Document S5. Analyses of RvhB8 proteins across Rickettsiales species.

Assessment of divergence for RvhB8 paralogs across Rickettsiales species

RvhB8-I and RvhB8-II proteins were aligned for 15 Rickettsiales species: *Rickettsia bellii* str. RML369-C, *Rickettsia typhi* str. Wilmington, *Orientia tsutsugamushi* str. Boryong, *Orientia tsutsugamushi* str. Ikeda, Rickettsiaceae bacterium str. Os18, "*Candidatus* Midichloria mitochondrii" str. IricVA, *Neorickettsia sennetsu* str. Miyayama, *Neorickettsia risticii* str. Illinois, "*Candidatus* Xenolissoclinum pacificiensis" str. L6, *Wolbachia* endosymbiont str. TRS (*Brugia malayi*), *Wolbachia* endosymbiont (*Drosophila melanogaster*), *Ehrlichia canis* str. Jake, *Ehrlichia chaffeensis* str. Arkansas, *Anaplasma phagocytophilum* str. HZ, *Anaplasma marginale* str. St. Maries. Complete proteins were aligned using MUSCLE (default parameters) (Edgar 2004), with percent identity matrices used to provide estimates of divergence (**fig 1**). (*A*) Pairwise divergence between RvhB8-I proteins. (*B*) Pairwise divergence between RvhB8-II proteins. NOTE: pairwise divergences between RvhB8-I and RvhB8-II proteins are shown in **fig. 6*A*** of the manuscript. Species within the same genus are colored similarly. NCBI GenBank accession numbers for all proteins are provided in **Document S1**.

Phylogeny estimations of RvhB8 proteins

Phylogenies were estimated on the global RvhB8 alignment, which included one outgroup VirB8 protein from *Yersinia frederiksenii* (WP_042562314) (**fig 2**). The alignment was trimmed of less conserved regions using Gblocks (Talavera and Castresana 2007). Phylogenies of the unmasked (295 aa) and masked (87 aa) alignments were estimated under maximum likelihood (ML) using RAxML v.7.2.8 (Stamatakis 2014), implementing a gamma model of rate heterogeneity and estimation of the proportion of invariable sites. Two separate analyses for each alignment employed the WAG or LG amino acid substitution models, resulting in four total ML-based phylogeny estimations. Branch support was assessed with 1000 bootstrap pseudoreplications. (*A*) WAG (unmasked): this tree is shown in **fig. 6*C*** of the manuscript. (*B*) LG (unmasked). (*C*) WAG (masked). (*D*) LG (masked). NCBI GenBank accession numbers for all proteins are provided in **Document S1**.

Relative conservation of RvhB8 paralogs across Rickettsiales species

The global RvhB8 alignment, which includes RvhB8-I and RvhB8-II proteins from 15 Rickettsiales species (see above). The assignment of predicted (top) and solved (bottom) structures are shown for *R. typhi* RvhB8-I and RvhB8-II, respectively. Predicted transmembrane-spanning regions (Krogh et al. 2001) are colored blue. Five residues conserved across all RvhB8 proteins are colored black, with residues conserved only in RvhB8-I (*n* = 15) or RvhB8-II (*n* = 1) highlighted yellow.

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A

RvhB8-I

	R. bellii	*R. typhi*	*Orientia* (Boryong)	*Orientia* (Ikeda)	Os18	*M. mitochondrii*	*N. sennetsu*	*N. risticii*	*X. pacificiensis*	*Wolbachia* (Bmal)	*Wolbachia* (Dmel)	*E. canis* Jake	*E. chaffeensis*	*A. phagocytophilum*	*A. marginale*
R. bellii	------	76.9	42.5	42.5	46.5	28.5	28.8	25.3	31.2	32.6	32.7	28.1	28.2	29.4	31.0
R. typhi	76.9	------	41.6	41.6	47.8	29.7	28.8	25.8	31.2	34.4	35.0	29.4	29.2	29.9	31.0
Orientia (Boryong)	42.5	41.6	------	100	64.6	29.8	30.0	29.2	29.2	34.7	33.5	30.7	30.7	31.9	30.2
Orientia (Ikeda)	42.5	41.6	100	------	64.6	29.8	30.0	29.2	29.2	34.7	33.5	30.7	30.7	31.9	30.2
Os18	46.5	47.8	64.6	64.6	------	28.6	28.8	27.6	31.2	35.3	34.1	32.6	30.4	32.9	30.0
M. mitochondrii	28.5	29.7	29.8	29.8	28.6	------	34.5	33.1	35.1	35.1	35.7	35.1	34.5	36.9	38.9
N. sennetsu	28.8	28.8	30.0	30.0	28.8	34.5	------	91.6	35.3	43.2	41.6	38.0	37.5	39.1	37.3
N. risticii	25.3	25.8	29.2	29.2	27.6	33.1	91.6	------	33.9	40.5	38.9	36.8	36.2	35.2	34.9
X. pacificiensis	31.2	31.2	29.2	29.2	31.2	35.1	35.3	33.9	------	40.2	41.3	40.4	39.9	38.0	35.2
Wolbachia (Bmal)	32.6	34.4	34.7	34.7	35.3	35.1	43.2	40.5	40.2	------	81.4	52.2	54.0	50.7	51.8
Wolbachia (Dmel)	32.7	35.0	33.5	33.5	34.1	35.7	41.6	38.9	41.3	81.4	------	48.9	48.9	49.1	50.2
E. canis Jake	28.1	29.4	30.7	30.7	32.6	35.1	38.0	36.8	40.4	52.2	48.9	------	93.6	62.4	69.2
E. chaffeensis	28.2	29.2	30.7	30.7	30.4	34.5	37.5	36.2	39.9	54.0	48.9	93.6	------	62.5	67.5
A. phagocytophilum	29.4	29.9	31.9	31.9	32.9	36.9	39.1	35.2	38.0	50.7	49.1	62.4	62.5	------	83.4
A. marginale	31.0	31.0	30.2	30.2	30.0	38.9	37.3	34.9	35.2	51.8	50.2	69.2	67.5	83.4	------

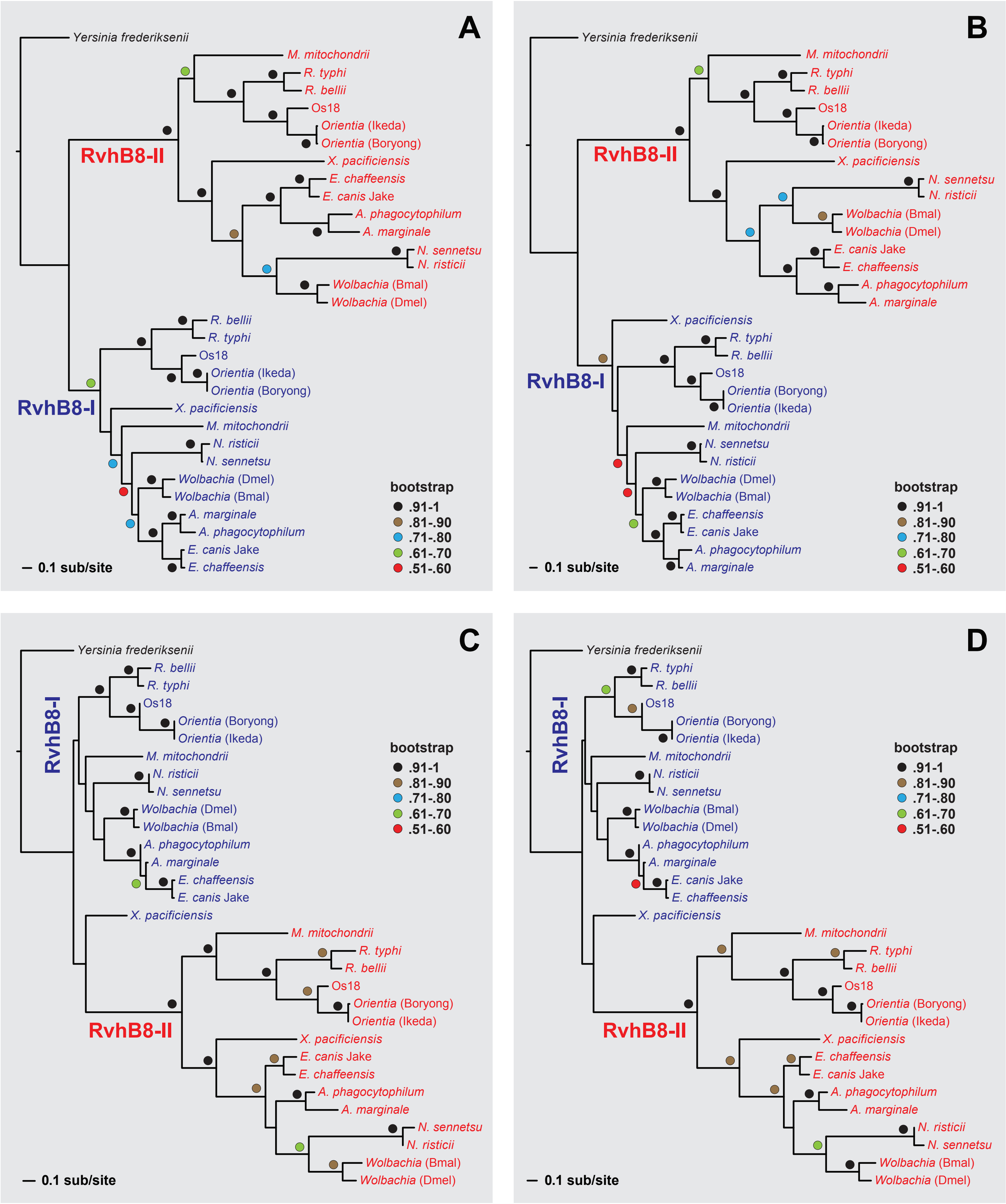
B

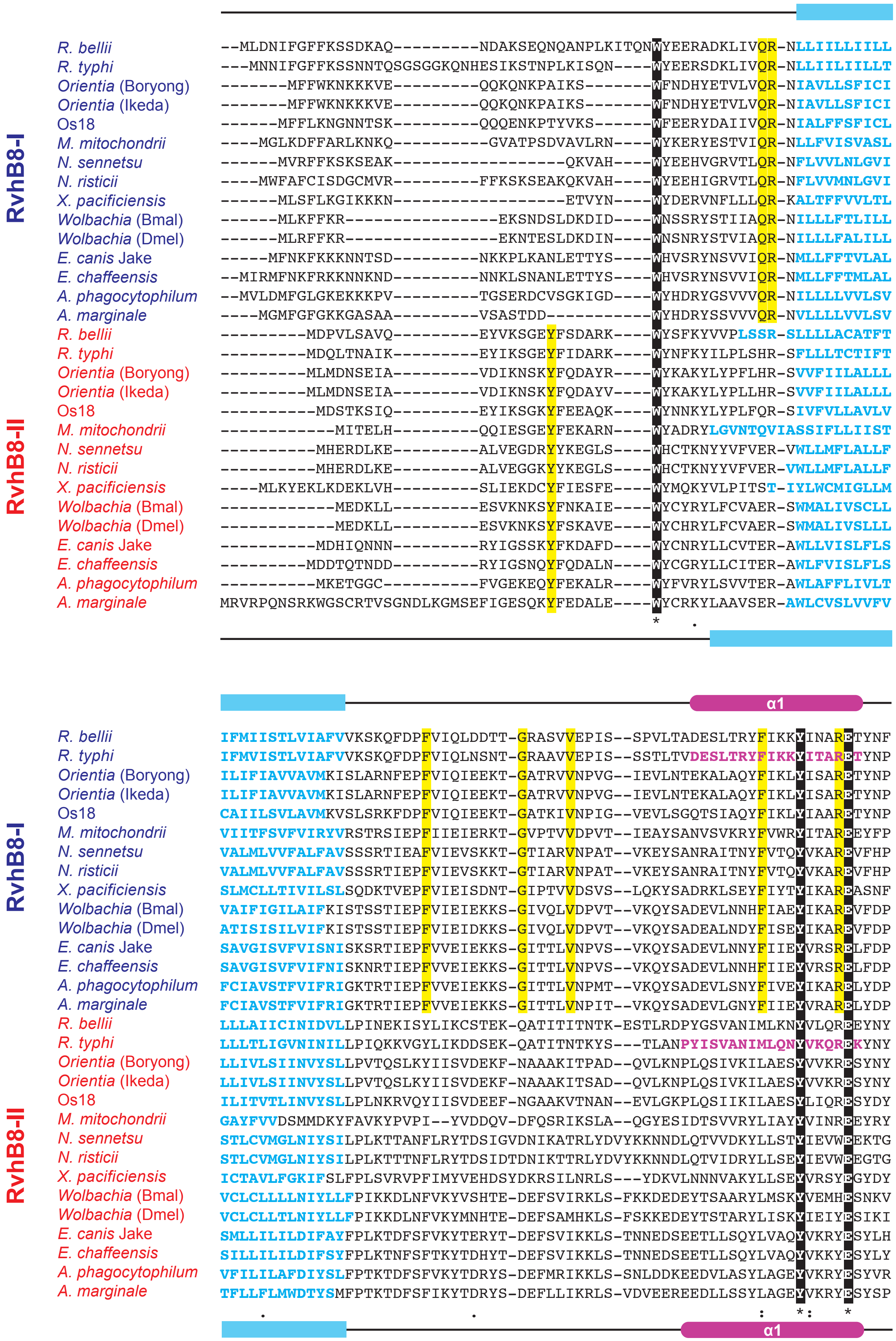
RvhB8-II

	R. bellii	*R. typhi*	*Orientia* (Boryong)	*Orientia* (Ikeda)	Os18	*M. mitochondrii*	*N. sennetsu*	*N. risticii*	*X. pacificiensis*	*Wolbachia* (Bmal)	*Wolbachia* (Dmel)	*E. canis* Jake	*E. chaffeensis*	*A. phagocytophilum*	*A. marginale*
R. bellii	------	71.1	37.5	37.9	39.0	26.3	17.0	16.5	21.3	24.1	23.2	19.1	21.3	15.7	18.1
R. typhi	71.1	------	38.5	39.0	40.4	25.1	17.6	17.1	21.8	25.7	24.8	22.4	25.1	18.1	19.2
Orientia (Boryong)	37.5	38.5	------	98.3	60.8	26.3	17.1	16.1	22.2	23.7	21.0	21.0	25.9	21.6	21.3
Orientia (Ikeda)	37.9	39.0	98.3	------	60.8	26.3	16.6	15.6	21.8	23.7	21.0	21.0	25.5	21.2	21.3
Os18	39.0	40.4	60.8	60.8	------	26.8	18.5	18.0	21.9	22.4	19.2	21.0	23.8	20.3	20.5
M. mitochondrii	26.3	25.1	26.3	26.3	26.8	------	15.1	15.1	23.9	23.3	22.2	25.1	27.2	21.8	20.1
N. sennetsu	17.0	17.6	17.1	16.6	18.5	15.1	------	87.9	23.3	26.2	27.1	21.8	22.3	22.9	19.9
N. risticii	16.5	17.1	16.1	15.6	18.0	15.1	87.9	------	22.4	26.2	27.5	21.8	22.3	22.4	20.4
X. pacificiensis	21.3	21.8	22.2	21.8	21.9	23.9	23.3	22.4	------	23.5	22.7	23.5	25.2	25.0	21.2
Wolbachia (Bmal)	24.1	25.7	23.7	23.7	22.4	23.3	26.2	26.2	23.5	------	76.9	35.2	34.3	33.5	29.2
Wolbachia (Dmel)	23.2	24.8	21.0	21.0	19.2	22.2	27.1	27.5	22.7	76.9	------	33.2	33.5	32.3	28.2
E. canis Jake	19.1	22.4	21.0	21.0	21.0	25.1	21.8	21.8	23.5	35.2	33.2	------	78.2	45.5	44.1
E. chaffeensis	21.3	25.1	25.9	25.5	23.8	27.2	22.3	22.3	25.2	34.3	33.5	78.2	------	43.2	43.2
A. phagocytophilum	15.7	18.1	21.6	21.2	20.3	21.8	22.9	22.4	25.0	33.5	32.3	45.5	43.2	------	60.7
A. marginale	18.1	19.2	21.3	21.3	20.5	20.1	19.9	20.4	21.2	29.2	28.2	44.1	43.2	60.7	------

Fig. 1 (Document S5)

Fig. 2 (Document S5)





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R. typhi            ---MNNIFGFFKSSNNTQSGSGGKQNHESIKSTNPLKISQN----WYEERSDKLIVQR-NLLIILIILLT
Orientia (Boryong)  -------MFFWKNKKKVE---------QQKQNKPAIKS-------WFNDHYETVLVQR-NIAVLLSFICI
Orientia (Ikeda)    -------MFFWKNKKKVE---------QQKQNKPAIKS-------WFNDHYETVLVQR-NIAVLLSFICI
Os18                ------MFFLKNGNNTSK---------QQQENKPTYVKS------WFEERYDAIIVQR-NIALFFSFICL
M. mitochondrii     ----MGLKDFFARLKNKQ----------GVATPSDVAVLRN----WYKERYESTVIQR-NLLFVISVASL
N. sennetsu         ------MVRFFKSKSEAK------------------QKVAH----WYEEHVGRVTLQR-NFLVVLNLGVI
N. risticii         ----MWFAFCISDGCMVR---------FFKSKSEAKQKVAH----WYEEHIGRVTLQR-NFLVVMNLGVI
X. pacificiensis    ------MLSFLKGIKKKN------------------ETVYN----WYDERVNFLLLQR-KALTFFVVLTL
Wolbachia (Bmal)    ------MLKFFKR----------------EKSNDSLDKDID----WNSSRYSTIIAQR-NILLLFTLILL
Wolbachia (Dmel)    ------MLRFFKR----------------EKNTESLDKDIN----WNSNRYSTVIAQR-NILLLFALILL
E. canis Jake       -----MFNKFKKKNNTSD---------NKKPLKANLETTYS----WHVSRYNSVVIQR-NMLLFFTVLAL
E. chaffeensis      --MIRMFNKFRKKNNKND---------NNKLSNANLETTYS----WHVSRYNSVVIQR-NMLLFFTMLAL
A. phagocytophilum  --MVLDMFGLGKEKKKPV---------TGSERDCVSGKIGD----WYHDRYGSVVVQR-NILLLLVVLSV
A. marginale        ----MGMFGFGKKGASAA---------VSASTDD-----------WYHDRYSSVVVQR-NVLLLLVVLSV
R. bellii           ---------MDPVLSAVQ---------EYVKSGEYFSDARK----WYSFKYVVPLSSR-SLLLLACATFT
R. typhi            ---------MDQLTNAIK---------EYIKSGEYFIDARK----WYNFKYILPLSHR-SFLLLTCTIFT
Orientia (Boryong)  ---------MLMDNSEIA---------VDIKNSKYFQDAYR----WYKAKYLYPFLHR-SVVFIILALLL
Orientia (Ikeda)    ---------MLMDNSEIA---------VDIKNSKYFQDAYV----WYKAKYLYPLLHR-SVVFIILALLL
Os18                ----------MDSTKSIQ---------EYIKSGKYFEEAQK----WYNNKYLYPLFQR-SIVFVLLAVLV
M. mitochondrii     ------------MITELH---------QQIESGEYFEKARN----WYADRYLGVNTQVIASSIFLLIIST
N. sennetsu         ----------MHERDLKE---------ALVEGDRYYKEGLS----WHCTKNYYVFVER-VWLLMFLALLF
N. risticii         ----------MHERDLKE---------ALVEGGKYYKEGLS----WHCTKNYYVFVER-VWLLMFLALLF
X. pacificiensis    ----MLKYEKLKDEKLVH---------SLIEKDCYFIESFE----WYMQKYVLPITST-IYLWCMIGLLM
Wolbachia (Bmal)    ------------MEDKLL---------ESVKNKSYFNKAIE----WYCYRYLFCVAER-SWMALIVSCLL
Wolbachia (Dmel)    ------------MEDKLL---------ESVKNKSYFSKAVE----WYCHRYLFCVAER-SWMALIVSLLL
E. canis Jake       ----------MDHIQNNN---------RYIGSSKYFKDAFD----WYCNRYLLCVTER-AWLLVISLFLS
E. chaffeensis      ---------MDDTQTNDD---------RYIGSNQYFQDALN----WYCGRYLLCITER-AWLFVISLFLS
A. phagocytophilum  ----------MKETGGC----------FVGEKEQYFEKALR----WYFVRYLSVVTER-AWLAFFLIVLT
A. marginale        MRVRPQNSRKWGSCRTVSGNDLKGMSEFIGESQKYFEDALE----WYCRKYLAAVSER-AWLCVSLVVFV
                                                                 *   .
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R. bellii           IFMIISTLVIAFVVKSKQFDPFVIQLDDTT-GRASVVEPIS--SPVLTADESLTRYFIKKYINARETYNF
R. typhi            IFMVISTLVIAFVVKSKQFDPFVIQLNSNT-GRAAVVEPIS--SSTLTVDESLTRYFIKKYITARETYNP
Orientia (Boryong)  ILIFIAVVAVMKISLARNFEPFVIQIEEKT-GATRVVNPVG--IEVLNTEKALAQYFIKLYISARETYNP
Orientia (Ikeda)    ILIFIAVVAVMKISLARNFEPFVIQIEEKT-GATRVVNPVG--IEVLNTEKALAQYFIKLYISARETYNP
Os18                CAIILSVLAVMKVSLSRKFDPFVIQIEEKT-GATKIVNPIG--VEVLSGQTSIAQYFIKLYIAARETYNP
M. mitochondrii     VIITFSVFVIRYVRSTRSIEPFIIEIERKT-GVPTVVDPVT--IEAYSANVSVKRYFVWRYITAREEYFP
N. sennetsu         VALMLVVFALFAVSSSRTIEAFVIEVSKKT-GTIARVNPAT--VKEYSANRAITNYFVTQYVKAREVFHP
N. risticii         VALMLVVFALFAVSSSRTIEPFVIEVSKKT-GTIARVNPAT--VKEYSANRAITNYFVTQYVKAREVFHP
X. pacificiensis    SLMCLLTIVILSLSQDKTVEPFVIEISDNT-GIPTVVDSVS--LQKYSADRKLSEYFIYTYIKAREASNF
Wolbachia (Bmal)    VAIFIGILAIFKISTSSTIEPFVIEIEKKS-GIVQLVDPVT--VKQYSADEVLNNHFIAEYIKAREVFDP
Wolbachia (Dmel)    ATISISILVIFKISTSSTIEPFVIEIDKKS-GIVQLVDPVT--VKQYSADEALNDYFISEYIKAREVFDP
E. canis Jake       SAVGISVFVISNISKSRTIEPFVVEIEKKS-GITTLVNPVS--VKQYSADEVLNNYFIIEYVRSRELFDP
E. chaffeensis      SAVGISVFVIFNISKNRTIEPFVVEIEKKS-GITTLVNPVS--VKQYSADEVLNNHFIIEYVRSRELFDP
A. phagocytophilum  FCIAVSTFVIFRIGKTRTIEPFVVEIEKKS-GITTLVNPMT--VKQYSADEVLSNYFIVEYIKARELYDP
A. marginale        FCIAVSTFVIFRIGKTRTIEPFVVEIEKKS-GITTLVNPIT--VKQYSADEVLGNYFIIEYVRARELYDP
R. bellii           LLLAIICINIDVLLPINEKISYLIKCSTEK-QATITITNTK-ESTLRDPYGSVANIMLKNYVLQREEYNY
R. typhi            LLLTLIGVNINILLPIQKKVGYLIKDDSEK-QATITNTKYS---TLANPYISVANIMLQNYVKQREKYNY
Orientia (Boryong)  LLIVLSIINVYSLLPVTQSLKYIISVDEKF-NAAAKITPAD--QVLKNPLQSIVKILAESYVVKRESYNY
Orientia (Ikeda)    LLIVLSIINVYSLLPVTQSLKYIISVDEKF-NAAAKITSAD--QVLKNPLQSIVKILAESYVVKRESYNY
Os18                ILITVTLINVYSLLPLNKRVQYIISVDEEF-NGAAKVTNAN--EVLGKPLQSIIKILAESYLIQRESYDY
M. mitochondrii     GAYFVVDSMMDKYFAVKYPVPI--YVDDQV-DFQSRIKSLA--QGYESIDTSVVRYLIAYYVINREEYRY
N. sennetsu         STLCVMGLNIYSILPLKTTANFLRYTDSIGVDNIKATRLYDVYKKNNDLQTVVDKYLLSTYIEVWEEKTG
N. risticii         STLCVMGLNIYSILPLKTTTNFLRYTDSIDTDNIKTTRLYDVYKKNNDLQTVIDRYLLSEYIEVWEEGTG
X. pacificiensis    ICTAVLFGKIFSLFPLSVRVPFIMYVEHDSYDKRSILNRLS---YDKVLNNNVAKYLLSEYVRSYEGYDY
Wolbachia (Bmal)    VCLCLLLLNIYLLFPIKKDLNFVKYVSHTE-DEFSVIRKLS-FKKDEDEYTSAARYLMSKYVEMHESNKV
Wolbachia (Dmel)    VCLCLLTLNIYLLFPIKKDLNFVKYMNHTE-DEFSAMHKLS-FSKKEDEYTSTARYLISKYIEIYESIKI
E. canis Jake       SMLLILILDIFAYFPLKTDFSFVKYTERYT-DEFSVIKKLS-TNNEDSEETLLSQYLVAQYVKRYESYLH
E. chaffeensis      SILLILILDIFSYFPLKTNFSFTKYTDHYT-DEFSVIKKLS-TNNEDSEETLLSQYLVAQYVKKYESYLY
A. phagocytophilum  VFILILAFDIYSLFPTKTDFSFVKYTDRYS-DEFMRIKKLS-SNLDDKEEDVLASYLAGEYVKRYESYVR
A. marginale        TFLLFLMWDTYSMFPTKTDFSFIKYTDRYS-DEFLLIKRLS-VDVEEREEDLLSSYLAGEYVKRYESYSP
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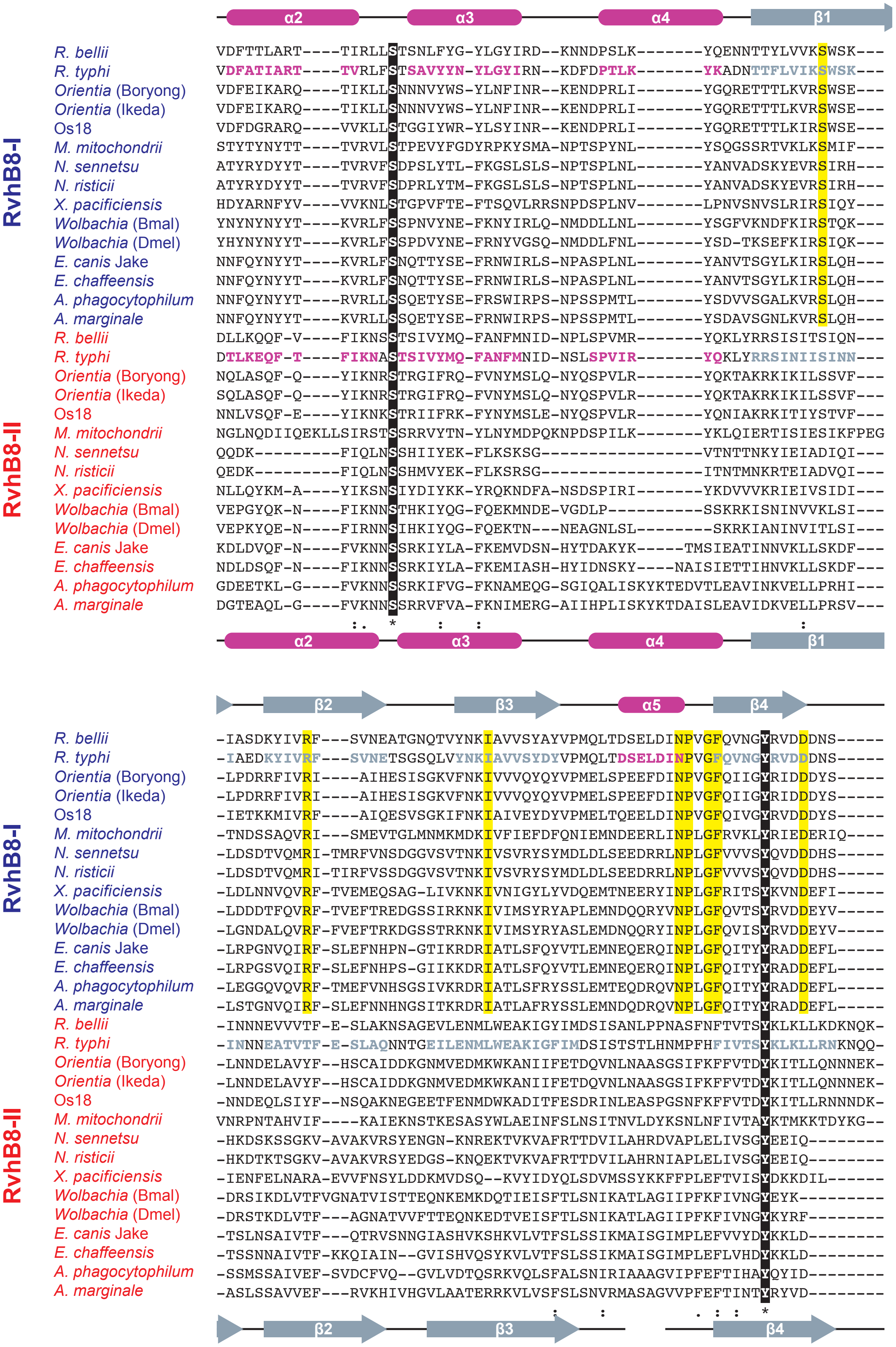
Fig. 3 (Document S5)



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R. typhi                VDFATIART----TVRLFSTSAVYYN-YLGYIRN--KDFDPTLK-------YKADNTTFLVIKSWSK---
Orientia (Boryong)      VDFEIKARQ----TIKLLSNNNVYWS-YLNFINR--KENDPRLI-------YGQRETTTLKVRSWSE---
Orientia (Ikeda)        VDFEIKARQ----TIKLLSNNNVYWS-YLNFINR--KENDPRLI-------YGQRETTTLKVRSWSE---
Os18                    VDFDGRARQ----VVKLLSTGGIYWR-YLSYINR--KENDPRLI-------YGQRETTTLKIRSWSE---
M. mitochondrii         STYTYNYTT----TVRVLSTPEVYFGDYRPKYSMA-NPTSPYNL-------YSQGSSRTVKLKSMIF---
N. sennetsu             ATYRYDYYT----TVRVFSDPSLYTL-FKGSLSLS-NPTSPLNL-------YANVADSKYEVRSIRH---
N. risticii             ATYRYDYYT----TVRVFSDPRLYTM-FKGSLSLS-NPTSPLNL-------YANVADSKYEVRSIRH---
X. pacificiensis        HDYARNFYV----VVKNLSTGPVFTE-FTSQVLRRSNPDSPLNV-------LPNVSNVSLRIRSIQY---
Wolbachia (Bmal)        YNYNYNYYT----KVRLFSSPNVYNE-FKNYIRLQ-NMDDLLNL-------YSGFVKNDFKIRSTQK---
Wolbachia (Dmel)        YHYNYNYYT----KVRLFSSPDVYNE-FRNYVGSQ-NMDDLFNL-------YSD-TKSEFKIRSIQK---
E. canis Jake           NNFQYNYYT----KVRLFSNQTTYSE-FRNWIRLS-NPASPLNL-------YANVTSGYLKIRSLQH---
E. chaffeensis          NNFQYNYYT----KVRLFSNQTTYSE-FRNWIRLS-NPASPLNL-------YANVTSGYLKIRSLQH---
A. phagocytophilum      NNFQYNYYT----RVRLLSSQETYSE-FRSWIRPS-NPSSPMTL-------YSDVVSGALKVRSLQH---
A. marginale            NNFQYNYYT----KVRLLSSQETYSE-FRNWIRPS-NPSSPMTL-------YSDAVSGNLKVRSLQH---
R. bellii               DLLKQQF-V----FIKNSSTSIVYMQ-FANFMNID-NPLSPVMR-------YQKLYRRSISITSIQN---
R. typhi                DTLKEQF-T----FIKNASTSIVYMQ-FANFMNID-NSLSPVIR-------YQKLYRRSINIISINN---
Orientia (Boryong)      NQLASQF-Q----YIKNRSTRGIFRQ-FVNYMSLQ-NYQSPVLR-------YQKTAKRKIKILSSVF---
Orientia (Ikeda)        SQLASQF-Q----YIKNRSTRGIFRQ-FVNYMSLQ-NYQSPVLR-------YQKTAKRKIKILSSVF---
Os18                    NNLVSQF-E----YIKNKSTRIIFRK-FYNYMSLE-NYQSPVLR-------YQNIAKRKITIYSTVF---
M. mitochondrii         NGLNQDIIQEKLLSIRSTSSRRVYTN-YLNYMDPQKNPDSPILK-------YKLQIERTISIESIKFPEG
N. sennetsu             QQDK---------FIQLNSSHIIYEK-FLKSKSG-----------------VTNTTNKYIEIADIQI---
N. risticii             QEDK---------FIQLNSSHMVYEK-FLKSRSG-----------------ITNTMNKRTEIADVQI---
X. pacificiensis        NLLQYKM-A----YIKSNSIYDIYKK-YRQKNDFA-NSDSPIRI-------YKDVVVKRIEIVSIDI---
Wolbachia (Bmal)        VEPGYQK-N----FIKNNSTHKIYQG-FQEKMNDE-VGDLP----------SSKRKISNINVVKLSI---
Wolbachia (Dmel)        VEPKYQE-N----FIRNNSIHKIYQG-FQEKTN---NEAGNLSL--------SKRKIANINVITLSI---
E. canis Jake           KDLDVQF-N----FVKNNSSRKIYLA-FKEMVDSN-HYTDAKYK-----TMSIEATINNVKLLSKDF---
E. chaffeensis          NDLDSQF-N----FIKNNSSRKIYLA-FKEMIASH-HYIDNSKY----NAISIETTIHNVKLLSKDF---
A. phagocytophilum      GDEETKL-G----FVKNNSSRKIFVG-FKNAMEQG-SGIQALISKYKTEDVTLEAVINKVELLPRHI---
A. marginale            DGTEAQL-G----FVKNNSSRRVFVA-FKNIMERG-AIIHPLISKYKTDAISLEAVIDKVELLPRSV---
                                      :.  *    :   :                                 :
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R. bellii               -IASDKYIVRF---SVNEATGNQTVYNKIAVVSYAYVPMQLTDSELDINPVGFQVNGYRVDDDNS-----
R. typhi                -IAEDKYIVRF---SVNETSGSQLVYNKIAVVSYDYVPMQLTDSELDINPVGFQVNGYRVDDDNS-----
Orientia (Boryong)      -LPDRRFIVRI----AIHESISGKVFNKIVVVQYQYVPMELSPEEFDINPVGFQIIGYRIDDDYS-----
Orientia (Ikeda)        -LPDRRFIVRI----AIHESISGKVFNKIVVVQYQYVPMELSPEEFDINPVGFQIIGYRIDDDYS-----
Os18                    -IETKKMIVRF----AIQESVSGKIFNKIAIVEYDYVPMELTQEELDINPVGFQIVGYRVDDDYS-----
M. mitochondrii         -TNDSSAQVRI---SMEVTGLMNMKMDKIVFIEFDFQNIEMNDEERLINPLGFRVKLYRIEDERIQ----
N. sennetsu             -LDSDTVQMRI-TMRFVNSDGGVSVTNKIVSVRYSYMDLDLSEEDRRLNPLGFVVVSYQVDDDHS-----
N. risticii             -LDSDTVQMRI-TIRFVSSDGGVSVTNKIVSVRYSYMDLDLSEEDRRLNPLGFVVVSYQVDDDHS-----
X. pacificiensis        -LDLNNVQVRF-TVEMEQSAG-LIVKNKIVNIGYLYVDQEMTNEERYINPLGFRITSYKVNDEFI-----
Wolbachia (Bmal)        -LDDDTFQVRF-TVEFTREDGSSIRKNKIVIMSYRYAPLEMNDQQRYVNPLGFQVTSYRVDDEYV-----
Wolbachia (Dmel)        -LGNDALQVRF-FVEFTRKDGSSTRKNKIVIMSYRYASLEMDNQQRYINPLGFQVISYRVDDEYV-----
E. canis Jake           -LRPGNVQIRF-SLEFNHPN-GTIKRDRIATLSFQYVTLEMNEQERQINPLGFQITYYRADDEFL-----
E. chaffeensis          -LRPGSVQIRF-SLEFNHPS-GIIKKDRIATLSFQYVTLEMNEQERQINPLGFQITYYRADDEFL-----
A. phagocytophilum      -LEGGQVQVRF-TMEFVNHSGSIVKRDRIATLSFRYSSLEMTEQDRQVNPLGFQITYYRADDEFL-----
A. marginale            -LSTGNVQIRF-SLEFNNHNGSITKRDRIATLAFRYSSLEMNDQDRQVNPLGFQITYYRADDEFL-----
R. bellii               -INNNEVVVTF-E-SLAKNSAGEVLENMLWEAKIGYIMDSISANLPPNASFNFTVTSYKLKLLKDKNQK-
R. typhi                -INNNEATVTF-E-SLAQNNTGEILENMLWEAKIGFIMDSISTSTLHNMPFHFIVTSYKLKLLRNKNQQ-
Orientia (Boryong)      -LNNDELAVYF--HSCAIDDKGNMVEDMKWKANIIFETDQVNLNAASGSIFKFFVTDYKITLLQNNNEK-
Orientia (Ikeda)        -LNNDELAVYF--HSCAIDDKGNMVEDMKWKANIIFETDQVNLNAASGSIFKFFVTDYKITLLQNNNEK-
Os18                    -NNDEQLSIYF--NSQAKNEGEETFENMDWKADITFESDRINLEASPGSNFKFFVTDYKITLLRNNNDK-
M. mitochondrii         VNRPNTAHVIF----KAIEKNSTKESASYWLAEINFSLNSITNVLDYKSNLNFIVTAYKTMKKTDYKG--
N. sennetsu             -HKDSKSSGKV-AVAKVRSYENGN-KNREKTVKVAFRTTDVILAHRDVAPLELIVSGYEEIQ--------
N. risticii             -HKDTKTSGKV-AVAKVRSYEDGS-KNQEKTVKVAFRTTDVILAHRNIAPLELIVSGYEEIQ--------
X. pacificiensis        -IENFELNARA-EVVFNSYLDDKMVDSQ--KVYIDYQLSDVMSSYKKFFPLEFTVISYDKKDIL------
Wolbachia (Bmal)        -DRSIKDLVTFVGNATVISTTEQNKEMKDQTIEISFTLSNIKATLAGIIPFKFIVNGYEYK---------
Wolbachia (Dmel)        -DRSTKDLVTF---AGNATVVFTTEQNKEDTVEISFTLSNIKATLAGIIPFKFIVNGYKYRF--------
E. canis Jake           -TSLNSAIVTF---QTRVSNNGIASHVKSHKVLVTFSLSSIKMAISGIMPLEFVVYDYKKLD--------
E. chaffeensis          -TSSNNAIVTF-KKQIAIN--GVISHVQSYKVLVTFSLSSIKMAISGIMPLEFLVHDYKKLD--------
A. phagocytophilum      -SSMSSAIVEF-SVDCFVQ--GVLVDTQSRKVQLSFALSNIRIAAAGVIPFEFTIHAYQYID--------
A. marginale            -ASLSSAVVEF---RVKHIVHGVLAATERRKVLVSFSLSNVRMASAGVVPFEFTINTYRYVD--------
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Fig. 3 (Document S5)