

## Data S1. Consensus sequences of multicopy *Academ* transposons characterized in this study.

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## Data S2. Representative sequences of single-copy *Academ* transposons characterized in this study.

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### Data S3. Protein multiple alignment of *Academ* transposase domains used for the phylogenetic analysis.

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SS-----SSKGLD
Y-----D---VVDQ-----LSSSI AV---
--AFR--NDDCEA-GRNAVKEL-----
LVHLP TIVTLL-----
-----QEFVEE--
-----HSHQ-----G-TFKYWMNYLEV V-NTLLCFIRAEREGNWH
EHLCAFEEMLP LIAVHDH--TNYTRWGPVYLECMKDLANFAPT-VYAEF---VEGGFGVK
T---TNL-----PFVNISTDQAIEH-
>Academ-1_AP
YVCDNADHNISSIDG-----LNTFHSMGMIKII SPYDK-----
--INDSQQIVRLSK-IPTK-----IEMANVS-----HIP LKLYNNHGVQG
----LKTITIKK-----LNFDQIKV---TS-----IFRNSDVLW WYAK---
-----WQADDVVGWS-----GF
ME--ILTREMIHT-----KSRILFLPFINHSASNYNT-----
-----IFTTLQYITNDGNKDGH-----
-----TTCVVTL DQPLYLKTREII-ATLTGEP-----
-----MF-SNVFV-RLGGFHLLMSYLSIGYIMAGSGLKEIM--SII FAPNSVD
KILLGHAYSRAVR-----AHTLIQITLSQIIFKE-----MSFND--
-----
-----EQKEQYKVH-----LDNFN-----
-----EELF-----ENIES
SKVIEELKLLF-----
-----EEKIVE--
-----LKNR-----GPTAKLWLQYFEMT-ALAKEFIRAERMGDWK
MHLVCVKRMLPYFHAAGH--YNYAKSAHLYVQDMENLENTMDNTAFQKF--TNNFFSIK
R---SNK-----YFCGTWSDMIEEQS
>Academ-2_BF
TAMDNIDHNPTATTA-----TTSFHGTSISAFQLPTEG-----NQGE
----FREPLTLRL----G-----EEKVKKVPELPEF-----YTNIRPAFFT KKNP
-----SPERSHGVTQVQDNTL---LG-----PQLALEYAWLEKV---
-SVE-----EETDGAVN--LTWS-----AH
HA--SQKRSEPKVE-----VSVTSL LPLFRDPAHSVAT-----
-----IRHVMDKVMETVTF LNP-----
-----GQIPVMTADQPIYALAKQIQ-WHWPEQY-----
-----GE-DKFVM-MFGGLHIELAALRSVGTILQSGS GWTWALVEAGVASSGTAE
SFLSAASITRTRQ-----AHQITACSLYQLMCAA-----YSD-YC
TEAA-----
-----DNSEELL--
-----SF-----
-----DAWCNS--
-----RKLQ-----SPQFQFWSLVLSME-LVILL LIRAFREANFN
LYCQALAE LIPYFFANN--TKYARWLP IHLKDM LTLKEKHPQ-LAEF--ESGKFVVH
K---SRR-----EFSGMAIDQAHEQA
>Academ-2_HM
WVADNVDHNI CTLTG-----KNTFHGMGIISITPYS-----
----VQKSI AVKR-LKHK-----QSFCFKD-----AIKILPYHGSSQQG
----LSKLKFKAVCDLVLP-----LFHS-----PVMNLDLLWQA AW--
-FLT-----SKESPRPNWS-----GF
MQHAVTTCSDNFK-----KTTINFLPIIDL NPLEESC-----
-----IYSTLQFVISQAKRFDI-----
-----STPCITFDQPLWLK AIGIV-KNEN-----
-----LNIVC-RLGGFHTLMSFLS IGLMSGSGLEEVF--EEVYAEHTVQ
HMFSGKAVARSLR-----AHII IQSVLTVYLMDF-----LIE--
-----
-----ESRIDLAGF-----IPAYQNA--
--IND--QGMNK-----EQLI-----EIGN
SDIFKQTKSAL-----
-----SALIEK--
-----KKAE-----SR TAALWLQYMEYI-DVVKEFICAERTSNWY
LHLQAVKMLNLFAATGH--VNYARSARMYFQEM LTLSETNPW-LHDRF---IEGEHAVR
R---SSR-----YWGLWSDLVIEQT
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>Academ-2_Lgigantea
CVWDDNDANIETLDG-----KETLHATVGHTYQNILQH-----DRET
-----NNIPIEFRD-GRNR-----RRFVGSQREIPPF-----RKPLNTAMFVTSAN
-MSESSNAITAESTDTA---ETSNMITSESTEP--NVIQRKVKLAMKALDLCWLWKL---
-----FEGNTPLYA-----GF
IS--MYIKDVLV-----MQRICYMDPISRSPNTNDV-----
-----VKETMIRTMNVARETGQ-----
-----DYSIVTYDLAVALKAYSIQ-AIESP-----
-----MF-DNLLI-MLGNFHVLEDFYGAVGTLINETGIEFILTEADILAEBSMM
GFIKGFYNCCTR-----IHELLANVLEQKLYQR-----FLL-DL
PE-----
-----EYESVVLV-----MHTLP-----
-----SNASQA-----EVHL-----L
DPVVLQHLEKY-----
-----EEFFQM--
-----IIDGSQ-----GPTAQFWATYIFLINRLHRELQRCVKVTNDVN
SYINVFPMLIGVFFSLNR--PNYARWGTFLFLQKLSK---DPK-LIEIL---EKGAFSVR
R---TTK-----DYSRSAVDLSLEQS
>Academ-2_SP
LVYDNDDFGEETVSG-----KGTHNTNGIIVQHPI---TQPEREPSK-
-----IAI-PKSR-----KIAF-----EVP-----PVELVTFGRRKIG
-----PQPFDRLG-----LECEEYQD---AQR-----YARDIDIACRLK---
-TVE-----VGEKLLPGWT-----GM
NV--MLTKP-VSK-----QCTVGYLPIDASPTEFDT-----
-----VNTILTTLSIADALKQ-----
-----ESVVLVFDQAIYSKAQQIR-WVNEI-----
-----FR-KRIVI-RLGAFHTALSMACIGKRFGDAGLENLMIESNIVAQGSIN
GVISGHHYNSIR-----AHKCIMEAMERLRWQA-----YIS-SL
SD-----
-----VDYASTYEI-----LAKLQ-----
-----SDFPT---SSFTEFV-----R
GEEFQAMASSY-----
-----RSFVKQ--
-----RSTQ-----DPTFALWSSYIEMV-EVILLFLRATRQGDWQ
LHLSSIRSFLPWFFAYDR--TNYARYLPAYWHEMHLPNSHPL-IYKAF--MEGKFVVH
R---QTE-----HGFCGVACDQTIEQT
>Academ-3_BF
AAADNNDLSEETLDG-----KNTHATTLVLFQRTG---YGPAP-----
-----RSQTLGD-HSVK-----KKSL---TSSCA-----TEILDFSACGKRPA
-----VTTFLNKV-----GELIGRQEDHD---SIC-----TTAMVDMEWVLMR---
-MLPTKLV DVS-----LHQNRPDQSI PGWS-----GF
HA--AVTSTFSPH-----MLSTVIGYCPMIQGSPTYEYST-----
-----VYTMKQVQAMMKHLDQ-----
-----EDSVITFDLAIYSMAKIQ-WRLPE-----
-----EF-SDTVI-RLGGFHIALNYSLLGKQYKGSGLDLLLLLESGVYGSNTAT
ILLEGKSYNRGVR-----AHKLTMEVMLRLQWQA-----YIS-SV
VP-----EGGEIP
P-----DVEEE-----VSAVQLA---
--YER--AGDLH---EPMTSL-----
HEAMPALMTKF-----
-----EHFKTS--
-----MKAK-----SHLFSFWDNYVSMV-LLLLQFIKAERSGDWS
LHLASTACMVPCFNMSMR--TNYARWLPVYLADMRRLPETHPQ-VHNAF--MAGDHAIS
R---SNQ-----PFAKVWTDMALEQS
>Academ-3_HM
AAIDNIDHNPSSSTA-----TKSFHGTSISIFQHAID-----
-----LPVKRYDYDFSEKATNAILELPSY-----YTTEPTKDHVSVEY
-----PIQTTNFHQFENF-----DAFSDSREWLTA VVK-
-VLQ-----NKSEGEGETHISWT-----AF
NS--KTIIDEQKT-----KNTSILLPIINESINSTSM-----
-----VRQTFNIVKKVLAKINP-----
-----TQVPIITADQPVYALGKQVQ-WHYPELY-----
-----GE-DKLLM-MMGGLHIEMASLSLVGDWLEGSWCDAITKAGITTSGRAE
SMLTGRKVKRSRY-----AAQVSLAGFYSLLEA-----FQK---
-----VSTTS-----
-----FDLWIHE--
-----QRTA-----YTQFNWFTAMELQ-AIVLLLKVSFRMGNFN
MFISALEQIVPWFALDH---THYARWLPIFLADMKMLPYKHPE-VYTEF---CKGFFTFQ
K---TRR-----PFSSMAIDQAHEQN
>Academ-3_SP
YIADNVHDNIDTLDG-----SGTFHMGIIATKTPG-----
-----TKCKKPVPR-ETVT-----AEDIAAVG-----RINIEYFKA--STT
-----VQPLVYQPIVNWG-----TED-----PTSNIDVLWKTSL---
-----LLRSRPSWS-----GT

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MQ--MVNKGNYPG-----QSSVMFLPMIDMNPSPDFSC-----  
-----VYSTLRFVCAHAKQYN-----  
-----TTPVLTFFDQPLWVKALTIIRSQPSDS-----  
-----DL-KQIVL-RLGGLHTEMSFLGSIHGLMTGSGLQELL--EVVYASNSVS  
HMLGGKAISRVR-----GHFLVDAALNTMLIAD-----LYNVQL  
PTNEKKPPEVPEQDQHPGVPFCGVANFGEQPTGVPSGTTNDQQLPDHCDVAIEEEQIP  
ETNCDAHVEQQPPEEVHGVARGGDHSSEVQFPCGTD-----VNEPATDTMKEQDIKE  
TDLGE--AQKLY-----DRLLSATAL-----VGEICS  
SEVIDQILRQI-----KAKKET--  
-----LT-----TRTAVLWLQYMDMI-DILRKFKAERTGNWE  
LHLQAIHDMPLPYFAASGH--ILYAKSAYVYLQMMRELPHTHPE-VYMRF---REGYHVVR  
R---SDR-----YWAGLSTDLIEQV  
>Academ-4\_BF  
LAWDNIDRLEETLSG-----EGTSHRVNGIAVQARH---FGPRFYSEQ-  
-----SPVI-PKSK-----RRSV---EPQD-----VVSLPIYNSGERQG  
-----PKTRGYVD-----VTCQD-----AIE-----SARRRNLWLIVR---  
-LHG-----EISQRVSGWT-----GY  
NI--LVRNETDVI-----KDSIGYLPTIDAPATNMST-----  
-----VHEILMRSLKIKDALHL-----  
-----KSIVLVFDQALYAKVTEIM-WKHPQ-----  
-----TF-KDIVP-RMGMFHTLLTLLSIIIGKRFEDAGLRDICIESGVIAEGSVT  
GVLEGRKYNRAIR-----FHKLMYEALQRLVWKH-----FLK-WI  
EKSP-----  
-----AKQKLVKDV-----FASLKPLY---  
-----NDVCQ---DEQEKVL-----A  
NQKFAKFKVLY-----DEHLEF--  
-----LRHSK-----GKLASFWMYSYIEIV-EIMLNLRASREGDWE  
LHLSAIAQMI PWCFAYDK--VNYARYLPAYLFDMSHLNETHPE-AFNYL---NSGGFSVQ  
I---GDH-----NPFGRIPVDQTCEET  
>Academ-5\_SP  
GALDNLDHNPSSSTS-----KTSFHGTGISLLQLPTKA-----KPGE  
-----SRAPVVIIP-----SGNEKHALPDS-----YAYVPATAKTTAV  
-----AVPESEVFPLE-RCLD-----AAKAGEHSWVEHSLP-  
-LLE-----TKELISGDTISWA-----AY  
HA--SNQPPVEDP-----PAQCALLPLFYEKSATPAM-----  
-----IKHGMDVESQAVEFLNP-----  
-----GQIPVTTFDQPLFALAKFVQ-WKWPDPH-----  
-----GE-KVHVV-MLGGLHTEMALWNTLGDVLEGSWGTALTEAEVASSGTAD  
SYLKAHLTRTRR-----AHQITVLT LHNQSEA-----FMH---  
-----SDGPKD-----EESF-----  
-----TAWKNN--  
-----MQKR-----SPTFMYWDLIMRYE-TLILIFIRAHREKNFP  
LYVEVLEELTPLFALDH--VNYSRWMPVHIRDMKSLPDTIKD-EFENF-----SHWVLS  
K---TRN-----KFSAI PFDQAHEQE  
>Academ-1\_CGi  
FVADNVHDNINTIDG-----NNTFHGMGII SCLSPG-----  
-----LEKNPLRIQR-LDVT-----TDDLIASG-----HISLFYFNAEKHKK  
-----FTQLKFQELRPLK-----SMN-----FSWKIDTLRNVLW---  
-----PLRSPLPGWS-----GM  
MQ--MVQEGNNQG-----VSDITFLPMIDLNPDLNC-----  
-----IFSTLMFVSKEASRYN-----  
-----RTPIITFDQPLYWKAVMMT-SSE-----  
-----EC-SNVVV-RLGAFHAEMSFIGSIGRIMSGSGLREIL--ELIYAPNAVS  
HMLSGKAVSRAVR-----AMMLLDTAMQCTLNEH-----IFD---  
-----MNQCDEVESD-----FEEANPI--  
--LDK--ADELY-----SRLCSKDIS-----VKQAID  
DPVFTALEKRI-----RDKTNE--  
-----IK-Q-----SRTAKLWLLFSEMVAAILKRFLVAERTGDWQ  
LHLSTLQEMLPYAAAGH--NLYAKSVYLYLSQMQLDRVHPE-VYNHF---MKGNHVLR  
R---TDR-----CWSGLSTDLIEQV  
>Academ-1\_CSa  
CVWDNNDANIETLDG-----KGTLHATVGHTYQNVIQG-----DQHT  
-----NTTIVAFRE-VRHR-----RSFVGNEREIPPF-----GKSIHKANFLS---  
-----LTTEAHVDTD---VSSTQLESDD-----GYNIRLNLLDLYWFWSS---  
-----REDSTPLHA-----GF  
MS--NYIQDKLP-----LQRICYMDPIKSPNTNDV-----  
-----VRETMIRTMVAKETGQ-----  
-----DFAVVTYDLAVAIAKAYSIQ-AIQTP-----  
-----IF-DKLLI-MLGSFHIELAFYGAVGTLINESGIEYVLTEADVLAEGSMV  
GFIKGRFYNRCTR-----HELLANVLEQKMYKR-----FLL-EI

SQ-----DDFDSFQQV-----MSTVP-----  
-----LDPILA-----KEHL-----S  
HPVVTQHRLRIY-----ENYFQT--  
-----ILDGNL-----GSTAQYWAIYIYLINRLHRELQRCVKTNDVD  
GYVNVFPQMLDVFALNR--PNYARWGTLFLRKLKSL---DPK-VREIL---QNGAFSIR  
R---TSK-----DYSRSAVDLSLEQT  
>Academ-1\_GA  
LVWDNIDFGEETL-----IRSWNYSPIYQWNHAFEDHRAVYVHSN  
-----Q-TATK-----EGSFLIQSPPP-----KMPIEYPYHQSKRQG  
-----PQNLA PQI-----RIDVQLDSWT-----GF  
HT--LQGENTLQ-----KSALYLPVIEALPTEMST-----  
-----VNTILKRSVQMA DQLEL-----  
-----DHIVLVFDQAIYAKAQQIR-WKNDD-----  
-----FT-QRLLI-RLGEFHTCMSYLSILGKRFGDAGLQDILIESEVVAPGSIN  
GVINGHHNRSMR-----AHKLEMR-----  
-----  
-----M-RLLLLFVRATRESNWQ  
LHLSIVRLMMPCCFFAYDR--VNYARYLPVYWLEMVNLPITHPS-CNSEM--NVKGQWTVQ  
R---QSV-----DRFASIA CDQAIEQT  
>Academ-1\_HM  
LVYDNADFLEETLSG-----SGTHVTHGICIQEKYNC-----  
-----NFSNSI-QVSR-----R---LKTVP LP-----KQVVQPYHLGKKPS  
-----FSVSYDSQ-----ISSEILPSWT-----GL  
LPT-----  
NT--IMSDKNM-----LTTIAYLPVIDAPVTEIST-----  
-----INEILKQALTIANTLEL-----  
-----AHIVLVFDEAVYSKIQLVR-WKTEE-----  
-----YL-SRIVV-RLGDFHMLMSYCSGISKIYADAGMQDIFIESGIVASGSIN  
GVLSGKHYNRSVR-----CHKTLYEALQRLCFQS-----FLD-SL  
VN-----EENC D I I E F-----LSAMREC-----  
--IVKENDDFYI--HNYKYDI-----E  
SQKFENLCQRY-----KDFVDV--  
-----QCQE-----NATFNFWYNYIDMI-QILLLHIRATR TGDWA  
LHLSAVRSM LPWF F ITDR--VNYARYATS YWVEMKRLAITHP--VNDEI---HNNWTSQ  
R---QE Q-----YGF SRVACDQTIEQT  
>Academ-1\_NV  
LAADNNDLNEETLDG-----KNTHATTMVVYQRKV---FGPDP-----  
-----PPIILAD-HSSR-----RRSL---PESTNL-----YELLECPYGRPA  
-----LNEHIRKV-----KNEWFSELD---VLV-----RALREDEIWL L L R---  
-MDLTGRTPAA-----VMKQTVPGWS-----GF  
NT--ILYPD-LPL-----SSKIGYCPMIDGASTEFST-----  
-----VYTVLKHAQKVS AVAQ-----  
-----EDTVITFDLAIYIKAKQIQ-LRYPE-----  
-----EF-ANTVI-RLGGFHIALNFLSLLGKGFASSGLD D L L I E S G V Y A A G T T S  
ALLKGSYNRGIR-----AHKLSMEALHRMMWSA-----YAQ-WC  
KD-----CEDSGLD  
E-----T M I S R-----I E E S R E A---  
--ILS--RDNTS--QNLEVL-----  
ECDIEKLAASL-----GKFKEE--  
-----ASLQ-----SKTFDFWMRYMSMV-KLLLQFIKAERTGNWE  
LHLASTAAMI PHFFSMDR--PNYSRWLPVYI S D M R Q L E V K H P R - V F E E F ---MAGNHA VS  
R---SGQ-----PFSQVWTDMALEQS  
>Academ-1\_SP  
LVWDNNDFGERTLSG-----KGTHTNTNGI AVQHAHLAAV I P Q A L P A Q -  
-----SM-KKTR-----QRSL-----PAP-----ATILVRFTGQRKSS  
-----PEAFDDSV-----ALEMSQYDD---VLH-----SNKEKDAAFYVAK---  
-SSQ-----ERLLPSWT-----GF  
NQ--LLSSN-IPP-----KATIAYLPVIDASPTDFNT-----  
-----VHTVLHRSLEIADQLAL-----  
-----PAIVIVVDQAIYCKAQTIR-WQEPT-----  
-----FL-KKIVI-RLGAFHTTMTALACIGKRFQEAGLQDILIEAGVVATGSVT  
GVMNGHNYSRIR-----CHKLMAEALHRLRWQS-----FMG-SL  
EE-----ERQH Q Y R E V-----VASLQ G-----  
-----SFP-----SEFTNQV-----Q  
GELYQAMVKEY-----KDFIEE--

-----GKK-----DATFTFWSSYLDLV-GNILLFIRATREGDWQ  
LHLASVRALLPWFAYDR--TNYARYLPVYWIEMSQLPHTHPY-TYNEL---MKGHFGVQ  
R---QDS-----HGFAQVACDMTIEQT  
>Academ-3\_SK  
HVADNVHDNVRTIDG-----LNTFHGMGIITTTIPG-----  
-----ILWNTIPK-VHVT-----SEDIVSVA-----KVNICYKQ-LSKG  
-----MAKLKYAQLPSLI-----AGD-----DTLNVDLLWKISW---  
-----LLHPSRPSWN-----GF  
MQ--MVHQGFPHG-----VSSIMFMP-IDMKSTDEPC-----  
-----IFSTMCFISEQAKKYD-----  
-----VTPVPTFDQPLWWKSLEIQ-QNEPTSS-----  
-----SV-RNIVL-RLGGLHVQMSFLGCIHGLMSGSLKELL--ETIYAENAVG  
HMLSGKAISRIR-----GHILVEAALYALLLSM-----MYDLPL  
PRKEH-----  
-----GDSSNANQSQ-----TEDTTNE---  
--LKE--AGTIL-----ERLLAHETE-----IESVCS  
EEVLTLIQEKI-----  
-----NQFKET--  
-----LA-S-----LRTSKLWLQYIEMI-EILQQFIKAERTGNWS  
LHLKAFSDMLPYFAASGH--NLYAKSVYIYLQIMSKLPESNAD-VFRSF---LNGYHVVR  
R---TDR-----YWAGISTDLAIEQV  
>Academ-4\_SK  
LAWDNYDVNMDTIDG-----KGTLHATVGCYQNMQDA---TSTNKL  
---NDEPIVTGIRD-GRSR-----RQFDGKEREIVPY-----YKQLKKARFNL  
-----LLNENQEP--EXVP-----TLRVIDFYWLLQS---  
-----EVAKPLPLFP-----GF  
YS--KYATDKLP-----QORIWMYPISASPTRNEV-----  
-----VRETMRRTMNVAMETGQ-----  
-----NYGIVTYDLAVALKAYSIQ-SLDAP-----  
-----LF-DKLLI-TLGNFHLELAFYGAIGTFINESGAQHLLTESGILAEGLM  
GFIHGKYYNRCVR-----IHDILALAMEHKIYDS-----FKS-TL  
TE-----  
-----ERQDAVKDL-----LANVP-----  
-----QDVNAQ-----EQFL-----HA  
HPLFQDHMEQY-----  
-----DLFFKD--  
-----MMNGKL-----GPTAQYWSMYVFMINRVHRDLVRLRMNND  
DYITTLPAIIDIFGLNR--PNYARWGLFLNQLMNA---APQ-SRMVL---QSGAFSIR  
R---TGK-----HFARSAIDLTLTLEQT  
>Academ-7\_SK  
IAADNNDTEETVDG-----KNTTHCTNMIVIQRKS---NNPLL-----  
-----SGSFMDN-IYVR-----KRSL--DTVKE-----PNVKMYLPPRRR  
---CPVLQSKN-----LTWLSRTMH--P-----EKLSLDEAWILCR--  
-ALPTKLITLETD-----GDVNMSQQYIPGWT-----GF  
NV--KASSH-SPV-----LSVIGYCPVINASPTQYDV-----  
-----VYTVLDIADKITRRVQ-----  
-----THTILVLDQAIYCKAMDVV-LEKKN-----  
-----EF-QNVVL-RMGSFHVLLAFLAVLGRMECSGFEDLLVESGAFAGSVP  
GIMTGRSYNRAVR-----AHKLVLEALERLLHNN-----  
-----LPYEDLD  
E-----NYRQSIRSA-----VTVVRDLF--  
-----QDDIRPDIPNAVKDL-----  
TKLLGPLLQLR-----  
-----DATVKD--  
-----KSSQ-----SQMFLWFWEYVQMV-DILLAFIRAEREGNWN  
MHLSSLRSMPLPYFAFDR--HNSRYATLYYVQMLELEDRAPG-VHEHF---INGDFVVA  
R---SSQ-----KFAQIPVDQTLTLEQT  
>Academ-8\_SK  
MAADNNDIIEETLDG-----KQTHSTTMVVYQRGQ---FGPKP-----  
-----FRVVHAD-HTVR-----RKAL--IETDYV-----HNILECGVFGKRPT  
---VTDLFNTI-----NVKQYQRNKD---LEE---SPSSMDLTWAILR--  
-MCPTKLFVVDI-----NPMSNPERQVSSWS-----SF  
NA--QVLQCNKPP-----TTEIGYCPMIAGSPTFEFSV-----  
-----VYTVMKQVQKMMKVLGQ-----  
-----ADSVITFDLAIYVKAKELQ-WRHGE-----  
-----EF-NDTVI-RMGGFHIALNYLAVIGKRFADSGLEDLLIESNTYANTAS  
SLLNGKSYNRGVR-----AHKLVMETMLRLQWQS-----FSQRQL  
NM-----APEHQID  
M-----TRVGS�DRK-----IEIFRDQ---  
--AVK--KGEIV---EEFEEL-----  
CRDLRDIQHNF-----  
-----TSFKSE--  
-----AVSK-----SNLFAFWNSYIDMV-QLLLLFIRAERTGDWK  
LHLSATAGMVPFFYCMDR--TNSRWLPIYLADMNQLPDRPQ-VYEEF---MKGHPVS  
R---SNT-----PFSQVWTDMALEQS  
>Academ-9\_Adi  
LAWDNIDRLEETLSG-----EGTSHRVNGIAVQARH---FGPQLPPEP-

-----STHI-VKTK-----KRSV----EALD-----TENLPIYNAGDRCG  
----PRSRRFVE-----VTCQE-----ALE-----NARRKNLLWLVLR---  
-LHA-----DARQKVSQWT-----GF  
NI--SVRNEVEVR-----QDSVGYLPTINAPATNMST-----  
-----VHEVLMRFVKIKDTLQL-----  
-----KSIVVVLQALYAKATEIV-WKHPD-----  
-----IF-KGIVL-RMG-----GLRDICIESGVIAEGSVS  
GVLDRRYNRSVR-----FHKLMEALQRLAWKG-----FQS-WV  
KKFP-----  
-----DXNLSVQXF-----FNGLIPLY---  
-----NXLCQ---QEFDAVM-----K  
SRXYSEFILLY-----  
-----DKYLDH--  
-----LRNRN-----GKLSFWMSYLGIV-EILLNLLRASREGDWE  
LHLSAIRKMPIWCFAHDN--LNYARYLSAYVSEMSHLXEEHPE-AFKYL--RSGGFSVQ  
I---GEG-----NPFQKVPVDQACEET  
>Academ-15\_CCri  
ASIDNINIKNLHA-----SLSDSHS-QRGLNGLATQVVGWARTYPDKYMEADEDS  
-SSGQRRMGFLPQSI AEIR-----RKL TGGISSSTAC-----TSGVGVASQ-----  
----RENFLQHM-----IPNRTPDPL-----K--LFNMAALGI IHDIGA--  
-RLDGRDE---CN-----SKVAYISVTRNDASEAAC-----PV-SL  
RA--LLLSMVHCVASKY-----IARVYELKWRLRIGQEG-----  
-----GPKFLVVQGDQVTFHVIFEKL-MASVRAQDPG-----  
-----GLWEWLTV-ICGVFHGDKTYLLD TVKILCRGSGMCELVGDAGVTKGFAD  
LWMKMS-----HWRKCRQIVHQVITAFLEL-----  
-----IERVSEEDEDTRAALCARD--SEQLF-----  
-----  
NSLLPEVATLQLNRN-----IVTAGMLKRGDAI--LKGLERCS  
-----G---KLV---NFRWYAQVLLLAVL-LPYCAYMVCSRLGQTH  
VMDKFFF AFASFVHLTNK--NKYQRLVLQYFV-SRIL--QPPQVFALLYSNLPGQAVIS  
LS--AAR---KRRREGVHVVHDEAQLG  
>Academ-1\_CCri  
VQMDNFDIHPLHS-----VKASGKT-LPMVSGTVTQGVVQSRKR-----  
----SRVSDTPAS-TSRD-----PAALDAWLDPKTV-----LK---S-----  
----RAEFASSF-----YSDDDKTI---LD---EFFDVVFGVAYENRA--  
-VLLGESASVG-----TYRCGRNAKEYKH---KGV-NF  
RT--LLLSCFQHQHGLDNSNPSLYDQEA LLVDVSRMSAADALT-----  
-----IHAKISMLKDLIRPGEFG-----  
-----RPRYVVCGGDQPTFKMIVKLWRKSYFEAERNGN--A  
ECPY---GELKVHQWLIP-FPGFFHIEKQSLYPLCKEMLYGLGLEEMAACSGLSKSQVE  
NILKHS-----HARNNRVLFNICAMVVHA-----  
-----SDIIQVECPDVRDA-----IDSLS-----  
-----RAYSSNNSTSAG  
TSKLLSATTDK-----VSKLTVDVGRLL--RRHVQDFF  
-----S---QSP---NGKHIVRTIIMTCL-LPTVGFHILSRGTGHTD  
LVDSFWLRQNNVLTSGH--IKYQELYLYYGF-FRAI--MPKVAFADLFTNKPAMVAR  
VPSFTGGMGSPYDHRGWVYVHLDELQEMF  
>Academ-2\_CCri  
VQMDNFDILPVHS-----VKAAGKS-LPMVSGTATQSI LQSKRR-----  
----KLVHNASNAT-TGMAGF---NEEWFQSWRKWSDV-----PSLS---S-----  
----RNAFISSL-----NSKEDQSV---LT---DFYDIAFGAVFEKRS--  
-ELLG TGREP M-----QYRRGNTEMAYKH---QGV-NF  
RT--LLLSCFTPHGMDSKSPELYEQDVL FVDVCRMNAADILT-----  
-----IHQKLQ LISELLRPGQPD-----  
-----CPRFVVVSGDQPTYKMLVNIWRNSLRESRGGIS--G  
DGSS---SRTRLHEWLIP-FPGFFHVEKQSMYPVCKEMLDGLGLQELAECSGLSRSQVD  
NILKHG-----HARNNRSLLFSVCAALI IHT-----  
-----TDLVQAECPD MKDN-----LEEIL-----  
-----QGR TSMTRAKEVSS  
NSVLLRCVTEK-----VTARTLSIGRLC--RSRVMEFF  
-----S---RSP---NGEHFVSMILFTCL-LPTVGFHVL SR TAHTD  
VVDSFWLR LNNVLTGTH--IKYQELYLYYAF-FRAV--MPPV SFNDL FKDKPGAMVAR  
VPSFTAGLGTLYDSRGWTVVHLDEALEML  
>Academ-4\_CCri  
LQFDNWDTTPLHA-----VKVDGKP-MPKVNGSLLQGITKKWKP-----  
----LENIEPHR-----KRFKAE PGDWKTS-----SLLG---D-----  
----RGSFVDKL-----LPPESHVI---IS---EFS AIVFGLCSGYRN--  
-RLVGGKEGLG-----SEYNTSVRTEFQHGCTE-APL-NF  
RT--LLLSAFKQHGKKAATDESLYDQVVYVEISRDSAADKLT-----  
-----VRRFLKIIEKQIRPGHPG-----



-----CPRHVVGGDQPSYKMFVEIWMESYRKRHGNTT---S  
NRSPGIIDDVYRVHEWLVF--FPGLFHTEKQAMYSICKEMLDGLGLDEIAACAGLSKGVQS  
NILTHS-----HARNNRAVLNFCAMIIHI-----  
-----  
-----TDMLENYELARQ-----VASM-----  
-----K-----NASEKKSADG-----VFKE-----PLGARVSTATSQHTNEKP  
FGQLYKETTEV-----  
-----VTADTINCGRRI--RDLAVKAF  
-----G-----RGC-----NGQHFVNTVLFSCS-LPTIGFHVLSRTGHSN  
VTDIFWFKHMPILHSTTH--LKYQELSLYAF-FRGI---LPTYVVDELYDKKPGRSLVK  
LLSFTGRGKDAIDRRGWTYVHMDESLEML  
>Academ-6\_CCrI  
LQFDNWDIKPLHA-----VKADQKA-MPKVNGSLLQAVTQKRKP-----  
-----EYEELFLPDA-----KRRKTEGQTSWRPQ-----LLLG---D-----  
-----REAFGDSF-----STPETQII---LD---RFNDVVFGITALFRN---  
-ALVGGHEQKK-----SEYNTSTREQFGYKCSS-PPI-NF  
RT--LLSFCFKPHGG---AAEPTFDQHVIVEISRDSAADILS-----  
-----VRRFLNLIVEQLKPGKPG-----  
-----RPRYVVLADQPSYKMFSELWLESWRKSKKDRDRMTT  
TYTECDKNEALPLHDWLVF--YPGFFHAEKQAMYSICKEMLDGLGLEELAGCTGLSKSQVE  
NILSHS-----HARNNRAVLNFCAMIIHL-----  
-----  
-----TDILVGEDDDIEKR-----ITRM-----  
-----A-----DASRKIIISADTEINPDEVHRQ-----EAQIRVSESYRSVCSPT  
PGRLYDATSDM-----  
-----VTAEVLEIGRIL--RRKVEYHF  
-----T---NGP---NGKHFITTVLFSCS-LPTIGFHVISRTGHTD  
CMDAFWFKHNSILHSTNH--LKYQELSLYAF-FRGI---LPTFVSNVLFKPKGKAVLK  
LLSFTGKEKGGDLRRGWVYVHQDEALEML  
>Academ-7\_CCrI  
FQFDNWDIKPLHA-----VKVDGKA-MPKVNGSLLQGSRRKRV-----  
GKSEGWNRNEIELKR-----QRQSSWRSM-----ERLG---S-----  
-----RENFTDSL-----SNREHEAI---IL---QFQSVVLGMSSLYRR---  
-QLLGGLEGAN-----AEYNTGTREGLDSLMHH--RPV-NF  
RT--LMLSCFKPHGGKNLGTESLFDQHVYVEISQDSAADILT-----  
-----ARRFLQLIEESVRPGQHG-----  
-----CPRYVVLADQPSHKMFMTLWVESWRAARKNRTR---  
-----EKVDLHEWLIP--FPGFFHAEKQILYSICKEMLSGLGGEEMANCSGLSPSQAO  
NFISHS-----HARNNRAVLNFCAMIIHI-----  
-----  
-----TDMVMEDEGVARR-----VTALH-----  
-----E-----KTGKQVSSDS-----VAS-----FHAKKDAWSNSDNKQKP  
CGSVYDQTTDL-----  
-----VTAEAEIVGAVL--RKELEKKF  
-----C---GGP---NGVHFVKTILLGCL-IPTVGFHVFSRTGHTA  
LNEAFWFHHTILHSSGH--LKYQELAVHHAF-MRSI---IPTVVAEDLFTKQPGRSVMK  
LLSFTGTGXVQDSRGWTVVHLDEALEML  
>Academ-2\_Adi  
LVLDNIDWDVVKVH-----DMRSGHQ-NKSVHAVASSIVFDR-----  
-----VSSDH-LPNK-----DSQKTLRNCNL-----  
-----RDVLL-----LTNEEKQS---TK---ERYKIFLGRIVCE---  
-LFP-AFH-----FLKGVVPAHTPC-----QY  
QA--EMSCA-----SLVVPLPVLKDEKKYAE-----  
-----VVVDVLDQLEVWVREIYSKAGRCAPPEPAHVLPGPPIAA  
PSRPDQPSHVPIPEANDPLA--NVRVPCSGDQLTRVRLAGAK-DLRAGSHTPD-----  
-----RF-DHLYPYRIVDWHTKRSFLKVVFKLYKNSGR-----EQGTLR  
YFREKLQRRNVT---IDVKHYEDCEQFFLTVGKSFTVEA-----LLH-FF  
GMET-----KESPIT  
Q-----NRPPYY---ILEVGDQKQYYDLV-----FDKFI-----  
-----DEFLKKEPITRGGD-----  
-----  
-----ESLSDD-----  
-----K-----DFVRNYSLCLLKY--FLLCDLKDATKEGNGE  
RLASLHKIILLHFALPGF--NSYAIEMLVNI IQNEVF---LSEAEAHQC---KWA-ATVN  
W---KGG-----AGKNIEIDLQENR  
>Academ-3\_Adi  
ITFDNIDFHLSSR-----NMSMSEQ--NRDVHVVNHSMVENR-----  
-----VSGNH-LL-----TAREKDI-----LDIP-----  
-----NIQFL-----PSVEDQRR---QR---MNYIIFVSRILVD---  
-YFD-SFN-----VFKDVCVRHIP-----KY  
SQ--EMSVK-----SRKTPLGIFKDNENED-----  
-----MLSILQEFHAYL-----  
-----PQTGEDQF---DSQLFAGDQLTVERATNVV--ASVSNNGYSAKD---  
-----RL-EGINL--QLGDWHAVKILDLIFRRFYSSASDV-----DQCTLH  
SDRSLINRRNVTH-----DPHSNYRADRDFFLLILKSRIVVA-----AMN-AL  
GLEH-----KKSTPTC  
-----FPIPEDISSLSKLRDLFLHEA-----AGIV-----

-----DKFVFKGD-----GL  
SSMINDVLTQ-----EKEEIIINGQELTDDGRFPCRFO---GCP  
FSFKFDGKSR----RKHELAHNPPVIGESTNLP----ITSEKPDMS----TNKAKT--  
-----S-----DDMFNYNCAIITDG-LFFLNFLDAVSEGDGQ  
RLMRQYKLLLLLYCKADGQHSSTKYALESLYQFFLIYAL---LSPRDAERF---VWN-RTVN  
N---GGG-----KGKNIALDLLEHS  
>Academ-2\_CGi  
LVGDNWDKNIIPA-----FRTSQQK-TLSLHLFNVVVVDR-----  
-----IIPFTRIGNE-----GDRKTDVP-----  
--GDKEIFI-----PSIEEQSI---LM-----DELVFLFATSVIQ---  
-NVP-QMK-----AEFLSIYPVHLHH-----RY  
TA--QAGEK-----TKQYPLGLFDTNETKTAD-----  
-----MIQLLRDLQSRV-----  
-----PFQNDIV--ESVFFGGDRLTDERVQCAQ-QSVLNGDTASS---  
-----RL-EGFIS-KIEDFHRLMNFLEAICRLTYSAESAG-----DRGTAA  
YFRNLLNAVNVKG-----EVRNAYRPHYKLLYYTILDAMCCVL-----FFQ-KF  
SKTS-----DEEIPLP  
H-----NF-----QNLSSSEEKIAWFNGI-----CCEIL-----  
-----QEYFFESQTDIMK-----  
--DLREILTDM-----GHPENYYSNLE---NGRVQCHF---CP  
KSYTYVGSGLKVHEEKVHGAKTPETK-----RSTEKV--  
-----K-----DEVGNYCQLFFKLA-LLHRNLDTAVDMADGH  
RSVRSAKYELPIYVKTNK--TKYAIGSIHLISLTEGI---LDEEEKERL---IAN-RCVN  
L---QGG-----KNNMALDEYVELL  
>Academ-1\_PGr  
LCYDNLDFQEKVH-----MKSIGHS-SKMFHGTWGYVHTIPRS-----  
-----LQSHLDPAE-LTVE-----ALNKALHIGKD-----LKIR-----  
-----PDMFT-----PTAESTIH---FE-----TTIKSQITRVILK---  
-YFA-TPT-----DKRVDLLVKPL-----EV  
NP--IAPDD-----PNITMLKLMVASDNSALG-----  
-----VGEVFTGVIQQS-----  
-----GLTPAEFH--SRLQIVEGDLGSCNIFDSLRLR-KQRTPALGNHN---  
-----SL-DNILP-IPGAAHTLWNLSQAIYLAHWGNEKLA-----RDTGAW  
RTLHALGIPAEKP-----VTKKDFNMLCHIEKIHEATLLYC-----VLL-VA  
N-----RAHEPWS  
-----GKRLKVSTESIHDW-----VELTF-----  
-----DRFCSGAAL-----  
-----QTELAS--  
-----N-----YSGHKNLLLRIRDF-GTIVEANRAMKGDYD  
RLMFMWQRWAVMSQIGGM-PHYSKHLPKLILIKYI---LPKSLSDLV---MNT-LLMS  
P---TGK-----PGHFVATDFYLEEL  
>AcademH-2\_PGr  
LCIDNLDMEERIQ-----IATVGKQ-NRMFHGTWGYIHIPSSD-----  
-----LMNSLNPND-LTLS-----AYHNALKNVSS-----LVID-----  
-----PNFFL-----PNDDQEH---HK-----LVVKSQIAQVMYK---  
-YVA-RPS-----HPKGRHPLHPP-----EV  
EL--ISHKK-----PEIHMLKLMNESDNSAEG-----  
-----IGQVMDALQHQT-----  
-----RLDPADFF--GRLQLIDGDLGTAQIFNAIR-VLRSPEHCDH---  
-----SL-NNISF-TLGAHTLWNIHTILTYHFGNSGSM-----DNLGVW  
RYLEALGIPPEKV---AQKKDFTKMLQYMEQVHEATLWYC-----LRD-VM  
G-----HHDTVIQ  
-----EELPIIPTAKWNDM-----VDKCY-----  
-----DRFFSHEAR-----  
-----RAA--R--  
-----G-----FPKLSNLLTRLQDF-STVIEANRAMKRGDIG  
RLINVWKMWSIMTQSLPGL-THYSAYLPRLLLLTKI---LPPSLGKLI---RHS-ILVS  
P---SGR-----PNHFVAKDFLLETH  
>AcademH-3\_PGr  
LCIDNIDFEERVH-----FKSVEKT-SHMFHGTWGYVHTLDPS-----  
-----LILEADPEE-FSMN-----QFQKAIKDSVN-----LKIS-----  
-----PTMFL-----PTFEEESH---FC-----NAIKSQIAQVMMS---  
-YIA-TTD-----NPKSSIPLEPP-----SI  
DQ--IRAQK-----PDIEMFELMLASDNCAEG-----  
-----IGEILTDIKQT-----  
-----NLTPDKFF--SELQIMDGDGLTLQNMELCLR-GQRKPSGHKED---  
-----SL-GNIFM-LLGASHTLWNIQAAYLKHFGNNTQ-----DDLGAW  
RTLQALGLPSEKP-----AAKNDFTLMLTSIQKIHEVTLIHC-----LLL-VM  
G-----IPRTSLP  
-----NEKIKLKAKSINHVV-----INLCY-----  
-----DRFFGCTQL-----  
-----KKAETF--  
-----N-----SPKLFNLMTRLRDF-ATIVEADRSKAGDIG  
RLLNIRRRWSVMAQGITGL-THYAIHLPRMILITKV---LPPALRHAI---QHS-LLIT

P---SGR-----PNHFVAKDFFLETE  
>AcademH-4\_PGr  
LCIDNLDFFEQRVH-----AKSLGHT-----  
-----ISSVPAGD-LSLE-----SYTASMKNAAX-----IDVT-----  
-----PTMFL-----ASKXEEQH---WT-----SVLKQCQIAKVILE---  
-YIA-VPS-----DKDFPIXSSPP-----VV  
EQ--ISHNR-----PDITMLKLMIASDNSAQG-----  
-----VEDVCTGIIQQT-----  
-----NLSETQFY--NRLLMLDGDGLGTCVNVKCLQ-NQRFPPSSHVEN---  
-----SL-DNICT-LLGGAHTLWNIGHAIYTKHFGNSSDS-----RDSGAW  
RYLES LGIPSRKT-----LDKKDFTL MIDNMIKIHEATLVHC-----IML-VM  
G-----KENISLD  
-----PEPQSLPSKDIVSI-----INSTY-----  
-----TRFFSAKSR-----  
-----VDASKR--  
-----P-----SPKLSNLQLR LDFD-ASVCEANAAMKAGDIG  
RVMFMWKRWAVMAQGIKKL-SNYAVHLPRMIVLMNEI---LPELLEFEV-----FLQ  
P-----FWTRNRNOKTERCLLSQ  
>AcademH-5\_PGr  
LCFDNLDFFEQRVH-----TKSVGHS-SRMFHGTWGYVHHPSPK-----  
-----LVSXVSSD-LTVE-----SYXQAMLNVES-----VDVH-----  
-----SRMLL-----PTAKEEVQ---WE-----LVLKSOITSALLE---  
-HLA-TPA-----ESYVSINTKPP-----VV  
DQ--ISSER-----PDITMLKLMIAADXS AQG-----  
-----AGEVFQXIVDQS-----  
-----NLTMSDFA--SRIQLIDGDLATCSNLTTLR-TQRTPSKHKEE---  
-----SL-MNVL-TLGAHTLWNI SQAIYSKHVGDKSDS-----RDAGAW  
RFLDGLGIPSNM-----LXKKDFTL MIRMIEKIXRATLVYC-----LML-VM  
G-----IQDKHLT  
-----KELPKISSLR I KQI-----VDETY-----  
-----ERFFSIXAK-----  
-----RNATIH--  
-----T-----SPKLSNXLLRLSDF-ATVVEGNSAMKSGDIG  
RLMXVWKRWSVIAQGIKKL-TQYSIQLPRMIILLNEI---LXPGLGKVI---KHS-MFVA  
P---SGK-----QKH FVAKDHYLENQ  
>AcademH-6\_PGr  
ICIDNIDFEERIH-----FQSVEKT-SHMFHGTWGYVHTLDPT-----  
-----LIEGHDPKD-FSLD-----SYKQAIKDSAK-----LKIT-----  
-----PPMFM-----PTFEEI IH---FR-----AAIKSQIAQVMMT---  
-YIA-TTD-----DPKKLVPLEPP-----TI  
DQ--ITAKK-----PQITMLKMLASDNCAEG-----  
-----VGKIFSDIIDQT-----  
-----YLTPEQFF--SELQVMEGDLGTIMNLECLR-SQRKPSGHKEE---  
-----SL-GNIFM-LLGAAHTLWNI GQAI FLKHFGNNKNQ-----DDLGAW  
RTLQALGLPSEKP-----AAKKDFTLMLTNMQKIHEATLIHC-----LLL-VM  
G-----IPRNSLP  
-----NEKCLKTAKSINHA-----IDL CY-----  
-----TRFFGCTAL-----  
-----QNADKS--  
-----D-----SPKLFNLMTRLRDF-ATVIEANRAMKAGDIG  
RLLN I WRRWSVMAQGITGL-THYAIHLPRMILLITKV---LPPALCHAI---QHS-LLVT  
P---SGR-----PGHFVAKDFLLET F  
>AcademH-10\_PCor  
ICIDNIDMEERVH-----QSSIGHR-THTFCGTWGYLHLPDEK-----  
-----LIATLDPLE-LTLG-----AYHKAIEQVNS-----MELT-----  
-----PIMFL-----PTPAKEQF---EI-----QVWKSQIAKVFRK---  
-QIA-TPI-----DETLAIPTLPP-----DV  
EL--ISHLA-----PEIHMLKLM DASDNSAEG-----  
-----ICQVFQSMI QQT-----  
-----GLTSKGFF--GRFQLLDGDLATI QNFHCLR-NQCAPSAFPEY---  
-----RM-DNIYF-QLGASHTLWNI SSTLFTHHFGDPSNM-----LDCGAW  
QHLEALGFSLHKA-----IQKKDFTL MVNQMERVFEALICYC-----LMV-KR  
D-----IHLAKLG  
-----SEKVELPTETWNSI-----IEECY-----  
-----VDYCTPRAR-----  
-----WAAAAD--  
-----K-----DAKLSNTLMLLHDF-STVVEAKRLMKAGDVG  
RLMLIWKWSIMCQSLNGL-THYATYLPRTVLLLDRI---LPVSMRRYL---RHN-LLIS  
P---SGR-----PGHFVAKDFWLEIQ  
>AcademH-12\_PCor  
ICIDNLDIEERVH-----SHSIRHC-SMMFHGTWGYIHHPNPK-----  
-----LLSSLDPLE-LTLR-----AYDALR KVST-----MKIN-----  
-----LQMLM-----PTCEEEKH---FE-----QVLKSQLVHAMSQ---

-YVA-KAA-----NPEHALSSDPP-----TV  
ET--IDPTP-----PDIQMIQLMSQSDSAEG-----  
-----TGQVAETLRKQF-----  
-----GLKPKDFV--SCVQIMDANLATCKNFNSLR-SLCTPSRYAKL-----  
-----RL-SNLCF-VLGASHTMWNI SQAILNAHLGHPTST-----HDLGAW  
HSLHALGIPSKKV-----IPKKDFTSMMNNIEKVHEASIVYC-----LRL-VI  
TSEEIV-----MP-----SEDAESP  
-----DQLPKLPTNKWIDI-----VEKCY-----  
-----SRFFSPQAQ-----  
-----QNASQK--  
-----E-----NLKQHTFLMRLHNF-STIVKANRATKAGDIG  
RLMRIWKAWLLMAQALPGL-VNYQSYLPRVLVLMNKM---LPPSLSKLI---RHN-ILVF  
P---SGR-----ENHFMPKENYLENQ  
>AcademH-12\_Pst  
ICIDNIDIEERVH-----DISVGNR-SRTFRGTWGYIHVPNQA-----  
-----LIQSLNWEE-LTLA-----AYQKSLANLKE-----FTIE-----  
-----PVHFM-----PTCEAKTS---EM-----DVFKSQIAGVLLK---  
-YLA-IPT-----NKSHSIPTDPP-----TL  
DQ--ISHEK-----PTIHLKMMDASDNSAEG-----  
-----IGQVFSSILQQS-----  
-----GLSAKDFY--GRLQPMGDGLATIONFNLSK-SQRAPSPYQGD---  
-----SL-HNVIF-QLGASHTMWNIASITFTHHFGDSDHA-----SNSGAW  
QYLEALGFPEKA-----IQKKDFSLMINQMEKVLEATLYCLRNPDYLLTALLLRV-TM  
K-----NENEVLS  
-----EERTVLPTRWNSI-----VNECY-----  
-----ERFCSQAR-----  
-----RVAAEA--  
-----D-----CPKLSNTLIQLHDF-SSVVEAKRSMKAGDIG  
RLMNVWKKWCLMSQGLTSL-TNYSSYLPRMVLLLTKI---LPPALQKYL---CHN-LLMS  
P---SGQ-----PNHFVAKDEWLELQ  
>AcademH-13\_Pst  
ICIDNIDMEQNVQ-----QLSVGNR-SVTRFGTWGYVHLPDHA-----  
-----LLSTLDFDQ-MNLK-----AYQDAIRKVEQ-----LHIE-----  
-----LTMFL-----PSPEDEDV---QV-----QVWKSQIARVLRD---  
-YIA-VPK-----DYNSAIPTEPP-----TV  
EK--ISHEK-----ANIHLKMLDASDNSAEG-----  
-----VGQVFQSILOQS-----  
-----GLTEDAFY--TKLQPMGDGLGTVANFNCLR-SQRMPAELPED---  
-----SL-NNIQF-QLGASHTLWNVASSIFTHHFGNPKDN-----TDGGAW  
QYLEALGFPAEKA-----IQKKNFTLMVNMERVFEATIIYC-----LRV-VM  
K-----TATKMD  
-----DQAAV IPTARWNRI-----VDECY-----  
-----ERFCSVEAR-----  
-----DSAAAR--  
-----K-----CPKLSNTLIQLHDF-SSVVECKRAMKCGDIG  
RLMMVWKKWSVMVQSIAGI-TKYSSYLPRMVLLLTVI---LPPSLAKYL---RHN-LLMS  
P---TGR-----ENHFVAKDFWLEIQ  
>AcademH-15\_Pst  
LCIDNLDMEERVH-----QASIGKQ-TRMFHGTWGYIHIPSKS-----  
-----LMDTLDPQE-LTLL-----AYHNSLKHAAS-----MEIE-----  
-----PDLFL-----PNDPGDE---YE-----LVLKSQIAQVMLR---  
-YVA-TPS-----DKKKMVPLHPP-----TV  
EQ--ILAEK-----PDIHMLKLMDES DNSAEG-----  
-----IGQVMEALQRQS-----  
-----GLDETFGF--GRLQLVDGDLGTSQIFNALR-SLRLPSEYPEH---  
-----NL-DNVHF-TLGAHTLWNI AQTIL TTHLGNSNKS-----DDLGVW  
RYLDALGISPEKV-----IQKKDFTKMIQAMELVHEATLFYC-----LRK-VL  
N-----IHETERIE  
-----EHLPISTESWNHA-----VETCY-----  
-----NEYCSPLAR-----  
-----RNAVQQ--  
-----K-----NTKLANLLIRMQDF-STVIEANRAMKAGDVG  
RLLRIWKMWSIMTQSLPGL-THYSAYLPRVLVLLTVV---LPPSLAKLI---RHN-LLVS  
P---SGR-----PNHFVAKDFLLETN  
>AcademH-16\_Pst  
VCIDNLDMEERVH-----MGSVGTQ-NRMFHTWGYIHVPSKE-----  
-----LLDSLDEG-LTLE-----AYHQSLKPTAS-----MVID-----  
-----PVLFL-----PSSSAND---YA-----AVFKSQITRRLIK---  
-YVA-TPA-----SRIGLCLDPP-----TV  
EQ--VDHHA-----PEIHMLRLMDES DNSAEG-----  
-----IGQVMEALQRQS-----  
-----GLEPEEFF--GRLQLMEGDLGTAQIFHAMR-SLRSPSEHAEH---  
-----NL-NNVTF-ALGAAHTLWNI SQTILLKHLGNTSAM-----DDLGVW

RYLDALGIRPEKV-----VQKKDFTKMIQAMELVHEATLAHC-----LRE-VM  
G-----IQESPIE  
-----EVLPIV PASTFNDL-----VNQCY-----  
-----ARFCSPEAR-----  
-----KLASTR-----  
-----A-----CPKLSNLLIRMHDF-STVVEANRAXKAGDVG  
RLIRIWTMWSIMTQSLPGL-THYSAYLPRLVLMITKI---LPPSLAKLM---RHS-LLVS  
P---SGR-----PNHFVAKDFLLENH  
>AcademH-17\_PCor  
VCFDNLDFQEKIH-----MKGICH-SQMFHGTWGYIHLPPPS-----  
-----LLAKLDKQ-LTID-----AMNAALHDAKS-----  
-----SAH---FK-----LTIKSQITRATLR---  
-YYA-LPI-----NSRIQIHKNNP-----EV  
QP--IEPYD-----PQICMLKLMVASDNSAIGVTARKVGS DGCIRVYIG  
CGHLIQTWARATNHPSQIFWQCVGEVFTGLIQQS-----  
-----GLTPAEFH--SRLQILEGDLGSCNIFNSLW-QQRI PAADNES----  
-----SL-NNVLP-IPGAAHTHWNVSQAI FLAHWGD KKN S-----RDTGAW  
RTLHALGIPANQP----VTKKDYNLMTCHMEKILEANL LYC-----VML-VD  
E-----CAHLPLE  
-----DDLKMSSEEIDVL-----VNKTY-----  
-----DRFFSAKAH-----  
-----HTNLAK-----  
-----T-----SPAHLNWL LLLRDF-STVVEALQAMKAGDPG  
RLMYMWQRWSVMTQAMDKL-PHYSKHLPKLIVMLQH G---LPEDLSLLV---LNT-LLIS  
P---TGL-----AGQFMPTDQFLELQ  
>AcademH-17\_Pst  
ICIDNIDMEQHVV-----DISVGNR-SNTFRGTWGYIHVPDPA-----  
-----LLQTLNLED-LTLK-----AYLDSLERARD-----FTIN-----  
-----PLHFM-----PTCEARES---EV---DVWKSQIAKVLME---  
-HLA-VPS-----DRSKAISTSPQ-----AL  
DQ--ISHTK-----PTIHMLKLM DASDNSAEG-----  
-----IGQVFASLLQQS-----  
-----GLTSEHFY--GRLQPM DGD LGTIQNFNSLK-SQRAPSPY GCD---  
-----SL-SNVVF-QLGASHTLWNI GLSIFSHHFGNSSDQ-----SNVGAW  
QYLEALGFPSEKA----IQKKDFTLMINQMEKTMEATLYYC-----LRV-VM  
N-----NNNEILG  
-----DERVTLSTERWNAV-----VEDCY-----  
-----ERFCSPHAR-----  
-----REAAKA-----  
-----A-----CPKLSNTLVQLHDF-SSVVEAKRSMKSGDVG  
RLMNVWKKWCLMTQGLTGL-TNYSSYLPRMVLQLTQI---LPPDLRKYL---CHN-LLIS  
P---SGR-----SNHFVAKDEWLK CQ  
>AcademH-1B\_PTrit  
LCIDNLD FEQRVH-----SKSQGHN-TKMFHGTWGYIHQLNPA-----  
-----MTSLLSPDK-ITLQ-----AFKEAMSKAAS-----VEIH-----  
-----PKTLY-----GSIPEHLH---WK---EVLKSQIATVLLK---  
-YLI-EPA-----DSKIHIQTTPR-----TV  
DQ--IPHTP-----PNITMLKLMVASDESSQG-----  
-----VSDVFDGILQQS-----  
-----SVSKEDFY--NRLQVIDADL ATCQNVQSLR-DLRIPNHRNEE---  
-----NL-TSILT-VLGG AHTLWNIAGAI FTLHLGNSANS-----RDSGAW  
CFLDALGMPSPDKP----IDKKDFTLMIQNMEKIHEATICH L-----LMV-VM  
G-----IDNTVLG  
-----PKLRKLP SDKIKFI-----VDECY-----  
-----NCFFTASTV-----  
-----RKAGEN-----  
-----L-----SPKLSNQLLRTIDF-ASVVEANRAMKSGDIG  
RVMYMWKRWSVMSQSMKKL-KNYA IHLPRMVVLEKV---LPPALSKAI---KHS-LFIA  
P---SGR-----RKHFVAKDFFLESQ  
>AcademH-2\_Pst  
LCIDNLD FEQKVH-----DKSLGKE-NQMFHGTWGYVHHPNSE-----  
-----MLASIPATN-LTME-----SYRKAMATVPS-----FEVL-----  
-----PKMFL-----PSRDEEDS---WE---LVLKAQIADV LLE---  
-YVA-SPA-----DSKVPIPTSP-----AV  
DQ--LSADL-----PDITMLKLMVASDNSAQQ-----  
-----VGEVFD SLELQ T-----  
-----NMSMTDFA--SRLQI IDGDLGTCTNIHSLR-SQRIP SQHIEE---  
-----DM-NNVCT-LLGGSHTLWNI AQAIYSKHYGDSDA-----RDSGAW  
RFLEGMSIPANKM----LDKKDYTLMIQNI VKIHKAALVHC-----IKT-VM  
G-----TPKAPVP  
-----EELPKVSSRVIKGT-----IDKTY-----  
-----DKFFTATAK-----

-----DSASNR--  
-----T-----SPKLLNMLRLSDF-ATIVEGNAAIKSGDIG  
RMMNVWKRWSVIAQGIKKL-TQYSIQLPRMVILLNEI---LPKGRMKLI---LHS-LLIA  
P---SGR-----HQHFVAKDQHLEDQ  
>AcademH-2\_Ptrit  
LCFDNLDFFQQRVH-----TKSVGHS-SRMFHGTWGYVHHPNPK-----  
-----LVSSVSASD-LTVE-----SYQQAMSNASS-----FDVH-----  
-----SQMFL-----PTPQEEVQ---WE-----LVIKSQITSALLD---  
-HLA-TQA-----NSYVSVKNKPP-----VV  
EQ--ISAKI-----PDITMLKLMIASDNSAQG-----  
-----AGEVFNAIVDQS-----  
-----TASMSDFA--SRVQVVDGDLATCTNITTLR-TQRIPSRHEEE---  
-----SL-LNIVT-ILGGAHTLWNIGQAIYSKHLGDTSDA-----RDSGAW  
RILDGLGIPFKKM-----LDKKDFTSMIKNIEKIQKASLVHC-----LMV-VM  
G-----IAEKHLT  
-----EKLPQLSSTRIKEI-----VDETY-----  
-----KRFFLIEAK-----  
-----EAAKLH--  
-----T-----LPKLRNLILRLSDF-ATVVEGNLAMQAGDIG  
RIMNVWKRWAVLLKGIKKL-TNYSIQLPRMILLNEV---LPPGLGKLI---KHS-MFIA  
P---NGK-----QKHFVAKDRYLKNQ  
>AcademH-3\_Pst  
ICIDNIDMEERVH-----DLSVGNR-SHTYRGTWGYVHVPNPT-----  
-----LIQSLNWD-LSLD-----SYQKSIEKFKN-----FSIE-----  
-----PAHFM-----PTAEARES---EI-----DVFKSQIARVLLK---  
-HLA-IPS-----NKSKAIPNPP-----TL  
DQ--ISHEK-----PTIHMMLKMDASDNSAEG-----  
-----IGQVFSSIIQQS-----  
-----GLTPEEFY--GRLQPMGDGLGTIQNFNSLR-SQRAPSPYQD---  
-----SL-HNVIF-QLGASHTMWNIASTIFTHHFGDSSDQ-----SDTGAW  
QYLEALGFPSEKA-----IQKKDFTLMINQMEKILEATFYC-----LRV-IM  
K-----NETEMLG  
-----DELVTLPTERWNAI-----VNECY-----  
-----ERFCSPHAR-----  
-----RTAAQA--  
-----N-----YPQLSNTLIMLHDF--SSVVEAKRSMKAGDVG  
RLMNVWKKWCLMTQGLTGL-TNYSYLPRLMVLQLTHI---LPPALQKYL---CHN-MLFS  
P---TGR-----KNHFVAKDHWLETO  
>AcademH-3\_Ptrit  
LCVDNLXFEQKIH-----AKSIGHT-SRMFHGTWGYIHHPSRQ-----  
-----LIDSVPSAD-LTVQ-----AYHQAMSKVAT-----FNVH-----  
-----PRMLL-----PSIQEEIS---WE-----SVIKSQIAQALLE---  
-HLV-SPS-----DSLVS IPTKPP-----PL  
EP--ISSQK-----PDITMLKLMIASDNSAQG-----  
-----AGEVFEAITDQS-----  
-----NMSPASFS--SRLQVIDGDLGTCTXVSTLR-NQRIPSGHSEE---  
-----SL-VNVLT-ILGGAHTMWNISQAIYSKHIGDPSDA-----RDSGSW  
RFLDSLGI PSNKM-----TDKKDY TLMIKNIEKIHRASLVYC-----IMV-VM  
G-----TEHNNIT  
-----EDLLKLP SAKIKEI-----IDETY-----  
-----ERFFSPEAK-----  
-----EAANLH--  
-----P-----SPKLLNLILRLGDF-ATIVEGNAAMKSGDIG  
RVMNVWKRWAI IAQGVKKL-TQYSIQLPRMI ILLNEV---LPPGLGQLI---RHS-LFIA  
P---SGR-----QKHFVAKDHYLEMQ  
>AcademH-4\_Pst  
ICIDNLDMEERVH-----LVSVGHR-TMMFHGTWGYIHTPPKA-----  
-----LLESLDLSE-ITLQ-----SYNQALQTVRT-----MNIT-----  
-----PRDFL-----PDRATEDH---YV-----QVWKSQLATVMKK---  
-YIA-IPA-----TTEGAHPTQPP-----PL  
EV--LSHAA-----PDFHMLKLMDEADNSAEG-----  
-----IGQVMESIRRQT-----  
-----GLTPAEFV--GRLQPMEGDLGTCQNFHSMR-ALRAPNRRPEE---  
-----NM-NNITF-QLGASHTLWNIGQTI FTKHFGDSNNG-----ENMGAW  
RTLNALGTPPNKV-----LQKKDFTGMIRHLERVHEATLFHC-----LRV-IM  
K-----IEGQPIR  
-----DTLPT IPTSRWNQV-----IDDCY-----  
-----LKYCSPAAR-----  
-----RQAYEKCR  
VDKSMQRRKLDDELDEVKRRHK-----QSKLSNLLVRLHEF-STVVEANRAMKQGDIG  
RLINIWRMWSVMSQSLPGL-THYATYLPRLVLLLTKV---LPPSLSKFF---QHS-MLVS  
P---SGR-----PGHFVAKDFLENH  
>AcademH-5\_PCor

LCIDNLDQFEQRVH-----AKSIGHD-SKMFHGTWGYIHQINPK-----  
-----LLASVSPAD-LTLE-----AYQESMQKASN-----IKVT-----  
-----PTMFI-----ASVAEDQH---WT---LVLKSQIADAITQ---  
-YVA-ESS-----DNEVKIITSPP-----AV  
DQ--ISHEQ-----PDITMLKLMVASDNSAQQ-----  
-----FEDVCTGIIQQT-----  
-----NLSETKFA--SRLMLDGLGTCVNVKCLQ-NQRFPSAHVED---  
-----SL-ENVCP-LLGASHTLWNIGHAIYTKYFGNSSDS-----RDSGAW  
RYLESGLGIPSRKT----LDKKDFTLMISNMIKIHEATLVHC-----VMQ-VM  
E-----EGEKSLD  
-----AKPHYLPKEIQRI-----IDLQY-----  
-----TKFFSAESR-----  
-----VEASQL--  
-----L-----SPKLANLQLRLLDF-ASIVEANAAMKAGDIG  
RVMYMKRWVMAQGIKKL-SNYAVHLPRMVVMINEV---FPSGMSHV---RHS-LLVA  
P---TGR-----QKHFSPKDLFLEKQ  
>AcademH-6\_PSt  
ICIDNLDQFEERIH-----SASPDKK-STMFHGTWGYIHRDLN-----  
-----LLEGFDLET-LKMQ-----SVARTLRESTN-----MVIE-----  
-----PSLFL-----PTETENLH---FK---AVIKSQIARVLLD---  
-YIA-TSSA-----KNSNVLVLRDPP-----PI  
DQ--IKAAC-----PDIHMLKMMVASDNSAG-----  
-----VDEVLTSTIIRQS-----  
-----GLTPEEFY--GRFQMEGDLGTCNLNLESLR-ALRKPFGFAEN---  
-----SL-SNIIM-LMGASHTLWNISQAIFIHFGKPNNA-----NDQGAW  
RTLSALNLPCKDP----IAKNDFTSMINNIQKIHEVTILEC-----LQ-VM  
G-----ISKTSLP  
-----NTKVAFPPETLNKI-----IDLQY-----  
-----NRFFGNVI-----  
-----RDALKN--  
-----S-----SSRYNLLLRDF-STIVEANRAMQAGDIG  
RLLNMWRRWAVMTQGMKSL-KHYKVHLPRMILLITKV---LPPALCRLI---QHS-LLIT  
P---SGR-----PNHFVAKDFYLEVQ  
>AcademH-6\_PTrit  
ICIDNIDMVEKVH-----ALSVGNR-THTFRGTWGYIHLNPPE-----  
-----LLRSLDLDE-LALP-----EFYQAMELADS-----APIE-----  
-----PQYFL-----PTADSNIV---EE---AVWKSQIAHVLRK---  
-YIA-IPA-----NNKSALPINPP-----IV  
DQ--ISHEK-----PDIQMLKMDASDNCAEG-----  
-----VGQVFKSILSQS-----  
-----GLSEENFF--GRLQPMGDGLGTVQNFNCLR-SQRTPNPFPQE---  
-----CL-DNCFE-QLGAAHTLWNVASALFTHHFGNSSDS-----SDCGAW  
QFLEALGFPAEKA----IQKKDFTLMINQMERVHESILFYC-----LRV-IT  
K-----TTGKAVP  
-----QSPPEIATEDWNAL-----INKCY-----  
-----NMFCSSEAR-----  
-----RTAAAR--  
-----K-----CPKLHNTLVMLHDF-SSVVEASRAMKAGDVG  
RLMIVWKKWCFMTRSLSGS-TNYSSYLPRMVLVLTVI---LPAALRKYL---QHN-LLFS  
P---TGR-----KDHVAKDFWLEIQ  
>AcademH-7\_PCor  
ICIDNLDMEQRVH-----EASVGHR-SHTFRGTWGYVHLPNRD-----  
-----FVASLDQSE-LSLE-----AYQEAIQKLDK-----IVIE-----  
-----PSMFL-----PSSEAIKT---TT---EVWKSQIARVLYK---  
-LA-IPK-----DRVSAIPEPT-----PV  
EK--ITPVK-----PEIYMMKLMDSDNSAEG-----  
-----VGQVFESILHQS-----  
-----GLKVDEFF--GRLQVMDGDLGTVQNFNCLR-AQRAPNPYPPE---  
-----SL-TNVLF-QLGASHTLWNIASAIFSLHIGDPANS-----LDLGAW  
QYLEALGFPAEKA----IQKKDFTLMVNQMEKILEAVLYC-----LRS-VM  
P-----KHIILNP  
-----DDPPTIKTTDWNAI-----VEDCY-----  
-----QKFCGTAR-----  
-----KEAKDQ--  
-----T-----CPKLYNTLMLLHDF-STVVEAKRSMKAGDVG  
RLMIVWVKWCLMTQALPGI-TNYLSYLPRMVLVLTVI---LPPSMRKYL---RHN-LLIS  
P---TGR-----LNHFVAKDFWLEIQ  
>AcademH-7\_PSt  
ICIDNLDMEERIH-----LVSVGHR-SMMFHGCWGYIHTPPKE-----  
-----LLESNLSE-INLE-----TYNQALQTVRT-----MKIR-----  
-----PRDFE-----PDSATEDH---YA---AVWKSQIATVMNK---  
-YIA-VPS-----KTDGAYSNOQP-----PL  
EV--LSPTA-----PDFHMLKLMEEESDNSAEG-----

-----IGQVMEAVQRQT-----  
-----GLTAEFFF--GRLQPMEGDLGTCQNFHSMR--ALRMPNNRPEE-----  
-----SM--NNVTF--QLSASHTLWNIQTIFTKHFGDNDNA-----ENMGAW  
RTLNALGTPPNKV-----LQKKDFTMGIQHMERVHEATLFHC-----LRV-VM  
K-----IDGQPIS  
-----DVRPTIETSRWNGI-----IDECY-----  
-----QRYCSPPEAR-----  
-----RNTYEQCR  
VPKSSLRKRLNEAEAEVRRKHS-----QSKLSNLLVRLHEF--STVVEADRAMKDGDIG  
RLINIWRMWSVMSQSLPGL--THYSTYLPRLVLLLTKV---LPESLSKFF---RHS--MLVS  
P---SGR-----PGHFVAKDFLENH  
>AcademH-8\_PCoR  
ICIDNVDFFEEKVH-----TKSISKK--NRAFHTGWYGLHTINPM-----  
-----LLSQVPHEH--LSLK-----CYKDAMREYSK-----RTIK-----  
-----PAXFL-----PSVEETIH---FK-----LVMKSQIAHVATK---  
-YVT-TCT-----SRIRPVNLDVP-----PI  
DP--ITPSI-----PDITMLKLMASDNSSSG-----  
-----IADVLEGITQQA-----  
-----NIPPSIFF--SELRVLEGDLATCSLIESLR--ALRRPNYPHE---  
-----SL--ENNFT--LLGASHVLWNFAQALNLLHHGDNTDS-----SNTGVW  
RLLAALGIPSDQP-----TTKKDFNLMIANMRRVHYATILSM-----IMA-TK  
E-----TSNRILT  
-----EKEEMTPGDIDDL-----VDKVY-----  
-----ENFMSVNAL-----  
-----EKAKED--  
-----K-----DHRLTNMLQVRDF--ATVVECDNAMRTGDIG  
RVLNMWRLWSVMAHGKGL--NKYGIQLPRMLLLTKA---LPEGLQKVL---RHS--LLIS  
P---TGR-----PGHFVAKDFYLELQ  
>AcademH-8\_PSt  
ICIDNIDMEQRVH-----QSSVGHQ--SHTFRGTWGYIHLPNKK-----  
-----LLATLDCSQ--LTLT-----AYHEAIKQVPS-----MEIE-----  
-----PMMFL-----PTKAEQEV---EL-----AVWKSQIASVLHK---  
-YLA-TPL-----DKKTALPTEPP-----QV  
EQ--ISHEA-----PDLHMLKLMASDNSEAEG-----  
-----MGQVFHNLLQQT-----  
-----GLTSEFFF--SQLQPMGDLGTVQNFNCLQ--AQRAPSAVPSN---  
-----RL--DNIFF--QLGAAHTLWNIASNIFSHHFGDSSDS-----SNCGAW  
QHLEALGFPSDKA-----IQKKDFTLMVNQMERVFEAM-----  
-----SNANNVP  
-----EERVQLPTAQWNAI-----VEECY-----  
-----ETYFTPKAR-----  
-----SNAASK--  
-----D-----SPKLSNTLLQLHDF--STVVEAKRAMKAGDIG  
RVMIVWKKWCLMAQALSGI--TNYSSYLPRMVLLLTKI---LPPSLAKYM---RHN--LLFS  
P---TGR-----SNHFVAKDYWLEIQ  
>AcademH-9\_PCoR  
ICLDNLDMEEKVH-----MSSVGHQ--SMTFHGAWGYIHLPHKS-----  
-----LLKSLDPSE--LNLS-----AYQKAVNQLST-----TVID-----  
-----PQLLM-----PSNSDFNH---YE-----LVMKSQIARAMNQ---  
-YLE-TPS-----HWDGAFPLDPP-----TI  
EQ--ISCDK-----PTIVMLKLMESDNSEAEG-----  
-----IGQVLEAIRRQT-----  
-----GLEPDQFF--TRLQPMADLGTQCNFNSLR--DIRHPSDNPEN---  
-----NL--NNVVF--QLGASHTLWNIQAIFTAHFGDSSNE-----EDLGAW  
RSLSSLGIPPEKV-----IQKKDYTAMVQHMEKVHEATLVHC-----LRL-VI  
QSEA-----EDDDRLLNKS---TVEVNPLP  
-----IEPQQITVDEWNMR-----INKCY-----  
-----DRFCSPEER-----  
-----RRATVS--  
-----E-----SPKLHNVLVRLEHEF--STVIEANRAMKAGDIG  
RLINVWKIWFMTQSLKGL--THYSSYLPRLIISLNSI---LPSSLSKLM---RHS--LLVS  
P---SGR-----PGHFVAKDFLLETQ  
>AcademH-1\_CVi  
IIGDNWDKDLLPS-----YRTSDRR--TMSLHLFNIAILDR-----  
-----VTFAP-----ENFERFHDQID-----  
-----VATFI-----PSEEEQNQ---LS-----KELCFIISTSIIE---  
-NHP--QMN-----RVLKQAYPKHLEH-----QF  
ST--FAGQK-----TTQYPLGLRDCNEIKTQD-----  
-----VIQLLKDLSKRYV-----  
-----PCKDSDIV---EPVFFGGDRLTDERIQSAQ--EAMKNADTPLE---  
-----RL--EGFVS--KIEDFHRMLNFLEAIHKLTYNTQSGP-----DRCTVY  
YFRNVLMNRNVKG-----KVCNSFRAYKMLYYVILDVAVCLLM-----FLT-IM  
NVETI-----EEQLPLP



E-----NF-----AELTDSEKVTWIDSV-----SLKIL-----  
-----RKWFFEGKDDVFK-----  
--DLREVISNP-----NHPDNYWISNLQA---DGRCLKCHY-----CE  
NTYKFSNTLQYHEKHIHNVITIEKSKP-----KEKKED---  
-----K-----DEVYDYILMLFRLT-VLLKNLDSGIDMGDGE  
RVVRSAKYELPIYNQTNK--VKYMGSIHLTALTSGI---LPQHQDRDL---VAN-RFVN  
V---QGG-----KNNNISLDEYLEML  
>AcademH-2\_CVi  
LVGDNWDKNIIPA-----FRTSQQK-TLSLHLFNVVVVDR-----  
-----IPIHAPMGNR-----EDQKADIP-----  
----IETFI-----PSIEEQIT---LM---DELVFLFATSVIQ---  
-NIP-QMK-----TEFANIYPTLHN-----QY  
SA--QAGEK-----TKQYPLGLFDTNETKTAE-----  
-----VIQLLRDMQSKYV-----  
-----PFHNEEIV---EPVFFGGDRITDERVQCAQ-QSVLNGETAAS---  
-----RL-EGFVS-KIEDFHRLMNFLEAICRLTYSTESGG-----DRGTVY  
YFRNLLNSVNVKG----DVRNAYRYPYKLLYYTILDAMCCVL-----FFK-YF  
NQTS-----KEEIPLP  
H-----DF-----QTFSLDGKITWLNIGI-----CREIL-----  
-----QEYFFGSQTDIMK-----  
--DLRCILTDN-----SHPENYYLTNLE---NGRVQCHF-----CP  
KSYTYVGS LKVHEEKIHGAKAPKSO-----ISCEKL-----  
-----K-----DEVEGYCOLLFLA-LLHKNLDSAVDMADGH  
RSVRSAKYELPLYVKTNK--VKYAIGSIHLVSLTEGV---LDEDLKERL---IAN-RSVN  
L---QGG-----KNNMALDEYVELL  
>AcademH-4\_CVi  
IVGDNWDKNILPS-----YRSSQNK-TQSIHLFNVLVVADR-----  
-----VQIPAVISEP-----EKEFSDIS-----  
----FENFL-----ASVEEQRK---LK---EELIFIFATSVIK---  
-NIP-HLF-----KVLDKIYPKHLPH-----KY  
SK--QAGTK-----TVQYPLGLYDCNESKTAD-----  
-----VIQLLKELOKKYV-----  
-----PLRGGEIH---EPVFFGGDRITDERIQCAQ-EAMLNGDTSVD---  
-----RL-EGFIS-KIEDFHRLMNFLEAIVKLTYSTGSST-----DRGTVY  
YFRNLLNHRGVKG----DVKNAYRAYKYLYTILDAICSYL-----FLK-DL  
DLQCL-----DSDVPLP  
D--HF-----SELSEADKILWINNI-----CARI I-----  
-----EKYFFENSSDIMS-----  
--KLRDCVTDK-----NHPDNYWVANYM---NGRVKCHY-----CE  
KTYAYVGS LKAHEEKMHGFTVSMGQK-----KGKEEN-----  
-----K-----DELHGYMLLFFKLT-LLHKNLDDAVDMADGI  
RSVRSAKYELPIYNKTGK--IKYAIGSIHLIAMTEGL---LNKEQNDRL---TAN-RFIN  
L---QGG-----KNNLALDEYVELL  
>AcademH-8\_CVi  
ILGDNLDITINPS-----KMSMQRQ-KKSFHWFLVLVKEKQ-----  
-----LTSEE-----SKVPFEQPLNF-----LALN-----  
----ALNWI-----PSEQLKS---LL---CSFKFHVASVLLH---  
-YVP-YLQ-----SHITSFPKYIEH-----MY  
MD--QVKKK-----SVFLNCDLIDASENSSEG-----  
-----MIEILQRIHELAVPHVR-----  
-----NPNKDV L---EKVVFFGGDVL TNERAFSAQ-EAMQNSPSEYE---  
-----SL-LGVIH-RPEGLHREMNFLLGIYQLFYKEKSCA-----DKGSLY  
QLRNLINRRNVSGP--DEVISSYRAHHDFIADITDSYIVAA-----FLD-IM  
QMED-----TSSTPTP  
-----IPLF---SLMSDSQKNEWLLNV-----AEKVLNELKI-  
-----NKVSFQHISDAIK-----SL  
DSDMDNLDAMK-----SDDFTYLCVAV---CG  
KEYCKSGWLKRHLEKHHWIF-----HVPQGN---  
-----SDANSPLQTFMFMS-LLHRD TYDSYRMGDGD  
RIIRNVYFEWLYAAGLKH--TKYKIWLFRVICYMYLL---NPEQSFEY---KWN-MTVN  
L---KGG-----IGQSIPNDNCVEIQ  
>AcademHP-1\_SP  
LCIDNVQKGCEAK-----HQGRTHS-NKFLLQTM CYAARDR-----  
-----VPASS-SSST-----VSDAEDLD-----  
----PFSFL-----PSPEVFNR---QR---MRLVDVVS NIMGR---  
-HMG-FLE-----SLSPDLPI TQEH-----AQ  
TA--AMAKK-----SEMTIGVVNANPSTTQG-----  
-----TISVLERLQTYV-----  
-----PVTE---GTPTQTLVSGDGLTIERILHAQ-RARSNGERWED---  
-----RL-DAFFA-TPQEFHKEILLQDSNNVFRGQSIS-----ARGTLA  
QLKCDFNHHSFKK-----DVMQNVQHVWDMYEFVTEAYTLLC-----ALK-FC  
GTSS-----LNDIPDS  
-----FP---AKGTTEEQLQWVKS V---AQQVV---  
-----DYIYQEPDKSVQVAEAYKNEASEGTD DALGYCLCKS-EK  
NDDMVLCCSST-CHKA-WFHLSCVGLTAAPDEKDWYCSADCESGPSYIYCVCRKVDPE  
GNTNMAQCALGNCRGHWEYHHRICIGLQ L TDL LPEK-WYCSEEC-----ALDSQN--  
-----D-----DHVLNHSRALVLEG-LRHLARRAAVRAGNGP

VMVEDWKIDLITFWSKRH--PKYLINAHYFLACIGGF---APSDIRNNL---IWN-RVIN  
V---TGK-----PGGNIGMDLGTTEH  
>AcademHP-1\_SKow  
LCWDNVQKLESEAR-----HQSQKVK-NKMMLWALSFKTKNR-----  
-----ISFRD-----YDDIRTKKA-----VDIP-----  
-----VAVFL-----PSQSDWTR---VR-----TRMKTIVQRILVR---  
-NFE-CFK-----DTQIQWHISH-----KY  
SS--ESRLK-----SEIVNLGVIKANPSSSKG-----  
-----VIEIMRHLGQYV-----  
-----PSQNGKPL---YNVCHGDQLSIERMVDAR-FSMACSQDHVN---  
-----RL-VGLEP-RPQEFHKRCITMQDTMNKLFSGSSAS-----ARGSLF  
HVKIKFGHRAVKK-----KVIDDVNHTVDFLNFMTTEGYTCLL-----AMH-LR  
RLTS-----LRDKPTI  
-----QP-----DQOKDYVEKL-----AEEIVSFIWP-  
-----DV-----DEVPLSDSDQO-----PCIDNYDEDDDDYCVCKT-DL  
GGTMI ECSALSQCKRGRWFHLDVCLQPEVDPDEWVCS PDCEQSS IYCFCKKEDTDDD  
K---WIGCDREFMCPNGEWFHMRCVGL---NQCPDGSWFCSDDCQVKGPL--SKPDQD--  
--TG-----A-----DYLFNYSCHVLWRG-LFHMAERDAERENDGP  
AMMSNWRVSMLEDFWENN--YKYLIIGHRLACINGY---VSPRQGEEM---LWN-STAN  
L---KGG-----AGNNIPLDLVNEFL  
>XP\_026196227.1  
FCCDESKAAAYTFSWGKVRVPSVSSADRG-NTFTTWAFRFAHQVR-----  
-----VNFRY-LQGP-----AIKAVEVS-----  
-----PHSIL-----PSKQTYEL---LR-----LRMKTIVMRIAD--  
-NLK-ALR-----GVKPRVVKHIPH-----TF  
SH--LMKEQ-----STSVSLGAVI--PNITED-----  
-----SVSIAVSLKNYI-----  
-----PVHY---GKPYHILCCGDI TNTDKTEQSKTQNRETPERSPNL--  
-----KF-DGLVE-APQEFQKEHLFHEEMIKMLLSEKSEK-----CRGSLH  
HIVSLDFDKTFNN-----TAKDYFLNMWDFITFVTAYVTLF-----AVT-EC  
SLDS-----VTQKPTD  
-----YP-----SQSSEQLDWLSNL-----AHLRV-----  
-----DLVWMPPPQEDINAVAAEAAGQSDREKKKTFPFCYCREEKP  
GEKLVRCSSNL-CPAI-WFHESCARAQTLSDPHEDWFCSECS SDGTIYIYCHCKEQKGGE  
----MIQCGLTDKCRHWEYHRDCLTAAEQNRGEQTPWFCS ESEC-----LLAADG--  
-----E-----DYLLNYTRAVVWEG-LYHMARRDAIQEGDGE  
AITDFWRMDLVLLWTREH--LQLFNSGHQLLTGIEGF---YPQVRQDM---KWN-RVLN  
L---QGK-----AGNNISLDLLELTEL  
>AcademH-1\_AQ  
IVGDNIDKNVVRPR-----HNREDRK-TISMHYHYSYAVCDR-----  
-----ASIYG-LSDD-----IPNLRNTNL-----LSIP-----  
-----VNEVL-----PSSADDQI---LK-----HNFTVLISRILVQ--  
-HLQ-FFA-----DNYNDVVDRHIKH-----IY  
YK--EMSGK-----SDVVPLGIELYNEANHDD-----  
-----MLAILESILNFTV-----  
-----DQVQSILGGDQMSCAMARRVI-ADRKN SRTDSQ--  
-----CL-KGIIP-VVEDWHSKLCFLTACFKLLYKESSVS-----EKGTLI  
QLKILLGHNRVTF--QQKITNF DACDDFFKIVLSSHVVTA-----AME-LL  
NMKN-----FEDTPAN  
D-----ELFP--AEAWLEGTETRKDVLYRF-----SSQIV-----  
-----KRFVDVDTSFVDR-----  
-----E-SPSNN--  
-----E-----DKVLAYSKLIMSLG-MIYLEYCDGIKEGDGM  
RVLRWCWRYMLLIKATGR--TNYSIEAFNMLAQYHFL---LSNRQKHQL---IWG-RFIN  
V---HGL-----PARNIPCDLYMEHL  
>AcademH-2\_ScPa  
VVWDNLNIAFKVS-----EQRMTNK-AHFDNGTTASMI VLE-----  
-----GVPVGT-LRTD-----MVPPRVYRTIQ-----LPFS-----  
-----AEDVL-----PSPEVSQE---LA-----NAHLYHIVDILFN--  
-AFP-TLRALF-----NDKNPVP-----VK  
DR--IPLHK-----TRHYALPAMKIDESSLDG-----  
-----TLDVVETI IKKTL-----  
-----DLNDDVVK-KQGVILCAGDQLTISLLDKAS-ASRRDDTVFLD---  
-----NIGKFTEG-QPGLFHGFMNSTRMIANEYWGAG-----LAPWSLW  
KANSILGRKNISCGWKAKQLAPFWPLQELILNLSLPANILDA-----FRL--  
-----HVPNYDLD  
-----SWVAKVASYEYV KSI-----AEKVQ-----  
-----RELTSRRKVY TMR-----  
-----RKPDE--  
-----R-----DFALENVILFN NDA-LTLREFQHAVRDG DIG  
RVVNVLTLMLEFRGTGSM-PKYADMLYRVLKRLKEM---HPALREAF---LRS-WLVN  
V---TGK-----EGRFAVDLLQEH  
>AcademH-1\_BBe  
IIFDNLNFFVKTH-----HQTATQH-NTLHNWNTNHMAVQNK-----  
-----VNPHH-LPDSG-----ATKPLPDL-----

-----LDEVL-----PTLHTQAC-----SR-----AETIVLCSRTITR---  
-YCK-AFH-----PFKDVVVRHIP-----KY  
SK--EMAEK-----SVEVPLGLLFPKDENDTSD-----  
-----LVDILLHMQKEYV-----  
-----PRREGNLC-----PIFAGGDRLSEGNRSNIQ-WAFQDGDTPED-----  
-----RL-EGIL-L-KYEDWHAIRNLCFVHRRIFYLEQSAK-----EHGTMA  
SNMNVLKCTNAKK-----GPKDYNSYKEFVDKETDWLILAV-----TMD-HF  
GMES-----LDDTPTK  
-----GGFPDQALAESTKEQRRQWLTSL-----VGAVV-----  
-----DKYVMMEEGDILG-----  
--NLTKCVKDA-----FYPKEC-----PSHP-----CRYP---GSE  
RVYLFATGRDRHETRVHGGILEPTPEPEVTSVK-----PKSTQE--  
-----P-----DYKRAHTLACLAFG-LLLRNMWDSVKEGDGE  
RLQRLYSYALLYRAFGH--TQYAYSCLLMKVQIASI---LSPYKSHSL---IWN-RFYN  
RP--GGG-----VGKNISLDRLEHL  
>AcademH-2\_LB  
LQFDNVQNYLRQR-----DPRIGRE-NKMNI GIAATYIELE-----  
-----DMDPKA-FDLD-----DKLKR LAENKR-----AKLT-----  
-----VNQLIDMI-----DQPH---LD-----VVSSLHWRALTN---  
-YIP-ELA-----KWKTHVSM LFRTRA-----SR  
LR--L PARA-----SKVHPLASSGKNETVTTD-----  
-----LKDALIDFFSQI-----  
-----GQKHGDYL--RRLLLVGGDGLTYEKMIQLQ-VYLQMHDDDL-----  
-----SF-RL LQP-ILADWHAEWTDLSRTYEAHWDSL LSI-----DPSSLG  
HSAGQLGR TAPSN-----LKKVDYFPSAEFLYLVDMMRLDC-----WRL-HF  
GCDNIF-----QHF-----KSLSDSNKIPDIE---ILEATA LK  
-----LHRTFSCTRAHYRALNDISGTSEWSRLVPLGTPWVAPVV-----  
-----DKSSLVGVPNL PN-----STPAHS  
SSKTKSASTSK-----KAKK-----AKEDAE--  
-----RLKFRGDRVLANSICFMRDA-LISREMSQAVAEGDVG  
RVWEVMKVM LFTFAGSSH--SKYTNYLLEMVCSLELE---SPEL RGI---LRG-TLVN  
L---TGK-----EGGFSAADFLQEFF  
>AcademH-1\_GyDi  
FAYDNFDIHFKTS-----QPTLEHS-DTFVSATSATAIPL-----  
-----HGVDQVLRCS-----QELWERDPINPS---PRVTPVQVD-----  
-----INDLLEFH-----KCSEAAKPPSGPGKLN P--SLERYAWHIRDILLS---  
-HGPPNFK-----NRF AKNLGEPE-----PI  
NP--IPIHK-----TNQIPCRAMNIKESTPDG-----  
-----NIEVVECLLRQGGIGEP ADEAFD-----  
-----HTSDVDMS--ESVLLVHGDL LTKERLDSVR--NSRSIEATPKR---  
-----RF-QFII F-VPGLFHFKMACADALWRTWIQPSASRT-----DANSLF  
QHVGILRPKETGK---IGTNPGFRRM HDI IHHDIWASMLNC-----WAL-EA  
AERN-----PQWTTLE  
-----EFAKADPSWELIEM-----SRSIV---  
-----QKYVGT TPL-----  
-----ISRER-----  
-----RKPEKE--  
-----R-----DDVFTNQILRNYNE-LLYLETSHAMNVGDIG  
RVEETFLQWIYIFRATGK--HKYASQILRFMFLNRDV---YSPELSQII---RHN-WLCN  
P---TGK-----PKGFRGVDWLVERN  
>AcademH-3\_PlCr  
VSHDNVNI PFRVY-----SQRLDNK-GEFGNGTAATVYVKR NAKP-----  
-----LPTD-----E--NRNLQETRAEGL-----KKPLG-----  
-----ALEIM-----K---MDVESAGR---IQ---DRMCDEVLQFITGSPE  
FDLK-TYA-----HRDSL LQRLP-----AI  
RP--LPCGPEN-----ITLQYMLGTVDIPEASYDD-----  
-----NDRLLIEWLRQLRKNA-----  
-----PNEKRRLA-LEQLIVWVGDLTVDRLRGLF-KSRAEDLNSYD---  
-----RM-DWIVP-VFGWLHLEMAVENS LHKQYLGTS SGR-----GLA  
HDFAVLERKGLSS---VLTKGPFHHLNQEALYHIAEAH IRID-----VCM-VA  
GVSD-----LKE LREKSP EELVEL-----ARTVV-----  
-----QEHASTAAIDKID-----  
-----HGTSV DK--  
-----R-----DEIKRQTVMFNRDV-LQYIVLDHAIKHGDVG  
VMEDSLPQLLFRFQSGSQ--SNYATEILELLQNL RRE---WPDELREHV---ITNCWLVN  
F---GGR-----RDGFVPVDM AQEHN  
>AcademH-1\_TrCi  
YAFDNLDTKLPTG-----SVPTIDGVSDGLIHITGTVFR LN-----  
-----HGVVLED-LRCS-----DLLWNRSPSNPLAADPRPYDSEAT-----  
-----VAHLLGLH-----PEPEYAAD---ALSR--RGRFRAWFAIEALCK---  
-YGP PHT-----DLRGGLREPE-----TV  
EK--IPVKK-----LYQTPLRAMDISLSTVSG-----  
-----NLEALGAMLAQGGVGDPRENPLAP-----  
-----NHAIRDLS--EYVTI IHGDLGTVEKVDIAM-RRRQKERTPYN---

-----RL-QHVVM-VPGLFHLKMASADAIWRMLVLPDDARI-----DHGSFN  
KLIGQLRPDDSSR-----LISNSKFRERHDLINHIGTLLELDA-----WQV-EV  
QRR-----EWAESKPAVADVEDT-----ARSLI-----  
-----QGHVEGAGQN-----  
-----MWAQ-----  
-----EKFAGQ-----  
-----R-----DKVKENTMRTLNYL-LLYEELSFAMNAGDIG  
RMETLLVSWISIFRAVGK--HKYATYMLRFMHALHLV---YPEGLRRAI---RYN-MLVN  
P---TGK-----PHAFRAVDWLVELL  
>AcademH-1\_TrPu  
YAFDNLDLQPSG-----IPTVEKSADGLIHITTTGTLHLE-----  
-----HGKVKDD-LRCS-----KILWERSESNPLASDPRPYNPRAT-----  
-----MLHLFSLH-----PEPEVPEG---GLSR--RGKFRWFLVRTLIR---  
-HGPARFA-----YFRTHFRDPA-----SI  
ES--IPITK-----LQQQPLRAMDISLSTISG-----  
-----NMEALTGLYAQQGGVGNPHEDPSRP-----  
-----NEAVVDLS--EYVTLIHGDLGSYEKVLVSVL-RRRKQERSPHD-----  
-----RL-QSVVF-VMGLFHLKMASADAIWRVLSPEGARV-----DNTSFM  
KLVGQLRPDASSR---LTSNAKFRDRHDLISHVVALLLDA-----WRV-EV  
KKR-----WGYATLE  
-----AWAETKPSVADVQEV-----AECIA-----  
-----REYIEGDGHD-----  
-----IYA-----  
-----TSSTGQ-----  
-----R-----DKVKENTLRTLNYL-LLYEELSYAMNAGDIG  
RVETLFPWIQIFRAVGK--HKYANHMLRFMHALYFV---YPDELRYAI---RYN-ILVN  
P---TGK-----PHAFRAIDWIVELL  
>AcademH-1\_TiCa  
VCHDNCQFPATAG-----DQSAANR-DNYKVTSGSVWELD-----  
-----RVYKVTSTDIRME-----GTKLS-----  
-----AGDLVRPGSHEHW---TQ--PRSQKDRQT-ERLA-----QVLCIARSRALTS---  
-ICPDPIAASHPCSSCCGRGTEGDDPETGCNKLRPMIEADKAAFRLISDRSTE-YTIDAI  
NA--LPLRR-----SKRHALPTTQIDEGTLDG-----  
-----NIDYLDVFDKML-----  
-----QLEPAYFD--NRMCIHGGDLGTVNLLGAQ-KLRSHAASAYD---  
-----GL-RFLVL-VPHLFHARMAALRMIFSAHWPSLQQL-----  
-AVKVLKHKRVS-----KDVKNFHDCEFAVAVRQGLLGL-----LLS-QL  
KIHA-----IDELSIK  
-----SWIDISTAIEDVSKQ-----LIPANIAEEEEQTS-----  
-----RRSVLMLASDL-----CAFEETTL  
TGDLLRRVLTTR-----  
-----SLRRLFVSTPPSRQLAEE--  
-----E-----QTSRRSVLMLASDL-CAFEYHAAKSDGDIG  
RVLVDLHDHWVQFQASSTT-MHYGRALIRVQAGLKHE--WSAELREMV---IGN-WLVN  
P---SGR-----EGHWREVDHVQEEH  
>AcademH-2\_TiCa  
LVYDNFDIYVQEL-----SNRVTS-TRVNLTCRMVVELPESF-----  
-----SSADISTSI-LSTV-----NAPRDLKESEVLGD-----DAFLT-----RAA  
HLFLAQELL-----QSKRAASD---PQ-----SKRVRDTIRLLRD---  
-YIR-DLRDAH-----RV  
DE--LSAAR-----WQVAPLPLEANEGSLDG-----  
-----TLAVMEDTSIILGVYDEVEIA-DPTAASQTSSSSP--N  
QTRW-----DIRRSVLPKDGVLVVGDLKTHRNAEAL-KGRSRHTKAED---  
-----RY-EFIHS-MSAPWHLHLNWVWAIKTHFSTSKVG-----YQASLE  
RLRDALRRGKTAL---REDEPLYNEAWALIQHTFSGWIRCL-----FVA-QL  
GKQR-----  
-----KDLATWTPSNADAVREL-----VDAVR-----  
-----NAALTEPSI-----  
-----YAAELL-----  
-----Q-----DEVGANARRFLRDA-LLAIEWSDACRTGDVG  
RMLMAQRFLAVAFAGVGK--HQYSQTCLDEIWAHKVL---PVKTWRTL---AAA-RLIN  
R---FGV-----QNGFIGADLYQEHL  
>AcademH-1\_TiIn  
LLFDNINIYVRHS-----NHTITAS-NTSIALTSRSIFTLPSQC-----  
-----HPI SATD-MSKL-----CALD-----  
-----RTKMTL-----PTILGDDD---FLH---RATVWHVSAALIP---  
-LLE-----VDDAR-----RQKLRAALRRRMNQR-----TI  
QQ--LKTER-----TTVVPLKVMNVNEGTVIG-----  
-----TKKVLDQTMSDF-----  
-----GLDLDD---PDPFLVAGDLLTVLNVFAAR-SAAGWEKRARL---  
-----QL-SNVYP-VAGPWHLHLNWVYSIFHTY-----GTIDGPTSLE  
RLRQVLGRGKTDL---DMRKPQFNEGWALLRQVWTGKVLSA-----VQF-EL  
EQDR-----  
-----ESWAGWNPSAKDFST-----VERVV-----  
-----NKHISQTAA-----

-----HEAQCM-----  
-----N-----DPARATSVLFMRDC-SLGWEYDHAIRAGDIG  
RMAEMEKFLCLSFYGCQG--TKYGSLLDRALVDQCF-----PDVARTL---RSA-QLIN  
I---HGK-----ENGWQGADHYQEIL  
>AcademH-1\_MoVe  
IVYDNLNIANKHH-----HQRADKR-DTFDNGTAATVILFSPDK-----  
-----DQAAAA-----PPALFRPENE-----RPKPD-----  
-----ADLFF-----PTDFDLEV---FQ-----QVTRSHVSNAIVQ---  
-----LSPDGSAAATAIPIVPI  
KP--LHINK-----TAFPLQTMKLESTIAG-----  
-----NLAVLERITRVGL-----  
-----QLPKSWFA-KPNNTIIAGDQMTVSRLLTLK-IHRIVDTPYH---  
-----SL-AWVHP-TLQLFHLDMNLCGTFRTHFGSPQ-----FPGSLA  
SIIILLGRKRLS-----KEKLEFKADELRLRIVFPAKVQLL-----YES---  
-----LRQGDTSDELDPKF-----AEIIT-----  
-----NSFC-----D-----LP  
SPSLLGLHC-----  
-----TTANINSLFLRDV-AVHIELSEAIKAGDIG  
RIKHLPIITLMMHGGGN--TNYALELLRLLYGIRHL---WTDEWATRV---LSS-MLVN  
P---KGC-----DGGWMATDMLQENH  
>AcademH-2\_MoVe  
LVYDNVNFVKRKY-----DQRIGNA-DDFENGTTATMIIGK-----  
-----NLSPG-----SVHQIRDS-----YSRLC-----  
-----STDFM-----MDEAEVDH---LR---HVSRFHIEELKK---  
-NLE-GYS-----HCSTPTP-----EL  
HR--LPAER-----TKTFPLPSMKIDESLEG-----  
-----NKMVLETVIQEVL-----  
-----GLEEGWFN-AGKLVVAGDLATVRKLRGLK-DLRLDEHSPYH---  
-----RL-DWATP-VTQLFHIQMLLAKIIVHNYRGSAS-----EQGSLE  
QLATMLGRKRKRF-----TDNPEFHAMDELLRHVFTATVLR---WEV-SM  
EAKE-----MQNLD---  
-----IYSDNVAFSNHVNEK-----VMEIV-----  
-----DQNINVPNI-----  
-----E-----STSSRNATLFLRDM-I LYMELSSAIKIGDIG  
RIEKTVKRLAVIFHAGST--PLYAYELMHFLCCIKHV---WDEQTKVAV---LSS-MLVN  
T---SGG-----QYGWKPTDLYQEHH  
>AcademH-1\_LoTr  
IVYDNINMASHKH-----HQRLGNR-DIFVSGTTATAIVSN-----  
-----VAAEE-----EINFKPT-----QSLR-----  
-----LQDLM-----PTDDNEAH---LR---KVQYHVLGVLLR---  
-NFK-RFD-----GQSMPAP-----TK  
HL--LTLEK-----TKTFPLPSMRIDQGTIRG-----  
-----NLEVLEFITEAAL-----  
-----ELPHEWFE--GRRILIAGDQLTVSRRLSLK-ELRADDISSYH---  
-----RL-DWVIP-VIQLFHLQMLLASTILRTHYGTAS-----TPGSIA  
FNVSLLERKRVS-----LEKPDFHATNELLESFDALVQRA-----WEL-TL  
LSTN-----LEEFA---  
-----EGVSDEVLKIELMAK-----VDTLI---  
-----DRFLLTGSLEILD-----  
-----GTTSRNSALFLRDM-LFYLELSSAIKAGDHG  
RIEILKWIITIMFQAGST--KNYANELLHLHCGFAYS---WSKQTKDAV---RSS-WLVN  
T---TGQ-----PNRWIPADLYQEHN  
>AcademH-1\_AsIm  
LCMDNADYTADV-----VDLPGKT-KHIQHDTVGYAFCDPGA-GVEEE-----  
--TAGGGRGLRQRF-VSRS-----ELQHSRA-----AFVT-----  
-----NLDLY-----PSKDA-SY---YV---STAKVNIFAVLKR---  
-FHDPAMS-SF-----IDRKG--ISEPMAV-----AI  
DV--LPLTR-----TAIYNLPLPLNEGKTDE-----  
-----CMQIIDQYLQNM-----  
-----GIPPEGMT--ESIMLLKGDLLTKAMVDGGI-FQRQDTRDPKQ---  
-----KF-DFVET-GMGLFHLHFAIRRLVNTTYWGKAT-----DPFSIQ  
RFLKVTGNNSVK-----RDGKDFRATLLFQNDMLDACLILAA-----VYT-AV  
GAKH-----DTQFGLF  
-----LKQGHGWKQSHVLPLEHA-----ITVLSQKC---  
-----FDFTG---MRNRQ-----  
-----EHEK---  
-----R-----DVVLEAALLFMRDM-LVIREFEAAVRAGDTG  
RIVCCIEYWCIVQASKQ--KNYALALVEIVANLHV---WGDDYKQHF---QNS-MLVN  
P---SGR-----EGKWPDDLYCEWI

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>AcademH-2_AsIm
MNFNDADYMSRVK-----TDTLHKM-NTMTSDTVGFVYFPE-----
-----GSKVGLDL-LPAT-----SVDHAKI-----SHLV-----
---ATHLL-----PTIDQLEF---LR---NQCPGHMTLVLEK---
-YHEDVIGLLF-----PDTKAGRATKPKIV-----KL
NE--LPVER-----TEIFVLPALPLNEAKTDE-----
-----CLQIADTYVREM-----
-----GLDSRRLE--NHKIITKGLRVTNMTASGL-YLRQDCVEASD---
-----RL-DFLEP-LPSLFHMDYAMSKLMNAAYWGEESGK-----DPCSAI
KFVSLSGNNKVK-----KEAKDYRSTGQFQSDATDAGILSA-----IYR-AF
NVR-----VRDGTITGTAVAGAMDSI-----SKTIF-----
-----DIEG---MKRRMLPDGAV-----
-----R-----
-----PTSDPY--
-----R-----DILNENVTLMMRDF-MVVREFKHAVRSGDIE
RICNVLFYWSLLQSAH--TKYAAVLVEITAGLRVL---WTDEFREHF---LRS-MLVN
P---SGT-----AGGWLADDMFCEWL
>AcademH-1_FiCBS
YAYDNVMDLKH-----TPTAEALHDTLIHLTSGTMIPLD-----
-----HGITPEM-LACS-----KMLWKKHKRNPKAL-PRDIPQPV-----
-----YSELLDIY-----PEDENDVS---GLTR--RERFGAWVFLRDLIT---
-HGPEYFR-----QFRMLGRPE-----AI
LE--IPITK-----SRQVPCRMMDINPSTNAN-----
-----NTSVLEDLFRQGGVGDSEST-----
-----QSGVRDIG--DQVILVHGDLTGERIHSQ--DTRSEEATPWR---
-----RF-QFVIY-VMGLFHLKMACADAIWRMHIQPLRARGQQNVKRASPGSLM
SHISIIIRPRETGK---METKPGFRRVHETTEHVGAVMRLDC-----WRL-AA
IQTG-----DFANLQPQWDELEAM-----AARMV-----
-----LEHAVSSDT-----
-----FTQQR-----
-----CQPIAI--
-----R-----DQERENILLRQQHF-LLYEEMSYALNEGDIG
RVEDAFMPWVFIKGCCK--HKYAAQMMKHLNLFHV---YPEGLRRAI---QMN-ILCN
P---TGT-----KGRFRAIDWWVEHN
>AcademH-1_PaCy
MCYDNINIKTSIH-----VEQTSSTP-NKVQSGSFVVIYPL-----
-----YNAQNSS-LRLA-----PILENIQKARP-----MQI-----
-----QALR-----ASRESAIS---YA-----ENTAINIAKILVQ---
-YIS-AFS-----Y---LNGCPELENKS---RR
QL--PQNLR-----TKCYPLRATIEEATVEG-----
-----NLLIHDDVYRDQL-----
-----GFSDEELN-SGRPILSINDQLTNSRIRSGQ-AARASDIDEWE---
-----CR-KAFQL-APGLFHTDMNFQLGILHNHRGTIN-----QHGSLS
HLFAVLEKTRLG-----SDKPDYHTLHAALMQIFDGLTLNA-----WRE-IC
G-----DLN
-----RYASRRPSASDILSK-----AREIM-----
-----VKYCTP-----LHSQVP
VTKIKKTSASTSNAAG-----NAASS-----
-----ASA-ST-
-----I-----DHVPLNIRLLLRDL-LYLVELKSATSAGDFG
RIEDILPDMACIFRGAGS--NNYSMEILHLIYNLNEV---WPPEFANIV---RDN-ILIN
P---TGR-----KGHFIPVDLNIHL
>AcademH-2_PaCy
LAYDNVNVSSSIF-----VEQAPSAM-NKVRSSTFAVIYKL-----
-----ANANIKH-MEIG-----PLMANLAKASP-----LQL-----
-----SDLR-----PSLVALQS---YM-----KQSTIHITQVLFK---
-YVA-GF-----NSSNDRKSPQLQHPS-----RR
RL--PPGHK-----TEFYPTRASTIEEASVNG-----
-----NLRVHDDLYVTQLQK-----
-----DVNNTTFN--STAIPSFNDQLTNARIRSCQ-ALRRKDVTWPWE---
-----RR-ELIQL-GFGVFHMVMNYLWCLLHTRGTLO-----QVGSLT
HLFAVLEKTRLG-----NEHPDYHTLLSALTQILDGLLNA-----WIN-EC
GHP-----SLD
-----AFSKSEPTADDILRI-----AKTIL-----
-----EKYT-----IP
DSRIEPTNARYPPKDI-----DTPED-----
-----ANVPPP--
-----V-----DIHQNVILLTRDL-LIVKELTDAMSSGDIG
RIEDILPTLACMFRAAGS--NNYSNEILFFLNLKEV---WTPPEFANIM---RDN-MLVN
P---SGL-----DGHAMAIDLNIHL
>AcademHP-1_PrCa
LCFDNVNQVRSVR-----HQTRDKT-NKQFNMVQYAAADR-----
-----IPSLH-LSDE-----QSPAD-----ISLIP-----
-----LEQYL-----PSTTDEAA---LQ-----QEMSQLIERVLCT---
-NMP-FLH-----DLQSEVAGHIQH-----EF

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QQ--ESSAK-----SQILPLGVLDKDESKVAE-----  
-----MVEIMAEYHRYV-----  
-----PLKPN--GDPFTLPLYADGLSCERGNDQAQ-NARVNGNSPWE----  
-----QL-QGLTM-GIQEWHKRCLLLQDIFDELYSASSGR-----EKGTLV  
HLKQVFNHRNVSS----DCKQKFNHNEEFLEFCCDGYIVLA-----ALH-CM  
KTKT-----VQQT PEN  
-----FP-----NSRQEQIAFIKTI-----AKQIL-----  
-----NILYTSCQETVTNINLNASGTGPT E-----YLYCVCKQDFP  
GSAMIFCENRN-CRRGTWFHLECI GMKEDDVPDGK WYCCISC-----  
-----HTSAES--  
-PTLD-----YQGPV--DVKRLYTSRLMWRG-LNQKVRRAIRENDGH  
RIILHWKFDMLEFFNNHH--PKYFLFGHKLLSAVHGA---VSERLQHTL---TWN-RTVN  
V---NGG-----KGKNIAMDLHMEFL