

Fig. S6

A

YP\_919986.1 -----MSSSP-----AARRELSYSWYFFDEPPLSVEKAWRLVQS-----SRFGKTE-----ILVGDVVEK 52  
YP\_003816556.1 -----MSGQLRR-----IVEMQDQWVKV-----ICIGDVSVA 26  
YP\_007174639.1 -----MKFVGLTLP-----ENVRYDFSQPRFRVLSG-----REWNFT-----ICVGDVVEY 49  
NP\_147085.1 -----MSVALSIPLLSLP-----EDMREALAAAAPVYSG-----DRFRRLQ-----TPCSGV-----ACTGDVVSQ 54  
YP\_008603597.1 -----MTTKHLLPVLSLP-----EDLRESLASAAPVYSG-----ERFVDEIAA-----TPCGGV-----ACTGDVVSQ 54  
YP\_006363113.1 -----MFLPSPVLR-----EFRRSASLPQCTIYASKGGTVRGLFT-----ATVGDVVE 47  
YP\_001040844.1 -----MKSIFIVPVLPKE-----SYLRKILSTPOCTIYIG-----KYPIKDLEAH-----ILVGDVBSN 49  
YP\_003669616.1 -----MKNKFIIPVLPKE-----SYLRKILCSPOCTIYIG-----KYPIKDLEAH-----ILVGDVBSN 49  
YP\_003650585.1 -----MASAGRSIPCLKPP-----DHLRKALSPOCTIYVVS-----DKQAITGLSCD-----AAVGDVBS 51  
YP\_004177111.1 -----MTRRLPVLPKE-----EHRSLGLIPOCTIYVVSRTRGLVQGLEAD-----VAVGDVBS 49  
YP\_002429036.1 -----MNKAIIPVLPKE-----VDFRLSLSPQCTIYVVSPPDRGLVYGLRAD-----AAVGDVBS 49  
YP\_006402879.1 -----MNKAIIPVLPKE-----VDFRLSLSPQCTIYVVSPPDRGLVYGLRAE-----AAVGDVBS 49  
YP\_004780378.1 -----MHVASPPPGYCLEPS-----EELREYMRRSKYLAYNT-----AELSELSKR-----DRR-----AVTGDYTAR 54  
YP\_005841883.1 -----MN-----DKLKKVLESEFPVYSG-----SSFENLIKTHN-----KFRYITIGDVT 44  
YP\_930015.1 -----MTCFKLC-----CRRDLFAPPYVPIIWKPEPPRSIEVVRDLVES-----YGIEQI-----YTVGDVIT 53  
YP\_001794902.1 -----MRCRLRI-----RERRDLFAPPYVPIIWRDPPRSLEVVSDLALS-----YGVHEH-----YTVGDVVK 53  
YP\_001056647.1 -----MTCYRLA-----KRRDLFAPPYVPIIWRDPPKSEIVRNLVAD-----GGFKH-----YTVGDVTR 53  
YP\_001153914.1 -----MTCYKLS-----RRRDLFAPPYPLTVWRDPPRSVEVVRDFVES-----YDIRH-----YTVGDVTR 53  
YP\_005259057.1 -----MTCYKLS-----RRRDLFAPPYPLTVWRDPPRSVEVVRDFVES-----YDIRH-----YTVGDVTR 53  
NP\_560628.1 -----MEVVKDIAESY-----AER-----YTVGDVTR 25  
YP\_005085004.1 -----MICYRLA-----GRDDLFAFPYVPIIWRDPPSVEFVKNLAES-----YGAVH-----YTVGDVTR 53  
YP\_004337001.1 -----MKVP-----EGRRHLFAFPYVPIIWRDPPRSVELAAEIAAD-----LGAAR-----FTVGDVVA 51  
YP\_004892291.1 -----MRCRLRP-----EERRELFAPPYVPIIWRDPPRSVELALAVAGD-----FGVKI-----YTVGDVVA 54  
YP\_008796927.1 -----MTNLRSPRIVFTEDMKNRVRKPLERHGH-----DLNYSPELAQ-----AKPL-----VVVGDYTR 52  
YP\_003860570.1 -----MLNDLGITKNGTAEFCFLMP-----NELRNLT-----YFHVKCSVYLTRGRDESIGI-----LLRLLYSNVHETMVGDCCK 71  
YP\_008071435.1 -----MRELSTGFEPLVVKL-----EDLKIQLGEC-----CVKQ-----LSVGDVBY 37  
YP\_007687666.1 -----MSAGRLQ-----PSLREEFQKPVGRDIGI-----SELRTIDA-----KL-----IAGDVS 45  
YP\_007713106.1 -----MGMAAGRLR-----PEMREVFQPPVGRDISE-----SELSQIHA-----KHI-----ITVGDV 48  
YP\_001541769.1 -----MSETNHPRLLR-----SKRARALMALPFRSIPRDPDSIMIARELFND-----FKLSI-----ATVGDV 60  
YP\_003902647.1 -----MYVLVS-----KWARSMMAWPLGIIISKEAPDSIIRVSEYGN-----SFI-----ITVGDV 50  
YP\_004244378.1 -----MYVLA-----SKWARSMMAWPLGIIISREAPESIVRSEYSES-----SFI-----ITVGDV 50  
YP\_001737791.1 -----MLFDLKL-----EDKRGKSEIKSIIKSIKSI-----LDLLEN-----KRE-----ISVGDVTR 43  
YP\_023646.1 -----MQLKFDHDLVNL-----QESINRIKEFSSHSCS-----IDDIKKGGR-----I-----ITVGDVTE 48  
YP\_008142358.1 -----MPLKLDNRNIVIG-----SREKRYIQDFKYSKCS-----VDDIRELALK-----NKI-----ISVGDVTE 50  
NP\_111003.1 -----MLLRSGSKYIIT-----AEAREEIKKRNKRVVT-----IDEMVEVSKS-----TQ-----DSVGDV 50  
NP\_394550.1 -----MT-----ESARQKIKGRNRVWDP-----DEVRLDLSVD-----HPV-----AAVGDV 40  
NP\_341954.1 -----MEVRNKNKVNLCFSF-----DNLRNELSRPYGIEFTN-----NKIFLEFISK-----SIQGRSR-----ITVGDV 59  
YP\_005643228.1 -----MEVRNKNKVNLCFSF-----DNLRNELSRPYGIEFTN-----NKIFLEFISK-----SIQGRSR-----ITVGDV 59  
YP\_002915007.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_002829735.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_002843724.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_005648862.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_005646225.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_007866027.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_002832457.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_002840150.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_003419971.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_002837983.1 -----MEIRDNNKVNLCFAF-----DNLRKELSRPYGIEFTN-----NKVFLDFVSK-----SIQGGFKY-----ITVGDV 59  
YP\_004457895.1 -----MEIRDKYKVDLCFYLP-----KEVRKELSRPYGIEFTN-----TEKLLKYVDN-----FERI-----ITVGDV 56  
YP\_001192301.1 -----MEVRYKRVLDLCFRPP-----KTRVAELSRPYGIEFTN-----NAKLLSYLGQ-----FERI-----ITVGDV 56  
YP\_004408663.1 -----MP-----DSIKKELTRPYGIEFTN-----NDIFINFILE-----KKNNR-----ITVGDV 44  
NP\_376249.1 -----MP-----RSLRAELSKPYGIEFTN-----ENKLLKQFLN-----KNSNR-----ITVGDV 44  
YP\_007433930.1 -----MP-----RSLRAELSKPYGIEFTN-----ENKLLKQFLN-----KNSNR-----ITVGDV 44  
YP\_007436201.1 -----MP-----RSLRAELSKPYGIEFTN-----ENKLLKQFLN-----KNSNR-----ITVGDV 44  
YP\_255496.1 -----MP-----RSLRAELSKPYGIEFTN-----ENKLLKQFLN-----KNSNR-----ITVGDV 44  
YP\_008946885.1 -----MEIRNNSIDLCFILP-----RNLRAELSKPYGIEFTN-----ENKLLKQFLN-----MSNSR-----ITVGDV 58  
YP\_001012648.1 -----MPIN-----ENDARLLKQPFIEVDPD-----KQVTKRKVASVLKG-----VKQ-----IAGDVA 48  
YP\_006862428.1 -----MPIL-----MTEILDMSVNKEAVLREAPP-----TIE-----VTGDVTE 34  
YP\_875902.1 -----MKIPLGIIPE-----NQTSKNEIQKYLE-----NSYI-----ITVGDRT 38  
YP\_006776123.1 -----MKIPLGIIPE-----NQTSKNEIQKYLE-----NSYI-----ITVGDRT 38  
YP\_001582567.1 -----MKIPLGIIPE-----NQADKENILKHLE-----NSYI-----ITVGDRT 38  
YP\_006774212.1 -----MKLP-----DSLREQMKIPLGIIPE-----SQSNKENILKHIEQ-----NSYI-----ITVGDRT 48  
ZP\_08257196.1 -----MKLP-----DSLREQMKIPLGIIPE-----SQVNKSNIQKHLK-----NPYI-----ITVGDRT 48  
ZP\_08668423.1 -----MKLT-----EVRAPAKKPPGELVYRGG-----VDVVKRVLKG-----DEF-----VCGDVL 47  
YP\_003400341.1 -----MLRMP-----ESLRKLDLQKPYRVRVYRGRGVELVKRIEELRKA-----KYI-----ACTGDV 49  
NP\_069944.1 -----MKGLRPL-----ESMREELAKPHKRYRGGKELLLVEEISEA-----KPF-----CTGDVVA 51  
YP\_007906114.1 -----MAVKGKLP-----DSLRYLAKPHKRYRGTGKGEDTVEKIEELGKY-----SPLE-----ICVGDV 53  
YP\_001434673.1 -----MTRLLASPRGAVKVD-----DRLLPFLLR-----GKTE-----VTGDVTK 37  
NP\_614736.1 -----MTVVLRPL-----RELREPLRRPWTIYPRPSIKTYRRLHEESEV-----DI-----ITVGDVTR 50  
YP\_003706636.1 -----MNNYIMT-----KELQSILKTPLEKHYKD-----IPEVFKIVKD-----ISISNLI-----ISVGDIT 51  
YP\_001323935.1 -----MYILT-----DKVATELKKPPEKWKYE-----LNSIEG-----KW-----ISVGDIT 39  
YP\_001330653.1 -----MYLLN-----DEVARELKKPPEKWKYE-----LPSIDG-----KW-----VSIGDVT 39  
YP\_001097707.1 -----MYLLN-----DKVAHELKKPPEKWKYE-----LPSIEG-----KW-----VSIGDVT 39  
YP\_004742083.1 -----MYLLN-----DKVAHELKKPPEKWKYE-----LPSIEG-----KW-----VSIGDVT 39  
NP\_987562.1 -----MYLLN-----DKVAHELKKPPEKWKYE-----LPSIEG-----KW-----VSIGDVT 39  
YP\_001548519.1 -----MYLLN-----DKVAHELKKPPEKWKYE-----LPSIEG-----KW-----VSIGDVT 39  
YP\_001324483.1 -----MYMLN-----ESTKEILKKPPEKWKYE-----LPPINR-----KNNIATAGDIT 41  
YP\_004484635.1 -----MYILT-----DELKLLKKPPEKWKYE-----LPPING-----KW-----VSIGDIT 39  
YP\_004575995.1 -----MYLLN-----ERLEILKKPPEKWKYE-----LPLING-----KW-----ISVGDIT 39  
YP\_003616685.1 -----MLKLP-----DHLREELRKPPEKWKYE-----FPDVG-----DI-----VTGDVTK 39  
YP\_003247808.1 -----MLILP-----EELRDLKKPPEKWKYKT-----LPHIDG-----YI-----ITVGDVTK 39  
YP\_003128192.1 -----MLKLP-----EDLRETLKKPPEKWKYKT-----LPNIDG-----DI-----VTGDVTK 39  
NP\_247369.1 -----MLVLP-----EELREKLLKKPPEKWKYKT-----LPDIDG-----DI-----VTGDVTK 39  
YP\_003458341.1 -----MLMLP-----EELREKLLKKPPEKWKYKT-----LPDIDG-----DI-----VTGDVTK 39  
YP\_008075056.1 -----MLQIT-----TKLIQELKDPLELHYPN-----FEDALEDIKA-----SKFL-----ISVGDCTLN 45  
YP\_001272768.1 -----MLRLDAELNKDITISKLLKPLKRYPH-----FEDAIEEIKS-----SEFL-----ISVGDATFN 49  
YP\_003424221.1 -----MFRID-----ENSIDEFKPLVLYPD-----FEDAIPIKE-----ASFL-----ISVGDQTK 45  
YP\_004004002.1 -----MLILP-----KKLRKLLKKPPEKWKYS-----IDDKNFPPN-----EYK-----ISVGDRT 45  
NP\_275409.1 -----MYLLP-----EELRAELKRLPELHRS-----FSDVDV-----GNSFL-----ITVGDVTR 42  
YP\_003849624.1 -----MYLLP-----EELRAELKRLPELHES-----FRDIDV-----GDSFL-----ITVGDVTR 42  
YP\_447663.1 -----MLTLP-----KYLSELKPLKRYYS-----IDIEEKLHQQLSE-----DKLE-----ISVGDAT 49

Fig. S6

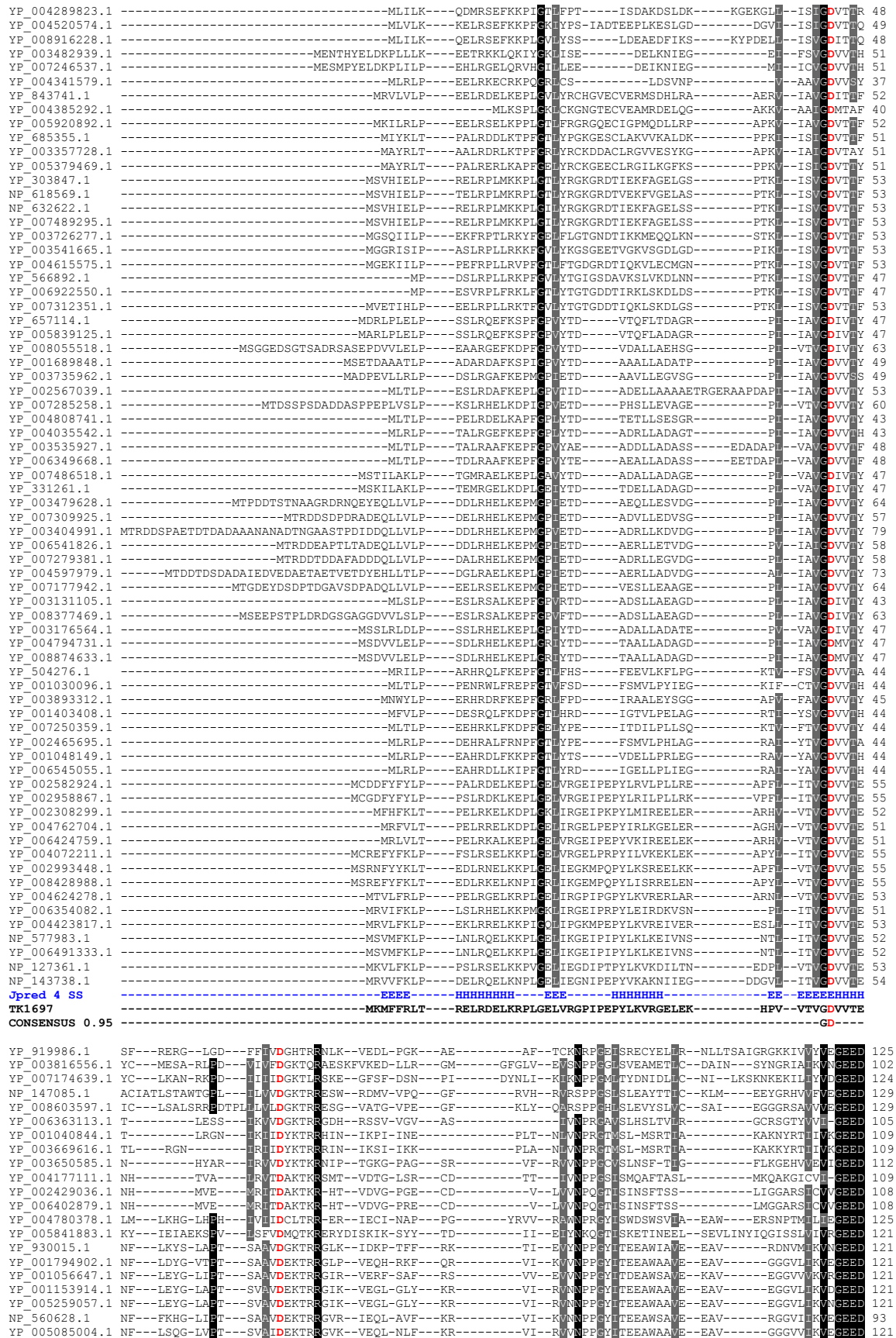


Fig. S6

YF\_004337001.1 NF---LAAG-LAFD---LAVDLKTRSEY---VRTV-EAF---PR-----IL---RVNPPGYTTEEAWAAVE---YA-----VKTPGTLIVDGEED 120  
YF\_004892291.1 NF---LAAG-VVFN---LAVDLKTRREY---VEIT-TRF---PH-----VL---KVNPSPEYTHEAWRAVQ---TA-----VNNDGTLIVDGEED 123  
YF\_008796927.1 RM---IEAG-LRFD---VAVDAKVMNAA---EMPR-LEG---RY-----VT---RVNMAAGVHEPEAAEAAM---SA-----VKKGRGLIVDGEED 144  
YF\_003860570.1 TY---IEFV-GVFR---LAVVDGKTLVYNN---TDIR-DIE---YE-----FNYVE---RCVNPGRCHTTNCEAAK---RCY---KEGVPCRLIVDGEED 121  
YF\_008071435.1 TL---LDNG-FKFD---LAVDLKTRER---RP-FSPL-SSK---LS-----LLCGEEV---VKNPAGYTPELVTEIS---SAL-----GDAPTKRIVDGEED 111  
YF\_007687666.1 TM---REHG-IVPL---LSVVDGYTEREL---TGFADLVR---NT-----GLEET---VVSNPAGTTSQLEDAVE---NAL---AGRSAGIRIVDGEED 119  
YF\_007713106.1 TV---RKHG-IVPL---LSVVDGYTERE---RE-LTGF-ADL---VR---DAGLAET---VVSNPAGTTSQLEDAVE---NAL---AGRSAGIRIVDGEED 122  
YF\_001541769.1 NV---ATYV-RRFD---LAVDLNTRRGTV---IQHS-DMD---GV-----VY---RVNNERSTTSYESFNLR---SAYANV-LSGNRNLIVDGEED 133  
YF\_003902647.1 NT---IRYV-RVFD---LAVDLKTRTIG---MGGV-ETV---GF-----DRVI---NVNPKPATTSIEVINAR---DAMRDA-VNGIHVLTIVDGEED 125  
YF\_004243478.1 NT---IRYV-RVFD---LAVDLKTRTID---MGME-ITG---FD-----KVI---NVNPKPATTSIEVINAR---GAMREA-MGGSRLVLTIVDGEED 124  
YF\_001737391.1 EL---LGSY-RRFE---LAVIDLKEREMN---CSTI-FYL---DD-----YLIL---VVRNPAQTMRMRAWLKR---KAIIS-LSGNAAVIVDGEED 118  
YF\_023646.1 NL---ERAG-LDIF---LAVDLKTRSEK---TYNH-REN---SI-----SIENRPTTSLSLIRAE---SSI---KSNKTRRIVDGEED 116  
YF\_008142358.1 NL---KNAG-IKLN---LAVDLVTRR---DG-KRFM-HEE---GS-----I---TVSNPPGITSIDLNRKY---EFI---STGVHGRIVDGEED 118  
NF\_111003.1 NL---RRAG-AKLF---LAVDLKTRGES---IFQH-EEG---SI-----TVRNDPGTTSFDLIEAK---SSI---ENNKPTRRIVDGEED 118  
NF\_394550.1 NL---RKVN-ARVL---LAVDLKTRSDL---LFAH-EEG---SI-----VIRNDPGTTSFDLIRALQ---SAL---LSDKKTTRIVDGEED 108  
NF\_341954.1 VL---EENG-IVFF---LAVVDGKTKTIT---QNRA-ITR---NK-----EY---KVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_005643228.1 VL---EENG-IVFF---LAVVDGKTKTIT---QNRA-ITR---NK-----EY---KVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_002915007.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_002829735.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_002843724.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_005648862.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_005646225.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_007866027.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QHRA-IVK---NK-----EY---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 129  
YF\_002832457.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QRTI-VKN---KE-----Y---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 128  
YF\_002840150.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QRTI-VKN---KE-----Y---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 128  
YF\_003419971.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QRTI-VKN---KE-----Y---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 128  
YF\_002837983.1 VL---EENG-IVFF---LAVVDGKTKRSIP---QRTI-VKN---KE-----Y---RVNPAEKRFEIFEIME---NIL---KDRGGVIVDGEED 128  
YF\_004457895.1 EL---LKNR-RRVF---LAVVDGKTKRNIK---LHMR-FSN---YI-----YI---MVRNPAQLRSLSAMS YK---AAL---NSFSSVIVDGEED 124  
YF\_001192301.1 LV---TRSG-IRPF---LAVVDGKTKRNVN---ISGERSSE---YI-----YI---MVRNPAQLRSLSAMS YK---EIM---YNSPFRSIVDGEED 123  
YF\_004408663.1 Y-----MTPE---LAVVDGKTKRNT---LDHR-ETE---F-----F---RVNPAQLRSLSAMS YK---SIM---ENRPTTRIVDGEED 61  
NF\_376249.1 TL---YDRN-IRPF---LAVVDGKTKRQIK---VKTV-NEN---VI-----VI---KVNPKSTTRFSVMKIK---NLL---DKNERATIVDGEED 112  
YF\_007433930.1 TI---LKFH-IKPF---LAVVDGKTKRKL---K-EN-FGQ---FE-----YI---KVNPEPLRLSTIREK---DILV---HNENDKILV DGEED 114  
YF\_007436201.1 TI---LKFH-IKPF---LAVVDGKTKR---KL-VKEN-FGQ---FE-----YI---KVNPEPLRLSTIREK---DILV---HNENDKILV DGEED 114  
YF\_255496.1 TI---LKFH-IKPF---LAVVDGKTKR---KL-VKEN-FGQ---FE-----YI---KVNPEPLRLSTIREK---DILV---HNENDKILV DGEED 114  
YF\_008946885.1 TI---LKFH-IRPF---LAVVDGKTKR---KL-VQEN-FGQ---FE-----YL---KVNPEPLRLSTIREK---DI---LV---YHNKDLIVDGEED 128  
YF\_001012648.1 TL---IRHG-VKPF---VAVFDCEARRDK---TCPS-IFE---GY-----AIL---RTRNERSTVEPAGVVR---KAL---RQGHVTVRVDGEED 77  
YF\_006824248.1 RL---VSFG-IKFD---LAVVDGKERESKR---SYSA-SYS---AK-----EL---HCINPACTSKAEAVQVQ---Q---DA---RMPSPVRIVDGEED 118  
YF\_875902.1 RI---SGFG-MTFL---LAVVDGKTRAAH---EPAGPPD---VE-----II---RCENPAAGSPECIETIR---RAL---GSSSPLRIVDGEED 105  
YF\_006766123.1 KM---IDFD-LIFS---LAVVDGQEKREK---IPPK-LKN---AI-----EL---TVDNPPAETSQSISVVK---KAF---TKMSPVRLIVDGEED 108  
YF\_001582567.1 KM---IDFD-LIFS---LAVVDGIEKREK---EPPK-LVN---AT-----EI---TVDNPPAETSQSISVVK---KAF---TKMSPVRLIVDGEED 108  
YF\_006774212.1 KM---IGFD-LIFS---LAVVDGIEKREK---EPPK-LAN---AT-----EI---TVDNPPAETSQSISVVK---KAF---SMKSPVRLIVDGEED 118  
ZF\_08257196.1 KM---VDFG-FIFS---LAVVDNQEKRVKR---EPTKNIHG---YT-----EL---VCENPAEETPQSVEIK---KAF---ESKPPVRLIVDGEED 119  
ZF\_08668423.1 KM---ISFG-FIFS---LAVVDNYEKR---VK-REPT-MSP---TV-----YTEL---TCNPPAETPASIDIK---KAF---LEKTPVRLIVDGEED 105  
YF\_003400341.1 TT---LKAG-FPKP---LAVVDGKSIREL---NSVV-----NIRDLRSRKYKEI---VVENPAQOTEDLAEKVF---EAVNSA-LBGNVRLIVDGEED 126  
YF\_003436628.1 YS---LQAG-YKFD---LAVVDKYTEREKL---DDDFSSKI---SK---LLEGEYKV---EENPQSCSEDLVQV---EAVRN---LGRRRATIVDGEED 128  
NF\_069944.1 SA---IKVG-LTFD---LAVVDGKTLREEN---VEFQEAFF---DE-----VI---ETINPPAHSCELLISAL---KALKLC-EDGRKVLIVDGEED 125  
YF\_007906114.1 YI---FKAG-YNFD---LAVVDFKTIRNEI---DEEV-ISFIESKT---EGYVRL---DWNPPQYITDLVLEK---I---EAVS---LLPKKVLIVDGEED 131  
YF\_001434673.1 RC---LELG-LVFR---LAVVDGKTRSQW---VELR-APN---GV-----L---KAFNPPQCLDAKAVVK---KAILTS---TWKVKVEED 104  
NF\_614736.1 SF---LRCS-IRFD---LAVVDKRMILTVP---VDFG-NKF---PV-----TL---DWNPPPTTREAMDTR---RGIDYA-LDGDATLIVDGEED 123  
YF\_003706636.1 NL---IEYG-IFPK---LAVLDFKTKRDIIP---VDIS-YNF---KK-----VY---TVNPPAETSQTSMEIK---KAF---YLSDIDDREVALIVDGEED 122  
YF\_001323935.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
YF\_00130653.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
YF\_001097707.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
YF\_004742083.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
NF\_987562.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
YF\_001548519.1 HL---LSNG-IVFD---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 110  
YF\_001324483.1 NL---LSKS-IVFN---LAVLDFKTKRNVF---VEIP-HKF---KT-----VF---EVENPPGCSDEAIERK---KAF---YLSDIDRDMALIVDGEED 113  
YF\_004484635.1 TL---LQSG-IVFN---LAVLDFKTKRDIK---VDIE-HKF---KK-----TF---EVENPPGCSDEAIERK---KAF---YLANINDKIALIVDGEED 110  
YF\_004575995.1 NL---LSKN-IVFN---LAVLDFKTKRDIS---VEIN-HKF---KK-----VF---EVENPPGCSDEAIERK---KAF---YLSRNNDDVALIVDGEED 110  
YF\_003616685.1 SA---IEKG-VKIK---LAVLDFKTKRNVF---VEIP-HKF---KT-----TF---EVENPPGCSDEAIERK---KAF---YISQLNDDVALIVDGEED 110  
YF\_003247808.1 TV---IENG-IVFK---LAVLDFKTKRNVF---VEIP-HKF---KT-----VI---KVNPAQCSNPAESIK---KAF---YLSDINDKIALIVDGEED 110  
YF\_003128192.1 TV---IENN-IVFK---LAVLDFKTKRNVF---VEIP-HKF---KT-----II---KVNPAQCSDEAIESK---KAF---YLSDINDKIALIVDGEED 110  
NF\_247369.1 TA---IENN-IVFK---LAVLDFKTKRNVF---VEIP-HKF---KT-----VI---KVNPAQCSDEAIESK---KAF---YLSDINDKIALIVDGEED 110  
YF\_003458341.1 TV---IENN-IVFK---LAVLDFKTKRNVF---VEIP-HKF---KT-----II---KVNPAQCSDEAIESK---KAF---YLSDINDKIALIVDGEED 110  
YF\_008075056.1 NL---ISHN-IVFD---VAVLDNRIQRKDH---DSII-NYT---DN-----IL---TAVNPAQTDDLWETG---FAIKQSIENNTRYIVDGEED 119  
YF\_001272768.1 NL---TKYE-LVFD---LAVLDNRIQRKDH---NHEV-IRA---EN-----IL---KAVNPAQTDDLWETG---QAMKLS-GDGNCHIVDGEED 122  
YF\_003424221.1 NL---LDND-LVFN---LAVLDNRIQRKDH---NHDI-IRT---EN-----IL---KAVNPAQTDDLWETG---LAISSLEDDTRIVDGEED 119  
YF\_004004002.1 NL---VDRG-LVFD---VAVLDNRIOQRKKS---YTRI-EYK---SK-----IL---NVSNPPGTTESLMAK---KAL---KSKEKTIIVDGEED 115  
NF\_275409.1 NA---LEHG-LKFD---VAVLDNRIOQRKKS---DHEF-RTT---AT-----IL---RSRNPPTTETSLWKSIE---EAIEGATERGERFIVDGEED 116  
YF\_003849624.1 NA---LEHG-LKFD---VAVLDNRIOQRKKS---DHEF-RTT---AT-----II---RSTNPPPTTETSLWKSIE---KALDGA-RAGERFIVDGEED 115  
YF\_447663.1 NL---IKLN-IFQF---LAVLDNKIEREPV---EHLK-THT---DN-----LV---HVNPAQOTDELVKICI---DSINTA-TSNPFVIVDGEED 122  
YF\_004289823.1 KM---LDEG-IVFD---VAVLDNKIEREPS---DYEI-CYD---NV-----TL---KTRNPPPTTQDMKTK---EGFSLVEKAGYVIVDGEED 122  
YF\_004520574.1 NM---LDAD-IVFD---VAVLDNKIEREPS---ENEI-YVD---NI-----TL---KTRNPAQTDELQNTG---KSNFLIENEGYVIVDGEED 123  
YF\_008916228.1 NL---QKAD-LIPH---LAVLDNVVERKPA---AYDV-VYD---NV-----TL---NVRNPPGVTDELQETHK---RAFQLV-KSGFVRLIVDGEED 121  
YF\_003482939.1 TL---LNRG-IVPK---LAVVDYKTRGSK---IYEDVKVF---GK-----KII---KVNPRSQTPPELVNAR---EA---MQYDSVKIVDGEED 122  
YF\_007246537.1 TL---LKMG-IVPK---LAVVDYKTRGSK---VFDV-VRS---FG-----ERVF---RVNPAQTTPGLWDAVK---KAL---ISEKNVIVDGEED 123  
YF\_004341579.1 SL---LSMG-RKVF---LAVVDGRTER---RK-FEQL-EEL---ER---MTAEYERI---EVENPPPTTYELVDAK---RAVEVA-AGVPTKIVDGEED 115  
YF\_843741.1 YL---LKAS-FIFD---LAVVDHKTRESVP---EDSI-KRRHLEGS---YRNV---NVNPAQTTEELLDAR---ESL---NGCPTTRIVDGEED 127  
YF\_004385292.1 YL---LKSS-IVFD---LAVVDNKTR---AQ-LPDH-ILQ---SL---EHNSYKRV---EVENPPAQTTEELLDAR---DSL---ACKERVIVDGEED 115  
YF\_005920892.1 CL---LSSSGRKF---LAVVDHKTRESVP---VPDH-VQQ---GI---GDRDEYDI---EVENPPAQTTEELLDAR---ERL---AGNVRKIVDGEED 129  
YF\_685355.1 YL---LKAG-VVFD---MCLVDQTMK---LP-VDHE-VRK---GT---SHHTFKEL---RVNPAQVTOALMDLK---DNM---SSTEPVRLIVDGEED 126  
YF\_003357728.1 HL---LKAG-IVFD---MCLVDQTMK---LP-VAHE-VRK---GT---AHESFVDI---VKNPAQVTOELIDAK---NNM---ASRPVRLIVDGEED 126  
YF\_005379469.1 FL---LKSQ-RVFD---MCLVDLTMK---LP-VDIE-VKQ---GT---AHESFMDV---RVNPAQVTOELIGAR---DNM---YSERPVRIVDGEED 126  
YF\_303847.1 HL---LEVG-IVFD---LAVVDNRTRK---KP-VSSD-VSA---RN---MDKVYEEV---SVDNPAQTDELKTC---EAF---ASEKPLRIVDGEED 128  
NF\_618569.1 HL---LEAG-IVFD---LAVVDNRTRK---KP-VSRD-VSD---RN---RDKVYEEV---SVDNPAQTDELKTC---EAF---ASEKPLRIVDGEED 128  
NF\_632622.1 HL---LEAG-IVFD---LAVVDNRTRK---KP-VSSD-VSV---RN---RDKVYEEV---SVDNPAQTDELKTC---EAF---ASEKPLRIVDGEED 128  
YF\_007489295.1 HL---LEAG-IVFD---LAVVDNRTRK---KP-VSSD-VSV---RN---RDKVYEEV---SVDNPAQTDELKTC---EAF---ASEKPLRIVDGEED 128  
YF\_003726277.1 YL---IESG-IVFD---VAVLDNRTNRKPT---PDRV-DKN---HR-----FTQV---TVNPPSPTTDELVNNIE---NAF---LSDKNRIVDGEED 125  
YF\_003541665.1 HL---LKSJ-IVFD---LAVVDNRTRK---QPA-CEQM-ITG---TK---QSGFKEL---VKNPAQVTEELVDFAFA---EAL---DSNRNRLIVDGEED 128  
YF\_004615575.1 HL---LSDS-IVFD---LAVVDNRTRK---EPA-SEKV-VSG---TR---HTGFKEI---TVNPAQTTEELVNVN---YAF---SDSNRIVDGEED 128  
YF\_566892.1 HL---LSDS-IVFD---LAVVDNRTRK---EPA-SSQV-VFG---TK---HKGFAEI---TVNPPSPTTDELVNVN---DAI---VSDKNRIVDGEED 122  
YF\_006922550.1 HL---LSDS-IVFD---LAVVDNRTRK---EPA-SDRV-VVG---TK---HKGFAEI---TVNPPSPTTDELVNVN---DAI---VSDKNRIVDGEED 122  
YF\_007312351.1 HL---LNSN-IVFD---LAVVDNRTRK---EPA-SAHV-VVG---TK---HTGFSEI---FVNNPPSPTTDELVNVN---DAI---ISKDHVRLIVDGEED 128  
YF\_657114.1 HL---QTVY-YTFA---VAVVDGQTKR---ES-VDET-VKA---AL---SKHNRI---DVENPQTSIALLEAQ---TAV---DETPESVMLIVDGEED 121  
YF\_005839125.1 HL---QTVY-YTFA---VAVVDGQTKRESV---DETVKPAKSHKN---RI---DVENPQTSIALLEAQ---TAV---DETPESVMLIVDGEED 121

Fig. S6

YF_008055518.1	HF	---EQAD-HQEA	---VAFVDGRTK	ETA	---PDDVRAELDERPN	-----RI	---TVGNPA	GVITADLLGA	IA	---DAL	----DIDGPTT	IVVDGEED	137								
YF_001689848.1	HL	---VDAG-QTFA	---VAVVDGRTK	DA	---VRPA-VRD	---AI	---PEPDL	---TWASEP	TVSVSLVRA	IV	---DAI	----ADADAT	VVVDGEED	121							
YF_003735962.1	HF	---ERIG-RTPD	---VAVVDGLTER	ETV	---DVEP-AAALEGSD	-----ARRI	---AATNPA	CAISERICRA	IR	---EAI	----ESDEPVA	IVVDGEED	124								
YF_002567039.1	HL	---REAG-RVFD	---VAVVDGKTER	ET	---VDAA-IGS	---AL	---AAADRR	---SVEENPAAS	SAAELLEAS	---EAL	----SDADPVI	IVVDGEED	128								
YF_007285258.1	HV	---LEAG-RTPD	---VAVVDGRTK	EA	---VDVA-IRE	---TV	---TAGETV	---DVENPQ	SAITDALIRA	IV	---AAI	----DDPPPTV	IVVDGEED	133							
YF_004808741.1	HL	---RMAG-HEPH	---VAVVDGRTK	ER	---VTDE-IRD	---AV	---DAAGRRV	---EHRNEP	AEISRDLV	IA	---DAI	----DHEESS	IVVDGEED	118							
YF_004035542.1	HL	---RRAG-RTPD	---VAVVDGKTER	EA	---VDEE-IRR	---AL	---SDPETRR	DVNPPAGE	TEALADTR	---DAL	----DADDPVI	VVVDGEED	117								
YF_003535927.1	HL	---RRAG-RFPD	---VAVVDGKTER	EA	---VGEE-IRR	---AV	---ETGRLV	---EVENP	ETVSVALVEA	IV	---AAL	----DDPPTT	IVVDGEED	121							
YF_006349668.1	HL	---RRAG-RFPD	---VAVVDGKTER	EA	---VDEE-IRR	---AI	---ETGRLV	---EVENP	ETVSPDLVSA	IV	---EAL	----DAEPTT	IVVDGEED	121							
YF_007485618.1	HL	---LEAG-RFPD	---VAVVDGKTER	ER	---VERE-VLG	---AI	---EAFDRI	---DVANP	OSTTDDLL	EA	---SAL	----EAPGST	VVVDGEED	121							
YF_331261.1	HL	---LEAG-HRPA	---VAVVDGKTER	ERV	---ERKV-LSA	---TE	---EFDERI	---DVANP	OSTTDDLL	EA	---SAL	----DRPPTV	VVVDGEED	121							
YF_003479628.1	HL	---LQAG-RVFD	---VAVVDERTK	DA	---VDEE-IRD	---TV	---ATEPTH	---EAINPP	AEISGDVIRA	IR	---EGL	----DDEPAT	VVVDGEED	137							
YF_007309925.1	HI	---VRAG-RDPD	---VAVVDERTK	QL	---VEAE-IRE	---TV	---TERVNE	EARNPPAE	TSVDLETR	---ESL	----EREPTT	VVVDGEED	130								
YF_003404991.1	HF	---LRAG-RFPD	---VAVVDERTK	SA	---VDEE-IRE	---TV	---TEGTTV	---EAVNPP	AEISQAVVEA	IV	---EGL	----ASDEPT	IVVDGEED	152							
YF_006541826.1	HL	---LQAG-HRPA	---VAVVDGRTK	TA	---VDEE-IRD	---AV	---TEGASI	---EAVNPP	AEISGAPVVA	IR	---RAL	----AADPPT	IVVDGEED	131							
YF_004729381.1	HL	---LQAG-RFPD	---VAVVDGRTK	TE	---VDAA-IRE	---AV	---TEGASI	---EAVNPP	AEISGVPVVA	IR	---RAL	----DADDPVI	VVVDGEED	131							
YF_004597979.1	HL	---LEAG-RAPD	---VAVVDERTK	EA	---VNEE-VRE	---TI	---TAEPTH	---EAVNPP	AEISADVIEA	IV	---EAL	----EREPTT	IVVDGEED	146							
YF_007177942.1	HL	---LEAG-HEPD	---VAVVDERTK	EA	---VDEE-IRE	---TV	---TARTNL	---EAVNPP	AEISTEDVVA	IC	---EGL	----SRLEPT	VVVDGEED	137							
YF_003131105.1	HL	---LEAG-RFPD	---VAVVDERTK	SA	---VDAG-IRE	---RIVEDE	GWGEFYRV	---QVDNPA	GTAAALGA	IV	---EA	---LD-RDEP	STIVVDGEED	122							
YF_008377469.1	HL	---LEAG-RFPD	---VAVVDERTK	CA	---VEAG-VRDR	IVGTDAE	EEWFYRV	---QVDNPA	GTADLLA	IA	---EA	---LD-REDE	STIVVDGEED	145							
YF_001376564.1	HL	---LEAG-YTFA	---VAVVDRTK	AA	---VDPE-VRD	---AV	---GGFDHC	---TVGNPA	GTITGLPL	IG	---RGL	----GEDGTT	IVVDGEED	121							
YF_004794731.1	HL	---LEAG-RVFD	---VAVVDERTK	SA	---VDAD-VSA	---AI	---DGFDRK	---DVSNPA	GTAEALLA	IA	---DGI	----DSGETT	IVVDGEED	121							
YF_008874633.1	HL	---LEAG-RVFD	---VAVVDERTK	SA	---VDAD-VSA	---AI	---DGFDRK	---DVSNPA	GTAEALLA	IA	---DGI	----DSGETT	IVVDGEED	121							
YF_504276.1	NL	---LRAG-RFPD	---VAVVDGHTM	QPY	---PGVN-IPE	---YH	---QL	---LVKNPA	SGTDEL	LDATQ	---IA	---ASRG	TVVVDGEED	113							
YF_001030096.1	NA	---LSAG-LIFP	---VAVVDGRTK	SPY	---LKMPE-IQ	---GH	-----IL	---HTVNP	AGTITDEL	IAA	---TA	---LMD	EPVTVVVDGEED	113							
YF_003893312.1	NL	---VRND-VVPE	---VAVVDGRTM	EP	---SRTPLRS	---SR	-----F	---EVENP	AGTITGEL	LDITL	---LA	---LES	FPALVVDGEED	114							
YF_001403408.1	SL	---QQAG-ITFA	---VAVVDGRTM	SPC	---IKMP-EIA	---GP	-----CI	---HVKNP	PGTITDEL	VSA	---HA	---VDHT	PTVIVVDGEED	113							
YF_007250359.1	TL	---KQNG-ILPA	---VAVVDGRTM	SPC	---NRAPEV	---PG	-----E	---SL	---RVKNPA	GTITDEL	VAA	---YA	---VHEP	PLIVVDGEED	113						
YF_002465695.1	NI	---LAAQ-ILPA	---VAVVDGRTM	SPC	---PPAL-LHQ	---AR	-----QI	---LVKNPA	GTITDEL	VAA	---DA	---AAN	PPALIVVDGEED	113							
YF_001048149.1	NL	---LAAQ-VVFD	---VAVVDGRTM	TPC	---NRSP-LLR	---AR	-----RL	---TVKNPP	GTITGEL	TD	---EA	---VKG	PPVIVVDGEED	113							
YF_006545055.1	NL	---LRAG-IVFD	---VAVVDGRTM	TPC	---TRSP-LIQ	---AR	-----RI	---TVKNPP	GTITDEL	VDA	---EV	---IRG	PPVIVVDGEED	113							
YF_002582924.1	NV	---IRLG-VVFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_002958867.1	NV	---IRLG-MHFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_002308299.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_004762704.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_006424759.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_004072211.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_002993448.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_004828988.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_004624278.1	NV	---LRLG-IRFS	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_006354082.1	NI	---LRLG-LNPN	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_004423817.1	NV	---LRLG-LNPN	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
NP_577983.1	NS	---LRLG-LRPR	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
YF_006491333.1	NS	---LRLG-LRPR	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	128						
NP_127361.1	NI	---MRKV-LNPN	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	127						
NP_143738.1	NI	---MRKV-LNPN	---VAVVDHRTK	KAY	---NPSV-GSE	---AV	-----FL	---TVKNPP	GTITKALL	NVA	---IR	---KG	VEIARGR	VVIVVDGEED	127						
Jpred 4 SS	HH	---HH	---E	---EEEE	---E	-----E	-----E	---EE	---EE	---E	-----HHHHHHHH	---HHHHHH	---EEEE	---							
TK1697	NV	---LKIG-VKPI	---IALVDL	TKRKEY	---SPEI-EDT	---AV	-----FL	---TVTNP	PGTITKALL	DTV	---R	---KAFGLA	---ERGR	NVHIVVDGEED	---						
CONSENSUS 0.95	---	---	---D	---	---R	---	---	---	---	---	---N	---	---	---V	---GEED						
YF_919986.1	L	LSVALLYCPLNDS	WVIYGNFR	GYHEV	IPCTSF	FRSVAEN	L	VKHFEK							175						
YF_003816556.1	M	TAALSCAPANSL	IYGFEN	RCAAVV	VNTN	IISHEV	QTRL	LRVPS	SSIMVQA						156						
YF_007174639.1	L	APTLSCAQDNL	VYGFEN	KCAALV	VNNY	IRREL	QNKI	LVLK	PGIETK						177						
NP_147085.1	L	AAALDCGIDWT	VYGFEG	VGVV	HRCLR	KPGLN	SSLL	AKFG	PGVHHQSSP						185						
YF_008603597.1	L	AAALDCGSGWT	VYGFEG	VGVV	HMNCLR	KPFGV	SSGII	AKFG	PVVRLLKA						182						
YF_006363113.1	L	TTSLAWVLSQGT	VAYGEP	VGVV	SVEDK	VRLAK	FKIKL	KPAI	IHTP	GRA					158						
YF_001040844.1	L	TAYALENEETS	IAYGEP	IGVVI	---	KNR	LKALREL	KT	FKPD	IVVYK					160						
YF_003669616.1	L	TAYALENEETS	IAYGEP	IGVVI	---	KNR	FKALREL	KT	FKPD	IVVYK					160						
YF_003650585.1	L	FPALPSTGVSS	IYGFEN	VGVV	EL	---	DARG	IRLKL	KT	FKPVNGFI					161						
YF_004177111.1	L	VPFTL	TWGS	VYGF	EP	TGVK	TASR	RALK	ILKEL	KPHMA	INL	KG	QRNG		163						
YF_002429036.1	L	VPFTLVRFK	VYGF	EP	VGVV	---	ISSP	SREVLK	EL	KG	LKPD	IVIMNL			157						
YF_006402879.1	L	VPFTLVRFK	VYGF	EP	VGVV	---	ISSP	SREVLK	EL	KG	LKPD	IVIMNL			157						
YF_004780378.1	L	FAPIEAPDGA	IYGFEN	SLNV	VEA	DWARA	VALHV	V	NMSL	VKCR					175						
YF_005841883.1	L	SYVPLIPMNSSGR	VYGF	EP	VGVV	---	MAAV	VDVNE	KTRE	ISNL	Q	D	FYIE	FSI	174						
YF_930015.1	M	SAFIKLAPPHSV	VYGHYM	GAL	HAIPV	DWYR	DAICK	F	EYLEK						168						
YF_001794902.1	M	SAFIKMAPPSL	VYGHY	---	KAL	IAVM	VWDYR	DAID	REL	QYLEK					168						
YF_001056647.1	M	SAFIRLAPPSI	VAYGHYM	GAL	HAIPV	DWYR	DRLLK	F	DFLEK						168						
YF_001153914.1	M	SAFIKLAPPSV	VAYGHYL	GAL	HAIPV	DWYR	SILRF	F	NYLE	QQQKA					172						
YF_005259057.1	M	SAFIKLAPPSV	VAYGHYL	GAL	HAIPV	DWYR	SILRF	F	NYLE	QQQKA					172						
NP_560628.1	M	SAFIKLAPPSI	VAYGHYL	GAL	HALPV	DWYK	EVYLF	F	DYLEK						140						
YF_005085004.1	M	SAFIKLAPPSI	VAYGHYM	GAL	HAIPV	DWYR	SYILK	F	DYLEK						168						
YF_004337001.1	M	SAFIALAPDSSA	VYGHYK	GAL	HV	IPV	GKY	---	KEIRE	L	K	MEPC			166						
YF_004892291.1	M	SAFIALASDSSA	VYGHYK	GAL	V	IPV	GAY	---	REIK	S	L	KFL	KEC		169						
YF_008796927.1	L	APAIHALPDGGV	VYGF	EP	CGV	VVKA	SVKVK	LVEE	I	SMAT					168						
YF_003860570.1	L	TATIILIDHG	I	VYGF	EP	EST	AIPI	---	DKAK	VDAIN	F	SQ	FIR	LSL	GYKDLNV	201					
YF_008071435.1	L	AVCAAAPTGSC	LMYGF	EP	VGM	LLK	VD	AA	SSDR	AKS	L	YS	MEELN		160						
YF_007687666.1	L	PCVLHAPGAV	VYGF	EP	VGVV	---	RMK	AVAT	DGSS	RKWA	EE	L	GR	MEELS	168						
YF_007713106.1	L	PCVLYAPGAV	VYGF	EP	VGVV	---	RMK	AVAT	DGL	SKAY	IEK	L	ES	MEELI	171						
YF_001541769.1	L	PAVLAPAGNTG	IYGLYT	GYL	HAIPV	NEYK	ILMK	EL	TL	DR	DEC	TL	RNC	SV	NYGWKNS	200					
YF_003902647.1	L	PAVLLAPRGS	VYGLYT	GYL	HAIP	T	DEY	KL	AMLK	F					175						
YF_004244378.1	L	PAVLLAPKGS	VYGLYT	GYL	HAIP	V	DEY	K	L	AMF	K	F			LMR	PGNA	174				
YF_001737971.1	L	FPAILPPEGWV	VYGF	EP	VGVV	---	GMV	SV	NI	DR	K	ARE	AMN	L	Q	E	FLPI	167			
YF_023646.1	L	PIIFYDINTL	VYGF	EP	VGM	CIF	INTE	I	K	SM	VD	L	RD	L	NG	T	165				
YF_008142358.1	L	PIIFYADKNTV	VYGF	EP	VGM	YIK	VN	DEI	K	ER	K	E	M	E	M	YR	NEQ	168			
NP_111003.1	L	PIIYKNTV	IYGF	EP	VGM	AL	T	V	DD	L	R	H	V	T	E	I	AK	MAIE	166		
NP_394550.1	L	PIIYADLDTV	IYGF	EP	VGM	IL	T	V	DF	L	K	H	V	C	E	L	SE	MAIA	156		
NP_341954.1	L	VPVLSANHGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAI	VKEC	179
YF_005643228.1	L	VPVLSANHGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAI	VKEC	179
YF_002915007.1	L	VPVLSANNGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAV	VEEC	179
YF_002829735.1	L	VPVLSANNGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAV	VEEC	179
YF_002843724.1	L	VPVLSANNGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAV	VEEC	179
YF_005648862.1	L	VPVLSANNGDI	VYGF	EP	AGAV	V	IV	N	E	M	I	K	WR	V	R	D	L	E	KAV	VEEC	179
YF_005646225.1	L	VPVLSANNGDI</																			



Fig. S6

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YF_004276.1 LAVPLAMHAPLGTV--LLYGGEG-EVWLLSITPAMKKRAEEF--TCFEVSTPTAREVFN----- 172
YF_001030096.1 LAVPLTEILPDGAV--LLYGGEG-EGLVICEVKNQLRANAKKLL--TYFVSL----- 161
YF_003893312.1 LAVPLVKIVPDGSA--VLYGGEG-EVWVKIVDEEARLADLF--SLEFADNSCE----- 166
YF_001043408.1 LAVPLVIAAPLSSI--VLYGGEG-EVWLRIVDDQAKTAARRLL--TQFTKTESPIPHN----- 168
YF_007250359.1 LAVPMVIAAPLGI--VLYGGEG-EVWLRITVTPGAQDTARAF--ERFIRSEE----- 163
YF_002465695.1 LAVPVLIAVDPGGF--LLYGGEG-EAVLCTVDQAKERARELL--ALFEQV----- 161
YF_001048149.1 LAVPLVLAAPDGAA--VLYGGEG-EVWLRIVDTAAKQEAASLL--SIFVRE----- 161
YF_006545055.1 LAVPLVLAAPSGAA--VLYGGEG-EVWLRIVDASAKREAETLL--KAFVRE----- 161
YF_002582924.1 LAAPAVLYAPLGSV--VLYGGEG-EVWLIKVTPECKRRCARLL--AKMEVVRDGD----- 180
YF_002958867.1 LAAPAVLYAPLGSV--VLYGGEG-EVWLIKVTPECKRRCARLL--AKMEVVRDGD----- 180
YF_002308299.1 LAAPAVLYAPEGSV--VLYGGEG-EVWLIKVTPECKLKCGRML--SKMEVVRDGD----- 177
YF_004762704.1 LAAPAVLYAPEGTL--VLYGGEG-EVWLIKVTPECKLKCGKML--SKMEVIHDGD----- 176
YF_006424759.1 LAAPAVLYAPPGSV--VLYGGEG-EVWLIKVTPECKLKCGKML--SKMEVVHDGD----- 176
YF_004072211.1 LAAPAVLYAPFNL--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 180
YF_002993448.1 LAAPAVLYAPEGAL--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVHDGD----- 180
YF_008428988.1 LAAPAVLYAPEGTL--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 180
YF_004624278.1 LAAPAVLYASPGTL--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 178
YF_006354082.1 LAAPAVLYAPYNSY--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 176
YF_004423817.1 LAAPAVLYAPYGA--VLYGGEG-EVWLIKVTPECKRRCARLL--REMEVVKNGDQNYRD----- 183
NF_577983.1 LAAPAVLYAPLGSF--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 177
NF_006491333.1 LAAPAVLYAPLGSF--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 177
NF_127361.1 LAAPAVLYAPIGTT--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 179
NF_143738.1 LAAPAVLYAPLGAT--VLYGGEG-EVWLIKVTPECKRRCARLL--RKMEVVYDGD----- 179
Jpred 4 SS HHHHHHHH---E-EEEE---EEEEEE---HHHHHHHHHH-HHH-----
TK1697 LAAPAVLYAPLGTLL--VLYGGEG-EVWLIKVTPECKRRCARLL--ASMEVVRDGD-----
CONSENSUS 0.95 L-----Y-----G-----

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**B**

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YF_004457895.1 -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
TK1697 -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
Jpred 4 SS -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
CONSENSUS 0.95 -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
PDB: 3HE1 -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
PDB: 3HE1 SS -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
PDB: 2T17 -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
PDB: 2T17 SS -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--
Catalytic aa -----MIRKRYIVKCFYLL---EYRELSRPFGLLPS---TEKLLAYVN-----FEI--ITVQVYQL-----LNN-RVFLIVWKTENRSLQRFER--YI---WVNEPAIIRLJAMSYIK--ALL---SSFSVYTVGEEGLVIFATLYGGQGLVYGGPR--AGAVALDVEATYRNVLIIP--SRFVWEC--

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