdBPK\_292910 | UD | N |   | PRODXm|LdBPK\_210310 | UD | N |
| C4STMO1r|LdBPK\_044320 | UD | N |   | GAMNtg|LdBPK\_323110 | UD | N |   | PROm|LdBPK\_030190 | UD | N |
| C4STMO1r|LdBPK\_262520 | UD | N |   | GAMNtg|LdBPK\_353910 | UD | N |   | PROTRS|LdBPK\_360040 | UD | N |
| C4STMO1r|LdBPK\_312790 | UD | N |   | GAPD|LdBPK\_100150 | UD | N |   | PRPPSi|LdBPK\_364030 | UD | N |
| C4STMO1r|LdBPK\_350560 | UD | N |   | GAPD|LdBPK\_130390 | UD | N |   | PS\_tm|LdBPK\_211490 | UD | N |
| C4STMO1r|LdBPK\_360400 | UD | N |   | GAPD|LdBPK\_242370 | UD | N |   | PSACTROPtm|LdBPK\_141460 | UD | N |
| C5STDSr|LdBPK\_020100 | UD | N |   | GAPD|LdBPK\_321620 | UD | N |   | PSD|LdBPK\_141420 | UD | N |
| C5STDSr|LdBPK\_201140 | UD | N |   | GAPD|LdBPK\_343280 | UD | N |   | PSEUTROPtm|LdBPK\_330250 | UD | N |
| C5STDSr|LdBPK\_242090 | UD | N |   | GAPt|LdBPK\_060580 | UD | N |   | PTD1INOter|LdBPK\_365160 | UD | N |
| C5STDSr|LdBPK\_301840 | UD | N |   | GCCa|LdBPK\_140700 | UD | N |   | PTHK|LdBPK\_030970 | UD | N |
| C5STDSr|LdBPK\_343750 | UD | N |   | GCCb|LdBPK\_181050 | UD | N |   | PTHK|LdBPK\_366160 | UD | N |
| C5STDSr|LdBPK\_344160 | UD | N |   | GDNBT|LdBPK\_060980 | UD | N |   | PTR1a|LdBPK\_353070 | UD | N |
| C8STIr|LdBPK\_343370 | UD | N |   | GK1er|LdBPK\_210300 | UD | N |   | PTRCt|LdBPK\_051140 | UD | N |
| CaATPAC|LdBPK\_341860 | UD | N |   | GK1er|LdBPK\_210310 | UD | N |   | PTRCt|LdBPK\_120480 | UD | N |
| CDAL2|LdBPK\_060910 | UD | N |   | GK1er|LdBPK\_362450 | UD | N |   | PTRCt|LdBPK\_180560 | UD | N |
| CDAL2|LdBPK\_282700 | UD | N |   | GLCBt2|LdBPK\_171450 | UD | N |   | PTRCt|LdBPK\_211590 | UD | N |
| CDAL2|LdBPK\_352780 | UD | N |   | GLCBtg|LdBPK\_170410 | UD | N |   | PTRCt|LdBPK\_212160 | UD | N |
| CDGPTm|LdBPK\_261530 | UD | N |   | GLCBtg|LdBPK\_322210 | UD | N |   | PTRCt|LdBPK\_230150 | UD | N |
| CDGPTm|LdBPK\_292420 | UD | N |   | GLCRtm|LdBPK\_151120 | UD | N |   | PTRCt|LdBPK\_230380 | UD | N |
| CDGPTm|LdBPK\_323830 | UD | N |   | GLCRtm|LdBPK\_151140 | UD | N |   | PTRCt|LdBPK\_281260 | UD | N |
| CDGPTm|LdBPK\_332740 | UD | N |   | GLINCOAtm|LdBPK\_330250 | UD | N |   | PTRCt|LdBPK\_282610 | UD | N |
| CDGPTm|LdBPK\_350360 | UD | N |   | GLNS\_i|LdBPK\_060910 | UD | N |   | PTRCt|LdBPK\_303720 | UD | N |
| CDGPTm|LdBPK\_363440 | UD | N |   | GLNS\_i|LdBPK\_282700 | UD | N |   | PTRCt|LdBPK\_320970 | UD | N |
| CDPCHOLtm|LdBPK\_242150 | UD | N |   | GLNS\_i|LdBPK\_352780 | UD | N |   | PTRCt|LdBPK\_343460 | UD | N |
| CDPDSP|LdBPK\_261530 | UD | N |   | GLNtm|LdBPK\_170870 | UD | N |   | PTRCt|LdBPK\_350710 | UD | N |
| CDPDSP|LdBPK\_292420 | UD | N |   | GLNtn|LdBPK\_323110 | UD | N |   | PTRCt|LdBPK\_363250 | UD | N |
| CDPDSP|LdBPK\_323830 | UD | N |   | GLNtn|LdBPK\_353910 | UD | N |   | PTROPACE|LdBPK\_260790 | UD | N |
| CDPDSP|LdBPK\_332740 | UD | N |   | GLNTRNAtm|LdBPK\_292910 | UD | N |   | PUNP6|LdBPK\_120490 | UD | N |
| CDPDSP|LdBPK\_350360 | UD | N |   | GLNTRS|LdBPK\_060910 | UD | N |   | PUNP8I|LdBPK\_151070 | UD | N |
| CDPDSP|LdBPK\_363440 | UD | N |   | GLNTRS|LdBPK\_282700 | UD | N |   | PYDXK|LdBPK\_161410 | UD | N |
| CDPDSPm|LdBPK\_261530 | UD | N |   | GLNTRS|LdBPK\_352780 | UD | N |   | PYDXNt|LdBPK\_070700 | UD | N |
| CDPDSPm|LdBPK\_292420 | UD | N |   | GLNTRSm\_i|LdBPK\_060910 | UD | N |   | PYDXNt|LdBPK\_070720 | UD | N |
| CDPDSPm|LdBPK\_323830 | UD | N |   | GLNTRSm\_i|LdBPK\_282700 | UD | N |   | PYDXt|LdBPK\_221380 | UD | N |
| CDPDSPm|LdBPK\_332740 | UD | N |   | GLNTRSm\_i|LdBPK\_352780 | UD | N |   | PYRt2|LdBPK\_340080 | UD | N |
| CDPDSPm|LdBPK\_350360 | UD | N |   | GLU5K|LdBPK\_322470 | UD | N |   | QDPR|LdBPK\_262500 | UD | N |
| CDPDSPm|LdBPK\_363440 | UD | N |   | GLUCYSL|LdBPK\_060910 | UD | N |   | RAFFH|LdBPK\_241880 | UD | N |
| CDPtn|LdBPK\_331150 | UD | N |   | GLUCYSL|LdBPK\_282700 | UD | N |   | RAFFH|LdBPK\_242110 | UD | N |
| CDPtn|LdBPK\_362390 | UD | N |   | GLUCYSL|LdBPK\_352780 | UD | N |   | RAFFH|LdBPK\_272390 | UD | N |
| CH4tn|LdBPK\_323110 | UD | N |   | GLUDx\_M|LdBPK\_230860 | UD | N |   | RBK\_Dg|LdBPK\_161340 | UD | N |
| CH4tn|LdBPK\_353910 | UD | N |   | GLUt6|LdBPK\_231270 | UD | N |   | RBK\_Dg|LdBPK\_355060 | UD | N |
| CHLPCTD|LdBPK\_261530 | UD | N |   | GLUTCOAtm|LdBPK\_292910 | UD | N |   | RBLLtg|LdBPK\_060890 | UD | N |
| CHLPCTD|LdBPK\_292420 | UD | N |   | GLUTRS|LdBPK\_060910 | UD | N |   | RNDR1\_n|LdBPK\_120490 | UD | N |
| CHLPCTD|LdBPK\_323830 | UD | N |   | GLUTRS|LdBPK\_282700 | UD | N |   | RNDR3\_n|LdBPK\_200120 | UD | N |
| CHLPCTD|LdBPK\_332740 | UD | N |   | GLUTRS|LdBPK\_352780 | UD | N |   | RNDR4\_n|LdBPK\_200110 | UD | N |
| CHLPCTD|LdBPK\_350360 | UD | N |   | GLUTRSm|LdBPK\_060910 | UD | N |   | RPE|LdBPK\_180810 | UD | N |
| CHLPCTD|LdBPK\_363440 | UD | N |   | GLUTRSm|LdBPK\_282700 | UD | N |   | RPE|LdBPK\_240330 | UD | N |
| CHLt6|LdBPK\_110210 | UD | N |   | GLUTRSm|LdBPK\_352780 | UD | N |   | RPE|LdBPK\_366160 | UD | N |
| CHOLK|LdBPK\_261530 | UD | N |   | GLYALDtm|LdBPK\_252480 | UD | N |   | RPEg|LdBPK\_200500 | UD | N |
| CHOLK|LdBPK\_292420 | UD | N |   | GLYALDtm|LdBPK\_361410 | UD | N |   | RPEg|LdBPK\_280240 | UD | N |
| CHOLK|LdBPK\_323830 | UD | N |   | GLYCt5|LdBPK\_311240 | UD | N |   | RU5PLtg|LdBPK\_323110 | UD | N |
| CHOLK|LdBPK\_332740 | UD | N |   | GLYCtg|LdBPK\_323110 | UD | N |   | RU5PLtg|LdBPK\_353910 | UD | N |
| CHOLK|LdBPK\_350360 | UD | N |   | GLYCtg|LdBPK\_353910 | UD | N |   | Ru5ptg|LdBPK\_221110 | UD | N |
| CHOLK|LdBPK\_363440 | UD | N |   | GLYKg|LdBPK\_230860 | UD | N |   | Ru5ptg|LdBPK\_271970 | UD | N |
| CLPNSm|LdBPK\_010490 | UD | N |   | GLYOX1|LdBPK\_230120 | UD | N |   | Ru5ptg|LdBPK\_280980 | UD | N |
| CLPNSm|LdBPK\_010510 | UD | N |   | GLYt6|LdBPK\_060890 | UD | N |   | S6PFH|LdBPK\_241880 | UD | N |
| CLPNSm|LdBPK\_010520 | UD | N |   | GLYt6|LdBPK\_230310 | UD | N |   | S6PFH|LdBPK\_242110 | UD | N |
| CLPNSm|LdBPK\_010540 | UD | N |   | GLYTm|LdBPK\_300940 | UD | N |   | S6PFH|LdBPK\_272390 | UD | N |
| CLPNSm|LdBPK\_010550 | UD | N |   | GLYTm|LdBPK\_300950 | UD | N |   | S7Ptg|LdBPK\_323110 | UD | N |
| CLPNSm|LdBPK\_030220 | UD | N |   | GLYTm|LdBPK\_343380 | UD | N |   | S7Ptg|LdBPK\_353910 | UD | N |
| CLPNSm|LdBPK\_130300 | UD | N |   | GMPS2|LdBPK\_354660 | UD | N |   | SAM24MTr|LdBPK\_190350 | UD | N |
| CLPNSm|LdBPK\_281250 | UD | N |   | GMPter|LdBPK\_050830 | UD | N |   | SBPP1r|LdBPK\_313030 | UD | N |
| CLPNte|LdBPK\_330310 | UD | N |   | GPAM|LdBPK\_261530 | UD | N |   | SELPS|LdBPK\_030580 | UD | N |
| CLPNte|LdBPK\_366560 | UD | N |   | GPAM|LdBPK\_332740 | UD | N |   | SELPS|LdBPK\_120850 | UD | N |
| CLPNtm|LdBPK\_242150 | UD | N |   | GPAM|LdBPK\_361200 | UD | N |   | SERD\_L|LdBPK\_321220 | UD | N |
| CO2t|LdBPK\_340080 | UD | N |   | GPDDA2|LdBPK\_261530 | UD | N |   | SERPTr|LdBPK\_111010 | UD | N |
| CO2tm|LdBPK\_330250 | UD | N |   | GPDDA2|LdBPK\_332740 | UD | N |   | SERter|LdBPK\_310010 | UD | N |
| CO2tp|LdBPK\_160560 | UD | N |   | GPDDA2|LdBPK\_361200 | UD | N |   | SERtm|LdBPK\_100270 | UD | N |
| COAter|LdBPK\_353280 | UD | N |   | GRTT|LdBPK\_050180 | UD | N |   | SERtm|LdBPK\_110220 | UD | N |
| COAtg|LdBPK\_323110 | UD | N |   | GRTT|LdBPK\_250020 | UD | N |   | SGPL12r|LdBPK\_150940 | UD | N |
| COAtg|LdBPK\_353910 | UD | N |   | GSADHm|LdBPK\_332650 | UD | N |   | SGPL12r|LdBPK\_171510 | UD | N |
| COAtm|LdBPK\_242150 | UD | N |   | GSN2t|LdBPK\_342500 | UD | N |   | SHMT|LdBPK\_353130 | UD | N |
| CPPPGO|LdBPK\_313250 | UD | N |   | GSS|LdBPK\_310860 | UD | N |   | SHSL1|LdBPK\_181660 | UD | N |
| CSm|LdBPK\_131420 | UD | N |   | GSS|LdBPK\_310870 | UD | N |   | SHSL4r|LdBPK\_120580 | UD | N |
| CTL2|LdBPK\_240370 | UD | N |   | GSS|LdBPK\_312540 | UD | N |   | SHSL4r|LdBPK\_350840 | UD | N |
| CTL2|LdBPK\_350840 | UD | N |   | GTHS|LdBPK\_230860 | UD | N |   | SINCOAL|LdBPK\_140470 | UD | N |
| CTPS2n|LdBPK\_210700 | UD | N |   | GUAt2|LdBPK\_354790 | UD | N |   | SPHK21r|LdBPK\_111010 | UD | N |
| CTPtm|LdBPK\_282880 | UD | N |   | GUAt2|LdBPK\_363990 | UD | N |   | SPMDte|LdBPK\_330310 | UD | N |
| CTPtn|LdBPK\_010310 | UD | N |   | GUAt2|LdBPK\_364000 | UD | N |   | SPMDte|LdBPK\_366560 | UD | N |
| CYOO6m|LdBPK\_181310 | UD | N |   | H2St|LdBPK\_030890 | UD | N |   | SPMS|LdBPK\_310860 | UD | N |
| CYSDS|LdBPK\_311070 | UD | N |   | H3MS|LdBPK\_302360 | UD | N |   | SPMS|LdBPK\_310870 | UD | N |
| CYSt6|LdBPK\_354790 | UD | N |   | HACD1m|LdBPK\_332860 | UD | N |   | SPMS|LdBPK\_312540 | UD | N |
| CYSt6|LdBPK\_363990 | UD | N |   | HACD3m|LdBPK\_332860 | UD | N |   | SQer|LdBPK\_363230 | UD | N |
| CYSt6|LdBPK\_364000 | UD | N |   | HACD5m|LdBPK\_332860 | UD | N |   | SQLS|LdBPK\_150270 | UD | N |
| CYSTRS|LdBPK\_261530 | UD | N |   | HACD8m|LdBPK\_230300 | UD | N |   | SQLS|LdBPK\_300130 | UD | N |
| CYSTRS|LdBPK\_292420 | UD | N |   | HACD9m|LdBPK\_030190 | UD | N |   | SQLter|LdBPK\_364100 | UD | N |
| CYSTRS|LdBPK\_350360 | UD | N |   | HBCOADm|LdBPK\_030190 | UD | N |   | SRTNtn|LdBPK\_323110 | UD | N |
| CYSTS|LdBPK\_240370 | UD | N |   | HBCOAE|LdBPK\_131420 | UD | N |   | SRTNtn|LdBPK\_353910 | UD | N |
| CYSTS|LdBPK\_350840 | UD | N |   | HBUHL1m|LdBPK\_261530 | UD | N |   | ST14DMr|LdBPK\_282600 | UD | N |
| CYT1t|LdBPK\_040010 | UD | N |   | HBUHL1m|LdBPK\_361200 | UD | N |   | STRCOAtg|LdBPK\_221110 | UD | N |
| CYT1t|LdBPK\_331060 | UD | N |   | HCO3Em|LdBPK\_322070 | UD | N |   | STRCOAtg|LdBPK\_271970 | UD | N |
| CYTK1|LdBPK\_120490 | UD | N |   | HCYSMT|LdBPK\_160590 | UD | N |   | STRCOAtg|LdBPK\_280980 | UD | N |
| CYTK1|LdBPK\_343160 | UD | N |   | HDCOADm|LdBPK\_363750 | UD | N |   | STRCOAtm|LdBPK\_351490 | UD | N |
| CYTK1n|LdBPK\_080060 | UD | N |   | HDDHL5m|LdBPK\_180580 | UD | N |   | Succoatm|LdBPK\_300940 | UD | N |
| CYTK1n|LdBPK\_282380 | UD | N |   | HDDHL5m|LdBPK\_323830 | UD | N |   | Succoatm|LdBPK\_300950 | UD | N |
| CYTK1n|LdBPK\_332230 | UD | N |   | HDDHL5m|LdBPK\_332740 | UD | N |   | Succoatm|LdBPK\_343380 | UD | N |
| CYTK1n|LdBPK\_364270 | UD | N |   | HDDR5m|LdBPK\_270740 | UD | N |   | SUCCt6|LdBPK\_280140 | UD | N |
| CYTK1n|LdBPK\_366960 | UD | N |   | HDDR5m|LdBPK\_363630 | UD | N |   | SUCCtg|LdBPK\_100040 | UD | N |
| D\_LACt2|LdBPK\_301550 | UD | N |   | HDMAT7m|LdBPK\_252220 | UD | N |   | SUCOGDPm|LdBPK\_261530 | UD | N |
| DADAr|LdBPK\_030030 | UD | N |   | HDMAT7m|LdBPK\_252230 | UD | N |   | SUCOGDPm|LdBPK\_292420 | UD | N |
| DADK|LdBPK\_070420 | UD | N |   | HDMAT7m|LdBPK\_363100 | UD | N |   | SUCOGDPm|LdBPK\_350360 | UD | N |
| DADKg|LdBPK\_010500 | UD | N |   | HDMAT7m7|LdBPK\_363750 | UD | N |   | T2M26DCOAtm|LdBPK\_060910 | UD | N |
| DAGAT|LdBPK\_010490 | UD | N |   | HEMEASm|LdBPK\_313250 | UD | N |   | T2M26DCOAtm|LdBPK\_070150 | UD | N |
| DAGAT|LdBPK\_010510 | UD | N |   | hemeAtm|LdBPK\_300940 | UD | N |   | T2M26DCOAtm|LdBPK\_282700 | UD | N |
| DAGAT|LdBPK\_010520 | UD | N |   | hemeAtm|LdBPK\_300950 | UD | N |   | T2M26DCOAtm|LdBPK\_352780 | UD | N |
| DAGAT|LdBPK\_010540 | UD | N |   | hemeAtm|LdBPK\_343380 | UD | N |   | TAL|LdBPK\_100560 | UD | N |
| DAGAT|LdBPK\_010550 | UD | N |   | Her|LdBPK\_353280 | UD | N |   | TCAFCOAL|LdBPK\_140470 | UD | N |
| DAGAT|LdBPK\_030220 | UD | N |   | HEX4g|LdBPK\_140770 | UD | N |   | TCINCOAL|LdBPK\_170300 | UD | N |
| DAGAT|LdBPK\_130300 | UD | N |   | HEX4g|LdBPK\_140790 | UD | N |   | TDCOAtg|LdBPK\_323110 | UD | N |
| DAGAT|LdBPK\_281250 | UD | N |   | HEX4g|LdBPK\_140800 | UD | N |   | TDCOAtg|LdBPK\_353910 | UD | N |
| DAGCPT|LdBPK\_010490 | UD | N |   | HEXg|LdBPK\_051160 | UD | N |   | TDPGDH|LdBPK\_200980 | UD | N |
| DAGCPT|LdBPK\_010510 | UD | N |   | HEXNCg|LdBPK\_342110 | UD | N |   | TDPGDH|LdBPK\_344230 | UD | N |
| DAGCPT|LdBPK\_010520 | UD | N |   | HHDHL7m|LdBPK\_261530 | UD | N |   | THFAT|LdBPK\_100430 | UD | N |
| DAGCPT|LdBPK\_010540 | UD | N |   | HHDHL7m|LdBPK\_292420 | UD | N |   | THFOCi|LdBPK\_340630 | UD | N |
| DAGCPT|LdBPK\_010550 | UD | N |   | HHDHL7m|LdBPK\_350360 | UD | N |   | THFtm|LdBPK\_191010 | UD | N |
| DAGCPT|LdBPK\_030220 | UD | N |   | HHDR7m|LdBPK\_292080 | UD | N |   | THFtm|LdBPK\_320920 | UD | N |
| DAGCPT|LdBPK\_130300 | UD | N |   | HIBHrm|LdBPK\_292250 | UD | N |   | THRLAD|LdBPK\_140710 | UD | N |
| THRLAD|LdBPK\_140760 | UD | N |   | THRt6|LdBPK\_181490 | UD | N |   |  |  |  |
| THRLAD|LdBPK\_140740 | UD | N |   | THRLAD|LdBPK\_140750 | UD | N |   |  |  |  |