



460            470            480            490            500            510            520            530  
 Vcar **R**SAEAEDEA--GG**C**SCGGGGGGGC-----LHMGMSAGE**E**ADY**F**EOPVPVQASPPSLPLPQQ**Q**Q**Q**AP  
 Pcal PAFGE-----**C**SCGA-----QIL**V**LGDEAA**F**SGGV---AAPAAHGLHS**Q**Q**Q**PSK  
 Vgig **R**PLAE-----**C**SCGA-----SA**A**V**L**VE**A**P**A**FA-----  
 Eele **R**PLAD-----G**C**CG**G**AVS-----GA**V**V**V**E**A**P**A**FA-----  
 Yuni **R**SEGP-----**C**AS**Q**G-----AP**L**V**T**ACDA**A**WP**G**NS-----AALHDVHR**Q**-----  
 Vfer PDDATVASVAAT**C**MEINPGDGVSGRDVQ**E**CWATKGGATLRF**S**PL**G**M**O**T**Q**L**T**GV**S**OTAL---ASALCLP**Q**-----  
 Pcau -----**C**AS**Q**G-----QL**S**FP**P**D**N**AT**L**AT**G**AD-----  
 Pmor **R**NNPTAAARDNT**G**AD**G**AP**E**EGYS-----FRFRPLAAAA**I**GP**A**TA-----AAASSENT**Q**Y**S**PS**P**

540            550            560            570            580            590            600  
 Vcar LLDVEMRVAAPRLSMTGGVGP**G**PAMA**P**TL-PAPATVGLTAIDSGC**Q**NWPSRL**L**Q**P**LY**L**Q**H**TS**H**Q**N**CD**Q**H**L**L**Q**Q**R**Q**Q**  
 Pcal --EEAMTIAATRLSATGGSSGGD**G**FA**P**MDV**D**ADGS**Q**LAEPWRSGPS**F**PH**L**Q**I**Q**Q**PH---SNHR--ENRY**Q**Q**Q**D**H**P  
 Vgig -----AAW**P**ENLT**P**TH-GIS**Q**Q**Q**KPS-----  
 Eele -----SAAW**P**ENLT**P**VHGGGG**A**Q**Q**KAS-----PLL**L**PL**L**  
 Yuni -----LASTTAD**A**TA**P**F**Q**GDGG**S**L**Q**DDASWVLHSA**A**ASVAP**A**PP**L**-----  
 Vfer --LTGLP**Q**ACSSL-KPGMSRPS**I**HL**D****P**SL**P**D-----E**P**L**M**L**M**PP**S**E**Q**L**N**L**R**PL**F**D**Q**PS**Q**  
 Pcau -----AAA**I**CA**V**T**N**A**I**PA**L**PE**H**GN**L**E**Q**-----MHET**F**K**E**L**N**GP**P**PP-----P**L**Q**Q**H**P**L  
 Pmor --FAAA**A**GR**C**AR**L**S**A**G**A**D**H**L**N**AP**L**AS**P**T---DAEAS**V**V**G**SP**A**GC**G**AS**T**AR**F**S**S**T**N**PP---DDALLAD**N**TAA**A**E**D**GP

610            620            630            640            650            660            670            680  
 Vcar **Q**Q**Q**Q**Q**----Y**I**Q**L**Q**L**Q**P**R**Q**N**P**CG**T**R**P**SK**L**G**D**DYGG**V**AAP**A**GP**P**AA**V**-----ETATT**V**VAP**A**CG**S**G**G**AA**G**D  
 Pcal **H**HE**Y**A**Q**----CFHAD**L**RRSR**N**Q**R**L**P**SETAD**L**L**S**GG**D**SAD**V**HAG**A**AV-----AAAAT**V**ATA**A**AA**E**GG**D**SG**G**E  
 Vgig **H**Q**Q**Q**Q**EP**Q**L**V**L**G**AAN**A**ISR**H**Y**T**CG**N**AT**P**CG**F**DS**R**GAA**A**V**H**VD**S**AA-G**Q**HRS-L**S**T**P**HR**D**AAA**A**V**G**A**F**T**N**L**A**I**T**  
 Eele **Q**Q**Q**PH---F**V**G**M**AAT**G**T**L**TH**Q**Y**T**GAG**T**GAA**A**GG**F**DT**T**M**Q**L**D**SG**A**PG**Q**HR-----VGG**G**SR**P**A--  
 Yuni --**H**Q**H**Q----C**I**D**F**C**Q**AL**R**K**L**P**V**MA**K**E-----G**P**E**Q**M**P**R**T**A**P**AL**K**RS-----DSG**K**PE**A**GG**G**A--  
 Vfer **L**Q**L**Q**P**Q----S**V**ASK**T**AG**G**T**G**DAL-----R**L**L**R**AP**A**GA-----FR**P**L**P**ARG**G**GGGG**S**  
 Pcau **R**T**Q**T**L**L---AV**A**AAAAAAAA**A**Q**E**EG**G**AA**E**AL-----AE**V**EL**R**DA**A**-----LR**S**L**R**RE**T**S**G**L**V**T**S**D  
 Pmor **A**PH-----AN**A**PH**H**H**H**H**L**NA**A**PE**V**S**Q**Q**A**S**A**C**G**GP**S**C--

690            700            710            720            730            740            750            760  
 Vcar AA-IP**L**ASGG**C**PP**I**D**N**S**R**EED**G**FG**A**CH**V**DATDAA**E**AA**A**AAAA**A**AA-**A**AG**M**PA**V****I**D**V**T**V**A**V**R**P**KAGAA**Q**R**R**N**A**G  
 Pcal AA-D**P**CTGGGGG**S**GS**H**T**F**AAAA**I**TAD**G**H**V**AD**V**EY**M**D**G**VE**A**T**A**AAAA**A**-**A**TGG**L**AW**A**SI**E**V**T**V**A**V**R****P**KAGG**S**K**R**SN--  
 Vgig AA-D**P**-----D**V**EY**M**DD**A**L**A**ATA**A**AA**E**AAG**G**LAW**A**SI**E**V**T**V**A**V**R****P**KAGAM**R**R**F**AP-  
 Eele AA-D**P**-----ID**A**V**P**I**G**AL**N**E-L**A**V**L**L**P**Q**M**S**I**E**V**T**V**A**V**R**S**T**G**R**R**R**H**W**G**T-  
 Yuni L**N**M**V**SHAN**S**R**P**HL**N**SL**P**-----F**P**GS**L**L**A**LA**A**PP--T**P**AN**V**PN**V**Q**L**E**V**T**V**A**T**R**N**NA**A**SR**Q**AG**L**T-  
 Vfer **Q**D**Y**D**P**Q**E**GD**G**E**G**AL**Q**Q**L**-----Q**Q**Q**L**L**Y**E**H**GE**A**AP**G**T**G**V--**A**DA**E**L**G**Y**M**A**V**S**V**T**I**A**V**R**A**SS**N**R**G**R**R**Q**L**A-  
 Pcau -----RAD**V**GT**G**AG**A**L**A**AA**V**AA**S**A**F**P**Q**V**S**Q**V**T**V**C**V**T**V**A**V**R**G**K**K**AG**R**GP**A**--  
 Pmor

21-40 aa            780            790            800            VARL domain            820            830 \*

Vcar **Q**RAG**P**D**V**-----S**V**S**A**M**H**NG**G**Y**L**R**G**P-----AC**G**V**F**D**L**T**R**Y**L**T**G**R**D**C**V**R--**H**C**G**R**W**I**S**R**S**O**F**E**K**V**G**G**S**T**M**A**K**  
 Pcal --**R**V**G**PG**G**-----I**V**H**E**M**H**N**G**Y**M**Q**G**P-----AC**G**V**F**D**L**T**R**Y**L**T**G**R**D**C**V**R--**H**C**G**R**W**I**S**R**S**O**F**E**K**V**G**G**S**T**M**A**K**  
 Vgig **A**R**I**G**V**D**G**E**G**-----P**V**D**E**V**H**N**G**Y**V**R**G**P-----AC**G**M**F**D**L**T**R**Y**L**T**G**R**D**C**V**R--**H**G**G**R**W**I**S**R**S**O**F**E**K**L**G**G**S**T**M**A**K**  
 Eele **A**R**V**G**I**D**G**GGGG**G**AAAA**A**EE**V**H**N****G**Y**V**R**G**P-----AC**G**T**F**D**L**M**R**Y**L**T**G**R**D**C**V**R--**H**G**G**R**W**V**S**R**S**O**F**E**K**T**G**G**S**T**M**A**K**  
 Yuni -----S**V**A**A**L**D**E**V**R**S****G**Y**T**R**G**P-----S**S**G**V**F**D**V**P**R**Y**L**A**G**R**D**C**I**H**--**N**G**S**R**W**M**S**R**S**H**F**E**K**V**G**G**S**T**M**A**K**  
 Vfer --**L**D**A**D-----**G**Y**A**R**P**S**A**V**L**AS**I**R**G**I**F**D**L**H**R**Y**L**A**G**R**D**C**I**Q**C**G**T**GG**G**W**M**S**R**S**O**F**E**K**V**A**G**S**V**T**A**K  
 Pcau -----D**S**G**A**E**A**V**C**R**K****G**Y**V**K**G**P-----V**C**G**V**F**D**L**V**R**Y**L**E**G**R**D**C**I**L**--**Y**O**G**R**W**V**S**R**S**K**F**E**K**A**G**G**S**T**M**A**K**  
 Pmor -----R**E**D**A**AA**M**H**G****G**Y**V**R**G**P-----V**C**G**D**F**D**L**V**R**Y**L**D**G**R**D**C**I**M**--**S**G**G**R**W**V**S**K**S**O**F**E**K**I**G**G**S**A**M**A**K**

840            850            860            870            DSGDE            890            900            910  
 Vcar **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**G**M**P**V**L**R**G**P**A**R**R**S**R**R**R--AA**A**D**S**G**D**E**M**-----**G**G**W**Q**D**D**E**E**A**A**G**P-  
 Pcal **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**D**M**P**V**L**R**G**P**A**R**R**S**R**K**R--AA**A**D**S**D**D**E**M**-----**V**S**W**H**C**-**D**E**A**K**G**P**D**  
 Vgig **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**D**M**P**V**L**R**G**P**A**R**R**S**R**K**R--S**A**A**A**D**S**G**D**E**L**-----**G**G**G**H**G**GG**G**W**D**A**A**D**D**D**G**P-  
 Eele **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**G**M**P**V**L**R**G**P**A**R**R**S**R**K**R--S**A**T**A**D**S**G**D**E**M**-----**G**G**G**F--**G**G**W**D**A**A**D**D**G**L**A**G-  
 Yuni **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**D**W**L**D**R**H**G**L**P**V**M**R**G**P**A**R**R**S**R**K**R--P**A**E**S**G**D**E**Q**-----**W**Q**W**Q**A**Q**E**V**A**S**G**S**E**  
 Vfer **W**H**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**G**L**P**L**T**K**G**P**S**R**R**I**F**K**R--**T**I--**D**-**G**D**L**K**T**Q**L**H**H**L**L**P**L**D**L**G**P**G**P**G**Q**A**G**T**G**S**P**A**Q**N**S**V**P**  
 Pcau **W**Y**R**S**I**R**A**L**P**S**L**E**P**L**G**E**W**L**E**R**H****N**L**P**V**F**R**G**P**N**R**R**S**R**K**R**--S**G**D**S**G**D**E**L**-----**G**L**W**Q**W**Q**L**P**A**Q**Q**H**D**  
 Pmor **W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**E**R**H**G**L**P**V**T**K**G**P**A**R**R**S**R**K**R--P**N**I**G**D**S**D**D**E**Q**-----**Q**R**Q**H**L**W**N**V**W**Q**A**A**Q**E**A**P**A**V-

```

          920          930          940          950          960          970          980
Vcar  -----ACGIHAAA-----VTIPVAEEGTQEE
Pcal  -----SAWIGIAAATGA-----TGTGALVAAASE
Vgig  -----ASA--PWVAEAA-----AQADGASGAA--
Eele  -----AATLPPWGAAGAA-----GGVDGPAAGAV--
Yuni  I-----VGNASGA-----TATAAVAGGLEP
Vfer  AT--AAATAAKMGDLATGTDGTMGTHLFDPAAPSPSSGLQTLAVAAASLGETNAPPTTMTMTLKPAPGHSAAFTIAN
Pcau  LPLDAAAL-----LSLDSNL--PLTGLAAVAGPG-----GDDFATTSAAALSRD
Pmor  -AAGTGLR-----HHYAHVLPATATATAAPAPVTAAVTPIRRAPDCAML---SALLATAAAAEEA

          990          1,000          1,010          1,020          1,030          1,040          1,050          1,060
Vcar  ELE-PDNSAVAAQQ-----PPLPPP-----PETW--ANRMLTQHCDGG-----GGDDLIV
Pcal  QDT-----STA-----APGSMP-----ETL--ANRMLLQORDGS-----GGDDLIV
Vgig  -----PP-----EAW--ANRMLMQHRDGG-----GGDDLIV
Eele  -----PP-----ETW--ANRMLMQHRGGGGGGSGGGGS-----GGDDLIV
Yuni  QDK-----PGE-----ACAW--ANRMLLQRGDGG-----GGDDGIV
Vfer  ASSLTRNPTDTAGWADHSIFQ-----PLQLPPLLQGPQTAPP--TQLAQLOQTPLSLKQPQ-----TSLH
Pcau  EGL-PSGMLQMLPQ-----TAAAAAPPA-----ACG--AHRDVMHSGSCKEEAAAG--GGNYATA
Pmor  ANEQPYGDAGEEKEEEEEEGAEGQGQGGQRPCQRGRGVVAEEWGPMDGQLMLLHQKGTGSPR---AADHCLIV

          1,070          1,080          1,090          1,100          1,110          1,120          1,130          1,140
Vcar  QRLI-----NTWPLSOPFLRPPAAHAAAATAANK
Pcal  QRLI-----STWPLSOPFLRPPSSSTAAST--
Vgig  QRLI-----STWPLSOPFLRPPAAAA--
Eele  QRLI-----STWPLSOPFMRPPATAATATT--
Yuni  QRLI-----STWPLSQQFVRQP-----PGQEGCMRSS
Vfer  MPIQAPIQTAPSALQEQTLWYIGTQIAGPSPPSAPTAAAGGI-SGLAQLPGAPSSDLMPL-QGALAP--TTGVDA
Pcau  CPPLEPQMVELGEAP----TDSVTRAQH--TSRASAFLLAALADGG----AVAPVQOPPTRPIPHMQPLQPHPQ
Pmor  AQKIREYEACLRDSS---AEPAAARSDNPAKRRAVAGVVGSGDGGDVGKGGSSSMPVFRQEYRPPGPAATAAVAVAG

          1,150          1,160          1,170          1,180          1,190          1,200          1,210
Vcar  SAEHAAA-----ATAAAGAAGATVSSLRC-----FPDAYGNVRGV--VGPO--HSPQAPPVSMMLLPAATCTL
Pcal  -----VAAAAPPAAVVTPRC-----FTEANGSRGGA--AKPH--HGP-----
Vgig  -----AAAAPAAAVTGAPRC-----FAGLYGIGPLRQ--GEHQ--QEPATDPATPVGAGGAA--
Eele  -----GAAAQPM-----AGVFGAG--GRAQ--HQP-----AAVGAAS--
Yuni  P-----VGAYGCARLH--QDPQLGSSPTDPLWQLGDAMDVEDV
Vfer  TAGIEDDTAGTTLPLSTAAANNYSAPQVHMLTGMLAVLHTRAQAQARGLLTDVAVGGG--GAVPGGATAAAAAAAD
Pcau  PLSQRAVV-----GPPVQVSTPTEE-----GHRN--SSPCTDTHROTGGVGVAGV
Pmor  AGTQQAGVSVVMSLAGAGTGAPAAKATAGDSC-----GFAQARLTHE-----GSSH-SQLPCQSSSARLTSAAAE--

          1,220          1,230          1,240          1,250          1,260          1,270          1,280          1,290
Vcar  SQCSPP-----ANGTLVPM--AMRDVA-----VNEAHGGLSV-----AAALELEVRDVNARMPA-----
Pcal  -----LPRPSA-----LGDAH-----
Vgig  -----AALGPG--AAVAAV-----VGAVPGPGRE-----AGGDSAPVADADAAM-----
Eele  -----AGDAPG-----VSAADADAVM-----
Yuni  GQMGPLHDRW-----RDTAPH--VQRLQ-----IVAPQGSFSH-----PHA
Vfer  R-----NHVRQEL-GRTQAAIHVVQELLKRELS-----TVSLGGSGGTA--LPPPPGLTAGNRDETA--
Pcau  T-TSPPPQRLLSMPGDGTAAAT--WDRPCA-----DVVEVHDDSNDDDDVILVDEVEVGVRDRQYGGGRAHTV
Pmor  ---PPARQ--AGDIDITPLKLLPLKRPLSALQDPDEVVDSLAAASR-----

          1,300          1,310          1,320          1,330          1,340          1,350          1,360
Vcar  VOLGAVPDMKAT-----PLPPPAPPHLALF-LPWARAPGRQLSNAPRSPRLFHFSQ-----PAAEP
Pcal  --ASPPLLPAT-----ASDAPSTFAMAL--LGRARVSGMQLSISPOSPRLFQSHPOPDSAR-KPLLAQ
Vgig  --LAGVPEIKCS-----LPVAVTMA--LPGFSL-----APRSAN
Eele  --LSSVPEIKCS-----LP-----VG-----PSSIV
Yuni  --VGAFPT-----
Vfer  -----TGVIPVTAAAAT-----VTPAVASTDNGAVGAMGTAGNTTPMLPSAMHPQLPLPALP-PPQ
Pcau  ADHDDLPIITCV-----RPRLPAGEA--FPQMLAKGDQWR--GGRILOQNT--EPORQG
Pmor  ---SFTPTTTAAQQSDHRHHRGPRAHLPAAVAVAG--DGRTSTSQSPHACASSNPLVSTENRLLALRLSPLRPG

```

PRL motif 1,440

```

1,370      1,380      1,390      1,400      1,410      1,420      1,440
Vcar ASSTA EHS SGPPLKCRLLPTSGGLSSAGAPSGNGVAGLPP--LLKRV RVEEPY--PGSAPLV RPRLLLHRRTTNAGL-
Pcal AA AEQHGT--MQAQWMSDGD-----PSMTAVSGMP PLLLLPPPRGQOLE--DHRSA PC RPRLLLHRRTAAAG--
Vgig LASHSHAA--AQ-----DEADAAGP--AGGVTHSOPV--GAGPAP RPRLLLQR TGAAA--
Eele APLHSQPA--AQ-----GAGESAAALP--LRRL-QCEPA--GGPAPPP RPRLLLHR TGAAA--
Yuni AA AEEKPR--PYED-----GEQAGVEROQC-----HPQPO--QROGLL RPSLLLHRATPDGHM
Vfer RLTPSQ LQMP P-PPRPP-----PMCPPAPPLNQ-----NLAPR--RSGI PAQPPQLLLKRKAAV
Pcau QVQQQQD SKPR TQAQ-----LQQGVLOPTIQ-----QLQPOQGGGLOGAVR QPRLLLRKAITVCDV
Pmor QASQPRPL--SQVQ-----PMAAAAAPLAP-----PQOPQD-CSPQGLAR RPRLLL RGVGTPAGG

      1,450      1,460      1,470      1,480      1,490      1,500      1,510      1,520
Vcar -----GNECDAAKEPYLFAVOAPLEM L YRE-----SSVPRDA-----
Pcal -----PDDGRGAAOPYLFAVOAPP GMLYRA-----AGGGVAA S G SGLGAADA-----
Vgig -----PGDGRGADOPYLFAVAAPPTMLYRE-----GGAA--SPSGAVG-----
Eele -----PGDGRGGGOPYLFAVHAPSAMLFRG-----GGGGAAPQSPAPSV A-----
Yuni G-----SGDASARIOPYLFAVOAPPAMLYRQS-----IASPAGDA TAAPGGVGGG-----
Vfer AAACEI STATAQDSNKCAPTHGYNIOSQPTRLYGIGDGVSVVGAVANAEGGDGSSGVAGGVDGILTSLLAKRQRQ
Pcau S-----PDGSPNRT E PYFLT VSAPPDMLYCPRN-----STGPAISA AFTPDGAAEGI-----
Pmor G-----VQTE SGVGAOPYVLSVQAPPTMLYL P-----QSGAR GSEPPPGGRADG-----

      1,530      1,540      1,550      1,560      1,570      1,580      1,590
Vcar -----GLM-----
Pcal -----GAV-----LDS SM-SGAWR-----
Vgig -----VVA-----GAQA-----
Eele -----VRAEA-TCPQA-----
Yuni --GDG GGC-----LV AQYE GANA AAVGGGKASTLRAQRQKAPEDVSCDETRHSALHQOQQC MPL
Vfer DVAVS GGGGVC SGTETEAPEDAGHAALVGA GGGGEVA AVESAAQTSTPGVIQLQGLAIMTIEEVHRRLLQMRQGS
Pcau -----TPNELARDDCVGGGAA GATA S GVVRRTLPLPHTQRRQALS AIS CENL TRRALLSAQSLHAL
Pmor -----GML-----E GAWA-----

      1,600      1,610      1,620      1,630      1,640      1,650      1,660      1,670
Vcar -----
Pcal -----LA-----
Vgig -----
Eele -----
Yuni DEPATHAQLLSASEQQMNDY-----LAAL-----
Vfer QPLHPQQNQQNQQQPQQQLHSV GQPDVAAGVGSVAGHNNPPGVGGNSTTLAAAGPTAPAMAPVAQSAPATEVSST
Pcau QQQTQQQTARSA-----LGGS-----AFMPWSSDAPO-----
Pmor -----

      1,680      1,690      1,700      1,710      1,720      1,730      1,740
Vcar -----
Pcal -----RE-----
Vgig -----IEE-----
Eele -----MEE-----
Yuni -----R RGWNQO ML-----PR-----GDRIHF-----LTGR-----
Vfer PGVMQLQGLAVMTIEEVHRR--LQOMRHAPHPOPPQPPALQGRHPGSAGGAGEDIRIPSTVGGGSINTPATGRPS
Pcau -----RR--NAAMI-----
Pmor -----RV-----

      1,750      1,760      1,770      1,780      1,790      1,800      1,810      1,820
Vcar -----
Pcal -----
Vgig -----
Eele -----
Yuni -----AP-----
Vfer TATATPAPAPAPITMLCAPGFAAISVTEVQRRIQLQQLRQPDAREGAGHHEPAVQDSKPPHEPQPQLPLPVAAAVS
Pcau -----APKPI-----
Pmor -----

```

1,830  
|

1,840  
|

1,850  
|

1,860  
|

1,870  
|

1,880  
|

1,890  
|

1,900  
|

Vcar  
Pcal  
Vgig  
Eele  
Yuni

Vfer SCPAPPVVTGDSLENPDGAAVGTGEGAVAGGDHEPEASCCSTSASPRAQQAPQSQHAVAPVAAVAVAVAAA VSAAGA

Pcau -----  
Pmor -----C

1,903  
|

Vcar  
Pcal  
Vgig  
Eele  
Yuni

Vfer **SGC**

Pcau  
Pmor

# regA

1 10 20 30 40 50 60 70

Vcar MEIGFRKEDSDIAPVA---ETOQSPQPE---QQEQKQDMPP---QPOLQPOALQLAAQOHLQOS--  
Pcal MEVDSAEEDGNSSQSG-DVP-QQQQTPQES---QQQQQQQQQRQ---QQQQQQQTLSSHQQQAMPL---  
Vgig MEADTSEDPNNDVAPPA---VEVHPQLLQQQQQQQQQQQLPAPSPLQP-QPOVQPOPOPOA---  
Eele MEADTSEDPNNDGAPPEVEVGVEVEAHPOLL---QQRQQQQQSPPTMTATP-QTOPQPOPLPQAOKLPELM---  
Yuni MEAESSEEGNDGIPAA---SRPMLQOEATGALQPERLPS-----  
Vfer MEADDPGDGGTD---DNREHRRVVHLRSIPGTQSMESAPPDRTTPSSR-----  
Pcau MEGESGDDG---VTAGSQQPTPPVETLHAR-----  
Pmor MEAEPGEEANE GTVAQ---APKQALPRQQQQQQQQQAPLQQQSQDPQEQHQPOQLQPYQQQRQQQSQQ

80 90 100 110 120 130 140 150

Vcar -----AQQPR-----PLEQMALDQNTTEL  
Pcal -----QPQPPPPPPPPPPPPPPPPPPH---HGQOHPHQCDQSMAPECTDPPFPCCOTHPAELVIPDPAGAL  
Vgig -----PDDTVVRFPAPPSPSLHPQEQPNPT---GTAHVDHRAG---TAGTPAGVSDAT  
Eele -----GPAAAPEPPLPPPHQAEPSPQPALPRQTETDPTERMPTSLPASAADA AVAAAAATAPATAAGVAGAA  
Yuni -----RPN-----PGQPL-----LLATGLGYGTAS  
Vfer -----RPSVDIPDFLPCMATPPPPPTGP-----  
Pcau -----W-----PSAPM-----  
Pmor HQYQHQQPATTASPTRRPPPA---VEPPA---AEPMPRVMSIAQ

160 170 180 190 200 210 220

Vcar ---ASAA TPAGGSN---GGYDAVKPLSHIRVOSPGRGSTPLALRPLYSMTVR-NADGTPOTARQLPSISAPC  
Pcal ---TSGANATCGAS---KGSVGSNRSLSIRMSSPVRGSTPLALRPLYSMAAR-NPDGTPQAPQMPA--AWPG  
Vgig AVFTAPEPGAAGGAGRGRRGPGSGAPPLRAIKMSSPARG-TPLALRPL---PR-NPDGTPKTPQOPL---QSL  
Eele TATDAPGAAGAGDAG-GGGGPGSGAPAPLRTIRMSAPARW-TPLALRPLYSMAAR-NPDGTPKTPHAL--HOPL  
Yuni -----RGRAG-----SIPPTPRG-PQALALRPL---PAGR-TMEGSPAP-----QPL  
Vfer -----PHGSG-----ALPVSTPPR---TTLALRPLR---PQHS-SASGTLQTH---TPT  
Pcau ---QAAPVAASAG-----AIRVQVWSASSRR-PALALRPLN---PAAALPRDGTPRGPQALL---RP-  
Pmor ---AQAQQAGGGGGHLATRPPGAFPTLPAWSVTPPG---IPLALRPLN---LAPFAMRDSSPHGPAPVP---RRV

230 240 250 260 270 280 290 300

Vcar SALSAYGPVTS GELPYDE-----SIEPPLTSVAAYPRSGRVGGSSGGG-AAGPNGEDDGLSQGSPSEPEL--  
Pcal SSTQS---QPSGTPYTD-----STAPP-SSAPMNPDGR---GSSGGG---AADDGAGRSDSGAGVTAA--  
Vgig HLPHYD---DSSSRGEVA-----AQGAP-LQNPAPPTSL---GAGADGVGGGRADAAPGGAAV--  
Eele HPLQPP---AWSGHPPPA-----AEPPP-TAVPLHPASA---GDVSGG-GAGADGVGGGRADAAPGGAAV--  
Yuni QPLLRY---AASSH-----LDFAAAGHSDAVLQAPEPRY  
Vfer QORLWL---MEGSE-----GGGAPP-----AAAAAASRPGAPSDAQEAAW  
Pcau -----PSRDDAELL-----VLGAWYEARPDSPPPEVDAA--  
Pmor HNPHDG---DSSGDDKDGMDLCEPGLAGSGALP-STVPRPPORR---GFVGGGRGVSAAADADAGSPEEPTVLQOT--

310 320 330 340 350 360 370 380

Vcar -----RPATTATLQSAIGSLMVT-----EGPATSTAGGELLGADLPSNEGVQQQQ  
Pcal -----TDGAETHGG-----  
Vgig -----QPL-----  
Eele ---GVGALPLSPLPLQPLQDPETGLRRTATTPOAALONAW---QPOGPTTDGHVTGGEDGGDQORQ---  
Yuni LDADAYAGPLPPV-----EERLRRAMTAPQLVLRVAVRPLYD-----RPDSPGAPGAAGAAWPEGSASLL---  
Vfer S-----DMEQGGSTTPRVVLRVAVRSLQE-----NLTRGQGAPGERDAGAV-----  
Pcau -----LQPLPDDK---PLGSLQDDKPSGASTPKIVLRVRSLOERAEGHNTGAAPCWPGSFQAVDM-----  
Pmor -----STGQPLLLRVSRSMVN-----SRAAELDPA GDLAARWLPHHCEAQPLP

390 400 410 420 430 440 450

Vcar QIKQQEEQQEEQQEEQQEEQQEQEKQEQEQEQEQEQDQORLAGPHSASPPEAV-----AVSAVSDSEEEVGR  
Pcal -----SANPPPLAS-----  
Vgig -----QRLPLVS-----  
Eele -----RQQQQQQQARPRFQSA PAAV--GT-----AAAAA AVKAEAESGE  
Yuni -----DLHQQLAL-----PLAA-----AAAALPPGGALQRGGS  
Vfer -----DAGSTARPLHFRPESVV-----SFDWGPGLQNLGL  
Pcau -----QQQQLLPLPPQPPTL-----YQAPSVPDQTIR  
Pmor HVAPPQLPPLP-----PRQHHQHQQPPHQGPEYGHYGGTDAGERVRRLLAAAGSDPESGR

460 470 480 490 500 510 520 530

Vcar GSVSSGTAR-----PQPSSPTAAEVTGE-----AIEVAAVP-----PVQPONIQEYQSS-----

Pcal -----AWSPPQPGVTTG-----EPAPQP-----PLQTRNPSNQPMQ-----

Vgig -----QPPPDPQKYSMQ-----LQLLP-----QEQHQHQHQHQHQHQHQHQHQ

Eele ALAAWPAA-----MEPAAPATTAA-----PPLL-----QPMPTSQYQGYLMQQQP-----

Yuni REAAWWAPQL-----GSHGAGVG-----LMPLP-----PAOHAQLOEYRQLQQOQARQL

Vfer RGAHGHSAAVGAPSVFEFVVPQRQHGSGLGAAYGLVQQQPSRPSMPLD-----PHNLVQQORQQOQOQQOQOPOHQ

Pcau RPAAGARTPQ-----YVAMDASKGGPRGSPA-----EQQ-----FRFALPPLP-----IDQQQEMCRPHLEQQOQQQQ

Pmor WSAEPEQPGY-----HPPYPGMPGVPAG-----LPVGTPEDAHLHPHQHOYPSYNRTR-----

540 550 560 570 580 590 600

Vcar -----PPPPALPQQSPPPPGQP-----KRASAGQSPEASDDAVQPNENAGQGAGGSSADGGDVAGANTT---D

Pcal -----PAEQSLLEAPASPREGQP-----SQGGAVTESACD-----AGQSADSPVDAAETGRAP---D

Vgig QLGGFVAPASAPLPAGAAVAGD-----QQLLAGSPGQ-----GVEAGGGGGDGGDGGGG---D

Eele -LGGLAAPVGLAGPAGEQQQQ-----QQQQQQQQPHAD-----SAGEGDGDGDGGAGGAGGPD

Yuni -----GESGTLGLPLK-----GVIGMEHLG-----GNRGVEEAGR---

Vfer -----QQM-----QRQGGALGQIVLHAP-----QMNLGALSGPVVDEQQDYEDD---D

Pcau -----GPPRSLSLPPO-----QP-----VLESGGLAALQLR-----PGAGVDD-----I

Pmor -----MLQPPLPAPPPPSLRPLARDSGLLRLPSGYPPAPAHMD-----AGGAGAG-AGAGAGGSGDYG

610 620 630 640 28-29 aa 660 670 680

Vcar TCAEAPGQPNQDLAQNLEELVAAALPPGPIQVTVAVRVGA-GGRRPRGGGSRVPEEDTRSGYMRGHACGVFDVPRYL

Pcal AAATAC-QPPQDFGQNLDELMAALPPGPIQVTVAMRVGA-GGRRPRGGGLRLSEODTRSGYTRGHACGVFDVPRYL

Vgig GVGEA--DP-----PNNEVPVA-LPLGPIYVTVPARSSG-GANRKNKNARQMGODAPRPTFVPGNIRGIFDVPRYL

Eele DMVEN--EP-----PNVEALLAVLPPGPIQVTVAVRVGGPGGRRPRGGAAARAAEEDTRSGYMRGNACGVFDMPRYL

Yuni --IOA--IPAS--PTGLFPVAELPAGPIEVTVAVRVGAGGGRRRRTLGGRSODDSSRSGYTRGPPSSGVFDVPRYL

Vfer DEDDA--VISQTTVPIGDLPEVETIDVTVAVRIGASSRRPKSGSGRAMDDDKTGYVKGPICGVFDLKRYL

Pcau FAAEH--NPE--LLTEEASANIPPGPIEVTVAMRVGAGGSRKAR-GGGRHADEDSRSGYVRGHVSGLFDITRYL

Pmor AMDLA-----DIPTELPEGPIEVTVAVRVGSSGTRRARGGGGRSADEDSRSGYMRGATGMFDVPRYL

VARL domain 700 \* 720 730 740 75 DSGDE 60

Vcar AGRDCIHNGSKWMSRS<sup>Q</sup>FEKVGGSKMAKWYRSIRVLPDLEPLGEWLERHGMPTKGPARRSRKRAA-ESGDGEEQ

Pcal AGRDCIHNGSRWMSRS<sup>N</sup>FEKVGGSKMAKWYRSIRVLPDLEPLGEWLERHGLHPTKGPARRSRKRAA-DSGDG-H

Vgig AGRDCVHHGCRWMSRS<sup>H</sup>FEKVGGSKMAKWYRSIHVMPEGVSMVWLAHGLPVRGAPARRSRKRTA-GSGDE

Eele AGRDCVHNGNRWMSRS<sup>H</sup>FEKMGGSKMAKWYRSIRVLPDLEPLGEWLERHGMPTKGPARRSRKRAA-DSGD

Yuni AGRDCIHNGSRWMSRS<sup>H</sup>FEKVGGSKMAKWYRSIRVLPDLEPLGEWLERHGMPTKGPARRSRKRAA-DSGD

Vfer AETSCIYKGEYVSRSAFEKFGKSKMAKWYRSIRALPDLMTMEDWLKRYGLPVLKGPARRSRKQA-ERKAG

Pcau ADRDCIHNGSRWMSRS<sup>H</sup>FEKVGGSKMAKWYRSIRVLPDLEPLGEWLERHGLAVTKGPARRSRKRAA-DSGD

Pmor AGRDCIHNGTRWMSRS<sup>N</sup>FEKVGGSKMAKWYRSIRVLPDLEPLGEWLERHGLPVTKGPARRSRKRNIG-DSGD

770 780 790 800 810 820 830

Vcar QGQGAE- QEGVA-----ASPDDVQGGV-----ADPTAALP--AVPPGP-APPPA-APASAAAAMP--

Pcal LAQGLE- GEGAA-----GSPPTAASPGGQGTAPMLVDPAAHMPSGQVS-----ASAPA-APTAAAAATPVAGSTL

Vgig AGQGE- LENA-----GDPDAAVGMGV-----APMFIDPAAAFDPAGAYNPQAFMPAAALAAAAAGPYPP--

Eele PALGDELDERAE-----GSPDGLAGLGA-----DPMMVDSSAA-----AAAAAGAYPPAAAMH

Yuni QAFGOD--PDA--DSPAAGGIEV-----APATAVAVIATGEP-----

Vfer -----PPRARELQLTASPO-----ADSNSAGAHLP TGTSN

Pcau QGSGOG- QELAR-----IDSMDA-----ASLAAHGAAVPTAA--

Pmor QASCAG-QDPAEGADATGSEPEAG--L--SP-----RGLPGA-PPATAGAAATTASSAPAT--

840 850 860 870 880 890 900 910

Vcar -----APL-----SSGTPLTPRTPMQLSPQAAAAAVAAAAAAAAA-----AAAA

Pcal I-----PPAGAVPQQHQYSAVPLIGPAQHLASLPSTPAMKPSVTAAAAAVAAAV-----AEPV

Vgig -----PPM--QLSPMLAPRPLALP-----PPPPL-----SAAAAGAGAAVTAP-----SPAA

Eele L-----PPLPHLPLPLPLPLALTPLSALAPPPPLPLAGVSVTTAAAEGAAAAASAVRGTVNSVAVPAPAA

Yuni -----EP-----

Vfer LDSGRMRDSDPLASIPGRPTHPO-----PPKQLP-----NNLPI-----

Pcau -----SLANSPOQAALPDYLPEH--APPQVAGGTRLSGGGAGAGGGSGGGGY-----MFVGSGL

Pmor -----EPL-----GTSSNTGPGDGPGGG-----AFATAAE



FLQ motif

	920	930	940	950	960	970		
Vcar	SGSAGVQAVGSA	AGPSPQIKAEQMA	-----EIPLEALAE	RLLO	QHORSGRPID	-----A	RFLRVLLNTLPMOPE--	
Pcal	RSAAAQAAGHAAA	AAASPPGAEANA	-----ERHLEALAE	RL	QHPR-GGRGD	-----R	KFLQVLLNTLPTQD--	
Vgig	AAAAAAAAAAAAA	ARFAPTGOASAVA	-----	-----	QAPDTAGAVSENAPVA	-----K	FMRLLYNTLSQSPD--	
Eele	VAPA AVAPAAVA	PAAVVDESAPGAPDDL	-----DSRLAALAE	RL	QOPRSARGAG	-----R	KFLQVLFNTLTVSEQ--	
Yuni	-----	-----GGMPDL	-----	LAEQLL	LHKVSANS	-----R	RFLQRLWNTLPSQSQ--	
Vfer	-----	-----	-----	-----	RHPD	-----P	RFLQRLMNTLTPASQH--	
Pcau	GSSGGGIGGG	-----	-----	-----	SGSAS	-----G	RFLQRLNTLTPSPLPLL--	
Pmor	AAAAAFGG	ARQPGRGGS	SGGGAEPLPVERSLPPYVS	RL	-----	-----G	RFLQRLNTLTPSPLPLL--	
	990	1,000	1,010	1,020	1,030	1,040	1,050	1,060
Vcar	MPLSRGAAAEAAA	AAVAAAA	AAAAAA	-----	AAATNNEEFDR	DAY-GAYAA	YGDYGAH	GSVSLTHGPAGR
Pcal	LQLSHGAAAAAA	AAAAAA	-----	-----	AATAKDEHDHGLY	DVY-GGYAA	YGAVRPO	GSMR-----PGT
Vgig	-----	EVAAAVAP	PMAATP	GTQDWG	PHATDQADQGE	LYGMY-GTYSR	YG VATPG	GSRP---TRGGL
Eele	LMLSRGAEAAAA	AAAAAA	AAAGGPPPGAQDRGRQAA	S	STERADPDQSYE	DMYDNVYDV	YGMGGGR	GPAR----GVM
Yuni	YMLPOP	EQADGAGRTPG	-----	-----	-----	DTY-AV	-----	PMRGA GGLAP-AAPVGG
Vfer	FMVPGLSLPEPG	SSLRGR	-----	-----	-----	DAT-GS	-----	GSSAHRAQFR---LSE
Pcau	SPLQQAESTEG	AARSAA	-----	-----	-----	DLP-GGQGR	WRLAAP	GSIR----GE
Pmor	LPLPRAQPPPEKY	SAA	LPSH-P	-----	ASVAAVNNTAAAD	DAA-AAAES	YEPSDRT	GRAQ----APQ
	1,070	1,080	1,090	1,100	1,110	1,120	1,130	1,140
Vcar	VSGAASVSPPPRGAAG	VPGADMQLAKVQAA	LKSEAAAGAA	I	GVTPSAAA	VAAAA	AAAA	SVRYNRAADVSSVA-GD
Pcal	RAGAGAGS	-----SG	GGEDRDTPETPVV	RMAETA	AVA	-----	AAAAAA	VEAEVEARYQRPDVPAGLHSD
Vgig	LAAAAN	-----	PVAPRGGSP	TAVGMREG	STLGYA	NETVAM	VEAAE	AEEEAGRFQSAGEAVATV--
Eele	PSGAGGS	-----GA	AAAARGGSPTAAA	DAGEA	AALT	EGATG	AAAAAA	VAAAVRSQREMAAMAV-G
Yuni	EKGFG	AAAAYPRDARG	-----	-----	PELQML	-----	-----	GDDVQEA-AE
Vfer	LTPRVS	SSC	-----	GGD	EGHASALHPPAAA	AHGTQA	ALM	-----TQDAADAERLNA
Pcau	VATA	-----	-----	-----	-----	DDDQY	FNTRS	A
Pmor	AAGAGA	AATAPFAGAG	-----	-----	-----	-----	-----	PLGRPTPADTSSAT--E
	1,150	1,160	1,170	1,180	1,190	1,200	1,210	
Vcar	TARLRMR	QQOQQQGG	GLER	-----	SQSFHEALAT	PPML	-----	HLDL-QD
Pcal	PPKIRWR	SLQY	-----	GGID	RAQSSGELLT	PPL	-----	TTAAATPPTTL
Vgig	ISRKR	WFGP	QHR	-----	AGVERGRIS	SSSDTLT	PPPL	-----
Eele	LPLSRWR	GSMQHA	-----	AGIERTLS	SSSGDML	SPPP	PLAQA	SASA
Yuni	VATLRWR	FRQTD	-----	RAQGAST	VAPKP	-----	SPITP	P
Vfer	QGTE	RHRAG	-----	G	RGDN	-----	EVWEV	S
Pcau	VPPIRWR	PIQAI	-----	RGPGPA	HAAQHP	-----	SPRAQ	P
Pmor	LAALRWR	VLRPQH	-----	RS	AEPGDLDP	PE	-----	SPPRAPRPA
	1,220	1,230	1,240	1,250	1,260	1,270	1,280	1,290
Vcar	AGVVDG	-----	VGRGVS	GRMPAAHFRTE	QQLQLL	-----	RRLLA	-----
Pcal	ASTGN	GGGRGSGSGGG	GRGSGGGGG	G	GRPPSGLRSEV	QOQQOQEQOQHLM	QLL	-----
Vgig	-----	-----	AGPSGR	LWAAPS	GYTEEQAPQR	-----	RRLLQ	QOMP
Eele	-----	EDAGGT	G	HWP	GSSLYADQPARQR	-----	RRLLQ	-----
Yuni	-----	-----	-----	SRPDRDR	-----	ERE	PD	-----
Vfer	-----	-----	-----	-----	E	-----	QIQPS	QL
Pcau	-----	-----	-----	QPPQAPLHP	SPP	-----	QLP	QOQQ
Pmor	-----	-----	-----	G	QWCGPSLEPRGQ	EHSW	-----	RRHDSGGLO
	1,300	1,310	1,320	1,330	1,340	1,350	1,360	
Vcar	D	-----	AAA	-----	EYEEEE	EDGGV	GMR	-----
Pcal	-----	NGT	-----	EIDV	DESP	-----	GIMDS	PGADLA
Vgig	DDEEAGNEAA	I	AWRRRQ	Q	EERKSGAGRG	MGHGGG	-----	GWGS
Eele	DDEAAAAAA	-----	RLP	LQAGGG	RGVYGGG	AGRG	GWGT	AGPLDL
Yuni	-----	M	-----	HRLR	PSRGAGG	AD	-----	GAGAE
Vfer	-----	A	-----	SQMP	PHWAAAA	HA	-----	KMG
Pcau	RYS	PGHRSI	-----	HPPPTD	KEGNG	SAMGS	-----	RGYA
Pmor	PYTH	-----	-----	TAEDAGEE	G	QREHG	-----	GFAV



1,370            1,380            1,390            1,400            1,410            1,420            1,430            1,440  
 Vcar P P P-----P P P P S Q V P O A-----R R A L S G M A L P N G A R V R R V E P S E S A-----A L D P A S A G F G A V A-----S A A T R S-  
 Pcal -----R G R S G D V P S A L R R A L S G V S S P H S V R L R R L E S C E T S P G G M A G G H D L P Q S N F G A L A-----R Q N S T A V R V-  
 Vgig F P-----G G V A A Q A P S S-----O V A R M O O P O A F A S E-----V G A G A D A Q A S F M E S E D A A A G A S A A P R S-  
 Eele A P P L H R V G S V G A A V A A P P P S-----H L A R I R Q L E A L A A E A E A I A E A Q A Q A Q A Q A Q A Q A S S R G A E P D R S S  
 Yuni R R D-----A A P H S H T P L L-----D T R I R R V H Q L G A E G P R M S S G S D E Q H R Y D E D Q A-----  
 Vfer H E D Y L-----Q E G K S S E V G E M-----D C R I L P R V O S T A S A A L P M L L-----  
 Pcau A P G L Q-----L P P Q S D A P R F-----R C F R Q H G D E E H A R A P A G I E A R E L-----V L D L Q O S S R P S S G--E Q P R L S A R Q-  
 Pmor L P-----A G D G G S G S S A-----R P Q P V P T E W A W R T E--E R H E Q T D E A N E H L Q G D R E P R G S G G V Y R S H  
  
                  1,450            1,460            1,470            1,480            1,490            1,500            1,510            1,520  
 Vcar ---A A A A A A A T A G G P P P-----R O E R R L P-----P P L P S A P L Q Q A S A L V L D A A T L A R G L A A L Q S L D V A G G G--  
 Pcal ---G T V V A A N S G T L P-----R O E R R O P-----P P P-----A S A S D S A F G S V A A L A R G L A A L Q G M D V A T A A A A  
 Vgig -----A A A R P G A R P O Q P T Q R R A L-----L L A P E G Y A Q A R G L A-----I D A A A V G G L  
 Eele T G G A P A A L R A A A A R A P P P P P L Q O Q R R A P-----P P-----S M T P G S A V L A R G L A A L Q G L E A G L G G G P  
 Yuni -----P L A G Q O R O E W R Q O-----R D V A P S P-----S L-----A L Q G F A A G R M S S R  
 Vfer -----P T Q P P P P A P Q Q Q Q Q P P T Y G Q H S V Q P P L-----L P V L Q P-----L P R R R R R R D D L D V Q D G--  
 Pcau ---G S V C H A V H S-----P H N D A G R A E P-----Y-L Y T L-----P P S C A P T V R R R P G S M---Y A L G A O G L V A E S E L D P G G G G--  
 Pmor -H Y Q P A A R R S D D S P P P P P-----R E P-----P Y K W N P Y P-----A A E A P S R L A C Y R G I L D P L A G A V A  
  
                  1,530            1,540            1,550            1,560            1,570            1,580            1,590  
 Vcar ---L S G H S R D H L T R T P A S V L N Q Y L G Q S Y T G-O R R Y R P H A P E-----P E H I S A S G D L G Y G R S---D T  
 Pcal A A A A A A A A---G L G Q V R T S L P S P Y P T R P I L G P P R A F R T T A P E S D P A V L R S Y R F A S D A Q I A A R P D G G H G F S V G P R D V  
 Vgig T G L G L G Q G P V R E A L-P A T L T P Y P H V A Q S F S R-P T G Y R P-A T G S A P G A R G S Y R---N P D Q G L E L L H L G L G L A---S L  
 Eele D S P G L G G S P R D G V G-A R A P L P Y P H S L R S F S G-P P G Y R P-A L E A G L A V R G G Y R S T S M P D A G I E P G S L A L E L---G S  
 Yuni D A-----P A R P T P F L Y S V P A-----P P G L Q Y-----Y R S T-----  
 Vfer -----O Y S L P G A S L-----D E Q O S L R G A P L T G W P---G T  
 Pcau -----P R A A A V A P S E L N R A S D Q P-----  
 Pmor A A A A V E-----L R D S L R E P R P E P G G D D D A Y E R R E Y Y S D R D P P F Q R M Q R R R I D S A G T A A D T H H D I R A---G Q  
  
                  1,600            1,610            1,620            1,630            1,640            1,650            1,660            1,670  
 Vcar Y H G E G S R R-----A A A S N A A T A A A A A A S L-----R R R R R P W E-D E E E E D E A  
 Pcal Y R T A D G R P R G L F A S P G D G G G-----R G A G A A M S A A A V A A A A A A A G A L P L F G R E R P R R R R R L P R W P D D E R E Q E Q A  
 Vgig A G G G G G R R H G-----G G T G N L-----E A R R S R W Q-L G E E A E A V  
 Eele H E G A G G R R H G-----G G A G V P E G W L L E E R G L A A A A A A G V A G E A A L A-----L R R W R R A R W Q-S E E E A E A A  
 Yuni -----P G Q G D V-----R A Q E G S H V T G T M A F E P G A-----H R O R R O R P M-----P G  
 Vfer Y A N-----W E-Y P Y G E T Q Q  
 Pcau -----R R R L R A Y L  
 Pmor S G G G G G-----Y A H Q O Q H R A A A A G L-----D D Y P T R R R A L Q Q T R A P P L D H N D N  
  
                  1,680            1,690            1,700            1,710            1,720            1,730            1,740  
 Vcar E E E E D-----V W R Q-----R E S V C E A P S R F L P R L P A E L K P N L L Q O O-----Q O Q O Q O Q O Q L P H K R O R L  
 Pcal E E D E D E D A G E G E E Y M Q E L L W R Q G E F G R R E S L O P P M Q P--Q P L O P P P P P P Q O Q Q P L A R F L A R L Q P D P H L H Q R H Q Q L  
 Vgig E E M E A E P-----A Q E R A W G L E E R G R G A--P P P H P R--S O P P A R L P P R A R Q P S H L Q H L Q L Q O Q O Q O Q L Q O Q O Q O Q  
 Eele E E M E A E A Q-----A Q A W G W G H E G R G R G A L L O P P O R G--R I P T V Q V P P P R Q P R P I M S-----Q O O L P O O Q O O Q  
 Yuni E V D E E-----A W R E-----P O O-----T Y Q O L Q Q H H P Q O R H S R Q  
 Vfer Q O Q O L-----P S E-----L G G R Q V R G E Q P E R L H G A D D S L  
 Pcau -----P S E-----L G G R Q V R G E Q P E R L H G A D D S L  
 Pmor D N D D D D G-----G G G G D D E R R P Q W Q A P N P Y--S Q P G G G P P S P P R W R H Q Q G--H Q L Q P H R S S P P R Y E H T  
  
                  1,750            1,760            1,770            1,780            1,790            1,800            1,810            1,820  
 Vcar G E G E C Q-----P P F P Q-----L N G H D P I D V D P Y-T V R O H M A R L Q D P P P S M L L Q O Q H R R R A H A V F A A A A D E L G E  
 Pcal Q Q T Q G S-----Q L F L Q-----P C A Q D P M E V D L Y-S V R O D L L Q M K E A Q Q P R Q R R G C R G G R G G R S G L A T S E M L E  
 Vgig Q O L Q M Q-----Q P Q H Q M H Q H G Q L S E Q D P M H Y D P F--R H H T A L L T W Q E T N V L-----A A M A A A E G L S  
 Eele Q Q-----A Q G L G A Q D P M I D Q Y H L I R O H T A L L R E L Q R T A A W R G Q-----  
 Yuni Q Q P H A T-----L P L S L Q P H Q--Q Q L E L P Q H T D V D D Y-T V R O S I A R O R G H Q R-----H S S A A E  
 Vfer E R S E H Q R V L R I T P L S E T S P Q G G Q P H G G T-----A A R I P A Q O M Q E S Q P Q A V L R---L R R A N A M A G N A P D D R D A  
 Pcau A D A G Y R-----V S E M G L G H R-----Y-----S S S V L E  
 Pmor -----G Y G Y G Y Q L G V A Y D D--R D H P A R R-----

	1,830	1,840	1,850	1,860	1,870	1,880	1,890	1,900
Vcar	DD <b>E</b> HQ <b>E</b> G <b>E</b> E--EEEEEEEEGGGVAEY-WADDTRRHAYRSGFNAVGD <b>A</b> K <b>G</b> E <b>H</b> PQ <b>V</b> P <b>P</b> L <b>A</b> M <b>S</b> L---P <b>A</b> V <b>A</b> A <b>R</b> R <b>P</b> A <b>Y</b> <b>Y</b>							
Pcal	D <b>G</b> <b>E</b> <b>E</b> E <b>M</b> G <b>D</b> V-M <b>E</b> <b>G</b> D <b>E</b> G <b>R</b> A <b>E</b> G <b>E</b> K <b>L</b> P <b>E</b> E <b>F</b> W <b>A</b> G <b>D</b> L <b>R</b> Q <b>H</b> R <b>N</b> R <b>S</b> G <b>H</b> R <b>L</b> A <b>D</b> L <b>L</b> Q <b>G</b> E <b>L</b> P <b>P</b> P <b>P</b> P <b>S</b> A <b>M</b> P <b>L</b> S <b>P</b> L <b>P</b> L <b>P</b> P <b>R</b> S <b>R</b> R <b>S</b> A <b>L</b> <b>Y</b>							
Vgig	V <b>L</b> <b>E</b> <b>Q</b> A <b>A</b> E <b>G</b> E-G <b>E</b> <b>G</b> E <b>A</b> G <b>V</b> G <b>E</b> G <b>A</b> A <b>W</b> A <b>E</b> A-----Q <b>R</b> S <b>R</b> W <b>R</b> G <b>G</b> --G <b>G</b> H <b>S</b> T <b>A</b> G <b>T</b> A <b>P</b> E <b>L</b> P <b>P</b> -----P <b>Q</b> P <b>P</b> R <b>L</b> P <b>T</b> F <b>Y</b>							
Eele	-----							
Yuni	G <b>G</b> <b>E</b> <b>E</b> A <b>W</b> E <b>D</b> V <b>S</b> F <b>S</b> <b>G</b> -----P <b>S</b> P <b>N</b> P-----Q <b>H</b> Y <b>R</b> P <b>P</b> R <b>P</b> A <b>F</b> <b>Y</b>							
Vfer	D <b>G</b> <b>Q</b> <b>Q</b> A <b>G</b> Q <b>D</b> A <b>F</b> G <b>Q</b> <b>G</b> P <b>A</b> N <b>V</b> G <b>T</b> G <b>A</b> G <b>A</b> E <b>Q</b> -G <b>V</b> G <b>Q</b> G <b>R</b> D <b>H</b> S <b>R</b> -----F <b>R</b> A <b>T</b> D <b>N</b> R <b>Y</b> M <b>Y</b> G							
Pcau	Q <b>A</b> <b>E</b> <b>E</b> P <b>R</b> E <b>A</b> A--G <b>G</b> Q <b>H</b> G <b>V</b> N <b>D</b> Q <b>A</b> V <b>V</b> P <b>L</b> R-----Q <b>G</b> Q-----V <b>A</b> I <b>Q</b> R <b>L</b> L <b>R</b> P <b>T</b> L <b>H</b>							
Pmor	-----P <b>Q</b> P <b>A</b> P <b>A</b> Q-----							
	1,910	1,920	1,930	1,940	1,950	1,960	1,966	
Vcar	T <b>P</b> Q <b>R</b> P <b>V</b> M <b>A</b> A <b>N</b> R <b>E</b> G <b>A</b> A <b>S</b> S <b>W</b> R <b>R</b> P <b>R</b> G <b>G</b> -----P <b>V</b> L <b>Q</b> G <b>E</b> S <b>Q</b> G <b>R</b> R <b>T</b> D <b>W</b> P <b>Q</b> Q <b>A</b> R <b>R</b> S <b>G</b> D <b>D</b> S <b>L</b> -- <b>S</b> D							
Pcal	A <b>Q</b> Q <b>Q</b> L <b>V</b> V <b>P</b> T <b>G</b> A <b>R</b> P <b>V</b> A <b>G</b> M <b>W</b> R <b>S</b> S <b>R</b> S <b>A</b> G <b>A</b> H <b>Q</b> P <b>G</b> E <b>P</b> P <b>P</b> P <b>P</b> P <b>P</b> Q <b>Q</b> M <b>Q</b> <b>Q</b> G <b>R</b> R <b>M</b> D <b>W</b> T <b>Q</b> Q <b>R</b> P <b>H</b> R <b>H</b> P <b>E</b> D <b>D</b> S <b>Q</b> <b>S</b> E							
Vgig	T <b>N</b> Q <b>R</b> V <b>T</b> A <b>T</b> R <b>A</b> G <b>R</b> E <b>G</b> A <b>G</b> A <b>W</b> R <b>G</b> P <b>R</b> A <b>A</b> D <b>V</b> E <b>D</b> P <b>W</b> -----V <b>A</b> L <b>Q</b> Q <b>Q</b> D <b>R</b> P <b>Q</b> P <b>P</b> E <b>D</b> D <b>P</b> S <b>F</b> V							
Eele	-----P <b>R</b> G <b>G</b> G <b>A</b> -----A <b>A</b> P <b>S</b> R <b>A</b> G-L <b>Q</b> Q <b>Q</b> P <b>D</b> W <b>S</b> Q <b>T</b> P <b>P</b> A <b>D</b> D <b>P</b> S <b>F</b> G							
Yuni	T---Y <b>A</b> A <b>R</b> P <b>M</b> G <b>R</b> D--G <b>P</b> W <b>R</b> D <b>P</b> R-----P <b>P</b> L <b>R</b> G-A <b>Q</b> P <b>Q</b> P <b>M</b> E <b>W</b> P <b>R</b> N <b>T</b> E <b>E</b> Q <b>P</b> K							
Vfer	D---L <b>G</b> A <b>D</b> S <b>G</b> G <b>V</b> E-----I <b>L</b> G <b>A</b> H <b>T</b> D <b>N</b> P <b>Q</b> A <b>R</b> R <b>R</b> R <b>T</b> A <b>Q</b> F <b>E</b> K							
Pcau	P---I <b>G</b> A <b>V</b> S <b>S</b> G <b>E</b> E <b>A</b> V <b>G</b> L <b>G</b> P <b>A</b> L <b>R</b> S <b>E</b> G-----I <b>Q</b> P <b>P</b> Y <b>A</b> D <b>W</b> P <b>Q</b> S <b>R</b> H <b>D</b> Q <b>E</b> P <b>R</b>							
Pmor	-----A <b>R</b> P <b>Q</b> K <b>T</b> S <b>G</b> A <b>R</b> M <b>R</b> D <b>V</b> R <b>E</b> E <b>T</b> ---S <b>Q</b>							



460 470 480 490 500 510 520 530

Vcar LSA<sup>A</sup>AAAA<sup>A</sup>AAAA<sup>A</sup>-GVALASAAVGGSGHORAGP<sup>-</sup>PAI<sup>C</sup>LRPMPREVIRYPLPPPLQ<sup>-</sup>-----ALPIAPS

Pcal LPPSAGV<sup>A</sup>AAQLQDA<sup>-</sup>-----GWR<sup>Q</sup>LSRAAPLHTLPLVSP<sup>-</sup>-----PLPFPAQ

Vgig --P<sup>A</sup>TAA<sup>A</sup>TAGTY<sup>-</sup>---HHPGLIDAS<sup>-</sup>-----GWR<sup>-</sup>---TQQLPAGPSA<sup>-</sup>-----SFFLLP

Eele --P<sup>A</sup>AAAA<sup>A</sup>AAAA<sup>A</sup>-SVHPRSDALDAP<sup>-</sup>-----GWR<sup>-</sup>---AAQSIVQGTSP<sup>-</sup>-----FYSPPPP

Yuni --L<sup>A</sup>ATT<sup>A</sup>AVPPG<sup>-</sup>GSLQRGGSREAAW<sup>-</sup>-WAPQLSSHGAGV<sup>C</sup>LM<sup>-</sup>-----

Vfer --Q<sup>Q</sup>Q<sup>Q</sup>Q<sup>Q</sup>AA<sup>V</sup>VPQN<sup>-</sup>GHRDRQSS<sup>-</sup>-----DVT<sup>C</sup>-----SAQHAPSGSASGGQETTTYGLARMLQ

Pcau -----E

Pmor TPPPETTA<sup>P</sup>AALGDGLLGVSTGLQVPE<sup>-</sup>-AGPKPSKLGVPVQ<sup>C</sup>LR<sup>-</sup>-----LPPGLPA-SSAVTRIROPDGA

540 550 560 570 580 590 600

Vcar PDQVPVHQSQI<sup>P</sup>QQLPGI<sup>G</sup>MGPALAE<sup>G</sup>DDDD<sup>G</sup>-----GDD<sup>G</sup>GD<sup>-</sup>-----

Pcal P<sup>Q</sup>Q<sup>Q</sup>Q<sup>Q</sup>Q<sup>Q</sup>Q<sup>Q</sup>LP<sup>L</sup>QPHLLP<sup>L</sup>ASLGLDAAPV<sup>G</sup>LL<sup>-</sup>-----ADAP<sup>G</sup>E<sup>-</sup>-----

Vgig Q<sup>Q</sup>T<sup>Q</sup>Q<sup>F</sup>PLPDVE<sup>L</sup>GPAAAA<sup>A</sup>AASFFGAAAA<sup>G</sup>WDMSSQLQ<sup>L</sup>AAAVA<sup>E</sup>GG<sup>E</sup>GE<sup>D</sup>EGGGGGSGGGGDGGGGGGDGGGGG

Eele P<sup>Q</sup>THHLALTDVAM<sup>S</sup>PAAAA<sup>A</sup>AAAA<sup>A</sup>AAAA<sup>A</sup>AG<sup>F</sup>LGA<sup>-</sup>-QPAE<sup>G</sup>GE<sup>A</sup>E<sup>G</sup>E<sup>D</sup>E<sup>-</sup>-----

Yuni -----PLPTGLLP<sup>M</sup>AALA<sup>-</sup>-----AE<sup>Q</sup>SG<sup>A</sup>-----

Vfer Q<sup>E</sup>Q<sup>Q</sup>Q<sup>Q</sup>Q<sup>Q</sup>HQ<sup>Q</sup>Q<sup>R</sup>Q<sup>Q</sup>Q<sup>Q</sup>W<sup>Q</sup>LA<sup>Q</sup>E<sup>Q</sup>Q<sup>R</sup>SISLQ<sup>K</sup>Q<sup>Q</sup>Q<sup>S</sup>O<sup>-</sup>-----Q<sup>Q</sup>SG<sup>Q</sup>-----

Pcau L<sup>E</sup>A<sup>Q</sup>HS<sup>Q</sup>Q<sup>Q</sup>Q<sup>H</sup>P<sup>Q</sup>Q<sup>Q</sup>RL<sup>-</sup>---TVGSE<sup>Q</sup>G<sup>P</sup>T<sup>G</sup>L<sup>Q</sup>SE<sup>-</sup>---CAVG<sup>P</sup>AA<sup>G</sup>E<sup>-</sup>-----

Pmor PDN<sup>-</sup>-----L<sup>G</sup>PALLP<sup>L</sup>DTLV<sup>-</sup>-----GTAT<sup>G</sup>S<sup>-</sup>-----

610 620 630 640 650 660 670 680

Vcar -----GG<sup>G</sup>GD<sup>-</sup>-----GAWGGV<sup>G</sup>AA<sup>G</sup>V<sup>-</sup>-----AGLEDI<sup>A</sup>APP

Pcal -----P<sup>G</sup>GG<sup>E</sup>G<sup>-</sup>-----GALAAE<sup>G</sup>GD<sup>G</sup>D<sup>-</sup>-----GDLQDS<sup>S</sup>QL

Vgig SGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGSDGGGGGGGG<sup>D</sup>-----GD<sup>D</sup>GG<sup>G</sup>GG<sup>G</sup>G<sup>-</sup>-----GGDGGDNAL

Eele -----AG<sup>G</sup>GD<sup>-</sup>-----GEME<sup>H</sup>AG<sup>-</sup>-----AVL

Yuni -----TR<sup>G</sup>A<sup>-</sup>-----AEG<sup>S</sup>E<sup>G</sup>N<sup>-</sup>-----RNAPSP<sup>A</sup>ADV

Vfer -----T<sup>G</sup>AAESLARPTAG<sup>G</sup>T<sup>T</sup>AT<sup>G</sup>T<sup>S</sup>GE<sup>A</sup>AAETQEPID<sup>D</sup>DEVAGAPAA<sup>P</sup>GS

Pcau -----TP<sup>G</sup>G<sup>Q</sup>-----PT<sup>T</sup>DT<sup>G</sup>L<sup>-</sup>-----DTALDI<sup>A</sup>AGL

Pmor -----G<sup>Q</sup>MLTTAV<sup>H</sup>GP<sup>-</sup>-----G<sup>Q</sup>S<sup>Q</sup>P

690 700 710 720 730 740 750 760

Vcar PPE--LLGP<sup>I</sup>DV<sup>T</sup>VAV<sup>R</sup>TS<sup>S</sup>AS<sup>G</sup>GG<sup>-</sup>RR<sup>R</sup>GR<sup>-</sup>-----EE<sup>V</sup>VS<sup>R</sup>GS<sup>-</sup>---AV<sup>R</sup>GO<sup>P</sup>V<sup>G</sup>K<sup>F</sup>DV<sup>P</sup>R<sup>-</sup>

Pcal PPA--LLGP<sup>I</sup>DV<sup>T</sup>VAV<sup>R</sup>V<sup>-</sup>GA<sup>-</sup>GG<sup>-</sup>RR<sup>R</sup>GR<sup>-</sup>-----ED<sup>L</sup>A<sup>-</sup>RS<sup>G</sup>GGG<sup>N</sup>Y<sup>V</sup>RG<sup>O</sup>H<sup>V</sup>GS<sup>F</sup>DL<sup>P</sup>R<sup>-</sup>

Vgig PAE--VPAS<sup>I</sup>EV<sup>T</sup>VAV<sup>R</sup>V<sup>-</sup>AA<sup>G</sup>GG<sup>-</sup>RR<sup>R</sup>GR<sup>-</sup>-----EE<sup>V</sup>V<sup>-</sup>RG<sup>G</sup>---Y<sup>T</sup>RG<sup>O</sup>HT<sup>G</sup>L<sup>F</sup>DV<sup>R</sup>R<sup>-</sup>

Eele PAV--IPGP<sup>V</sup>DV<sup>T</sup>VAV<sup>K</sup>V<sup>-</sup>GA<sup>A</sup>GG<sup>-</sup>RR<sup>R</sup>GR<sup>-</sup>-----ED<sup>F</sup>V<sup>-</sup>RG<sup>G</sup>---Y<sup>V</sup>RG<sup>O</sup>HT<sup>G</sup>R<sup>F</sup>DV<sup>P</sup>R<sup>-</sup>

Yuni PPAALPAGP<sup>I</sup>EV<sup>T</sup>VAV<sup>R</sup>V<sup>-</sup>GAG<sup>G</sup>GG<sup>-</sup>RR<sup>R</sup>OR<sup>-</sup>-----GGAGRH<sup>V</sup>DE<sup>F</sup>I<sup>-</sup>RAG<sup>-</sup>---Y<sup>M</sup>RG<sup>P</sup>V<sup>N</sup>GV<sup>F</sup>DV<sup>P</sup>R<sup>-</sup>

Vfer DAALGEPSP<sup>P</sup>VE<sup>V</sup>T<sup>V</sup>AV<sup>R</sup>V<sup>-</sup>GAG<sup>G</sup>GG<sup>-</sup>RR<sup>R</sup>PR<sup>-</sup>-----GGV<sup>N</sup>RLAT<sup>D</sup>I<sup>V</sup>-RNG<sup>-</sup>---Y<sup>T</sup>RG<sup>P</sup>V<sup>S</sup>GV<sup>F</sup>DL<sup>N</sup>R<sup>-</sup>

Pcau P<sup>Q</sup>P<sup>I</sup>RL<sup>P</sup>ORT<sup>I</sup>EV<sup>T</sup>VAV<sup>R</sup>V<sup>-</sup>GP<sup>G</sup>GG<sup>A</sup>R<sup>K</sup>P<sup>K</sup>TGG<sup>-</sup>-----GG<sup>S</sup>K<sup>Q</sup>Q<sup>T</sup>D<sup>D</sup>EL<sup>-</sup>RAH<sup>-</sup>---Y<sup>I</sup>PG<sup>P</sup>V<sup>C</sup>GT<sup>F</sup>NL<sup>O</sup>R<sup>-</sup>

Pmor RVR--IAAH<sup>I</sup>EV<sup>T</sup>VAV<sup>R</sup>V<sup>-</sup>G<sup>S</sup>SG<sup>G</sup>-R<sup>K</sup>V<sup>R</sup>V<sup>G</sup>V<sup>G</sup>AGV<sup>G</sup>V<sup>G</sup>MPAA<sup>G</sup>GG<sup>Q</sup>PG<sup>L</sup>E<sup>D</sup>S<sup>-</sup>RS<sup>G</sup>---Y<sup>V</sup>RG<sup>P</sup>V<sup>C</sup>GR<sup>F</sup>DV<sup>R</sup>

21-42 aa

VARL domain

780 ↓

\*

DSGDE

780 790 800 810 820

Vcar YI<sup>A</sup>GRDCI<sup>F</sup>FNG<sup>R</sup>WMSRS<sup>H</sup>FEK<sup>V</sup>GGSRMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GE<sup>W</sup>LERN<sup>G</sup>MP<sup>I</sup>T<sup>K</sup>GPSRRSSRR<sup>-</sup>TTT<sup>V</sup>ES<sup>G</sup>DE<sup>H</sup>

Pcal YLAG<sup>R</sup>DCI<sup>H</sup>HN<sup>G</sup>RWMSRS<sup>H</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GE<sup>W</sup>LERN<sup>G</sup>MP<sup>V</sup>T<sup>K</sup>GPSRRSARR<sup>-</sup>AAA<sup>D</sup>SG<sup>D</sup>EQ

Vgig YRG<sup>R</sup>DCI<sup>O</sup>YNG<sup>R</sup>WLSRS<sup>O</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GE<sup>W</sup>LERN<sup>G</sup>LP<sup>V</sup>T<sup>K</sup>GPARRSSKR<sup>-</sup>AA<sup>D</sup>SG<sup>D</sup>EL

Eele YLAG<sup>R</sup>DCI<sup>O</sup>YNG<sup>K</sup>WLSRS<sup>H</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GE<sup>W</sup>LERN<sup>G</sup>LP<sup>V</sup>T<sup>K</sup>GPARRSSKR<sup>-</sup>AA<sup>D</sup>SG<sup>D</sup>EL

Yuni YLAG<sup>R</sup>DCI<sup>H</sup>NGS<sup>R</sup>WMSRS<sup>H</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GD<sup>W</sup>LERN<sup>N</sup>MP<sup>V</sup>T<sup>K</sup>GPARRSSKR<sup>-</sup>PA<sup>D</sup>SG<sup>D</sup>EQ

Vfer YKT<sup>G</sup>RCDCI<sup>F</sup>YGN<sup>R</sup>WMSRS<sup>H</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YRSIRVLPDLEP<sup>L</sup>GD<sup>W</sup>LERN<sup>G</sup>LP<sup>V</sup>T<sup>R</sup>GPSRRSSKR<sup>-</sup>PA<sup>E</sup>S<sup>-</sup>DER

Pcau YVE<sup>G</sup>RCDCI<sup>O</sup>YDGR<sup>W</sup>LSRS<sup>N</sup>FEK<sup>V</sup>GGSKMAK<sup>W</sup>YKSIRVLPDLEP<sup>L</sup>LE<sup>H</sup>WLERH<sup>N</sup>LP<sup>L</sup>L<sup>K</sup>GPSRRSSRR<sup>-</sup>AE<sup>E</sup>GN<sup>E</sup>G

Pmor YLAD<sup>R</sup>DCI<sup>M</sup>YGG<sup>R</sup>WLSRS<sup>H</sup>FEK<sup>V</sup>GGSRMAK<sup>W</sup>YKSIRVLPDLEP<sup>L</sup>GE<sup>W</sup>LERN<sup>G</sup>LP<sup>V</sup>RG<sup>P</sup>SRSSAKR<sup>-</sup>IP<sup>E</sup>GV<sup>D</sup>LO

840 850 860 870 880 890 900 910

Vcar LGHTGLELQ<sup>T</sup>-----GL<sup>R</sup>PEL<sup>-</sup>QNL<sup>-</sup>-----PSDEPQ<sup>S</sup>SS

Pcal LGAA<sup>-</sup>-AAG<sup>-</sup>-----LGP<sup>D</sup>A<sup>-</sup>ADA<sup>-</sup>-----QDIGIVED<sup>S</sup>

Vgig LLGAA<sup>-</sup>-AAE<sup>-</sup>-----PML<sup>L</sup>PPPPPPQAL<sup>-</sup>---PPPP<sup>M</sup>PSLQTP<sup>P</sup>LR<sup>G</sup>PAV<sup>-</sup>TGAVAAS<sup>I</sup>APFARG<sup>S</sup>FDESLEGSD<sup>Q</sup>S

Eele LLAAA<sup>-</sup>-AAS<sup>-</sup>-----PPPP<sup>M</sup>-----PPPP<sup>M</sup>PPMLQ<sup>P</sup>LW<sup>G</sup>PAA<sup>-</sup>AGAGAAS<sup>T</sup>PPAARG<sup>R</sup>VDAL<sup>E</sup>ISD<sup>Q</sup>S

Yuni GPGKEQE<sup>A</sup>AD<sup>-</sup>-----SP<sup>G</sup>-----GCE<sup>L</sup>SSP<sup>V</sup>A<sup>-</sup>-----

Vfer VL<sup>G</sup>-----PSIE<sup>Q</sup>VDSAD<sup>V</sup>EG<sup>S</sup>SA<sup>-</sup>GG<sup>-</sup>-----

Pcau -----SAEP<sup>Q</sup>GGSE<sup>P</sup>GPSAS<sup>L</sup>LRMPSS<sup>S</sup>STAAP<sup>S</sup>AGRR<sup>G</sup>AGAGAGAGAAS<sup>P</sup>QA<sup>-</sup>---VP<sup>S</sup>TSP<sup>R</sup>SH<sup>S</sup>

Pmor ALVGD<sup>L</sup>RWRADS<sup>A</sup>EAE<sup>D</sup>NYGA<sup>A</sup>PPS<sup>P</sup>PA<sup>-</sup>---APPP<sup>P</sup>GS<sup>L</sup>PARG<sup>L</sup>SG<sup>M</sup>AA<sup>-</sup>ESL<sup>G</sup>LGG<sup>T</sup>GGASAA<sup>A</sup>VDWHEA<sup>V</sup>AAT

920            930            940            950            960            970            980  
 Vcar ----- PPPP----- PATAAMAPVROPPLGINNP-----LTDPLIDPLIASVGS  
 Pcal ----- PPPPPLPLV PNLAVAPIRQPPSELNNP-----LPDPLIDPL-----G  
 Vgig Q----- PATAAAMAVRTRPQEIHDP-----LIDPLSEQPG  
 Eele ----- PPSPTPA----- PATAIAAVRPPQGLSES-----LLPDPLIQPLAAGGS  
 Yuni ----- ITAAAVPEE PRLALN----- PGEVPTT-----LAERLILHO  
 Vfer ----- EATTAGLPL-----AQQLLILORQ  
 Pcau ----- SPQDPDP----- PPLQDQERKTRQQQSPPPPRQKPPPPQLQQQRQOSP  
 Pmor AADAAGVGCNFAVGESFFAAGIDRGEGRLLGGNASGV-----TAVECMVTGPGCNAGGMSS-----AASDINAAPGPNAGSS  
 990            1,000            1,010            1,020            1,030            1,050            1,060  
 Vcar **GGGSGGAGGNSGSSAGGGGG**-----GAAAGLT **FLORLWNTLP**-----RPSQ  
 Pcal **GGGTASAGG**-----SSSADRA **FLORLWNTLP**-----RSSQ  
 Vgig **AGCAAVGGG**-----GGSGAGS-----GNLAGRNT **FLORLWNTLP**-----RSSQ  
 Eele **GGGAGGAGG**-----SGGGAGG-----SGGAGRA **FLORLWNTLP**-----OSSQ  
 Yuni **GGGSGGGGS**-----SG-----GG-----GGGGRA **FLORLWNTLP**-----QSQQ  
 Vfer -----GS-----IPSSERR **FLORLWNTLP** LQMSPHGQTQH  
 Pcau PQGP-----GA-----GLGDER **FLORLWNTLP**-----TQSQHQHQLQEEEEEE  
 Pmor **GGGSGSGG**-----GGNGI GATEPLPVERPLPPPGRLLGAPS DER **FLORLWNTLS**-----PPSQD  
 1,070            1,080            1,090            1,100            1,110            1,120            1,130            1,140  
 Vcar ----- QLLLQQQQ-----QQQPAHEPLAAASDPSP-----SPNWD DTRAAEVTA-----P-----LP  
 Pcal ----- QLLLPTOP-----AHEPPSSAREPVA-----PPWGAHRGASAAVVKTPS-----TS  
 Vgig ----- RFLGAGEL-----AAWASGIRDMTA-----AP-----PS  
 Eele ----- RLLLPTOP-----ADGAGRTPGDTYA-----VP-----MRGAGGLA-----P  
 Yuni ----- YMLPQPEQ-----GEGSGRMPDLYG-----P-----QSR LAWAH-----PLAGAGYPHDA  
 Vfer ----- LDAMSGDA-----GEGSGRMPDLYG-----P-----QSR LAWAH-----PLAGAGYPHDA  
 Pcau EEEEEEEQQQQQQQQQQQQQQQQQQQQQLAAQDEDPYTVQVSPAAQVVRGARWIV-----STSVGGYAALA  
 Pmor ----- PQRRLSPPP EMLVPDRPGSRMAMAQADAPGAAGDNS EGRARTPE-----LPLODLPGGVA-----PTAI-----TA  
 1,150            1,160            1,170            1,180            1,190            1,200            1,210  
 Vcar P----- PAFDPDLL-AMLOS GGASTVSI-----GGEGIPRERSE-----RRPVRPRTAQ-----QLAT  
 Pcal P----- LAAAVDPEML-LLP PRAGGDS-----NEGLOLPAAE-----RLPGRRRVLSPO-EFYQ  
 Vgig P----- LAAGAEMLQPALPHHGAES-----LAMPEA-----QAPVRRRVMQLTSGRYQ  
 Eele ----- ELGEPGEPLTGAGS-----GLPSASD-RQAPVRLRAVP-----DLYP  
 Yuni ----- -----AAPIGGEAD-----LRRWRSRSLQTDLSH  
 Vfer P----- RLPDAESARGDDASPDSGAEMLSP-----RWR-----QPPARROCIR  
 Pcau PGFIAATAASATHETVA AAEAAIAAAAPIAAESLVMDPQAPAW-GTEGLEVA AEA AVAAATELRWRRLRQLDRSL  
 Pmor PPRFRRRALQQQYTWGS SAAAAAAAAASADVPERST-----W-----APMP-----QVPLQQSEVO  
 1,220            1,230            1,240            1,250            1,260            1,270            1,280            1,290  
 Vcar PHRQPADLDG-----SSPPLPPP-----PQ **PMTPPAPHLLLORFMOSSA**-----  
 Pcal LGGEAAPPLP-----SSPPRPPPLSVRL **PLATPPGQLRLQORFAQ**-----  
 Vgig AGDENVLLPPPSPL-----PQHFLQSRRLP-VA **PLTPPAVORLLMORFAQ**-----  
 Eele AGGDD-----LPPPAQQLHYQPPQPPYPPRLP-TT **PLTPPPOHLLSORFAQ**-----  
 Yuni SGSDAAPLQP-----APLTPPMQ-----LTIQWAD-----  
 Vfer -----DLRD-----M **PMTPPVQ**-----LPLQWATA  
 Pcau GVWEQG-PHP-----SPRTPPMQ-----  
 Pmor -----LQP-----LPMQPQLPOPL **POQPHPQORQPLQVQPLPLQSPLSYQQQHLASPERHPEYQLR**  
 1,300            1,310            1,320            1,330            1,340            1,350            1,360  
 Vcar -----PPAPPP-----TQQQQQQLSLHGGDPR-----LSRRSTL-----GR-----GS  
 Pcal -----PPAP-----LHGADPA-----FTGMER-----SL  
 Vgig -----PPHPQGDAPVQHRQHQQQQHQEQEQLDQDQ-----POHRHHAH-----GRAPV-----PAP  
 Eele -----PPLLPSSEMLPHHHHPHYQHQQHQWHPFAQPGR-----AASLAQH-----AQ  
 Yuni -----POQDPPTLSRHDRDQ-----PAPRQRE-----MR-----  
 Vfer -----TAMEQGAGMPRHRSQGL-----PGRQDL-----  
 Pcau -----PSP-----SGWEPQSGHHLVSLRGRSTLRLQPLMLGSVV-----PSPAAAVS-----VAA  
 Pmor RQPPLSP **PPQPOPOQ**-----PSMAGLQTLSPPGIQHQQQLLHLRLLOPVQAV **PRQQLDPPALFKLQRVPTDPGFRPAA**

1,370      1,380      1,390      1,400      1,410      1,420      1,430      1,440  
 Vcar RAMPGGPIHRRARWS-----AGGAGDRG--DEDSEERSERVTV**EG**LLRFDPAN**V**GVLETSAR**R**THVWAASSAA**AAAA**  
 Pcal RGTDPARPRARWR-----GEDSDGG--GEDVE-----ADD**CG**VGRVGGSD**LN**RQERQS---PWLSTAV**AA**N-  
 Vgig HGAEAY--QPRWPPQRASEPF**GAG**T**Q**GITSEAAEAAAARE**AE****EG**CRGWSAD**G**VEMEEWQQ-GPAAWAATATA**AA**PP  
 Eele HGMDAYR-RPAWPPQHAPPEH**GGGG**-----EAATAAEAA**EA****EG**CAAWFAP**G**DVGMKEG**Q**QPGGAWA-----  
 Yuni -----QLRFS-----YATGDDE**G**--D-----AA**EG**EMDVDPGP---LPDSR-----RGA**AS**H-  
 Vfer -----DDAH--D-----VDA**CE**EELDLSAP-----RHH**AAA**-  
 Pcau AGSATGA-----EGSGGG**GGGG**GGG--D-----GGWVKMEV**G**ST**D**---SPEAG-----ANV**AG**S-  
 Pmor PASPAAH-----QSSGG**GGW**GGGA--D-----GRR**S**GG**CS**AAAGGES**D**YGARAGV-----DGAGGS-  
 1,450      1,460      1,470      1,480      1,490      1,500      1,510      1,520  
 Vcar EEAAEEAAEA**V**VAEAVEHPSLATPA**S**RPPPPPP**P**V**L**RMGAG--MPP**Q**LAR**F**R**O**----QDA**E**GAG--RSVAPER  
 Pcal -----PTN**PL**RL**L**HAIP--VQPS**Q**P**S**R**R**----LD**P**ENPS---FGAVLER  
 Vgig -----SASEVA**PL**LYPARSGRIRHRV**TR**M**G**E----RQ**E**Q**P**Q---LTGWYSG  
 Eele -----VP**GL**HPARSGG**PL**PR**TR**IR**R**----LE**T**E**A**P**Q**PP**PP**GGWY**T**L  
 Yuni -----SQ**Q**PL-----Q**G**PR**IR**R**L**Q---Q**L**GA**E**GS**R**-----  
 Vfer -----GA**Q**PL**PA**LHG**L**OS--LPP**PP**R**LR**R**V**YP**GL**DP**D**GA**S**---Q**L**GT**T**L  
 Pcau -----SYD**L**LP-----AA**A**M**R**-----  
 Pmor -----SAD**AAAA**I**G**R-----Q**R**PA**F**NT**P**  
 1,530      1,540      1,550      1,560      1,570      1,580      1,590  
 Vcar HRPM-----Q**Y**P**G**PNQLE**Q**Q**Q**Q**Q**E**R**TQ**R**Q**R**Q**R**Q**H**Q**A**Q**L**S**Q**R**D**I**D**E**V**PDELNRD**I**TEAAR**PP**S**R**P**Q**AG**T**  
 Pcal RRPLRL-----V**G**Q**Q**P**Q**PD**D**AP**R**D**Q**E**M**E**E**PAYNA**AD**L-----G**I**A**Q**A-----STV  
 Vgig GLGELP-----P**S**A**Q**AG-----Q**E**G**T**A**A**P**D**Q-----D**M**T**D**V  
 Eele GGPEAA-----A**Q**R**Q**P**P**---P**W**V**T**P**P**E**E**D**G**AM**R**P**D**Q-----D**M**P**N**V  
 Yuni -----T**A**P**G**---S**G**E**Q**Q**G**R**Y**D**E**D**Q**A**S**A**A**H**Q**R**Q**E**W**R**Q**R**D**V**A**P**S**P  
 Vfer GTTSS**R**TT**T**Y**P**MS**D**G**Q**P**P**---V**L**V**L**R**R**P**N**AM**A**G**S**S**P**D**E**R**G**G**D**G-----  
 Pcau -----M**W**Q**L**Q**Q**Q**Q**E**Q**A**Q**P**Q**M**Q**Q**Q**Q**Q**L**Y**R**S**D**I**P**R**I---R**V**V**R**Q**V**G**E**G**S**-  
 Pmor RGSTGD-----N**W**R**L**PA**Q**L**R**V**P**A**Q**Y**D**V-----S**T**S**D**M**P**A**V**-----Q**A**T**D**  
 1,600      1,610      1,620      1,630      1,640      1,650      1,660      1,670  
 Vcar TL**R**Q**G**M**V**P**T**S**R**L**S**P**A**R**D**LL**L**R**A**M**T**T**S**G**V**Q**P**L**V**L**P**A-AP-S**M**P**P**P**P**P**P**P**P**L**H**R**F**A**T**P**P**Q**A**G**S**S**R**Y**Q**P**L**Q**P**D**V**Q**G**R**R**G  
 Pcal AL**H**A**G**R**S**S**L**H**G**L**S**P**G**R**G**LL**L**R**A**M**A**T**A**G**Q**Q**L**-----P**L**R**P**P**R**Y**G**A**Q**V**P**A**A**G**R**F**R**L**N**P-----S**D**A  
 Vgig ---G**R**A**T**V**S**H**Y**E**P**L**A**G**Y**G**S**-----A**A**H**T**G**L**P-----  
 Eele ---A**G**P**V**A**Q**A**S**P**L**R**G**S**L**V-----G**Y**G**S**E**L**P-----  
 Yuni ---G**S**V**P**L**Q**G**F**A**A**A-----G**H**V**S**P**R**D**A**P**I**R-----  
 Vfer ---R**Q**N**G**M**D**G**Y**G**P**G-----  
 Pcau ---G**Q**V**P**---G**P**A-----A**M**Q**L**P**A**L**R**G**V**L**D**L**N**R**E**P**P**G**S**V**E**S**E**A**A**A**P**K**R**L**K**E**Y**P**P**V**D**T**T**A**A**G**I**T**L**H-----  
 Pmor ---G**R**A**Y**T**A**S**I**G**A**G-----A**A**T**G**A**S**R**R**S**H**L**G**F**A**S**G**A**P**L**G**M**Q**L**S**A**A**P**Q**R-----  
 1,680      1,690      1,700      1,710      1,720      1,730      1,740  
 Vcar DAAT**G**F**Q**D**A**A**A**G**L**V**A**G-----L**P**H**Q**H**Q**Q**Y**-----H**S**Y**P**P**R**H**P**L**W**R**R**R**A**L**S**A**A**G**A**  
 Pcal RAAS**G**F**M**E**V**P**A**Q**I**A**G**G**E**A**S**P**P**L**Q**H**Q**Q**Q**-----S**L**Q**Q**Q**S**Q**L**L**Q**E**H**G**T**Y**T**P**R**P**V**H**W**R**R**R**P**F**S**E**A**A  
 Vgig RER**D**T**V**A**H**A**T**A**A**A**A**A**A**M**Q**Q**H**Y**H**H**A**Q**Q**Q**K**E**R**Q**Q**Q**Q**Q**Q**L**Q**L**Q**Q**Q**Q**S**P**Q**L**P**Q**Q**E**R**P**S**L**H**W**R**R**R**A**L**A**A**A**R**D  
 Eele PAR**Q**T**A**M**R**V**A**A**A**L**A**A**A**A**P**Q---H**H**Q**H**D**Q**Q**Q**---Q**Q**Q**Q**Q**Q**P**S**S**P**Q**Q**Q**Q**Q**P**Q**P**Q**L**E**S**Q**E**Q**P**L**H**W**R**R**R**A**L**A**A**V**R**E  
 Yuni ---S**A**S**V**G**A**V**N**G**D**E**M**R**G**S**R**W**S**Q**S**R**K**R**Q**Y**C**A**V**D**E**-S**E**W**P**E**E**P**R**R**Q**P**M**Y-----Y**T**V**Q**A**H**S**G**L**O**Y**Y**R**A**G**P**G**A**G**G**A  
 Vfer -----T**A**R**E**V**R**R**S**K**A**A**V**A**L**V**Y**H**R**H**Q**H**H**Q**H**G-----T**S**G**S**T**P**G**E**  
 Pcau ---T**A**R**P**L**A**A**P**A**L**-----Y**T**F**P**A**P**E**I**V**Y**L**Q**G**L**P**A**T**L**G**G**  
 Pmor -----  
 1,750      1,760      1,770      1,780      1,790      1,800      1,810      1,820  
 Vcar H---E**P**Q**L**L**A**A**E**P**T**L**L**P**P**Q**L**V-----  
 Pcal E**D**D**A**L**E**P**P**G**A**E**L**S**P**L**S**M**P**P**Q**L**V**A**A**L**H**Q**H**S**A**Q**P**Q**P**Q**L**Q**P**L**H**E**Q**H**S**Q**Q**Q**P**Q**Q**Q**Q**P**Q**Q**Q**Q**Q**L**Q**L**Q**L**Q**L**Q**L  
 Vgig E**T**T**R**D**A**P**E**-E**S**T**E**A**G**-S**R**A**P**P**R**-----  
 Eele D**T**P**R**G**R**P**A**D**A**A**E**T**G**S**S**Q**V**P**P**R-----  
 Yuni M**G**E**A**R**A**P**---**T**T**A**P**D**T**A**F**E**P**---G**A**R**R**Q**L**R**Q**R**P**L**P**G**V**A**D**E**E**A**W**R**E**A**Y**Q**Q**L**Q**R**D**Q**A**T**H**V**P**L**S**L**S**L**Q**L**Q**Q**E**Q**Q**G**Q**-  
 Vfer -----D**Q**P**R**Q**V**A**V**P**V**-----  
 Pcau A**V**G**C**D**A**P**---**-----G**V**S**S**V**F**N**A**L**A**S**A**A**A**T**A**G**A**G**L**E**P**G**P**S**L**Q**R**R**R**R**R**A**V**V**A**P**D**E**D**A**M**G**H**Y-----  
 Pmor A**Q**A**E**P**G**P**---**E**P**S**G**D**T**S**M**-----A**V**T**G**E**T**E**G**P**E**N**N**A**I**S**A**G**Q**R**R**R**R**R**R**V**L**L**A**A**E**D**S**P**M**P-----





# rlsO

	1	10	20	30	40	50	60	70	
Yuni	MEA								-----DASE
Pcau	MSATNLVSLQRHRMPTPHHVALALSPVQCTAMPGCHTAAMYYS								CPCLCFAALQVEPGEGLNVDLPENLLPLPPSQ
Pmor	MRV								-----DCTG
	80	90	100	110	120	130	140		<b>LALRP motif</b>
Yuni	EGNDGTLAGGRQOFQOSGAPP								LEPHLSRASSGOPLPLAADMGHAGAPRGRAGSVSPPPRAHQ-LVLRPILRT
Pcau	PPPSGAGGPAQEHLDSEYAPP								PA-----ASVGSFLNLSLSPG-PGAP-----SAAPRGHPI-LALRPLTLASAG
Pmor									-----AAGDTPHPQOPRVPAAASNAATEPLTEAQSCAISAEERLDRLPMPRGLY-LALRPLLPA
	160	170	180	190	200	210	220		
Yuni	IEGSP								PAHQHVPS
Pcau	PEGAP								AAHNPL-----MHVAGPEQGGV-DHSEAAAVPEPLNAA
Pmor	NSGPP								SLQLAOLAQATLOAGPPPPSSPADDSGGGS
	230	240	250	260	270	280	290	300	
Yuni	AEAYA								AASTALRAL--QEEGRRR--VGAAPYLVSOVVRPTPEGSQSPGTP-EAAPLLDLHQQLALPLAAATAAA
Pcau	ARADI								AGTSAPAPLLMPLPDDROO--RPAPVRLVLRPVRSLQDRIQALG--AAP-----PTLGTAGT
Pmor	GNGNG								SASTAA-----EHPARRQSVPLLRPLRPLRILRVRSLPCSAALDAAVAVAAP-----DRIQTNQH
	310	320	330	340	350	360	370	380	
Yuni	LPPGGALQRC								-----G-----SREAAWVAPOLE-----
Pcau	SGATGGLLEG								SLAHSPEAFSPRTOGATFLCPGLRPIHIQ-----HTGRP
Pmor	STAQEHFPA								QGTLPQHDSFVEKVLWRQPSSTAGARSAASPPSAAPSGIIPGAVPLRLSPLLTGARSFAFSVPAP
	390	400	410	420	430	440	450		
Yuni	-GSHGAGVGLMPLPP								-----PAHHAQLOELROVOQPPROLAALGSARROPRA-----AAD-----Q
Pcau	PGSMHLGPGLEPP								TGLVPSIAARIQALERSHQOQOLSRLGPTROLPGASWHVVTGAADVGAQHAEVPAAREHSA
Pmor	PSSAGNATPASMPPP								-----PAGYS--PPLRQOQPQHCHAPPPPAAARATAAG-----AYPGGRFSDGDDGD--R
	460	470	480	490	500	510	520	530	
Yuni	SGDSRDTAEGGVHAGSPAS								PAMPPAALPAGPIEIVTVAVRVGAGGRRRORGAGRHTEGI-VRAGYTRGPVCGVFD
Pcau	SGEEEEAAE								DEASPTPHRLPVDLSTLSLPSTKIEIVTVAVRVQAPGVRRRRGSARHADGI-TRAGYMKGPVSGIFD
Pmor	NGAGDREH								DRGVSPG--LPAVRTGLTLPRGPIEIVTVAVRAPGTGLSRPRGGAVQPGMVVTRSCYVRGPFVCGRFD
	540	550	560	570	580	590	600		
Yuni	VPRYLADRDCI								HSGRWMSRSNFERVGGSKMAKWYSIRVLPDLETGLGDWLERHMPVTKGPARRSSKRAA
Pcau	VKRYLD								DDVDCIOYNGOWMTRSNFEKLGSKMAKWYSIRVMPLETGLGEWLDRHGLPLARGPNRRSSKRPIDSGDE
Pmor	VGRYLADRDCI								MYEGSWMSRSNFEKLGSKMAKWYSIRVLPDLETGLGEWLERHVPVARGPNRRSVKRPLIDSGDE
	610	620	630	640	650	660	670	680	
Yuni	LGLVQDPV								-----AYSPDVA-----DRLGGEPMALATVPVA-----HEPRDIPEL-----
Pcau	LWAGLDPM								-----AESPDAAAVVPALARVASAPLAAAAAAVAAVVAAGKRHEARGSSALQPLPINPGA
Pmor	LWLEL								AAAAYLGQHRRSTSCEDSPDPAPELPTAYQHQVAGPTAAGTTAARGDAWSSGRCDRSAGAAG-----GD
	690	700	710	720	730	740	750	760	
Yuni	-----LANRAPOQG								-----GEDRAFMORLLNTLPAQOQFMIAQPEQVTFSGPASMWGVRGMTTAPLSEAPDFG
Pcau	GRPLPAPTR								OPSAGAGASAVA-----GTDSAFMORLLNTLPPSSQRHVLOTPEIQEAGTGISAVLRGSRRTLSTQAAPTA
Pmor	GEQLRLWN								DAADASGG-----GEGGSFLRLLNTLPAQO-----VLPPQLTASAHAGGMRAPQTLSRARDPLA
	770	780	790	800	810	820	830		
Yuni	AGVAYPRVRS								TEPKAARAATGIEAG-----RDVGL--EAGRSVPTLRWRSLQV-----DLSH
Pcau	-----PAPAATPAS								LLRAGAGGSLLEGKPTRLIET--QTAGGPTTLELRMLKR-----SRSP
Pmor	-AVSEGAAPAG								GVPIHPSAAL-----SADTPQSVRSVRLAESHPRPASAAGVQLRPLKQPAVGIDRDGRPGELPG
	840	850	860	870	880	890	900	910	
Yuni	SGSDAAPLOPAPLT								-----PPMQLTLOWADPOQDEP-TLSRHDR-DORPAPROREMQRLEFSYA-T
Pcau	POEDLQPSOPH								--S-----PPTQLPWAATPWPHEPSTQAFIDR-ORRPTHLLPEAH--RIAL-A
Pmor	ERQOASPLSPWPANRAVPGGPGGNTPAPL								PROPPOAAWAPAWHSPA--AVVRRLOSAPTPLOPHDG--QLAKEDA
	920	930	940	950	960	970	980		
Yuni	GDD								EGDATEGEMDVPDGP--L--PDSRGAASHSQQPLOGPRIRRLQQLGAEGSRTAPG-----SGE
Pcau	PGAEGIHVGS								DAVAESP--TAHRPALVVRVPLLQEEQLQTRRVRRLDQEGVGAGRGAEGHEPGLA--KATVAGE
Pmor	PAP								EQLPAALNASAGGSPPLVTRQAVLTRLALPLLPLDRL-----LGVKRGREDSDKGTAATAARVANQ
	990	1,000	1,010	1,020	1,030	1,040	1,050	1,060	
Yuni	QOGRYDE								QOAAASA--ROQEWROQRDVAPSPGSVPLQGFAAAGGHVSPRDAPIRM-OPEFYTVOAH--S
Pcau	QPLOPP								QOQOPQRKRAPEFQGSRLTDVAAGSSGPTPYDIFFS-----RPQREPLTTHOPEVYPOPPHRVRIILSIPS
Pmor	DVRGVPE								EARRRPRTGE-QOQOQOQAWVAGGNPAASSRFVFE-----EPENATGPV-RPRLHGLGH--VHS

29-30 aa

VARL domain

DSGDE

FLQ motif

```

      1,070      1,080      1,090      1,100      1,110      1,120      1,130      1,140
Yuni  G L Q Y Y R A ----- G P G A ----- G G A M G E A R A P T T A P D T A F E P G A R R O L R O R P L - P G V A -----
Pcau  G F E P Y A A ----- V I E G T P G E G E Q E Q L G S A A G E A C L G S G V P ----- R R R R R P R P R S P A T S -----
Pmor  G R R T G A Q D R G D L G L Q P L L R K G G G N G A A A A A A S A A A A D V P A T G M G D E -- H P -- A Y K A N T S T R V E G T Q L G A R P S L P C

      1,150      1,160      1,170      1,180      1,190      1,200      1,210
Yuni  D E E A W R E A Y Q Q ----- L Q O R D L A ----- T L V P L
Pcau  D D E W D R E G L A R S P P H P E P L A L L P P P S Q S P R L P O P O Q R E H ----- F L Q O O D V G ----- G S M A T
Pmor  D E S S Q Q L C G T V G P L O P O P O L O T O P O P P P P R - P H P S Q F H H E Q V M R A L A S C I W E G A D Q O I E V G A W Q E L G S E H G S A D D

      1,220      1,230      1,240      1,250      1,260      1,270      1,280      1,290
Yuni  S L S L Q L Q O O Q O O O O O O O O O O O O O O O O O O O O O O O O O O O O P D L Q O S E D F D E H A V ----- R O O R A V R R R R
Pcau  P H A L S Q R O O Q L O O O O O O O O O O O O O O O O O O O O O O O O ----- O O O O H O H R H
Pmor  P H A Q A A G G E E D S C A A G Q D R A S G F G P Q V E P E I A P E D W M M S Q P H E P V -- R A V L G R P E A M G G V R E G E G D G G S R Q G A L V A

      1,300      1,310      1,320      1,330      1,340      1,350      1,360
Yuni  Q O Q H S L A E E T O P G E L S P G P R D G L Q L L R P A G P A L Y R Y T V M P S Q E G A M D G P O S T L E N E E A L S P G - R S R G S A G
Pcau  Q H Q H H H H Q O O Q O O F V A L S A D D V T Q H R A V R R R V O H L Q N V P P E S G M ----- G T L E P R -- L P P G - H S P G S T S S -----
Pmor  E R Q A V G S T E L D E R S G G L O A D S P L G N A S V S S R E D E A M O S --- S G G A --- D D L O L V D L R S P G Q O G P S S S E G L R E P A

1,370      1,380      1,390      1,400      1,410      1,420      1,430      1,440
Yuni
Pcau  ----- P H S E P T A F S S Q O L Q G A Q A D R T T V R E P P S T V D D P M D S -----
Pmor  L S Q S G A E G L L T Q R P K E A P P Q A P O R Q O Q A A V D Q S A A P P E P Q S E A A P T P D T K H T E L G L G P L P A P P P E L W P P R T V P Q A A

      1,450      1,460      1,470      1,480      1,490      1,498
Yuni
Pcau  --- S G E P A H S
Pmor  R A Q E S E K P E H A A E L Q A A T Q G P S L M T E L K L L A G A A P L E C A G R A E A V Q E H G L K G R

```

# *rlsC*

	1	10	20	30	40	50	60	70
Vcar	M		GD	TDP	SDEEN	NDNPQPPEEAPHSP	QQQQQYQ	RVLIP
Vgig	M		PRGG	TDT	SDEDN	ESTLTPSHHQ	SQQQQQ	
Eele	M		PRGS	TDP	SDDN	ENTLPPSNQORY	QQQQQR	HQQQPP
Yuni	M		ETPP	TDT	SEEDNE			
Vfer	M	EVRSCQSVLISWCHGWRNT	GT	DSC	TNVQNT	PPFP	GGPLAQEEVD	SCFAMCTQAA
Pcau	M	S	ADEV	TST	SDEGNV			
Pmor	M							
	80	90	100	110	120	130	140	150
Vcar	QQQQQHPE	QQQQQR	QQQR		QPPP	AAAAAGL		PLP
Vgig	P	APP	HQNSA		AAAP			AMP
Eele	PQTAAAAA	APP	SQQQH		PPA			AMP
Yuni	SQQSPG	APP	DWOPSQ					AMP
Vfer	RAESRP	GP	PPLQR	MDNDPTDHRIPAEQHVVSLCPEKTA	QSP	TAPFLNRPHPT	GTDSHTNPPPP	PAP
Pcau		ST	SSG	LRQR		TCA		AVAP
Pmor	P	CCR	PKQ	SQE		PQQ		PLQ
	160	170	180	190	200	210	220	
Vcar	Y-RTS	PP			HP	QLRATAAA	AGGSSSS	AAAAASYGSGS
Vgig	HPRAS	PS			R	PHLPSAGGSGGAG		PSYG
Eele	HPHTS	PP			R	PHLPPS-ASGGAG		PSYGA
Yuni	--TAP	D			HQ	PPRAAGTGY	GGVP	
Vfer	SHVLH	PP	GQNP	HNSLNPRHPPVVI	IRPRGMLK	WQ	PS	SRYS
Pcau								
Pmor	HQARP	PS			N	PALPTPFSA	ASDTPT	TRTP
	230	240	250	260	270	280	290	300
Vcar	GLFLP	PP	PPRARQVVSH		PIV			
Vgig	GMF	PP	PARGRQLVSH		PIV			
Eele	GAF	PP	PPRGRQLMSH		PIV			
Yuni	GV	SP	TLRGPPLAFH		PIL			
Vfer	HVPLP	PP	SSEL	PQHASHN	TVSRV	PV	TRRPHGS	NPVRAPPTNQSDSPPQADHFTADDNNNNNTSSTPLSLSLHPETQS
Pcau	LAVM	PP	STQ	AGLR		PV	F	
Pmor	SGDM	PP	SPLGGLGEPR		RV	P		
	310	320	330	340	350	360	370	380
Vcar	L	SRPDT	PGSS	PPHQR	PPPOLPL			
Vgig	L	SPSSTPTCS	PPAQR	PV	POLPP			
Eele	L	SPPGTPNSS	PPQR	PLPP	PPHQQHHPHQPPLYL	PTR		
Yuni	L	PRPGALGSAP	PPAHR	HLYQQPL		HPLP		
Vfer	M	PRSDAVVLWRTARR	DP	QLYPL		QP	LLLLAP	SMM
Pcau	Y	PRPVYD	SW	I	VHR	H	V	LQ
Pmor	L	SATGLLDIL	PPVRR	Q	I	R	D	L
	390	400	410	420	430	440	450	
Vcar	LRVLRAIAPAGHTA	PHPSRG	PPPL	PPPP	MPIRLQ	EGP	WRA	FAG
Vgig	LRARRVALPSGHAPP		PP	M	MPMRLQ	EGP	WRA	FAG
Eele	LRARRAALPGHVPP		P		PGHMPARLQ	EGP	WRA	FAG
Yuni	GLHHRSGPEAG		PP		PAHAS	F	TARR	PEGP
Vfer	A-DKESGFEGSR		PV	G	YRNP	PP		PPP
Pcau	E		G	P	TAE	L	TAF	P
Pmor	A		D	C	D	T	A	S
	460	470	480	490	500	510	520	530
Vcar	DLSSLAADPA		T		L	R	M	R
Vgig	DMP		P	G	D	P	S	Q
Eele	DAP		L	P	G	D	P	S
Yuni	D		A	A	P	P	G	A
Vfer	TGL		R	P	G	L	T	V
Pcau	TVS		G	P	L	F		
Pmor	Q		D	P	L	L	P	

540 550 560 570 580 590 600

Vcar -----PPPRORGN<sup>S</sup>MPGHSYVVAAPPPW-IDPRVP-----QQRLSY-GLGRLVAGALAP-----PPPAF--P-  
Vgig -----LPRORS<sup>G</sup>IPGHPYAAAPLPPLW-MDPRVG-----GQRPPLYALGRL-QPAIAPLPQPAQ-PPMPY--P-  
Eele -----PPRORGGGMPGHQYAAAPPPPLW-MDPRVG-----GQRPPYINLGRLL-PPAHAPMPQPP-PPMPY--P-  
Yuni -----RHR-SGLQGH<sup>P</sup>PAGAA-----WGLDPRAA-----AHGPPY-GL-----PPLQ--PQPA-QHLQH--PE  
Vfer GYGVGGGG<sup>R</sup>QO-GRLRWQVGMQSPD<sup>S</sup>P--QS<sup>P</sup>RQOASNGAQAS<sup>P</sup>SV-ASTKGKT<sup>V</sup>ATAA<sup>A</sup>VAVAAA<sup>P</sup>DAFSD<sup>E</sup>RA  
Pcau -----RPS-NE<sup>L</sup>RS<sup>H</sup>-----PVM-LDPK<sup>E</sup>EAF-----DDES<sup>P</sup>-----PPSAE--PV  
Pmor -----DE<sup>D</sup>QGGDPGL<sup>H</sup>RSAS<sup>P</sup>-----SS<sup>P</sup>Q<sup>A</sup>T<sup>S</sup>-----S<sup>T</sup>S<sup>T</sup>SP-----PPGH<sup>S</sup>PAP<sup>A</sup>HA<sup>Q</sup>L<sup>L</sup>PP<sup>L</sup>GH<sup>R</sup>EP<sup>R</sup>

610 620 630 640 650 660 670 680

Vcar -GPHFQPQR<sup>D</sup>O--PHV<sup>R</sup>---SRSFDDPETS<sup>P</sup>AAAA<sup>A</sup>AA<sup>A</sup>AS<sup>A</sup>AA<sup>A</sup>AVHPT<sup>A</sup>TAA<sup>S</sup>DHSE<sup>E</sup>SGG--AG<sup>F</sup>DG<sup>E</sup>AS<sup>T</sup>A  
Vgig -GPHMSQLP<sup>H</sup>PL-LAR<sup>P</sup>RGSAESFEAREAA<sup>D</sup>TAA<sup>V</sup>AA<sup>A</sup>AA<sup>A</sup>AA<sup>A</sup>PGPPP<sup>H</sup>LAD<sup>E</sup>QSG<sup>E</sup>SQ<sup>S</sup>GAA<sup>G</sup>GG<sup>D</sup>DGE<sup>G</sup>STA  
Eele -GPHLS<sup>P</sup>PLP<sup>H</sup>HLPH<sup>G</sup>R<sup>R</sup>PLGGASSPEGRHAAAA<sup>A</sup>AA<sup>A</sup>AA<sup>A</sup>AGPL<sup>P</sup>PYVAG<sup>E</sup>QSG<sup>D</sup>SH<sup>S</sup>G--GG<sup>D</sup>DGE<sup>G</sup>STA  
Yuni YGQH<sup>H</sup>PL<sup>R</sup>-----VTEPGAAG<sup>P</sup>LRRAS<sup>A</sup>AA<sup>G</sup>-----EQSG<sup>D</sup>SRGA-AE<sup>G</sup>G<sup>E</sup>Q<sup>E</sup>GS<sup>P</sup>A  
Vfer HSGARLAARTLAGL<sup>G</sup>E<sup>O</sup>---LSGNWVVVAQE<sup>A</sup>Q<sup>D</sup>V<sup>F</sup>ETG<sup>P</sup>GG<sup>V</sup>-----OHGG<sup>G</sup>GG<sup>S</sup>E--GMAS<sup>P</sup>GS<sup>V</sup>A  
Pcau -GPOQ<sup>P</sup>DS<sup>P</sup>QVQ<sup>P</sup>SI<sup>R</sup>-----LPEPV<sup>E</sup>PG<sup>P</sup>AR<sup>P</sup>V<sup>A</sup>GA<sup>A</sup>-----ELSG<sup>S</sup>SDA-EE<sup>G</sup>G--PG<sup>E</sup>D<sup>V</sup>  
Pmor PTGY<sup>R</sup>PL<sup>P</sup>Q<sup>T</sup>PP<sup>S</sup>O---LLQH<sup>V</sup>PKALLAD<sup>T</sup>GR<sup>G</sup>AAG<sup>S</sup>ATI-----EQ<sup>P</sup>SS<sup>S</sup>SD<sup>G</sup>A--CG<sup>Q</sup>Q<sup>P</sup>E<sup>T</sup>AR

690 700 710 720 730 740 750 760

Vcar SPP<sup>S</sup>TS<sup>T</sup>S<sup>V</sup>OPPE-SNIE<sup>H</sup>QS<sup>I</sup>EV<sup>T</sup>V<sup>A</sup>IR<sup>V</sup>QRAAAA<sup>G</sup>GAAG<sup>T</sup>SI--GVAAAV<sup>G</sup>RTW<sup>P</sup>DD<sup>D</sup>QAQ<sup>S</sup>PL<sup>S</sup>Q<sup>S</sup>Q<sup>G</sup>AAAP<sup>A</sup>E  
Vgig SPP<sup>S</sup>TS<sup>T</sup>S<sup>I</sup>NP---D<sup>T</sup>DK<sup>Q</sup>R<sup>I</sup>EV<sup>T</sup>V<sup>A</sup>IR<sup>V</sup>GRAAAA<sup>A</sup>AAAA<sup>S</sup>A---AAG<sup>S</sup>AAG<sup>G</sup>FGRD<sup>G</sup>AGG<sup>G</sup>R<sup>T</sup>EE<sup>G</sup>---T<sup>D</sup>  
Eele SPP<sup>S</sup>S<sup>I</sup>NP---D<sup>V</sup>E<sup>Q</sup>QR<sup>I</sup>EV<sup>T</sup>V<sup>A</sup>IR<sup>V</sup>GRAAAA<sup>A</sup>AAAA<sup>V</sup>AA<sup>G</sup>GD<sup>G</sup>AAAG<sup>A</sup>GAG<sup>P</sup>GR<sup>G</sup>G<sup>A</sup>GR<sup>G</sup>EE<sup>C</sup>---A<sup>D</sup>  
Yuni SPSEL<sup>S</sup>SPAT---GT<sup>Q</sup>ER<sup>I</sup>EV<sup>T</sup>V<sup>A</sup>IR<sup>V</sup>---AAG<sup>G</sup>R---RQ<sup>P</sup>RG<sup>G</sup>DA<sup>A</sup>AE  
Vfer GPMLV<sup>G</sup>GPV---AA<sup>E</sup>D<sup>V</sup>GN<sup>A</sup>PE<sup>Q</sup>VE<sup>V</sup>M<sup>V</sup>LP<sup>S</sup>AE<sup>R</sup>GG<sup>G</sup>GG<sup>R</sup>G---G---GGS<sup>R</sup>GR<sup>Q</sup>Q<sup>Q</sup>CG<sup>G</sup>GD<sup>D</sup>  
Pcau SPSS<sup>R</sup>S<sup>D</sup>AKAT---G-SGL<sup>C</sup>I<sup>EV</sup>T<sup>V</sup>A<sup>I</sup>R<sup>S</sup>PF<sup>A</sup>AAAA<sup>G</sup>AG<sup>G</sup>SG---GG---KAG<sup>A</sup>KAG---GR<sup>Q</sup>AE<sup>D</sup>E  
Pmor SPG<sup>A</sup>GS<sup>D</sup>VRV<sup>A</sup>AAAL<sup>P</sup>PV<sup>R</sup>I<sup>EV</sup>T<sup>V</sup>A<sup>I</sup>R---G<sup>P</sup>VP<sup>S</sup>G---G---RL<sup>S</sup>DA<sup>G</sup>LA<sup>G</sup>E

770 780 790 800 810 820 830

Vcar LRAGYAP<sup>G</sup>VR<sup>G</sup>FDV<sup>P</sup>RYLA<sup>G</sup>RDCI<sup>F</sup>HN-GRWMSRS<sup>N</sup>FER<sup>V</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPLGEWLER<sup>H</sup>CM<sup>P</sup>V<sup>T</sup>K  
Vgig AOLGYMR<sup>G</sup>PV<sup>C</sup>GLFDV<sup>P</sup>RYVA<sup>G</sup>RDCI<sup>Y</sup>HN-GRWMSRS<sup>N</sup>FER<sup>V</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPLGEWLGR<sup>H</sup>GL<sup>S</sup>V<sup>T</sup>K  
Eele ARSGYMR<sup>G</sup>PV<sup>C</sup>GLFDV<sup>P</sup>RYLA<sup>G</sup>RDCI<sup>Y</sup>HN-GRWMSRS<sup>N</sup>FER<sup>V</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPLGEWLER<sup>H</sup>CM<sup>P</sup>V<sup>T</sup>K  
Yuni SRAGYTR<sup>G</sup>PV<sup>S</sup>GLFDV<sup>P</sup>RYLA<sup>G</sup>RDCI<sup>H</sup>NS-GRWMSRS<sup>N</sup>FER<sup>V</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPLGDWLER<sup>H</sup>N<sup>M</sup>P<sup>V</sup>T<sup>K</sup>  
Vfer ---GMQEE<sup>F</sup>LM<sup>G</sup>VFDV<sup>K</sup>RYLE<sup>G</sup>RDCI<sup>L</sup>VS<sup>P</sup>GYWMSRS<sup>O</sup>FE<sup>K</sup>GGSKMA<sup>K</sup>WYRSI<sup>H</sup>VLPDKISLGEWLE<sup>N</sup>NI<sup>E</sup>IK  
Pcau SRSGYVR<sup>G</sup>PV<sup>C</sup>GLFDL<sup>K</sup>RYLE<sup>G</sup>RDCV<sup>L</sup>YS-NRYLSRS<sup>H</sup>FE<sup>K</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPIGEWLER<sup>H</sup>GLA<sup>V</sup>T<sup>K</sup>  
Pmor SRAGYVR<sup>G</sup>PV<sup>C</sup>GLFDV<sup>G</sup>RYLE<sup>G</sup>RDCV<sup>L</sup>YG-GRWLSRS<sup>H</sup>FE<sup>K</sup>GGSKMA<sup>K</sup>WYRSIRVLPDLEPLGEWLER<sup>H</sup>K<sup>M</sup>P<sup>V</sup>T<sup>K</sup>

840 850 860 870 880 890 900 910

Vcar GPARRSS<sup>K</sup>R<sup>R</sup>AAAD<sup>S</sup>GD<sup>E</sup>-----PSPMGTAP<sup>G</sup>QAEAA<sup>A</sup>AA<sup>A</sup>SA-----ATR<sup>G</sup>SS<sup>D</sup>  
Vgig GPARRSS<sup>K</sup>R<sup>R</sup>-AAD<sup>S</sup>GD<sup>E</sup>LLL-----AAAXXXXX<sup>X</sup>AA<sup>A</sup>AL-----GGR<sup>G</sup>SS<sup>D</sup>  
Eele GPARRSS<sup>K</sup>R<sup>R</sup>-AAD<sup>S</sup>GD<sup>E</sup>LLL-----ATA-----AA<sup>A</sup>AA<sup>A</sup>V-----MSPRG-SGGIGSGGG<sup>R</sup>SAD  
Yuni GPARRSS<sup>K</sup>R<sup>R</sup>-PAD<sup>S</sup>GD<sup>E</sup>ELGLGQVHETVES-PDMAG<sup>S</sup>SGGDAM<sup>V</sup>AA<sup>A</sup>GA<sup>S</sup>-----EGV<sup>G</sup>VAI  
Vfer GPSRRT<sup>C</sup>K<sup>R</sup>-SAA<sup>S</sup>AD<sup>V</sup>GAG-----TEQAD<sup>S</sup>AE<sup>Q</sup>EG<sup>S</sup>SA<sup>A</sup>GD<sup>T</sup>PI-----EGV<sup>G</sup>VAI  
Pcau GPARRSS<sup>K</sup>R<sup>R</sup>-PVD<sup>S</sup>GD<sup>E</sup>EQGFALPVAHSPDVEG<sup>S</sup>SGGEP<sup>S</sup>AL<sup>A</sup>VAGASAIGAALLPQAGQE<sup>H</sup>M<sup>F</sup>RLDHT<sup>P</sup>LQ<sup>P</sup>  
Pmor GPARRSS<sup>K</sup>R<sup>R</sup>PYIPP<sup>G</sup>D<sup>V</sup>AWIYGH<sup>L</sup>QDF--PSLDGVEES<sup>R</sup>SG<sup>S</sup>V<sup>A</sup>AAAA<sup>A</sup>-ETP<sup>V</sup>T<sup>L</sup>PP<sup>Q</sup>P---LAP<sup>L</sup>AS<sup>Q</sup>AM<sup>Q</sup>P

920 930 940 950 960 970 980

Vcar ADDPLLA-----AS<sup>E</sup>Y<sup>D</sup>T<sup>F</sup>AR<sup>P</sup>ARI<sup>P</sup>VR<sup>H</sup>D-----ISGT<sup>A</sup>C<sup>A</sup>G<sup>E</sup>AS<sup>G</sup>GL-----  
Vgig ADGAAMAAA-----G--Y<sup>D</sup>AF<sup>G</sup>RPV<sup>R</sup>L<sup>P</sup>MR<sup>H</sup>D<sup>S</sup>GA-----AAG<sup>V</sup>GV<sup>G</sup>D<sup>I</sup>SG<sup>G</sup>L-----  
Eele LDAAALAAA-----AA<sup>E</sup>Y<sup>D</sup>AY<sup>G</sup>RT<sup>A</sup>RL<sup>P</sup>SR<sup>H</sup>D<sup>S</sup>GS<sup>L</sup>T-----GGAGAG<sup>G</sup>AG<sup>S</sup>GE<sup>I</sup>SG<sup>G</sup>L-----  
Yuni ---ASA-----AQ<sup>E</sup>Y<sup>D</sup>-----YEP<sup>T</sup>SH<sup>D</sup>RL<sup>V</sup>A-----QQGG<sup>A</sup>CV<sup>D</sup>GE<sup>G</sup>GG<sup>H</sup>-----  
Vfer AETALRSS<sup>S</sup>HRPV<sup>T</sup>RS<sup>E</sup>ALLL<sup>M</sup>PT<sup>A</sup>K<sup>R</sup>RR<sup>R</sup>R<sup>H</sup>DE<sup>D</sup>D<sup>V</sup>TP<sup>V</sup>AM<sup>I</sup>DD<sup>G</sup>F<sup>I</sup>SE<sup>A</sup>DP<sup>G</sup>GAM<sup>G</sup>AL<sup>H</sup>MP<sup>Y</sup>MS<sup>V</sup>AQ<sup>F</sup>AV<sup>Q</sup>Q<sup>O</sup>T  
Pcau SQQRYS<sup>P</sup>-A-----QQ<sup>Y</sup>SS<sup>L</sup>LE<sup>Q</sup>HS<sup>P</sup>PP<sup>Q</sup>QR<sup>S</sup>PP<sup>S</sup>P---PP<sup>Q</sup>P<sup>Q</sup>P<sup>Q</sup>GT<sup>T</sup>LS<sup>G</sup>DS<sup>G</sup>P  
Pmor ATRGAG<sup>P</sup>VG-----ST<sup>D</sup>AV<sup>R</sup>L---RIP<sup>V</sup>RA<sup>Q</sup>-GL<sup>V</sup>Q<sup>P</sup>---PGPP<sup>Q</sup>PH<sup>F</sup>AG<sup>Q</sup>P<sup>G</sup>SP<sup>A</sup>PL

990 1,000 1,010 1,020 1,030 1,040 1,050 1,060

Vcar VQRL<sup>R</sup>T<sup>I</sup>S<sup>P</sup>LV-TAP<sup>V</sup>R<sup>P</sup>SV<sup>R</sup>PT-----LL<sup>T</sup>S<sup>P</sup>L<sup>T</sup>PL<sup>P</sup>L<sup>P</sup>Q<sup>R</sup>F<sup>S</sup>GG<sup>P</sup>--MEAG<sup>G</sup>L<sup>Y</sup>-GI<sup>P</sup>I  
Vgig VTRL<sup>L</sup>GI<sup>P</sup>PP<sup>Q</sup>H<sup>M</sup>ATA<sup>V</sup>R-P<sup>P</sup>LP-----LRS--S<sup>L</sup>OSS<sup>P</sup>AR<sup>L</sup>-----GEEAG<sup>V</sup>Y-AIP<sup>V</sup>  
Eele AKRL<sup>L</sup>IA<sup>S</sup>PL<sup>L</sup>AT<sup>T</sup>PL<sup>R</sup>SP<sup>S</sup>LP-----LQ<sup>S</sup>PPAL<sup>A</sup>PL<sup>P</sup>RR<sup>L</sup>SG<sup>G</sup>PG-GEAP<sup>G</sup>V<sup>Y</sup>-AIP<sup>V</sup>  
Yuni VR<sup>R</sup>ML<sup>T</sup>-----S<sup>T</sup>S<sup>P</sup>L-----PH<sup>L</sup>L<sup>I</sup>R<sup>L</sup>PL<sup>R</sup>N<sup>S</sup>EG<sup>P</sup>N-R<sup>T</sup>AE<sup>G</sup>L<sup>Y</sup>-SIP<sup>S</sup>  
Vfer ATRL<sup>L</sup>AM<sup>O</sup>TRL<sup>S</sup>E<sup>S</sup>AH<sup>H</sup>RR<sup>H</sup>L<sup>P</sup>PP<sup>R</sup>Q<sup>O</sup>N<sup>K</sup>LE<sup>P</sup>L<sup>T</sup>AI<sup>W</sup>S<sup>R</sup>AQ<sup>S</sup>VR<sup>S</sup>RV<sup>G</sup>AP<sup>L</sup>S<sup>R</sup>AV<sup>T</sup>LAP<sup>D</sup>-THAL<sup>R</sup>MY<sup>D</sup>SD<sup>L</sup>V  
Pcau LQRL<sup>L</sup>RI<sup>A</sup>PL<sup>L</sup>--T<sup>S</sup>LR-----P<sup>L</sup>AT<sup>M</sup>PRE<sup>D</sup>S<sup>D</sup>PP<sup>S</sup>PN<sup>A</sup>AY-----  
Pmor --RT<sup>I</sup>SV<sup>H</sup>SLA-----P<sup>L</sup>TP<sup>F</sup>K<sup>R</sup>TR<sup>L</sup>S<sup>F</sup>EG-----DDL<sup>V</sup>

26-56 aa

VARL domain

\*

DSGDE

```

1,070      1,080      1,090      1,100      1,110      1,120      1,130      1,140
Vcar  RRMGSAAAAAAGAAATGSGGYTVVAERDSGVSAGVAFPPQQQQQQQQG--ATSAEGV-----EDAAAAAA
Vgig  RQAGSGFTAAAAA---GFQEQQHQP-----PRPQQQRHQEQQQPPSEQQQP-----AQQEAQKG
Eele  RQAGSGLFAAAAA---PL-----P-----PQQQQQQQQQQQ-----GG
Yuni  GRSWGAAAAQSA---GDAGM-----LYNTATRQDRMD-----STPREYGRFAGHVRLDSDGRGTATA
Vfer  LOSGTGDGTTDAYGSIEGGGGTHAM-----LYNTATRQDRMD-----STPREYGRFAGHVRLDSDGRGTATA
Pcau  -----ADGSADPAGGGGSSEHTP-----FQPGGRVVRGRGGDAGGSNHLPMRL-----
Pmor  VSSGGG-----GAGSSGGGGSSRTSP-----SRHDASGSGALG-PGSPDSAPSRLGQLSA-----ASTRPSVA

1,150      1,160      1,170      1,180      1,190      1,200      1,210
Vcar  AEEEEEEEVATLRWLRROA--SRAAAAA-----SAASHPEPAAAAALGPVRLSSTL-----RSAGDPPSEA
Vgig  GDEEPEEDVATVRLWLRLOT--RRAARQQ-----QQQQQQ-----QQQQQQQQA
Eele  AEEEEPEEDVATVRLWLRLOT--GRAAR-----ARRRRVA-----QQQQQQQAV
Yuni  VDEDGGDDVATLQWLRLOT--GRSRGLRGTA-----QDPQPQPQ-----SPPAQQQVLI
Vfer  TADAYGREFVTLRWLVEHS--GPHVREETVGMFNDDDATQEAAAETMAGAVTPLLSSQTLLPHYSSKPHSEPPPPQ
Pcau  -DAEGLHKLALQLLQAIQGRAQGG-----PEGEGAAPVPA-----
Pmor  RASQPESDQLHLRLLQAQAAGSRAAASSRP-----PAEAE-----PGQPEWQRTA

1,220      1,230      1,240      1,250      1,260      1,270      1,280      1,290
Vcar  STAVQVFRWPPAPPLPEAAAAAATATAVMVTTEPPQPPPEPPLPEAPEVLTALTEHORFA-----
Vgig  SPTAQLPMHWTAVP-----PSPLTEPELLRP-----TRRORVA-----
Eele  SPTAQLPVQVAAPP-----SSPAEAEMVRP-----ARRRVA-----
Yuni  TPSMQVPIRWAE-----PQQDPSSLRSP-----TRRHRPS-----
Vfer  SPSRQVATRWSGPP-----SGTSPPPPNDGPR-----LIHRRRTG-----
Pcau  SPAEQILLQWAE-----RQPNTPALIPQ-----LHRRRI-----
Pmor  APAGLPLLSAAA-----EQAFLAPTSYRS-----AQRRRLEHGYTEHERQPAAIEGPA

1,300      1,310      1,320      1,330      1,340      1,350      1,360
Vcar  -----KPSQPRHATRDDDAD-----PYYYQQEQQLHS-----TDLGVEPQPPERT
Vgig  -----SPH-----RRDDVD-----ARKHGDVDAGS-----RSGNDVDPRQGQS
Eele  -----SPQ-----ARDDDDVYVGGGGGDAAMEHGEAEAA-----AGAAVEDEPGLH
Yuni  -----QPD-----
Vfer  -----TLNCEPP-----SQHHEQ-----PNPISQEFNSLSREPP-----HRKRKGYQEPPEQH
Pcau  -----EPH-----DELHIG-----VHQRQEQQLQ-----PP-----A---APTRNPQHH
Pmor  AAENARGPAGLQLRPGIP-----GEKLAQA-----TQQTQGPQRTYL--QLPAHLIACDAAAGTIGQQPLSQ

1,370      1,380      1,390      1,400      1,410      1,420      1,430      1,440
Vcar  LPPPPPPPPPPPPPHRHLSSTGGGVAALAAQTLHDVAA---QRQODPFA-----PGLASSEGRISPTQQLH
Vgig  LHPLPLPPP---PHRQRTGGVTAASTVAGGSAP---RQPRTAEILRLEDPGPSSVSRSAHTSPNQQQQ
Eele  PLPLPLPPP---LPHRRRFSASAAAAAASNASAHHQOQQQRPADILRLEETSPT---HQHQHQQE
Yuni  -EPSPPE---PETGLLPAAGGDTTGGGGR--MPLAR---QEPRHSPS-----YGLRPLGLVLQ
Vfer  -POLPLSP--PCGPQGGLI-----L--HPTTNRVTVDVL-----PPYTLHLTRVVP---
Pcau  -RPLPLPH--PVSPEVGSENASGGD-----EARR---REAQGPRL--L---PA-----
Pmor  ARPLPLRL--SLIP---LRLAGNIPGGG---PLAA---AQPRPPVCAF---PGFGRPEPVSP---

1,450      1,460      1,470      1,480      1,490      1,500      1,510      1,520
Vcar  GD--PTAAAAAAEEAAV---SYTYTRKRAS---SL--TDMPYRPRRLI---TL-ELDTAAAAAPHSAENV
Vgig  ENEGPAAAAAIAAERAF---LYPYFRHPQTSGSTL--PV--SDVPYRTRGRVA---T---IAAPPSPRQQ--
Eele  HEEEDDDPEAAAAAEQAF---LYPYARQPAASASPTL--PV--SDVPYRPGHRVA---T---IAAPLPAGQRR
Yuni  GL--PAAAGPASARDEPDRPHFYPIA---LSGP--PGRPYQVARRPTGGPF--TL--PRGGGGGAGGGGGG
Vfer  ---PYALALHTLPGSAL-----PPAPAPSSL--SF---AARSVGG--TYHDAGGGDGGGGGNTGG
Pcau  ---PAELVMLPMPRRPH---LYEIADPLQKPYTIRSM--SHLPLYRAGPRIR---T---RTGGAPGELASQ
Pmor  ---PPTAGAAAASVYLDASHPRDAA-RLGGQPYGLRPLQASERVPPAAIARVQ---I---TGAGAPCGEAAQ

1,530      1,540      1,550      1,560      1,570      1,580      1,590
Vcar  -SSSAGGS---TAASAAAMATMA---MMPPLPLWQKHRFVAEPRLPTSHQQQQQQQPAAPA-----PPPLQP
Vgig  -GASGSGA---DVIPAAAMG-----PTLTALQP-----
Eele  GGGSGGA---AAT-AATAG-----PPLTLAQS-----
Yuni  -GRGGGGG---SGAGGGAGGGGGYGELAPGHP-----GAVGAPPDSASVRQWQOHAFGAAA---
Vfer  -GAVAGNT---SGNGGDATAGGGDDNWDGDDYNDG-GVNPAREQEPSLQDKRQKRPGGSSKAGKHLATEDALAT
Pcau  TRLAEEED---EAQSGGEQEQGAFDDDGPE-----QRRINSPA-----
Pmor  VVKPAEGDVLGVAFESQGEQVGEAGNAAGGA-----ERRGDTAG-----

```

```

      1,600      1,610      1,620      1,630      1,640      1,650      1,660      1,670
Vcar  LPEV-LEQRQEQRFQEQELM-----HLGLERHLGLRLAPEWE-LEEE
Vgig  --TMAMRRRHGSSDNPVQQP-----LPLERRPVRQPPQDEQPO
Eele  --AM-LRQRPYFDEPEDQA-----LPLERRPVRQPPQYQ-EQQH
Yuni  -----RDGSQQE-ERRH
Vfer  WESR-GHQEQEHRKGP IRQKKMISAEGAEIRYGAVTDSPAHRLEGEAAGGAEVGGIVGVAAAAPAADVQ-QQHW
Pcau  -----QQSTSQAE-ETYW
Pmor  -----QAQAHRPPQVNSGI-----GWTGL-----

      1,680      1,690      1,700      1,710      1,720      1,730      1,740
Vcar  PISQQEE-----EEEEAVEAEAADAIGVVGEAL---EAPDVAEQV-ETVAAAAAADAAMMESVEAAVAEAVE
Vgig  PQQQPPQPOQQLRYLRVQMQRQGRVWGQEAWGRGAGGLGAGGDMLEQ
Eele  PQRQPPQ-----HLQQGQGAWAQGGWQGK---QMEEQDMQQQ
Yuni  KQRQPPYQ-----REGEQQEQEGGPGEG-
Vfer  QQTQREQQKDVGDDVEEEGEEEEEKQPPQHQRQCRQL---QQTWDQQKQPQRLVGPEGGDQGAEE-
Pcau  QRQQSDQ-----QDAQQQQQPRRRR-
Pmor  -----

      1,750      1,760      1,770      1,780      1,790      1,800      1,810      1,820
Vcar  AVMEEAVEAMEAAAAEEAVETAAEAVQAGTAEGVSTEALYRPYDQSPCGQASSLSPLSLPEQLQQPQ
Vgig  ---PGGIEEEQAA-----RAHFRPGEALRGLQGA---PPPMLQQQQ-QS
Eele  ---PQQQEEE-A-----RAHFSLQNRPHGLQS---PPSLPQQQRQP
Yuni  ---EEAED-----QGRFRPQDSSRDEQA---SPSPPQQQQ
Vfer  ---EEEEEEEEGAREPPLVAANYP-----QSHHHQQNQQHQL---QPSQPHELLQSPAPPAPPP
Pcau  ---LQAERWQLE-----QDESPHDDSA---HEVQSPSSLLQ
Pmor  -----ADGGSGGER-----

      1,830      1,840      1,850      1,860      1,870      1,880      1,890      1,900
Vcar  -----QQQELHHHNYQPQQERREEL
Vgig  -----
Eele  -----
Yuni  -----YHYQHPHP
Vfer  QTWNEGVLDQITRLKTAPTYPSPDTHPPPPATCLRLVPSAAVVRIHLTGTPPHQHHHHHHHHPSQ
Pcau  -----
Pmor  -----

      1,910      1,920      1,930      1,940      1,950      1,960      1,970
Vcar  QLQQQIEP-----LLRAEHEY-----AMRHRAL-RRRQQRG-PGDEASDEGE---
Vgig  -LQREIDP-----QRLELEMY-----SMRHRAMRRRQQ-----EADDENWERR
Eele  -LRQEVDP-----QQRAELEDY-----AMRRRAMRRRQQRG-SGDEAYDDEERDRR
Yuni  -HQHQLEQ-----QQHELEGY-----ATRHRAMRRRQQRG-SSAE---EEEEWDPQ
Vfer  -QQHQQPQQHQLLLLLAAHPPTHPDAQSSELQMSPPPPAVSLPSIHQSKQPGASSPSSLSEDGDCNTN
Pcau  -----EGGESNNA-----VQWRIVRRRVIQHPE---STAEALEE
Pmor  -----GGTLRAKRR-----EDDSEREDEDRLRE

      1,980      1,990      2,000      2,010      2,020      2,030      2,040      2,050
Vcar  -GS-----
Vgig  S-----
Eele  S-----
Yuni  SQAAGSGMLPQPIPGYQSIRPSLATVYPLAHMRSQEG-----AWRSAQPPLPGRRRSPSEWTHSP----ED--
Vfer  TPSAQGG-----DTAQGANEWLTVREGAQGGEEGEDCAGAEDTGRQQR---QQSKPSDHVEALQGGNEDVA
Pcau  -----
Pmor  S-----RKRGPALSSEA-----

      2,060      2,070      2,077
Vcar  -----GE
Vgig  -----
Eele  -----
Yuni  -----QQPPE
Vfer  VQDGDDGSAGNLPGEAQAGLREGKA
Pcau  -----
Pmor  -----GA

```

# RLS1/rlsD

1 10 20 30 40 50 60 70

Vcar MALKSNTTLAIVRIVWRINYLECAISTFWEGSVVSKGALLKPKQRNWPGLQPRRLMLLARTQPSLKDLAAAAGLS  
Pcal  
Yuni MPTVDMMHVAERGEG-----  
Vfer MVRMLMHAGR-----  
Pcau MPTLVGVCVME-----  
Pmor M-YVEV-CL-KFDDG-----SPTSP  
Gpec MQL-----DGPA-----ERGLFAG-----  
Crei MAT-----VTLGR-----

80 90 100 110 120 130 140 150

Vcar AESGSSSDSCGGCIGTPHSLSNLGLTHAGVVATAAPRPNAAPPGCCLDLPSPPHAETSHTVAQAQVHRYGSGMLSA  
Pcal  
Yuni  
Vfer  
Pcau CD-DHQP  
Pmor ADGKPP  
Gpec D  
Crei D

160 170 180 190 200 210 220

Vcar GESKQQQQHNNLMLRGEELQRNAKRAAAAAATANGAFATSHHGIVEAALQQLQMLAASQDMGCVTGDARDA--GS  
Pcal  
Yuni  
Vfer DAHSALNG  
Pcau QLLQRDG--NSVAAITGASRAPSNVQGTALRGVQQ--VPGPGRGALLGT  
Pmor KRTAASVG--VLLTH  
Gpec  
Crei TGDS

230 240 250 260 270 280 290 300

Vcar DDGGGG--GNGAAAG--AATATGSQLOSGAAPAARPR--IGRGGSYNSSPGGQLPATAPYDLL--  
Pcal  
Yuni  
Vfer AYSKYSSDMSHRYVHVPEDCSSFESSTTFFVLTILRTSQARITKVPARETALHRMFDSAPRS  
Pcau ASGGGGGYCCGDGLSVGLDAANRGGVYLHGGASPPHAPS YDCKASASIAIAGNGLAHGSAGNIKAATAAAVDAA--  
Pmor ITAPWATCCLGETIATQPLGVNATSVW-----PAPSGLTEVGLSSHITREARPF AKRVEVAAAAAACPPGGP--  
Gpec  
Crei GRTRAES

310 320 330 340 350 360 370 380

Vcar GEQQGAAAGGGA--GGVHDGPMHVRRSSSMGTAAAAA--A  
Pcal  
Yuni  
Vfer DSLDVLAGRSTE--AETATFLRKESATTLQTS SSSGS S DLRVRLLDVVGICSAETDALCASARNLP--AILRQPQT  
Pcau DATHEGFLDRGA--EGGGDVGERERRASPWAAAAAAPRR--HLKRPSHSAE-----LELELGPS  
Pmor DALRPGSERDQP--ADPGRVDSARLTVNSKPSQLAS SPTVVKVEEAV--ECVYDPQQOSSNPLPTGVRLSLPPS  
Gpec AGRGS--AAVDARAPGR--LAAS  
Crei DLGDRGAGKKRKP ELAGANS GSSDSSAGHLAVASSERS SPORAR--ATPGLAMSASLL--LVKEDPT

390 400 410 420 430 440 450

Vcar AALAAAAAADC-----VDGDGGDFATGQG  
Pcal  
Yuni  
Vfer HSADQOPSAQLNPQDRELPTQOTTIREPSQHPPQRPQSODA--NMTTPTSLPSAAAVNGDSVKHHTTEKH  
Pcau AAAAAAAAAAGL-----GAERGGGEDSEDG  
Pmor RA AHDAAMALLQNRQQQLVQQQ--QEQQARS AVGPA--GFVKPEQGAAGAADGGGNPSGTEVA  
Gpec ASATAAAAAAG-----H  
Crei EEEEEQEQQQNC ELDEPPPPQQQ--QQQPQQQPAAAAATGGT LAALSGSVHATSLRNSTSVPGVAITVQSRSL



460            470            480            490            500            510            520            530  
 Vcar -----RWPRRKQKLSATSDLLGDELSPDDGGGGGGGGGGGGDGGGRQGGE-----PQGGHSDG  
 Pcal  
 Yuni -----RPWRRRTVRRNAKC-----PGGCCGGDRSGRS-----Y-----SR  
 Vfer DAPSTSPIPIINEQTATADL-----GRTKLO-----PPPPPHSQPROQ  
 Pcau -----YEPPAAQRRRRGSHD-----GVVGRGGDGAGGGGVSG-----P  
 Pmor TTPADSPPPGAATDTAGDTAVEDDN---DVVEAGVGGRRGGAGVGVGGNGGRSTLKRPLSHNGYIAPGEPRIVPGYP  
 Gpec VSPADNGAAELTDQLGEAHR-----RSLKR-----T-APEAADTDERLQ  
 Crei GAPIPVQVLAARSAAAAASG-----GGKPPSHSLGCG-----YP

540            550            560            570            580            590            600  
 Vcar **PSR**AAAAA---AAAAAAVLSGASSAQQOQHQLNHLHGSGNGSG**SG**AAKAGAA**AGG**-GGRGARAAVAARRCTPTAEA  
 Pcal  
 Yuni **P**DAPP**AV**-----G  
 Vfer **P**PEPN**AA**---APPSTRYDPPPPPTT**FOR**TASLSTLAT---ACGPTT**AA**SAGG-GSRG**PQ**-----L**P**POSTSW  
 Pcau **P**OG**PA**AV---PPSGAGGT**RTA**AL-LGS---AGSR**RA**AGSGG-GS**SETI**AKVRNATK**PE**PGTEG  
 Pmor **P**M**DD**AV**F**GLLP**I**QR**S**R-GPP**Q**L**P**GG**V**R-ASL---ACG**P**QAASAGGGRGGG**G**ARG-----RRMSAAAA  
 Gpec **P**VEAE**AE**-----AEAVDM**R**---AGS**LE**G**AA**AEDD-----APSGAD  
 Crei **P**GS**P**RE**DY**-----DN**GR**AP**R**G---LGD---GGS**G**W**EA**AG**AY**G-GGG**GD**P-----M---AW

19-23 aa

610            620            630            640            650            670            680  
 Vcar PDVGGLDID**DD**GQ**DG**AGALGGGA**AMP**SE**L**PP**PV**EV**TVA**VR**V**SG**S**GRAS**E**ED**L**R-YGN**G**S**Y**VR**G****AC**GV**F**EP**A**L**Y**MS**R**M  
 Pcal            GGV**D**GSSG**AF**PT**D**L**P**GP**V**EV**TVA**VR**V**GSARAA**ED**A**R**-FG**N**G**S****Y**I**K**G**H****AC**GV**F**EP**A**L**Y**MS**R**M  
 Yuni RKAAP**LE**PE**E**AS**D**P**G**DP**G**EVE**C**AL**PA**AF**F**PA**AV**EV**TVA**VR**V**SG**S**GR**AA**EE**E**EP**R**-TG**A**G**C****Y**VR**G****AC**GV**F**EP**E**L**Y**VS**R**M  
 Vfer KSL---GAT**P**ST**G**G**A**NG**E**GF**VL**PP**G**AS**L**PP**PV**EV**TVA**VR**V**L**NG**AP**LD**EE**EP**R**CS**G**Y**G**Y**VR**G****AC**GV**F**DP**E**L**Y**V**N**R**H**  
 Pcau CDA---EAD**K**SL**Q**AAS**P**EAG**LL**PL**P**GE**L**PP**PV**EV**TVA**VR**V**SG**S**R**PG**D**D**E**T**R-YGN**G**C**Y**AR**G****AC**GV**F**EP**K**L**Y**M**N**R**R**  
 Pmor AAATA**AD**A**E**GG**S**D**G**D**G**E**A**E**E**G**AM**PL**V**M**PE**P**V**EV**TVA**IR**V**SG**S**RA-P**D**EP**R**-YGN**G**T**Y**T**K**G**AC**GI**F**DP**K**L**Y**MS**R**M  
 Gpec RDG---G**V**D**G**GV**D**G**E**E**G**AF**D**MA**S**L**PA**V**L**PP**PV**EV**T**MP**IR**V**Y**D**G**R**P**GT**V**K**A**R-GAN**AY****Y**I**K**G**AV****CG**T**F**D**P**S**L**Y**M**O**H**K  
 Crei RNA---AAAA**AA**E**A**EA**E**F**D**M**S**T**L**PA**V**L**PP**P**V**EV**TVA**VR**V**SG**S**---DE**PP**R-G**P**GG**G****Y**V**K**G**AV****GL**F**Q****P**OL**Y**L**AR**M

VARL domain

700            \*            710            720            730            740            750            760  
 Vcar **DC**IR**Y**H**G**OL**I****S****R**S**H**F**E**K**I**GG**S**N**MA**K**W**Y**R**S**I**R**V**L**P**D**L**E**P**L**G**E**W**L**R**H**G**MP**V**T**K**G**P**ARR**Y**R**R**K**Q**P**G**-----GGGG**V**  
 Pcal **DC**IR**Y**Q**G**LL**I****S****R**S**H**F**E**K**I**GG**S**N  
 Yuni **DC**IL**Y**Q**G**TH**V**S**R**S**H**F**E**K**I**GG**S**N**MA**K**W**Y**R**S**I**R**V**L**P**N**L**E**P**L**G**E**W**L**R**H**N**L**P**V**L**K**G**AARR**S**R**R**P**K**PP**M**-----SS**AA**A  
 Vfer **DC**IR**Y**E**G**ML**V**S**R**S**H**F**E**K**I**GG**S**N**MA**K**W**Y**R**S**I**R**V**L**P**E**L**E**P**L**G**E**W**L**R**H**G**LP**V**T**K**G**A**ARR**S**R**R**P**K**L**V**V**Q**-----SS**I**AA**N**  
 Pcau **DC**IR**F**Q**G**SL**V**S**R**S**H**F**E**K**I**GG**S**N**MA**K**W**Y**R**S**I**R**V**L**P**S**L**E**P**L**G**E**W**L**R**H**N**L**P**V**L**K**G**AARR**S**R**R**P**K**PL**V**GR**C**VG**AN**AAA  
 Pmor **DC**I**Y**CD**G**AL**V**S**R**S**H**F**E**K**I**GG**S**N**MA**K**W**Y**R**S**I**R**V**V**T**M**E**P**L**G**E**W**L**R**H**S**L**P**V**L**K**G**A**ARR**S**R**R**P**K**H**I**G**A**AP**S**AG**AAA**H  
 Gpec **DC**I**R**C**N**G**M**MS**R**S**K**F**E**Q**T**GG**S**N**MA**K**W**Y**R**S**I**R**V**L**P**E**M**E**T**L**G**E**W**L**S**R**G**L**P**T**K**G**R**PR**R**C**P**T**R**PT**AA**-----OH**M**AV  
 Crei **DC**IR**Y**K**G**LN**V**S**R**S**N**F**E**K**V**GG**S**N**MA**K**W**Y**R**S**I**R**V**M**P**D**L**E**P**L**G**E**W**L**R**H**G**LP**V**L**K**G**A**ARR**S**R**R**PR**RV**VL-----AN**AAA**

770            780            790            800            810            820            830  
 Vcar SNDGG-----GEAS**G**GGG**GE**V-E**V**AA-----  
 Pcal  
 Yuni AAAAA---AN**L**AA-----DET**G**CE**AS****G**GG-----D**CE**A-----  
 Vfer GGF**G**P**AAAA**A**K**RS---SA**MA**S**L**AR**PC**V**T**F**P**T**W**Q**P**ST**H**P**GG**D**V**S**G**D**D**G**AG**D-----D**G**DD**D**G-----G**E**Y**M**PP--  
 Pcau AN**AG**S-----V**E**L**S**P**W**AA-----D**G**S**C**CE**G**S**G**GG**E**GA**L**G**E**Y**E**Q**P**G-AAAA**AA**AG**R**P--  
 Pmor G**SH**G**P**G**P**G**A**TH**NN**NAV**VE**L**S**P**V**G**S**G-----G**E**G**S**G**GG**D**G**V**C**CG**GG**G**AG**GG**S**G**D**GG**G**-V**GG**GG**E**ASE**P**--  
 Gpec G**V**SR**P**GA**AA**V-----K**AS**S**CE**AS**G**GS-G**S**ACE**V**AA**AV**-R**AG**S**G**AV**G**SP**S**F  
 Crei A**AAA**A-----T**G**L**AA**S**G**S**D**S-----H**GR**G**SP**G**T**S**AL**AA**AG**GG**AG**G**AG**AG**AG**ANG**F**GR**GG**V**G**AA**ADR**S**R**SK**G**

840            850            860            870            880            890            900            910  
 Vcar -----P**I**K**Y**R**AG**S-G**E**V**C**SS**S**C-----GG**G**-----G**AG**AA**A**Q**R**SH**G**-----**AA**V  
 Pcal  
 Yuni -----P**AK**RR**AG**S-G**E**G**C**SS**S**C-----A**E**G---DE**PL**PP-----  
 Vfer -----P**SK**RR**AG**S-A**E**V**C**SS**S**C-----A**D**G**E**D-----G**GP**GL**S**-----  
 Pcau -----R**V**K**RR**GG**S**GG**D**G**C**SS**S**F-----A**E**-----E**ES**G**AV**AS**G**AA--G**GG**Y**P**SS**A**Q**R**GG**EM**T**G**PT**S**GP**AA**RA  
 Pmor -----P**AK**RR**AA**S**G**V**E**G**C**SS**S**C-----V**E**G**GD**D**W**IR**P**PT**HA**AH**G**AA**V**Y**AAA**PA**V**S**QR**-----L**S**E**Q**  
 Gpec G**AM**S**D**EP**RR**AL**K**R**Q**AT**G**H**L**G**C**V**Q**GL**S**G**M**MP**E**A---H**M**Q**PL**T**Y**G**NG**H**G**A--G**H**G**S**G**S****S****GT**Q**R**GL**M**-----**K**P**I**L**D**  
 Crei S**AP**AS**L**L---A**K**R**K**A**AG**GG**G**SS---S**G**ED**G**D**G**DP**WP**P-----R**S**PR**D**

920 930 940 950 960 970 980

Vcar HLLQQQQHLLQQQQQLLQLQEI~~AAAR~~HOYGEVA-----DPGSI~~P~~PGVVKLENGGAAGGGGAVTPELPOSAAA  
Pcal  
Yuni -----QH~~HQHQ~~-----QH~~HL~~POPTLPVCPQLCPVGOAHQPPRPPVSVGVVPPRQETRRARR-RATPED~~H~~RP~~AVL~~  
Vfer -----MQLHTGSC----SLPHEPAR~~R~~-GGYQPAPAPPRPLQRHLPP~~T~~AAAAAAAVSMGPPERPH-ANGALGH~~H~~APPAL  
Pcau AL~~L~~QR~~Q~~  
Pmor RLLEQQSHHQHQR---Y~~Q~~OH~~AAAR~~SGAAQA~~A~~FARSSGVAF~~A~~ASGDAAAAAASGASGSRLRHS-AL~~A~~ARQD---VA  
Gpec QVGPDTAAGDHNRL~~L~~LSLQ~~AAA~~AI~~R~~GGGGGSRIAQT~~V~~GGEPYGRGSQS~~Q~~LAP~~EL~~PQQ~~Q~~HRPRQ-FL----HAM~~A~~APQ  
Crei RLPPQQ~~Q~~SQSGAM---Q~~P~~LS~~EL~~R~~T~~AG-----EQERLLRR-VLLGDGN~~N~~GAAGA

990 1,000 1,010 1,020 1,030 1,040 1,050 1,060

Vcar AAGA-----P~~S~~E~~D~~E~~A~~E~~G~~T~~A~~L~~I~~S~~L~~S~~Q~~MOVAN-----G~~S~~T~~A~~A~~P~~K~~G~~L~~R~~-----N~~G~~C~~G~~-----AA-----  
Pcal  
Yuni H~~G~~C~~G~~-----P~~S~~E~~D~~E~~A~~E~~G~~T~~E~~A~~L~~I~~I~~Y~~L~~S~~K~~PRMD-----G-----P~~C~~R~~P~~  
Vfer AASE-----P~~N~~D~~D~~E~~A~~E~~G~~T~~A~~A~~L~~M~~F~~L~~S~~S~~Q~~TIDNGGGLGLAPEGPV---A~~A~~S~~P~~~~G~~C~~G~~R~~R~~A~~G~~V~~G~~A~~M~~R~~A~~G~~L~~P~~M~~G~~F~~P~~A~~L~~G~~  
Pcau  
Pmor F~~G~~A~~G~~A~~H~~E~~D~~A~~N~~E~~P~~N~~D~~D~~E~~A~~E~~G~~T~~E~~A~~L~~M~~S~~L~~S~~M~~M~~P~~P~~G~~G-----G~~G~~D~~G~~C~~G~~-----L~~A~~-----P~~G~~L~~P~~  
Gpec A~~G~~L~~T~~V~~S~~E~~D~~V~~L~~F~~P~~K~~A~~D~~E~~I~~D~~G~~L~~G~~G~~R~~L~~D~~S~~R~~D~~R~~L~~A~~G~~C~~A~~G~~G~~L~~G~~A~~S~~A~~N~~A~~S~~S~~L~~R~~G~~D~~L~~D~~D~~~~G~~C~~G~~A~~S~~A~~S~~L~~V~~D~~A~~L-AA-----V~~L~~A  
Crei D~~G~~A-----G~~S~~Q~~C~~C

1,070 1,080 1,090 1,100 1,110 1,120 1,130 1,140

Vcar -----ADTSSA~~Q~~R~~L~~M~~Q~~R~~R~~~~O~~P~~P~~P~~P~~A---L~~O~~P~~P~~  
Pcal  
Yuni A-----O~~K~~A~~R~~I~~E~~P~~S~~Q~~P~~P~~O~~L~~P~~P~~Q~~  
Vfer LRRGGTAVHVAHAVSLQPSMAAGAVGGGMRPHPHMMLQRHGM~~R~~NGVVLEEFEMGVEGGLLHY~~P~~G~~K~~E~~E~~G~~A~~E~~E~~L~~T~~S~~T~~P~~G~~  
Pcau  
Pmor ARRGGE-----E~~E~~G~~R~~Q~~G~~E~~G~~-----E~~D~~S~~E~~G~~G~~A~~G~~E~~P~~R~~E~~V~~G~~G~~R~~P~~R~~P~~S~~S~~A~~R~~L~~A~~O~~P~~P~~  
Gpec ARRAAR-----  
Crei -----A~~A~~G~~G~~A~~G~~A-----I~~N~~S~~L~~L~~L~~Q~~L~~Q~~Q~~~~K~~Q~~O~~R~~F~~Q~~O~~M~~Q~~V---

1,150 1,160 1,170 1,180 1,190 1,200 1,210

Vcar P~~O~~P~~P~~G~~R~~~~R~~Q~~R~~G~~P~~Q~~S~~Q~~Y~~P~~S~~G~~G~~G~~G~~G~~G~~E~~A~~L~~G~~K~~F~~-----E~~I~~E~~G~~E~~G~~D~~G~~E~~V~~P~~V~~R~~A~~G~~A~~T~~E~~A~~D~~~~G~~A~~P~~G~~G~~G~~G~~G~~S~~G~~G~~G~~G~~N  
Pcal  
Yuni P~~O~~Q~~P~~O~~H~~Q~~Q~~O~~R~~K~~V~~A~~P~~Q~~A~~M~~A~~-----V~~Y~~R~~R~~A-----D~~G~~  
Vfer R~~P~~G~~G~~G~~O~~R~~H~~Q~~G~~M~~L~~T~~H~~R~~S~~A~~A~~W~~D~~G~~G~~S~~D~~G~~G~~S~~G~~R~~G~~G~~G~~A~~R~~R~~R~~F~~V~~S~~D~~M~~E~~G~~R~~-----A~~W~~S~~E~~G~~G~~G~~E~~R~~N~~G~~V~~V~~T~~Y~~G~~-----A~~A~~  
Pcau  
Pmor P~~P~~Q~~Q~~Q~~Q~~Q~~Q~~P~~Y~~M~~V~~H~~Q~~N~~G~~L~~K~~G~~P~~G~~I~~K~~A~~A~~E~~-----E~~V~~E~~G~~E-----E~~V~~G~~V~~G~~A~~V~~T~~G~~N~~G~~R~~Y~~A~~R~~G~~-----G~~A~~  
Gpec -E~~E~~Q~~Q~~Q~~E~~Q~~L~~E~~F~~A~~G~~A~~A~~V~~G~~G~~G~~S~~G~~S~~R~~R~~A~~D~~Y~~S~~H~~-----A~~L~~E~~D~~E-----L~~G~~V~~G~~P~~G~~G~~A~~G~~G~~M~~L~~S~~R~~D-----G--  
Crei -Q~~L~~E~~Q~~O~~R~~L~~E~~P~~W~~L~~E~~R~~G~~R~~G~~Q~~G~~S~~A~~A~~G~~A~~P~~G~~G~~G-----G~~V~~E~~M~~R-----L~~A~~V~~D~~R~~L~~A~~G~~G~~A~~A~~G~~A~~F~~A~~R~~G~~L~~G~~G~~S-----G~~A~~

1,220 1,230 1,240 1,250 1,260 1,270 1,280 1,290

Vcar F~~Q~~Q~~L~~R~~T~~A~~M~~R~~R~~G~~G~~-----G~~T~~P~~V~~D~~G~~-----P~~L~~G~~R~~A~~P~~P~~P~~S---R~~S~~A~~G~~P~~P~~Q~~C~~A  
Pcal  
Yuni V~~E~~A~~G~~R~~F~~N~~Y~~R~~E~~G-----D~~S~~D~~G~~-----E~~A~~G~~D~~T~~E~~G~~S~~E~~D~~V~~F~~S~~T~~G~~C~~A~~R~~C~~V~~F  
Vfer A~~D~~G~~H~~D~~N~~G~~Y~~D~~T~~A~~M~~P~~L~~R~~V~~A~~L~~P~~T~~S-----V~~G~~V~~M~~P~~P~~V~~G~~A~~V~~Q~~H~~L~~A~~M~~P~~P~~P~~T~~T~~T~~T~~G~~L~~L~~P~~P~~R~~T~~P~~S~~G~~A~~A~~A~~A~~G~~G~~---A~~M~~S~~G~~A~~A~~G~~G~~-  
Pcau  
Pmor F~~E~~A~~P~~Q~~S~~A~~R~~R~~R~~S~~S~~M~~A~~A~~A~~A~~V~~L~~D~~R~~A~~-----V~~E~~G~~L~~T~~A~~E~~G~~-----E~~A~~G~~A~~A~~A~~G~~Q~~D---A~~G~~L~~G~~A~~A~~G~~Q~~V  
Gpec -----R~~P~~A~~M~~S~~A~~L-----Q~~L~~G~~R~~L~~G~~N~~D~~S---G~~S~~G~~C~~P~~G~~G~~S~~L  
Crei T~~A~~A~~L~~N~~V~~G~~R~~D~~H~~E~~R~~A~~A~~A~~G~~R~~D~~D~~R~~A~~E~~A~~Q~~A~~D~~L~~D~~D~~D~~E~~A~~E~~G~~-----T~~A~~A~~L~~I---S~~L~~A~~A~~A~~A~~A~~G~~A---G~~G~~G~~C~~G~~S~~G~~S~~L

1,300 1,310 1,320 1,330 1,340 1,350 1,360

Vcar K~~D~~V~~A~~A~~A~~M~~V~~A~~A~~A-----A~~A~~A~~R~~A~~E~~A-----A~~A~~A~~A~~P~~Q~~P-P~~P~~O~~H~~Q~~Q~~L~~S~~L~~G~~G~~P~~S~~A~~A~~A~~A~~A~~A~~R~~R~~R~~A-----  
Pcal  
Yuni D~~V~~R~~F~~A~~Q~~O~~R~~V~~P~~L~~V~~L~~N~~P~~A~~P~~V~~A~~A~~P~~P~~A~~L~~P~~P~~P~~I~~A~~G~~G~~C~~P-P~~G~~H~~T~~-----G~~A~~P~~T~~T~~A~~Q~~W~~A~~L~~A~~R~~Q-----  
Vfer G~~N~~T~~L~~D~~V~~A~~R~~R~~A~~L-----A~~L~~A~~R~~Q~~K~~T~~T~~C~~G~~S~~Q~~A~~A~~G-G~~P~~T~~A~~P---V~~A~~V~~P~~G~~A~~G~~S~~G~~A~~L~~I~~P~~H~~D~~D~~R~~N~~G~~P~~L~~V~~R~~A~~A~~A~~H~~Q~~V~~C~~D~~F~~  
Pcau  
Pmor E~~D~~R~~L~~A~~V~~A~~R~~R~~V~~L-----A~~R~~R~~R~~E~~A~~E~~R~~L~~A~~A~~A~~A~~A~~G-E~~G~~R~~G~~-----G~~A~~P~~W~~M~~G~~A~~G~~A~~R~~G~~P~~E-----  
Gpec G~~T~~-----Y~~P~~L~~S~~R~~T~~G~~D~~G~~P~~F~~A~~D~~V~~G~~V~~G~~I~~R~~P~~R~~R~~-----E~~L~~R~~L~~A~~G~~G~~S~~G~~Y~~D~~P~~D-----  
Crei G~~T~~A~~D~~A~~V~~A~~A~~A~~L~~L-----Q~~R~~A~~A~~A~~A~~G~~G~~-G~~G~~R~~C~~-----Q~~V~~D~~V~~L

1,370 1,380 1,390 1,400 1,410 1,420 1,430 1,440

Vcar -----IAGNPVSE<sup>h</sup>DVPE-----FVNVHG-----TSGEPGYARTSGY

Pcal

Yuni AEEEEAMDAVVLQDVEARAMHGL-----KMEAAVATRPDHCELLLRV-----KRHAHDYEG-GLH

Vfer QPDSGDGLLPKDTDEGAGAGAGGAGRVSA<sup>h</sup>GRGVA<sup>h</sup>GP-----RWRGGRVMDDGVGRGLGLEGAAAARALAGEH

Pcau

Pmor ATDADADAEVYEEHEGGGG-----SGRAFV<sup>h</sup>GR-----YAR-AGY

Gpec -----SAALLAGPGVDDEEPG-----LLLSR-----QLHPVMPVARGGGG

Crei ASLRQLRAVAVESGAAGGALSRL-----ERLGAEREPD-----AAR-----GFTARDLLR-----

1,450 1,460 1,470 1,480 1,490 1,500 1,510 1,520

Vcar GDEVDDGEEEE--YGGY-----NLPAWQC-----G-GGPGARAAPDDP-----

Pcal

Yuni DEGPRAAAGCG-----G-GSAAVSGNGNCR-----

Vfer SRGDR<sup>h</sup>TADGSAGGAGGYGVPATMAAGTLPAGVGAGLAGSGGCG-GSGGSGTNDNDCNPTSLAAVAANVGSNCGSR

Pcau

Pmor GYGAGAGAAE-----G-DAAAATAASDAE-----

Gpec RLPTRQGGAP-----GLSSLAKAGSLDGRLD-----

Crei -----DLRDTR-----G-DAAAAAAILDGA-----

1,530 1,540 1,550 1,560 1,570 1,580 1,590

Vcar -----GFG-----ANAIGRHSAS-----

Pcal

Yuni -----VNA<sup>h</sup>GHAASLA

Vfer QGLRSVQKREDDKAGDGEDGGSGGGSATLTTVAPVGPSSGGRRTPASMARAVSQHA<sup>h</sup>AV<sup>h</sup>ARPDVIGHEGTGQQOAT

Pcau

Pmor -----AAIQ<sup>h</sup>ARLA

Gpec -----AGGG-----SNGHAASGGVADLA

Crei -----GGPEQLSRDGRAVSTAA<sup>h</sup>VA<sup>h</sup>ALERIAVLEQQOQORER-----

1,600 1,610 1,620 1,630 1,640 1,650 1,660 1,670

Vcar -----RLHGGGGGGPASVSLDGV--LQHLPPPP-----PGGYPPAAAAARGAAR

Pcal

Yuni -----GYAAAAAAAAAATRGYGMAPPPDSSAARALPYGCPAAP-----VGALCGKGGGLGAGLG

Vfer HPWGGGQQVAAADGWPPPTAAATTAAGGGGVALVDHSAAATAVEGDPEDPWISEPGG--MGRK<sup>h</sup>LHHA<sup>h</sup>AAAAAGP

Pcau

Pmor -----ALLHSASGRRAPGRGGGAPWHS<sup>h</sup>SADAE--LASPEYD-----TTRLAA<sup>h</sup>AAAAVA<sup>h</sup>AAT

Gpec -----ERERERERERERERERERERERERERERERELTALA<sup>h</sup>AAGA--

Crei -----ERERERERERERERERERERERERERERERELTALA<sup>h</sup>AAGA--

1,680 1,690 1,700 1,710 1,730 1,740

Vcar DLPPHLMHALYGRVSEHDGTGDTWAGDGD<sup>h</sup>PGQYGGEYGE<sup>h</sup>EE<sup>h</sup>EM<sup>h</sup>DA<sup>h</sup>E<sup>h</sup>DE<sup>h</sup>LO<sup>h</sup>AH<sup>h</sup>MSVGA-PALLLSIQLEQAELYDK

Pcal

Yuni G-----GDVYA-----EDGAD<sup>h</sup>IDD<sup>h</sup>L<sup>h</sup>Q<sup>h</sup>L<sup>h</sup>Q<sup>h</sup>A<sup>h</sup>Q<sup>h</sup>LMCVGA-PALLLSIQLEQEMELLER

Vfer LPPG-----TDTGCGTV-----DDSD<sup>h</sup>IDD<sup>h</sup>M<sup>h</sup>Q<sup>h</sup>L<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>L<sup>h</sup>ATVGA-PALLLSIEME<sup>h</sup>Q<sup>h</sup>E<sup>h</sup>QLIDR

Pcau

Pmor D-----DDSSL-----DDG--IDDG<sup>h</sup>Q<sup>h</sup>L<sup>h</sup>HA<sup>h</sup>Q<sup>h</sup>LA<sup>h</sup>AVGA-PALLLSIQLERLQLLQR

Gpec NPG-----ADGGQ<sup>h</sup>IDD<sup>h</sup>HA<sup>h</sup>AL<sup>h</sup>Q<sup>h</sup>RE<sup>h</sup>L<sup>h</sup>AL<sup>h</sup>GA-PTLLS<sup>h</sup>SI<sup>h</sup>Q<sup>h</sup>E<sup>h</sup>Q<sup>h</sup>E<sup>h</sup>QLMRR

Crei -----G<sup>h</sup>T<sup>h</sup>E<sup>h</sup>E<sup>h</sup>LD<sup>h</sup>DS<sup>h</sup>QL<sup>h</sup>RL<sup>h</sup>LL<sup>h</sup>LS<sup>h</sup>AG<sup>h</sup>GL<sup>h</sup>SP<sup>h</sup>LL<sup>h</sup>AV<sup>h</sup>RM<sup>h</sup>E<sup>h</sup>Q<sup>h</sup>L<sup>h</sup>QL<sup>h</sup>QR

1,750 1,760 1,770 1,780 1,790 1,800 1,810 1,820

Vcar LRR<sup>h</sup>LER<sup>h</sup>VR<sup>h</sup>RR<sup>h</sup>LE<sup>h</sup>AI<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>ER<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>SL<sup>h</sup>LR<sup>h</sup>SS<sup>h</sup>GS<sup>h</sup>N<sup>h</sup>LES<sup>h</sup>AG<sup>h</sup>GG<sup>h</sup>RR<sup>h</sup>RP<sup>h</sup>AT<sup>h</sup>RY<sup>h</sup>D<sup>h</sup>VM<sup>h</sup>E<sup>h</sup>Q<sup>h</sup>HP<sup>h</sup>AAA-AAVA<sup>h</sup>ALDER-----

Pcal

Yuni LEALERLQ<sup>h</sup>RL<sup>h</sup>Q<sup>h</sup>TL<sup>h</sup>H<sup>h</sup>Q<sup>h</sup>RGAL--TSASAGL<sup>h</sup>PD<sup>h</sup>GR<sup>h</sup>GT<sup>h</sup>VL-GPLGAGD--GRS<sup>h</sup>RAG-AAQS<sup>h</sup>AT<sup>h</sup>DF<sup>h</sup>R<sup>h</sup>NN<sup>h</sup>GR<sup>h</sup>NH<sup>h</sup>LY<sup>h</sup>GT

Vfer LR<sup>h</sup>OLERLQ<sup>h</sup>RL<sup>h</sup>LEALQ<sup>h</sup>QA--TGSQRNSARHES<sup>h</sup>GV--LD--GFA<sup>h</sup>AEG-DALGGRSRRAAGGGGCYGA

Pcau

Pmor VR<sup>h</sup>QL<sup>h</sup>DR<sup>h</sup>LK<sup>h</sup>DR<sup>h</sup>V<sup>h</sup>LAL<sup>h</sup>Q<sup>h</sup>Q<sup>h</sup>PP<sup>h</sup>LP<sup>h</sup>PHAARQGRGGDGGGGGV-GSLSREE--ALFG-GEAAATGGRGGGG--YGT

Gpec LRL<sup>h</sup>LORL<sup>h</sup>RQAVL<sup>h</sup>ATQ<sup>h</sup>CP--GGGA--TG--GRSSAG-AFEAA<sup>h</sup>RAGE<sup>h</sup>GLPGGGLTGH

Crei LR<sup>h</sup>QLORMQ<sup>h</sup>SRL<sup>h</sup>LAL<sup>h</sup>CP--GSA<sup>h</sup>AEG<sup>h</sup>LLGLGGGDR<sup>h</sup>GLGGGG-PGD

EQ motif

```

      1,830      1,840      1,850      1,860      1,870      1,880      1,890      1,900
Vcar  -----VGRRVGGKRPRTSDVAHGVYLGGGVRLDLDLDDLYGLH-----DSGGGGALDALRLAEMYAAGP
Pcal
Yuni  G-----DSRNSA-----YGCSSRGSSTSD-----VYGRSNGACGVYAGGNAPGA
Vfer  GLGQG-----VDERGGGLGRGGMAVESVVGMMGGASRQDVGDVGRGR---MPMAIWKGRGRHAGGSGGGGGGAAR
Pcau
Pmor  A-----AQLYGG-----YCASGGSRG-----RLGSSVVQEEIELADARALAA
Gpec  GCAEALRTAARGDVIRGGSGGAVGGGAVVT--RGDAAGSGVTNLGSPMGGPLPLASLGRP-----GRGLGGSE
Crei  RLGMTPPLEATPPLPAMHAAGLSGGDALYLNLMGVAGGGRGPNGGGGGGGSLPPLRMCGSGSRGAIASGGGRDGGAR

      1,910      1,920      1,930      1,940      1,950      1,960      1,970
Vcar  PAASAGCGGGGMHIIGRSAMTGAALPL--VRIVHRSQLP-ARGGDAR-----
Pcal
Yuni  VDACGEGEL-----QLPARHAAVY-----GGRVGPPLPSSYNVGTGMGRNAAGLVRFRVAGE
Vfer  ISRT-DGCF---HIAPIYHHGDDAVAY-----ACGVDTDGGVYGEVAIGGHPYDREDTRDVGGAH
Pcau
Pmor  AAATAAVCYGRDROIERELPGGAALLV-----S--P-GRGG-----
Gpec  PLAL-SAHSPDAEIPVAMLPATAAAAGRDLRMDLRG--PFGRCGSVQ-----AAAARG-----
Crei  DMALECGPG---VAEALISKLA AAA-----AOGADVS--GVVAALGLG-----

      1,980      1,990      2,000      2,010      2,020      2,030      2,040      2,050
Vcar  -----EMAILSEDNDVYGNGYGEGELALRGELAEAVARIPPSAHAVLRQQA WQRM-----QS
Pcal
Yuni  HGCS-----AGPQEVLELMQDDEEAQGFDEG-----VAVAEGLGPLHHVV--RQPWPRTRGQWPQQ
Vfer  HAVNFVGHWRVQPPAPPPAPPLSHRQYGGHSYARSHQPAH--SQHYNAWPGVGEAEEVQ--PMAWPHSGGR----
Pcau
Pmor  -----
Gpec  -----PKRDPPVPAV-----GAGSGDGDAL--VGPDAAEELLQOLFART--RAAGAADAHTRRG
Crei  -----GGSGGGGGA--GGNADSEAQL-----RQALAEELLIRNTRM

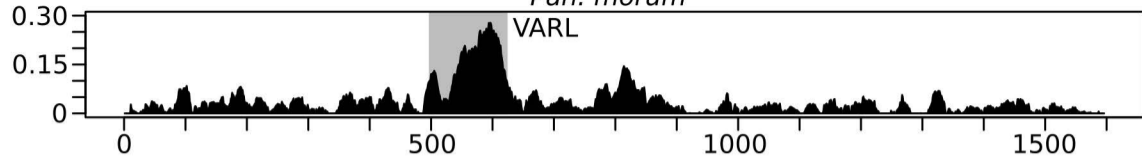
      2,060      2,070      2,080      2,090      2,100      2,110      2,120
Vcar  RADAGPPLPPQPPGNRSHHAAGGGGGGGGPPSEDPRAAAYAAQLAGGGPDRSRRAVVGYGRRQRGDEP-GGGG---
Pcal
Yuni  RWPAGPP-----GSAAGGGGGV-GPVRGSARAP--PAAHAHNP-----YMRHHRG-----GAYG---
Vfer  -----EDVMTNGGGLVGGRQSGLVQRPHRALPYIKHMP-----FAVRROGVVGFAGDGLLA
Pcau
Pmor  -----
Gpec  DGLPRGN-----GVSAGSAAPSGERMGAGAAHPGSGAAHWGIYD-----DGAARLR-----GGRG---
Crei  EQLGGPG-----NSNAGGGGGTGGPLRGAAGGGVLGASRAGVHP-----YGGGRTG-----GGGG---

      2,130      2,140      2,150  2,155
Vcar  AASAAATRGYEDDWEQVERGMYERARV
Pcal
Yuni  ----AERG-EGEW
Vfer  GVGRGGRS-QAKWE
Pcau
Pmor  ----AVRGGEREVO-----GL
Gpec  -----W
Crei  ----GGDRY-ERELQLGGRRGPGSGL

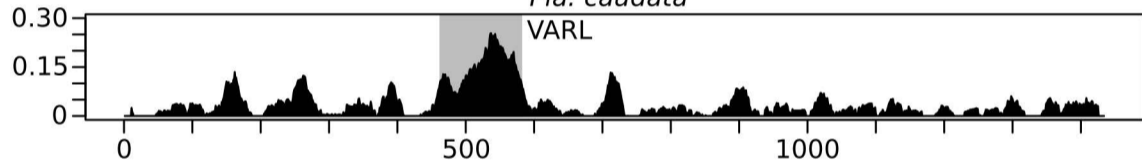
```

Protein Similarity

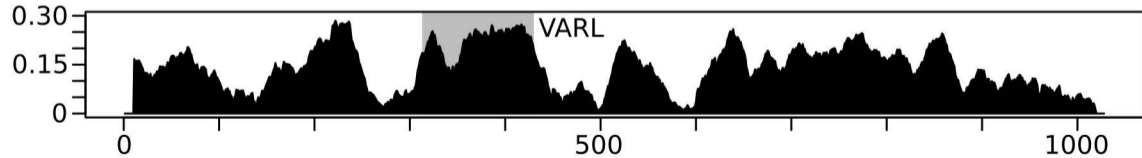
*Pan. morum*



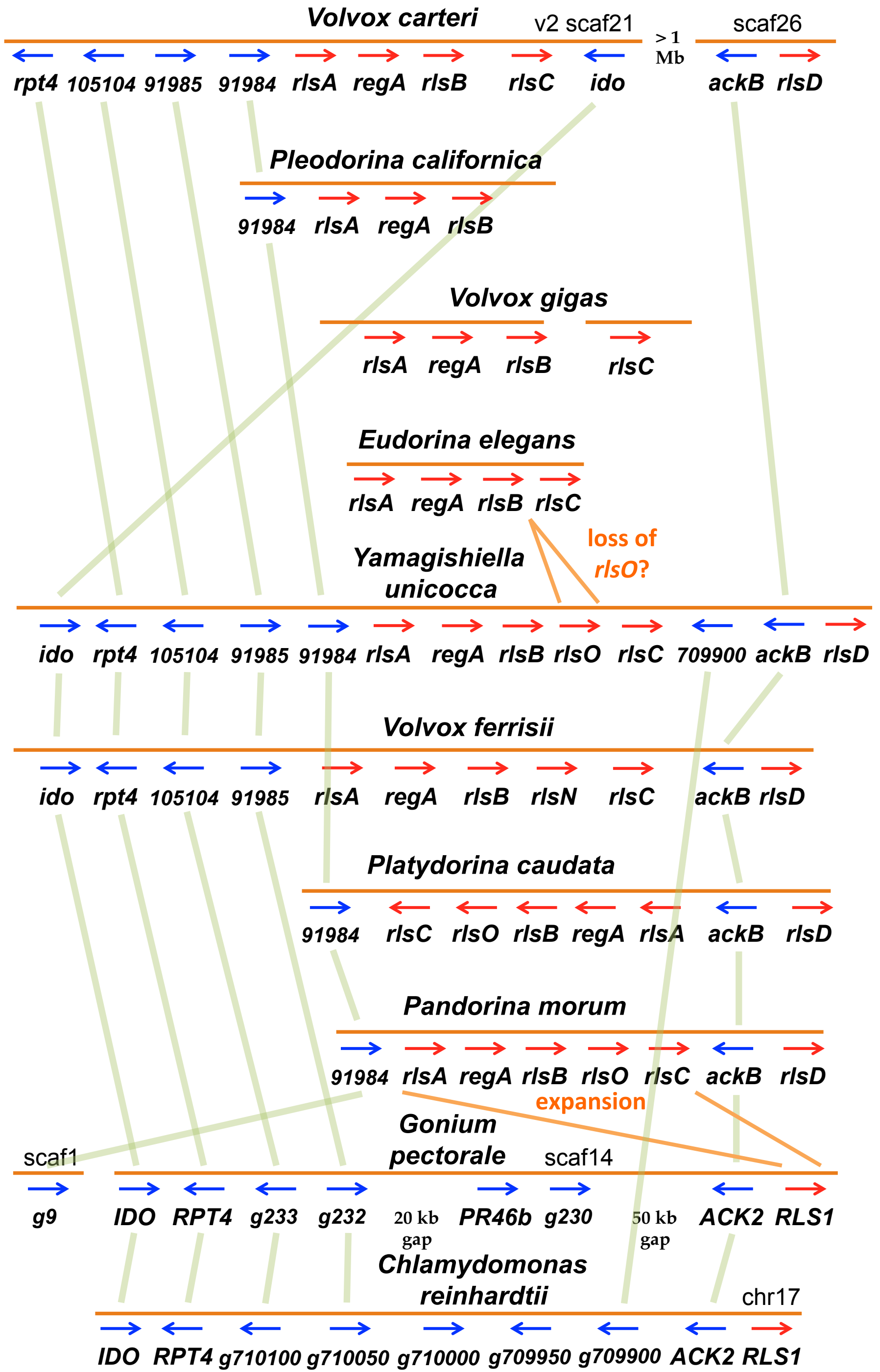
*Pla. caudata*

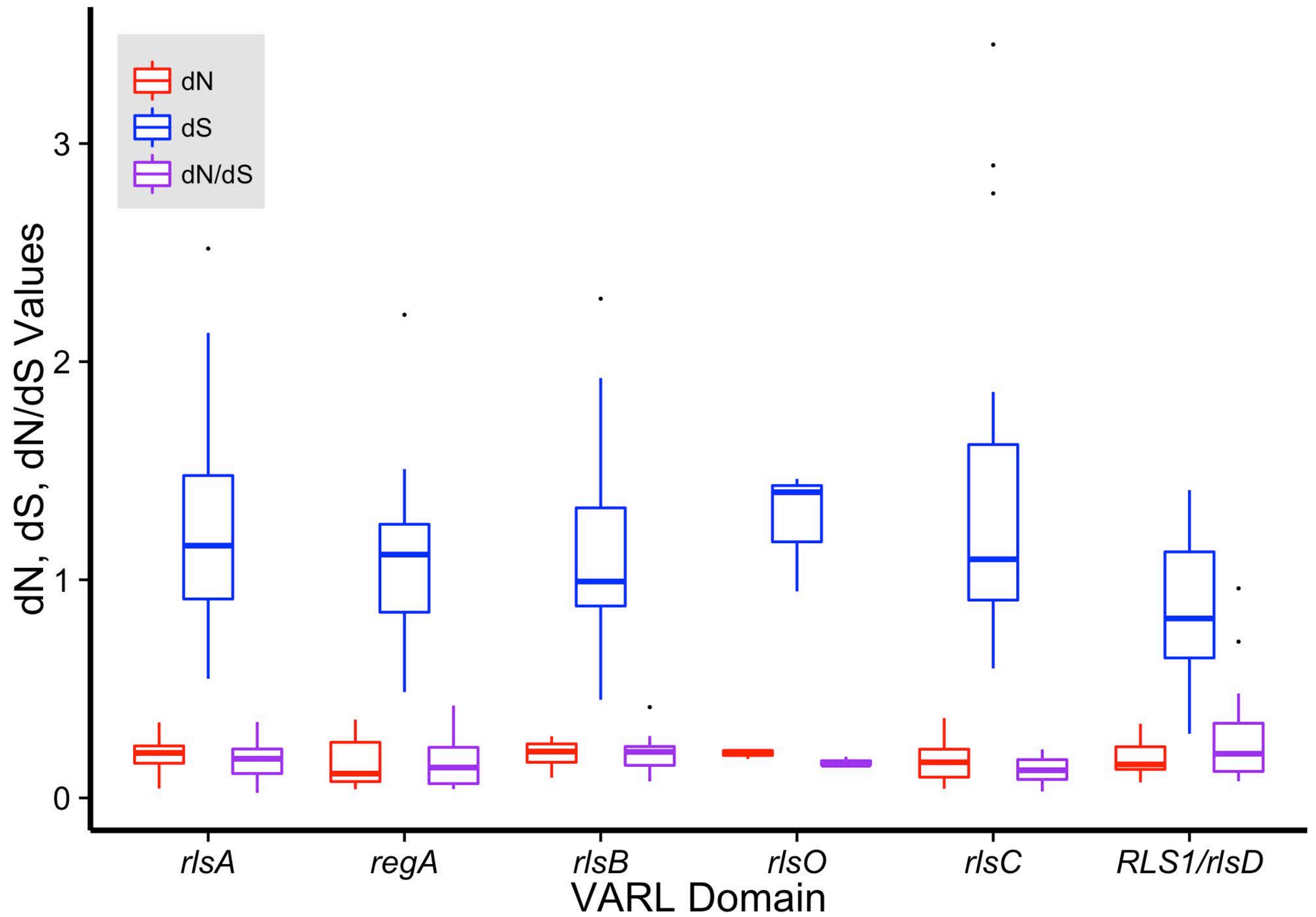


*Y. unicocca*



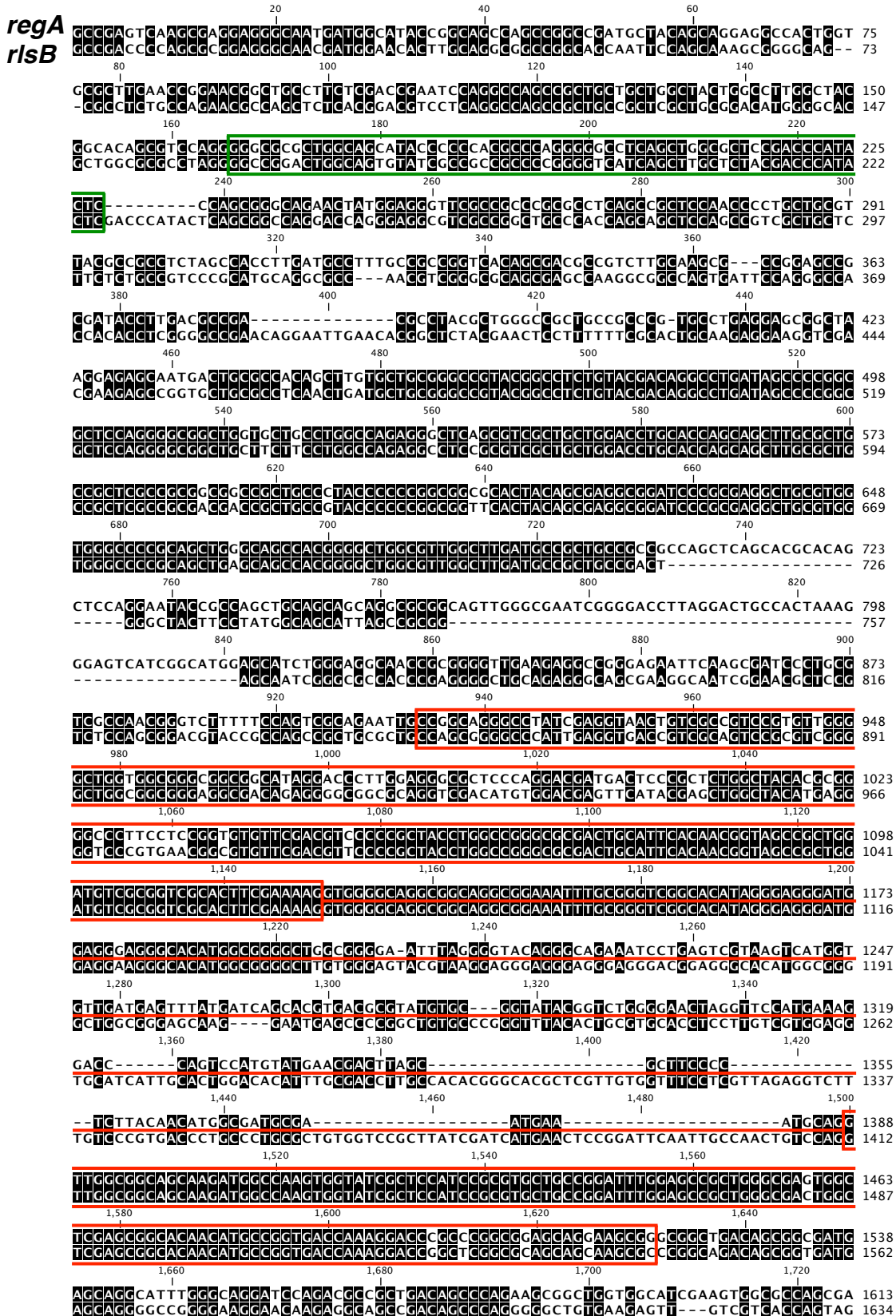
Amino Acids







# Alignment of *Yamagishiella unicocca* *regA* and *rlsB*



1,740 1,760 1,780 1,800  
 GGGCAGTGGCGGTGATAGCGACCGGTCAACC-----AGAGCGGGGGGTATGGCTGACCTCTGGGTTG 1676  
 CAATAACCCGAGCTGCACTGCCCAAGAGCTTCGCCCTAGCATTGAATCCAAGGGAGGTGCCACAGACCCTGGGTTG 1709  
 1,820 1,840 1,860  
 AGCAATTAATCTGTTCACACAAGTCAAGCGCAACACGCGGTGACCGAAG----- 1722  
 AAGCCTTGTCTGCTGCATCAAGGCGCGGAAAGTGGCGCGGTGGCCAGCAGCGCGGTGGCGGGCGGCGGCGGTG 1784  
 1,880 1,900 1,920 1,940  
 ---ATTTCCTTCAAGCGGTTTGGAAAGCGCTTGGCGAGTCCGAGGAGTATATGTTTCCCGAGCGCGGAAGAGGGCG 1793  
 GTGCAATTCCTTGCAAAGGGTTCTAAACAGCGCTTGGCGAGTCCGAGGAGTACATGTTTACCCCAAGCGGAAACAGGCG 1859  
 1,960 1,980 2,000 2,020  
 ATGGCGCGCGGCGGACTCCTGGGACACCTACCGTCTCCCATGGCGGGCGCTGGGGGGTTGGCGCGGGCGGGCAC 1868  
 ATGGCGCGCGGCGGACTCCTGGGACACCTACCGTCTCCCATGGCGGGCGCTGGGGGGTTGGCGCGGGCGGAGCAC 1934  
 2,040 2,060 2,080 2,100  
 CCGTTCGGCGGAGAAAGGGTTTCGGAGCGGCGGCTATCCCGGGACGGCGGGTCTGTGAGCTCGAGGAA 1943  
 CGATTCGGCGGAGAAAGGGACTT-----GGCTCGGTGGGCTCCCT-----GGAGAAGGATCTGAGGCACAG 1995  
 2,120 2,140 2,160  
 TGCTTGGGACGACGTTCAAGAGGCTGCGGAGGTGGCAACCGCTTCTTGGCGGTTTCGCCAAACAGATCGGGCCC 2018  
 -----CGGAGCGGATGGCGGCCG----- 2014  
 2,180 2,200 2,220 2,240  
 AGGGCGCAAGCAGGTTGCTCCGAACCGCTCGCCGATTACCGCTCGAATGCGAGTGGCGGCTGCAATGGCGAGAGC 2093  
 -----CTGCAAGCGCGGCCCTCACCGGACCGGATGCGAGCTGAGGCTGCAATGGCGAGGAGC 2069  
 2,260 2,280 2,300 2,320  
 CTCAGCGGAGATAACGTTGCGCCGAGCGCTAAGCCGCGCCGACCGGTGATCGCGAAGCTGAGCCTGATCGCGACCGCC 2168  
 CTCAGCGGAGATC-----CGCCAAAGGCTAAGCCCGCAGCAGGACCGCGATCAG-----C 2114  
 2,340 2,360 2,380 2,400  
 ACCGAGCGCGCGGAGGAAAGACATGGCACGGGCTCAGGCCCTGGCGGGAGGTGGAGCTGTCTGACCGCCCTGTGTG 2243  
 GCCAGGCTGCTGCTCAGGGAGAGATGGCGGAGGCTTCGGTTTCTTACGGCAACGGCGATGATGAGGGTGTATGCCG 2189  
 2,420 2,440 2,460  
 CTGAGGAGGATATGGATTTCGACAGGGGC CCCCTAGCTGACAACCGCGGTGACGACCGCGGCTGCGGATTCGACACAC 2318  
 CGGAGGGGAGATGGATTGAGACCGGGTCCCCTAGCTGACAGCAACGTCAGGTCGGCTGGCTCGGATTCGACAGCAG 2264  
 2,480 2,500 2,520 2,540  
 CTCCTCTAGATACCGGCATCAGGGCTGTCTCATCAGCTTGGGGCTGAAGGCCCTCGCATGTCTTCGGGCTCTGATG 2393  
 CTCCTCCAGGGCTCAGGCATCAGGGCTGTCTCAACAGCTTGGGGCTGAAGGGCTCTGCTGACGGACCTGATTCAGAG 2339  
 2,560 2,580 2,600 2,620  
 AGCAGCA---TCGGTACGACGAGGATCAGGCAACACTTGCTGGGAGCAGCGCAAGAGTGGGGCAACAGCGGG 2465  
 AGCAGCAGGGTCCGTACGACGAGGATCAGGCAAGCTCGGCTGCGCATCAGCGCAAGAGTGGGGCAACAGCGGG 2414  
 2,640 2,660 2,680 2,700  
 ACGTTCGGTCCGTCCCCAGCTTAG---CCCTGACGGGCTTCGCTGCTGGC-----GCGATGCTTCTCGCGATG 2531  
 ACGTTCGGTCCGTCCCCGCTCGCTCCCGCTGACGGGCTTGGCTGCTGCGGTTGGGGATGTGCTCCCGGCTGATG 2489  
 2,720 2,740 2,760  
 CGCCTGCCCGACCACGGCCTTCCCTCTACTCGGTCCGGGCGCACGGGATTCGAGTATTACCGGAGCACCCCTG 2606  
 CGCCTATCCGTATCAGCCCTGAATTTTACACTGTCCAGGACACTCGGGCTGCGAGTACTATCGAGCTGGCCCTG 2564  
 2,780 2,800 2,820 2,840  
 GACAGGGGAGCGTGAAGCCAGAGGGTAGCCACGTAAAGGCGAC---CATGGCTTTGGAACCGGGGGCTCAGC 2678  
 GGGCGGCTGCGGCTATGGGGAAAGCAGAGCTCTACGACAGCGGCTGACACTGCTTTGGAAGCGGGGGCTGTC 2639  
 2,860 2,880 2,900 2,920  
 GTGAGAGCGGACAAAGGGCAATGGCGGGGAAAGTTGAGGAGAGGGCGTGGCGAGAAAATACACAGGAGCTGGAGC 2753  
 GTGAGCTCGGACAAAGGGCAATGGCGGGGTTGCTGACGAAAGGGCGTGGCGAGAAAATACACAGGAGCTGGAGC 2714  
 2,940 2,960 2,980 3,000  
 AAGAT-----CATCCGAGCAAGGCAATTCGCGGACGAGCAGC 2792  
 AAGTGGACAGGCAACACATGTGCCATTATCGTATCATTGAGCTGCAACAGGAAAGCAAGGTGAGCAGGAGC 2789  
 3,020 3,040 3,060  
 CCATGCAAGCTTCCATTATCGCTGCAGCCACATCAGGAGCAGTT----- 2838  
 AGCAACAGC 2864  
 3,080 3,100 3,120 3,140  
 -GGAACCTCCCGCAGATACGGATCTCGACACTACACCGTACGGGAGAGCATAGCAAGGCGAGCGGGTTCACAGC 2912  
 AGGATTTCCGAGGCGGAGGATCTCGAGCGCTGTCGGGAGCGAGCGGATCAGCGGCACTCCTGAGCAGC 2939  
 3,160 3,180 3,200 3,220  
 GACA-----GAGCTCGCGGCTGAAGGGGTGAGGAGGCTGGGAGGATGTGCTCTTCTCAG 2969  
 AGCAACACCACCTCACCAGCGCAGCTTCCGGGCGAAACCGGCGAAGAGGCTTGGCAAGGACTGCGGGCTTCC 3014  
 3,240 3,260 3,280 3,300  
 GCCCAGCCCCAAACCGGACACTATCGGCAGGCCAGCATTCTACCGTATGCCGCGAGACCCATGG--- 3041  
 GGGAAAGGGCGGGGAGGAGTACAACCGGAGAGCT---CGCGAATCCTCAGTTGACCAGCC-AGGGTTATGACCA 3086  
 3,320 3,340 3,360  
 GTCGGGAGGGCCATGGCGGACCGGGAAGTCCGTTTGGTGGAGGCAACCGCAACCGTGAATGGCCCGGGA 3116  
 GTCAACCCTGCTCGGGAGGGCGACTGCCCGTTTCAAGGGCCAAAGAGCGGCAAGCCCGGACTGGCCAGGTG 3161  
 3,380 3,400  
 ACACTGAGGAACAACCGCCCAATGCA 3142  
 ACCTTACCAGAGCGCCTTGGATGCA 3187

FLQ motif

# Alignment of *Yamagishiella unicocca* *regA* and *rlsO*

*regA*  
*rlsO*

```
      20      40      60
GGCGAGTCAAGCGAGGAGGGCAATGATGCGCATACCGGCAGCGAGCGCGGCGCAGTCTACAGCAGGGA--GGCACTGGT 75
GGCGACCGCAGCGAGGAGGGCAACGATGGAAACAGTTGAGGGGGGGGGGCAAGCAGTCTACAGCAAGCGGGGAC---- 73
      80      100     120     140
GCGCTTCACCCGTAACGGGTGCCTTTCGACCGAATCCAGGGCAGGGCGCTGCTGCTGCTAGTGGCCTTGGCTACCG 152
-CCGCTTCGCAACACCCGTTTTCAGGGGCTCCTCAGGGCAGGGCGCTGGCGCTGCTGCTGCGAGATGGGCAACCG 149
      160     180     200     220
CACAGCGCTCAGGGGGGGCGGCTGGCAGCATAACCCACAGGGCAGGGGGGCTCAGAGCTGGCGCTCCGACCCATACTCC 229
TGGCGCGCTAGGGGGCGGGCGGGAGTGTATGGCCACGGGGCGGGGCTCATCAACTTGTTCCTGGCTCCCATTTCTC 225
      240     260     280     300
CAGCGGGCAGAACTATGAGGGTTCGGCGGGCGGGGCTCAGCGCGTCCGAACCGCTGCTGGCTTACGGGGCGCTCTAGC 306
-----AGGAGGATAGGGGCTCAAGGGCGGGCACAGGATGTCCGCTGCTGCTGGCTTTCGGCTGTGCTGGC 294
      320     340     360     380
CACTTTCGATGCTTTGCCGCCGCTCAGAGCGACGCGGCTTTCGAAAGCGCCGAGCCGCGATACCTTACAG-----C 377
AGGATGATGCAAGCCCTTTGGGCGCCAGCGCGA-----GCAGCGACCGGGGCGCAACACAGTCCGGTGGGAGTGC 362
      400     420     440     460
CGACCGCTACCGTGG-----GCCCGTGCAGCGCTGCTGAGGAGCGGCTAAGGAGAGCAATGACTGGCCAC 445
GGAGCGGCTACCGCGCCGCATCCACGGCGCTGCAGGGGCTAGAAAGGAGAGGCGGACGAGAGTCCGGCGCTGACCGCT 439
      480     500     520     540
AGCTTGTCTCTGGGGCGCTAGCGGGCTCTGTAGCACAAGCCTGATAGCGCGGGGCTCCAGGCGGGGGTGGTGTGCC 522
ACTTAGTTCGCAATCTGTGGCGCGACGCCGAGGATCTCCAAAATCCCGGAGCTCCAGAGGGGG----- 506
      540     560     580     600
TGCCAGAGGGGCTCAGCGTCCGCTGCTGGACCTGCACAGCAGCGCTTGGCGCTGCCGCTCGCCGGCGGGCGGGCGGCTGCCCT 599
-----ACCGCTGCTGGACCTGCACAGCAGCGCTTGGCGCTGCCGCTCGCCGGGACGGGGCGGCTGCCCT 566
      620     640     660     680
ACCGCGGGGGGGCGCACTACAGCGAGGGGGATCCCGCGAGGGCTGGCTGGTGGGCGCCCGCAGCTGGGCGAGCCAGGGG 676
ACCGCGGGGGGGCGCACTACAGCGAGGGGGATCCCGCGAGGGCTGGCTGGTGGGCGCCCGCAGCTGGGCGAGCCAGGGG 643
      700     720     740     760
CTGGCGTGGCTTGGCTGATGCGCGCTCCGGCGGGCGAGCTGAGCAGCGCAGAGCTCCAGGAATACGGCGAGCTGCAGGAGGAG 753
CTGGCGTGGCTTGGCTGATGCGCGCTCCGGCGGGCGAGCTGAGCAGCGCAGAGCTCCAGGAATTCGGCGAGCTGCAGGAGGAG 720
      780     800     820     840
GGCGGGCAGTTGGCGCAATCGGGGACCTTAGGACTGCCACTAAGGGGAGTCAATCGGCATGGAGCATCTGGGAGGGCAA 830
CCAGGGCAGTTGGCTGATGGGATCAGCAAGAGGGGAACCTTAGGGGAG-----CGGG--GGACCAATCGGGCGAGCAG 791
      860     880     900     920
CGCGGGGGTGAAGAGCGGGGAGAATTCAAAGCATCCCTGGCTGGCGAAGCGGTCITTTTCCAGTCCGAGAATTCG 907
CGCGGATACTGCGGAAGCGGGGTGCCACGGGAGCGGAGCGGAGCTTCGGCGAGTGAATGCCCGGGGCTGCA-----TCG 865
      940     960     980     1,000
CGCGAGGGCCCTATTCAGGTTACTGTCCGCGTCCCGTGTGGGGCTGGTGGCGGGCGGGCGGACATAGGACCTTGGAGGG 984
CAGCGGGGGCCCATTCAGGTTACTGGTCCGGTCCCGCTTCGGGGCTGGCGGGGGAGGGCGACAGGGGGCGGGCGAGGT 942
      1,020     1,040     1,060
CGCTCCAGGACATGACTCCCGCTCTGGGCTACAGGGCGGGGGCCCTTCTCCGGTGTGTTCGACGCTCCCGCGTACCT 1061
CGGCACACTGAAAGAATTGTTGAGCTGGCTACAGCAGGGGGCTGCTGGTGTGTTCGACGCTGCGCGGTACCT 1019
      1,080     1,100     1,120     1,140
GGCGGGGGCGCACTTCGATTCAGAACGGTAGGGCGTGGATGTGCGGGTGGCAGTTGGAAAAGCT----- 1124
GGCTGATGGTATTCGATTCAGCAGACGGGGCGTGGATGTGCGGTGAAAGTTCGAGAGCTTACGTCGGCGGCTGG 1096
      1,160     1,180     1,200     1,220
-----GGGGCAGCGGGCAGGCGCAAAATTTGCCGGTCCG--CACATAGGGAGGGATGGAGCAGGGGCACATGGCGGG 1193
TTTCGGAGCGGGCGCTGTAGTAGTAACCTTTACAGTGGTTCAGACCAAGAGGTAGAACCCTCGGGCACATCGC--- 1170
      1,240     1,260     1,280     1,300
GCTGGCGGGGAATTTAGGGGTAAGGGCAGAG-----AATCCTGAGTTCGT-----AAGTCATGGTG----- 1248
-CTGTAATGGACTTGGACCGGTACCGTGTAGTGTGTGAGCGCGGCTCGTTGGCAAAAATGCCAAGTGGCATT 1246
      1,320     1,340     1,360     1,380
-----TTGATGACTTTATGATCA-GCAGCTGACCGGATGTGCGGTTATACGGTCT----- 1297
GCCTAGCGTGTGTGACTCTTTGCTGTGTTTTGACTAATGTAGTGTGCTCTCTTTTGGGGTGTGAAATTTCACTCCGA 1323
      1,400     1,420     1,440     1,460
-----GGGCAACTAGT-----TCCATGAAAGGACCGAGTC----- 1328
AATCCCAGGAAATGAAGGTGTGTGTCTGGTCCACCCAGCAGAGGGCGCAACCGCTCTTAGTCCGCTACTA 1400
      1,480     1,500     1,520     1,540
-----CATGTATGAACGACCTTTAGCGCTTCCCGTCTTACACATGGGATGGGAATG 1379
GACGTCTCGGTTTACCACGGCCAATTACCGCAAAATTTTAAAGGCGCTAGCATCCCTAAGACCCGAAATTTGGGATC 1477
      1,560     1,580     1,600
A-----AATGCAGGTTTGGGGCAGCAAGATGGCCAAAGTGGTATCGCTCCATCCGGCTGCTGCCGGAATTTGGA 1446
CTGATTCGCCCTATACAGCTTTCGGGGAGCAAGATGGCCAAATGGTACAAAATCCATCCGGCTGCTGCCGCGCACTTGG 1554
      1,620     1,640     1,660     1,680
GCGCTGGGCGAGTGGCTCGAGCGGCACAACATGCCGGTGAACAAAGGACCCGGCCGGGGAGCAGCAAGCGGGGGG 1523
GACTTGGTGACTGGCTCGAGCGGCACAACATGCCGGTGAACAAAGGACCCGGCCGGGGAGCAGCAAGCGGGGGG 1631
      1,700     1,720     1,740     1,760
CTGACAGGGGGCATGAGGAGGCATTTGGCGAGTCCAGACGGCGTACAGCGCGAAGAGCGGCTGTGGATTCGAA 1600
CTGACAGGGGGCAGGAGGTGGGCTGTGTGCAAGATCGGGTGGCT---ACAGCGCTGACGTGGGGACAGACTTCGGT 1705
```

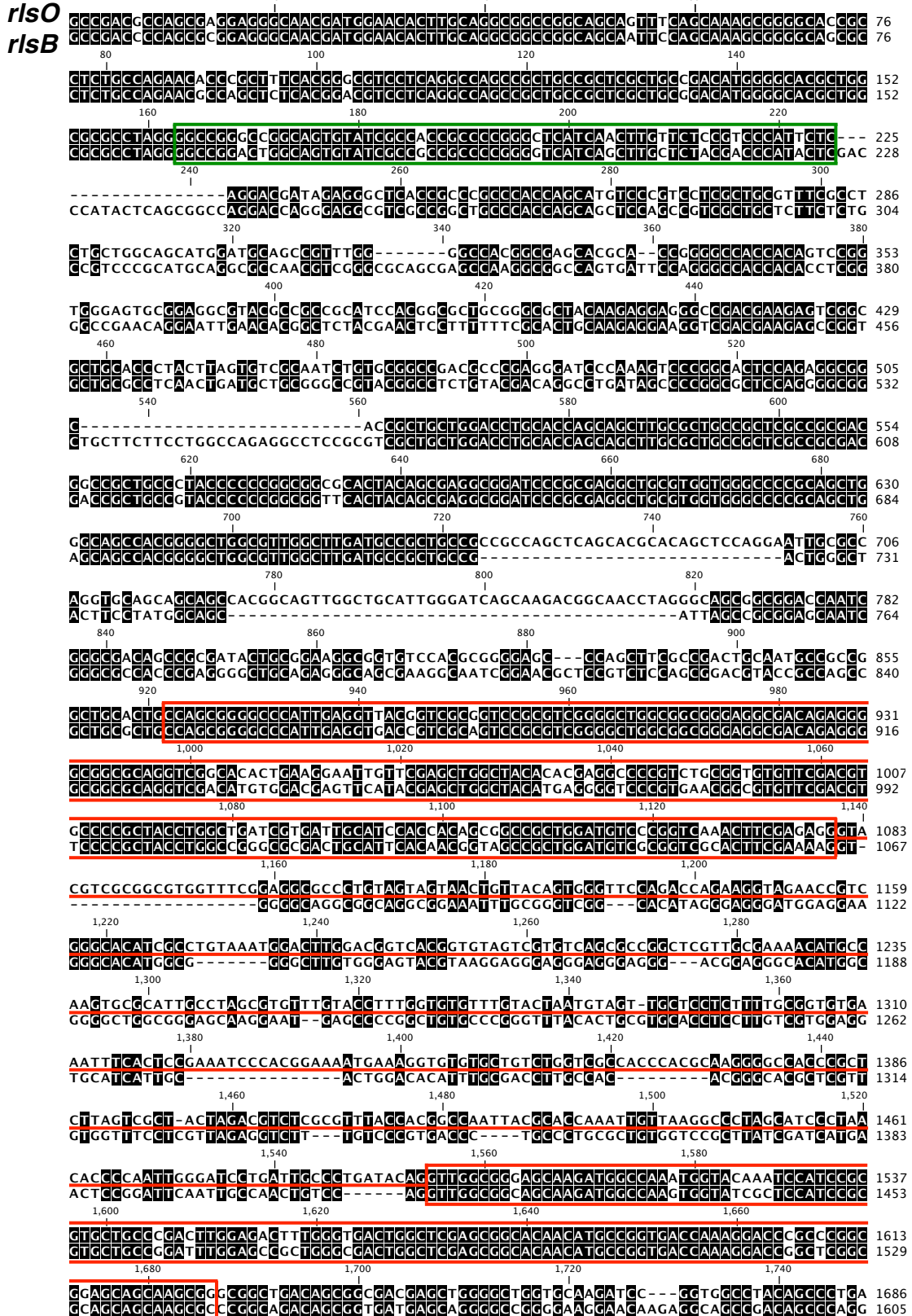
LALRP  
motif

VARL  
domain

1,780 1,800 1,820 1,840  
 GTGGCCGAGCAGGGCAGTGGGGGTATAGCGACCGGTGAACAGAGCCGGGGGTATGCGTGAAGCTCTGGCGTGA 1677  
 GGGAGGCTATGCGCTTAGCGAGGGGTCCGGTGGC-----AGATGAGCCCTCGGGATATAAGGGAGCTGTGGCCAA 1776  
 1,860 1,880 1,900 1,920  
 GCAATTACTGTTGCACAAAGTCAGCGCAAAAGAGCGGTGACCCGAAGA TTTCTTCAGCGGCTTTGGAAACAGCTTGGCCG 1754  
 CCGCGCGCTCAAGCA-----AGGGCGTGAAGACCCCGCC TTTCACTCAGCGGCTCTTGAATACATTTGGCCG 1841  
 1,940 1,960 1,980 2,000  
 AGTCCGACGAGTATATGTTGCGCCAGCCCGAAACAGCGGATGGCGCGGCCGGACTCCTCGGCGACACCTACGCTGTG 1831  
 AAGGGGAGCAGTTCATGCTGGCTCAGCGGTGAGCAAGTAACTTCTCGGG-----TCCTGCTGACAGC----- 1903  
 2,020 2,040 2,060  
 CCCATGCGGGGCGCTGGGGGCTTGGCGCCGGCGGGCACCCCTGGCGGAGAAAAGGTTTTCGGAGGGCGCGCGGCCTA 1908  
 ---ATGTGGGGGTTTAGGGGCATGACA--ACCGCACCCCTGAGCCAGGCTCCGGACTTTTGGAGCGGTCTGGCAT 1974  
 2,080 2,100 2,120 2,140  
 TCCCGGGACCGCGCGGGTCTTGAGCTGCAAG-----GAATGCTTGGGACGACG---TTC 1961  
 TCGTGGGTCGCGAGGCACACTGAGCCAAAGGCTGCTCGCGCCACTGGGATTGAAGCGGGTAGAGAGCTGGGCTCG 2051  
 2,160 2,180 2,200 2,220  
 AAGAGGCTGGCGAGGTGGCAACCGTTTGGTTGGGGTTTTCGCAAAAGAGATCGGGCCAGGGGGCAAGCA---CGGTT 2035  
 AAGCGGTAGAAGCTGCGCAACCGTTTGGTTGGGGCTTCCGTGAGAGGATCTGAGCCACAAGGGCAGCGATGCGGCG 2128  
 2,240 2,260 2,280 2,300  
 GCTCGAAACCGTCGGCCATTAGGCTCCAAATGCAGTTGGCGCTGCAATGGGCAACCCCTCAGCGAGATAACGTTGCG 2112  
 CCGCTGACAGCCCGCCCTCAGGCCACCGATGCAGCTGACGCTGCAATGGGCGGACCCCTCAGCAGGATC-----C 2199  
 2,320 2,340 2,360 2,380  
 GCGGAGGCTAAGCCGGCCGACCGGTGATCGCGAACGTGAGCCTGATCGCGACCCGCAACCCAGCGCGCGGGCAGCAAG 2189  
 GCGAAGACTAAGCCGGCAGGACCGCGATCAG-----CGCCAGGCTCTCTGTCAGGCGAG 2252  
 2,400 2,420 2,440 2,460  
 ACATCCACCGGCTCAGGCCCTCGCGCGGAGCTGGAGGTGCTGACCGCCCTGCTGTGCTGAGGAGCATATGGATTTCGAG 2266  
 AGATGGCGAGCTTCGGTTTTCTTACGCAACCGGCATGATGAGGGTGAATCCAGGAGGGAGATGGATTGTCAG 2329  
 2,480 2,500 2,520 2,540  
 ACGGGCCCCCTACCTGACAAACCGCGGTGACCGAGGCGCGCATTCGCAACACAGCTCTCCTAGATAACCGCATCAGGCG 2343  
 CCGGGTCCCTACCTGACAGCAAGACGTTGGCTGGCTCGCATTCGCAAGCAGCCTCTCCAGGTCACAGGCATCAGGCG 2406  
 2,560 2,580 2,600  
 TGTCCATCAGCTTGGGGGTGAAGGCCCTTCGCTATGTCTTCCGGTCTGATGAGCAGCA---TCGGTACGACGAGGATC 2417  
 TCTCCAAAGGCTTGGGGGTGAAGGCTCTCGTACCGGACCTGATGAGAGGAGAGGGTGGGATAGGACGAGGATC 2483  
 2,620 2,640 2,660 2,680  
 AGGCACACTTCTGCGGAGCAGCGGCAAGAGATGGGGCCAAACAGGGGGAGGTCGGTCCGTCGCGGAGCTTAG---CC 2491  
 AAGCGCTCGGCTGCGCATCAGCGCAAGAGATGGCGCCAAACAGGGGGAGGTTGCTCCGTCGCGGCTCGCTCGTCC 2560  
 2,700 2,720 2,740 2,760  
 CTGCAAGGCTTCCCTGCTGGC-----CGCATGCTCTCTCGCGATGGGCTTGCCTGACCGACCGCTTCTCTACTC 2562  
 CTGCAAGGCTTCCCTGCTGGC-----CGCATGCTCTCTCGCGATGGGCTTGCCTGACCGAGCTTCTCTACTC 2637  
 2,780 2,800 2,820 2,840  
 CTTCCCGGGCCACCGGGATTGCGAGTATTACCGGAGCACCCCTGGACAGGGGAGCTGAGAGCCAGGAGGCTAGCC 2639  
 TTTCCAGGCACTCGGGGCTGCGAGTATTACCGAGCTGGCGCTGGGCGGGTGGGCTATGGGGAGCAGAGCTC 2714  
 2,860 2,880 2,900 2,920  
 ACGTACAGGCA---CATGGCTTTCGAAACCGGGGCTCATCGTCAAGGGGCAACAGGGCCATGCGGGGGAAGTT 2713  
 CTACGACAGCGCTGACACTGTTTCGAGCCCGGGGCTCTCGTCACTGCGCAACAGGGCCACTGCGGGGCTTCT 2791  
 2,940 2,960 2,980 3,000  
 GACGAGGAGGCGTGGCGAGAAACATACCAGCAGCTGCAGCAACATCATCCG----- 2764  
 GACGAAAGGGCTGGCGAGAAAGATACCAGCAGCTGCAGCAAGTGA---GCAACACTTGCCATTATCGCTGTC 2868  
 3,020 3,040 3,060 3,080  
 -----CAGCAAAGGATTCCGGGAGGAGCAGCCCATGCGACGTTGCGATTAT 2813  
 GTTGCAGCTGCAGCAGCAACAACAGCAGCAAAGCAACAGCAAGAGCAGCAACAGCAGCAACAAGCAGCAAC 2945  
 3,100 3,120 3,140  
 CGTGCAGCACAATCAGCAGCAGTTGGAACCTCCCGCAGCATAAGGATGTCGACGACTACA---CGTACGGCAG---GC 2887  
 AAGAGCAACAGCAGGGCAGCAGCCGATCTCCAGCAAGCGGAGGATTTTACAGCAGATGCTGTACGGCAGCAACGA 3022  
 3,160 3,180 3,200 3,220  
 ATAGCACGGCAGCGGGTCAACAGGGAACACGCTCGGGGCTGAAGCGGTGAGGAGGCTCTGGAGGATGTGCTCTT 2964  
 GCGGTGCGCGCGCCCAACAGGAGGACAGCTTGGGG-----AGGAAACTCAGCCGGGAACTCTC 3087  
 3,240 3,260 3,280 3,300  
 CTAGGCGCCAGCCCAAAACCGAGGCACTATCGGGCGCGAGGCGAGGATCTAGACGATATGCGCGAGAGCCCATGG 3041  
 CCGAGGCTAGGGACGGGCTCAGGTGCTAGCGGCGAGCGGGCGGGCTTACAGGATATACAGTTATGCCA--- 3161  
 3,320 3,340 3,360 3,380  
 GTGGGACGGCCATAGCGGGACCGGACCTCCGTTGCGTGGAGCCCAACCGCAACCCATGGAATGGCCCGGGAAC 3118  
 GCAGGAGGGGCAATGACCGGGCAAGTCCAGCTTGGAAATGAAGAGGAGCTGTCTCTGGCGGCTCGGAGCG 3238  
 3,400  
 ACTGAGCAACACCGGCCAAATGA 3142  
 TAGCAGGCTAG----- 3250

FLQ motif

# Alignment of *Yamagishiella unicocca* *rlsO* and *rlsB*



1,760 1,780 1,800 1,820  
 CG-TGGCGGACAGACTCGGTGGGAGC--CTATGGCCTTAGCGAGGTCGCCG-----TGGCATGAG 1747  
 GGCTGTGAAGATTGTCTACCCAGTAGCAATAAACCGCAGCTGCAAGTGCCTAAGAGCCTCGCCTAGCATTTGAAT 1681  
 1,840 1,860 1,880 1,900  
 CCTCGGGATATACTGGGACTGCTGCTGGCCAAACGGCGCCCTCAGCAA----- 1792  
 CCAAGGGAGGTGCCACACCTGCTGCTGAACTCAAGGCGGCGGAAGTGGCGGCGTGGCAGCA 1757  
 1,920 1,940 1,960  
 -----GGGGTGAACACCCCGCTTCATGCAAGCCCTCTGAATAGATTGCGGAGGGGAGGAGTT 1854  
 GCGGCGGTGGCGGGGGCGGTCTTCACTTCGCTTAAACAGGCTGCGGAGTGGCAGGAGTTA 1833  
 1,980 2,000 2,020 2,040  
 CATGCTGGCTCAGCCTGAGCAAATAACCTTCTCGGGTCTGCTGACAGCATGTGGGGGTTAGGGGCATGACAAC 1930  
 CATGTTACCCAGCCGACAGCCGATGGGCGGGCGGACTCCTGGG-----ACACCTAGG 1892  
 2,060 2,080 2,100 2,120  
 GCACCCCTCAGCGAGGCTCCGGACTTTGGAGCGGTGTGGCATATCCTCGGGTCCGGAGCACACCTGAGCCAAAG 2006  
 CTGTCCCATGGCGGGCGTGG----- 1914  
 2,140 2,160 2,180 2,200  
 CTGCTCGGCCACTGGGATTGAACCGGCTAGAGACGTGGGGCTCGAAGCGGCTAGAAGGGTGCAACCTCTCGGTG 2082  
 -----TTGGCGCCCGCAGCACCCATCGGC-----GAGAAGCGGACTTGG--TCGGTG 1965  
 2,220 2,240 2,260 2,280  
 GCGCTCCCTGCAAGCGGATCTGAGCCACAGGGGAGGGATGGGGCGCCGCTGAGCCGGGGCCCTCAGCCACCG 2158  
 GCGCTCCCTGCAAGCGGATCTGAGCCACAGGGGAGGGATGGGGCGCCGCTGAGCCGGGGCCCTCAGCCACCG 2041  
 2,300 2,320 2,340  
 ATCGAGCTGAGGCTGCAGTGGGGGAGCCCTCAGGAGGATCCGGCAAGACTAAGCCGGCACGAGCCGGATCAGGGCC 2234  
 ATCGAGCTGAGGCTGCAGTGGGGGAGCCCTCAGGAGGATCCGGCAAGACTAAGCCGGCACGAGCCGGATCAGGGCC 2117  
 2,360 2,380 2,400 2,420  
 CAGCTCCTCGTCAAGGAGAGATCGGGGAGCCTTCGGTTTTCTTACGCAACCGGGGATGATGAGGGTGTATGCCACGG 2310  
 CAGCTCCTCGTCAAGGAGAGATCGGGGAGCCTTCGGTTTTCTTACGCAACCGGGGATGATGAGGGTGTATGCCACGG 2193  
 2,440 2,460 2,480 2,500  
 GGGGAGATGGATGTGGACCCGGTCCCTACCTGACAGGAGAGGTTGGGGCTGGGCTGGATTCGGAGGAGCCCTTC 2386  
 GGGGAGATGGATGTGGACCCGGTCCCTACCTGACAGGAGAGGTTGGGGCTGGGCTGGATTCGGAGGAGCCCTTC 2269  
 2,520 2,540 2,560 2,580  
 CAGGGTCCAGCCATCAGGCGTCTCCAACAGCTTGGGGCTGAGGGCTCTCGTACGGCACCTGGATCAGGAGAGGAGC 2462  
 CAGGGTCCAGCCATCAGGCGTCTCCAACAGCTTGGGGCTGAGGGCTCTCGTACGGCACCTGGATCAGGAGAGGAGC 2345  
 2,600 2,620 2,640 2,660  
 AGGGTGGTACGAGGAGGATCAGGCGAGCCTCGGGTGGCCTCAGCGACAAAGAGTGGCGCAACAGCGGACGCTTTC 2538  
 AGGGTGGTACGAGGAGGATCAGGCGAGCCTCGGGTGGCCTCAGCGACAAAGAGTGGCGCAACAGCGGACGCTTTC 2421  
 2,680 2,700 2,720  
 TCGTCCCGGGCTCGGTCCCGCTGCAGGGCTTCGGTGTGCGCGGTGGGCATGTGTCCCGGGTGTATGCCGCTATC 2614  
 TCGTCCCGGGCTCGGTCCCGCTGCAGGGCTTCGGTGTGCGCGGTGGGCATGTGTCCCGGGTGTATGCCGCTATC 2497  
 2,740 2,760 2,780 2,800  
 CGTATGCAAGCCTGAATTTTACACTGTTCAGGACACTCGGGGCTGCAGTACTATCGAGCTGGCCCTGGGGCGGGTG 2690  
 CGTATGCAAGCCTGAATTTTACACTGTTCAGGACACTCGGGGCTGCAGTACTATCGAGCTGGCCCTGGGGCGGGTG 2573  
 2,820 2,840 2,860 2,880  
 GCGTATGGGGGAGGAGAGGCTCCTACGACAGGGCGTGCAGCTGCTTTTCGAGCCCGGGGCTCTCTCGTACGGTGG 2766  
 GCGTATGGGGGAGGAGAGGCTCCTACGACAGGGCGTGCAGCTGCTTTTCGAGCCCGGGGCTCTCTCGTACGGTGG 2649  
 2,900 2,920 2,940 2,960  
 ACAACGGCCACTGCCGGGCGTTGCTGACGAAGAGGGCGTGGCGAGAAGCATACAGCAGCTGCAGCAACCTGACCTG 2842  
 ACAACGGCCACTGCCGGGCGTTGCTGACGAAGAGGGCGTGGCGAGAAGCATACAGCAGCTGCAGCAACCTGACCTG 2725  
 2,980 3,000 3,020 3,040  
 GCAACACTTGTGCCATTATCGCTGTGCTTGGAGGTGCAAGCAGCAAGCAAGCAGGAGGAGGAGGAGGAGGAGG 2918  
 GCAACACTTGTGCCATTATCGCTGTGCTTGGAGGTGCAAGCAGCAAGCAAGCAGGAGGAGGAGGAGGAGGAGG 2801  
 3,060 3,080 3,100  
 AGCAGCAAAGCAGCAGCAAAGCAGCAGCAAAGCAGCAGCAA-----CAGCAGCGCCAGCAGCGGATCTCCAGCA 2982  
 AGCAGCAAAGCAGCAGCAAAGCAGCAGCAAAGCAGCAGCAAAGCAGCAGCAAAGCAGCAGCGGATTTCCAGCA 2877  
 3,120 3,140 3,160 3,180  
 AAGGGAGGATTTCAGCAGCATCTGTAGGGCAGCAACAGGCGTTCGGCGCCGCGCCCAACAGCAGGCA----- 3051  
 GCAGGAGGATTTCAGCAGCATCTGTAGGGCAGCAACAGGCGTTCGGCGCCGCGCCCAACAGCAGGCAACACCCAC 2950  
 3,200 3,220 3,240 3,260  
 -----CAGCTTGGGGAGGAAAC-----TCAAGCGGAGAACTCTCCCAAGGCTAGGGAGG 3104  
 CGTCACCAGCGAGCTTGGGGAGGAAACCGGCGAAGAGGCTTGGGAAGGACTGCGGCTTCCGGGCAAGCCCGG 3026  
 3,280 3,300 3,320 3,340  
 GGCAGCAGCTGCTACGGCCCA---CGCCGGCGGGCTTACAGGTATACAGTTATGCCCAGCCAAAGAGCGCAAT 3177  
 GGCAGCAGCTGCTACGGCCCAACCTGCGCAATCTGACTTTCAGCAAGCCAGGCTTATGACAGTCAAACCCGTGCCTCG 3102  
 3,360 3,380 3,400 3,420  
 GGACGGGGCAGACTCCCGCTTGAATAATGAAGAGGCACTGTCTCTGGCGCGGTGGCAGGCTCAGCAGGCTAG--- 3250  
 GCGAGGGGGCAGACTCCCGCTTGAATAATGAAGAGGCACTGTCTCTGGCGCGGTGGCAGGCTCAGCAGGCTAG--- 3178

FLQ motif

----- 3250  
 TTCGAGTGA 3187

