

A MSTVISLPKINGEYRKNE**KLSQLTWFKVGGISQ**VFYKPKDEEDLSCFLKNLQFDIQITVLGAGSNLLIRDNGIDGVTIKLGR
 SENE**INFVKNNHY**NIISVGAGTLNYDVAKFCLQHNLGGLFLVGI**PGTIGGGIAMNAGAYGQEFKD**VVYSVEALDRLGNKH**I**
FLSKDLNFEYRQCIVNGFLIFTKTNLCYNDSKTSISQKLQKIQTVRKLTQPINQKTA**GSAFRNTNNYK**AWQLIDKVGRLGH
 SIGGAQVSNLHC**NELIN**NGNATASDIENLGELIRKNVFDHTGITLEWEIKIVGKKS
 WP_011944569 UDP-N-acetylmuramate dehydrogenase [*Orientia tsutsugamushi*]

B MTKILKILITKNKSLMTYYINI LILLSYIFVSTSIQASNELLQAGEQLPTSN**SLQWMDKYPNDNNTGCTNVSPTWLS**VADV
 WIDIQ**ANSNNWNIDS**GMTKAGKSISVEIPKISQNFRLQKRYLVLHRVDFRFPVIGKTFIIELGTNNKPI SRLHNFENGKI
 LNYQNE**SSNFQNGSTNFTNA**INLQK**KFF**ENGADTKISVKAGDIIDIALISSVDFFNKLQKGGTEKSG**TGELYPRWDDYKY**
 YKPYGIYTVSLKSNVGVVDNALVLTG**QTSDDKALS**KLLVGKSIDSISSFEKCNLNNLSKSQSCIMQSGIGMEIKLDQEV
 SKFDKFLVGYNVGNANSSAFLDKPIEGMYHIVAKSDGDLSE**TPLFNNNVKYRTNGLQDVEYSSILS**SCSTLNFEQKY**NS**
ILSSQEIIQGI VDKTLVGRYLMYIT**DRHNIVSDEYDG**DIEYIISNT**PNLSTKGTTLPRNG**INIVTPESAKLWFR**VKT**
NNEQFNLKVTVPPDSEGKIKVAGFFYDNIYIPIKQKVEKFSKLFYFGLAKNAALKKVSILAILYITLYGIYFLLGVVKVTA
YDLLIRCSKIIVIAALFNESQYIFYDTLFPMDGGINS**LISYAVKTTASDVDPNF**KFFDLVVSRYIDVNFILKIIL**EIVNI**
HNGLTILGILTLWSIMRFIIIMVKVCMELLMISMIAAILVGLAPMFIIFILFDRTAEIFKRWLTALLNTLMPVIMIIFILI
 INELMLVAEEAFPEIRICWGTLELNLNLDLSAIGLPTAFSIPMAVPFYNVVFVGGNLFNAMDLGNSFAGSLAGVFLLYN
 LVLLAGTLVGSQVFTKGIN**RKMSY**VKSIMMQLLS
 WP_011945117 type IV secretion system protein [*Orientia tsutsugamushi*]

C MFCFLGLRL**LKYITFRTAYATIF**AFLLALIFGPFIISRLK**KLKDQILRKDGPKHHLSEKMG**IPTMGVLIFFCVLVSFFW
 IHFFNIYFLIVLFVMVS**FACLGFTDDLKIKRKNSDGLNPK**EKIYQILFSFISVVMYYFGGEHVSILY**FFFKSLKLDLG**
 ILYIPFGMFVLI**SASNSFNLT**DGLDGLAIGLSIVVIGALIIAYLTSRVDFALYLN**PNVKGCE**LVIFLGALLGGSFGFLW
 FNAYPAKIMMGDTGSLSIGAVLGMVALILKSEILFAILAGVFVETLSVIIQVVY**KKTKKRVFKMAP**LHHHFEELGWSEMQ
 VVIRFWIIGLIFAILALSTIKIR
 WP_012538808 phospho-N-acetylmuramoyl-pentapeptide-transferase [*Borrelia recurrentis*]

D MLYNLLPHIHNSHIANLFHYITFRSGLAIIITLSISFVTGPILIKFLRSLQKYQ**PIRSDGPESHKTKAGT**PTMGGIMIIL
 SSCLSTLL**ADLTNKYI**WITLFGFISFGIIGFMDYAK**KRNHYGV**RKSKELLQGIISLIYVLELDKNFSHLLNVPE
 FKNLSLDLNYFYMVFAIFVIVGSSNAVN**LDGLDGLATVPIAFTAGSFALISYLVGNLIYANYLQ**LTYPNTGELTVLCAGL
 VGSCGLFW**NAQPAEVFMGDTGSL**SGGVLG**LISVITKHEIVLAI**IGGLFVIETTSVILQVYYFKA**TKGKRIFKMAPLHH**
FEKHGWAESKVVIRFWIISVIFSLIGLSSSLKLR
 NP_220963 phospho-N-acetylmuramoyl-pentapeptide-transferase [*Rickettsia prowazekii*]

E MLYNLLVSHINSCYISNIFYNVIVRSGIAILLFSISFSLIPILIKYFKYWKNLAQPIRNLGHRSHIAKAGTPTMGGIAIVE
 SIIISTLMADYKNIYVLTTFVMLSLAILGLIDDYQKVTKKNTKGINATYKLISQIMVSVICCMIVNYNLDSEIANHLLIIP
 FFKKLTIDLSIFYIPFALFIIIGSSNAVNLTGDLGLVTPVPIIVAFCLGLMICYLADNAQYININHLQILHVQQASETVLC
 SAIGASLGLWYNIQPAKIFMGDVGSLSLGGAIGIISVISKNEIRLGIIGGLFVIEALSIIQIYSIRYLGGKRVFKMAPI
 HHHFEQIGWSESKIVSRFWLLSIIFSLIGLSSLIL

WP_011944610 phospho-N-acetylmuramoyl-pentapeptide-transferase [*Orientia tsutsugamushi*]

F MILHNFSEFNTRNLNIMNQNTLFLKFLVGIILFCSVISYSIAEQIDADDFGFPIIAISSRYDTKQLTGQKDNQVAPWIDSK
 LLVNGKPLVVMVKHWNHYEYDNDISHLSAWSAWYGTNKNKHTLASITKRFPECFRFRNNKTFSDSYDDNDIPVINPPCLFKH
 GIGLYALIAKPGVDPNANVHSQSYGIPKKTINFHVQNYLSSLNSTELSGFLDTPDGNIVTGGYFHKYQDQEAQYVGG
 RLYFKILDREYDDNNGQYKIIIKSGVDEKDSPETFLINIVKEMLEGNKKNQNKNGIQNLFINILKNPSYKIVVNLTLILF
 IAFSGLAFLIGNINMTAHELVLRTVKILVISVLLNSDTAWKFFDYLFIFVDGPQFIKTINEATAIGPGSSSILGLMIAP
 HTLKKLFSILFVDWGGFIYIICYLILLYYIFIISFKATVLYNALILVGIGIIVGPVFLCFVLFQFTKPIFENWIKQLTIIYA
 LQPVILFAGIAFVGMFIRHEIYASLGERVCEVPFPPIANTLIKIISGDSSKKQSLNLNWFPAQVLKKTLLFSQKCANIPVPE
 DHIVYRDPWQCSDGISGNSKQITSTDPSNEKHCSAYECKANRYVELPFLDPNINKDRYRIRNFAGNEVQNDSSLLLAA
 CVFLLSMFNDNAIALANYISSGGDRSSASEKSTAIIVSTVTPPSPTTEIPAFAFSKIGQQRTKNSNSHSNSNSRSGINTGPKK

WP_011944382.1 type IV secretion system protein [*Orientia tsutsugamushi*]

G MEYLLGLRLLQYITERTAYATIFAFLESLILGPFIIIVRLKKLKLQDQILREDGPRRHLSAKTGIPTMGGILIFFCVLVSLEFFW
 INPWNIFYLIILFVMISFACLGFIDDFLKIKRKNSDGLNPSLKIYGQVFFSCISVTMLYYFGGDHVSIIYFPFFKSLKLDLG
 VLYLPFGIFILISASNFFNLTDGLDGLAIGLSIVVTGSLVIIAYLTSRADEFYLNIPNIGSEELVVFLGALLGSGFGLW
 FNAYPAKIMMGDTGSLSIGAILGMVALILKSEILFAILTGVFIVETLSVIIQAVYKKTKKRVFRMAPLHHHFEELGWSEMQ
 VVIRFWIIGLIFAILALSTLKIR

WP_020954693 phospho-N-acetylmuramoyl-pentapeptide-transferase [*Borrelia miyamotoi*]

H MNKKLSLFLFFGAMNLEAQTKSLQPTNGLNFPFVDFVNSGGSGIIFPLQLLLILTITLSPAFLVLMTSFLRIAIVLDFIR
 RALSQQSPNPQIIMGLALFLTIFTMWPTFNIIYEDAYLPKESKIGFNQFYDKGIAPLRNFMKQMSNSRHEEIRLFMKIS
 NYSRPKNFSEVPTHVLIASFILHELKIAFKMGILIFLPFIVIDIVSVAIVMAMGMIMLPVMISLPFKLILFVMVDGWTLT
 SGLVKSFM

WP_020954665 flagellar type III secretion system pore protein Flp [*Borrelia miyamotoi*]

MFYLLGLRLLKYITFRMAYATIFAFLLSLIVGPYVILRLKKLRADQILREDGPKRHLSEKAGIPTMGGILIFFCVFISLVFW
SNILNVYFLIMVFVMLGFAFLGFIDDFLKIKNKTSDDLKARFKIYGQIIFSFSVGLIYFGSEHVSIIYFPFIKSFQIDLG
LFYIPFGMFILISASNSFNLTGDLGLAIGLSIVITGALIIAYLTSRADFAAYLYIPNIKGSEELVIFLGALLGGSFGFLW
FNAYPAKIMMGDTGSLALGAILGMAALILKSEILFSILAGVEIETMSVIIQVLVYKTKKRVFKMAPLHHHFEELGWSEMQ
VVIRFWIIGLIFAIIALSTIKIR

WP_075552002 phospho-N-acetylmuramoyl-pentapeptide-transferase [*Borrelia mayonii*]