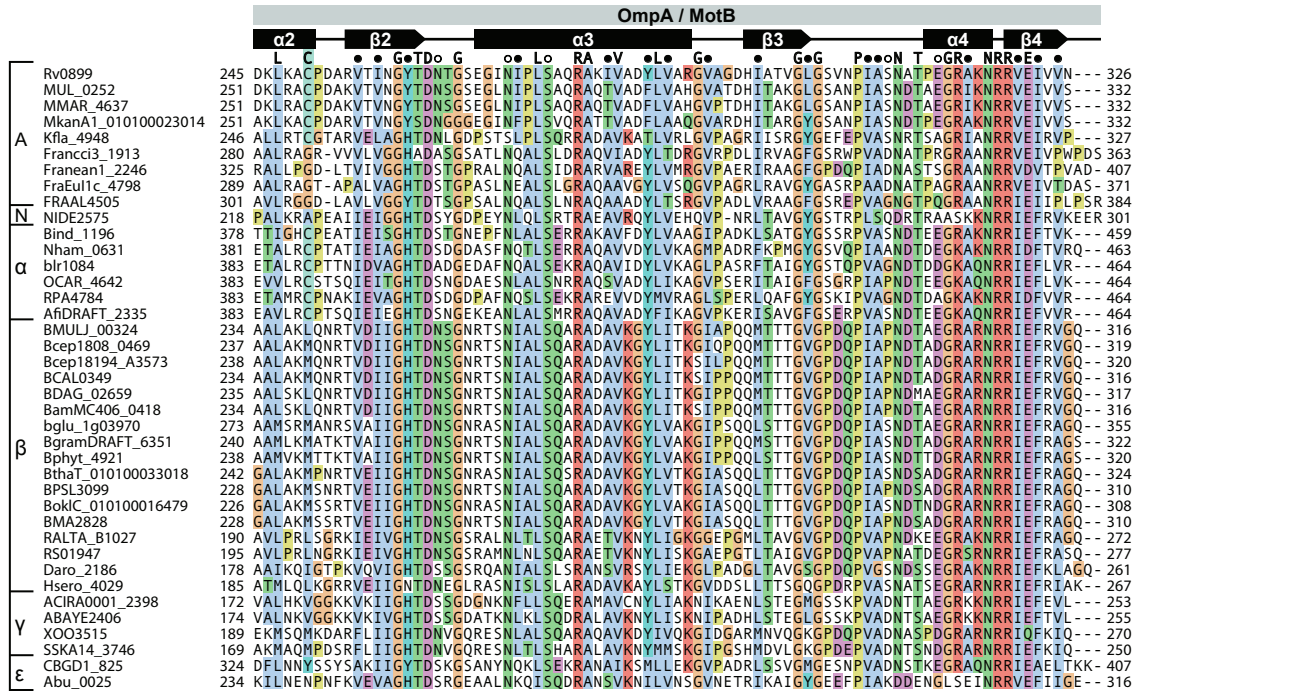
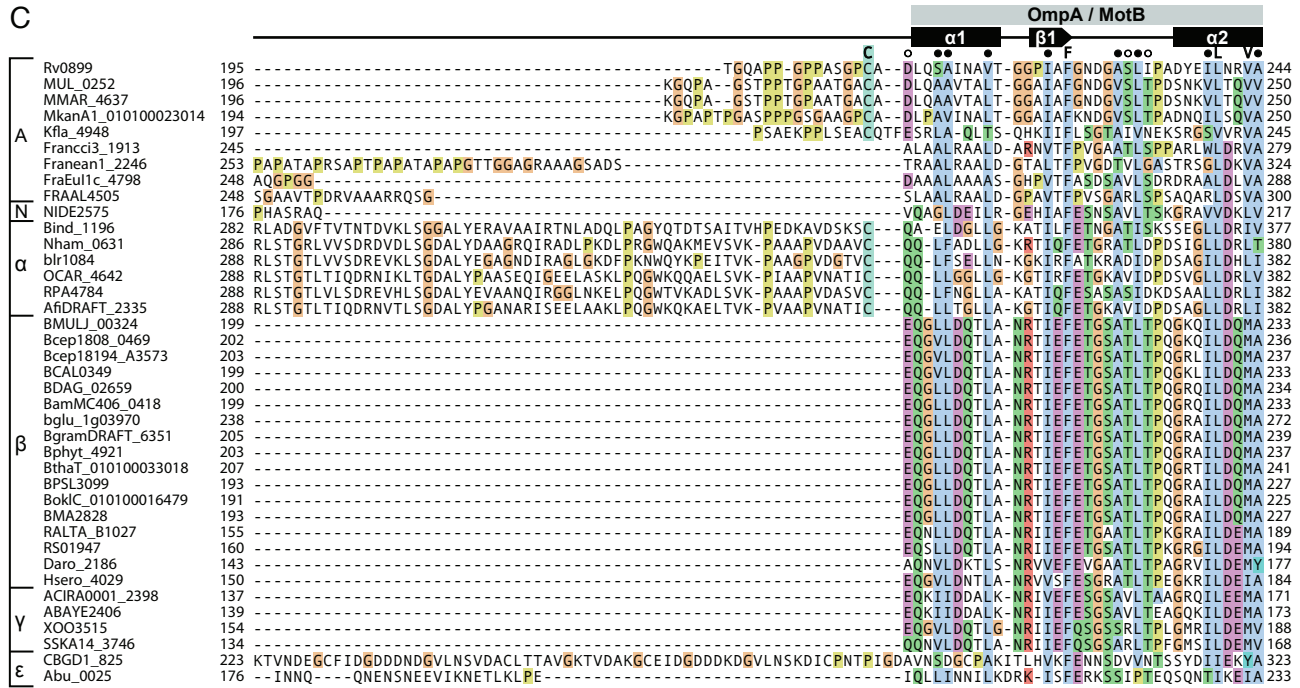






C



**Figure S1C. Amino acid sequence alignment for Rv0899 family proteins.**

Alignment is shown for (A) the transmembrane region (TM), (B) the central BON-containing domain, and (C) the C-terminal OmpA-like domain. Fully conserved residues (single letter), conserved hydrophobic residues (□), and conserved polar residues (◻), are marked above the sequences. Secondary structure is derived from the structure of *M. tuberculosis* Rv0899 (PDB ID: 2KSM, 2LBT). Conserved regions include two BON domains (pfam04972) and one OmpA-like domain (pfam00691). Alignments were rendered with ClustalX coloring using Jalview 14. Sequences are grouped by organism class: (A) actinobacteria; (N) nitrospira; (α) α-proteobacteria; (β) β-proteobacteria; (γ) γ-proteobacteria; (ε) ε-proteobacteria.

## Supporting data S1. Alignments of Rv0899-like proteins in FASTA format.

```
>Rv0899|NP_215414|/1-326 [Mycobacterium tuberculosis H37Rv]
M-ASKAGLGQTPATTDARRTQKIFYRGSPPGRPWLIGAVVIPLLLIAAIGYGAFERP-----
-----QSVTGPTGVLPTLTPTSTRG-ASALSLS-----L
LSISRSRSG-----NTVTLIGDFPDEAAKAALMTALNGL-LAPGVNVID--QIHVDPVVRSLDFSS-AEPVFT
ASV-PIPDFG-LKVERD-----TVT
LTGTAPSSEHKDAVKRAATSTW----PDMKIVNNIEV-----
-----TGQAPP-GPPASGPCA--DLQSAINAVT-GGPIAFGNDGA
SLIPADYEILNRVADKCLKACPDARVTINGYTDNTGSEGINIPLSAQRAKIVADYLVARGVAGDHIATVGLGS
VNPIASNATPEGRAKNRRVEIVVN---
>MUL_0252|YP_904461|/1-332[Mycobacterium ulcerans Agy99]
M-GTDAGLDEAPAPTEAPKEPKFERRPLGVSWLIGVVVIPLLLAALGYGAYQRP-----
-----TSVNGPTGELPTVTASSAKPDRPELSLS-----L
LSVSRSG-----NTLTLIGDFPNGDAKALMTSLKGL-LSQNVTVVD--QIQIDPKVRALDFSN-AEPVFS
ASG-PIPDFT-LKVERD-----TIT
LTGTAASPDQKDAVRSAAATSVW----PDVNVENQIEV-----
-----KGQPA--GSTPPTGPAATGACA--DLQAAVTALT-GGAIAFGNDGV
SLTPDSNKVLTQVVDKLRACPDAKVTVNGYTDNSGSEGLNIPLSAQRAQTVAADFLVAHGVATDHITAKGLGS
ANPIASNDAEGRIKNRRVEIVVS---
>MMAR_4637|YP_001852895|/1-332 [Mycobacterium marinum M]
M-GTDAGLDEAPAPTEAPKEPKFERRPLGVSWLIGVVVIPLLLAALGYGAYQRP-----
-----TSVDGPTGELPTVTASSAKPDRPELSLS-----L
LSVSRSG-----NTLTLIGDFPNEDAKAALMTSLKGL-LSQNVTVVD--QIQIDPKVRALDFSN-AEPVFS
ASG-PIPDFT-LKVERD-----TIT
LTGTAASPDQKDAVGSAAATSVW----SDVNVENQIEV-----
-----KGQPA--GSTPPTGPAATGACA--DLQAAVTALT-GGAIAFGNDGV
SLTPDSNKVLTQVVDKLRACPDAKVTVNGYTDNSGSEGLNIPLSAQRAQTVAADFLVAHGVPTDHITAKGLGS
ANPIASNDAEGRIKNRRVEIVVS---
>MkanA1_010100023014|ZP_04750863|/1-332 [Mycobacterium kansasii ATCC 12478]
MAGTQPVS DTAPAPAHA---RRFRRHPLGVAWLIALAVIPLLLMAAIGYGAFGRP-----
-----TSVTAPTGDLPTLTITISSTPNASDVSW-----L
LSISRSRSG-----NTITLIGDFPDDNAKALLAALRNV-LTPGVTVID--QIRIDPLVRALDFAN-AEPVFT
AGA-AIPDFS-LKVERN-----TVT
LSGTAASPDQKDAVERAAKTSW----PGVKIVNNIEV-----
-----KGPAPTGPASPPPGSGAAGPCA--DLPVINALT-GGAIAFKNDGV
SLTPADNQILSQVAALKACPDARVTVNGYSDNGGEGINFPLSVQRATTVAADFLAAQGVARDHITARGYGS
ANPIASNDAEGRIKNRRVEIVVS---
>Kfla_4948|YP_003382763|/1-327 [Kribbella flavida DSM 17836]
-----MPGSARRP-GRLWLLALVVVPLVLAALLVAVKGE-----
LRSATADDGGAETA-----QSPSATASSRSTAAPTPTGLPSTPPASEPAVAP-----F
AVVRTDG-----GLSVTAVVQSAARDTITSEAQAL-LEAGETFAD--HLSVDPSVGPLNPAA-LVGVL
TVATATTGTT-VSFDGT-----SVT
LTGAVADQATKATAARAAKAA----PGAVVANQLRV-----
-----PSAEKPPLSEACQTFESRLA-QLTS-QHKIIFLSGTA
IVNEKSRGSSVVRVAALLRTCCTARVELAGHTDNLGDPSTSLPLSQRRADAVKATLVRLGVPAGRIISRGYGE
FEPVASNRSTSAGRIANRRVEIRVP---
>Francci3_1913|YP_481018|/1-363 [Frankia sp. CcI3]
-----MSLSTTVRLQRPRPVAFALVLAALLLALVAFALRRGPIEDDLAARATAAVRSTGG
VHAQVHVEGREAVVTGRFPSAAAAEQARASA AVAGTTSARLGDDVVIATEPARPL-----V
LAVAGRG-----LSITATVPDRASRAALLA AVADA-SGG--SVTG--EVRVDPVAEPPVEV-VA AVAA
ALR-GFPGSHSVTVSGT-----TVA
VAGSAPDEATRRRLGAQVLAAGTTVPDATLDNRLVVPREKPA AAAAKSTSDAG-----
-----ALAALRAALD-ARNVTFPVGAA
TLSPPARLWLD RVAALRAGR-VVVLVGGHADASGSATLNQALS LDRAQVIADYLTDRGVRPDLIRVAGFGS
RWPVADNATPRGRAANRRVEIVPW PDS
>Franean1_2246|YP_001506587|/1-407 [Frankia sp. EAN1pec]
-----MSSPAVAFPRRRLVAFVSLIIAWLLLGLGALWLRGPIENDLTGRAADAVRAAGA
TQVRVSAEGREIVLHGRFDSAEDARRARAAA AVSGSSVRLAADAVIASEPAQPL-----V
VGVERAG---RAPGGVVL SATVPDSATRAALLGAAADA-AGG--VVSA--TVTVDP RVATPAVEA-FGDVAK
ALG-TGPGVRSVTIDGS-----SVV
LWGSAPDDAARASIGAAVLAAARQSIPGASLENRLAVGSGATVTLDPATGEIVRPAAPAPATAPRSAPTAP
ATAPAPGTTGGAGRAAAGSADS-----TRAALRAALD-GTALTFPVGDT
VLGASTRSGLDKVARALLPGD-LTVIVGGHTDSTGPRALNQALS IDRARVAREYLVMRGVPAERIRAAGFGP
DQPIADNASTSGRAANRRVDVTPVAD-
```

>FraEu1lc\_4798|YP\_004018658|/1-371 [Frankia sp. Eu1lc]  
-----MVLAVTQLKRPRPVAFVSLLLTTLVLLAVGLRRGPIEKDLSQRANEAVRQSGA  
SQVVVTVAGTAATLHGDFASVAAADAALRAARVDGVSSARLGS DALVATRPAQP-----V  
VLTVEQG-----RLTVRATVPDRTRRTALLDAVVDA-TGG--QLTS--DIAVDPRAAQPAVPA-LAGLVT  
ALT-RAPGTHLTLDDGG-----HLV  
LTGTVANESGRTSLGAAVLTAGRVGGTRIDLNRLLVVATAAAPGPRSPDAGAAGTGGAGQPGG-----  
-----DAAALAAAAS-GHPVTFASDSA  
VLSDRDRAALDLVAAALRAGT-APALVAGHTDSTGPASLNEALS LGRAQA AVGYLVSQGVPA GRLRAVGYGA  
SRPAADNATPAGRAANRRVEIVTDAS-  
>FRAAL4505|YP\_714692|/1-384 [Frankia alni ACN14a]  
-----MSPSLAARLHRPRPVAFVSLVLA WLLLALIAFALRRGPIQDDL GARATAAVRAAGG  
VHAQVRIEGREAI V TGRFPNAAAAEQARASAAVSGTTSARLGDVLIATQPPRPL-----V  
LAVAGRG-----LSVTATVPDEASRAALLAAVADA-AGG--TVHG--QVLVDPVAEPPVEA-VSALAV  
ALHAVA-GEHSATVSGS-----TVA  
LTGGAPDEAARRRLGAAALAATAAVVPGATLADHLVVARAAGPAAAGPAAAGSAAAGSGAAVTPDRVAAARR  
QSG-----SLAALRAALD-GPAVTFPVSGA  
RLSPSAQARLDSVAAVLRGGD-LAVLVGGYTDTSGPSALNQALS LNRAQAAADYLTSRGPADLVRAAGFGS  
REPVAGNGTPOGRAANRRIEIIP LPSR  
>NIDE2575|YP\_003798208|/1-301 [Candidatus Nitrospira defluviu]  
-----MSRGIIFGVGLFALTLAFLCIPRHL-----  
-PVTSSATGHP-----A  
FSAHLEN-----GQLTSLGAVASEEAKAAAVARAQDLAKSLRLRVTD--NLEVI EDGQAAGWEAALPALLT  
QVVTLQHHPATVSLSGQ-----TVT  
VKGTVAGTDLKHKLLHEVASLL---GTSVHVQDQVTVASAGSTSPANLSPAGQPS PAPHASRAQ-----  
-----VQAGLDEILR-GEHIAFESNSA  
VLTSKGRAVVDKLVPA LKRAPEAII EIGGHTDSYGDPEYNLQLSRTRAEAVRQYLVEHQVP-NRLTAVGYGS  
TRPLSQDRTRAASKNRRIEFRVKEER  
>Bind\_1196|YP\_001832327|/1-459 [Beijerinckia indica subsp. indica ATCC 9039]  
-----MSQPEKWWWGLLPLVLLWILVNL FMDGTV--ESDLATR SKAALG-TFVQN  
PAVSVSGRDATLAGSVFSPADAQTAVDHVGGTGWVRRVISELAASPVVKPY-----D  
WHISQDG-----KRVTLSGHVPD TTVQMNLLAAVRAAFPOS--QIND--QTIYAAGAPEGFEGK-ALFVIS  
QLAPLA-GGN-ASLTD SGFSIAGKAPTDAVYDAALKA IHA-PPKGLTLVKADIVAPLOYTFSATRLDG-KLT  
LTGDVPSYEDVHKQILAEAKRLF----FNEEIVDR LTVLGNAPQNF GSVILAGINALSRLADGVFTVTNTDVK  
LSGGALYERAVAAIRTNLADQLPAGYQTDTSAITVHPEDKAVDSKSC---QA-ELDGLLG-KATILFETNGA  
TISKSS EGLLDRI VTTIGHCPEATIEISGHTDSTGN EPNLALSERRAKAVFDYLVAAGIPADKLSATGYGS  
SRPVASNDTEEGRAKNRRIEFTVK---  
>Nham\_0631|YP\_575979|/1-463 [Nitrobacter hamburgensis X14]  
-----MRGFFRWSSKWWPGLIPLAILWAVAAWTTTGPL--EADLSA HAAAALKDSVLDK  
TAISAAGR DITFSAEAFSEQERSNAVASVEAVPGVRLVDDRTALVAEAKPF-----V  
WTVREEV-----GKVTLSGSAPLPVVRNKL L DAARTTFAGI--DIAD--RMNLSRGAPPRFETA-AALLIG  
EIGK-LKTGK-ATISDGTVN-LSGMARELG GREAIAAALKNLPEGYSVANDIHAPPYIFEANKDPVAA-TLT  
LTGYVPDNAVHAAIAASAGRKF-----GEKVVDK LKASLGAPAGFD AVVTRALGSL SRLSTGRLVVS DRDVD  
LSGDALYDAAGRQIRADLPKDLPRGWQAKMEVSVK-PAAAPVDAAVC---QQ-LFADLLG-KRTIQFETGRA  
TLDPDSIGLLDRLTETALRCPTATIEIAGHTDSDGDASFNQTL SERRAQAVVDYLVKAGMPADRFKPMGYGS  
VQPIAANDTDEGKAKNRRIDFTVRQ--  
>blr1084|NP\_767724|/1-464 [Bradyrhizobium japonicum USDA 110]  
-----MQKLFWRASKWWPGLIPLAVMWGFAAWNNTLPV--EADLSARSSAALKETVLDK  
TRIAVDGRDVS LAADAFSEEGRRDAVMAVEIVPGVRLVDDRTRLVAEAKPF-----V  
WNAERDV-----VRVTLSGSAPLPSIKARL TEAARKEVGGV--EVAD--QMGLARGAPPRFEAA-AMLLLD  
QIGK-LKDGK-ITISDTKINLSGM-ARDLGGREAI A AALKNLPEGFLIAANDIKAPPYIFQAYKDPVAATVT  
LTGYVPDNNVHAAIATSASRKF----FNEKVVDNLKASLGAPGAFNP AVVAALGALSRLSTGTLVVS DREVK  
LSGDALYEGAGN DIRAGLGKDFPKNWQYKPEITVK-PAAGPVDGTVC---QQ-LFSELLN-KGKIRFATKRA  
DIDPDSAGILDHLIETALRCPTTNI DVAGHTDADGEDAFNQALSEKRAQAVIDYLVKAGLPASRFTAIGYGS  
TQPVAGNDTDDGKAQNRRIEFLVR---  
>OCAR\_4642|YP\_002287650|/1-464 [Oligotropha carboxidovorans OM5]  
-----MSAFSDWVRRWWPGVIPLAVLWVAAAWTGTGPV--EQQLTARTGAVLKESVLDK  
TQIEVSGRDVRLSADAFSEQGRRAAVDQVASVPGVRLVRDETQLIAEVFPF-----N  
WSVERDV-----VHVTLKSNAPLPAIKARLLEAARNAANGA--EVVD--QMALARGAPVRFDA A-ALLLID  
QVSK-LKEGR-LSLAGTKVELTGL-AREIGGREAI SAALKNLPEGYTVEKNDLRAPPYLFQINKDPVASTLV  
LSGYVPDNNHAAIVNAITRKF----VGEKVEDK LKASAGAPQGFMAAAMLALKGLSRLSTGTLTIQDRNIK  
LTGDALYPAASEQI GEELASKLPQGWKQQAELSVK-PIAAPVNATIC---QQ-LLGGLLG-KGTIRFETGKA  
VIDPDSVGLLDRLVEVVLRCSTSQIEITGHTDSNGDAESNLALS NRRAQSVADYLIKAGVPSERITAIGFGS  
GRPIAPNDTEEGKAQNRRIEFLVK---  
>RPA4784|NP\_950118|/1-464 [Rhodopseudomonas palustris CGA009]  
-----MRGLYSSSGKWWPGAIPLVILWAI AAWTTMPAV--EADLGARATAVLKDTVLDK

TKITAAGRDIITLTAEAFSEEGRRRAAVSAVEAVPGLRLVNDRTKLVPEASPY-----V  
WSIERDV-----VRVTLTGSAPLPASRTRLADGARAANGT--EVVD--RMALARGAPQRFDA--AMLLID  
QIAK-LKQGK-ITLTGTQVALKGM-AKDLGGRESIAAALRTLPGDYTVGENDIEAPPYVFRAYKDPVAGQVT  
LDGYVPDNNVHAALAAATGRKF----FNEKVVNDLKASVGPVLEAATPALGALSRLSTGTLVLSDREVEH  
LSGDALYEVAANQIRGGLNKELPQGWTVKADLSVK-PAAAPVDASVC---QQ-LFNGLLA-KATIOFESASA  
SIDKDSAALLDRLIETAMRCPNAKIEVAGHTSDSDGDPAFNQSLSEKRAREVVDMVRAGLSPERLQAFGYGS  
KIPVAGNDTDAGKAKNRRIDFVVR---  
>AfidRAFT\_2335|ZP\_07027206|/1-464 [Afipia sp. 1NLS2]  
-----MSEFSNWVRKWWPGLIPLVALWVAIWTGTVPPI--EQHLTAQAAAALKESVLDK  
TQIEVSGRDVRLSADAFSEQGRRTAVDQVASVPGVRLVTDQTQLIAEVTPI-----V  
WSVERDV-----VHVTLSGNAPLPAIKARLLEAARNAANGA--EVVD--QMALARGAPVRFDA--ALLLID  
QISK-LKEGK-ISLANTKVTLEGS-ARELGGREIAAALKNLPEGYTVEKNALYAPPYLFQVKNKDPVATTLA  
LSGYVPDNNHAHAIVSAIERKF----VGVKIEDKLKASAGAPQGFLLAATMTALSALSRLSTGTLTIQDRNVT  
LSGDALYPGANARISEELAAKLPQGWKQKAELTVK-PVAAPVNATIC---QQ-LLTGLLA-KGTIQFETGKA  
VIDPDSAGLLDRLIEAVLRCPTSQIEIEGHTSDSNGEKEANLALSMRRAQAVADYFIKAGVPKERISAVGFGS  
ERPVASNDTEEGKAQNRRIEFVVR---  
>BMULJ\_00324|YP\_001944835|/1-316 [Burkholderia multivorans ATCC 17616]  
-----MORTNHALRARRCAVVAALVAAGFVASGAAYAQNA-----  
GGATVTPVGNG--TVAAALP----ANAGAGSASAAAATLVRGT-----A  
GTLA-PPANAAPGQVVVGGKVPDEATKAAVLQKLRDT-YGAA-NVVD--QIEVGDVATPPNWSANVQKLLG  
TQLKQISKQ-LKINGT-----QIE  
MKGEVHNEAQRQOIASDMANTL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQKQILDQMAAALAKLQNRVTDIIGHTDNSGNRTSNIALSQARADAVKGYLITKGIAPQOMTTTGVGP  
DQPIAPNDTAEGRARNRRIEFRVQ--  
>Bcep1808\_0469|YP\_001118316|/1-319 [Burkholderia vietnamiensis G4]  
-----MORTIRARRARLLPFFAALAAAGLVAGSAYAQNT-----  
GGATVTPVGNG--TVATTALPSTPNASAAPGAAPGTASGTVVHGT-----A  
GTIT-PPANATPGQVVVGGKVPDEATKAAVLQKLRDT-YGAA-NVVD--QIEVGDVATPPNWSANVQKLLG  
AQLKQISKQ-LKINGT-----QIE  
VKGEVHNEAQRQQLASDMANSL---NPTYTIKNGLRVSAS-----  
-----EQGVLDQTLA-NRTIEFETGSA  
TLTPQKQILDQMAAALAKMQRNRTVDIIGHTDNSGNRTSNIALSQARADAVKGYLITKGIQPOQOMTTTGVGP  
DQPIAPNDTADGRARNRRIEFRVQ--  
>Bcep18194\_A3573|YP\_367818|/1-320 [Burkholderia sp. 383]  
-----MHRTIHVRRARFSVAFSPAVALAAGLFASGAA-----FAQN  
TGATVTPVGNG--TVATTALS-----ANTGAAPGTASGAVVHGTAGT-----A  
NTLT-PPPATATPGQVVVGGKVPDEATKAAVLQKLRDT-YGAT-NVVD--QIEVGDVATPPNWSANVQKLLG  
AQLKQISKQ-LKINGT-----QIE  
MKGEVHNEAQRQQLASDMANTL---NPTYTIKNGLRVSAS-----  
-----EQGVLDQTLA-NRTIEFETGSA  
TLTPQGRILILDQMAAALAKMQRNRTVDIIGHTDNSGNRTSNIALSQARADAVKGYLITKSILPQOMTTTGVGP  
DQPIAPNDTADGRARNRRIEFRVQ--  
>BCAL0349|YP\_002229515|/1-316 [Burkholderia cenocepacia J2315]  
-----MHRTIQVRRARLSAAVSPALAALFAAGLVASGAA-----FAQN  
TGATVTPVGNG--TVATTALP-----QANPNAGG-ASGTVVHGT-----A  
GTLT-PPANAAPGQVVVGGKVPDEATKAAVLQKLRDT-YGAT-NVVD--QIEVGDVATPPNWSANVQKLLG  
AQLKQISKQ-LKINGT-----QIE  
MKGEVHNEAQRQQLASDMANTL---NPTYTIKNGLRVSAS-----  
-----EQGVLDQTLA-NRTIEFETGSA  
TLTPQKGLILDQMAAALAKMQRNRTVDIIGHTDNSGNRTSNIALSQARADAVKGYLITKSIPPOQOMTTTGVGP  
DQPIAPNDTADGRARNRRIEFRVQ--  
>BDAG\_02659|ZP\_04946714|/1-317 [Burkholderia dolosa AU0158]  
-----MRRTIHVRRMRLSRLSSFVAVLLAAGLVGNSAAY-----AQNT  
GGATVTPVGNG--TVATAALP-----APNAGAPGTASGTVVHGT-----A  
GTIT-PPANAVPGQVVVGGKVPDEATKAAVLQKLRDT-YGAA-NVVD--QIEVGDVATPPNWSANVQKLLG  
AQLKQISKQ-LKINGT-----QIE  
MKGEVHNEAQRQOIASDMANTL---NPTYTIKNALRVAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRQILDQMAAALSCLQNRVTDIIGHTDNSGNRTSNIALSQARADAVKGYLITKGIPPOQOMTTTGVGP  
DQPIAPNDMAEGRARNRRIEFRVQ--  
>BamMC406\_0418|YP\_001807131|/1-316 [Burkholderia ambifaria MC40-6]  
-----MORTIHRRARFSRFVAALVAAGLVGSGAAYAQN-----T  
GGATVTPVGNG--TVATAALP-----ANSNPAAAPAAGAGTVVHGT-----A  
GTIA-PPANATPGQVVVGGKVPDEATKAAVLQKLRDT-YGAA-NVVD--QIEVGDVATPPNWSANVQKLLG

AQLKQISKQ-LKINGT-----QIE  
VKGEVHNEAQRQQLASDMANTL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRQILDQMAAALSCLQNRVTDIIGHTDNSGNRTSNIALSQARADAVKGYLITKSIPPQOMTTTGVGP  
DQPIAPNDTAEGRARNRRIEFRVQ--  
>bglu\_1g03970|YP\_002910300|/1-355 [Burkholderia glumae BGR1]  
-----MTTSLVLPPIRRRQLAAALAAGAALCAGGLALLAAPAGA-----FADNA  
GPATVTRVDPGAAVRSTALPPSG-APAQGPSGGLSAPPQAEGGTSQNGTVLTGTNVAGGTGAGPVTGAGTG  
ATVSVPPQASATPGQVVVGGKVPDEATKAAVLQKLRDT-YGAG-NVVD--QIEVGDVATPPNWSNVQKLIG  
PQLKQISKQ-LRIDGT-----SID  
VKGEVRNEALRQOVASDMANQL---NPTYTIRNALRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQMAAAMSRRMANRSVAI IIGHTDNSGNRASNIALSQARADAVKGYLVAKGIPSOQLSTTGVGP  
DQPIASNDTAEGRARNRRIEFRAGQ--  
>BgramDRAFT\_6351|ZP\_02887541|/1-322 [Burkholderia graminis C4D1M]  
-----MTYSRTAIGALLASLLVSGLFSTLAHADN-----D  
GPARTVVDNSGISIRTTALPSP-SSTTAGSAGPAVNTAGLASGTTGAGTG-----A  
VTAS-PPANAAPGQVVVGGKVPDEATKAAVLARLRDT-YGSA-NVVD--QIEVADVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVRNESQRQQLASDMANAL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQMAAAMLKMATKTVAI IIGHTDNSGNRTSNIALSQARADAVKGYLVAKGIPPQOMSTTGVGP  
DQPIASNDTADGRARNRRIEFRAGS--  
>Bphyt\_4921|YP\_001888655|/1-320 [Burkholderia phytofirmans PsJN]  
-----MLNHTSTARMTVLLAGLLLGAFAHADNDGPAR-----  
-----VTPVDNSGVSIIHTTVLPPA-ASASVGNAGPAVNTAGLASGTTGAGTG-----A  
ITAA-PPANATPGQVVVGGKVPDEATKAAVLARLRDT-YGAA-NVVD--QIEVADVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVHNESQRQQLASDMANAL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQMAAAMVKMTTKTVAI IIGHTDNSGNRTSNIALSQARADAVKGYLVAKGIPPQOLSTTGVGP  
DQPIASNDTTDGRARNRRIEFRAGS--  
>BthaT\_010100033018|ZP\_02375888|/1-324 [Burkholderia thailandensis TXDOH]  
-----MTKPLRPSRRSRFALTLAALALGGALGGAARADN-----V  
GPATVTPIDAGGVSVKSTPLAAPGAVAPGAAANGTGTGTGTGTGTG-----A  
IVSS-PPANAAPGQVVVGGKVADEATKAAVLQRLRDT-YGAA-NVVD--QIEVGNVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVHNEAQRQQLASDMANAL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRITILDQAGALAKMPNRTVEI IIGHTDNSGNRASNIALSQSRADAVKGYLVTKGIASQQLTTTGVGP  
DQPIASNDSADGRARNRRIEFRAGQ--  
>BPSL3099|YP\_109694|/1-310 [Burkholderia pseudomallei K96243]  
-----MTKP-----RLPLLRARRFALAFALALGGAARAD-----NV  
GPATVTAIDAGGVPVKSVPPLAAPVTAAPVAATAGA-----G  
ATVSSPPANATPGQVVVGGKVADEATKAAVLQRLRDT-YGAA-NVVD--QIEIGNVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVHNEAQRQQLASDMANAL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQAGALAKMSNRTVEI IIGHTDNSGNRTSNIALSQARADAVKGYLVTKGIASQQLTTTGVGP  
DQPIAPNDSADGRARNRRIEFRAGQ--  
>Bok1C\_010100016479|ZP\_02364314|/1-308 [Burkholderia oklahomensis C6786]  
-----MTKP-----LRSSRFRLTLAALALGGTLHGVALADNV-----  
GPATVTPIDAGGVPVKSVPPLAAP---APAAASGAGG-----G  
ATVSSPPANATPGQVVVGGKVADEATKAAVLQRLRDT-YGAA-NVVD--QIEVGDVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVHNEAQRQQLASDMANAL---NPTYTIKNGLRVSAS-----  
-----EQGLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQAGALAKMSSRTVEI IIGHTDNSGNRASNIALSQARADAVKGYLVAKGIASQQLTTTGVGP  
DQPIASNDTNDGRARNRRIEFRAGQ--  
>BMA2828|YP\_104341|/1-310 [Burkholderia mallei ATCC 23344]  
-----MTKP-----RLPLLRACRFALALALGGAARAD-----NV  
GPATVTPIDAGGVPVKSVPPLAAPVTAAPVAATAGA-----G  
ATVSSPPANATPGQVVVGGKVADEATKAAVLQRLRDT-YGAA-NVVD--QIEIGNVATPPNWSANVQKLIG  
PQLKQISKQ-LKIDGT-----QID  
VKGEVHNEAQRQQLASDMANAL---NPTYTIKNGLRVSAS-----

-----EQLLDQTLA-NRTIEFETGSA  
TLTPQGRAILDQMAGALAKMSSRTVEI IGH TDNSGNRTSNIALSQARADAVKGYLVTKGIASQQLTTTGVGP  
DQPIAPNDSADGRARNRRIEFRAGQ--  
>RALTA\_B1027|YP\_002007692|/1-272 [Cupriavidus taiwanensis]  
-----MVGTRTPALAAGLLAALVMLPGHAAPGDP-----  
-GTTATP-----A  
ASAAAPS-----GRVVAGGAVPDEATKASVLARLREL-YGSA-NVVD--QIEVGNVVSPPNWSGNVQKILS  
PQIKQVSRGQ-LSIDGT-----QVS  
VHGDVNRNEAQRQOIASDMATGL---GQSYTVKNGLRVPAS-----  
-----EQNLLDQTLA-NRIIEFETGAA  
TLTPKGRAILDEMAAVLPRLSGRKIEIVGH TDNSGSRALNLTLSQARAETVKNYLIGKGGEPGMLTAVGVGP  
DQPVAPNDKEEGRAKNRRIEFRAGQ--  
>RS01947|NP\_522322|/1-277 [Ralstonia solanacearum GMI1000]  
-----MGLDAIRYGFRPATVLAALAAACLGLT-----  
-PAHAAPGDPAP-----A  
SATSPVP-----GPVVAGGMVPDEATKASVLARLREL-YGSA-NVVD--QIEVGNVVSPPNWTGNVQKILS  
PQIKQVSRGQ-LNIDGT-----QVA  
VHGDVQNEAQRQQLASDMATTL---GASYTIKNGLRVAAS-----  
-----EQSLLDQTLA-NRIIEFETGSA  
TLTPKGRGILDEMAAVLPRLNGRKIEIVGH TDNSGSRAMNLTLSQARAETVKNYLISKGAEPGTLTAIGVGP  
DQPVAPNATDEGRSRNRRIEFRASQ--  
>Daro\_2186|YP\_285395|/1-261 [Dechloromonas aromatica RCB]  
-----MNMKTPLIVAALCLAFQGAFAQ-----  
-----S  
KSPEEPGK-----VIASGTVPDEASRAAILGKLRDL-YGAG-NVVD--RMEVGGVPPSNWTENMTKIIG  
PNLKQVHKQ-QMVNGT-----QIA  
IKGNVANEALRQOVVSNLATS---NPTYTIDNGLVAAAGE-----  
-----AQNVLDKTLN-NRVVEFEVGGAA  
TLTPAGRVILDEMYAAIKQIGTPKVQVIGH TDSSGSRQANIALSLSRANSVRSYLIEKGLPADGLTAVGSGP  
DQPVGSNDSSEGRAKNRRIEFKLAGQ--  
>Hsero\_4029|YP\_003777408|/1-267 [Herbaspirillum seropedicae SmR1]  
-----MKTNILSLFYRLALS AVCL SCTTSD-----  
-----A  
QNLA-PPVATPAPGQVLVTGTVPDEASKAAALTRLREL-YGHD-RVVD--QISVGPVVL PANWNNHVQKLIS  
PNLKAVRQGG-LKIDGT-----NVS  
ISGEVSHEAQRQOIASDMATSL---NSSYIINNGLRVSTS-----  
-----EQGVLDNTLA-NRVVSFESGRA  
TLTPEGKRILDEIAATMLQLKGRRVEI IGH TDNEGLRASNISLSLARADAVKAYLSTKGVDDSLLTSGQGP  
DRPVASNATSEGRARNRRIEFRIAK--  
>ACIRA0001\_2398|ZP\_05359661|/1-253 [Acinetobacter radioresistens SK82]  
-----MRSYKCLKYAVVCVIGL-----  
-----G  
GSLVWAE-----PVVVEGVVPNEASKQAILMRMOSV-YGAN-QVIDKIQVR--PVAAPNGWSDSVARVIT  
PELKKVRQGG-LRVRGT-----QIE  
LNGKVSHLNDIQPTTANFQMLI---QOPYRFNAQLSVNQA-----  
-----EQKIIDDALK-NRIVEFESGSA  
VLTAAGRQILEEMAVALHKVGGKVKI IGH TDSSGDGNKNFLLSQERAMAVCNYLIAKNIKAENLSTEGMGS  
SKPVADNTTAEGRKKNRRIEFEVL---  
>ABAYE2406|YP\_001714238|/1-255 [Acinetobacter baumannii AYE]  
-----MNQKYQIKLSQLIKGCFIYA-----  
-----I  
ANYALAQ-----PIVVEGVVPNEASKQAILMKMOSV-YGAD-QVVDKIQVR--PVAAPNGWSDSVTRVIT  
PDLKKVSQGG-LSVNGT-----RFE  
LTGKMLNPTEIQPTIQSFQSLV---QPPYQLFSQLSVNQA-----  
-----EQKIIDDALK-NRIIEFESGSA  
VLTEAGQKILDEMAVALNKVGGKVKI IGH TDSSGDATKNLKLSDRALAVKNYLISKNI PADHLSTEGLS  
SKPVADNTSAEGRKKNRRIEFTVL---  
>XOO3515|YP\_202154.6|/1-270 [Xanthomonas oryzae pv. oryzae KACC10331]  
-----MRHLSARTLALSGLITAFASAQVAAPAATPAA-----  
-----T  
PATGGVGE-----RPVIVEGVVPDQATKVRILNLRDT-YGSA-RIVDRVQVE--SIPSPNNGEYVAKMVS  
PGLKRVAAGK-LEVNGQ-----AVR  
ISGOVVNEAQRQOVASDLASL---NTSYTVTNSLKLGG-----  
-----EQGVLDQTLG-NRIIEFQSGSS  
RLTPLGMRILDEMVEKMSQMKDARFLI IGH TDNVGQRESNLALSQARAQAVKDYIVQKIGIDGARMNVQKGGP



DQPVADNASPDGRARNRRIQFKIQ---  
>SSKA14\_3746|ZP\_05136662|/1-250 [Stenotrophomonas sp. SKA14]  
-----M--LPLLLVAAPLAAQNAPA-----  
-----A  
AAGER-----PVVIEGVVPDQATKAKLLNNLRAY-YGAE-RVVDRIQVE--TIATPPNWGDYVSGMIN  
PGLKRVSPGK-LEVNGQ-----AVR  
ITGEVGNALRQOVASDLASL---NTSYTVTNALKVGS-----  
-----QONVLDQTLA-NRIIEFQSGSA  
RLTPFGMSILDEMVAKMAQMPDSRFLIIGHTDNVQRESNLTLSHARALAVKNYMMSKGIPGSHMDVLGKGP  
DEPVADNTSNDGRARNRRIEFKIQ---  
>CBGD1\_825|ZP\_05070558|/1-407 [Campylobacteriales bacterium GD 1]  
-----MKKLLLIPALLLGNVAIATDYNFEITPLIGYNVAEGNIDLDNYATFG  
AEIQYNGLNSI IKPELSVLYSKAN-----Y  
STNTLPSNADTDVWRVALNG--VYEYKKIGSVIPLAKAGIGY--ETMDGGSYTGQTGNADSVFLDTGVGAKI  
PFNDMIALKLEALYMLK-----YNDNRYDNNLAV  
LAGLNIAFGEKAQKAAPVKEEP----APVVAAVVVDGDDDKDGVLSVDKCPATAAGKTVNDEGCFIDGDD  
NDGVLNSVDACLTTAVGKTVDKAGCEIDGDDDKDGVLSKIDICPNTPIGDAVNSDGC PAKITLHV K FENNSD  
VVNTSSYDII EKYADFLNNYSSYS AKI IGYTDSKGSANYNQK LSEKRANA IKSMLLEKGV PADRLSSVGMGE  
SNPVADNSTKEGRAQNRRIEAELTKK-  
>Abu\_0025|YP\_001488979|/1-316 [Arcobacter butzleri RM4018]  
-----MSISGKIILLLLFIFLLLNFI SIFTFNYDEYF--KDKSGSNIYFENKSSF-  
-----NLFNKTE----YKPSD-----F  
TITKIDN-----SIELSG--TFENQKVAQDVIQAL---GINKEGTL--TYQN-NVVVDKGVLETIFLLIV  
PFKDF FADNSKISVINN-----EIL  
LSGELKNKMYKNLIDTIILQKS----KNIILKTEISIPEDNP-----INNQ----QNENS  
NEEVIKNETLKLPE-----IQLLINNILKDRK- ISFERKSS  
IPTEQSQNTIKEIAKILNENPNFKVEVAGHTDSRGEAALNKQISQDRANSVKNILVNSGVNETRIKAIGYGE  
EFPIAKDDENGLSEINRRVEFIIGE--



### Supporting data S3. Alignments of Rv0901-like proteins in FASTA format.

```
>Rv0901|NP_215416|/1-175 [Mycobacterium tuberculosis H37Rv]
-----ME-HV--HWLWLAGLAFTLGMVLTSTLMVRPV-----
-----EHQVLVKKSVRG-----
----SSAKSKPPTARKPAVK-----GTKREESPTAKTKVATESA-----AEQIPVAG
EPAAEPIPVAGEPA-----ARIPVVPYAPYGP SARAGADGSGP-----
-----QGWLVKGRS-----DTRLYYTPED-----PTY-DPTVAQVWF-QDEES---AARAF
F-----TPWRKSTRRT-----
>MUL_0250/1-213 [Mycobacterium ulcerans Agy99]
-----MA-HV--HWLWLIILSFLGLVLTTCALMVRST-----
-----KYRVAGAASGA
GADAADAETKPPAMKTADRRATRKE--GCRRRGRAQEEGRREEEDRRREKGRPASTPDCW---GQEAPSEA
HGGGQAGSEEKGCAGQEGTDRKD-----RCYRGVLGCPAGAGAVCPVRPGFGPSRCRR-----
-----HWAPGLGRE-----GAHRHPPLH-----PRGLVVRDDVCSGLVSGRS---GRRAG
I-----L-HRVEQERA-----
>MMAR_4635|YP_001852893|/1-212 [Mycobacterium marinum M]
-----MA-HV--HWLWLIILSFLGLVLTTCALMVRST-----
-----KYQVAAAASGA
GADAADAETKPPAMKTATAEPREKKAATGEDAPKKKVP GAKKKTAAAKKAAARKIAG-----ARKRPVKR
MVGAKRVPKKKVARAKRAPTEKTAVTEESSAAQLAPGRFAPYGP SARADADGTGP-----
-----QGWVVKGRT-----DTRHYYPED-----SSY-ETTCAQVWF-QDEEA---AARAF
F-----TAWSKSTHRK-----
>MkanA1_23004|ZP_04750861|/1-195 [Mycobacterium kansasii ATCC 12478]
-----MTGHV--HWLWLVGLAFALGMLLTFTLMVGPV-----
-----KEQLPQHKS-----
-----TMPRRPAKKATAAETPRKRAVAHKRAPAKKIPAAKKVPETPDADTASTQEIAPAKVTPAQVDPDAT
ESSAEQTVVIGES-----SLQSPARFAPYGP SARAGADGSGP-----
-----EGWLVKGRT-----DTRLYYTPDD-----PDY-DATVAQVWF-QDEGA---AARAF
F-----TPWRKSARRE-----
>Kfla_4950|YP_003382765|/1-203 [Kribbella flavida DSM 17836]
-----MGDLLRDHWAWELAAFLFGALITWVLLPQR-----EPA
LPRPPAEKEKEEERVLVTAGAPPEPASEPTQ-PRRAFSTPEPAPGPGQP-----RWEFRG-----
-ADPEPGVAETGFSQOMEQVGVAGPAAFGVR-----
-----AGDGEVAEGKYGP SARADAVPHQGP-----
-----DGFRIKGVV-----GSMLFHTPQS-----PDY-GRTRPDVWF-RTEAD---AVRAG
F-----AHAVRRPRRTPVPRRDDQN-----
>Nham_0633|YP_575981|/1-351 [Nitrobacter hamburgensis X14]
-----MLGSIRRAISVLRKQILHKLGV AISVTVIAVAFYVLFHILRDT-DVDEVIEAVRQTEPR
LIALSGLFVAAGYFTLTFYDLFAVRAIGVTHIPYRVAFAAFTSYSVGHNVGASVFTGGAVRYRYSSCGLS
AIDVAKVCFLAGLTFWLGNAAVLGLGIAYHPEAATSIDQLPAWCNRLIAIAIILGLIGY-----
-----VIWVGIRPRRVGSGPW-TVVLPGGPLTLLQILIGIVDLGFC
ALAMYVLVPDQPNVGFVVVAVIFVSATLLGFASHSPGGLGVFDAAMLVGL---WQMDKDLLAGMLLFRLL
YYVVPFVISIILLTLREIIISARMKRVGDVRSAGPTGKLSCLREHGDSGA
>blr1088|NP_767728|/1-143 [Bradyrhizobium japonicum USDA 110]
MPVVWNEDPAAIDWNELSALYRTAPLGNKTPADLALVFGNSMFCAFAYDQGRLVGAG-----
-----RALADGRDCAY
LCDVAVRPDCQOGLGREIIERLLARCRGHRKIILYAVPGKEGFYERLGFRRMTTAMAI FDDQASAHQGYL
TAP-----
-----
>OCAR_4644|YP_002287652|/1-346 [Oligotropha carboxidovorans OM5]
-----MMLDFLRRTLAFLEKQILQKLGVL SITVICFALYIYLQMLSDI-DLDELLKALRGTEVK
TVLLAGLCVAAGYFTLTFYDFLALRAIGKTEIPYRVAFAAGFTSYSIGHNVGASVFTGGAVRYRIYSSWDMT
AIDVAKVCFLAGLTFWLGNAVAVLIGIVYHPEAASSIDQLPIWLNRLAIVLLAGLVGY-----
-----VAWVSSRPRHVGRGSW-TVVLPGGPLTLVQIMIGIIDLSFC
ALAMYMLMPNEPHVGFVVVAVIFVTATLLGFASHSPGGLGVFDAAMLYGLTHFDSQFNKEELLAGMLLFRVL
YYITPFMISVMLLLREVILGALARRRPSGPHRHDDISAPGPS-----
>RPA4782|NP_950116|/1-344 [Rhodopseudomonas palustris CGA009]
-----MRIAIRRTIEVLREKQILHKLGVAVSIAVIAAACYVLYHILRGI-DHDRVLDAMQTEPT
SIALAALFVAAGYFTLTFYDLFAVHAIGRDDVPYRVNALAAFTSYSIGHNVGASALTGGAVRYRIYSAWGLD
AIDVAKVCFLAGLTFWLGNAAVLGLGVAYHPEAASAVDLLPPAVNRVLA LLLILAGLMVY-----
-----VAWVSFKPRCVGRGSW-TVTLPGGKLTLLQIAIGIVDLGFC
ALAMYVLTPEPNVGFVVVAVIFVSATLLGFASHSPGGLGVFDAAMLVGL---WQMDKEELLAGMLLFRLL
YYIVPFVISVLLVAVREIVLGARLKRVPPLAEALPKPVRGDPSPG-----
```

>AfIDRAFT\_2337|ZP\_07027208|/1-343 [Afipia sp. 1NLS2]  
-----MLEPVRRTLAFLEKQILHKLGVLSLMVIGFALHILYQMLRDI-DLDDVLKALRGTEVK  
TVALAGLCVAAGYFTLTFYDFFALRAIGRTEIPYRIAAFAGFTSYSIGHNVGASVFTGGAVRVRVYSSWDLT  
AIDVAKVCFIAGLTFWLGNAAVLGLGVAYHPEAASSIDQLPVWLNRLAVVLLLILVGY-----  
-----VWVSSRPRNVGRGNW-TVTLPGGSLTLVQILIGIVDLSFC  
AIAMYILMPDEPYVGFVVAVIFVSATLLGFASHSPGGLGVFDAAMLYGIMHFDSQFDKEELLAGMLLFRVL  
YYIVPFVISVMLLLFREVMLGAKARRESGLRKRDDISTSES-----