

Additional File 14

Alignments of fungal NOXR, Bem1, Cdc24, and CBSn-PB1 amino acid sequences.

To describe species of sequences, we used the following naming: Mg (*Magnaporthe grisea*), Fg (*Fusarium graminearum*), An (*Aspergillus nidulans*), Sc (*Saccharomyces cerevisiae*), Ca (*Candida albicans*), Y1 (*Yarrowia lipolytica*), Sp (*Schizosaccharomyces pombe*), Cc (*Coprinopsis cinerea*), Lb (*Laccaria bicolor*), Pp (*Postia placenta*), Pg (*Puccinia graminis*), Pb (*Phycomyces blakesleeanus*), and Bd (*Batrachochytrium dendrobatidis*). Gray boxes indicate predicted PB1 domains. Red and blue letters indicate the amino acid residues corresponding to the K355 and K382 of PB1 domains of human p67phox and four acidic amino acid residues (D289, D291, D293 and D302) of OPCA motif of human p40phox PB1 domain, respectively. Asterisks indicate identical residues.

PB1 domains were identified by Pfam search program

(<http://www.sanger.ac.uk/Software/Pfam/search.shtml>).

Alignment of fungal NOXR proteins

Fg-NOXR	MSLKQEIETWVAALGRYDNEFEEALNEFGKIGDT-----SKILFNMGVIHATLGEHE	53
An-NOXR	MSLKQEIETWVQALEHFDNQEYDLALRSFAAIADT-----SKILFNCVGIYATLGEHE	53
Mg-NOXR	MSLKAELETWAAALKAYDEEDFEKSLDLFSRIADS-----SKILTNIGLIYATLGEHE	53
Lb-NOXR	MSLKAELETWAAALKAYDEEDFEKSLDLFSRIADS-----SKILTNIGLIYATLGEHE	53
Cc-NOXR	MSLKAELETWAAALKAYDDQDFDKALQLFSEIADN-----SKIHTNIGLIYATLGEHE	53
Pp-NOXR	MSLKAELETWASALKAYDEENFDKSLQLFSEIGDS-----SKILTNIGLIYATLGEHD	53
Pg-NOXR	MSLKAEIETWATALELYDQQNFDDALAAFEDIADS-----SKILFNIGLIYATLGEHE	53
Pb-NOXR	MEFKLELDQWLNACAAFDSDKYETAVQSFLSMADN-----AKMHFNIGLIFAIEDDHQ	53
Bd-NOXR	MALKEQLAQWASKALDYWDTNDFFGAYEQFVSFADF-----AKIHYNVGMCMARTRNLD	53
Y1-NOXR	MLTLQQVVTWLGVELYSKGDYAPALKQFNQLINSPEYSGEVSKVAHNIAAIYYKMEDHE	60
	* * * * *	
Fg-NOXR	KAVESYQRAIRLDQYLAVAYFQQGVSNFLGDFEEALANFNDDLLYLGRN---AMI----	106
An-NOXR	KAVECYQGAIVGLDQYLAIAFYQEGVSNFLGDFEEALANFNDDLLYLGRN---TYI----	106
Mg-NOXR	AAVQRFIEATNFDQYLAVAYFQCGVSNFLARYELAYKDFEEALLYLRGN---QAI----	106
Lb-NOXR	AAVQRFIEATNFDQYLAVAYFQCGVSNFLARYELAYKDFEEALLYLRGN---QAMYVVF	110
Cc-NOXR	EAVKHFIEATGMDQYLAVAYFQCGVSNFLQRYELALKDFEEALLHLRQN---QTMNVS	110
Pp-NOXR	AAVEQFTAATQLDQYLAVAYFQCGVSNFLGRYETSLRDFDALLYLRGN---GDI----	106
Pg-NOXR	VAIENFRTATSLDQYLAVAYFQCGVSNFLGMYYEAVKDFEDALMYLRGN---LTI----	106
Pb-NOXR	RALAAYSRAISMDAYFAVAYFQKGVSNFVMNMEAMHDFDNAYQRLRGNEMIN-----	107
Bd-NOXR	EATIAAFSRAITLDEYLSVAYMQIGICQYHMGFEALANFEESFKMLRGN-----	103
Y1-NOXR	RATKWFVTALQKDPYLCITHFVLFQCLFEQEKYSEAAKEWDKCLEYMRGN-----	110
	* * * * *	

Fg-NOXR -----DYAQLGLLFLKLYSCEVLFNRLGCLYIYLQQMDAGMQDFSYAVKE-K 150
 An-NOXR -----DYEQLGLKFRLYSCEVLFNRLGCLYIYLQQIGPMQDLEYASKE-K 150
 Mg-NOXR -----NYEQLGLKFRLFSAEVLFNKGLAQIYMGRAQEGGLADMEEARRE-K 150
 Lb-NOXR MVEPYLPYSSIPAHRNQEQLGLKFRLFSAEVLFNKGLAQIYMGRAQEGGLADMEEARRE-K 169
 Cc-NOXR DDG-----LNSNYEQLGLQFKLYSAEVLFNMGSLIFMGQIEMGLQNFEEARRE-K 160
 Pp-NOXR -----NYEQLGLKFKLYSAEVLFNKGLAHIYMGQVDQGLAELQEARKE-K 150
 Pg-NOXR -----DYSQLGLKFRLYSCEILFNKGLSLIYQGAEAEGMIDLQEARKE-K 150
 Pb-NOXR -----YTQLGLAFRLYACEVLFNRGVCQLYLGLKIDAGLTDLYHAQKA-K 150
 Bd-NOXR -----FFIDYTLQGMFQVAFACHAIFNIALCHLQRGDTERGVRVYISEAIIKA-V 150
 Y1-NOXR -----TWINYQPLGLNFTLYSCEVMFNKSMAKIYSGDILPGVSDLSRAGKEHK 158

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Fg-NOXR VVEDHNVIDDAINEQAEGY-----TVFSIPVGVVYRP---NEAKVRNLKTKDYLGA 199
 An-NOXR YRSR-----LTPQGY-----TVFSIPVGVVYRP---NEAKVKNLTKDYLGKS 191
 Mg-NOXR ATDEHNVIDDAIQEREGY-----TVFSIPVGVLYRP---SEKCLKNSMQKDYMGKA 199
 Lb-NOXR ATDEHNVIDDAIQEREGY-----TVFSIPVGVLYRP---SEKCLKNSMQKDYMGKA 218
 Cc-NOXR ATEDHNVIDEAIIRDQGRGY-----TVFSIPVGVLYRP---SEKCLKNAVQKDYMGKA 209
 Pp-NOXR VTPEHSVIDDAIADRGDGY-----TVFSIPVGVLYRP---AEKCLKNAKTKDYMGKA 199
 Pg-NOXR QTAEHSVIDDAIADRAEGY-----TVFSIPVGVLYRP---AMSKVKNLASKNYLGQA 199
 Pb-NOXR MTEEHVIDQAVRDRGRGY-----SVFSIPVGVLYRP---SEARMRQLQANMFAAV 199
 Bd-NOXR PVDSDVFPDIADIEEAERLGENAADTIMPYEVPVNLVFRP---QEDNLRNAERVDYLGQS 207
 Y1-NOXR WSADHNRIKAYIYFNAIKDSLHRATHHTKQSQNDGLQRSKLSRSKSNLRSKSLARS 218

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Fg-NOXR RLVAASDRANAFTGFAGSEIKNAGKLEVKDDRPADNISFAATNLVKPGLSSR-RQQSEPP 258
 An-NOXR RVIAANRLSTPAD-----TSQRSVDSVPPFATSHLVQKNLTSRSRQQSEPP 236
 Mg-NOXR KLVAASDPNDIFTFTGSTR-----LKQGISPSGVFIDRPDIESAVIPSVTRSASVPS 252
 Lb-NOXR KLVAASDPNDIFTFTGSTR-----LKQGISPSGVFIDRPDIESAVIPSVTRSASVPS 271
 Cc-NOXR KLVASSDPDDKITTFVGSAR-----LKMGISPAGIYIDRPDIDTPAGAASRSATVPA 262
 Pp-NOXR KLIATEDASEAFTEFTGVAR-----MRQGVSPGTATDFGP-----GGLQRAATVSN 245
 Pg-NOXR KLVAATDASETFVGTGSAR-----AAAKTTTTGPVMSTPIEQAPMPPAPGMLRRGTV 252
 Pb-NOXR DKLSLPNKNFKTALTSIQRNNSILLPDARFQKRVPGAQAAPRQVQPPVSSLAEHGMRA 259
 Bd-NOXR KVVASVNATDNYTGFSG-----KLTRDLTLLSRSKKDDANSGAKEAALKS 253
 Y1-NOXR KSMKHKQQLQDNIRNRSSMG-----FGANYTNTFDVSAEKEAKQLAQSSGNVG 270

Fg-NOXR NGRNVFPPTPPPENERPSRAASVRN-----QKPQLAK-----LNIQQAEPN- 299
 An-NOXR MHRNLFPTPPDADKASLSTGSNGTVRAQPGKAQRPPKLD-----LDRPGAQPA 288
 Mg-NOXR STAPSRQPADGVRLAGVERSRTAMNPPQSAR-LASNKGPPPR-----PPMSAGASIGRS 305
 Lb-NOXR STAPSRQPADGVRLAGVERSRTAMNPPQSAR-LASNKGPPPR-----PPMSAGASIGRS 324
 Cc-NOXR SYPASRPAESIRSAGLERSKTTINVPSNARALTSPQSLSPSSR---LPPVSSAGALGRS 319
 Pp-NOXR PTPPP-KSDDYVRSALQRANTTIN---VSVDRFRSNPASPAS-----PATSPGSGPPS 295
 Pg-NOXR ATAGSGMGDGLPGAGMLRRGTSAAITPMMPSSSSGDSPTVG-----IIRRGTTAAR- 304
 Pb-NOXR IARESSRPMATHIYTDQLPPTPVSSVSHYPRKQNTQYSPIERQRNDSNAGSFSTEE 319
 Bd-NOXR PASFSAAQTTIAQNTIRVNRKPSVTSISREPIQEGYEQTIT-----MSRSNSATTS 305
 Y1-NOXR PVGLGIRQSPSMRGSANRSPNPNNGGTPNLGRSQTLGGG-----GHTQSSQLHRS 323

Fg-NOXR RRYEKAASPAD-----ARRPMPRSASTTRTPLQRE---PPPLQLRPKQ----- 339
 An-NOXR RSTTDLTAPEK-----PRLGTIRTASEPRGQSRQPRGYAPERHVRSSDGYGHRRGASD 341
 Mg-NOXR NTNITPSRSPNATIGGPVVRGLSVRRPGNASPGNSSPPRAPPKDDARLTFEYDDYLDYSY 365
 Lb-NOXR NTNITPSRSPNATIGGPVVRGLSVRRPGNASPGNSSPPRAPPKDDARLTFEYDDYLDYSY 384
 Cc-NOXR NTQITPGRSPSAGMGGPSRVRHPSFPDRIHADMTKADLPDVPAPERITFEYDDYLDYSY 379
 Pp-NOXR APALS--RNASFAGRMQPTRGLSIRKPGTDAP-----PPSTRGMRTTEFYDYSYLDYSY 346
 Pg-NOXR -IESTAARPAP-----VPTNNDLRRRPSEAGSTARLNRSATASSGSKPTSRLAPMAEQRE 358
 Pb-NOXR WADSPHPSISSTSSFSLSLRQADGRRVDSGFESTHEERYSSSSGRSSTKSHKANRYSPP 379
 Bd-NOXR RKYIPRRLSSN-----NISANTIPGASRVPGTLSRAPSAPLSREGSG----- 347
 Y1-NOXR QTTGHAHSVAEHPSSANVHRSQSTRAPVTGTSTTEVDLPSTVKMARMNETYKIYQISSE 383

Fg-NOXR --IPEETGSPEDVYAMYSATDGYRNSRGSAGSRRLRPQQYSEED----ASDYEGTINEN 393
 An-NOXR HGFVSNHSDDAYGMYGEARAMLANG---GRPFQQQGYIDEEYESSPCDEDLVPA 398
 Mg-NOXR GDAPIPPIAQP-GPDRIAAWARTNANPNYPLVRSGRSAPTSQYTPSSYGGGSLRRKVT 424

Lb-NOXR GDAIPPIAQP-GPDRIAAWARTNANPNYPLVRSGRSAPTSQYTPSSYGGGSLRRKVT 443
Cc-NOXR DQPPVPQLSAPPTADRVATWARQTPAYPAGVARSTRSAPNSQYAPSSYGGG-SMRRKPT 438
Pp-NOXR DAP----SALPPVEARPAPAAVRRAP-----SRARAAPQSTYS-----NGSVRRRPT 390
Pg-NOXR PEKSPRYGSRTRGSLGTESYEDYEDNEPAVPSRSGGSEDRTTNWARNLSTSGSSSGRNR 418
Pb-NOXR PVPPIPHNASYEGDTSANYGNFDLEMYGSLPTIDTQDNKQDRVRPRLNSNNTAPLEDD 439
Bd-NOXR --SGQQLFPLRLTRSAGGSSRMGLGDTQNNVDTAAERLNSLTINNNDLPASPAIKLTTS 405
Y1-NOXR FCLFSIHDNRLKNI VGEQMASLLRGKDKEISSGGGVV GASSPPPEDSTEFVSVESVGRS 443

PB1 domain

Fg-NOXR DF-EMIGQRRGPGSVS---GSRNSRR-----TEVTKIRVKVH-ADEVKLIMITPDTR 440
An-NOXR SF-ELMGSRPRARSCSRGPARGYSRR-----PEVRRFRVKVHSFEDTRYILIPPTIE 449
Mg-NOXR KR-NNPRAPSRVQSTYEEEEEGYVSG--EYEDGPFELTLIRVKLHYQDDTRGMTLTPDTP 481
Lb-NOXR KR-NNPRAPSRVQSTYEEEEEGYVSG--EYEDGPFELTLIRVKLHYQDDTRGMTLTPDTP 500
Cc-NOXR RR-ATSRQQNRIGSTYEEEEEGYVSG--DYDDGPFEMNLIIRVKLHYQDETTRGMTLAPDLT 495
Pp-NOXR RR-GTVR--SRYE---EEEEEGYSGEYEREEDGFVKIRVKLHYADDVRGMALSPGMP 444
Pg-NOXR DP-PAVRRPPANSPYDDPPSDAEYPETVMSGGYAEMTKIRVKLHYGSDTRGMLS--HAM 475
Pb-NOXR RRGNDQINNNDYSNIRAHPPQPTASVSTPTLKEGSINTKIRVKVHYTDTR-ILLVPHIT 498
Bd-NOXR NR-----SNVSTDSIRVKCHYIESR-FIVVPINIS 434
Y1-NOXR DDVDDIYDIDDYGTTPASTGQRSANQSVNRSGGSIKSNAAATVATGSPPARSKPTPIDVD 503

Fg-NOXR FETLSDKVRDKFNKRR-FKIKVKDDMPNGDMITVGDQDDLEMVDSVKDEARKQRTET 499
An-NOXR FAEFETRIREKFGFQMA-LKIKMQDE---GDMITMVDQEDL DLLMASREIARREGSEM 504
Mg-NOXR FADFMDKVTAKFGKQINGLGLKFKDED---GKVTLRDESDYELAIETARESAKGPPEG- 537
Lb-NOXR FADFMDKVTAKFGKQINGLGLKFKDED---GKVTLRDESDYELAIETARESAKGPPEG- 557
Cc-NOXR FNEFIVKITA KFNKSFSGLGLKFKDED---GKVTLRDESDYELAIETARENAKGRAGK 552
Pp-NOXR WEEFLERVTKFGRELDGLGMKFKDED---GMVSLRDEMDYELAIETAREQAKGPPEG- 500
Pg-NOXR IRGFLGKSDQEVFLKSRSSGDEIQGRE---GSMVSIIMDDDWESAVETARSYAKGRAEG- 531
Pb-NOXR FNELLGRVREKFGAPPS-TRLQYKDEE---EEMVLMIDDDDLHLVRQTSRQKHGDFGVE- 553
Bd-NOXR FRDLRERVSAKFG-VQGLLSLKYKDEE---EFMTMVNDDDLDEAVAVSAQG----- 482
Y1-NOXR LAREMRKVSFDSSLSTPKLNKLVDKIQGTTTRDSVSSVSDSIHAPKATKHRVQINYIRPVT- 562

Fg-NOXR G-----KMEI 504
An-NOXR G-----KMEI 509
Mg-NOXR -----RLEI 541
Lb-NOXR FFDSFSLTH-----CFLIEMGLGGRKIKQRI PDDPRNLS 591
Cc-NOXR LEICSSLYYGQYKRKLGKLVVLRVHRSKANQLCLDSNMGLSGRKVKQRI GNDPRNLS 612
Pp-NOXR -----RLEI 504
Pg-NOXR -----KVEI 535
Pb-NOXR -----KIEI 557
Bd-NOXR -----RLEI 486
Y1-NOXR -----AKVCS 567

Fg-NOXR WILQL----- 509
An-NOXR WVEERRMI----- 517
Mg-NOXR WCMDL----- 546
Lb-NOXR WADDAARFGSNYLSKFGWDASQGLGVDGEGRTSHIKVSHKLDMLGIGAAHQKDPNGIAWK 651
Cc-NOXR WADDAARFGSNYLSRFGWDASKGLGAE GEGRTSHLKVAKLDMLGIGAAHQKDPNGIAWK 672
Pp-NOXR WCTDE----- 509
Pg-NOXR WVEDAGFL----- 543
Pb-NOXR WCVT----- 561
Bd-NOXR WCFLLDPPK----- 495
Y1-NOXR FVAEECSSDPTPIPTIPVKKKAVKDYSTRSPYPSVASSSYEDTTSWKS LPLLPNDHA 627

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR QNKDFENLLKRLNEN-----ATEIVDGKEEQ 677
Cc-NOXR QNRDFENLLKRLNAAGGEGGAIEVVKTEVSGFVSSTKEVQVEVKKEEKEKEDEMVDDEKK 732
Pp-NOXR -----
Pg-NOXR -----

Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR AHKTDQRLRELR-----ERDRREIRDGFIDR 653

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR DVVKEETPKKKRKQKGDEEKDTKKR-----RKTEDSSPSADEVVPDSLADP 725
Cc-NOXR ERKKEKKEKDKKDKDKDKDKGKRKRSEVDGDEESGSQKKMKTEEASPTPQSSDSTPSEQ 792
Pp-NOXR -----
Pg-NOXR -----
Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR DTGMTPPQSHQFDPTNTVAPGRSRNTKFLTVDLDDPNHQGNNGRSKSPGSPMSPFILVT- 712

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR APVRVAPRYRAHRARATAAKSITSKSAAAISEILGIAPSSGLSVTTTQ-----TTGK 777
Cc-NOXR PKKAFVPRHRAHRARAIAAKSISMKSSTHISEILGIAPESSTTSAASGSISPAPPDQGK 852
Pp-NOXR -----
Pg-NOXR -----
Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR -----

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR LTSLTDDA-TIEKLTTSTKSVADYFKEKLLVRA-----TQSESTTPISEQDA 823
Cc-NOXR LTVISEDVPELEKITTTSTKSVADYFKERLLAKANAKAQSSGSSASTPQPSATKDEEMDEA 912
Pp-NOXR -----
Pg-NOXR -----
Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR -----

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR YDLPRSLGSGRARFEIQEDDSEMG-ARRVGLSKFSSLMSSQFLAATSTLSTPPEKTQSE 882
Cc-NOXR EEKPRGGLGFARVQWESQESTSVQSDTLRMGLSKFSSLMSTFLS--STFSSSTSESTSP 970
Pp-NOXR -----
Pg-NOXR -----
Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR -----

Fg-NOXR -----
An-NOXR -----
Mg-NOXR -----
Lb-NOXR DVATTQLDMVEEQTSEEKRRKKKDKDEKKEKSKDKVTRTEVKDPDTLQTASLDDVDR 942
Cc-NOXR ATEEKKETGEEDEKETEEQRKERKRLKKEEKARKKAEKEKRKAACAATSEAKGGDAED 1030
Pp-NOXR -----
Pg-NOXR -----
Pb-NOXR -----
Bd-NOXR -----
Y1-NOXR -----

Fg-NOXR -----
 An-NOXR -----
 Mg-NOXR -----
 Lb-NOXR KARKAQRKAIEKKARKAAENNLH 964
 Cc-NOXR AGKEREKESKSKKSKKEKKT- 1051
 Pp-NOXR -----
 Pg-NOXR -----
 Pb-NOXR -----
 Bd-NOXR -----
 Yl-NOXR -----

Alignment of fungal Bem1 proteins

Sc-Bem1	---MLKNFKLSKRDSNGSKGRITSADIS-----TPSHDNGSVIKHIKTVPVRYLS	47
Ca-Bem1	---MIKTFRKSRRSSNS-----SSPKKTTIS	23
Mg-Bem1	---MKALRRS IKGDKDKQPQ-----	17
Fg-Bem1	---MKALRRS IKGDKDKGP-----	16
An-Bem1	---MKALRRSLKGEKDSKPHHHHQ-----	21
Yl-Bem1	---MIKGIIRSLKGEKTTSSGSAN-----	21
Sp-Bem1	---MLKIKRTWKTHS-----	12
Cc-Bem1	---MKSLRKS L NGNKDSS-----	15
Lb-Bem1	---MKSLRKS L NGNKDSS-----	16
Pp-Bem1	---MKTLRKS L NGHKDNS-----	15
Pg-Bem1	---MKVLRSLHKEKDRSTSTSSPTKPDFNSHLLPPLSAKHNSKQQQQQQQQQQQQQ	55
Pb-Bem1A	-----	
Pb-Bem1B	MNLKEKVKPPRSRSLRSTRLSVVKN-----	23
Bd-Bem1	-----MSPELPHRGHLTVAPVR-----	17
Sc-Bem1	SSSTPVKSQRDSSPKNRHNSKDI TSPEKVIKAKYSYQAQ--TSKELSFMEGEFFVYVSGDE	105
Ca-Bem1	RVSS-----TSSNQTSHDG--ILQSPKKVIRALYDYEPQ--GPGELKFFKGDFHVLDDV	74
Mg-Bem1	-----ISIAPKSAVAIVPPKKVIRALYDYEQAQ--STQELSF SRGDFHVI GRE	63
Fg-Bem1	-----VTPKSAVAIVPPKKVIRALYDYEAR--SSQELSF SRGDFHVI GRE	60
An-Bem1	---HHHQQHHLSTIPKSAVAI LPPKKVIRALYDYQPEPGNTQELAFSKGDFHVISRE	77
Yl-Bem1	-----SLVSDKNPLHTNPPKMVIRALYDYEPQ--GPGELSFCKGDFHVISNE	67
Sp-Bem1	-----RILDKDPFSIEPPRKVIRALYDY TAR--KATEVSFAKGDFHVI GRE	57
Cc-Bem1	---KLQISTPLPIPTMSKPPSAILPPQKVI RANSSYKSQ--APQELSFQKGDFHVLKDA	70
Lb-Bem1	---KLQISTPVP IPTISKPPSAVLPQKVI RALFNYSRQ--APQELSF SKGDFHVL RDA	71
Pp-Bem1	-----PSITTLPLRLSKPSGAVLPSPKVIKALQTYKAN--APQELSF EKGDFHVLNDV	67
Pg-Bem1	QPTQPFASLAAGNHNL TNPRSIGKPPTLV IKAITAYKSN--RIVELSFQKGDFHVVGER	113
Pb-Bem1A	-----SLAAPKKI I KALYDYQAQ--GPDEL SFSEGDFYHVTARE	37
Pb-Bem1B	-----KISTPINFQQSAITPKIVAKALFDYKAQ--TQREISFHQGDYFHV DKT	70
Bd-Bem1	-----GSSHPASIFNLPPKKVVRANANYTAR--FAGELSF AKGDFHVI NER	62
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Sc-Bem1	KD-----WYKASNPST--GKEGVVPKTYFEVFDRTKPSSVNG-----	140
Ca-Bem1	DDELHKEAEANGWIEATNPMT--QLKGMVPI SYFEIFDRSRPTVTAS-----	119
Mg-Bem1	NDTD-----WYEACNPALPDARGLVPVAFQALGRTERDSAQSDTSVTRTS-----	109
Fg-Bem1	NDDD-----WYEACNPALPDARGLVPVTFQALGRTERDSAQSDGGQP-----	103
An-Bem1	DDSD-----WYEACNPLIPTARGLVPVTF FEVIGKTQRDSSGS-----	115
Yl-Bem1	QDSE-----WFEAFNPLR--NVRGMVPVPYFEVLGKKEGITS PDPNEALLPEERKALH	118
Sp-Bem1	NDKA-----WYEVCPNAA--GTRGFVPVSHFEEIGKT VKS-----	90
Cc-Bem1	EGS-----AWYEAHNPVT--GARGIVPRAMFEEF GKNAPPVRHS-----	107
Lb-Bem1	DDVG-----TWYEAHNPVT--GARGIVPRNMFEEFNKNIAXTF FDSALRLWYL-----	117
Pp-Bem1	NNEG-----WYEAHNPAT--GARGLVPCHMFEEFGR-----	97
Pg-Bem1	DDHEG-----SWFEASNPAT--GARGIVPKDCFELFGRKQNELPSTTPTATAFP-----	160
Pb-Bem1A	NDSK-----WFEACNPAT--NTKGLVPVAFQVLDKAERN-----	70
Pb-Bem1B	N-PH-----WFEAFNPVT--HAKGIVPVNYFQILEKNDTP-----	102
Bd-Bem1	PDGLN-----YEVINPIQ--RIRGIVPTSHFASLDKVVQEEANARNPDYNGDDQNNYGY	113

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Sc-Bem1 -----SNSSSRKVTNDSLNMG----- 156
Ca-Bem1 -----SNSFTNSIDIQHQQG-----IHNGTGNRNL 146
Mg-Bem1 APVPSKNDH-----DSGYAETSAPVPSTPGFS-----NRDSKS-GKSG- 147
Fg-Bem1 -PSPPKNDH-----DSGYSESPAMHPAPAVMSPTTNSAPQGHQRNSKSVGKTG- 151
An-Bem1 IDLGKKKEPH-----DSGFADRATSSGSEFGSGSSKSYQSHPAFPRTSMGKAGG 165
Yl-Bem1 RSSQSKHAQHSPQHVLANGLDVSQSMQNL SLGGASGGGHTREPSMAGASDRSSQGKST- 177
Sp-Bem1 -ERSDSGSQ-----ISFTDLTNSSTT-----RSSISELHSGS 123
Cc-Bem1 -----QFSTPGGGGFKSMHLP-----GSGSAPSPTPK 135
Lb-Bem1 --IPS-----PLRVRTSQVGPRTALPSP-----SRPESSIPTPK 150
Pp-Bem1 -----GPSKRVAD-----AGADRPLSTVK 118
Pg-Bem1 --PRSSAPGYQ-----SSANNPPGSPLLVVRTPLS-----AEPFRQSHPSK 199
Pb-Bem1A -----LVAQPLNDLNIKSDSGFSDSADTMLPTPSK 102
Pb-Bem1B -----NHLGDPT-----RTETQLP-PVKK 120
Bd-Bem1 TDDGYDDSYNN-----HHTSDPYGQPNNNYMGNHGRSPLSPASPGSNQAHGISASGSGR 169

Sc-Bem1 --SLYAIVLYDFKAEKAD-----ELTTYVGENLFICAHNCEWFIKPIG----- 199
Ca-Bem1 NQTLYAVTLYEFKAERDD-----ELDIMPENLIICAHHDYEFIAKPIIN----- 191
Mg-Bem1 -AMVYGI VMYDFAERAD-----ELQAQAGEAII VIAQSNPEWFAKPIG----- 191
Fg-Bem1 -AMVYGI VMYDFAERAD-----ELEAKAGEAII VIAQSNPEWFAKPIG----- 195
An-Bem1 GAMVYGVVYDFQAERPD-----ELDAKAGEAII VIAQSNPEWFAKPIG----- 210
Yl-Bem1 -PTLHGVLVYDFQAERPD-----ELQASKGDNI I IQAQSNHEWFAKPIG----- 221
Sp-Bem1 -QPLFGIVQDFDFAERPD-----ELEAKAGEAII I IARSNHEWFAKPIG----- 167
Cc-Bem1 HQVYIAI VMHDFSAERPD-----ELDAKRGDAITVVAQSNREWFAKPIG----- 180
Lb-Bem1 TQVFYAIVLHDFVAERAD-----ELDAKRGDAITVVAQSNREWFAKPIG----- 195
Pp-Bem1 QQAFYAI VLVHDFTAERAD-----ELDAKAGDTITVVAQSNREWFAKPIG----- 163
Pg-Bem1 TQPLYGIVQHDFVAERPD-----ELDAKRGEPI I VIAQSNHEWFAKPIG----- 244
Pb-Bem1A TSHLYGVVLYDFQAERSD-----ELNAKEGEPI I VIAQSNPEWFAKPIG----- 147
Pb-Bem1B MQPLYGVVLYDFQAERFD-----ELDARAGESILVIAQSNVEWFAKPIG----- 165
Bd-Bem1 GDKQLVSVLVQRSEQRDDGLWVFTVELKMTDNSSNILFRTYDDFWILQVSLLNHFPSSEG 229

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Sc-Bem1 RLGPGPLVPVGFVSIIDIATG-----YATGNDVIEDIKSVNL--PTVQEWKSNIARY 249
Ca-Bem1 RLGPGPLVPVSVYKIIDLLNPNSHYTSIDTSRRSQUIVINGFNI--PTVEQWKNQTAKY 249
Mg-Bem1 RLGPGPLIPVSFIEIRDMSANT-----PVDP--EGAVRRAGI--PRVEEWKMAAEY 240
Fg-Bem1 RLGPGPLIPVSFVEIRDMSDK-----AIQNP--GDAIKRAGV--PKVEEWKMAAEY 244
An-Bem1 RLGPGPLIPVSFIELRDMQSGQ-----AVADP--LEAVRRAGV--PKVEEWKMTAEY 259
Yl-Bem1 RLGPGPLIPASFIEIRDIVTGK-----AVDV--ESALRASGL--PKVEEWKMAADY 270
Sp-Bem1 RLGPGPLIPLSFIQLRDLKGTGA-----VIKDV--SEAVLRISCI--PRVEDWKRAADY 217
Cc-Bem1 KLGRPGLIPVSFVEIHDPTTGA-----PIVD--V-DALIDRGDL--PKVEDWKRAMLY 229
Lb-Bem1 RLGRPGLIPVSFVEIHDPTGK-----AIPD--V-QGLMDRGEL--PKVEDWKRAMLY 244
Pp-Bem1 RLGRPGLIPVSFVEVRDPATGL-----AVQD--I-MALIDGGAL--PRVEEWKRAMLY 212
Pg-Bem1 RLGPGPLIPVSFVEVDVNTGK-----ALAPNV--QDLIRSSV--PAVEEWKATAAY 295
Pb-Bem1A RLGPGPLIPVSFVQVRDAVSGQ-----IITVNSN--LRQTSSNFI--PNVEEWKMTQGY 198
Pb-Bem1B RLGPGPLIPVSFVEIRDALTGH-----TITSSQ-----PSNPL--PRVEEWKRMTMGH 211
Bd-Bem1 RLDQPRTIPLPTPRTLTPPEQAQRHQLDSYMQELIKLPSHIMNAPSVKRFLMVRSGD 289

* * * * *

Sc-Bem1 K-----ASNISLGSVE----- 260
Ca-Bem1 Q-----ASTVPLGISGSGTPPT----- 267
Mg-Bem1 K-----NSSITLGKFEVGGAPQQ----- 258
Fg-Bem1 K-----NSSITLGKFEVGGPQPG----- 263
An-Bem1 K-----NSSISLGKIETTGSMS----- 277
Yl-Bem1 K-----ASSIALGNFDDPQQHSQ----- 289
Sp-Bem1 K-----KSSIPLGKFS--GETQTM----- 235
Cc-Bem1 K-----QNSISLGVIDPPSRG----- 245
Lb-Bem1 K-----QNSIALGVIDPPSRG----- 260
Pp-Bem1 K-----ANSISLGVLEESVAAN----- 229
Pg-Bem1 K-----GNSIPLGKFDAATSPMP SATNGGSFNHPTSSRSASTSHTRQPSGAGYD 346
Pb-Bem1A -----EASSIPLGRIDKQPQQQLQT----- 219

Pb-Bem1B DNPEKLNHPSSSALYYAPNTIDTFSRIPTH----- 241
 Bd-Bem1 LDTPMNIREFDVSETLLDLLTEYQEEADLR**K**LVLG----- 324

(PBI domain of Bd-Bem1)

Sc-Bem1 -----QQQQSITKPQNSAKLVDG----- 280
 Ca-Bem1 -----SANSQYFDNHTMTSNRSSSGS----- 288
 Mg-Bem1 -----QAIEQGMDR-MSLQP--TDSR--SSQGQLNGKLQ--A 289
 Fg-Bem1 -----QGIEQGMR-MSIQQQ-QHSRQPSQNGTQSGYASQ--P 297
 An-Bem1 -----VTSGMER-MSVRQSADHVSQNGHANAYHNRNAS 312
 Yl-Bem1 -----QALQHALRGQQTLEHQVQQEHQTLQERQSLQEQ--A 325
 Sp-Bem1 -----PSLSPSTENLQINNDVTYQAATDNSSTFPQSVANELTP 273
 Cc-Bem1 -----GPPTSPFLS--TMAEPMPPREPEPP----RP 271
 Lb-Bem1 -----SVQSNYSYPREDYQSPPPQAASEPA----RA 288
 Pp-Bem1 -----FAKAQATKQMPPLPTATPPPSQPQPVKQKPPSPISRP 267
 Pg-Bem1 RPPSGRGPQHGSWHGAGGDPSSAYDHSRQSSANTPWNPNTSYNSRQSPTQQGRDYQDEP 406
 Pb-Bem1A -----QQSQSQFQSPIQDTINEGRSVKSGSSCPTHRLPSEEY 256
 Pb-Bem1B -----NSVNTLLGSSNAGSGAGGSASASASAGAIITTAEQIA 278
 Bd-Bem1 **-EEIICWKEPDYISFEELMYHAEE****R**LEFRFQALMY**K****D**CE**Q**LIPLR**S**NT**D**LRLLV**T**TL**S**K 383

Sc-Bem1 -----ELLVKASVESFGLEDEKYWFLVCCELS----- 307
 Ca-Bem1 -----SISIEASVDSYQLDHGRYQYSITARLN----- 316
 Mg-Bem1 MQPQNAYPTP-----KPSTQLYAPVQASIPRYCAEEKYWFVIEAILE----- 332
 Fg-Bem1 RTSQQPQPHQSQV--QKPAAPLHAPLEARIPRYCAEDKYWFVIEAVLE----- 344
 An-Bem1 KASIAPSTHQQP--PHSQQLVAPIAASIPRYCFDNDKYWYIEVKME----- 359
 Yl-Bem1 LREQALREN-----YAAPATGPLVVAASVESFALHSGRYWLVNAELE----- 369
 Sp-Bem1 LQTLESRTASIASKNKDMSSSEPTVVAAMVENYMRDDQYWYLVRVMS----- 322
 Cc-Bem1 QTPECLPEG-----ILLSADVVSFHYEMEEYWFRVDAIFQPYSSPGSGQLP 317
 Lb-Bem1 QSPDILPEG-----ILLSADVVSFHYEMEEYWFHQN-----VLP 322
 Pp-Bem1 ISPKLLPEG-----ILLSADVVSFHYEMEEYWFRIHAVFQPYDPSDHSPLP 313
 Pg-Bem1 YPPQSGPEGDGYATVDELREYGVVVHASVESFHFEGHYWFHLRAHFSRIS--EDGRDE 464
 Pb-Bem1A LSRHNSTSRRTATADGTQHTQAVVSAVIDSFIEGQYWFVYTRLS----- 305
 Pb-Bem1B QEIGNLSIGPRDNRD--NTRSRVVAATVDSYVPEGDQFWFIVFAQMS----- 324
 Bd-Bem1 **KLTFYGSKKSSNRLNGR**TSDPASTVRTASQLTMQLESANSNTTVPTLN-----IADS 436

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Sc-Bem1 NGKTRQLKRYQ-----DFYDLQVQLLDAPFAEAGKLRDAGGQWSKRIM 351
 Ca-Bem1 NGRIRYLRYQ-----DFYDLQVKLLELFPYEAGRIENS----KRII 355
 Mg-Bem1 DGRKYELSRYYE-----DFYDFQIALLTEFPAEAG----NTGTQKRTL 371
 Fg-Bem1 DGRQWELSRYYE-----DFYDFQIALLTEFPAEAG----NTGTQKRTL 383
 An-Bem1 DGRCWELSRYYH-----DFYDFQIALLTQFEEEAG----NRG-KPRTL 397
 Yl-Bem1 DGSRRRLCRYQ-----DFYVFQINLLGVFEEAAG----HND-QPRLL 407
 Sp-Bem1 DGKHRNLCRYE-----DFYDFQIALLTQFEEEAG----RND-ERRVI 360
 Cc-Bem1 PAKQLILFRVYE-----DFYEFQVTLRLTFPREAG----QQPPHPRVL 356
 Lb-Bem1 PAKQLILFRVYN-----DFYDFQVSLLDNFPREAG----REPPHPRTL 361
 Pp-Bem1 PAKQLVLFVRSYN-----DFYDFQVEILNAPFHEAG----RPDVNTRIL 352
 Pg-Bem1 QTTVLVLYRLEY-----DFYDFQIALLTQFEEEAG----DEDGAP-NL 502
 Pb-Bem1A NNTHRILYRLEY-----DFYDFQINLLNDYPVEAG----KAK-RERIL 343
 Pb-Bem1B DRRHRVLYRLEYALNVHAFVCLGGLRTDFYDFQVTLQDYPVEAG----KTG-KPRIL 378
 Bd-Bem1 VNSTTGAVQVSE-----NRVNQDTPVGSLSASAGQG-IRMARSLPRTI 479

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Sc-Bem1 PYIPG-----PVPYVNSITKKR---KEDLNIVYADLVNL---PDYISR 389
 Ca-Bem1 PSIPG-----PLINVNSISKLR---REKLDYYLSNLIAL---PSHISR 393
 Mg-Bem1 PYMPG-----PVNYVTDAITEGR---LHNLDAYVKNLLAQ---PTYISR 409
 Fg-Bem1 PYMPG-----PVNYVTDAITEGR---LHNLDAYVKNMLNQ---PPYISR 421
 An-Bem1 PFMFG-----PVAHVTDATSDGR---RHNLDYIKKLLAM---PPHITR 435
 Yl-Bem1 PFMFG-----PLTYVNSISMQR---RHNLDYVRKLMAL---PAYISR 445
 Sp-Bem1 PYMPG-----PVDDVNELISSQR---AMDLDVYLKEMCRL---PARLLE 398
 Cc-Bem1 PYMPG-----PAKVDVDDALTATR---REELDEYIHGLCALSRSGYRHILE 398
 Lb-Bem1 PFMFG-----PAQDVDDALTSTR---RGELDEYIHGLCALGKSGSRNILE 403
 Pp-Bem1 PYMPG-----PSDQVDNEVTAAR---RIELDDYLHKLCELQLYS-RYILE 393
 Pg-Bem1 PRMPG-----PSDNVDELVCAQR---VEDLSTYLHELCEL---PLYIRE 540
 Pb-Bem1A PYMPG-----PLAVIDQEITAER---QRDLNTYCKDLLGL---PRYISE 381

Pb-Bem1B PFMPG-----PQTEVDERLTAKR---QTELNIYCQELFQL---PRYLVE 416
 Bd-Bem1 PSPPTGLLRDNTTVVPATIPESIMSTSIPRRQSVSDNAGASSYHLSLKINRQSSPSHHSQ 539
 * * * * *

Sc-Bem1 SEMVHSLFVVLNNGFDREFER----- 410
 Ca-Bem1 SEEVKLKFDVLDNGFDRET----- 413
 Mg-Bem1 CNLVK-QFFAPREGDYEMD----- 427
 Fg-Bem1 CNLVR-QFFAPREGDYEID----- 439
 An-Bem1 CALVR-QLFAPRPGDFEID----- 453
 Yl-Bem1 SVIMQ-ELFALRPGDVAAG----- 464
 Sp-Bem1 NELVK-LFFLPLDGDVESP----- 416
 Cc-Bem1 HEVLR-QFLALKPGDSEIDPRVDEIDALFGEYPED---DYDREYAQEIADQVGRMKV 453
 Lb-Bem1 HLVVR-KFLALKPGD-----MGRMRV 423
 Pp-Bem1 DKLIR-EFLALKPGDAEVEVEPRMKEIAALARAPDANGAHESDNVDPEYGVTTISQLRI 452
 Pg-Bem1 SELVY-EFLGPREGDVELEGDPGNLGLDRSPTEVEG-----EVVEYLQR 584
 Pb-Bem1A GDLVQVQLFGIHEGDIETD----- 400
 Pb-Bem1B SPLVQDVLVFLHEGDVEID----- 435
 Bd-Bem1 FRPFATTSTLESFARSALDASQPLSSLKPFISGSMNAR-----RDGF 581

Sc-Bem1 -----DENQNIKTLENDTATFATASQTSNFASTNQ----- 442
 Ca-Bem1 -----AINKRFSKPISQKSNHQDRLSQYSNFNVLQSQSQSQ----- 450
 Mg-Bem1 -----ANGEDEYRMSGGSQSS--PDSPNGGISQSSRNNL----- 462
 Fg-Bem1 -----PNDNENEYRLSQGSQLSS--MESPAGG---SQNNL----- 469
 An-Bem1 -----PSAFGEDARFSGGSQHSSGHELSPASRQSSQSQNGP----- 490
 Yl-Bem1 --PTDDLQPLTPETESFDDAAQAEARAKGIHPKSLGPTNVSSSVSY----- 509
 Sp-Bem1 -----HPTSTMPEALPREP----- 430
 Cc-Bem1 SDSG--HSDGSDYEDEGYAASPQHRPYDR--HPYGTAPVNGRHSR----EESL---- 500
 Lb-Bem1 QDD---QRSDGSDYEDEGYAPSLQKAYDRGRHPYVQGS---ERSSQ---DNTF--- 468
 Pp-Bem1 SGEANGQSGSDGYGD---GDMNSPYDRDSSAYVYGEKEPSRMST----EQTYNTTQ 503
 Pg-Bem1 MDSSRGEDGRLADLNESI SRLSTGNGPLEAHHQYQHRRRQSSQASQPSHHP----- 636
 Pb-Bem1A -----HDPRSDP-----AMFT----- 411
 Pb-Bem1B -----YDPRTGAPRPESVELSHSIL IPEAFGSSSTMNTFTPF----- 471
 Bd-Bem1 PINTRPLSSGPASISHLRHYQAMQRRSSSCSPNKTGSHGSNTDSEIGDVLTEDEVALMI 641

Sc-Bem1 -----DNLT-----GEDLKNKKLSDLS----- 463
 Ca-Bem1 -----QQQYAHHSRGS DNSPTNESSGNL INSSSHNDSSLS----- 487
 Mg-Bem1 -----SSGGYNNNLAPSQQRGLSAQPPMMRQASSLSQPSQA----- 499
 Fg-Bem1 -----NGSGYG---LAPS-----HPDMQTQASSLSQPSQA----- 496
 An-Bem1 -----SERSSHSHSHSHSHSHQRSQTSSIPNGKPPMVRQQS----- 527
 Yl-Bem1 -----SEGTEESRPVSTASGLMPPEPTGLPGGGHQRMTSVS----- 546
 Sp-Bem1 -----LSFSLPEKAPEKATNIS----- 447
 Cc-Bem1 -----RVQAHQNHQRAGSTSSFHTHTQHTQSYAS-HSRNHSSERISPI SRDSYSNGQS 553
 Lb-Bem1 -----RLQGQNHQRNASTPSTASFRSSQAMSSRS-HSHSHS----- 504
 Pp-Bem1 PLRPRSRTNGHERTENGISLYGRSSPGVAALRYDSYHAHSQS-----RSSVASSQE 555
 Pg-Bem1 -----SRMSKGTGPAGYHQRGQRSQDLRPFSSSTTSSEG----- 671
 Pb-Bem1A -----QQPQQSVSQPMPGAI VGGAYYDT----- 434
 Pb-Bem1B -----GRNSNPIKDISQTNTATATATATATTT----- 499
 Bd-Bem1 SEHLVNGDEMGGSEVGGGTASDRDRSSRLDGEGLDGDHRMSG----- 685

PB1 domain

Sc-Bem1 -----GSKQAP-----AQSTSGLKTTKIKF--YKDDIF 490
 Ca-Bem1 -----SSPPPPQTVTTNTTITTDSSSKQPKVKVF--YFDDIF 525
 Mg-Bem1 -----SLS---PGIPQAG---AFMKVKL--SYNGDLI 523
 Fg-Bem1 -----SLG---GGMQAPSQPPSAMKIKM--YFNGDLI 523
 An-Bem1 -----SLT---QVSTSSG-GALKVKV--NFQDDLI 551
 Yl-Bem1 -----TVGPTPDNPAVNTPQSSSNSVKVKV--FYQDDLI 578
 Sp-Bem1 -----IPE----SAPTTAG-STCKVKV--RLGDETF 471
 Cc-Bem1 RWDHTQPTPTTANSFSSASRTRSQTATS VNLNTPPISAANPQTAFVKIKIFDRVADLI 613
 Lb-Bem1 -----TTNLNPPISAANPQTAFVKIKIFDRVSDDLI 537
 Pp-Bem1 PSPVSTRASHAGSTATSRTSGSRSRQSNATYNPPI SASNPQIAFMKIKIFDKSAEDIV 615
 Pg-Bem1 -FSSHLPSHTSTSSVPVGSRVTS LTPAGPGEHPGSANHNPNSTGFLRIKIKYQRQTDDLI 730
 Pb-Bem1A -----IKIKIVHK--DDIF 446

Pb-Bem1B -----TAAKNAIGSSNLIKVKIAYKEEMF 523
Bd-Bem1 -----MSFGSVSHGLLGGDVTRNIYRWKETRIDIERQRRNSEPDLLTIP (KR) SPSGFEIARA 739

Sc-Bem1 ALMLKGDTTYKELRSKIAPRIDTDNFKLQTKLFDG---SGEEIKTDSQVSNI IQAKLKI 546
Ca-Bem1 VLLIPTNLRLQDLKSKLFRLELDITYKYKPDQQKPTSES IHLFLKND FEDFLIENET 585
Mg-Bem1 AIRVPSDIQFRELFDKITERLRIQPGEEVQLSYKDDITNGKLALMNDQDLIYAMQRNEKL 583
Fg-Bem1 AIRVPTDISFQALYDKICDRLKIPANEEIQLFYKDEPTGDKPSMISDNLDLDFALQRNEKL 583
An-Bem1 AIRVPSDINVQQLKEKLMDRKIN--DEIVVQYKDEASGAYVDLISDSDLDTAIQRNSKL 609
Yl-Bem1 AIRVPSDIDYATLHDLRCELRVET---LSLLYKAD-DGSRVVISNDEDLGAAVYGKNKL 635
Sp-Bem1 ALRVPSDISFEDFCERLTNKLGECE---HLSYRDTNANKVPLNNVDLDRKACQSQESGV 527
Cc-Bem1 AIRVHPKVSHHELMKVVQARLGSELR---VLKYRDSLNTFVGLDTDELRRAWMEGTDKH 670
Lb-Bem1 AIRVHPKVTHSELMDKVQARLGGEVGV---NLRYRDSMTNTFVGLDSNEELRSWMEGTDKH 594
Pp-Bem1 AVRVPRTVYQAQLLEKASQRLNCHVE---RLRYLDSETRQFIDLETDEDLRFWLDDETEKH 672
Pg-Bem1 AIRAPTGVQFLELLQRTIQRVGAEVR---SIRFRDE-SGVAYSTGGSVPINANNGARLIG 787
Pb-Bem1A AIKVPANTLDVLRDRIDHRLG-FNVQ---LNYKDEITGESMELSEERDMEEA----- 495
Pb-Bem1B AIKVPIDCSFQKLHDRVQERLGGSNVR---LRYKDTQGESLPLETESDIAEAFESSLK- 579
Bd-Bem1 STLMEPGMFRRQFLQNKAAQRERKRPPMFITRNFDLFLALYGVYGGDVYPSDDDEDTDSNA 799

Sc-Bem1 SVHDI----- 551
Ca-Bem1 SNNNNSEIDFENEI I KEKLGFEVNDDEKQFSILFDKCKLMVLVY----- 630
Mg-Bem1 LFYHRYSNSFDR----- 595
Fg-Bem1 LLYVEAV----- 590
An-Bem1 TLYVGLA----- 616
Yl-Bem1 VLYAS----- 639
Sp-Bem1 LLFAERRRF----- 536
Cc-Bem1 VLYAD----- 675
Lb-Bem1 VLYA----- 598
Pp-Bem1 LLNKRRLPTPRPHRKMETDNASAAVDAMIRGALDLDHGI SDDSIQLSNDSSASLSQE 732
Pg-Bem1 IDNDGDLDRWINSRSLVLYVD----- 808
Pb-Bem1A -----
Pb-Bem1B IGKLI LYATPL----- 590
Bd-Bem1 TGFAIDSEDLVDEEMGRGGRSERLTYEEVGRNHHDGRFARNQTCIGTDAYHDECYDHAR 859

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 DNDLRDDDKALEWHEVIELQAFSERKAWIEEKITFLGKMPPIEVFAGLDAVRSSAVEVPG 792
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 TSETALLLAQSGLTNGIATVPGDGGNTVGVHGTSSSHTGTSESKAFFMLLKAFVGTGV 919

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 LPTRAELEEWLAEHDRIEKETEIFDSGELRKLKKFTKAAAQRNLSPEDDTLIELTLTTIY 852
Pg-Bem1 -----
Pb-Bem1A -----

Pb-Bem1B -----
Bd-Bem1 LFLPKGFLNGGLGFSMWLLVVLGYLTLHCMILLVDTSRSLGGKSFGDIGGHIYGPYMRQL 979

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 ELDKLFHLLRDRSDNLDLLGIRLTWEERRMAAWSELRSVLSDIREFLASRARWTPNAYDS 912
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 VLASIAISQMFGCCAYFIFVGNLRDLLMVSSGCRIIWPDWVFLILQLAVYIPLSWVRRRI 1039

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 VPVEDELMPEPETKRRNSVVSINSTFSESSNLPLVLSRTSRYKLAESLSRNAAQFAS 972
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 KNFGITSLIADVIFILLGLGYIFMYDLSVIGQTGIKPTAWINIESFSLFVGTAMFAFEGIC 1099

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 RVSSLRHASKIAGAGKALDKLIDHSRRPVPDELLDEQDKLEDHGINEMEDVGKFMVTVMVQ 1032
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 LILPIAESMQHPQKFSVLSWCILLIGTIFITIGTLGYMSFGDQIETVLFNLPLQNPLVN 1159

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 WKKADEIYVETMKDKSAAQTLLEEIEVATSSHPTSROQVAFLSRATALAKRLAMRDNPAS 1092
Pg-Bem1 -----
Pb-Bem1A -----

Pb-Bem1B -----
Bd-Bem1 SIQFFYAVAIMLSFPLTIYPVIRITEQKLFHGHSRTGKSSPVVWQKNLYRAVLACMLGV 1219

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 SGTTFPLPTHLLFPDQSGSNEEVIRMLSSELAAGEHVRKAEQCAKEYHTSLEAVKRVET 1152
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 ISWAGSTSLDKVVSLVGCFACIPLSFIYPALFHLHITTSWWARVTDWMLVGFGTVAMVYT 1279

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 ACKAASDLSVQLESIVQRLKDGVPDAGDGTTPDLSTEACLEGSRHASFLTVLPSILQEL 1212
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 TFVTLEQWAINGPDTPRDRCHDAMGTQLELPSFGLW----- 1316

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 QDADASVDGLLPGARVAMLHLDRPGVDPQFKLEAGSNIDRLIQLRREAAQTRDEVTARTS 1272
Pg-Bem1 -----
Pb-Bem1A -----
Pb-Bem1B -----
Bd-Bem1 -----

Sc-Bem1 -----
Ca-Bem1 -----
Mg-Bem1 -----
Fg-Bem1 -----
An-Bem1 -----
Yl-Bem1 -----
Sp-Bem1 -----
Cc-Bem1 -----
Lb-Bem1 -----
Pp-Bem1 ALNDIKRTWTSMGGLAKDLTSVQDDIAAAAERQIWHQVRQHDAPPTPESPVTHLPTPTI 1332
Pg-Bem1 -----
Pb-Bem1A -----

Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SPASVLATLDGLATRLEEKVSTPLSAVAPAMGESLNKYLTECSTALSLLLDHTRYLTWW	1392
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	VSMQNGASTMGAVRDDFHGLQVQTEELKLRFDDETEGVLSGTLTGDELLTEGGLSSQLK	1452
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	HAEESVQSFIDDLPRRVTFVAPAHSEPHSSPPKGPRLTSVEFNLAMVQHAAAAELPVDL	1512
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SHLDQTVRSDSNAYSMMLSGALKLLEYKATHFQSAKAAKIVDAALASVVSKVRRVADVVT	1572
Pg-Bem1	-----	
Pb-Bem1A	-----	

Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SVQDSMDRPDEQQNSERLGKLSAMVNEVLQVEVQEIARSFSPVRGLMHRLRTLPGVSEIT	1632
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	AADGIVASRQRALEDAAEQFATWKENAATLHEQITLALQAERARQIERLRLQEEREQAAA	1693
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	EERARLAREEAETLAKAELDRIEQERRETEERARREQUEELEERERLEAENRAKEERSIPQ	1752
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	GIGLILGSSELLEPVQETDEHSMTREIYGPEAKDDLFGQLQVLPVTADPLSQHTSILRPQI	1812
Pg-Bem1	-----	
Pb-Bem1A	-----	

Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	LALRKRLRSLHINDVVRPSQKSDLSPEDYRKRMDKELLAIVSGVDLPPSIIDDPLTN	1872
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	AELHSLRTEVKASVDLMP TVHKLADLAIALRNCDDALSDLLEHIDSYP SAPLGM LSSSHT	1932
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SDPTLPPESQLSARIAFTKSLVD TMTTQYS AVSGDPRAVSEHDRVQTWMELEAMASDRV	1992
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	NGTKSRPNSVMSSGRSSRASAVSTA AAKAAPTKKAAGYSRLSVGGSDARYLAPPPNRRTT	2052
Pg-Bem1	-----	
Pb-Bem1A	-----	

Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SGSSTGTRPRSTSRVSSISSNRSVSGPTPNVSSATLHGSTFASRQRTTSVTSGAPMKTPL	2112
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	KQPHLASSKASSRPRSNTNTTPRTASPAFSETSSRSISRGLNASVSSVARSSWSRAPRQ	2172
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	SFPALLRSPPKNKAVPTAKKPYIANPKNKLDVAVGDVINSLPVNIINVEVVADTWKQSGK	2232
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	YWIGDQDPKLCFCRILRSQTMVVRVGGGWSELSRF IKDHFADAFRILPESPRLGSRREEKW	2292
Pg-Bem1	-----	
Pb-Bem1A	-----	

Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	ISSATLSQAAESI ALSNPKTPEVVSSHLP SFALSTPSGTSPKSIKTVSSPGSPLTPLQFL	2352
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	
Sc-Bem1	-----	
Ca-Bem1	-----	
Mg-Bem1	-----	
Fg-Bem1	-----	
An-Bem1	-----	
Yl-Bem1	-----	
Sp-Bem1	-----	
Cc-Bem1	-----	
Lb-Bem1	-----	
Pp-Bem1	RRADRESPVRAETPTRPPRNTAAKPARPPVWRP	2407
Pg-Bem1	-----	
Pb-Bem1A	-----	
Pb-Bem1B	-----	
Bd-Bem1	-----	

Alignment of fungal Cdc24 proteins

Mg-Cdc24	MNQASRRQPGLNAPRDTKLAGSVQSNVDVNNQQPLLPTPAPKPPDQSLPGPSRRSASENIGV	60
Fg-Cdc24	-----	
An-Cdc24	-----	
Sp-Cdc24	-----	
Pb-Cdc24	-----	
Cc-Cdc24	-----	
Lb-Cdc24	-----	
Pp-Cdc24	-----	
Yl-Cdc24	-----	
Pg-Cdc24	-----	
Ca-Cdc24	-----	MEHPPAAL 8
Sc-Cdc24	-----	
Mg-Cdc24	GHPTCPVAFTPPNALAMAYAPLLRTNTTPIFSSSTGGVARLQGTMGSTGPAVGIPPLRAS	120
Fg-Cdc24	-----	MNHAP-----RAS 8
An-Cdc24	-----	
Sp-Cdc24	-----	MAYFQDRKTS 10
Pb-Cdc24	-----	
Cc-Cdc24	-----	
Lb-Cdc24	-----	
Pp-Cdc24	-----	

Y1-Cdc24 -MNGSSRRLSPPNDNLAHQMLHQEINLLPSSPYTKTPQQRKSSSQSTPSLSTLSPSTQ 59
Pg-Cdc24 -----MTNPPPTPSTSSFNYQNPFSSTRSS 27
Ca-Cdc24 RTFSTQSTSSLNSVSTVSSSRIVSSGPVNIINNFNKPSTPKDHLFYRCESLKRKLQKIPGM 68
Sc-Cdc24 MAIQTRFASGTSLSDLKPKPSATSISIPMQVMNKPVTEQDSLFIHCANIRKRLEVLPLQ 60

Mg-Cdc24 QLSGTTLHN-STTSLSSLASASTVVPQAQGGQVATSNIINQKADASRSLYQICMSLK-- 177
Fg-Cdc24 QLSGSTAYTGSSASLSSLATATTITPT-NGGPVHATANIINQKADASRSLYQICISLK-- 65
An-Cdc24 -----MADTAGLNPG----GPVAEDNIINRRGNEG--IYQSCVNLK-- 35
Sp-Cdc24 SRSLPSYINHSTQNLVGP RKDETNLSEYMKLRLLQSPSQVIYNLENTVSLYRRCNLNR-- 68
Pb-Cdc24 -----MPSCLIESPQKPIQ----GQSLYHTCLSVL-- 26
Cc-Cdc24 -----MASQAAARKKSI ISSQNLQIETPVAGNTLLNKSASQATSLYQQCASLR-- 48
Lb-Cdc24 -----MATVAGRKKSIVISTAGLTIDTPVATNGLLNKAASQSTSLYQQCSALR-- 47
Pp-Cdc24 -----MASAAGRKKSIVISATPTIESPIANNTLLNKAASQSTSLYQQCSALR-- 47
Y1-Cdc24 NSTYPTPRLRSMTPTMSMSSVQSTAPTSVAPMPVANLVMNRQADSEKSLYNMCKTMR-- 117
Pg-Cdc24 TTTTHTMTTTTTSASSHTSLNQHSANLSIDMPIATSSVVNKTANRSASLYQNCLETR-- 85
Ca-Cdc24 EPFLNQAFNQAEQLSEQQALALAQERSNGNGHNSNGKRHQSLDGAMNRLSVGSDSSSIQGS 128
Sc-Cdc24 KPFLQLAYQSSSEVLSEKQLLSQKQHQLLKSNGANRSDSLAPTLRSSSISTATSLMS 120

Mg-Cdc24 -QRLAQVPGFEEYMSLMDQW-----EAEDPEGGIVESVWKLRLMGTPLIVIFNLL 226
Fg-Cdc24 -QRLAQVPGFGPYLDELDP-----DPVDP-----LWNLFRRSGYPLLLIYNAL 107
An-Cdc24 -KRLAEVPGFEPYLRMEMEE-----DLAQGNSDPVASLWNYLRHGYPLLA IYNAS 84
Sp-Cdc24 -KRLMDISELAFFDSIHREALNSSFKILEFKDIEFDDPVTEIWLFCRLGYPLCALFNCL 127
Pb-Cdc24 -DRLALVNGFQQFLDSP-----VQKTQLLNTDPVTKLWNLQCLGTPLYTLFNAL 74
Cc-Cdc24 -SRLMRIRGFSYFFNLAAES-----TDDRQSTDPVTQLWDIFSLGISLCYIFDQL 97
Lb-Cdc24 -SRLMLIRGFPHYFNLATP-----PDSRQSTDPVTQLWDLFALGVPLCYIFDLL 95
Pp-Cdc24 -TRLLQVQDFPEWFTVSSPP-----DSSRRSTDPVTQLWDFALGVPLCYLFNLL 96
Y1-Cdc24 -DRFHDI EQVRPFLEDSEMSIIVP---ITHLPPSIPLDPVTQLWSLFRLGAPLCILFNML 173
Pg-Cdc24 -ALLRRVPGFEAGPWITETK-----NPNLLSVTQTLEIFRLGSPLCFLYNAL 132
Ca-Cdc24 LTRMATNASTSSLISGMPNNTLFTFTAGVLPANISVDPATHLWKLQQGAPFCVLI NHI 188
Sc-Cdc24 MEGISYTNNSNPATPNMEDTLLTFS--MGLPITMDCDPVTQLSFLQGGAPLCILFNVS 178

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Mg-Cdc24 K-----PENPMSFDPTP---DAKKAKMYIYKFAEQCKN----E 257
Fg-Cdc24 R-----PNEELKVDSSANEAKKSKIAIFKFKVQACMK----E 141
An-Cdc24 D-----PGAPLEIDTSKVP-EARRPKAATFKFLQAAIQ----E 117
Sp-Cdc24 P-----VKQKLEVNSSVLENTNCKASLYRFMLMCKN----E 161
Pb-Cdc24 D-----PKEPLTLEYNHNLNQANNAKAIYVHFLVSCRK----E 108
Cc-Cdc24 --D-----QNFNKINNSQFNPEKYEANPDKERKHAIALFAMQVRNQQ--VM 139
Lb-Cdc24 PAE-----AGFNKINNSFTAD-YDANPDRAQKRAIALFAMQIRTDE--VT 138
Pp-Cdc24 P-----APFSPIN-IDTDPKSFDTA NEKTKKRISALFSMQIK----- 132
Y1-Cdc24 QP-----RTPLTVDPHAAANRASIDVRTCKRSVYDFVQGCKA----E 211
Pg-Cdc24 LNPPLSPPELANLPLPPGKTWQNLKPLKVLWCPREDLKGCCQKSAAHFIMALKTELGWGT 192
Ca-Cdc24 LP-----DSQIPVVSSDDLRIKCKSVYDFLIAVKT----Q 219
Sc-Cdc24 KP-----QFKLPVIASDDLKVCKKSIYDFILGCKK----H 209

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Mg-Cdc24 LGIED--IFTISDLLKN-DTGFVKVTTVVNQVLIDIAQTRGMLIQQQYPEDDMPDSGKS 314
Fg-Cdc24 LEIPSTQSFVITDLMGT-DTSGFVKVTQVVNYVLDRAEERGYLMQAQPDVESNEPTGG-- 198
An-Cdc24 MAFPQQECFLITDLYGE-NTIGFTKVIKMNVRVLDILEIQGQLKKP-SDTAMAAPAAG-R 174
Sp-Cdc24 LGLTDAALFSISEIYKP-STAPLVRALQTIELLLKKEYVSNTTKSSSTPSPSTDDNVPTG 220
Pb-Cdc24 LDFAEEDLFGITDIFLD-DTNGFVKVNTITKILQILQDR-GVISAKSPNRNSDPNAPKD 166
Cc-Cdc24 QAIIPGLEPFAITDLWDRKSTDGLVKVINSVTAIVEYLPEDVF EQAPTSPTLS-AHESSD 198
Lb-Cdc24 QKIPGCELFVTDLWDRKLT DGLVKVINTVTAIVDHLQPDVFEESSPPTLS-SHDSSD 197
Pp-Cdc24 -QLEGCEQFTVTELDWRNSTDGFVKVNNVINLVRCLPDEVFVPEQLSSPHLASAQQSTD 191
Y1-Cdc24 LGYSDELFTISNLFSE-NTGDLIKVMRTVSMVETLEARHLLPPKTAPITAPATRDAR- 269
Pg-Cdc24 EIDEIQENGLMVNMLYDVNTNATVKVISNVLRLHLLKALGVLLPSEDELVPHSNELNV 252
Ca-Cdc24 LNFDDENMFTISNVFSD-NAQDLIKI IDVINKLLAEYSDASDSGGGDEDEDVNMVQITDER 278
Sc-Cdc24 FAFNDEELFTISDVFAN-STSQLVKVLEVETLNMSSPTIFPSKSKTQQIMNAENQHRHQ 268

Mg-Cdc24 KMSYR-----DYIVRELV DTERKYVQDLENLHD----- 342

Fg-Cdc24 QMTYR-----DHI IRELV DTERKYVQDLENLHD----- 226
 An-Cdc24 KLTKR-----EHILKELLETERDYVHHLQNLQA----- 202
 Sp-Cdc24 TLNSLIASG-----RRVTAELYETELKYIQDLEYLSN----- 252
 Pb-Cdc24 TR-----DKIVLELLETERKYVQDMELLQASTKEHKIYIPYNILT 206
 Cc-Cdc24 SLHHDSPAGPAPPTNAREARRIHITREILETERKYVEGLEIMQ----- 242
 Lb-Cdc24 SLL-DALPQ----PNGKEAARNNIVREMVETERKFVQDLEIMQVRVFPVPLMSLALPIQP 251
 Pp-Cdc24 SLDADGAAP---PPERDGGARYNIVRELVETERKYVQDLEVMQ----- 231
 Yl-Cdc24 -----YNVVQELLQTERKYVQDLEILHD----- 292
 Pg-Cdc24 AMDDR-----ARVVKIILESERKYVQDLEVLQN----- 280
 Ca-Cdc24 S-----KVFREI IETERKYVQDLELMCK----- 301
 Sc-Cdc24 PQQSSKKHN-----EYVKI I KEFVATERKYVHDLEILDK----- 302

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Mg-Cdc24 -----LKKALTEGIVTGDVAYQIFGNIDAILDFQRRFLIRVETTNSMPGEVQQWG 393
 Fg-Cdc24 -----LKKTLEQQGEIPGDTLHQIFFNINAILDFQRRFLIRVETTNSMPALNQRWG 277
 An-Cdc24 -----LKKELEDTGALTGDASHQIFLNLNLLDFSRFLIRLEQHYARPEEQQNWG 253
 Sp-Cdc24 -----YMVILQQKQILSQDTILSIFTNLNEILDFQRRFLVGLMNLSPVEEQRLG 303
 Pb-Cdc24 KFFVYFIQSYMRELQIQKILSPDTVHYLFANLALVDFQRRFLIQLEDIAEKPAQDQQLG 266
 Cc-Cdc24 -----KYATQLAQQNIIDQDTIHLLFPNLNLLNFQRKFLIRFESTLEQPWSEQRWG 294
 Lb-Cdc24 A---GYVQKYSNALSQANLMDQDTIHLLFPNLKLLNFQRKFLIRFESTAELPWQDQRWG 308
 Pp-Cdc24 -----KYSIAASQMNVMQDETQLRFLPGLNLLNFQRKFLIKLESTIAELSPNDQSWG 283
 Yl-Cdc24 -----YQNRLLAEAILNPDTHLMLFNVSALVDFQRRVVGIEHVCCLPVEEQRFQ 343
 Pg-Cdc24 -----YQRALLQREILPSDQIRALFINLDSLVDQRRFLIGVEANARLPDEQRFQ 331
 Ca-Cdc24 -----YRQDLIEAENLSSEQIHLLFPNLNEIIDFQRRFLNGLECNINVPRIYQRIG 352
 Sc-Cdc24 -----YRQQLLDSNLTSEELYMLFPNLGDAIDFQRRFLISLEINALVEPSKQRIG 353

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Mg-Cdc24 SPFVAMEASFDPITYPFIANQRKAALIAQSEFDKIKSIE----HPVACDFNTLDGFLLK 448
 Fg-Cdc24 APFVHYEDALIDIYQPFIANQRKAAQVANQVFDKIQRSS----HPVAADYNTLDGFLLK 332
 An-Cdc24 ELFIQHEEAFR-QYEPFIANQMRCDKTCQKEWDKIQAAPRSPDLQMQVAQPATLNGFFVK 312
 Sp-Cdc24 ALFIALEEGFS-VYQVFCNFPNAQQLIIDNQQLLKVA-----NLLEPSYELPALLIK 356
 Pb-Cdc24 LLFVQTEDAFI-VYEPYCSNYAAQDLVKEKAELQKLD-----HVLSPHQLLSMLIK 319
 Cc-Cdc24 QHFVDCDEFEA-VYEPYCSNFTNATELLVANEQNLAALN-----GFISVS-ELKAFHIT 346
 Lb-Cdc24 QHFLESEDEFV-VYEPYCANYNATELMLANEESLVPLN-----HLINVKGELPAFLIK 361
 Pp-Cdc24 VPFMENEFEA-VYEPYCALYTSASDMLQEMQNLTALD-----NVLSKS-ELPAFLIK 335
 Yl-Cdc24 ALFLNMEAGFH-IYEPYALNQKASSDLAVQEAPKLTALA-----HIIEPTYELQAFLIK 396
 Pg-Cdc24 HLFHSFEDSFS-CYEPFCANFASASQLAQDENAAALTLQV----- 370
 Ca-Cdc24 SVFIHASLGPFNAYEPWTIGQLTADLINKEAANLKKSS-----SLLDPGFELQSYILK 406
 Sc-Cdc24 ALFMHSHKHFVK-LYEPWSIGNAAI EFLSSTLHKMRVDESQ---RFIINNKLLELQSFYK 409

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Mg-Cdc24 PMQRLVKYPLLLKDLLK-----KSEDDKVKDDL SLGIAAAERTLQKANEAVDRD 497
 Fg-Cdc24 PMQRLVKYPLLLKDLNK-----KTEDDEVKMDLTTGCEAAERVL SKANEAVNRD 381
 An-Cdc24 PFQRLTKYPLMLSELRK-----QIEDPDLQADISRAIDSIQSVLDAANDAIDKE 361
 Sp-Cdc24 PIQRICKYPLLLNQLLK-----GTPSGYQYEEELKQGMACVVRVANQVNETRRRIH 406
 Pb-Cdc24 PIQRICKYPLLMSSLLK-----STNPSWQSYPQLIQGSEAIRRVAEKVNETQRKQ 369
 Cc-Cdc24 PIQRVCKYPLFFGDLIKV-----ATGDDTYPHLEGLKQGAEAAHRI TAKINEAHRRRA 398
 Lb-Cdc24 PIQRVCKYPLLLD-----ASSPTYQHFDLKRGSDAAKRITDKINEAQRRRA 408
 Pp-Cdc24 PVQRI CKYPLLESLLK-----AVKTTDYPFIEELKLGVA AAKRVTDKINEAQRRRA 386
 Yl-Cdc24 PIQRICKYPLLLRELVK-----VSSSDHPYASELLDGL EAIKRVTNSVNETQRRV 446
 Pg-Cdc24 -----HTSPNGAYYDELKEGLASITRVTDVAVNETTRQR 403
 Ca-Cdc24 PIQRLCKYPLLLKELIKTSPEYSKQDPHGSSSSTSFNELLVAKTAMKELANQVNEAQRRRA 466
 Sc-Cdc24 PVQRLCRYPLLVKELLAE-----SSDDNNTKELEAALDISKNIARSINENQRRT 458

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Mg-Cdc24 LLDDALEDLKTRVDDWKNHQVDQFGSLLLHGVTVL TG--KSESERDYEIYLFECILLCC 555
 Fg-Cdc24 LLDEAVEDLTSRVEDWKS HKVEQFGKLL LHGVYVITG--KTDQEKDYEIYLFESILLCC 439
 An-Cdc24 QLAAAFVELDERVDDWKALKIETF GELLRFGTFTVIKNDNNKDSEREYHIYLFERILLCC 421
 Sp-Cdc24 ENRNAIIELEQRVIDWKYSLQYFGQLLVVDVNVCKA----DIEREYHVFLFEKILLCC 462
 Pb-Cdc24 ENLQLVQDLKRRMDDWK GPPIDSHGALLQEKLMVTVN----DLDREHLILLFEKAILIC 425
 Cc-Cdc24 DNEQIVKSLAKRITDWKGHHLENFGELLLEDVVFVTKS----DIDREYHVFLFEKILLCC 454
 Lb-Cdc24 ENEQTVKSLHYRIDDWKGHHLENFGELLLEDVVFVTKS----DIDREYHVFLFEKILLCC 464

Pp-Cdc24 ENLATVEALKGRVEDWKGHHISQFGSLLDDIFTVTKS---EVDREYHVFLFEKIILCC 442
 Yl-Cdc24 ENVAIIQDLKERIDSWKSYNLEDFGDLLYMDHLTIKAE----SGEYEVLYVLFDAIILCC 502
 Pg-Cdc24 ENELAVNDLKERVEDWKGHELVTFGQLVLEDFTFVVKN----ESEREYHVYLFERIILCC 459
 Ca-Cdc24 ENIEHLEKLERVGNWRGFNLDAQGELLFHGQVGVKDA----ENEKEYVAYLFEKIVFFF 522
 Sc-Cdc24 ENHQVVKKLYGRVNVWKGYRISKFGELLYFDKVFISTTNSSEPEREFEVYLFKIIILF 518
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Mg-Cdc24 KEISSTKSKDKKDKTKS-----TGPKIRNKGAKLQLKGRIFMT 593
 Fg-Cdc24 KEISSSKSKDKKDKLRS-----GGPKARNKSAKLQLKGRIFMT 477
 An-Cdc24 KDINPNKQKSRLVGGSK-----DKPNTSKGKPRVLKGRIFYMA 459
 Sp-Cdc24 KEMS-TLKRQARSISMN-----KKTKRLDSLQLKGRILTS 496
 Pb-Cdc24 KELKEGSKNRLTKTNTI-----MKKKRRASIQAAGTISVN 460
 Cc-Cdc24 KEALQQPPNPGRGKNAKNSILKKQ--P----APLPLATGGQSIAGRDTPLLKGRIFLG 507
 Lb-Cdc24 KEAPLLPQNGRNKVGKNSILKKQGTP----PPLTLPGGVGPQKKTTPLLKGRIFLG 519
 Pp-Cdc24 KEYLVPSANGR-KVGKSNSILKKPPVP----PPLMLP-GAGPSKKRNTPLLLKGRIFLA 495
 Yl-Cdc24 KETRDKKGKTMSPSKK-----PQKTVLSLKGRIYIA 534
 Pg-Cdc24 KEVGVKLDKASKQMSLKKNSQIN-----NSNVNGGKRKNTQQLKGRIFIA 506
 Ca-Cdc24 TEIDNKKSDKQEKSKFSTRKRSTSSNLSSSTTNLLESINNSRKDNTLPLELKGRIYIS 582
 Sc-Cdc24 SEVVTKKSASSLILKK-----SSTSASISASNITDNGSPHH 556

Mg-Cdc24 NVTEVLSFAKPGS-----YTVQIWWKGDGP-VEFIIKFKQNEE 630
 Fg-Cdc24 NVTDIVSFTKPGS-----HSVQIWWKGDGP-VEFIIKFLNEE 514
 An-Cdc24 NVTDIVLQKPGS-----YRIQIFWKGDGPVVDNFIIRYQNEE 497
 Sp-Cdc24 NITTVVPHHMGs-----YAIQIFWRGDPQ-HESFILKLRNEE 533
 Pb-Cdc24 RITHILN-KSTAS-----GGKYYSSNSNS-VQQFTLKRNEE 496
 Cc-Cdc24 NVTQALSVPARAST-----ASGIPAHFPLQVWKGDDD-LEFFTLRCKRED 552
 Lb-Cdc24 NVTQAVPVSARIST-----PSGVPPHFPLAVWKGDDD-LEFFTLRCRNEE 564
 Pp-Cdc24 NVHLAEPKIS-----AGQYSLAVYWRGDDD-TEFFTLRCRNEE 532
 Yl-Cdc24 NVTNMSSTENG-----YSLTLTYKGDGY--GSMTMFRHEE 569
 Pg-Cdc24 NVMSATPRPVPPEEQKKWQAAITKAVDDAVERRRRQVHLLSSGSRKMSPLSQFPNTP 566
 Ca-Cdc24 EIYNISAPNTPGS-----TLIISWGRKE-SGSFTLRYRSEE 618
 Sc-Cdc24 SYHKRHSNSSSN-----NIHLSSSAAAIHSSSTSSDNNS 593

Mg-Cdc24 MMKKAAGLDQQRKASG-SQSATS-----PDQPTAEFAWMRSQSA-VEFIIKFKQNEE 682
 Fg-Cdc24 TLKKWVNTLETQRKHNV-PRQSTN-----SDTLSTDFAWTRDQVAGLENPYLKENDDED 567
 An-Cdc24 TMRKWKDINTQREIQAEQRSARN-----TGTSDEFTYMKLSLN-IPNPYQQEYDVEE 550
 Sp-Cdc24 SHKLWMSVLNRLWKNEHGSFKDI-----RSAASTPANPVYNRSSSQTSKGYNSSD 584
 Pb-Cdc24 QLKQWEAVIDKTRMNIQS-----TSSSTPLLPSPQSTS-----530
 Cc-Cdc24 QMRQWESTINRLIKEAAQRASER----PHGP-ISRVAHHSPIVRVPPTDP-HSHFSSQ 605
 Lb-Cdc24 QMRQWEAQINRLIKEAAQRKASDR----PTMSGIARIAMTNSINPSSASRFGNSSTYSN 619
 Pp-Cdc24 QLKMWETQLNRLIQENINRRMSDRNPQRLTQMTPSAAAMQQRPPVAVNQEKTYSTFSQ 592
 Yl-Cdc24 QLRQWDATIKQLHDWYNQDSYESH-----FSPLVESPISSRNSQSSHLSLEDL 618
 Pg-Cdc24 QSEMGPSPNSASYQHHPVSHPPRIP---EHPYAHSGHGNGGGSISSRTFEDEEESYQTD 623
 Ca-Cdc24 ARNQWEKCLRDLKTNEMNKQIHKKLRDSDSSFNDDSAIYDYTGISTSPVNQSTQQQYYD 678
 Sc-Cdc24 NNSSSSLFKLSANEPKLDLRGRIMIMNLNQIIPQNNRSLNITWESIKEQGNFLKFKNE 653

Mg-Cdc24 EE-YEFGAIPQSQYQAMAGTMRMNSTASIRGRSQTGESSQSIASIRGPPPRFPLPQ 741
 Fg-Cdc24 DEDIGPATAPAGFPVTHPMSLGPRTASSNNLRARAGTGESSASLAGMVRAPPPRFLPA 627
 An-Cdc24 QS-TKEAAFFSEFP-----MSRNASSTSLRTRSATGGSGSGPPLSTSRP-RYP-AM 599
 Sp-Cdc24 YDLRTHSLDENVSPTSISPPSSKSPFTKTTSKDKTSAT-----625
 Pb-Cdc24 -----DKTSFIDSLDDD-----542
 Cc-Cdc24 GSVVSSAYSS-QASSAVSARSSSRSTAPYHYESSHTSYSS---SGPQGYPPHEGFDRD- 660
 Lb-Cdc24 GAPVSIHHQPS-ISSSIRSNRPVN-SYNHDDASSNAGSMYS---AGPQGYPPHDFDFEP 674
 Pp-Cdc24 STVVSAYGATSPYGAPGRMGRHPYAAAGDEPPASANGSYNGFGHGQGYPPHDFDFVD- 651
 Yl-Cdc24 RLTLGNRSLSGVPKLGPRQHSSTINGMHGANGMNHSSVS-----659
 Pg-Cdc24 ESSVNGRNTPSGSRRTTGHRSMPAERSEASFGPGRARAQTDDAASANLAQWRNQMPNSAI 683
 Ca-Cdc24 HRGSHSRHHSSSTLSMMKNRVKSGDLSRISSTSTLDS-----719
 Sc-Cdc24 ETRDNWSSCLQLIHDLKNEQFKARHHSSTSTSTAKSSS-----MMSPT 699

Mg-Cdc24 PPQPLSVQTLQGG-NSPGFRPGDSYFSPIGESPSSRTSTASNVFPGSAGYGSFKGVGTG 800

Fg-Cdc24 PPGSLSLQTQPNGA-HSPSAWAGDSYFSPVTEPASTRTSTSTSGMFS-TPQYGFPKSAT- 684
 An-Cdc24 PDSTLSVHTQFPGGSMSPGERNGNSYFSPT----ESARSSSQS-----AGYPYNRQVT- 648
 Sp-Cdc24 TTDERPSDFIRLNSE---ESVGTSSLRT-----SQTSTIVSNDSSSTASIPSQISR 674
 Pb-Cdc24 DDESTKFFIRPIAS---SSRLELAN-----IPLSLLSSTSTSTSTSTSSASS- 590
 Cc-Cdc24 DEEDDLEDYPPASTS---YSGRGTPMGN-----RRPTALSMPGERSESLHGYERPRAQTE 712
 Lb-Cdc24 EDEEDYEDYPPVSAANYPASGRGTPMGGPPGARRNPALSMPLEP-EPVAGYDRPRAQTE 733
 Pp-Cdc24 -LDEDEYEEYPLPNYP---PSGRATPAGS-----RRSDMIGFSQSARTSSHSS-IPSAMSS 701
 Yl-Cdc24 IASSNGGMSRARSASTPGFDDGSMRPS----- 687
 Pg-Cdc24 PPVPRSGQLTPASSDAYLPNLSRSTSSKPLRHQPSHEWGAGTINGSNFYRVDDRSHLPT 743
 Ca-Cdc24 -FSNNLNGSPNTTNPMLSSDATKIPT----- 746
 Sc-Cdc24 TTMNTPNHHNSRQTHDSMASFSSSHMKRVSDVLPKRRTTSSSEFESEIKSISENFKNSIPE 759

Mg-Cdc24 QPYPGMWDGPIVDQNRYTAPAMPRAPSRDGPSPVNAYGMSGANGRNPRGSPMPVMASHA 860
 Fg-Cdc24 -PNPQQWED---ANGNRYTAPAMPRAPSRDGPSPN-----PARNPRGSPSLPAMSSSQ 733
 An-Cdc24 --PVTWGD---DNNRYTAPALSRATSRDGSNSGYFNG-APPNGRSAQRPSLPMSGSNQ 702
 Sp-Cdc24 ISQVNSLLNDYNYNRQSHITR----- 695
 Pb-Cdc24 -----
 Cc-Cdc24 SNDGPTIAQWRNNVAGPRA----- 731
 Lb-Cdc24 STDGLTMAQWRNGLPQPPSNQPSAGALRPITPRMNSNVANSYTSASFGNSSVPLPLK 793
 Pp-Cdc24 HT---SLYPGRPISRSAMS-----YNVETDSASS-----S 729
 Yl-Cdc24 -----
 Pg-Cdc24 SGPSGHPLHARHNEPQLLPSNSTGVPMFRSRSASSPNIHQSPDFSQQWNSGLLNVPVSPV 803
 Ca-Cdc24 -----
 Sc-Cdc24 -----

Mg-Cdc24 QGASQQRSRSYSTPDIQQGQPPGMRRTPGGSQSNVPAVPGIPAHLHAAHERH----- 913
 Fg-Cdc24 AALAAQQRNRSYSTPDING---PGMPRTRQPSHGNIAPVPGIPQHLHPGHN----- 781
 An-Cdc24 SSNSASQMRMSASSPDIHHHNPESTRYMGVHTMQTVDNVPPPIPAHMANMK----- 754
 Sp-Cdc24 -----
 Pb-Cdc24 -----
 Cc-Cdc24 -----
 Lb-Cdc24 SSSRPVLRQASSNRLKNGYDASYNIGIPTAVNSSDYRTVRAPTPTGGLTAP----- 846
 Pp-Cdc24 TTTRSALRSQFSSTRKLGAYDQAESR-----PNASSRQSAPAAP----- 768
 Yl-Cdc24 -----
 Pg-Cdc24 SLPSGSHSSSSTRPALPLHNQVQIGGHKQRSSDSSAAALDRSSTESQRLSGGVGGGN 863
 Ca-Cdc24 -----
 Sc-Cdc24 -----

Mg-Cdc24 -----DSNIPRSNTGSPALSLRNDLPMRSNTQSPGVQRDRMLQQGGGYSGGTLAQF 964
 Fg-Cdc24 -----PNLSRDQGTGSP---RNDQPTRAQTNSPGAQRERMHKPTG-SVGGSMNHF 826
 An-Cdc24 -----APVNRSQNNSP---TNQSLPIRTNTS-----HAFHEPQYSDGRAAAPL 794
 Sp-Cdc24 -----VYSGTDDGSSVSIFFEDTSSS 715
 Pb-Cdc24 -----
 Cc-Cdc24 -----
 Lb-Cdc24 -----LMNRSRSASQPTAYVPKTAVPPPMPSPSYNS--HWSTHRSNHLN--NNKRGS 894
 Pp-Cdc24 -----SRSRSASQPTAYIPPTVPPLPTSIPSSVQWSTRAQSTVGNHGNKRGS 817
 Yl-Cdc24 -----
 Pg-Cdc24 GVGGRSNLPLSNPMAQTAHGGPPAGGGGLNPRYSQQAGLTGHSAASSLITRSGSLVV 923
 Ca-Cdc24 -----
 Sc-Cdc24 -----

Mg-Cdc24 PMQPVYPRGGTPNPPGSGHTPAPLNLSADMGRTVSPPLGTGTPQPNTAGLMSPDQGGGI 1024
 Fg-Cdc24 PAQPVHPRSITP---GGGNQILRVDAANAASRTVSPALGTATMPPP-SANPLSPEIP--- 879
 An-Cdc24 SDQPTSPLSHEP-----EEEP-----F 811
 Sp-Cdc24 TKQKIFDQPTTNDCDVMRPRQYSYSAGMKSDGSLLPSTKHTSLSSS----STSTLSVR 770
 Pb-Cdc24 -----GSSYFPPSLLSPVTLT-----GSQD----- 610
 Cc-Cdc24 -----
 Lb-Cdc24 SSQSTGDSSEYSPNSS-SPVTPFGSSESLGGV-AIRNSRTQPYES-----APALNGH-- 945
 Pp-Cdc24 SSESTGESSDYSPHSSGSPITPFGSSDTSLAGMASRHSRSQQHVD-----QVVTSAANE 872
 Yl-Cdc24 -----

Pg-Cdc24	VQGGSEGVGGSRYGAADQLVGGSHPSKPLGGGGSSSTSSTMKSSLTATHNPNNNNNNNN	983
Ca-Cdc24	-----	
Sc-Cdc24	-----	
	PBI domain	
Mg-Cdc24	MPTQLK V KVNYDT-----SNYMTLVAAYNITYRSLVDRIDAKLARFTNSSISRG-NLR	1076
Fg-Cdc24	LPTQLK V RVNCES-----GNYVTLVAFNITYQSLVDRIDAKLARFTSSISKS-MLK	931
An-Cdc24	MPTQLK A KVNF-----ENYVTLVISSNIGFRTLDRVDAKLARFTNRSIGSK-TVR	862
Sp-Cdc24	NTTN V K I RRLRH-----EVSLVLVAHDITFDELLAKVEH K IKLCGILKQAVPFRVR	822
Pb-Cdc24	--TL V K L TYN-----EGVYCVTPHQIKFSDLMERVE K IKIVANLKPNA--VLR	657
Cc-Cdc24	-----	
Lb-Cdc24	--HN V K V VHFH-----EDIFVIQVSRAEYEDLVEK V G R KIRLCGP-RRDDG-PLR	993
Pp-Cdc24	LSRPV K V V HFH-----EDIFVIQVPRSTEFDQLVEK V G K KIRLCGPNRRDDG-PLR	923
Yl-Cdc24	--NI K V R VQYF-----QDVFTLIVPAKVTYDQLIERVER K VRLCGKVVPA--LR	733
Pg-Cdc24	GPTSIR F K L RAG-----EDTYVIVTSLTITYHELIE K I V K L RNCGVYKSSA-RLK	1034
Ca-Cdc24	--FDVA I K L LYKST-----ELSEPLVNAQIEYNDLLQ K I S Q I IITSNLVADDVN-ISR	797
Sc-Cdc24	--SS L FR I SYNNNSNNTSSSEIFTLLVEK V VNFDDLMA I NS K ISNTHNNNISP--ITK	815

Mg-Cdc24	LRY R DE S DFVSI V CDE D VQMAFTDGRNGDRDMYN-GG V GE V ELFC V GIGGE	1127
Fg-Cdc24	LRY R DE D GDYVAIEGDD D IQIAFMEWREGVRN M YS-GG V GE I ELFC V GD T A-	981
An-Cdc24	LRY Q DE D GD F IT S DE A VQLAFV E W Q HREELARG V GE I QL F C Q P I EN-	913
Sp-Cdc24	LKY V DE D GD F IT I TSDE D VLMA F ET C T F ELMD P V H NG M D T VS L H V V V Y F --	872
Pb-Cdc24	LKY R DE D GD H IT I SSD D VQMA F E-----SR Q NT V N L F V T L ----	694
Cc-Cdc24	-----	
Lb-Cdc24	V K Y K DE D GD M VS L GS T ED V QMA F E-----Q G G Q V T L F V T -----	1027
Pp-Cdc24	V K Y K DE D GD L V S LGS T ED V QMA F ES-----FR P GN L V T L V Y Q -----	960
Yl-Cdc24	I K Y Q DE D GD M V T I H SDE D I A MA L E Q -----KN L E Q L N I W V A -----	769
Pg-Cdc24	I R Y E DE E GD L IL I C N DE D V S MA L E W M R -----S V G I S H LL L L F V D -----	1073
Ca-Cdc24	LRY K DE D GD F V N LS D DD W GL V LD M L T SE D F Y Q T SS N E K RS V T V W V S-----	844
Sc-Cdc24	I K Y Q DE D GD F V V LGS D ED W N V A K E L A E -----N N E K F L N I R L Y-----	854

Alignment of fungal CBSn-PBI proteins

Mg-CBSn-PBI	-----	
Fg-CBSn-PBI	-----MSGSHNTHRSTPNKGRGAVPFANSPSGGGGGSSNIPRPVLEP-----	44
An-CBSn-PBI	-----MS--STPTFRGTTSHR--TVGRGLPDFEGGSSASHIPRPRPESSTITSHNP	49
Yl-CBSn-PBI	-----MSRNTPSRFSNYSGTSQTSP-----	21
Ca-CBSn-PBI	-----	
Sp-CBSn-PBI	-----MTVGTLVVSSSTASDT-----	16
Cc-CBSn-PBI	-----	
Lb-CBSn-PBI	-----	
Pp-CBSn-PBI	-----	
Pg-CBSn-PBI	MSRIPLPIQVNSTTPTQH Q H Q H Q H Q HSPNSLMTSSQRSANRSGLPRPN S IYSDDPAL T S	60
Pb-CBSn-PBI A	-----MLPKPSRS	8
Pb-CBSn-PBI B	-----	
Bd-CBSn-PBI	-----	

Mg-CBSn-PBI	-----MSAS--RQKQTKRDEAIRK M ENDLAK K HH-----VTGRAR H S	36
Fg-CBSn-PBI	-TPPAETG-SSFSAS--RQKQSKRDEAIRK K LENDLS K KKH-----LTSRAR H S	89
An-CBSn-PBI	HTPSSD I GSST M SAASSR Q R Q N Q SKRDEAIRK K LEADLN K KRS-----NPARAN R T	100
Yl-CBSn-PBI	-----IDSL T ES--RKRQSK K DEAIRK L ETDLS K RSH-----VRPK P --T	58
Ca-CBSn-PBI	-----MAP P TS L DS--RQRQSKR D AIRK K IEN D L R KK A -----STSL S TRR	41
Sp-CBSn-PBI	-----ASH V SD T --RKRQ Y QR D EAL R KK I ISE L G K K S GN F -----ESPVR K IR	57
Cc-CBSn-PBI	-----M S T V SG S MS H SE T R K T N RR D EAIRK K IE S EL A RR--T I ST H Q P PP S RR R G K	53
Lb-CBSn-PBI	-----M S SL S --F Q SD P RR K Q S KR D EAIRK K IE S EL S RR K --T I ST T Q Q RS K R G --V K	49
Pp-CBSn-PBI	-----M S T V S--A S VA E TR K K Q TKR D EAIRK K IE G EL S RR K --T I ST T Q T SS R R G -- H K	49
Pg-CBSn-PBI	STSPSS H RNT S F Q SS L SE T R Q R Q R K DEAIRK K IE N L Q R K RP G Q K RT N NP A GSS G G P R	120
Pb-CBSn-PBI A	RL P A I ATA R A E TP D V A NN R Q R Q T K D EAIRK K LE Q EL S KK R -----TG T TR V R-- Q	58

Pb-CBSn-PB1B	-----ALRKKLENELSKKR-----GGSRLRKH	23
Bd-CBSn-PB1	-----MKRNSASSASGQK-----HDT	16
Mg-CBSn-PB1	RKAPPGTVLALKPSQALQIKPGTTVAEAAQLMAAKREDCVLVTDDEDRAGIFTAKDLAF	96
Fg-CBSn-PB1	RKAPPGTVLALKPSQALQIKPNTTVSEAAQLMAAKREDCVLVTDDEDRAGIFTAKDLAF	149
An-CBSn-PB1	RKAPPGTVLALKPSALQIKPSTTIAEAAQLMAAKREDCVLVTDDEDRAGIFTAKDLAF	160
Yl-CBSn-PB1	KKIVSGTVMALKPSPAVTIKPKTSVSEAAQLMSAKRENCVLVIEDDN-ISGIFTAKDLAF	117
Ca-CBSn-PB1	SRGAPGTVLWLKPGPEPIICKPTATVVEVAQLMTARRENCVLVVEIEGELLGIFTAKDVAF	101
Sp-CBSn-PB1	RNGEPGTVDSAADLPAALTVHMQLVTEAQLMAAKRQNCVLVDDDEQLAGIVTATDIAT	117
Cc-CBSn-PB1	NAPTKGTVAALKPSPALTVPENITVAEASQLCAAKRTDCVLVVDDEEGLSGIFTAKDLAY	113
Lb-CBSn-PB1	ATPAKGTVAALKPSPALTVPENITVAEASQLCAAKRTDCVLVVDDEEGLSGIFTAKDLAY	109
Pp-CBSn-PB1	PNVQKGTVAALKPSPALTVPENITVSEASQLCAAKRTDCVLVVDDEEGLSGIFTAKDLAY	109
Pg-CBSn-PB1	PKRQAGTVSALRPLPALTVPNIIVADASQLCAAKRTDCVLVVDDEHLGIFTAKDLAF	180
Pb-CBSn-PB1A	TRKIAGTVSALRPAQALTVKENMLVIEASQLMAAKRSDCVLVVDEDDHLSGIFTAKDLAY	118
Pb-CBSn-PB1B	AQRVAGTVSALRPAQALTVKENMLVMEAAQLLAAKRDCVLVVDDEDDHLSGIFTAKDIAY	83
Bd-CBSn-PB1	RRTRVGTVSSLRPAPII I IETARI I QAAQLMAAKRTDAVLVVGEDGALAGILTDKDIAY	76
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Mg-CBSn-PB1	RVVGAGLKATNVTIAEIMTKNPLCARTDTSATDALDLMVRKGRHLPVMDE-----	147
Fg-CBSn-PB1	RVVGAGAKASAVTIAEIMTKNPLCARTDTSATDALDLMVRKGRHLPVMDE-----	200
An-CBSn-PB1	RVVGAGLKARDITVSEIMTKNPLCARTDTSATDALDLMVRKGRHLPVMDE-----	211
Yl-CBSn-PB1	KVVGSLDASVTTVDQIMTRNPLYATTNTSATEGLNLMVNKGRHLPVMDE-----	168
Ca-CBSn-PB1	RIVGSLNATQVTIDTMTKNPICANAADPAGDALNLMVERGFRHLPVLDE-----	152
Sp-CBSn-PB1	RCVGAGLNARQTLIADIMSTSPLCITSDTRFDDALLMIEHKFRHLPVVSDDGGPDGSAGD	177
Cc-CBSn-PB1	RVTAEGLDPHSTPVAQIMTRNPMVTRDTSATEALQLMVSRHRHLPVCNEDG-----	166
Lb-CBSn-PB1	RVTAEGLDPHSTPVSQIMTRNPMVTRDTSATEALQLMVSRHRHLPVCNEDG-----	162
Pp-CBSn-PB1	RVTAEGLDPHVTQVSTIMTRNPMVTRDTSATEALQLMVQRHRHLPVCNEEG-----	162
Pg-CBSn-PB1	RVIGDGMPPRTTPVSAIMTRNPMVTRDTSATEALTMTVTRGRHLPVCNDEG-----	233
Pb-CBSn-PB1A	RVVAESLDARHTPVSQIMTPGMCVTADTSATDALNLMVTRGRHLPVCNEEG-----	171
Pb-CBSn-PB1B	RVVAEELDASHTTVATIMTRGPMCVTSDTSATDALNLMVTRGRHLPVCNEEG-----	136
Bd-CBSn-PB1	RVVAEGLDIRTPVSSVMTRDPIAVYDKGSRNEALNIMVSRFRHLPVIVSETGGGNDDDD	136
	* * * * *	
Mg-CBSn-PB1	-----NQDISGILDITKCFYDAMEKLERAYSSSRKLYDALEGVQSELGA-----	191
Fg-CBSn-PB1	-----NQDISGVLDTKCFYDAMEKLERAYSSSRKLYDALEGVQSELGS-----	244
An-CBSn-PB1	-----NQDISGVLDTKCFYDAMEKLERAYSSSRKLYDALEGVQSELGS-----	255
Yl-CBSn-PB1	-----NNEVSGILDITKCYHEAMEKLERAYQSSRKLDALEGVQTELGS-----	212
Ca-CBSn-PB1	-----KSQIVGVLDITKSYAQQMEKLERMHSSSKLHEALDSVHNEIGVG-----	197
Sp-CBSn-PB1	-----EGDVIGIINMRACLREPLNRIARQQEAAQKLVLEAEGAQEEIENKSVSGNTN	229
Cc-CBSn-PB1	-----NVVGLLDITKVFHEALGKVERSSAASEQLFNAMAGVQSELGG-----	208
Lb-CBSn-PB1	-----NVVGLLDITKVFHEALGKVERSSAASEQLFAMAGVQSELGGA-----	205
Pp-CBSn-PB1	-----NVVGLLDITKVFHEALDKVERSSASEKLYSALAGVQSELGTG-----	205
Pg-CBSn-PB1	-----DVIGLLDITKVFHEALEKLERAYGSSQKLYNAIEGVQSEFGSGG-----	277
Pb-CBSn-PB1A	-----DIFGLLDITKCLYEALDKMERAFFGSSSRKLYDALEGVEREWSGS-----	214
Pb-CBSn-PB1B	-----DIFGLLDITKCLYEALDKMERAYGSSSRKLYDALEGVEREWSSS-----	179
Bd-CBSn-PB1	NEFDEAAGGTSVVGLLDITKCFVERIDDLERKVNEDLNIISAMEALERRGTV-----	189
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Mg-CBSn-PB1	-----SQPQQIIQYVEALRTKMSGPTLESVLNG-----MPPTTVGVKTSVKEAAQM	237
Fg-CBSn-PB1	-----TQPQQIIQYVEALRSKMSGPTLETVLNG-----VPPTTVSVRTSVREAQAL	290
An-CBSn-PB1	-----SQPQQIIQYVEALRSKMSGPTLESVLDG-----MPPTTVSVRTTVKEAAAL	301
Yl-CBSn-PB1	-----SQPAQIIQYVEALKQRMGPDLLESVLDG-----TPPTYVDVRTTVFEAASL	258
Ca-CBSn-PB1	-----EQPHHVVFQYFETLKNKMGPTLEDALDAN-----TVPTYVNVKASVHEATML	244
Sp-CBSn-PB1	SSSVSGNHAAEFLEYVESLKKKASGLEIMSLIDSS-----EEPFLVGRTRTTVAEATES	282
Cc-CBSn-PB1	-VGSNPQAA-AMLAWAEKREKTALPDLTTVMDSR-----THPATVGPKTTVRDVAKL	259
Lb-CBSn-PB1	-VGSNPQAA-AMLAWAEKREKTALPDLTTVMDSR-----TQPATVGPKTTVREVAKL	256
Pp-CBSn-PB1	-LGANPQAA-AMLSYVESLREKTALPDLTSMDSR-----TQPATVGPKTTVKEAVL	256
Pg-CBSn-PB1	-RGTTPGAVNPLMAYVEALRNKMSFPDLGSLDAR-----TSAATVGVKTSVKEAAVL	329
Pb-CBSn-PB1A	-----PVQLAQYMETLRDKMSCPDLNTVLDG-----SLPAQVSVKVNVRDVARL	258
Pb-CBSn-PB1B	-----PIQLVQYMEALRDRMSCPDLHSLVLDG-----SPPPEVDVKVNVREIAKM	223
Bd-CBSn-PB1	-----AEHVGVRQHHCQPDVGFVLTQTIIGGQLEHGTVPEVSIKSSVRDAARI	237
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Mg-CBSn-PB1 TRERL-----DSVAPGDSASHAGVESPGHSIVQHSPELPV-SEIPFPFKFK 433
 Fg-CBSn-PB1 VRDLN-----DTVAPGDSASHVGMESPPRSILPDVLEHQPELPPFPFKFK 486
 An-CBSn-PB1 SFDAR-----DSVLPNESASHHGGD-----EHSEFHHGELSPFPFKFK 487
 Yl-CBSn-PB1 SHSELAQFGV-----GEVGPSDSISTDGYDRP-----GSNAAGMIATMPFQFKFK 450
 Ca-CBSn-PB1 TPSEFHSFN-----VDIKPSDSVSHVNTSPLKAS-SFKMTSSMTVDEIPFIFKFK 453
 Sp-CBSn-PB1 SQKPMPTPENGSNSFA-ASPYLQPYNSASQLAPSYVGLPQYHGNPSFVEQALQDLVQPT 558
 Cc-CBSn-PB1 HS-EVHPNDSASVVDD-DNGSMLS-YSRKKGVSVP---LGSAP----VQDDGTYYVFKFR 470
 Lb-CBSn-PB1 HS-EVHPNDSASVIDD-DPVSVLDGYPRHKGLNIP---SGAAP----IPVDDGTYYVFKFR 477
 Pp-CBSn-PB1 HSPEVHPNDSASMVDEQEEHSVLEGYSSKQGEPLP---SIVGPPVPLPAVDDGTYYVFKFR 482
 Pg-CBSn-PB1 PGSELAPNDSASVVQE-DYESALAGRSTLQSVTSSQPFTGMVP----LDYDDGTYYLKF I 554
 Pb-CBSn-PB1A SISFSQLHGFPEISPN-ESASMAHNEENRSANSS---HNTRPTKTSNGGDGSAFAKFT 469
 Pb-CBSn-PB1B SLSYTHLQGYAEILPN-ESASMVATNDDALSTISS---RNIR---THGRD-DGTFSEKFT 430
 Bd-CBSn-PB1 MSNRQSLQLQRTLSPHPDEYSSMLRSQIQNDPDPN---MFTFKLKMTRTNGKVFRRFS 460

Mg-CBSn-PB1 AP--SGRVHRLQVIASHGVAFITNVTSKLGGE----IEAVGGAPEVTEDEGQVRRGFALS 487
 Fg-CBSn-PB1 AP--SGRVHRMKIVATDGEIAFVEATASKLGAE----ADNIGGVPDVEDGKIVGSGFALS 540
 An-CBSn-PB1 AP--SGRVHRVNIPLAAGIAELVAQVTAKLGPE----VEAVGGAASCADGVLNNTGYALS 541
 Yl-CBSn-PB1 SP--SGRNHRLTVVNPAGVTALRTSISDKLS-----VG-----DVELVTQFYALS 493
 Ca-CBSn-PB1 SPGIEGRVHRITLKASDGI IKLRELMNEKLDHK---DFAFLNVPKPDGNSSTQETYAIS 509
 Sp-CBSn-PB1 DS--ASQIFPLNPQSPSQFTIKYRSIAGRVRHRLRLDGINVSDLRTAVEEREKEQLVTLT 616
 Cc-CBSn-PB1 TP--SGRTHRFQSRHDD-IQLLREIVAGKLAID---PFFTEFTG-NPGDEVDPDNDFHLS 523
 Lb-CBSn-PB1 TP--SGRTHRFQARHDD-VEHLREIVSGKLATD---PFFTEFQPKNEDSPKPDIDFHL 531
 Pp-CBSn-PB1 TP--SGRTHRFQARHDN-VENLRDVIAGKLATD---PFFTYKTADPSEPPDPDFLLS 536
 Pg-CBSn-PB1 AP--SGSAHRFQARYDS-YDFVREIVVVKIESD---PFIADHPS-NATTIKPDAQDFQLA 607
 Pb-CBSn-PB1A TK--GGKTHR-IASTPK-HSQLELVRQKVLSE---HVPS----AAEG-----EWLSIS 512
 Pb-CBSn-PB1B SL--SGRTHRFVAPLDS-YSQLFDSVLQKVATE---HLTLTGKRAGEGAADPSAEWLSIS 484
 Bd-CBSn-PB1 SR--FNLSSEVYAQVCL-KTGAKSLIFEAAATS---GTHSMRSEHLDELTKDGEIVRIC 514

Mg-CBSn-PB1 YLDNEGDSVSIADQDLLEAILLARQSGRDKVDFVHDPEKPPVAVAAPAAVPPAPSEPV 547
 Fg-CBSn-PB1 FLDDGEDSISITADHDLLEAVILARQAHHDKVDFVHDPEKPPVSAADPRHP----- 592
 An-CBSn-PB1 YVDNEGDTVSIITDQDLVDAVYIARHARRDKVDFVHDPAQPPVIPAP----- 589
 Yl-CBSn-PB1 YIDDEGDIVAITSDQDLDAVSI TRRAGLEKADLFHHPDNE----- 535
 Ca-CBSn-PB1 YVDDEGDVVSITSDSLAECIRINLNQNEKADLYLHNPHEP----- 551
 Sp-CBSn-PB1 YIDDEGDVVELVSDSLREAILLARRRGLPRLEVRGVAAF TNHLESS----- 663
 Cc-CBSn-PB1 YTDDDGDSVLMTTDSADVAVTIARNHNQQRVVLFIQGGKGWAEAG-----D 570
 Lb-CBSn-PB1 YTDADGDTVLITSDDDITDAVKIARTAGTDRVVLVQGGKGWAEAGA-----D 579
 Pp-CBSn-PB1 YTDADGDIVLITSDTDSVDAVKIARAAGADRVVLYIQGGKGWADVMA-----E 584
 Pg-CBSn-PB1 YLDDENDLVLITSDRDVTDVAVNQAKKQRKDRVVLHRLGKGSWGDSELS-----K 656
 Pb-CBSn-PB1A YLDDEDEVLITSDADVQDAVRLARKLGQDRVKLFAHDSTSVTAHTA----- 559
 Pb-CBSn-PB1B YMDDENDVLMSSDADVQDAVMLARKVGGSRVKLFIHD--AMIESIA----- 529
 Bd-CBSn-PB1 YMDDENDVVHLESKDVEEAVLMSRRLGLTRLMIIYLGEPLQNAVTDSE-----Q 563

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Mg-CBSn-PB1 SVPIPTPASSVARERRRRKS-PASDESDEEESEDDGSSTLRRPRRHQRA-AAAQEQPL 605
 Fg-CBSn-PB1 ----ATPSVSTGAGLRERRRWWPEEEEEEDDDSEDEHPARRRKSRAAHTH-AHAHEEQI 647
 An-CBSn-PB1 ----VEPAPVKPVEVKT-----PASDDQLSEE-----SPIPKPRATQAYPAHPPEEQ 633
 Yl-CBSn-PB1 ----VKPVVT-----QKLEDSVEIPVAAAAAPAEI 562
 Ca-CBSn-PB1 ----APIEN-----IKSIHKSANRHNAGNDNGL 575
 Sp-CBSn-PB1 ----HPIISTVDSSIGS-----ASVVEKGVANSIVDIHQPTAKA 698
 Cc-CBSn-PB1 KSEAKAQEVS--AAALKEVKEVEKAEEDTPLVQTPPKATTPTT---RGVVHNPQEE 624
 Lb-CBSn-PB1 KSEAKAAAVT--AAAQKEVKEVEKAEIIVVTPPPVEAPVAQTTPVQ--THRPRAPPAEE 636
 Pp-CBSn-PB1 KSAQAQAEVA--AAAQAEKVEVEKAEVSLP-----EPVSNPPPP----PVHVVEDET 630
 Pg-CBSn-PB1 KKAEEVYSTR--LKAVTEAEEIENELEERHSQAGSRDRLSTTRSSKKNAHNQTPVDPTL 714
 Pb-CBSn-PB1A EPPAPVISLS--PPSDVSSKTRQEDDDTSSMSTRKRSSKRKSSRRNESEEPPEYES 617
 Pb-CBSn-PB1B AEEAELIDNN--DDG-----EEDTAEETEEYIRKSSKKRSHRRHHYDD----- 573
 Bd-CBSn-PB1 YSSGATPNVGHGGQVRYEDSHQSVVSEQLVEGGNSRINPVVVYNP INGGQGRDPPAS 623

Mg-CBSn-PB1 IAGVPELLLPGAIVTLA-VVIVGVFTISRISNNR- 640
 Fg-CBSn-PB1 IAGVPELILPGAIVTLA-VAIVGVFTIARLTSR--- 680
 An-CBSn-PB1 IAGVPNDLLLPGAIVTLA-AVIAGVFILSRATSR--- 666
 Yl-CBSn-PB1 IPGLSNDLLLPGAVAVVA-AACAVAFSLGRAR----- 593

Ca-CBSn-PB1	IFGIPNEILIPSALAVLG-ASIIIVGFTLSRK-----	605
Sp-CBSn-PB1	DKGNSKKPIYIGIVSSSI-VILAVSMWYLRRKR----	730
Cc-CBSn-PB1	VFGIPKDLLLPASIGALA-VVIIDGEWKPLDR----	656
Lb-CBSn-PB1	VFGIPKDLLLPASIGALA-VVIIGIFTISRLSSPSHY	672
Pp-CBSn-PB1	VMGIPKDLLLPASIGALA-AVILGVFTISRLSR----	662
Pg-CBSn-PB1	VAGVPKEFILPAATIGFLG-VVILGVFLASKPGH----	746
Pb-CBSn-PB1A	NTGFPQELILPASIAFLG-VVILGVFAFSRVSPKHR-	652
Pb-CBSn-PB1B	--GFPRDLLLPAATVFLG-VVVVGVAISRISPRHR-	606
Bd-CBSn-PB1	IVDYLKDAPLPVNIAISAGIIVVASYLIMKLQR----	656