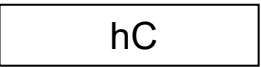
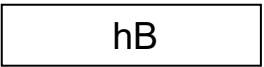
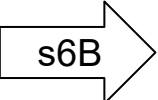


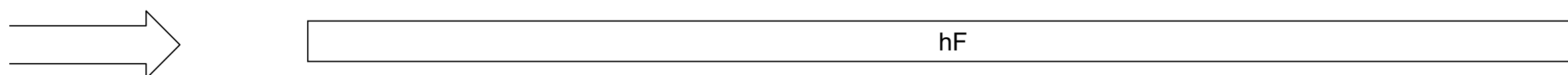
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CpSPN4  : -----FGQNQGIKGHDEPEYPTNLHNGLSEATGNFSVELLYHAAKK--Q-----
CpSPN5  : -----MRFTVLILLTSSCYCDVEFSEPRNFSIELLYHTQK--Q-----
CpSPN6  : -----VTGQCFYKDDSAKKLDPEARTSLYRGQLEFTLNLFNSINDA--Y-----
CpSPN7  : -----MWKVIIAACTSLVVTAPVDDRVDSPINQFALRLLDNAYAFQEN-----
CpSPN8  : -----LGQNHGVKEPVYRMNLAKFSESTGNFTIELLYHVAKR--Q-----
CpSPN9  : -----ATYLYLLAIFLPPILGQCSVEKAGHSFSRAVYEFSLDLIQRVGQ--E-----
CpSPN10 : -----VLCLAVGLSSARWVRRGRAPPKTTGFVGEATNQLSTAIFQGYID-----
CpSPN11 : -----FLAYLQSLECIDNKRPNARLNYFDTDLLKYTTE--D-----
CpSPN12 : -----VVPVSQSSQLLNMTNDIKLASAVISHVGIEMMK SAR-----E-----
CpSPN13 : -----AISEHEENTTDPSVTDQPHEQQLSNTINELGFKLLTEEMKR--Y-----
CpSPN14 : -----NCDERSVTAYYKKPIYEFSTGLLDRVSQ--E-----
CpSPN15 : -----MDPKLSLSLWNFAARFCNELEKG-----
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CpSPN17 : -----MTSISHVANFGARFCNELDNS-----
CpSPN18 : -----MVKWGRRNKVVQFLGTLSEMPYEL--D-----
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CpSPN22 : -----
CpSPN23 : -----
CpSPN24 : -----MEPSLAASLSHFAARFANELEKG-----
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CpSPN26 : DNFVKISTINPHQQNNNPPLKVKETINKVSNPVSKTTVGLETTTSTSTETPMDPILSESMDDL LSQVVNQAPQSI VDS ENKLQESNVISTAENFVDTTTVVI
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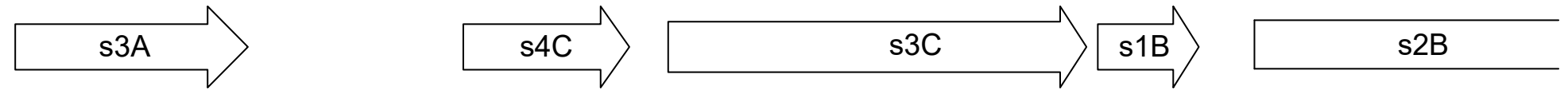


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CpSPN3	:	-----SE-ENFLL	SPL	S	GLKLALAILTEAA-TGPTQAQLASV	LGFQDVN		
CpSPN4	:	-----GK-QNLIL	SP	S	ITAWTVLAVTSEGA-LGNTRTQLVSAL	RIKRN		
CpSPN5	:	-----TG-GHVVI	SP	S	FGIWTLMTGLAVGA-TGDSFEQIRVAFILPRS			
CpSPN6	:	-----PT-DNIFF	SP	S	FVYHSLLLAYFSA-GGQTEASLKES	LQIE-K		
CpSPN7	:	-----FGRQN	FAI	SPL	S	VWSVFSLLAEGS-AGDTFQELMKEL	QLPQD	
CpSPN8	:	-----PD-QNFVV	SP	S	FAAWTMLAVTYEGA-VGNTNEELILAL	RFPRK		
CpSPN9	:	-----ND-NHFVT	SP	S	FLWTVLTTASLGA-EDETTLAEMKRV	LRLH-H		
CpSPN10	:	-----DN-KNIAF	SP	S	LGYSAILAILAEGA-TGQTREQLVSAL	HLPEN		
CpSPN11	:	-----RS-GNVVV	SP	S	ASIKSTLAMLLAEGA-SGNTEVEIRCS	LRLSPN		
CpSPN12	:	-----NH-SNVVV	SP	S	TSVVNMLALLQAGA-TGVTQEQVSNA	LRLS-P		
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CpSPN15	:	-----KSQVC	SPL	S	LAQAVLALTALGS-GGDTRKELLQAM	ALP-D		
CpSPN16	:	-----TG-GHVVI	SP	S	FGIWTLMTGVALGA-TGNSFAELQRA	FILPRS		
CpSPN17	:	-----KNFIC	SPL	S	SVETVLALVALGS-SNESRAEIFKAL	DIP-N		
CpSPN18	:	-----SN-KNFIC	SPL	S	SVETVLALVALGS-RNDSREEIFKAL	DIP-N		
CpSPN19	:	-----KTFIC	SPL	S	SVETVLALVALGS-SNESRAEIFKAL	DIP-N		
CpSPN20	:	-----NG-ISFLQ	SGL	S	FLYHLLMSLSLTM-DQNAVREIEEY	FGLNMS		
CpSPN21	:	-----KNFIC	SPL	S	SVETVLALVALGS-SNESRAEIFKAL	NIP-N		
CpSPN22	:	-----MSAMS	S	S	VFTPIAELCLYTEDGPAFDQCIKI	LNLK-D		
CpSPN23	:	-----MSF			-----CSAGKQDL	-----		
CpSPN24	:	-----KSQVC	SPL	S	LAQAVLALTALGS-GGDTRKELLEAM	ALS-D		
CpSPN25	:	-----PN-ENIIM	SAMS	S	VFTPIAQLCLYS-NGPAFDQCIKT	LNLK-D		
CpSPN26	:	KFKTDGNNPESPD	KDIVLDVSKENQGLEVT	TKDLSDDVAQFTELCNELAFRYWNAIAETIPNKRSFIL	SP	S	ITSMLAMFMGA-RGATSGEMNEI	LKLD-D

	hD	s2A	hE	s1A
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CpSPN2	: --TDAIRSSFSLVSSRLKS-----VKGVTLDVANR-VYLQQG-HELDPKLKDDAVKVFDAGL-----			
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CpSPN7	: --LRATQELHLAADSVLRSN-----DPDLVIHKQAA-LFPECS-LEIHQEFC-----			
CpSPN8	: SPRTTVRYYYQEIAQWLNVN-----RTTAQFTKFSG-IFMDRVWTGMDNDFRHIAEEIYNTEA-----			
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CpSPN10	: --PNLIRKTYRYIMERLKNTH-----YKYNQPELKNY-FYIYKN-YTINDDYKKILEDYLLTDVRSVERYNDVDHFKPDESNDDEETIEISDKKAA			
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CpSPN12	: --EKSA-EAFRLMNTLRLRS-----TERNILRSASS-IFAADS-FELSRDFKNIAIQNFGSEV-----			
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CpSPN14	: CMQRTLRLKTLNSLY-----GEGKDYKCQSL-VIIDKY-LAVKNYFKRRVERSRTVKV-----			
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CpSPN18	: --EDNLRVFTSVTQNLKKPFIESLTSKLNPFNRDSTLQIATK-IYVKCG-KSVKPELKKDAEKVFNSSL-----			
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CpSPN20	: --EADKIEILERTVSWLPKS-----SEELKFRWSSR-LVLQR--VAAGNGLHGAAARVLPLRL-----			
CpSPN21	: --EDNLFSTFTSLTATLASKDPSEFKT-----CEDVTLKIANI-IYVKHG-GALKAALKKKDAEEVFQASL-----			
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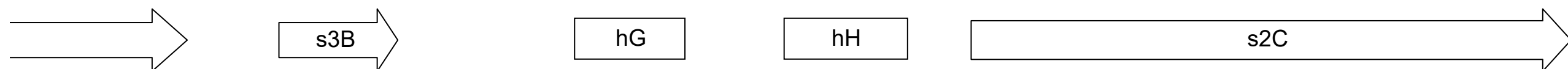
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CpSPN3  : -----KKVDFRLPAETA-----AQINGW-----VSNLTHGNIIPNLID
CpSPN4  : -----VDLDFKNSAATA-----ATINGA-----VSTATKGRIPKLVD
CpSPN5  : -----KVLDFKDSNEAA-----AKANNF-----IQNSGARVTNVLT
CpSPN6  : -----ERLNFHETPSEA-----R-----EHINKW-----VAAATKNHIQALIP
CpSPN7  : -----QAANMY-----RTEGQIRNAVK
CpSPN8  : -----VDLPFKNKAAAA-----TINRA-----VSLTTEDRIPTLID
CpSPN9  : -----MILPFDNYNNVA-----TTINNY-----VSQATHNTIQEIVN
CpSPN10 : ESNKNEEIVDLVPPKESG-----EKFISFAVEDKPEKVDISQIEYKPAKNIKEKIKLVKTYPKKDDSGEEEEETMVAVEARNHARSHHHVLQE
CpSPN11 : -----VILNFLDPVGSA-----AIVNDW-----VGNQTRGLIRSLIE
CpSPN12 : -----SRISFDNPNAAG-----QKINSW-----IASKTNDQIDRLVS
CpSPN13 : -----RAVEFTDAPLAR-----DTVNDW-----IKNHTKGKIEEFLK
CpSPN14 : -----ASLDRDTPYDSA-----DEASEI-----IERATG--VGNSID
CpSPN15 : -----QQVDFMEKEGAA-----DSINKW-----VAAKTNNMIRNIVS
CpSPN16 : -----KVLDFKNPDLAA-----GKANNF-----IQNSGGRVSNVLT
CpSPN17 : -----EQIDFTQSNNAAG-----NAINKW-----VSNQTNNTIKDIVS
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CpSPN19 : -----ELIDFGKNDDAA-----NSINNW-----VAKQTNDI IKDIVS
CpSPN20 : -----SWLVGNETSTQLA-----ETLNSM-----VLSDSGGSMHDTFS
CpSPN21 : -----EQIDFTQSNNAAG-----NAINKW-----VSNQTNNTIKDIVS
CpSPN22 : -----QNLDFSKNVEAA-----AIMNAW-----VESQTNNRIKNLVT
CpSPN23 : -----EQIDFTQSNNAAG-----NAINKW-----VSNQTNNTIKDIVS
CpSPN24 : -----EQLDFTESAAAAGAVNKWMANKVYVTNKS KLQPD IQKDAEEVFQSALEQLDFTENAAAVGAVNKW-----VAEQTEDMIKDVVD
CpSPN25 : -----QEIDFIKKNQAA-----AIMNAW-----VESKTNNRIKDLVS
CpSPN26 : -----EEINFKLISDII-----R-----RRTNLL-----VKRYTWGKIIEYMK
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CpSPN2  : EDSL-----NALTRLVLVNALYFKGKWKHQFKPHNTMDKPFYVKKD TTV-DV----PMMYIEEQ-FRYGESDKLNAQL-----
CpSPN3  : EDEV-----KGSIVLVLTTLFFKGTWKHQFNPNTTKTRAFYVTP TVQK-QV----PFMNVKDK-FYYAESAKYDAKI-----
CpSPN4  : ESNL-----SDAQMIITS AVYFKGQWTAPFNVSSSTKQNFYNSSGMKIGEV----NMMYNRYT-YPFANIKEIQARV-----
CpSPN5  : SEDF-----EQSRMILTNVITFKGLWTSPFNASH TTLEYFYNENKEIIGEV----NMMHQKGE-FPLSNIIDLKSFV-----
CpSPN6  : EDGI-----THTTKLVLANAAYFKGVWASKFPAERTKKEAFFVSETLQT-LV----PFMKQKGT-FHFMVSEDLGAQI-----
CpSPN7  : EEFL-----RDLRLLIVDALYFKANWTHPFDPTATREEDFYNGQGKTIGRV----NMMFHKAS-HNVGDSNSIGAQI-----
CpSPN8  : ESHL-----NNTQLIIASAVYFNGQWTAPFNV-ITVKRDFYNSIGEKIGEV----NMMYNRYT-YPFANISELQASV-----
CpSPN9  : SNDI-----EGVYLLLLDAVYFKGMWNIPFEPSETEVTSFYDERNNPVGDV----NMMFSMRQ-YNLASIDQLQAKV-----
CpSPN10 : KSDIASSISVNTVVGKKSEKTSPSNSLMLIFNGMYFRGAWKQPF--LKVEPAMFYTSNSEKK-QV----QMMCTKGI-FKTGSLPGLDSSA-----
CpSPN11 : PAHI-----PPSSDVLVIN ALYFKSAWQHAFDRSLTRSACFRVQGACKK-QV----AMMEISTE-LNYAFVDNLRAHA-----
CpSPN12 : PDSI-----GVNTQLVLN A IYFKGIWETMFKPSETSLQDENLSNGSKK-SV----PFMTLRSG-FRAGVDKANKALV-----
CpSPN13 : EPL-----PVETRVVLLSALYFSGQWTHPFLPEHTKKMAFK-TPTGDV-MA----DMMLNFGH-FQYTYS AEDGVQM-----
CpSPN14 : PFEF-----KLTSLMLADVATFKAAWRQPFDPGFTAVQPFYHGNVKLG-EV----NMMSSIGY-FNYINLTAINAEV-----
CpSPN15 : PNSL-----HYATRLLL VNAIYFQGTWEKPF EKDLTKERIFHVNNRDTV-EV----PMMFMDEEYFRYRHSLELKAQL-----
CpSPN16 : SDDF-----AESRMILTNVISFKGLWLSPFNTSETTVENFYNNENNDVVGVQV----NMMYQRAE-FPFSNIVELKAFV-----
CpSPN17 : ADML-----DEDTRLVLINAIYFHAFWEYQFDADDTYTRVFHVNKSKKI-DI----KQMSLMGKPFNYKHSPELKAKI-----
CpSPN18 : ADML-----DGD TGLVLVNAIH FH-----I-----
CpSPN19 : ADML-----MQDTRVVLVNAIYFHGFWEIPFKANATFTEKFQVNRTKSV-NV----KMMTLEGPSFNYKHSPELQAKI-----
CpSPN20 : EE EV-----EAGVCAAALGTVYLRGTWRTA-PTLLNDTL PFRDSPAAPN-RS----SRYFRLNDLMAYSYLHEWDTEA-----
CpSPN21 : ADML-----DEDTRLVLINAIYFHAFWEYRFDADDTCTRVFHVNN SKKI-DI----KQMSLMGKPFNYKHSPELKAKI-----
CpSPN22 : PDMI-----SALTRLVLINAIYFKGNWLYRFNETNTKEEDFYLS DGSTA-KV----KLMYQEINDLEYGEVPSLDCKV-----
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CpSPN25 : PDML-----SESTRIVLINAIYFKGKWLKQFNENDTKKEDFYLS DGSTT-KT----KLMYQEIKDLEYGEDASLDCKV-----
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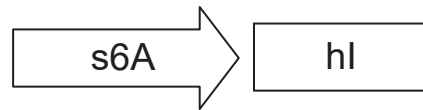
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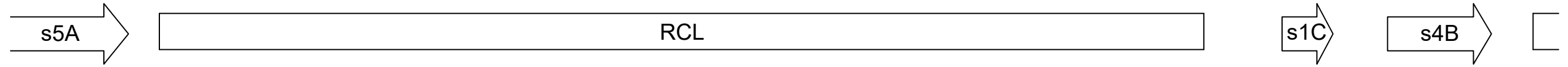
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CpSPN3  : -----LRMPY-LGKKFSMYIVVP--NSLKG----LPRVMDSL----SD---LRTEMLYLAER-----TVDVTLPK
CpSPN4  : -----IELPYGVENRLSMLLMIP--NPGVT----LEDMFLNF--KKVP---LDTV FQELKLS-----QEEYSDD EIDCFIPR
CpSPN5  : -----CELT YGTDAAYSMLVILP--HPGVK----VEDVYKKF--ENIT---IPDIIARLQND-----EKEYGLDEVEIKLPR
CpSPN6  : -----LELPY-KGNDISMYILLP PYSMKED---MTNRCKPY--GEFA---WPYSMQNLLVSD FHRCEEHHSQPDTPARLA AVVEESYMGREVIVEIPK
CpSPN7  : -----LEMTY GKHEEF SMLILIP--FEGMP----LKTLLSNLVT SPLD---WITDFKRDDKR-----PEIDVFI PR
CpSPN8  : -----IELPYGVENHMSMILILP--NPGMT----LKDMFLIF--LKAN---LKT V FQELKVS-----QEERGDVEIDCFIPR
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CpSPN20 : -----IEIPY-ATPGLTLLI LIVP--KELS----LRPLVERA--AAVG---LDAVVGVMHTM-----RIAVTLPL
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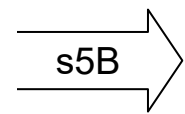
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CpSPN3 : FKFDFTS-ILDGVLKD-----LGIRQAFEDTASFP-----GLARGQSPQNRLKISKV
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CpSPN5 : FKISTNI-VMNRPLND-----MGVYDIFDPEYA-----SFSRA--TNESIYVSAI
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CpSPN7 : FKISSQI-DLIPALKY-----TGIHTIFDSEKA-----QLPGI--SDSPLFVSKT
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CpSPN9 : AQFPHI-----SDYSFYISNV
CpSPN10 : FYVETTT-KPVAALAK-----FGVSSI FSRDAE-----LSGVS-SAEGLFVQEL
CpSPN11 : FTVDYSE-DMVGPLRS-----MRITTLFSSKSN-----LSGII--EGGPAQINHL
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CpSPN14 : FKISSEIVNLPELISD-----MGVSYIFKINGN-----LKGI--SDFPIRVNRM
CpSPN15 : FKIETDI-NLEELLPK-----MGIHDIFDQNKs-----DIRMFT-SHDRMCVTQA
CpSPN16 : FKISTNV-VMNKPLND-----MGVYDIFQPDVA-----SFKRV--TNENIYVSAI
CpSPN17 : FKIESEI-NLKELLPKGTSPTRKVGVNIFCCNPTVWGIVGKMGIKAI FDPIKS-----EVNMLS-SDDRQFVSQA
CpSPN18 : FKVETEI-NLRELLPK-----MGIQTIFDKNKA-----EINMLS-SNDPLHVSEA
CpSPN19 : FKAETEI-NLKELLPK-----MGIKAVFDMNKG-----DTTMLS-SDEPLYVSEA
CpSPN20 : YTLRMTL-LLPNKLQD-----MGMQSLLTNGTD-----CQPVRLSHA
CpSPN21 : FKIESEI-NLKELLPK-----MGIKTIFDPIKS-----EVNMLS-SDDRQFVSQA
CpSPN22 : FVISTTT-DLKVLLQK-----SEV-----
CpSPN23 : FKIESEI-NLKELLPK-----MGIKAI FDPIKS-----EVNMLS-SDDRQFVSQA
CpSPN24 : FKIETEI-DLTQLLPE-----MGIKLIFND RYS-----NINMLT-SNEPLYVSKA
CpSPN25 : FVISTTT-DLKDLLKK-----ANITNWFNCGNS-----GLSGLLAKPEDICITEA
CpSPN26 : FSHKSIF-NVSSTLKK-----MGLKDLFDAEHA-----DLGGLNGPSKDLYLSDM



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MsSPN1K : IQKAFIEVNEEGAEAAA-----ANAF-----KITTYSFHFVPKVEINKPFFFSCLKYNRNS-
CpSPN1  : IQKAFIEVNEEGAEAAA-----ANDF-----GVTY-----LSAYVKPETYFNADHPFIFILKSGESA-
CpSPN2  : IQKAFIEVNEEGAEAAA-----ATAM-----NIMM-----CCAMVDVAPVPVFTADRPFLLAVIQAHGIL-
CpSPN3  : LQSGGIEVNELGSAVYS-----VTEV-----SLVN-----KFGEDSEYSAGEVIANRPFLFFIEDEATRQ
CpSPN4  : IHKAEIEVTTEGTTASG-----ATAA-----EFANRIGVIRFEANRPFSYLIVEKVTNT
CpSPN5  : VHKADIEVSETGTVASA-----VSTA-----YLSNRFGTTKLIADRPFLLYFIEKSTAT
CpSPN6  : VHKAKIQIDEEGTVAAG-----ATAI-----FGFRSSRPAEPTRFVANFPFVYLVYERPTNS
CpSPN7  : IQNVEIDVKEEGTVAAA-----ATVV-----GLENRFLSQRFKANKEFVFMITHRKSNV
CpSPN8  : IHKTEIDVTEESSTPSG-----NIAP-----EFANDSKVLIFEANRPFSYFIVEKHTDT
CpSPN9  : VQKADVEVTEEGTVAAA-----ASAA-----EFEARRLPDSFQANRPFVFMIVDKLNYI
CpSPN10 : VQHVAVRVDNADTSASQ-----LSAI-----NAVQESLKNIPSSIKEPRRFSVDRPFMFIFIIDRLDNL
CpSPN11 : YHRVYVSVDEEDGTVAAG-----ASAA-----LVVPLIEGNVQLVVDKPFPAFFIKDNTLGL
CpSPN12 : VHSAMMSIDERGATAAG-----STVV-----AVVALSFDNPSVVFRADRPFLLAVLWDNQLNV
CpSPN13 : LHEVRITIDEYGTAVAA-----ASGG-----FLSRTAEQFYVDSPFYMFIRDESTKL
CpSPN14 : KQVVEIEVTEEGVAADI-----VQNL-----IDPEVEPMKFEANRPFAFMLVDKPTET
CpSPN15 : IQRAVIEXNETGTGTEAAA-----CTLT-----AISE-----ICAVIELEPPKRFVADRPFLLYLLARGVP-
CpSPN16 : VHKADIEVTEGTGTVASA-----STSA-----NFADRISTPLMRANKPFAYFIEKTTTT
CpSPN17 : IQKAFIAVDELGTGTEAAA-----ASLLTTWPYQQRKRDSTTLSCIGLILYVDSVDVDIRHF---IEHGHSC
CpSPN18 : IQKAFITVDEKGTGTEAAA-----ANEI-----TLQLLCLRWWMGETFIADHPFLYILLAQEIP-
CpSPN19 : IQKAFISVDEAGTEAAA-----ATQM-----VRRR-----LCGHWWTGETFVANRPFLYQLTAREIP-
CpSPN20 : VQRLMF-WAEAGRNAFK-----DDGI-----EWDPRPELEIVVDRPYLFFVVRWNNVT-
CpSPN21 : IQKAFIAVDELGTGTEAAA-----ATSM-----WQRERCGHFWTGDFTADRPFLLFLLQAHEIP-
CpSPN22 : -----KLMFYVIMCVVT---
CpSPN23 : IQKAFIAVDELGTGTEAAA-----ASLLTTWPYQQRKRDSTTLSCIGLILYVDSVDVDIRHF---IEHGHSC--
CpSPN24 : VQKALIEVDEAGTKAVA-----RTMI-----PPEMPCCIRRPRKFKADRPFVYLLAAREFP-
CpSPN25 : IQKAWCEFNEIGTEATA-----ANVV-----VGVGAMPMPVVFKANRSEFLFYILLKNASE
CpSPN26 : VQATTFVTCGEGIIIGEQHHIEEYPESIELARRRRTSRWATGWDEPRDYQRAFHDPHDVGDMNLPLHLRPRQARLPARNAQPARLKFDRLPFLLYFVRHNPSGM
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MsSPN1K : -MFSGVCVQP-----
CpSPN1  : -LFSGVFYN-----
CpSPN2  : -YFLAVHSGNE-----
CpSPN3  : LLFTGRVSDPLVATAEFKAHTPSA-----
CpSPN4  : IVFGGVYQQPILY-----
CpSPN5  : VIFAGIYSKPSLY-----
CpSPN6  : VLFMGVYRDPKK-----
CpSPN7  : ILFAGVYSDDPAVV-----
CpSPN8  : VVLAVYRKPILY-----
CpSPN9  : PLFTEEDGTERSRLRDSLTFGR-----
CpSPN10 : VVIAGKVIDPEAPTPFEI-----
CpSPN11 : VLFEGKIEEPHEYVAPKKGSENNFVKSSRNSFGTRF----
CpSPN12 : PLFMTKIEDPSL-----
CpSPN13 : VTFSAAIIFNPNL-----
CpSPN14 : ILFAGVYSIPSVF-----
CpSPN15 : -TFIGVYHQ-----
CpSPN16 : VIFGGIYSKPTVY-----
CpSPN17 : ----GLPEHPHFHHMNSVQL-----
CpSPN18 : -IFYGIFHGNETSL-----
CpSPN19 : -IFYGTFYGNYSQ-----
CpSPN20 : -IMNGVFVL-----
CpSPN21 : -VFYGTfngSDIIFFKY-----
CpSPN22 : ----LATDS-----
CpSPN23 : ---CGLPEHPHFHHMNSVQL-----
CpSPN24 : -IFLGIYQGSEFAVPDVSDSDIDQTKPVNVGVKKQLSK--
CpSPN25 : LPIFCGKYGNPN-----
CpSPN26 : ILYVGRYNPRLLP-----
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Shutter Breach Hinge Gate

Figure S1 Multiple sequence alignment of 26 *Cydia pomonella* (CpSPN1-26) with *Manduca sexta* serpin-1K (MsSPN1K). Conserved residues in regions, which are critical for the inhibition mechanism, are highlighted based on the amino acid residues of MsSPN1K. Residues corresponding to the shutter are in cyan, residues of the breach in yellow, residues conserved in the hinge region are in green, and residues of the gate region are in magenta. Predicted α -helix and β -strand and reactive center loop (RCL) secondary structures of serpins are assigned based on the crystal structure of MsSPN1K.