

Progressive multiple sequence alignment of TIM sequences

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                10      20      30      40      50      60      70      80      90     100
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Roseiflexus_castenholzii  -----MRTPLLAGNWKMYKTTEARELVEGLLHGL-GDVG-----D-RKVLVCPFFPTALQTVHDLVQG---
Chloroflexus_aurantiacus  -----MRIPLIAGNWKMYKTVGEATTLVRDLLAGL-GELS-----D-REAIVCPFFPTALAAVAALVAD---
Nostoc_punctiforme       -----MRKIVIAGNWKMFKTOAETOEFLOGFPLHL-EETP-----QGREVILCPPFTDL SVLSKTLHG---
Anabaena_variabilis      -----MRKIVIAGNWKMFKTOAESQEFLKEFLPAL-EETP-----QEREVLLCVPFPTDLA ILSQSLHG---
Synechocystis_sp         -----MRKIIIAGNWKMHKTQAEAQAFLOGFKPLI-EDAA-----ESREVVLCVPFPTDL SGM SQ LHG---
Cyanobacterium_aponinum  -----MRQIIIAGNWKMHKTQTESLEFLQGFSLHL-EDTP-----EERETVLCVPFPTCLN FMSKNLHG---
Crocospaera_watsonii     -----MAVGKIIIAGNWKMHKTQAEALEFLTVLKSKV-EETN-----ETREIVLCVPFPTALS ILSKSLHG---
Trichodesmium_erythraeum -----MRKTIIAGNWKMYKTQLEAKEFLEGLMSQL-TKTP-----EEREVVLCTPFPTALD FMSKILHG---
Synechococcus_sp         -----MRKVVIAGNWKMHKTQADASAFVQQLMPQL-ESVP-----EEREIVLCAPFPTTLGL LVDK LQS---
Prochlorococcus_marinus  -----MSKTVIAGNWKMHMTCAQARDFISAYLPLI-KNVP-----KGRELVLAPPFTAISTLSE I LKG---
Sphaerobacter_thermophilus -----MRKPIVAGNWKMNNTSLEEARALAGELRSTL-SAY-----STVERVLIPFPFWIVPLAD I LDG---
Anaerolinea_thermophila  -----MRKKFVAGNWKMNKTAEEARLLLNELIPAL-EPF-----SHVERAVCPPFPYLM MVRHMLEG---
Myxococcus_xanthus      -----MATARRRKIVAGNWKMNKSVPEALALVRLRGQV-ASLG-----DTVEVVVAPPFVAL QPLHVALEG---
Collinsella_tanakaei    -----MTQNNRLLIAGNWKMNNDVQAATLADELVAALDGVDN-----G-VEVLVCPPTIDLT TVA AK LDG---
Atopobium_vaginae       -----MRNTMIAGNWKMNKTYGEAAELAQLVRELPGSTG-----N-VDVVVCPTIDLKAVAATLE QSD---
Eggerthella_sp          -----MRKPMAGNWKMNNTVAEAVVLTQELSNRYTDAWA-----DRADVVICPPFVDLKP AKTVLEFDK---
Dictyoglomus_thermophilum -----MRRKIIAANWKMYKTCAETESFIKEFIELSKGY-----EEKEIVICPPFPTS L YVASKLLKDTA---
Aquifex_aeolicus        -----MRR-LIAANWKMNKTVKETEEYINTFLKFEVHP-----ESREILICPPFPTS L YVAGKMLQGTG---
Thermodesulfovibrio_yellowston -----MPKKFIVANWKMHKTVREALAFLDEFIPITKGL-----NGREIGIAPTFFICIESVGKVLINTS---
Dehalogenimonas_lykanthroporep -----MSERP TVIAGNWKMHHTTVDEAVELV GEMSSALAEF-----ENVEVII CPPFIALCKVKELLGQANR---
Dehalococcoides_sp     -----MRQIIIAGNWKMNNTLSEACTLVQSMKCELERI-----EGIEKII CPPFISLYPIKTI L ENSS---
Geobacter_metallireducens -----MRTPIIAGNWKLFKKSSEAQDFVAELIPLVQKT-----TDVEI VIAPFTT L SVL SAVKRAIADCN---
Desulfobacter_postgatei -----MTRIPLIAGNWKMYKTGTQAVAAKQLAHL SKGV-----DGDVIMIAVPFTT L SVL A AAL GKSSP---
Planctomyces_brasiliensis -----MRRYLIAGNWKMNLTPEGALYAAELAKAVQK GK-----PDAKVMIA PAFVA I PAVLEAVKGS---
Spirochaeta_coccoides  -----MRRYIAGNWKMNLTPEGALYAAELAKAVQK GK-----PDAKVMIA PAFVA I PAVLEAVKGS---
Denitrovibrio_acetiphilus -----MRKPYIYGNWKMNLDMHGSSDLISSILS-VKIDY-----TKVDVG VAPDFSSSLYKVSQTIKQMG---
Prosthecochloris_aestuarii -----MRKKIVVGNWKMNK TIAEAVELSSAIDQLGEVS-----ASCEVGIAPAFPALSGVHG VISGT---
Chlorobium_phaeobacteroides -----MRKKIVVGNWKMKNVAEGVALASSILENLDG GK-----MACEVGIAPAYPVLSEVGRVIEGS---
Chlorobium_ferrooxidans -----MRQKIVVGNWKMNNTIAESSALASELVAALGKGF-----SGCEVGIAPTYVALQ EAGKIIAGS---
Chloroherpeton_thalassium -----MRKKFVAGNWKMNKDLLGAVSLATEILQLL GDEA-----PTCEVAIAPTFLCQQAVFQVIDES---
Treponema_pallidum      -----MRGYFIAGNWKMHKTCAEAVALAQELVREL RGG-----PHTYMIAPSFTALD AVGKVL RGS---
Leptospira_interrogans  -----MRKTIIAGNWKMNLSLKEAVFLAHSIREKIP SIS-----KDKVSMVFPSTLHLENVSKILEGS---
Borrelia_turicatae     -----MRKIFLAGNWKMHYTSMEAGVAKQIVDGVKNIK-----DDVVVMITPPFPTSLCKVCEVTRGS---
Thermotoga_maritima     -----ITRKLILAGNWKMHKTI SEAKKFVSLLVN E LHDV-----KEFEIVVCPFFPTALS EVGEILSGR---
Fusobacterium_nucleatum -----MRRLLVIAGNWKMYKNNKEAVE TL TQLKDLTRDV-----KNVDIVIGAPFTCLSDAVKIVEGS---
Selenomonas_sputigena  -----MARRPIIAGNWKMNNTIAEGVALVKELMPLVKDA-----KDVDV VACPTATALAAVAEAVKGS---
Ruminococcus_sp        -----MARKKIIAGNWKMNMTPEAVKLVETLKLPLV V N-----DEV DVVFCVPAIDIIPVVEATKGT---
Clostridium_botulinum   -----MRTAIIAGNWKMNKTVKEAVELVKELKPLVKD-----AKCDVVV CPTYVCLPAVLEEVKGS---
Clostridium_perfringens -----MRTPIIAGNWKMHYTIDEAVKLV EELKPLVKD-----AKCEVVV CPTFVCLDAVKKAVEGT---
Thermoanaerobacter_wiegeli -----MISKGVFVLRPIIAGNWKMHMTPEAVKLV EELI PQVKD-----AKAEVVV I PPFVDL TEVNKVIQGT---

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Brachyspira_murdochii	-----MARRKLIAGNWKMNNSNKEALELVNQLKNLVKDV-----	KDRDIMIAPTFTCLSDVHNAVKGS--
Acholeplasma_laidlawii	-----MAKRIPVIAANWKMFKTKDEALEFIFAVNAAVPSRD-----	EVESITCAPAILLNLLVKEGE---
Lactobacillus_reuteri	-----MRKPFIAANWKMHKNVQESVEFVDAIKGKLPDPQ-----	EVEVGIAAQAFALPSMVQAADD--
Bacillus_subtilis	-----MRKPIIAGNWKMNKTLGEAVSFVEEVKSSIPAAD-----	KAHAVVCPALFLEKLASAVKGG--
Bacillus_thuringiensis	-----MRKPIIAGNWKMNKTLAEAVSFVEEVKSSIPAAAS-----	AVDAVVCSPALFLERLVAATEG---
Listeria_monocytogenes	-----MRKPIIAGNWKMNKTAAGQFAEDVKNNVPSDD-----	AVESVVAAPALFLQELVRLTEG---
Geobacillus_stearothermophilus	-----MRKPIIAGNWKMHKTLAEAVQFVEDVKGHVPPAD-----	EVISVVCAPFLFLDRLVQAADG---
Staphylococcus_aureus	-----MRTPIIAGNWKMNKTVQEAQDFVNALP-TLPDSK-----	EVESVICAPAIQLDALTTAVKEGKA
Enterococcus_faecalis	-----MRKPIIAGNWKMNKTLSEAQSFAEAVKNAVPSND-----	VVDAVIGSPALFLAPLAWNLDK---
Lactococcus_lactis	-----MSRKPIIAGNWKMNKTLSEAQAFVEAVKNNLPSSD-----	NVESVIGAPALFLAPMAYLRQG---
Streptococcus_pneumoniae	-----MSRKPFIAGNWKMNKNPEEAKAFVEAVVSKLPSSD-----	LVEAGIAAPALDLTTVLAVAKG---
Erysipelotrichaceae_bacterium	-----MRKPIIVGNWKMNKTMKETKEFMEAVDAAAASEN-----	AVFG-IGAPYTALSAAVAGAKN---
Lentisphaera_araneosa	-----MKRRLFIAGNWKLNKTAAEETETVADLKAKLADFNG-----	SLDVALFPPFLSIAAGQAAAAG---
Chlamydomphila_pneumoniae	-----MTRQSYVLGNWKMHKTIQEAKEVYQTLASLLQG-EP-----	LSCTIGIASPFTSLRAIHEMINTTG-
Desulfovibrio_vulgaris	-----MKKLIANWKMKYTIDEARATGRELVSAVAGSLP-----	ADREVLVCPFFTALHALHDTFFKDVE-
Mesorhizobium_opportunistum	-----MVYVWGTSWKMNKTLAEAMDFAAILAGFVPG-FD-----	DRIQPFVIPPFTAVRQVKQALSSTR-
Bartonella_henselae	-----MSPNIRPFIAGNWKMNGTGES-LGELRAIAAGISSDLGRL-----	FEALICVPATLLSRAFDILGGEN-
Brucella_abortus	-----MTPGIRPLVAGNWKMNKGES-LTELRAIAAGLSSDLGRK-----	LDAVICVPATLLSRAAETLEGET-
Rhizobium_etli	-----MTPDVRPLVAGNWKMNNGTRAS-LDQIKAIAGEVRPPLADK-----	VEALICPPATLLYVATALCTDSP-
Agrobacterium_tumefaciens	-----MTPNVRPLVAGNWKMNNGTRAS-LDQIKAMAEGVKGALSEK-----	VDALICPPSTLLYVATALCDDSP-
Rhodobacter_sphaeroides	-----MRKLAAGNWKMNNGTEAD-LGEIDALLA---AHPAPR-----	CEMLICPPATLVARMAGR-AAQG-
Ruegeria_sp	-----MARKLAAGNWKMNNGTGEH-LAELENLAQ---GDLPEG-----	VDVLICPPATLIAAFAADKARGKK-
Bradyrhizobium_japonicum	-----MTDAIRPLIAGNWKMNGLKAA-SSEFDAMLEGA-TELSSG-----	IDLLVCPATLIAAFAADRLAANEK
Rhodopseudomonas_palustris	-----MPVPAVRSIAGNWKMNGLKAA-SSEFDAMLEGA-TELSSG-----	IDLLVCPATLIAAFAADRLAANEK
Methylobacterium_radiotolerans	-----MTQSGRRPLVAGNWKMNNGTRSS-IQVVEAIRDGLSPDLASR-----	IDVLICPPATLIGSCVAAAAGSP-
Rhodospirillum_rubrum	-----MTVRRPLIAGNWKMNGLKAEQGLARDLAQRLNKAGGVD-----	FDLLCPPFPPLISTVVAVAGSG-
Zymomonas_mobilis	-----MTIRKLIAGNWKMNGLKAEQGLARDLAQRLNKAGGVD-----	FDLLCPPFPPLISTVVAVAGSG-
Gluconacetobacter_hansenii	-----MKQIIVGNWKMHGMDAATAKAADDIGAAMGADVSG-----	AQVVICPPFTQLALLGPKLREHG-
Thermus_thermophilus	-----MRRVLVAGNWKMHKTPSEARVWFELKRLPPLQS-----	EAVLPAFPILPVAKEVLAE---
Thermus_aquaticus	-----MRRVLVAGNWKMHKVPSEARVWLAELKRLPPLDS-----	EAVLPAFPMLPVAKEVLSG---
Oceanithermus_profundus	-----MRTPLLAGNWKMHKTPSEARVWFELKRLPPLDS-----	EAVLPAFPMLPVAKEVLSG---
Deinococcus_deserti	-----MPNNLLALNWKMNKTPSEAQAWEAELSSALSPGEA-----	ELAVMAPAIMLPALAAGLP---
Bifidobacterium_bifidum	-----MAS-RIPLLGNWKMNLDHLEATYFVQKLVWLLRDAREDY-----	SRCEIALMPSFTSLRSVQVLVEADK-
Bifidobacterium_longum	-----MASKRIPLVAGNWKMNFDHLEATYFVQKLVWLLRDAREDY-----	KRCEVALFPSTSLRSVQVLVEADK-
Gardnerella_vaginalis	-----MVVNRKPLVAGNWKMNFNHLEATHFIQKFWRLCDSHFDC-----	KKCDIALMPSFTSLRSVQVLVEADK-
Nocardia_farcinica	-----MARKPLIAGNWKMNLDHLEATYFVQKLVWLLRDAREDY-----	KRCEVALFPSTSLRSVQVLVEADK-
Mycobacterium_tuberculosis	-----MSRKPLIAGNWKMNLDHLEATYFVQKLVWLLRDAREDY-----	KRCEVALFPSTSLRSVQVLVEADK-
Corynebacterium_glutamicum	-----MARKPLIAGNWKMNLDHQAIGTVOKLAFALPKEYFE-----	KVDVAVTVPFTDIRSVQTLVEGDK-
Propionibacterium_acnes	-----MSRTPMAGNWKMNLDHVAATSLVQDLGEMALKAAGYDS-----	SKSEAVVIPPFTDIRPVAVIIDDGK-
Actinomyces_odontolyticus	-----MAGNWKMNLDHLEANHLVQGLAMALSDAGHDY-----	SKCEVLVIPPFTDIRVQTLVDADE-
Microbacterium_testaceum	-----MGVTRTPLIAGNWKMNLDHLEAVVQKLVWLLRDAREDY-----	KRCEVALFPSTSLRSVQVLVEADK-
Moritella_marina	-----MRHPVVMGNWKLNGSKEM-----VVDLLNGLNAELEG-----	VTGVDVAVAPPALFVDLAERTLTEA--
Photobacterium_profundum	-----MRHPVVMGNWKLNGSKEM-----VVDLLNGLNAELEG-----	VTGVDVAVAPPALFVDLAERTLTEA--
Vibrio_cholerae	-----MIRYGDIPMRRPVVMGNWKLNGSKAM-----VTDLLNGLNAELEG-----	VEGVDVVVAPPAMYDLAERLIKEG--
Shigella_flexneri	-----MRHPLVMGNWKLNGSRHM-----VHELVSNLRKELAG-----	VAGCAVAIAPPEMYIDMAKREAEG--
Escherichia_coli	-----MRHPLVMGNWKLNGSRHM-----VHELVSNLRKELAG-----	VAGCAVAIAPPEMYIDMAKREAEG--

Salmonella_enterica	-----MRHPLVMGNWKLNGSRHM-----VNELVANLRKELTG--VAGCDVAIAPPEMYIDLAKRAAAG---
Klebsiella_pneumoniae	-----MRHPLVMGNWKLNGSRHM-----VNELVANLRTELAG--VSGCAVAIAPPEMYIDLAKRAAEG---
Enterobacter_aerogenes	-----MRHPLVMGNWKLNGSRHM-----VNELVANLRTELAG--VSGCAVAIAPPEMYIDLAKRAAEG---
Serratia_symbiotica	-----MRHPLVMGNWKLNGSRHM-----VSELIAGLRNALSRL--VDGCGVAIAPPVYLDQARHALAG---
Yersinia_pestis	-----MRHPLVMGNWKLNGSTHM-----VNELIAGLRKELST--VDGCGVAIAPPVYLDQAKHELAG---
Actinobacillus_pleuropneumonia	-----MARRPLVMGNWKLNGSKAF-----TKELIAGLKAELAD--VKGCDVAIAPPVYLAEEAALAGQ---
Pseudomonas_aeruginosa	-----MRRPLVAGNWKMHGTHSS-----VAELIKGLR-QLAL--PSGVDVAVMPPCLFISQVIQGLAG---
Marinomonas_posidonica	-----MIRQKIVAGNWKMNKSKAS-----ISSLVNGLLEMSE-----SSAEVVTTPFPYLSQVADVIAQQ---
Xylella_fastidiosa	-----MRPKIVAGNWKLHGSHAF-----AQALVAQVAAGLP--LLGVSVIILPPLLYLSDLAQRFKG---
Xanthomonas_campestris	-----MRRKIVAGNWKLHGTRAF-----ATELVAQVAHMP--LAGVDVVILPPLPYLGLDIEDFEA---
Marinobacter_algicola	-----MRRKIVAGNWKMNKSKGL-----VSNLVGQVRSELASF--DNGVEAVIIPPALFVDDVVEQA-G---
Aeromonas_caviae	-----MGHRKPFVAANWKLHGSRSQ-----LEQFTSQCAERI-----DEDVDVVLCPSPVHLGFTAELLGEOG---
Pseudoalteromonas_haloplanktis	-----MAARKAMVAGNWKMNKSLLEL-----VKQMSDAINNPK-----SNEIDIVLFP---PFPLVSAMIASG---
Legionella_pneumophila	-----MRQKIVAGNWKMNKQIQQ-----VTELVSQIEELIGF--DCAAQVAVMPPSIYIPKVRDCLRTG---
Ralstonia_solanacearum	-----MS--ARPKLVVGNWKLHGSLNG-----NAELLEKIKAAAG-----QARAALAVCAPFPYLAQCQSLLAGS---
Burkholderia_sp	-----MSNQORAKLVVGNWKMHGRLAA-----NAALLQAVVQGANEL--PADVVRVGVCPVPSLYLAQTQSLLLEGT---
Bordetella_pertussis	-----MTTAENRARLVLGNWKMHGRLAE-----NAALLAEELRAAD--A-AAHCCEMGVCPFPYLAQTAAALQGS---
Nitrosococcus_watsonii	-----MRTSLVVGNWKMNGSRAA-----NRALLESMRKEM-EA-GVVAEVAVCPPFPYLAQDMESSLQGS---
Coxiella_burnetii	-----MQRRPLVAGNWKMHGSRES-----VGQLLRALKHGC-ER-LETAELAVFPFPVFLQOCEEALMRT---
Variovorax_paradoxus	-----MVT'TTNNAM'TKKKLIAGNWKMNKGLAV-----NEALVKALQQGLAAS--PAACDVALCAPYFAQLQSLLAGTP---
Halomonas_elongata	-----MPTPLIAGNWKMNKSLDL-----IESFGRALADAE--L-PSRLEVALMVPFPYLEAASRALTGS---
Tenebrio_Molitor	-----MARKFVVGGNWKMNKDKQINEIIG--FLKSGPLNDP-----TEVVVGVPAIYLSYVKTICVP---
Bombyx_mori	-----MGRKFFVGGNWKMNKDKQINEIVN--NLKKGPLDPN-----VEVIVGVPAIYLSYVKTIIIP---
Apis_mellifera	-----MGRKFFVGGNWKMNKDKSEINDIVG--FLKKGPLDSN-----VEVVVGVPSIYLYTYAKNILP---
Aedes_aegypti	-----MGRKFCVGGNWKMNKDKASITDLCK--TLTTGPLSAD-----TEVIVGCPAPYLTILARSQLP---
Anopheles_gambiae	-----MGRKFCVGGNWKMNKDKASITELCK--TLSAGPLDPN-----TEVVVGVCPAPYLSLARSLLP---
Drosophila_melanogaster	-----MSRKFVGGNWKMNKDKQSIKAEIAK--TLSSAALDPN-----TEVVIGCPAIYLMYARNLLP---
Rhipicephalus_microplus	-----MAARRFCVGGNWKMHGSKNSIRDICN--TLKGASLDPN-----VEVIVACAPAYLDYCRSLLP---
Ixodes_scapularis	-----MSGRKFVGGNWKMNKDKSISKEICD--MLKTAKLDPN-----TEVVVLGCPAPYLDYVRRILP---
Anolis_carolinensis	-----MAP--RKFFVGGNWKMNKDKKSLGELIQ--TLNGAKVSGD-----VEVVCGAPTIIYLDIFARQKLD---
Gallus_gallus	-----MAP--RKFFVGGNWKMNKDKKSLGELIH--TLNGAKLSAD-----TEVVCGAPSIYLDIFARQKLD---
Orcinus_orca	-----MAPSRKFFVGGNWKMNKGRKNNLGEELIN--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Bos_taurus	-----MAPSRKFFVGGNWKMNKGRKNNLGEELIN--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Canis_lupusfamiliaris	-----MAPSRKFFVGGNWKMNKGRKNNLGEELIT--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Odobenus_rosmarus	-----MAPSRKFFVGGNWKMNKGRKNNLGEELIT--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Oryctolagus_cuniculus	-----APSRKFFVGGNWKMNKGRKNNLGEELIT--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Nomascus_leucogenys	-----MAPSRKFFVGGNWKMNKGRKQSLGELIG--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Pan_troglodytes	-----MAPSRKFFVGGNWKMNKGRKQSLGELIG--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Homo_sapiens	-----MAPSRKFFVGGNWKMNKGRKQSLGELIG--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Pongo_abelii	-----MAPSRKFFVGGNWKMNKGRKQSLGELIG--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Macaca_mulatta	-----MAPSRKFFVGGNWKMNKGRKQNLGELIG--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Ochotona_princeps	-----APSRKFFVGGNWKMNKGRKNNLGEELIT--TLNAAKVPAD-----TEVVCAAPTAYIDIFARQKLD---
Sus_scrofa	-----MAPARKFFVGGNWKMNKGRKNNLGEELIN--TLNAAKLPAD-----TEVVCAAPTAYIDIFARQKLD---
Mus_musculus	-----MAPTRKFFVGGNWKMNKGRKCLGELIC--TLNAAKVPAG-----TEVVCAAPTAYIDIFARQKLD---
Rattus_norvegicus	-----MAPSRKFFVGGNWKMNKGRKCLGELIC--TLNAAKLPAD-----TEVVCAAPTAYIDIFARQKLD---
Xenopus_laevis	-----MSPRKFFVGGNWKMNKDKKSLGELIN--TLNSGKMNAD-----TEVVCGAPAIYLDIFARQKLD---

Xenopus\_tropicalis -----MSSRKFVGGNWKMGDKKSLTELIN-TLNSGKISAD-----TEVVCGAPTIYLD FARQKLD----  
Danio\_erio -----MSGRKFVGGNWKMGDKKSI EELAN-TLNSAKLNPD-----TEVVCGAPTIYLDYARSKLN----  
Ictalurus\_punctatus -----MTARKFFVGGNWKMGDKKSLGELIN-TLNGAKLNAD-----TDVVCGAPSIYLD FARSKLD----  
Oreochromis\_niloticus -----MT-RKFFVGGNWKMGDKKSLGELIQ-TMNGAKVDPN-----VEVVCGAPSIYLD FVRSKLD----  
Nematostella\_vectensis -----MG--RKFFVGGNWKMGSLVQIDGILK-NLHDSLSLSD-----TEIVVSPPALYLSYVRKAAK----  
Schistosoma\_mansoni -----MSGSRKFVGGNWKMGSRDDNDKLLK-LLSEAHFDDN-----TEVLIAPPSVFLHEIRKSLK----  
Strongylocentrotus\_purpuratus -----MASGRRFVGGNYKMGSKASIDGLLK-MLEESQIPGN-----TDVVVAPPVYLDYMNSKIP----  
Caenorhabditis\_elegans -----MTRKFFVGGNWKMGDYASVDGIVT-FLNASADNSS-----VDVVVAPPAPYLAYAKSKLK----  
Caenorhabditis\_remanei -----MTRKFFVGGNWKMGDFASVDGIVT-FLNQSADNAS-----VDVVVAPPAPYLAYAKSHLK----  
Brugia\_malayi -----MSRKFVGGNWKMGNKASVDNIK-FLNDGAVVPN-----VDVVVAPPAPYLSYVKEKVK----  
Trichinella\_spiralis -----MSSRKFVGGNWKMGDSKSI E EYIK-LLNDNTLPGN-----VEIVIAPPFVYLERIRKQLK----  
Ricinus\_communis -----MARKFFVGGNWKCGTSEEVKIVS-TLNEGHVPSD-----VVEVVISPPFVFLPLVKDSLK----  
Vitis\_vinifera -----MGRKFFVGGNWKCGTGEEVKIVS-TLNAGEVPSGD-----VVEVVVSPFVFLPLVKSTLR----  
Arabidopsis\_thaliana -----MARKFFVGGNWKCGTAEVVKIVN-TLNEAQVPSQD-----VVEVVVSPYVFLPLVKSTLR----  
Zea\_mays -----MGRKFFVGGNWKCGTTDQVEKIVK-TLNEGQVPSD-----VVEVVVSPYVFLPVVKSQLR----  
Oryza\_sativa -----MGRKFFVGGNWKCGTTDQVDKIVK-ILNEGQI ASD-----VVEVVVSPYVFLPVVKSQLR----  
Fragaria\_vesca -----MGRKFFVGGNWKCGTIDEVKKIVN-LLNDGKVPSPD-----CVEVVVSPYVFLPLVKSTLR----  
Glycine\_max -----MGRKFFVGGNWKCGTTEE VKKIVT-TLNEAKVPGED-----VVEVVVSPFVFLPFVKSLLR----  
Cucumis\_sativus -----MARKFFVGGNWKCGTNEEVKIVS-TLNEAEIPSED-----AVEVVVSPFVFLSLVKSLLR----  
Perkinsus\_marinus -----MSPKPFVGGNWKSNGSVESIKKLAP-ALVAGEATYNKD-----AVDVVIAPTAIHLPLAMEQFKG----  
Aspergillus\_niger -----MPRQFFVGGNFKMNGTADSITSIIK-NLNAAKLDE-----SAEVVVSPPLYLLPARQAG----  
Penicillium\_chrysogenum -----MPRQFFVGGNFKMNGVAQSITDIIVN-NLNAAKLDD-----TTEVVISPPAIYLALTR ELAN----  
Paracoccidioides\_brasiliensis -----MPRKFFVGGNFKMNGTAKSITHIIT-NLNSAKLDP-----STEIVIAPP AIYLALVARQLAN----  
Schizosaccharomyces\_pombe -----MARKFFVGGNFKMNGSLESMTIIE-GLNTPKLNVG-----DVEVFIFQNMYLITTRQOVK----  
Saccharomyces\_cerevisiae -----MARTFFVGGNFKLNGSKQSIKEIVE-RLNTASIPE-----NVEVVICPPATYLDYSVSLVKK----  
Kluyveromyces\_lactis -----MARTFFIGGNFKMNGSKASIKEIVD-RLNGASIPS-----NVEVVIAPP AIYLDH AVALNKR----  
Candida\_dubliniensis -----MARQFFVGGNFKANGTKQQITSIID-NLNKADLPK-----DVEVVICPPALYVGLAVEQNKQ----  
Clavispora\_lusitaniae -----MARQFFVGGNFKMNGTKESITKIID-NLNKADLPK-----DVQVVIAPPAPYLSLAVAENKQ----  
Chlamydomonas\_reinhardtii MQLCKVQRASAARSSRASRS-----QRVEVCASSAKFFVGGNWKCGSVANVAKLVD-ELNAGTIPRG-----VDVVVAPPFIYIDYVMQH LDR----  
Volvox\_carteri MLATRSRLRASGCRSPAVTQPRLLALGRGRLEIVCASNAKFFVGGNWKCGSVASVRKLV D-ELN GSVPRG-----VDIVCAPPFIYIDYVMQH LDK----  
Dictyostelium\_fasciculatum -----MTGSRKFVGGNFKCNGNKSSLQTLIE-SIIKSTLPASE-----IVDIVVSPPSIYLEYV NQLVG----  
Entamoeba\_histolytica -----MSARKFVGGNWKCGT LASIETLTK-GVAASVDAELAK-----KVEVIVGVFFIYIPKVQQILAGEAN  
Cryptosporidium\_parvum -----MSRKYFVGGNFKCNGTKESLKT LID-SFKQVE--SSN-----SEVYVFPTSLHISLVKEFFGNDHP  
Cryptosporidium\_muris -----MARQPFVGGNFKCNGTKDSLRLLLK-SFKDSQI-TTN-----TQVYVFPTFIHIPLAYEILED SG-  
Plasmodium\_falciparum -----MARKYFVAANWKCGTLESIKSLTN-SFN NLDFDPSK-----LDVVVFPVSVHYDHTRKL LQSKF-  
Plasmodium\_vivax -----MTRKYFVSANWKCGTQESVKALAA-SFNE LDFDPAK-----LDVVVFPVSVHYELAKSLLKPKF-  
Paramecium\_tetraurelia -----MRRYFVGGNWKCNNTIAQTQSLINTVINKLVF DVNK-----VEVAVAPIFLHVPWPVQANI QKNV-  
Tetrahymena\_thermophila -----MAIRRLFVGGNWKCNNTLAQTKDLVNNVLNKLHEDPAK-----VDVVVAPVFLHVPWVAEHIQKPV-  
Toxoplasma\_gondii -----MVRTPWVGGNWKCGT VGSITDL CG-EFGKTEFDPKT-----IDVVFPPALHAPLMTREKLPKPY-  
Trypanosoma\_cruzei -----MSKPQPIAAANWKCGSQQSLSELID-LFNSTSI-NHD-----VQC VVASTFHLAMTKERLSHPK-  
Trypanosoma\_cruzi -----MASKPQPIAAANWKCGSESLVPLIE-TLNAATF-DHD-----VQCVVAPTFFLHIPMTKARLTNPK-  
Leishmania\_mexicana -----MSAKPQPIAAANWKCGTTASIEKLVQ-VFNEHTI-SHD-----VQCVVAPTFFVHIPLVQAKLRNPK-  
Leishmania\_donovani -----MSSKPQPIAAANWKCGTTASIEKLVQ-VLNEHNI-SHD-----VQCVVAPTFFVHIPLVQAKLRNPK-  
Giardia\_lamblia -----MPAR-RPFI GGNFKCNGSLDFIKSHVA-AIAAHKI-PDS-----VDVVIAPSAVHLSTAIAANTSKQ-  
Trichomonas\_vaginalis -----MRTFFVGGNWKANPKTVEEA EKLIEMLN GAKVEGN-----VEVVVAAFPFI FLPTLQOKLR----  
Sphingobacterium\_sp -----MRKKIVAGNWKMNMDYQEGISLSEVANMVKDEVIG-----NQOIIVCSPFIHLHSIASLAKESE-

Pedobacter\_saltans -----MRKKIVAGNWKMNKDYSEGLSLFSEVLNMVKDEVRG---EQQVVVCAPYIHLHLSLSALAKGTN-  
 Marivirga\_tractuosa -----MRQKIVAGNWKMNKTLVEAQSLTSEIANMVEDEAPS---DVKVVIAPPAPFIYAVENLIPEMG-  
 Cyclobacterium\_marinum -----MRKKIVAGNWKMNCLLEEGQKLTSEIVNMIKDEPIK---DVKVIINPPFVHLHGKVKLIAGVD-  
 Leadbetterella\_byssophila -----MRKKYAAGNWKMNKTFEEGQILLSEVVMVVKDELTHP---NVQVVLGVPFPYLSSTFSKLVDTTP-  
 Haliscomenobacter\_hydroxiss -----MKTRQQIVAGNWKMNKNYGEGRLEAMEIVERLK---PS---NTQVVLCAPIYIHLQLVKNIKDVAA-  
 Parabacteroides\_distasonis -----MRKNIVAGNWKMNTLAEGGLALAKGLDEALKGKTPN---CDVIIIGTFFTHLASVAAAIDTN--  
 Bacteroides\_fragilis -----MRKNIVAGNWKMNKTLQEGIALAKELNEALANEKPN---CDVIICTPFIHLASVTPLVDA--  
 Prevotella\_ruminicola -----MRKKIVAGNWKMNMLQDGIALAKELNETLKADKPN---CGVVICTPFIHLASIAQFLDQD--  
 Alistipes\_shahii -----MRKKIVAGNWKMNTPAEGVELAKGVVAGRGEVCSC---VNFIVCPPFTHLAMVAEALKGS--  
 Porphyromonas\_asaccharolytica -----MDKRTLIVAGNWKMNMTLDAGLRLITDIKEQVAKLSNP---CKVILAPPYIHLGAMKGLLAGS--  
 Cellulophaga\_lytica -----MRAKIVAGNWKMNKTLTETNALLAELSGKLP---DT---DAEVMVAPTYVNLAAAVEDVKSS--  
 Kordia\_algicida -----MRRKIVAGNWKMNNDLSETEALLNDLIEQVP---NT---DASVMVAPAFVNLFOAFNVLKTF--  
 Flavobacterium\_psychrophilum -----MRAKIVAGNWKMNKNSEETEDLINELIDKLP---NS---NAKIIAPTFFINLASAVDHTEFT--  
 Neisseria\_gonorrhoeae -----MYRQIGMWDQKVVIGNWKMNQRLQNNALMHRF-RILPTAER-----VLIGLAAPTIVYLLQLHNAMQIVLN  
 Francisella\_tularensis -----MQKLIMGNWKMNQNSTSIKELCSGISQVQYDTSR-----VAIAVFPSSVYVKEVISQLPEKVG  
 Mycoplasma\_genitalium -----MRTRYLIGNWKTNKNLKDVSFVEQFQONKLNYN-----AKIGIAPVYVHLTEIKKIISDS--  
 Ureaplasma\_urealyticum -----MVKMYYIIANFKMNATEELINHFNLNLSIFDE-----QKLTIGLAPGDLYLKTFFVLSQTK-  
 Ureaplasma\_parvum -----MKYIIANFKMNATQELINHFNLNLTLEFDE-----QKIIIGLAPGDLYLKTFFVNLAEIK-  
 Buchnera\_aphidicola -----MKKFFITANWKLNGNIKMISSFFKYLKLYSSSYL-----EKNTVIIAPPYIYLERVCKNISNM-  
 Campylobacter\_jejuni -----MIFAANLKNHTRASFKIYAEILNKITIG-VK-----CDDIIVFPP-----SVAFLEKEN--  
 Helicobacter\_pylori -----MTKIAMANFKSAMPFKSHAYLKELEKTLKPOH-----FDMVFVFPD-----FLGLLPSFL-  
 Orientia\_tsutsugamushi -----MESIVSNWKMHFSFSEACNYLNLITSLNSNLN-----LAKMIVAPPNLYLSGLKLPNFNDTY-  
 Wolbachia\_sp -----MSFLIVANWKMNGRSSEFVDFIGKLNNSNEIT-----SKLVICPPFT-----SFPSSIELNN-  
 Methanocaldococcus\_Jannaschii -----MVIVINYKTY-NESIGNRGLLEIAKIAEKVSEESG---ITIGVAPQFVDLRMIVENVNIP--  
 Methanococcus\_voltae -----MIKPVVIINYKTY-MESISDKGLNIAKCAEKVSEESG---IEISVAPQFTDLKTIVEQTNVK--  
 Methanothermococcus\_okinawensi -----MIKPIIIINYKTY-AESVGEKGLKIAKAAEKVSEESG---ISIGVCPQFLDLRMISENVNIP--  
 Pyrococcus\_Woesei -----MAKLKEPIIAINFKTY-IEATGKRALEIAKAAEKVYKETG---VTIVVAPQLVDLRMIAESVEIP--  
 Pyrococcus\_furiosus -----MAKLKEPIIAINFKTY-IEATGKRALEIAKAAEKVYKETG---VTIVVAPQLVDLRMIAESVEIP--  
 Thermofilum\_pendens -----MKIGYPLILINFKAY-SEASGKRGQLAKVAEKVSKETG---ITIAVAPQLTDLAFIASQVEIP--  
 Methanothermobacter\_thermautot -----MLEDELEKDTPIVILNFKTY-LESTGERALELASICGDVADETG---VNMAVAPQHMDLHRVSDAVEIP--  
 Methanosaeta\_thermophila -----MRWSQSLGGMALTLIVLNFKTY-REATGDSAVALSKICESIASEYG---VDIAPVAPQAADIRAVASAVSIP--  
 Natronobacterium\_gregoryi -----MFVLVNLKTY-PCDP---LEIATAVRDVEDTDD---ARLAVAPQAIHIERVAET-GVE--  
 Halobacterium\_salinarum -----MFVLVNLKAY-PCDP---VAIAEAAADVAETTP---ATIAVAPQPADIGRVADT-GAT--  
 Halogeometricum\_borinquense -----MFILVNLKAY-PCDP---LEVATAAHEVAEESG---VRIAVAPQAADVRRVADT-GVE--  
 Methanosphaerula\_palustris -----MSSQFILVNLKAY-KEGMGPRAHMIARAAEEVSEESG---IQIGVAPSFDFDLHPLSKHFEIP--  
 Thermoproteus\_tenax -----MRLPILIIINFKAY-GEAAGKRAVELAKAAERAARELG---VNIIVAPNHLELGLVVSQSDIP--  
 Pyrobaculum\_islandicum -----MKFPILIIINLKAY-GEAAGKKALEIAKAAEKVAKELG---VNIIVAPNHLELALVAQSVEIP--  
 Cenarchaeum\_symbiosum -----MLIINCKNY-KEAAGGRIDSLAAAAAGAAKYG---VRIALAPPQHLLGAVKGEDLT--  
 Nitrosopumilus\_maritimus -----MFVINCKNY-EEISGEKITKFKVKTAEKSKKEK---VKIAICPPPHLIGVVAENSSIP--  
 Desulfurococcus\_kamchatkensis -----MVKP-VLAVNFKAYYPHSFGENAYRLAKDAVRVWRETG---VEVILAPPQHELKSVIEAVKDTG-  
 Pyrolobus\_fumarii -----MRDVYILAVNFKVY-PSAFGRRALEVVKAAERVAREFEG---TVSVIIAPPHTELIARISSSVER--  
 Acidilobus\_saccharovorans -----MPRL-VFAVNFKAY-ETAFNEKSLEIAREASKASSRYG---NVRVILIVPAAIASKVLQIYDD--  
 Sulfolobus\_islandicus -----MKPP-IIVINFKAY-ENSFNGKAIELGKKIEKISKEYS---VEIILSVPATMIYRMVQEVLDLP--  
 Clustal Consensus

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	110	120	130	140	150	160	170	180	190	200
Roseiflexus_castenholzii	..	..	..	..	..	..	..	..	..	..
Chloroflexus_aurantiacus	--	TPIALGAQDVYIE	-PQGAFTGAISPVMLRDLG	CAYVIVGHSERRAIFGEGDELIGK	VRAAL-AHDLT	-PILCVGETK	QORDAGHAETV	VVAQVRAAL		
Nostoc_punctiforme	--	SPLGLGAQNLYPE	-AQGAFTGEVSPMLVDIG	CRYVIIGHSESRQYFGE	SDAFVNRKLRAL-AHGLR	-PIVCVGESK	QORDAGQAEPI	IVTAQVRAAL		
Anabaena_variabilis	--	SLIQLGAQNIHWE	-EFGAYTGEISGPMLTES	GVRFVIVGHSERRQYFGET	DATVNLRLRTAQ-RFGLT	-PILCVGETK	QORDAGETES	LIALQLDKGL		
Synechocystis_sp	--	SRVRLGAQNVHWE	-ASGAYTGEISAAMLTEI	GIHYVIVGHSERRQYFGET	DETANLRVLAQA-KAGLI	-PILCVGESK	AORDAGETE	QVIVDQVKKGL		
Cyanobacterium_aponinum	--	SRVRLGAQNIHWA	-DQGAFTGEISGEMLKEF	GINVIVGHSERRQYFGET	DETVNARLLAAQ-KHGLT	-PILCVGESK	AORDAGETE	AVISAQIEKDL		
Crocospaera_watsonii	--	GKVRLGAQNVHWE	-DKGAYTGEISGPMLTEL	SDYVIVGHSERRQYFSET	DETANLRVITAQ-RHGLT	-PILCVGESK	QORDAGEA	ESVIINQLQKGL		
Trichodesmium_erythraeum	--	SLIRLGAQNVHWE	-DEGAYTGEISGLMLKDV	GVSYVIVGHSERRQYFGET	DETVNMRLKAAQ-KHGLT	-PILCVGETK	QORDSGETE	SHIFSQLANDL		
Synechococcus_sp	--	SRVQVGAQNVHWE	-REGAYTGEVSGVMLKEL	GVRYVVVGHSESRQYFGET	DETVNARLKAAQ-LHGLT	-PILCVGETK	QORDADQTE	SVITGQIKKAL		
Prochlorococcus_marinus	--	SNVSLSSQNVHWE	-DNGAFTAETISPKMLLE	HSVSYAIVGHSEPRKYFSE	SDKQINLRKASQ-ANGLI	-PIVCVGETI	EQREGEA	ERVIRRQVEQGL		
Sphaerobacter_thermophilus	--	SDIVLGAQDCAVE	-DQGAFTGEVSARMLAPL	-CRYIIVGHSERRHIIGET	DEVVAAKLRAVL-RNGAR	-PILCVGELLE	EREREGEAR	AVVERQLQSAF		
Anaerolinea_thermophila	--	TNIGMGAQNMHWE	-ASGAYTGEVSPKMVAEF	-CQYVILGHSERRTYFGET	DETVNRKVKSAI-STGLT	-PIVCVGETL	AENEAGKTA	EVVWRQITEGL		
Myxococcus_xanthus	--	APLALAAQNCHE	-SSGAYTGEISAPMLAEL	GAYVIVGHSERRQLFGDT	DEQVNRKRAKAVR-AAGMT	-PIICVGETL	AEREA	NQTLAVVERQVRGAL		
Collinsella_tanakaei	--	SAIKLGAQNVYWE	-AAGAYTGESSCDMLKS	AGCTYCIIGHSERRDYFH	ETDEDQNKAKALV-AAGLV	-PVFCCGEP	LEVREAGTY	VEHVVAQVKAGL		
Atopobium_vaginae	--	SSIALGAQNVYWE	-ENGAYTGETAPNMLVSL	GATYCIIGHSERRGYFGET	DEDINKKAKALL-AHNIV	-PISCCGES	LEVREAGK	HVEFVVEQIKADT		
Eggerthella_sp	--	TRIAIGAQDVYWE	-PKGAYTGEISVPMIKEI	GCTYCVIGHSERRERLFG	ETNEDVNRKAKALI-AGGLA	-PIVCVGESL	AVRDEGTT	NEYVCAQVRAAF		
Dictyoglomus_thermophilum	----	IKLGAQNMFW	-KEGAYTGEISPIMLKDL	NCTYVIIGHSERRNYFSE	TNEMINKKIKSAF-NYGLI	-PIFCVGEK	WEERER	ERGKTEEVITKQVREGL		
Aquifex_aeolicus	----	VKLGAQNCHYE	-KRGAYTGEISIPMLQEV	GCEYVIVGHSERRHIFGE	SDELHKKIVACL-EMGIR	-PILCVGEK	KEERE	EAGMTFKVIETQIKLAL		
Thermodesulfobacterium_yellowston	----	IKLGAQNAFYE	-NKGAYTGEVSPAMLKDC	GVYVIVGHSERRKYFYEN	DDIINKKIHACI-KEGLK	-VIFCIGET	FFEDRQNK	TMEILKQIRNGL		
Dehalogenimonas_lykanthroprep	----	IQLGAQNMFOE	-AKGAYTGEISPVMLQDF	-CKYVIIGHSERRYFGET	DDMIKLRAL-KFGLK	-PILCVGENL	AQREGGK	QVQEVIEGQITKAL		
Dehalococcoides_sp	----	IKLGAQNLFYQ	-EKGAYTGEISPLMLKEL	-CQYVIIGHSERRYFGET	GQVNVKRIKAAI-QAGLL	-PIVCVGEK	PEENENG	QTRQVLETQIKAL		
Geobacter_metallireducens	----	IMLSAQDCFW	-EEGAYTGEISPGMLVD	AGCSHVIIGHSESRQYFGET	DETVNRKIKAAI-TAGLT	-VLFCEGET	LAEREA	DKTFFEVLRQIENGL		
Desulfobacter_postgatei	----	IRLGAQNIYPG	-TEGAYTGEVSGPMIKD	AGADYVIIGHSESRQYFGET	DESRLKIRSAL-DAGLI	-PVMCIGET	ESQDA	DETFFFILDQKQITDGL		
Planctomyces_brasiliensis	----	GISVGAQNCYFE	-ASGAYTGEVSDMLKDIG	CDVILGHSERRHVIKEDD	MINKKTKAAI-EGGLQ	-VVLVGE	LLEEREA	DKTEAVLDEQMAAGGL		
Spirochaeta_coccoides	----	PIIVAAQNAADH	-LSGAYTGEVSLMLKDL	GVGTVILGHSERRAYGES	DALINAKTKLAL-SEGFE	-VILCVGET	LEEREA	GKLEDVLSRQVKIGL		
Denitrovibrio_acetiphilus	----	YPISVAAQNISAE	-EKGAYTGDVSAAMVFA	AGADSTILGHSERRMIFA	EGDELINQKVTAL-RNNLD	-VILCVGET	LDERES	GVAADRVDVYQVMGL		
Prosthecochloris_aestuarii	----	GIHLAAQNCHE	-DDGAYTGEVSVRMLDE	AGCSYVIVGHSERRQYFG	TNPVNVNLKVKAL-SAGLN	-VILCVGET	LDEREK	GITTEVVTCQVKEGL		
Chlorobium_phaeobacteroides	----	DICLVAQNCHE	-DEGAYTGEVSVRMLDSL	GCSYIIVGHSERRQYFGET	TNRVNLRLKAL-EGGMR	-VILCVGET	LEEREA	GVTDIVTAQVREGL		
Chlorobium_ferroxidans	----	AVQLVAQNCHE	-NDGAYTGEISTGMLK	AVGCSYVIIGHSESRQYF	GETNATVNLRIKAL-AEGLK	-VILCVGET	LAERE	SEVTSKVVTSQVTEGL		
Chloroherpeton_thalassium	----	AIKLAAQNCFYE	-DQGAFTGEISAAMLRNS	GCEYVILGHSESRQYFNE	TDEIVNKKVKAL-SVELD	-VIMCVGET	LEQRE	SGVTKSVVETQVRGGL		
Treponema_pallidum	----	NVLLGAQDVSSE	-EWGAYTGEVSVLQLED	LGQVIVGHSERRHGRGEN	DKLINQKVRVLE-ESGLR	-VILCVGER	LQREY	EAGCTNEVVGTVQVRAGM		
Leptospira_interrogans	----	SVIVGAQNCYHS	-GLAAYTGETSPDQLKEI	GVKVMVGHSESRQFLGES	SNFFCNDKIRFLL-KNEFT	-VLYCVGET	LSERES	GKTEVLSSQIREGL		
Borrelia_turicatae	----	NVLLGAQNMSE	-DSGARTSEISPSMLLE	FVDYVILGHSECRTYLGD	TDEVNKKVLAGL-KHPFKY	LILCIGET	LEEREN	NKTLDDVVLNQIRKGL		
Thermotoga_maritima	----	NIKLAGQNVFYE	-DQGAFTGEISPLMLQEI	GVYVIVGHSERRIFKED	DEFINRKVKAVL-EKGMT	-PILCVGET	LEEREK	GLTFCVVEKQVREGF		
Fusobacterium_nucleatum	----	NVKIAAENVYPK	-IEGAYTGEVSPKMLKD	IGVTVILGHSERRYFKE	SDEFINQKVKAVL-EIGMK	-PILCIGEK	LEDRE	GKTEVLAKQIKEGL		
Selenomonas_sputigena	----	NIHIGAQNVHWE	-KSGAYTGEISTDMLKEI	GVYVILGHSERRYFGET	DEGVNKRKAAAF-AAGIT	-PIICCGEP	LEIRE	ANTYIDFVTKQIKAAI		
Ruminococcus_sp	----	NIQVGAENMYFE	-EKGAYTGEISPAMLVD	AGVKYVILGHSERRYF	GETNEDVNVKVKAF-EHGIT	-PIMCCGET	LTQRE	QVMTDFIRQVQVKG		
Clostridium_botulinum	----	NIKVGAQNMHFE	-ESGAYTGEIAPKMLEEL	EGVHYVIIGHSERRYFNE	TDETVNKKVKAFF-AHNLI	-PIVCCGES	LEERE	GNITKDFVLEGQIKVGL		
Clostridium_perfringens	----	NIKVGAQNMHFE	-EKGAYTGEIAPRML	EAMNIDYVIIGHSERRY	FNETDETVNKKVKAFF-AHNLI	-PILCCGET	LEQRE	NGTTNDVIKAQITADL		
Thermoanaerobacter_wiegelii	----	NILLGAQDMFWE	-EKGAYTGEISPLMLKEI	GVYVIVGHSERRQYFGET	DEMVNKKVLSAL-SHGLS	-PIVCVGES	LSQRE	EKGITFEVVLNQTKAL		
Brachyspira_murdochii	----	NIKLAGQNLIFYE	-EKGAYTQGISADMLL	AVGCEYVIVGHSECRDIF	GKDELINKKVKRAL-DKNLI	-PVLVGEH	LEEREK	GITSDIVSSQTKAFAF		
Acholeplasma_laidlawii	----	HIRIGAQNMHYA	-DEGAYTGENSPAQVKTA	GAEYILIGHSERRSLFNE	TDKDVNLKMHAAF-KYDLA	-PILCIGEQ	LDTRE	ANKTKEVLDVQLDKAF		
Lactobacillus_reuteri	----	GLKIIAQNAAAE	-YSGAYTGEISLRGLAD	AGVSYVMLGHIERRHLF	HEDNELVNRKVLAAAL-QMGVT	-PIICTDE	TMVQ	KEVNGEIHVYFQQLMSVL		
Bacillus_subtilis	----	TDLKVGQNMHFE	-ESGAYTGEISPVALKDL	GVYVIVGHSERRMFAET	DETVNKKHAAAF-KHGIV	-PIICVGET	LEERE	AGKTNDLVDQVKKGL		

Bacillus\_thuringiensis --TDLQVGAQNMFHE-KNGAFTGEISPVALSCLKVGYVVLGHSERREMFAETDESVNKKTIAAF-EHGLT-PIVCCGETLEERESGKTFDLVAGQVTKAL  
Listeria\_monocytogenes --TNLRVSAQNCYFE-DEGAFTGEISPFALADLGSYVIIGHSERREYFHETDEDINKKAAIAIF-KHGMT-PIICCGETLDQREAGQDTWVRGQIRAAL  
Geobacillus\_stearothermophilus --TDLKIGAQTMHFA-DQGAYTGEVSPVMLKDLGVTVVILGHSERROFMAETDETVNKKVLAIF-TRGLI-PIICCGESLEEREAGQTNANVVASQVEKAL  
Staphylococcus\_aureus --QGLEIGAQNTYFE-DNGAFTGETSPVALADLGVKYVVIIGHSERRELFHETDEEINKKAAIAIF-KHGMT-PIICVGETDEERESGKANDVVGQVKKAV  
Enterococcus\_faecalis --SEVKLAAQNCYWE-NAGAFTGENSPAIIADLGVYVIIGHSERREYFHETDEDINKKAAIAIF-ANGMT-PIFCCGETLETYEAGKTAEWIEGQITKGL  
Lactococcus\_lactis --SELKLAAEANSYFE-NAGAFTGENSPAIIADLGVYVIIGHSERREYFHETDEDINKKAAIAIF-AAGAT-PIICCGETLETYEAGKTAEWVSGQIEAGL  
Streptococcus\_pneumoniae --SNLKVAAQNCYFE-NAGAFTGETSPQVLKEIGTDYVVIIGHSERRDYFHETDEDINKKAAIAIF-ANGML-PIICCGESLEETEYAGKAAEFVGAQVSAAL  
Erysipelotrichaceae\_bacterium ----LVIAAENCHWE-DSGAFTGEISVPMLEQVGVTHCIIGHSERREMFNDTDETVNKKAKRLI-DAGIT-PIICIGETEAYDAGDSEKVIDRDLTGSL  
Lentisphaera\_araneosa --SPIGIGAQNVFHA-ESGAYTGELSAAMLKEAGIELVIIGHSERRQYFGETNETVNLRTKAAL-AAGIK-PFVCIGETLEEREAGGMEVSVLKAQIVEGF  
Chlamydomphila\_pneumoniae --AFLWLGAQNVHPE-LSGAFTGEISLPMLEKGVGVFVLVGHSEERRHIFGESDAFIASKVKSVA-QAGLV-PVLCVGESLEVREEGKAHQVIKKQLLLGL  
Desulfovibrio\_vulgaris --GFA-IGGQDVYPA-TEGAYTGEIAPGMLLDAGCGWVLTGHSEERRHILGEDDETVAARKTAFSL-KAGLR-VVLCIGEKLDEREAGRLDVLAHQLQVGL  
Mesorhizobium\_opportunistum --VKV--GAQNMHWA-DAGAWTGEISPVMLTDCGLDLVELGHSEERRHFGETDRTVGLKTAATAV-KHGLI-PLICVGETLAERESGEADAVLAKQVEGAL  
Bartonella\_henselae ----ILLGGQNCDFD-DYGPYTGDISAFMLKEAGASHVIIGHSEERRTVYQESDAIVRAKVAQAAW-RAGLV-ALICVGETLEERKSNKVLVDLTRQLEGS  
Brucella\_abortus ----VGLGGQDAHFK-TSGAHTGDISPMLKEAGATHVILGHSEERRDHHESNKLICAKTEAAW-AAGLV-AIVCVGETASERKAERALDVIQDQLSGSL  
Rhizobium\_etli ----LSIGAQDCHQK-ASGAHTGDISAEMIADSGFTYVIVGHSEERRDHAETDHLVRAKAEAAW-AAGLV-AIICIGETADERRAGQALDIKRLSASV  
Agrobacterium\_tumefaciens ----LLIGAQDCHQN-DTGAHTGDISAEMIADCFGTHVIVGHSEERRDHAETDHLVRAKASAAH-QVDLI-AIVCIGETADERKAGQTLDIKRLLAGSL  
Rhodobacter\_sphaeroides ----LMVGGQDCHPK-TSGAHTGDVSAAMLADAGASHVILGHSEERRADHGETDSLVRKAEAAW-GAGLV-AIVCVGETEAQORDAGQTLDVIGAQLAGSV  
Ruegeria\_sp ----IAIGGQDCHAK-TSGAHTGDLSADMLRDAGATYVIIGHSEERRADHGEDADVRAKTEAAQ-AAGLV-AVVCIGETLEEREAGTTLEVVGQLAGSL  
Bradyrhizobium\_japonicum ----VAVGAQDCHPK-ASGAHTGDIAAEMLANAGATAIIVGHSEERRADHGEDALVRQKAEAAW-RAGVT-AIVCIGETQAORDAGQTLDIRGQLDGS  
Rhodopseudomonas\_palustris GALAVAIGAQDCHAN-ATGAHTGDISAEMLDAGARAIIVGHSEERRADHGETDAIVRTKAQAAW-RAGLV-AIVCVGETQGERNAGHTLDVVGQLAGSL  
Methylobacterium\_radiotolerans ----IAIGGQNLHAR-PSGAHTGDISAEMLDLGAQYVIVGHSEERRADHGETDDGVHAKALGAR-RAGLC-GIICVGETIEEREAGRALDVVAGQLAGSL  
Rhodospirillum\_rubrum ----IAVGGQDCHAK-AGGAHTGDVSAAPMLDGCQYVIVGHSEERRADHGETDAIVRTKAQAAW-RAGLV-AIVCVGETEAQORDAGETLAVVSGQLAGSL  
Zymomonas\_mobilis ----MTFGAQDCHYD-ESGSHTGCVSAPMLREVGASVIVGHSEERRIEQNETNEEIRAKTTAI-ANGLV-TIVCIGESRAAHASGQALPIIGAQLDGC  
Gluconacetobacter\_hansenii ----IALGAQDCHQD-PCGAHTGDIAASMLRDLGVQYVILGHSEERRDHELDLTVREKAVAAA-AAGLI-PIICVGESADQRSNGDSQETVQWQIQGSL  
Thermus\_thermophilus --TQVGYGAQDVSAH-KEGAYTGEVSARMLSDLGCRYAIVGHSEERRYHGETDALVAEKAKRLL-EEGIT-PIICVGEPIEVREKGEAVPYTLRQLRGS  
Thermus\_aquaticus --TPIAYGAQDVSPH-REGAYTGEVSARMLADLGCRYAIVGHSEERRYHGESDALVAEKAKRLL-EEGIT-PIICVGEPIEVREKGEAVPYTLAQLLGS  
Oceanithermus\_profundus --SGVAWGAQDVSAH-TFGAYTGEVAAEQLDLGCYVVVGHSEERRAYWNESDALVAAKARRAM-EAGLV-PIICVGERLEEREAGRAVSFTLEQLAGSL  
Deinococcus\_deserti --AGVAYGGQDVSOH-ESGAYTGEISAAMLRDVGAKYAIVGHSEERRYHGETDAVVAAKARQAQ-AHGLT-PIICVGEGLVREKGEHVQYTLAQLRGS  
Bifidobacterium\_bifidum --LKIRYGAQAVSVT-TQGAFTGDVSADMLHLGCSYVIVGHSEERRKYHPEDDANIVDQVRAVL-AAGMQ-PIICVGESFEERRQGIELDFAVGQVHDVT  
Bifidobacterium\_longum --LHVAYGAQAVSVT-TQGAFTGDVSADMLHLGCSYVIVGHSEERRKYHPEDDANIVDQVRAVL-AAGMQ-PIICVGESFEERRQGIELDFAVGQVHDVT  
Gardnerella\_vaginalis --LPILYGAQAVSVT-AQGAFTGDVSADMLASLGCMSVIVGHSEERRKYHPEDDANIVDQVRAVL-AAGMQ-PIICVGESFEERRQGIELDFAVGQVHDVT  
Nocardia\_farcinica --LLLTYGAQDVSVH-ESGAYTGEISASMLAKLGCFTVVVGHSEERRYHEDDATALVGAKKAL-EHGLT-PIICVGEGLNVREAGTHVEYNLEQLRGS  
Mycobacterium\_tuberculosis --LRLTYGAQDLSPH-DSGAYTGDVSGAFLAKLGCYVVVGHSEERRYHNEEDDALVAAKAAATL-KHGLT-PIICVGEHLNVREAGTHVEYNLEQLRGS  
Corynebacterium\_glutamicum --LEVTFGAQDVSOH-ESGAYTGEVSASMLAKLNCSSWVVGHSEERRYHNESEDELVAKAKAAAL-SNGIS-PIICVGEPIEIREAGTHVEYVVEQTRKSL  
Propionibacterium\_acnes --LPIAYGAQDISAH-DDGAYTGEVSGAMLSKLCRYVVVGHSEERRYHNESEDELVNAKAKKVI-ENGMT-PIICCGEALVRKAGKHVEHTVGGQIKADL  
Actinomyces\_odontolyticus --LGIKYGAQDVSIH-DNGAYTGEISTDMLTKLGVSYVVMGHSEERRYHGESDELVGAKARKVF-DAGMT-PIICCGEALVRKAGTYVEFVLGQIRAAL  
Microbacterium\_testaceum --IEFALGGQDLSAH-DSGAYTGEISGQFLAKLNARYVIIGHSEERRQFHNETDEVVAAKTQAAL-RHGLV-PVICVGETSEDLKFGASAVPVGQLEVAL  
Moritella\_marina --GSAIILGAQNTDLN-NSGAFTGDMSPAMLKEFGATHIIIGHSEERRYHAESEDFVAKKFAPLK-ENGLT-PVLCIGESDAQNEAGETMAVCAQRLDAVI  
Photobacterium\_profundum --GSAIILGAQNSDLN-NSGAFTGDMSPAMLKEFGASHIIIGHSEERRYHNESEDFVAKKFAPLK-ENGLT-PVLCIGESDAQNEAGETMAVCAQRLDAVI  
Vibrio\_cholerae --GNKILGAQNTDTH-NSGAFTGDMSPAMLKDFGASHIIIGHSEERRYHNESEDFVAKKFAPLK-ENGLT-PVICIGETEANEAGETMAVCAQRLDAVI  
Shigella\_flexneri --SHIMLGAQNVDLN-LSGAFTGETSAAMLKDIGAQYIIIGHSEERRYHNESEDELIAKKFAVLK-EQGLT-PVICIGETEANEAGKTEEVCAQRIDAVL  
Escherichia\_coli --SHIMLGAQNVDLN-LSGAFTGETSAAMLKDIGAQYIIIGHSEERRYHNESEDELIAKKFAVLK-EQGLT-PVICIGETEANEAGKTEEVCAQRIDAVL  
Salmonella\_enterica --SHIMLGAQNVDLN-LSGAFTGETSAAMLKDIGAQYIIIGHSEERRYHNESEDELIAKKFAVLK-EQGLT-PVICIGETEANEAGKTEEVCAQRIDAVL  
Klebsiella\_pneumoniae --SHIHLGAQNVQDN-LSGAFTGETSAAMLKDIGAQYIIIGHSEERRYHNESEDELIAKKFAVLK-EQGLT-PVICIGETEANEAGKTEEVCAQRIDAVL  
Enterobacter\_aerogenes --SHIHLGAQNVQDN-LSGAFTGETSAAMLKDIGAQYIIIGHSEERRYHNESEDELIAKKFAVLK-EQGLT-PVICIGETEANEAGKTEEVCAQRIDAVL  
Serratia\_symbiotica --SRIALGAQNVQDN-LSGAFTGEISANMLKDVGAQYIIIGHSEERRYHNETDGAISEKFAVLK-EAGLI-PVICIGETEANEAGKTEEVCAQRIDAVL

Yersinia\_pestis --SRIALGAQNVDVN-LSGAFTGETSAEMLKDIGAQYIIIGHSEERRYHQESDELIAKKFGVLK-EIGLI-PVLCIGESEAEENEAGQTEAVCAKQLDAVL  
Actinobacillus\_pleuropneumonia --SVIALGAQNVDVN-VQGAFTGDISTEMLKDFGAKYIIIGHSEERRYHKECDTFIAKKFAALK-AAGLV-PVLCIGETEAEENETGQTEAVCAKQIDAVI  
Pseudomonas\_aeruginosa --KAIDVGAQNSAVEPMQGALTGETAPSQADVGCMSVLVGHSERRLLILGEDVVSRRKFAAQ-SCGLV-PVLCVGETRAEREAGKTELVVARQLGSVI  
Marinomonas\_posidonica --SGLVLAQNLSQY-EKGAYTGEVSTAMLTDFKVTVYLVGHSERRSLYGETDEVVVAEKVKMAL-SAGLK-PILCVGETLEEREAGQTELLVCERQVAAVI  
Xylella\_fastidiosa --EGLAFGAQNVSQH-DKGAYTGEVSAAMVADVGAHYTLVGHSERRYHHEDESSELVARKFAAAL-SAGLR-PILCVGESLPQREAGQTEVAIAMQLAPVL  
Xanthomonas\_campestris --HHLAFGAQDVSSN-EKGAYTGEVSASMLVDVGAHYGLVGHSERRYHQESSELVARKFAAAM-HAGLI-PVLCVGESLEQREAGQTEAILRAQLEPVL  
Marinobacter\_algicola --KKLAVGVQNVACW-SSGAYTGEISAAMAKDCGCGFTLVGHSERRQLFGETDEQVATKVEQAL-ASGLV-AVICVGETLEERDAGKAEDVVSRRQVRKAV  
Aeromonas\_caviae ---RVKLGAQNVSOH-RQGAYTGEISCEMLVEAGCRYVLVGHSERRRLFGETSFIVAEEKFAAVR-AAGLI-PILCVGESGAARQARRTFEIVIAEELDVI  
Pseudoalteromonas\_haloplanktis ----VSTGTQTVSEN-TPGAFTGEVDAQLIKELGAQYVLVGHSERRSIYKESNDVVAAKFARAQ-QVGLT-PILCVGESESEQENKTEQIVAAQIDAVI  
Legionella\_pneumophila ---RIVVGAQNVYPK-DYGAYTGEISAPMLKDFCRYVLVGHSERRQFFHEDENFVAQKFFHVK-DHGMI-PILCVGETLSEERENGKTEQIIAQVLAVS  
Ralstonia\_solanacearum ---AVAWGAQDVSAE-TRGAFTGEVAASMLSEFGCGYVIVGHSERRYHAETDAQVATKALRAL-EHGIT-PIVCVGETLVQREAGETEQQVVARQLDAVL  
Burkholderia\_sp ---SVVWGVQDVSAF-THGAYTGEVAAPMVTDFGATFAIVGHSERRAYHRESAELVAVKAQVRL-DAGLT-PIVCVGETLEEREAGSTEQQVGGQLDEVL  
Bordetella\_pertussis ---AIGWGAQDVSAH-AKGAYTGEVAAPMLAEFGCRWVLVGHSERRTLHAESDQLVADKARAAL-EAGLT-PVVCVGESLQEREGGNTLVGIERQLEPVL  
Nitrosococcus\_watsonii ---VINWGAQNLSHH-EMGAYTGEIAPSMLADLGRFVIIGHSERRTLYGETDSLVAEKAAIAAQ-KVDII-PIICVGETLQEREQNITEQVVERQLNAVL  
Coxiella\_burnetii ---QISWGAQDVSEF-ERGAYTGEVSAAMLRDFHCXYVIVGHSERRQRFGETNEQVAAKVRRAAL-RCGIR-PIICVGETEKQRNANQTLVSIKEQLAVVL  
Variovorax\_paradoxus ---SLALGAQDVSAH-PQGAFTGEQSAAMLKDFGVRYAIVGHSERRYHGETDETVAAKAAAAAL-ANGIT-PIVCVGETLAEREAGQTEEVVVRQLAAVI  
Halomonas\_elongata ---RAALGAQTLSDQ-PSGAFTGEVSGEMLREVGTSLVLVGHSERRQFGEDDSAVLARVRRAL-ECELT-PVLCIGETLEERDADRGEAVVIGQLEAVL  
Tenebrio\_Molitor --ASIGVAAQNCYKV-PKGAFTGEISPAMIKDVGADWVILGHSERRQIFGESDELIAEKVCHAL-ESGLK-VIACIGETLEEREAGKTEEVVFRQTKAIA  
Bombyx\_mori --DNVEVAAQNCWKS-PKGAFTGEISPAMIKDVGWVILGHSERRIFGKDELVAEKVAHAL-ESGLK-VIACIGETLEERESGKTEEVVFRQLKALV  
Apis\_mellifera --NNISIAQONTYKV-AKGAFTGEISPAMLLDNGIPWVILGHSERRNIFGENDELIAEKVAHAL-ESGLK-VIACIGETLEEREAGKTEEVVFRQTKAIA  
Aedes\_aegypti --DSVGVAAQNCYKV-AKGAFTGEISPAMKDLNIGWVILGHSERRIFGESDELIVADKVAHAL-AEGLK-VIACIGETLQEREAGQTEAVCFRQTKAIA  
Anopheles\_gambiae --ETIGVAAQNCYKV-AKGAFTGEISPAMKDLGLGWVILGHSERRIFGESDELIAEKVAHAL-AEGLK-VIACIGETLQEREAGKTEEVVFRQTKAIA  
Drosophila\_melanogaster --CELGLAGQNAKYV-AKGAFTGEISPAMKDLGADWVILGHSERRIFGESDALIAEKVAHAL-AEGLK-VIACIGETLEEREAGKTEEVVFRQTKAIA  
Rhipicephalus\_microplus --PSVALAAQNCYKV-EQGAFTGEISPGMIKDCGGQWVILGHSERRHVFGEEDVLIGEKIKHAL-ESGLN-VIACIGELLEEDREAGRTEEVCFRQIKHIA  
Ixodes\_scapularis --AAIAVSAQNCYKV-EKGAFTGEISPAMIKDCGATWVILGHSERRNVFGESEDELIGDKVHHAL-ESGLN-VIACIGELLEEREAGKTEEVVYRQTAIA  
Anolis\_carolinensis --AKFGVAAQNCYKV-AKGAFTGEISPAMIKDIGATWVILGHSERRHIFGESDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKAIA  
Gallus\_gallus --AKIGVAAQNCYKV-PKGAFTGEISPAMIKDIGAAWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKAIA  
Orcinus\_orca --HKIAVAAQNCYKV-ANGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Bos\_taurus --PKIAVAAQNCYKV-ANGAFTGEISPGMIKDLGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Canis\_lupusfamiliaris --AKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Odobenus\_rosmarus --AKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Oryctolagus\_cuniculus --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-SEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Nomascus\_leucogenys --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Pan\_troglodytes --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Homo\_sapiens --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Pongo\_abelii --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDYGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Macaca\_mulatta --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Ochotona\_princeps --AKIAVAAQNCYKV-ANGAFTGEISPGMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Sus\_scrofa --PKIAVAAQNCYKV-ANGAFTGEISPGMIKDLGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Mus\_musculus --PKIAVAAQNCYKV-TNGPFTGEISPGMIKDLGATWVILGHSERRHVFGESEDELIGQKVAHAL-AEGLG-VIACIGEKLDEREAGITEKVVFEQTKVIA  
Rattus\_norvegicus --PKIAVAAQNCYKV-TNGAFTGEISPGMIKDLGATWVILGHSERRHIFGESDELIGQKVAHAL-SEGLG-VIACIGEKLDEREAGITEKVVFEQTKAIA  
Xenopus\_laevis --AKIALSAQNCYKV-AKGAFTGEISPAMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-SEGIG-VIACIGEKLDQREAGITEKVVFEQTKAIA  
Xenopus\_tropicalis --AKFAVSAQNCYKV-AKGAFTGEISPAMIKDCGATWVILGHSERRHVFGESEDELIGQKVAHAL-SENVG-VIGCIGEKLDQREAGITEKVVFEQTKAIA  
Danio\_rerio --PNIDVAAQNCYKV-AKGAFTGEISPAMIKDCGVWVILGHSERRHVFGESEDELIGQKVAHAL-ENGLG-VIACIGEKLDEREAGITEKVVFAQTKFIA  
Ictalurus\_punctatus --AKIGVAAQNCYKV-AKGAFTGEISPAMIKDCGVWVILGHSERRHVFGESEDELIGQKVAHAL-ENGLG-VIACIGEKLDEREAGITEKVVFAQTKAIA  
Oreochromis\_niloticus --PKFGVAAQNCYKV-PKGAFTGEISPAMIKDCGVWVILGHSERRHVFGESEDELIGQKTAHAL-ENGLG-VIACIGEKLDEREAGITEKVVFAQTKVIA



Nematostella\_vectensis --QNIGVAAQNCYKV-ASGAFTGEISPAMIKDIGCEWVIIGHSEERRNIFGKDELIGEKVAHAL-SANVK-VIACIGELLISEREAGKTQEVVFRQIKAIA  
Schistosoma\_mansoni --KEIHVAAQNCYKV-SKGAFTGEISPAMIKDIGCDWVILGHSEERRNIFGESDELIAEKVQHAL-AEGLS-VIACIGETLSERESNKTEEVVVRQLKAIA  
Strongylocentrotus\_purpuratus --AGVFVAAQNCYKV-PKGAFTAETSPAMLQDLGVGWVILGHSEERRHVFGESDELIAEKVHAL-SCKLK-VVACIGEKLDEREKQTKDNNFRQMRALA  
Caenorhabditis\_elegans --AGVLVAAQNCYKV-PKGAFTGEISPAMIKDLGLEWVILGHSEERRHVFGETDALIAEKTVHAL-EAGIK-VVFCIGEKLEEREAGHTKDVNFRQLQAIIV  
Caenorhabditis\_remanei --AGVLVAAQNCYKV-PKGAFTGEISPAMIKDLGLEWVILGHSEERRHVFGETDALIAEKTVHAL-ESGIK-VIFCIGEKLEEREAGHTKDVNFRQLQAIIV  
Brugia\_malayi --NGIEVSAQNCYKV-EKGAFTGEISPAMIKDLGLHWVILGHSEERRHIFGESDELIAEKLHVAL-DSSLQ-TIFCCGEKLDEREAGTKAVNFRQLQAVI  
Trichinella\_spiralis --PAVGLSAQNCYKV-EKGAFTGEVSASMLRDIGCDWVILGHSEERRHILHESDELVAEKVSMAL-NSGLG-VIFCVGEKLDEREAGHTKDVNFRQLASLL  
Ricinus\_communis --PDFHVAAQNCWVK-KGGAFTGEVSAEMLVNLSPWVILGHSEERRLLLSENEFVGDKVAYAL-SQGLK-VIACVGETLEQREAGSTMVVAQAQTKAIA  
Vitis\_vinifera --PDFHVAAQNCWVK-KGGAFTGEISAEMLVNLGIPWVILGHSEERRLLLSENEFVGEKVAYAL-SKGLK-VIACVGETLEQRESGSTMVVAQAQTKAIA  
Arabidopsis\_thaliana --SDFVAAQNCWVK-KGGAFTGEVSAEMLVNLDPWVILGHSEERRAILNESSEFVGDKVAYAL-AQGLK-VIACVGETLEEREAGSTMVVAQAQTKAIA  
Zea\_mays --QEFVAAQNCWVK-KGGAFTGEVSAEMLVNLGVPWVILGHSEERRALLGESNEFVGDKVAYAL-SQGLK-VIACVGETLEQREAGSTMVVAQAQTKAIA  
Oryza\_sativa --PEIQVAAQNCWVK-KGGAFTGEVSAEMLVNLSPWVILGHSEERRSLLGESNEFVGDKVAYAL-SQGLK-VIACVGETLEQRESGSTMVVAQAQTKAIS  
Fragaria\_vesca --PDFQVAAQNCWVK-KGGAFTGEVSAEMLKNEVPWVILGHSEERRALLGETNEFVGDKVAYAL-SQGLK-VIACVGETLEQREAGSTVEVVAQAQTKAIA  
Glycine\_max --PDFHVSAQNCWVR-KGGAYTGEVSAEMLVNLGIPWVILGHSEERRLLNELNEFVGDKVAYAL-QQGLK-VIACIGETLEQREAGTTTAVVAEQTKAIA  
Cucumis\_sativus --SDIQVAAQNCWVR-KGGAFTGEVSAEMLVNLGIPWVILGHSEERRLLKESNEFVGDKVAYAL-SQGIK-VIACVGETLEQRESGSTIEVVAQAQTKAIA  
Perkinsus\_marinus --SNIQISAQNCSTK-GPGAYTGEITAEMIKDAGLNWTLGHSEERRHLFNETNEDLAAKVAKAE-AAGLK-IIFCIGELLEEREAGKTEEVCAQMDAIV  
Aspergillus\_niger --EKIGVAAQNVFDK-PNGAFTGEISVEQLRDVKIDWTIIGHSEERRVILKESDEFIARKVKAAL-DGGLS-VIFCIGETLEEREANKTIDVVTQQLNAVA  
Penicillium\_chrysogenum --PKIGVAAQNVYDK-PNGAFTGEISVEQLRDNKINWAVIGHSEERRVILKESDEFIARKTKAAL-EGGVS-VIFCIGETLEEREANKTIEVVTRQLNAVA  
Paracoccidioides\_brasiliensis --GQVAVSAQNVFDK-PNGAFTGELSVEQLRDEKITWTLGHSEERRVLLREDDEFVARKTKAAL-NGGLN-VILCIGESLEEREAGKTIDVVTQQLDAVA  
Schizosaccharomyces\_pombe --KDIGVGAQNVFDK-KNGAYTGENSAQSLIDAGITYTLTGHSEERRIFKESDEFVADKTKFAL-EQGLT-VVACIGETLAEREANETINVVTRQLNAIA  
Saccharomyces\_cerevisiae --PQVTVGAQNAYLK-ASGAYTGENSDQIKDVGAKWVILGHSEERRSYFHEDDKFIADKTKFAL-GQGVG-VILCIGETLEEKKAKTLDVVERQLNAVL  
Kluyveromyces\_lactis --KEVKISAQNAYSK-ASGAYTGENSVEQIKDVGAEWVILGHSEERRTYFNETDEIVAQKVFAL-DSGVK-VILCIGETLEEKQONITLQVVRQLNAVL  
Candida\_dubliniensis --PTVAVGAQNVFDK-ACGAFTGETCASQILDVGATWTLTGHSEERRTIKESDEFIAEKTKFAL-DNGVK-VILCIGETLEERKAGITLDVCAQQLDAVS  
Clavispora\_lusitaniae --STVAVAAQNVFNK-ASGAYTGEISPEQLKDLGATWTLTGHSEERRTIKESDEFIAEKTKFAL-DSGVS-VILCIGETLEERKAGITLDVCAQQLDAVS  
Chlamydomonas\_reinhardtii --DKYQLSAQNAWIG-GNGAFTGEVSAEQLTDFGVPWVILGHSEERRSLFESNEVVAKKTSHAL-AAGLG-VIACIGETLEQRNSGSVFKVLDAQMDALV  
Volvox\_carteri --DKYQLAAQNCWIG-GNGAYTGEVSAEQLQDFGLPWVILGHSEERRSLCGETNQVVAKKTALHAL-DVGLG-VIACVGETLDQRNSGAMFQVLDGQMQUALV  
Dictyostelium\_fasciculatum --QRVQVAAQNCYSE-TKGAYTGEISAEMIVDIGLKWVILGHSEERRNLFKESNQQLIAKKTQHAL-SQGLS-VIFCIGELLEQRETNKTEQVLDEQLGFL  
Entamoeba\_histolytica --GANILVSAENAWTK-S-GAYTGEVHVGMVDCQVPYVILGHSEERRQIFHESNEQVAEKVVAI-DAGLK-VIACIGETEQAQRIANQTEEVVAQAQKAIN  
Cryptosporidium\_parvum --GVFKIGSQNISCT-GNGAFTGEVSCMLKMDVDCSLVGHSEERRQYYSETDQIVNNKVKGL-ENGLK-IVLCIGESLSERETGKTNDVITQQLTEAL  
Cryptosporidium\_muris -----INIGSQDISST-GNGAYTGEVSCDILKDYNIHCTLIGHSEERRQYYSETDSVNAKVLHAL-KHNFT-VVLCIGESLQERESGKTNDVIKHQLEFAL  
Plasmodium\_falciparum -----STGIQNVSKF-GNGSYTGEVSAEIAKDLNIEYVIIGHFERRKYFHETDEDVREKLQASL-KNNLK-AVVCFGESLQERESGKTNDVIKHQLEFAL  
Plasmodium\_vivax -----HTGIQNVSKF-GSGSYTGEISAEIAKDLNIEYVIIGHFERRKYFHETDEDVREKLQASL-KNNLK-VVVCFGESLQERESGKTNDVIKHQLEFAL  
Paramecium\_tetraurelia -----QVALQNSSLT-KVGAYTGEISVEQVKDLAIWVILGHSEERRQYYGETNEIVGKKTTRIAL-DYQLS-VMACVGEKLAEREAGQTTQVIQAQLDAIK  
Tetrahymena\_thermophila -----QVSVQNTSLT-GTGAYTGEISVAHVKDLGLNWAILGHSEERRQYYGETNEVVANKVKYAV-ENGLD-VIACVGEHLADREANQTNQVVEGQLEAIR  
Toxoplasma\_gondii -----HVGLQNCSTK-HNGAFTGEISVEMIKDFGLRWILGHSEERRQYYGESDEVVAEKVNIILQEKDLN-VVLCVGEQLKDREANKTNDVVAQQLAACL  
Trypanosoma\_brucei -----FVIAAQNAIAK-S-GAFTGEVSLPILKDFGVNIVLGHSEERRAYGETNEIVADKVAQAAV-AAGFM-VIACIGETLQERESGRTAVVLTQIAAIA  
Trypanosoma\_cruzi -----FQIAAQNAITR-S-GAFTGEVSLQILKDYGIKWVILGHSEERRLYGETNEIVAQKVAQAC-AAGFH-VIVCVGETNEEREAGRTAAVLTQLAAVA  
Leishmania\_mexicana -----YVISAENAIK-S-GAFTGEVSMPIKDLIGVHWVILGHSEERRTYGETDEIVAQKVSEAC-KQGFV-VIACIGETLQOREANQTAQVLSQTSIAIA  
Leishmania\_donovani -----YAVSAENAIK-S-GAFTGEVSMPIKDLIGVHWVILGHSEERRTYGETDEIVAQKVADAC-KQGFV-VIACIGETLQOREANQTAQVLSQTSIAIA  
Giardia\_lamblia -----LRIAAQNVYLE-GNGAFTGETSVEMLQDMGLKHWVILGHSEERRIMGETDEQSAKAKRAL-EKGMT-VIFCVGETLDERKANRTMEVNSIAQLEALG  
Trichomonas\_vaginalis --KDWKVSAENVFTK-PNGAFTGEVTPMIKSGFIEWTLGHSEERRDILKEDEFLAAKAKFAL-ENGMK-IIYCCGEHLISEREAGKASEFVSAQIEKMI  
Sphingobacterium\_sp ---NVSVGAQNIHQE-DAGAYTGEISAKQVRSTGAEXVILGHSEERRAYFGESELLAQVNIAL-THGLI-PIFCIGETREERESGDFDVIKTQLEKGV  
Pedobacter\_saltans ---NVFVGAQNAHQE-ASGAYTGEISTGMLKSVGVEYVILGHSEERRQYFGENNELLAKKTNTAL-ANDLK-PIFCIGETLAERESNQHFQDVIKTQLAQLEAT  
Marivirga\_tractuosa ---QIVLAGQNCQOE-DAGAYTGEVSAEMLKSLGAQYVILGHSEERRHVFSETDEELAKKTNDAL-KNDLK-VIFCCGEPLEREADTQNEYVTKQLTNSL  
Cyclobacterium\_marinum ---NIALGAQNCSDK-EAGAYTGETSAAMLASFGAEYVIIGHSEERRSMFNESNELLTEKTKQAL-SNGLT-PIFCGEPLEREADTHEYVKAQLESL  
Leadbetterella\_byssophila ---KVALAAQNCYPK-ASGAYTGEVSPMLKSVGVYVIIGHSEERRREYFAESDAFIAEKVDAIL-AEGLT-PIFCGETLSQREAGIHFDVVKQLTNSL

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Haliscomenobacter_hydrossis      ---SLYLGAQNCHQE-DKGAYTGEISVDMLKSVGVSYVILGHSEERREYFGESDELLAKKTDKVL-AAGLL-PIFCCGESLDIRDAGTHVAHVQAQIKAGL
Parabacteroides_distasonis      ---KIGVAAENCADK-EKGAYTGEVSAAMVASTGAKYVILGHSEERRAYYHETPEILKTKVELAL-ANGLT-PIFCIGEVLEEREAGKHFEVVDQAQIAGSL
Bacteroides_fragilis            ---KIGVGAENCADK-ESGAYTGEVSAAMVASTGAKYVILGHSEERRAYYGETVEILKDKVKLAL-ANGLT-PIFCIGEVLEEREANKQNEVVAAQLA-SV
Prevotella_ruminicola           ---IIGLGAENCADK-EKGAFTEVSAEMVKSTGAQYVILGHSEERREYKETEPEILKEKVLALQ-KNDLK-VIFCIGESLEEREAGKQNEVVKALEGSV
Alistipes_shahii                ---DVALGAQDCATE-AKGAYTGEIAASMI AALGCKYVILGHSEERRQYGETSATLNKMAQAY-ANGLI-PIYCVGENLDEREAGKHFDVVKAQIEEVV
Porphyromonas_asaccharolytica   ---DIEYAAQDCSAH-DAGAYTGEVSAEMIRSCGCTYVIIHSEERRAYYHESAEELLAQKIDQAL-AHGLK-VIFCVGEQQAEREGRNRYFEVVDQQLRGS
Cellulophaga_lytica             ---TIQVIAQNMHFA-DNGAYTGEISADMLLDIGINTVIIHSEERRAYYFGETDEILAKKVIKAL-EKNLR-VVFCFGEELEDKSDNHFNIVASQLKNAL
Kordia_algicida                 ---NVEVIAQNMHQE-AKGAYTGEVSARMLKSVGIKTIVILGHSEERRAYYFGETDELLAKKVDAAAL-ANELE-IIFCFGEELEDKAGNHFNIVENQLKNAL
Flavobacterium_psychrophilum    ---NIRVAAQNMHQA-ENGAYTGEISADMLKSIGVNTVILGHSEERRAIFHETDAIISFKVDLAL-RHEMT-VIFCFGEELKDRQNKQHFNIVENQLRDGL
Neisseria_gonorrhoeae          N--RILTCAQDVSRFPDNGAYTGEVSAEMLADTGTDIVLIGHSEERSLYFGEKNEIQRRKMENVL-NVGLI-PLLCVGESLEERETGKEHEVIAHQLS-IL
Francisella_tularensis         -----VGLQNT-FYDDGAYTGEISARMLLEDIGCDYLLIGHSEERSLFAEDEDVFKLNKII-DTTTT-PVVCIGESLDDRQSGKIKQVLAQSLIL
Mycoplasma_genitalium           -----LLLFAQDANFI-ESGSYTGTVSFTQLQDIGVNSIIGHSEERRKYNETSAVINQKLEACL-KASMQ-VVLCIGAL-----GQEISFLKTDLTNCL
Ureaplasma_urealyticum         ---KVKLYAQNPAY-SKGPYTGQISCLQLLDINIKNALVGHSEIRIDCSQS--IIDQKTKICM--DLLDQVVICIGEPDVEYEQK--KSLSFVLSQLAN
Ureaplasma_parvum              ---KVNLYAQNPALH-NKGPYTGQISCLQLLDINIKNALVGHSEIRIDFSQS--IIDQKIKISM--DLLEQVVICVGETTFDAYKQN--KSLNFVLNQLAN
Buchnera_aphidicola            ---NIFLGSQNVGIN-LNGAFTGETSILMLRDIGVKYVIIHSEERRFLHETDDIIAKKFLIK--KSNLTPILCVGETEIEKKNH--QTEQVIQRQLNL
Campylobacter_jejuni           ---NFIQGAQNFYPC-VNGAFTGELGKEHLDEFGIKCVLIGHSEERRALGDEE--FIKAKDFEAK--EHGYKIVFCIGENLDTKNSG--KTLEFLKKQLEI
Helicobacter_pylori            ---HFTLGVQNAAYPR-DCGAFTGEITSKHLEELKIHTLLIGHSEERRLLKESPSFLKEKDFEFK--DNKFKIVYCI GEELTTREKGFKAKEFLSEQLN
Orientia_tsutsugamushi         ---HFSAQDVSMITE-SSGPYTGGEISASMLKNLNVYAIVGHSEERRLLFYEDANTIALKVRNCI--NNAIVPIVCI GEPIEARKNK--TYLQYLAQQLSS
Wolbachia_sp                   ---NINIGAQNCHKH-KFGSYTGEISAEMLEKELGCTYVILGHSE---ANEKDESEIKLSEIAI--ESGLHPIICVGENSEDYKNE--KTKEVIEYQCKN
Methanocaldococcus_Jannaschii   -----VYAQHIDNI-NPGSHTGHILAEAIKDCGCKGTLINHSEKRMLLADIEAVINKCKNLGL-----ETIVCTNNTSKAVAALSPDC-----
Methanococcus_voltae           -----VYSQHMDAI-KPGSNTKILPEAVKSTGAFGTLINHSEKRLLLSDIEEINKSKELKL-----ESVCTNNTGSKAVSALSPDY-----
Methanothermococcus_okinawensi -----VYAQHFDVAI-SPGSHTGHVLAETLKDCGLNGSLLNHSEKRMILADLEAIRAEEVGL-----ETIVCTNNTGSKAVAALNPNM-----
Pyrococcus_Woesei             -----VFAQHIDPI-KPGSHTGHVLP EAVKEAGAVGTLINHSENRMLADLEAIRAEEVGL-----MTMVCNNPAVSAVAALNPDY-----
Pyrococcus_furiosus           -----VFAQHIDPI-KPGSHTGHVLP EAVKEAGAVGTLINHSENRMLADLEAIRAEEVGL-----MTMVCNNPAVSAVAALNPDY-----
Thermophilum_pondens           -----VFSQHVDDV-PPGSYTGHTVLEAVKDAGAVGTMVNHSEERRVADQVDVIVKRARSIGL-----TTVVCTNTPEVTAAMAALGPDM-----
Methanothermobacter_thermautot -----VLAQHIDAV-DAGGHTGSILAECARDAGAAGTLINHSEKRMQLADIEWVISRMKELEM-----MSVCTNNTVMTTAAAAALGPDF-----
Methanosaeta_thermophila       -----VYAQHVDPV-GFGSFTGHITAASVKAAGASGSLINHSEERRLRADIEASLRACRSEGL-----TSIICNTNVATTRAALRPDY-----
Natronobacterium_gregoryi      -----TWAQHVDPI-EHGSNTGHTLAESVADAGAVGTLVNHSEERRLKLADIDGAVRAAERADL-----ETVVCANNPEQIGAGAALGPDA-----
Halobacterium_salinarum        -----TYAQHVSPT-EHGSHTGSVLAESVADNGAVGTLVNHSEHRRRLADIDGSAVAAERAGL-----DTVVCANNPAQVAAAAALGPDA-----
Halogeometricum_borinquense    -----TWAQHVDPI-GYGSHTGSTLAESAAGADGTLINHSEKRLKLADIDGSAVAAERAGL-----ETVVCANNPAQIGAVAALGPDS-----
Methanosphaerula_palustris     -----VFAQHLDGV-VPGAFTGHVTA AAVRQTGAVGTLINHSEERRLTLAEIEASVRAATEAGL-----VTVICSNNDMTSAAAAALSPTY-----
Thermoproteus_tenax            -----VYAQGADVE-AGGAHTAHVSL ENIKEAGGSGVILNHSEAPLKLNDLARLVAKAKSLGL-----DVVVCAPDPTSLAAAAALPHA-----
Pyrobaculum_islandicum        -----VYAQGADVE-TPGAYTAHIAVDNIKAVGASGLILNHSEAPLALNQLSKLAARAKSIGL-----DVVICAPDPVTSLAAAAALPHA-----
Cenarchaeum_symbiosum         -----VLAQHIDDK-GVGSTTG YVPELLGESGVSGALINHSEHRVSADQVASLVPRLRGLDM-----ISVVCVKDSAEAAANLSRHRPDY-----
Nitrosopumilus_maritimus       -----IFAQHIDDK-KVGSTTG FVPELLKKSQVNGSGLINHSEHRVSSKEITKLVSKLKLKLM-----TSIVCVKDVAEARKYAKLNPY-----
Desulfurococcus_kamchatkensis  -----VKVFAQHADPV-EPGAITGFIPLEGLKNGLAHGVLNHSEHRLKISDINYLKVKARRLGI-----ETLVCADTPETGA AVAVLGPDM-----
Pyrolobus_fumarium            -----VIVYAQHVDPV-EPGAHTGSVPVEAVKEAGARGSLVNHSEKRLRLDEIERVVERLKVVGL-----EQLVCADTPRAAAAIAVFPTY-----
Acidilobus_saccharovorans     -----VYIEHADPV-DYGAYTGYLPAKAARLLGVRGILVNHSEHKMIYRDVAKVVEVETASKDGI-----ETMACADTPGEAAGLAYLRPTY-----
Sulfolobus_islandicus         -----IYAEHVDPV-PLGAYTGA VLPEMIKDADAKGTLINHSEHRRRLADEIDDLVLRTRKLG L-----SSILCVDRYELVYPFSLLRPDA-----
Clustal Consensus              . * . * * * * * * *

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210 220 230 240 250 260 270 280 290 300  
Roseiflexus\_castenholzii TGMTPEQ--IGRIVIAIEPVWAIGTGDTATPADAQAMHE-TIRRILGDMAG--SDTAATINILYGGSVKPDNIDDLMAQPDIDGALVGGASLKADSFLR-  
Chloroflexus\_aurantiacus LEVPPDQ--MANVVIAYEPIWAIGTGDTATPADAQAMHA-AIRATLAELYG--SEIAATVRIQYGGSVKPDNIDELMAQPDIDGALVGGASLQAASFRL-  
Nostoc\_punctiforme VDDIQN----NLVIAIEPIWAIGTGGETCEAVEANRIIG-LIRSQLSNPN-----VSIQYGGSVKPNNIDEIMAQPEIDGVLVGGASLEPESFAR-  
Anabaena\_variabilis INVDQT----NLVIAIEPIWAIGTGDTCEETEANRVIG-LIRSQLNKND-----VPIQYGGSVKPNNIDEIMAQPEIDGVLVGGASLEAASFAR-  
Synechocystis\_sp VNVDSQ----NLVIAIEPIWAIGTGDTCAATEANRVIG-LIREQLTNSQ-----VTIQYGGSVNANNVDEIMAQPEIDGALVGGASLEPQSFAR-  
Cyanobacterium\_aponinum VNVDSQ----NLVIAIEPIWAIGTGDTCEAAEANRVIG-LIRSQLTNKN-----VTIQYGGSVNPKNVDEIMAQPEIDGALVGGASLDPEFAR-  
Crocospaera\_watsonii VDDVDS----NLVIAIEPIWAIGTGDTCESTEANRIIR-VIRDQLSNKN-----VTIQYGGSVKPNNIDEIMAQSDIDGALVGGASLDPVNFAR-  
Trichodesmium\_erythraeum VDDVDE----NLVIAIEPIWAIGTGDTCEAKEANRVIG-LIRGKLNSN-----VTIQYGGSVKPNNVDDIMAQEEIDGALVGGASLNPEFSFR-  
Synechococcus\_sp VDIQNF----NLVIAIEPIWAIGTGDTCAADEADAVIG-KIRALLDNKE-----VSIQYGGSVKPNVDEIMAQSEIDGALVGGASLTPDSFAR-  
Prochlorococcus\_marinus EETDKK----KLIVAYEPIWAIGTGKTCEANEANRIG-LIRQWANCPE-----ILIQYGGSVKPGNIDEIMAMSDIDGVLVGGASLDPEFAR-  
Sphaerobacter\_thermophilus ADVEAAD--VLRTVIAIEPVWAIGTGRAATPEDAR-EMANWIREVLARHVG--AEAANEIRVQYGGSVNADNAAGFLSLPEIDGALVGGASLKADQFTQ-  
Anaerolinea\_thermophila KDLLPEE--GLKLVIAIEPVWAIGTGRAATAEVAQSVHANVVRPALAHFVG--QEVAGQIRIQYGGSVTAKNAPELFAFPDIDGALVGGASLKAGEFFAA-  
Myxococcus\_xanthus EGFGAKE--VAGFVLAYEPIWAIGTGRNATAAQAEVHA-AIRGLVERLYD--GETAGRVRIQYGGSVKPDNAEELGQPDVDGALVGGASLKAGDFAA-  
Collinsella\_tanakaei EGLEIAD--PAQLVVAYEPIWAIGTGMTATADDAQEVCA-AVREALADLFG--AELASGIRVLYGGSAPGNIAELTAKPDVDGALVGGASLKAADFSQ-  
Atopobium\_vaginae KGLTLTS--PSQYVVAYEPIWAIGTGKTATAEDAQEVCS-AIRATLRDIFG--AELANGIRVLYGGSAPPENIAGFLAEEDVDGALVGGASLKADSFAA-  
Eggerthella\_sp AGIDATD--AKVCVVAYEPIWAIGTGRTATPEQAEVCA-AIRATLAELYG--ADVSEAMRVLYGGSMPGNVEGLMAQPNIDGGLVGGASLDATSFAE-  
Dictyoglomus\_thermophilum EGLEKEN--VEKIVIAIEPVWAIGTGHSAKGEDANEVAG-LIRKIISEMYD--TEVSQKIRIQYGGSVNPQNITEFLSQNEIDGALVGGASLKQPFSFN-  
Aquifex\_aeolicus TGVE-EH--TDKIDIAIEPVWAIGTGTPATPEDAVEVHT-FIRNLINQLNP--KNE-GKTRILYGGSVNPQNAKEFMKHEEINGLLVGTASLDPEFSAK-  
Thermodesulfobacterium\_yellowston LEIN--S--PEALTYAYEPIWAIGTGVVATEEQIKQSHL-FIRNQLKEYG--ERA-NEVRILYGGSVTPENIKSIMAIDNVEGVLVGGASLDPLKFAK-  
Dehalogenimonas\_lykanthroprep DGVN----SPDIYVAYEPIWAIGTGRAATGDIANETAM-LIRNVGKLYG--NAVSQALPILYGGSVNPNISDFISRSIDGALVGGASLKAQEFVE-  
Dehalococcoides\_sp DGLN----LSCIIIAYEPIWAIGTGKAATASEANSAIG-YIRRVGLDITLQ--NAAQTSPILYGGSVNEKNITEILSQTNIDGALVGGASLKAQESFVS-  
Geobacter\_metallireducens AGLARGD--LAKIVIAIEPVWAIGTGKTATDEQAQIAHA-FIRKVVGELEFT--VQIAETIRILYGGSVKPNVVRGLMNQPDIDGALVGGASLKADSFGA-  
Desulfobacter\_postgatei KGFDLGD--LDTLILAYEPIWAIGTGKTAGPEQVKEVHG-FLRHLLKEKYA--EGLAATIRILYGGSVKPGNIKDLMLQLEDVDGALVGGASLNPEDFNE-  
Planctomyces\_brasiliensis KDISAEQ--MTNVVIAIEPVWAIGTGKTASPEQAEQHA-HLRKWLADRYT--SEVAEQTRILYGGSVKPANAKELLGQONVDGALVGGASLTVDNFGP-  
Spirochaeta\_coccoides GGVSSAD--MSRVVIAIEPVWAIGTGKTATPDDADNAHA-YIRGLINGLYG--KDVAEQLIQYGGSVKADNVKELMAKPNVDGALVGGASLSIDKFLP-  
Denitrovibrio\_acetiphilus KDIGMDR--INRVTLAYEPIWAIGTGKTATPADAEDIHG-KIRTQLSKMYG--PVVAEKIRILYGGSVKPDNVSALMMRENIDGALVGGASLDATSFAK-  
Prosthecochloris\_aestuarii EGV--AD--IGDIVIAIEPVWAIGTGKTASSLQAEVHA-SIRATVAGLYS--EPAAGVRIQYGGSVKPSNAEELFAMPDIDGGLIGGASLNAEDFVA-  
Chlorobium\_phaeobacteroides ADI--ED--LGNVVLAYEPIWAIGTGKTATPEQADAVHA-SIRATISDMYG--EADAEDIRIQYGGSVKPSNAVELFGMPNIDGGLIGGASLKADDFVA-  
Chlorobium\_ferrooxidans AGI--SD--ISTVVIAIEPVWAIGTGKTASSAQAEVHL-LIRNTITKLYG--DAAAGKLRIQYGGSVKPSNAEELFAMPNIDGGLIGGASLNAADFAA-  
Chloroherpeton\_thalassium KDLTAED--MKSVVIAIEPVWAIGTGKTATPEQAQEVHA-FIRGIVKDMFG--EEVANELRIQYGGSVKPSNAKELFGMPDIDGGLIGGASLNAEDFVE-  
Treponema\_pallidum ADVCGSL--MHNVTVAYEPIWAIGTGKTATPAQANAVHA-HIRSVVREMYG--AAIAEALCIQYGGSMKAENARALLAEHIDGGLIGGASLEAASFVP-  
Leptospira\_interrogans KGIDSVF--FSNLILAYEPIWAIGTGKVATPSQAQEVHS-FIRKEISGLFVGASSISESISILYGGSVKPDNIQDLLKEKDIDGGLVGGASQKISSFAE-  
Borrelia\_turicatae ISVSESD--LKRIILAYEPIWAIGTGKTATKEEAQEVHR-AIRHEVELLYS--VSAANNIIQYGGSVNIDNVKGLMGESDIDGALIGGASLKADSFLN-  
Thermotoga\_maritima YGLDKEE--AKRVVIAIEPVWAIGTGRVATPQAQEVHA-FIRKLLSEMYD--EETAGSIRILYGGSIKPDNFLGLIVQKDIDGGLVGGASLK-ESFIE-  
Fusobacterium\_nucleatum VDLKED--AEKTIVAYEPIWAIGTGKTATPEMAQETHK-EIRNVLAEMFG--KDVAKMIQYGGSMKPENAKDLLSQEDIDGGLVGGASLKADSFFE-  
Selenomonas\_sputigena DGFSADE--AAQLVIAIEPIWAIGTGKTATFEQAEVCA-AIRATVAEVFN--KDAEGRIRIQYGGSVKPATIAGLMEKPNVDGALVGGASLKAKDFSE-  
Ruminococcus\_sp QGVTADQ--AKTVIAIEPIWAIGTGKTATTEQAQEVCA-GIRACIAEIYD--EATAEAIQYGGSVNPATAPDLFVQNDIDGGLVGGASLKA-DFGK-  
Clostridium\_botulinum KELSKEQ--VEKLVIAIEPIWAIGTGKTATDEQANETIG-YIRTVVKAMYD--ESVADKIRIQYGGSVKPGTIKAQMAKKEIDGALVGGASLKAEDFAA-  
Clostridium\_perfringens EGLTKEQ--AEKVVIAIEPIWAIGTGKTATSDQANETIA-AIRAMVAEMFG--QEVADKIRIQYGGSVKPNITIAEQMAKSIDGALVGGASLVAADFAQ-  
Thermoanaerobacter\_wiegelii KGVSHDD--IVNVVIAIEPIWAIGTGKTATAKDANEVIK-AIRNTIASLYG--KGKASLVRIQYGGSVKPENISELMAESDIDGALVGGASLVAADFVAK-  
Brachyspira\_murdochii KGLSEAE--AKKVVIAIEPVWAIGTGKTATPQDADEVHK-TIRETLKSLYN--ESVAEGMIILYGGSVNEKNADDLLNMPNIDGALVGGASLVAADKFAK-  
Acholeplasma\_laidlawii EGVSKAQ--ALKTVIAIEPVWAIGTGKTATPQMANDTIK-DVRAKLSLDLYG--AEVAAQVRILYGGSVKPDNIESLLQESDIDGALIGGAALDHKNFLT-  
Lactobacillus\_reuteri RGVSLDQ--IKNVVSYEPSWAVGYQHANPVLAEQCR-QIRRTIADNYT--YEIADKIRILYGGSVNPDNIGMIMNKPVDVGLIGRASLDVDNFLR-  
Bacillus\_subtilis AGLSEEQ--VAASVIAIEPIWAIGTGKSSSTAKDANDVCA-HIRKTVAESFS--QEAADKLRIQYGGSVKPANIKIEMAESDIDGALVGGASLEPQSFVQ-

Bacillus\_thuringiensis AGLTTEEQ--VKATVIAYEPIWAIGTGKSSSSADANEVCA-HIRKVVAEAVS--PEAAEAVRIQYGGSVKPENIKEYMAQSDIDGALVGGASLEPASFLG-  
Listeria\_monocytogenes AGLTTEEQ--VIKSVIAYEPIWAIGTGKSSSTSADANETCA-VIRAEVADAVS--OKAADAVRIQYGGSVKPENIADYLAESDIDGALVGGASLEPASFLA-  
Geobacillus\_stearothermophilus AGLTPEQ--VKQAVIAYEPIWAIGTGKSSSTPEDANVCG-HIRSVTSRLFG--PEAAEAIRIQYGGSVKPDNIRDFLAQQQIDGPLVGGASLEPASFLQ-  
Staphylococcus\_aureus AGLSEdq--LKSvVIAYEPIWAIGTGKSSSTEDANEMCA-FVRQTIADLSS--KEVSEAVRIQYGGSVKPNNIKEYMAQTDIDGALVGGASLKVEDFVQ-  
Enterococcus\_faecalis VGLSNEQ--VASMVIAYEPIWAIGTGKSADANIADIEICG-VVRSTVEKLYG--KEVSEAVRIQYGGSVKPENIAEYMAKENVDGALVGGASLEADSFLA-  
Lactococcus\_lactis AGLTAEQ--VSNLVIAYEPIWAIGTGKTATNEIADETCG-VVRSTVEKLYG--KEVSEAVRIQYGGSVKPETIEGLMAKENIDGALVGGASLEADSFLA-  
Streptococcus\_pneumoniae AGLTAEQ--VAASVIAYEPIWAIGTGKSASQDDAOKMCK-VVRDVVAADFG--QEVADKVRVQYGGSVKPENVASYMACPDVDGALVGGASLEAESFLA-  
Erysipelotrichaceae\_bacterium ADMCPKC--VGNMVIAYEPIWAIGTGKSASVEIAENCCR-IVRDQVRVMYG--DEAAENVRVQYGGSVKPNNIVEYMAQPDIDGALIGGASLKADSFIE-  
Lentisphaera\_araneosa ADITAEQ--MTNLVVAYEPVWAIGTGVTASPEQAQDTHA-YIRSEFAALYG--QEVADKVIQYGGSVKPANVAELMSCEDIDGALVGGASLKADDFSA-  
Chlamydomphila\_pneumoniae EQMDN----GSEFLIAYEPVWAIGTGKVAEASDVQDIHM-FCREVVAERFS--EATAEEISILYGGSVKVDNAQRFQCSDVDGLLVGGASLEGQSFFE-  
Desulfovibrio\_vulgaris ADVDATYV-PQSLVVAYEPVWAIGTGKVAGPAEVVEAHA-LVRSLEARYG--RD-GAAIRILYGGSVKPDNAAELLSLDNDVGLLVGGASLQAVSFSR-  
Mesorhizobium\_opportunistum QFFEEEVK-GATILFAYEPVWAIGDKGIPASSDYADKQ----QGLIKAVAG--SLLPSVPSVLYGGSVNPGNAAELIGQPNVDGLFTGRSAWQAQGYID-  
Bartonella\_henselae P---DGAT-AENIIIIAYEPVWAVGTGNTATSADVAEVHA-FIHhKMHSRF---GDEGAKIRLLYGGSVKPSNAFELLSTAHVNGALIGGASLKAIDFLT-  
Brucella\_abortus P---DGVT-AENTIIAYEPVWAIGTGLTPTVQDVRAAHA-FMREQLIERF---GAKGAHLRLLYGGSVKPSNAAELLGVAADVGDALVGGASLKAADFLA-  
Rhizobium\_etli P---DGAT-AENTVIAYEPIWAIGTGVTPTS GDVEKAHA-FMRAEMARF---GEEGRKMRLLYGGSVKPANAGELMGIANVDGALIGGASLKAADFLA-  
Agrobacterium\_tumefaciens P---DEAT-AENTVIAYEPVWAIGTGLTPTTQDVEAHA-FMRDELVKRF---GDAGKTMRIYGGSVKPANALELMGVENVGDALIGGASLKAADFLS-  
Rhodobacter\_sphaeroides P---DAAT-AANTVIAYEPVWAIGTGRTPTTAEIAEVHA-FLRARLAERF---SDA-EGFRLLYGGSVKPSNAAEIFAVPNVDGALVGGASLKAADFGG-  
Ruegeria\_sp P---DGVT-AENTVVAYEPVWAIGTGKVP TLDQIAEVHD-ALRADLVARF---GAAGKDLPLLYGGSVKPGNAAEIFGVSNDGALVGGASLKAADFGP-  
Bradyrhizobium\_japonicum P---DGST-AANLVVAYEPVWAIGTGLTPTVQDVEQIHG-FIREFLTSRF---SVDGAKMRILYGGSVKPSNAAELMAVKNVGALVGGASLKAADFLA-  
Rhodopseudomonas\_palustris P---DGAT-AANLVVAYEPVWAIGTGMP TTAADVEEVHG-FIRQTLTQRF---NAEGDQMRLLYGGSVKPSNARELMSVPHVNGALVGGASLKAADFLA-  
Methylobacterium\_radiotolerans P---KGAT-AADTVIAYEPVWAIGSGRTP TPRDIAEVHA-SLREMLDKLV---GDEAQKIRILYGGSVKPGNAKELLSVDNDVGDALVGGASLVAEDFLG-  
Rhodospirillum\_rubrum P---THAD-SGKVVIAYEPVWAIGTGRVPTTEDVAKVHG-ALRKDLVGL---GADNGKVRILYGGSVKPDNAAELMALENVDGALVGGASLKAEDFWA-  
Zymomonas\_mobilis P---PDAT-SDNLVVAYEPVWAIGTGNTP PPEEIAEMHA-SIRDRLCLL---GSEGGKVRILYGGSVTKNAEELMAIPDVNGTLVGGASLTAEQFVP-  
Gluconacetobacter\_hansenii P---QGFT-G---IVAYEPVWAIGSGTAASQODIADMTQ-FIREELVRQF---GDAGKTIKILYGGSVNGRNAADILPIADVGGALVGNASLAAETTFMP-  
Thermus\_thermophilus EG-VEPPG-PEALVIAYEPVWAIGTGKNATPEDAEAMHQ-EIRKALSERYG--EAFASRVRIYGGSVNPKNFADLLSMPNVDGGLVGGASLELESFLA-  
Thermus\_aquaticus KG-VEPES-PDRLVIAYEPVWAIGTGKNATPEDAEAMHQ-AIRQALAEYRG--EAFASRVRLYGGSVNPKNFADLLSMPNVDGGLVGGASLELESFLA-  
Oceanithermus\_profundus EG-VGLET-GEELVIAYEPVWAIGTGKTASADDAQAMAA-AIRGFLAEYRG--ESVAGRTRILYGGSMKPANTTEILAGPDVDGGLVGGASLEVASFSA-  
Deinococcus\_deserti EG-VG----TDVVIAYEPVWAIGTGKTATAEDAEEELAE-AIRGALTEQYG--EAAG-TLRILYGGSVKPDNIASICAKPNVNGALVGGASLKVADVVG-  
Bifidobacterium\_bifidum RD-LSDKE-AAKLIIAYEPVWAIGTGMVATPD TAQQAQK-AIRDDLGE MFG--PAVADTVRIYGGSVSSKNATHLIGEPDVGFLIGGASLDPDELAK-  
Bifidobacterium\_longum RD-LNEEQ-AAKLIVAYEPVWAIGTGMVATPQSAQDAAN-AIRNDLKTTFG--TKVSDSVRIYGGSVTSKNAAEELISQPDVDGFLIGGAALDVEELAK-  
Gardnerella\_vaginalis RD-LDSKQ-AERLIIAYEPVWAIGTGMVATAQSAQDAK-AIRDDLQETFG--DTVSKVRILYGGSVTSSNAASLICEPDVDGFLIGGASLDIEELAT-  
Nocardia\_farcinica KG-LSAEQ-IAKVVIAYEPVWAIGTGKVASAADAQEVCG-AIRAELAE LAG--PEVAAQVRVLYGGSVNAKNVGE LVAQPDVDGALVGGASLKGDEFAT-  
Mycobacterium\_tuberculosis AG-LLAEQ-IGSVVIAYEPVWAIGTGRVASAADAQEVCA-AIRKELASLAS--PRIADTVRVLYGGSVNAKNVGDIVAQDDVDGGLVGGASLDGEHFAT-  
Corynebacterium\_glutamicum AG-LDAAE-LANTVIAYEPVWAIGTGKVASAADAQEVCK-AIRGLIVELAG--DEVAEGLRILYGGSVKAETVAEIVGQPDVDGGLVGGASLDGEAFAK-  
Propionibacterium\_acnes DG-IPAEQ-VAKLVIAYEPIWAIGTGGETATADDAQEV CQ-AIREAVKELYD--APTAEAVRIQYGGSVKPANVAEIMAKPDVDGALVGGASLKAGDFSK-  
Actinomyces\_odontolyticus AG-WKPEE-VAKIVIAYEPIWAIGTGGETASAEDAQEVCG-AIRAALAE DFG--AETAESTRILYGGSAKPDNIKELMAQPDVDGGLVGGASLKADSFAA-  
Microbacterium\_testaceum EG-VAS---AAEIVVAYEPVWAIGSGQAATPEQAQEVCA-KLRVVAEKLG--ADAAARTRVLYGGSVKANNIAAFMREPDVDGALVGGASLVVDEFAA-  
Moritella\_marina NT-QGVEA-LEGAI IAYEPIWAIGTGKAATAEDAQR IHA-QIR-AHIAEKS--EAVAKNVVIQYGGSVKPENAAAYFAQPDIDGALVGGAAALDAKSFAA-  
Photobacterium\_profundum NT-QGVEA-LEGAI IAYEPIWAIGTGKAATAEDAQR IHA-QIR-AHIAEKS--EAVAKNVVIQYGGSVKPENAAAYFAQPDIDGALVGGAAALDAKSFAA-  
Vibrio\_cholerae DA-YGVEA-LNGAI IAYEPIWAIGTGKAATAEDAQR IHA-SIR-ALIAAKD--AAVAEQVIIQYGGSVKPENAAAYFAQPDIDGALVGGAAALDAKGFAA-  
Shigella\_flexneri KT-QGAAA-FEGAVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKVD--ANIAEQVIIQYGGSVNASNAAE LFAQPDIDGALVGGASLKADAFAV-  
Escherichia\_coli KT-QGAAA-FEGAVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKVD--ANIAEQVIIQYGGSVNASNAAE LFAQPDIDGALVGGASLKADAFAV-  
Salmonella\_enterica KT-QGAAA-FEGAVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKAD--AKIAEQVIIQYGGSVNASNAAE LFAQPDIDGALVGGASLKADAFAV-  
Klebsiella\_pneumoniae KT-QGAAA-FEGVVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKAD--AKIAEQVIIQYGGSVNAGNAAELFTQPDIDGALVGGASLKADAFAV-  
Enterobacter\_aerogenes KT-QGAAA-FEGVVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKAD--AKIAEQVIIQYGGSVNAGNAAELFTQPDIDGALVGGASLKADAFAV-  
Serratia\_symbiotica KT-LGAPA-MKSAVIAYEPVWAIGTGKSATPAQAQAVHK-FIR-DHIAKHD--TAIAAEVVIQYGGSVNDKNAAELFAQPDIDGALVGGASLKADAFAA-

Yersinia\_pestis NT-LGVKA-FEGAVIAYEPIWAIGTGKSATPAQAQAVHK-FIR-DHIAKQD--AAVAAQVVIQYGGSVNDKNAAEELFTQPDIDGALVGGASLKADAFVAV-  
Actinobacillus\_pleuropneumonia DA-LGVEA-FNGAVIAYEPIWAIGTGKSATPAQAQAVHA-FIR-GHIAAKS--QAVADQVVIQYGGSVNDANAAEELFTQPDIDGALVGGASLKAPAFVAV-  
Pseudomonas\_aeruginosa DE-LGVGA-FARAVVAYEPIWAIGTGLTASPAQAQEVHA-AIR-AQLAAEN--AEVAKGVRLLYGGSVKAAASAEELFGMPDIDGGLVGGASLNADDFGA-  
Marinomonas\_posidonica DV-VGIQA-FENIVIAYEPIWAIGTGLSASAQAQDVHQ-AIR-ANLASLS--TPVSEKVIQYGGSVKASTSAEELFTMPDIDGALVGGASLDKAEFLD-  
Xylella\_fastidiosa AL-VGPQG-VARGLIAYEPIWAIGTGRHADPSQVQAMHA-FIR-GEIARQD--ARIGDSLILLYGGGKPCNAAEELFSQDQVDGGLIGGASLVADDFLA-  
Xanthomonas\_campestris SL-VGSAG-FARAVVAYEPIWAIGTGRATPDQAQAVHA-FIR-GEVAKAD--ARIADSLPILYGGSVKPDNAAEELFSQDQVDGGLVGGASLVAEDFLA-  
Marinobacter\_algicola AD-VGNGL-WQOVVIAYEPIWAIGTGKTATADDAQAMHA-AIR-AVLSMLG--A-PADEVSLLYGGSVKADNAAALFAQPDIDGGLIGGASLDASDFVS-  
Aeromonas\_caviae EK-NGAMA-FDNAIAYEPIWAVGTGKCATPEQAQEVHS-FIR-SRLAEDT--PVIGEKVRIYGGSVTPANAQDLFAQSDIDGGLIGRASLDGEAFLG-  
Pseudoalteromonas\_haloplanktis EK-LGVAA-LKDSVIAYEPIWAIGTGKTASPEQAQSVHK-FIR-DKIASLN--SDLAQGLTILYGGSVNEKNESELLFAQTDIDGGLIGGASLKADSFTA-  
Legionella\_pneumophila AK--GKDC-FRDCVVAYEPIWAIGTGKTATPEQAQKIHQ-FIR-DLVGEIN--DSDAKHLTLIYGGSVNENNAKALFSMPDIDGGLVGGASLNKQFVE-  
Ralstonia\_solanacearum ES-LSLEQ-LGRIVVAYEPIWAIGTGKTATSEQAQAVHA-FLR-GRVAACD--AGVAQRMPIYGGSVKPDNAAEELFSMADIDGGLIGGASLKAEDFLV-  
Burkholderia\_sp AK-LSAQE-AARLVVAYEPIWAIGTGKSASAAQAQAVHA-FLR-ARLAAG-----AADVPLLYGGSVKPDNAAEELFRQNDIDGGLIGGASLKDQDFLA-  
Bordetella\_pertussis A--LGRDA-LVRMVLAYEPIWAIGTGRTASPEQAQEVHS-AIR-VALDGLQ-----ASQVRVLYGGSVKGANAAASLFAMPDIDGGLVGGASLVAEEFLR-  
Nitrosococcus\_watsonii QL-AGVNA-LKKAVIAYEPIWAIGTGRTATPEQAQEVHA-FIR-GHVAVQN--SGIAEELLVLYGGSVKGSNAAQLLAMPDIDGGLIGGASLNKAEFLT-  
Coxiella\_burnetii QMNDNLAS-LEGMVVAYEPIWAIGTGKNATPSQAEEVHA-ALR-DQLHRQD--ATLAESTRILYGGSVKPDNAAALFEMPNDIDGALVGGASLEAEQFLK-  
Variovorax\_paradoxus HV--NGHC-ISEIVVAYEPIWAIGTGKTASPEQAQAVHA-VLR-AQLHHA--SEHAAGISILYGGSMNAAEELLAQADIDGGLIGGASLKAPDFLQ-  
Halomonas\_elongata DG-LEAGQ-RSRLVIAYEPIWAIGTGRTATPEQAQAIHA-AIR-RRRLARYG--DGLAEGTQLLYGGSMKADNAAADLLAQPDIIDGGLVGGASLKIDDFLA-  
Tenebrio\_Molitor AKVND---WSNVVIAYEPIWAIGTGKTATPQQAQDVHK-ALRQWICENIDA--KVGNSIRIQYGGSVTAANCKELASQPDIDGFLVGGASLK-PEFVD-  
Bombyx\_mori SAIGDK---WENIVLAYEPIWAIGTGKTATPQQAQDVHH-ALRNWLSANVSG--SVSDAVRIQYGGSVTAANAKELASCKDIDGFLVGGASLK-PEFVE-  
Apis\_mellifera NKINS---WDNVVAYEPIWAIGTGKTATPQQAQEVHE-KLRNWFTEVNSA--DVSAGAIRIQYGGSVTAANCRELAAKPDIDGFLVGGASLK-PEFIQ-  
Aedes\_aegypti DKVKD---WSNVVIAYEPIWAIGTGKTATPEQAQEVHA-ALRKWFTEVNSA--DVSAGAIRIQYGGSVTAANCRELAAKPDIDGFLVGGASLK-PEFIQ-  
Anopheles\_gambiae AQVKD---WSNVVIAYEPIWAIGTGKTATPEQAQEVHA-ALRKWFTEVNSA--DVSAGAIRIQYGGSVTAANCRELAAKPDIDGFLVGGASLK-PEFIQ-  
Drosophila\_melanogaster QKIKD---WKNVVVAYEPIWAIGTGQTATPDQAQEVHA-FLRQWLSDNISK--EVSASLRIQYGGSVTAANAKELAKKPDIDGFLVGGASLK-PEFVD-  
Rhipicephalus\_microplus SNVKD---WSKVVIAYEPIWAIGTGKTATPDQAQEVHS-KVRNWLSTNVSA--DVASKVRIQYGGSVNAGNCKELGRKPDIDGFLVGGASLK-PEFVQ-  
Ixodes\_scapularis AKVTD---WNRVVLAYEPIWAIGTGKTASPEQA-EVHA-QLRQWLSKNVSP--DVAKKVRIQYGGSVTAANCQELAKKPDVDGFLVGGASLK-PEFVE-  
Anolis\_carolinensis DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHL-KLRGWLKSHVSD--AVSQSTRIIYGGSVTGATAKELASQPDLDGFLVGGASLK-PEFVD-  
Gallus\_gallus DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSHVSD--AVAQSTRIIYGGSVTGATCKELASQHDVDGFLVGGASLK-PEFVD-  
Orcinus\_orca DNVKD---WGVVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Bos\_taurus DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Canis\_lupusfamiliaris DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Odobenus\_rosmarus DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Oryctolagus\_cuniculus DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Nomascus\_leucogenys DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Pan\_troglodytes DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Homo\_sapiens DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Pongo\_abelii DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Macaca\_mulatta DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSE--AVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Ochotona\_princeps DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVSD--AVAQSTRIIYGGSVTGATCKELASQADVDGFLVGGASLK-PEFVD-  
Sus\_scrofa DNVKD---WNVVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKTHVPE--AVAHSTRIIYGGSVTGATCKELASQPDVDGFRVSGASLK-PEFVD-  
Mus\_musculus DNVKD---WSKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKSNVND--GVAQSTRIIYGGSVTGATCKELATPADVDGFLVGGASLK-PEFVD-  
Rattus\_norvegicus DNVKD---WCKVVLAYEPIWAIGTGKTATPQQAQEVHE-KLRGWLKCNVSE--GVAQSTRIIYGGSVTGATCKELASQPDVDGFLVGGASLK-PEFVD-  
Xenopus\_laevis DNVKD---WSKVVLAYEPIWAIGTGKTATPEQAQEVHK-KLREWVKTNVSE--GVAQSVRIYGGSVTGGTCRELAGQPDIDGFLVGGASLK-PEFIE-  
Xenopus\_tropicalis DNVKD---WSKVVLAYEPIWAIGTGKTATPEQAQEVHK-KLREWVKTNVSE--DVAKSVRIYGGSVTGGTCKELGAQPDIDGFLVGGASLK-PEFID-  
Danio\_rerio DNVKD---WSKVVLAYEPIWAIGTGKTASPEQAQEVHD-KLRQWLKTNVSE--AVANSVRIYGGSVTGGTCKELASQKDLGFLVGGASLK-PEFID-  
Ictalurus\_punctatus DNVKD---WSKVVVAYEPIWAIGTGKTASPEQAQEVHD-KLRQWMSANISE--AVANSVRIYGGSVTGGTCKELASQKDVVDGFLVGGASLK-PEFID-  
Oreochromis\_niloticus DNVKD---WSKVVLAYEPIWAIGTGKTASPEQAQEVHD-KLREWVKTNVSE--AVANSVRIYGGSVTGGTCKELASQKDVVDGFLVGGASLK-PEFID-

Nematostella\_vectensis DKIS---DWSKVVIAYEPVWAIGTGKTATPQQAQEVHN-QLRAWLKENVSV--DVAESTRIIYGGSVNAKNCRELAAEGDIDGFLVGGASLK-PEFVQ-  
 Schistosoma\_mansoni NKIKSAD-EWKRVVYAYEPVWAIGTGKVATPQQAQEVHN-FLRKWFKTNAPN--GVDEKIRIYGGSVTAAKCKELAQHQDVGFLVGGASLK-PEFTE-  
 Strongylocentrotus\_purpuratus DVITD---WGNVVIAYEPVWAIGTGKTATPQQAQEVHQ-NLRSWLTKVHVA--AVANTRIVYGGSVNNGNCCDYGQPDVDFVGGASLK-PEFKQ-  
 Caenorhabditis\_elegans DKGVS---WENIVVIAYEPVWAIGTGKTASPEQAQEVHE-WIRAFLEKESVSP--AVADATRIIYGGSVTADNAAELGKKPDIDGFLVGGASLK-PDFVK-  
 Caenorhabditis\_remanei DKGVS---WENIVVIAYEPVWAIGTGKTASPEQAQEVHE-WIRAFLEKESVSP--AVADATRIIYGGSVTADNAAELGKKADIDGFLVGGASLK-PDFVK-  
 Brugia\_malayi DKKAN---WKNIVVIAYEPVWAIGTGKTASPEQAQEVHG-WIREFLKEKVSAA--DVAQKTRIIYGGSVTAEENAAELAKKPDIDGFLVGGASLK-PDFIK-  
 Trichinella\_spiralis KYKLD---WNNIVVIAYEPVWAIGTGKTASPEQAQEVHV-WIRDWLKQNVSA--DAAAKCRIIYGGSVTGDNCRALGKQSDIDGFLVGGASLK-PEFLK-  
 Ricinus\_communis ERVKD---WADVVLAYEPVWAIGTGKVATPQAQEVHF-ELRKWLKENTSS--QVAATRIIYGGSVTATNCKELAAQPDVDFVGGASLK-PEFIE-  
 Vitis\_vinifera DKVSN---WANVVLAYEPVWAIGTGKVATPQAQEVHS-ELRNWFQANASP--EVAATRIIYGGSVGANCKELAAKPDVDFVGGASLK-PEFID-  
 Arabidopsis\_thaliana DRVTN---WSNVVIAYEPVWAIGTGKVASPAQAQEVHD-ELRKWLAKNVSA--DVAATRIIYGGSVNNGNCKELGGQADVDFVGGASLK-PEFID-  
 Zea\_mays EKIKD---WSNVVYAYEPVWAIGTGKVATPQAQEVHA-SLRDWLKTNASP--EVAESTRIIYGGSVTAAKCKELAAQPDVDFVGGASLK-PEFID-  
 Oryza\_sativa ERIKD---WTNVVYAYEPVWAIGTGKVATPDQAQEVHD-GLRKWLAANVSA--EVAESTRIIYGGSVTGANCKELAAKPDVDFVGGASLK-PEFID-  
 Fragaria\_vesca EKVKD---WTNIVLAYEPVWAIGTGKVASPAQAQEVHC-ELRKWLHANTSP--EVAESTRIIYGGSVNGANSKELAGQPDLDGFLVGGASLK-PEFID-  
 Glycine\_max AKISN---WDNVVLAYEPVWAIGTGKVATPQAQEVHA-DLRKWVHDNVSA--EVAASVRIIYGGSVNNGNCKELAAQPDVDFVGGASLK-AEFVD-  
 Cucumis\_sativus EKISN---WDNVVLAYEPVWAIGTGKVATPQAQEVHA-ELRKWFQNNVSA--EVAASVRIIYGGSVNNGNCKELAAQPDLDGFLVGGASLK-VNSSY-  
 Perkinsus\_marinus PVVKD---WNNIVVIAYEPVWAIGTGKVATTEQAQEVHA-SIRAYLKSQVST--EVAENTRIIYGGSVNPNCGELIKCADVDFVGGASLK-PQFTE-  
 Aspergillus\_niger KELTK-E-QWAKVVIAYEPVWAIGTGKVATTAQAQEVHA-AIRKWLVDALSA--EAADNTRIIYGGSVSEKNCRDLAKEADVDFVGGASLK-PAFVD-  
 Penicillium\_chrysogenum KELSA-E-QWAKVVIAYEPVWAIGTGKVATTEQAQEVHA-AIRKWLGEALSA--QAQENVRVIYGGSVSEKNCRELATQPDVDFVGGASLK-PAFVD-  
 Paracoccidioides\_brasiliensis EEVSP-A-EWNVVYAYEPIWAIGTGKVATTEQAQEVHA-SIRKWLNEKISP--EAAENIRVIYGGSVTENNCRDLAQPDVDFVGGASLK-PAFVD-  
 Schizosaccharomyces\_pombe DKV---Q-NWSKIVVIAYEPVWAIGTGKTATPEQAQEVHA-EIRKWATNKLGA--SVAEGLRVIYGGSVNNGNCKEFLKFHDIDGFLVGGASLK-PEFHN-  
 Saccharomyces\_cerevisiae EEVKD---DWTNVVYAYEPVWAIGTGLAATPEDAQDIHA-SIRKFLASKLGD--KAASELRILYGGSVANGSNNAVTFKDKADVDFVGGASLK-PEFVD-  
 Kluyveromyces\_lactis EKVQ---DWTNVVYAYEPVWAIGTGLAATPEDAQDIHA-SIRKFLASKLGD--KAASELRILYGGSVANGSNNAVTFKDKADVDFVGGASLK-PEFVD-  
 Candida\_dubliniensis KIVS---DWTNIVVYAYEPVWAIGTGLAATPDDAEEETHK-GIRAHLLAKTIGA--EQAQKTRIIYGGSVNGKNAKDFKDKANVDFVGGASLK-PEFVD-  
 Clavispora\_lusitaniae KIVS---DWTNIVVYAYEPVWAIGTGLAATPDDAEEETHK-GIRAHLLAKTIGA--EQAQKTRIIYGGSVNGKNAPEFKDKADVDFVGGASLK-PEFVD-  
 Chlamydomonas\_reinhardtii D-EVKD---WTKVVLAYEPVWAIGTGCVASPEQAQEVHA-YLRQYCAKKLGA--AVADKLRIIYGGSVSDTNCKDLKQEDIDGFLVGGASLKGAAFVT-  
 Volvox\_carteri D-EVKD---WSKVVIAYEPVWAIGTGCVATPEQAQEVHA-YLRRFCQSKLGT--SVADQLRIIYGGSVNDANCKELSVQEDIDGFLVGGASLKGSFVVT-  
 Dictyostelium\_fasciculatum NGVSD---WSKVVIAYEPVWAIGTGKTASPEQAQEVHA-FIRKWLSEKVS--EVANATRILYGGSVTATNSAELSKQLDVGFLVGGASLVASDFVT-  
 Entamoeba\_histolytica NAISK-E-AWKNIILAYEPVWAIGTGKTATPDQAQEVHQ-YIRKWMTEENISK--EVAEATRIYGGSVNPNANCNELAKKADIDGFLVGGASLDAKFKT-  
 Cryptosporidium\_parvum KDVS--D--LSNLVIAYEPIWAIGTGCVATPGQAQEAHA-FIREYVTRMYP--QVSSNLRIIYGGSVTPDNCNELIKCADIDGFLVGGASLK-PTFA--  
 Cryptosporidium\_muris KKVS--D--LSNIVVIAYEPIWAIGTGCVATPEQAQEAHE-FIRKCLLMYNN--NVSSSTRIIYGGSVNPNENCNELINCADIDGFLVGGASLK-PSFV--  
 Plasmodium\_falciparum DLID--N--FDNVILAYEPLWAIGTGKTATPEQAQVLVHK-EIRKIVKDTGCE--KQANQIRILYGGSVNTENCSSLIQOEDIDGFLVGNASLK-ESFV--  
 Plasmodium\_vivax HLID--N--FDNVVLAYEPIWAIGTGKTATPEQAQEVHK-EIRNIVKEKCGE--KNaNQIRILYGGSVNTDNCASLIKQEDIDGFLVGNASLK-SSFV--  
 Paramecium\_tetraurelia KELT--TALWSKVVIAYEPVWAIGTGRTATPEQAQEVHA-FIRGWLKSIQGT--QAQATRIIYGGSVTEKNAADLIKQPDLDGFLVGGAAALK-PGFA--  
 Tetrahymena\_thermophila GKLN--EAQWEKIVVIAYEPVWAIGTGKVATPQAQEVHE-FIRSYLTQKVSQ--NVSQKTRIIYGGSVTEKNAGELIHQKDIDGFLVGGASLK-PAFA--  
 Toxoplasma\_gondii PKIS--D--WDRVVIAYEPVWAIGTGKVATPQAQEVHE-HIREFLKAKVSE--DVANKVRIVYGGSVNASNSTELIQPDLDGFLVGGASLK-KDFL--  
 Trypanosoma\_brucei KKL--KKADWAKVVIAYEPVWAIGTGKVATPQAQEAHA-LIRSWVSSKIGA--DVAGELRILYGGSVNGKNARTLYQQRDVNGFLVGGASLK-PEFV--  
 Trypanosoma\_cruzi QKL--SKEAWAHVVIAYEPVWAIGTGKVATPQAQEVHE-LLRRWVRSKLGAA--DIAAQLRILYGGSVTAKNARTLYQMRDINGFLVGGASLK-PEFV--  
 Leishmania\_mexicana AKL--TKDANQVVLAYEPVWAIGTGKVATPEQAQEVHL-LLRKWVSENIQT--DVAAKLRILYGGSVNAANAATLYAKPDINGFLVGGASLK-PEFR--  
 Leishmania\_donovani TKL--PKEAWDQIVLAYEPVWAIGTGKVATPEQAQEVHA-LLRKWVSEKIGA--DVAARLRILYGGSVSANGNAKTYLMPKPDINGFLVGGASLK-PEFR--  
 Giardia\_lamblia KELGESKMLWKEVVIAYEPVWSIGTGCVATPEQAQEVHV-GLRKWFAEKVCA--EQAQHIRIYGGSVSANGSNCKELGQCPNIDGFLVGGASLK-PEFMTM  
 Trichomonas\_vaginalis PAIPAG--KWDDVVIAYEPIWAIGTGKVASTQDAQEMCK-VIRDILAAKVGAA--DIANKVRILYGGSVKPNNCNELAACPDVDFVGGASLE-PGFIN-  
 Sphingobacterium\_sp FHLASD--FSKIILAYEPVWAIGTGLTASPEQAQEVHA-FIRKQIEAKYGA--AVADETSVLYGGSCNPKNAPDLFSQPDIDGGLIGGASLKSDFD-  
 Pedobacter\_saltans FHLAED--FSKLVIAYEPVWAIGTGVTASSAQAQEIHA-FIRSEVAKYGA--EVAENTTILYGGSCNPNAAELFAQKDIDGGLIGGASLKSDFVD-  
 Marivirga\_tractuosa FHLTPEQ--FKNIVVIAYEPIWAIGTGKTASSQAQDMHK-TIREHIAAKFGQ--DAANKTSILYGGSCPKPNAKELFSQPDVDFVGGASLKSDFD-  
 Cyclobacterium\_marinum FGFSEEE--IKKLVIAYEPIWAIGTGKTASSEQAQDMHA-AIRKHLSSKYGE--AVAEESILYGGSCPKPSNAKELFSQPDVDFVGGASLKSDFVD-  
 Leadbetterella\_byssophila FHLSEA--IQQVVIAYEPIWAIGTGVTASSDQAQEMHK-VLRDHLASKYGA--AVAEESILYGGSVNAGNAEELFSQPDVDFVGGASLKSDFD-

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Haliscomenobacter_hydrossis      FHLSPEE--FQKVVIAYEPIWAIGTGRTASPEQAQDMHA-AIRALLTDQYGA--EIADATTILYGGSVNGGNAAVLFSQPDVDGGLVGGASLKAEEFIT-
Parabacteroides_distasonis      FDLSEAED--FGKIILAYEPVWAIGTGKTASAEQAEEIHA-HIRATLAAKYGN--EVADNCTILYGGSCNAGNAKELFAKPNVDGGLIGGASLAVDKFMP-
Bacteroides_fragilis            FDLSEAED--FSKIVLAYEPVWAIGTGKTASPAQAQEIHA-FIRSAVAEKYQK--EIADNTSILYGGSCKPSNAKELFANPDVDGGLIGGAAALKVADFKG-
Prevotella_ruminicola          FNLSEED--FRKIVIAIYEPVWAIGTGKTATAEQAEIHA-YIRSIIAEKYQ--AVADDTTILYGGSCKASNAPELFAKPDIDGGLIGGASLKAADFQK-
Alistipes_shahii                YNLTEEQ--YKNLVIAIYEPVWAIGTGKTASAEQAQEIHA-YIRQVLTAKFG---AAAQETAILYGGSCKPSNAAEIFAKEDVDGGLIGGAALKAEDFLA-
Porphyromonas_asaccharolytica  GHLSHEQ--MEQIVIAIYEPVWAIGTGLTATPDQAQEMHQ-HIRQTVASLFDQ--KLADLTITILYGGSCKASNAESLFSQPDVDGGLIGGAALKADTFLP-
Cellulophaga_lytica            FNLKPEA--WSNIVLAYEPVWAIGTGGETASPEQAQEMHA-FIRKTIADDEYTT--EIAEAVSILYGGSVKAPANAREIFSKADVVDGGLIGGAALKADDFIA-
Kordia_algicida                FHLDTAA--WKNIVLAYEPVWAIGTGGETASPEQAQEMHA-FIRKTVSEKFGD--ETGNGVSILYGGSVKAPANAAEIFAKEDVDGGLIGGASLKAADFVA-
Flavobacterium_psychrophilum   FHIDKSA--WANIILAYEPVWAIGTGGETASPEQAQEMHE-FIRETVRKVFGS--DIAEDVSILYGGSVKPDNAKEIFSKPDVDGGLIGGAALKADDFV-
Neisseria_gonorrhoeae          QGLDTKN--IA---VAYEPVWAIGTGKVVATVEQIADMHA-FIYKEILSLCGS---DVK-IRVLYGGSVKADNAADIFAVPYVDGALVGGASLSYDSFTA-
Francisella_tularensis        ENLSVEQ--LAKVVIAYEPVWAIGTGCVASLEQIQETHQ-FIRSLAKVDER---LAKNIKIVYGGSLKAENAKDILSLPDVDGGLIGGASLKAEEFNE-
Mycoplasma_genitalium          DTIDKSL--IKNLVIAIYEPVWAIGTGKTATPEVANQTIK-TIREYINDLYDE--NVANNISILYGGSVDHNNIQKLAIMEQIDGFLVKGASLEIKNFLE-
Ureaplasma_urealyticum        VINYKG---LKKIIIIAYEPIWAIGTNLTLDLKHINMIE-GIKTYLYNCTGL--N----IPILYGGSVNANNIKELCTQKLDIGFLIGNASLDVNNFNQ-
Ureaplasma_parvum             IINYKG---LKKIIIIAYEPIWAIGTDLELDFKHINMIE-GIKTYLYNCTGI--N----IPILYGGSVNDNNINELCNQKLDIGFLIGNASLDVNVFNK-
Buchnera_aphidicola           ILKNLGTSAFKNIIIIAYEPIWAIGTGVSADPEHVQLIHV-FIKNYILKYSSI--NR-NDIIIQYGGVINHTNVKFFIEQPDINGLLIGNSSLSAKEFLE-
Campylobacter_jejuni          IDLNYEK-----LIIAYEPIYSIGTGVSQAQSTDIQVLE-FLASLT-----KAPLLYGGSVNENNIKEILSVNHCGGVLIGSAALKVENFIK-
Helicobacter_pylori           IDLNYSN-----LIVAYEPIWAIGTKKSASLEDIYLTHG-FLKQILN-----QKTPLLYGGSVNIQNAKEILGIDSVDGLLIGSASWELENFKT-
Orientia_tsutsugamushi        ISFSFTKN---VIIAYEPIWSIGSDMIPTIDDIYEVVT-MIREIQNRYIPH--NIENSVKIVYGGSVSANNIHQILTAG-VDGVLIGKASLKLESITT-
Wolbachia_sp                 R-LPTHGE---YTVAYEPIWAIGTGHVPPNDAIAKVIE-VIKLCTS-----KKHIIYGGSVSSENIENLLNISNLGVLIGSASLDFDHFYK-
Methanocaldococcus_Jannaschii  -----IAVEPPELIGTGIPVSKANPEVVEG-----TVRAVK--EINKDVKVLGCGAGISKGEDVKAALDLGAEGVLLASGVVKAKNVEE-
Methanococcus_voltae          -----IAVEPPELIGSGIPVSKANPEVVEG-----TVSAVH--DINKDVKVLGCGAGISKGEDVKSALDELGAEGVLLASGVVKAADVEQ-
Methanothermococcus_okinawensi -----IAIEPPELIGTGIPVSKANPEVVEG-----TVKEVR--KINKDVKILGCGAGISTGEDVSSALELGAEGVLLASGVVKAADVEG-
Pyrococcus_Woesei            -----VAVEPPELIGTGIPVSKAKPEVITN-----TVELVK--KVNPEVKVLCGAGISTGEDVKKAIELGTVGVLLASGVTKAKDPEK-
Pyrococcus_furiosus          -----VAVEPPELIGTGIPVSKAKPEVITN-----TVELVK--KVNPEVKVLCGAGISTGEDVKKAIELGTVGVLLASGVTKAKDPEK-
Thermofilum_pondans          -----VAIEPPELIGTGIPVSKAKPEVITS-----SVELVK--KVNPNVKVLCGAGITVGEDVAAAALRLGTVGVLLASGVVKAADWEK-
Methanothermobacter_thermautot -----VAVEPPELIGSGIPVSRAPPEVITG-----SVDVAVK--KVNPEVSVLCGAGISTGDDMKAAVDLGAEGVLLASGIILADSPRD-
Methanosaeta_thermophila      -----VAVEPPELIGSGIPVSKADPEVVRG-----SVEAVR--AIEKDVGVLCGAGITHGDDLRAAIELGAVGVLLASGIVKAKDQRK-
Natronobacterium_gregoryi     -----VAVEPPELIGTGTPVSQADPGVVEN-----AVVAAE--NVDDDVSVLCGAGISTGEDVTAADDLGTGEGVLLASGVAKADNPRA-
Halobacterium_salinarum       -----VAVEPPALIGTGTPVSQADPDIVSD-----AVAAA--AVDPSVDVYCGAGITTEDVVSAGDLGASGVLLASGVAKADDPRA-
Halogeometricum_borinquense   -----VAVEPPELIGGDDSVATADPDIVRD-----AVEAAA--NVDESVEVFCGAGISSGDDVDAAGDLGATGILLASGVAKADDPRA-
Methanosphaerula_palustris    -----VAIEPPELIGSGVSVAKADPGIQR-----SVAAVH--AVNPKVKVLTGAGIQSGECVKIARDLGTGTVLLASSVVKVEDPAI-
Thermoproteus_tenax           -----VAVEPPELIGTGRAVSRKPEAIVE-----TVGLVS--RHFPEVSVITGAGIESGDDVAAAALRLGTRGVLLASAAVKAADPYA-
Pyrobaculum_islandicum        -----VAVEPPELIGTGKAVSKYKPEITIE-----TVRLVT--KHFPEVSVITGAGIETGEDVEAALKLGTGKGVLLASAAVKAADHYQ-
Cenarchaeum_symbiosum        -----IAIEPPELIGSGRSVSSERPELIGE-----AAEAIR--GADG-TKLLCGAGITSGADVRAKALELGSKGILVASGVVKSDDPAA-
Nitrosopumilus_maritimus      -----IAIEPPELIGSGKAVSTERPELITK-----AANAVK--SANNTKLLCGAGIVSGQDVSKAVELGSKGILVASGIKAKNWDK-
Desulfurococcus_kamchatkensis  -----VAVEPPELIGTGVSVSKAKPEVITN-----SVMIR--RVNKDVAILTGAGITTEDAYIAVKLGTIGVLVASGIVKADPYQ-
Pyrolobus_fumariorum         -----VAVEPPELIGTGIAVSRAPPEVITK-----AVESVT--RVSPNVPVVLVAGIVSREDARRSVELGARGVLVASAVMKAADPYA-
Acidilobus_saccharovorans     -----IAIEPPELIGTGVSVSKARPEVITE-----GVKAVK--AVA-DIPVLAGAGITTYREDVVRVAVQLGASGILLASAVMKAADPK-
Sulfolobus_islandicus         -----ILIEPPELIGTGISVSKAKPEVITK-----AVDEIR--KSE-GIYLIAGAGITTEDVYKALKLGAHIGVASAVMKAKEPEK-
Clustal Consensus              .  **      :*                               :  *.  .                               *  :.  .

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Roseiflexus_castenholzii  --IVHFLSPQE-----
Chloroflexus_aurantiacus  --IIHYQ-----
Nostoc_punctiforme       --IVNFHLV-----
Anabaena_variabilis      --IVNYQ-----
Synechocystis_sp         --IVNFQP-----
Cyanobacterium_aponinum  --LVNYQ-----
Crocospaera_watsonii     --IINYQ-----
Trichodesmium_erythraeum --LVNYQ-----
Synechococcus_sp         --LANYQDQ-----
Prochlorococcus_marinus  --ISNYKVE-----
Sphaerobacter_thermophilus --IVERAAALRL-----
Anaerolinea_thermophila  --IVQAAAEAKA-----
Myxococcus_xanthus       --IVKAAT-----
Collinsella_tanakaei     --MVVKSAE-----
Atopobium_vaginae        --MVKAAM-----
Eggerthella_sp           --LVKAACL-----
Dictyoglomus_thermophilum --IVKS-----
Aquifex_aeolicus         --IVYSF-----
Thermodesulfobivibrio_yellowston --IVKY-----
Dehalogenimonas_lykanthroporep --IVRKS--VQS-----
Dehalococcoides_sp       --ICRQAAVIQNKH-----
Geobacter_metallireducens --IVNYKA-----
Desulfobacter_postgatei  --IIRF-----
Planctomyces_brasiliensis --IIDAGVELSA-----
Spirochaeta_coccoides    --IIEFGL-----
Denitrovibrio_acetiphilus --LVNFNG-----
Prosthecochloris_aestuarii --IVKAAEKS-----
Chlorobium_phaeobacteroides --IVNAAG-----
Chlorobium_ferroxidans    --IIKAAS-----
Chloroherpeton_thalassium --IIKSAE-----
Treponema_pallidum       --IARSV-----
Leptospira_interrogans   --LF-----
Borrelia_turicatae       --IVNKVAK-----
Thermotoga_maritima      --LARIMRGVIS-----
Fusobacterium_nucleatum  --IIKAGN-----
Selenomonas_sputigena    --IVKF-----
Ruminococcus_sp          --IVNYK-----
Clostridium_botulinum    --IVNY-----
Clostridium_perfringens  --IVNY-----
Thermoanaerobacter_wiegelii --IVNY-----
Brachyspira_murdochii    --IVNYIAK-----
Acholeplasma_laidlawii   --FTKAANK-----
Lactobacillus_reuteri    --MVNYLKNDQEK-----
Bacillus_subtilis        --LLEEGQYE-----

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Bacillus_thuringiensis	--LLGAVK-----
Listeria_monocytogenes	--LLEAVK-----
Geobacillus_stearothermophilus	--LVEAGRHE-----
Staphylococcus_aureus	--LLEGAK-----
Enterococcus_faecalis	--LLDAVK-----
Lactococcus_lactis	--LLEMYK-----
Streptococcus_pneumoniae	--LLDFVK-----
Erysipelotrichaceae_bacterium	--IIEKTK-----
Lentisphaera_araneosa	--LILNAAALS-----
Chlamydomphila_pneumoniae	--VAKNFNV-----
Desulfovibrio_vulgaris	--IILA-----
Mesorhizobium_opportunistum	--ILGRASAAI-----
Bartonella_henselae	--ICDVYRKL-----
Brucella_abortus	--ICETYRNL-----
Rhizobium_etli	--IYRAYEALLA-----
Agrobacterium_tumefaciens	--IYAAYEQLTA-----
Rhodobacter_sphaeroides	--IVAALSAA-----
Ruegeria_sp	--IIAALAAS-----
Bradyrhizobium_japonicum	--IAKGCP-----
Rhodopseudomonas_palustris	--IAAGCP-----
Methylobacterium_radiotolerans	--ICAAYA-----
Rhodospirillum_rubrum	--IAQSCA-----
Zymomonas_mobilis	--IIEAGGRLA-----
Gluconacetobacter_hansenii	--IVRAAVDI-----
Thermus_thermophilus	--LLRIAG-----
Thermus_aquaticus	--LLRMAG-----
Oceanithermus_profundus	--MVEAAG-----
Deinococcus_deserti	--MNDALK-----
Bifidobacterium_bifidum	--IARLTLKATRR-----
Bifidobacterium_longum	--IARLALKSTKSRN-----
Gardnerella_vaginalis	--IVQLSSYKNRI-----
Nocardia_farcinica	--LSAIAAGGPLP-----
Mycobacterium_tuberculosis	--LAAIAAGGPLP-----
Corynebacterium_glutamicum	--LAANAASVA-----
Propionibacterium_acnes	--IVTFYEA-----
Actinomyces_odontolyticus	--MATFYA-----
Microbacterium_testaceum	--IIRYQKHVGV-----
Moritella_marina	--IAKAAAEAKA-----
Photobacterium_profundum	--IAKAAAEAKA-----
Vibrio_cholerae	--IAKAAAEAKKA-----
Shigella_flexneri	--IVKAAEAAKQA-----
Escherichia_coli	--IVKAAEAAKQA-----
Salmonella_enterica	--IVKAAEAAKQA-----
Klebsiella_pneumoniae	--IVKAAEAAKKA-----
Enterobacter_aerogenes	--IVKAAEAAKKA-----
Serratia_symbiotica	--IVKAAGAACKA-----

Yersinia_pestis	--IVKAAAKAKKA-----
Actinobacillus_pleuropneumonia	--IVKAAEKAKA-----
Pseudomonas_aeruginosa	--ICRAAGS-----
Marinomonas_posidonica	--IVKAAG-----
Xylella_fastidiosa	--IARATV-----
Xanthomonas_campestris	--IARAAAAC-----
Marinobacter_algicola	--ICRAVPGKS-----
Aeromonas_caviae	--IVEAAKGAS-----
Pseudoalteromonas_haloplanktis	--ICNSAKGTV-----
Legionella_pneumophila	--IVKGIN-----
Ralstonia_solanacearum	--IGRA-----
Burkholderia_sp	--ICKAAAATTVAD-----
Bordetella_pertussis	--IAAA-----
Nitrosococcus_watsonii	--ICQAAV-----
Coxiella_burnetii	--IGQQCNQSF-----
Variovorax_paradoxus	--IISATAR-----
Halomonas_elongata	--ICQSAG-----
Tenebrio_Molitor	--IINARQL-----
Bombyx_mori	--IVNANQ-----
Apis_mellifera	--IVNAKQ-----
Aedes_aegypti	--IVNARQ-----
Anopheles_gambiae	--IVNARQ-----
Drosophila_melanogaster	--IINARQ-----
Rhipicephalus_microplus	--IINAMQG-----
Ixodes_scapularis	--IINARQ-----
Anolis_carolinensis	--IINAKH-----
Gallus_gallus	--IINAKH-----
Orcinus_orca	--IINAK-----
Bos_taurus	--IINAKQ-----
Canis_lupusfamiliaris	--IINAKQ-----
Odobenus_rosmarus	--IINAKQ-----
Oryctolagus_cuniculus	--IINAKQ-----
Nomascus_leucogenys	--IINAKQ-----
Pan_troglodytes	--IINAKQ-----
Homo_sapiens	--IINAKQ-----
Pongo_abelii	--IINAKQ-----
Macaca_mulatta	--IINAKQ-----
Ochotona_princeps	--IINAKQ-----
Sus_scrofa	--IINAK-----
Mus_musculus	--IINAKQ-----
Rattus_norvegicus	--IINAKQ-----
Xenopus_laevis	--IINAKH-----
Xenopus_tropicalis	--IINAKQ-----
Danio_rerio	--IINAKA-----
Ictalurus_punctatus	--IINAKV-----
Oreochromis_niloticus	--IINAKA-----

Nematostella_vectensis	--IVNARL-----
Schistosoma_mansoni	--ICKARQR-----
Strongylocentrotus_purpuratus	--IIAAGSA-----
Caenorhabditis_elegans	--IINARS-----
Caenorhabditis_remanei	--IINARS-----
Brugia_malayi	--IIHARD-----
Trichinella_spiralis	--IIEARSN-----
Ricinus_communis	--IIKSAEVKKS-----
Vitis_vinifera	--IIKSAEVKKN-----
Arabidopsis_thaliana	--IIKAAEVKKS-----
Zea_mays	--IINAATVKSA-----
Oryza_sativa	--IINSATVKSA-----
Fragaria_vesca	--IINAADVKK-----
Glycine_max	--IINAATVKK-----
Cucumis_sativus	--KFASFVHFLFG-----
Perkinsus_marinus	--IIAAAQSA-----
Aspergillus_niger	--IINARL-----
Penicillium_chrysogenum	--IINARI-----
Paracoccidioides_brasiliensis	--IINARL-----
Schizosaccharomyces_pombe	--IVNVHSL-----
Saccharomyces_cerevisiae	--IINSRN-----
Kluyveromyces_lactis	--IINSRV-----
Candida_dublinsiensis	--IIKSRL-----
Clavispora_lusitaniae	--IIKSRL-----
Chlamydomonas_reinhardtii	--ICNAAGPKAK-----
Volvox_carteri	--ICNSAGPKAK-----
Dictyostelium_fasciculatum	--IINTANPKSYL-----
Entamoeba_histolytica	--IINSVSEKF-----
Cryptosporidium_parvum	-KIIESAQ-----
Cryptosporidium_muris	-EIINCTFH-----
Plasmodium_falciparum	-DIIKSAM-----
Plasmodium_vivax	-EIIKSAM-----
Paramecium_tetraurelia	-DIVAAANDAR-----
Tetrahymena_thermophila	-DIVAACNIVKH-----
Toxoplasma_gondii	-DIIASGMKKNE-----
Trypanosoma_brucei	-DIIKATQ-----
Trypanosoma_cruzi	-EIIEATK-----
Leishmania_mexicana	-DIIDATR-----
Leishmania_donovani	-DIIDATR-----
Giardia_lamblia	IDILTKTRT-----
Trichomonas_vaginalis	--IVNSNVHVK-----
Sphingobacterium_sp	--IVKVFN-----
Pedobacter_saltans	--IVKTFNN-----
Marivirga_tractuosa	--IIKSF-----
Cyclobacterium_marinum	--IAESF-----
Leadbetterella_byssophila	--ISKSFPA-----

Haliscomenobacter_hydrossis	--IVEATKK-----
Parabacteroides_distasonis	--IIEAF-----
Bacteroides_fragilis	--IIDAFN-----
Prevotella_ruminicola	--IIDAWKK-----
Alistipes_shahii	--IGKGFSS-----
Porphyromonas_asaccharolytica	--IITANK-----
Cellulophaga_lytica	--IIDAI-----
Kordia_algicida	--IINAI-----
Flavobacterium_psychrophilum	--IVNGI-----
Neisseria_gonorrhoeae	--IISAAQNA-----
Francisella_tularensis	--IINQANKICTE-----
Mycoplasma_genitalium	--MARVYA-----
Ureaplasma_urealyticum	--IINACK-----
Ureaplasma_parvum	--IIDKCK-----
Buchnera_aphidicola	--IIKIAHEHYS-----
Campylobacter_jejuni	--LIK-----
Helicobacter_pylori	--IISFL-----
Orientia_tsutsugamushi	--IIKTVQGLD-----
Wolbachia_sp	--IIQQVEKKFSLINSKISN-----
Methanocaldococcus_Jannaschii	-AIRELIKFI-----
Methanococcus_voltae	-SIRDLISEL-----
Methanothermococcus_okinawensi	-SIQELIKHI-----
Pyrococcus_Woesei	-AIWDLVSGI-----
Pyrococcus_furiosus	-AIWDLVSGIIE-----
Thermofilum_pendens	-AILDLISPIIK-----
Methanothermobacter_thermautot	-ALLDLVSKV-----
Methanosaeta_thermophila	-ALEDLVTGV-----
Natronobacterium_gregoryi	-ALDDLVEPL-----
Halobacterium_salinarum	-ALADLVAPL-----
Halogeometricum_borinquense	-ALEDLVEPL-----
Methanosphaerula_palustris	-VLRDLVSL-----
Thermoproteus_tenax	-KIVELAKPLSELR-----
Pyrobaculum_islandicum	-KIFELAKPLTVAAEPP-----
Cenarchaeum_symbiosum	-AIAELAQAMS-----
Nitrosopumilus_maritimus	-IISEFAKALV-----
Desulfurococcus_kamchatkensis	-VMKEMAEAMLKGLA-----
Pyrolobus_fumarii	-KMRELAEGLAPRR-----
Acidilobus_saccharovorans	-ALSEFVDALSSVA-----
Sulfolobus_islandicus	-VVEDFITSALKAISS-----
Clustal Consensus	