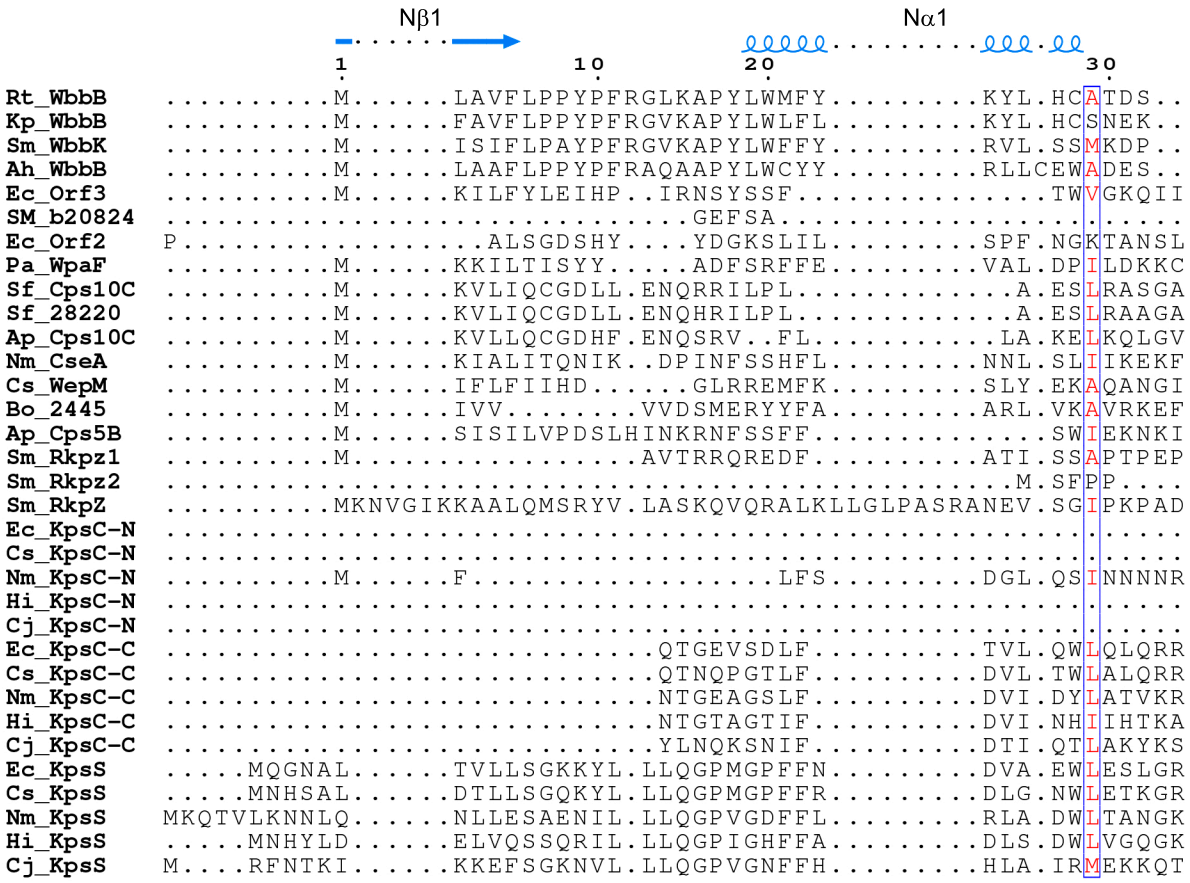
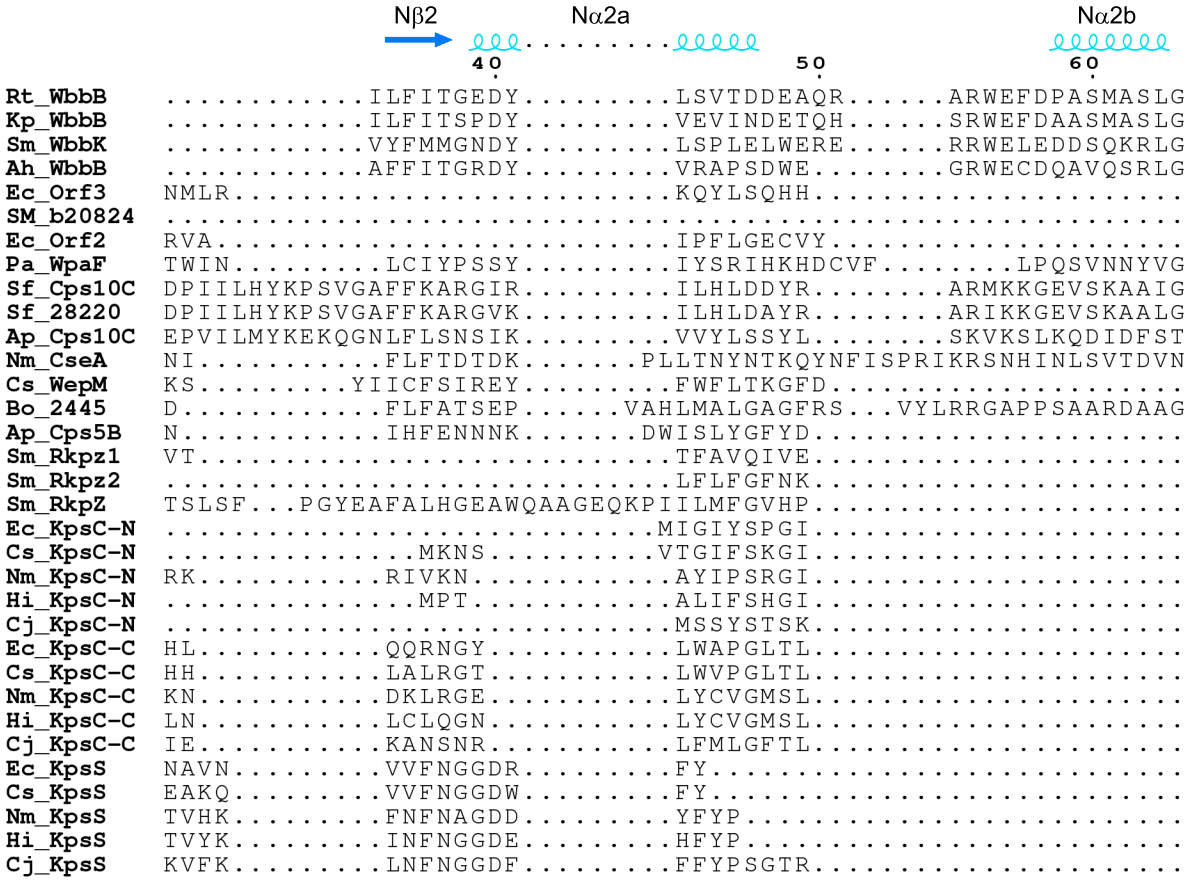
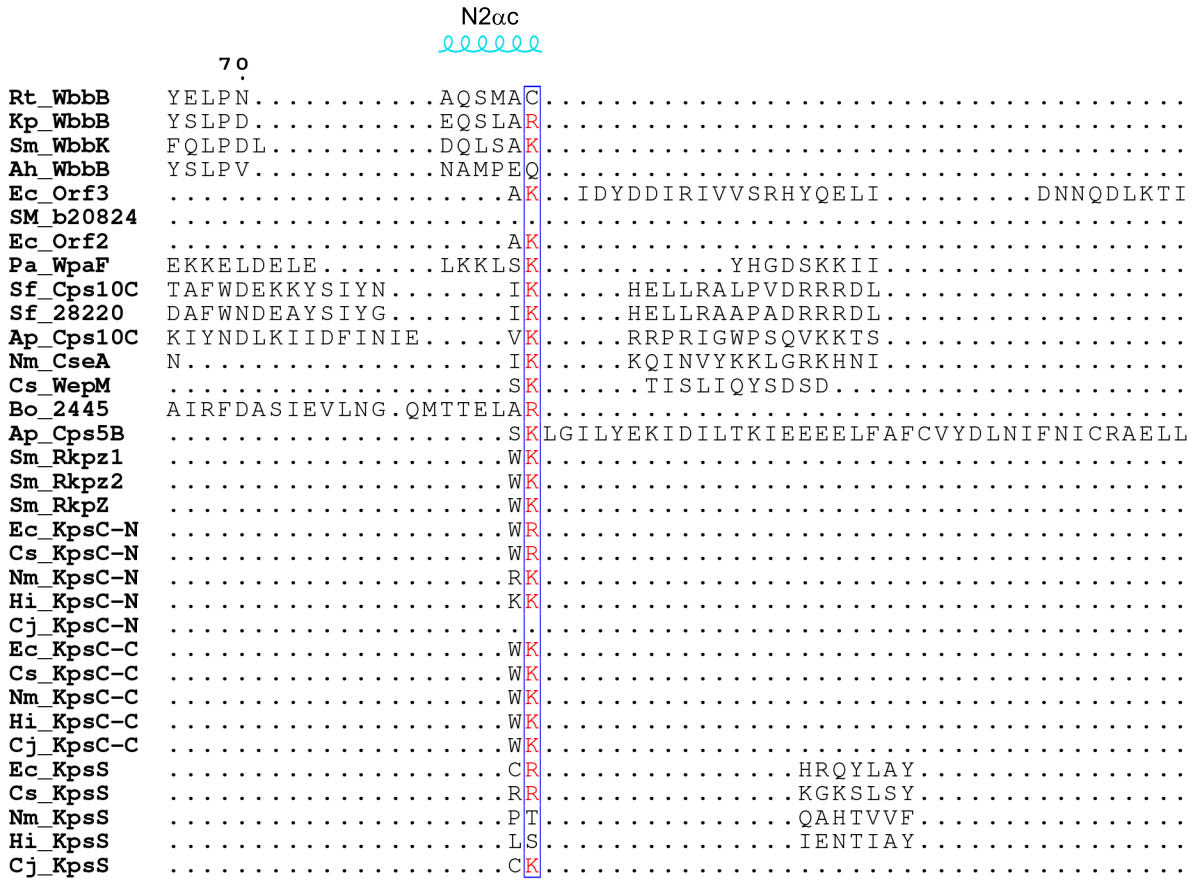

Nβ1
Nα1
1
10
20
30
Rt_WbbB ..........M......LAVFLPPYPFRGLKAPYLWMFY.........KYL.HCATDS..
Kp_WbbB ..........M......FAVFLPPYPFRGVKAPYLWLFL.........KYL.HCSNEK..
Sm_WbbK ..........M......ISIFLPAYPFRGVKAPYLWFFY.........RVL.SSMKDP..
Ah_WbbB ..........M......LAAFLPPYPFRAQAAPYLWCYY.........RLLCEWADES..
Ec_Orf3 ..........M......KILFYLEIHP..IRNSYSSF.............TWVGKQII
SM_b20824 ....GEFSA.....................
Ec_Orf2 P.................ALSGDSHY....YDGKSLIL.........SPF.NGKTANSL
Pa_WpaF ..........M......KKILTISYY.....ADFSRFFE.........VAL.DPILDKKC
Sf_Cps10C ..........M......KVLIQCGDLL.ENQRRILPL.............A.ESLRASGA
Sf_28220 ..........M......KVLIQCGDLL.ENQHRILPL.............A.ESLRAAGA
Ap_Cps10C ..........M......KVLLQCGDHF.ENQSRV..FL...........LA.KELKQLGV
Nm_CseA ..........M......KIALITQNIK..DPINFSSHFL.........NNL.SLIIKEKF
Cs_WepM ..........M......IFLFIIHD......GLRREMFK.........SLY.EKAQANGI
Bo_2445 ..........M......IVV........VVDSMERYYFA.........ARL.VKAVRKEF
Ap_Cps5B ..........M......SISILVPDSLHINKRNFSSFF.............SWIEKNKI
Sm_Rkpz1 ..........M..................AVTRRQREDF.........ATI.SSAPTPEP
Sm_Rkpz2 ....M.SFPP....
Sm_RkpZ ..........MKNVGIKKAALQMSRYV.LASKQVQRALKLLGLPASRANEV.SGIPKPAD
Ec_KpsC-N ....
Cs_KpsC-N ....
Nm_KpsC-N ..........M......F..................LFS.........DGL.QSINNNNR
Hi_KpsC-N ....
Cj_KpsC-N ....
Ec_KpsC-C ..............................QTGEVSDLF.........TVL.QWLQLQRR
Cs_KpsC-C ..............................QTNQPGTLF.........DVL.TWLALQRR
Nm_KpsC-C ..............................NTGEAGSLF.........DVI.DYLATVKR
Hi_KpsC-C ..............................NTGTAGTIF.........DVI.NHIIHTKA
Cj_KpsC-C ..............................YLNQKSNIF.........DTI.QTLAKYKS
Ec_KpsS .....MQGNAL......TVLLSGKKYL.LLQGPMGPFFN.........DVA.EWLESLGR
Cs_KpsS .....MNHSAL......DTLLSGQKYL.LLQGPMGPFFR.........DLG.NWLETKGR
Nm_KpsS MKQTVLKNNLQ......NLLESAENIL.LLQGPVGDFFL.........RLA.DWLTANGK
Hi_KpsS .....MNHYLD......ELVQSSQRIL.LLQGPIGHFFA.........DLS.DWLVGQGK
Cj_KpsS M....RFNTKI......KKEFSGKNVL.LLQGPVGNFFH.........HLA.IRMEKKQT


Nβ2
Nα2a
Nα2b
40
50
60
Rt_WbbB ............ILFITGEDY.........LSVTDDEAQR......ARWEFDPASMASLG
Kp_WbbB ............ILFITSPDY.........VEVINDETQH......SRWEFDAASMASLG
Sm_WbbK ............VYFMMGNDY.........LSPLELWERE.......RRWELEDDSQKRLG
Ah_WbbB ............AFFITGRDY.........VRAPSDWE........GRWECDQAVQSRLG
Ec_Orf3 NMLR.........................KQYLSQHH.....................
SM_b20824 ....
Ec_Orf2 RVA..........................IPFLGECVY.....................
Pa_WpaF TWIN.........LCIYPSSY.........IYSRIHKHDCVF.........LPQSVNNYVG
Sf_Cps10C DPIILHYKPSVGAFFKARGIR.........ILHLDDYR.........ARMKKGEVSKAAIG
Sf_28220 DPIILHYKPSVGAFFKARGVK.........ILHLDAYR.........ARIKKGEVSKAALG
Ap_Cps10C EPVILMYKEKQGNLFLSNSIK.........VVYLSSYL.........SKVKSLKQDIDFST
Nm_CseA NI...........FLFTDTDK.......PLLTNYNTKQYNFISPRIKRSNHINLSVTDVN
Cs_WepM KS.........YIICFSIREY.........FWFLTKGFD.....................
Bo_2445 D............FLFATSEP.......VAHLMALGAGFRS...VYLRRGAPPSAARDAAG
Ap_Cps5B N............IHFENNNK.......DWISLYGFYD.....................
Sm_Rkpz1 VT..........................TFAVQIVE.....................
Sm_Rkpz2 ....LFLFGFNK.....................
Sm_RkpZ TSLSF...PGYEAFALHGEAWQAAGEQKPIILMFGVHP.....................
Ec_KpsC-N ....MIGIYSPGI.....................
Cs_KpsC-N ..............MKNS..........VTGIFSKGI.....................
Nm_KpsC-N RK...........RIVKN...........AYIPSRGI.....................
Hi_KpsC-N ..............MPT...........ALIFSHGI.....................
Cj_KpsC-N ....MSSYSTSK.....................
Ec_KpsC-C HL...........QQRNGY..........LWAPGLTL.....................
Cs_KpsC-C HH...........LALRGT..........LWVPGLTL.....................
Nm_KpsC-C KN...........DKLRGE..........LYCVGMSL.....................
Hi_KpsC-C LN...........LCLQGN..........LYCVGMSL.....................
Cj_KpsC-C IE...........KANSNR..........LFMLGFTL.....................
Ec_KpsS NAVN.........VVFNGGDR.........FY.....................
Cs_KpsS EAKQ.........VVFNGGDW.........FY.....................
Nm_KpsS TVHK.........FNFNAGDD.........YFYP.....................
Hi_KpsS TVYK.........INFNGGDE.........HFYP.....................
Cj_KpsS KVFK.........LNFNGGDF.........FFYPSGTR.....................


N2αc
70
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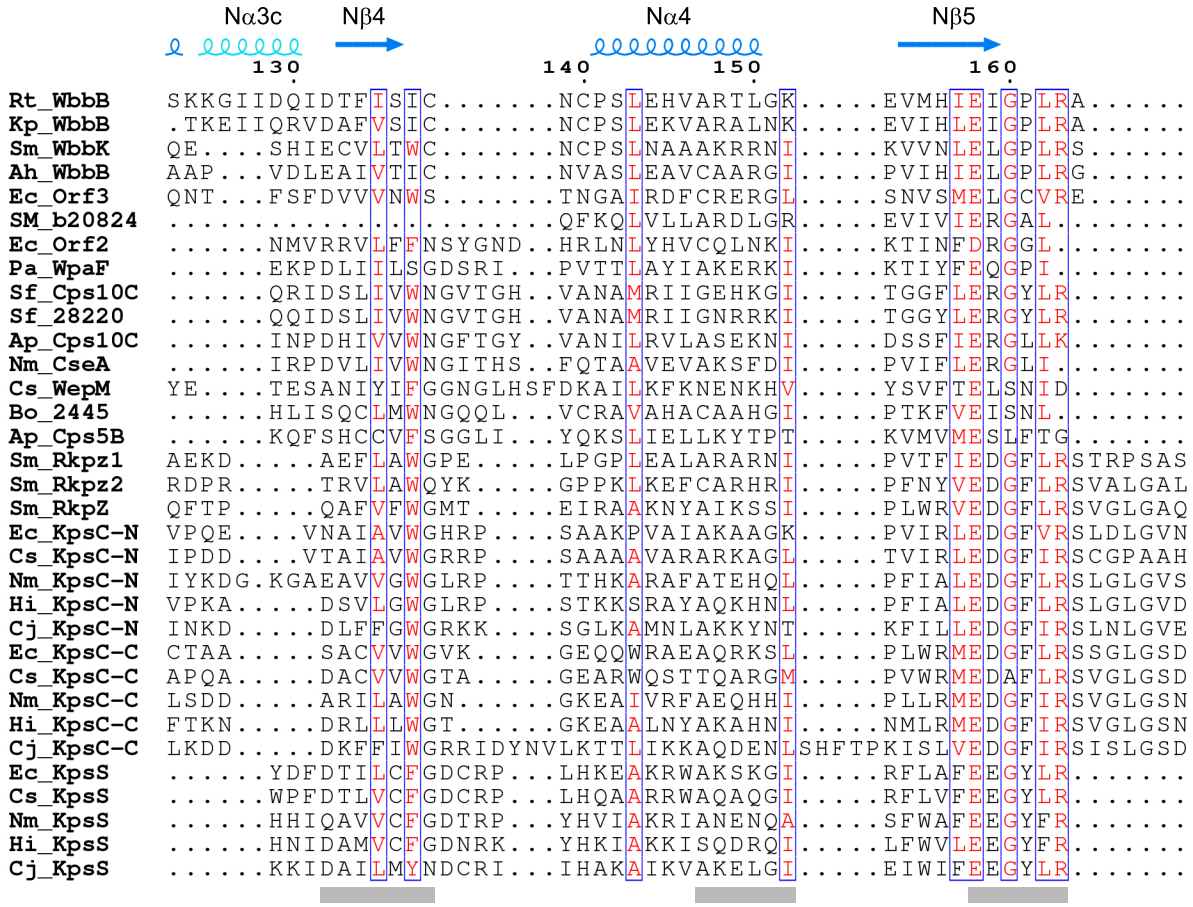
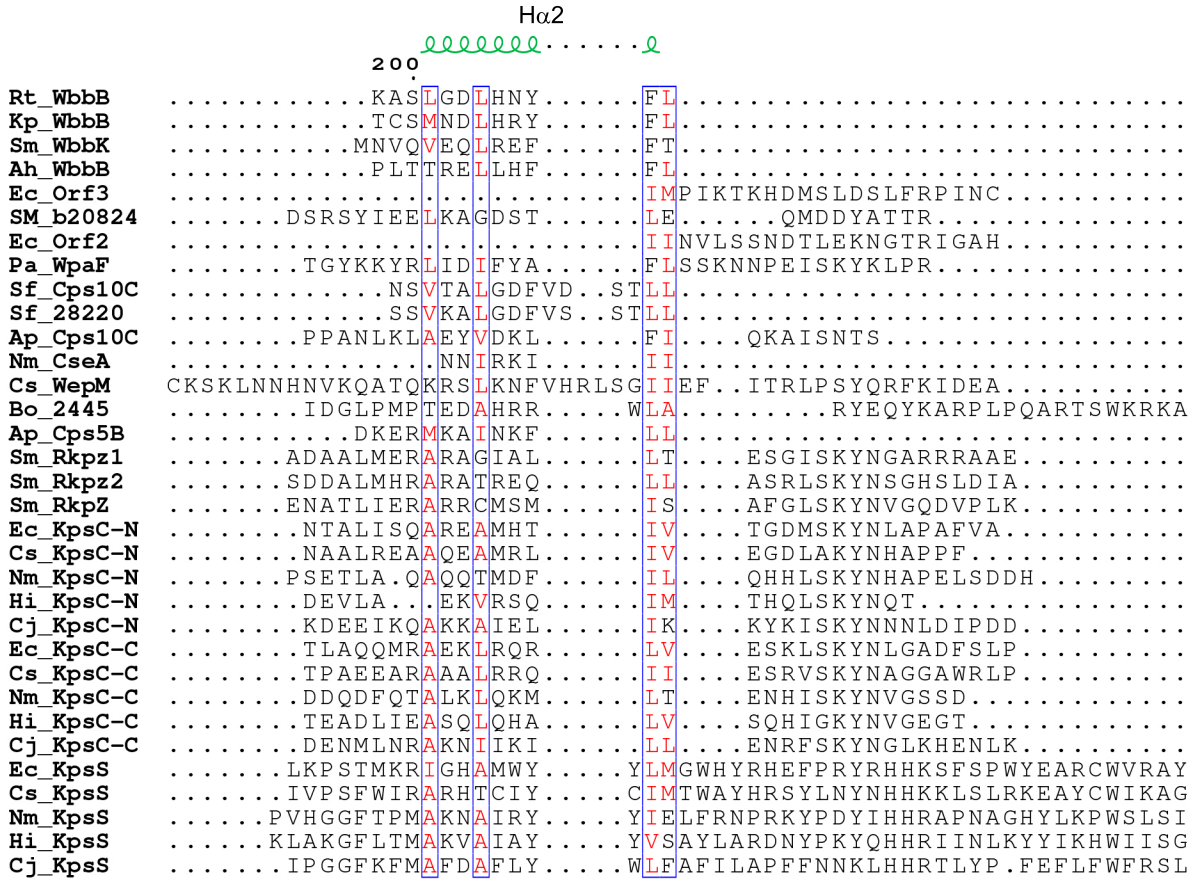
Kp_WbbB YSLPD.....EQSLAR
Sm_WbbK FQLPDL.....DQLSAK
Ah_WbbB YSLPV.....NAMPEQ
Ec_Orf3 .....AK..IDYDDIRIVVSRHYQELI.....DNNQDLKTI
SM_b20824 .....
Ec_Orf2 .....AK
Pa_WpaF EKKELDELE.....LKKLSK.....YHGDSKKII
Sf_Cps10C TAFWDEKKYSIYN.....IK.....HELLRALPVDRRRDL
Sf_28220 DAFWNDEAYSIYG.....IK.....HELLRAAPADRRRDL
Ap_Cps10C KIYNDLKIIDFINIE.....VK.....RRPRIGWPSQVKKTS
Nm_CseA N.....IK.....KQINVYKKLGRKHNI
Cs_WepM .....SK.....TISLIQYSDSD
Bo_2445 AIRFDASIEVLNG.QMTTELAR
Ap_Cps5B .....SKLGILYEKIDILTKIEEEELFAFCVYDLNIFNICRAELL
Sm_Rkpz1 .....WK
Sm_Rkpz2 .....WK
Sm_RkpZ .....WK
Ec_KpsC-N .....WR
Cs_KpsC-N .....WR
Nm_KpsC-N .....RK
Hi_KpsC-N .....KK
Cj_KpsC-N .....
Ec_KpsC-C .....WK
Cs_KpsC-C .....WK
Nm_KpsC-C .....WK
Hi_KpsC-C .....WK
Cj_KpsC-C .....WK
Ec_KpsS .....CR.....HRQYLAY
Cs_KpsS .....RR.....KGKSLSY
Nm_KpsS .....PT.....QAHTVVF
Hi_KpsS .....LS.....IENTIAY
Cj_KpsS .....CK
Nβ3
Nα3a
Nα3b
Nα3
80
90
100
110
120
Rt_WbbB .....HEYLTLDNAFYETLLSRHHH..DPIKSFSAFLTERIPD.....LETELHALLD
Kp_WbbB .....HEYLYLDHALYEIMLAQHHH..DPIKSFTTFLTESISE.....LENELFSLL.
Sm_WbbK .....HKVSVIDESFFSHYMGKCFN..NPDVLFKTFITEVIPE.....LETALFAALS
Ah_WbbB .....HHYAWLDENRFDDWLNKLNG..NPIEAFRRFLCERDAA.....FERELEALLD
Ec_Orf3 FL.....GLTKEENDRLSFYMRDWNSDVQAINNWTSLMQGTGEVS...EFYKSILDRIY
SM_b20824 .....LSIFNPYMKSHA
Ec_Orf2 .....DTEFKDENVFLDFIKK
Pa_WpaF .....DKTQKYLSYYDNLLDK
Sf_Cps10C .....YMLRRDGLALTRLVED
Sf_28220 .....YMLRRDGLALTRLVDD
Ap_Cps10C .....QQVYKYIIAINNILGD
Nm_CseA .....WTLVTDYIDISEFYRK.....NFIE
Cs_WepM .....DIIDDLESTIDV.....AAGFINIKSASK...IYHSTYKSLNK
Bo_2445 .....ADAAAIVAAMSGVFRR
Ap_Cps5B SLVATRPEWYNEDYPNNLREIYKKLY....T.NNRSELLQNMAAAWYWVDFWKKRLSEL.
Sm_Rkpz1 .....REPFERYFPN.....RRFHFLPMNVGVR...EFERVWRPRIL
Sm_Rkpz2 .....TFIRDWFPD.....HEPRFVRLKQWPF...EYELYWKRLLL
Sm_RkpZ .....RDVLARYFSD.....FRVAYVRTNTSWT...KVQ....TSFC
Ec_KpsC-N .....IPHLEKFLAQ.....PCQKLSLLR.....P
Cs_KpsC-N .....IAGLHHLLPM.....PCRKLAPRR.....A
Nm_KpsC-N .....IPHLSTLLPE.....FH
Hi_KpsC-N .....IPHLASFFPN.....QKLAFARI.....FS
Cj_KpsC-N .....KLITNVKNFYTI.....FLYKKNLK
Ec_KpsC-C .....SAILKPFLRT.....PTNRLSFSR.....R
Cs_KpsC-C .....RSVVKPFLST.....PYNRLRFTR.....R
Nm_KpsC-C .....RAVAKPFFNV.....PSCRLKFISSTQKL.....AGVK
Hi_KpsC-C .....RAVIKPFFRL.....PSCKLHFVKDVSKL.....NGKT
Cj_KpsC-C .....RHFIKPFFKA.....KNNEIIFLNSIKSL.....VRYK
Ec_KpsS .....YQTPKEFPGWLRDLHRQ
Cs_KpsS .....QGTPKGFGAWLAATRSA
Nm_KpsS .....NDNYDAFPEFLQEYITQ
Hi_KpsS .....RGSVSEFYPYLQLFCKQ
Cj_KpsS .....CDEKDLENFYRDFFQS


Nα3c
Nβ4
Nα4
Nβ5
130
140
150
160
Rt_WbbB SKKGIIDQIDTFISIC.....NCPSLEHVARTLGK.....EVMHIEIGPLRA.....
Kp_WbbB .TKEIIQRVDAFVSIC.....NCPSLEKVARALNK.....EVIHLEIGPLRA.....
Sm_WbbK QE....SHIECVLTWC.....NCPSLNAAAKRRNI.....KVVNLELGPLRS.....
Ah_WbbB AAP...VDLEAIVTIC.....NVASLEAVCAARGI.....PVIHIELGPLRG.....
Ec_Orf3 QNT...FSFDVVVNWS.....TNGAIRDFCRERGL.....SNVSMELGCVRE.....
SM_b20824 .....QFKQLVLLARDLGR.....EVIVIERGAL.....
Ec_Orf2 ......NMVRRVLFFNSYGND..HRLNLYHVCQLNKI.....KTINFDRGGL.....
Pa_WpaF ......EKPDLIILSGDSRI...PVTTLAYIAKERKI.....KTIYFEQGPI.....
Sf_Cps10C ......QRIDSLIVWNGVTGH..VANAMRIIGEHKGI.....TGGFLERGYLR.....
Sf_28220 ......QQIDSLIVWNGVTGH..VANAMRIIGNRRKI.....TGGYLERGYLR.....
Ap_Cps10C ......INPDHIVVWNGFTGY..VANILRVLASEKNI.....DSSFIERGLLK.....
Nm_CseA ......IRPDVLIVWNGITHS..FQTAAVEVAKSFDI.....PVIFLERGLI.....
Cs_WepM YE....TESANIYIFGGNGLHSFDKAILKFKNENKHV.....YSVFTELSNID.....
Bo_2445 ......HLISQCLMWNGQQL...VCRAVAHACAAHGI.....PTKFVEISNL.....
Ap_Cps5B ......KQFSHCCVFSGGLI...YQKSLIELLKYTPT.....KVMVMESLFTG.....
Sm_Rkpz1 AEKD.....AEFLAWGPE.....LPGPLEALARARNI.....PVTFIEDGFLRSTRPSAS
Sm_Rkpz2 RDPR.....TRVLAWQYK.....GPPKLKEFCARHRI.....PFNYVEDGFLRSVALGAL
Sm_RkpZ QFTP.....QAFVFWGMT.....EIRAAKNYAIKSSI.....PLWRVEDGFLRSVGLGAQ
Ec_KpsC-N VPQE....VNAIAVWGHRP....SAAKPVAIAKAAGK.....PVIRLEDGFVRSLDLGVN
Cs_KpsC-N IPDD....VTAIAVWGRRP....SAAAAVARARKAGL.....TVIRLEDGFIRSCGPAAH
Nm_KpsC-N IYKDG.KGAEAVVGWGLRP....TTHKARAFATEHQL.....PFIALEDGFLRSLGLGVS
Hi_KpsC-N VPKA.....DSVLGWGLRP....STKKSRAYAQKHNL.....PFIALEDGFLRSLGLGVD
Cj_KpsC-N INKD.....DLFFGWGRKK....SGLKAMNLAKKYNT.....KFILLEDGFIRSLNLGVE
Ec_KpsC-C CTAA.....SACVVWGVK.....GEQQWRAEAQRKSL.....PLWRMEDGFLRSSGLGSD
Cs_KpsC-C APQA.....DACVVWGTA.....GEARWQSTTQARGM.....PVWRMEDAFLRSVGLGSD
Nm_KpsC-C LSDD.....ARILAWGN.....GKEAIVRFAEQHHI.....PLLRMEDGFIRSVGLGSN
Hi_KpsC-C FTKN.....DRLLLWGT.....GKEAALNYAKAHNI.....NMLRMEDGFIRSVGLGSN
Cj_KpsC-C LKDD.....DKFFIWGRRIDYNVLKTTLIKKAQDENLSHFTPKISLVEDGFIRSISLGSD
Ec_KpsS ......YDFDTILCFGDCRP...LHKEAKRWAKSKGI.....RFLAFEEGYLR.....
Cs_KpsS ......WPFDTLVCFGDCRP...LHQAARRWAQAQGI.....RFLVFEEGYLR.....
Nm_KpsS ......HHIQAVVCFGDTRP...YHVIAKRIANENQA.....SFWAFEEGYFR.....
Hi_KpsS ......HNIDAMVCFGDNRK...YHKIAKKISQDRQI.....LFWVLEEGYFR.....
Cj_KpsS ......KKIDAILMYNDCRI...IHAKAIKVAKELGI.....EIWIFEEGYLR.....
Nβ5a
Hα1
170
180
190
Rt_WbbB ...PMYRNTAYLDF..AGVNGGTEASARYEK.....CQAEFDI.....
Kp_WbbB ...PMYRNTAYLDF..TGVNGNTEARARYES.....CQTEIDI.....
Sm_WbbK ...PEYLATAYFDF..SGVNGNTEAERRY.....LSSDYRFN.....
Ah_WbbB ...PLYRETSYVDF..RGVNGNSESAQRYS.....LCHDWQL.....
Ec_Orf3 ...PII.NTVCFDA..CGVNGNSVIKNLDFN.....AIDEDELI.....DIKT.....
SM_b20824 ...P...GTIYYDE..DVAYNSPNFSEERFLQE...QFSDDELA.....
Ec_Orf2 ...P...HTWFFDP..HGFNYSSHSYNPNNWDL...QITKDERE.....SVQEY....
Pa_WpaF .....NTTILDS..KGVNANCSFRHSNEI.....NNQSKRFE..EAKKTRIKKW....
Sf_Cps10C .....DSVFFDR..DGTNGISSLARGTAT.....IYDSADVA.....
Sf_28220 .....DSVFFDR..DGTNGASSLACGTAN.....IYDSADVS.....
Ap_Cps10C .....DSIFIDV..KGVNGNSTLTDLSDY.....
Nm_CseA ...P...RSIFYDF..QGVNAESEIGQNQQWQQQESLLTDKDIF.....
Cs_WepM .....GKLFFDS..LGSNASSFFYS.....LLKNNEINFKKCNGANINEWKNNY
Bo_2445 ...P...DKLFVDR..LGVNALSSISRNPAV.....
Ap_Cps5B .....NEYYCEERYSSIANNSDIKHLAIFNSYKKTFSSKSEY.....
Sm_Rkpz1 RTPP...LSLALDG..RALYFDCRHPSDLEV.....LLKTYDFE.....
Sm_Rkpz2 RVPP...LSLAFDA..QDMYFNANGPTDLED.....ILRTYDFE.....
Sm_RkpZ HVLP...LSLAVDT..TGIYFDPSRPSTLET.....LISEIGVT.....
Ec_KpsC-N GEPP...LSLVVDD..CGIYYDASKPSALEK.....LVQDKAG.....
Cs_KpsC-N GYPT...LSLVIDY..DGIYYDASQPSTLEN.....LIQDTAG.....
Nm_KpsC-N GYPP...YSIVYDD..IGIYYDTTHPSRLEQ.....LILAADTM.....
Hi_KpsC-N GYPP...LSMIVDK..LGIYYDTTRPSTLEQ.....LVLAGEC.....
Cj_KpsC-N NSPS...FSMVKDD..IGIYYDGTMPSKLEN.....LLNTYEF.....
Ec_KpsC-C LLPP...LSLVLDK..RGIYYDATRPSDLEV.....LLNHSQL.....
Cs_KpsC-C LFAP...LSLVLDK..RGLYYDATRASDLEI.....ALNRVHL.....
Nm_KpsC-C LVPP...LSLVTDD..MSIYFNAETPSRLEY.....ILQNQNF.....
Hi_KpsC-C LVAP...LSLVCDD..LGIYFNAESPSRLEE.....ILQHQQF.....
Cj_KpsC-C LTRP...FSLIVDD..KGLYIDPNKASKLEE.....LLQNEIF.....
Ec_KpsS ...P...QFITVEE..DGVNAYSSLPRDPDF.....YRKLPDMP.....TPHVEN.....
Cs_KpsS ...P...CFITLEE..NGVNGFSSLPREAGF.....YMQLPDTG.....QVRINK.....
Nm_KpsS ...P...YYITLEK..DGVNAFSPLPRRADF.....FLEQFPKL.....AQQEYKAPT
Hi_KpsS ...P...DYVTLEK..LGVNAFSPLPRQADF.....YLEQAEN.....LPEPTVPL
Cj_KpsS ...P...YCITLEK..DGVNANSSLPRDKNF.....YLSQNIFT.....KESIKE.....


Hα2
200
Rt_WbbB
Kp_WbbB
Sm_WbbK
Ah_WbbB
Ec_Orf3
SM_b20824
Ec_Orf2
Pa_WpaF
Sf_Cps10C
Sf_28220
Ap_Cps10C
Nm_CseA
Cs_WepM
Bo_2445
Ap_Cps5B
Sm_Rkpz1
Sm_Rkpz2
Sm_RkpZ
Ec_KpsC-N
Cs_KpsC-N
Nm_KpsC-N
Hi_KpsC-N
Cj_KpsC-N
Ec_KpsC-C
Cs_KpsC-C
Nm_KpsC-C
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Nm_KpsS
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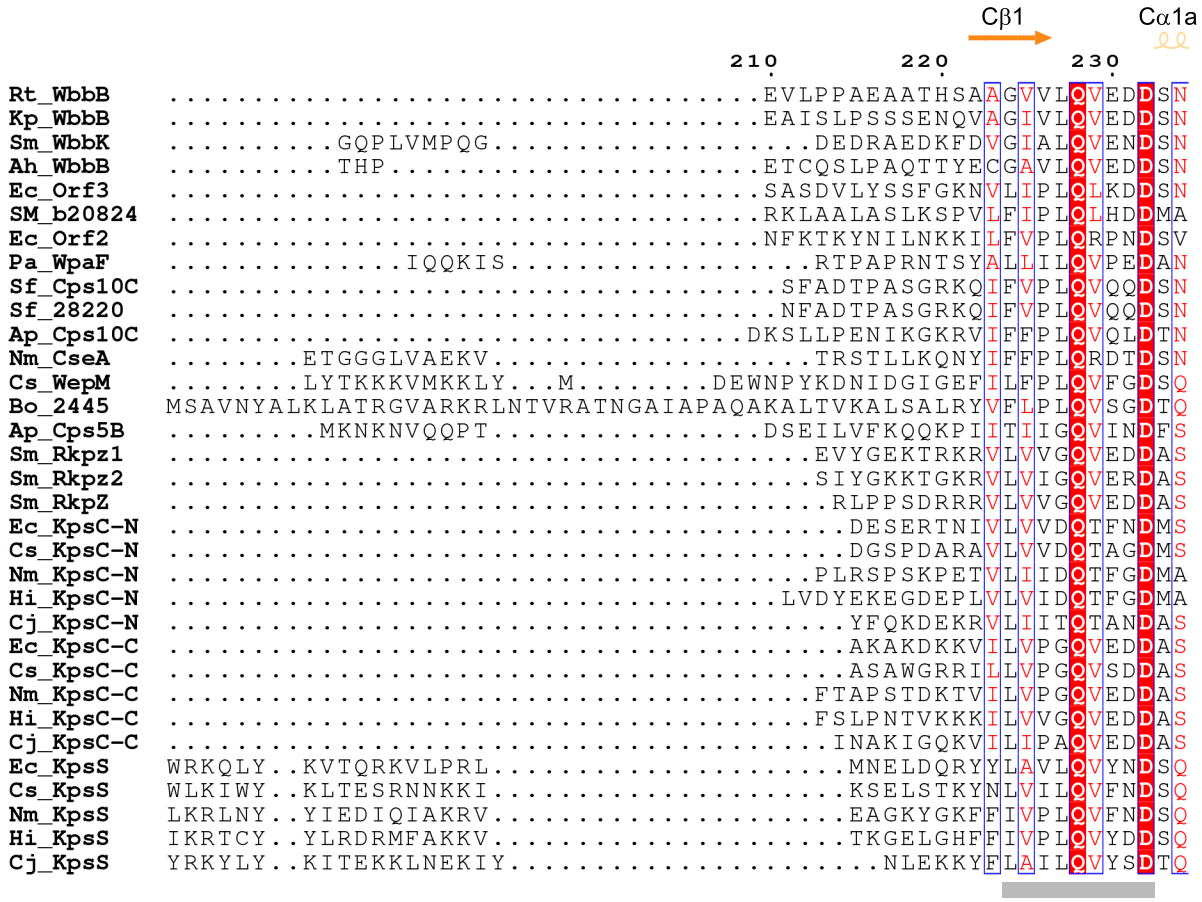
Cj_KpsS


Cβ1
Cα1a
210
220
230
Rt_WbbB
Kp_WbbB
Sm_WbbK
Ah_WbbB
Ec_Orf3
SM_b20824
Ec_Orf2
Pa_WpaF
Sf_Cps10C
Sf_28220
Ap_Cps10C
Nm_CseA
Cs_WepM
Bo_2445
Ap_Cps5B
Sm_Rkpz1
Sm_Rkpz2
Sm_RkpZ
Ec_KpsC-N
Cs_KpsC-N
Nm_KpsC-N
Hi_KpsC-N
Cj_KpsC-N
Ec_KpsC-C
Cs_KpsC-C
Nm_KpsC-C
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Cj_KpsC-C
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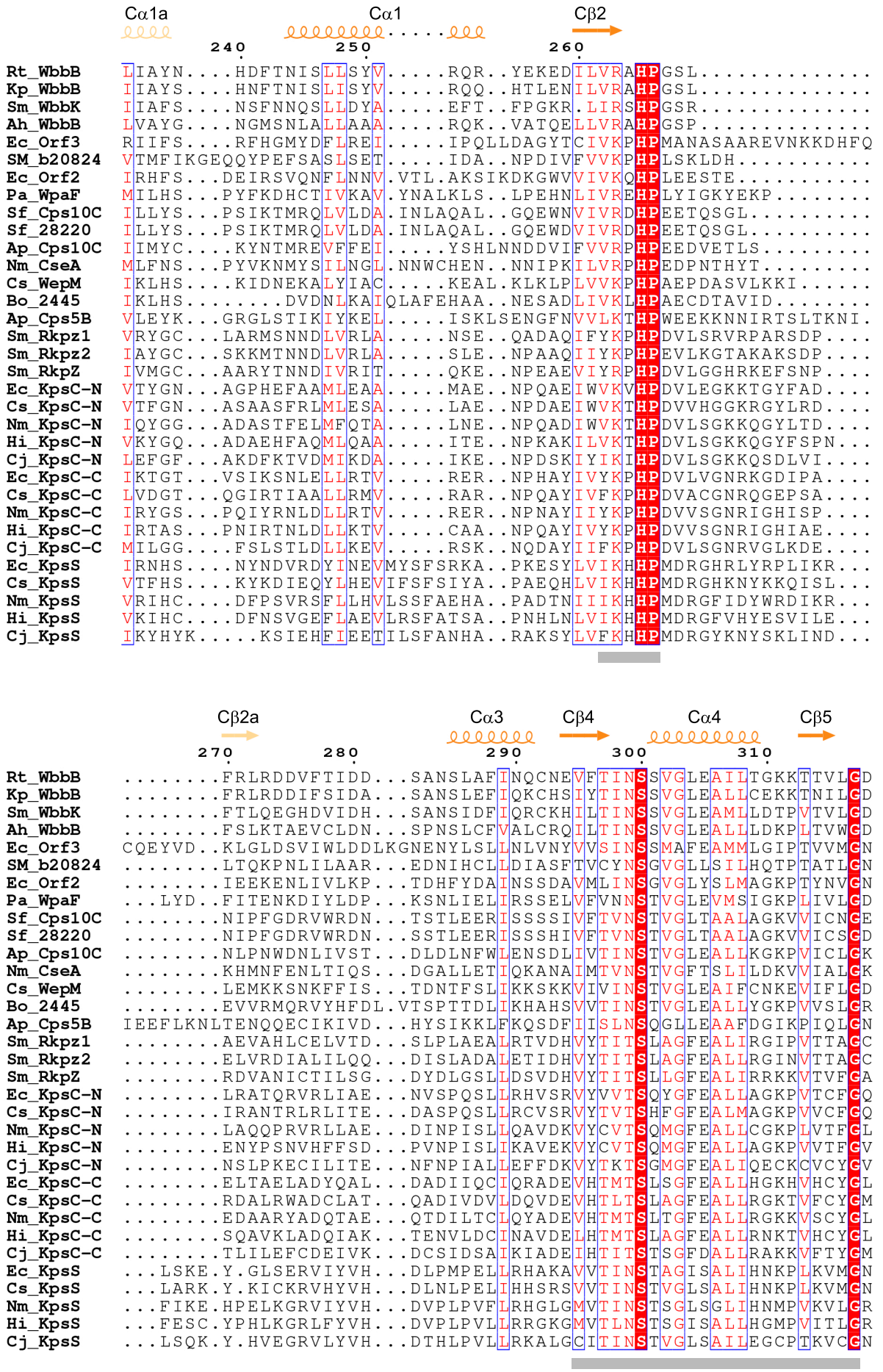
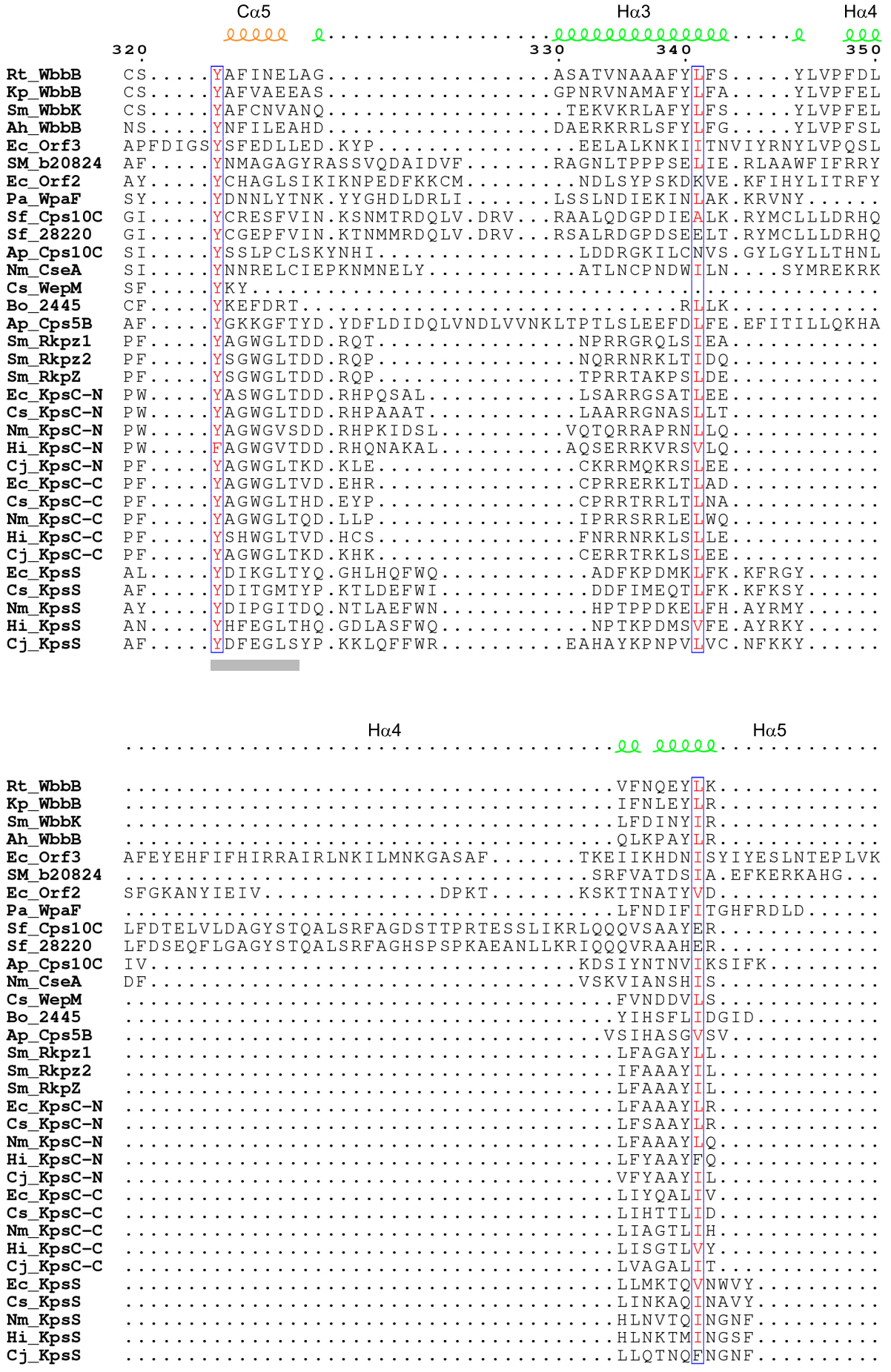
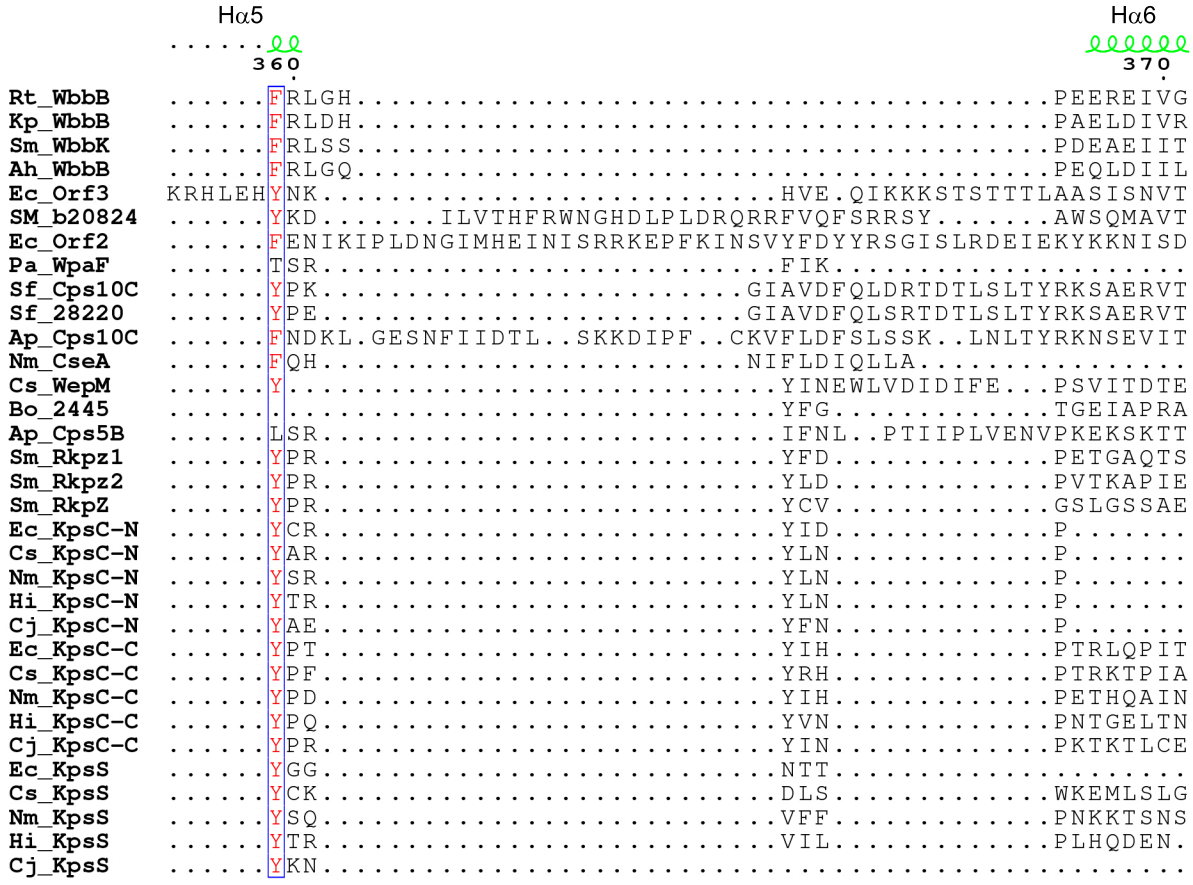
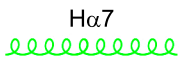
Cs_KpsS
Nm_KpsS
Hi_KpsS
Cj_KpsS


Cα1a
Cα1
Cβ2
240
250
260
Rt_WbbB LIAYN....HDFTNISLLSYV.....RQR..YEKEDILVRAHPGSL.....
Kp_WbbB IIAYS....HNFTNISLISYV.....RQQ..HTLENILVRAHPGSL.....
Sm_WbbK IIAFS....NSFNNQSLLDYA.....EFT..FPGKR.LIRSHPGSR.....
Ah_WbbB LVAYG....NGMSNLALLAAA.....RQK..VATQELLVRAHPGSP.....
Ec_Orf3 RIIFS....RFHGMYDFLREI.....IPQLLDAGYTCIVKPHPMANASAAREVNKKDHFQ
SM_b20824 VTMFIKGEQQYPEFSASLSET.....IDA..NPDIVFVVKPHPLSKLDH.....
Ec_Orf2 IRHFS...DEIRSVQNFLNNV.VTL.AKSIKDKGWVVIVKQHPLEESTE.....
Pa_WpaF MILHS...PYFKDHCTIVKAV.YNALKLS..LPEHNLIVREHPLYIGKYEKP.....
Sf_Cps10C ILLYS...PSIKTMRQLVLDA.INLAQAL..GQEWNVIVRDHPEETQSGL.....
Sf_28220 ILLYS...PSIKTMRQLVLDA.INLAQAL..GQEWDVIVRDHPEETQSGL.....
Ap_Cps10C IIMYC....KYNTMREVFFEI.....YSHLNNDDVIFVVRPHPEEDVETLS.....
Nm_CseA MLFNS...PYVKNMYSILNGL.NNWCHEN..NNIPKILVRPHPEDPNTHYT.....
Cs_WepM IKLHS....KIDNEKALYIAC.....KEAL.KLKLPLVVKPHPAEPDASVLKKI.....
Bo_2445 IKLHS.....DVDNLKAIQLAFEHAA..NESADLIVKLHPAECDTAVID.....
Ap_Cps5B VLEYK...GRGLSTIKIYKEL.....ISKLSENGFNVVLKTHPWEEKKNNIRTSLTKNI.
Sm_Rkpz1 VRYGC...LARMSNNDLVRLA.....NSE..QADAQIFYKPHPDVLSRVRPARSDP....
Sm_Rkpz2 IAYGC...SKKMTNNDLVRLA.....SLE..NPAAQIIYKPHPEVLKGTAKAKSDP....
Sm_RkpZ IVMGC...AARYTNNDIVRIT.....QKE..NPEAEVIYRPHPDVLGGHRKEFSNP....
Ec_KpsC-N VTYGN...AGPHEFAAMLEAA.....MAE..NPQAEIWVKVHPDVLEGKKTGYFAD....
Cs_KpsC-N VTFGN...ASAASFRLMLESA.....LAE..NPDAEIWVKTHPDVVHGGKRGYLRD....
Nm_KpsC-N IQYGG...ADASTFELMFQTA.....LNE..NPQADIWVKTHPDVLSGKKQGYLTD....
Hi_KpsC-N VKYGQ...ADAEHFAQMLQAA.....ITE..NPKAKILVKTHPDVLSGKKQGYFSPN....
Cj_KpsC-N LEFGF...AKDFKTVDMIKDA.....IKE..NPDSKIYIKIHPDVLSGKKQSDLVI....
Ec_KpsC-C IKTGT...VSIKSNLELLRTV.....RER..NPHAYIVYKPHPDVLVGNRKGDIPA....
Cs_KpsC-C LVDGT...QGIRTIAALLRMV.....RAR..NPQAYIVFKPHPDVACGNRQGEPSA....
Nm_KpsC-C IRYGS...PQIYRNLDLLRTV.....RER..NPNAYIIYKPHPDVVSGNRIGHISP....
Hi_KpsC-C IRTAS...PNIRTNLDLLKTV.....CAA..NPQAYIVYKPHPDVVSGNRIGHIAE....
Cj_KpsC-C MILGG....FSLSTLDLLKEV.....RSK..NQDAYIIFKPHPDVLSGNRVGLKDE....
Ec_KpsS IRNHS....NYNDVRDYINEVMYSFSRKA..PKESYLVIKHHPMDRGHRLYRPLIKR....
Cs_KpsS VTFHS....KYKDIEQYLHEVIFSFSIYA..PAEQHLVIKHHPMDRGHKNYKKQISL....
Nm_KpsS VRIHC....DFPSVRSFLLHVLSSFAEHA..PADTNIIIKHHPMDRGFIDYWRDIKR....
Hi_KpsS VKIHC....DFNSVGEFLAEVLRSFATSA..PNHLNLVIKHHPMDRGFVHYESVILE....
Cj_KpsS IKYHYK.....KSIEHFIEETILSFANHA..RAKSYLVFKHHPMDRGYKNYSKLIND....
Cβ2a
Cα3
Cβ4
Cα4
Cβ5
270
280
290
300
310
Rt_WbbB .....FRLRDDVFTIDD...SANSLAFINQCNEVFTINSSVGLEAILTGKKTTVLGD
Kp_WbbB .....FRLRDDIFSIDA...SANSLEFIQKCHSIYTINSSVGLEALLCEKKTNILGD
Sm_WbbK .....FTLQEGHDVIDH...SANSIDFIQRCKHILTINSSVGLEAMLLDTPVTVLGD
Ah_WbbB .....FSLKTAEVCLDN...SPNSLCFVALCRQILTINSSVGLEALLLDKPLTVWGD
Ec_Orf3 CQEYVD..KLGLDSVIWLDDLKGNENYLSLLNLVNYVVSINSSMAFEAMMLGIPTVVMGN
SM_b20824 .....LTQKPNLILAAR...EDNIHCLLDIASFTVCYNSGVGLLSILHQTPTATLGN
Ec_Orf2 .....IEEKENLIVLKP...TDHFYDAINSSDAVMLINSGVGLYSLMAGKPTYNVGN
Pa_WpaF ...LYD..FITENKDIYLDP...KSNLIELIRSSELVFVNNSTVGLEVMSIGKPLIVLGD
Sf_Cps10C .....NIPFGDRVWRDN...TSTLEERISSSSIVFTVNSTVGLTAALAGKVVICNGE
Sf_28220 .....NIPFGDRVWRDN...SSTLEERISSSHIVFTVNSTVGLTAALAGKVVICSGD
Ap_Cps10C .....NLPNWDNLIVST...DLDLNFWLENSDLIVTINSTVGLEALLKGKPVICLGK
Nm_CseA .....KHMNFENLTIQS...DGALLETIQKANAIMTVNSTVGFTSLILDKVVIALGK
Cs_WepM .....LEMKKSNKFFIS...TDNTFSLIKKSKKVIVINSTVGLEAIFCNKEVIFLGD
Bo_2445 .....EVVRMQRVYHFDL.VTSPTTDLIKHAHSVVTINSTVGLEALLYGKPVVSLGR
Ap_Cps5B IEEFLKNLTENQQECIKIVD...HYSIKKLFKQSDFIISLNSQGLLEAAFDGIKPIQLGN
Sm_Rkpz1 .....AEVAHLCELVTD...SLPLAEALRTVDHVYTITSLAGFEALIRGIPVTTAGC
Sm_Rkpz2 .....ELVRDIALILQQ...DISLADALETIDHVYTITSLAGFEALLRGINVTTAGC
Sm_RkpZ .....RDVANICTILSG...DYDLGSLLDSVDHVYTITSLLGFEALIRRKKVTVFGA
Ec_KpsC-N .....LRATQRVRLIAE...NVSPQSLLRHVSRVYVVTSQYGFEALLAGKPVTCFGQ
Cs_KpsC-N .....IRANTRLRLITE...DASPQSLLRCVSRVYTVTSHFGFEALMAGKPVVCFGQ
Nm_KpsC-N .....LAQQPRVRLLAE...DINPISLLQAVDKVYCVTSQMGFEALLCGKPLVTFGL
Hi_KpsC-N .....ENYPSNVHFFSD...PVNPISLIKAVEKVYCVTSQMGFEALLAGKPVVTFGV
Cj_KpsC-N .....NSLPKECILITE...NFNPIALLEFFDKVYTKTSGMGFEALIQECKCVCYGV
Ec_KpsC-C .....ELTAELADYQAL...DADIIQCIQRADEVHTMTSLSGFEALLHGKHVHCYGL
Cs_KpsC-C .....RDALRWADCLAT...QADIVDVLDQVDEVHTLTSLAGFEALLRGKTVFCYGM
Nm_KpsC-C .....EDAARYADQTAE...QTDILTCLQYADEVHTMTSLTGFEALLRGKKVSCYGL
Hi_KpsC-C .....SQAVKLADQIAK...TENVLDCINAVDELHTMTSLAGFEALLRNKTVHCYGL
Cj_KpsC-C .....TLILEFCDEIVK...DCSIDSAIKIADEIHTITSTSGFDALLRAKKVFTYGM
Ec_KpsS ...LSKE.Y.GLSERVIYVH...DLPMPELLRHAKAVVTINSTAGISALIHNKPLKVMGN
Cs_KpsS ...LARK.Y.KICKRVHYVH...DLNLPELIHHSRSVVTINSTVGLSALIHNKPLKVMGN
Nm_KpsS ...FIKE.HPELKGRVIYVH...DVPLPVFLRHGLGMVTINSTSGLSGLIHNMPVKVLGR
Hi_KpsS ...FESC.YPHLKGRLFYVH...DVPLPVLLRRGKGMVTLNSTSGISALLHGMPVITLGR
Cj_KpsS ...LSQK.Y.HVEGRVLYVH...DTHLPVLLRKALGCITINSTVGLSAILEGCPTKVCGN


Cα5
Hα3
Hα4
320
330
340
350
Rt_WbbB CS.....YAFINELAG.....ASATVNAAAFYLFS.....YLVPFDL
Kp_WbbB CS.....YAFVAEEAS.....GPNRVNAMAFYLFA.....YLVPFEL
Sm_WbbK CS.....YAFCNVANQ.....TEKVKRLAFYLFS.....YLVPFEL
Ah_WbbB NS.....YNFILEAHD.....DAERKRRLSFYLFG.....YLVPFSL
Ec_Orf3 APFDIGSYSFEDLLED.KYP.....EELALKNKITNVIYRNYLVPQSL
SM_b20824 AF.....YNMAGAGYRASSVQDAIDVF.....RAGNLTPPPSELIE.RLAAWFIFRRY
Ec_Orf2 AY.....YCHAGLSIKIKNPEDFKKCM.....NDLSYPSKDKVE.KFIHYLITRFY
Pa_WpaF SY.....YDNNLYTNK.YYGHDLDRLI.....LSSLNDIEKINLAK.KRVNY.....
Sf_Cps10C GI.....YCRESFVIN.KSNMTRDQLV.DRV...RAALQDGPDIEALK.RYMCLLLDRHQ
Sf_28220 GI.....YCGEPFVIN.KTNMMRDQLV.DRV...RSALRDGPDSEELT.RYMCLLLDRHQ
Ap_Cps10C SI.....YSSLPCLSKYNHI.....LDDRGKILCNVS.GYLGYLLTHNL
Nm_CseA SI.....YNNRELCIEPKNMNELY.....ATLNCPNDWILN....SYMREKRK
Cs_WepM SF.....YKY.....
Bo_2445 CF.....YKEFDRT.....RLLK.....
Ap_Cps5B AF.....YGKKGFTYD.YDFLDIDQLVNDLVVNKLTPTLSLEEFDLFE.EFITILLQKHA
Sm_Rkpz1 PF.....YAGWGLTDD.RQT.....NPRRGRQLSIEA.....
Sm_Rkpz2 PF.....YSGWGLTDD.RQP.....NQRRNRKLTIDQ.....
Sm_RkpZ PF.....YSGWGLTDD.RQP.....TPRRTAKPSLDE.....
Ec_KpsC-N PW.....YASWGLTDD.RHPQSAL.....LSARRGSATLEE.....
Cs_KpsC-N PW.....YAGWGLTDD.RHPAAAT.....LAARRGNASLLT.....
Nm_KpsC-N PW.....YAGWGVSDD.RHPKIDSL.....VQTQRRAPRNLLQ.....
Hi_KpsC-N PW.....FAGWGVTDD.RHQNAKAL.....AQSERRKVRSVLQ.....
Cj_KpsC-N PF.....YAGWGLTKD.KLE.....CKRRMQKRSLEE.....
Ec_KpsC-C PF.....YAGWGLTVD.EHR.....CPRRERKLTLAD.....
Cs_KpsC-C PF.....YAGWGLTHD.EYP.....CPRRTRRLTLNA.....
Nm_KpsC-C PF.....YAGWGLTQD.LLP.....IPRRSRRLELWQ.....
Hi_KpsC-C PF.....YSHWGLTVD.HCS.....FNRRNRKLSLLE.....
Cj_KpsC-C PF.....YAGWGLTKD.KHK.....CERRTRKLSLEE.....
Ec_KpsS AL.....YDIKGLTYQ.GHLHQFWQ.....ADFKPDMKLFK.KFRGY.....
Cs_KpsS AF.....YDITGMTYP.KTLDEFWI.....DDFIMEQTLFK.KFKSY.....
Nm_KpsS AY.....YDIPGITDQ.NTLAEFWN.....HPTPPDKELFH.AYRMY.....
Hi_KpsS AN.....YHFEGLTHQ.GDLASFWQ.....NPTKPDMSVFE.AYRKY.....
Cj_KpsS AF.....YDFEGLSYP.KKLQFFWR.....EAHAYKPNPVLVC.NFKKY.....
Hα4
Hα5
Rt_WbbB .....VFNQEYLK.....
Kp_WbbB .....IFNLEYLR.....
Sm_WbbK .....LFDINYIR.....
Ah_WbbB .....QLKPAYLR.....
Ec_Orf3 AFEYEHFIFHIRRAIRLNKILMNKGASAF.....TKEIIKHDNISYIYESLNTEPLVK
SM_b20824 .....SRFVATDSIA.EFKERKAHG...
Ec_Orf2 SFGKANYIEIV.....DPKT.....KSKTTNATYVD.....
Pa_WpaF .....LFNDIFITGHFRDLD.....
Sf_Cps10C LFDTELVLDAGYSTQALSRFAGDSTTPRTESSLIKRLQQQVSAAYER.....
Sf_28220 LFDSEQFLGAGYSTQALSRFAGHSPSPKAEANLLKRIQQQVRAAHER.....
Ap_Cps10C IV.....KDSIYNTNVIKSIFK.....
Nm_CseA DF.....VSKVIANSHIS.....
Cs_WepM .....FVNDDVLS.....
Bo_2445 .....YIHSFLIDGID.....
Ap_Cps5B .....VSIHASGVSV.....
Sm_Rkpz1 .....LFAGAYLL.....
Sm_Rkpz2 .....IFAAAYIL.....
Sm_RkpZ .....LFAAAYIL.....
Ec_KpsC-N .....LFAAAYLR.....
Cs_KpsC-N .....LFSAAYLR.....
Nm_KpsC-N .....LFAAAYLQ.....
Hi_KpsC-N .....LFYAAYFQ.....
Cj_KpsC-N .....VFYAAYIL.....
Ec_KpsC-C .....LIYQALIV.....
Cs_KpsC-C .....LIHTTLID.....
Nm_KpsC-C .....LIAGTLIH.....
Hi_KpsC-C .....LISGTLVY.....
Cj_KpsC-C .....LVAGALIT.....
Ec_KpsS .....LLMKTQVNWVY.....
Cs_KpsS .....LINKAQINAVY.....
Nm_KpsS .....HLNVTQINGNF.....
Hi_KpsS .....HLNKTMINGSF.....
Cj_KpsS .....LLQTNQFNGNF.....


Hα5
Hα6
360
370
Rt_WbbB .....FRLGH.....PEEREIVG
Kp_WbbB .....FRLDH.....PAELDIVR
Sm_WbbK .....FRLSS.....PDEAEIIT
Ah_WbbB .....FRLGQ.....PEQLDIIL
Ec_Orf3 KRHLEHYNK.....HVE.QIKKKSTSTTTLAASISNVT
SM_b20824 .....YKD.....ILVTHFRWNGHDLPLDRQRRFVQFSRRSY.....AWSQMAVT
Ec_Orf2 .....FENIKIPLDNGIMHEINISRRKEPFKINSVYFDYYRSGISLRDEIEKYKKNISD
Pa_WpaF .....TSR.....FIK.....
Sf_Cps10C .....YPK.....GIAVDFQLDRTDTLSLTYRKSAERVT
Sf_28220 .....YPE.....GIAVDFQLSRTDTLSLTYRKSAERVT
Ap_Cps10C .....FNDKL.GESNFIIDTL..SKKDIPF..CKVFLDFSLSSK..LNLTYRKNSEVIT
Nm_CseA .....FQH.....NIFLDIQLLA.....
Cs_WepM .....Y.....YINEWLVDIDIFE...PSVITDTE
Bo_2445 .....Y.....YFG.....TGEIAPRA
Ap_Cps5B .....LSR.....IFNL..PTIIPLVENVPKEKSKTT
Sm_Rkpz1 .....YPR.....YFD.....PETGAQTS
Sm_Rkpz2 .....YPR.....YLD.....PVTKAPIE
Sm_RkpZ .....YPR.....YCV.....GSLGSSAE
Ec_KpsC-N .....YCR.....YID.....P.....
Cs_KpsC-N .....YAR.....YLN.....P.....
Nm_KpsC-N .....YSR.....YLN.....P.....
Hi_KpsC-N .....YTR.....YLN.....P.....
Cj_KpsC-N .....YAE.....YFN.....P.....
Ec_KpsC-C .....YPT.....YIH.....PTRLQPIT
Cs_KpsC-C .....YPF.....YRH.....PTRKTPIA
Nm_KpsC-C .....YPD.....YIH.....PETHQAIN
Hi_KpsC-C .....YPQ.....YVN.....PNTGELTN
Cj_KpsC-C .....YPR.....YIN.....PKTKTLCE
Ec_KpsS .....YGG.....NTT.....
Cs_KpsS .....YCK.....DLS.....WKEMLSLG
Nm_KpsS .....YSQ.....VFF.....PNKKTSNS
Hi_KpsS .....YTR.....VIL.....PLHQDEN.
Cj_KpsS .....YKN.....
Hα6
380
Rt_WbbB .....KHIEFYSADMPG.....
Kp_WbbB .....KHLQFYS.KMPD.....
Sm_WbbK .....KHVNYYITCGDGM....
Ah_WbbB .....CHVSEYM.....
Ec_Orf3 PELIMSTVT.....PSPSA.....GELVI
SM_b20824 VKGTTKHSH.....SSFYE.....W...AFLIT.....V
Ec_Orf2 LNSLINKLKT..NRTTKIIEEDTSSN.....KDTHT
Pa_WpaF ...ISEIIKNE.....
Sf_Cps10C ASWVMQALE.....KNF.....PGITFRRSLPDEPVNPA
Sf_28220 ANWVMQALE.....KNF.....PGIAFRRSLPDEPVNPA
Ap_Cps10C LEWIEKILL.....SYFKD.....KEISYVRNIDDA.....
Nm_CseA .....
Cs_WepM FRKIINIAK.....
Bo_2445 ARSVFSMKH.....
Ap_Cps5B LPTQKDVVK.....KENTTIVNMVE.....L
Sm_Rkpz1 FEATVTAIR.....RQLDEPQSLGPPRPQWRAWGPYGLLGWRHLLTAF.....V
Sm_Rkpz2 IEQALEVLA.....RMRAEQIAA.....
Sm_RkpZ IEHAIMSLALEKNGVPRELAEGVSS.....AL.....P
Ec_KpsC-N .....
Cs_KpsC-N .....
Nm_KpsC-N .....
Hi_KpsC-N .....
Cj_KpsC-N .....
Ec_KpsC-C VEEAAEYLI.....QTPRKPM.....
Cs_KpsC-C AEEAVALLS.....ASPRRNVTH.....
Nm_KpsC-C AETAAQILI.....RQKNMQKNN.....
Hi_KpsC-C AQTAIEILK.....AQR.LALNH.....
Cj_KpsC-C IEVCLDIML.....NLQKDYFSK.....KHIKLAIDF.....
Ec_KpsS .....
Cs_KpsS EQEHITR.....
Nm_KpsS STPVI.....
Hi_KpsS .....
Cj_KpsS .....

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                    390       400
Rt_WbbB     ....SLSQAAHSLSSLINEAIS..........................................
Kp_WbbB     ....EREENSHTLSTLINEAIS..........................................
Sm_WbbK     .......RDAEMEKKASS..............................................
Ah_WbbB     .......QQDHLDPKIFDGLPS..........................................
Ec_Orf3     KHPVIKSSFKKKMIKLKNNPKK...........FF......KDSKKGYI.....RVLSNI
SM_b20824   PATMPPPPKTSRKRSNGNAQGQI..........YYGM.................PRKLTGV
Ec_Orf2     TNIVRTGAMQAKLKKLNKHPYL...........FF......KDAIKN.IGVKTKKIIINA
Pa_WpaF     ..............................IY..............................
Sf_Cps10C   SSVCVCSTNVTTFGKLHSDYVAVLDQYGEPHLRFYD..........................
Sf_28220    SSVCVCSANIATFGKLHNGYAAVLDQYGEPHLRFYD..........................
Ap_Cps10C   .NIVITDK.........................FY.SDLKFQDS..........KIYIDI
Nm_CseA     ..............LKNKIYS.................................KILL..
Cs_WepM     ..............NKHHA..............................................
Bo_2445     ................................................................
Ap_Cps5B    PKVVPQSDKNRKYQKFRNNPRQ...........FF......ADSRNPVI.....RSLMYF
Sm_Rkpz1    TAAIRKIGSDRDVEDFRADPIR...........FFRS...LSDRKYRIIG....RILYPF
Sm_Rkpz2    ................................................................
Sm_RkpZ     AEAINVDCVSQTLEGLKSIPS............................................
Ec_KpsC-N   ................................................................
Cs_KpsC-N   ................................................................
Nm_KpsC-N   ................................................................
Hi_KpsC-N   ................................................................
Cj_KpsC-N   ................................................................
Ec_KpsC-C   ..FITRKKAGRVIRYYRKLIMFC.......KVRFG..............................
Cs_KpsC-C   ..HRRRKTITRLANKARNLFHAL..........FYSR..........................
Nm_KpsC-C   .NGLHRGYFAKKLGKIKQLYRS...........FK..............................
Hi_KpsC-C   .SGIHRHWLAKQYGKLQHLVCA...........LRT.............................
Cj_KpsC-C   ........KTFMFRKIRR..............FYEF...LTEK.....................
Ec_KpsS     ..................NCQHN...........IY..............................
Cs_KpsS     ................................................................
Nm_KpsS     ................................................................
Hi_KpsS     ................................................................
Cj_KpsS     ..................................FF......LDK.....................
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Rt_WbbB     ......
Kp_WbbB     ......
Sm_WbbK     ......
Ah_WbbB     ......
Ec_Orf3     IP....
SM_b20824   TAIEI.
Ec_Orf2     KGSQIQ
Pa_WpaF     ......
Sf_Cps10C   ......
Sf_28220    ......
Ap_Cps10C   YGVALN
Nm_CseA     ......
Cs_WepM     ......
Bo_2445     ......
Ap_Cps5B    FPYK..
Sm_Rkpz1    G.....
Sm_Rkpz2    ......
Sm_RkpZ     ......
Ec_KpsC-N   ......
Cs_KpsC-N   ......
Nm_KpsC-N   ......
Hi_KpsC-N   ......
Cj_KpsC-N   ......
Ec_KpsC-C   ......
Cs_KpsC-C   ......
Nm_KpsC-C   ......
Hi_KpsC-C   ......
Cj_KpsC-C   ......
Ec_KpsS     ......
Cs_KpsS     ......
Nm_KpsS     ......
Hi_KpsS     ......
Cj_KpsS     ......
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