

Trypanosomatids Prozyme:

72390539 *Trypanosoma brucei* TREU927 -----MSVTRINQQTECPSSVHDLVSCWGGCTQSKT---STDSGLEKRFELNFAQPV----
 71408277 *Trypanosoma cruzi* CL Brener -----MLESTWAAAREEVPEVSHALMAMWGGFDGPRN---ANDCGIEKRLELDFRGI----
 157872786 *Leishmania major* Friedlin* -----MPTNSWASSRDVFPESVRALMSLWGGFVNPTS---YSDSGLEKRLELDFFAAV----
 154341969 *Leishmania braziliensis** -----MPPHSWASPRDVFPEVSHALMSLWGGFANPTN---YNDSGLEKRLELDFDTSV----
 588319214 *Phytomonas sp. isolate_EM1* -----MPSWTCRDEYPPQSVHALMSLWGGFAPLPE---VSDSGLEKRLELDFKFFC----
 528258165 *Angomonas deanei* -----MTSWASPRDVYPPSVHDLMSLWGGFDSTAPN---SDNGLEKRFEVDFARHV----
 528251074 *Strigomonas culicis** -----MTSWASPRDAYPSSVHALMSLWGGFDSTAPG---SDSGLEKRFEVDFFAQPI----

Trypanosomatids:

72390527 *Trypanosoma brucei* TREU927 -----MSSC-KDSL-SLMAMWGS IARFDPKHERSEFEGPEKRLEIVIMRVVDG---
 71408275 *Trypanosoma cruzi* CL Brener -----MLSN-KDPL-SLMAMWGSVKGYDPNQGASEFEGPEKRLEIVIMRIIDE---
 157872783 *Leishmania major* Friedlin -----MNVCSNNT-KDPL-TLMAMWGS MKGYNPEQGFSEFEGPEKRLEIVILRSTLE---
 154341967 *Leishmania braziliensis* -----MNVSLNTT-KDPL-TLMAMWGS MKRYNPEQGFSEFEGPEKRLEIVILRSTLE---
 588319215 *Phytomonas sp. isolate_EM1* -----MSS-KDPV-TLMAMWGS MKDYNPDQGFSEFEGPEKRLEIVIRFLPE---
 528270660 *Angomonas deanei* -----MS-SSCN-KDPL-TLMAMWGS MRGYNPDQGFSEFEGPEKRLEIVIRFLDE---
 529494686 *Strigomonas culicis* -----MSVSSPST-KDPL-TLMAMWGS MRGYNPEQGFSEFEGPEKRLEIVIRFLDE---

protists:

831777486 *Acytostelium subglobosum* LB1 --MPIMTTN-KTFNESDAGF-----EVEEQCFPGGFEFEGPEKKLDIRFHPIN[5]Q
 166240588 *Dictyostelium discoideum* AX4 --MPILST--EIFNEADAGFV-----YQSNNDYSDGFEFEGPEKKLDIRFGPIS[9]S
 330840910 *Dictyostelium purpureum* --MPIMST--EIFNESDAGFV-----IBSTQNCYADGFEFEGPEKKLDIRFCPIN[6]S
 470246992 *Dictyostelium fasciculatum* --MPIMSSQ-KIFNEAAGFAHCI[5]NNTTTP[8]QEDQETFPGGFEFEGPEKKLDIRFCISKY[4]S
 290984948 *Naegleria gruberi* NEG-M NGKPIILVN--YAEKHVKHVDC-----ECCAEAGFEFEGPEKRLELDFRPIA[22]
 676381665 *Aureococcus anophagefferens* -----MDESSVPESVGVFEFEGPEKTLVVCFLPGV----
 813169519 *Saprolegnia parasitica* IDQAI PDSTNNVSSDTASSTDS-----RGDQPV-----MDYPNTEFEGPEKNLEVDLVPACD--G
 673049047 *Aphanomyces invadans* -MPTTDDMKTTAASATA-STDSCS-----NCSDTPA-----TVDYPNTEFEGPEKNLEIDFTPA----
 675188663 *Phytophthora parasitica* MAQPFPEPIKLHDETS-STQS-----EASDT-----VPNTEFEGPEKNLEIDFKLVG----
 294883519 *Perkinsus marinus* -MYDFPTQGGPMASDIKQLMREERRDSQEDS-----QEPTEFEGTEKRIEIDFVWSGE---
 551667574 *Guillardia theta* -----MPEI IETNQLFCFEFEGSEKKMEIDFRPID[6]I

fungi:

629651635 *Eutypa lata* -----MVNLAIPSDYTFSPSE--GTPHLTINHDVA--ADLD-STNAEFEGPEKLLVWFVAPGP[5]S
 261202444 *Blastomyces gilchristii* -----MVNIEILKNYTASPSSFMGTSSLTINHEAT--LDLD-SSTADEFEGPEKLLVWFVGPSP[5]S
 50553544 *Yarrowia lipolytica* -----MILEHHVNHQVA--VDLD-SAEAFEGPEKLLVWFVAPNQESLE
 891574827 *Schizosaccharomyces cryophilus* -----MSPILVVDQENA--QEFN-SS-SFEGPEKLLVWFVAPNP[6]G
 6324521 *Saccharomyces cerevisiae* -----MTVTIKELTNHNYIDHELSS--ATLD-STDAEFEGPEKLLVWFVPHKKSII-
 444315950 *Tetrapisispora blattae* -----MSASTIPQETTSFIDYEKS--NNLD-STDAEFEGPEKLLVWFVYPET[6]A
 149237635 *Lodderomyces elongisporus* -----M-----VSPPAY--HQDSFVDHELSS--KNLD-STYAFEGPEKLLVWFVWKSE[5]C
 953449703 *Mixia osmundae* GHSHTNLPLARQHAKHDDHFDPPHHENKANDSGVE--ILQDSAPGFEFEGPEKLLVWFVAPSE[25]
 331247566 *Puccinia graminis* -----MVTVCVLTKDSTSG--AEPAN-NGPPEFEGPEKLLVWFVAPSA[19]
 955498480 *Moesziomyces antarcticus* QRIKSLEIMDARAELLRSKFQDDASSIITAVDSNSG[8]FHD-PCGPFEFEGPEKLLVWFVFAEEP[14]
 914974225 *Tilletiaria anomala* -----MTATTS SQLKSTKEQE--DWME-AQGPFEFEGPEKLLVWFVFAEGP[22]

animals:

74275346 *Homo sapiens* -----MEA-AHFFEGTEKLLVWFVSRQPPDAN
 936678339 *Trichogramma pretiosum* --MMSMEEEGNKKKLEQQQGS DSDVEAGA-----EIMS-VQFFEGVEKLLVWFVSTNV[21]
 157115295 *Aedes aegypti* --MAE-----NEDLSNSS--SSSSSR-----ED-MHFFEGVEKLLVWFVFE---PNPS
 24583360 *Drosophila melanogaster* --MLE-----NG-SHFFEGVEKLLVWFVFESS----
 910327857 *Papilio xuthus* --MAE-----TEIISNSE-----SN-DQFFEGVEKLLVWFVFT---P
 871243907 *Aplysia californica* CIMAS-----AA-SNECFEGTEKLLVWFVSSSH---P
 675851988 *Helobdella robusta* --MKN---IE-----PGSHCTISVVEDPLHEGEYFEGTEKLLVWFVSPSS[8]Q
 156370797 *Nematostella vectensis* --MCE-----VGFFEGPEKLLVWFVWRPTL[15]
 761906225 *Amphimedon queenslandica* --MED-----TNADLSRPAEPHPAADLSRRFSIEEVGFEGTEKLLVWFVFD--IPSPE
 198416848 *Ciona intestinalis* --MSV---VD-----VKDGAP-----QSWFEGVEKLLVWFVSSSA--PD
 268561468 *Caenorhabditis briggsae* --MSA-----TATICS-EKNFAVQTHPV---KAPDEEYFEGAELKLLVWFVFCSTK---G
 312078795 *Loa loa* --MST-----STLSVGS LDEITFSVEDV---PSVIEDYFEGAELKLLVWFVDFKNQ----

protists (seq. close to metazoa):

929755270 *Sphaeroforma arctica* JP610 --MGN-----DNTAKDVVVEGVV-----SDFEGAEKLLVWFVFE----PS
 514686471 *Salpingoeca rosetta* --MDN-----NDFEGQEKLLVWFVFKPPN[11]

plants:

985701157 *Solanum tuberosum* -----MEMDLPVSAIGFEGFEKRLEISFVPEPLFAD
 731352674 *Beta vulgaris* subsp *vulgaris* -----KNDNETGQ---PVSAIGFEGFEKRLEITFSNVPMFSD
 302803606 *Selaginella moellendorffii* -----MPTPGFEGFEKRLEVEFFPAA----
 168048070 *Physcomitrella patens* -----MGATACV-----SEVAPVCGA---LGTSPGEGFEKRLEIEFQPAPVFRD
 702445187 *Eucalyptus grandis* -----MAASGFEGFEKRLELHFTGDE--PA
 923724061 *Brassica napus* LSPHTNTNTHF--LCSVLVATSSVLFYQ---FFS--DL-PMAVSGFEGFEKRLELRFFNDS-ITN
 514802427 *Setaria italica* GEKKFQSAAYS--NC-----AKKPS-----YA----HPVSAIGFEGYEKRLEITFSEAP[3]D
 514756085 *Setaria italica* -----MASSGFEGFEKRLELVFSLPS[4]A
 926775472 *Monoraphidium neglectum* -----MADR-R-PSMVLNPIFEGSEKRVEIDFAPSA---S
 159470359 *Chlamydomonas reinhardtii* -----MTV-N-ENGLHMPLEFEGSEKRIEVDLRLGP---N
 308810503 *Ostreococcus tauri* -----TMVDGLYPSPHFEGAEKRIEIDFHLNK----
 612398587 *Bathycoccus prasinos* -----MQSELYPSPHFEGVEKRIEINFRVAA[9]I

Trypanosomatids Prozyme:

72390539	<i>Trypanosoma brucei</i> TREU927	----DIGTVTVKQLASVMERAGESLRQNSAELGIHTLKFDRSLLVFTAKQIVVRSVSVMLHEAVHP
71408277	<i>Trypanosoma cruzi</i> CL Brener	----VPSEVAVLDLESVMHAGELLERHSAEKGLISLVFGNSLMQLTQRHVIVTSSSSVLLHEILGP
157872786	<i>Leishmania major</i> Friedlin*	----DVQTFAVEELEDVLAAGQKLQHHFSAEGLLSLEMTQCIIILTPCKLVVTSASEVMLHQVITP
154341969	<i>Leishmania braziliensis</i> *	----DVQTFKVAELEDVLAAGQELQHHSPAKDLLSLEMTQSILIVMKQKLVVTSASEVMLHQLITP
588319214	<i>Phytomonas</i> sp. isolate_EM1	----PIGKLTVAIEALMRNVDEYLENYSCEGDFQSFQTLIVLITSKMLMSSNSTVMLHHVLPK
528258165	<i>Angomonas deanei</i>	----GQDELCTADIEIILAAADQCLLEHSCGAMQSLTFSEALVLFNGRQFIVTADSSVHLHKLVP
528251074	<i>Strigomonas culicis</i> *	----TAATFTVAEMEEVFAAADQYLVSQKCEYQVLTALTFQVLVALGSSQMVASADSIQVQLHKVIAP

Trypanosomatids:

72390527	<i>Trypanosoma brucei</i> TREU927	THVSGLLAHDDDDVWQKVIDAICAHIVSREFNEYIRS YVLS ESSLFVMDKDRVILI TCGTITLLNCVPL
71408275	<i>Trypanosoma cruzi</i> CL Brener	THSEGLHALGDEVWKGVVGSLNAQIVSKESNEYIRS YVLT ESSLFVMDRRIILI TCGTITLLNAVPF
157872783	<i>Leishmania major</i> Friedlin	THVDGLRSLDDSVWGSVVGSLNAQIVSRESNEYINS YVLT ESSLFVMDKDRVILI TCGTITLLNSIPN
154341967	<i>Leishmania braziliensis</i>	THVDGLRSLDDSVWTRVVGSLNAQIVSKEANEYINS YVLT ESSLFVMDKDRVILI TCGTITLLNSIPN
588319215	<i>Phytomonas</i> sp. isolate_EM1	THPDGLYSLEDDVWARVVGTLNAQIVSKENNAHIKS YVLT ESSLFVMDKDRVILI TCGTITLLNSIPE
528270660	<i>Angomonas deanei</i>	TNKEGFLSFEDSSWEHVVGSLNAEIVSREKNGQINS YVLT ESSLFVMDKDRVILI TCGTITLLNSVPI
529494686	<i>Strigomonas culicis</i>	TNKDGFSSFFEDAAWEKVVGALNAQIVSRESNEFIKS YVLT ESSLFVMDKDRVILI TCGTITLLNSVPI

protists:

831777486	<i>Acytostelium subglobosum</i> LB1	PSRLGLRTLNERKQVSLDSARCTIISQTSNDFMDS YVLS ESSLFVYPRRVMVK TCGTITLLHLVDK
166240588	<i>Dictyostelium discoideum</i> AX4	PSKVLGLRTIDKEKWQTVLDSARCTIISQTSNDHMDS YVLS ESSLFVYPRRAMIK TCGTITLLHLIAK
330840910	<i>Dictyostelium purpureum</i>	TSKIGLRAINKDRWQQVSLDSARCTIISQTSNQFMDS YVLS ESSLFVYPRRAMIK TCGTITLLHLIAK
470246992	<i>Dictyostelium fasciculatum</i>	GPKSGLRSIGKEQWQVSLDSARCTIISSTSNQYLDSD YVLS ESSLFVYPRRVMIK TCGTITLLHLIEK
290984948	<i>Naegleria gruberi</i> NEG-M	SNFYNLMNVTDDETWQSMMLDACCRILSKKTNEHFVS YVLS ESSLFVFKRKLVIK TCGTITLLGILKK
676381665	<i>Aureococcus anophagefferens</i>	GRERGCRDLTRAQLDTMLTEARCTIILSHISNAHLDA YVLS ESSLFVYPFKVVIK TCGRITLLRCVVP
813169519	<i>Saprolegnia parasitica</i>	ADPRGLRALSRAQIDALLDAAKCTILSHVSNNAHLDA YVLS ESSLFVYPRKMLIK TCGTITLLKALPL
673049047	<i>Aphanomyces invadans</i>	GHPDGLRALSRTQLDALCDVAKCTILSKISNASLDA YVLS ESSLFVYPRKMLIK TCGTITLLKALPL
675188663	<i>Phytophthora parasitica</i>	GHERGLREVPRNDLDEMLEAGQCQIILSRTSNEHIDA YVLS ESSMFIYAHKIVLTCGTITLLKCLPY
294883519	<i>Perkinsus marinus</i>	KADLGRARAI SRSMWDKILALCECTIVSHKALKRLDA YVLS ESSLFVCAKDIILKTCGTITLLLQGLRT
551667574	<i>Guillardia theta</i>	DINGGLRQYNREFWSDIVAILNGTILLADPQEKFDAYLIS ESSLFVYNDRVIILTCGTITLLLKLTPA

fungi:

629651635	<i>Eutypa lata</i>	AKPNGLKAVPSDTWVDMMLDMVNCKIILSVLDSEHVDAYLIS ESSMFMVFPKHLILKTCGTITLLLLGLHR
261202444	<i>Blastomyces gilchristii</i>	TEPTGLKVVVPEVWKDMLDLVSVCKVLSIIESDDVDAYLIS ESSMFMVFPKHLILKTCGTITLLSGLPR
50553544	<i>Yarrowia lipolytica</i>	GTNKS LRNVSTAQWEQLLNIVQCKVLSVHTSVLDAFVLS ESSMFMVFPKHLVLKTCGTITLLVGI PR
891574827	<i>Schizosaccharomyces cryophilus</i>	NTKFGLKNVSRDLWDDMLSRQAQCKVLSVSSNEVDAYLIS ESSMFMVFPKHLILKTCGTITLLLASLPK
6324521	<i>Saccharomyces cerevisiae</i>	TIKTLRNLIGMDRWIEILKLVKCEVLSMKKTKELDAFLLS ESSLFVFDHKLTMKTCGTITLLFCLEK
444315950	<i>Tetrapisispora blattae</i>	GENKTLRDIAYEDWVLSILKLVNCEILSFKKTSQLDAYLIS ESSFFVYDYKVVVKTCGTITLLFCLQG
149237635	<i>Lodderomyces elongisporus</i>	SPRDGLRSIKMDAWAKMLDLVNCKIILSMKSSPFMDAYLIS ESSLFVFPKHLILKTCGTITLLACLDE
953449703	<i>Mixia osmundae</i>	NALLGLRIVDRPSWERMLDEVHCKVLSVIEGEQVDA YMLS ESSMFMVFPKHLILKTCGTITLLLLGLNT
331247566	<i>Puccinia graminis</i>	PKFTGLRIVNHPLWHAMLDQVKCKVLSVIESEHVDAYLIS ESSMFMVFPKHLILKTCGTITLLLLGLDS
955498480	<i>Moesziomyces antarcticus</i>	PGYFGLRIVPKAVWETMLDVVKCKVLSVIESSHVDAYLIS ESSMFMVFPKHLILKTCGTITLLLLGLEK
914974225	<i>Tilletiaria anomala</i>	LRLGLKGVPREQWEEMLDIVKCKVLSVIESEVDAYLIS ESSMFMVFPKHLILKTCGTITLLLLGLER

animals:

74275346	<i>Homo sapiens</i>	QGSGLRITPRSEWDIILKLVQCSIIISVTKTDKQEA YVLS ESSMFMVSKRRFILKTCGTITLLLLKALVP
936678339	<i>Trichogramma pretiosum</i>	ESKHLRILIPRQKWESLLKIVRCEIISFCRNDSDVDA YVLS ESSMFMVSKRRILILKTCGTITPLQCLEP
157115295	<i>Aedes aegypti</i>	NKNADLRKIPRAMWDALLKTVRCEIISFTRNEQIDA YVLS ESSMFMVSKRRWILKTCGTITPLQCLEP
24583360	<i>Drosophila melanogaster</i>	NGDDDLRNLISRSWENVLNVNQCIIISTSKNDIIDA FVLS ESSMFMVSKRRWILKTCGTITPLKCLGQ
910327857	<i>Papilio xuthus</i>	AKQADLRKITRQWKEVKLVIRCEIISFTKSEQVDA YVLS ESSMFMVSKRRWILKTCGTITPLRCVRA
871243907	<i>Aplysia californica</i>	NDSCDLRRIERKEWDDLKLVKCEIISFMRDSDMDA YVLS ESSMFMVSKDRFILKTCGTITLLMAVDR
675851988	<i>Helobdella robusta</i>	GGRASLRDINRSEWELLKLVNCEIILSSRHSTTMDA YVLS ESSMFMVSKDRILKTCGTITLLEAVKP
156370797	<i>Nematostella vectensis</i>	AKKGDRLRIPRQKWEKILQLVNCQIIISEKRNEDMI S YVLS ESSMFMVSKDRILKTCGTITLLYSIKP
761906225	<i>Amphimedon queenslandica</i>	SESRLRDI PMSFWQVLLDLAKCHVLSKCNNEKLDAYVLS ESSMFMVSKDRILKTCGTITLLSTVKP
198416848	<i>Ciona intestinalis</i>	GPKKGANLIERWKWENILTHVHCKILDEMKHQDQTA YVLS ESSLFVSRERILKTCGTITLLCLQALPF
268561468	<i>Caenorhabditis briggsae</i>	ITDTSLRISIPRSEIDNMLDVARCKILHSHKHNESID S YVLS ESSLFVSDNRVILKTCGTITLLLAALPV
312078795	<i>Loa loa</i>	GGATSLRSIPYSELVAMLDIARCHILHSRSSECMDS YVLS ESSMFMVSDFRILKTCGTITLLLHTVRR

protists:

929755270	<i>Sphaeroforma arctica</i> JP610	ETGQSLRLIKREDIDEFLRVAGCCVVAQCSNEKWDS YVLS ESSLFISDDMFLKTCGTITLLAAIPN
514686471	<i>Salpingoeca rosetta</i>	DDAQLRLAIPRARVEGILDEAKCCILDFAFHGDFMDS YVLS ESSLFITAYRIILKTCGTITLLPALPL

plants:

985701157	<i>Solanum tuberosum</i>	PNGKGLRSLSKAQLDEILGPAECTIVDNLSNDYVDS YVLS ESSLFVYSYKIIKTCGTITKLLLAIPP
731352674	<i>Beta vulgaris</i> subsp <i>Vulgaris</i>	PTGLGLRSLTRAQLDSFLDEAACTIVAELSNSEFDS YVLS ESSLFVYPHKIIKTCGTITKLLLAIEP
302803606	<i>Selaginella moellendorffii</i>	--ARSLRSLSRDIDSFLNVAECTIVSQLSNGHFD S YVLS ESSLFYIYRRIIYKTCGTITRLLKALPK
168048070	<i>Physcomitrella patens</i>	PNGRGLRDLTRSELDMLCVAECTIVSQLSNAEVD S YVLS ESSLFVYPHRIIYKTCGTITKLLCIVPV
702445187	<i>Eucalyptus grandis</i>	AVRMGLRRIDFESLERVLHEVQCTVVS AVGNAHLDA YVLS ESSLFVYPTKIVIKTCGTITQLKSVRP
923724061	<i>Brassica napus</i>	TNPIGLRLIDFESLDQVLNEVQCTVVS AVANHSFDA YVLS ESSLFVYPTKIIKTCGTITQLKLSIRP
514802427	<i>Setaria italica</i>	PHGRGLRALSRAQIDS VLDLARCTIVSELSNKDFDS YVLS ESSLFYIPLKIVIKTCGTITKLLLTIPR
514756085	<i>Setaria italica</i>	RAQHGLRLLPVGALREALDTVQCAVVS AAGNAAFDA YVLS ESSLFVYPSRAILKTCGTITRLLRAVPI
926775472	<i>Monoraphidium neglectum</i>	TPAAGLRALSRAQLDEMLSLAECTIVSSRTNDHLDAYVLS ESSLFVYPTKVVILKTCGTITKLLNAVPR
159470359	<i>Chlamydomonas reinhardtii</i>	VPANGLRILPRETLDELMTLARCCIIVSSRNDKLDAYVLS ESSLFVYPTKVVILKTCGTITRLLNSVPR
308810503	<i>Ostreococcus tauri</i>	ENPRGLREI TRTQLDECMTARCEIVSVRTNVKFDAYVLS ESSLFVYPTKVVILKTCGTITHLLAGVPA
612398587	<i>Bathycoccus prasinos</i>	PVAGGLRCLSRALDVCMTAAECEIVSVRSNEKFDAYVLS ESSLFVYPTKVVILKTCGTITKLLSAVDP

Activation Residues

positions anchor strand
 displaces N132; forms N-helix pocket prozyme/enzyme interaction
 Putrescine * * *

Trypanosomatids Prozyme:

72390539 *Trypanosoma brucei* TREU927 MLELMRSH----NIIIVDWSFMRVNYGSPWDMTSET---MAHEFYAELKSAFP-----TGHYPYLAGP-
 71408277 *Trypanosoma cruzi* CL Brener LLDLLRSH----GIDIEWASFMRNNTSPWSSLCSEM---MAQEQYALQKSVFPP-----SGHPYLTGP-
 157872786 *Leishmania major* Friedlin* TIALLTSK----GVRVEWASYLKRNKNTSPWCAESEM---MAQEQYAEKKAAFP-----AGKSFLTGP-
 154341969 *Leishmania braziliensis** IIAFLKSK----GVRVEWASYLKRNKNTSPWCTDSET---MAQEQYAEKKAAFP-----TGKSFLTGP-
 588319214 *Phytomonas sp._isolate_EM1* LLDLLNQR----SVLVEWMSFSRRNTTAPWSTQCETSDIMAQEQYAEKKAAFP-----TGQSFLTGP-
 528258165 *Angomonas deanei* LVKMLSEK----NIDIEWASFCKRKNISSPVDHNDTSDVMACEYAEKKAFA-----DGQSFLTGP-
 528251074 *Strigomonas culicis** FMALCARK----GVQAEWASFFRKNTHSPWEHS-DTSDMMACEYAEKSSLP-----QGHSFLTGP-

Trypanosomatids:

72390527 *Trypanosoma brucei* TREU927 ICEAVSTV----CGEVEVWVFMHKNYSFPWEQKGPVPH---MAEEFKTLRSHFP-----SGQPFIFGP-
 71408275 *Trypanosoma cruzi* CL Brener VLDAVSDV----RGEVEVWVFMHKNYSFPWEQKGPVPH---MAEEFNLTLYTFP-----SGKPFIFGP-
 157872783 *Leishmania major* Friedlin ILEAISAV----RGELEWVFMHKNYSFPWQKGPVPH---LADEFATLQKQHP-----TGKPYIFGP-
 154341967 *Leishmania braziliensis* ILEAISAV----RGELEWVFMHKNYSFPWEQKGPVPH---LADECATLQKQHP-----TGKPYIFGP-
 588319215 *Phytomonas sp._isolate_EM1* ILKAIASV----RAELEWASFMHKNYSFPWEQKGPVPH---LSGEIATLQKSHFP-----TGKTYILGP-
 528270660 *Angomonas deanei* IMELISCM----RGEVEVWVFMHKNYSFPWEQKGPVPH---LSEEFNHLKTHFP-----TGKPYILGP-
 529494686 *Strigomonas culicis* ILELISCM----RAELEWVFMHKNYSFPWEQKGPVPH---LSEEFNHLKAHFP-----TGRPYILGP-

protists:

831777488 *Acytostelium subglobosum* LB1 MVEVGR---CGLEIEMVLFSSRKNLNNPHKQVFPVPH---FDDEVKYLNKTFFN-----GQAYVMGP-
 166240588 *Dictyostelium discoideum* AX4 MVQVQKE---CGLEVEMVVFSSRKNLNQPSKQVFPVPH---FSDEVNFLNKIFD-----GQAYVMGD-
 330840910 *Dictyostelium purpureum* MVEVQKE---CGLEVEMVVFSSRKNLNQPTKQIFPH---FNDEVAFLNKIFK-----GEAYVMGD-
 470246992 *Dictyostelium fasciculatum* MTQLAKDT---CGLEVEMVLFSSRKNLNNPGKQIFPH---FSDEVYDYLNKIFNN-----AGHAYVMGP-
 290984948 *Naegleria gruberi* NEG-M LKEIAAT---QGLEAELVIFSRKNYVFPVPHRQPHYH---FEEELKLYLTDFFP-----GGEGHVGS-
 676381665 *Aureococcus anophagefferens* LVDAATKA [5] LGLKLEWVGYSRKNYAFDEQPSPH---FGEELAYLRAHRD-----GYVLGP-
 813169519 *Saprolegnia parasitica* LTEYVRD---LGLAVEKVRYSRKNFLFPDDQLFPH---FADEVYDYLNDFFP-----NGAAHILGP-
 673049047 *Aphanomyces invadans* IMEYLQE---LNMAIEKVRYSRKNFLQPEEQHPVPH---FSVEVEYLNDFFP-----NGVAHVLP-
 675188663 *Phytophthora parasitica* IKTFSE---LGLEIEMVNYSRKNYTFPEEQKYPVPH---FQTEVAVFLSSYFP-----KGSYVLP-
 294883519 *Perkinsus marinus* LLDHAVNE---LGLELEWVLFYSRKSFLFPEFQVGVHG---SLEDEVSVLREVCKDFGCSTGNAYVLP-
 551667574 *Guillardia theta* IMKAGAD---VGLVVCWFQYSRKNFLFPEEQSFPVPH---SFDQEVHFLHEYFP-----TGRPFIMGP-

fungi:

629651635 *Eutypa lata* LLRIAAEH [16] AATPWRVVFYSRKNFLFPHKQEGPHR---SWKQEVKYLDDMFE-----GGSAYMVGK-
 261202444 *Blastomyces gilchristii* ILEIAAVY [16] AAAPYRVVFYSRKNFLFPDRQVPHR---SWRDEVKAMDQLFL-----GGSAYMIGK-
 50553544 *Yarrowia lipolytica* LLEIARTI [4] ANATPYRVVFYSRKNFLFPEKQAPPHK---SWKDEVSYLDSQDF-----NGKAYLVGD-
 891574827 *Schizosaccharomyces cryophilus* LLEIASS---VGFTPLRTFYSRKNFLYPERQLAPHT---SWNDEVAVFLQVFFP-----KGSYVVG-
 6324521 *Saccharomyces cerevisiae* LFQIVEQE [11] KYKPFKVFYSRRCFLFPCKQAAIHQ---NWADVDYDYLNKFFD-----NGKYSVGR-
 444315950 *Tetrapisispora blattae* LFNLLFRK [14] KYTPYKVFYSRRCFLFPCKQKSIHQ---KWSDEVKYLDDQFFA-----NGRNYLVGR-
 149237635 *Lodderomyces elongisporus* LFQMTQRICQLTSKEIYRVVFYSRSMFMEPEKQIHVHK---DWKHEVSLNQHFM-----LGKSYVGN-
 953449703 *Mixia osmundae* LLRIAAEH---CGLGKVVRCFYSRKTFMFERQLGPHR---DWNQEVRFLDGVFD-----NGSAYAVGR-
 331247566 *Puccinia graminis* LLKIAKEE---CGFSGAWRVFYSRKAFMFPAPQVPH---SWEDEVTRFLDHRFA---PHATAQVGL-
 955498480 *Moesziomyces antarcticus* LLTIATRA [50] GAVVKHAFYSRKSFMFERQKGPVPH---DWMLEVAVLDLRFDD-----YGSAYTVGK-
 914974225 *Tilletiaria anomala* LLEIAFSA [34] GSVLVRFCFYSRKSMFERQKGPVPH---DWMTEVATLDLDAFFT-----NGSAYTVGK-

animals:

74275346 *Homo sapiens* LLKLARDYS---GFDSIQSFFYSRKNFMKPSHQGYPH---FQEEIEFLNLAIFP-----NGAAYCMGR-
 936678339 *Trichogramma pretiosum* LLDLVEYSY---GFDKVENLFYSRKNYKRPQLIAPH---FEEEVTLTLDTFPP-----DGEAYCLGS-
 157115295 *Aedes aegypti* LLRLASEIA---GYGEIEDLFYSRKNFKRPEMVSPPH---FEEEVAVFLDSFFE-----DGRAYSLGA-
 24583360 *Drosophila melanogaster* LLKLAEAN---GYNVADLFYSRKNFTRPEAQITPH---FTEEVTYLDSIFP-----NGRSYCLGS-
 910327857 *Papilio xuthus* VLALARDTA---GHARVNVFYSRKRFARPHACLTPH---FDEVEVLLDSFFG-----DGRAYIMGP-
 871243907 *Aplysia californica* LVELVKQRC---GYDVTADIFYSRKNFTRPELQHLLH---FDKEVEHLDNMFK-----NGAAYVLGR-
 675851988 *Helobdella robusta* LLGLAKEQC---GFDNIVDFYSHKNYLRPDLQPEY---FDQEVAMLDLTFE-----DGAAYVLGK-
 156370797 *Nematostella vectensis* LLNLAAEEC---GLTIVQDLFYSRMNYLKPDMQKDLH---FEKEVQWLDKLF-----NGAAYSLGR-
 761906225 *Amphimedon queenslandica* LLKTVKFFY---PRSEVDFFYSHSPFMKPDQLLPH---FNDESTYLDLTFP-----DGAAYVLGR-
 198416848 *Ciona intestinalis* IIQLVQDEC---GFDTVADFFYSRKNFIKPDNPPHY---FQDETVYLDLTFP-----ESASYCLGR-
 268561468 *Caenorhabditis briggsae* LMQLAGTYA---GLDQVQSVYYSRKNFLRPDLQPNLH---FDAEVEYLDLTFE-----DGHAYCLGS-
 312078795 *Loa loa* ILHLAKIYC---NVDNVVSVFYSRKSFIRPERQVPPH---FETEVDYLEEHT-----GGSAYCIGP-

protists:

929755270 *Sphaeroforma arctica* JP610 MISLAKDL---GRNNVDVVFYSRKNQFMEPEQVPH---FEEEVKFLDLSLF-----DGAAYQLGR-
 514686471 *Salpingoeca rosetta* IVQAAADV---GLTEIDDMFFSRRFETIAPHTQEPH---FEEVAVYLDQYFD-----GVAYPLGR-

plants:

985701157 *Solanum tuberosum* ILRLAET---LSLKVQDVRYTRGSFIFPGAQSPVPHR---FSEEVAVLDGYPFGKL---AAGSKAVIMGSP
 713152674 *Beta vulgaris* subsp *vulgaris* VLKLADS---VGLSVLSVLYSRGTFIFPNAQVAPH---FSEEVSYLNRYFGNL---GSGPHAYVLGDP
 302803606 *Selaginella moellendorffii* LLAVAASIG---LARVNR---CKYTRGSFLFPEVQPPH---FDEEVRTLDEHFGSL---HSSKHVVMGD-
 168048070 *Physcomitrella patens* LLEVVAR---LAMKVRVYKTRGTFMFPVQPPYH---FSEEVGYLEKYFGGI---GSGGRAYVMGNR
 702445187 *Eucalyptus grandis* LVAHARD---LGLTLCLCRYTRGSFIFPLAQPPH---FPEEVAYLEGCLPTN---VCSRKASIMRSH
 923724061 *Brassica napus* LIHLARN---VNLTLRACRYSRGSFIFPNSQPPY---FEDEVVIVEESLPKS---LRYRKASVMTPS
 514802427 *Setaria italica* IIEIAEE---LSMPLAAVKYSRGMFIFPGAQVPH---FSEEVVALNRYFGGL---KSGGNAYVIGDP
 514756085 *Setaria italica* LLRAAQG---LGLALRSCRYSRGSFLFPEAQPPH---FADIEIRFLDGAVLSA---LRFRRSSVMPSP
 926775472 *Monoraphidium neglectum* LLELASQ---LGMAPRRCKYSRASFLFPEQVAPY---FDQEARFLRTHFGHL---GNNGSAYVLGDM
 159470359 *Chlamydomonas reinhardtii* LLEVARS---IGLEPRRCKYTRASFIFPENQPPY---FEHEVGFLEHFGAMCANGGTAFMLGEP
 308810503 *Ostreococcus tauri* ILKYAKE---VGMEPRRVKFTRSSFDKPDLPALH---FDDEVDFLEKHFGLSIEGSSYILGSK
 612398587 *Bathycoccus prasinos* ILERAASIER---LKLVPSSVRFTRSTYLFPEEQREHH---FTDECEFLGRFGHL---GNSNSYVMGNS

shift+3; prozyme/enzyme interaction

Activation Residues

shift+1

* *

Trypanosomatids Prozyme:

72390539 *Trypanosoma brucei* TREU927 --VDRDHCFFYFVYDGDIDRDP-----SCSRENDVQINVYMYNVQADDEY-DLDG-----
 71408277 *Trypanosoma cruzi* CL Brener --LDSDFHFFYFVYDAIERNVL-----GAPPEDDVQINVYMYNVKTDGSG-DDDD-----
 157872786 *Leishmania major* Friedlin* --VDGHHCFFNFVYDNVERIA-----GRKEEDVQVNVFLNDVAAGLEE-----
 154341969 *Leishmania braziliensis** --VDGHHYFNFVYDGNVRVA-----ERKEEDVQVNMFLYDVAEGLDE-----
 588319214 *Phytomonas sp._isolate_EM1* --VDSEHYFFFTFDADRSE-----GNAVEQDVQINVFLYDIVEREDDE-LA-----
 528258165 *Angomonas deanei* --IDGHEHFFHYIYDNIQRAAAV---ESGRVEEDVQLNAYFYNIQNDDET-----
 528251074 *Strigomonas culicis** --IDGDHFFHYIYDNIERGD-----ERARVEVDTQLNLFHLGLKADQV-----

Trypanosomatids:

72390527 *Trypanosoma brucei* TREU927 --IDSDFHYFLYFHSDDVVQP-----SCSDDAQLSMTMYGLDRNQ-T-KHWYSDKM----PTGPET
 71408275 *Trypanosoma cruzi* CL Brener --VDSDFHYFLFVYDDVIRPC-----ETENDTQLSMTMYGLDRQT-KHWFSDRF---STGTET
 157872783 *Leishmania major* Friedlin --VDSDFHYFLFCYDDIIRPC-----SSEDNTQLSMTMYGLDKEQT-KYWFSDRF---STSAET
 154341967 *Leishmania braziliensis* --VDSDFHYFLFCYDDIIRPC-----NSEDDTQLSMTMYGLDKEQT-KYWFSDRS---STNAET
 588319215 *Phytomonas sp._isolate_EM1* --VDSDFHYFFFCYDDVIRPY-----SNEDDTQLNMTMYGLDKEQT-KYWFSDRF---ISTSAET
 528270660 *Angomonas deanei* --VDSDFHYFFFCYDDIIREEGN----TVYEADAQLSMTMYGLDHNQT-KHWFHDKF---ECTNDIT
 529494686 *Strigomonas culicis* --VDSDFHYFFFCYDDIIRDTSK---LDTGYETDAQMSMTMYGLDPNQ-T-QYWFNDKF---ECTNEVT

protists:

831777486 *Acytostelium subglobosum* LB1 --LTKDHWNLVIADMRQGN-----TLQRTEQTFEVMHDLDQEVN-KQFFKR-----EGVTA
 166240588 *Dictyostelium discoideum* AX4 --VNKDHWNLYIADFRKNP-----TLQRTEQTFEVMHDLDETVM-KQFFKR-----EGVSA
 330840910 *Dictyostelium purpureum* --VNKDHWNLYIADYRKNK-----TVQRTEQTFEVMHDLNPEVM-KQFFKR-----EGVSA
 470246992 *Dictyostelium fasciculatum* --LNKDHWNLCYIIDNRRSS-----TIRRTEQTFEVMHDLDPQVM-KQFFKR-----DGVSA
 290984948 *Naegleria gruberi* NEG-M --VLSDFHWYIYICDMQGVDDQ-----ITKDPDQTFEVLMLHDLDPAVM-RQFMEEARK---ERAPG
 676381665 *Aureococcus anophagefferens* --ITGDHWFVYVADQCERP-----AASATERTINIMFDLGEDVR-DAFYLKPGE---DLRSAA
 813169519 *Saprolegnia parasitica* --INADHWFAYAWDVEHEGEPVA--KPSAGVKEHTLHILMQDMHEDAA-AAFFKRD-----NGWDG
 673049047 *Aphanomyces invadans* --ITGDHWSYSNWDADTHGPN5 [5] VCDERKSEHTVHMLMQDMHADAA-AHFFKRD-----NGMDG
 675188663 *Phytophthora parasitica* --LNHDHWYIYAWDADHEQPG [7] LKEPRANESTLQVLMQDMHPSVA-LQFFKNNND-----STMTS
 294883519 *Perkinsus marinus* --LNGDHWIMWNADFKEVD-----SNRYDHNLDIMMYDLPDDVR-SKFFSSSA-----SGTVA
 551667574 *Guillardia theta* --LSSDFHWYLFVADFIRRETPDG--SRKIVDRDQMLNIYMYGIDPQVA-QYFMKADP [29] EFCATG

fungi:

629651635 *Eutypa lata* --MNGDHWYLYITSPQSPFTPP [26] GGLESNDETEILMTDLDPENA-KKFFYLENA [91] EGHALG
 261202444 *Blastomyces gilchristii* --MNGDHWYLYLTPYTVLTPP [33] EEEDEEDETLEILMTDLDEENA-KQFYLDHA [55] EGHGLG
 50553544 *Yarrowia lipolytica* --TTSDDHWCYVLTGDDHDEEVAHKDHISSHDETEILMTDLLPSRA-QQFFTDRL [49] PGHVLG
 891574827 *Schizosaccharomyces cryophilus* --TNKNHWWYLFSDVADESDFE---SSLDPEDETEILVMTNMSPEVS-LQFFYAPSL [23] TGHILG
 6324521 *Saccharomyces cerevisiae* --NDKSNHWNLYVTETRSTPKG---KEYIEDDDETEFVLMTELDPECA-SKFVCGPE [12] KGHNLG
 444315950 *Tetrapisispora blattae* --NPSEAGHWNLYITDNTKILENK [6] QTQIDREDETEMLMTGLDQTM-KYFHKDIS [5] DDGHEMG
 149237635 *Lodderomyces elongisporus* --FASDDHWFYLVGGKEDDDCRE [11] FGNKPLDQTFEILMTELDPECA-SKFIYSRQ [9] DLGHELG
 953449703 *Mixia osmundae* --INGDHWVLYLTPAMDALGL [34] SLGMPDQTFEILMSELDPPEAS-RAFFHPIS [7] DDGHAAG
 331247566 *Puccinia graminis* ----ENPWYLYHRTAPPRSGSA [29] SQAERDYTEILMTGLSRRRA-SHFESSEE--LGEHHEAG
 955498480 *Moesziomyces antarcticus* --MNGDHWLWLMWCGEGAREAER [13] PAPCVEDQTFEILMTHLSPASC-ARFVFDEN [27] KGHALG
 914974225 *Tilletiaria anomala* --MNGDHWLWLYMAADQAQGEAG [21] AKQAVDQTFEILMTHLSPASC-ARYYFADD [25] KGQRLG

animals:

74275346 *Homo sapiens* --MNSDCWYLYTLDFPESRV-----ISQPDQTFEILMSELDPAVM-DQFYMK-----DGVTA
 936678339 *Trichogramma pretiosum* --EESCEWYLYTLNREAPSSTP [21] TNEREPDQTFEIMMTQLDPKVM-SIFTRH-----VCSSA
 157115295 *Aedes aegypti* --LNRDCWHLTYLTSRGGGGSAN [41] LQLPDPDQTFEILMTDLDPKVM-AVFTKD-----VCNTA
 24583360 *Drosophila melanogaster* --MNLCEWYLYTFSRSDIKITP [6] KNVSDPDQTFEILMQDLDPETM-SIFYKN-----KFNDA
 910327857 *Papilio xuthus* ---EKDCWYLYLTLPLGTVAA [14] CAGEPDQTFEILMSDLDPAVM-SIFTRA-----HSASA
 871243907 *Aplysia californica* --MNKDCWHLTYLLEDGN-----VHQSDQTFEILLMWDQCQDKM-KIFTKE-----ISSDG
 675851988 *Helobdella robusta* --LNKDCWYIYTLDRFN-----ITEPDQTFEIMMDVNVQDVM-NMFTQS-----YGLTA
 156370797 *Nematostella vectensis* --VNGDSWYFYTLRQQG-----VEQPDQTFEILMQDLDPNVM-KAFYTG-----QYANV
 761906225 *Amphimedon queenslandica* --INGKCWYLYLVESIENP-----LQDPDQTFEILMTEFDSELI-GRFSKL-----SYESA
 198416848 *Ciona intestinalis* --MNRDCWYLYTLNHPENTSL----IGVNQPDQTFEILMTNLSVESM-QKFTRCDE----GNVRNA
 268561468 *Caenorhabditis briggsae* --LKQDRWYLYTFHREVEF-----PANKQPDHTEILMSDLDEEVL-HKFTKD-----FAVDG
 312078795 *Loa loa* --RRQDCWFLYTYMVAAPRAA-----FPFPEHTLEILMNGLPEDVL-NVFNPS-----VSKDG

protists:

929755270 *Sphaeroforma arctica* JP610 --LNGDSWYLYMLDHPDG-----SIEKPDQTFEILMMDLDQEAM-KAFHVSP-----EYPTT
 514686471 *Salpingoeca rosetta* --LNGDRWYLYTLNQLH-----ITCPDVTVEIMMTSLDRTAM-NAFYK-----STLTA

plants:

985701157 *Solanum tuberosum* D--KTQKWHVYASAGS-----VQSNDPVYTLMECMTGLDREKA-SVFYKT-----EESSA
 713152674 *Beta vulgaris* subsp *vulgaris* T-VQNCNWHIYSASCVADVE-----DRRGVVTVMCMTGLNREKA-AVFYKK-----EGHLA
 302803606 *Selaginella moellendorffii* ---DRQKWHVYVASESKSDRAGE-AVSKSNTIYTLVECMTELDKLSVA-RSFFKS-----ASIVTG
 168048070 *Physcomitrella patens* --GKFPNWHIYTACEQNADASG [4] EEEEEECVYTVEMCMTKLGRRA-GQFWKG-----AGRESG
 702445187 *Eucalyptus grandis* M-AASHSWHVFTACDPLVMDKG----PAPEDFYTVEMCMTGLDRGRA-QKFFMRP--GDGTGDSAG
 923724061 *Brassica napus* NSNPSRAWHVFTASADVEP-----DESLVVVEVCMTGLDRVNA-RSFFRRK--GDENSDSAG
 514802427 *Setaria italica* A-RPGQKWHIYYATEYPE-----QPMVNLEMCMTGLDKKA-SVFFKTS--AD-GHTTCA
 514756085 *Setaria italica* [5] QQHKWHVYAASTDDQHV-----DGATFTVEVCMTGLDRTLA-RQFYLTTPGDGTSIAIG
 926775472 *Monoraphidium neglectum* ---FNLQWHVYVADAHGADAAAYA---PPSGRPFHKFEVCMTGLCRVAA-AAFYRDN-----PAFVSA
 159470359 *Chlamydomonas reinhardtii* --YQGLQWHVYVLAADDMLPLGP-----EFKPTYNFVMTDLGTEAA-AQFFRDN-----PKFVSA
 308810503 *Ostreococcus tauri* --LKGVQWHVYVAGDACPQV-----DARPKASLEVCMTQLNREHCDEHFYRT-----DKFVSS
 612398587 *Bathycoccus prasinos* --FDDAQWHVYVAGDFVEET-----KSEASLSECCMTSLHREHS-QHFFRENSQEEGVFPVSS

Trypanosomatids Prozyme:

72390539 *Trypanosoma brucei* TREU927 -----NTKEQQLVSHCA----GEYETLRVSTYGSTHPFASFET
 71408277 *Trypanosoma cruzi* CL Brener -----ALKSVQVVPLSE----TEYEMLRVSTDNTHAFPAAFET
 157872786 *Leishmania major* Friedlin* -----VNKTTQRFHALQS----GEYEVMTFTA---GVPCISFET
 154341969 *Leishmania braziliensis** -----VDKTTQRFALALPN----GEYEVTRTFA---GVPCVFSFET
 588319214 *Phytomonas_sp._isolate_EM1* -----PNVGLTRKNTQQLTHLEG----NTYEIMRTFD---DISYISFET
 528258165 *Angomonas deanei* -----NEKDRQSINILPD----GTYTVDKVFP---HAHCATFET
 528251074 *Strigomonas culicis** -----TTPTVKGVNHQLVVLPE----GFYEMHRKFP---EAGSATFET

Trypanosomatids:

72390527 *Trypanosoma brucei* TREU927 AVIREATGLSEVVD----DSWILHDLQYFPCGYSINAIRG----SEYQTIHITPE-EHCSFASFYET
 71408275 *Trypanosoma cruzi* CL Brener AAIRKATKLDKVD----DSWKLHDLQFPCGYSINAIRG----AEYQTIHITPE-DHCSFASFYET
 157872783 *Leishmania major* Friedlin AAIRAATHLDRVVD----GTWTLHDLQFPCGYSINAIRD----EEYQTMHITPE-DHCSFASFYET
 154341967 *Leishmania braziliensis* AAIRSATHLDRVVD----NSWSLHDLQFPCGYSINAIRD----EEYQTIHITPE-DHCSFASFYET
 588319215 *Phytomonas_sp._isolate_EM1* AAIRAATHLDRLVD----ETWTFHDLQFPCGYSVNAIRE----GEYQTIHITPE-EHCSFASFYET
 528270660 *Angomonas deanei* QKIRKDKLDILFN--KEEGWTIHDLQFPCGYSINAIRG----SDYATTHITPE-SHCSFASFYET
 529494686 *Strigomonas culicis* AAIREHTLHCQLFP--SEAGWKLHDLQFPCGYSINSING----ANYQTIHITPE-SHCSFASFYET

protists:

831777486 *Acytostelium subglobosum* LB1 WDTTVSSGIANLIP----GSI-IDDFQFPCGYSMNLGRNK----AYWTIHTIPE-DHCSYVVSFDT
 166240588 *Dictyostelium discoideum* AX4 WDTTVNSGIADLLP----GSM-IDDFQFPCGYSMNGLLNE----FYWTIHTIPE-SHCSYVVSFDT
 330840910 *Dictyostelium purpureum* LDTTVSSGISNLLP----GSI-IDDFQFPCGYSMNGLLDQ----WYWTIHTIPE-SHCSYVVSFDT
 470246992 *Dictyostelium fasciculatum* WDTTVSSGISNLLP----GSI-IDDYQFPCGYSMNGMLDK----WYWTIHTIPE-DHCSYVVSFDT
 290984948 *Naegleria gruberi* NEG-M VTIEQQSGIDKLLP----GSE-IDSFEFPCGYSMNGLLGK----TYWTIHTIPE-DSCSFVSFET
 676381665 *Aureococcus anophagefferens* RAMTARSGLGALIP----SSSHLDHAFAPCGYSMNALCFE----SYTIVHVTPE-ASCYSYASFET
 813169519 *Saprolegnia parasitica* AVMSEKSGIRDLAP----DAI-MDAFAFPCGYSMNAIDGP----SYSTIHTIPE-SHCSYASFYET
 673049047 *Aphanomyces invadans* AKMSEASGIRDLVP----NAI-LDSFAFPCGYSMNSIEDD----VYSTIHTIPE-SHCSYASFYET
 675188663 *Phytophthora parasitica* RRMTIESGIRDLVP----GAV-IDDFAFPCGYSMNGILFD----AYYTIHTIPE-SHCSYVVSFET
 294883519 *Perkinsus marinus* DRMSEESGICDIYP----GAV-VDAINFTPCGYSNALSDD---GESFTIHTIPE-ESCSYASFYET
 551667574 *Guillardia theta* DEASDRSGISSLLEHD--GKV-VHSHLFPCGYSMNGQAAD---GSSYWTIHTIPE-AHCSYASFYET

fungi:

629651635 *Eutypa lata* TVVSDVGLSEVYPTSKYPDARIDSYLFSPCGFSANGIVPA [31] THYFTIVHVTPE-PVCSFASFYET
 261202444 *Blastomyces gilchristii* TVVAESCGLTDIYPTSKYPGARVDAYLFTPCGFSANGVPPA [17] SHYFTIVHVTPE-PHCSYASFYET
 50553544 *Yarrowia lipolytica* AYVSTQSGIADIYPRN-KASVAVDSFCFTPCGYSANAVDS----GYYYTIHVTPE-QHCSYASFYET
 891574827 *Schizosaccharomyces cryophilus* TYMAELSGVKELCSTK-DGKSVLDAFQFPCGFSNMIIYKD----RYATIHTIPE-DHCSYASFYET
 6324521 *Saccharomyces cerevisiae* YQMTKNTRLDEIYVN [6] LSFHHDFAFPTPCGYSNMILAE----KYYYTLHVTPE-KGWSYASFES
 444315950 *Tetrapisispora blattae* NEMTRCSKIDKIYTLDNNSTIISDSFAFPCGYSNNIIDE----SNYFTLHVTPE-KGWSYASFES
 149237635 *Lodderomyces elongisporus* RETMIETELDSVFP [72] EFLHDAFAFPTPCGFSNSISCSN-IGGGYYTLHVTPE-SGWSYASFET
 953449703 *Mixia osmundae* TRVSRQVGVQDLFP----DAVLDAFLFPCGYSANAVLDD----RYATIHTIPE-QDWSYASFEC
 331247566 *Puccinia graminis* IQIATSLGIDAPGLLG---SGETDAYLFSPCGFSANLVGGP--DQKRYGTIHTIPE-RSHSFASFES
 955498480 *Moesziomyces antarcticus* LALSINKLGLTQLLP----ETEIDAFAPPCGYSANAVMPR [5] NAGYWTIHTIPE-EDSSFASFET
 914974225 *Tilletiaria anomala* VALASQLGLTNLFA----ETHVDFAFAPPCGFSANAVVLN [15] DGYWTIHTIPE-EGSSYASFET

animals:

74275346 *Homo sapiens* KDVTRESGIRDLIP----GSV-IDATMFNFCGYSMNGMKS----GTYWTIHTIPE-PEFSYVVSFET
 936678339 *Trichogramma pretiosum* EEATRKSIGIDQLLP----NML-IDDFLFPCGYSMNGVSKN----GSYMTIHTIPE-PDFSYSVSFES
 157115295 *Aedes aegypti* LEATQKSGIHKLIP----GMV-IDDYLFPCGYSMNGVSKS----GCYMTIHTIPE-PDFSYSVSFES
 24583360 *Drosophila melanogaster* NGATVKSIGIDTILP----TMH-IDDFLFPCGYSMNGINDK----GEYMTIHTIPE-NQFSYVVSFET
 910327857 *Papilio xuthus* HHATKESGIDKIIP----GMV-IDDYLFPCGYSMNGVAKD----GCYMTIHTIPE-RSCSYVSFES
 871243907 *Aplysia californica* K4ATKESGIDKIIP----GLQ-IDDFLFPCGYSMNGILPG----GRYTIHTIPE-PHCSYVSFES
 675851988 *Helobdella robusta* SQLTEKTGILDILP----GAI-IDDWLFPCGYSMNALLPN----GRYFTIHTIPE-DEFSYVSFET
 156370797 *Nematostella vectensis* SEVTKATGIADFIP----GAI-IDDFLFPCGYSMNGLFGD----NYFTIHTIPE-KECSYVSFET
 761906225 *Amphimedon queenslandica* EDLNKSTGLNDLIP----GAT-IDSYIFPCGFSLNIAIVKE----DMYFTIHTIPE-EBCAYVSFET
 198416848 *Ciona intestinalis* AKFTEDIGISDILP----GSK-INSILFPCGYSMNGLLDK----NQYWTIHTIPE-PEFSYVVSFET
 268561468 *Caenorhabditis briggsae* KDCFMRAGIDKIIPA---GAD-VHDELDFPCGYSMNAYIND---TDQYATIHTIPE-KEFSFASFET
 312078795 *Loa loa* KDCRMKSAINTILPP---GII-VHEELFPCGYSNLGLIPH---SDHYIMIHTIPE-PDFSYSVSFET

protists:

929755270 *Sphaeroforma arctica* JP610 EVVTKKSGIADFLP----GAM-TSGALFNFCGYSVNGLLGD----AYFTIHTIPE-EGFSYASFET
 514686471 *Salpingoeca rosetta* REVTTQSGIADIVP----GAH-IHEFLFPCGYSNNAVFG---FYFTIHTIPE-EFYSYVSFET

plants:

985701157 *Solanum tuberosum* AHMTVRSIGIRKILP----KSE-ICDFEFPCGYSMNSIEG----AAVSTIHTIPE-DGFTYASFES
 731352674 *Beta vulgaris subsp vulgaris* KEMTKMSKINDIIS---SHE-ICDVDFPCGYSMNGVDG----GAYSTVHVTPE-DGFSYASVEV
 302803606 *Selaginella moellendorffii* EDMTRASGINSILP----RSQ-ICDFAFPCGYSMNGLEN----GAHSTIHTIPE-DGFSYASFEC
 168048070 *Physcomitrella patens* EEMTAGANISLLP----ESR-ICDFAFPCGYSMNGIEG----AAHSTIHTIPE-EGFSYASFEC
 702445187 *Eucalyptus grandis* KEMTALTGIGEINP----GAL-ICDFAFPCGYSMNGIDG----DRYSTIHTIPE-EGFSYASYEC
 923724061 *Brassica napus* KEMTRLSGIDMINA---NAF-ICDFAFPCGYSMNGVDG----DRYSTIHTIPE-DGFSYASFEC
 514802427 *Setaria italica* KEMTKLSGISEIIP----EME-ICDFEFPCGYSMNAIHG----SAFSTIHTIPE-DGFSYASYEV
 514756085 *Setaria italica* DAMTAAASGLGVNP----RSL-AFGYAFPCGYSMNALDG----ARYATVHVTPE-DGHSYASYEV
 926775472 *Monoraphidium neglectum* ARTTTDTGIRGLVP----GAD-IDDYVFPCGYSMNGILG----GGFTIHTIPE-DGFSYASVEV
 159470359 *Chlamydomonas reinhardtii* ERTTKDTGIAELKP---KAI-IDDYVFPCGYSMNGIDN----TGLTIHTIPE-AHQSYASVEV
 308810503 *Ostreococcus tauri* AQTTTDSGIRSIIFE---EFD-IDDYVFPCGYSMNGINEHGSIDQYSTIHTIPE-EGFSYASCEL
 612398587 *Bathycoccus prasinos* EKTTTHDSGIQSIFE---SFS-IDDYVFPCGYSMNGLNEE--YSGEYSTIHTIPE-DGFSYASVEH

Activation Residues

Trypanosomatids Prozyme:

72390539 *Trypanosoma brucei* TREU927 N[4] ASDITK---ILLKFFY--PERVLLVLLQDR [13] LEGFTVVRHGANHFGGG--YVFHQATYARS
 71408277 *Trypanosoma cruzi* CL Brener N[4] ATKKRE---LLEKFC--PDRFTMVVLQDR [13] MEGYTIMNRATNHFQGG--YAFHQTSYIRA
 157872786 *Leishmania major* Friedlin* NAKAAVASPT---RLLDTFQ--PTHFTVAALQDR [13] FTPYTLQNRVTNLFEGG--YAFHQLLFARS
 154341969 *Leishmania braziliensis** NAKAAVTPK---RLVDTFR--PAYFTIAALQDK [13] FHAYTLQNRVTNFFEGG--YAFHQLLFARS
 588319214 *Phytomonas_sp._isolate_EM1* N[6] SPARLE---SLLKQYK--PSKIVMFALQDR [13] LPGYALQSSLTNHFREG--YSFYQLTFVCG
 528258165 *Angomonas_deanei* N[6] SKTKIA---SLLLEQHQ--PARFTLIFFEDEK [12] FDSYALNHRKSVNYFGMG--YAFHQLVFEKC
 528251074 *Strigomonas_culicis** N[6] DTSKIA---ALLAAEY--PTRFTIVCLEDT [12] FEHYEQKRRTANYFGAG--YSYIHSVFERT

Trypanosomatids:

72390527 *Trypanosoma brucei* TREU927 NTC-ALNYSK---CVLRFVD--PERFSVIVFIDP [20] YPNYEAHHRVTVNEYTPG--HWVLKVNIVKVR
 71408275 *Trypanosoma cruzi* CL Brener NTP-AVNYSE---RVLGVFA--PIRFSVIVFIDP [20] YPKYELQNRVTNVEFAPG--YVVMKMNYARR
 157872783 *Leishmania major* Friedlin NSR-ATNYSYD---RVLGVFR--PQRFVTIVFLDP [20] YPEYSLLRHTTNEFAPG--YVAMKINYVRT
 154341967 *Leishmania braziliensis* NSR-AANYSD---RVLGVFR--PQRFVTIVFLDP [20] YPEYRVLHRHTTNEFAPG--YVAMKINYIKT
 588319215 *Phytomonas_sp._isolate_EM1* NCH-DANYADRIKRVLSVFR--PQRFVTIVFLDP [20] FTEYEVFNKSVNNEFTPG--YVAMKINYVRS
 528270660 *Angomonas_deanei* NAN-EANYFKTVLKVLDVFR--PQRFVTIVIIDP [36] EVDYCVMHRAVNEFAPG--YVAMKINYVQR
 529494686 *Strigomonas_culicis* NKD-ADNYFATVRNVLRFVR--PQRFVTIVVVDP [40] FIDYCVLHRVTNVEFSPG--YAMKINYIQR

protists:

831777486 *Acytostelium subglobosum* LB1 NLA-VADYNQ---LVLAVFK--PGRFTAALYCED [14] MPEFAMTNTKIHGFDGG--YDVVVCNFDRO
 166240588 *Dictyostelium discoideum* AX4 NVA-LADYNQ---LVLNVFK--PGRFTAALYAED [14] VPSYAIQNKTVHGFDGG--YDVVVSNYQQL
 330840910 *Dictyostelium purpureum* NIA-LPDFNQ---LVLNVFK--PGRFTAALYSED [15] IPEFSIQNKTLHGFDGG--YDVVVSNFKLS
 470246992 *Dictyostelium fasciculatum* NIA-LPSYHI---LILKVER--PGRFTAALYAED [14] LLEHAI TNKTVHSFDG [12] FAVERYKDK
 290984948 *Naegleria gruberi* NEG-M N[5] IENYSE---LVIHTFR--PGRFTVTLFADD [49] GDEYKLSKTFYEFTGG--YNLTFNFAKI
 676381665 *Aureococcus anophagefferens* NTA-LKGYAS---LVLAVFK--PKKVVTLFADE [22] LGTYHRNDLSLLHVEHD--CVMMANYS LH
 813169519 *Saprolegnia parasitica* NDM-VGAYGP---LVVGVFR--PAKFTVTMSVVG [13] FNGYKRRGGWTQAHMDGDI TVLKANFAVA
 673049047 *Aphanomyces invadans* NDK-VGTYAP---MVLAVFR--PRKMTLTMSVLG [13] FKGYKRRGGWTQVHMDGDLI SLKANFVIV
 675188663 *Phytophthora parasitica* NAR-LRSYAS---LVLRCFR--PAKYSVSVYTD [15] EDMVKIDDDLLYKRKG [12] CRMANYAQT
 294883519 *Perkinsus marinus* N[7] LVEITR---RAVAVFK--PGRFSLTHVADN [12] DTDYKVKATSTYRWELD--YQASVSSVSR
 551667574 *Guillardia theta* N[5] YHHLIA---RVLEVER--PAKFTTVEHVDA [14] LDGYDLAGRFTNEFGTKDYVQMCNIVSK

fungi:

629651635 *Eutypa lata* N[10] SEVVE---HVVDIFK--PGRFSITLFEAK [26] IKGYRRIDRIVHDFD--YELVFRFFERE
 261202444 *Blastomyces gilchristii* N[10] SEIVE---HVVDIFK--PGRFSVTLFEAK [46] IPGYRRVDRIVHDLG--YDLVFRYERN
 50553544 *Yarrowia lipolytica* N[10] IDVIE---KVLNVER--PGKLSVTLFEAE [13] LDGYKRTDKVLYEFDG--YQMVYVCFEAI
 891574827 *Schizosaccharomyces cryophilus* N[10] METIE---KAVKTFG--AGNFSLTLFQAK [24] FESYKREEFIVYDFPG--YELVFASFSSV
 6324521 *Saccharomyces cerevisiae* N[13] LDVLL---HILNVEK--PREFSMTFFTKN [15] LPDYIKLDKIVYDLDD--YHLFYMKLQKK
 444315950 *Tetrapisispora blattae* N[12] RNMVQ---RVLDFIR--PQEFCLTLFQNT [19] VPGYVKMDHILYDLDD--YQLLYVRLHRI
 149237635 *Lodderomyces elongisporus* N[11] LTVLT---KVLKIFR--PRKFSLTLINEI [19] EFGYKKEKAVYDLKNE--YNLLYLNFKVA
 953449703 *Mixia osmundae* N[20] HSLVN---KVLAVFK--PARFSITLFSVR [28] QDAYTRDRIHHEFDD--YDLGFATYEHF
 331247566 *Puccinia graminis* N[10] RNVIS---RILKTFE--PKNTTITLFSNH [26] RNLYRLGEQKDHELDD--YNLAYISLQRR
 955498480 *Moesziomyces antarcticus* N[22] PTLVR---RVVDIFE--PGKMSVTLFVST [34] LKGYKRTDRIAYEFER--YNLVFVSFEKR
 914974225 *Tilletiaria anomala* N[24] TSLIN---HVISTFE--PGKMSITLFSVN [36] IKGYQRTDRIAYEFER--YDLVVFVSFEKV

animals:

74275346 *Homo sapiens* NLS-QTSYDD---LVVEVFK--PGKFVTLFVNQ [13] IEGFKRLDCQSAMFND--YNFVFTSFAKK
 936678339 *Trichogramma pretiosum* NVA-AASYGD---VVLRCFK--PGKFVVSIFANK [21] RRLDYVRDDAQYCRFKN--YDLSCAFYSKF
 157115295 *Aedes aegypti* NVA-SSSYGD---LVLDTFQ--PGKFIVTVFANK [16] IDQWKRDRDQFSRFPT--YDLTYAQYCKY
 24583360 *Drosophila melanogaster* NVA-LSNYRK---LVINTFK--PGKFIVTIFANK [17] GSHWKRTDMQCCNFPS--YNLLFAQYSHS
 910327857 *Papilio xuthus* NVP-VSSYDE---VVLHAFR--PGRFVLTVFATP [16] LCGYEQKEAQYCRFSG--YELHYALYAKF
 871243907 *Aplysia californica* NVP-Q-SYDD---LVLNVEN--PGKFLMTVFANK [16] IEGYQRMDHQFCFSFKN--YFLTYYTQFSRP
 675851988 *Helobdella robusta* NVP-RDSYND---LVTDFIQ--PNKFIVTLMANE [14] VKFFRRTHEQACEMKN--YNLNYALYERP
 156370797 *Nematostella vectensis* NIR-VKCYKE---LVLKAFK--PGRFLMTLFADE [15] FHGYQRWDLQLCQMKY--YNLTYGHRQV
 761906225 *Amphimedon queenslandica* NVV-GECYKS---LVLDFIK--PGSFTLTLFANK [15] LSNYTCCLKDQISLFSI--YNLTFLHYKHN
 198416848 *Ciona intestinalis* NVI-MKDYKE---LVLNLFQ--PQVVSMTLFAFH [16] VPGYKRLDRQVAQLQD--YSLWYSQLKKE
 268561468 *Caenorhabditis briggsae* NQD-LVCLYS---QVLQCFR--PNKILMTVFAND [16] LPGYRRTNVQFVRLET--ETLVYAHFVRK
 312078795 *Loa loa* NQN-TLNLSE---QVLEIFRHPVKNKFLITFTND [16] ICGCHRTNLQFLELPT--ETLVYAQFERA

protists:

929755270 *Sphaeroforma arctica* JP610 NYL-AEDYTE---LVLKTFK--PGKFVMTVFANP [15] LTGYNRTERQEYQFNK--YNLSYGHFSRD
 514686471 *Salpingoeca rosetta* DVL-KEDYTP---MVLDFIK--PGKFSINVFANE [17] GAGFQRHDQQLCCLAH--ASVLFQGHFTSN

plants:

985701157 *Solanum tuberosum* V[8] LGPLVE---RVLACFE--PAEFSVALHADV [12] VKGYSLAEWSPEEFEGG--GSIVYQKFTRT
 731352674 *Beta vulgaris subsp vulgaris* M[5] SIRFEP---LALRCFE--PKEFTIAVTCFG [14] VKGFTCRSAVKQELPGG--GFVIYKTYVAQ
 302803606 *Selaginella moellendorffii* M[5] KTGLNA---LVVRCFK--PGFVSVCVHAAP [24] PVAYATCSGSHKEELPGG--SAVVYHTFVLA
 168048070 *Physcomitrella patens* M[5] QVELGA---LVVGVFK--PAAFAMSVDVSG [18] PRGYVCNGSSRQELASG--SAVVYHTFQEA
 702445187 *Eucalyptus grandis* V[6] GDDIAR---MVAWVER--PGAMSVSVTSGS [12] PLGLKRRSCATDQFPEA--GTVVVFQSFRTAR
 923724061 *Brassica napus* G[7] QGDIAE---VAIDVFR--PGCVSIATTYNG [17] KLGLKCRSRLMDEFPGS--GTVVYQSFRTPR
 514802427 *Setaria italica* M[5] ALAYGD---LVLRCFG--PSEFSVAVTIFG [13] AEVYDCNNMVEQELPG--GVLIYQSFVST
 514756085 *Setaria italica* G[3] AGCALA---SAIAVFR--PATVSVSVCYDG [20] PMGLACRSRAAEAFPGA--TTVYQTFTRT
 926775472 *Monoraphidium neglectum* T[5] AFCPAD---MIAATFR--PGLSASLSVDA [15] PPGYGVQSATAQELATG--GRVSYTTFGPD
 159470359 *Chlamydomonas reinhardtii* S[6] MAPVQE---LVVKIFA--PGKVSVTMSVDK [15] PAGFGLQGASSQVSPCG--GKVAYYTLIEK
 308810503 *Ostreococcus tauri* S[5] DLDAFA---YVANVFK--PGKMIFAISVDG [16] IPGYTRVQATRQEFDVE--GVVAYYTFYEHN
 612398587 *Bathycoccus prasinos* S[8] AFSVSN---FCANVFK--PGKMTFAVTCHG [22] GETYSRPSMCFQQLPKDQGFVAYLTFVKT