```
P.gonderi          MKVLLFLF SLIFFVTKCQSET I ENYKQLLAKLNKLEELVVEGYDLFHKQKITIPNVSTGN  60
P.fragile NIH      ...A.....F...I.T.HG..-- D.....L..D...A...D..E...K..GENDIEVDS  59
n=2                          K     C      QT
P.coatneyi         ...A.......F.........C..-- D.....V..D...A.......E.......GTNEINIV.  59
P.knowlesi H       ...A.......F.........C..-- D.....V..D...G...D..E....N..GINIINEVQ  59
n=4                                            SLE   D A
P.hylobati         ...A.....L.F.........C.P-- .......D..D...A...D..E....E.LKVEDIKEAD  59
P.inui A.hackeri   ...A.....L.F.........C.P-- ...R.L.V..D.......D..E....E.LKTEIINNEEGD  59
n=13                                        V I                          NKKQ
                                                                         KTP
                                                                         M
P.fieldi N-3       ...A.......F.........C..-- .......V..D...A...D..E....K.IVQSDIQSVS  59
n=4                                                                     L EN     AN
                                                                           D
P.vivax Sal-1      ...A.......F.......C..-- S....V...D...A...D..E....K.LGENDIKVET  59
n=43                                                                       S Q  DA
                                                                              Y
P.cynomolgi Smithonian ...A.....F....T...CE..-- D....LV..D...A...D..E..Q.K.LEVKDIEVD.  59
n=10                                   A     V          I       G          ESETPEN
                                                                         A  TI
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```
P.gonderi          ----DPSSNSNNNTLGYKIRGFVNKFLELQITGHGNLLHLIRELAIDPNGIKYLVESYEE  116
P.fragile NIH      -----S.DGTRV.P.A...VD..G.Y.A..LP...H...M.KD..LNV..L..........  114
n=2
P.coatneyi         -----NDDG.SV....HQ..D..G.Y......P..A....M.....L.A..L..........  114
P.knowlesi H       -----NIDGN.V.A.A....DI.G.Y......P.......M.....L.A..L.....S....  114
n=4                          V                                                N
P.hylobati         I----TNP..DV...AF...D..A...Q........D...M..D.SLNI..L..........  115
P.inui A.hackeri   I----NDPKNEV.I.AF...DF.....Q...P...D..LM...MVLNI..L..........  115
n-13                         T       L       E                  L
P.fieldi N-3       -----VG..N.V.S.N....D..G........P..A....M..E..LDANI..........  115
n=4                                                  T          D   NND M
                                                                     T
P.vivax Sal-1      NASANNNN.NQVSV.TS...N.LS........P..TD.........VE.............  119
n=43                            A       VG                   I        F
                                                                     L
P.cynomolgi Smithonian -----NANENV.NS.A....D..G........P..TN...M....VM.NN.L..LV.....  114
n=10                           HP  G                                 SD      AI TH     FL
                                                                     A       A
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P.gonderi          FNQLMHIINFHYDLLRAKLNDMCANEYCKIPEHLKINDKELDMLKKIVLGYRKPLDNIKD  176
P.fragile NIH      .....LV..H.............H.............T.N.......V..............  174
n=2                     V  N
P.coatneyi         .....VV..N.............H.............S........V..............  174
P.knowlesi H       .....V...N.............H.............SA.......V..............  174
n=4
P.hylobati         ......................H.............KE.....N.V.........Y.....  175
P.inui A.hackeri   .....V.................H.............E........I..............  175
n=13                                                                   V
P.fieldi N-3       .....V........S.........H.............TD.......V..............  175
n=4                                L                                N
P.vivax Sal-1      .....V..............H....HD...........SD.......V..............  179
n=43                                                                TE
P.cynomolgi Smithonian .....V.................H.............S.......I..............  174
n=10                                                                T       V
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P.gonderi          DINKMEAFITKNKKTVENINALIAEEHGKR----------------------------  206
P.fragile NIH      ..G.....N...Q.ITK..E...A.NV.A-YGQNNNGAVIVGQLTD-------------  220
n=2
P.coatneyi         ..G.........D.IN...Q...T.NN.I-VAGDTNLTNIIHASSDDGVSAAASAGASQ  233
P.knowlesi H       ..G.....IN..E.IS...K..TE.NA.I-VGHPINGVNVTGASTD----AVTSTTGAE  229
n=4                          L     N     Q   A   V
P.hylobati         ..G.........E.IKK..Q..TT.NT.K-NNLHTELTNST---------AAITSG---  222
P.inui A.hackeri   ..G.........E.IKK..E..TA.NK.L-SGQRTGAIADGTQIARG-------------  222
n=13                                       T
P.fieldi N-3       ..G.........D.ITK..E..TT.NG.VRNGQNTNGTNSSGASVD--------------  222
n=4                                E                       V
P.vivax Sal-1      ..G.L.T.....I.IKN.SD..IA.NK..-SGHPTTTTNGAGTQPAN--------GSIA  230
n=43                         E   SK  NK   SD  HA
                             D   D        TT  D
                             K            E
                             N
P.cynomolgi Smithonian ..G.........D.IKK..D..TA.NV..-NGHQINNVNSTGGSTD-------------  220
n=10                             E   T    E..VT   G
                                                 A
                                                 I
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P.gonderi          ----------------GGYSVTAASGTGTSSTTG----------------------------  224
P.fragile NIH      ----------GNPTVRGSAD-------AAQ..GLL-------HIP----------------  241
n=2
P.coatneyi         SSSSPGVAPGVGVAPGVGVAPG.GV.P.V.VAPGV-------VAPGP--------------  274
P.knowlesi H       GVS---------GPSSTGVAG-----PASAG.PGA------ISPAP----------------  256
P.hylobati         ----------GIEAATVKAQN.TDSSESSDSGN.VS------DDTPSTPTG-------ST  259
P.inui A.hackeri   ----------NSASSPSTVTV.TPTV..GTG.T.......STTAPATTTS-------SP  260
n=13
P.fieldi N-3       ----------GAQAVTGSTE----V.QSSG.AG----------------------------  241
n=4
P.vivax Sal-1      AASSETTQISGSSNSGSSSTG.SNSG.SSTG..G.........STGTGQSP-------PA  276
n=43
P.cynomolgi Smithonian ----------GSQIATANTE----T..SSS.TGP.......STGTGP-----AGTGST  253
n=10
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P.gonderi          -------TEEYTNKKKQFQAVYNTIFYSNQLEEAQKLIGVIEKRVKILKEHKDIKVLLEK  277
P.fragile NIH      ---STSTNQD.NKQ.TTY..I..I...T.........E.L....NV.....S..A..DQ  298
n=2                        S     A
P.coatneyi         --VAPSTGGD.NQ...NT...I..V...T.........Q.L.....V.....S..A...E  332
P.knowlesi H       --AASSTT.N.DQ..VI...I..F...TN........MQ.L.....L.....S..A...Q  314
n=4                        P                   D
P.hylobati         VTVSASTP.S.N.D.LI...M..IT..T...V.....E.L....EV..K..S..P..DE  319
P.inui A.hackeri   VTVSASQDGS.ENE.PI...M..IT..T...V.....EVL....GV..K..S..A..DQ  320
n=13                       NAN   K    L                  I      M        V
                           R     Q
P.fieldi N-3       -SVSPSAPES.DQ..PI...M..V...T.........E.L.....V.....S..A..DQ  300
n=4                        TQD ND   L    I                          N        E
                             N  S
                                E
P.vivax Sal-1      AADASSTNAN.EA..IIY..V..T...TNQLQ.....A.L.....V.....D..V..EQ  336
n=43                       DED DE  K  F  M  G     SLKE        E                G   A   KK
                           GT  NN  A     I  I
                               NT
P.cynomolgi Smithonian GTASPSTAGT.EE..NI...I..I...TS.........E.L.....V.....S..A..DQ  313
n=10                       PA  QD   A                N                   L
                             E P
                               Q
                               D
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P.gonderi          IAQEKAKLPVQ-----GATGTETGQDNQQPTQEQQVEIKKKINELENSIIAIAKTVKFDM  332
P.fragile NIH      V.T..EN.AKNTNTST.DVT.VQKEA----------QD..TD..KQ.T...N..N...  346
n=2                                     QQ                          I
P.coatneyi         V.A..GNTENSN-PTT.GVA.LQNEA----------QI..AN...Q.V.......N...  379
P.knowlesi H       ..T..NNLTTNN-ATT.GAT.I-PEEV----------Q...AD..KQ.V.......N...  361
n=4                  A       V   N       V-Q
                     V                    -
P.hylobati         .EK..E...NGN-PPT.TNST..EQEAA----------....AD...Q.V.......N..L  367
P.inui A.hackeri   .EQ..TN..NGN-PPA.TNLTP--QEAA----------....AD..EQ.V.......N..L  367
n=13                 K                 RD  T-                     VH
                                       S   -                      T
                                       G
P.fieldi N-3       V.T..G..PSDN-PTT.ANLTPE-QTEA----------KN..AD...Q.V.......N..M  347
n=4                  A  S  INN         E P  TA-L                 QK  T            L
P.vivax Sal-1      VAK..ENL.SDY-PNT.TNLTNV-HKEA----------ESK.AE..K.K.EAI....N..L  383
n=43               IEA  KKF  KN          EPP DE-Q  A              QKN   D  SQ VDN
                      T  G   N            T  A-     T              K
P.cynomolgi Smithonian V.T..GN..ST-PPT.ASLTDA-QKEA----------QK..AD...Q.V.......N...  360
n=10                 A  V K     N         GD  TV-                T                I
                     I                      PE-                  N
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P.gonderi          DGLFTDPDELDYYLREKGKSAGTLITPGSAQITP----------------------------  366
P.fragile NIH      G.V..N.E.........A.M....V..E.TKSIS----------------------------  380
n=2
P.coatneyi         .....NAE..E.......A.M.....A.E.S.S..S----------------------------  413
P.knowlesi H       .....NVE..E.......A.M.....G.E.S.S.G----------------------------  395
n=4                          A
P.hylobati         .....NAE..E.......A.MTAM..I.E.TEAAS----------------------------  401
P.inui A.hackeri   .....NTE..E.......A.MVDM..I.E.T.AGSTQASSTQAG-----------------ST  412
n=13                                   T VTA
                                         AT
P.fieldi N-3       .....NTE..E.......A.M....VT.E.N.PVS----------------------------  381
n=4                          A                IA
P.vivax Sal-1      .....DAE..E.......A.M.....I.E.TKSAG----------------------------  417
n=43                         N                 V
P.cynomolgi Smithonian S....NAE..E.......A.M..T....E.TKSAI----------------------------  394
n=10                   D     T                M
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P.gonderi          ----EGGENAPTFNQIYPNGVSYALPESNIYELIEKMGSGTLFGDLQNPDNESAPKKEII  422
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P.fragile NIH     - - - - A P . K T V . . M K E T . . H . I T . . . . . T . L . . . . N I E . Q E S . . . . . D G Q Q . N . G . .  436
n=2
P.coatneyi        - - - - T P Q K A V . . L K . T . . H . I . . P . . . . S . F . . . G . I . . E E S . . . . . H D G K Q . S . G . V  469
P.knowlesi H      - - - - T P . K A V . . L K E T . . Y . I T . . . . . R T . . . . . F . . E E S . . . . . G R Q . N . G . .  451
n=4
P.hylobati        - - - - A P K K E V . S M K D S . . H . I T . G . G . . S . F . . . . . L . . E E T . . . F E . . . D A E L . . . . . 457
P.inui A.hackeri  Q E G S T P T K T V . S M K E S . . H . I T . G . A . . T . F . . . . . I . . E E T . . . . E . . . D G K L . Q . . . . 472
n=13                                                   L                 L   Y                 T   D   S                     E   K
P.fieldi N-3      - - - - T T E K A V . . M K E T . . H . I A . . . . . S . F . . . G . I . . D E S . . . . . D G K Q . . . G . T  437
n=4               P     T                                T           N   I                 E   T                             E
                  S
P.vivax Sal-1     - - - - T P . K T V . . L K E T . . H . I . . . . A . N S . . . . . I . . D E T . . . . . D G K Q . . . G I L  473
n=43              T   N                   Q                                                                                   E T I
P.cynomolgi Smithonian - - - - T T E K T V . . M K E T . . H . I T . . . . . T . F . . . Q . N A . Q E T . . . . . D G K Q . K . G . .  450
n=10              P                                                   N           I S . E V S                             N
                                                                                    G
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P.gonderi         T D E N E R K D L L D K I A N K I K L E E E K L P K L K E E Y E K K L K E Y N E K V K E F L P L L E K F Y E A R L E N T  482
P.fragile NIH     I N A G T . . L . . . . . M . . . Q E . . . . . E . Q Q . . D Q . M E V . K Q . L Q A . . . S . N H . . . . . N . .  496
n=2                                                            A                 K L                             Y                 H
P.coatneyi        I S . T K . . L . . . . N . T . . . . M . . . . . . . . . . . D A . M . L . . . . . E A . . . T . N H . . . . K . D . .  529
P.knowlesi H      I N . T K . . T . V . . . M S . . . . . . . L . N . . K E . D E . M K L . K Q . . Q D . . . T . T Y . . . G K . D . .  511
n=4                                                            F   K       V           E Q     E                     K
P.hylobati        G S . E K . . . . M . . . M . . . . M . . G . D N . . K . . D E . V N N . . . . . S Q . Q . T H K . . . . . . . N . .  517
P.inui A.hackeri  V S . D K . . E . M . . . M N . . . M . . . . . D S . . K K . . D Q . . K . E . . . . D . Q Q T H K E . . . . . N . .  532
n=13                                                   S                 I                                         A
                                                                                                                     I
P.fieldi N-3      I S . T K . . E . Q D K . T . . . . I . . D . . . D . . K . . D E . F . V . E Q . . N D . K . I . N H . . . . . D . .  497
n=4               .   I                 I Q                           G           E           E     K           E
                      S                   V                           N
P.vivax Sal-1     I N . T K . . E . . E . . M . . . . I . . D . . . D . . K . . D E . Y K V . E A . . N E . K . A F N H . . . . . D . .  533
A                 .   I                                               N           E           F T       Q     K D   Q   E     Y
                                                                                                       E
P.cynomolgi Smithonian I S . H K . . E . L . . . I . . . . L . . D . . . D . . K . . D E . I . A . E K . . E E . Q . T . H H . . . G . . . . .  510
n=10              .   N   I       A   Q                   I           N           V   Q     K D           I                   A
                          V
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P.gonderi         M E G N K F D E F K N K R S E Y M N K K N D L E K C P Y E Q I T N L I N K L K K Q L T Y L E D Y I L R K E I A N D E I N  542
P.fragile NIH     L V A E . . . . . T N . E A . L K E . . E . . . . T . . . N I . . . . . V . . . . . T . . . D . . D . . . .  556
n=2                                                                                                   L
P.coatneyi        F V . D . . . K . . T N . E A . . E M . K E . . . . T . . . E K . . . . . Q . . N . . . . D . T D . . . .  589
P.knowlesi H      L V . T . . . . . T . . E A . . K E . E E . . . . T . . . S I . . . . . V . . T . K . D V T E . . . .  571
n=4                   S               N     A E
                                      S
P.hylobati        I D K Q . . . D . . A . . D . . . K . . G E . . E . T . . . E A D . . . . . T . K . D . . D . . . .  577
P.inui A.hackeri  L V   D . . A N . . T . . D A . . T E . I E . . . . T Y Q Q E A D . . K . . . . Q . . . . . T . . . D . A N . . . .  592
n=13                G   E     P                         K           S H L     N                 H                 N         V D
                                L
P.fieldi N-3      L V E T . . D A . . T H . E A . . K E .   E . . . T . . . N T . M . . . . . S . . . D V S D . . . .  557
n=4                   A A . . G E . . A                 Q                 I   L                                     A N
P.vivax Sal-1     L V   N . . D D . . K . . E A . . E E . K K . . S . S . . . N S . . . . . V . . . D . . D D . . K  593
n=43                  E E     G E     T       E     K                         T                                       N
                                                                              A
P.cynomolgi Smithonian L D . D . . . Q . . A . . E . . . K E . K E . . . . T . . . N A . L . . . . . N . . . D V . N . . . .  570
n=10                  V               T                                     I   M                 S           I   D
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P.gonderi         H F S A M E W E L K K E I Y K L E K E I K K N E S K I T I D N Q F E L S D V V E L Q V Q K V L I M K K I E A L K N V K N  602
P.fragile NIH     Y Y . D . . . K I . N . . . E . A R . . Q . . . I . L I V E . K . D F . G . L . . . . . M L . . . . . A Q .  616
n=2                 F                                D                     D
P.coatneyi        Y . . H . . . K . . S . . F E . A . . . R . . . . . L I T E . K Y D F . G . . . . . M I . . . . . Q .  649
P.knowlesi H      Y . . D L . . K . . N . . . E . A . . V R . . . N . L I M E . K . D F . G . L . . . I H . . . M I . . . G . . . . . Q .  631
n=4
P.hylobati        S . . . . . K . . S R . . E . S . . V R . . . N . M V L E D K . D F . G . . . . . I . . . . . I Q .  637
P.inui A.hackeri  S . S . . . . K . . S R . . E . S . . V R . . . N . L V L E . K . D F . G . . . . . I . . . . . I Q .  652
n=13                  R
P.fieldi N-3      Y F . D . . . K . . N E . . G . A K . . Q . . . N K L . V E . K . D F . G . . . . . I . . . . . I Q .  617
n=4               .   L   H               D           Q           S E                 I
                          G
P.vivax Sal-1     . . . F . . . K . . S . . . D . A Q . . R . . . N . L T I E . K . D F . G . . . . . I . . . . . Q .  653
n=43                                                                    I V
P.cynomolgi Smithonian Y F . T . . . K . . N . . . . E . S K . . R . . . S . L . V E K K . D F . G V . . . . . N . . . . . V Q .  630
n=10              .   Y   H                       M           N       A   N               I                   I                   I
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P.gonderi         L L K N A K V K D D L Y I P K V Y K T V Q K P E P Y Y L I V L K R E V D K L K D F I P K I H K M I E A E K A K Q - - - -  658
P.fragile NIH     . . . . . N G . . . . . S G D . . . . . K . I . . . . . E T . . T T . . . . S - - V T  674
n=2                         D
P.coatneyi        . . . . . L . D G . . . . . G E . . . . . K . I . . . . . E T . . A T . . . N S - - A T  707
P.knowlesi H      . . . . . L . . K . . . . . G . . . . . K . I . . . . . E T . . A T . . . . A - - P T  689
n=4
P.hylobati        H . . . . . G E . . . . H . . . . . K . I . . . . . E A . . T T . . . N L - - A K  695
P.inui A.hackeri  H . . N . . V . . D L . V . . . . . G E . . . . H . . . . . K . I . . . . . E A . . T T . . . N L - - A K  710
n=13                    K     L     N F                 V
P.fieldi N-3      L . . . . . N . . . . . G E K . . . . . K . I . . . . . E T . . T T . . . . T - - P T  675
n=4               H                                     T
P.vivax Sal-1     . . . . . I . . . . . S E . . . . . M . . . . . I . . . . . E S . . A T . . N . P T V A A  713
n=43                                    V   G                                                   Q A     T     A
P.cynomolgi Smithonian . . . . . D . . . . . G E . . . . . K . I . . . . . E T . . T T . . . S - - G T  688
n=10                        G           D G                                                                 T
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P.gonderi         - T A P A T G T I V A Q D E R S T S S T P S S A A A P T E T S - - - - - - - - - - - - - - - - - - - - - - - - - - - -  688
P.fragile NIH     A P V V I K . Q S L R G A S E T K E T A T T . P V G D A V G A A G Q - - - - - - - - - - - - - - - - - - - - - - - Q G T  711
n=2
P.coatneyi        E P . N V S . Q S L R G A S E T V T G A V T . T V G T . G S Q T A S E T S E Q S G N Q S Q G P P P Q G G N K P Q G P P P  767
P.knowlesi H      E P V K V R A Q S L R G A S E T A P . A . P A Q P . A . T E T Q S V P S E A S A K P T P T A - - - - - - - - T E S G S G  741
n=4
P.hylobati        E A . D . . T Q S . K G E S E T V T V A G G . T . . T . T A N A S E N A A G T - - - - - - - - - - - - - - - - - - - -  734
P.inui A.hackeri  E A A A T Q Q Q S L R G E S E T . . P A . P A P P T V P A A P T V P A A P T V P A - - - - - - - - - - - - - - - A P A  754
n=13                  V S S T E
                        T   P
P.fieldi N-3      S A V Q I R . Q S L R G A S E T G A T G V T . D V G T S A A . A S - - - - - - - - - - - - - - - - - - - - - - - - - - -  708
n=4                     P     E           D
P.vivax Sal-1     A D I V A K . Q S L R G A S E T G T T G N T - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  735
n=43              .   A P   T S     L       S
P.cynomolgi Smithonian E A V Q I K . Q S L R G A S E T G V T P T P P . P . . A L S P A V G A T - - - - - - - - - - - - - - - - - - - - - - -  724
n=10                        V
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P.gonderi         - M Q Q T S S D G S Q Q P Q - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  701
P.fragile NIH     G Q T A . E G S A G . G E . A - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  726
n=2
P.coatneyi        P P A S V . P Q A E S S T P Q - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  782
P.knowlesi H      S T T S A T T A V Q . P . . P - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  756
n=4
P.hylobati        - - P A V N T . A T P A E N - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  746
P.inui A.hackeri  A P A P L A . H T T T S D T - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - T T S N T A T S N T  778
n=13
P.fieldi N-3      - Q . S Q Q T Q V E T A . A A - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  722
n=4
P.vivax Sal-1     - V N A Q T A V V Q P . H . V - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  749
n=43
P.cynomolgi Smithonian - T . T A Q G A A T P G A A - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  737
n=10
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P.gonderi         - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - A H V E S T I Q S T P V Q G S Q P N - - - - - - - - - - -  719
P.fragile NIH     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - V T E T E . T P T P - . A Q T E K S E S V V E K S T H - - -  752
n=2
P.coatneyi        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - T A S L P A V P G E A P A T T Q V . A - - - - - - - - - -  801
P.knowlesi H      - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - A A G T T S T . A P A E G G A Q E V T Q - - - - - - - - - -  776
n=4
P.hylobati        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - A D A T P A . N A D A T P A E N A D A T P - - - - - - - - - -  767
P.inui A.hackeri  A T E I S T S D T T T S N T A T S N T A T E I S T P A T T T S N T A T . I S T P A . T T P A T T T S - - - - - - - - - -  828
n=13
P.fieldi N-3      - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - P A . P . P Q V . T A Q . T S Q . P T - - - - - - - - - - -  741
n=4
P.vivax Sal-1     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - V N . V T V Q P G T T G H Q A Q G G E - - - - - - - - - - -  768
n=43
P.cynomolgi Smithonian - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - A A T . T T T G G G E - - - - - - - - - - - - - - -  748
n=10
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P.gonderi         - - - - - - S V S N P G A E E G T S A P E T N N E A T E V Q E Q A S - - - - - - - - - - - - - - - - - - - - - - - - - -  747
P.fragile NIH     - - E T T T T G G P T V E . S A I T D K Q P A E S E A T H E T P P A - - - - - - - - - - - - - - - - - - - A I G E G A Q  791
n=2
P.coatneyi        - - - - Q P A P P E E P P V A Q A T V . V P E T . E Q S A P T E P A - - - - - - - - - - - - - - - - - - - G G E E A G A  838
P.knowlesi H      - - - - - S E E T A T P P G P E V P . T P - - - - V P G E T . . Q Q - - - - - - - - - - - - - - - - - - - E Q Q - - - -  804
n=4
P.hylobati        - - - - K A M S V E D L K A M T K E M . . E T L R . I T T P T T . E - - - - - - - - - - - - - - - - - - - N P E T N T E  804
P.inui A.hackeri  - - - - - A T T T S A T T T S A . T T S A . T T S . . T T S A T T T S A T - - - - - - - - - - - - - - - - - T S A T T T P  867
n=13
P.fieldi N-3      - - - - Q A A P A P T P . . - - S P S . A . L P S E . - A T T A P T - - - - - - - - - - - - - - - - - - - E T S T T G T  775
n=4
P.vivax Sal-1     - - - - - - - - - - - - - - - - - . E T Q T . S V Q A A . V . Q T - - - - - - - - - - - - - - - - - - - P A G A G G Q  791
n=43
P.cynomolgi Smithonian - - - - - T Q A A G V A . G V E A P E G A E S Q P . G A A P Q P . G - - - - - - - - - - - - - - - - - - - A A P Q P A G  784
n=10
```

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P.gonderi         - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - E E S S S - - - - - - - - - -  752
P.fragile NIH     T T S S P E E P T E A E A - - - - - - - - - - - - - - - - - - - - E V P A P G K S A T T A E E P A - - - - - - - - - - - - -  820
n=2
P.coatneyi        E T A A P G G E A T - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - Q E Q E A A A E A P Q E S Q Q P P T E P A G  870
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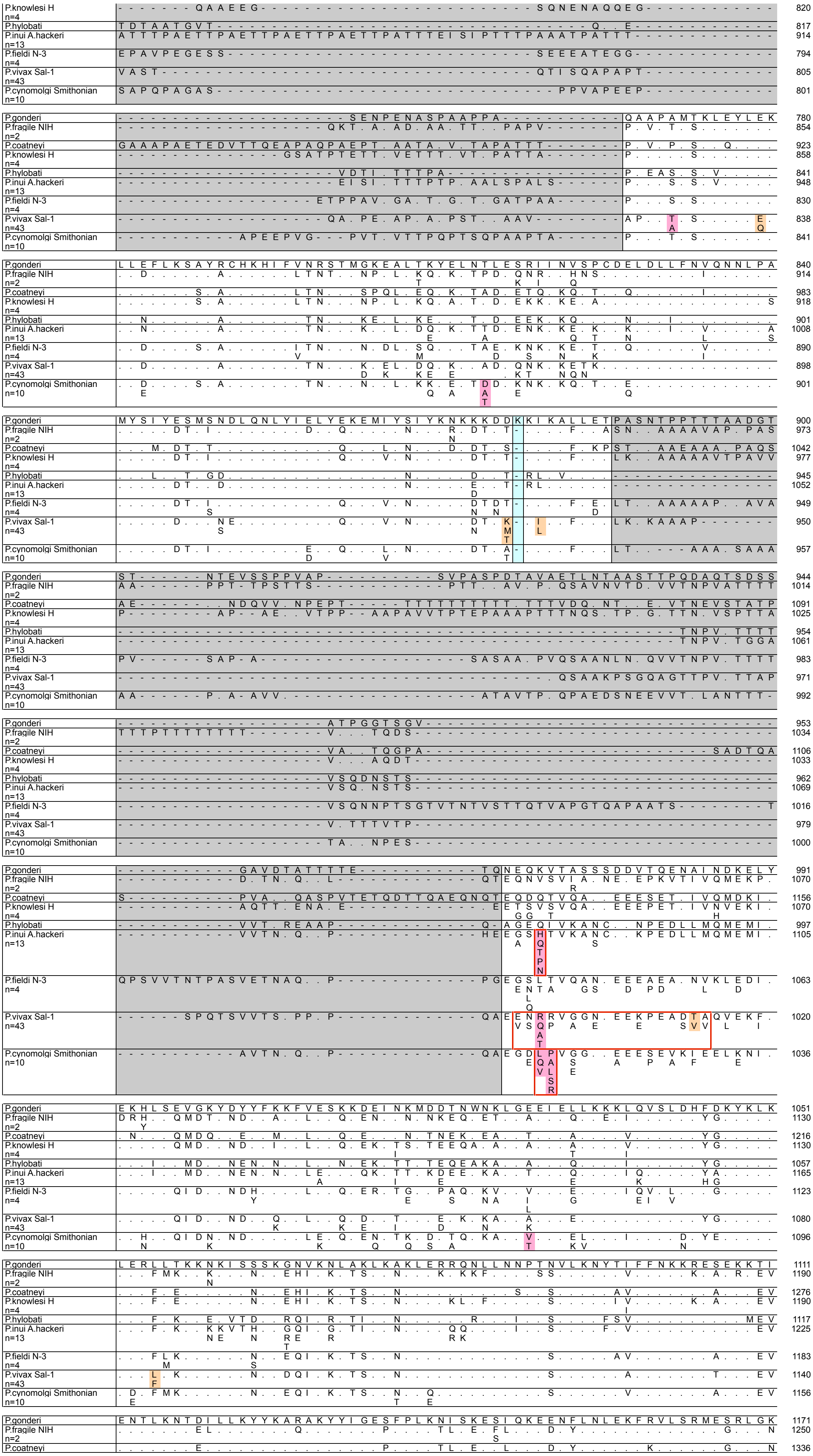

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P.hylobati 817
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P.vivax Sal-1 n=43 805
P.cynomolgi Smithonian n=10 801
P.gonderi 780
P.fragile NIH n=2 854
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P.hylobati 841
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P.cynomolgi Smithonian n=10 901
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P.fieldi N-3 n=4 949
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P.gonderi 944
P.fragile NIH n=2 1014
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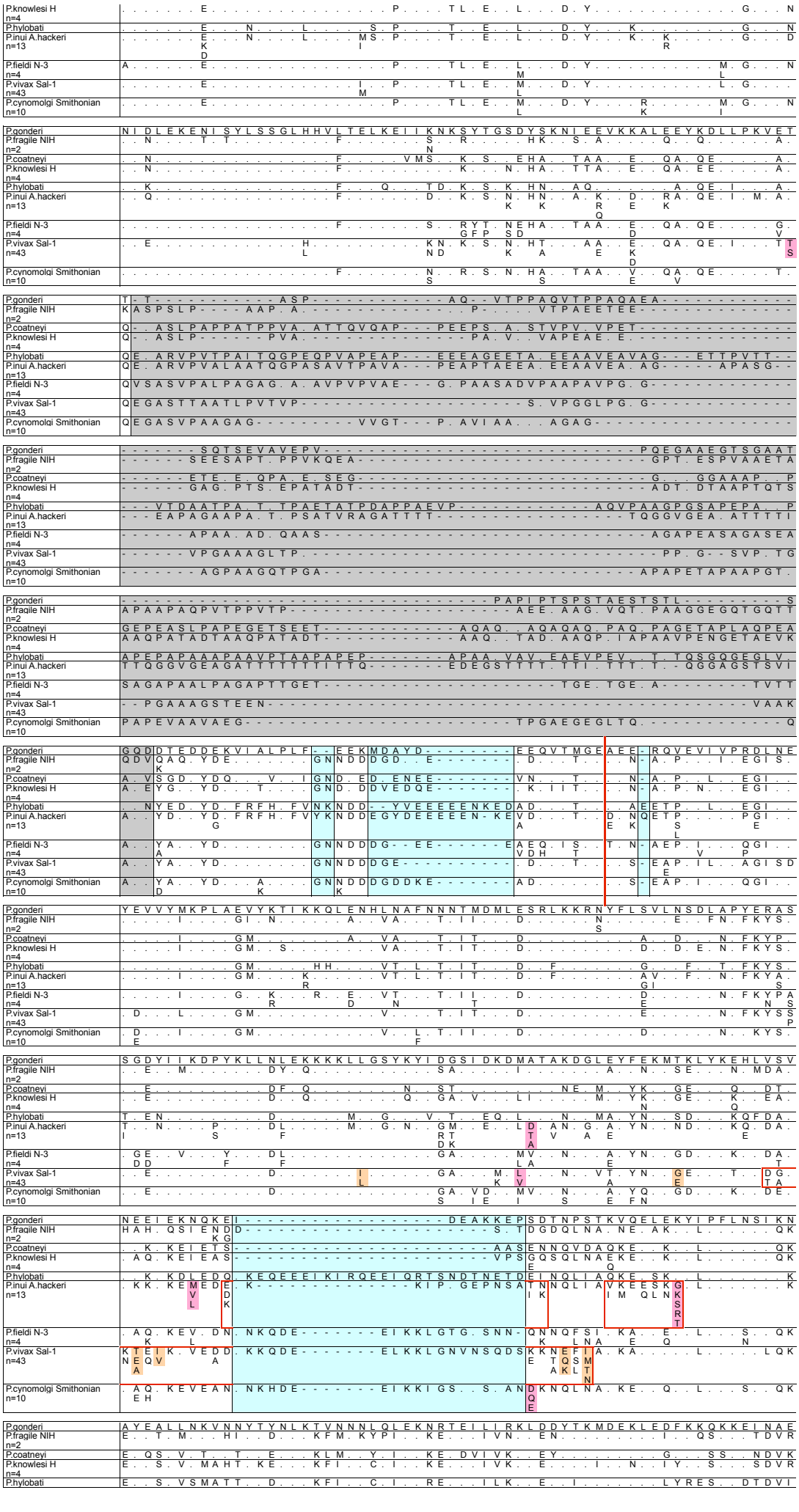
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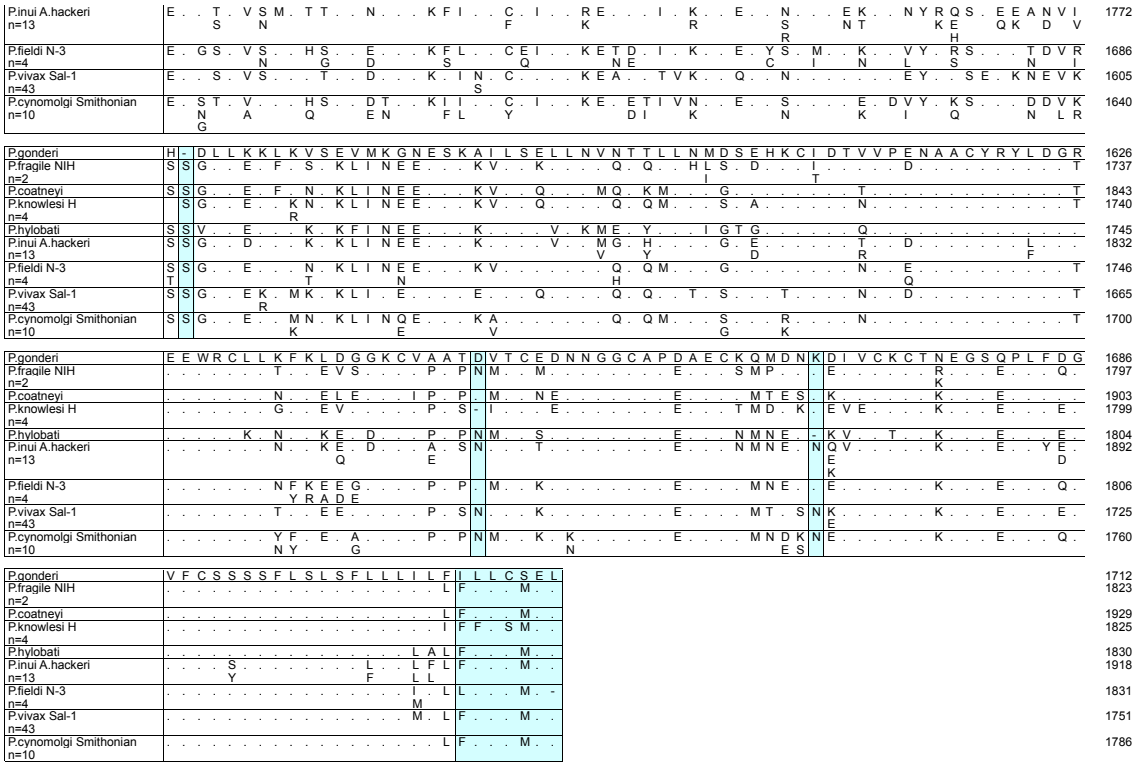

Additional figure S1: Amino acid sequence alignment of MSP-1 from *P. vivax* and *P. vivax*-related simian malaria parasite species. Sequences were divided into 9 blocks according to sequence similarity: 5 interspecies conserved blocks and 4 variable blocks (gray-shaded). Excluding short unaligned regions (blue-shaded), 4176 bp in the 5 conserved blocks were used for constructing phylogenetic trees and inferring evolutionary analyses. Borders between the 5'- and central regions and between the central- and 3'-regions are marked with vertical red lines. Amino acid sites under selection as detected by the omegaMap (Wilson and McVean 2006) are red-boxed for *P. vivax, P. inui* and *P. cynomolgi*, and those as detected by the HyPhy/Datamonkey (Kosakovsky Pond and Frost 2005) are pink-or beige-shared. For *P. vivax*, 5 computations were done to detect positively selected sites using HyPhy/Datamonkey for 14 randomly selected msp1 sequences from 43 sequences, due to a technical reason inherent to the program. Positively selected sites repeatedly detected 3 times or more are pink-shaded and those less than 2 are beige-shaded.