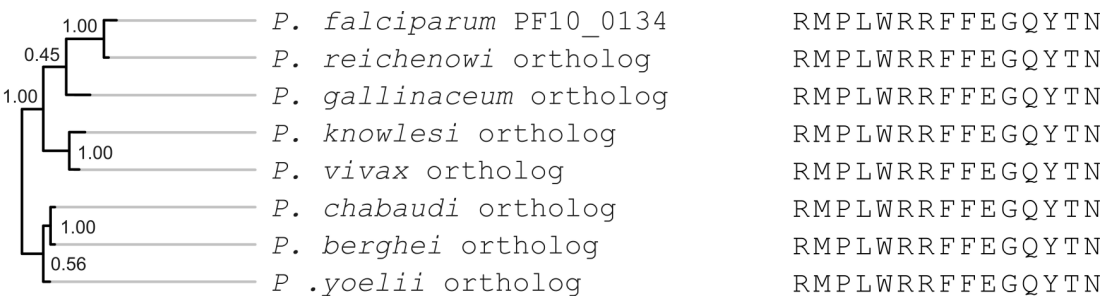


Additional file 7

Phylogeny of exported *P. falciparum* proteins with orthologs present in all *Plasmodium* species; corresponding amino acid alignments and information on the amount of missing data; *P. falciparum* PEXEL motifs and orthologous sequences of the other *Plasmodium* species.

■ PF13_0317

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

>P_falciparum_PF13_0317
MNVSRVLLNNSKILKRNIEFKEIFTPRWFLECPNYS-----RMPLWRRFFEGQYTN---
---GSFLFFGNAWTSMFAFAFMLWYSRIFDPPPLERIDKYWLNSPKFRILSAFYNEGKRP
GVKISLMTYEARYFYRGMDHPFTINEIKDLWFKLKENYLVESVPAIQYPYVFRQYNNISS
PSDLHVHLH

>P_reichenowi_ortholog
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---GSFLFFGNAWTSMFAFAFMLWYSRIFDPPPLERIDKYWLNSPKFRILSAFYNEGKRP
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PSDLHVHLH

>P_gallinaceum_ortholog
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PSDLHVHLH■

>P_knowlesi_ortholog
MNATRILLSSQKVLKRNVEFKEIFTPRWFLESPNYS-----RMPLWRRFFEGQYTN---
---GSFLFFGNAWTSMFAFAFMLWFSRIFDPPPLERVDKYWLNSPKFRILSAFYNEGKRP
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PADLHVHLH

>P_vivax_ortholog
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GVKISLMTYEARYFYRGIDHPFTINEIKDLWFKLRENYLIESIPAIQYPHVFRQYNNVST
PADLHVHLH

>P_chabaudi_ortholog
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PADLHVHLH

>P_berghei_ortholog
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---GSFLFFGNAWTSMFAFAFMLWYSRIFDPPPLERVDKYWLNSPKFRILSAFYNEGKRP
GVKISLMTYEARYFYRGIDHPFTINEIKDLWFKLKENYLIESIPAIQYPHVFRQYNNVST
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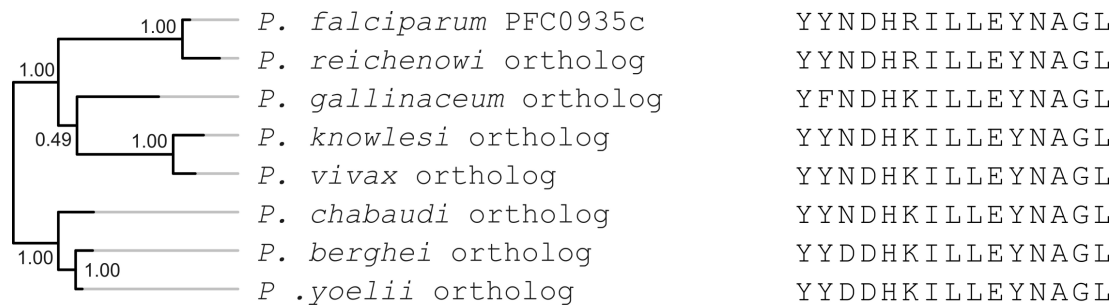
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---GSFLFFGNAWTSMFAFAFMLWYSRIFDPPPLERVDKYWLNSPKFRILSAFYNEGKRP
GVKISLMTYEARYFYRGIDHPFTINEIKDLWFKLKENYLIESIPAIQYPHVFRQYNNVST
PADLHVHLH

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	0%	0%	0%	0%	0%	0%

■ PFC0935c

■ PHYLOGENY AND PEXEL/VTS



■ SUPPORT FOR ALTERNATIVE TOPOLOGY RESEMBLING THE SPECIES TREE:

Expected likelihood weights	0.1247 +
Shimodaira-Hasegawa test	0.9770 +
two-sided Kishino-Hasegawa test	+
one-sided KH test	0.2220 +

■ ALIGNMENT

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>P_reichenowi_ortholog
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LINIG----KSPL-ENLILKQHFLSIIIFTIPFLTINLATFSNFYPSKGFVGNLTLYFCG
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>P_gallinaceum_ortholog
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>P_knowlesi_ortholog
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LNFIKERIIDIGFFYYLYIILLCVFCTNAINIYAGINGLEIGQSLIAFFISIHNLIEI
ILNIGTGQSGKITEGAQILKQHFLSIIIFLPVVSINLVTFSNFYPSKGFVGNLTLYFCG
IFLAVVSIFGHFSKTLILFLIPQFLNFFISLPQLLNFPVPCPRHRLPVVNPRTNKLTYSHN
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HKILLEYNAGLLSIIFMTFLGFIIDVLELKWRYKVLPFFASLPLLLCYSGETHIRIPNF
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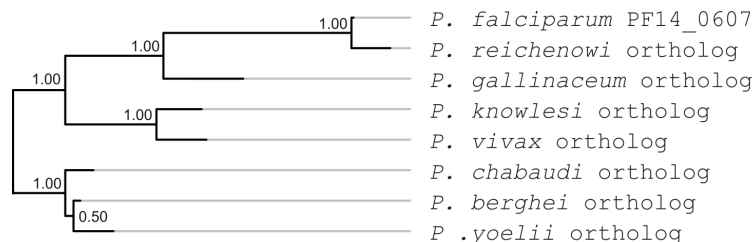
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VLNIR----SFDVSGLLILKQHFLSVIFTLPFISINLATFAFNFYPSKGFVGNTLTYFCG
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
29%	23%	1%	1%	0%	0%	0%

■ PF14_0607

■ PHYLOGENY AND PEXEL/VTS



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XXXXXXXXXXXXXXXXXX
-KLNRYQLEEEENDF
-ESRGRLLGEDNNEF
-ESRSRLLGEDNNEF
-KRYNRLLIEDNNEL
-QYNRVLIEDNNEV
-KWYNRVLIEDNNEV

- ALIGNMENT

>P_falci~~parum~~_Ff14_0607
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-----WYEDSRNKNIRISEPIDAIK-----STLHALKEGEFIRWQRLLIKSTVPSNI
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[illegible][illegible]

>P_knowlesi_ortholog
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QMGAPVNEHNTEKGSMDGMDGMEQHVEVLRQKEDINPMVMNQYTGEEQMKNETGRGTG
EQJEEHIF-LDTKVNGPTEKFINKHDHVDNTRNVEKEKEENKVKSD-----
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---NNTYETPEFYMPKNDAEKFNTRLRSKIKFEFFVDNVLKYMKNLGIKSNIEHEFV
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NP_vivax ortholog
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 NAQLNNGLQSVFLLKQVSLKSYFGSSSEQSGSGVPVV-----VQVNSH
 ADGDKKMNNDQVAHLSGDT-----NYGTNAAEANDKMSPTSKDNKGGK
 ---NNYAEFPSTFPEKEGAEKNTHLRMLKKEFSEVNDLVKYMKNLLGIKSNIEKFE
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 IEKRVNSQDKQDFOLDLPFASQTRISLITIIINLTWIGLQSNVAAELDIIFNDILPRQR
 VDEVLHNGVPLELTIKFEKILISMNFIILCYSLFIINTEFVTRRILKVPSEADNCSINTA
 KEMKEARKEGCFKNFFLLRYARNSKYLAAHRYFSENDAVITSGPLDNGPYGYYEEMRAK
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 FLILIKYIIYNNIMISKTGLDITLLEK-----
 ---VWEFERSDNKIRISEFIDAIKIK-----STLHLKKEGGEVFWRQLLIKSNVTSPNI
 QFVMSIWLGVDEENRVDISTKILFLKQSGINLASESDIKFEFLVDRNNKMLKQEEF
 KPFLIIIVQGLVELLDINAVQSLFEVYIPWNSLSIANDSKLRITLNLQWPHQKI
 RNLIDFVCEKNCKITKVSAYEYFKQ-----LINEETVLFPFHVRIPMCALRCVCIG
 LLYGHTSTAYFASNNKVTNLCKGLQYKVKIK-----LRMYQTHFFAYALITCLFL

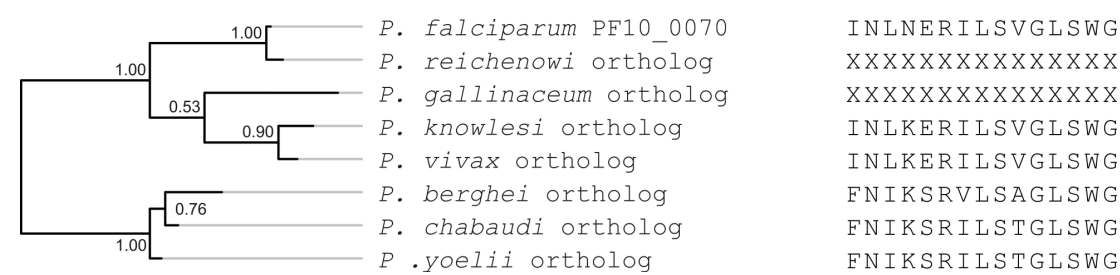
[illegible]

- AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
29%	56%	13%	9%	34%	34%	52%

■ PF10_0070

■ PHYLOGENY AND PEXEL/VTS



■ SUPPORT FOR ALTERNATIVE TOPOLOGY RESEMBLING THE SPECIES TREE:

Expected likelihood weights	0.0570 +
Shimodaira-Hasegawa test	0.9990 +
two-sided Kishino-Hasegawa test	+
one-sided KH test	0.2860 +

■ ALIGNMENT

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>P_falciparum_PF10_0070
MALFHFVNCSLATFIPYIIYDGFKLSKNVGATKLLFLVCFYIIISQI---LKLFAALFC
SIGLFQSMNLFNIIQESANIIDLAGIYYILSHKHTNS-----INLNERILSVGLSWG
-----FYESLATNFFPFLI--GGKSLEFSLKYIYRSISANTFLFSLNLSKTCLLF
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>P_reichenowi_ortholog
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-----XXXLANNFFPFLM--GGKSLEFSLKYIYRSISANTFLFSLNLSKTCLLF
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>P_gallinaceum_ortholog
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SIGLLQNMNLFNVCFXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XXXXXXXXXXXXX
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>P_knowlesi_ortholog
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>P_vivax_ortholog
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>P_chabaudi_ortholog
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-----FCESVATNFFPFLV--GGKSVDLSLKHYSISANTFLISNLSKTYLLY
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>P_yoelii_ortholog
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-----FCESVATNFFPFLIGGKSVDFSLKHIYRSISANTFLVSNLSKTYLLY
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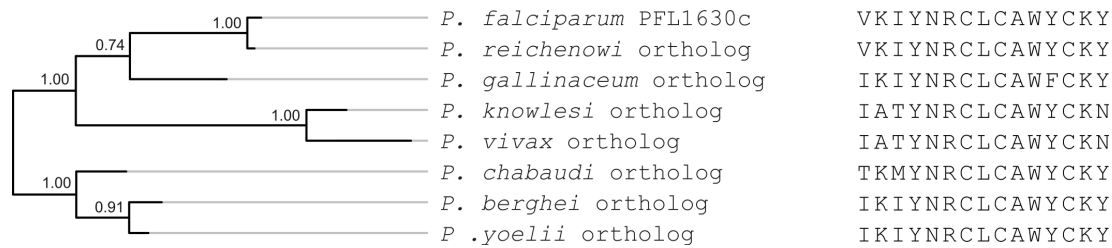
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
24%	72%	5%	4%	15%	5%	48%

■ PFL1630c

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_PFL1630c
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>P_reichenowi_ortholog
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-----SVPEE---FSDSENTDSDED-----

>P_gallinaceum_ortholog
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>P_knowlesi_ortholog
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SAIGIPAEEEQLSGSDSDMTDSDEEG-----

>P_vivax_ortholog
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KRNFEGQVEYSFSEETGRFENGHGGEEDMYRFYRKLR-----CGRAVCG
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>P_chabaudi_ortholog
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>P_yoelii_ortholog
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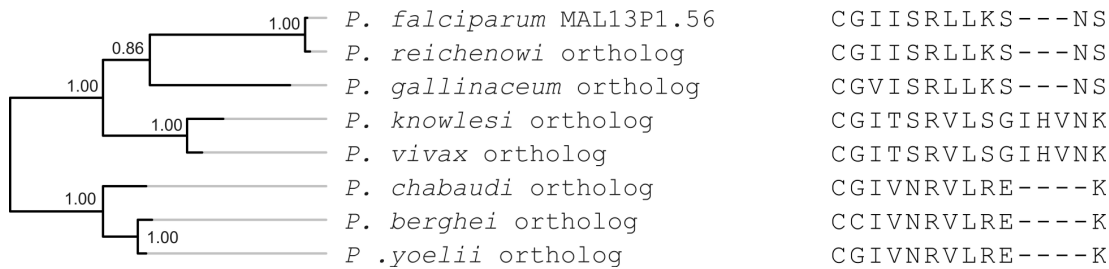
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KKNISRGIEYVYNNNTSKFQTIE-KNDIYAKFYKKIQ---EKKQ-----
-----TCSKEEAIYSDDATDS-----
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	3%	29%	11%	16%	18%	6%

■ MAL13P1.56

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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--NNNNNHQNNNGNDNKKRLGSVVNNEEN-----TCDKRMKPFEEGHGITQVDMKNNN
SD-HLQQNGVMNLSNNVNNNNNNNSVVVKNEPKIHYRKDYKPSGFIINNVTNLNINIH
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VTADKEKYPVLLSNGDKVNEFEIPGGRHGARFNDPHLKPCYLFVAVVAGDLKHLSATYITK
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>P_reichenowi_ortholog
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>P_gallinaceum_ortholog
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>P_vivax_ortholog
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--SGSTNMSVTANQEKRPGTGDASEGNQSGISAAAQDKRMKGGDQSEEVSNVSGSTNA
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>P_knowledi_ortholog
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>P_chabaudi_ortholog
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>P_yoelii_ortholog
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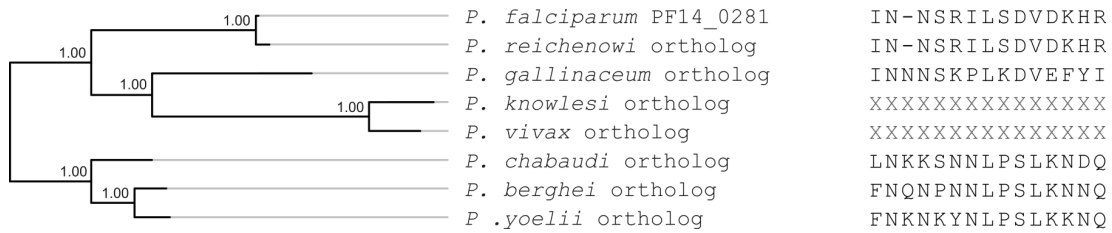
>P_berghei_ortholog
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	2%	2%	2%	3%	3%	3%

■ PF14_0281

■ PHYLOGENY AND PEXEL/VTS



■ SUPPORT FOR ALTERNATIVE TOPOLOGY RESEMBLING THE SPECIES TREE:

Expected likelihood weights	0.1242 +
Shimodaira-Hasegawa test	0.9970 +
two-sided Kishino-Hasegawa test	+
one-sided KH test	0.1790 +

■ ALIGNMENT

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>P_reichenowi_ortholog
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KHQKKQ-----
-----KHF-----NHKKKKLNNKKNYLIFDSGTSFNSVPKDEIEYFFRVVPSKKC
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>P_gallinaceum_ortholog
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DINNKKKDKVD-NKLSN-----TQVTLPQQLEDSDQYVGTVKIG
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>P_knowlesi_ortholog
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>P_vivax_ortholog
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>P_chabaudi_ortholog
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 KRWKRE-----
 -----KHF-----KPLNSDENYLIFDSCTSFNSVPKSEIKYFFKVVPKKEC
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>P_yoelii_ ortholog
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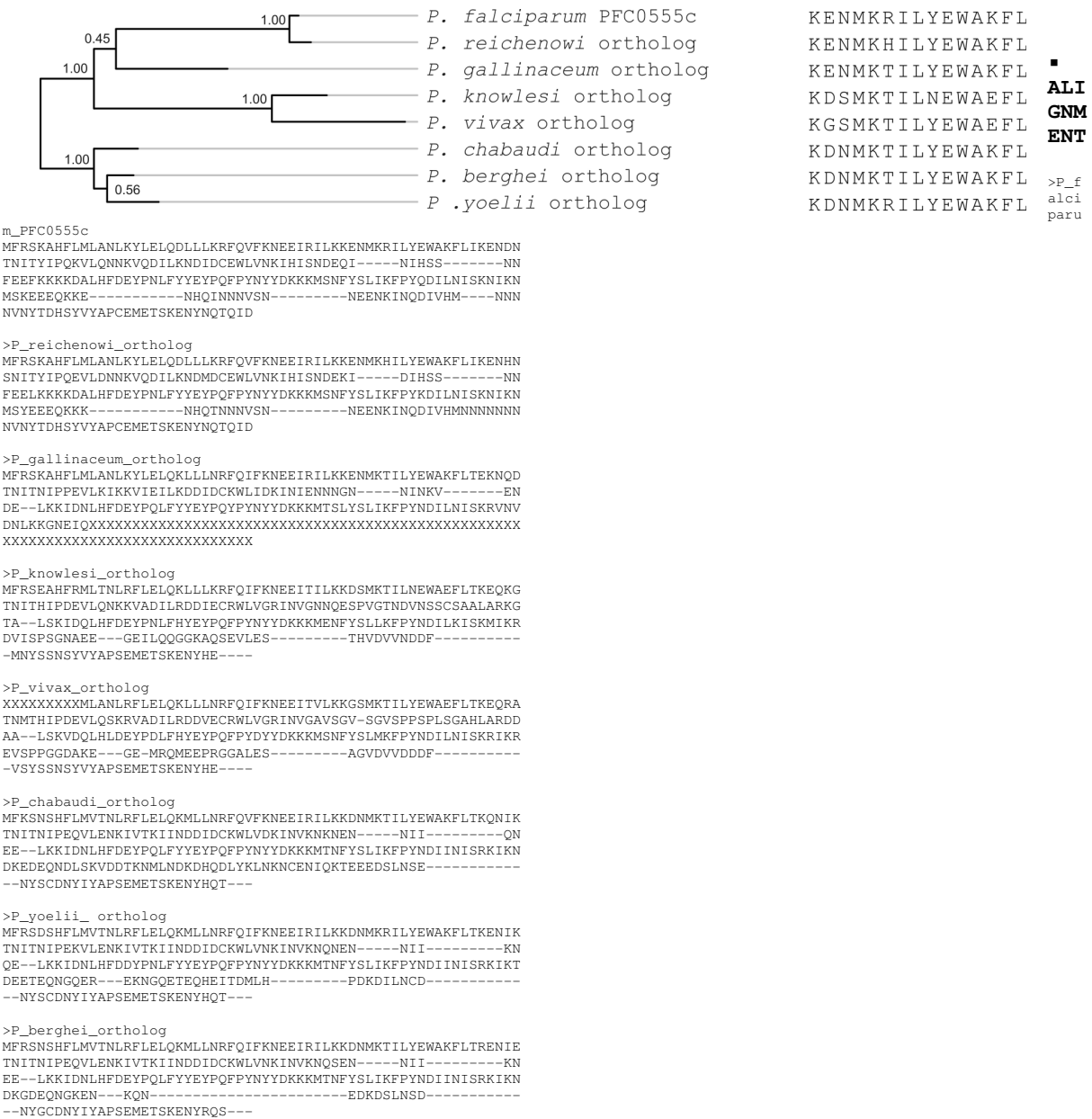
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 NGFPV-----KNKMDNST---NYFQKELNKK-KKNYNF IEN-----
 -----HTAISNIDNDITDEYKESESDLEENIVKDNFNNLRSSEY-----
 NIYNQKKEHSID-----SKVILPLQQLKDSQYVGS IQIG
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 IQGTIGITDFKIGPFKIEHQSFGLVKREKGTNKS NVKRINFEGII GLAFSTMLSTGNI
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 KHWKRE-----
 -----KHF-----NPLSSNENYLIFDSCTSFNSVPKSEIKYFFKVVPKKEC
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
4%	7%	19%	31%	7%	7%	9%

PFC0555c

PHYLOGENY AND PEXEL/VTS

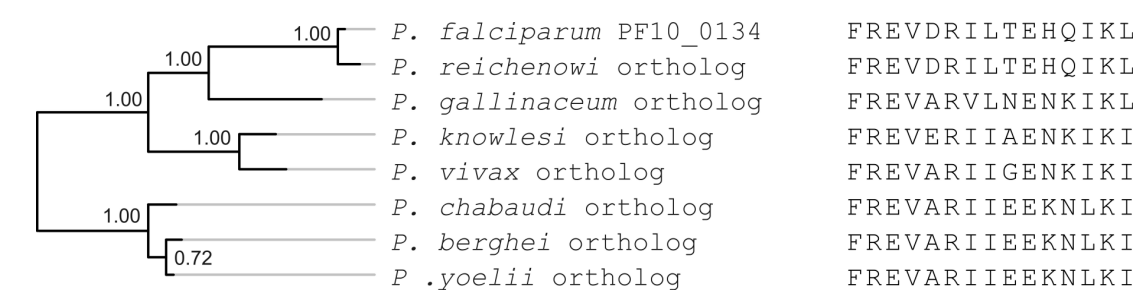


AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
1%	24%	13%	15%	14%	12%	9%

■ PF10_0134

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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>P_reichenowi_ortholog
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>P_knowlesi_ortholog
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>P_vivax_ortholog
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IKTLPVILYVSSVHKKKYNSLLYKALSSSKDVRIKISNAFRYNGDMYCYDIYVEWIEAHYYF
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>P_chabaudi_ortholog
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>P_yoelii_ortholog
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XXXXXXXXXXXXXXXXXXXXX

>P_berghei_ortholog
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VTSPLPLILYVSSVHKKKYDSLLQKIVNSSKDIKIGNAFRYSGDMYCYDIYVDWVEVHHYF
AKALLFMKRIFMKRI-
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
3%	2%	2%	2%	2%	2%	20%

■ PHYLOGENY AND PEXEL/VTS



■
ALI
GNM
ENT

>P_f
alci
paru

>P_vivax_ortholog
XX
XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXEAYLSYHKVVDDELRAAS--GGVSKGQGHPPDD--
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>P_chabaudi_ortholog
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NNLMNNEKMT-----YDKEYLSYLKGYIINGKDLDLSENGSSICQAE NNKKDGE-
-----PIWDIETVIDKAVTQRELELFEFLMKVNEQYKLDTTTLRVVGGWVR
DKFLNISNDDIDITVDNMKGSDFCNYIKEYIKDKENKNFNFGI IKINCDQSKHLETSSFN
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ISKRLASEI IKIFSHKCKNIVLSLTLNYSNYSEEIFKLPSDYFIQNEEVFEKMKKKKN
HKIEDH-WY-----ETNGVNVNKRVLHFE DSKE---IDKN
LDKSIDEYVGHKDSSK-----DDNKIESLENLK-----DDR
-----NIENDWLFEGLN YVKFFKDIEKSELLKQILCDLDYK
ENINYIHMCLFLLPLKNYYIYIKKGVKTEYVIEYI IRESLKFPLKYSKFCVNI YEGFTHL
YKLYKNINVLKFLKDDN-DKKTDLN IKGDVVIFLKNVGDKWDL LILIFYIFHKYNELNKN
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>P_yoelii_ortholog
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NNTNNNNN-----NIYDFEKMIDKAI THRELELFEFLIKINETYKLN TTLRVVGGWVR
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ISKRLASEI IKIFSHKCKNIVLSLTLNYSNYSEEIFKLPTDYFVQND EIFEKMKKKKN
HKIDNHSYY-----DTNEMV NKRVLHFE DSKE---VHQN
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-----NIENDWLFEGLN YVKFFKDVESSELLKQIFYDLN YK
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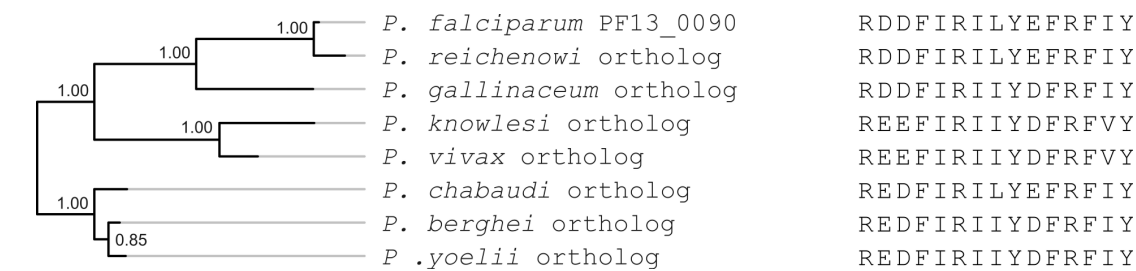
>P_berghei_ortholog
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YNKMA-----YDNEYMFYLKKYI INEKELELSGTGNSIYQKEDDDDDDDN
NKND EQNNNK-----YIYDIEKMIDKAI THRELELFEFLMKINETYKLN TTLRVVGGWVR
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LFNFQVDIVNLRNEKYTESRIPEISIGTVEEDALRRDFTINSLFYNLKNKKVEDYTKNG
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ISKRLASEI IKIFSHKCKNIVLSLTLNYSNYSEEIFKLPRNYFVQND EIFEKMKKKKS
HKIENH-WY-----DIVEMENKRVLHLENSKE---VHKN
MEKSINEYVNNKDNSSI-----TYLNKS-----ENLKNQ-----NDDK
-----NIENDWLFEGLN YVKFFKGIEKSKLLKQIFYDLN YK
ENINYIHMCLFLLPLKNYYIYIKKNIKTEYVIEYI IRESLKFPLKYSKFCVNI YEGFTYL
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FIN-IITNDIYLSDFAIKLYQYILKNDIQKSYNIKPF LKWPNIKHHFPNITPNRINEIYE
KIIQFTCIHGEKEEECIEFLKNHFNPE

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
6%	33%	14%	24%	10%	9%	8%

■ PF13_0090

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_PF13_0090
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QEIIINFFALPKDLLIRCNFISCSSTLSGQGLKEGLEWLL--YYNLPFYNNELNCID--RRAT
KHLEL--

>P_reichenowi_ortholog
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KHLEL--

>P_gallinaceum_ortholog
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>P_knowlesi_ortholog
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>P_vivax_ortholog
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TFYNY--

>P_chabaudi_ortholog
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KLYDY--

>P_yoelii_ortholog
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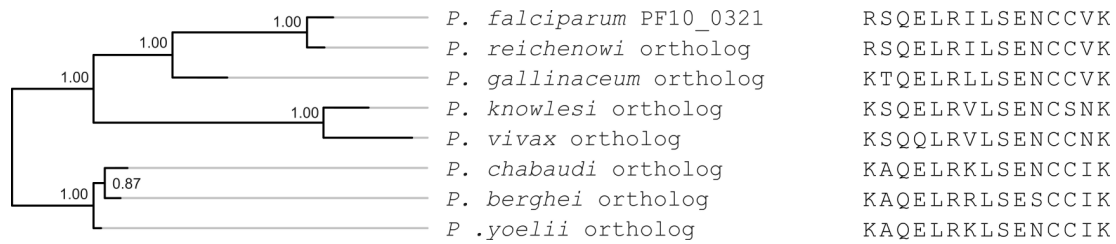
>P_berghei_ortholog
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KLYDY--
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
20%	1%	9%	9%	8%	28%	28%

■ PF10_0321

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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CFANLKIANKDLIKTLCKSIKKNINLFDYIHLTNIVGALRSLEITDDIFYYVIDQKQLKE
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NDNNNNSSSDFIDINCGGANFLVALSKWCANQVYHYPSSRSTKRPTSQYLKLYELMKE
FNIHNSDFIEKAIYRFVITRGGLENNRDKMFKPTSQYQGR--KYIFTKDPQ-----
-----IDHINY-----EKNKEHSYSHHYNLKDHTTDYEQQNMHYQTYDYNDENHNMNQ
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>P_reichenowi_ortholog
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TFSDFVIKQISYQLPEHFILLINLYCRVNIIPRVLFTEIFHGIKYNCKLYPDEYVNLIT
CFANLKITNKDIIKTLCSEIKKNINLFDYIHLTSIVGALRSLEITDDIFYYVIDQKQLKE
LKFLTQVEIFDHIIKKIKLLQYSWKLYEKDLMKEFLFKVYNFKNEKDVQDQDDPFVCLNLF
VSRGLLQGNNTNGK-----NNNNNNKNNNNNDNNNDNNNDNNN
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>P_gallinaceum_ortholog
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LKFLTQVELYDNLKKIKLLTYSWEIYEKDLIKEFLFKQKNFKNEKDXLDDNLIKCLNXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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KKVENYDFIEKAIYRFVISRGGLENNRDKMKPVSYQGR--KYIFTKDPKXXXXXXXXXX
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XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

>P_knowlesi_ortholog
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VSK-----
-----QCVRNFLFALSCKWCASHVYEPSSAKRPLAYQLIMLYQLMKE
HDVKNYNFIEKAIIRRFVISRGGLAVNRDKMKIPVSYQGR--KYIFAEADPL-----
EEARTAEVDASSD----HTLDQPTGHDYSYVQEGISHRMSQSDGY---TSPHSYADTEEP
NPMTEKKRSIMLSLGTTECKKPSMYSRGRHFNFKLRQRPKRVKNAPVPVET

>P_vivax_ortholog
MIGWAKSIVGAKPNGWRAPRRWLPPTGGERRRFGSSSPTDELT--KKIIIESNYGHIKQLK
SQQLRVLSENCCNKKIRDVVLWSEISRNAINRCDEFKYFDVALLLSFEKMNMDADHLYK
TFHVFVFVKQINHMEPRHLILLINLYCKANLFPVLFVQVFHAIYRYCSKFYPPEYTDLLI
CFASLINSGLDMKTLCCKSMVQNTLFDYNLCCIVGCLRLRLGVQDDVIYVYVDEKQOKE
LKLMTTQELFDCKMKVKLLKYSWELYEKDLLEEFKNRIKAFQGEKDVNQLEDPFVCLNLF
VSK-----
-----QHVTKNFLIALSKWCASHVYEPSSAKRPLAYQLIMLYQLMKE
HDVNYYHFIEKAIHRFVVSRGGLAVNRDKMKIPVSYQGR--KYVFARDPLEGGTAEVGA
TEVGAHVVDASSD----RLADQPTGEDFYHLEHIAHRMGEDDGYDGHTPPQRYAHPEEP
PPMTEKQRAIALSLGEGTERKKPSTHSHGRHFNFKLRQRPKRVKNAPVPVDM

>P_chabaudi_ortholog
MYAPFVTST-----TNDNIILKRYEIEIKNLK
AQELRKLSENCCIKKISDVIWSEICRNAIKKSDEFKHFDAALLLSCFDKMNLDDKSLYT
HFSDFIKHINNFEPRHLILLINLYCKVNIIPRILFIEVFHAIIRYSPKLYPNEYVDIFE
CFAKYEIANKDLISTLCKSIKKNINLFDYTDLCISIVGSLRSLEINDDVFFYCIDQKQLKE
LKMSCTQELFDYINKIKLLKYSWELYEKDLIKEFLNRIINDFKNGNDINQLHDPFICLNYL
ISK-----
-----NIXNNFLLLTSMWCANQVYQYPSRSKRPLSYQLIKLYQIMKE
HNVENYDFIEKAIHKFVISRGGLATNREKITKPVSYQGR--KYIFAPDPL-----NAD
SEDNTKYIDSSNEET--HQNEQLAYSNNYQGNNDNDFDIEQDSYNNENANEHIKHNSN--
--ILTQQRILINLSLEKKTENK--ETYSNSRHCNFKLRQRPKRKNQPISDQK

>P_yoelii_ortholog
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HFSDFIKHINNFEPRHLILLINLYCKVNIIPRILFIEVFHAIIRYSPKLYPNEYVDIFE
CFAKYEIANKDLISTLCKSIVKNINLFDYTDLCISIVGALRSLEINDDVFFYCIDQKQLKE
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LKMSTCQELFDYINKIKLLKYSWELYEKDLIKEFLNRINDFKNGNDINQLHDPFICLNYL
ISK-----TNDNIILKRNYYEIKNLK
-----NIISNNFLLTSMWCANQVYQYPSRSAKRPLSYQLIKLYQIMKE
HNVENFDFIEKAIHKFVISRGGLATNREKITKPVSYQKGR-KYIFTPDPL-----NTY
SEDINKYIDSSNKTENIINKNEQLDYSNMYQENDKDLDIETESYNDNTNEHIKYN--
-ILTQKQRLINLSLEKKTENKK-ETYSNSRHCNFKLRQRPKRKNQPIPDQK

>P_berghei_ortholog
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AQELRRLSESCCIKKISDVIWSEICRNAIKKSDEFKHFDAALLLSCFDKMNLLDKILYT
HFSDIFIKNINNFEPRHLILLINLYCKVNIFFRILF-EVFHAIIRYSSKLYPNEYVDIFE
CFAKYEIANKDLISTLCKSIVKNINLFGYTDLCISIVGALRSLKINDDVFFYCIDEKQLKE
LKMSTCQELFDYINKIKLLKYSWELYEKDLIKEFLNRINDFKNGNDVNLHDPFICLNYL
ISK-----TNDNIILKRNYYEIKNLK
-----NIISNNFLLTSMWCANQVYQYPSRSAKRPLSYQLIKLYQIMKE
HNVENYDFIEKAIHKFVISRGGLATNREKITKPVSYQKGR-KYIFTPDPL-----NAY
SEDINKYIDSSNKTENIPNKNEQLAYSNMYQGNKDFDLTETYSYNENANDHIKYNPN--
-ILTQKQKLINLSLEKKTENKK-ETYSNSRHCNFKLRQRPKRKNQPIQDQK

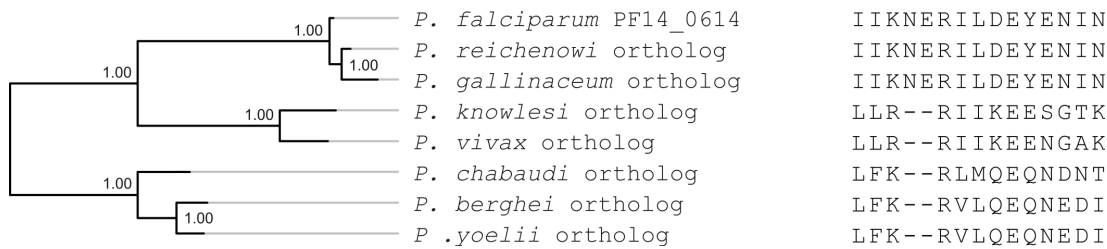
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
11%	37%	15%	16%	20%	20%	20%

■ PF14_0614

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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>P_falciparum_PF14_0614
MNILNLFICCLSLITLLKF-IEWEQYNY-DCVVAINKKNS-----I I K N E R I L D E Y E N I N-
-----N S E N E D E-----Y E D Y L D D K G S N E F E Q V N Y K Y L D Y V N F T I V K S Q S T Y Q
H A V N E L F V F L G S Q Y S T D E K I V V H V K L I D I L S L L F V H Y R D N L S N F E H I I N S F Q D R N K L M N S
V E G E Y F R E F I D E R D N Y I F D V K N T Y N S Q Y V N K E - K E T I L N K K K T I Y E I F Q K N W K T D G Y R F
Y S V K N K K K Y Y P R K I N L D E P R K R K H K K K K Q K N I K C V N M V C K P L K I E Y K S L N K P V N S P V D
D N T D V K T M K G E Q H I K G Q A E D K N - H V V Q G I E N V Q Q E K K E I M D R I D I Q N E I Q N Q V Q N D I E N E
I E Y E L K-----N D D S N N N I E E S D-----V M X
S Y X N X I C N A D E N R T S N V - G Y V R E N S I G P G I A Y R M R K D F F L K D S S F N V I T L I N S I T S N R D N
K V V T K L H E G L T K L G I T T I E H L I R Y T N I L A I F F S Y D I F D E Y L Q I K L V K E Y F G L I K Y K P N I
L D T E E -- N E Y V V G K K T F Y G K Y N M I D D E V F V S P N C L S A Y C K L K S V M M Q N R N I T V K V E K S T T
N S L K I M M L G D I G Q G F E E E K N F D V Q N I Y N F M G F N E L K S T V Q S M K K W H L E N N A D F V I N L G D N
I P N D G S Y N F I G N F Q W H R L M R E L F V F K K K S E Q V H K D L G T N T L S A E S I A N F Y N D K I K E M N E
G N Y E N -----H I N Y Y N D K N L H K I K A Q N E N N E K E N L D N S I K M N N A K G T S S K I N D L
Q N V S N T N P Y K I E V V D H T K L V E S N T S I N E K E E K S I S S V E - E R A N L Y E D D E E S D E E D S N E F
A S E A I P F Y S V L G E K D Y F Y F P S E Q I Q E H Y S K R I P G Y F M P N N Y Y C V N Y D F T Y N P V K K N V N G D
E D D D D E E E E E G S G T D R K V K T Q E K F R A S F I F I D T W A L M V G F P I I R N Y R A F R E Q F N W L S K
T L Y E S A K K S D W I F V V G H H P L I S S G R R S D N Y S Y E E H S F H D I I R D F L F N Y H V D A Y F S A H D H L
M E Y I K F G S V D L F I N G S S S R V L F D N S S M - G R G Y F G K I I G K L Y P L S C Y V L K T I H T G L K P K G C
N I N R Y S K W N K S D I G F S T H K L T K D E L V T Q F I S S R T G K P L S E K I I T K N K K H E R K K F Y D L D G
F A E D R I K E L E K K I I D F S V N N P D L I N Y K I Q E F N E N I E K L N L I I K K L K T E E K E I F K E L I Q M
N N L I F D V S D H L D N V P I E K L K I M S E L V S K Y N I F F N K E L A G F I V A A L E R A I Q - M E -----
-----R K K P H S S D E N G S L N D ---E D K N L I E L I E S L G Y Q P E E F L Q K Y E S M T S E Q K V A L K
N K I G R N I S L E D Y V N R I K F Y V E K K K K E K E - K N G N E Q E A E E E T E V V E E I D E L K E M E K K R K E
S E G D I T D E D E N E I K E E Q K D N E K E D E T Y E E Y L D E S Q Y N D E E I P L V ---K Q V H K D F K K L A N
Q E K K L S E Q K Y I L L M L A S M R K F D I K K Y A L N L S T K K E R I K D V T T S N Y L S N I E P R K T F F Q L C I
E L P P D I K R I I N N F G V G K R L P F F N F I N K L Y D E I I K L K D S L N R I S R-
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>P_reichenowi_ortholog
MNILNLFICCLSLITLLKY-IEWEQYNY-DCVVAINKKNS-----I I K N E R I L D E Y E N I N-
-----N S E N E D E-----Y E D Y L D D K G S N E F E Q V N Y K Y L D Y V N F T I I K S Q S T Y Q
H A V N E L F V F L G S Q Y S T D E K I V I H V K L I D I L S L L F V H Y R D N L S N F E H I I N S F Q D R N K L M N S
V E G E Y F R E F I D E R D N Y I F D V K N T Y N S Q Y V N K E - K E T I L N K K K T I Y E I F Q K N W K T D G Y R F
Y S V K N K K K Y Y P R K I N L D E P R K R K N K K K K Q K N I K C V N M V C K P L K I E Y K S L N K P V N S P V D
D N T D V K T M K G E Q H I N G Q A E D K N - D V V Q G I E N V Q Q E K K E I M D R F D I Q N E I Q N Q V Q N D I E N E
I E Y E L K-----N D D S N N N I E E S D-----V M X
S Y X N X I C N A D E N R X ---X X X X N S I G P R I A Y R M R X D F F L X X I S F N V I T P Y N S I T S N R D N
K G V T K L H E G L T K L G I T T I E H L I K Y P T I L A I F F S Y D I F D E W Y L Q I K L V K E Y F G L I K Y N I N I
L D T E E -- N E Y V V G K K T F M G K Y N M I D D E V F V S P N C L S V C K L K S V M M Q N R N I T V K V E K S T T
N S L K I M M L G D I G Q G F E E E K N F D V Q N I Y N F M G F N E L K S T V Q S M K K W H L E N N A D F V I N L G D N
I P N D G S Y N F I G N F Q W H Q L M R E L F V F K K K S E Q V H K D L G T N T L S A E S I A N F Y N D K I K E M N E
G N Y E N -----H I N Y Y N D K N L H K I K A Q N E N N E K N L D N S I K M N N A K G T S S K I S D L
Q N V S N T N P Y K I E V V D H T K L V E S N T S I N E K E E K S I S S V E - E R A N L Y E D D E E S D E E D S N E F
A S E A I P F Y S V L G E K D Y F Y F P S E Q I Q E H Y S K R I P G Y F M P N N Y Y C V N Y D F T Y N P V K K N V N G D
E D D D D E E E E E R D S G K D R K V K T Q E K F R A S F I F I D T W A L M V G F P I I R N Y R A F R E Q F N W L S K
T L Y E S A K K S D W I F V V G H H P L I S S G R R S D N Y S Y E E H S F H D I I R D F L F N Y H V D A Y F S A H D H L
M E Y I K F G S V D L F I N G S S S R V L F D N S S M - G R G Y F G K I I G K L Y P V S C Y V L K T I H T G L K P K G C
N I N R Y S K W N K S D I G F S T H K L T K D E L V T Q F I S S R T G K P L S E K I I T K N K K H E R K K F Y D L D G
F A E D R I K E L E K K I I D F S V N N P D L I N Y K I Q E F N E N I E K L N L I I K K L K T E E K E I F K E L I Q M
N N L I F D V S D H L D N V P I E K L K I M S Q L V S K Y N I F F N K E L A G F I V A A L E R A I Q - M E G -----
-----K K T H N S S D E N G S L N E ---E D K N L I E L I E S L G Y Q P E E F L Q K Y E S M T S E Q K V A L K
N K I G R N I S L E D Y V N R I K F Y V E K K K K E K E K N G N E Q - E A E E E T E V V E E I D E L K E I E K K R K E
S E G D I T D E D E N E I K E D Q K D N E K E D E T Y E E Y L D E S Q Y N D E E I P L V ---K Q V H K D F K K L A N
Q E K K L S E Q K Y I L L M L A S M R K F D I K K Y A L N L S T K K E R I K D V T T S N Y L S N I E P R K T F F Q L C I
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>P_gallinaceum_ortholog
MNILNLFICCLSLITLLKY-IEWEQYNY-DCVVAINKKNS-----I I K N E R I L D E Y E N I N-
-----N S E N E D E-----Y E D Y L D D K G S N E F E Q V N Y K Y L D Y V N F T I I K S Q S T Y Q
H A V N E L F V F L G S Q Y S T D E K I V I H V K L I D I L S L L F V H Y R D N L S N F E H I I N S F Q D R N K L M N S
V E G E Y F R E F I D E R D N Y I F D V K N T Y N S Q Y V N K E - K E T I L N K K K T I Y E I F Q K N W K T D G Y R F
Y S V K N K K K Y Y P R K I N L D E P R K R K N K K K K Q K N I K C V N M V C K P L K I E Y K S L N K P V N S P V D
D N T D V K T M K G E Q H I N G Q A E D K N - D V V Q G I E N V Q Q E K K E I M D R F D I Q N E I Q N Q V Q N D I E N E
I E Y E L K-----N D D S N N N I E E S D-----V M X
S Y X N X I C N A D E N R A P N V X X X X X N S I G P R I A Y R M R X D F F L X X I S F N V I T P Y N S I T S N R D N
R V L L N Y M K G L T K L G I T T I E H L I K Y P T I L A I F F S Y D I F D E W Y L Q I K L V K E Y F G L I K Y X X X X
X X X X X X X X X X X K T F M G K Y N M I D D E V F V S P N C L S V C K L K S V M M Q N R N I T V K V E K S T T
N S L K I M M L G D I G Q G F E E E K N F D V Q N I Y N F M G F N E L K S T V Q S M K K W H L E N N A D F V I N L G D N
I P N D G S Y N F I G N F Q W H Q L M R E L F V F K K K S E Q V H K D L G T N T L S A E S I A N F Y N D K I K E M N E
G N Y E N -----H I N Y Y N D K N L H K I K A Q N E N N E K N L D N S I K M N N A K G T S S K I S D L
Q N V S N T N P Y K I E V V D H T K L V E S N T S I N E K E E K S I S S V E - E R A N L Y E D D E E S D E E D S N E F
A S E A I P F Y S V L G E K D Y F Y F P S E Q I Q E H Y S K R I P G Y F M P N N Y Y C V N Y D F T Y N P V K K N V N G D
E D D D D E E E E E R D S G K D R K V K T Q E K F T A S F I F I D T W L M M G F P I I R N Y R S F R E Q Y N W L G K
T L Y E S A K K S D W I F V G H H P L S S G R R S D S F S Y E E R S F H E I I R D F L F T Y K V D G Y F S G H D H L
M E Y I N F G K I N L F V N G S S R I I F D D S K M - S R G Y F G K F L G K I Y P I S C Y V L K T V H R G L K P K G C
N I N R Y S K W N K S D I G F S A H K L T K N E F I T E F I N G R N G K P L S H K I V I E N K K Q E R I K F Y D L E G
Y A N N R I K E L Q R I I E F A S K N P A L V K Y K I E E F K E N T E K F N L I M E K L K T E E E K I F K N L L F L
N N L V F D I S E H V I N V P I E K L K I M S Q L V S K Y N I F F N K E L A G F I V A A L E R A I Q - M E X X X X X X X
X X X X X X X X X X X D E N G S L N E ---E D K N L I E L I E S L G Y Q P E E F L Q K Y E S M T S E Q K V A L K
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NKIGRNISLEDYVNRKIFYVEKKKKKEKKNGNEQ-EAEETEVEVEEIDELKEIEKKRKE
SEGIITDEDENEIKEDQKDNEKEDETYEEYLDSEQYNDEEIPLV----KQVHKDFKKLAN
QEKKLSEQYILLMLASMRKFDIKKYALNLSKKERIKDVTTSNYLSNIEPRKTFQQLCI
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>P_knowledesi_ortholog

MNITKYLLITLPLILLKYPLLKELSNHGNLVRNIRGA----LLR--RIIKEESGK-
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HLLNESLVLFGSQYSTDEKLTfHVKLIDILSLLFVHYKDNLSTFDHVLSSFQDRNKLMS
IENEFFREFIDERDNYIFEVKNMYKVDHQDEE-KERILRKKKTIYEIFLRNWKNDGYRF
YSMNNKKKYIPKKID-----HKKKKKNETQYTLQCRSLVSSP-----QD
SD-----KGKGR-NATSSDNGLSIPSGVPKIRVKQNG----DSADKMLSHVEEDVDEE
TLEEIEQGEEMGNKNRMEERTCVGQKEEQEEEQEENAEKDSDELYDQDVYEDDANQQAILE
SYNQKICHASEYNQGKSASMNTYRNGIPGVTYKMRKDFFLNGSSLNVTILINAITSNRDN
ATVTLEHAEALKKLGITFDHLVRYTNIIGIFFSYDIFDELYLQIKLVKEYFGLIQKKKND
FDIVEKVKIKLKKRKAYGEYKMSDDEMFPVPPNCLSAYCMLKSVMMRRNRNVTMKIERTSS
NSMNFMMGLDIGQGFEEDKDFDQNMNLNIGFNEKLSVTQAMKDWHFANNADVFVNLGDN
VPNDGTINYMENFQWHNLMKELFVFKRSEQEISSMFGDNKLTQOSIKDFYNEKVKEMQD
N-----YNSGGIGKEEKTDEKKDEK--KDEKKEEMKKTKKKK----
--RSGTNEQNKENV----VESPSN-----EEDLSVYDNRKKLYQFD--DEESDEDF
--EAI PFYSILGEKDYFFFPSEQIQEHYSYRIPGYFMPNNYCVNYDFTYNNVGYK----
-----GIINQEKFRASFIFIDTWSLMVGFPPIIRNYRSFREQFNWLSK
TLYESAQSSDWIFVIGHHPLISSGRRADNYSYEEHSFDILRDFLFNYNVDGYFSAHDHL
MEYIKFGNIDLFINGSSSRVMPFDNSTM-GRGYFGKVIKGLYPVTCYILKTIHRGLKPKGC
SVNRYSKWSNKADIGFSTHKLKDEFITEFINGRTGKPLSHKIVLKNKKSERKKFYNLDG
YVDDKIHLEKKIEEFKQKNPELIKYEENENIRKLNKIMKLTKEEVENFELLFL
NNLIFDVSEHLSGMTVEKLRSMHALAVKYSIFFNKKIVNHIVVALEKAVQ--SENDESDNE
YEEIDEVEAEMRLKEKQKKQND--EKKSL-EIETLGYNPEQFLEKYDSMTKEEKNLK
EKVGKDVTLIEDYVNRIRLYVEKKN-----LSESDLEAMQ-----EKLDEG
EGSD-----EESTKESEEESS----QMSSEDIGEVALV---KDVHKTHQKFVF
MEKALSEQYILLMLSALKIHDKNKYALNMSTKRENKTIASSNFLYK IENHKTFQQLCI
ELAPDIKRIISNLGGVGLRLPFFKLMTKLYDEIMNLRGLDRVAK-

>P_vivax_ortholog

MNITKYLLIILPLILLKYPSRKGLISHDNVLLRSNIRGA----LLR--RIIKEENGAK-
-----EKEKEEERE-----YEEYLQNKGSYEFQVKYKYMDYVNTTIHKSCKYK
HLLNESLVLFGSQYSTDEKLTfHVKLIDILSLLFVHYRDNLSTFDHVINSFQDRNKLMS
IENEFFREFIDERDNYIFEVKNMYKVDHKNEE-KEKILSKKTIYEIFLRNWKNDGYRF
YSMNNKKKYIPKKID-----HKKKKKNETQYSLQCRNLVSSP-----QD
SE-----EGKKEPNGKGPDKGSTPSEETNSKEKQNG----GADAKMLSHVEDDVVEE
THEEVEQGGKGDNTNKTEEAASAGK----DAQEENAADESDELYDHDVYEDEANREALLE
SYNNQICHASEIDQGGSSPLSRYTNGIPGVTYKMRKDFFLNGSSFNVTILINAITSNRDN
ATVTKLYEALRKLGITTFDHLVRYTNIIGIFFSYDIFDELYLQIKLVKEYFGLTQKKKSD
FALVEKVERKKNKRRKAYGEYKMSDDEMFPVPPNCLSAYCNLKSVMRRNRNVTVKIERTSS
NSMNFMMGLDIGQGFEEDKDFDVQNMNLNMGFNELKSTVQTMKDWHFKNADVFVNLGDN
VPNDGAMNYMENFQWHNLMKELFVFKRSEQEINSMGHNPLTKOSIKDFYNEKMKEMKD
D-----YNNRQV-----EDQEMKKKKKSKKKK----
--KSANNEGKE-----VDSSS-----QEDFSHYDNRKKLYQFD--DEESDENF
--EAI PFYSILGEKDYFFFPSEQIQEHYSYRIPGYFMPNNYCVNYDFTYNNVGYK----
-----DIISQEKFRASFIFIDTWSLMVGFPPIIRNYRSFREQFNWLSK
TLYESAQSSDWIFVIGHHPLISSGRRADNYSYEEHSFDILRDFLFNYNVDGYFSAHDHL
MEYIKFGNIDLFINGSSSRVMPFDNSNM-GRGYFGKVIKGLYPVTCYILKTIHRGLKPKGC
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YADDRIDELEKKIEFTLNPNDLIKYEENENMRKLNLMKLTKEESENFKELLFL
NNLIFDVSKHLSGMTSKKLRSMHALAEKYSIFFNKLNVNHLVVALEKAVQ--SENSQSDNL
NEEIDEEEAERRLKEKQKKQNE--EKKTL-EVETLGYKPEQFLEKYDNMTKEEKDLK
EKVGKDVTLIEDYVNRIRLYVEKKN-----LSESDLEAMQ-----EKVDAE
EAGH--AAEANVOGGSGERSSDGSS----DGSSESSGEVALV---KDVHKTHQYFVF
KEKALSEQNYILLMLSALKIHDKNKYALNMSTKKEDLKSIASSNFLYNIENHKTFQQLCI
ELAPDIKRIISNLGGVGLRLPFFKLMNKLYDEIMKLRLGLDRIAK-

>P_chabaudi_ortholog

MNISKFLLIFLPLVLFKYPANNELINY-NVILKYDVKD-----LFK--RLMQEQNDNT-
-----EGDKDENHE--G-----YSIYIKSHGTNEFDKVKHKYADYVRF5IFKSKNIYT
HIFNELLVLFGAQYGTETEEIVVHVKLIDLLSLLFTHYRDNLSKFSHILNSFQDRSKLMNS
VESEFNMNEFINERNNYIYEMKNASHSSDNKDGIEWIEAVVNKKNMLYDKFLKEWNGDGARF
YSIHNKKKAYIPKKVF-----LNKQNYIPDFESMEHVDLVCKPI-----TD
SDTDENLIE-----EFEDKELNT-----NEENE-----
-----NSDSSNKTDGSD-----
-----VCKSESKYDKTKNNKQNKVKPGVIYKMRNDFFLSDASLNVISLISSITSNEDN
KVVKKLYTGLKKLGITTFDNLVRYTNIIGIFFSYDIFDELYLQIKLVKEYFGLIPKNNDE
LSIVS--SKSHLSKIKVYGKYNMTDDEMFPVPPNCLSAYCKLRSVMMQNRDNFKIEKDSS
NSINFMMLGDVGSGITKENSYDEEQMLKLI GFNKLKSTSNAMKDWHE TNADVFVNLGDN
VPDVDEL DYLKNFEWHKIIKGLFTFKKTEDEPEDDSYLYPDTNDSMHEFYKEVEKQMNN
ENKEKTNQDDTSTTPVNNYTDKNESSNNSENNGFNEHINDNTKDPNIDKNKTTK----
-----KETD-----
--DTIPFFSIFGEKDYFFFPSEQIQEHYTKRIPGYFPPNNYRVNYDFTYNNKEKN-----
-----GV--QEKFRASFIFIDTWSLMIGFPPIIRNYRSFREQYNWINT
VLLESAKESDWIFVVGHHPFISSGRRSDNYSFEELS FHNILRNFFFYINIDGYFSAHDNL
MEYIKFGSNLNFVNGSSSRVLFDSKSTMMGRGYFGKMVGSIIYPVACYILTTLHSGLRPKGC
DISKYSKWSNKFDIGFSTHKLKDEFVTEFINSRTGKPVSQKIVIKNKYKRRHFYDLEG
YADNGIKQFEKQIHEFSKKHPNFIKYKIEEFKENDKKLNI IINNLKSQEEKDAFKSLMFL
NNLIFDISNHLNISFQQLKLMCYLANKYHTFFNKKLVTFLVEELKNAIQNMDEDTANE-
-----LLNE--NENEKIQPNDNMSEGMEIIELEALGYKPDLEKYNAMTQEEKDALK
EQLGNDVPLEDYINRVKMYSHKKK-----LSAEELQEFEEENEENIQIADAPDE
SK-D-----DNTDSQTGDNNH-----QENKDEIDIMNAPNEVHKNNKALVE
KEKNLNEHEYSLLLSSLSKYDEMYSNLILSKKEIIKNEAHPYGLYIEKHKTFQVSL
ELCPDIKRIIANLGQVGTCLAFYDYNINLYNIMDLKNSLDKIAIF

>P_yoelii_ortholog

MNISKYFLIFLPLVLFKYPANNELINY-NVILKYDVKD-----LFK--RVLQEQNEDI-
-----KDDNDESGEEGEESEEDSNNLENRGTNEDKVKYKYADYVRF5IFKSKNIYT
HIFNELLVLFLGAQYGTETEEIVVHVKLIDLLSLLFHYRDNLSKFGHILNSFQDRSKLMNS
VENEFMKFVNERDNYIYEVKNAYKSDNDDEWIEITVLNKKNMLYDKFLKEWRVDSGYF
YSIHNKKKTYLPKKVF-----QTKQNYIPDFENMEHVDLVCKPI-----SD
SDTAEKGTE-----EYDKKELDT-----NEHNE-----QTNSEKEQNSNDNVSET
KMHKEE-----SSDSSNKADESN-----
-----MCKSESKYIKKTN5NKQIKKGRPGVIYKMRNDFFLSDASLNVISLINSITSNEEN
KIVKKLYTGLKKLGITTFDNLVRYTNIIGIFFSYDIFDELYLQIKLKEYFDLIPRNND
LSIVS--KAKNISKIKVYGKYNITDTEFVPPVCLSA YCKLRSVMMQNRDNFKIEKSSS
NSINFMMLGDIGRGFKKENS YDEEQMLKLI GFNKLKSTSNAMKDWHAANNADVFVNLGDN
VPEVDEL DYLKNFEWHKIIRELFTFRKQNEDEQKNVTDPAITKDNIQEFYKEVEKQMNI
TNVEDTNQHNDISTTSLKNYTDNENNDSENNGFSEYISDNTKDFNIYKNNESTE----
-----KEETY-----
--DSIPFFSIFGEKDYFFFPSEQIQEHYAKRIPGYFPPNNYRINYDFTYNNKEKN----

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-----GV--QEKFRASFIFIDTWSLMIGFPIIRNYRSFREQFNWINK
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DISKYSKWSNKYDIGFSTHKLSDKDEFVTEFINSRSGKPVSQKIVLKNKKDKRRQFYDLDG
YANDRLKQFENKIYEFSSKNPNFIKYKIEEFKENDKKLNIIMNNLKSEEEKDAFRSLMFL
NNLIFGISSHSNISFEQQLKMLCYLANKYRTFFNNKLIITFLGEELKMAVQEMEKEGANE
QLNSNDMVNTNENENENIQPNDQTLAEQTMELIETLGYPKDFLEKYNAMTQEEKDTLK
EKLGNVSLDYINRIKMYIHKKK-----LSAEELKEYEENEENIKIEEVPDE
SKED-----DNTDSQPEDTID-----QENKDEINDIINAPNEVHKNYKELVE
KEKKLTENEHALLMLSSLKTYDEMKYSLNILSKKEVIKEESYPYGLHYIEKHKTTFFQVSL
ELCPDIKRIISNLGKVGTKLAFYDYINNLYNKIMDLKNSIDKIAIF

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>P_berghei_ortholog
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HIFNELLVFLGAQYGTTEEIVVHVKLIDILSLLFTHYKDNLSKFGHILNSFQDRSKLMNS
VENEFMNEFINERDNYIYDVKNAYNKSDDNDDWIEITVLNKKNNMLYDKFLKEWRIDGSNF
YSIHNKKKTYLPKKVF-----QNKQNYIPDFENMEHVDLVCKPI-----SD
SAIDEKSAE-----KYEDKELNI-----NEQNE-----QSNKKEQTGNDNVSET
KMHKEE-----SSDSNNKTDESN-----
-----VCKSENKYIKKTNNNKKIKEERHGFYKMRNDFFLSDASLNVISLINSITSNEEN
KIVKKLYTGLKKKITTFDNLIRYTNIIIGIFFSYDIFDELYLQIKLIKEYFGLIPRNNDE
LSIVS--KSKNVSKIKVYGKYNITDDEMFPVPVCLSA YCKLRSVWMQNRDFNFKIEKYSS
NSINFMTLDIGRFGKKENS YDEEQMLKLI GFNKLKSTSNAMKDWASNNADV INLGDN
VPEVDEL DYLKNFEWHKIMRELFTFRKQDEDEEKNDADSYSITKDNIQEFYKEVEKQMN
TNTDDKNQHNDISTTPINNYTDGNEGNNSNNNGFREYINDNTKDYNIYKNETTE----
-----KEETY-----
--DSIPFFSIFGEKDYFYFPSEQIQEHYAKRIPGYFFPNYIRIN YDFVYNNKEKN----
-----GV--QEKFKASFIFIDTWSLMIGFPIIRNYRSFREQFNWINK
ALLESAKESDWIFVVGHHPISSGRRSDNYSFEELS FHNII RNFFYYNIDGYFSAHDNL
MEYLNFGPLNLFVNGSSSRVLFDKSTILGRGYFGKMVGSIYPVTCYLLTTIHSALRPKGC
DI-KYSKWSNKYDIGFSAHKLSDKDELVT EFINSRSGKPVSQKIVIKNKKDKRRKFYDLDG
YTNDKIKQFENKIYEFSSKNPNFIKYKIEEFKENDKKLNIIMNNLKSEEEKDAFRSLMFL
NNLIFGISSHSNISFDQLKMLCYLANKYRTFFNNKLIKFLGEELKIAVQKMEVKTNET
PHNSNEILNT--NENESI QPNDPTMKVEQIMELIDTLGYKPD FLEKYDAMTQEEK--ALK
EKLGNVSLDYLSKV KMYIHKKK-----LSAEELKEYEENEENIKIAEVPDE
SKED-----DNTNSQPEDTID-----QENKDDINDIINAPNEVHKNYKELVE
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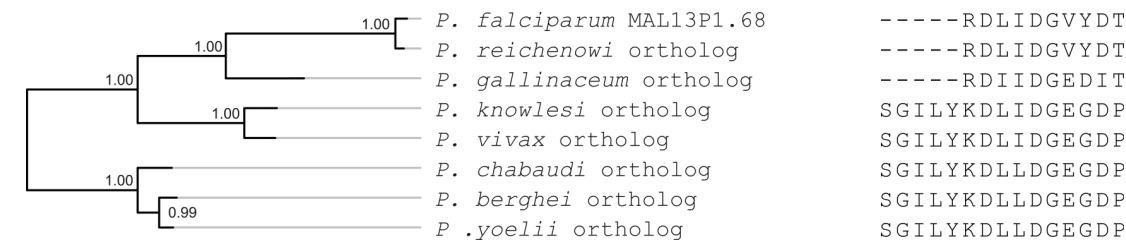
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	0%	12%	12%	15%	14%	14%

■ MAL13P1.68

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

>P_falciparum_MAL13P1.68
MVYFKR---FFFHRRHRLSIFNSYFFMKKQLLN---NLNKLIFISLNSYFL-KLLFS
KNTYIYYLQEK-KNSYLEKKYRPDTPYKKTE-----RDLDGVYDT
-----VEEGDIVYIHYQGKTTNDFRIESTFKSIIPPKIAGHYDQKHAI
YEMVIGMKKNTTRRECIIPPYLAPNHFPTQPLIYEIDVVRIVKNAQNKTTLQKLEVKLE
KIIDTICSYF

>P_reichenowi_ortholog
XX
XX-----RDLDGVYDT
-----VEEGDIVYIHYQGKTTNDFRIESTFKSIIPPKIAGHYDQKHAI
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XXXXXXXXXX

>P_gallinaceum_ortholog
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-----VEEGDIVYIHYQGKTTNDFRIESTFKSIIPPKITAGFYDQKHAI
YEIVIGMKKNTTRRQCIIPPHAYPNHFNPQPLIYEIDVVKIICKNSQKETFLQMKMKIE
NIKIAISEYF

>P_knowlesi_ortholog
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NTSTVFHLEGKGVDALEYKKYKSDKPYIKTE-----SGILYKDLIDGEGDP
-----IEEGDIVYIHYQGKTTNDFRIIHSFNSIIPPKIRAGQYDKKHAI
YEIVIGMKKNTTRRQCIVPPHAYPNHFPSQPLLIEIDVVKVVKNSQGKTFIENAEKKIE
QIKSFISFF

>P_vivax_ortholog
MRSFARR-GTFFKYDRGKLPFRSFHFGDKKQFII-----HLFFISLNSYFVKKYLS
NSSVVFHLEGKGVDALEYKKYKSDKPYIKTE-----SGILYKDLIDGEGDP
-----IEEGDIVYIHYQGKTTNDFRIIHSFNSIIPPKIRAGQYDQKHAI
YEIVIGMKKNTTRRQCIVPPHAYPNHFPSQPLLIEIDVVKVVKKDSQGKTFIEKVEQKID
QIRSVISSYF

>P_chabaudi_ortholog
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KNIRISYLEDRG-HAYLQKKYRTDTKFLRTR-----SGILYKDLIDGEGDP
-----IEEGDIVYIHYQGKTTNDFRIIQSTFTSIIPPKIKAGIYDKKHAI
YEIVIGMKKNTTRRQCIVPPHAYPNHFNPQPLIYEIDIVKVIKKGEHDTLLERIKKNAN
YLKTAITSFF

>P_yoelii_ortholog
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-----IEEGDIVYIHYQGKTTNDFRIIQSTFKSIIPPKIKAGVYDKKHAI
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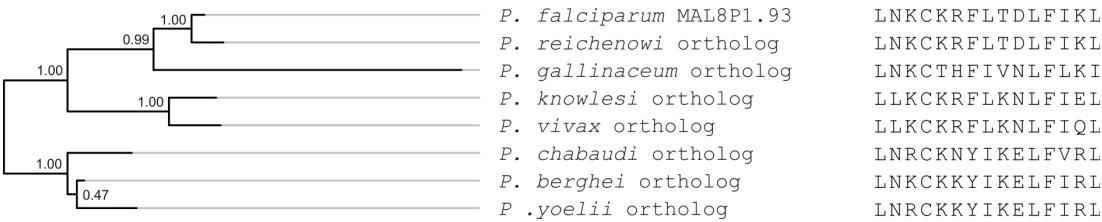
>P_berghei_ortholog
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-----IEEGDIVYIHYQGKTTNDFRIIQSTFKSIIPPKIKAGVYDKKHAI
YEIVIGMKKNTTRRQCIVPPHAYPIHFPNQPLIYEIDIVKVIKKGEENDTLERIKKNVN
YLRTAITSFF

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
58%	27%	6%	5%	7%	11%	13%

■ MAL8P1.93

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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CKRFLTDLFIKLKIEENIPICIMKEFENCSS

>P_reichenowi_ortholog
MVKKDNIWVLCKLYLDEKNTQLNKLQEDDIFKIIQNSNTLLSVLIKEEFEKNALIFYGKI
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CKRFLTDLFIKLKIEENIPICIMKEFENCSS

>P_gallinaceum_ortholog
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KKILIFKIFTIIFNRKSLRIFIIRTYNKYKREVSLLTRFVTICDD-IRVKILYSGITLNLN
CTHFIVNLFILKIGLIINIVCIFK-----

>P_knowlesi_ortholog
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CKRFLKNLFIELKIEENMPIIMKELEH-S

>P_vivax_ortholog
MARKDHIWVLCKFYCGKRGVSVSKKKEEVFKILESSHIALPVLIKEEFERKATMLYGKI
YKSLIFSRLVIFANLRLRIFIIRTSNKFRQDISQLAQFVTLCDYLDVQVLYIGVTLNK
CKRFLKNLFIQLKLEENIPLIMKELEH-L

>P_chabaudi_ortholog
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CKNYIKELFVRLEIEEFIPSILK-----

>P_yoelii_ortholog
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CKKYIKELFIRLKIEESIPILK-----

>P_berghei_ortholog
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CKKYIKELFIRLKIEESIPILK-----
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	5%	1%	1%	4%	4%	4%

■ PHYLOGENY AND PEXEL/VTS



_VP_knowles1_ortolog
 MPTTVERVLAHLHL-VYLSAHNVKCEISRYFLMHKEY-KDFNLEKFNSSDFLNEEKSYIA
 DVNSVGGKRRKLQNDINGIFAGNPLYGCFNKYALRRNGYQGQVNVKRSAKLVNKNFPAC
 NGDTCSSMFLIKAHLPARTVKK--NEKNHTLQLQREGRNKGPIIEEKMGQAVTINK
 H--YNSNVLVDLTRELNKQHPMGFEGYSEKKNVHTPDSIQSTHESRSTAS
 NMKKNPKREEKQIRIHGNSK--QNELPMEKNEKGRDNMVLVPYNDISYSGSNGYV
 EKEKFINIKFPKIS--REVAEQNPMDNEKQIMKHLKQAPRNSNDNAEFTNK
 EGEA--DNTENRDNKILVRLKLGEGN--LGIGFTGPIVLGRDSFTKINMEDLQ
 INSERG--NKQYKIDRLDLMTGETSINTQPLKGGTQIMKNKNVLTNHNPNFY
 NHA-TYDKVHNPDIDLSKYVLGYDIIMGNPEGDPTINVDPGFPGVLQINIEEMRVNK
 --DISGDLNTGLSYLSIGDVRIGGGLGYRESTLMDGYT
 IEHHKT--LTPWVPIEHCSCSGK--NVEEQNLQEKYKME-L--
 --LSDVTKSPISFPFSSASAEYKNAIKKLKVNVNFMFKIYCLRYGTGP-T
 TTSWRFDTFNRAKLPKPTFDGLGKSDCSYVEYINKHTICEEENNVNKKMMFRLHG-T

HVAHEIYLGKKII IKMNMKEDEYNKLDKNNISIKTFFNLYFHKMGLSGGYSKHTQKLVKK
FRTSEDISILGGNPLNIENSTFFEKWVNS INKNSMPIRTKLLPFSFFMDDPYMIQAYKD
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>P_vivax_ortholog
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AGNTCSSFMLIKAHRRAGGHAVKK--NEKNYNLCNLQREERSCEQIPSGKKKVQQAATIKR
HN-----YNSNMMDLTKRTDKQHLLHGLPEDYPKEEKNVHAEPDQLQSFSHFETDTPAPS
NLKKNPKREEQIRIHGNSRRDEPPQNELPHNEPPQNGADDMVVPSPSYNDSIGYSGGNYP
EKEKF IQIKFP IKIS-----SEAEQQDEEMNNEKEIMKELERQESLHTRSDANFEKYTNK
EGER-----DNAQKGGKNFVNSKLGEDN---IMGIFKNPYSLGSDNFFIKNEMEDLKR
INSERK----DEQYKDFDLRDALMGETGSIINTQPLSGGTQMKENENNALTN--PNDGE
SHT-AYDKGHNPDIIDLKYLGLGYDIIMGNPEGDPTINIDPGRGPVLQINIEEMRVNK
-----DSNVNANGTTPSPYSGFGRGGGLPYRESTLLGDYT
LEEHPK-----LTPWVPIEHSQSQSK-----NVEEIQNLEQYKME--L-----
-----LSDVKVSTPSIFPYSFSASAEYKNAIKKLKVQNNVIFMMKIYCLRYTYGIP-T
TTSWRFTDNFRNAMKKLPNFDGLKEDSQCSYEYMYNMKIHTPQCEENVNKMWMFFKLHGT
HVAHEIYLGKKII IKMNMKEDEYNKLDKNNISIKTFFNLYFHKMGLSAAYSKQTKLVSK
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>P_chabaudi_ortholog
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NTNLVNKNGRWKHIYKGLLNNHLYSLGKRPLVQQSP--G---NNNINTLEKLNKDNLSLK
HTKGGTNFISIKQNN-----VVRK
NETELNTNMNNAQFTN-----TKNSIINSHDHLDEYNKNYIDNL---
-----KSVKNHFNAQNLDNSNTDFFDNNYL
EPEKYVPIKYPFDNH-----ETNNNSNNIKSNNIYHNEESSKKNDVTEENYND
NIKP-----TPCTKNEKACINKTLDTGNEFYLRDVLDDGYKPDVSSYI--NTKKSFKN
KQKEKI-----IEEFKDFDLIDPLTPNVNEHTSM-----NDEEDDNKNSNFISMKYDGD
DENPPEPIPKEDEVMSLKYLGGLGYDIIMGNPEGDPLLNVDPGFRAPVLIQINITDTGINN
-----NNDNVEEHEDSQDSHSTGNIKHS-----S-----
---NKKK-----IPWIIPEHSCNQSK-----NVEEKSLSEYITL--L-----
-----LSDVKVSTPSIFPYSFSASAGYKNALKKLKIQNSIIFMMKIYCLRYTYGIST
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ACVDKATIGLESQTFTKVKNLGSVDSSNNYQNDGYLDLECPENSTLVFGFALEFHTNFQK
ARDNF IKCPKEENTCSIRGIGINTNLFFPKDKHSLGIVALCRSTSSKMGKN

>P_yoelii_ortholog
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NPKRGTDIFIQIK-HN-----IINK
NETKLNTNINNAQFTN-----TKNSIISSHDHLDKYNKYIDNL---
-----KNVKNSFIVPILDDSNITDFFDNNYL
EPEKYVPIKYPFDNH-----DMKYNSSNIDGNNIYHNEGTYKSDVTEKGNYNR
NIKH-----TTCIKNKKASINKTLDTGNEFDLRNVLLDDGYKPDVNNYT--NIKQSFKN
KKKKRV---PQKFDFDLSDALTPNINEHNSI-----NDGRRNNKNANFISVKDWDITD
DEISQNEALPKEDVDMSLKYLGGLGYDIIMGNPEGDPLLNVDPGFRAPVLIQINIKVDIISN
-----NNDNIELNECSIDSHSNIIDDIKHGDNNKNTVS-----
---SKKK-----IPWIIPEHSCNQSK-----NVEEKSLSEYKLE--L-----
-----LSDVKVSTPSIFPYSFSASAGYKNALKKLKIQNSIIFMMKIYCLRYTYGIPIT
MTKWEFTNFRNALNKLPHTFDGLKEDNECTYEEYISKSHTPQCEKNVNKWMTFFKLHGT
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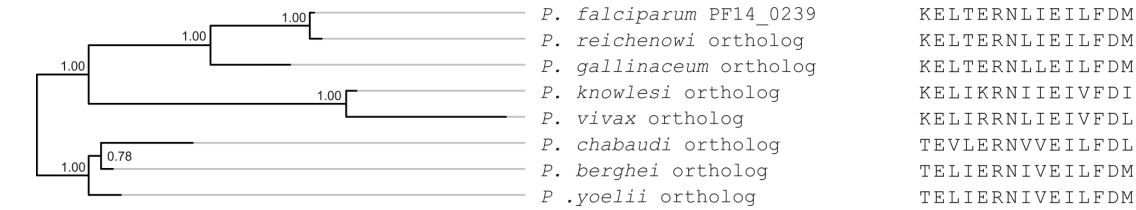
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HTKRGAYFIHIKQHN-----IINK
NETKLNTNINNAQFTN-----TKKSIISSHDHLDKYNKTYIDNL---
-----KSVKNNFIVPILDDNNTDFFDNNYL
ESEKYVPIKYPFDGH-----EMKHNSNVGDGNNIYHNEGNTKKSVDTEKENYNG
NIKP-----TTCIKNKKESINKTLDTGNEFDLRNALLDDYKPDVNNYT--NIKKSFKN
KKQQRV---TEKFDFDLADALTPNINEHISI-----NDGERNNENANFISMKDWTN
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-----NNDNIELNEGNQDSHSNIIDDIKGDGNKKNRS-----
---NKKK-----IPWIIPEHSCNQSK-----NVEEKSLSEYITL--L-----
-----LSDVKVSTPSIFPYSFSASAGYKNALKKFKIQNSIIFMMKIYCLRYTYGIPIT
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ACVDKTTIGLDNLQTFTKVKNLGYVDPNNYQNDGYLDPECPQNSTLVFGFALEFHTNFQK
ARNNF IKCSKEENTCSIKGVGINTNLVFFPKDKHSLGIVALCRSAASKMGQN

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
82%	15%	11%	12%	11%	10%	11%

PF14_0239

PHYLOGENY AND PEXEL/VTS



ALIGNMENT

```
>P_falciparum_PF14_0239
MEEQNEEIEKTVEESEE-INEEVYEELFLFASDNDLVKKESLRILSLLEEKEFIDHII
KNNKKYKTLTISSLNSRCKLLTLECLLNLSAQLP-----KELTERNLIEILFD
M-----MKEEEKIED-NCIDL YIMI ISNLT RCKEGVYKVL DNNDSNINIKE---
--DNFKVSVFLLNKLL YFFFLPIKP-SINKNLSDKYIYVSHVLINISSIKESIVFFKNVAF
LNKISDQILNVERFRAILPFIINLCLNEVIHPYIFHDDCYLFPYVLSYLYTNDYNI TKG
SYNNNSNN--EEINTQNIHHIIMNKSSILVSCSVIKSRILILFYLCNRDYSREKLLSYG
ISDILKNWKSCEKNAEFINDIENVTNKLEIGSNSREAIAT

>P_reichenowi_ortholog
XXXXXXXXXXXXXXXXXXXXXKRYEELFLFASDNDVKKESLRILSLLEEKEFIDHII
KNNKNFLKTISSLNSRCKLLTLECLLNLSAQLP-----KELTERNLIEILFD
M-----MKEEEKIED-NCIDL YIMI ISNLT RCKEGVYKVL DNNDSNINIKE---
--DNFKVSVFLLNKLL YFFFLPIKP-SINKNLSDKYIYVSHVLINISSIKESIVFFKNVAF
LNKISDQILNVERFRAILPFIINLCLNEVIHAYIFHDDCYLFPYVLSYLYTNDYNI TKG
SYNNNSNN--EEINTQNIHHIIMNKSSILVPCSVIKSRILILFYLCNRDYSRXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

>P_gallinaceum_ortholog
MDMKKEE--DATGESNE-ANENIYEELFSYANS DNEIVKKESLRILSLLEENELIEYIR
KNNKCKFKI IISNLSNRNKM LSL ECLLNLSARLP-----KG-TERNLLEILFD
M-----VKEEEKYEE-NCIDL YIMI ISNLT RCKEGYKILDLKEDTNIDINE---
--EKFPVSYYLNKLL YFFFLPIKP-SINKNINDKYIYVSHILINISSIKESLFFKNVAF
LNKISEQILNKDRFRAILPFIINLCLNETTHNYLFHDSCLIFPYILSYTYTNNYSLCSNN
IY-NSNNV--EK--SDNIHHIILQKATVLINCSIKSRIL IILLYLCKKDYSRXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

>P_knowlesi_ortholog
MMLIAEEVENAKNAEREPIDASIYNELFSFAASDNEILKKE SLKIILGLLDETMVAYIQ
KNEKKCLKVLISGLNSNYEVVALQCLVNLSAHIP-----KELIKRNIIEIVFD
I-----LRDEETEAKSHTELYIMLVANLSREKEGIYKILDLP-GEKVKEQE QEE
MKEELAVSYLLNKLLH LFSKPIVPSSINKQITDKYFFI SHALINVS SVKECVHFFKSVFL
LNMLSNQMFQEERCAAVLQCVINLCVSELLHPYVFHEDCTLIPRVLSLVYTRQKGSEDNF
SKLSSVQTSQKETNKDPVHHLILNMSTTLTTSTDIKNRVMILLRNLFTRDQARQKL RNYG
IEHVLTNWLTYEKNT EIT-----

>P_vivax_ortholog
MEEEVDEGKKERDKRSSNHDDSLYDEFLSLICADKEIVKKEAFKILLGLIDTESMVAYIQ
RNEKKCLKILISGLNSDYEVVALQCLVNLSAHIP-----KELIRRNLIEIVFD
L-----LRDEEEAQERSHTELYIMLVANLSREKAGLYKILDLPEGGQKEGEKQEE
TSRELA VSHYLNKLLH LFSKPIVTATINKQVTDKYFFI AHILINVS SVKECAHFFKSVIL
LNMLSKQMLQQRCAAVLQCVINLCMSETLHPYIFHEECNLMRPVLSLVYTRKGSNDEF
AALPSIATSQKGANKDSVHPLILDMSTVLTPSTVDKNRVMILLRNLSRELARQKLRSYG
VEHVLNRWLLHEKNTGIT-----

>P_chabaudi_ortholog
-MLIAEELENSKNTPK EPIDVSVYNELFSFAASDNEVLKKE SLKIILGLLDEPDLIAYIL
QNSKSKCFRIITSGLSQSKMVALECLLNLSAQIP-----TEVLERNVVEILFD
L-----IKDEEKYEE-NYIDMYIMI ISNLT RCKEGVYKIL DITDVNQVYHNT---
----FVSYSYLLNKLL YFFYPQIPITP-SINKNMSDKYMHSHILINISSIKESMPFFKNVAF
LNKLSEQILILERCRTFLPFI MNLSLHKDIHDFIFQSDCNMFPYLLSYLYTPHTAIEDKN
SI-SGYTV--RP--NKT IHRITVKKATSLVRCPVIKNRILVILLHLSKDN DTKERIKKYG
I IALLNNWKENENSPDIMXXXXXXXXXXXXXXXXXXXXX

>P_yoelii_ortholog
MMLIAEEAENAKNGNEPIDISVYNELFSFAASDNDILKKE SLKIILGLLDETDLIAYIL
QNSKKCFKIITSGLSQCKMVALECLLNLSAQIP-----TELIERNIVEILFD
M-----IKEEEKNEE-NYIDMYIMI ISNLT RCKEGYKILDISDEGQIYHNT---
----FVSYSYLLNKLL YFFYPQIPITP-SINKNMSDKYMHSHILINISSIKESMPFFKNVAF
LNKLSEQILILERCRTFLPFI MNLSLHKDIHDFIFQSDCNMFPYLLSYVYSHDTPINEEN
IL-NGV-I--KP--DKSIHKLILKKSTSLVQCSIKNRILVILLHLSKNNDTREKIKKFG
VIPLLNNWKANEKSTDIIXXXXXXXXXXXXXXXXXXXXXX

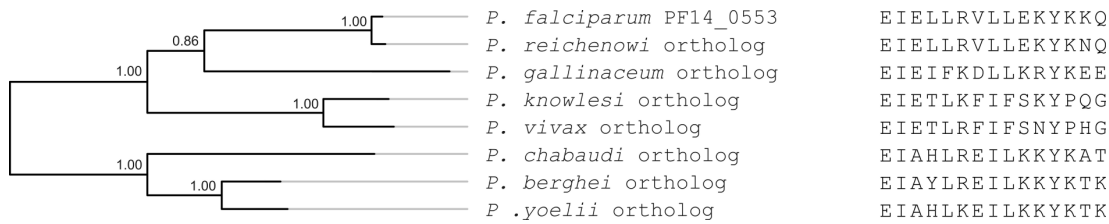
>P_berghei_ortholog
-MLIAEEVENAKNAEREPIDASIYNELFSFAASDNEILKKE SLKIILGLLDETDLIAYIL
QNSKCKFKI IISLNSQCKMVALECLLNLSAQIP-----TELIERNIVEILFD
M-----IKDEEKIEE-NYIDMYIMI ISNLT RCKEGYKIL DINEEGQIYHNT---
----FVSYSYLLNKLL YFFYPQIPITP-SINKNMSDKYMHVSHILINISSIKESMPFFKNVAF
LNKLSEQILILERCRTFLPFI MNLSLHKDIHDFIFQSDCNMFPYLLSYVYTPNTPIDDKK
SL-LNGVTT--KP--YKSIHKVIVKSTSLVRCSVIKNRILVILLHLSRNNDTREKIKKFG
VVALLNNWKANEKAPDIMXXXXXXXXXXXXXXXXXXXXX
```

AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
17%	14%	8%	8%	7%	8%	7%

■ PF14_0553

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_PF14_0553
MVAIKEMKEFAFARPSLVETLNKKKKFLKKKEKRTFVLSIYAFITFIIFCIGILYFTNKS
SAHNNNNNNKNEHSL-----KKEEIELLRVLLLEKYKKQKDG
ILNES-----SNEEDEEKYTLNSETYNNKNNVSNIKNDSIKSKKEEYINLERILLE
KYKKFINENNEENRKELSNILHKLLLEINKLILREEKDDKKVYLINDNYDEKAL-----
----EIGMNEEMKY---KKEDPIN-----NIKYASKFFKFMKEHNKVYKNIDEQM
RKFEIFKINYISIKHNHKL--NKNAMYKKKVNQFSDYSEELKEYFKTLLHVPNHMIKEY
SKPFENHLKDNI---LISEFYTINGKRNEKDI FSKVPEILDYREKGI VHEPKDQGLCGSCW
AFASVGNIESVFAKK--NKNILSFSEQEVVDCSKDNFGCDGGHPPYFSLYVYLQNELCLGDE
YKYKAKDDMFCLNYRCKRKVSLSSIGAVKENQLILALNEVGPLSVNVGVNNDVFVAYSEGV
YNGTCEELNHSVLLVGYGQVEKTKLNNKIQT----YNTKENSQNP----DDNIYY
WIIKNSWSKKWGENGFMRLSRNKGDNVFCGIGEEVFYPIL

>P_reichenowi_ortholog
MVAIKEMKELAFARSSLIETLNKKKKFLKKKEKRTFVLCIYAFITFIIFCIGILYFTNKS
SAYNNNNNNNEHSL-----KKEEIELLRVLLLEKYKNQKDG
ISNES-----SNEEDEKKYALNSQAYNNNNNISINIKNDSIKSKKEEYINLERILLE
KYKKFINENNEENRKELSNILHKLLLEINKLILSEEKDNKKVYLINDNYDEKAL-----
----EIGMNEEMKY---KKEDPIN-----NIKYASKFFKFMKEHNKVYKNIDEQM
RKFEIFKIMYISIKHNHKL--NKNAMYKKKVNQFSDYSEELKQYFKTLLHVPNHMIQKY
SKPFENHLKDNI---LISEFYTINGKRNEKDI FTKVPEILDYREKGI VHEPNQDGLCGSCW
AFASVGNIESVFAKK--NKNILSFSEQEVVDCSKDNFGCDGGHPPYFSLYVYLQNELCLGDE
YKYKAKDDMFCLNYRCKRKVSLSSIGAVKENQLILALNEVGPLSVNVGVNNDVFVAYSEGV
YNGTCEELNHSVLLVGYGQVEKTKLNNKIQT----YNTKENSQNP----DDNIYY
WIIKNSWSKKWGENGFMRLSRNKGDNVFCGIGEEVFPPIM

>P_gallinaceum_ortholog
MK--KEINNHLSRRGL--ESLSKKKEHFKNEEKKVFRIYIYALITFIICSLILYFTNNS
-----IESHDL-----IFNSDEIEIFKDLLKRYKEENSL
KNDEKIEDNYN---SNDLQKKK-----VNKNIIDD
LYN-LIDEKNNISKERLFEILDLLQKK----FSKKNEKEEYILLNGIAKK-----
-----NDNNLYREYDKNEELYDSKALVNLYSNLKVYSKFYEFMNEHNKNYNSMKEKI
EKYENFKINYLEIKKHNT---ENHLYKKKVNKFSYDSKKELENYFKKLVPVPVSHLIEKH
VKPFTILKSVKG---IEEK-----EKNKDLFTSTFPTNLDYREKGI VHEPKDQGVCGSCW
AFAGVGNIESMYAYK--NKKMISLSEQEVIDCSKKCFCDGCHPPYAFLYALENKICFEEQ
YEYKIMENIFCLNYRCTNKVSLTSIGSVKENELIEALNKVGPLSVCVGASDDVFVYHEGI
FDGICTKEVNHAVLLVGYGQVEKNKLNQ-----KYKGSFSDE----DDNFYY
WIIKNSWSGNWGENGFMRIRNKGDNLFCCGIGKDVFPVL

>P_knowlesi_ortholog
MA--QNMSIMNLTSSSL-EALNRNQMLSKRRNRKILKICIYIVLTFVMCGVVFCVTTIS
-----RNDWSL-----NRSDNLKDSFSNSGDDILNKAEIETLKFIFSKYPQGGKD
LSGDEVEALADAASNEED-EK-----IKIEEPGKHILKLMK
KYNEVVADLSQENREQLAKMLKELLKKK---MNEKKTGKDPNSVNGEKGEDINGLSN
FNDFS VGANEDD-N---GGDAVLSEEHIEGLFFNLKYASKFFKFMNKYRNRNKDITEQM
EKYENFKINYLIKIKHNE---TSQMYRMRLNQFSDYSKKDFENYFRKLLIPDHLKKKY
VVPFAS-LNNVKGK-MVDS-----NKSADIFTDVPEILDYREKGI VHEPKDQGLCGSCW
AFASVGNVECIYAKEHDKTILTLSEQEVVDCSKLNFCDGCHPPYFSLYAIENGICLGAD
YKYAMDNLFCCLNYRCKNKITLSSVGVKENELIRALNEVGPPSVNVGVITDDFSFYDGGI
FNGTCTEELNHSVLLVGYGQVQTSKIFQQNNIYDDANGLTK-KGAIASPSKANDDGIQYY
WIIKNSWSKYWGENGFMRLSRNKEGDNVFCGIGVEVFYPIL

>P_vivax_ortholog
MA--QDIKIMNLTSSSL-EALNRNQMLSKSSRKILKICMYAILTAMCGVVILCLTAMS
-----NSDGSLTQSGSHNQSGSLKGLSSTPGDGEILNKAEIETLRFIFSYPHGNRD
PTGDDVEKPADAALPNEED-QK-----VKIADAGKHILKLMK
QYNEIVADMSDENKEQLAKMLRELLKKK---INERKKKREDPNG--NNEEGKEVINISVPS
FNYKRVSANQDD-S---DDEEEVSVQIEGLFVNLYASKFFNFMMNKYKRSYKIDINEQM
EKYKNFKMNYLIKIKHNE---TNQMYKMKVNQFSDYSKKDFESYFRKLLIPDHLKKKY
VVPFSS-MNNGKGVNVVTS-----SSGANLADVPEILDYREKGI VHEPKDQGLCGSCW
AFASVGNVECMYAKEHNKTIITLSEQEVVDCSKLNFCDGCHPPYFSLYAIENGICMGDD
YKYAMDNLFCCLNYRCKNKVTLSSVGVKENELIRALNEVGPPSVNVGVITDDFSFYGGGI
FNGTCTEELNHSVLLVGYGQVQSSKIFQEKNAYDDASGVTK-KGALSYPSKA-DDGIQYY
WIIKNSWSKFWGENGFMRISRNKEGDNVFCGIGVEVFYPIL

>P_chabaudi_ortholog
MM--NDIRINFTTTGI-DSLNGENTYSKGNHKKTIKICAYAITAIALFFIGGVYFKYQT
-----DRNAL-----NAIDEAELMNKEIAHLREILKKYKATND
-----DNEFEYPT-----
--NDDMNEDSEDGEHQLLMLHLKLLKN-----NANKVNTFGIN-----
-----NESNTN---TDNTYIFTQKLESMDQNIKYASKFFKYMKKYNNKKYENMDEQL
ERFENFKISHMKVKKHNMIGKNGVTYVQKVQYSDFSKEEFNNYFKKFLSVPHDLKTKY
LVPLKEHLANNN---ITPA-----NDLVGDFPDSRDYRGKYTLTPPKDQGMCGSCW
AFATIANFEYLFPAKIKCTMPTSFSEQQVVDCTDNYGCDGGHPPYFSLYFINNGVCLGDE
YPYKGHDDFFCLNYRCSFLGSMHFIGDVKNELIMALNVYGPVTTIGVGASDEFVLVYSGGV
FDGECASELNHAVLLVGYGQVKSLAFDDSHSNVDSLSIKKYKENIKGD----DDETIYY
WIIRNSWGTWEGGYIRLKRKKEGDDGFCGVDVFFPIY
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>P_yoelii_ ortholog
MV--NDIRRVNFATSGV-ESLNENSKYLNRNHKKTIKICTYAITTFALFFIVVVYFKNQT
---NVNDINGSSTL-----SAIEETSLMNKEIAHLKEILKKYKTKINE
-----DNEYGYEK-----
--NDNINGDDEDGEQELLMLLHKYLKKNK-----SNSNKIDSFIDNNNESNK-----
-----NRSNEN---IDQINILSQKLETMHDNIKYASKFFKYMKEYNKEYKNIDEQL
KRFENFKTTYMKVKKHNEMVVGKNGITYVQKVNQFSDFSKEEFDNYFKKLLPISHDLKTKH
VVPLKTHLDDNK---IKPK-----EDVL-SYPEHRDYREWDILLPPKDQGMCGSCW
AFASVANYEALFAKKYAILPISFSEQQVVDCSSDNFGCDGGHPFLSFLYFLNNGVCFGDQ
YEYKAHDDFFCLSYRCGYKGRLLKIGNAYPYELIMALNEVGPIITVNVGVSEFVLYSGGI
FEGPCSPELNHSVLLVGYGKVKKSLAFEDSHTNVDSNLIKKYKENIKEN----DDDFLYY
WIIRNSWSSAWGEGGYIRIKRNKLGDDIFCGIGIDVFFPL

>P_berghei_ortholog
MI--NDIRRINITTSSI-ESLNENSKYLKRNHKRTIKICAYAITTFALFFIVVVYFKNQT
---NVNDANRNTL-----AAIDETSLMNKEIAYLREILKKYKTKTNE
-----NNEYAYEK-----
--NDDINGDGED-EHELLMLLHKFLKKNK-----GNPNKIDRFDINNDSNK-----
-----NRGNEN---IDQINILSQKLESMDNIKYASQFFQYMKE-NKKYKNIDEQL
VRFENFKTTYMKVKKHNEMVVGKNGITYVQKVNQFSDFSKEELDSYFKKLLPIPHNLKTKH
VVPLKTHLDDNK---IKPK-----EGVL-DYPEQRDYREWNILLPPKDQGM-GSCW
AFASVGNYEALFAKKYSILPISFSEQQVVDCSSDNFGCDGGHPFLSFLYFLNNGVCFGDN
YEYKAHDDFFCLSYRCAYRSKLLKIGNAYPYELIMSLNEVGPIITVNVGVSEFVLYSGGI
FDGTCASELNHSVLLVGYGKVKRSLVFEDSHTNVDSNLIKNYKENIKDS----DDDYLYY
WIIRNSWSSWTWEGGYIRIKRNKLGDDVFCGIGIDVFFPIL

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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	15%	17%	18%	18%	17%	16%

■ PHYLOGENY AND PEXEL/VTS



- ALIGNMENT

>P_knowlesi_orntholog
MGNAL-----RKGKDAQGVFGKIPNNIYAVFSIHGEDSSLRNKPADGGVEEC
TSTKREDKKK-----NNFLRLAIRDMTKGE-----KTLVLVIAFALAIN
AYTNLNPYKIMBGEVTEINLAEGGVSAVNGVNGDGSVGGC-----NIGA
PTKCNFLVFLQRIKILNNLFLQIQORGAHFLCLPFIYICGVASVFRIFYTNKCIKIR
ENLRKLKRHKHTITIQNSEKFKSHKSPSYDILNCVNEFSAKHLITSIQTMMRYGNSILK
GSMISCIISPYLTKLILVPTYFGLVLLTIRLKLKSKIMKTSNSEEQKMARSLDSIQG
VYSFFGNDYDENSFIAFKMLKMYNNRLSDYTNWESLFYSFLNTGNISVICISLFCRGESEIN
KNNMTHGQLVSYFAFSSMLGLGIVMLGLKKDLGVLLQLSLQKIYEVDFTPMG-----
-----NNQQDERMPLQRC
NVLIHMSPTERDPPTTIGDVNGGDS-----PVLVDGQRE

NLRGSLKFENVNFAYNAFDPSKRKDV LKNINLEIKEKEKVAI IGKSGSGKSTLWKLLTME
YEYQGNIIYDITYNLKNINKTYFKKF IISVSEQDSSVLNRSLYENLIYALLPVKIED----
-----QWELPKVI--TMGDDQLPSGNAKICSQDQSRYNKSSSPKEGEDTSN
EKLDKAPHQTGGQNCNTYNT---RLGEGKITPITEEAQLNDQVNYALLHEYGDQKLNLINE
TLNELCEQLDLTHFIRSLPVDIHSSIQNSAMSSGQQRQISIIIRSLIKDTPIYVFEITSF
LDESNEEKVYNLINTIIPNKTIIVYTHSVNILHQMDKIIIVDQGKICSIGTFSQIKNDPL
FLDIFSHSKMASR

>P_vivax_ortholog
MGNAL-----RKAKEAQGVAGKILSSIIAAFSIHGQDSSRGKPKDGGAEEG
ASAKGEAAKGR-----KNFLLRVADMTKGE-----KTLTTIAFAFLAIN
AYTNLSYPKIMGECVETVNLAEQGVPAVSGLNGGGSAGGSVGGSVGGSDIGSTIGT
PSKCNFLATLVQKTRILNKLFLGTPDRGAHAVLCFLPYFICGGVASYFRIYFTNKCIOKV
ENRLKRKVHKTIVIQNSERFKSLKSPDHLLNCVFHEIKFSAQOLITSITQVMRYGNSILG
GSISMVCISPYLTKLVLVPSYGLLVLLILRLKLSIKMKASNCCEEQMARLSDILQKKN
VISFPGNDYIENRFFCKNLKYMNRNLNERYTNWESLFYSFLNIGSNIVICSILCFGRSELS
KKNITHGQVLVSFIAFSSMLGLGIVGMLKLKDLGVLQLSLQKIYEIVDFAPVG-----
-----GAERDGGASAQGDVSTEVHSQVGGT-----PTVGAPWPR
NPRGSLKFENVHFAYNADFASKRKEVLKNISFEIKEKEKVAI IGKSGAGKSTLWKLLTTE
FDYQGNIIYDEYNLKHMNKTYFKKCIISVSEQDCCLNRSLYENLLYAVLPVKIEG----
-----KREFPRVI--TMG-----GREICTDQSTRPKEGEGTSN
GTPDEAAHSQRETCNTLNTSSTHPGEAKATPNSEAAQLKDHACHALLQEYGDQKLIILIND
TLNQLCEQLDLTQFIRSLPEHLHTSIQNSSMSSGQQRQISIIIRSLIKDTPIYVFEITSF
LDEANVERVYSLINTVLAKKTIIVYTHSVNILPQMDKIIIVDQGRICSIGTFSQIKNDPL
FLDIFSHSRVASV

>P_chabaudi_ortholog
XX
XXXXXXXXXXXX--DNYIFRALYEMTSYE-----KTLLSISLIFLGIN
AITNLNYPKIMGECVEGENL-----K
FCRSNIIIVKLQKLNILEKFKLNS-NKSIISAMLYFLPYFICGGIASYFRIYFTNKCICKI
EYRLKKQVHNKIIINENDEKFKKYKSN DYLVNCLFNEIQFSSKELITSITQMLRYTNSIIG
GIMSMCLISSYLTKFCIFIVPTYGFCILII LKKLNKIKIEINNFEKQMERFSDSLQKKN
IITIFGNEYEYENKHFSKIINLTEKEHQKYINSESMFYSLNIGTNLVICTILSFGKIELN
NNRITHGQVLVSFIAYSSMLGLGIVGILKLDKINLLKLSMKKIYEILDFTPET-----
-----SDGTVSTTKQLTDKPMDWGNDKNSDTSLSA
SANLSN-----IAQLESSVQND DK-----HEENNIICE
KIEGSLKFENVNFTYNKFDQDK-KIILKNINFEIKKNEKVAI IGKSGSGKSTIWKLLTRQ
YEYEGNIIYDNYNIKNFDKTYLKKSILSITEQECCILNRSLYENIVYALLPTKVSD----
-----ASGAKDLLSDSIGEXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXIQNY-DHMLLEKYG-NKINTINS
TIDILCKELNLDDFINSMPQNILTNVNNMSGQQRQISIIIRSLMKNSSIYIFDEITSF
LDESNDKVVYNLIHTLIPKTIITHITHSLKHLKEMDKIIIDQGTISAIGTYQELNHNPL
FLEIFSL-----

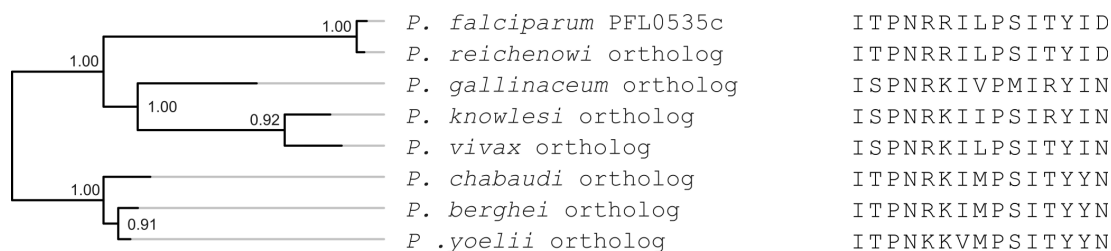
>P_yoelii_ ortholog
XX
XXXXXXXXXXXX--DNYLFRALCEMTN YE-----KTLLSISLVFLGIN
AITNLNYPKIMGECVEGENL-----K
LCRPNIIIVKILQKLNILEKFKLNS-NKSLSAMLYFLPYFICGGIASYFRIYFTNCKVKKI
EYRLKKQVHNKIIINENDEHFKKYKSN DYLVNCLFNEIKFSSKELITSITQMLRYINSIVG
GIISMCLISPYLTKFCIFIVPTYGFCILVILKLLKKIKIEINNFEKQMERFSDSLQKKN
IITIFGNEYEYENHYFSKIINLTEKEHQKYINSESMFYFLNIGTNLVICTILSFGKIELN
NNRITHGQVLVSFIAYSSMLGLGIVGILKLDKDVNLLKLSIKKIYDILDFSSIEI-----
-----NNSITNSNNQLSNKMTNSICDQISDISLS
NTSLNNDNNDNNDNMQLGNSIRKGD I-----IETNNTVCE
KIEGSLKFENVNFTYNKFDQDK-KLILKNINFEIKKNEKIAI IGKSGSGKSTIWKLLTRE
YEYEGNIIYDNFNIKNFDKTYLKKSILSITEQECCILNRSLYENIVYALLPTKISD----
-----AKGMKDLLLLENIGDLKRLDDELK-----VN
NSNNTNNDKLNNDCTNKTFTVNENKLEKKIINNIEDIQNY-NYMLLEKYG-DKINTINS
TIDILCKELNLNDFINSMPQKILTNVNNNAMSSGQQRQISIIIRSLMKNSSIYIFDEITSF
LDESNDKVVYNLIHTLIPKTIITHITHSLKHLKEMDKIIIDQGTISAIGTYQELNHNPL
FLEIFSL-----

>P_berghei_ortholog
XX
XXXXXXXXXXXX--DNYLFRALYEMTN YE-----KTLLSISLVFLGIN
AITNLNYPKIMGECLEGENF-----K
FCRPNVIVKILQKLNILEKFKLNS-NKSLSAILYFLPYFICGGIASYFRLYFTNCKICKI
EYRLKKQVHNKIISETDENFKKYKSN DYLVNCLFNEIQFSSKELITSITQMLRYINSIVG
GIMSMCLISPYLTKFCIFIVPTYGFCILII LKKLNKIKIEINNFEKQMERFSDSLQKKN
IITIFGNEYEYENQHFSKIINLTEKEHQKYINSESMFYSLNIGTNLVICTILSFGKIELN
NNRITHGQVLVSFIAYSSMLGLGIVGILKLDKDVNLLKLSIKKIYDILDFSPQI-----
-----NNNTTSFNNQLSNKNTINSVCDKIDDISLS
NINLNN-----IQLENSIQND DI-----VEKNNIICE
QIQGSLKFENVNFTYNKFDQDK-KLILKNINFEIKKNEKIAI IGKSGSGKSTIWKLLTRE
YEYEGNIIYDNFNIKNFDKTYLKKSILSITEQECCILNRSLYENIVYALLPTKVSD----
-----PKGTYLLENIGDLGRLDNELKANISNN-----TN
NANNKNHYDKLNNCTDKFTT IENKLEKNF INNKLEDIQNY-NYMLLEKYG-DKINTINS
TIDILCKELNLNDFINSMPQNILTNVNNMSGQQRQISIIIRSLMKNSSIYIFDEITSF
LDESNDKVVYNLIHTLIPKTIITHITHSLKHLKEMDKIIIDQGTISAIGTYQELNHNPL
FLEIFSL-----

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
1%	38%	15%	14%	28%	23%	23%

■ PHYLOGENY AND PEXEL/VTS



Expected likelihood weights	0.0750	+
Shimodaira-Hasegawa test	0.9880	+
two-sided Kishino-Hasegawa test		+
one-sided KH test	0.1400	+

[illegible]

SCHINNAMKHNHIFLINNYCYVILASSDVNKIYEFIKLHLATDTNFDENTKMDNVQIVSH
FCGNVLNQVATLDAVNGRLLFIQQYIHKNDNYNETNKNEEHQKKSPN-----
-----VFLNNYSNQNNND-----DTLKFKINYLT
IMDLKSENKDIIEYVQYMKNKPELSIYQPMHISFDEHSNLYYIVQHGSNGSLNFIISP
QLLVYTYTLKIKNFYSGWLLNSDNEHENKGIVLF--GEYPPYEDELHIWDITNFQHRKYL
NIIKTY---

>P_yoelii_ ortholog
MITPSADGIETERRTYFKYFIIFLFIFIFTSILQNEKEEEEETKGQQNKVNLQRQNDNY-RN
PEFIYLRNINHLKYKSAIY----ITPNRKIMPSITYYN-----NCTIYLEGYGNI
FNNFENVSLGINKINNDHIIYVTDKDNINNDK-----NII
CMNNDGSKDSCAIINTILIDNYFFKNINISSCNDN-NELCFFVFVQLKKNKCYNFNNLSN
SCHINNAMKHNHIFLIKNYCYVILASSDVNKIYEFIKLHLASDKDFDENTKMDSVEIVTH
FCGNLLNQIATLDAINGRLLFIQQYIHKNDNYDETKKNEEYQKKSSG-----
-----VFFNNYSNKNNTDD-----DTLKFKINYLT
IMDLKSENKDIIEYVQYMKNKPELSMYQPMYVSFDEYSNFYYIVQHGNNGSLNFIISP
QLLVYTYTLKINNFYSGWLLNPDSEYENKGIVLFGAGEYPPXXXXXXXXXXXXXXXXXXXX
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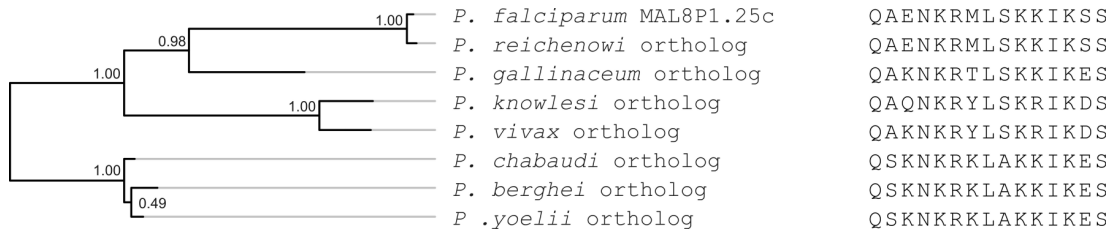
>P_berghei_ortholog
MITPSADGIETERRTYFKYFIIFFFIFILTSLLQNEK-EETNAQQNKVNLQRQTDNY-RN
PEFIYLRNINHLKYKSAIY----ITPNRKIMPSITYYN-----NCTIYLEGYGNI
FNNFEDVSLGINKINNDHIIYVTDKDNINSDK-----NII
CMNNDGSKDSCATINTILIDNYFFKNINISSCNDN-NELCFFVFVQLKKNKCYNFNNLSN
SCHINNAMKHNHIFLIKNYCYVILASSDVNKIYEFIKLHLASDKDFDENTKMDNVEIVTH
FCGNLLNQIATLDAINGRLLFIQQYIHKNDNYDETKKNEEYQKKSPS-----
-----VF-NNYSNKNNTDD-----DTLKFKINYLT
IMDLKSE-RDIIIEYVQYMKNKPELSMYQPIYVSFDEYSNFYYIVQHGNNGSLNFIISP
QLLVYTYTLKIRDFYCGWLLNSDSEYDNKGIVLF--GEYPPYEDELHIWDIINVQHRKYL
NIIKTY---

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
79%	45%	9%	9%	14%	15%	19%

■ MAL8P1.25

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_MAL8P1.25
MLKFFVXYLYTAAILDEEITTDIKIKEMLKGRQSLSFLLSVPYFFLFL-W--NEDIKQ
SLLPVSYASHQMSYFQDKLTPHEIKSDLKKTFSNFISSKIQVLKNKFKLYDIKNREKYNNE
EGNDSDLIGDAYISSLEDEIKHLLQEAENKRMLSKKIKSSYERAHKNLKKRRNVE-----
-DDGKMKNVLKQNLQHDYLNKKS DYLEKKAGELKNILERRGNENA---KEGNDNDEKNI
YNNEYHNNCSISKRGTLKFINSNGLKHSIDNVGMINENGFTIFYKNKKKMTYFWSVLE
LPIKMGISIEQCQFYFYKNNNQIFCADNKAISWMMNSLSEASLCFHFQIGVLINSNIN
NINKNDMMNTNDENVKHSDFMNNISNGIKQGKKNKQKKIDENSLTVDIKPEDTGTRIFV
NDVEQKINKDVPFGKDNVFNLDIKKKMDDERKTPQSENDEQ-----QGGYDKMEE
NEKEDTQMDN-----DDYEM

>P_reichenowi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXKGRQSLAFLLSVPYFFLFL-W--NEDIKQ
SLLPVSYASHQMSYFQDKLTPHEIKSDLKKTFSNFISSKIQVLKNKFKLYDIKNREKYNNE
EGNDSDLIGDAYISSLEDEIKHLLQEAENKRMLSKKIKSSYERAHKNLKKRRNVE-----
-DDGKMKNVLKQNLQHDYLNKKS DYLEKKAGELKNILERRGNENV---KEGNNNDENNI
YNNEYHNNCSISKRGTLKFINSNGLKHSIDNVGMINENGFTIFYKNKKKMTYFWSVLE
LPIKMGISIEQCQFYFYKNNNQIFCADNKAISWMMNSLSEASLCFHFQIGIK-VLINSNIN
NINKNDMMNTNDENVNHSDFMNNXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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>P_gallinaceum_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXLLNVYIFSLFFPFL--NNKIKQ
TFLPVSYPYTHLYSFEKLTTPHDIRSNLKRITISNFIITTKLENIKNFKRK-----ND
KNNDINDIKNEYGTSLEDQIKSLLQQAQNKRTLSKKIKESYDRALKNLKKKQSGV-----
-DEEKIIKILEHNLEQINYLKKS SHYLEKKAELKKNLENTNENS---KQ-----
-----NNNCNISKTGKLFVTS SNGLKHSIDNVQGNINQNGFTIFHKNKKKMMYWNIE
LPIKMGISIEQCQFFFIYRNQILSADNXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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>P_knowlesi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXRSVKS RVTLSLAFFLLTC-LSPHGKANCQ
SLLPVSYATHQLYSFDKLTPEVKS DLKKTLSGFITISKLKDLQKKFYDYKGYGSHGH-SS
SDEQGETLRSYDASIEEEVKALLGQAQNKRYLSKRKIDSHDRALNLRNKRNEE----G
RDEERTKLLQHNLEQINYLKKS SHYLERKAEELRNHLKSSNSKNYNYQQE-----
-----GRNCDIYKIGLKFVASSNGLKHSIDNVRGKIDNSGFTIFYKNKKKMTYLVNLE
LPIKMGISIEQCQFLFAYKNNQILCTDNKLAASWVNSLAEASACYHFQIGILVNT---
-----NNVKNIQELGKSRKDDADGKMLVVDLKPEEDTTRVFN
NNHEQNVQD---GDDGVIDLNKIKRNMEEEGTKKLTQEEVPSGEEKADTEGVVEEMDE
TQVVDENG-----GAQTGDEDAE

>P_vivax_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXRSVKS RVTLSLAFFLLTC-LSPHGETNCQ
SLLPVSYATHQLYSFDKLTPEVKS DLKKTLSGFIASKLKDLQRKFYDYKGYGTHGR-GS
SDGQGEVLKSDYDASLEEEVKALLGQAQNKRYLSKRKIDSHDRALNLRNKRSSNGE----G
SDEEKTRKLLQHNLEQINYLKKS SHYLESKAEELKRHLKSGNNKNYNYEQE-----
-----GRSCDIHKTGKLFVTS SNGLKHSIDNVQGINNSGFTIFYKNKKKMTYLVNLE
LPIKMGISIEQCQFLFAYKNSNQILCTDSRLKTASWVNSLAEASTCYHFQIRGMLVNT---
-----NNVKSQVEKIGKNRKKDAGDKLLVVDLKPEEGTTRVFN
NDREQNVQD---ANGGVIDLNKIKRNMDEE--KRRRGTRREEVPSGAEAG----EEMMGD
AEVVDSDASNSGTTDDGDA TDDGGAQAGDEDAE

>P_chabaudi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXMKKSIRISYILFSLCL-LIRNG--ICQ
SFLPVSYATHKLYSFDKVSFNDIKSNVNNIVSNFITSNLKVIKNKIDYNSY---Y-KN
NDEYDSLTONYDASLEDEVKSLQSKNKRKLAKKIKESYNRNLNLRNKRDKNDNYQ
DDDELLQNMLEHNLEQIHSNLKKS EYLENKAMELKKYINKSQSSNY---ED-----
-----YKNCNISKTGKLFVSSSNGLKHSIDNVQGINVHNGFSIFYKNKKKMTYLLNIE
LPIKIGNVQCFSFVYKNDQIFCTNNKLTLSWVNSLSEASFCANFKIKGILMNL---
-----DNIDK-----ESFKNIKDNLLRVHIKPDEKGTQVFV
NGKKQNAKE---NGGVINLNKIKQAEDEEKISKKEMLKDD-----DESEQ
NEEYENN-----DDNLI

>P_yoelii_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXRKMSSIKISYILFVSLCL-LIRNG--ICQ
SFLPVSYATHKLYSFDKVSFNDIKSNVNNIVSNFITSNLKVIKNKIEGYNSY---YKN
NDEYDNLQNEYDASLEDEVKSLKQSKNKRKLAKKIKESYNRNLNLRNKRDKTNDNYQ
DDDEITKNMLEHNLEQINSNLKKS DYLENKAMELKKYINKQNLNNY---ED-----
-----YKNCNISKTGKLFVSSSNGLKHSIDNVQGINVHNGFSIFYKNKKKMTYLLNIE
LPIKIGNVQCFSFVYKNDQIFCTNNKLTLSWVNSLSEASFCANFKIKGILINL---
-----DNVDN-----ESYKNIKDNLLRNIKPDEKGTQVFV
NGKKENAKE---N-GVINLNKIKQAEDEEKISKKEILKED-----DESEQ
NEESEDN-----DDNLI
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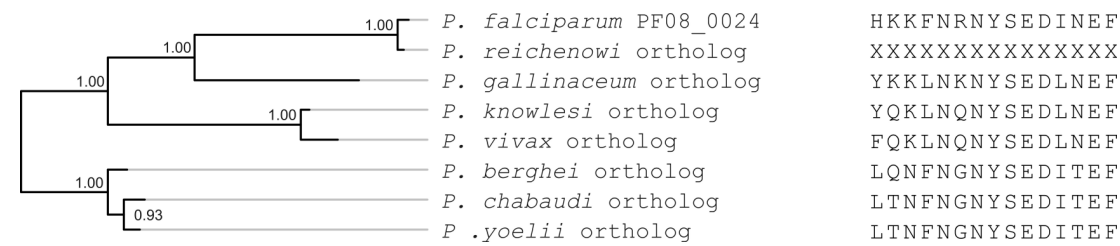
>P_berghei_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXKMKSSIKISYILFLFCL-LIRNG--ICQ
SFLPVSATHKLYSFDKVPNDIKSNVHNIVSNFITSNLKVIKNKIEGYNSY---Y-KN
NDEYDSLIQNEYDASLEDEVKSLQSQSKNKRKLAKKIKESYNRALNNLKNRKDKTNDNYQ
DDELLQNFLENNLEQINSLNKKSDYLENKAMELKIIY-KKNQSNNY---ED-----
-----YKKCNISKTKGLKEVTSNGLKHSIDNVQCIINHNGFSIFYKKKKKMTYLLNIIIE
LPIKIIIGNVEQCFSFVYKNVDQIFCTNNKLTLSWVNSLTEASFCANFKIKGILINL---
-----DNVDN-----ESYKNIKKDNLRLRIHKPDEKGTQVFV
NGKKENAKE----NGGVINLNKIKKQAEDEEKISKKEILKED-----DATEQ
NEEYEDN-----DDNLL

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
27%	46%	19%	22%	21%	21%	21%

■ PF08_0024

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

>P_falciparum_PF08_0024
MRNIIFLFCLILFLVCFCQGHKNYLKRDNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
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T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_reichenowi_ortholog
XX
XXXXXXXXXXXXXXXXXXXXKNKKKENYLS-KNINEQENNRINNN-EKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_gallinaceum_ortholog
MK--ILSIIIVSFISLCKSHRSFSKKNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_knowlesi_ortholog
MR--VISLLSVICLVSTCRGHRNLFARNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_vivax_ortholog
MR--VLSLLSALCLVSTCRGHRNLFARNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_chabaudi_ortholog
MK--ILVVISFVCLVAFPCRGHKNFSRRNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_yoelii_ortholog
MK--VFVVISFVCLVAFPCRGHKNFSRRNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

>P_berghei_ortholog
MK--IFVVISFVCLVAFPCRGHKNFSRRNNYLQYLRSTFLQERSKHKKFNRNYSIEDINEF
DDYDEETDNLDNKISDEIKNKKKENYLS-QNINEQKND SINNNNEKKLTFKNIENEINS
T-DTFMDDS-NVKS LGKTKECNVNEKGLDVLNSNDFFNMKNYVEITSSNIIKDKN
IKIIEIPFEHIKLPITTIETRETCWYIKTTNDKILLCDKEKEERDIWITNLKALFCYN
TNNLII---VNKEKDDTVSLPKESTVDKRINALKEKETIKSSDNNTSTNDNK--VNNITI
SNLSDHEPKIVFN

■ AMOUNT OF MISSING DATA

P. reichenowi	P. gallinaceum	P. knowlesi	P. vivax	P. chabaudi	P. berghei	P. yoelii
26%	5%	7%	7%	10%	8%	8%

■ PHYLOGENY AND PEXEL/VTS

[illegible]

[illegible]

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-----DVKGVNNYV
YNFKDIRLFIKYFLLCFKENQXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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>P_berghei_ortholog
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ENDPRSLSNLVKKKS-----KEEIEREKLEEKQ-----NSSNNKE
TTNNTIPYSYDYDRIFKNNKFLQ-EKIHVKDKFSLKDDKTKLIDTYNVNIMNDILNNHQ
DSEIPFYKGRDKYFGREDLNQED-----GPNFGKEH
ETDIANGENNIKENYL----VEDLESVNFLRKIKSDFHFERDEYIQASIKQIEENVVKG
-----EKDNIIYENTKLNENRTKIEYGNKRDIEE-----E-EVRQCISN
RIH-NYEDKDVINKILSRKFVNMFSDDEVKKINEKIKTSKNINEILDIFSKEKRLNIIN
IMYIFIYMYRYKNININEYLYDKRLRYITNGLEELLKHYLYII-----
-----NXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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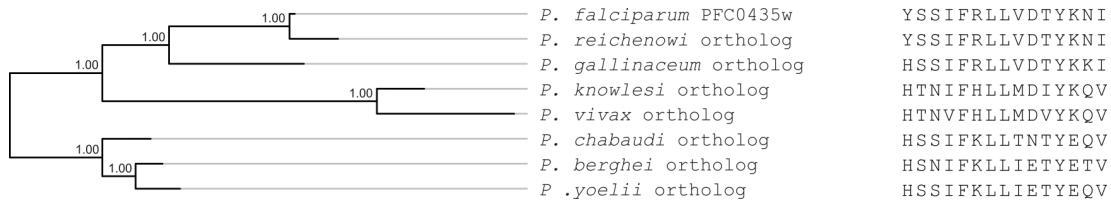
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
19%	70%	18%	18%	70%	73%	33%

■ PFC0435w

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

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>P_falciparum_PFC0435w
MKV-GIIFFC-----LFFVVLGACNNVKERIFKNIKRRTKFIILNEPIVDLSFSENLFH
TLFLDLDVD--KNLYTLDESLLNLENLYSSIFRLLDVDTYKNIKEN---EDDNKNIRYIFL
GTSFSRIHPLNFEYFLRKLNKYIYNGNIYEKGNVDIRGILEEYNKEIEKKLEKQKLNKI
KDKNNNNNNNNNSKFDGDNEDFNKNNDLYNPSDKLYNNDDIDVHQLLEEIIITKEKRF
FLNDDDDNDSNDKYILKT-----DEVNKYKGFFIGYGFNDIPSVIHYNFDKNFLF
PSLNSGIIIDITLLKNIYEVSNILLSNNEKDQSIHIDIYEVTKYIKENLRVRLTHSENV
CLNEEQNIHLLDND--PNNFEIYKYYQVLNLFKDYNNKNTQEQKYEKIGHENVRHEETSSEG
NENLN--RNTKHNNDNNNDNNNYSEDAIAELLSSYFNVFYPISTCMCYIRSRSKHSMDYD
KYHMINLENDIKLKHYIKETEE--IHFSNIEEYKMKLNIRINY--KYDTLLEEHEENLVTHKN
ILIGIKTSINTEEEERIPHINKNTYDNKENTQIIIFNTFNYD-----NKL
KEKNFTG-----FYNNSSLQNALENDNIDLDIYMSDKESQKYDNLYFNS--
-----KVTSKEGLCEKLKHMIIYYYEYVMKNSEK-----KYFFIADDD
TFVNVKNLIDVNTLNTCSHKKYMYDKYIKSYDFVKEANEALFLQNFPPKTLFLYSYLK
DTFAKTIQTLKKYDYPKYCQGGILSKKHNNDSDDDDHHVGNKQNNDSSTNHQDIEKNQ
VNVINNNNNNNNAKASIPYILGRRYSYNTFSTNSNEYFYDYLTGGAGILINDETAKRIY
ECK-----ECTCPSTNSSMDDMIFGKWAKELGILAINFEGYFQ
NSPLDYNKKYINTLVPITYHRLNKNRRTTKESRDMYFNLYVN---YNRNDKEQNKDIYVD
YLDNRHKNMIDNVFHYFFYVNMNMYDE---KNKVVTKIEHNADMNSKKNKSNPQKLNNNT
QGDKNVNDNENVDNENKGDENVKGDENVKGDENVKGDENVKGDENVKDDENVKDDENI
KGDNNYVNDNMENIDDIINMVEVSDDDV--MERNKKGTDKEKKDDKNHNNKEKATDVKKS
SVPTNIDKNEDTTKYVIKMEKIYNRMQESGKYQLFDINKFFKKEIEGHPYPFOKIKKK
NEKAKKEKEKKNQLKKQDYTNNTYFHTS--NMQGNFNQQKMGNYQONQENEENDFFDQRP
IEEDAINPMDYEEYEMENLSNFE----DDGEPYDEYD--DYDDFVNTINADKLKINDQNKH
LYEQIKD-----I
AQPPVNFQNDQNSNTFDFDTDEL
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>P_reichenowi_ortholog
MKV-GIIFFG-----LVFFVVLGACNNVKERIFKNIKRRTKFIILNEPIVDLSFSENLFH
TLFLDLDVD--KNLYTLDESLLNLQNLNYSSIFRLLDVDTYKNIKEN---EDDNKNIRYIFL
GTSFSRIHPLNFEYFLRKLNKYIYNGNIYEKGNVDMRGILEEYNKEIEKKLEKQKLNKI
KDK--NKNNNNNNSKISKDDNNDFNKNNDLYNPSDKLYNNDDIDVHQLLEEIIITKEKRF
FLNDDDDNDSNDKYILKT-----DEDNKYKGFFIGYGFNDIPSVIHYNFDKNFLF
PSLNSGIIIDITLLKNIYEVSNILLSNNEKDQSIHIDIYEVTKYIKENLRVRLTHSENV
CLNEEQNIHLLDND--PNNFEIYKYYQVLNLFKDYNNKNTQEQKYEKVEHNNKHEETSSEG
NENLN--RNTKHNNDNNNDNNNYSEDAIAELLSSYFNVFYPISTCMCYIRXXXXXXDTS
NYYLNPIDNDIS---HISQGREPLNFNSFDDQKEDDYRNNVITYDHDIQENNNITTHNN
-----NNNNNNNNNNNNNNNVYTNDIAYNN-----NLL
KDENYFYKYNDDLDCEIRIYHFFSKYFINKILYADNIDLDIYMSDKESQKYDNLYFNS--
-----NVTSEGLCEKLKHMIIYYYEYVMKNSEK-----KY-FIADDD
TFVNVKN--IDVNTLNTCSHKKYMYDKYIKSYDFVKEANEALFLQNFPPKTLFLYSYLK
DTFAKTIQTLKKYDYPKYCQGGIISKKHNNNDG---DHHMDNKQNNDSSTNHRDIEKNQ
VNVVNNN-----KAKSIPYILGRRYSYNTFSTNSNEYFYDYLTGGAGILINDETAKRIY
ECK-----ECTCPSTNSSMDDMIFGKWAKELGILAINFEGYFQ
NSPLDYNKKYINTLVPITYHRLNKNRRTTKESRDMYFNLYVN---YNRKDKEQNKDIYVD
YLDNRHKNMIDNVFHYFFYVNMNMYDEKNASQKNKVVTKIEHSDMNSKTNKSNKTQRLNNT
QGDK-----NVKGDVNMKGDVNMKGDVNMKGDVNTI-----DVNT
NGDENNYVNDNMENIDDIINMVEVSDDDNDMERNKKGTDKEKKDDKNHNNKEKATNVKKS
SVST--NIDKNEDTTKYVIKMEKIYNRMQESDKYQLFDINKFFKKEIEGHPYPF-----
-----XXXXXXXXXXXXXXXXXXPE
IEEDAINPMDYEEYEMENLSNFE----DDGEPYDEYD--DYDDFVNTINADKLKINDQNKH
LYEQIKD-----I
AQPPVNFQNDQNSNTFDFDTDEL
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>P_gallinaceum_ortholog
MNLFSNSFFSFPSLIIHFFFIL-----SSLFLFIHRFFVFLLLNEPIVHLSFSENLIH
SLVFDLEND--KNLYTLDETLLNLENINHSSIFRLLDVDTYKKIEED---KDDRENIRYIFL
LTSFSRIHPLNLEYFLRKLDKYIYNESIYKKGNIKEILNEYNNEIEKMEKEEIEKK-
-----KNGEQININD--IEKIRNEKIF
FLNDD--KGSDDKYVIK-----DSIYNGLFIYGLNDESPSIHHYNLDNNFYF
PYFNSGVLIDITLLRNIIYKKSLLTNTFE---IINIDYIEVSQFLKENLNVKLTTFQNT
CLNDEKNIHLLDND--LNNFELYKYYQVLYLFKDLK-----EKPQKDNNEEN
NQNIETKNDKENNTEKNYNQKNEDNELAELILSYFNIFYPISTCISYSIRSRSNESLLGYD
KFHLMNIENDTKLENYIKETED--ITFSNIDYKMKLNKVVN--KYDYLLENENTLGYKN
ILIGVKTSTINT--EERIPYIKNTYDNEENTKRIFNNFNYNYES-----QL
KEKQHG-----ILSNEFLNNVFHSEIRINIDVIYMSDKKSTKYDNLYMDT-
-----KITSKDGLCEKLKHMIFIFYEYVVKNSEK-----KYFFIADDD
TYVNVKNLIDVMNLTNECEHSSKKYMYNKYIKSYEFLEENEPFLQNFQNKSIILYQYLK
NNFLKTIINSLKKYDYPKYC-----FSEKN---YYDYLTGGAGILINEETAKRIY
MCD-----SCICPTKNSFMDDMILGSWAKELEILAINFEGYFQ
NNPNENYKILYNTIVPITYHKLNDKNVEETKKVYFDKLVN---YNK--NYTSTKSLQVD
YLDNRNYKNMIDNIFHYLYYNTIY-----
-----
-----TIESNKN---IINMKNKIYNKMHEKSNFNHFLDLNKKFFKKQINDYEHQTSQGY
KSKK-----KIKKGYSNNYIEKNNSNLSDLKWKQD-----
-ENESKSSYDSEELY-----EDYEDYD--DYEYLEKI-----
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[illegible]

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>P_berghei_ortholog
MKI---ITWLLPLLVIN--IVIKCNNKIKDNIFQNLRRKTKFLVLNEPIIDLDFSENLFH
TLFPDLEIY--NNIYTLDKTLLNLEKSNHSNIFKLLIETYETVSKENEQANDENKIKYVIL
ATSHTRLHPINLEYLLLFNKYIYNQNTYQNGDIDIKAILQEYNEEINESLEKKKKINNI
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-----DSSDKFVKKNNISRNLN--NYNNQYKGMFVGYGFDNDESFTFHNLENKKILF
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CLDTKQNIYIINKE--NTEFDVYKYLTALFQDYD-----
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KNQKETS-----VINTDLLKSGFDNENIDIQIFYISDIESKLFNTLKYDT--
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----KDEKNNN----ISKINKKIYAKMEYNGSYKKLFNLKSKFFKEE IENIIQFKYNKKN
GTR-----KEKFNYVNNYVVENTEIKTNQNYENE-----E
LVQDYFPENSEED-----DENDLFSEDDFDYDEYIKDIEN-----

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
10%	30%	27%	29%	30%	30%	88%

■ PHYLOGENY AND PEXEL/VTS

[illegible]

YLLKYDINTEFNNEEFLHNFFYEEDNETVXXXXXXXXXXXXXXXXXXXXXXXXXXXX

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XT_chabaudi_ortolog
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 DYDSLWSMENSINKKLSRSKSNSSGKFNCFSSFGKHAIVLSDSDEEDAFE-----S
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 SMHMRSSYFPLINIRNEYRLNYLNPAYLSDINYSNNVFPNFYIKNNPICKHVDRNLGK
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 -----RTNINNSIFCTSPVSVVPVNRPMRSINDVYIRAFI
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PF_Yeoelli_ortholog
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 HNFKRTLDVNIITDKSTIKYRSDPYFKKHHKLYGSKFFKVPKKRLITDYEFEMFSHDV
 EYDSLVSNVQLKSLKSLKSLKSSYSSSKMRNPFKMEEDLTSNISKSDYSEDEEESIS
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 LKKNFLNGLFTGATFGSYLGLANMEDVTIGYQNVSKYRHIIKYIPKIV-TSKLAKLRDFK
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 SHMRSLSFLILNIRNEYLYNKNIPVHSLDINSVNNPPFYNIKHNPCKHVPSHNLGQ
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 DNLNINTVDNLINSNVINHYTKVPIPKNNPVDAYRLHYRTLNNFSIPIGRISVGNKK
 KLFSLSLSTPKISRDEAIIEYIENYKNTPIQNYLMLNLSYIKYENHILTKPAKEYKHQ
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 DVNACFTVSAKTLNLGNIFNVNSRMDPETI-

[illegible]

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
60%	6%	15%	15%	8%	7%	10%

■ PHYLOGENY AND PEXEL/VTS

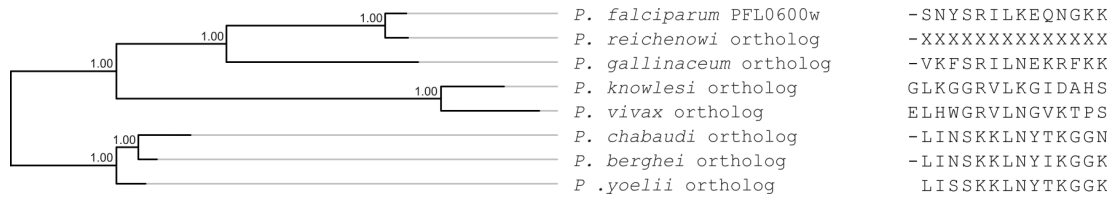
[illegible]

[illegible]

[illegible]

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
26%	86%	30%	34%	73%	32%	33%

■ PHYLOGENY AND PEXEL/VTS



- ALIGNMENT

XP_falcaripum_PFL0600w
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KNDKTHM-----KDNSLENKEKEGIGDKQGEKEKEKIIILDKNKLDEBKLEK
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INCNEIMNIIQENLYNLVFKIQYLVKKAINDIKE-----ISLKNMNDYISYNNKINKI
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>P_reichenowi_ortholog  
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LSLNFL
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xP_yoelii ortholog
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 -----NV-----SLISNKAITPKNQVQD-----
 -GINEKSPKNGSKIEETLGRKNETKEGGETDKGEE-----NDDRNR-----
 -----KIEGYEIVL-----ELNKNPKDALKNQVRYTEHLKNMDDMKI
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 YKVFYNNIIEEHLHLNLNKLQFLKALNDIKD-TISKQTNINDIYSIDYNNINFI
 SYVEKLNNLQPKNYFIITYDN-----IKEK-----SNILNFNYDISIDYKQNAIKI
 IDYLNKFSDQLTKKKKKIKYKINEKHEYNILKIIDNQKQIEVLQEQLESSIDGSNEK
 YSFYCYAISYRIPDNLNISTQYLKKFKFNKLCNIPDSSMHLGSGYGFVKALPFGNLGLS
 FSLNF

XP-berhei_ortholog
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-----INRYFYIHNHW-KRRKRTNYKLHH-----YKLCSIFSIFKKQNDKNNAN
ETTKKNV-----PLITNTIPIPKNGIQGK-----
GINKNNNTGNIKSETKSEKKI-----DINKNDE-----NNKISH-
-----KIEEYPEIVL-----DLNKNPQDALNKIQYTEHLKNWMDMKI
NLNNIIFYFKTKEIEKDKFKFFFEYIFKEEFKNVYKITINEIKMKHMYENTKYEYLAN
YKVFKNLNIIEEHLHLKLKLQLKLKALNDIKD-IISKHTNNTYEVSVNNNNINNVIF
SFEKELKNLQPKNYKITFYTDN-----IEKK-----SNMLINFNNDISDKYQNVIKI
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FSLNCF

XP_chabaudi_ortholog
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-----INRYFYIHNWK-KRRKRNRYLQH-----YKLCSIFSFKQDQDEGEEK
KT--NV-----SPISNQTATPKSDTQK-----
-GSDGKGKVENVIKEAGKKN-----DKIRGE-----DSQTSH-
-----EGEYTEIPLV-----DMKNKPNQDAIKIKQYTEHLNWKMDKMI
SLNNIIFYTKTYIENNKDFKMFFYIFKEFEKNYKVYTDLEIKMHYDNTKNEYLAN
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LSLNF

vP_gallinaceum_rthrtolog
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>P_vivax_ortholog
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 FSLNF

>P_knowledsi_ortholog
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 FSMNF

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
69%	11%	17%	9%	14%	14%	15%

- PHYLOGENY AND PEXEL/VTS



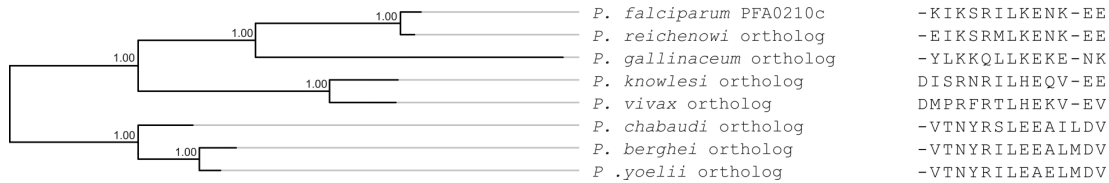
- ALIGNMENT

- AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	15%	3%	3%	5%	4%	15%

■ PFA0210c

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
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IPKFIQNNILNQIFPDLIFNLHNTSIAITNKTIVGTIVDLSKNEQNAWHAHSLKNVKPDT
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FNKD

>P_reichenowi_ortholog
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VPSQ---AQADAENVLENAPENLRKTSATLINDGMLNYLLNFCQDVNNKTFPFNECTNL
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FNKE

>P_gallinaceum_ortholog
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YNXX

>P_knowlesi_ortholog
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V-EEENE-----SVVREINGNDVNVSGNSDNA-----NDIAEY-EETIKG-----
-----QASTQEELPQQSVGTVKVSPLIEKDTIDHYLDVCTRIRNKTFSLENCEIF
YKSPVETLYKNILEDKSETRYDLIGYGTLDVSLYGGSQLNNIDIIKEWNKNIYKLNLY
KLNKTSILEKFKDGQKIDPSKYILQNEHLREN--RRYIYLINGLPWPFPKSQDTIYEFYQK
YIEDQNILLVANKSVNNVFTDSSYYTRIRDYENFFCLYPKNKNSYKGLDYVISVYDVN
IPKFIIRNNILSQIFPALIFDLHKSSELTEKGLS---LSSEEIN--KNQLPFPQM-DNF
SEDGAGGLAGMDGQVAK-----SPFFGSTVLRVIFVDPFFYIWTNNVFFKKIVVIV
TSIF

>P_vivax_ortholog
MILKSKLLAVSLLALVE-YLCRDGRKRWMLLSRWEATPYGGSVDGSDVGLGQTGGGK
AAHIFALKSALQFANGYEEVRQKGRSGRSGRERRERRERNVPVCILPDSMPRFTLHEK
V-EVEEE-----LLQEKTAADDMMNVSGDADNT-----NNKDEYGOPLIKG-----
-----QTATEGVLPPQQTIVATKVSPLEKSTIDHYLDVCTQIRKKTFSFKNCEIF
YESPEVTLYKNILEDKSETRYDLIGYGTLDVSLYGSQALNNLDVIKWNKNIYKLNLY
KLNKASILEKYENDEKIDATKYILEKEHLREN--RRYIYLINGLPWPFRSHDTIYEFYQK
YIENQNMLLVANKSVNEVFSNYSYTRIRDYENFFCIYPKSKNSYKGLDYVISVYDVN
IPKFIIRNNILSQIFPALIFDLHEVSKTITEKGLA---MSSDDIK--KNELPFPQLKDNFS
PGEKGAGQDGKEGQDGK-----SPFFGATVLRVIFVDPFFYIWTNNVFFKKIFVIV
TSIF

>P_chabaudi_ortholog
MNFKHNKYYFLVSLFVLAKY-----NNFVGSCKS----
-----TN-----VTNYRSLEEA
ILDVENVKENQKYLEQAKIEEALNV-----EA-----NTEKESTQTLVKTI-----
-----KSEILTE--EKIAINEKSVFINDELVTYKLNICDSVRNNTFSNENNEFF
NKSEDCITLFKNPVD-KNKPNEYIVGHGKLDVSLYGMNIALRDLISAIREWNTHISYLNLY
DLTKDGIEDKMKKNESIDPSKHTIEDTEIFNN--NSYLYLVNGLPWPFRSHDTPYEEYQK
YFPDKNMLLVANRSVKKAFKDVSGYTRIRNYENFFCLYSKNKDIYSPGLDYVASIFYDVN
ISAFIQNSILNQLPFKLIFDLNATSRKYTQAGLS---MSEEEKT--TYQLLQCKTHNX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXX

>P_yoelii_ortholog
MNFQKNKYYIFLVSLFVLAKY-----DNNVGPCNLKNSL
NGESYISKNLIFYKN-----VTNYRILEAE
LMDVENNVKENLKYVQAAMEENELNV-----EG-----NAQKESPVSRVKS-----
-----KSEILIE--EKTNLNETSTFITDELISKYLNICDSVHNNTFTYNNDESF
NKSEDCITLHKNLVDEKNNSNYEIGHGKLDKDVSIYGMNIALRNLISAKEWNTHISYLNLY
NLTKETIENKIKKHEQIDPSKHTLNDTELSNN--NSYLYLVNGLPWPFRSHDSPYEEYQK
YFPDKNMLLIVNRSIKNAFKDVSGYTRIRNYENFFCLYSKNNDMYTPIGLDYSSILYDVS
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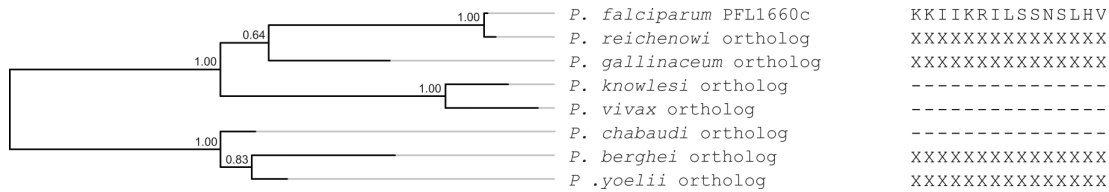
>P_berghei_ortholog
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NEESYISTNLISFKN-----VTNYRILEEA
LMDVENVKENLKYYVQQAQMEENELNV-----EG-----NAQKESPIPSVKS-----
-----KSE-LIE--EKKKINETSAFITDELVTKYLNICDSVHNNTFIYNNDSEF
NKSEDCITLHKNLIDEKNNNSYEIIIGHGKLNDSVYGMNYALSNISAIKEWNTHISYLNLYL
NLTKETIEDKIKRHEKIDPSKYTLNDANMLNN--NSYLYLINGLPWPFRSHDAPYEYYQK
YFPDKNMILIVNRSIKNAFKDVSQYTRIRNYESFFCLYPKTNDMYTPGLDYVSSILYDVS
IPPFLLKNSILNQLFPPKLIIDLNLQCSRKYTKVGLS---LTDEEKA--SYLLSLQIKGDNX
XX
XXXX

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	26%	30%	16%	26%	26%	26%

■ PFL1660c

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_PFL1660c
MLFLLHIYPQNSVAYVSNVFPMTYIYPSFTFVSFLLFSYLSFHSFTYILKYEKKIIKRIL
SSNSLHVHNSFVKNDIERNIIKDDKNDENIDNINKQYMSDEEKIEKKEKIEKNEKIEK
NENGDPHPQLFQHNYNNLNIRHNNNQMLDFLSSVQKESRR--FYSINLKEKNFRWSMILS
IGSKKDLELGILTNSNITGLYCSYN--YKDNDELKNLKYDITLSEDLKYVECKSIMCDN
VEHSSPCLPLENYFKLINDYKIRKRSQNKFCDYVNNMNFNLNMDIKLNDRLNLSICSFNTT
INNQIKIGFYFKDSFPLYKKIKTSFLYFACITESDPLHFNNKLSGFIGLANYNDEKHYH
NQNKKIYSTILYSFIYKSISKKNIFSLCFKQGGGFIITGGYDQNVLTKEEAPLSKIQ---
--LYSIDKNTNKKYVQQLNSV--DVYDLLWIHYAKNKSYYSLFLKNVTATMDQNMNSV
INAEAKVDSYNYFLSFPADITIKLKNFVHDKCPDQDQFNDCSNLIKGLIKLKNKNIKDF
PKIELLFEEGTIVHPEDIYIHESDGVYRVLI-NSSGELKLGIPFFLNKYLIFDNENERL
GVSKSECALELNDNEL-FGVDLSSNDPVEEKDDDDSMKENLFQKYKTHIILISSGIFVSS
IGSILYFS

>P_reichenowi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--EKN
NENGDPHPQLFQHNYTLNIRHNNNHMLDFLSSVQKESRR--FYSINLKEKNFRWSMILS
IGSKKDLELGILTNSNITGLYCSYN--YKDNDELKNLKYDITVSEDLKYVECKSIMCDN
VEHSSPCLPLENYFKLINDYKIRKRSQNKFCDYVNNMNFNLNMDIKLNDRLNLSICSFNTT
INNQIKIGFYFKDSFPLYKKIKTSFLYFACITESDPLHFNNKLSGFIGLANYNDEKHYH
NQNKKIYSTILYSFIYKSISKKNIFSLCFKQGGGFIITGGYDQNVLTKEEAPLSKIQ---
--LYSIDKNTNKKYVQQLNSF--DVYDLLWIHYAKNKSYYSLFLKNVTATMDQNMNSV
INAEAKVDSXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX

>P_gallinaceum_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXLNEFNFRWSIPLY
IGSKKTKIELCIITSSSITALYCTDS--FKEKDNLLKLYNINESIDLRYVECKSKSCDN
IL--NNECLPLKNYFKMLHEYNIKKKNCKDRFCDYINNMNFNLNMDIKLNDRLNLSVCSFNST
IDNDQIKIGFYFKDSFYINNTVKYFYDYFGCISESDYLKFNNEVLSGFIGLGN-----YN
ENNKKYPTIILNSFIHKSISKKNIFALCFVENSGLISFGGYEKSIL--KKKEHIPKLE--
INRRKIIIRDREEM--PVEDI--DQYEILWLHYSNPNKSIYNIFLKEANVNSKSKLINT
IKRDAIVDSKNYFLSFPADITAKIKTFIYNECSDKT--NECSRLIEKGIFELKNKNINNF
PQIELVFKXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX

>P_knowlesi_ortholog
MALIIPLFLTATLLHTQNVTC-----SADHFGEAIRKAFKVQRSVR
GDPGVNSAITSKRVNGASTTSGKNSLLE----AK-KREQD--YFTLKINEQNFRWSLPLL
MGSKKTPLELGIVTSTPITALYCSYN--AKPNEEMNNIKYEVNASEGVKYSISCKSRYCTA
IGQNTCAPIEHFFKMIHDFGLRKKNCTNRFCTYINDINFLNVNITKLDKRNMSVCSFSSN
LGSEQVEGFYFRDSFYLYDTVKFYKHFGCVTQSGVLTFNNVISGFIGLAY----NRADA
IANKESSSILHTLVQKSVSKKNIFGLCFVEGGGFATFGGINNEAL-RKVLVPSKLO--
MGFQHLGGEDPQAT-----SHEIVWLAYSdTSTKSTYSLLKEVNMVSTSNRVENA
IGRAVIDSYNYFLSFPAEITAKLKTAVNSCVGND--NKCSNIINKGVFTLKNQGVADF
PTVELVFDDGKVLIIHPKDYLIHEDGVYRVLI-NSEETLKLGIPIFFLNKYLIFDNENKGI
GVGPSDCTFEMKGVSPGVDSLATEADSNDDPEDKDFTIEDFFQENKLMILALITSLSVVGA
IVGVVFFFG

>P_vivax_ortholog
MGRIAPLLTLAELLYAHNATVC-----SAYHLGEAARKKACKY-----
-----GCTGKGNLVE----AKTQSEQD--YFTLKLSEHNFRWSVRLL
MGSKKTPQLGVVTSPTITALYCSYNASARESDQMKDLKYGVNESEDVKYVGCKSRQCTA
AQRGNSCPAPHNFKMIHEFGLRKKNCTSRFCSYINDMNFLNVDITQLDKRNMSVCSFSS
VGSEHIEGFYFKDSFYLHETVRCSYNYFGCLTQSDDLTFNNAISGFIGLAY----NRADD
MAHSKEPSMMHTLVQKSISKRNVTLCFVEGGGFASFSGGVNNEAL-RKTPAVSKLO--
MSSQHLEADAPLELVADQQA--PHQIVWLAYSdTSTKSTYSLLKEVNLVSGSKRVENS
-----YFLSFPAEITAKLKTAVHSSCAGGA--NTCSEIINKGVFTLKNQGVADF
PALELVFDDGKVLIEPQDYLIHEDGVYRVLL-NSEGTLKLGVPPFLNKYLIFDNENKGL
GVGPSDCTYKMKETFPGVDSLTPADSKGDPEDDCTRESFFQANKLITLALITSLSVVGG
IVGVVFFFC

>P_chabaudi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXVQDDEATD--FYNLKLHEKNFRWSLPLA
LGSEKSVVDLVLTIGNSSTAFYCHDE--TKPASETDLVAYDLKSKDLKYVDCKSAECTE
ILGSKNCLVLDYFQKLGKYLTRKKNCKSKLCDYVTSMNFLSMNDPSVDKNASVCPFDHK
IDSEQIKGFYFNDSFLLINKDKKITDYDFGCITENKSLNINADTYGVIGLITN-----N
HQADKKYSSILNSFVNSASKKNIFGLCLIEGGGFIISFGGHDKAAL-GPVPPPKEAVDTA
LDTSDYDD--SDLTYNKLLTSV--NESDGLIWDVYAGPTTESYKIKVTKINFVNTDSSSEHK
IDKEFTLDITYDFISLPKEVSTKLTEQIDKICKGLG--EKCKYTKESGSFQMASEHLGS
```

PILEFSFGEHKVMVHPQDYIIDNGXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XX
XXXXXXXXXX

>P_yoelii_ortholog
MSQKYLVIIVHCVFLLLNLFKTNCY-----SVQSHSNLKT
NNSQCIGCMNGKTKTLRNIESKNRINSSFLHVREDEEDNTFYSLKLNKFNFRWSIPLA
IGSDKTVIDLVLTIANSSTAFYCYDE--KKPSPDTETLGYDLSKSTDLYVDCKDETCTE
ILGSNKCILILEEYFKLLNGYVLRKKSCSKFCDYVNMNMFNLMSNPGVDKNASVCPFDNK
VDSDKIKGFYFNDSFLISKEKKVTYNYFGCITENENLNINENTSGIIGLTN-----D
YKADKKYSSILNSFISNSESKKIFGVCLIDGGGFI SFGGYDKLAL-KPGVPPKKVK---
-GPEDSDDSVDTSYRNTLLSIGDSDGLIWDYSESTNELYKVKVTKINVNVTDDSEHE
VNKDFILDTYDYFISLPREISAKLTEKINKICKDLN--DKCKQVENSGTFQMESEQVASF
PAIEFYFNENKVXVQPQDYIIDGDKNYKILVKHAESNEKLGVPFFLSKYIIFDNEQKKL
D-----QIIKMKRIKDMRIILVLLFPF
LYFYLNLI

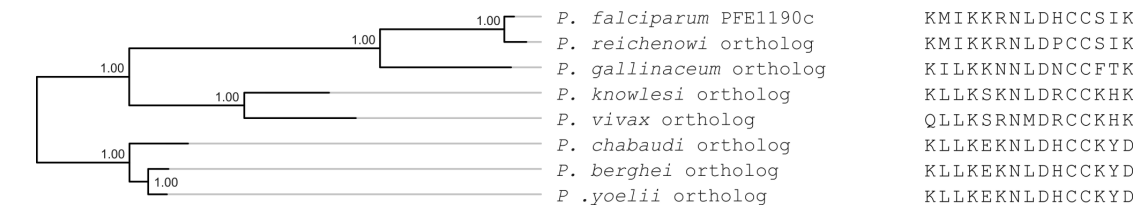
>P_berghei_ortholog
XX
XX
XX
XX
XX
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VDNDKIKGFYFNDSFLISKEKKITNYFGCITENENLNINENTSGIIGLAN-----D
YKADKKYSSILNAFISNSGSKKIFGLCLIDGGGFI SFGGYDKAAL-EPALPAKEIK--
-GSEYED-LDTSYRNPLLSIGDSDNLIWNTYSESTNELYKVKVTKINLVNVTDDNSEYD
VNKDFILDTYDYFISLPREISTKLTEKINKICKDLN--DKCKNVENSGTFQMGNEQVGSF
PAIEFFFNNDKVVVPPHDYIIDGDNNYKILVKHTENSEKLGIPFFLSKYIIFDNEQKKL
G-----YTYIHKY
IYIYIYIM

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
43%	45%	14%	18%	41%	46%	21%

■ PFE1190c

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_PFE1190c
MTPICSLCILFNFIQLNNVLLLTWGIFSVILFVISHGHFNI-GPKCNELLEKYHVFISIL
SIILLSSNNYTS-----QMIKKRNLDHCCSIK-----RFGKANNSSFTN-----H
HSSEHACNEDHHDDHHNRTISASSNNGNKYYMNYDKNER-----ELVS
FL---

>P_reichenowi_ortholog
XXXXXXXXXILFNFIQLKNVLLLTWGIFSVILFVISHGHFNI-GPKCNELLEKYHVFISIL
SIILLSSNNYTS-----PKMIKKRNLDPCCSIK-----RFGKANNSPFTN-----P
HFSEHACNEDHHDDHHNRTISASSNNGNKYYMNYDKNER-----ELVS
FL---

>P_gallinaceum_ortholog
MAPICSLCIIFNYYQLKNVLLLTWGIVFGIILFTISHGHFSI-NEKINIFLQKFHIIISLF
SILILLSSNNYVS-----QKILKNNLDNCCFTK-----NNEKNENGQKYA-----Y
HXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XX---

>P_knowlesi_ortholog
MTPIIISFTTIYNFIQLKNISLFLMTLVGITLFLVTHAHIQVPNQNMNFRKMHIPILAIL
AAIFLIGTNRAA-----HKLLKSKNLDRCCKHK-----KITNNFDKHSCTEHQSCDHHHH
HHDDHDDHHHHHHHHHDDLEMNEDNYDMHNNKGKNDNSASFERYYHIGFQQNGDQELVR
FL---

>P_vivax_ortholog
MTPIIISFTTIYNFVQLKNFPLLLTTLIGITMFLVLSHAHIEFSSPSVANIFKKMHIPMAIL
AAIFLVSTNYAA-----HQLLKSRNMDRCCKHK-----KISHHLEEQSCEQ-----H
HHHPQHPPHHHHY-----DLEMNDITYGMHSHPHNNDNVNLEKFYNIGFQHNDHELVR
FL---

>P_chabaudi_ortholog
MMPITLTITVINFYKLRNIPLLMSALTGMTLFIISHAHIEFSNDNINDILEVLHIPLALL
GAFLSLSTNYAS-----HKLLKEKNLDHCCCKYD-----HIKSYQNNHPHCH-----H
HCHHH--RHHHATNNNRSNLTVNKNVLDISFGKPLDENS-----DLLS
SL---

>P_yoelii_ortholog
MMPITLTITVINFYKLRNVPLLSALTGMTLFIISHAHIEFSNDNINDIETLHIPLALL
GATFLSLSTNYAS-----HKLLKEKNLDHCCCKYD-----HIKNYHNNNNHHH-----NHHH
HNHHHHNNHHHAANNRSDLTGKDEFDNFEKPSDENT-----DLLS
YL---

>P_berghei_ortholog
M-PIITLTITVINFYKLRNVPLLSALTGMTLFIISHAHIEFSNDNINDIIEILHIPLALL
GAFLSLSANYAS-----HKLLKEKNLDHCCCKYD-----HIKNY-----H
HNHHH--QQHADNNNRSDLTVDKDVFGNFEKPSDENT-----DLLS
YL---
```

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
4%	30%	15%	14%	2%	8%	2%

■ PHYLOGENY AND PEXEL/VTS



NP_vivax_ortholog

MARK-----ESNKGSGESKESKETRKETKKE-----
-----TRKETKTKETKTKETKTKTANRLPSGRLSSYGGGPDADRCRKQILKGGENHAC
KKKKPENPVATPDEALNNKNFRQ-----
-----DLNFYYPALIGKGINRSKADVAAKNKLDGGCEKK-----CCEKPKVYPKAK
SLLDECCVKNKNSQNPLTVSKEGGLRGVFEPEE-----
-----KHA-----RKGKPGQKSHLAMPNGSGSVGGVSGVGG
VSGVSGVSGTSSFSGLSGSPNSVSSVSSLSLDVSNLSVSSVSSVSGVSGVSSVSSDSS
-----VIS-----LGNRSDSVSLGNSRDSVSLGNSDSVSLGNSRDSRYSRY
GTGNKTHYDKMLTHLFGALIFYLSS--SYVEKMAQLPNQYNYLC-YRDLHNGIKRIYEN
FTOMYEDFYEMEKHL-KP-----TEOKGYEYKYYAFNVYTLTLLFLEYLOKDAHLH

SFESLPMEYR-----LRRDELVDTVTKATPSDMNDIYFTTYKFFDAMC
TCMDLSSCFNFNYIGKKLINNLHQKGSFHSKVTLEMKKIKEYMANMNDIVEYVKDLNSY
FKHLLLEYAARENLFCEPVLVYCYSLFLDYDLATIDQLLDHLNIHLKYPVNKESQESLSHIY
RELKTHADNLGCTMRCFYFKKNIKSDPEL-SII SLFTDSKFRLQLADKYASKKYADFIAL
MLNILDYLRVLVASLTSVLTLQTVHALLMDTE-HGNIKYEDAMKVMRYFTRYISHNSSVL
AQRSGAPWSGA-----

>P_chabaudi_ortholog

XXHI-----SKLNRVNRILSSTNSDTSDN-----
-----TIKGTKSSNDSQKKGLGKKSHKK-----KGSSNGSI
EQEDSELKTSTEGENTY-----
-----TGYLSSNTIGSTGSTGSGP
DEFVYNINEGAIKKRRHSIFNCFN-----SNNDDD-----
-----GDS--YKQKDANESNLKIKSDDDPGEG-----
-----QSQAAGNNKGNKYEGNTNPHKLDNLYLTRNSSTSNYEINLALVTKVIDSN
KNILK-----R--ENDRIKDNMKNSSSTVRSRDMLFNTSARNI-----
---DTFFYDKIIITHLLGYAYIFYEHK--ININKLEKTLIKDYIYN-YKVLKGSINTI---
---PEEFKYNQIN-KTDLVYSRLNHLGIEKYYYGFNRNLHTFLFLARECLQKEHALEK
VYESLPDLE-----FDRKELKEKIQASTSDEM-DIYGFSYNMFQIC
KFLHTYCNFNLYISNKLINNLNSKNS-NSIITKELNNLTETQATYSEIIEYLDLTYY
ISNLFYGHKENLNFELVIFCYSLFFDYIDTLDKLLDIMQIHLDPFNERIKNELSTIN
IRVKAHRDFVENEVVSFYRKYNISENLSE-CVTNIFSNNEYRVIIIEQYLDSTRYSNYLSL
ILLIFRYLKVVFISMSTYSNLQITYSLLSDLK-KKKVKYDEALNILSHHASFNIFDREFF
NKKNRNSKSAKNK---

>P_yoelii_ ortholog

XXYI-----RKLNRVNRILSNTKSDTSDE-----
-----KTKETKFSNDSHKNGKGEKSHKK-----KG-SNDHI
EGENSEKSSIECENKY-----
-----KDDLLE-----SNGS
GDFSHSVKEGAIKKYQCHSSIFNCFTKSRNDDDDDD-----
-----EDS--YKQKDTNENNLNIKPDDEPDEG-----
-----HSKFWRNKKKKHGIDTNPHKINISYLTRKKNPLPNYEFNLETVTKFIDSN
QKIID-----L--GNDTIIKDNMNRSSSVKSRDMLNLSLKNI-----
---DNLFYDKIVTHLLGYAYIFYGHK--VNINKLEKELIKDYIYN-YKVLKDSINNI---
---PDEFKYTQNN-SKIDPVYNLLDYLIEKYYYGFNRNLHTFLFLAREFWQKEHALTK
VYESLPVDFE-----FDRKELIEQIHDSTSDEK-DIYDFSYKIFDPIC
NFLHTYCNFNLYISNKLINNLRAKKS-NGVIKKELSKLTEYIQATHFDIIEYLDLTYY
ITNLFYGHKENLYNELVIFCYSLFFDYDLTLGKLLYITQIHLKYPFNEQIKNDLSTIN
VRIKTHRDFVENELTSFYHKYNISENLLE-CVTGVFSNNEYRVLIIEQYLDSTRYSNYLSL
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>P_berghei_ortholog

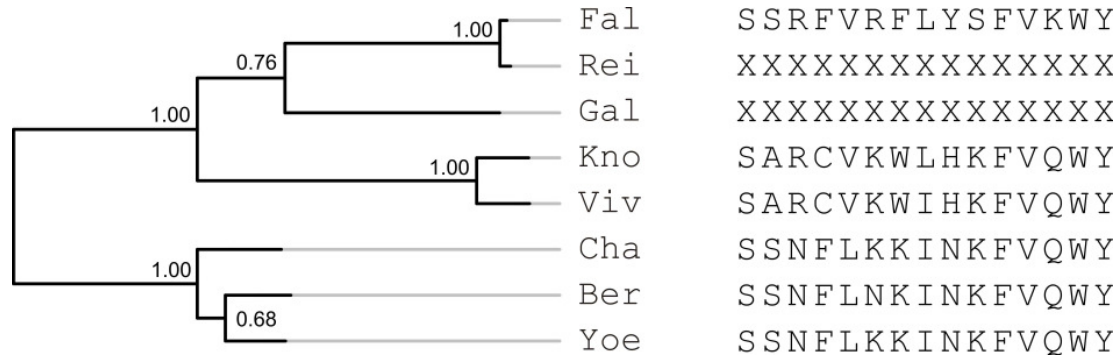
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-----KKKETKSSNDSPKNYKGGKSHKK-----KGSSNDHI
EMENSELKPSIECENKY-----
-----TDDLLE-----SNGS
GDFLHSVVDVAVKKQCHSYIFNCFAKSRN-DNDDDD-----
-----EDS--YKQKYTSENNLDIKSGDDPDEG-----
-----HSKFWRIKKSGKRGSDTNPFKLDNMYLTRKKSSLPNYEFNLAMVTKFIDSN
QKIID-----LENENDTVIKDNMNRNSNTVRSRDLNLSSTFKNI-----
---DNFVYKGIITHLLGYAYIFYGHK--ININKLEKELIKDYIYN-YIVLKESINNI---
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VYEVLPVDFE-----LDRKELIEQIHDSTSGEK-DIYEFYKIFDPIC
SFLHAYCNFNLYISNKLINNLRIKKS-NAVITKELSKLTEYVQTTHFDIIEYLDLTYY
ITNLFYGHKENLYNELVIFYSLFFDYDLTLGKLLYITQIHLKYPFNEQIKNDLSTIN
ARIKTHRDFVENEMIRFYHKYNISENLLE-CVTGIFSNNEYRVLIIEQYLDSTRYSNYLSL
ILLIFRYLKVVFISMSTYSNLQITHSLLSDLK-KKNVKYDEALDILTHHASFNIFDSAFF
NKKK-----

■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
0%	51%	40%	26%	30%	30%	31%

■ PF11_0343

■ PHYLOGENY AND PEXEL/VTS



■ ALIGNMENT

```
>P_falciparum_Pf11_0343
MSNLKNDMFISKKKRKFYKSSRFVRLYSFVKWYKMERVVGPVWINKYSSMIYFLMFL
FILNLSVGILILILSSKYIECRIPYKYGETFTKYSIVKVTPEQCKGQKNLKNLGNIN
HYEILGMQNNHYKFVSGMKKEQLNGNIFLKKEELEECYPLITFSEGKKKKLLHPCGIFP
WNVFTDSYIFYDKPEDEVFPPTPLPLKQNVVEITIKYRQFYKNPSPQNVQLYKDHIFYW
MEPDIQYERLQENKETNEKLLVLPQTLKYNQAGKAIENSHFINWMIPALNYIKRLYGKL
YIPLKFPFYIYIENNFKINDTKIIVISTSQYYMRTFLIGFIFIISIIALILCIFYLIRM
NKYENKXXXXXX

>P_reichenowi_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
HYEILGMQNNHYKFVSGMKKEQLNGNIFLKKEELEECYPLITFSEGKKKKLLHPCGIFP
WNVFTDSYIFYDKPEDEIPFPPTPLPLKQNVVEITIKYRQFYKNPSPQNVQLYKDHIFYW
MEPDIQYERLQENKETNEKLLVLPQTLKYNQAGKAIENSHFINWMIPALNYIKRLYGKL
YIPLKFPFYIYIENNFKINDTKIIVISTSQYYMRTFLIGFIFIISIIALILCIFYLIRM
NXXXXXXXXXX

>P_gallinaceum_ortholog
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXFLIFL
FIFNMIIIGIIVLLSNQYIECRIPYKYQSQYTKYSIVRVTPCHKGIGNLKELKGLNV
HYELQGLQNNHYRFVSSFKKEQLSGQIFLKKEDVSECHPITFSE-GGVNKLHPCGIFP
WNVFSDSYIFYDREPEDEFPPTPIPIQKQVEDITIKYRKFKNPSEALINSHKDHIFYW
MDEKLQSKSLQENKETNEKLLVLPQTLKYDQAGKAIENSHFINWMIPALNYIKRLYAKI
DGPLSFPPFYIYIXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXX

>P_knowlesi_ortholog
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FLFNLLGIAILIISSKYIECRIPYKYQSQYTKYSIVKVTPEHCKGNENLKGPIINI
HYEISGVEQNNHYRFLTSFKKEQLHGDLLFQEKELSECFPLITYEQ-NGIRKILHPCGILQ
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MDEVDQLQILQEHAEATNDKLVLPQTLKYKAGKAVENSHFMNWIPSAFNVVKRLYAKF
DGPLVFPPFYIYIENNFKISDTKIIVISNADFYLNTTLIGFIFIITAVFALLSLLYFIRM
KKHQFMXXXXX

>P_vivax_ortholog
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HYEYIGVQNNHYRFLTSFKKEQLRGDLFLQEKELSECFPLITYEQ-SGTRKILHPCGILQ
WNVFTDSYIFYDKPEDESPFPPTPLPLKQRAEDITIKYRKFKNPTRDIIINLHKKNIFYW
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DGPLVFPPFYIYIENNFKISDTKIIVISNADFYNTTLIGFIFIITAVFALLSLLYFIRM
KKHQFKXXXXX

>P_chabaudi_ortholog
XXXXXXXXXXXXFNNNELFYKSSNFLKKINKFVQWYRMEKVFVGVFYKYSTSIVFFIFL
FILNLSVGIAILYLSSQYIECKIPYKYQSQYTKYSIIKVTPEHCKGHNELKELKGEINV
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WHVFTDNYIFYDKPEDEAPFPDPLPLKERVEDITIKYRKFKNPHEPETIDLYKDKVYFW
MDRFTQSEALHENIVANEKLLILPQALKYNIAGNAMENSHFINWMIPSPFRIKRLYGKL
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXX

>P_yoelii_ortholog
XXXXXXXXXXXXKRNNTFTYKSSNFLNKINKFVQWYRMEKVFVGFVYKYSTLIAFFIFL
FILNLSIGIAILYLSSQYIECKIPYKYQSQYTKYSIIKVTPEHCKGRENELKELKGEINI
HYEYIGVQNNHYSFMSLNTEQLGGKIVVSKNDLNQCYPLITYFK-DRINKILHPCGILP
WNVFTDNYIFYDKPEDDPFPSPPLPLKERVEDITIKYRKFKNPHEPENIKLYKDKVYFW
MDAETQSEALXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXX

>P_berghei_ortholog
XXXXXXXXXXXXLNNKIFYKSSNFLKKINKFVQWYRMEKIFGPVYKYSTLIAFFIFL
FILNLSIGIAILYLSSQYIECKIPYKYQSQYTKYSIIKVTPEHCKGRENELKELKGINV
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WSVFTDNYIFYDKPEDDAPFPDPLPLNERVEDITIKYRKFKNPHEPENIKLYKDKVYFW
MDAKTQSEALHENIVANEKLLILSQALKYDIARNAMENSHFINWMIPSPFSYIKRLYGKL
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KKHKFMRQIDE
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■ AMOUNT OF MISSING DATA

<i>P. reichenowi</i>	<i>P. gallinaceum</i>	<i>P. knowlesi</i>	<i>P. vivax</i>	<i>P. chabaudi</i>	<i>P. berghei</i>	<i>P. yoelii</i>
30%	30%	0%	0%	21%	4%	34%