

## **Supplemental material 1**

### **Chapter 3. A Devonian origin of parasitic mites estimated using expressed sequence tags of the predatory mite *Phytoseiulus persimilis* (Phytoseiidae, Mesostigmata, Acari)**

**The amino acid sequences from 74 orthologous groups of 14 invertebrate species were used for phylogenetic analysis in this chapter. Sequences were concatenated using MEGA 4 and the masking process was performed with Gblocks (Castresana Lab. V. 0.91b). Abbreviations enclosed in parenthesis are used for species: *Phytoseiulus persimilis* (PP) EST- derived protein fragments from *Aedes aegypti* (AA), *Anopheles gambiae* (AG), *Apis mellifera* (AM), *Acyrtosiphon pisum* (AP), *Bombyx mori* (BM), *Culex quinquefasciatus* (CQ), *Caenorhabditis elegans* (CE), *Daphnia pulex* (DP), *Drosophila melanogaster* (DM), *Ixodes scapularis* (IS), *Nassonia vitripennis* (NV), *Pediculus humanus* (PH), and *Tribolium castaneum* (TC).**

**a) Alignment of 74 concatenated amino acid sequences output file from Gblocks v.0.91b. Initial of 24501 amino acid positions processed. Parameters for masking (block selection) and selected blocks are indicated below the alignment.**

**Gblocks 0.91b Result**

Number of sequences: **14**

Alignment assumed to be: **Protein**

New number of positions: **18416** (selected positions are indicated by "#" under the aligned position)

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          10      20      30      40      50      60
=====+=====+=====+=====+=====+=====+
AA      DQLINANHAQSAAILKRHEDVLRWQKLRADSEARKYRLLAMQEQFRQIEDLYLTFAKKA
AG      DQLINANHAQSAAILKRHEDVLRWQKLRADSEARKYRLLNMQDQFRQIEDLYLTFAKKA
AM      EMLVDSGHDQTPSIQKRHADVIARWQKLLADSDARKQRLLRMQDQFRQIEELYLTFAKKA
AP      DQLIAANHNSAEAILKRHADVIDRWQKLLGSDGRKQQLLRMQNQFRQIEELYLTFAKKA
BM      EQLVAAGHEQTPAIVKRHGDVIARWQRLSDSATRKQRLQLQDQFRQIEELYLTFAKKA
CQ      DQLISASHAQSAAILKRHEDVLRWQKLRDSEARKYRLLGMQEQFRQIEDLYLTFAKKA
DM      DQLINASHAQSPAILKRHGDVIARWQKLRDASNTRKDRLLAMQEQFRQIEELYLTFAKKA
DP      DQLVLSAGHDQTATILNRHGDVISRWNSLLGASNSRKQRLLRMQDQFRQIEELYLTFAKKA
IS      DQLVAANHDQTAAIMRRHDDVLRWNNLLAASNARKRLRLHMLEQFKQIEDLFLTFAKKA
NV      EMLIEAGHEQS PAIHKRHADVIARWQKLLADSQARKQRLLMQEQFRQIEELYLTFAKKA
PH      DQLIAAQHDQS PAILKRHGNVIARWQKLLADSDARKQRLLRMQDQFRQIEELYLTFAKKA
TC      DQLIASNHDQS PAILQRHADVIDRWQKLLADSDARKQRLLRMQDQFRQIEDLFLTFAKKA
PP      DQLVNAANHDQKNNIIKRHDVLSRWHNLRGASEARKAKLIQMLDQYKQIEELFLTFAKKA
CE      DQLVLSSEHQSP AIEKRHTNVIQRWQNL LAHSEARRQKLLKMQQFKQIEELYLTFAKKA
#####

          70      80      90      100     110     120
=====+=====+=====+=====+=====+=====+
AA      SAFNSWFENAEEDLTPVRCNSIEEIKALREAHAQFQASLS SAQYDFQALADLDRKIKSF
AG      SAFNSWFENAEEDLTPVRCNSIEEIKALREAHAQFQASLS SAQYDFQALALDQKIKSF
AM      SAFNSWFENAEEDLTPVRCNSIEEIRALREAHAQFQASLS SAEADFEALALDRQIKSF
AP      SAFNSWFENAEEDLTPVRCNSIEEIRALREAHAQFQASLT SAQSDFEALALDHQIKSF
BM      SAFNSWFENAEEDLTPVRCNSIEEIRALKDAHAQFQASLS SAQSDFEALALDAQIKSF
CQ      SAFNSWFENAEEDLTPVRCNSIEEITALRAAHAQFQASLS SAQYDFQALADLDRKIKSF
DM      SAFNSWFENAEEDLTPVRCNSIEEIRALRDAHAQFQASLS SAEADFEALALDQKIKSF
DP      SAFNSWFENAEEDLTPVRCNSIEEIRALREAHAQFQASLS SAQYDFESLALDAEIKSF
IS      SAFNSWFENAEEDLTPVRCNSVEEIRALREAHAQFQGSLS SAQADFEALATLDRKIKGF
NV      SAFNSWFENAEEDLTPVRCNSIEEIRALREAHAQFQASLS SAEADFEALGALDRQIKNF
PH      SAFNSWFENAEEDLTPVRCNSIEEIRALRDAHAQFQASLS SAQADFEALALDQKIKSF
TC      SAFNSWFENAEEDLTPVRCNSIEEIRALREAHAQFQASLS SAQADFEALALDQKIKSF
PP      SAFNSWFENAEEDLTPVRCNSLEEIALREAHSQFQASLS SAQADFEALALDAKIKSF
CE      STFNSWFENAEEDLTPVRCNSLEEIRALRDAHGEFQRSLSSAEEDFRQLQDLDRRDKSF
#####

          130     140     150     160     170     180
=====+=====+=====+=====+=====+=====+
AA      NVGPNPYTWFTMEALEDTWRNLQKIIEERDAELAKEVHRQEENDKLRKEFAKHANLFHQW
AG      NVGPNPYTWFTMEALEDTWRNLQKIIEERDAELAKEVHRQEENDKLRKEFAKHANLFHQW
AM      NVGPNPYTWFTMEALEDTWRNLQKIIKERDVELAKEAQRQEENDKLRKEFAKHANAFHQW
AP      NVGPNPYTWFTMEALEDTWRNLQKIIKERDIELTKEAQRQENDTLRKEFAKHANTFHQW
BM      NVGANPPYTWFTMEALDDTWRNLRKKIIAERDVLSKEAQRQEENDKLRKEFAKHANTFHQW
CQ      NVGPNPYTWFTMEALEDTWRNLQKIIEERDAELAKEVHRQEENDKLRKEFAKHANLFHQW
DM      NVGPNPYTWFTMEALEETWRNLQKIIEERDGEELAKEAQRQEENDKLRKEFAKHANLFHQW
DP      KVGPNPYTWFTMEALEDTWRNLQKIIISERDSELLKEAQRQEDNDRLKEFARHANAFHQW
IS      NVGPNPYTWFTMEALEDTWRNLQKIIKERDVELAKEAQRQEENDLRRREFAKHANALHQW
NV      NVGPNPYTWFTMEALEDTWRNLQKIIKERDVELAKEAQRQEENDKLRKEFAKHANAFHQW
PH      NVGPNPYTWFTMEALEDTWRNLKIIKERDTELAKEAQRQEENDKLRKEFAKHANAFHQW
TC      NVGPNPYTWFTMEALEETWRNLQKIIAERDVLNKEAQRQEENDKLRKEFAKHANAFHQW

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BM ELIMSKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKESVLYRKKEGTPEGGLYL-  
CQ ELIMAKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKESVLYRKKEGTPEGGLYLD  
DM ELIMAKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKESVLYRKKEGTPEGGLYLD  
DP ELIMSKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKENVLYRKKEGTPEGGLYLE  
IS -----AICTEAGLMALRERRRMKVTSEDFRKSKENVLYRKKEGSPEGGLYLE  
NV ELIMAKDDLSGADIKAICTEAGLMALRERRRMKVTSEDFKKSKESVLYRKKEGSPEFFIFD  
PH ELIMAKDDLSGADIKAICTEAGLLALRERRRMKVTNEDFKKSKESVLYRKKEGTPEGGLYLD  
TC ELIMAKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKESVLYRKKEGTPEGGLYLD  
PP ELVMAKDDLSGADIKAICTEAGLMALRERRRMKVTNEDFKKSKENVLYRKKEGVPEGLYLD  
CE EFITAKDELSGADIKAMCTEAGLLALRERRRMVMTMEDFQKSKENVLYRKKEGAPEELYLD  
#####

1750 1760 1770 1780 1790 1800  
=====+=====+=====+=====+=====+=====+  
AA AAMKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQDEKNEEERSKVDDL  
AG AALKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKIEEERSKVDDL  
AM AALKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKNEEERSKVDDL  
AP TATKLPITPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEERNEEERSKVDDL  
BM ---LPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKIEEERSKVDDL  
CQ AAMKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQDEKNEEERSKVDDL  
DM AAMKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQDEKNEEERSKVDDL  
DP AATKLPQVTPHTRCRLKLLKMERIKDYLLMEEEFIRN-QERLKPQEEERNEEERSKVDDL  
IS PASKLPVTPHTRCRLKLLKQERIKDYLLMEEEFIRN-QERLKPQEEKHEEERSKVDDL  
NV AALKLPQVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKNEEERSKVDDL  
PH AALKLPVTPHTRCRLKLLKSERIKDYLLMEEEFIRN-QERLKPQEEKNEEERSKVDDL  
TC TALKLPVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKNEEERSKVDDL  
PP AASKLPVTPHTRCRLKLLKLERIKDYLLMEEEFIRN-QERLKPQEEKNEEERSKVDDL  
CE AASKLPVTPHTRCRLKLLKSERIKDYLLMEEEFIRN-QERLKPQEEERAKVDDL  
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1810 1820 1830 1840 1850 1860  
=====+=====+=====+=====+=====+=====+  
AA GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
AG GSPMSVGTLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
AM GTPMSVGTLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
AP GTPMSVGTLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
BM GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
CQ GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
DM GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
DP GTPMSVGTLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
IS GSPMSVGTLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
NV GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
PH GTPMSVGTLEEIIDDNHAIIVSTAVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
TC GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
PP GTPMSVGNLEEIIDDNHAIIVSTSVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
CE GTPMAVGSLEEIIDDQHAIIVSTNVGSEHYVSIILSFVDDKQLEPGCSVLLNHKVVHAVVGV  
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1870 1880 1890 1900 1910 1920  
=====+=====+=====+=====+=====+=====+  
AA GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
AG GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
AM GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
AP SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
BM GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
CQ GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
DM SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
DP SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
IS SDDADPMVAVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIRPPKGV  
NV GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
PH SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
TC GDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
PP SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIKPPKGV  
CE SDDTDPMVTVMKLEKAPQETYADIGGLDQIQEIKESVELPLTHPEYEEEMGIRPPKGV  
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1930 1940 1950 1960 1970 1980  
=====+=====+=====+=====+=====+=====+  
AA LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
AG LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
AM LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
AP LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
BM LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
CQ LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
DM LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
DP LYGAPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
IS LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYL-----

NV LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
PH LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
TC LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
PP LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
CE LYGPPGTGKTLAKAVANQTSATFLRVVGSSELIQKYLGDGPKLVRELFRVAEEHAPSIVF  
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1990 2000 2010 2020 2030 2040  
=====+=====+=====+=====+=====+=====+  
AA IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
AG IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
AM IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
AP IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
BM IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
CQ IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
DM IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
DP IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
IS -----  
NV IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
PH IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
TC IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
PP IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR  
CE IDEIDAVGTRKRYDSNSGGEREIQRMTLELLNQLDGFDSRQDVKVMATNRIETLDPALIR

2050 2060 2070 2080 2090 2100  
=====+=====+=====+=====+=====+=====+  
AA PGRIDRKIEFPLPDEKTKRRI FN IHTARMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
AG PGRIDRKIEFPLPDEKTKRRI FN IHTARMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
AM PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLAPDVNLAEELIMAKDDLSDGADIKAI CTEAG  
AP PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLAEVNLQELIMAKDDLSDGADIKAI CTEAG  
BM PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
CQ PGRIDRKIEFPLPDEKTKRRI FN IHTARMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
DM PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
DP PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
IS -----AICEAG  
NV PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLAPDVNLTELIMAKDDLSDGADIKAI CTEAG  
PH PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
TC PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
PP PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
CE PGRIDRKIEFPLPDEKTKRRI FN IHTSRMTLADDVNLSSELIIMAKDDLSDGADIKAI CTEAG  
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2110 2120 2130 2140 2150 2160  
=====+=====+=====+=====+=====+=====+  
AA LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
AG LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
AM LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
AP LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
BM LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
CQ LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
DM LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
DP LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
IS LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
NV LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
PH LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
TC LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
PP LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
CE LMALRERRMKVTNEDFKKSKE SVLYRKKEGTPEGLYLEIMEFVNF LKNPQQYIDLGAKIP  
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2170 2180 2190 2200 2210 2220  
=====+=====+=====+=====+=====+=====+  
AA KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
AG KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
AM KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
AP KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
BM KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
CQ KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
DM KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
DP KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
IS -----  
NV KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
PH KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
TC KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
PP KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP  
CE KGAMLTGPPGTGKTLAKATAGEANVFFITVSGSEFLEMVGVGSPSRVRDMFAMARKHAP

2230 2240 2250 2260 2270 2280  
====+====+====+====+====+====+====+  
AA CILFIDEIDAVGRKRGGKS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
AG CILFIDEIDAVGRKRGGKS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
AM CILFIDEIDAVGRKRGGKN-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRIDIL  
AP CILFIDEIDAVGKKRGGRN-VGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDVL  
BM CILFIDEIDAVGRKRGGRS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
CQ CILFIDEIDAVGRKRGGKS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
DM CILFIDEIDAVGRKRGGKT-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
DP CILFIDEIDAVGRKRGGRN-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRDIL  
IS -----MHQCCFNTT-TNVVLAATNRVDIL  
NV CILFIDEIDAVGRKRGGKS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRIDIL  
PH CILFIDEIDAVGRKRGGRN-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
TC CILFIDEIDAVGRKRGGRS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRIDIL  
PP CILFIDEIDAVGRKRGGKS-FGGHSEQENTLNQLLVEMDGFNTT-TNVVLAATNRVDIL  
CE CILFIDEIDAVGRKRGGKGGHSEQENTLNQLLVEMDGFNTTDESSVIVIAATNRVDIL  
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2290 2300 2310 2320 2330 2340  
====+====+====+====+====+====+====+  
AA DKALLRPGRFDRQIFVVPADIKGRASIFKVHLGPKLKTDLNKTDLARKMAALTPGFTGADI  
AG DKALLRPGRFDRQIYVVPADIKGRASIFKVHLGPKLKTDLNKTDLARKMAALTPGFTGADI  
AM DKALLRPGRFDRQIYVVPADIKGRASIFKVHLKPLKILTLDKDLARKMASLTPGFTGADI  
AP DQALMRPGRFDRQIYVVPADIKGRASIFGVHLKPLKSNLNTLETARKLAARTPGFTGADI  
BM DKALLRPGRFDRQIFVVPADIKGRASIFKVHLTPLKTLNKENLARKMAALTPGFTGADI  
CQ DKALLRPGRFDRQIFVVPADIKGRASIFKVHLNPLKTLSDKNLDRKMAALTPGFTGADI  
DM DKALMRPGRFDRQIYVVPADIKGRASIFKVHLGNLKTSLDKNELSRKMAALTPGFTGADI  
DP DNALLRPGRFDRQIYVVPADIKGRASIFKVHLATLKSNLKDDLARKMAALTPGFTGADI  
IS DQALLRPGRFDRQIFVVPADIKGRASIFKVHLNPLKTLLEKALARKMAALTPGFTGADI  
NV DKALLRPGRFDRQIYVVPADIKGRASIFKVHLQNLKTNLDKIELSRKMAALTPGFTGADI  
PH DRALLRPGRFDRQIFVVPADIKGRASIFKVHLQVLTNLDKSDLARKMAALTPGFTGADI  
TC DKALLRPGRFDRQIFVVPADIKGRASIFKVHLGPKLKTNLDKSELARKMAALTPGFTGADI  
PP DKALMRPGRFDRQIYVVPADIKGRASIFKVHLKNLKTLNLDKDDLARKMAALTPGFTGADI  
CE DSALLRPGRFDRQIYVVPADIKGRASIFRVHLGPLRTSLDKTVLSRKLAAHTPGFTGADI  
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2350 2360 2370 2380 2390 2400  
====+====+====+====+====+====+====+  
AA ANVCNEAALIAARDLNEISINLKHFEQA IERV IAGMEKKTNVLSPEEKRTVAYHEAGHAVS  
AG ANVCNEAALIAARDLNEISIVMKHFEQA IERV IAGMEKKTNVLSPEEKRTVAYHEAGHAVC  
AM ANVCNEAALIAARDLNDNIHLKHFEQA IERV IAGMEKKTNVLQPEEKRTVAYHEAGHAVA  
AP ANVCNEAALIAARELASSISMQHFEQA IERV VAGMEKKSRLQADEKKIVAYHEAGHAVC  
BM ANVCNEAALIAARELANDITMKNFEQA IERV VAGMEKKS NVLQPDERKIVAYHEAGHAVA  
CQ ANVCNEAALIAARDLNEISILKHFEQA IERV IAGMEKKTNVLAPDEKRTVAYHEAGHAVS  
DM ANVCNEAALIAARDSKDSIVLKHFEQA IERV IAGMEKKTNVLAPEEKRTVAHHEAGHAVA  
DP ANVCNEAALIAARDLNEISIELKHFEQA IERV VAGMEKKS NVLQPEEKRTVAYHEAGHAVA  
IS ANVCNEAALIAARDLNDISINMKHFEQA IERV VAGMEKKTNVLQPEEKRTVAYHEAGHAVA  
NV ANVCNEAALIAARDKRESIIMKNFEQA IERV VAGMEKKTNVLQPEEKRTVAYHEAGHAVA  
PH ANVCNEAALIAARDLHDSINMKHFEQA IERV VAGMEKKT NVLQPEEKRTVAYHEAGHAVA  
TC ANVCNEAALIAARDLNEISINMKHFEQA IERV VAGMEKKTNVLSPEEKRTVAYHEAGHAVA  
PP ANVCNEAALIAARELNTSIEMKHYEQ IERV VAGMEKKTNVLQPEEKRTVAYHEAGHAVA  
CE SNVCNEAALIAARDANHEISNKHFEQA IERV VAGMEKKTQVLQKEEKRTVAYHEAGHAVA  
#####

2410 2420 2430 2440 2450 2460  
====+====+====+====+====+====+====+  
AA GWFLEHSDPLLKVSII PRGKGLGYAQYLPKDQYLLTTEQLFDRMCMTLGGRVSEELFFGR  
AG GWFLEHSDPLLKVSII PRGKGLGYAQYLPKDQYLLTTEQLFDRMCMTLGGRVSEELFFGR  
AM GWFLEYADPLLKVSII PRGKGLGYAQYLPHEQYLYTKEQLFDRMCMTLGGRVSEELFFGR  
AP GWFLQYADPLLKVSII PRGKGLGYAQYLPKEQYLYSKRQLFDRMCMTLGGRVSEQVFFNE  
BM GWFLQHADPLLKVSII PRGKGLGYAQYLPKEQYLYSKEQLFDRMCMTLGGRVSEELFFGR  
CQ GWFLEHSDPLLKVSII PRGKGLGYAQYLPKDQYLLTTEQLFDRMCMTLGGRVSEELFFGR  
DM GWFLEHADPLLKVSII PRGKGLGYAQYLPKDYLLSKEQLFDRMCMTLGGRVSEELFFNR  
DP GWFLEHADPLLKVSII PRGKGLGYAQYLPKEQYLYTAEQLFDRMCMTLGGRVSEQVFFGR  
IS GWFLEHADPLLKVSII PRGKGLGYAQYLPKEQYLYTTQQLFDRMCMTLGGRVSEQVFFGR  
NV GWFLQHADPLLKVSII PRGKGLGYAQYLPREQYLYTKEQLFDRMCMTLGGRVSEELFFHR  
PH GWFLQYADPLLKVSII PRGKGLGYAQYLPKEQYLYTKEQIFDRICMAGGRVSEELFFNR  
TC GWFLRYADPLLKVSII PRGKGLGYAQYLPKDQYLYTKEQLFDRMCMTLGGRVSEELFFQR  
PP GWFLQHADPLLKVSII PRGKGLGYAQYLPKEQYLYTTEQLFDRMCMTLGGRVSEQVFFGR  
CE GWFLQHADPLLKVSII PRGKGLGYAQYLPKEQYLYSKDQLLDRMCMTLGGRVSEELFFGR  
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2470 2480 2490 2500 2510 2520  
====+====+====+====+====+====+====+  
AA

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AA ITTGAQDDLKKITDSAYAQITRFGMKNKVGQVSFD-SQSGDFMFTKPYSEQTAQLIDEEV
AG ITTGAQDDLKKITDSAYAQITRFGMKNKVGQVSFDSSQFGDPMFAKPYSEQTAQIDEEV
AM ITTGAQDDLQKVTSNAYAQVIQYGMNEKVGQVSFQMPQGGEMTFDKPYSEHTAQLIDNEV
AP ITTGAQDDLKKITDSAYAQVHFGMNEKVGQVSFDLPQGGEMTFEKPYSSETAHLIDSEV
BM ITTGAQDDLKKITDSAYAQIVHYGMNAKVGQVSFEMPOQPGEMVIDKPYSEHTAQLIDSEV
CQ ITTGAQDDLKKITDSAYAQITRFGMKNKVGQVSFDGSDQFGDPMYAKPYSEHTAQMIDEEV
DM ITTGAQDDLKKITDIAYSQVVRFGMNEKVGQVSFDVGGAGDVFVSKPYSSETAQLIDNEV
DP ITTGAQDDLKKITDSAYAQVHYGMNEKVGQVSFDMPQFGQVLEKPYSEHTAQLIDSEV
IS ITTGAQDDLKKITDSAYAQVQVFGMNEKVGQVSFDMPQFGDMVLDKPYSEHTAQMIDSEV
NV ITTGAQDDLQKVTSNAYAQVHYGMNEKVGQVSFEMPOQFGDMVLDKPYSEHTAQLIDQEV
PH ITTGAQDDLKKITQMAYSQVQVGMNEKVGQVSFDVPPQFGLVMDKPYSEHTAQLIDVEV
TC ITTGAQDDLKKITDSAYAQVHYGMNEKVGQVSFDMPREGEMMLEKPYSEHTAQMIDVEV
PP ITTGAQDDLQKVTSNAYAQIVQFGMNEKIGNLSFEMPOQFGDMVMEKPYSEHTAQMIDAEV
CE ITTGAQDDLQKVTSNAYSQVVKFGMSEKVGPLSFETPAPGEMAFDKPYSEHTAQLIDQEV
#####

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                2530      2540      2550      2560      2570      2580
=====+=====+=====+=====+=====+=====+
AA RKLIDSAKRTTDLLEKHKSDVEKVAERLLKNEILSRDDMIELLGKRPFPPEKSTYEEFVE
AG RALIDRAYVRTKALLTKHRADVEKVAERLLKNEILSRDDMIELLGKRPFPPEKSTYEEFVE
AM RELIQAHTHTRNLLMQHKEDVSKVAERLLKQEILSREDMIELLGRPFPEKSTYEQFVE
AP KLLVTKAYDDTMELVKKHKSDIKVAERLLKQEVLSREDMIDLGLGKRPFPPEKSTYEEFVE
BM RDLINNAHKHTDLLTKHKPNIEKVAERLLKQEILSRDDMIELLGRPFPEKSTYEEFVE
CQ RLLIDKAYVRTKELLIKHKSDVEKVAERLLKNEILSRDDMIELLGRPFPEKSTYEEFVE
DM RSIKCAHEATSLTKHKNVQKVAERLLQNEVLSRDDMIELLGRPFPEKSTYEEFVE
DP RVLIGTAYKSTHELLTLHKEKVLKVAERLLKQEILNRDDMIELLGRPFPEKSTYEQFVE
IS RKMVQQAADHTMTLLTEHKADVEIKAKRLLLEKEILSREDMIELLGRPFPEKSTYEEFVE
NV RIMIDTAHKHTTALLTKHKADVKNKVAERLLKQEILSRDDMIELLGRPFPEKSTYEEFVE
PH RNLILSAHKRTDLLNEHKGDVEKVAERLLKQEIVSRSDIEILLGRPFPEKSTYEEFVE
TC RNLIDQAYKRTTALLTEHKENVARVAERLLKQEIISREDMIELLGRPFPEKSTYEEFVE
PP RSLVDRAVDYDTTKLLTQHKADVEKVAQRLLAKEILNRDDMIELLGRPFPEKSTYEEFVE
CE RDLVNMALRRTRDLEKRSDIERVALRLEKEILNRDDMIELVGRPFPEKNTYEEEMVS
#####

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                2590      2600      2610      2620      2630      2640
=====+=====+=====+=====+=====+=====+
AA GTGSFEEDTTLPEGLSSWNKEKTPVEEEDSSSDSQRQATKDAGTISGLNVLRIINEPTAA
AG GTGSFEEDTTLPGGLASWNEKEKQEKESAKDDSDSQRQATKDAGQIAGLNVLRVINEPTAA
AM GTGSFEEDTTLPKGLQEWNKSRRES-EKKGERTDSQRQATKDAGQIAGLNVLRVINEPTAA
AP GTGSMDEDTTLPKGLQDWNKNSENKDDTKKK-DSQRQATKDAGQIAGLNVLRVINEPTAA
BM GTGSLDEDTTLPEGLKDWNEKEKQPTTTPPETSDSQRQATKDAGTISGLNVLRIINEPTAA
CQ GTGSFEEDTTLPEGLTSWNEKATPEEEDSSSDSQRQATKDAGQIAGLNVLRVINEPTAA
DM GTGSFEEDTTLPEGLKSWNEKERTPELDAGSDSQRQATKDAGQIAGLNVLRVINEPTAA
DP GTGSLDEDTTLPEGLKGNWKKKETEPEKKDTSRQATKDAGQISGLNVLRVINEPTAA
IS GTGSFEEDTTLPKGLESWNGPED-EAKLKKPDSQRQATKDAGQISGLNVLRVINEPTAA
NV GTGSFEEDTTLPEGLKWNKARDSSDTPKDGSDSQRQATKDAGQIAGLNVLRVINEPTAA
PH GTGSFEEDTTLPEGLKDWNQEKSKKVAEKEADSQRQATKDAGQIAGLNVLRVINEPTAA
TC GTGSLEEDTTLPEGLKDWNEKAAEQPKQSDSQRQATKDAGQIAGLNVLRVINEPTAA
PP GTGSFEEDVTLPKGLESRNKSGDEKSSSEVTSRQATKDAGQISGLNVLRVINEPTAA
CE GTGGLDENVELPKGLENWNESEKSKKDEEKKDSQRQATKDAGQISGLNVLRVINEPTAA
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                2650      2660      2670      2680      2690      2700
=====+=====+=====+=====+=====+=====+
AA AIAYGLDKKTERNVLI FDLGGGTFDVSILSIDDGIFEVKTAGDTHLGGEDFDNRLVNHF
AG ALAYGMDKSEDKI IAVYDLGGGTFDISVLEIQKGVFEVKSTNGDTLLGGEDFDNHILNLYL
AM ALAYGMDKTEDRI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNALVNHL
AP ALAYGMEKSDSKLIAVYDLGGGTFDVSILEIQKGVFEVKSTNGDTLLGGEDFDNLLVNYL
BM AIAYGLDKKGERNVLI FDLGGGTFDVSILTIEDGIFEVKTAGDTHLGGEDFDNRMVNHF
CQ ALAYGMDKSEDKI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTLLGGEDFDNHIVNHL
DM ALAYGMDKTEDKI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTLLGGEDFDNHIVNHL
DP ALAYGMDKSEDKI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNALLNFL
IS ALAYGMDKTEDKI IAVYDLGGGTFDISVLEIQKGVFEVKSTNGDTFLGGEDFDNALVKFL
NV ALAYGMDKTEDRI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNALVNYL
PH ALAYGMDKTDKI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNLLNLYL
TC ALAYGMDKTEDKI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNVLVNL
PP ALAYGMDKTDKDI IAVYDLGGGTFDISILEIQKGVFEVKSTNGDTFLGGEDFDNTLVTSL
CE ALAYGLDKDADKI IAVYDLGGGTFDVSILEIQKGVFEVKSTNGDTFLGGEDFDHALVHHL
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                2710      2720      2730      2740      2750      2760
=====+=====+=====+=====+=====+=====+
AA AQEFKRKHKDLSTNKRALRRLRTACERAKRTLSSSTQASIEIDSLFEGIDFYTSITRAR
AG AAEFKKQGGIDTKKIDAMAMQRLKEAAEKAKCELSVQTDINLPYLTMDKHLNKLTRAK
AM VSEFKKQGGIDVTKIDAMAMQRLKEAAEKAKIELSSSLQTDINLPYLTMDKHLNKLTRAK
AP ISEFKKEQGVLDLKNQVMAQRVKEAAEKAKVELSSSLQTDINLPYITVMDKHLNKLTRAK
BM VQEFKRKYKDLATNKRALRRLRTACERAKRTLSSSTQASIEIDSLFEGIDFYTSITRAR

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CQ VQEFKDKQGVDTITKDPAMQRLKEAAEKAKCELSSSVQTDINLPHYITMDKHLNKLKFRTRAK  
DM VAEFKKDSGDIRKDNIAMQRLKEAAEKAKCELSSSQQTDINLPHYITMDQHMNLKLRTRSK  
DP INEFKRDQGLDITKDPAMQRVKEAAEKAKIELSSSMQTDINLPHYITMDKHMNLKMSRSK  
IS ADEFKKEQGI DVTKDNMAMQRLKEAAEKAKIELSSSVQTDINLPHYITMDKHMNLKLSRSK  
NV ANEFKDKQGI DVAKDAMAMQRLKEAAEKAKIELSSSQQTDINLPHYITMDKHLNKLKLSRSK  
PH VSEFKKEQGI DVTKDPMAVQRLKEAAEKAKIELSSSQQTDINLPHYITMDKHMNLKLSRSK  
TC VSEFKKEQGI DVTKDPAMQRLKEAAEKAKIELSSSMQTDINLPHYITMDKHMNLKLSRSK  
PP ATEFKRDQGVDTITKDPAMQRLKEAAEKAKIELSSAVQTDINLPHYITMDKHMNLKLSRSK  
CE VGEFKKEQGVDLTKDPQAMQRLREAAEKAKCELSSSTQTDINLPHYITMDKHLNKLKTRAK  
#####

2770 2780 2790 2800 2810 2820  
=====+=====+=====+=====+=====+=====+  
AA FEELNADLFRSTMEPVEKAI RDAKMDKAS IHDIVLVGGSTRIPKVQKLLQDFFGKELNKS  
AG LETLVGDLIKRTIAPCQKAMS DA EVSKSDIGEVLLVGGMTRMPKVQSLVQEVFGRQPSRA  
AM FENLVADLIRRTIQCQKALS DA EVTRSDIGEVLLVGGMTRVPKVQQTVOEIFGRQPSKA  
AP FEGLVGDLLIKRTIGPCQKAVKDAEIKLSDISDVLLVGGMTRMPKVQSLVQEVFGRQPSKA  
BM FEELNADLFRSTMEPVEKSLRDAKMDKAIHDIVLVGGSTRIPKVQKLLQDFFGKELNKS  
CQ LEQLVGDLLIKRTIGPCQKALS DA EVAKSDIGEVLLVGGMTRMPKVQQTVOEIFGRQPSRA  
DM LESLVGDLIKRTIQCQKALS DA EVSKSEIGEVLLVGGMTRMPKVQSLVQEVFGRQPSRS  
DP LESLVGDLIKRTIAPCQKALK DA EVNKNNDIGDVLLVGGMTRMPKVQEVTKEIFGRVPSKA  
IS FEGLVGDLLIRRTVPCCKAMS DGEVVKRTDIGEVLLVGGMTRMPKVQQTVOEIFGRQPSRA  
NV FEALVSDLIKRTIQCQKALTD AEVSKSDIGEVLLVGGMTRVPKVQQTVOEIFGRQPSRA  
PH FESLVESLIKRTISPCQKALQ DA EVSKSDIGEVLLVGGMTRMPKVQSLVQEVFGRQPSRA  
TC FESLVGDLIRRTVPCQKALK DA EVAKNEIGEVLLVGGMTRMPKVQQTVOEIFGRQPSRA  
PP FETLVGDLIKRTVGPCKAMQ DA EVKSDVGDVILVGGMTRMPKVQQTVOEIFGRQPSKA  
CE FEQIVGDLIKRTIEPCRKALH DA EVKSSQIADVLLVGGMTRMPKVQQTVOEIFGVPSKA  
#####

2830 2840 2850 2860 2870 2880  
=====+=====+=====+=====+=====+=====+  
AA INPDEAVAYGA AVQAALHGEVQDLLLLDVTPLSLGIETAGGVMSVLIKRNTTIPTKQTSQ  
AG VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLINRNTTIPTKKSQ  
AM VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLISRNTTIPTKKSQ  
AP VNPDEAVAVGA AVQGGVLSGSVTDVLLLDVTPLSLGIETMGGVFTSLISRNTTIPTKKSQ  
BM INPDEAVAYGA AVQAALHGEVQDLLLLDVTPLSLGIETAGGVMTLIRNTTIPTKQTSQ  
CQ VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLITRNTTIPTKKSQ  
DM VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLISRNTTIPTKKSQ  
DP VNPDEAVAVGA AVQGGVLSGGVTDI LLLLDVTPLSLGIETLGGVFTKLIQRNTTIPTKKSQ  
IS VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTKLIQRNTTIPTKKSQ  
NV VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLITRNTTIPTKKSQ  
PH VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLISRNTTIPTKKSQ  
TC VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVFTRLISRNTTIPTKKSQ  
PP VNPDEAVAVGA AVQGGVLAGDVTDVLLLDVTPLSLGIETLGGVMTKLIQRNTTIPTKKSQ  
CE VNPDEAVAMGA AVIQGAVLAGDVTDVLLLDVTPLSLGIETLGGIMTKLITRNTTIPTKKSQ  
#####

2890 2900 2910 2920 2930 2940  
=====+=====+=====+=====+=====+=====+  
AA TFTTYSDNQPGLIQVFEGERAMTKDNLLGKFELSGI PPAPRGVPQIEVTFDIDANGIL  
AG VFSTAADGQTQVEIKVHQGEREMASDNKMLGSFTLVGIPAPRGVPQIEVTFDIDANGIV  
AM VFSTAADGQTQVEIKVHQGEREMASDNKLLGQFTLVGIPAPRGVPQIEVTFDIDANGIV  
AP VFSTAADGQTQVEIKVFGGERAI AADNKPLGQFSLVGI PPAPRGVPQIEVTFDIDANGIV  
BM TFTTYSDNQPGLIQVFEGERAMTKDNLLGKFELTGIPAPRGVPQIEVTFDIDANGIL  
CQ VFSTAADGQTQVEIKVHQGEREMASDNKMLGSFTLVGIPAPRGVPQIEVTFDIDANGIV  
DM VFSTAADGQTQVEIKVHQGEREMANDNKLGSFTLVGIPAPRGVPQIEVTFDIDANGIV  
DP VFSTAADGQTQVEIKVHQGEREMANDNKILGQFSLIGIPAPRGVPQIEVTFDIDANGIV  
IS VFSTAADGQTQVEIKVHQGEREMASDNKLLGQFSLVGI PPAPRGVPQIEVTFDIDANGIV  
NV VFSTAADGQTQVEIKVHQGEREMANDNKLGSFTLVGIPAPRGVPQIEVTFDIDANGIV  
PH VFSTAADGQTQVEIKVHQGEREMASDNKLLGQFTLVGIPAPRGVPQIEVTFDIDANGIV  
TC VFSTAADGQTQVEIKVHQGEREMANDNKLGSFTLVGIPAPRGVPQIEVTFDIDANGIV  
PP VFSTAADGQTQVQIKVCGGEREMAEHDKVLGFEFSLVGI PPAPRGVPQIEVTFDIDANGIV  
CE VFSTAADGQTQVQIKVFGGEREMATSNKLLGQFSLVGI PPAPRGVPQIEVTFDIDANGIV  
#####

2950 2960 2970 2980 2990 3000  
=====+=====+=====+=====+=====+=====+  
AA NVTALEKSTNKENKI TINDKGRLSKEDIERMVNAEKYRSEDEKQKETI SAKNALESYCF  
AG HVSARDKGTGKEQVIQSSGGLSKDEIENMIKNAEQY AQADKQKDRIEAVNQAEIVH  
AM HVSARDKGTGKEQVIQSSGGLSKDEIENMVKNAEQYAKQDKIKKERVEAVNQAEIGI IH  
AP HVSARDKGTGREQVSIQSSGGLSKDEIENMVKNAEQY AQDQVKKDRVEALNQADSIVN  
BM NVSAIEKSTNKENKI TINDKGRLSKEE IERMVNAEKYRNEDDKQKETI QAKNALESYCF  
CQ HVSARDKGTGKEQVIQSSGGLSKDEIENMVKNAEQY AASDKLKKDRIEAVNQAEIVH  
DM HVSARDKGTGKEQVIQSSGGLSKDEIENMIKNAEYATADKQKRELI EIVNQGESIVH  
DP HVSARDKGTGKEQVIQSSGGLSKDEIENMVNAEQY FAKEDQVKKDRVESVNAEIGIVH  
IS HVSARDKGTGKEQVIQSSGGLSKDEIENMIKNAERYAQEDRQKKE TVEAVNQAESI IH  
NV HVSARDKGTGKEQVIQSSGGLSKDEIENMVKNAEQY AKEDRIKKERVEAVNQAEIVH

PH HVSAKDKG TGKEQQI VIQSSGGLSKDE IENMVKNAEQFAAQDKVKKERVETVNOAEGIIH  
TC HVSAKDKG TGKEQQI VIQSSGGLSKDE IENMVRRAEYAKEDKIKKERVEAINQAEGIVH  
PP HVSAKDKG TGKEQRVI QSSGGLSKDE IENMIKNAERFAEEDKKKKEVVEAVNKAEGIVH  
CE NVSARDRGTGKEQQI VIQSSGGLSKDQ IENMIKAEKNAAEDAKRKE LVEVINQAEGIIH  
#####

3010 3020 3030 3040 3050 3060  
=====+=====+=====+=====+=====+=====+  
AA NMKATMEDDKLKDGLSCEDLFRNSDGLTYNDFIILPGYIDFTADDVDLSSPLTKKIML  
AG DTETKMEEFKQDPDGLSCEELFRKSDGLTYNDFIILPGYIDFTAEEVDLSSPLTKKIML  
AM DTESKLEEFKAQLPDGLSAGQLFTTGDGLTYNDFIILPGYIDFTADEVLLSPLTKKIMI  
AP DTESKLTLEYQVHIPDGLSAQELFNTGEGLYNDFIILPGYIDFVAGVDLSSPLTKNITL  
BM SMKSTMEDEKLKEDGLSAEDTFANSEGLTYNDFILLPGYIDFTAEEVDLTSPLTKKILL  
CQ DTESKMEEFKDQLPDGLSCEGLFQNSDGLTYNDFIILPGYIDFSADAVDLASPLTKKINL  
DM DTETKMEEFKQDPDGLSCKELFQNGEGLYNDFIILPGYIDFTAEEVDLSSPLTKSLTL  
DP DTESKMEEFKQDPDGLVGSLLFNVDGGLTYNDFIILPGYIDFAAEEVDLTSALTKKITL  
IS DTESKMDEFKQDLP-----  
NV DTEAKMEEFKQDPLDGLTAAQLFANGDGLTYNDFIILPGYIDFTADEVLDLSSPLTKKITL  
PH DTESKMEEFKDQLPDGVSVEFEIKNGEGFTYNDFIILPGYIDFSAKVDLTSPTTKNINL  
TC DTETKMEEYKQDPLDQGSLQDMMNDGVGLTYNDFIILPGYIDFTPDVAVDLTQLTKKITL  
PP ETEAKMEEFKDQLPDGYSAQILGMDGGLTYNDFIILPGYIDMSADDVLLTSKLTKKITL  
CE DTEAKMTEFADQLPDGETVHEMMAHKAGLTYNDFIILPGYINFGVHDVLSLETNITKDLKI  
#####

3070 3080 3090 3100 3110 3120  
=====+=====+=====+=====+=====+=====+  
AA KAPLVSSPMDTVTEADMAISMALCGGIGIIHHNC-TPEYQANEVHKVKKYKHGFI RDPMV  
AG KAPLVSSPMDTVTEAEMAI SMALCGGIGIIHHNC-TPEYQANEVHKVKKYKHGFI RDPV  
AM KAPLVSSPMDTVTESDMAI AMALCGGIGIIHHNC-TPEYQANEVHKVKKYKHGFI RDPV  
AP QAPLVSSPMDTVTESEMATAMALCGGIGIIHHNC-LPAYQASEVLKVKYKHGFI RDPV  
BM KAPLVSTPMDTVTEADMAISMALCGGIGIIHHNC-TPEYQANEVHKVKKYKHGFI RDPV  
CQ KAPLVSSPMDTVTEADMAI AMALCGGIGIIHHNC-TPEYQANEVHKVKKYKHGFI RDPV  
DM RAPLVSSPMDTVTESEMAI AMALCGGIGIIHHNC-TPEYQALEVHKVKKYKHGFI RDPV  
DP KAPLVASPMMDTVTESEMAISVALCGGIGIIHHNC-SPEYQATEVSKVKYKHGFI RDPV  
IS ---MSDKKTFSEDGLTAQHILGSGDGLTYK-----YKXKHGFI HDPVV  
NV KAPLVSSPMDTVTESDMAI AMALCGGIGIIHHNC-TPEYQANEVHK-----  
PH KLPLVSSPMDTVTESEMAI AMALCGGIGIIHHNC-TPDKQAKEVI KVKYKHGFI RNPV  
TC KSPVSSPMDTVTES SMAI AMALCGGIGIIHHNC-SPSYQANEVHKVKKYKHGFI HNPV  
PP NAPLVSSPMDTVTESNMAI AMALCGGIGIIHHNC-TPEYQAAEVKVKYKHGFI RDPK  
CE KAPLVSSPMDTVTESGMAI VMALYGGIGIIHGNFPKPEDQAAEVKVKYKHGFI RDPK  
#####

3130 3140 3150 3160 3170 3180  
=====+=====+=====+=====+=====+=====+  
AA MSPENNADVLEAKKNGFTGYPITENGRLGERLLGIVTSRDI DFREEDVALKLKDIMTK  
AG MGPENTVADVLEAKKNGFTGYPITENGLIGTRLVGIVTSRDI DFREHDVDIKLKDIMTK  
AM LSPNHTVKDVLNVKAHEHGFSGIPITNTGKVGKLLGIVTSRDI DFLESTNIKLETIMTK  
AP ISQDLLVSDVFRLEKEHGFCEGFPVTENGLKGLLVGIVTSRDI DFLEGSQQSVNLVMT  
BM MGPENTVADVLEAKKNGFTGYPITQNGKLGRLIGIVTSRDI DFREGDPHLSLKEVMTP  
CQ MSPENTVADVLEAKKNGFTGYPITENGLIGTRLVGIVTSRDI DFREEDVLDIKLKDIMTK  
DM MSPNTTVDVLEARRKNGFTGYPVTENGLKGLLVGMVTSRDI DFRENQPEVLLADIMT-  
DP LTTQHTVGDVLEIKRKKGFCEGIPITENGRMGKLVGIVTSRDI DFLEKSTDIPLEHVMTK  
IS LSPNCAVDVFEVKKRKHGFAGVPIITENGLKGLLVGMVTSRDI DFIPEDHRLLEVMTS  
NV -----  
PH MSPDNTVADVFKRDKQGFCEGVPITENGLKGLLVGIVTSRVDVFLNETQSMKLESVMTK  
TC LCPTNTVADVLTTRKEQGFSGIPITEDGKMGKLVGIVTSRDLDFLEDQNYSKLETIMTK  
PP LGPDNIVTDVLDIKAKYGFAGVPTDTRVGGKLLGIVTSRDI DFLEPDDELKRLKGLMTP  
CE LSRDSTAFDMIQIKKKGFTGAPVTE DGRVSGSKLIGMVT SRDFDFITMDVATPITRIMVS

3190 3200 3210 3220 3230 3240  
=====+=====+=====+=====+=====+=====+  
AA VEDMVTAPSGVTLQEANHILEKSKKGLPIVKNNGELVALIARTDLKARSYPNASKDSN  
AG LEDLITAPNGVTLQEANNIMEKSKKGLPIVKNGTGELVALIARTDLKGRYPNALKDSN  
AM LENLITATAGVTLQEANIILEKSKKGLPIVNEKGLVSLMARTDLKKNRYPNASKDEN  
AP IENIISAKSGVTLQEANSLLLENSKKKGLPILNENGELVALIARTDLKKSRYNPKASKDEN  
BM INDMI TAQLGVTLQDANYILEKSKKGLPIINNDGELVALIARTDLKARSYPNASKDSN  
CQ IEDMVTAPSGVTLQEANHILEKSKKGLPIVKNNGELVALIARTDLKARSYPNASKDSN  
DM -TELVTA PNGINLPTANAI LEKSKKGLPIVQAGELVAMIARTDLKARSYPNASKDSN  
DP AGDLVTA PSGVTLQEANAILEKSKKGLPIVNECGELVLIARTDLKKSREYFPASMDPF  
IS LKDLTVASSKVTLSEANSLQKSKKGLPLVNEGGELVLIARTDLKKSRSYPLASKDEN  
NV -----  
PH FEDLVTA KAGVTLQANKILEKSKKGLPIVNDNSELVALMARTDLKKNRSPNASKDEN  
TC LEDLITA QSGVTLPEANSILEKSKKGLPIVNAEGLVALMARTDLKAKSYPTASKDDN  
PP LNELVTA TSTITLRDANEILRKS KGLPIVQNGELVSLMARTDLKKNRDFPSASKDEN  
CE VDQLHLGHINDAPELSQKKLKEHRLGKLPINVDNSELVALMARTDLKARSYPMASYSK

3250 3260 3270 3280 3290 3300
KQLLVGAAI STRDDKERLELLVQNGVDVVLDSSQGNSSFQINMIKYYIKQKYPDLQVIA
AG KQLLVGAAI GTRDEDKERLELLVQNGVDVIVLDSSQGNSSLYQINMIKYYIKKYPDLQVIA
AM KQLLVGAAI GTRNADKQRLQLLAVAGVDVIVLDSSQGNSSKYQIDMIKYYIKSEYPELQVIA
AP KQLLVGAAI GTREDDKDRLLHLHQAGADVIVLDSSQGNSSVYQIDMIKYYIKKNLPSLQVIA
BM KQLLVGAAI GTRDTRERLKLNNVNGVDVIVLDSSQGNSSYQIKMIKYYIKETYPETQVVG
CQ KQLLVGAAI STREEDKERLELLVQNGVDVVLDSSQGNSSYQIMMIKYYIKQTYPELQVIA
DM KQLLVGAAI GTRSEDKARLALLVANGVDVIVLDSSQGNSSVYQVEMIKYYIKETYPETQVVG
DP RQLLVGAAVGTREGDKQRLQLLVQAGVDVVLDSSQGNSSIFQIDMIQYYIKQHYPDQVVG
IS KQLLVGAAI GTREADKPRELLVQAGVDVVLDSSQGNSSVYQIEMVKYYIKSKYPGLQVIG
NV -----
PH KQLLVGAAI GTREEDLYRLKGLIQAGVDAVLDSSQGNSSVYQIKMIHEIKKAYPNLQVVG
TC KQLLVGAAI GTRDEDKERLKLNNVAGVDVIVLDSSQGNSSVYQIEMIKYYIKKYPDLQVIA
PP KQLLVGAAI STREEDKRLKLVAAGVDVVLDSSQGNSSYQIEMIKYIKKNPKVEVIA
CE GQLLCAAVNTRGESQYTVDRVVEAGVDVLIIDSSNGSSYQISMLRYIKKHPHVQVIA

3310 3320 3330 3340 3350 3360
GNVVTRQQAKTLDAGCDALRVGMGSGSICITQEVMACGCPQATAVYQVSRIFAREFGVFPV
AG GNVVTRQQAYNLITAGCDALRVGMGSGSICITQEVMACGCPQATAVYQVSNLARQYGVFPV
AM GNAVTTMQAKNLI EAGADALRVGMGCGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV
AP GNVVTRQQAALIDAGADGLRVGMGCGSICITQEVMAVGRAQGTAVYRVAQYASQFQVFPV
BM GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMACGCPQATAVYQVSRIFAREFGVFPV
CQ GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMACGCPQATAVYQVSRIFAREFGVFPV
DM GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMACGCPQATAVYQVSRIFAREFGVFPV
DP GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRSQTAVYKVAEYARFQVFPV
IS GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV
NV -----
PH GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV
TC GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV
PP GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV
CE GNVVTRQQAALIDAGADGLRVGMGSGSICITQEVMAVGRPQATAVYKVAEYARFQVFPV

3370 3380 3390 3400 3410 3420
IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
AG IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
AM IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
AP IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
BM IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
CQ IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
DM IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
DP IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
IS VADGGV SVGHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
NV -----AGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
PH VADGGI SSTGS IVKALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
TC IADGGI QSI GHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
PP IADGGI SVGHI KALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
CE VADGGI RDVGYITKALS LGASVMMGSL LAGTSEAPGEYFFSDG-VRLKRYRGMGSLEAM
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3430 3440 3450 3460 3470 3480
ERKDAKGAAGARYFHTDMDKLRVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGTKSL
AG ERKDKGGSASSRYHTEIEKMRVAQGVSGSIVDKGSILRFVYLLCGLQHSQCDIGARS I
AM NRKDAQGSAMDRIYFHNEKDKLVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGAKSL
AP NRKDAKGSALNRYFHSEKDKLVAQGVSGSIVDKGSALRFLPYLQCGLQHSQCDIGTKSL
BM ESKDKGGSAMSRIFHSEKDKLVAQGVSGSIVDKGSVLRFLPYLQAGMQHSQCDIGARSV
CQ ERKDAKGAAGARYHTEIDKLRVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGTKSL
DM ERKDAKGAAGARYHNEKDKLVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGANSI
DP EKDKTKGAASSRYFHSEKDKLVAQGVSGSIVDKGSALRFLPYLQCGLQHSQCDIGARS I
IS QSTEGGG-SLNRYQSDQDKRVAQGVSGSIVDKGSIHRYVPLYITGIRHGQCDIGVRSV
NV DRKDAKGSAMDRIYFHNEKDKLVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGAKSI
PH NTKESGGSASSRYFHNEKDKLVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGAKSV
TC NRKDAKGSAMNRYFHSDADKLRVAQGVSGSIVDKGSVLRFLPYLQCGLQHSQCDIGVRSV
PP DSG--KG-SLSRYHQSKDKLVAQGVSGSIVDKGSVHTYVPLYITGIRHGQCDIGVRSV
CE EAH---ASSQDRYFTAESDQIKVAQGVSGSIVDKGSVHTYVPLYITGIRHGQCDIGVRSV
### #####

3490 3500 3510 3520 3530 3540
QNLKMI YSGELRFMRRTHTSAQAEAGNVHSLFSYKRLFMGIKFLI IKPFCSILPEIAKP

AG ANLRKMIYNGELRFMKRTHSAQLEGNVHGLFSYEKRLFFAVKFLLEIKPFCCGILPEIAKP  
AM STLRSMMYSGELKFERRTHSAQLEGNVHSLFSYEKRLFMGPKFLEVIKPFCSILPEIEKP  
AP KNLRAMMLSGQLRFERRTHSAQLEGNVHSLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
BM SVLREMSHSGDLRFMKRTHSAQLEGNVHGLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
CQ QNLKMTMIYNGELRFMRTHSAQAEAGNVHSLFSYEKRLYMGKIFLEVIKPFCSILPEIAKP  
DM NKLRDMIYNGQLRFMKRTHSAQLEGNVHGLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
DP SHLRAMMYSGELKFERRTPSAQMEGGVHGLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
IS DVLKANMYSGDIKFEKRSVSAQAEAGGVHGLYSFEKRLF-----  
NV TALKQMMYNGELRFMKRTHSAQLEGNVHGLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
PH TILRNMAQSGVLRVEKRTPSAQMEGVSVHGLFSYEKMLFFTVKFLLEMIKPFCCGVLPEIAKP  
TC TKLKELDCEGEVRFKERTHSAQLEGNVHGLFSYEKRLFMGPKFLEVIKPFCSILPEIAKP  
PP EILRDQMYAGNVKFEKRTVSAQMEGGVHGLFSYEKRLF-----  
CE RDFREKVDNGIVKFERRSTNAQLEGGVHSLHSFEKRLYMGKIFLEFVKPFCCGFVPEVSKP  
#####

3550 3560 3570 3580 3590 3600  
=====+=====+=====+=====+=====+=====+  
AA ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
AG ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
AM KRKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
AP ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
BM ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
CQ ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
DM ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
DP ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
IS -----MSSDSADPFYIWRVILASNRGTLMELGIS  
NV QRKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
PH ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
TC ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSSDSADPFYIWRVILASNRGTLMELGIS  
PP -----PFYIWRVILASNRGTLMELGIS  
CE ERKIQFREKVLWTAITLFI FLVCCQIPLFGIMSTDSADPFYIWRVILASNRGTLMELGIS  
#####

3610 3620 3630 3640 3650 3660  
=====+=====+=====+=====+=====+=====+  
AA PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAE  
AG PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAE  
AM PIVTSGLIMQLLSGTKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPTE  
AP PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPSE  
BM PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGEPSE  
CQ PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAE  
DM PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPSE  
DP PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGEPSE  
IS PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAD  
NV PIVTSGLIMQLLAGAVKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAE  
PH PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPSE  
TC PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPAE  
PP PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGDPYD  
CE PIVTSGLIMQLLAGAKI IEVGDTPKDRALFNGAQKLFMGVITIGQAIYVVMGMYGEPSE  
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3670 3680 3690 3700 3710 3720  
=====+=====+=====+=====+=====+=====+  
AA IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
AG IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
AM IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
AP IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
BM IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
CQ IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
DM IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
DP IGRGVCLLI VIQLFIAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
IS IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
NV IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
PH IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
TC IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
PP IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
CE IGAGVCLLI IIQLFVAGLIVLLDELQKGYGLGSGISLFIATNICETI VWKAFSPATVN  
#####

3730 3740 3750 3760 3770 3780  
=====+=====+=====+=====+=====+=====+  
AA TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF  
AG TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF  
AM TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF  
AP TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF  
BM TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF  
CQ TGRGTEFEGAVIALFHLLATRQDKVRGLREAFYRQNLPLMNLATVLFVAVVIYFQGF

DM TGRGTEFEGAVIALFHLMATRNDKVRALREAFYRQNLPLMNLATVLFVAVVIYFQGFR  
DP TGRGTEFEGAVIALFHLATRQDKVRALREAFYRQNLPLMNLATVLFVAVVIYFQGFR  
IS TGRGTEFEGAVIALFHLATRSKVRALREAFYRANLPLMNLATILVFAIVVIYFQGFR  
NV TGRGTEFEGAVIALFHLATRQDKVRALREAFYRQNLPLMNLATILVFAIVVIYFQGFR  
PH TGRGTEFEGAVIALFHLATRQDKVRALKEAFYRHNLPLMNLATIMVFAIVVIYFQGFR  
TC TGRGTEFEGAVIALFHLATRQDKIRALREAFYRQNLPLMNLATVLFVAVVIYFQGFR  
PP TGRGTEFEGAVIALFHLATRDKIRALREAFYRPNLPLMNLATILVFAIVVIYFQGFR  
CE TGRGTEFEGAVIALFHLATRSKVRALREAFYRQNLPLMNLATVLFVAVVIYFQGFR  
#####

3790 3800 3810 3820 3830 3840  
=====+=====+=====+=====+=====+=====+  
AA VDLPIKSTRYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFHGNLLVNLG  
AG VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFHGNFLINLLG  
AM VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALISNLYVISQMLAVKFGQNIIVNLLG  
AP VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFHGNILVNLG  
BM VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNFLVNLG  
CQ VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFHGNFLINLLG  
DM VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGQNFILNLLG  
DP VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNFLVNLG  
IS VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNFMVNLG  
NV VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFHGNILVNLG  
PH VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNLLVNLG  
TC VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNFLINLLG  
PP VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAVKFGNFLVNLG  
CE VDLPIKSARYRGQYSSYPIKLFYTSNIPILQSALVSNLYVISQMLAGKFGGNFFINLLG  
#####

3850 3860 3870 3880 3890 3900  
=====+=====+=====+=====+=====+=====+  
AA TWADVGGGPARAYPIGGLCYLSPPELSHILQDPIHALLYIVFMLGSCAFFSKTWIDV  
AG VWADVGGGPARSYPVGGGLCYLSPPELSGHIVADPIHAVLYIVFMLGSCAFFSKTWIDV  
AM VMSDVGGGPARSYPVGGGLCYLSPPEVSVGHILQDPIHAILYILFMLGSCAFFSKTWIEI  
AP VWADVGGGPARAYPIGGLCYLSPPENLSHIAEDPIHAILYIVFMLGSCAFFSKTWIEV  
BM VWADVGGGPARAAPPVGGGLCYLSPPELSLAHIAHDPVHALLYVLFMLGSCAFFSKTWIDV  
CQ VWADVGGGPARSYPVGGGLCYLSPPELSGHIVSDPIHAVLYIFMLGSCAFFSKTWIDV  
DM VWADVGGGPARSYPVGGGLCYLSPPEVSVGHILQDPIHALLYIVFMLGSCAFFSKTWIDV  
DP VWADVGGGPARAYPIGGLCYLSPPELSGHIAEDPIHAVLYICFMLGSCAFFSKTWIDV  
IS VWADVGGGPARAYPIGGLCYLSPPENLAHILEDPVHAVLYIFMLGSCAFFSKTWIEV  
NV VMSDVGGGPARSYPVGGGLCYLSPPEVSVGHILEDPVHAFYILFMLGSCAFFSKSWIEI  
PH VWADVGGGPARAYPIGGLCYLSPPEVSVGHILEDPHALLYIVFMLGSCAFFSKTWIEV  
TC VWADVGGGPARSYPVGGGLCYLSPPEVSVGHILEDPHALLYIVFMLGSCAFFSKTWIEV  
PP VMSDSGAGYGGRSYPVGGGLCYLSPPENLSSILSDPIHAVLYIVFMLGSCAFFSKTWIDV  
CE TWSNDNTG---YRSPYPTGGLCYLSPPELSGHIFEDPIHCIIYIVFMLGSCAFFSKTWIDV  
#####

3910 3920 3930 3940 3950 3960  
=====+=====+=====+=====+=====+=====+  
AA SGSSAKDVAKQLKEQQMIMRGHRESSMIHELNRYPATAAFGGLCIGALSVTADFMGAIG  
AG SGSSAKDVAKQLKEQQMVMRGHRENSMIHELNRYPATAAFGGLCIGALSVLADFMGAIG  
AM SGSSAKAVAKQLKEQQMVMRGHRDNSMIHELNRYPATAAFGGLCIGALSVLADFLGAIG  
AP SGSSAKDVAKQLKEQQMVMRGHRDNSMIHELNRYPATAAFGGLCIGALSVLADFMGAIG  
BM SGSSAKDVAKQLKEQQMVMRGHRDNSMIHELNRYPATAAFGGLCIGALSVLADFLGAIG  
CQ SGSSAKDVAKQLKEQQMVMRGHRENSMIHELNRYPATAAFGGLCIGALSVLADFMGAIG  
DM SGSSAKDVAKQLKEQHMVMRGHRENSMIHELNRYPATAAFGGLCIGALSVMADFLGAIG  
DP SGSSAKDVAKQLKEQQMVMRGHRETSMIHELNRYPATAAFGGLCIGALSVLADFMGAIG  
IS SGSSAKDVAKQLKEQQMVMRGHREKSMIHELNRYPATAAFGGLCIGALSVLADFLGAIG  
NV SGSSAKDVAKQLKDSQVMVQGHREKSLIHELNRYPATAAFGGLCIGALSVLADFLGAIG  
PH SGSSAKDVAKQLKERQVMVRGHRDYSMVKELNRYPATAAFGGLCIGALSVLADFLGAIG  
TC SGSSAKDVAKQLKEQQMVMRGHRDNSMIHELNRYPATAAFGGLCIGALSVLADFLGAIG  
PP SGSSAKDVAKQLKEQQMIMRGHRETSMIHELNRYPATAAFGGLCIGALSALADFLGAIG  
CE SGSSAKDVAKQLKEQQMVMRGHREKSMIHELNRYPATAAFGGLCIGALSVTADFMGAIG  
#####

3970 3980 3990 4000 4010 4020  
=====+=====+=====+=====+=====+=====+  
AA SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMFAFAPKRASRHQGRKAFPKDDPAK  
AG SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMFAFYPKKRASRHQGRVKAFFPKDDASK  
AM SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMGFYPKKRQRHRGKVKAFPKDDPSK  
AP SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMGFYPKKRARRHRGRVKSFPKDDPSK  
BM SGTGILLAVTIIYQYFEIFVKEQAEMGGMSTLLFMGFYPKKRARRHRGKVKAFPKDDPSK  
CQ SGTGILLAVTIIYQYFEIFLKEQSEMGGMSTLLFMFAFYPKKRASRHQGRKAFPKDDPTK  
DM SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMFAFYPKKRASRHQGRKVKAFPKDDASK  
DP SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMGFYPKKRARRHRGKVKAFPKDDPKK  
IS SGTGILLAVTIIYQYFEIFLKEQSEMGGMSTLLFMGFYPKKRKRRLRGKVKAFPKDDPTK  
NV SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMGFYPKKRQRHRGKVKAFPKDDPTK  
PH SGTGILLAVTIIYQYFEIFVKEQSEMGGMSTLLFMGFYPKKRARRHRGKVKAFPRDDRSK

TC SGTGILLAVTI IYQYFEIFVKEQSDMGGMGALLFMGFYPKKRSQRHRGKVKAFPKDDPSK  
PP SGTGILLAVTI IYQYFETVREQGDMMGMSLFLFMGFAPKKRSRRRRGRIGAFPKDDPSK  
CE SGTGILLAVTI IYQYFEIFVKEQQEMGVSAMFFMGFTPKKRSRTYRGRKAFPKDDSK  
#####

4030 4040 4050 4060 4070 4080  
====+====+====+====+====+====+====+  
AA PVHLTAFLAYKAGMTHVREADRPGSKINKKEVVEAVTILETPPIVVGAVGYIETPPFGP  
AG PVHLTAFLAYKAGMTHVREADRPGSKINKKEVVEAVTILETPPLVVGAVGYIETPPFGP  
AM PVHLTAFIGYKAGMTHVREADRPGSKVNKKEIVEAVTILETPPMIVGVVGYIETPHGL  
AP PIHLTAFIAYKAGMTHVREADRPGSKLNKKEIVEPVTILEAPPMIIVGVVGYVETPYGL  
BM PVHLTAFIGYKAGMTHVREPDPRGSKINKKEIVEAVTILETPMVCVGVVGYIETPHGL  
CQ PVHLTAYLAYKAGMTHVREADRPGSKINKKEVVEAVTILETPPIVVGAVGYIETPPFGP  
DM PVHLTCFYGKAGMTHVREADRPGSKINKKEVVEAVTVLETPPMIVVGAVGYIETPPFGL  
DP PIHLTAFLAYKAGMTHVRECDKPGSKVNKKEVVEAVTILETPPMIVGVVGYVATPKGL  
IS PIHLTAFLGFKAGMTHVREVDKPGSKVNKKEVVEPVTILEVPMIIVGLVGYIETPKGL  
NV PVHLTAFIGYKAGMTHVREADRPGSKVNKKEIVEAVTILETPMIIVGVVGYIETPHGL  
PH PVHLTAFLGKAGMTHVREADRPGSKVNKKEIVEAVTILETPMIIVGAVGYIETPHGL  
TC PVHLTAFIGYKAGMTHVREADRPGSKINKKEIVEAVTILETPPMIIVGVVGYIETPHGL  
PP PIHLTAFIGYKAGMTHVREVDKPGSKVNKKEVVEAVTILEAPPMIIVGLVGYIDTPRGL  
CE PIHLTAFLGKAGMTHVREVDKPGSKVNKKEVVEAVTILETPPMIIVAGTVGYVDTPOGP  
#####

4090 4100 4110 4120 4130 4140  
====+====+====+====+====+====+====+  
AA RALCNVWAQHLSEECRRRFYKNWHASKKKAFTKASKKWTDDLGGKKSIEDNFKKMI RYCKF  
AG RALCNVWAQHLSEECRRRFYKNWHASKKKAFTKASKKWTDDLGGKKSIEDTFKKMVR YCKF  
AM RALTTVWAHLS EDCRRRFYKNWYKSKKAFTKASKKWQDDLGRKSIENDFKKI I KYCKV  
AP KPLKT VFAEHLSEDCRRRFYKNWYKSKKAFVKYSRKWDENGRQIAKDLGKI AKYSKV  
BM RALTTVWAHLS EDCRRRFYKNWYTCCKKAFTKASKKWQDELGRKSI EKKDFKMI RYCSV  
CQ RALCNVWAQHLSEECRRRFYKNWHVSKKAFTKASKKWTDDLGGKKSIEDNFKKMI RYCKF  
DM RALVNVAQHLSEECRRRFYKNWYKSKKAFTKASKKWTDDLGGKKSIEDNFKMLR YCKV  
DP RALTTVWAHLS EDCRRRFYKNWYKSKKAFTKASKKWQDDLGGKVI EKKDFKMI RYCSV  
IS RAFKT VWAHLS EDCRRRFYKNWYKSKKAFTKASKKWQEDLGKQBI ERDLKMKKYCKV  
NV RALTTVWAHLS EDCRRRFYKNWYKSKKAFTKASKKWQDDLGRASIEKDFKKI I KYCKV  
PH RALTTVWAHLS EDCRRRFYKNWYRSEQKAFTKASKKWQDELGVKSI DKSFKKI I KYCRC  
TC RALAT IWAHLS EDCRRRFYKNWYKSKKAFTKASKKWNDLGGKSI ERDFKKI I KYCKV  
PP RTFKT I FSEHLSEDCRRRFYKNWHCKKAFTKYAKKWQDEGKKALDKDFARIKKYCTV  
CE RALTTIWAHLS EDCRRRFYKNWAKSKKAFTKYAKKWQDEGKKLIEADFAKLYKCYSS  
#####

4150 4160 4170 4180 4190 4200  
====+====+====+====+====+====+====+  
AA IRVIAHSQIRLIKQGKKAHIEIQLNNGGTIEDKVNWVKEHLEKPPVADVFQDEM IDC  
AG IRVIAHSQIRLIKQGKKAHIEIQLNNGGSIADKVNWVKEHLEKPIPVSVQVFSQDEM IDC  
AM VRI IAHTQMQLLRQRQKKAHIEIQLNNGGTIEQKVQWAREHLEKPPVSNV FAPDEM IDV  
AP IRVVAHTQMQLLRQKKAHIEIQVNGGTVAEKVQWAKEHFEKPPVPSVSHV FAPDEM IDC  
BM VRI IAHTQMQLLRQRQKKAHIEIQLNNGGTIEDKVWAREHLEKPIPVDSVFAQDEM IDC  
CQ IRVIAHSQIRLIKQGKKAHIEIQLNNGGTIEDKVNWVKEHLEKPPVADVFQDEM IDC  
DM IRVIAHSQIRLIKQKKAHVEIQLNNGGSI EDKVWAREHLEKPIQVSNV FQDEM IDC  
DP IRVIAHTQMQLLRQRQKKAHMEIQVNGGTVRQKVDWARQHLEKPIPTSLFAQDEM IDV  
IS IRVLAHTQMQLMRRRQKKAHIEIQVNGGSGVAKI KWAREHLEKPPVTVS VQFAQDEM IDV  
NV VRI IAHTQMQLLRQRQKKAHIEIQVNGGTIEDKVWAREHLEKSI PVSNV FAPDEM IDV  
PH VRI IAHTQMQLLRQRQKKAHIEIQLNNGNMAQVKWI KEHLEKPPVPSVQV FAPDEM IDC  
TC VRI IAHTQMQLLRQRQKKAHIEIQLNNGSVVDKVQWAREHLEKPIPVAVQVFAQDEM IDC  
PP IRVIAHTQMQLMRRRQKKAHIEIQVNGGTVEKVEWARQHFEKPIPVSVFAQSEM IDV  
CE IRVIAHTQMQLLRRRQKKAHVEIQVNGGTIEQKVDWARHLEKQVQVDTVFAQDEM IDT  
#####

4210 4220 4230 4240 4250 4260  
====+====+====+====+====+====+====+  
AA VAVTKGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVAF TVARAGQKGY HHRTE  
AG VAVTKGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVAF TVARAGQKGY HHRTE  
AM IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVSF TVARAGQKGY HHRTE  
AP IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVQF TVARAGQKGY HHRTE  
BM IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVSF TVARAGQKGY HHRTE  
CQ VAVTKGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVAF TVARAGQKGY HHRTE  
DM VAVTKGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVST TVARAGQKGY HHRTE  
DP IGVTGKGFKGVTSRWH TRKLPKTHKGLRKVACI GAWHPSRVQF TVARAGQKGY HHRTE  
IS IGVTGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVQF TVARAGQKGY HHRTE  
NV IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVSF TVARAGQKGY HHRTE  
PH IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVQF TVARAGQKGY HHRTE  
TC IGVTGKGYKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVSF TVARAGQKGY HHRTE  
PP IGVTGKGTAGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVQF TVARAGQKGY HHRTE  
CE IGVTGKGFKGVTSRWH TKKLPKTHKGLRKVACI GAWHPSRVAF TVARAGQKGFHHRTE  
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DP RVKSFPHDDPKPIHLTAFLAYKAGMTHIVRECDKPGSKVNKKEVVEAVTILETPPMVIV  
IS VKVAFPKDDPTKPIHLTAFLGFKAGMTHIVREVDKPGSKVNKKEVVEAVTILETPMMIV  
NV VKVAFPKDDPTKPVHLTAFLGFKAGMTHVREADRPGSKVNKKEVVEAVTILETPMMIV  
PH VKVAFPRDDRSKPVHLTAFLGFKAGMTHVREADRPGSKVNKKEVVEAVTILETPMMIV  
TC VKVAFPKDDPSKPVHLTAFLGFKAGMTHVREADRPGSKVNKKEVVEAVTILETPMMIV  
PP VKVAFPKDDPTKPVHLTAFLGFKAGMTHVREVDKPGSKVNKKEVVEAVTILETPPIVIN  
CE RIKAFPKDDSKPIHLTAFLGFKAGMTHVREVDKPGSKVNKKEVVEAVTILETPMMIVIA  
#####

4810 4820 4830 4840 4850 4860  
====+====+====+====+====+====+====+  
AA GVVGYIETPRGLRALKTIFAEHLSDDARRRFYKNRYKSKRKAFTRAQAKWRQPEGLKIIIE  
AG GAVGYIETPPGPRALCNVWAQHLSEECRRRFYKNWHASKKKAFTKASKKWTDDLGGKSIE  
AM GVVGYIETPHGLRALTTVWAEHLSEDCRRRFYKNWYKSKKAFTKASKKWQDDLGRKSIE  
AP GVVGYVETPYGLKPLKTVFAEHLSEDCRRRFYKNWYKSKKAFTVYSRKWQDENGKRQIA  
BM GVVGYIETPHGLRALTTVWAEHMSSEDCRRRFYKNWYTCKKAFTKASKKWQDELGRKSIE  
CQ GAVGYIETPPGPRALCNVWAQHLSEECRRRFYKNWHVSKKAFTKASKKWTDDLGGKSIE  
DM GAVGYIETPPGPRALCNVWAQHLSEECRRRFYKNWYKSKKAFTKASKKWTDDLGGKSIE  
DP GIVGVVATPKGLRALKTVAEHIGEDCRRRFYKNWYKSKKAFTKASKKWQDDLGGKVIE  
IS GLVGYIETPKGLRALKTVAEHLSEECRRRFYKNWYKSKKAFTKSKSKWQEDLGGQIE  
NV GVVGYIETPHGLRALTTVWAEHLSEDCRRRFYKNWYKSKKAFTKASKKWQDDLGRASIE  
PH GAVGYIETPHGLRALTTVWAEHLSEDCRRRFYKNWYRSEQKFTKASKKWQDELGVKSID  
TC GVVGYIETPHGLRALATIWAHLSSEDCRRRFYKNWYKSKKAFTKASKKWQDDLGGKSIE  
PP GVVGYIETPRGLRALKTIFAEHLSDDARRRFYKNRYKSKRKAFTRAQAKWRQPEGLKIIIE  
CE GVTGVVDTPPGPRALTTIWAHLSSEARRRFYSNWAKSKKAFTKYAKKWQDEDGKLLIE  
#####

4870 4880 4890 4900 4910 4920  
====+====+====+====+====+====+====+  
AA RDFKKIQKYCTVVRVIVHTQMSMLKRRQKKAHIMEIQLNGGSIADKIKFAREHMEKAVPI  
AG DTFKKMVRKYCKFIRVIAHSQIRLIKQGGKKAHIMEIQLNGGSIADKVNWVKEHLEKPIPV  
AM NDFKKIIKYCKVVRVIAHTQMQLLRQRQKKAHIMEIQLNGGTIEQKVQWAREHLEKPVFV  
AP KDLGKIAKYSKVIIRVVAHTQMQLLRQRQKKAHIMEIQVNGGTVAEKVQWAREHLEKPVFV  
BM KDFKKMIRYCSVVRVIAHTQMQLLRQRQKKAHIMEIQLNGGTIEDKVWAREHLEKPIPV  
CQ DNFKKMIYCKFIRVIAHSQIRLIKQGGKKAHIMEIQLNGGTIEDKVNWVKEHLEKPVFV  
DM NDFRMLRYCKVIRVIAHSQIRLIKQGGKKAHIMEIQLNGGSIADKIKFAREHMEKAVPIQV  
DP KELRAMKRYCKVIRVIAHTQMQLLRQRQKKAHIMEIQVNGGTVRQKVDWARQHELEKTIPI  
IS RDLKKMKYCKVIRVLAHTQMQLLRQRQKKAHIMEIQVNGGTVGAKIKWAREHLEKPVTV  
NV KDFKKIVYCKVVRVIAHTQMQLLRQRQKKAHIMEIQVNGGTIEDKVWAREHLEKSPV  
PH KSFKKIIKYCRVVRVIAHTQMQLLRQRQKKAHIMEIQLNGGNMAQVKVWIKHLEKPVFV  
TC RDFKKIIKYCKVVRVIAHTQMQLLRQRQKKAHIMEIQLNGGTVVQVQWAREHLEKPIPV  
PP RDFKKIQKYCTVVRVIVHTQMSMLKRRQKKAHIMEIQLNGGSIADKIKFAREHMEKAVPI  
CE ADFAKLKYCSSIRVIAHTQMQLLRQRQKKAHIMEIQVNGGTIEQKVQWAREHLEKQVQV  
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4930 4940 4950 4960 4970 4980  
====+====+====+====+====+====+====+  
AA KNVFAQDEMIDIIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
AG SQVFSQDEMIDCVAVTKGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVAFTVA  
AM SNVFAQDEMIDVIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
AP SHVFAQDEMIDCIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
BM DSVFAQDEMIDCIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
CQ ADVFAQDEMIDCVAVTKGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVAFTVA  
DM SNVFAQDEMIDCVGVTGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVSTVA  
DP TSLFAQDEMIDVIGVTKGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
IS SQVFAQDEMIDVIGVTKGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
NV NNVFAQDEMIDVIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
PH SQVFAQDEMIDCIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
TC AQVFAQDEMIDCIGVTKGKGYKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVSTVA  
PP KNVFAQDEMIDIIGVTKGKGFQVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVQFTVA  
CE DTVFAQDEMIDIIGVTRGHGFKGVTSRWHTKKLPRKTHKGLRQVACIGAWHPSRVAFTVA  
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4990 5000 5010 5020 5030 5040  
====+====+====+====+====+====+====+  
AA RAGQKGYHHRTEINKKIYRIGDGFHTVDGKLVNNGSTEYDNTNKSINPMGGFKHYGEV  
AG RAGQKGYHHRTEINKKIYRIGAGIHTKDGKVIKNSAAEYDLTDKSIIPMGGFPHYGEIN  
AM RAGQKGYHHRTEINKKIYRIGQGIHTKDGKVIKNSAAEYDLTEKTIIPMGGFPHYGEVN  
AP RAGQKGYHHRTEINKKIYRIGLGIHTKDGKVIKNSAAEYDLTEKTIIPMGGFPHYGEVN  
BM RAGQKGYHHRTEINKKIYRIGQGIHTKDGKVIKNSAAEYDLSEKSIIPMGGFPHYGEVN  
CQ RAGQKGYHHRTEINKKIYRIGAGIHTKDGKVIKNSAAEYDLTDKTIIPMGGFPHYGEIN  
DM RAGQKGYHHRTEINKKIYRIGAGIHTKDGKVIKNSAAEYDLTDKSIIPMGGFPHYGEVN  
DP RAGQKGYHHRTEINKKIYRIGGIHTKDGKVIKNSAAEYDLTDKSIIPMGGFVHYGEVN  
IS RAGQKGYHHRTEINKKIYRIGQGVHKKDGKLVNNAATDYDTSNKSIPMGGFPHYGEVN  
NV RAGQKGYHHRTEINKKIYRIGQEHTKDGKVIKNSAAEYDLTEKSIIPMGGFPHYGEVN  
PH RAGQKGYHHRTEINKKIYRIGQGIHYKDGKLVNNAATDYDLTEKSIIPMGGFPHYGEVN  
TC RAGQKGYHHRTEINKKIYRIGAGIHTKDGKVIKNSAAEYDLTEKTIIPMGGFPHYGEVN

PP RAGQKGYHHRTEINKKIYRIGDGFHTVDGKLVNNGSTEYDNTNKSINPMGGFKHYGEVK  
CE RAGQKGFHHRTIINNKIYRIGKSALTEEG---KNNGSTEFDLTQKTIITPMGGFPYGIWN  
#####

5050 5060 5070 5080 5090 5100  
=====+=====+=====+=====+=====+=====+  
AA QDFVMLKGCVMGPKRRVITLRKSLITQTKRAATENITLKFIDTSSKMGHGRFQTHEEKNA  
AG QDFLMIKGCCEGAKRRVITLRKSLLVHTKRSALEQIKLKFIDTSSKMGHGRFQTPADKRA  
AM NDFIMIKGCCMGPKRRVITLRKSLLVHTKRSALEINLKFIDTSSKMGHGRFQTAADKTS  
AP NDFLMIKGCCEGPKRRVITLRKSLLVHTKRAALESINLKFIDTSSKMGHGRFQTVADKAA  
BM NDFVMIKGCCEGPKKRIITLRKSLRVHTKRAALEINLKFIDTSSKMGHGRFQTPADKAA  
CQ QDFLMIKGCCEGAKRRIITLRKSLLVHTKRSALEQIKLKFIDTSSKMGHGRFQTPADKKA  
DM NDFVMIKGCCEGPKKRIITLRKSLLVHTKRSALEQIKLKFIDTSSKMGHGRFQTPADKLA  
DP NDFVMIKGCCEGPKKRIITLRKSLVTSAKRVALEIELKFIDTSSKMGHGRFQTPADKAAQ  
IS CDYIMLKGCCIMGPKKRIITLRKSLLVHTKRAALEINLKFIDTSSKMGHGRFQTPAEKHN  
NV NDFVMIKGCCEGPKKRIITLRKSLLVHTKRAALEINLKFIDTSSKMGHGRFQTAADKAS  
PH HDFIMIKGCCVGPCKKRIITLRKSLLVHTKRSALEINLKFIDTSSKMGHGRFQTPQDKFA  
TC NDFIMIKGCCMGPKRRVITLRKSLLVHTKRSALEINLKFIDTSSKMGHGRFQTAADKAA  
PP QDFVMLKGCVMGPKRRVITLRKSLITQTKRAATENITLKFIDTSSKMGHGRFQTHEEKNA  
CE QDYIMLRGAVLGPKKRLITLRKSLITQTKRVAHEKINLKWIDTSSKMGHGRFQTTAEKRA  
#####

5110 5120 5130 5140 5150 5160  
=====+=====+=====+=====+=====+=====+  
AA FMGPKKDRLEKAAADSELARKNWELENNIETLPASDEIFRYDAEQQRILAAFPWDKD  
AG YYGVLKDKDRIREEKAAIEMEMARKTWEMENNIIVLPPSDEIFRYDAEQQRILTARPWEKD  
AM FMGQKDKDRMREEEQ-QSTIAKKTWEMENNIETISTVDEIYRYDRKEQQDILAAKPWEKD  
AP FMGPKKDRIREEKQSEI IAKKTWELENSVQTVNTVDDIFKYDKQQQDILTAKPWEKD  
BM FMGTLKDKDRIREEAAAQASIAQKTWVMANNIETVNSVDDIYRYDKKQQDILAAKPWEKD  
CQ YYGVLKDKDRIREEKAADAEMARKNWELENNIETLPASDEIFRYDAEQQRILAAFPWEKD  
DM FMGPKKDRLEKAAAMSDAAQKTWELENNIETLPASDEIFRYDAEQQRILAAKPWEKD  
DP FMGPTKKSPTPAPATSSQSNIALNNWLMANNVENISSVDEIYRYDRKQQDMLAAKPWDKD  
IS FMGPKLKKDKLKEEATMDNHMAQKTWELENSVETIQSVDDLYKYNKKQQDILTAKPWEKD  
NV FMGQLKDKDRMREELSQSNIAQKTWEMENNVETISTIDEIYRYDRKEQQDILAAKPWEKD  
PH FMGALKDKDRIKEEQSQCSIAQKTWEFANNIETISPIDEIYRYDKKQQDILAAKPWDKD  
TC FMGPKLKKDRIKEEEKTQEIAQKTWEMANKVELVNSVDDIYRYDKKQQDILAAKPWEKD  
PP FMGPKKDRLEKAAAMDAPAAFKRWEMENRIEDV-GADAIYRFDAVQNRDILHAKPWEKD  
CE FMGKLRDFLAEAAEPSSVPRQNWENK---NVQNVDSIFEYNNKQVEIRNAKPWDKD  
#####

5170 5180 5190 5200 5210 5220  
=====+=====+=====+=====+=====+=====+  
AA PHFFKDIKISALALLKMMVMHARSGGALEVMGLLGKVEEDTMVMDAFALPVEGTETRVN  
AG PNFFKDIKISALALIKMVTSHRSGGALEVMGLLGKVVDDTMVMDAFALPVEGTETRVN  
AM PHFFKDIKISALALLKMMVMHARSGGTLEVMGLLGKVAANTMIVMDSFALPVEGTETRVN  
AP PHYFKDIKISALALLKMMVMHARSGGILEIMGLLGKVEGNTMIVMDSFALPVEGTETRVN  
BM PHFFKDIKISALALLKMMVMHARSGGTLEVMGLLGKVDANTMIVMDSFALPVEGTETRVN  
CQ PHFFKDIKISALALLKMMVMHARSGGALEIMGLLGKVEEDTMVMDAFALPVEGTETRVN  
DM PHFFKDIKISALALLKMMVMHARSGGTLEVMGMLGKVEDNTMIVMDAFALPVEGTETRVN  
DP PHFFKEIRISALALLKMMVTSHRSGGHLEVMGLLGKVDANTMIVMDAFALPVEGTETRVN  
IS PHYFKDMKVSALALLKMMVMHARSGGTLEVMGLLGKVDANTMLVMDSFALPVEGTETRVN  
NV PHFFKDIKISALALLKMMVMHARSGGTLEVMGLLGKVNTANTMLVMDSFALPVEGTETRVN  
PH PHFFKDIKISALALLKMMVMHARSGGTLEVMGLLGKVDANTMIVMDSFALPVEGTETRVN  
TC PHFFKDIKISALALLKMMVMHARSGGTLEVMGLILGKVDGNTMIVMDSFALPVEGTETRVN  
PP GHYFKDIKISALALLKMMVMHARSGGNLEVMGLLGKVDANLMIVMDCFALPVEGTETRVN  
CE PHYFKQIKISALALLKMTMHAKRGGNLEIMGLLQGRI DANSFIILDVAFALPVEGTETRVN  
#####

5230 5240 5250 5260 5270 5280  
=====+=====+=====+=====+=====+=====+  
AA AQSQAAYEYMTAYIEAAKEVGRCEAIGWYHSHPGYGCWLSGIDVNTQMLNQNYQEPFVAI  
AG AQSQAAYEYMAAYIESAKEVGRMENAIGWYHSHPGYGCWLSGIDVNTQMLNQNYQEPFVAI  
AM AQAQAAYEYMTAYIEAAKQVGRQENAIGWYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
AP AQAQAAYEYMTAYIESAK-----  
BM AQAQAAYEYMTAYIEAAKQVGRHENAIGWYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
CQ AQSQAAYEYMTAYMESAKEVGRCEAIGWYHSHPGYGCWLSGIDVNTQMLNQNYQEPFVAI  
DM AQAQAAYEYMTAYEAAKEVGRMEHAGWYHSHPGYGCWLSGIDVSTQMLNQTYQEPFVAI  
DP RLENAIG-----WYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
IS AQAQAAYEYMAAYTESAKTVGRLENVVGVYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
NV AQAQAAYEYMTAYIDAAKQVGRQENAIGWYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
PH AQAQAAYEYMTAYIEAAKVVGRLENAIGWYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
TC AQAQAAYEYMYSSYIEAAKLVGRQENAIGWYHSHPGYGCWLSGIDVGTQMLNQNFQEPFVAI  
PP AHTEAYEYMATYADACKQVGRLENVIGWYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
CE AQAQAAYEYMTVYSEMCDTEGRKEKVVGVYHSHPGYGCWLSGIDVSTQMLNQNFQEPFVAI  
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5290 5300 5310 5320 5330 5340
====+====+====+====+====+====+
AA VVDPVRTVSAGKVCGLGAFRTYPKGYKPPNEEPSEYQTIPLNKIEDFGVHCKQYYQLEVS
AG VIDPVRTVSAGKVCGLGAFRTYPKGYKPPNEEPSEYQTIPLSKIEDFGVHCKQYYQLDVTY
AM VIDPVRTISAGKVCGLGAFRTYPKGYKANEPESEYQTIPLNKIEDFGVHCKQYYLSLEVS
AP -----VGYKANEPESEYQTIPLNKIEDFGVHCKQYYLSLEVNY
BM VIDPVRTISAGKVCGLGAFRTYPKGYKANEPESEYQTIPLNKIEDFGVHCKQYYLSLEVS
CQ VVDPVRTISSGKVCGLGAFRTYPKGYKPPNEEPSEYQTIPLNKIEDFGVHCKQYYPLEVS
DM VVDPVRTVSAGKVCGLGAFRTYPKGYKPPNEEPSEYQTIPLNKIEDFGVHCKQYYPLEISY
DP VVDPVRTISAG-----KVCLGAFRTYPKS-LNKVEDFGVHCKQYYALEVS
IS VIDPVRTISAGKVNLCGAFRTYPKGYKPPDEGPAEYQTIPLNKIEDFGVHCKQYYLSLEVS
NV VIDPVRTISAGKVCGLGAFRTYPKGYKANEPESEYQTIPLNKIEDFGVHCKQYYLSLEVTY
PH VIDPVRTISAG-----KGYKANEPESEYQTIPLNKIEDFGVHCKQYYSLDVTY
TC VIDPVRTISAGKVCGLGAFRTYPKGYKANEPESEYQTIPLNKIEDFGVHCKQYYLSLEVS
PP VIDPVRTVSAGRVNLSAFRVYPKGYQTKNGVAEYQSIPLSKIEDFGVHCPQYYSLDVS
CE VIDPLRTMSAGKVDIGAFRTYPEGYRPPDDVPSEYQSIPLAKIEDFGVHCKRYSLDVSF
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5350 5360 5370 5380 5390 5400
====+====+====+====+====+====+
AA FKSALDRKLLDSLWNKYVWNTLGSSGLLSNADMSEPIRVVVTTGAAGQIAYSLLYMIAGKD
AG FKSALDRKLLDSLWNKYVWNTLGSSGLLSNPDAAEPIRVVVTTGAAGQIAYSLLYMVAKGD
AM FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADMSEPINVVVTTGAAGQIAYSLLYQLAAGT
AP FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADGEPIRVVVTTGAAGQIAYSLLYSMIANGD
BM FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADMAEPIRVVVTTGAAGQIAYSLLYQIASGA
CQ FKSALDRKLLDSLWNKYVWNTLGSSGLLSNADMSEPIRVVVTTGAAGQIAYSLLYMIAGKD
DM FKSALDRRLLDSLWNKYVWNTLGSSGLLTNTMAEPIRVVVTTGAAGQIAYSLLYMIARGE
DP FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADMAEPIRVVVTTGAAGQIAYSLLYQLAKGD
IS FKSALDRRLLDSLWNKYVWNTLSSSSLLTVRCAKEPIRVLVTTGAAGQIAYSLLVAT IARGE
NV FKSALDRRLLDSLWNKYVWNTLSSSSLLTNTDMAEPIRVVVTTGAAGQIAYSLLYQLAAGS
PH FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADSAEPIRVVVTTGAAGQIAYSLLYQIAHGD
TC FKSALDRRLLDSLWNKYVWNTLSSSSLLTNADMSEPIRVVVTTGAAGQIAYSLLYMIAGKD
PP FKSALDAALLDNLWNKYVWNTLSSSSLLTNADMSEPIRVVVTTGAAGQIAYSLLYMIAGKD
CE FKSQDHAHLTSLWNSYWIISTLSSSPLFSNVEMSAPLRVLVTGAAGQIGYSIVIRIADGT
#####

5410 5420 5430 5440 5450 5460
====+====+====+====+====+====+
AA VFGPNQRLLHLHLLDIPMMGVLEGVVMELEADCALPLLAVVPTTDPVAFKDVVSAFVLV
AG VFGPNQPLILHLHLLDIPMMGVLEGVVMELEDDCALPLLVRVPTADPAVAFKDVDAFVLV
AM VFGPNQPINLRLLDIPMMKVLDGVVMELELDLALPLLREVPTADPSVAFKNVAAAFVLV
AP VFGTRQPVIHLHLLDIPAMGVLEGVVMELEDDLALPLLKGYVKTTEPEVAFKDVDAFVLV
BM VFGPQQPVFLHLHLLDIPMMGVLEGVVMELEADCALPLLAVLPTANPEEAFKDVDAFVLV
CQ VFGPNQKLIHLHLLDIPMMGVLEGVVMELEADCALPLLAVVPTADPAVGFKDVSAFVLV
DM VFGKQPIVHLHLLDIPPMVGVLEGVVMELEADCALPLLVEVPTTDPVAFKDVSAFVLV
DP VFGEPQPLSLHLHLLDIPMMGVLEGVVMELEQDCALPLLREVIPTADPAVGFKDVDAFVLV
IS VFGADQPIILHLHLLDIPMMLGVLEGVVMELEIDCAFPLLKDIVATDSEQTAFAAIDVAFVLV
NV VFGPPQPINLRLLDIPMMGVLEGVVMELEDDLALPLLKDVLPADPEPAFKDAAAFVLV
PH VFGPNQPLILHLHLLDIPMMGVLEGVVMELETDLALPLLVEIVPTADPGVAFKDVDAFVLV
TC VFGPNQPLILHLHLLDIPMMGVLEGVVMELEADCALPLLRGVPTADPAEAFKGVVAAAFVLV
PP VFGSTGTGVIHLHLLDIPMVEALGGVMELEDCAFPLLKGVVATADVQKAFSDVDAFVLV
CE VFGKEQPVELVLLDVPQCSNILEGVVLELQDCALPTLFSVAVTDEKSAFTGIDVAFVLV
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5470 5480 5490 5500 5510 5520
====+====+====+====+====+====+
AA AMPRKQGMERKDLLSANVKIFKVQGEALNNYARKDVKVLVGNPANTNALVCSHYAP-SI
AG AMPRKQGMERKDLLSANVKIFKVQGEALDKYAKKDVKVLVGNPANTNALVCSHYAP-SI
AM AMPRKEGMERKDLLAANVEIFKVQGEALDKYAKKDVKVLVGNPANTNALVCSHYAP-SI
AP AMPRREGMERKDLLSANVKIFKVQGEALNKYAKKDVKVLVGNPANTNALVCSFYAP-SI
BM AMPRKEGMERKDLLAANVRI FKEQQAALDKVARKDVKVLVGNPANTNALVCSKYAP-SI
CQ AMPRKQGMERKDLLSANVKIFKVQGEALNNYAKKDVKVLVGNPANTNALVCSHYAP-SI
DM AMPRKEGMERKDLLSANVKIFRTQQAALDKFAKDVKVLVGNPANTNALVCSYAP-SI
DP AMPRKEGMERKDLLAANVKIFKAQQAALDQHAHKTVKVLVGNPANTNALSICSKYAP-SI
IS SMPRKEGMERKDLLAANVKIFKSQGRALDQHAHKS VKVLVGNPANTNALVCSKFAP-SI
NV SMPRREGMERKDLLAANVKIFKIQGEALDKFAKDVKVLVGNPANTNALVCSHYAP-SI
PH AMPRKEGMERKDLLSANVKIFKIQGEALDKFAKKTVKVLVGNPANTNALVCSKFAP-SI
TC AMPRKQGMERKDLLSANVKIFKVQGEALDKHADKNVKVLVGNPANTNALVCSRFAP-SI
PP AMPRREGMERKDLLSANVKIFKAQQAALDQFAKKS VKVLVGNPANTNAAVCSKYAP-SI
CE AMPRREGMERKDLLAANVKIFKSQKALAEYAKPTTKVIVGNPANTNAAVIAAKYAAGKI
#####

5530 5540 5550 5560 5570 5580
====+====+====+====+====+====+
AA PKENFTAMTRLDQNRAQAQIAARLGVGIAHVKNVI IWGNHSTQY PDAKNATVELA-GAQ
AG PKANFTAMTRLDQNRAQAQIAGRLGVGITVKVKNVI IWGNHSTQV PDARNASVEVD-GAT
AM PKENFTAMTRLDQNRAQAALS AKLVQVDKVKVKNVI IWGNHSTQV PDASHATVALQSST-

AP PKENFTAMTRLDQNRQAIAAKRLGLCVSNVKNVTIWGNHSSSTQFQFDVFNASVTS--DSS  
 BM PKENFTAMTRLDQNRQAQLAARLSVGLDRVRNVI IWGNHSSSTQFPDASNAVAIVG-GAQ  
 CQ PKENFTAMTRLDQNRQAQLAARLSVGLDRVRNVI IWGNHSSSTQY PDAKNATVD-----G  
 DM PRENF SAMTRLDQNRATSQIAAKLVPI SAVKNII IWGNHSSSTQY PDAGQAKVTAN-GTV  
 DP PPAF SAMTRLDQNRQAQIANRLGVVNVNVKVT IWGNHSSSTQFPDANATVVTANGET  
 IS PKENFTAMTRLDQNRQAQIAQRLKVS PADVRNVI IWGNHSSSTQFPDANHATVNLID-GKT  
 NV PKENFTAMTRLDQNRQAIAARLGVAIDKVKNVI IWGNHSSSTQY PDAQATVEVNGTS-  
 PH PKENFTAMTRLDQNRASAQIALKLVPI SNVKNVI VWGNHSSSTQY PDVFHATVHKQGSNP  
 TC PRENF SAMTRLDQNRQAQIAARVNVVANVNI IWGNHSSSTQFPDGHGQVKMDSGKT  
 PP PKENFTAMTRLDQNRACAQIAKRLNKGAEQVKNVI IWGNHSSSTQFPDASAGII CDD--SSC  
 CE PAKNF SAMTRLDQNRALALALKTGTTIGNVKNVI IWGNHSSSTQFPDVTHTVKNK-GTE  
 #####

	5590	5600	5610	5620	5630	5640
	=====+=====+=====+=====+=====+=====+					
AA	KSVVEAIANNDYLNGEFVETVQKRGASVIAARKMS SAMSADLACSYPHMRDWFAGTKDGEY					
AG	KTVPEAVADDEFLKQFLETVQKRGAAVIAARKMS SAMSAAKASDHMRDWFAGTRDGEY					
AM	KPI SLAINDENWLNTTFVETIQKRGAAVIAARKMS SAMSAAKAGDHMRDWWVGTKPGEW					
AP	KSVYDSINDTQWLEGF I KTI QTRGAAVIAARKMS SAMSAAKAAVDHMRDWWSGTASGSW					
BM	KSVSEI INDDAYLKGAFVTVQKRGAAVIAARKMS SALSAAKASDHMRDWF LGTEDR-W					
CQ	KSVVEAIANNDYLNAEFVETVQKRGAAVINARKMS SAMSAAKASDHMRDWFAGTKDGEF					
DM	KSVVDAINDNGYLGQSFVETVQKRGAAVIAARKMS SAMSAAKACDHMRDWWNGTAPGQF					
DP	KSVADAINDAQAWLNGDFISTVQKRGAAVIAARKLS SAMSAAKAAADHMKDWWNGSPEGSW					
IS	VKVTEAINDADYFKGDFVTRFF-----CTQGEW					
NV	KEPVEVVDKDKWLNVEFVETIQKRGAAVIAARKMS SAMSAAKAGDHMRDWWFVKPGQY					
PH	VPPYDAVNDTKWLENFVTTIQKRGAAVIAARKMS SAMSAAKAGDHMKDIWHGTQPGCW					
TC	VSVREAVGDDAWLRSIFVETVQKRGAAVINARKMS SAMSAAKAGDHMKDWFHGT P AGQF					
PP	QKVVDAINDEAYLNGEFITTVQKRGAAVIAARKMS SAMSAAKACDHMRDWWLGT KAGGF					
CE	TDAYAAGVDNAFLQGFFIATVQKRGV IIEKRKLS SAMSAAKACDHIHDWHFGTKAGQF #####					

	5650	5660	5670	5680	5690	5700
	=====+=====+=====+=====+=====+=====+					
AA	VSMGVVSDGSYGT PKD VFSFPVQIQNGQWKIVQGLSVDDFARGKLDLALRFLVKYHRFLS					
AG	VSMGVI SDGSYGAPKDI VFSFPVQIQNRQWKIVQGLSVDEFTRSKLDSLRLFLVKYHRFLS					
AM	VSMGVLSDGSYGI PKD VFSFPVTTIENGQYKIVQGLSINDFARSKLELRLVLTYYHRFIS					
AP	VSMGVISDGSYGVPKDLIYSLPVSISNKQWKIVQGLKITDFAKNKL EY LKMLITYHRFVS					
BM	VSMGVVSDGSYGT PRD VVY SFPVTVTNGKWT IVEGLTISDFARQMLDYLKFLVTYHRFIS					
CQ	VSMGVVSDGSYGT PKD VFSFPVQIKDGKWTIKQGLAVDDFARGKLDLALRFLVKYHRFLS					
DM	VSMGVVSDGSYDSPKDVIFSPVEIKNKQWKIVSGLT L SDFAKTKLEYLKFLVTYHRFLS					
DP	VSMVAFSDGSYNT PAGV MYSFPVRCSKQWEIVQGLNLDEFARGKLEFLRALVKYHRFIS					
IS	VSMVAFSDGSYSPADV MFSY PVHVDNRWRIVTGLPISDFARAKLDLALRFLVRYHRFIS					
NV	VSMGVVSDGSYGI PKD VFSLPVTTI QNKQYKIVQGLN I SSFARSKLDLRLVLTYYHRFVS					
PH	VSMGVVSDGSYGI PKD VFSFPVTTI ENKNWKIVQGLNL DGF SKGKLDLRLFLITYHRFIS					
TC	VSMGVVSDGSYGT PKD VVFSFPV IKNKKWEIVKNLQIDDFGRKMLDPLRLVLTYYHRFIS					
PP	VSMGVISDGSYGAAKDVLSFPVEIKDGQWKIVKGLTVS PFAQEKIRALTFLVLTYYHRFIS					
CE	VSMVAFSDGSYGI PQGLIFSPVTTIEGGEWKIVQGLS FDDFAKGI N FLHFLVAYHRLVS #####					

	5710	5720	5730	5740	5750	5760
	=====+=====+=====+=====+=====+=====+					
AA	FCLYICIGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIIQNI FEGYAKLYNPEN					
AG	FCLYICIGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIIQNI FEGYAKLYNPEN					
AM	FCLYI VGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIIKNI FEGYSKLYNPEN					
AP	FSLYIAGLVWFVLSLVKYYMKQFSLFAWTHVCLLIVVSQSYFII RNI FEGYSKLYNPEN					
BM	FSLYICIGFVWFVLSLVKRY YMRQFSLFAWTHVALLIVVTQSYLIIQNI FEGYAKLYNPEN					
CQ	FCLYIIGFVWFVLSLVKRY YMKQFSLFAWTHVALLIVVTQSYFIIQNI FEGYAKLYNPEN					
DM	FALYIIGFVWFVLSLVKYYIKQFSLFAWTHVSLLIVVTQSYLIIQNI FEGYSKLYNPEN					
DP	FSLYIIGFVWFVLSLVKRY YMKQFSLFAWTHVALLIVVTQSYLII RNI FEGYAKLYNPEN					
IS	FCLYL L GFI W FVLSLVKYYMRQFSLFAWTHVTLVIVTQSYFLIQNM FEGYAKLYNQEN					
NV	FCLYIIGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIIQNI FEGYSKLYNPEN					
PH	FSLYI VGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIMQNI FQGHSKLYNPEN					
TC	FCLYICGGFVWFVLSLVKYYMKQFSLFAWTHVALLIVVTQSYLIIKNI FEGYSKLYNQEN					
PP	FCLYITGFVWFVLSLVKYYMRQFSLFAWTHVTL L L I V T Q S Y L I V Q N L F E G Y E R L Y N R E N					
CE	FALYICIGFVWFVLSLRKGYMRQFSLFAWTHLTL L L I V S Q S F F I I Q N I F Q G F S N L F N T D N #####					

	5770	5780	5790	5800	5810	5820
	=====+=====+=====+=====+=====+=====+					
AA	VYLSKGGGAGNNWASGFSQGEKLEHEEVFDI IDREADGSDSLEGFVLCHSIAGGTGSGMG					
AG	IYLSKGGGAGNNWASGFSQGEKLEHEEVFDI IDREADGSDSLEGFVLCHSIAGGTGSGMG					
AM	IYLSKHGGGAGNNWASGYHQGEKLEHEEVFDI LDREADGSDSLEGFVLCHSIAGGTGSGMG					
AP	VYLSKHGGGAGNNWASGFSQGERLQEEVFDI LDREAEGGDSLQGFVLCHSIAGGTGSGMG					
BM	VYLSKHGGGAGNNWASGYAQGEKLEHEEVFDI INREADGSDNLEGFVLCHSIAGGTGSGMG					
CQ	VYLSKGGGAGNNWASGFSQGEKLEHEEVFDI IDREADGSDSLEGFVLCHSIAGGTGSGMG					
DM	VYLSKHGGGAGNNWASGYHQGEKLEHEEVFDI IDREADGSDSLEGFVLCHSIAGGTGSGMG					
DP	IYLSKHGGGAGNNWGSYSHGERLFDI IDREAEGSENLEAFTLCHSIAGGTGSGGLG					

IS IYLSQSGGGAGNNWAVGYSQ-----  
NV IYLSKHGGGAGNNWASGYHQEKLQEEIFDI LDREADGSDSLEGFVLCHSIAGGTGSGMG  
PH VYVSKHGGGAGNNWASGYSQEKLQDEIFDI IEREAEGSDSIEGFVLCHSIAGGTGSGMG  
TC VFVLSKNGGGAGNNWASGFSQGEKLNEEIFDI IDREADGSDSLEGFVLCHSIAGGTGSGMG  
PP IYVSKTGGGAGNNWASGYCQGHQLRDEILEI LERETENVDSLDAFVLCHSIAGGTGSGMG  
CE IFMSDHGGGAGNNWASGYCQGEVQEKIMDI IIREAENTNNDGLIFTHSVSGGTGSGTG  
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5830 5840 5850 5860 5870 5880  
-----+-----+-----+-----+-----+-----+  
AA SYIMERLSDHFPKKLVQTYSVFPNQDEIS-DVVVQPYNSLLTLKRLTSCADCVVVDNNTA  
AG SYIMERLSDHFPKKLIQTYSVFPNQDEIS-DVVVQPYNSLLTLRRLTSSADCVVVDNNTA  
AM SFMLESADRFPKKLIETYSVFPNQDEIS-DVVVQPYNSLLTLKRLTQCADCVVVDNNTA  
AP SFLEHLTDTRYPKKI IETYSVFPNQDEIS-DVVVQPYNSLLTLKRLAQADCVVVDNNTA  
BM SYILEHLSDRFPKKLVQTYSVFPNLDEIS-DVVVQPYNSLLTLKRLTESADCVMVDNNTA  
CQ SYIMERLSDHFPKKLVQTYSVFPNQDEIS-DVVVQPYNSLLTLKRLTSCADCVVVDNNTA  
DM SFIMERLADRYPKKLIQTFVFPNQDEIS-DVVVQPYNSMLTLKRLTTAADSVMVDNNTA  
DP SYMLERISERYPKKLVQTYSVFPNLAESS-DVVVQPYNSLLTLKRLTLNADCVVVDNNTA  
IS -----  
NV SFMLESADRFPKKLIETYSVFPNQDEIS-DVVVQPYNSLLTLKRLTQCADCVVVDNNTA  
PH SNI LEQLTERFPKKLIQTYSVFPNQDEIS-DVVVQPYNSLLTLKRLTHSADCVVVDNNTA  
TC SNI LEKLSDRFPKKLVQTYSVFPNLDEISSDVVVQPYNSLLTLKRLTESADSVMVDNNTA  
PP SYLIEQVKDRFPKKLIQTYSVFPNQDDSA-DVVVQPYNSMLTLRRLIEFADCCIVLDNNTA  
CE SLLLERLREAFPKKVIQTYSVFANSDTST-DVVVHPYNWVLSMQRLIENPDHVVDNNA

5890 5900 5910 5920 5930 5940  
-----+-----+-----+-----+-----+  
AA LNRIATDRLHLENPSFTQINTLVSTIMSVSTTLRYPYMNNDLIELIAPLIPTSQLHFL  
AG LNRIATDRLHLDNPSFAQINTLVSTIMSVSTTLRYPYMNNDLIELIAPLIPTSQLHFL  
AM LNRIASDRLHIQNPSFTQINKLVSTIMSVSTTLRYPYMNNDLVGLIAPLIPTPRLHFL  
AP LNRIATDRLHIENPSFAQINLVSTIMSVSTATLRYPYMNNDLVGLIPLIPSPRLHFL  
BM LNRIASDRLHIQNPSFAQINTLVSTIMASATTLRYPYMNNDLISLVAPLIPTPRLHFL  
CQ LNRIATDRLHLENPSFTQINTLVSTIMSVSTTLRYPYMNNDLIELIAPLIPTSQLHFL  
DM LNRIACDRLHIQNPSFSQINNVSTIMSVSTTLRYPYMNNDLIGLAPLIPTPQLHFL  
DP LNRIATDRLHIETPSFTQINSLVSTIMASATTLRYPYMNNDLIGLVAPLIPTPRLHFL  
IS -----VSTIMSVSTTLRYPYMNNDLIGLVAPLIPTPRLHFL  
NV LNRIASDRLHIQNPSFTQINKLVSTIMSVSTTLRYPYMNNDLVGLIAPLIPTPRLHFL  
PH LNRIATDRLHISNPSFAQINTLVSTIMSVSTATLRYPYMNNDLIGLAPLIPTPRLHFL  
TC LNRIAADRLHIQNPTFTQINSLVSTIMSVSTTLRYPYMNNDFMGLLAPLIPTPRLHYL  
PP LNRIACERLHIQNPSFAQVNNMVSINMSLSTATMRFPALCTDIKSLFLPLIPLQSLHFL  
CE LHRLAAGFKTDTPTFDHINSLVARIMSTAPYRFNSAMCPSIR--YLDLAPFPFMHFI  
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5950 5960 5970 5980 5990 6000  
-----+-----+-----+-----+-----+  
AA MTGYTPLATDTSVQKTTVLDVMMRLLQPKNMMVSTGPKTNHHRYISILNI IQGEVNP  
AG MTGYTPLATESDTSVQKTTVLDVMMRLLQPKNMMVSTGPKTNHHRYISILNI IQGEVNP  
AM MTGYTPLTTDQEGSVRKT SVLDVMMRLLQPKNMMVSTALDRNASHCYISILNI IQGEVDP  
AP MTGYTPLTTDHEDNIRKTTVFDVMMRLLQPKNMMVSTAQERTIPHCYLSILNI IQGDVDP  
BM MTGYTPLSADHEQKIRKTTVLDVMMRLLQPKNMMVSLSPDRANQHCYISILNI IQGEVEP  
CQ MTGYTPLSTDDTSVQKTTVLDVMMRLLQPKNMMVSTGPKTNHHRYISILNI IQGEVNP  
DM MTGYTPLTSDSDSINVRKTTVLDVMMRLLQPKNMMVSTGPKSNHHCYISILNI IQGEVDP  
DP MTGYTPLTNDHEESVRKTTVLDVMMRLLQPKNMMVSTTPDRNGSHCYTSILNI IQGEVDP  
IS MTGYTPLTTEHEVSVRKT VLDVMMRLLQSKNMMVSI THDRTVNHCYISILNI IQGEVDP  
NV MTGYTPLTTDQEGSVRKT SVLDVMMRLLQPKNMMVSTALDRNAAHCYISILNI IQGEVDP  
PH MTGYTPLTTDQENSVRKTTVLDVMMRLLQPKNMMVSTAFDRNAAHCYISILNI IQGEVDP  
TC MTGYTPLSTDDDENVRKTTVLDVMMRLLQPKNMMVSTSQRNSQHCYISILNI IQGEVDP  
PP MTGFTPLMIDQEQAVQRTTVLDVMMRLLQ-KNMMVSTNFSG-NQHCVNLLNI IQGDVDT  
CE QSAISPVVDPNENFTRKTSVADVTRFLKPTSMVSTA-SRRPNDCMLSAYMFLQGGIEA  
#####

6010 6020 6030 6040 6050 6060  
-----+-----+-----+-----+-----+  
AA TQVHKYANRSFAYLRQEAFGYALNDAVQA IKCNPNYKGYRRAGAHMALGKYKALADL  
AG SQVHKYANRSFAHFRTEYGYALSDADKAI SMKNSYTKAYYRRAAALMALGRFKALADL  
AM TQVHKYGNRSFAYLKTFFGYALTDASKA IELDKNYVKGYRRAAAHMSLGKFKLALKDY  
AP TQVHKYANRSFAHKS TEAYGYALADASKA IQLDPKYKGYRRATAYMSLGKFKALKDY  
BM SQVHKYANRSIANLRLENFGYALGDASKA IALDKGYTKAYYRRAAALMALGKYKALADL  
CQ TQVHKYANRSFAYLRQEAFGYALNDAVQA IKCNPAYLKYRRAGAHMALGKFKLALQDL  
DM TQVHKYANRSLAHLRQESFGALQDGVSAVKADPAYLKYRRAAAHMSLGKFKALCDF  
DP TQIHK-----MALGKTKLALKDY  
IS TQVRLYGNRSFAYLKTFCFGYALSDASKA IELDRSYVKGYRRAAAHMSLGKFKLALKDF  
NV TQVHKYGNRSFAFLKTECFGYALRDATEA IELDRNYKGYRRAAANMSLGKFKLALKDY  
PH TQVHKYGNRSLAHLRTECFGYALEDASKA IELDKNYIKGYRRATAYMSLGKFKLALKDY  
TC TQVHKYGNRSFAYLKTFCFGYALADASKA IELDKGYVKGYRRAAAHMSLGKFKALKDY  
PP SLDHSYGNRSFAYLKLFCFGYALRDATEA IELDRKYVKGYRRAAAYMSLGKFRFALRDF

CE HTIMTYGNRAQAYLKKELYGSALEADADNAIAIDPSYVKGFYRRATANMALGRFKKALTDY  
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      6070      6080      6090      6100      6110      6120
=====+=====+=====+=====+=====+=====+
AA ELVAKRCPNDKDAQLKYTECNKIVKKMAFERAIAVDKQEKSLLEMCRDLESATIEEDYEG
AG EFVAKRCPNDKDAQLKYTECKKMVVKIAFEKAI SVQHQEKSVKMCRDMEFATIEEDYTG
AM KTVTKARPNDDKAMI KYTECKTLKMLAFEKAI SVEENKKN IADMIN-LEAMAIEDEYTG
AP EVVVKALPNDDKAKVYAECKNLVKRLAFEKAI SVEDT-KSVSEQID-IESMNIENDYSG
BM EYVTVRVPYDQDAKLKYSECNKIVKKAIFEKAI SVDKKEVNIADSI N-LDSMTIEDEYEG
CQ EFVAKRCPNDKDAQMKYSECKKIVTKMAFERAIAVDKVEKSLMEMCRDLESATIEADYEG
DM EFVAKRCPNDKDAKLKYTECNKIVKMAFERAIAVDKPEKTLSEMYSDMENITIEEDYKYG
DP ETVFKARPNDDKDAKLFNECSKIVRQAFERAIAVDTVKKS VSESI N-IDSMAVESTYTG
IS EAVTKARPNDDKACAKYNECNKIVRRIAFEKAI AVDDLKKS VADSID-IEAMCIEEDYTG
NV EAVMKARPNDDKAKAFTECNKIVKLAFEKAI AVEENKKS IADSI N-LEAMTIEDEYSG
PH ETVKKARPNDDKDAQMKFMECNKIVKKAIFEKAI AVEDT-KSIADI I N-LESIVIEDEYTG
TC EYVTVRPNDDKAKSKYTECNKIVKLAFEKAI SVEDTKKNIAS TI N-LDAMTIENEYTG
PP EAVTNACPNDDQAKRFL ECRRI VQRALAFENAI RVDDVKKS VADAL-DLDSMSI DDDYDG
CE QAVVVCV PNDKDARAKF DECSKIVRRQKFEAAI STDHKKTVAETL-DINAMAI EDSYDG
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      6130      6140      6150      6160      6170      6180
=====+=====+=====+=====+=====+=====+
AA PKLEEGKVTLEFMKHLMEWYKNEKKLHKNFAYRILCDVEALFKK---QPSLVDITVPDEC
AG PKLENGKVTLEFMKSLLEWYKQKQLHKNFAYRILCDMETLLKT---QPSLVEIPVPDEQ
AP PKLEDEKVTLQFMQDLLEWYKQKQLHRYAYKILLDVKAWFMA---QPSLVDITIPEDS
AM PCLNDGKVTLEFMKELIKTYREQGKLLKHKHAYKILLDVKKYLEK---QPTLVHINI KSDE
BM PMLLEDGKVTLFVKELEMEYKQKQLHKKYAYKILLDVKTYLQN---QPSLVDIKVPDDK
CQ PKLEDEKVTLDFMHLMEWYKNEKKLHKNFAYRILCDVEALFKK---QPSLVDITVPADC
DM PQLEDDKVTLFKFMELIKTYREQGKLLKHKHAYKILLDVKTYLQN---QPSLVDITVPDEE
DP PHLVNGRVTLEFMQELMDAYKQKQLHRYAYFQIILEVAELFKA---QPSLIDVTIPEDS
IS PELKEGKVTLEFMKQLMETFKAGKLLHRYAYKARIPPSFIFFKGSLLPSLVDIEVPSDS
NV PKLEDDKVTLFKFMQDLIDWYKNEKKLHRYAYKILLDVKTYLQN---QPSLVDITVPDEN
PH PKLEDEKVTLEFMTCLMQHFKEQKQLHRYAYKILLDVKQLFMA---QPSLVDITVPEPA
TC PELEDGKVTLFKFMKDLMELYKQKQLHRYAYKILLDVKYFMK---QPSLIDVVI GDED
PP PCPSDDGITVEFMEELIDKLSKCGKLLHRYAYQILLEAKTIFEN---QPTLVDI EVPDGG
CE PR-LEDKITKEFVQLIKTFKNQKQLHKKYAFKMLLEFYNYVKS---LPTMVEITVPTGK
# #####
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      6190      6200      6210      6220      6230      6240
=====+=====+=====+=====+=====+=====+
AA KFTVCGDIHGQFYDLLNIFEINGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
AG KFTVCGDIHGQFYDLLNIFEINGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
AM KFTICGDIHGQYDLLNIFEINGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
AP KFTVCGDIHGQYDLLNIFEINGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
BM KFTMCGDIHGQFYDLNIFEKLNGLPSENPNYLFNGDFVDRGSFSVECI FTTLFS-YKLLYP
CQ KFTVCGDIHGQFYDLNIFEINGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
DM KFTICGDIHGQFYDLNIFEINGLPSEKNPNYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
DP KFTVCGDIHGQFYDLNIFEKLNGLPSTENPNYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
IS KFTVCGDIHGQFYDLNIFEINGLPSESNPNYLFNGDFVDRGSFSVECI FTTLGAGCF LFK
NV KFTICGDIHGQYDLLNIFEINGLPSESNPNYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
PH KFTVCGDIHGQFYDLNIFDLNGLPSEKNPNYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
TC KFTVCGDVHGQFYDLNIFEKLNGLPSETNPYLFNGDFVDRGSFSVECI FTTLFG-FKLLYP
PP KFTICGDIHGQFYDLNIFEKLNGLPSETNPYLFNGDFVDRGSFSVECI LVLFG-FKLLYP
CE KFTICGDIHGQFYDLNIFEINGYPSETNPYLFNGDFVDRGSFSVETIFTMIG-FKLLYP
#####
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      6250      6260      6270      6280      6290      6300
=====+=====+=====+=====+=====+=====+
AA NHFFLSRG-NHESVNMNQEIMRHPHKLIEGCL IAGRAMGARAAY IYIRGEFYNEASNMQ
AG NHFFLARG-NHESVNMNQEIMRHPHKLIEGCL IAGRAMGARAAY IYIRGEFYNEASNMQ
AM NHFFMSRG-NHESATMNQEILRHPHKLIEGCL IAGRAMGACAAY IYIRGEFYNEASNMQ
AP DKFFMSRG-NHESVTMNREIMRHPHKLIEGCL VAGRAMGACAAY IYIRGEFYNEASNMQ
BM DHFFMSRG-NHETLDMNREIMRHPHKLIEGCL IAGRAMGAQAAY IYIRGEFYNEASNMQ
CQ NHFFLSRG-NHESVNMNQEIMRHPHKLIEGCL IAGRCMGARAAY IYIRGEFYNEASNMQ
DM NHFFLARG-NHESINMNQEIMRHPHKLIEGCL IAGRAMGAQAAY IYIRGEFYNEASNMQ
DP NHFFMARG-NHESQTMNQEIMRHPHKLIEGCL IAGRAMGARAAY IYIRGEFYNEGTNVQ
IS ITCVLDLIRNHESQTMNQEIMRHPHTLVGEC LVAGRAMGARAAY IYIRGEFYNEASNMQ
NV NHFFMSRG-NHESATMNH EILRHPHKLIEGCL IAGRAMGACAAY IYIRGEFYNEASNMQ
PH NHFFMSRG-NHESQTMNQEILRNDPHKLIEGCL VAGRAMGAQAAY IYIRGEFYNEASNMQ
TC NHFFMSRG-NHESATMNQEIMRHPHKLIEGCL IAGRAMGACAAY IYIRGEFYNEASNMQ
PP NHFFMSRG-NHESHTMNREIMRHPHTLVGEC LVAGRAMGARAAY IYIRGEFYNEASNMQ
CE NHFFMSRG-NHESVNMNQEIMRHPHKLIEGCL IAGRAMGARAAY IYIRGEFYNEACILQ
#####
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      6310      6320      6330      6340      6350      6360
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=====+=====+=====+=====+=====+=====+
AA LAIAEAYQAGLIGKNACNSGYDFDFVMHRGAGAYICGEETALIESLEGKQKPRLKPPFP
AG LAIAEAYQAGLIGKNACNSGYDFDFVMHRGAGAYICGEETALIESLEGKQKPRLKPPFP
AM VAIAEAYQAGLIGKNACNSGYDFDI FVQRGAGAYICGEETALIESIEGKQKPRLKPPFP
AP QAICEAYQAGLIGKNACNSGYDFDFVHRGAGAYICGEETALIESLEGKQKPRLKPPFP
BM VAIAEAYQAGLIGKNACNSGYDFDI FVHRGAGAYICGEETALIESIEGKQKPRLKPPFP
CQ LAIAEAYQAGLIGKNACNSGYDFDFVMHRGAGAYICGEETALIESLEGKQKPRLKPPFP
DM LAIAEAYQAGLIGKNACNSGYDFDFVMHRGAGAYICGEETALIESLEGKQKPRLKPPFP
DP VAIAEAYQAGLIGKNACNSGYDFDFVHRGAGAYICGEETALIESIEGKQKPRLKPPFP
IS IAIREAYQAGLIGKNACNSGYDFDFVHRGAGAYICGEETALIESIEGKQKPRLKPPFP
NV VAIAEAYQAGLLGKNACNSGYDFDFVQRGAGAYICGEETALIESIEGKQKPRLKPPFP
PH IAIAEAYQAGLIGKNACNSGYDFDFVMHRGAGAYICGEETALIESIEGKQKPRLKPPFP
TC VAIAEAYQAGLLGKNACNSGYDFDFVMHRGAGAYICGEETALIESIEGKQKPRLKPPFP
PP IAIAEAYQAGLIGKNACNSGYDFDFVHRGAGAYICGEETALIESIEGKQKPRLKPPFP
CE EAINEAYKAGYLKDCCLGTGYNFDVDFVHRGAGAYICGEETALIESLEGKQKPRLKPPFP
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          6370          6380          6390          6400          6410          6420
=====+=====+=====+=====+=====+=====+
AA ADVGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
AG ADVGVFGCPTTVSNVETVAVAPTICRRGGTWFASFGRTRNSGKLFNISGHVNPCTVEE
AM ADVGLFGCPTTVSNVETVAVAPTICRRGGVWFASFGRPRNHGKLFNISGHVNPCTVEE
AP ADVGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
BM ADVGLFGCPTTVSNVETVAVAPTICRRGGVWFASFGRQRNSGKLFNISGHVNPCTVEE
CQ ADVGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
DM ADVGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
DP ADIGVFGCPTTVSNVETVAVAPTICRRGGVWFVGFGRPRNSGKLFNISGHVNPCTVEE
IS ADVGVFGCPTTVSNVETVAVSPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
NV ADVGLFGCPTTVSNVETVAVAPICRRGGVWFASFGRPRNSGKLYNISGHVNPCTVEE
PH ADIGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRPRNSGKLFNISGHVNPCTVEE
TC ADVGVFGCPTTVSNVETVAVSPTICRRGGTWFASFGRTRNSGKLFNISGHVNPCTVEE
PP ADVGVFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
CE ADIGLFGCPTTVSNVETVAVAPTICRRGGVWFASFGRTRNSGKLFNISGHVNPCTVEE
#####
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          6430          6440          6450          6460          6470          6480
=====+=====+=====+=====+=====+=====+
AA EMSIPLKELIERHAGGVIRGGWDLNLLGIIPGGSSTPIIPKNVCDVLMDFDGLVQAQTSLG
AG EMSIPLKELIERHAGGIIRGGWDLNLLGIIPGGSSTPVIIPKSVCEVLMDFDGLVQAQTSLG
AM EMSIPLKELIERHAGGVIIRGGWDLNLLGIIPGGSSTPVIIPKSVCDTVLLDFDGLVQAQTSFG
AP EMSIPLKELIERHAGGIIRGGWDLNLLAVIPGGSSTPLIIPKHVCETAIMDFDGLVQAQTSFG
BM EMSIPLKELIERHAGGVIRGGWDLNLLAIIPGGSSTPLIIPKNVCEVLMDFDGLVQAQTSFG
CQ EMSIPLKELIERHAGGVIIRGGWDLNLLGIIPGGSSTPIIPKSVCDVLMDFDGLVQAQTSFG
DM EMSIPLKELIERHAGGVIRGGWDLNLLGIIPGGSSTPIIPKNVCDVLMDFDGLVQAQTSFG
DP EMSIPLRELIERHAGGVIRGGWDLNLLAVIPGGSSTPMIIPKSVCEVLMDFDGLVQAQTSFG
IS EMSIPLKELIERHAGGVIIRGGWDLNLLGIIPGGSSTPVIIPKSVCDVLMDFDGLVQAQTSFG
NV EMSIPLKELIERHAGGVIIRGGWDLNLLGIIPGGSSTPVIIPKHICDTVLMDFDGLVQAQTSFG
PH EMSIPLKELIQLHAGDVIRGGWDLNLLAIIPGGSSTPLIIPKDVCEEAIMDFDGLVQAQTSFG
TC EMSITFKELVERHAGGIIRGGWDLNLLAIIPGGSSTPLIIPKSVCEVLMDFDGLVQAQTSFG
PP EMSIPLRELIERHAGGVIIRGGWDLNLLCVIPGGSSTPVIIPKSVCDVLMDFDGLVQAQTSFG
CE EMSVPLKDLIERHAGGVIIRGGWDLNLLAIIPGGSSTPLIIPKSVCEVLMDFDGLVQAQTSFG
#####
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          6490          6500          6510          6520          6530          6540
=====+=====+=====+=====+=====+=====+
AA TAAIIVMDKSTDIVKAIARLIDIFYKHESCGQCTPCREGITWYKMMHRFVVDGNGRPEEID
AG TAAIIVMDKSTDIKAIARLIMFYKHESCGQCTPCREGIAWMNKIMHRFVVDGNARPAEID
AM TAAVIVMNKQTDI KAIARLISFYKHESCGQCTPCREGISWYKIMRRFVVDGQAEVHEID
AP TAAIIVMNKQTDI KAIARLIMFYKHESCGQCTPCREGINWMNKIMYRFVVDGQAQSEID
BM TAAIIVMDKSTDIVKAIARLIMFYKHESCG-----SALLAAKVSFG---
CQ TAAIIVMDKSTDIVKAIARLIDIFYKHESCGQCTPCREGIAWMHMMHRFVVDGNARPEID
DM TAAIIVMDKSTDIKAIARLISFYKHESCGQCTPCREGIWMNKIMTRFVVDGQAPAEID
DP TAAIIVMNKQTDIVIRAIARLIEFYKHESCGQCTPCREGTGMNKMIMYRFVEGNARPEEID
IS TAAVIVMNKQTDIIRAIARLLEFYKHESCGQCTPCREGVGLWLMHMMGRFVVDGNARVEID
NV TAAIIVMNKQTDI KAIARLISFYKHESCGQCTPCREGIWMYKIMQRFVEGNAEVHEID
PH TAAVIVMNKQTDI KAIARLIEFYKHESCGQCTPCREGINWMNKI IHRFITGNAEPGEID
TC TAAIIVMNKQTDI KAIARLIMFYKHESCGQCTPCREGINWMNKIMYRFVVDGNARPEEID
PP TAAIIVMNKQTDLIRAIARLIEFYKHESCGQCTPCREGVGMNKMIMYRFVVDGNAKVEEID
CE TAAVIVMNKQTDI KAIARLISFYKHESCGQCTPCREGCNWLNKMMWRFVVDGKAKPSEID
#####
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          6550          6560          6570          6580          6590          6600
=====+=====+=====+=====+=====+=====+
AA MLWEISKQIEGHTICALDGAAPVQGLIRHFRPEIEARIKEVQEVQEEGKIAIDSPGNP
AG MLWEISKQIEGHTICALDGAAPVQGLIRHFRPEIESRIKEVQEVQEEGKIAIDSPGPS
AM MLWELTKQIEHMTICALADGAAPVQGLIRHFRPEIEARIKEVQEVQEEGKIAIDSPGFA
AP MLWEISKQIEGHTICALDGAAPVQGLIRHFRPEIECRIKEVQEVQEEGKIAIDSPGNP
```

BM -----IKEVQDVQAEQKYAIDSPGSP  
CQ MLWEISKQIEGHTICALGDGAAPVQGLIRHFRPEIEARIKEVQEVQEGKIAIDSPGSP  
DM MLWEISKQIEGHTICALGDGAAPVQGLIRHFRPEIEKRTREVKKVQEEGKYAIDSPGSP  
DP MLWELSKQIEGHTICALGDGAAPVQGLIRHFRPEIEDRIKEVQEVQEEGKNAIDSPGNP  
IS MVYELSKQIEGHTICALGDGAAPVQGLVVRHFRPLMEERSVPIVELQEEGKNAIETPGSP  
NV MLWELTKQIELHTICALADGAAPVQGLIRHFRPEIESRIKEVQEVQEEGKYAIDSPGFA  
PH MLWELSKQIEGHTICALGDGAAPVQGLIRHFRPELEARIKEVQEVQEEGEIAIDSPGFV  
TC MLWELSKQIEGHTICALGDGAAPVQGLIRHFRPELEERIKEVQEVQAEQKYAIDSPGPH  
PP MLWEISKQIEGHTICALGDGAAPVQGLIRHFRPIVESRIKEVEDLRSEEAKAIDYEGRI  
CE MMWELSKQIEGHTICALGDAAAPVQGLIRHFRPELEERREDEVLELELEGREALDQSLVP  
#####

6610 6620 6630 6640 6650 6660  
=====+=====+=====+=====+=====+=====+  
AA NAPEIPPEEYNLEDNESRSIIQPASLQHPHVRELLQVLDWINDELVEDRIIVTDIEEDL  
AG NAPIIPPEEDYNLEDNESRSIIQPASLQMPKVKELQVLDWINDELVEERIIVTNIEEDL  
AM ANPEMPPEEYALDENEERSMIEPRSLSDSKLKEKELIIVLIEWINDELADQRIIVKDAIEDL  
AP AMADVPPEEYTLNEENEERTMVEPKSYSDFKLQELMNI LIDWVNDVLADHRIIVKKNLEQDL  
BM TAPEIPPEEYTLNENEERAIIEPRSLDEPRVRDLIQLVLDWINDELASQRIIVQDIIEEDL  
CQ NAPVIIPPEEDYNLEDNESRSIVQASLEHHPHFRELLQVLDWINDELVEERIIVTNIEEDL  
DM SQDYIPPEDYALREHEQRAVIDPQSIISDPQVIKLQRIIVLDWINDELAEQRIIVQHLEEDM  
DP MAPSPLPEEYALEENEERSMVEPKSMEDIKALKALAVLDWINDELAEHHRMIVQNVDEDL  
IS TLPDLPPQDYIILDEMEERAMIEPLSYEDPRLKELISVLIIEWINDELASHRIIVKDIIEEDL  
NV ALVDMPPEDYALDENEERSMIAPRSLDPKVKQELIHLVLIIEWINDELAEQRIIVKDIITEDL  
PH FSPVISPDEYALDENEERSILAPGERNNPKLTELIRVLIIEWINDELADQRIIVKDIIEEDL  
TC TNPIIPPEEYDLEDNEERCMEVPRSYDDPKFRELSQVLDWINDELASQRIIVQDLAEDL  
PP LDIEIELPEDCHLEEGEERAVIERESYESAQFQELVKILIEWINDELASNRIIVKSIIEEDL  
CE ---VLARNIWLLEEGERIRRYLTKETARDQKLAQVVDLLIYWLNEELADQRIIVRHLQEDL  
#####

6670 6680 6690 6700 6710 6720  
=====+=====+=====+=====+=====+=====+  
AA YDGQVLQKLFKELTGHKLNVEVTSQSAEGQRQKLTVVLVNAVNH TLGFHH---SIPQWTV  
AG YDGQVLQKLWEKLSNNKLNVEVTSQSAEGQRQKLSVVLNAVNH TLGYHH---NTPKWTVE  
AM YDGQVLQKLLKELTGEKLDVPEVTSQSEEGQKQKLAVV LSTANRV--LG--RYPPYKWHVE  
AP YDGQVLQKLYEKLTKNEKLDVPEVTSQSEEGQKQKLVV LSGVNNILGLTGNRSQQKWSVE  
BM YDGQVLQKLEQLTKLDVPEVTSQSEEGQRQKLTIVLRAVNRVLYGT--SKPVPKWSVD  
CQ YDGQVLQKLFKELTGHKLNVAEVTQSAEGQRQKLA VV LNAT---LGFHH---NIPKWTVE  
DM YDGQVLHKLWEKLTGKLDVPEVTSQSEEGQHEKLNIVL KAVNH TLGFHQ---KIPKWSVA  
DP YDGQVLQKLEKLTGKLDVPEVTSQSEENQKQKLR T V LAYANRVR--LG--RTSPARWSVE  
IS YDGQVLQKLES LTGKRLDVPEVTSQSEEGQKQKLR T V VDCANQILGLP--KWGQYKWSVE  
NV YDGQVLQKLEKLTGKLDVPEVTSQSEEGQRQKLA VV LNTANRV--LG--CYPYKWSVE  
PH YDGQVLQKLEKLSGELLVPEVTSQSEEGQKQK LQIVLRAVNQVLGVP--YMS SPKWNVE  
TC YDGQVLQKLEKLTNDKLDVPEVTSQSEEGQKQK LSVVLAHFNQVLGVQ--RLGHKKWSVE  
PP YDGQVLHKLLEQLSGVRIDCVEMTQSNEGQREK LKVVLEKASQALGVPVTWGQGL--KWSVD  
CE FDGQI IQKLEKLEQIRIEVPEVTSQSEEGQRQK LQIVVQTANRILGQPR---EQEKWSAD  
#####

6730 6740 6750 6760 6770 6780  
=====+=====+=====+=====+=====+=====+  
AA SIHTKNIVSILHLLVALVRHFRAPIR--LPENVHVTVVMAQK-VNGKLT SKQFQEQITQQ  
AG SIHTKNIVSILHLLVALVRHFRAPIR--LPDNV FVTVMVQK-LNGKLT SQRFFQEQITQS  
AM SVHSNVAIILHLLVGLARQFRAPVR--LPERVAIQV VIVRK-KDGLTHTNTRIEEITST  
AP SVHKNVAIILHLLVSLARHFRAPIR--LPENVT VNVVIVQK-RDGLVKNRTVIEEITSR  
BM SIHKSIVSILHLLVALARHFRAPIR--LPENVS VNVVIVKKNTPQLSHRTLIEITTT  
CQ SIHTKNTVSIHLLVALVRHFRAPIR--LPENVS TVVLAQK-VNGKLT SRFLEKQITEQ  
DM SVHKNVAIILHLLVALVRHFRAPVR--LPENV FVTVIAEK-NAGVLNAQKFQEQITSE  
DP SIHKTIVSILHLLVSLARQFRAPIR--LPENVV VNVVVVTK-KDGLVSHRIVAEIITST  
IS SIHNKNIVSILHLLVALARHFRAPVR--LPENVV VNVVVVQK-RNGLHPRTVQEELTST  
NV SIHSRNVAIILHLLVSLARLFRAPVR--LPELV SVQVVVTK-KDGLVHKTVEEITST  
PH SIHKNVVSILHLLVSLARHFRAPVR--LPENVV SVVVVVK-KDGLVSHRTVHEELTAT  
TC AIHKNIVPILHLLVALARHFRAPPVR--LPEHVS TVVVVQK-VGGQLSHRIVKESITTA  
PP AIHKNVVAIVHLLVSLARHFRAPVRARLPENVV SVVSVTK-RNGQLTPAKVQEQITTT  
CE LIHQKDFTAIIQLLVLLALHYRAPVR--FPDNV VANVVAQK-EHQVKTTHRIETEITTV  
#####

6790 6800 6810 6820 6830 6840  
=====+=====+=====+=====+=====+=====+  
AA YDDVGMRCERDAFDTLFDHAPKLVVQKSLITFVNKHLNKLNF EAADLSSDFKDGVFLC  
AG YDDVGMRCERDAFDTLFDHAPDKLVVQKSLISFVNKHLNKLNF EAADLNTDFKDGVFLC  
AM YDDLGMRCERDAFDSLFDHAPDKLAVVQKSLVSVFNKHL SKVHLEVTDLDTQFHDGVFLT  
AP YDDLGMRCERDAFDTLFDHAPDKLEVQKSLITFVNKHLNKLNF EAADLDTQFHDGVFLT  
BM YDDLGMKRCERDAFDFHAPDKLVVQKSLITFVNKHL SKVNLEVMDLDTQFHDGVYLC  
CQ YDDVGMRCERDAFDTLFDHAPKLVVQKSLITFVNKHLNKLNF EAADLGSDFKDGVFLC  
DM YDDLGMRCERDAFDTLIDCAPDKLAVVQKSLITFVNKHLAKLNFEISDLNTDFRDGVYLC  
DP YDDLGVRCERDAFDTLFDHAPDKLVVQKSLITFVNKQLNKHLEVTDLDTQFHDGVFLT  
IS YDDLGMVERDAFDTLFDHAPDKLVVQKSLMTFVNKHLNKLNF EAVLNTDFQDGIYLV



7090 7100 7110 7120 7130 7140
====+====+====+====+====+====+
AA VVHKANIMRMSDGLFLRCCREMAKYPKFEELYLDTVCLNMVQDPSKFDVLMVMPNLYG
AG VVHKANIMRMSDGLFLRCCRDMAQKYPKFEELYLDTVCLNMVQDPRKYDVLVMPNLYG
AM AVHKANIMRMSDGLFLRCCREAAQKFSIKFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
AP AVHKANIMRMSDGLFLRCCRMASQKYPKFEELYLDTVCLNMVQDPSHYDVLVMPNLYG
BM -----MSDGLFLRCCRELATKYPDIKFEELYLDTVCLNMVQDPSKFDVLMVMPNLYG
CQ VVHKANIMRMSDGLFLRCCRDMAKYPKFEELYLDTVCLNMVQDPSKFDVLMVMPNLYG
DM VVHKANIMRMSDGLFLRCCRDMAQKFPKFEELYLDTVCLNMVQDPSKFDVLMVMPNLYG
DP AVHKANIMRMSDGLFLRCCREAAEKNDIRFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
IS AVHKANIMRMSDGLFLRCCRDAAERNPTVKYNEMYLDTLCLNMVQDPSKFDVLMVMPNLYG
NV AVHKANIMRMSDGLFLRCCREAAQKFPNVKFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
PH AVHKANIMRMSDGLFLRCCREAAKNPEVKFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
TC AVHKANIMRMSDGLFLRCCREAAEKYPDKFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
PP AVHKANIMRMSDGLFLQCCRDAAEHNDIKYNEMYLDTLCLNMVQDPAKFDVLMVMPNLYG
CE AVHKANIMRMSDGLFLSICREQAALYPDIKFEELYLDTVCLNMVQDPSQYDVLVMPNLYG
#####

7150 7160 7170 7180 7190 7200
====+====+====+====+====+====+
AA DIMSDMCAGLVGGLGLTPSGNMGALFESVHGTAPDIAGKDLANPTALLSVMMLRH
AG DILSDMCAGLVGGLGLTPSGNMGALFESVHGTAPDIAGKDLANPTALLSVMMLRH
AM DILSDMCAGLVGGLGLTPSGNIGLNGALFESVHGTAPDIAGQDKANPTALLSVMMLKY
AP DILSDMCAGLVGGLGLTPSGNIGSNGALFESVHGTAPDIAGKDLANPTALLSVMMLRH
BM DIMSDMCSGLVGLGLTPSGNIGKNGALFESVHGTAPDIAGQDKANPTALLSVMMLRH
CQ DIMSDMCAGLVGGLGLTPSGNMGALFESVHGTAPDIAGKDLANPTALLSVMMLRH
DM DILSDMCAGLVGGLGLTPSGNMGALFESVHGTAPDIAGKDLANPTALLSVMMLRH
DP DILSDLCAGLVGGLGLTPSGNIGTQGAIFESVHGTAPDIAGQDKANPTALLSVMMLRY
IS DILSDLCAGLVGGLVTPSGNIGSDGAI FESVHGTAPDIAGQDKANPTALLSGIMMLRH
NV DILSDMCAGLVGGLGLTPSGNIGLNGALFESVHGTAPDIAGQDKANPTALLSVMMLKY
PH DILSDMCAGLVGGLGLTPSGNIGLNGALFESVHGTAPDIAGLQDKANPTALLSVMMLRH
TC DILSDMCAGLVGGLGLTPSGNIGLNGALFESVHGTAPDIAGKDLANPTALLSVMMLRY
PP DILSDLCAGLVGGLVTPSGNIGTDGAI FESVHGTAPDIAGQDKANPTALLSVMMLRY
CE DILSDLCAGLVGGLVTPSGNIGKGAAVFESVHGTAPDIAGQDKANPTALLSVMMLRY
#####

7210 7220 7230 7240 7250 7260
====+====+====+====+====+====+
AA MELTQHADKIQACFETIREAKFLTGDLGGKAKCSEYTNAI CEKIRVLE-GKKDESVLQD
AG MELNQHADKIQACFETIKEAKYLTGDLGGKAKCSEYTNAI CDRI RILE-GKKDADVLKD
AM MGLNKHAKI IETCAYETIKEGKHLTGDLGGS AKCSEY TDEICKVAIVDDLKANSALQN
AP MELNSQADI IQACFETIKEGKYRTGDLGGKAKCSEFTDEICRKVKI VENADETNLLKS
BM MNMRDHADRIEACFHVLRREGKVLTDQDLGGKSTCTDFTEIKNLRIID-SKLDTNALSG
CQ MELNQHAEKIQACFETIKDAKYLTDGDLGGKAKCSEYTNAI CERIVLE-GRKDEDVLKD
DM MELNTYADKIERAAFETIKEGKYLTGDLGGRAKCSFTNEICAKLVMLNSKADAEVVKT
DP MNLPEHAAKIERACYATIKEGKYLTADLGGKAKCSEY TDEICQKI IVADKIEDTNSLSK-
IS MKLSNFADVIEVACFDTLREGKYLTADLGGNASCSDFTSEICSKVKVAGNMLEAQEISKT
NV MGLNNHARI IEHSAYDTIKEAKYLTGDLGGS AKCSEY TNEICKVAIVDDLKQTPNALET
PH MSLNDHADKIERACLNVIKEGKYRTGDLGGS SKCSEFTDEICCKIMLVSNHDEADKVAKD
TC MNLNQYASKIENACFETIKEAKYLTGDLGGKAKCSEFTNEICEKICMVD--DKGCSEFDK
PP MNLNEFADRIEKATFDTIKEGRHLTADLGGKGTCSDYTNEICSKVKVADTSAQARDIAQS
CE MNLNQHAARIEKAVFDAIADGRAKTGDLGGTGTCSFTADV CARVVVNASRKEAEKWMMS
#####

7270 7280 7290 7300 7310 7320
====+====+====+====+====+====+
AA FNVNEYVVKQAQILAGGRGKGFDFNGFK--GGVHITKDRSQV IPLVEKVMGHR LITKQTPK
AG FDNVEYVVKQAQILAGGRGKGFDFNGFK--GGVHITKNRAEVIPLVEKVMGHR LITKQTPK
AM LHANEYV IKAQVLAGGRGKGFDFNGFK--GGVHLTKDRKAVIDVVKMMLGHR LITKQTPSE
AP FVDVYVVKQAQVLAGGRGKGFDFNGFK--GGVHVTKERTKIYDLLKNMLGKYLITKQTPK
BM FKADEYVVKQAQILAGGRGKGFDFNGFK--GGVHLTKNRDKIVDLAKNMI GNKLITKQTPK
CQ FNVNEYVVKQAQILAGGRGKGFDFNGFK--GGVHITKDRSKV IPLVEKVMGAKLITKQTPK
DM FECPYVVKQAQILAGGRGKGFDFNGFK--GGVHITTKSEVLSLTQQMIGNRLITKQTPK
DP LNPGEYVVKQAQILAGGRGLGVFDSGFK--GGVHLTKDPVKA KSLVGEMLNKR LITKQTPK
IS LNVVEFV IKAQILAGGRGKGFDFSSGLR--GGVKLT KDPAQVSELVEKMLGYKLVTKQTPK
NV LHAEYVVKQAQVLAGGRGKGFDFNGFK--GGVKITKDKKAVAEYVKSMLGHR LITKQTPSK
PH LRVVEYVVKQAQILAGGRGVGVFDSGFK--GGVHLTKNPSEVGNLVKMLGNKLITKQTPK
TC FNVKEYV IKAQILAGGRGKGFDFNGFK--GGVHVTEKRNEVDIVKMLGHR LITKQTPK
PP VKYDEFVVKQAQVLAGGRGKGFDFNSGLH--GGVKLTRDPAQVVEFVEKMLGYRLVTKQTPK
CE FGDHEYVVKQAQILAGGRGKGFDFNGFK--GGVHLTKDRSKV IPLVEKVMGHR LITKQTPK
#####

7330 7340 7350 7360 7370 7380
====+====+====+====+====+====+
AA



CQ TIANGIVNATKVI GLRVPLVVRLEGNTNVNAKKILQESGLKIESAQDLDEAAKKAVQAIG  
DM TIANGIVAASKKLQ LNVPLVVRLEGNTNVNQAAREILKNSGLPIQTASDLDDAAHKAVAALG  
DP TIASGIVGACKRI ELKVPLIVRLEGNTVDAKQILKDSGLPIQSASDLDDAAKKAVASIG  
IS TIANGITSACRTINLKVPLVVRLEGNTVDEARLILKNSGLAITPASDLEDAARKAVASLG  
NV TIAKGIVSAARNLGLKI PLVVRLEGNTVNEAKKI I AESGLPILTANDLDEAAKKAVASIG  
PH TIAKGIVAACKKINVKTPIVRLEGNTVNEAKKI LENSGLPI INAKGLQEAAREVVAAG  
TC TIANGIVGAMKAMKLEVP LIVRLEGNTNAEARRI I KDSGMNIQTAE NLDDAAKKAVQONAG  
PP TIANGIVNACKKMSLKVPLVVRLEGNTVVEAAKE I LANSGLPIHSANDLDDAATKAVASLG  
CE TIANGVVSAVANKI GLNVPMVVRLEGNTVDAKQIMKKSGLKILTANNLDEAAAKAVSSLG  
#####

7630 7640 7650 7660 7670 7680  
=====+=====+=====+=====+=====+=====+  
AA VEEEDRKQTIWDDADHCAKEGAFECARAVYNYALSEFPSSKSIWLRRAAYFEKNHGSRESL  
AG IDEEDRKQTIWDDAENCAKEGAYECARAVYGYALSEFPSSKSIWLRRAAYFEKNHGTRESL  
AM VEEEDRKHTWMEDEAETCAQQGALECARAVYAYALSTFPSSKSIWLRRAAYFEKTYGTRESL  
AP IEEDERKHTWMEDEADSCASQLAYECARAI FSHSLAAPPSSKSIWLRRAAYFEKNHGTRESL  
BM IEPEDQKHTWMEDEAEACATEGAFECARAVYGYALSVFPSSKSIWLRRAAYLEKQHGTRASL  
CQ IDEEDRKQTIWDDADNCAKEGAFECARAVYTFALAEFPSSKSIWLRRAAYFEKNHGTRESL  
DM VEEEDRKQTIWDDAEFCAKENAFECARAVYAHALQIFPSSKSIWLRRAAYFEKNHGTRESL  
DP VEEDERKHSWLEADANFTSQGAFECARAVYSHSLETFPAKSIWLRRAAHFERQHGTRDLSL  
IS VEEDERKHAWMEDAEAVAAQGAQECARAIYAHALSVPSSKSIWLRRAAYFEKSSGTRSTL  
NV VEEEDRKHTWMEDEAETCAQQGALECARAVYAYALSAPPSSKSIWLRRAAYFEKTYGTRESL  
PH VEEEDERKHAWLEDAEMCASQGALECARAVYAHALSVPSEKSIWLRRAAYFEKAHGTRDLSL  
TC VEPEDQKHTWIEDAENCVSQGALECARAVYAHALSVPSEKSIWLRRAAHLEKNHGTRESL  
PP IEEDERKHTWLADAEQRANQQAPECARAIYGHALAVFPKSIWLRRAAFFEKNHGTRETL  
CE VEEDERKHTWLADAEENFEKEEAFTCVTRVYATALKEFSRKRSIWDAAIHFEREHGSLEDEH  
#####

7690 7700 7710 7720 7730 7740  
=====+=====+=====+=====+=====+=====+  
AA EALLQKVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSED IWLAAVKLE  
AG ETLLQKVAHCPQSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSED IWLAAVKLE  
AM ESLLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSEE IWLAAVKLE  
AP ETLLQKVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSEE IWLAAVKLE  
BM ETLLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSEE IWLAAVKLE  
CQ EAILQKVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSED IWLAAVKLE  
DM EALLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSED IWLAAVKLE  
DP ESLLQRAVAHCPQAEVLWLMGAKSKWLAGDVPAARS I LSLAFQAN-PNSEE IWLAAVKLE  
IS EALLQRAVAHCPKAEVLWLMGAKSKWLAGDVPAARS I LSLAFQAN-PNSEE IWLAAVKLE  
NV ETLLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LSLAFQAN-PNSED IWLAAVKLE  
PH EALLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARS I LALAFQAN-PNSEE IWLAAVKLE  
TC EGLLQRAVAHCPKSEVLWLMGAKSKWLAGDVPAARGI LALAFQAN-PNSEE IWLAAVKLE  
PP EALLQKVAHCPQAEVLWLMGAKSKWLAGDVPAARS I LSLAFKAN-PNSEE IWLAAVKLE  
CE EAILLKA CETVPEVEDYWLMLAKLRFVNRVGEARDTLMSAFKHHGQSEK IWLAAATKIE  
#####

7750 7760 7770 7780 7790 7800  
=====+=====+=====+=====+=====+=====+  
AA SENSEFERARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALSLEDAVKVFPDFAKLW  
AG SENAEYERARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALSLEDAVKVFPDFAKLW  
AM SENSEYERARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALLLLEKEALEAFDDFPKLV  
AP SENSEFDRARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALSLEDAVKVFPDYAKLW  
BM SENKEYDRARRLLAKARASAPT PRVMIKSAKLEWALNNLDVAIKLLEDAIKVFGDYAKLH  
CQ SENSEYERARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALSLEDAVKVFPDFAKLW  
DM SENSEYERARRLLAKARASAPT PRVMMKSAKLEWALNLEDAALSLEDAVKVFPDFAKLW  
DP SENWEYERARRLLAKARASAPT PRVLMKSAKLEWALNLEDAALSLEDAVKVFPDFPKFY  
IS SENNEFERARRLLAKARASAPT ARVMMKSVRLEWALGDLRMALELLEGLKLYADFPKLV  
NV SENSEYERARRLLAKARASAPT PRVMMKSAKLEWALNNLEDAALSLEDAVKVFPDFPKLV  
PH SENSEYERARRLLANARASAPSPRVLMKSAKLEWALNLEDAALSLEDAVKVFPDFPKLV  
TC SENREYERARRLLAKARASAPT PRVMMKSAKLEWALNLEDAALSLEDAVKVFPDFAKLW  
PP SENNEYDRARRLLAKARASAPT GRVLMKAAKLEWALGDLKALDI LEKGVEDYPNFAKLW  
CE IETDQFD TARGLF GKARAKAPSARVMMKNAHFECWCLGNVEAKRLECECIQKYDDFHKIY  
#####

7810 7820 7830 7840 7850 7860  
=====+=====+=====+=====+=====+=====+  
AA MMKGQIEEQKLLERAVDTYNSGLKCCPN SI PLWLLLSLEEKRLLT KARSVLEGRRLK  
AG MMKGQIEEQKLLERAAESYNAGLKRCPN SI PLWLLLALEEKRLLT KARSVLEGRRLK  
AM LMKGQIEEQQGNLDKALETYNQAIKCCPN SI PLWLLLALEEKRLLT KARSVLEGRRLK  
AP LMKGQIEEQQGNLDRAHETFN SALKCCPN SI PLWLLLALEEKRLLT KARSVLEGRRLK  
BM MMKGQIEEQMAKDEDAHNTYSQGLKCCPT SVPMWILL SRLEEKRLHVT KARSVLEGRRLK  
CQ MMKGQIEEQKLLERAVETYNGLKCCPN SI PLWLLLSLEERQNL LT KARSVLEGRRLK  
DM MMKGQIEEQQRRTDDAAATYTLGLKCCPT SI PLWLLLSLEERQNL LT KARSVLEGRRLK  
DP MMQGGIHLVQQRRMTQARES YNLGTRKCP TSVPLWLLLRLEDESQGNMTRKARSVLEGRRLK  
IS MMKGQILQSQGQTDARATYNGGLKCCPT SVPLWLLLRLEDESQGNMTRKARSVLEGRRLK  
NV LMKGQIEEQKQQALETYNQGIKCCPT SI PLWLLLAHLEMKRNQFT KARSVLEGRRLK

PH LMKGQIEEQNMVDKALETYNLGIKKCPSSVPIWRLLANLEERRGLLTRASVLEKGRLLR  
TC MMMGQIHEQEGELSKAFDVIYGAIKKCPNSIPLWILLRLEEKRGILLIKARSMLEKARLK  
PP MMYGGIWCQSKRSDKAKEVFGRGKACPGSVPLWVLLANLEETGMLIKARSVIEKARLR  
CE LVLGGVLEQMNDVHGARLAYTQGIKCKPGVIPLWILLRLEEKAGQIVKARVDLEKARLR  
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7870 7880 7890 7900 7910 7920  
=====+=====+=====+=====+=====+=====+  
AA NAKNPILWLAIRIEIRRG-FKDMANTLMARALQDCPNAGELWAEAI FLEPRPQRKTKSV  
AG NPKNALLWLAIRIEIRAG-MKDMANTLMARALQDCPTAGELWAEAI FLEARPQRKTKSV  
AM NSKNPELWLEAIRNELKIGGVRDMANTLMAKALQECPTSGLLWAEAI FMEPRPQRKTKSV  
AP NPHNPWLWLEAIRIEFRAG-MRDIANTMMAKALQECPNAGILWSEAI FLEARPQRKTKSV  
BM NPKNAELWLESVRLERRNG-SPEIANAVMAKALQECPSAGRLLWADAI FMESRPQRKTKSV  
CQ NPKNATLWLAIRIEIRAG-LKDMANTLMARALQECPNAGELWAEAI FLEARPQRKTKSV  
DM NPKVAVLWLEAIRVELRAG-LKEIASTMMARALQECPNAGELWAEAI FMETPQRKTKSV  
DP NFQNSQLWLEAIRLEWKTG-LKDIASAMMAKALQDCPTSGLLWSETI FIVDRPQRKTKSV  
IS NPCHPELWLEAVRVEARAG-FKEIALTLMAKAMQDCPGSGLWSEAI FMEPRPQRKTKSV  
NV NPKNPWLWLEAIRNEMKSGGNRDMANTLMAKALQECPNAGELWAEAI FMEARPQRKTKSI  
PH NPKNAELWLEAIRIESRAG-LKDIANNLMAKALQECPNAGILWAEAI FMESRPQRKTKSV  
TC NPKNDQLWLEAIRIEKRAK-MKDIANAMMAKALQECPTSGPLWAEAI FMEARPQRKTKRSV  
PP NPCNDVLWLEAIRIECRAD-KKDIATKMMAKAMQECPSAGRLLWAEAI FMEPRPGRKTKSV  
CE NPKNDLWLESVRFEQVRG-CPEMAKERMSRALQECGSGKLWAEAI WMEGPHGRRAKSI  
#####

7930 7940 7950 7960 7970 7980  
=====+=====+=====+=====+=====+=====+  
AA DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYKFEHQHGT  
AG DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWANFYKFEHQHGT  
AM DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
AP DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYRFEVLHGT  
BM DALKKCEHDAHVLLAVSQLFWTERKLNKCREWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
CQ DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
DM DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
DP DALKKCEHDPHVLLAVSKLFWTERKTQKCREWFNRAVKIDDPDFGDWAYFYKFEHNGTV  
IS DALKRCEHDPVLLAVSKLFWTERKTNKREWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
NV DALKKCEHDPHVLLAVSKLFWSEKIQKCRDWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
PH DALKKCEHDPVLLAVSKLFWCERKLNKCREWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
TC DALKKCEHDPVLLAVSKLFWSEKIQKCREWFNRTIKIDDPDFGDWAYFYKFEHNGTE  
PP DALKKCEHDARVLLAVSKLFWAERKIGKAREWFNRTIKIEQDFGDTWAYFYKFEHNGTE  
CE DALKKCEHDPVLLAVSKLFWSEKIQKAREWFNRAVNLDPDNGDAFANLAFEQIHGKE  
#####

7990 8000 8010 8020 8030 8040  
=====+=====+=====+=====+=====+=====+  
AA QQQKDLLEERCVAAPKHGEWCRVSKDIANWCFKTEDVLLKAVVVKILPTPMGILEKISDIE  
AG QQQQLLEERCVAAPKHGEWCKVSKNIANWCFKTEDVLLKAVVRLPTPMGILEKISDIE  
AM EQQEDVKKRCIAAEPHHGENWCKVSKNIANWCLSTDQILLVAKDLPTPMGILEKISEIE  
AP EVQVDIKKRCIAAEPHHGEAWCIVSKNIDNWRLLTENVLMLVAKDLPTPMGILEKISEIE  
BM QQQEDVKSRCRAAEPHHGEWCKVSKDIANWCFSTDQILLLVAKNLPVPMGILEKISEIE  
CQ QQQKDLLEERCVAAPKHGEWCRVSKDIANWCLKTEDVLLRAVVKLPPTPMGILEKISDIE  
DM AQQQEVLDRCISAEPTHGESWCRVSKNIQNWQFKTEVLLRAVVRLESPMGILEKIAEIE  
DP EEQNDVKKRCVQAEPRHGEVWTSISKGPQNRWARTEDILLVAEALPVPMGILEKISEIE  
IS EQQEDVKKRCIAAEPHHGPNWCKVSKDIANWCKTEDILLVLAASLPPEMVGILEKISEIE  
NV EQQEDVKKRCVSAEPHHGENWCKVSKNIANWCLSIDQILLVAKNLPPTPMGILEKISEIE  
PH ETQSDVKKRCVAAEPHHGEWCVSKNIRNWKYSTEVILLSLVAQLPVPMGILEKISEIE  
TC EQQEDVQRCLAAPHHGELWCSISKDKNVLGSLNEQLLTLVAKEVVPMPGILEKISEIE  
PP EQQEDVKKRCVAAEPHHGEWCKVAKDIENWRKTPPEILLCAKSLQPEMVGILEKIAEIE  
CE EDRKSVFKKCVTSEPRYGLWQSVSKDPINWRRTTEILLQATQKIKVPMGILEKIAEIE  
#####

8050 8060 8070 8080 8090 8100  
=====+=====+=====+=====+=====+=====+  
AA KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKG-EKGEFVLLKSGDARIALIGFP  
AG KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKG-EKGDGFVLLKSGDARIALIGFP  
AM KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKQ-EKGEFVLLKSGDARVALIGFP  
AP KEISRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKG-EKGEFVLLKSGDARVALIGFP  
BM KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKGDKGEGFVLLKSGDARVALIGFP  
CQ KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKG-EKGEFVLLKSGDARIALIGFP  
DM REIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKG-EKGDGFVLLKSGDARVALIGFP  
DP KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKAGEKGEFVLLKSGDARVALIGFP  
IS KEISRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKAGEKGEFVLLKSGDARVALIGFP  
NV KEIARTQKNKATEYHLGLLAKLAKYRSQLEPPSKKQ-EKGEFVLLKSGDARVALIGFP  
PH KEITRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKQ-EKGEFVLLKSGDARVALIGFP  
TC KEISRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKQ-EKGEFVLLKSGDARVALIGFP  
PP REISRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKAGEKGEFVLLKSGDARVALIGFP  
CE HEISRTQKNKATEYHLGLLAKLAKYRSQLEPPSKKAGEKGEFVLLKSGDARVAMVGF  
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8110 8120 8130 8140 8150 8160  
=====  
AA SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
AG SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
AM SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
AP SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
BM SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
CQ SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
DM SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
DP SVGKSTLLSTLTKTQSEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGASQKGKGRGK  
IS SVGKSTLLNLTDTHTHSEAAAYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGASQGMITCR  
NV SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGAAQKGKGRGR  
PH SVGKSTLLSILTATESEAANYEFTTLTLCIPGVIEYKGANIQLLDLPGIIEGASQKGKGRGR  
TC SVGKSTLLSTLTKTESEAANYEFTTLTLCIPGVIDYNGANIQLLDLPGIIEGAAQKGKGRGR  
PP SVGKSTLLTTITETKSECASYEFTTLTLCIPGVIRYNDAEIQLLDLPGIIEGASQKGKGRGR  
CE SVGKSTLLSSMTSTHSEAAAGYEFTTLTLCIPGVISYNGANIQLLDLPGIIEGASQKGKGRGR  
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8170 8180 8190 8200 8210 8220  
=====  
AA QVIAVARTADLVLMMLDATKPNVHRELLEYELESVGLRLNKRKPNYFKIKKGGGVSFNA  
AG QVIAVARTADLVLMMLDATKPNVHRDLLEYELESVGLRLNKRKPNYFKIKKGGGVSFNA  
AM QVIAVARTADLVLMMLDATKQDVQRQLLEKELESVGIIRLNKPKPNYFKIKKGGGLAFNS  
AP QVIAVARTADLVLMMLDATKQDIQRQLLEKELESVGIIRLNKRKPNYFKVKKGGGLAFNA  
BM QVIAVARTADLVLMMLDATKPVYHRQLLEKELESVGIIRLNKPKPNYFKVKKGGGLSFS  
CQ QVIAVARTADLVLMMLDATKPNVHRELLEYELESVGLRLNKRKPNYFKIKKGGGVSFNS  
DM QVIAVARTADLVLMMLDATKPNVHRELLERELESVGIIRLNKRKPNYFKQKGGGLSFSNA  
DP QVIAVARTADLVLMMLDATKGVQVTKLLQKELESVGIIRLNTKPKPNYFKHKGGGIAFNA  
IS QVIAVARTADLVMMMLDATKGEVHRKLEQLEAVGIRLNKLPNNYFKAT--GGLSFS  
NV QVIAVARTADLVLMMLDATKQDVQRQLLEKELESVGIIRLNKRKPNYFKIKKGGGLSFS  
PH QVIAVARTADLVLMMLDATKQDVQRVLEKELESVGIIRLNKPKPNYFKIKKGGGLSFSNA  
TC QVIAVARTADLVLMMLDATKQDVHRHLEKELESV-----KGGGVSFS  
PP QVIAVARTADLVIMMLDATKAEVHRQLLEAELESVGIIRLNKPKPNYFKKGGGLSINA  
CE QVIVAKTADLVLMMLDAGKSDQKMLLERELEAVGIRLNKPKPNYVQKQKGGVVKFTN  
#####

8230 8240 8250 8260 8270 8280  
=====  
AA TCTLTRCNEKMQVTILHSFKIFNAEVLFRDCTEDEFIDVVTGNRIYLPCLYVYNKIDQI  
AG TCPLTRCNEKMQVTILHSFKIFNAEVLFRDCTEDEFIDVVTGNRIYLPCLYVYNKIDQI  
AM TCPLTKVDEKLVQMI LHEYKIFNAEVLFRDCTEDEFIDVINANRVYLPCLYVHNKIDQI  
AP TCPLSRVDEKLVQVILHEYKIFNAEVLFRDCTPDELIDVISDNRVYLPCLYVYNKIDQI  
BM TCQLTKI DEKMQVTILHEYKIFNAEVLFRDCTPDELIDVILANRVYLPCLYVYNKIDQI  
CQ TCPMTRCNEKMQVTILHSFKIFNAEVLFRDCTEDEFIDVVTGNRIYLPCLYVYNKIDQI  
DM TCSLTRCNEKMQVTILHSFKIFNAEVLFRDCTEDEFIDVVTANRVYLPCLYVYNKIDQI  
DP VCPLTKVDEKLVQVILHEYKIFNAEVLFRDCTEDEFIDVISDNRIYLPCLYVYNKIDQI  
IS TCNLTKVCDEKLVQVILHEYKIFNAEVLFRDCTEDEFIDVILANRVYLPCLYVYNKIDQV  
NV TCILTKVDEKLVQVILHEYKIFNAEVLFRDCTEDEFIDVINANRVYLPCLYVYNKIDQI  
PH TCPLTKVDEKLVQVILHEYKIFNAEVLFRDCTEDEFIDVILANRVYLPCLYVYNKIDQV  
TC TCPLTKI DEKLVQVILHEYKIFNAEVLFRDCTEDEFIDVINANRVYLPCLYVYNKIDQI  
PP TCTLTKCDEKMQVTILHEYKIFNAEVLFRDCTEDEFIDVITGNRVYLPCLYVYNKIDQV  
CE TVPLTHCNEKMLIMTVLHEYKIFNADVIFREDCTVDEFIDVITGNRVYLPCLYVYNKIDQI  
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8290 8300 8310 8320 8330 8340  
=====  
AA SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
AG SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
AM SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
AP SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
BM SIQEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
CQ SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
DM SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
DP SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
IS SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
NV SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
PH SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
TC SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
PP SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
CE SIEEVDRLARQDPSVVVSCNMHLNLDYLLEVLWEHLMLIRVYTKKPGAPPDF--DDGLIL  
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8350 8360 8370 8380 8390 8400  
=====  
AA RRGVSVVEH--VCHAIHRTLADQFKYALVWGTSTKYSQQRVGI SHIMQDEVDV IQVVKGMT

AG RRGVSVVEH--VCHAIHRTLAAQFKYALVWGTSTKYSPQRVGI SHIMSDDEDVIQVVKKGMT  
AM RRGVTVVEH--VCHAIHRTLAAQFKYALVWGTSTKYSPQRVGLQHIMHDEDVIQVVKKGAV  
AP RRGVSVVEH--VCHSIHRTLAEQFKYALVWGTSTKYSPQRVGLQHIMHDEDVIQVVKKGMT  
BM RRGVTVVEH--VCHSIHRTLAAQLKYALVWGTSTKYSPQRVGINHTVNDDEDVQLIKKGM  
CQ RRGVSVVEH--VCHAIHRTLADQFKYALVWGTSTKYSPQRVGI SHIMQDEDVIQVVKKGMT  
DM RRGVSVVEH--VCHAIHRTLAAQFKYALVWGTSTKYSPQRVGI AHVMADEDVIQVVKKGAV  
DP RRGVSVVEH--VCHSIHRTLAAQVLYALVWGTSAKFNPQRVGSHHIVHDEDVIQVVKKGLV  
IS SRQRVWHPCSCHAIHRSIVHVFKYALVWGTSTKYSPQRVGLSHVVHHDVQIVVK---  
NV RRGVSVVEH--VCHAIHRTLAAQFKYALVWGTSTKYSPQRVGI QHIMHDEDVIQVVKKGM  
PH RRGVTVVEH--VCHGIHRTLAAAFKYALVWGTSTKYSPQRVGLHHIMHDEDIKIYRQDGMV  
TC RRGVTVVEH--VCHAIHRTLAAQFKYALVWGTSTKYSPQRVGTSHVMHDEDVIQVVKKGMA  
PP RRNASIEH--VCHSVHRNFVNEFKYALVWGTSTKYSPQRVGLSHVVHNEDEVQLVKKGRV  
CE RRGATIEH--CCHALHRSIAAQLRYAIVWGTSTKFSQRVGLHHKLDHEDVIQVVKKQGI  
#####

8410 8420 8430 8440 8450 8460  
====+====+====+====+====+====+====+  
AA GGFLPGVKQIANVAALPGIVGRSVGLPDIHSGYGF AIGNMAAFDMSNPVSI VSPGGVGF  
AG GGFLPGVKQIANVAALPGIVGRSVGLPDIHSGYGF AIGNMAAFDMSDPTSI VSPGGVGF  
AM GGFLPGMKQIANVAALPGIVWRSVGLPDVHSGYGF AIGNMAAFDMNDPKSI VSPGGVGF  
AP GGFLPGVKQIANVAALPGIVHKSIGLDPDVHSGYGF AIGNMAAFDMDDPQSI VSPGGVGF  
BM GGFLPGVKQIANVAALPGIVGRSVGLPDVHSGYGF AIGNMAAFDMDDPKSI VSPGGVGF  
CQ GGFLPGVKQIANVAALPGIVGRSVGLPDIHSGYGF AIGNMAAFDMSDPTSI VSPGGVGF  
DM GGFLPGVKQIANVAALPGIVGRS IGLPDIHSGYGF AIGNMAAFDMDPLSVS VSPGGVGF  
DP GGFLPGMKQIANVAALPGIVGRS IGLPDVHSGYGF AIGNVAAFDMDDPNSI VSPGGVGF  
IS -----  
NV GGFLPGVKQIANVAALPGIVGRSVGLPDVHSGYGF AIGNMAAFDMNDPKSI I SPGGVGF  
PH GGFLPGVKQIANVAALPGIVGKSVGLPDVHSGYGF AIGNMAAFDMSDPKSVS VSPGGVGF  
TC GGFLPGVKQIANVAALPGIVGKSVGLPDVHSGYGF AIGNMAAFDMDPNPESI VSPGGVGF  
PP GGFLPGVKQIANVAALPGIVGHS IGLPDIHSGYGF AIGNMAAFDMDPLAVS VSPGGVGF  
CE GGFLPAVRQIANVASLPGIVGHS IGLPDIHSGYGF SIGNIAAFDVGNPESVI SPGGVGF

8470 8480 8490 8500 8510 8520  
====+====+====+====+====+====+====+  
AA INCGVRLRLRNTLFEKDVQFVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
AG INCGVRLRLRNTLFEKDVQFVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
AM INCGVRLRLRNTLFEEDVQFVKEQLAQSMFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
AP INCGVRLRLRNTLFEKDVQPIKEQLAQSMFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
BM INCGVRLRLRNTLHEKDVLP I KEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
CQ INCGVRLRLRNTLFEKDVQFVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
DM INCGVRLRLRNTLFEKDVQFVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
DP INCGVRLRLRNTLFEKDVQFVKEQLTQSMFDH IPVGVGSKGVI PITAQDLEEALMGMDS  
IS -----  
NV INCGVRLRLRNTLFEKDVQFVKEQLAQSMFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
PH INCGVRLRLRNTLMEKDI LPVKEQLTQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
TC INCGVRLRLRNTLFEKDVLPVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
PP INCGVRLRLRNTLFEKDVQFVKEQLAQSLFDH IPVGVGSKGI IPMNAHDLEEALMGMDS  
CE INCGVRLRLRNTLFEENVKPLKEQLTQSLFDH IPVGVGSRGAI PMLASDLVECLEMGMDS

8530 8540 8550 8560 8570 8580  
====+====+====+====+====+====+====+  
AA LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVVEE IYD  
AG LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVVEE IYD  
AM LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
AP LREGYAWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDEVYD  
BM LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
CQ LREGYVWAEDKEHCEEYGRMLTADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVVEE IYD  
DM LREGYVWAEDKEHCEEYGRMLNADPAKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
DP LREGYAWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
IS -----  
NV LREGYVWAEDKEHCEEYGRMLQADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVVEE IYN  
PH LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
TC LREGYVWAEDKEHCEEYGRMLNADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD  
PP LREGYAWAEDKEHCEEYGRMLNADPSKVS AKAKRGLPQLGTLGAGNHYAE IQIVDE IYD  
CE LREGYSWAEDKEHCEEYGRMLQADPSKVS MRACKRGLPQLGTLGAGNHYAE IQVVDE IYD

8590 8600 8610 8620 8630 8640  
====+====+====+====+====+====+====+  
AA KFAASKMGI EELGQICVMIHSGSRGF GHQVATDALVEMEKAMKRDKI ETNDRQLACARIN  
AG KFAASKMGI EELGQICVMIHSGSRGF GHQVATDALVEMEKAMKRDKI ETNDRQLACARIN  
AM KWAACKMGI EEKQICVMIHSGSRGF GHQVATDALVQMEKAMKRDKI ETNDRQLACARIK  
AP KWAACKMGI ENVGQVCVMIHSGSRGF GHQVATDALLEMEKAMARDKI ETNDRQLACARIN  
BM KYAAGKMGIESIGQVCVMIHSGSRGF GHQVATDALVQMEKAMKRDKI ETNDRQLACARIK  
CQ KYAASKMGI EELGQICVMIHSGSRGF GHQVATDALVEMEKAMKRDKI ETNDRQLACARIN

DM KWSASKMGI EEKGQV VVMIHSGSRGF GHQVATDALVQMEKAMKRDKI ETNDRQLACARIN  
DP KWAANKMGI EEKGQVCIMI HSGSRGF GHQVATDALNSMDKAMKRDKI VTNDRQLACARIS  
IS -----  
NV KSAASKMGI EEKGQVCVMIHSGSRGF GHQVATDALVQMEKAMKRDNIEVNDRQLACAHIN  
PH KWAASKMGI EEKGQVCVMIHSGSRGF GHQVATDALVQMEKAMKRDNIEVNDRQLACARIN  
TC KWAASKMGI EEKGQVCVMIHSGSRGF GHQVATDALVQMEKAMKRDKI ETNDRQLACARIS  
PP KQSASKMGI EHTGQVCVMIHSGSRGF GHQVATDTLLEMERAMKRDKI EVNDRRLACARIH  
CE KHAASTMGI DEEGQVVVMLHCGSRGLGHQVATDSLIVEMEKAMARDGI VVNDKQLACARIN

8650 8660 8670 8680 8690 8700  
=====+=====+=====+=====+=====+=====+  
AA SVEGGQNYLKMAAAANFAWVNRS SMTFLTRQAF AKQFNTTPDDLDMHVIYDVSHNVAKME  
AG SPEGQNYLKMAAAANFAWVNRS SMTFLTRQAF AKQFNTTPDDLDMHVIYDVSHNVAKME  
AM SQEGGDY LKMAAAANFAWVNRS SMTFLSRQAF AKQFRLSPDDLDMHVIYDVSHNIAKIE  
AP SNEGGQNYLKMAAAANFAWVNRS SMTFLARQAF AKQFKLTPDDLDMHVIYDVSHNIAKME  
BM SVEGGQDY LKMAAAANFAWVNRS SMTFLTRQAF AKQFKMAPDDLDMHVIYDVSHNIAKVE  
CQ SVEGGQNYLKMAAAANFAWVNRS SMTFLTRQAF AKQFNTTPDDLDMHVIYDVSHNVAKIE  
DM SVEGGQDY LKMAAAANFAWVNRS SMTFLTRQAF AKMFNTTPDDLDMHVIYDVSHNIAKVE  
DP STEGGQDY LKMAAAANFAWVNRS SMTFLCRQAF AKQFNSTPDDLDMHVIYDVSHNIAKVE  
IS -----MHVIYDVSHNIAKVE  
NV SQEGGDY LKMAAAANFAWVNRS SMTFLSRQAF AKQFNMS PDDLDMHVIYDVSHNVAKVE  
PH SPEGQDY LKMAAAANFAWVNRS SMTFLCRQAF AKQFNSCPDDLDMHVIYDVSHNIAKIE  
TC SQEGGDY LKMAAAANFAWVNRS SMTFLSRQAF AKQFNMAPDDLDMHVIYDVSHNIAKIE  
PP SQEGGDY LKMAAAANFAWVNRS SMTFLTRQAF GKMFNSTPDDLDM--VIYDVSHNIAKVE  
CE SVEGKNY FSGMAAAANFAWVNRS CI TFCVRNAF QKTFGMSADMDMQVIYDVSHNVAKME  
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8710 8720 8730 8740 8750 8760  
=====+=====+=====+=====+=====+=====+  
AA EHMVDGRPKQLLVHRKGSTRALPPHHPLI PV DYL TGTGQFVLIGGSMGTCSFVLTGTEKGM  
AG EHMVNGRPKQLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLVGGSMGTCSFVLTGTEKGM  
AM EHMVDGKQKTLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTDQAM  
AP QHYIDGKPKHLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
BM EHVVDGKLTLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTHQGM  
CQ EHIVDGRPKQLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLVGGSMGTCSFVLTGTEKGM  
DM NHMVDGKERKLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLVGGTMGTCSYVLTGTEQGM  
DP QHTVDGKLTLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
IS QHVVDGKMRLLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
NV EHMVDGKQKTLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
PH EHIVDGKQKTLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
TC EHIVDGKQKTLVHRKGSTRAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEQGM  
PP EHLVDGKLTLLVHRKGSTWAFP PPHHPLI PV DYL TGTGQFVLIGGTMGTCSYVLTGTEEGM  
CE EHMVDGRPRQLCVHRKGATRAFP PPHHPLI PV DYL TGTGQFVLIGGSMGTCSYVLTGTEQGL  
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8770 8780 8790 8800 8810 8820  
=====+=====+=====+=====+=====+=====+  
AA AATFGSTCHGAGRSLSRAKSRRLDYKDVLRDLEAKGIAIRVASPKLVQEEAPDSYKDV  
AG VETFGSTCHGAGRSLSRAKSRRLDYKDVLRDLEAKGISIRVASPKLVQEEAPDSYKDV  
AM KETFGSTCHGAGRALSRKSRRLDYTVLEKLERQGISIRVASPKLVMEEAPESYKNV  
AP NETFGSTCHGAGRALSRKSRRLDYNDVLEKLERQGISIRVASPKLVMEEAPESYKNV  
BM TETFGSTCHGAGRALSRKSRRLDYKVLNKLLETMGISIRVASPKLVMEEAPESYKNV  
CQ AETFGSTCHGAGRSLSRAKSRRLDYKDVLRDLEAKGISIRVASPKLVQEEAPDSYKDV  
DM QETFGSTCHGAGRALSRKSRRLDYKDVLDKLDLQGLGIAIRVASPKLVMEEAPESYKDV  
DP VETFGSTCHGAGRALSRKSRRLDYEVLERLKEQGISIRVASPKLVMEEAPESYKNV  
IS NETFGTCHGAGRALSRKSRRLDYQVLDKMNEMGISIRVASPKLVMEEAPESYKNV  
NV NETFGSTCHGAGRALSRKSRRLDYQVNLKLEDMGISIRVASPKLVMEEAPESYKNV  
PH LETFGSTCHGAGRALSRKSRRLDYQVNLKLSDMGISIRVASPKLVMEEAPESYKNV  
TC LETFGSTCHGAGRALSRKSRRLDYTVLNLKLEEMGISIRVASPKLVMEEAPESYKNV  
PP KNTFGSTCHGAGRALSRKSRRLDYAEVLEKLAEKNISIRVASPKLVMEEAPESYKNV  
CE VETFGTCHGAGRALSRKSRRTITWDSVIDDLKKEISIRIASPKLVMEEAPESYKNV  
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8830 8840 8850 8860 8870 8880  
=====+=====+=====+=====+=====+=====+  
AA DVVQTC HDVGISAKAIKLRPIAVIKGNFLRFGQSADIDVFDGAENRQHADIKTEDGKK  
AG DVVQTC HDVGISAKAIKLRPIAVIKGNFLRFGQSADIDVFDGAENRQQAIEIKTEDGKK  
AM DVVNTCHAAGISRKCIKLRPIAVIKGMSFFGFGQSADIEITLDDAETRKTADIKSEDKKK  
AP DVVDTCHEAGISKKTVKLRPIAVIKGMTFFGLGQTAELEIVLDRPDGKKKLD--ESSKK  
BM DVVDTCHAAGISRKKTVKLRPIAVIKGMSFFGFGQTADIEIVFDADKRVAEVKTDDGKK  
CQ DVVQTC HDVGISKCIKLRPIAVIKG----MVFSADIDVFDGAEHRQYADIKTEDGKK  
DM DVVDTCHAAGISRKCIKMRPIAVIKGNFLRFGQSADIEIVFDGAEH--KTAEVKGEDGKV  
DP DVVDTCHAAGISRKKTVKLRPIAVIKGMSFFGFGQSAEIDILLDGAATRRTAEVKTEDGKK  
IS DVVQTCHEAGISRKCIKLRPIAVIKGMAFFGLGQSADIDILLSGTENRKMMAEMKTEDGKK  
NV DVVNTCHDAGISRKCIKLRPIAVIKGMSFFGFGQSADIEITLDDAETRKTADIKSEDKKK  
PH DVVNTCHDAGISRKCIKLRPIAVIKGNFLRFGQSADIEILLDGVENRKTAEIKSEDKKK



9130 9140 9150 9160 9170 9180  
====+====+====+====+====+====+====+  
AA SLTRINVYACLVCGKYFQGRGTNTHAYTHSVAESHVFLNLSTLKFYCLPDNYEIDSSSL  
AG SLTRINVYACLVCGKYFQGRGTNTHAYTHSVAESHVFLNLSTLKFYCLPDNYEIDSSSL  
AM SLSRINVYACLVCGKYFQGRGTNTHAYTHSVAESHVFLNLHTLKFYCLPDNYEIDSSSL  
AP SLSRINVYACLVCGKYFQGRGTNTHAYTHSVAESHVFLNLQTLKFYCLPDNYEIVDSSSL  
BM SLTRINVYACLVCGKYFQGRGTNTHAYTHSVADGHHVFLNLNTLKFYCLPDNYEIVDSSSL  
CQ SLTRINVYACLVCGKYFQGRGTNTHAYTHSVAEAHHVFLNLQTLKFYCLPDNYEIDSSSL  
DM SLTRINVYACLVCGKYFQGRGTNTHAYTHSVAEAHHVFLNLHTLKFYCLPDNYEIDSSSL  
DP SLTRINVYACLVCGKYFQGRGPSTHAYLHSVGEHHVFLNLHTLKFYCLPDNYEIDSSSL  
IS SLSKINVYACLVCGKYFQGRGTNTHAYTHSVQVSHHVFLNLQTLKFYCLPDNYEIVDSSSL  
NV SLSRINVYACLVCGKYFQGRGNTHAYTHSVAEYHHVFLNLHTLKFYCLPDNYEIDSSSL  
PH SLSRINVYACLVCGKYFQGRGTNTHAYTHSVSDGHHVFLNLHTLKFYCLPDNYEIDSSSL  
TC SLTRINVYACLVCGKYFQGRGTNTHAYTHSVAEGHHVFLNLHTLKFYCLPDNYEIDSSSL  
PP SLSRINVYACLVCGKYFQGRGPSTHAYTHSVHVGHHVFLNLHTLKFYCLPDNYEIVDSSSL  
CE SLSHQNVYACMVCCKYFQGRGTNTHAYTHALETDHHVFLNLQTLKFYCLPDNYEIVDPSL  
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9190 9200 9210 9220 9230 9240  
====+====+====+====+====+====+====+  
AA DDIKYVLPVFTGRDIRNLDKEDQKMSRTVDGTYSPGIVGMNNIKANDYCNVILQS---  
AG DDIKYVLPVFTVRDIRSLDREDVKQSRVTDGTFYHPGVVGLNNIKANDYCNVILQA---  
AM DDIKYVLPVFTFKAQIGQLDKSD-KLSRAIDGSLYSPGIVGMNNIKANDYCNVILQA---  
AP DDIKYVLPVFTFKHVGQLDTC-DKRSRAIDGTLYLPGIVGLNNIKANDYCNVILQA---  
BM NDIKYVLPVFTPEQIKLIDTNT-KMSRAIDGTMYPGIVGLNNIKANDYCNVILQC---  
CQ DDIKYVLPVFSQRDIRNLDKEDQKMSRTVDGTYIYAPGIVGMNNIKANDYCNVILQS---  
DM DDIKYVLPVFTFRQEKISLDQLQPKHSRTVDGTYLPGIVGLNNIKANDYCNVILHA---  
DP DDIKYVLPVFTFKKANIAVLVDID-KVSRSCDGTLYRPGVFGNLIKANDYCNVILQA---  
IS DDITVYLRPTFTKGDIIIRLDLSD-RLSRAYDGTLYLPGIVGLNNIKANDYCNVILQASAA  
NV DDIKYVLPVFTFKHQIAQLDRND-KLSRAIDGSMYSPGIVGMNNIKANDYCNVILQA---  
PH DDIKYVLPVFTSEHINSLDKTD-KLSRAIDGTLYLPGIVGLNNIKANDYCNVILQA---  
TC DDIKYVLPVFTFEQHISTLDVST-KMSRAIDGLYMPGIVGLNNIKANDYCNVILQA---  
PP DDILFVLPVFTFRFSKQDIKALDENE-KLSIALDGTLYLPGIVGLNNIKANDYCNVILQA---  
CE EDIKYVLPVFTYTKEMIASIDKQS-KMVRAYDDSTYFPGVVGGLNNIKANDYCNVILQA---  
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9250 9260 9270 9280 9290 9300  
====+====+====+====+====+====+====+  
AA ---LSHVKPIRDFFLIEKNYANIKRPPGDFTAFTLVQRFGELLRKLWNPRNFKPHVSPHE  
AG ---LSHVKPIRDFFLMEKNYANIKRPPGDFTAFTLVQRFGELLRKLWNPRNFKAHVSPHE  
AM ---LSHVTPLRDFFLRESNYSHVKRPDSSYLLVQRFGELMRKLWNPRNFKAHVSPHE  
AP ---LSNVTPLRDYFLDERNYAKVVRPPGDSSVLLVQRFGELMRKLWNPRNFKAHVSPHE  
BM ---LSQVRPLRNYFLREENYASVVRPPGDSSVLLVQRFGELLRKLWNPRNFKAHVSPHE  
CQ ---LSHVKPIRDFFLIEKNYANTKRPPGDFTAFTLVQRFGELLRKLWNPRNFKAHVSPHE  
DM ---LSHVGPLRDYFLQKQSYAHVVRPPGDSSVFTLVQRFGELMRKMWNPRNFKSHVSPHE  
DP ---LSHVVPLRDYFLREENYIGIKRPPGDNNVILVQRFGELIRKLWNPRNFKAHVSPHE  
IS GLAALSHVPLRNYFLREENYAAKRPDSSYLLVQRFGELIRKLWNPRNFKAHVSPHE  
NV ---LSHVTPLRDYFLRESNYSKVKRPPGDSSYQLVQRFGELMRKLWNPRNFKAHVSPHE  
PH ---LSHVSPLRNYFLREVNYSKVKRPPGDSSVLLVQRFGELLRKLWNPRNFKAHVSPHE  
TC ---LSRVVPLRNYFLREENYSKIKRPPGDSSYLLVQRYGELMRKLWNPRNFKAHVSPHE  
PP ---LSVVIPLRDFMIRDENYKNTKRPPGDNNFLVQRFGELVLRKLWNPRNFKAHVSPHE  
CE ---LSAVRPLRNWFLKESNYTSIKRPPGDKLTLVQRFGELIRKLWNPRNFKAHVSPHE  
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9310 9320 9330 9340 9350 9360  
====+====+====+====+====+====+====+  
AA MLQAVVLWSKKRFQITEQGDPIEFLSWFLHLHKLQLRGNKQPNSSVYVRTFLGEMKIYTR  
AG MLQAVVLWSKKRFQITKQGDPIEFLSWFLHSLHKLQLRGNKQPDSSVINRSFLGEMKIYTR  
AM MLQAVVLWSKKRFQITEQGDPIEFLSWFLNALHLALNGTKKRDSIVYKTFLGHMRIYTR  
AP MLQAVVLWSKKRFQITEQGDPIEFLSWFLNSLHRLALNGKSRHSSIVYKTFMGSMRVKTTR  
BM MLQAVVLWSKKRYQFIKQSDPIEFLSWFLNSLHMLALNGTKKPNSSIIYKSF LGHMRIYTR  
CQ MLQAVVLWSKKRFQITEQGDPIEFLSWFLHSLHKLQLRGNKQPNSSVNVNRTFLGEMKIYTR  
DM MLQAVVLWSKKRFQITEQGDPIEFLSWFLNTLHRLALNGKHPNSSIYKIFLGEMKIYTR  
DP MLQAVVLCSKKRFQITSQGDPIEFLSWFLNALHLALNGTKKPTSSIIYKSF LGAMKHSQ  
IS MLQAVVLCSKKRFQITEQGDPIEFLSWFLNSLHRLALNGTKRSSSIVYKTFRGMNIYSR  
NV MLQAVVLWSKKRFQITEQGDPIEFLSWFLNALHLALNGTKKDDSSIIYKTF LGHMRIYTR  
PH MLQAVVLWSKKRFQITEQGDPIEFLSWFLNSLHIALNGTKKPDSSIIYKSF LGSMRIYTR  
TC MLQAVVLWSKKRFQITAQGDPIEFLSWFLNALHRLALNGKKNSSIIYQSFLGNMKIYTR  
PP MLQAVVLCSKKRFQITAQGDPIEFLSWFLNSLHIALNGTKDSSSIIYKTFRGRMRVYSK  
CE MLQAVVCSNKKRFQIKQNDAAFMFLFLLTTLHSLALNGTDKK-PSIISKTFRGRMRQYSR  
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9370 9380 9390 9400 9410 9420  
====+====+====+====+====+====+====+  
AA KLPPTLDDVQKQLLLATDEYQEKVETSTFLYLTCDLPATPLFIDEFRENIIPQVNLVQL  
AG KLPPTLDDVQKQLLLATDEYQEKVETSTFLYLTCDLPATPLFIDELRENIIPQVNLVQL

AM KIPPLELEESQRSELLHTVEYGETVTESPFFLYLTCDLPPPLFKDQFTENI IPQVNLTYL  
AP KIPPELDEKQRYSLCTDEYAHEVSESPFFLYLTCDLPPPLFKDEV MENI IPQVSLYSL  
BM KLPPDADDAAK-VLDSSEYENEMITESPFFLYLTCDLPPPLFTDEFRENI IPQVNLTYL  
CQ KLPPPELDDVQKQLLLATDEYQEKSETSTFFLYLTCDLPATPLFIDEFRENI IPQVNLTYL  
DM KMPPVELDDAQAQLLATEEYKQVDEKDNFI YLTCDLPPPLFTDEFRENI IPQVNLTYL  
DP RIPPDAITDEKDALMLTAEYVETVDSFFFLAADLPPPLFKDEFRENI IPQVSLFAL  
IS KVVVVEHTEAERRAALRTAEYQEKVENTGFMYLTLADLPAQLPKDELRENI IPQVPLFTI  
NV KIPPLELEESQRSELLNTVEYGETVTESPFFLYLTCDLPPPLFKDQHAENI IPQVNLTYL  
PH KIPPELEEDKQKVALLLTDEYQEKITESPFFLYLTCDLPPPLFKDEFRENI IPQVNLTYL  
TC KIPPELEDDRQKRMLLSTPEYQEIITESPFFLYLTCDLPPPLFIDEFRENI IPQVNLTYL  
PP KLFPA--DEHQPKIYDPSEYEKVEKLPFMYLTVLPSQPLFKDDQENI IPQVPLNVI  
CE RVI PAEDTDEEKYMKLRMPFEYQEKVIESPFFLYLTLDLPSAPLYRDVQLQNI IPQVPLSTL  
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9430 9440 9450 9460 9470 9480  
=====  
AA LAKFNSVSEKEYKTYKEN-FLKRFEITRLPKFI ILYIKRFTKNTFFLEKNPTIVNFPVK  
AG LAKFNSI SEKEYKTYKDN-FLKRFEITRLPKVILYIKRFTKNTFFLEKNPTIVNFPVK  
AM LNKFNAI TEKEYKTYKEN-FMKRFEITELPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
AP LTKFNNESEKEYKTYKEN-FMKRFEITQLPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
BM LSKFNGQTSKEYKTYKEN-FLKRFEITQLPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
CQ LSKFNNAVSEKEYKTYKEN-FLKRFEITRLPKFVILYIKRFTKNTFFLEKNPTIVNFPVK  
DM LSKFNGTAEKEYKTYKAN-FMKRFEITRLPQFI ILYIKRFTKNTFFLEKNPTIVNFPVK  
DP LSQFNGVQOKEYKTYKEN-FLKRFEITLKLPRYI ILNIKRFTKNTFFIEKNPTI INFP  
IS LSKFNGTSEKEYRTYKDS-TLKRQQLTSLPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
NV LNKFNNAVSEKEYKTYKEN-FMKRFEITRELPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
PH LTKFNGTQEKYKTYKDN-FLKRFEITVLPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
TC LTKFNGTQEKYKTYKEN-FLKRFELITRLPPYLILYIKRFTKNTFFVEKNPTIVNFPVK  
PP MSKFNGIQEKYKTYKDN-TLKKFELIKLPNYLILYMKRFTKNTFFTEKNPTI INFP  
CE LEKFDGKTEKEYPTYNNDNIMKRFEILLQLPDLIIITYKRFRQKNQFVEKNPTIVNFP  
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9490 9500 9510 9520 9530 9540  
=====  
AA IDFGDILTEENK-QQHQT KYNLVANI VHDGEP--NAGTYRCHILQKSTNQWYEMQDLHV  
AG VDFGDILT EDNK-KTHRYTKYNLVANI VHDGEP--NSGTYRCHILQKSTNQWYEMQDLHV  
AM VDFGDILT SEVKQKHP-YTTYDLVANI VHDGEP--GQGT YRVHILHRATGQWYELQDLHV  
AP VDFGDILT PEVKAAHK-NTSYDLIANI VHDGEP--NKGT YRVHVLKQGNKSWYEMQDLHV  
BM VDFGDILT AEIKAKHNGKTIYELVGNIVHDGTP--EKGT YRAHVHLHKPTQQWYEMQDLHV  
CQ IDFGDILTEENK-RAHRFTKYNLVANI VHDGEP--KSGTYRCHVLQKSTNQWYEMQDLHV  
DM VDFGDILGMRQRDKDVKDKTYNLVANI VHDGDP--KKGTYRAHILHKANGQWYEMQDLHV  
DP VDFGDILGADVRAKHG-CTTYDLLANI VHDGEP--TKGT YRVHILHKATGKWFEMQDLHV  
IS VDLGELVAGAE GDDT--YVYDLIANVVEHEGPGSGKTYRAHLLHRSGKWYEMQDLHV  
NV VDFGDILT PEVKAMHP-CTTYELVANI VHDGEP--SHGT YRVHILHKATGQWYELQDLHV  
PH VDFADIMTDDVKAMHK-YTTYDLIANI VHDGEP--NRGT YRVHVLHKGNKSWYEMQDLHV  
TC VDFGEFLT PEVKAKHK-HTVYDLVANI VHDGEP--GKGT YRVHILQKSTGKWYEMQDLHV  
PP VDFSLLTPELRRVN-PENAYELVANI VHEGEP--NKGT YRCHVLHRGTGKWYELQDLHV  
CE VDFYDCLAKDARANHK-YTTYDLVANVVEHGT--KDGNYRIQIVHEGSGKWFLEEDLHV  
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9550 9560 9570 9580 9590 9600  
=====  
AA TSILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
AG TNILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
AM TQILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
AP SDILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIAKDT SRLGATIDV  
BM TSILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
CQ TSILPQMITL TEAYIQI YEQ-----MFLFP-----VDV  
DM TEILPQMITL TEAYIQI YERMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
DP TEILPQMITL TEAYIQI WEQMKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
IS TEILPQMITL SEAYIQI WERMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
NV TQILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
PH TDILPQMITL TEAYIQI YELFYQVLLMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
TC TDILPQMITL TEAYIQI YELMKKKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIDV  
PP TEILPQMITL SEAYIQI WRRMKKVL LMGKSGAGKTSMRSI IFANYIARDTRRLGATIDV  
CE KDLLPQMITL VLAESYIQI WRLSKRKVL LMGKSGSGKTSMRSI IFANYIARDTRRLGATIEV  
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9610 9620 9630 9640 9650 9660  
=====  
AA EHSVRFLGNLVLNLWDCGGQESFMEQYFASQKDN IFRNVEVLIYVFDVESR--ELDKDM  
AG EHSVRFLGNLVLNLWDCGGQESFMEQYFASQKDN IFRNVEVLIYVFDVESR--ELDKDM  
AM EHSVRFLGNLVLNLWDCGGQEA FMENYFASQRDN IFRNVEVLIYVFDVESR--ELDKDM  
AP EHSVRFLGNLVLNLWDCGGQEA FMENYFVSQRDN IFRNVEVLIYVFDVESRDEELKRDL  
BM EHSVRFLGNLVLNLWDCGGQEA FMENYFASQRDN IFRNVEVLIYVFDVESR--EMEKDM  
CQ EHSVRFLGNLVLNLWDCGGQESFMEQYFASQKDN IFRNVEVLIYVFDVESR--ELDKDM  
DM EHSVRFLGNLVLNLWDCGGQEGFMKQYFAQQRDN IFRNVEVLIYVFDVESR--EIERDI

DP EHSVRFGLNVLNLWDCGGQEAFFMENYFASQRDNI FRNVEVLIYVFDVESR--ELEKDM  
IS EHSVRFGLNVLNLWDCGGQEAFFMENYFASQRDNI FRNVEVLIYVFDVESR--ELEKDL  
NV EHSVRFGLNVLNLWDCGGQEAFFMENYFASQRDNI FRNVEVLIYVFDVESR--ELDKDM  
PH EHSVRFGLNVLNLWDCGGQEAFFMENYFASQRDNI FKNVEVLIYVFDVESR--ELDKDM  
TC EHSVRFGLNVLNLWDCGGQEAFFMENYFASQRDNI FRNVEVLIYVFDVESR--ELEKDM  
PP EHSVRFGLNVLNLWDCGGQEAFFMENYFAPQRDHI FRNVELLIYVFDVESR--ELERDI  
CE EHAHVKFLGNMVLHLWDCGGQESFMENFLVSKQDI FKNVQVLIYVFDVESR--EFEKDL  
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9670 9680 9690 9700 9710 9720  
====+====+====+====+====+====+====+  
AA HYYQSCLEAILQNSPDAKIFCLVHKMDLVAEEQRDIIFKEREEDLKRLSK---PLE---  
AG HYYQSCLEALLVNSPNAKIFCLVHKMDLVAEEQRDIIFKEREEDLKRCSR---PLE---  
AM HYYQSCLEAILQNSPEAKIFCLVHKMDLVQEDQRDLIFREREEDLKRLSL---PLE---  
AP RYYETCLSAIYENSPSAKVFLIHKMDLVQEDQRDKIFSDRENEIINMSK---PVD---  
BM HYYQSCLEAILQNSPEARIFCLVHKMDLVAEEQREEIFRAREEDLKGSLK---PLE---  
CQ HYYQSCLEAILQNSPDAKIFCLVHKMDLVAEEQRDIIFKEREEDLKRLSK---PLE---  
DM HYYQSCLEALLQNSPEAKIFCLVHKMDLVPEGLRESVFTERMEDLIKLSK---PGN---  
DP HYYQSCLEAILQNSPEAKIFCLVHKMDLVQEDQRDLIFREREENLQRLSK---PLD---  
IS HYYQSCLEAILQNSAEAKIFCLVHKMDLVPEEERERIFQLRQEDLNKLSK---PLE---  
NV HYYQSCLEAILQNSPDAKVFLIHKMDLVQEDQRDSIFREREEDLRRLSL---PLQ---  
PH HYYQSCLEAILQNSPEAKVFLIHKMDLVQEDQRDIIFREREEDLKRLSK---PLQ---  
TC HYYQSCLEAILQNSPEAKVFLIHKMDLVQEDQRDIIFKEREADLKRLSL---PLE---  
PP HYYQSCLEAILQNSPDAKVFLIHKMDLIPPEKRDILFDREAEKLLKSE---PID---  
CE RYDQSCLEALLQNSPNAQVFLIHKMDLIEEDKREETPKRREADVLRYSSELAAATPLQNER  
#####

9730 9740 9750 9760 9770 9780  
====+====+====+====+====+====+====+  
AA ----CTAFRTSIWDETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFL  
AG ----CTAFRTSIWDETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFL  
AM ----CTCFRTSIWDETLYRAWSSIVYMLIPNVKELEQSLKQFTNIDADEVLLFERATFL  
AP ----CSCFKTSIWDETLYRAWSSIVYKLIIPNVKELEQSLTLFADLMGDDEVLLFERATFL  
BM ----CTCFRTSIWDETLYKAWSSIVYKLIIPNVKALESSLKQFAAIVDADEVLLFERATFL  
CQ ----CTAFRTSIWDETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFL  
DM ----VTCFRTSIWDETLYKAWSSIVTMLIPNVAALENSVTHEFNGVIEADEVLLFEKATFL  
DP ----CTCFRTSIWDETLYKAWSSIVYMLIPNVKELECSLTNFADIDADEVLLFERATFL  
IS ----CTCFKTSIWDETLYKAWSSIVYTLVFNQQLLETNLQQFTNIDANEVLLFEKATFL  
NV ----CTCFRTSIWDETLYRAWSSIVYMLIPNVKELEQSLNQFANIDADEVLLFERATFL  
PH ----CTCFRTSIWDETLYRAWSSIVYKLIIPNVQELEQSLNEFANIDADEVLLFEKATFL  
TC ----CTCFRTSIWDETLYRAWSSIVYMLIPNVKELENSLQQFANIVDADEVLLFERATFL  
PP ----CRCFRTSIWDETLYKAWTEIVYTLIPNVQELERHLKHFAEIEADEVLLFERATFL  
CE TNAVQCCKFSSIWDETLYKAWSAIVYHLPNVGTMEDKLLKFGAILDADEVLLFERATFL  
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9790 9800 9810 9820 9830 9840  
====+====+====+====+====+====+====+  
AA VISHCQRKQHRDHRFEKVSNI IKQFKLSCSKLGAFFSSMEVRNSIFAAFIDTFTSNTYV  
AG VISHCQRKQHRDHRFEKVSNI IKQFKLSCSKLGAFFSSMEVRNSVFAAFIDTFTSNTYV  
AM VISYQQRQHRRDHRFEKVSNI IKQFKLSCSKLAAQFQSMEVRNTNFAAFIDVFTSNTYV  
AP VISHCQRNLQRDIHRFEKVSNI IKQFKLSCSKVAQFQSMEVRNSNFAAFIDLFTTNTYI  
BM VVSHCQRQRHDAHRFEKVSNI IVKQFKLSCSKLAAQFQSMEVRNSVFAAFIDGFTSNTYV  
CQ VISHCQRKQHRDHRFEKVSNI IKQFKLSCSKLGAFFSSMEVRNSIFAAFIDTFTSNTYV  
DM VISHCQSKKNRDHRFEKVSNI IKQFKLSCSKLGAFFQSMEVRNSAFAAFIDTFTSNTYV  
DP VISHTERPHRDPHRFEKVSNI IKQFKLSCSKLAAQFQSMEVRNSNFAAFIDVFTSNTYV  
IS IISHCQRKQHRDHRFEKVSNI IKQFKLSCSKLAAQFHSMEVRNNGNFAAFIDAFPTNTYI  
NV VISHCQRRYHRDHRFEKVSNI IKQFKLSCSKLAAQFQSMEVRNTNFAAFIDVFTSNTYV  
PH VISHCERREHRDHRFEKVSNI IKQFKLSCRLAAQFHSMEVRNSNFAAFIDVFTSNTYV  
TC VISHCQRKHRRDHRFEKVSNI IKQFKLSCSKLAAQFQSMEVRNSAFAAFIDMFTSNTYV  
PP VISHCQRKNHRDHRFEKVSNI IKQFKLSCSKLAAQFQSMTVKNSNFAAFIDIFTNTYV  
CE VTAHAVLREHKDHRFEKVSNI IKQFKLSCSKLAAQFQSMTVKNSNFAAFIDIFTNTYV  
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9850 9860 9870 9880 9890 9900  
====+====+====+====+====+====+====+  
AA MVIMSDPSIPSEATLINIRNARKYFEELENPN-SMAAMTTY---FNYPPKDVQEEELAR  
AG MVVMSDPSIPSEATLINIRNARKYFEELENPNSSGTASMTTY---FNYPPKEIQEELAR  
AM MVIMSDPAIPSAATLINIRNARKHFEEKLERSQS-SALAAEK---YDKLTPELKQELKS  
AP MVIMSDPHIPSAATLINIKNARKHFEEKLERSQSQQNKMTTY---FEYPSVELQNELSK  
BM MVEMSDPKIPSEATLINIRNARKHFEEKLEKVSSSAPSQMSTY---FQYPTPELQEEELK  
CQ MVIMSDPSIPSEATLINIRNARKYFEELENPNNSLSASMTTY---FNYPTVEVQEEELSR  
DM MVVMSDPTLPSSEATLVNIRNARKYFEELENPNNSAIN-MTTY---FNYPSKELQDEELRE  
DP MVVTS DSTIPSAATLMNMKNARKHFEEKLEKLSSESQSSMMTTY---FNYPSPALQEEELRT  
IS MVIMADPSPMSAATLINIKNARKHFEEKLEGAKSPNSQSMAGH---FTYLSPELQKELKA  
NV MVVSDPTIPSAATLINIRNARKHFEEKLERSQS-SSLPADS---YLKADPELKKELSE  
PH MVIMSDPGIPSAATLINIKNARKYFEEKLERSAQTSALMSTH---FNYPPALQEEELK  
TC MVCMDDPQIPSEVTLINIRNARKHFEEKLEKVSSSAPATMATH---FNYPPALQDEELRK



10150 10160 10170 10180 10190 10200
====+====+====+====+====+====+====+
AA RRTVPAAVPGVTFVFLSGGQSEEEASVNLNAINQVPLLRPWALTFVSYGRALQASVLRWAGGK
AG RRTVPAAVPGVTFVFLSGGQSEEEASVNLNAINQVPLLRPWALTFVSYGRALQASVLRWAGGK
AM LRTVPPAVPGITFVFLSGGQSEEEASVNLDAINKFPANKPWALTFVSYGRALQASVLRWAGGK
AP QRTVPPAVPGIMFVFLSGGQTEEEASVNLNAINKYNNAKPPWALSFSYGRALQASVLRWAGGK
BM LRTVPAAVPGVTFVFLSGGQSEEEASVHLNAINAVDLKRPVLTFSYGRALQASVLRWAGGK
CQ RRTVPAAVPGVTFVFLSGGQSEEEASVNLNAINQVPLLRPWALTFVSYGRALQASVLRWAGGK
DM RRTVPAAVTGVTFVFLSGGQSEEEATVNLNAINNPLLRPWALTFVSYGRALQASVLRWAGGK
DP QRTVPPAVAGVTFVFLSGGQSEEDASVHLNAINAYPGRKPWGLTFVSYGRALQASVLRWAGGK
IS QRTVPAAVPGITFVFLSGGQSEEEASVNLDAINKYPGKKPWALTFVSYGRALQASALKAWAGQ
NV SRTVPPAVPGITFVFLSGGQSEEEASVNLDAINKFPGKKPWALTFVSYGRALQASVLRWAGGK
PH QRTVPAAVPGITFVFLSGGQSEEEASVHLDAINKYPGKKPWALTFVSYGRALQASVLRWAGGK
TC SRTVPPAVPGIVFLVFLSGGQSEEEATVNLDAINKFQGKKPWLFSFSYGRALQASVLRWAGGK
PP QRTVPPAVPGIVFLVFLSGGQSEEEASVNLDAINKFQGKKPWLFSFSYGRALQASALKAWGKK
CE -----

10210 10220 10230 10240 10250 10260
====+====+====+====+====+====+====+
AA KENLKAQDELKRAKANGLACQAKYVAGSI PSYAANASLVKSHAYLTVRDALNSALDE
AG KENVKAAQEELKRAKANGLAAQAKYVPGSIPSYAANASLVKSHAYLTVRDALNAAALDE
AM KEQISAGQEELKRAKANSESALGKY-SGGVVAAGNATLFVANHAYGTR--CFKSALDE
AP KENVKTAQDELKRALANKLSALGKYEAGSVQTAAGSQGLFVKDHAYMTVRDALNSAMDD
BM TENILAGQQEELKRAKANGLAAVAGKYVAGSIPSLAASKSNFVKSHAYLTVRDALNQAIDE
CQ KENIKAAQDELVKRANGELGKYGGG-VVGAAGTGS LFIANHAYLTVRDALNAAALDE
DM KENIAAGQNELKRAKANGELGNYTAGSVKGFAGKDTLHVDDHRYMTVRDALNSALDD
DP PENVKAGQEELKRAKANGLACQAKYVAGSIPFSAADKSLFKAHAYLTVRDALNSAIDE
IS AGS IKNQGEELKRAKANHLACQKGYVAGSIDS LAADRSNFVPTHSYMTVRDALNAAAMDE
NV KDQINAAQDELKRAKANSESALGKY-AGGVAGAAGDAALFVANHAYMTVRDALNSAMDE
PH DENVKTAQDELAKRAKANGLACVQYRAGSVFSLQGNKSNFVQHTYMTVRDALNSALDE
TC DANVPAGQAEMLKRAKANSESALGKYVAGSVQQAADQGLFVKNHAYMTVRDALNSALDE
PP DENCKAGQEEFLKRAKANSDASLGY-AGGVKGAATEDTLFVKNHAYMTVRDALNAAIDE
CE -----
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10270 10280 10290 10300 10310 10320
====+====+====+====+====+====+====+
AA EMERDERVFLGEEVAQYDGAYKVSRLWKKYGDKRVIDTPIITEMGFAGIAVGAAGFAGLR
AG EMERDEKVFLLGEEVAQYDGAYKVSRLWKKYGDKRVIDTPIITEMGFAGIAVGAAMAGLR
AM EMERDERVFLGEEVALYDGAYKVSRLWKKYGDKRVIDTPIEAGFAGIAVGAAMAGLR
AP EMERDERVFLGEEVAMYDGAYKVSRLYKKGKRRVIDTPIEIGFAGIAVGAAMAGLR
BM EMERDEKVFVLLGEEVAQYDGAYKVTGRGLWKKYGDKRVIDTPIEAGFAGIAVGAAGFAGLK
CQ EMERDERVFLGEEVAQYDGAYKVSRLWKKYGDKRVIDTPIITEMGFAGIAVGAAMAGLR
DM ELARDDRVLGEEVAQYDGAYKVSRLWKKYGDKRVIDTPIITEMGFAGIAVGAAMAGLR
DP EMERDERVFLGEEVAQYDGAYKISRGLWKKYGDKRVIDTPIITEMGFAGIATGAAMGLR
IS EMERDERVFLMGEEVAQYDGAYKVSRLWKKYGDKRVIDTPIITEMGFAGIAVGAAFVGLR
NV EMERDERVFLGEEVAQYDGAYKVTGRGLYKKGKRRVIDTPIESGFGGMVGAAMAGLR
PH EMERDKNVFLGEEVAQYDGAYKISRGLWKKYGDKRVIDTPIITEMGFAGIAVGAAMAGLK
TC EMTRDERVFLGEEVAQYDGAYKVTGRGLWKKYGDKRVIDTPIITEMGFTGIAVGAAMAGLR
PP EMERGDKVFILGEEVAQYDGAYKVTGRGLWKKYGD RRVIDTPIEIGFAGMAVGAAGFAGLR
CE EIKRRDRVFLMGEEVAQYDGAYKISRGLWKKYHGDKRVIDTPIITEMGFAGIAVGAAGFAGLR
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10330 10340 10350 10360 10370 10380
====+====+====+====+====+====+====+
AA PVCEFMTFNFMSQAI DHVINSAAKTFYMSAGTVNVP I VFRGPNGAAAAGVAAQHSQCFCGAW
AG PVCEFMTFNFMSQAI DHVINSAAKTFYMSAGTVNVP I VFRGPNGAAAAGVAAQHSQCFCGAW
AM PVCEFMTFNFMSQAI DQ I INSAAKTFYMSAGRVNVPVFRGPNGAAAAGVAAQHSQCFCGAW
AP PICEFMTFNFSLQAI DHVINSAAKTFYMSAGMVNVP I VFRGPNGAAAAGVAAQHSQCFCGAW
BM PICEFMTFNFMSQAI DHI INSAAKTFYMSAGTVNVP I VFRGPNGAAAGVAAQHSQCFCGAW
CQ PVCEFMTFNFMSQAI DQV INSAAKTFYMSAGTVNVP I VFRGPNGAAAGVAAQHSQCFCGAW
DM PVCEFMTWNFMSQAI DHI INSAAKTFYMSAGAVNVP I VFRGPNGAAAGVAAQHSQCFAAW
DP PICEFMTWNFMSQAI DHVINSAAKTFYMSAGLVNVP I VFRGPNGAAAGVAAQHSQCFCGAW
IS PICEFMTFNFMSQAI DHVINSAAKTFYMSAGNIAVP I VFRGPNGAAAGVAAQHSQCFAAW
NV PICEFMTFNFAMQAI DQ I INSAAKTFYMSAGRVNVP I VFRGPNGAAAAGVAAQHSQCFCGAW
PH PICEFMTFNFAMQAI DQ I INSAAKTFYMSAGLVNVP I VFRGPNGAAAGVAAQHSQCFAAW
TC PVCEYMTFNFAMQAI DQ I INSAAGTFYMSAGRVNVP I VFRGPNGAAAAGVAAQHSQCFCGAW
PP PICEFMTFNFMSQAI DHVINSAAKTFYMSAGLIAVP I VFRGPNGAAAGVAAQHSQCFAAW
CE PICEFMTFNFMSQAI DQ I INSAAKTFYMSAGRVNVP I VFRGPNGAAAGVAAQHSQDFSAW
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10390 10400 10410 10420 10430 10440
====+====+====+====+====+====+====+
AA YSHCPGLKVISPYDSEDAKGLMKAAIRDPDPVVCLNEMLYGVGFVSDQVLDKDFVLP I
AG YSHCPGLKVVSPYDSEDAKGLMKAAIRDPDPVVCLNEMVYGVSYVSDQVLDKNFVLP I
AM YSHCPGLKVVSPYDSEDAKGLMKAAIRDPDPVVCLNEMLYGVQYVMSDEALSKDFILPI

AP YSQCPGLKVISPYNSEDARGLLKAAIRDPPVVFLENELLYGNQYPI TDEVLDKDFVLP I  
BM YSHCPGLKVLMPYSAEDAKGLLKAAIRDPPVVMLEDEIMYGI PPFMSDEAQSDFVLP I  
CQ YSHCPGLKVVAPYDSEDAKGLLKAAIRDPPVVFLENEMVYQGGFPVSDQVLDKEFVLP I  
DM YAHCPLGLKVLSPYDAEDARGLLKSAIRDPPVVFLENELVYGTAFVADNVADKDFVLP I  
DP YSHCPGLKVVAPYSAEDAKGLLKAAIRDPPVVFLENEIMYGTAFVSDVSKDFVLP I  
IS YGHCPLGLKVISPYNSEDCKGLLKAAIRDPPVVFLENELMYGISFEVPEVSKDFVLP I  
NV YAHCPLGLKVISPYNSEDCKGLLKSAIRDPPVVFLENELLYGVQY PMSDEALSKEFVLP I  
PH YAHVPGLKVISPYSSSEDCRGLLKAAIRSDPPVVFLENEILYGOQFPVEDEVLSKDFVLP I  
TC YAHCPLGLKVISPYNSEDCKGLLKAAIRDPPVVFLENEILYGVQY PMSDQALSNDVLP I  
PP YAQCPGLKVLSPYNSSEDSKGLLKAAIRDNDPPVVFLENELVYGTTFDMSAEAMSKDFVLP I  
CE YAHCPLKVVCPYSAEDAKGLLKAAIRDNDPPVVFLENEILYGOQSFVGVDEVLSDDFVVP I  
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10450 10460 10470 10480 10490 10500  
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AA GKAKIMRPGKHITLVAHASKAVENALQAANELAG-KGVECEVINLRSRPLD TETIFKSVQ  
AG GKAKIMRPGKHITLVAHASKAVETAMLAANELAG-KGIEAEVINLRSRPM DSETIFKSVQ  
AM GKAKIERAGKHVTLVAHASKAVEQALQAANELAG-KGIEAEVINLRSR PLDIDTIVQSVV  
AP GKAKIERKGDHITFVAHASKGVELALDAAKELSS-VGIEAEVINLRSR PLDINTI IQSVV  
BM GKAKVEREGRHITLVCAGRGTDTALKAEEQLAGSKGIECEVNLRTIR PDMDFTTIARSIA  
CQ GKAKIMRPGKHVTLVAYAKAVETAMLAANELAG-KGIECEVINLRSR PMSDSTIFKSVQ  
DM GKAKVMRPGKDITLVAHASKAVETSLAAELAK-KGIEAEVINLRSIR PLDTATIFASVR  
DP GKAKIERVGKHTLVAFSRAVATCLDAAKELSA-IGIEAEVNLRSR PLDFDTVMESVK  
IS GKAKVERAGQHVTLVSHSKAVGTCLDAAQELAS-VGIDCEVINLRSIR PLDDQAIQASVM  
NV GKAKIERVGKHTLVAHASKAVETALEAANELAG-KGIEAEVINLRSR PLDINTI IQSVA  
PH GKCKVERPGKHVTLVAHASKAVETALDAAKILAG-EGIECEVINLRSIR PLDEEGIKQSVL  
TC GKAKIERPGKHITIVAHSAVETSLQAANELSS-KGIEAEVINLRSR PLDINTITASVA  
PP GKAKIERGTGNVTLVAHASKPVGTCLAAANELAA-AGIECEVINLRSIR PLDFETIAN SVM  
CE GKAKIERAGDHVITVSYRGEVFSLEAAQLEA-IGVSAEVINLRSR PLDFDESIRQSVH  
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10510 10520 10530 10540 10550 10560  
#####  
AA KTHHLVTVQGWPPQSGIGSEICARIMEHETFFHLDAPVWRVTVGDV PMPYAKSLEAAALP  
AG KTHHLVTVQGWPPQGGIGSEICARIMEHETFFHLDAPVWRVTVGDV PMPYAKTLEAAALP  
AM KTNVYVTVQGWPPQCGIGAEISARISESEAFYHLDAPVWRVTVGDV SPMPYARTLENASLP  
AP RTNHIISIEQGWPPYAGIGSEIAAQIMESEAFYHLDAPVIRVTVGDV PMPYTKSLEIAALP  
BM KTHHLITVEQGWPPQSGIGAEICARVMSPPFFELDAPVWRVTVGDV PMPYARTLEAAHVP  
CQ KTHHLVTVQGWPPQSGVGEICARIMEHETFFHLDAPVWRVTVGDV PMPYAKTLEAAALP  
DM KTHHLVTVENGWPPQHGVGAEICARIMEDQTFELDAPVWRVTVGDV PMPYAKTLEAAALP  
DP KTNHLVSVVEHGWPPQSGVGAIEVSRMVEGPGFYLDAPPVWRVTVGDV PMPYAKTLEDNSLP  
IS KTNHLVTVENGWPPHFGIGAEICARIVESPAPFYLDAPVIRVTVGDV PMPYATASLEAVEAVP  
NV KTNHVITVVEQGWPPSSGIGAEIARIMESEAFYHLDAPVIRVTVGDV SPMPYTKSLEIKALP  
PH KTNHLVTVVEHGWPPFCGVGAEIISRISEMT-----GVDV PMPYAKTIESMALP  
TC KTNHLITVEQGWPPSAGIGAEILARIMESEAFYHLDQPAIRLTVGDV PMPYTKSLEMAALP  
PP KTNRVTVTEGGWPTAGVGADI SARLMSAVFDYLDAPVIRVTVGDV PMPYATASLEVRVAVP  
CE KTHHLVSVETGWPPFAGIGSEIAAQVMESDVFQDLDAPVWRVTVGDV PMPYATQLEAAALP  
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10570 10580 10590 10600 10610 10620  
#####  
AA QTHDVVTVAVNKVLMKLVHKNIDKAGDGSVV-LIPEEPEDMWHAYNLI AEGDQVRSSTIRK  
AG QVPDVTAVNKVLLNLLFPRLRPNRSVV-LVPEPEDMWHAYNLI AEGDQVRSSTIRK  
AM QANDIVYTVNKLMLKLVSKNVDKDGEGSVS-LVPENTEDMWHAYNLI SEGDFVTCSTIRK  
AP QTNNIVDAAKLLMLKLVHKDIEKDGKGVVV-LIPEEAEDMWQAYNII RKGDRIRASTIRK  
BM GPADVVDVAVTNVLMKLVHKNIEKDDSGSIG-LIPEEPEDMWHAYNLI TEGDAVTA STVRK  
CQ QPADVVAVNKVLMKLVYKNVDKFGDGSIV-LIPEEPEDMWHAYNLI AEGDQVRSSTIRK  
DM RVQDLVEATLKVLMKLLGKYVDKGMQGNVT-LVPEEEDMWHAYNLI AKGDSVRSSTIRK  
DP QGKDVVRVVKKILMKLVSRVIDRDGTGRVA-LIPEEPEDMWHAYNLI SHGDTIRASTIRK  
IS TVAHVVAVKMLMLKLLHKYIDKDGSGNVT-CVPEEAEDMWHAYNLI MSEGDSLKASTIRS  
NV VPADIVFAANKILMKLVAKNVDKDGEGSVS-LVPENTEDMWHAYNLI SEGDCVSCSTIRK  
PH QPKDVIKAVKIVLMKLLHKYVEKDGGFVSLIPEEAEDMWHAYNLI SEGDCVRASTIRK  
TC VPKDVVEMTKKLLMLKLDKSIDKEGQGVYV-LVPEEPEDMWHAYNLI SEGDYVRSSTVRK  
PP QASDVVRVAVKMLMLKLLGKHFERDGSIG-TTTLVPEEPEDMWHAYNLI NENDTLEASTIRK  
CE TAEHVVKAVKSLMKQFKRGIERDGTGFVV-LMAEEAEDMWHAYNLI RIGDIKASTIRK  
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10630 10640 10650 10660 10670 10680  
#####  
AA VQNETSTGSSSSSRVRTTLTIRVESIDFDTQAQVLRRLKGRNIEENQFVKMGAYHTLDLEL  
AG VQNESSTGSSSSSRVRTTLTISVETIDFDTQAQVLRRLKGRNIEENQFVKMGAYHTIDLEV  
AM VQMESATGSSNSYRVRTTLTICVEGIDFDTQACVLRRLKGRNVEENKYVKTGAYHTLDVEQ  
AP VQNESATGSSSTSHRVRTTLTISVESVDFDTQACVLRRLKGRNIEENEYVKMGAYHTIDLEL  
BM VQTESSTGSSSTSRVRTTLTITVENIDFDTQACVLRRLKGRNIVENQYVKMGAYHTLDLEL  
CQ VQNETATGSSSTSRMRTLITISVETIDFDTQAQVLRRLKGRNIEENQFVKMGAYHTLDLEL  
DM VQNETATGSSSTSRVRTTLTIAVESIDFDTQACVLRRLKGRNIEENQYVKMGAYHTLDLEL  
DP VQTESATGSSSSSRVRTMLTIEVETIDFDTQACVLRRLKGRNVEENQYVKMGAYHTVDIEP



CE ELMSTPDRAFYGFNVNFRANQELAIETLLVADSLFRAQDIETRRKYVRLVESVREQNGK  
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10930 10940 10950 10960 10970 10980  
====+====+====+====+====+====+====+  
AA VKIFSSMHVSGEQLAQLTGVAAILRFPMPPELEDSDEKFPDYKVADISLADFGRKEIMLAE  
AG VKIFSSMHVSGEQLAQLTGVAAILRFPMPPELEDSDEKFPDYKVADISLADFGRKEIVLAE  
AM VKIFSSMHVSGEQLDQLTGIAAILRFPMPPELEDSDDKPAFKVADLTLAEWGRKEIIIAE  
AP VKIFSSMHVSGEQLSQTGVAAILRFPMPPELEDDDEETHKFKVADLSLAEWGRKEIIIAE  
BM VRIFFSSMHVSGEQLDQLTGIAAVLRFMPPELEDSDAE-----  
CQ VKIFSSMHVSGEQLAQLTGVAAVLRFMPPELEDSDEKFPDYKVADISLAEFGRKEIMLAE  
DM VKIFSSMHISGEQLAQLTGIAALLRFPMPPELESDDDKPSYKVADISLAEWGRKAIIEAE  
DP ARIFFSSLHVSGEQLMQLTGVAAVLRFMPPELEDEPLDKPAYKVADISLADFGRKEIILAE  
IS VKIFSSLHISGEQLDLLTGIAALLRYPMPPELEDEELSFPYKVIADIGLAEFGRKELVMAE  
NV VKIFSSMHISGEQLDQLTGIAAILRFPMPPELEDDENDKPAYKVADISLAEWGRKEITLAE  
PH VKIFSSMHVSGEQLAQLTGVAAILRFPMPPEIEDEED-----MLAE  
TC VKIFSSLHISGEQLLEQLTGIAAILRFPMPPELEDDKSPFKVADLKLADWGRKEISLAE  
PP VKIFSSLHISGQQLDQLTGIAAVLRFMPPELEDEEDVDFPYKVANIDLADFGRKEIICAE  
CE VHIFFSSMHVSGEQLAQLTGCAAILRFPMPDLDEPMDKPAYKVADIKLADFGRKEIILAE  
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10990 11000 11010 11020 11030 11040  
====+====+====+====+====+====+====+  
AA NEMPGLMACRKKYGPQKVLKGARIAGCLHMTIQTAVL IETLVELGAEVQWSSCNI FSTQD  
AG NEMPGLMACRQKYGPLKILKGARIAGCLHMTIQTAVL IETLIELGAEVQWSSCNI FSTQD  
AM QEMPGLMAIRKKYGPQKILKGARIAGCLHMTVQTAVL IETLVELGAEVQWSSCNI FSTQD  
AP NEMPGLMASLRKKYGIKILKGARIAGCLHMTIQTAVL IETLIELGAEVQWSSCNI FSTQD  
BM --MGGVICALCNQTYCYPKLFVVPNNS-----RTNKTQRPNVQWSSSNIYSTQD  
CQ NEMPGLMACRQKYGPKKVLKGARIAGCLHMTIQTAVL IETLVELGAEVQWSSCNI FSTQD  
DM NEMPGLMACRKKYGPSKPLKGARITGCLHMTVQTAVL IETLVELGAEVQWSSCNI FSTQD  
DP NEMPGLMAIRKKYGPSKPLKDARIAGCLHMTVQTAVL IETLIELGAKVTWSSCNI FSTQD  
IS NEMPGLMALRRKYGPSKPLKGARIAGCLHMTIQTAVL IETLIELGAEVQWSSCNI FSTQD  
NV NEMPGLMAIRKKYGPEKILKGARIAGCLHMTVQTAVL IETLIELGAEVQWSSCNI FSTQD  
PH NEMPGLMALRAKYGHMKPLKGAQIAGCLHMTIQTAVL IETLVELGAEVQWSSCNI FSTQD  
TC NEMPGMALSRLKQYGPKKPLKGAQIAGCLHMTIQTAVL IETLRELGAEVQWSSCNI FSTQD  
PP NEMPGLMALRRKFGE SKPLKGARIAGCLHMTIQTAVL IETLVELGAEVQWSSCNI FSTQD  
CE NEMPGLMAMRSKYGPSQPLKGARIAGCLHMTIQTAVL IETLALGAEVQWSSCNI FSTQD  
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11050 11060 11070 11080 11090 11100  
====+====+====+====+====+====+====+  
AA HAAAAIAKTGVVYAWKGETDEEYMWCIRQTLVFKDGQPLNMI LDDGGDLTNLVHTEYFQ  
AG HAAAAIAKAGV VYAWKGETDEEYMWCIRQTLVFDGKPLNMI LDDGGDLTNLVHAEHPE  
AM HAAAAIAKAGI PVYAWKGETDEEYIWCIEQTLVFKDGRPLNMI LDDGGDLTNLVHDKFPK  
AP HAAAAIAKAGI PVFAWKGETEEYIWCIEQTLVFDGQPLNMI LDDGGDLTNLVHDKYFQ  
BM EAAAAIAVAVGIP IYAWKGETDEEYIWCIEQTLVFDGKPLNMI LDDGGDLTNLVHVKYFQ  
CQ HAAAAIAKAGV VYAWKGETDEEYLWCIEQTLVFDGQPLNMI LDDGGDLTNLVHTEYFQ  
DM NAAAAIAATGVVYAWKGETDEEYMWCIEQTLVFDGQPLNMI LDDGGDLTNLVHEKFPQ  
DP HAAAAIAATGVVYAWKGETDEEYIWCIEQTLVFDGQPLNMI LDDGGDLTNLVHDKYFQ  
IS HAAAAIAKRGV VYAWKGETEEYIWCIEQTLVFKDGQPLNMI LDDGGDLTNLVTKYFQ  
NV HAAAAIAKGV VYAWKGETDEEYLWCIEQTLVFDGKPFNMI LDDGGDLTNLVHVKYFQ  
PH HAAAAIAQKGI PVFAWKGETDEEYLWCIEQTLVFDGSPNMI LDDGGDLTNLVHVKYFQ  
TC HAAAAIAKTGV VYAWKGETDEEYIWCIEQTLVFDGKPFNMI LDDGGDLTNLVHVKYFQ  
PP HAAAAIAKTGV VYAWKGETDEEYDWCIEQTLVFKDGKPLNMI LDDGGDLTNMVHDKFPQ  
CE HAAAAIAQTVGV VYAWKGETDEEYEWCIQTLVFKDGQPLNMI LDDGGDLTNLVHAKYFQ  
#####

11110 11120 11130 11140 11150 11160  
====+====+====+====+====+====+====+  
AA YLEGIKGI SEETTTGVHNLKMKKEGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
AG LLKEIRGLSEETTTGVHNLKMFREGRGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
AM YLKECRGVSEETTTGVHNLKMMKEGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
AP FLDGIKGVSEETTTGVHNLKMKKQGLKMAAINVND SVTKSKFDNLYGCRESLDGIKR  
BM LLKDVKGITEETTTGVHNLKMFREGLLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
CQ YLGGIKGI SEETTTGVHNLKMKKEGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
DM YLKNIKGLSEETTTGVHNLKMFKEGRGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
DP LLEGIKGI SEETTTGVNLKRVKDGSLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
IS Y-----ETTTGVHNLKMKKEGLKITPAINVND SVTKSKFDNLYGCRESLADGIKR  
NV YLKECKGI SEETTTGVHNAYRMFREGKLVKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
PH LLSGIKGI SEETTTGVHNLKMFKKNIKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
TC YLKDCKGI SEETTTGVHNLKMFKEGLKVPAINVND SVTKSKFDNLYGCRESLDGIKR  
PP YLEGRGLSEETTTGVHNLKRLKKGTLKVPAINVND SVTKSKFDNLYGCRESLADGIKR  
CE YLAGIRGLSEETTTGVHNLAKMLAKGLKVPAINVND SVTKSKFDNLYGIRESLDGIKR  
# #####

11170 11180 11190 11200 11210 11220



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BM YLRDKHAIMHRDVKPSNILVNSNGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
CQ YLRDKHAIMHRDVKPSNILVNSNGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
DM YLRDNHAIHRDVKPSNILVNSNGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
DP YLRDKHQIHRDVKPSNILVNSRGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
IS YLREKHQIMHRDVKPSNMLVNSRGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
NV YLRDKHAIMHRDVKPSNILVNSAGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
PH YLRDKHAIMHRDVKPSNILVNSGGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
TC YLRDKHAIMHRDVKPSNILINSNGEIKICDFGVSGQLIDSMANSFVGTRSYMSPERLQGT
PP YLRDKHAIMHRDVKPSNILVNTNAGEIKICDFGVSGQLIDSMANSFVGTRSYMAPERLQGD
CE YLKDEIKILHRDVKPSNMLVNSNGEIKICDFGVSGMLIDSMANSFVGTRSYMAPERLQGS
#####

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          11470      11480      11490      11500      11510      11520
=====+=====+=====+=====+=====+=====+
AA HYSVQSDIWSLGLSLVEMAIGMYPPIPPDAKMLDYIFQ-----DKGDDSS
AG HYSVQSDIWSLGLSLVEMAIGMYPPIPPDAKTLDLIFQ-----ERGEDCS
AM HYSVQSDIWSLGLSLVEMAIGMYPPIPPDEKTLAAIF-----NTPTGQP
AP QYTLQSDIWSLGLSLVEMAIGMYPPIPPDAKTLASIFG-----PRSQATE
BM HYSVQSDIWSLGLSLVEMAIGMYPPIPPDAKTAAIFG-----GQNEDEH
CQ HYSVQSDIWSLGLSLVEMAIGMYPPIPPDARTLDLIFQ-----ERPEDNS
DM HYSVQSDIWSLGLSLVEMAIGMYPPIPPNTATLESIFA-----DNAEESG
DP HYSIQSDVWSLGLSLVEMAIGMYPPIPPDPQVLANIFG-----AKFSEDPENMT
IS HYTVQSDIWSLGLSLVEMALGRYPIPPNDKELTAMFG--RKYNPEGGPPYVVSAGNSG
NV HYSVQSDIWSLGLSLVEMAIGMYPPIPPDDKTISAFVGVQPGSTTDHTVGNVSTPTTQS
PH YYSVQSDIWSLGLSLVEMAIGMYPPIPPDAKTAAIFG-----PKKND
TC HYSVQSDIWSLGLSLVEMAIGMYPPIPPDPELTKAMFE-----SRNDNDS
PP HYSVSDDFWSLGLSLVEMALGRYPIPPDHHELSTLLG--PQFK-----STETVN
CE HYTISSDIWSFGLSLVELLIGRYVVPAPSQAEYATMFN-----VAENEIE
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          11530      11540      11550      11560      11570      11580
=====+=====+=====+=====+=====+=====+
AA PGQN-----IIEPKPMAIFELLDYIVNEPPPKEHH--SFTDRFKDFVDRCL
AG PGQS-----IIEPKPMAIFELLDYIVNEPPPKEHH--SFTDRFKNFVDLCL
AM PAEN-----TGSPPRMAIFELLDYIVNEPPPKLPAF--IFSADFDFVDRCL
AP TIENIEG----DVFANGNGPRPMAIFELLDYIVNEPPTLPAF--IFSADFDFVDRCL
BM PGQAP-----NSPRPMAIFELLDYIVNEPPPKLPSG--IFSDFKDFVDRCL
CQ PGQSS-----LIEPKSMAIFELLDYIVNEPPPKEHH--SFSDFKDFVDRCL
DM QPTD-----EPRAMAIFELLDYIVNEPPPKEHH--IFSTEFKDFVDICL
DP PPSRSRPSQSPFGGVGNPRPMAIFELLDYIVNEPPPKLPSG--VFSVEFKDFVDRCL
IS MSSG-----DSTRAMSIFELLDYIVNEAPPVPTG--VFSPEFKDLVDRCL
NV PSHN-----PNSPRPMAIFELLDYIVNEPPPKLPSG--IFSADFDFVNRCL
PH SSHSP-----TNGPKPMAIFELLDYIVNEPPPKLPSG--IFSNEFKDFVDRCL
TC PDHT-----KGPRPMAIFELLDYIVNEPPPKLPSG--LFSDFKDFVDRCL
PP LDES-----NQKSMSIFELLEIVNEAPTIPTAPGIFTKEFKHFVDRCL
CE LADSLLEE----PNYHPPSNPASMALIFEMLDYIVNGPPTLPKR--FFTDEVI GFVSKCL
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          11590      11600      11610      11620      11630      11640
=====+=====+=====+=====+=====+=====+
AA KKNPEERADLKTILNHDWIKNIEQED--VDIAGWVCKTMDMKLTDVSVRSFK---VAKVF
AG KKNPEERADLKTILNHDWIKNIEQED--VDIAGWVCKTMDMKLTDVSVRSFK---VAKVF
AM KKNPSERADLKTILNHDWIKKAESEN--VDIAGWVCRMDMKLVDHVRSFK---VAKVF
AP KKNPNRERDGLKMLMDHQWIKKAESEP--VDIAGWVCKIKGMKLVNDVRSFK---VAKVF
BM KKNPDERADLKTILNHDWIKKAEAEK--VDIAGWVCKTMDMKLVDQVRSFK---VAKVF
CQ KKNPEERADLKTILNHDWIKNIEQED--VDIAGWVCKTMDMKLTDVSVRSFK---VAKVF
DM KKQPDERADLKTLLSHPWIRKAELEE--VDISGWVCKTMDIKLIDVSVRSFK---VAKIF
DP KKNPAERPALRTLMGHEWVKKWTSN--VEIAGWVCKIIDMKLTEPVVRSFR---VAKVF
IS KRNPNRERDGLKTLMNHPYVRRWDQEK--VDFAGWVCTMGMKLVHDVRSFR---VAKVF
NV KKNPAERADLKTILNHDWIKKAESEN--VDIAGWVCRMDMKLVDVRSFK---VAKIF
PH KKNPAERADLKTILNHDWIKKAEAEK--VDIAGWVCRMDMKLVDQVRSFK---VAKVF
TC KRNPNRERDGLKTLLSHPWIRKAEAEK--VDIAGWVCKTMDMKLVDQVRSFR---VAKVF
PP KRLPSEERATLKSILTADVFTQYADHDQGEFAVFKGTINMKEVEITAESLAKLTPAKQP
CE RKLPSERATLKSILTADVFTQYADHDQGEFAVFKGTINMKEVEITAESLAKLTPAKQP
#####

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          11650      11660      11670      11680      11690      11700
=====+=====+=====+=====+=====+=====+
AA RENTDKINAIIDYSSNGEMLISCEDDQIVLFDCEKGTQIRTVNSKKGVDLIHFTHANNT
AG RENTDKINAIIDFSPANGEMLISCEDDQIVLFDCEKGTQIRTVNSKKGVDLIHFTHANNT
AM RENTDRINSIDFSPNGDTLISCEDDQIVYDCEKGTQIRTVNSKKGVDLIHFTHANNT
AP RENTDKINSDFSPAGDYIISCEDDQIVYDCEKGTQIRTVNSKKGVDLIHFTHANNT
BM RENTDKINSIDFSPNGETLISCEDDQIVYDCEKGTQIRTVNSKKGVDLIHFTHANNT
CQ RENTDKINAIIDYSSNGEMLISCEDDQIVLFDCEKGTQIRTVNSKKGVDLIHFTHANNT
DM RENTDKINAIIDFAPNGEHLISCEDDQIVYDCEKGTQIRTVNSKKGVDLIHFTHANNT
DP KENTDRINNIIDFSPGTDLISSCEDDQIVYDCEKGTQIRTVNSKKGVDLHVFTHANNT
IS RENTDRINSIDFSPNGETLISSEDDQIVYDCEKGTQIRTVNSKKGVDLIHYTHAANT

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NV RENS DRINSIDFSTTGD TLISCEDDQIV IYDCEKGTQMR TVNSK KYGVDL IHFT HAKNT  
PH RENDKINSIDFSPSGETLISCEDDQIV IYDCEKGTQMR TVNSK KYGVDL IHFT HAKNT  
TC RENTDKINSIDFSPSGETLISCEDDQIV IYDCEKGTQMR TVNSK KYGVDL IHFT HAKNT  
PP RENTDRINCIDFSSDGM TLISSDDDSII IYDCSKGIQKRT LNSK KYGVDL IHST HAPNT  
CE RNTTFRVNSLSYGLKGDHIMSTDDDSMFLYDMNTGLRSRSVNSK KYGC SHV KFASDSMC  
#####

11710 11720 11730 11740 11750 11760  
=====+=====+=====+=====+=====+=====+  
AA AIHSSTKIDDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKTLRLWDLR  
AG AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKTLRLWDLR  
AM AIHSSTKIDDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKSLRLWDLR  
AP AIHSSTKVDDTIRYLSLHDNKYLRYFTGHAKKVVSLCVS PIEDMFVSGSLDKTLRLWDLR  
BM AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVVTMCLSPVEDTFLSGSLDKTLRLWDLR  
CQ AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKTLRLWDLR  
DM AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKTLRLWDLR  
DP AIHASTKVDDTIRYLSLHDNKYLRYFPGHSTKKVVALSMS PVDDMFLSGSLDKTLRLWDLR  
IS AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVVTLC TSPVDDTFLSGSLDKSLRLWDLR  
NV AIHSSTKIDDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKSLRLWDLR  
PH AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSASLDKTLRLWDLR  
TC AIHSSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVISLNI SPVEDTFLSGSLDKTLRLWDLR  
PP AIHSSTKIDDDTIRYLSLHDNKYLRYFPGHSTKKVVTLC TSPVDDMFLSGSLDKTLRLWDLR  
CE ALHGSTKVDDTIRYLSLHDNKYLRYFPGHSTKKVVTLC TSPVDDMFLSVAEDKTIRLWDLK  
#####

11770 11780 11790 11800 11810 11820  
=====+=====+=====+=====+=====+=====+  
AA SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LNQEKECD  
AG SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LNQEKECD  
AM SPNCQGVMMVNSGRPVAAYDPEGLIFAAGVNSESEFLKLYDLRSFDKGFVTFK-LSQEKECD  
AP SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESEFLKLYDLRSFDKGFVTFK-LSQEKECD  
BM SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LNQEKECD  
CQ SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LNQEKECD  
DM SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LNQEKECD  
DP SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESVKLYDLRSFDKGFVTFK-LNQEKECD  
IS SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESEFLKLYDLRSFDKGFVTFK-LPQDKECD  
NV SPNCQGVMMVNSGRPVAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LSQEKECD  
PH SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESVKLYDLRSFDKGFVTFK-LNQEKECD  
TC SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESIKLYDLRSFDKGFVTFK-LTQEKECD  
PP SPNCQGVMMHLNRPVAAAYDPEGLIFAAGVNSESEFLKLYDLRSFDKGFVTFK-LTQDKECD  
CE THNCIGLMNLSATPIATFDPEGLIFAAGLDNNIKLYDLRSFDKGFVTFK-PLNEDNVE  
#####

11830 11840 11850 11860 11870 11880  
=====+=====+=====+=====+=====+=====+  
AA WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
AG WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
AM WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
AP WTDLKFSDGKTILIPNGLIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
BM WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
CQ WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
DM WTGLKFSRDGKTILISTNGSVIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
DP WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
IS WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
NV WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
PH WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
TC WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
PP WTGLKFSRDGKTILISTNGSIIRLIDAFHGTPLQFTTGH LNNKGIPIEASFSPDSQFIFS  
CE WTAMRFSPCGKYIMICTNSQLLVDAFTGLIKFTLEEHQNAQKIPLMASFTPESHIMV  
#####

11890 11900 11910 11920 11930 11940  
=====+=====+=====+=====+=====+=====+  
AA GSTDGRVHVWNADTGY---KICVLNGDHPGPIQCVQFNPKFMMLASACTNMAFWLPTAED  
AG GSTDGRVHVWNADTGY---KICVLNGDHPGPIQCVQFNPKFMMLASACTNMAFWLPTGEE  
AM GSTDGRVHVWNAETGY---KVCVLNGDHPAPVQCIQFNPKYMMMLASACTNMAFWLPTVDE  
AP GSTDGRVHVWNADTGY---KVCVLNGDHPGPIQCVQFNPKFMMLASACTNMAFWLPTVDE  
BM GSTDGRVHVWNADTGY---KVCVLNGDHPAPVQCIQFNPKYMMMLASACTNMAFWLPTVDE  
CQ GSTDGRVHVWNADTGY---KICVLNGDHPGPIQCVQFNPKFMMLASACTNMAFWLPTAED  
DM GSTDGRVHVWNADTGN---KVCVLNGDHPGPIQCVQFNPKYMMMLASACTNMAFWLPTSEE  
DP GSTDGRVHVWNAESGH---KICVFNADHNGPVQCIQFNPKYMMMLASACTNMAFWLPTSEE  
IS GSTDGRVHVWNAETGY---KVCVLNADHHPGPIQCVQFNPKYMMMLASACTNMAFWLPTVDE  
NV GSTDGRVHVWNADTGY---KVCVLNGDHPAPVQCIQFNPKYMMMLASACTNMAFWLPTVDE  
PH GSTDGRVHVWNAETGY---KVCVLNADHHPGPIQCVQFNPKYMMMLASACTNMAFWLPTVDE  
TC GSTDGRVHVWNADTGY---KVCVLNADHHPGPIQCVQFNPKYMMMLASACTNMAFWLPTVDE  
PP GSPDGCVHAWNADTGN---KLA VLKAEHTGPVSCVQFNPKYMMMLASACTNMAFWLPTGDD  
CE GSSDGYIYFYDVETGEI ALKTLAPNNQT---CHIAEFSPQHFAAATADTKLTLWCASDEL

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	11950	11960	11970	11980	11990	12000
AA	RIVKMEVDYSATCDEKI	PLCKEMAKTES--KFNEALEM	LLQLEKQTRIGADMVSSSRV	LIA		
AG	RIVKMEVDYSATCDEKI	PLCKEMAKDEN--KFNEALEI	LLQLEKQTRIGADMVSSARV	LIA		
AM	---	MEVDYSSNCDVKI	PECKKLASEGK--LHDALDQ	LLALEKLARTSADVASTSR	ILVA	
AP	RVVKMEVDYSSTCDEKI	IAVAESLAASGK--LQEA	LDTLVLEKQTRTGCDMA	STSRV	LVA	
BM	KI IKMEVDYSATCDEKL	PLWKSAAQGG--IQEAI	DQLALEKQTRTGADMV	STSR	ILVT	
CQ	RIVKMEVDYSTICDEKI	PSSKEMAKAG--KFNEA	LEVLLQLEKQTRVAD	MVSCSRV	LVA	
DM	RITKMEVDYEPACNEKI	PLAKELAKKNPDAFHEA	IEMMLQLEKQTRLGAD	MVSCSRV	LVA	
DP	RI IKMEVDYSSTCDEKI	PICKALAAEGK--INEGLE	I LYALEKQTRTGADA	ISTGR	I LEA	
IS	-----	MLP LLEGVSI	VVIALQGGK--LKEALD	TLLSLEKQTRTGGD	THSTSRV	LVT
NV	RI IKMEVDYSSNCDTKI	PECKKLAQEGK--LHDALD	QLLVLEKLRTRTASD	MISTSRV	LIA	
PH	KIVKMEVDYSATCDEKI	PECQKLAQSGK--IHDALD	NLLSLEKQTRTGADM	VSTGRV	LVA	
TC	KIVKMEVDYSSTCDEKI	PECQKLAQAGK--LHDALD	QLLALEKQTRTGADM	VSTGRV	LVA	
PP	RIVKMEVDYEKEVDDKIA	AATNALVKGGK--LDEALD	QLLALEKQTRTGAD	THSTGR	ILVQ	
CE	RLFKMEQDYSKQVDEAL	KARDIAQKDA---VA	AVESLNNIEKLRLGAD	MKSNTRV	VVQY	

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	12010	12020	12030	12040	12050	12060
AA	IVQICFEAGNWN	YLN EYITILVKRRS	SQSKQAVAKMVQECCT	YVDKTPDKET	KLKLI	DTLR
AG	IVQICFEARNWN	YLN EYVITILVKRRS	SQSKQAVAKMIQECCT	YVDQTPDKET	KLKLI	DTLR
AM	IVQICLEAKN	WAVLN EHVLLSKRRS	QLKRAVTAMVQECCT	YVDKMPDKET	KIKLI	ETLR
AP	IVKLCFEAKEW	ALLN EHVVMLTKRRS	QLKLSVAAMVRECC	TFIDQTPDKET	KLKLI	ESLR
BM	VVQIYFEAKN	WSALNDHIVVLSKRRS	QLKQAVKVMVQECY	T YVDKTPDKET	KIKLI	ETLR
CQ	IVQICFETS	NWN YN EYITILVKRRS	SQSKHAVTKMVQECCT	YVDKTPDKET	KLKLI	DTLR
DM	ICQICFDAS	NWNALN EYVSLVRRS	QLKQAVKMIQECV	T YVDKTPDKET	KLKLI	DTLR
DP	IVQLCFDT	TKKWDLLNENIISLTKRRS	QLKAAVTKMVQCC	KYVDQMPTEK	VLKLI	DTLR
IS	IVRLCFES	GDWAALNEQV	LGLTKRRS	SQKQAVAKMVQEC	LT YIDKLPDKET	QLRLIDTLR
NV	IVEICFEAKN	WSALN EHVLLSKRRS	QLKQAVTKMVQECCT	YIDKTPDRE	TMIELI	ETLR
PH	IVQICFEAKN	WSMLN EHVITLLAKRRS	QLKQAVAKMVQECCT	YVDQTPSKDI	KLKLI	ETLR
TC	IVQICKEARN	WGALN EHVLLTKRRS	QLKQAVAKMVQECCT	YVDQTPDKD	TMIKLI	DTLR
PP	VVKLCYEAKN	LTKLSEMVVALSKRRS	SQKQAIQKQMVQEC	CVYVDQLE	GPE--KLN	IDTLR
CE	MTKLCFEGQ	KWDLMETIMT	LSKRLLIKMAIAK	MVRDAVAMIDK	MPTEDLK	MKLIETLR

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	12070	12080	12090	12100	12110	12120
AA	TVTEGKIYVEVERARL	TKMLADIK	EADG	VDTGAAS	IMEELQVETY	GSM
AG	TVTEGKIYVEVERARL	TKMLADIREAD	G	VDTGAAT	IMEELQVETY	G
AM	TVTEGKIYVEVERARL	THRLAKI	KEEDG	DISGAAAV	MLELQVETY	G
AP	NVTEGKIYVEVD	RARLTQKLAQI	KEDEG	VDTGAANI	IQELQVETY	G
BM	TITEGKIYVEVERARL	THLAKI	REEEG	NVAEAAK	IQELQVETY	G
CQ	TVTEGKIYVEVERARL	TKMLADIK	EADG	VDTGAAS	AMEELQVETY	G
DM	SVTEGKIYVEIERARL	TKILADIK	EADG	VAGAA	TVMEELQVETY	G
DP	TVTTGKIYVEVERARL	THLAKI	QKSEGE	VTAAAD	IQELQVETY	G
IS	TVTAGKIYVEVERARL	THKLAQ	KEAEG	NVAEAA	IMQELQ-----	
NV	SVTEGKIYVEVERARL	THRLAKM	KEEDN	IAGAAS	VMLELQVETY	G
PH	SVTEGKIYVEVERARL	THKLAQ	KEEEN	ITEAANI	IQELQVETY	G
TC	QVTEGKIYVEVERARL	THKLAQ	KEEEN	ISEAANI	IQELQVETY	G
PP	TVTAGKIYVEVERARL	TYKLSQI	KEAAG	DVEGAAN	IMYEMQVET	F
CE	TVTAGKIYVEVERARL	SMVVK	KLEREG	KLDEAAT	MLELQVETY	G

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	12130	12140	12150	12160	12170	12180
AA	MRLCLAKQDFV	RTQI	I	AKKINIK	FFNDAE---	QDLK
AG	MRLCLAKQDFV	RTQI	I	AKKINIK	FFNDAE---	QDLK
AM	MRLCLAKKDFM	RTQI	I	AKKINVK	FFNDE	ND
AP	MRLCLAKKDY	IRTQI	I	SKKINTK	FFDDVK--	PEIQ
BM	MRLCLAIKDY	VRTQI	I	SKKINTK	FFEDEN---	TQEL
CQ	MRLCLAKQDFV	RTQI	I	AKKISIK	FFNDPE---	QDLK
DM	MRLCLLLKEDY	VSTQI	I	AKKISIK	FFDDPA---	QHD
DP	MRLCLAKKDF	FIRTQI	I	SKKISIK	FFEE---	KDTH
IS	-----					
NV	MRLCLLLKQDFV	RTQI	I	AKKINIK	FFEDEN	DE
PH	MRLCLAKKDY	IRTQI	I	SKKINTK	FFDDEK---	TQEL
TC	MRLCLAKQDY	IRTQI	I	SKKINTK	FFDDEG---	TQDL
PP	MRLGFARND	FIRAAI	I	SKKISV	KFFED---	PEQ
CE	MRYSLVRND	FVRATI	I	SKKINIK	FFNKSD	DE

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	12190	12200	12210	12220	12230	12240
AA						
AG						
AM						
AP						
BM						
CQ						
DM						
DP						
IS						
NV						
PH						
TC						
PP						
CE						

AA YLAVVDSMMVYAVLYCILSPYDNEQVDMMHNLKSNKLEELPVYKELLRFLMCKELINFD  
AG YLAVVDSMMIYAVLYCILSPYDNEQVDMMHNLKSNKLEELPVYKELLRFLMCKELINFD  
AM NRAVLETALSRVAVLYLVLPAPHEPEQADLTHRLSDKLLDEIPTYKELLRFLVNPFLIKWS  
AP YRAIQVTALQNAIYLILAPFDNHQSDLTHRILEDETLOKIPKYKSFLLQFTTMELIQWK  
BM FRALGTAALIGSVVFLILAPYDNEQADLTHRVNEDKELDKLPDYKELLRFLINPEIRWR  
CQ YLAVVDSMLTYAVLYCILSPYDNEQVDMMHNLKSNKLEELPVYKELLRFLMCKELINFD  
DM YQAIAPKLVCAVLYCVLAPFDNEQSDMMAHLSKNKLEEVPAYKEILRFLMCKELINFD  
DP YRAMYNTMMQHAILYLLSFPDNEQSDLTHRFLKEKVDEIPKYKELIQLFIAELIHWG  
IS -----ALKKLLFLVLSPHDNEQHDLHRTKADKRLDELPOYQELLKFLTPELINWR  
NV NRAVLETALSRVAVLYLVLPAPHEPEQADLTHRLADKLLEDIPIYKELLRFLVNPFLIKWS  
PH YRAVLSTILQNVILYLILAPYDNEQADLTHRVMEDKLIDELPAKELLMKFINPELIQWS  
TC YRAVLNTAARAVVLYLVLPAPHEPEQADLTHRVLADKVLLEIPMYKQLLKLFTTSELIKWS  
PP YLAVYNTALQAALLFCILAPYDNEQHDLHRLNQDKILKELTKYKQLLQFLTSELIWVA  
CE HREIYETHLRSIVYCLLAPHTNEQWDLNRIAIQRELETPDYKIIIDLFINQELISFK  
#####

12250 12260 12270 12280 12290 12300  
=====+=====+=====+=====+=====+=====+  
AA -ALCTVYGTLELNT-----LDIFNQETHGKCKWAEKLNRLIEHNVRIISNYTRINLK  
AG -ALCTVYGAELNT-----FDIFNQETHGKCKWAEKLNRLIEHNVRIISNYTRINLK  
AM -GLCEIYERDLKA-----TEVFSLWTEEGKRKRWADLNRNVEHNIIRIMAKYYTKITLT  
AP -ELCKDYELTELKSGST---ATDVFSSETEKGRKRWADLNRNVAEHNVRVMKYYSRIRVV  
BM -TLCSSEYKMLRA-----TPYFDASDDKQERWDLNKRNVVEHNIIRIMSMYYTRITLK  
CQ -ALCTVYGAELNT-----FDIFNQETHGKCKWAEKLNRLIEHNVRIISNYTRINLK  
DM -TFNADFLGLVLA-----NEMFKDSTKHGKCCI TELKDRLEIHNIRIAMYYSRHLHA  
DP -TLCCQYEQVLRVGDASTPATNVFTVGTTEGEKRWKALKTRVVEYNIRIMAKYYTRVMTQ  
IS -SLCQAYEAELRTAQG----AVFAPGDEMGERHWKDFKSRVVEHNIIRVMAQYYTRITLQ  
NV -GLCEIYETNLR-----TEVFSSTAEEGKRKRWGELNRNVEHNIIRIMAKYYTMITLS  
PH -GLVSVYENVLKHGTDDSPPTDVFNPNTEEGQARWKEKLNKVVVEHNIIRVMKYYSRITLG  
TC -GLCEIYEEKELLS-----TPVFSGN-EQAKKRWDLNKRNVVEHNIIRVMKYYSRITRIS  
PP -GIAQGYEDELRT-----STVFKTQSR----FEDLKRKRVVEHNMRIMAKYYTRIRLE  
CE GTIVAKYEKLLRRGTSSPDTGIFDKSSTE-GEKRWSDLHLRVGEHNMRIMAKYYTQITFE  
#####

12310 12320 12330 12340 12350 12360  
=====+=====+=====+=====+=====+=====+  
AA RMAELLDLTEGECECYLSRMVNAGTLT-VKTRDPAGI IHFS--TKKAASEIINDWAFGLN  
AG RMAELLDLSEGECECYLSRMVNAGTLT-VKTRDPAGI IHFS--QKKAASEIINDWAFGLN  
AM RMAELLDLPVEETEACLSLVETGVIN-ARTDRPAGVVRFT--GTQEPAALDWAASLS  
AP RMSQLDMLTLEDTEQLLNMVVDKSVT-AKIDRPSGVVEFS-VG-KSVEVLENEWSFGLN  
BM RMSELLGLSETETEELSLSVAVVK-AKIDRPAAGVHFS--LNMDASDRLENEWSNGLN  
CQ RMAELLDLSEAECECYLSRMVNAGTLT-VKTRDPAGI IHFS--TKKAASEIINDWAFGLN  
DM RMSELLNLPTSRCCEEYLSKLANTDTIR-VKIDRPAAGIYFT--QKKAASDILNNWATDVN  
DP RMAELLDLSEVEETEELSLSVSSKTVT-AKVDRDLGTVHVFQTSQTQDVNVLLNNWSSGLA  
IS RMSQLDLPVEETEELSELVVAKRVA-AKVDRDLGTVHFS--RHQEPNEVLENDWSRNLN  
NV RMAELLDLPVEETEQLCNLVETGVIS-ARTDRPAGVVRFT--RTQEPAALDEWAGSLS  
PH RMAQLDLPVEETEELSLSLVVKKTIE-AKTDRPDGIVCFT--RSKDPDDILNEWSNHLN  
TC RMADLLDSPAETEELSLSQMVVSKSVQ-AKTDRPSGVVHFQ--QSKDPSDVLENDWAHDLA  
PP RMAQLDLDGLAETEQLTSLNATNKVIY-AKIDRLSGIVHFV-HQQKDPVEVLENDWSHNLN  
CE RLAEELDFPVDEMESFVNCNLIVTGQITGAKLHRPSRIVNLR--LKKANVEQLDWDVSNVH  
#####

12370 12380 12390 12400 12410 12420  
=====+=====+=====+=====+=====+=====+  
AA ELMNLVNTCHLINKKECINMTQQG--PAF--DSNCMTLTRFVLQEQKQKATGDLSQL  
AG ELMNLVNTCHLINKKECINMTQQG--PAF--DSNCMTLTRFVLQEQKQKATGDLSQL  
AM KLMSLVNHTTHLIHQEEMLAMALK---NHSFSDCITLTRFVLAERKIPVNGDLSQL  
AP DMLKLVNHTTHLINKQMVHMAQQQYEPFDSNCMTLTRYVLAEQKQKVP SATGDLSQL  
BM TLMQLVNTCHLINKKECINMTQQG--PAF--DVNAMTLTRVLAQQRTAPTATGDLTQL  
CQ ELMNLVNTCHLINKKECINMTQQG--PAF--DSNCMTLTRFVLQEQKQKATGDLSQL  
DM QLSMLVNTCHLINKKECVYMTQQR--PAF--DSNAMTLTRFVLQEQKQKATGDLSQL  
DP SLMELVTKTNHLINREEMVHMSN-----SPIDTNCMTLTRFVLAERKIPGASGDLSQL  
IS SLMALLSKTSHLISKEEMHHSFN-----MSIDTNCMTLTRFVLAERKQKVP SATGDLTQL  
NV KLMSLVNHTTHLIHQEEMLAMSSK---GHTFDSNCMTLTRFVLAERKQKVP SATGDLTQL  
PH SLMQLVNTCHLINKKEEMHMAEN---GQQFDSNCMTLTRFVLAERKQKHAIGDLTQL  
TC SLMQLVNTCHLINKKECIVHMAS---SAAALDSNCITLTRYVLSQKQKAPATGELTQL  
PP ALMGLSKTTHLINKKEEMVHMTSMN---AGI---DTNCMTLTRFVLEEQKQKVP SATGEMTTL  
CE KLTDTLNVKSHLILKEQMVHMASET--SQFGIETDSITLQRYVLEQQRKHADASGELTAL  
#####

12430 12440 12450 12460 12470 12480  
=====+=====+=====+=====+=====+=====+  
AA LNCIQTAIKAISSAVRKAGIAKLQGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYSTC  
AG LNCIQTAIKAISSAVRKAGIAKLQGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYATC  
AM LNSIQTAIKGISSAVKAGITNMYGISGK-KNIHGEEVRKLDILSNELFINMLTSSYTC  
AP LTSIQTAVKAVSSAVRRAGLTHLYGMDGS-TNVQGEDVKKLDVLSNELFINMLASSYTVH  
BM LNSIQTAVKAIQSAVRKAGIAKLHGISGD-TNVQGEVKKLDVLSNDFINMLKSSFTTC

CQ LNCIQTAIKAISSAVRKGIAKLGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYATC  
DM LNSIQTAIKATSSAVRKGIAKLHGFAGD-VNVQGEVKKLDVLSNELFINMLKSSYTTTC  
DP LNSLQSAIKAVSSAVRRAGIANLYGIAGQ-VNVQGEVKKLDVLANELFINLLRSSTTC  
IS LTSIQSAIKAVAAVRRAGIAHLYGLAGN-TNVQGEQKTLVDVLSNDFINMLKSSYTTTC  
NV LNSIQTAVKAVSSAVRKGIANMYGIAGT-TNVQGEVKKLDILSNELFINMLTSSTTC  
PH LTSIQTAIKAVSTAVRKGIAKLYGIAATATNVQGEKVKKLDVLSNELFINMMKSSYTTTC  
TC LNSIQTAVKVISSAVRRAGITKLFGTVGH-TNVQGEVKKLDCLANELFINMLSSSYTVA  
PP LNALATAIKAMSSAVRKGIAKLYGIAGS-TNVQGEVKKLDVLANDMFINVLKSSYSTC  
CE LTNMLVAIKAIASATQKAGLAKLYGIAGA-TNVQGEVKKLDVLSNELMINMLKSSYTTTC  
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12490 12500 12510 12520 12530 12540  
=====  
AA LLVSEENDNVIEIETEKRKGYVVSFDPLDGSSNIDCLVSGSIFGITRQANEATEPSVAD  
AG LLVSEENDNVIEIETDKRKYVVSFDPLDGSSNIDCLVSGSIFAITRQVKNENTPSEQD  
AM VLVSEENADVIEIEIEKRKGYIVCFDPLDGSSNIDCVSVSGSIFGIYKKNELKEPLIAN  
AP MLVSEENETVIEIETEKRKGYVVSFDPLDGSSNIDCLVSGSIFGIFKKTDESNETVNN  
BM LLVSEENQTVLQVETERRKGYVVSFDPLDGSSNIECLVSVSGSIFAIIYKKSSEGD-PVESD  
CQ LLVSEENDVIEIETEARGKYVVSFDPLDGSSNIDCLVSGSIFGITRKRINDGAEPSEAD  
DM LMVSEENENVIEVEVEKQKGYIVCFDPLDGSSNIDCLVSGSIFAIRKKSDDGP-PTVED  
DP LLVSEEDETVIEVEVEKQKGYIVCFDPLDGSSNIDCLVSGSIFKKTTEGVPS-VKD  
IS LLVSEENDSVVEVETEKRKGYVVSFDPLDGSSNIDCLVSGSIFAIFRRTSSGEPSS-AKD  
NV LLVSEENPSAIEVKTENHGKYIVCFDPLDGSSNIDCLVSVSGSIFGIYKKLNSKPPSVSD  
PH LMVSEENETVIEVEKDKQKGYVVSFDPLDGSSNIDCLVSVSGSIFAIRKKEHDG-FATESD  
TC LLVSEENETVIEIETDKRKYIVAFDPLDGSSNIDCLVSGSIFAIMKKTDNSIPS-VKD  
PP LLVSEENDNIEVEPKRKYIVTFDPLDGSSNIDCLVSGSTFAIRKKNVPGE-PTVAD  
CE LLVSEENDELIEVEPQRKGYIVTFDPLDGSSNIDCLVSGITIFGIYKKGDDGP-ATVDD  
##### #

12550 12560 12570 12580 12590 12600  
=====  
AA ALQPGNKMAAAGYALYGSATMIVLSLGE--VHGFMYDPSIGEFVLT DYNMRI PERGNIY  
AG ALQPGNKIVAAGYALYGSATMIVISLNG--VHGFMYDPSIGEFVLT DYNMRI PERGNIY  
AM VLQSGKNLIAAGFALYSSATIIILSVG--HGNGFTYDSAIEFILT DKNIQIPSRGNVY  
AP AFQPGRNMAAAGYALYGSATMMVLSLKGKSGVNGFMDPSIGEFLLTESNIKIPSKGNIY  
BM ALQPGRQCVAAGYSYLYGSATMMVLSLKGKSGVNGFMYDPSIGEFILT DPNMKIPEKGIY  
CQ ALQPGNKMAAAGYALYGSATMIVLSLGE--VHGFMYDPSIGEFVLT DYNLRI PERGNIY  
DM ALQPGNQVAAGYALYGSATAIVLGLSG--VNGFTYDPAIGEFVLT DPNMRVPEKGIY  
DP ALQPGRQCVAAGYSYLYGSATMMVLSLSTG--NGVNGFLDPAIGEFVLT DPNMVKPRGIY  
IS ALQTRNVVCAAGYALYGSATMVVLSL--SGVNGFMDPAIEFILT DRDMKIPRGIY  
NV ALQQGNLVAAGYALYGSATMMVLSIG--QVNGFTYDPAIEFILT EKNMIPSRGIY  
PH ALKPGKSLVAAGYALYGSATMMVLSLSCG--AGVNGFTLPAIGEFVLT EPNMIPSRGIY  
TC ALQPGNQVAAGYALYGSATMMVLSV--NGVNGFMDPSVGEFILT DKNMIPRGIY  
PP ALVSGRNILAAGYATYGSATMVVLSLQG--VHGFMDPAIEFILT EPNITVPRGIY  
CE VLKPGKEMVAAGYALYGSATMVVLSLSTG--VNGFTLDPISIGEFILT HFNMKCKEKGSIY  
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12610 12620 12630 12640 12650 12660  
=====  
AA SINEGYASAWDPSVYNYVQDKKDPKAGK-PYGARYVGSMDVHRTIKYGGIF IYPATAA  
AG SINEGYASTWDESVLNVKDKKDPKAGK-PYGARYVGSMDVHRTIKYGGIF IYPATAA  
AM R-----  
AP SINEGYSHLWDKSVTEYVRRKKDPE-CGKPYGARYVGSMDVHRTIKYGGIF IYPATKL  
BM SINEGYAAEWDKGLQDYIEDKKRPTGK-AYGARYVGSMDVHRTIKYGGIF IYPATKS  
CQ SINEGYASTWDKSVLNVYVQDKKDPKAGK-PYGARYVGSMDVHRTIKYGGIF IYPATAA  
DM SINEGYAADWEDGVFNIAAKKDPKAGK-PYGARYVGSMDVHRTIKYGGIF IYPATKS  
DP SINEGYTNNWDKAIQEVVASKKEGP--KPYGARYVGSMDVHRTIKYGGIF IYPATD  
IS SINEGYAGSWDPAVKEYVESKNVAQNTGKPYGARYIGSMVADVHRTIKYGGIF IYPASKD  
NV SINEGNERTWDKAIKEYVD-LKKNPSSGKPYGARYVGSMDVHRTIKYGGIF IYPATKD  
PH SINEGYTYLWDDCIREYVSEKKLKNGGKPYGLRYVGSMDVHRTIKYGGIF IYPSSTD  
TC AINEGYTHQWDDAVKEYVSNKKDPS-KGKPYNARYVGSMDVHRTIKYGGIF IYPATRD  
PP SINEGYESQWDPVVKAYVHKKYKSKG-PYGARYVGSMDVHRTIKYGGIF IYPATKD  
CE SINEGYAQTWSKGFAYIRTRKYPEAGKAMQRYVGSMDVHRTILNNGIFLYPPTVS  
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12670 12680 12690 12700 12710 12720  
=====  
AA ARNGKRLRLLEYECNPMAYIVTKAGGKASAGKDKELIDVVPSTIHQRCP IYLGSKLDVEEMK  
AG ARNGKRLRLLEYECNPMAYLVTVQAGGKAYATKKEILDVMPSTIHQRSP IYLGSKLDVEEMI  
AM -----MI  
AP SPNGKRLRLLEYECNPMAYIIIEEAGG IASNGK-IPILDIQPTALHQRSP IFLGSKEDVNEML  
BM APNGKRLRLLEYECNPMAYIVTEAGGLATNGK-VPILDIVPSSIHQRVPC YLGSKKDVEEVA  
CQ SKNGKRLRLLEYECNPMAYIVTKAGGKASAGKDKELIDVVPSTIHQRCP IYLGSKLDVEEMK  
DM APSGKRLRLLEYECNPMAYLMIQAGGLASDGK-ISILDIVPKK IHERSP IFLGSKSDVEEMI  
IS APRGKRLRLLEYESIPMAFIMEQAGGAATTGS-IPILDIQPEK IHERCPV ILGSKDDVDML  
DM APSGKRLRLLEYECIPMAYLVERAGGMATTGK-QAILDVQPTSLHGRAP IFLGSKEDVQD-T  
NV NPNGKRLRLLEYECIPMAYIIIEEAGGLASNGE-INILDIVPKD IHQRSP IYLGSTEDVEDMI

PH APNGKLRLLYECNPMAFIITQAGGLASDGF-KNILDIQPKIHQRSPIFLGSKDDVEDAL  
TC SPNGKLRLLYECIPMAFIMTQAGGLASNGK-IPILDVQPTS LHQRCPIFLGSKEDVEEMI  
PP SPNG-LRLLYECNPMALMEQAGGMADGN-KCILDIVPHS IHQRSPIFLGSFEDVSEML  
CE APNGKLRLLYECNPMAYIEQAGGLATTGK-ERILDIQPTQIHQRAPILGSKLDVEEMF

12730 12740 12750 12760 12770 12780  
=====  
AA NTGKLAGRTIFITGASRGIGKAIALKAAQDGANIVVAAKTAEPHPKLPGTIFTAAAEIEA  
AG NTGKLAGRTLFTITGASRGIGKAIALRAAQDGANVVVAAKTADPHKLPGTIYTAAKEIEA  
AM NTGKLAGRTIFITGASRGIGKSIALKAARDGANIVIAAKTAEPHPKLPGTIYTTAKEIEE  
AP NTGKLSGLTLFTITGASRGIGKAIALKAARDGANIVIAAKTAEPHPKLPGTIYTAAKEIEE  
BM NTGKLAGRTLFTITGASRGIGKAIALKAARDGANVVIAAKTAEPHPKLPGTIYTAABEIEA  
CQ NTGKLAGRTLFTITGASRGIGKAIALKAAQDGANIVVAAKTAEPHPKLPGTIYTAABEIEA  
DM NTGKLAGRTLFTITGASRGIGKAIALKAARDGANIVVAAKTAEPHPKLPGTIYSAABEIEK  
DP NTGKLAGRTIFITGASRGIGKAIALKAARDGANVVIAAKTAEPHPKLPGTIYTAAKEIEA  
IS PCRKLAGRTLFTITGASRGIGKAIALKAARDGANVVIAAKTAEPHPKLPGTIYTAABEVEA  
NV NTGKLAGCTIFITGASRGIGKSIALKAAQDGANIVVIAAKTAEPHPKLPGTIYSAABEVEK  
PH NFRKLDMTIFITGASRGIGKAIALKAARDGANIVVIAAKTAEPHPKLPGTIYTAABEVED  
TC NTGKLGQTLVFTITGASRGIGKAIALKAARDGANIVVAAKTAEPHPKLPGTIYTACKEIEE  
PP NTGKLAGRTIFITGASRGIGKAIALKAARDGANIVVAAKTVTENPKLPGTIYTAABEIEK  
CE NTGKFVGRVTLITGASRGIGKAIALKAKDGANIVVAAKTAHAPKLPGTIYSAABEIEK  
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12790 12800 12810 12820 12830 12840  
=====  
AA AGGKALPCVVDVRDENAVRTAVKNAVEKFGGIDILVNNASAIISLTPTEQTMKRYDLMHN  
AG AGGKALPCVVDVRDEGAVRTAVQNAVAKFGGIDIVVNNASAIISLTPTEQTEMKRYDLMHQ  
AM IGGKALPCVVDVRFETNII SAVENAVNKFGGIDIVNNASAIHLIDTLESTEMKRYDLMNN  
AP AGGKALPCVVDVRDEGQIADAVSKSISKFGGIDIVVNNASAIISLTPDTEMKRYDLMHN  
BM LGGKALPCIVDVRDEKQVQKAVDEAVKFGGIDILVNNASAIISLTPGTAQTMKRYDLMHN  
CQ AGGKALPCVVDVRDENAVRAAIKSAVEKFGGIDILVNNASAIISLTPTEQTMKRYDLMHN  
DM AGGKALPCVVDVRDEQQVRSVAEAAVAKFGGIDIVNNASAIISLTPDTEMKRYDLMHN  
DP AGGKALPCIVDVRDESQIQAAVEAAVKTFGGIDILVNNASAIISLTPLETQMKRYDLMHN  
IS AGGKALPCIVDVRDEEQVRAVGDVSKFGGIDILVNNASAIISLTPDTEMKRYDLMHS  
NV AGGKALPCIVDVRDETQVTNAVKSVEKFGGIDILVNNASAIISLTPGTEMKRYDLMNN  
PH AGGKALPCVVDVRDEAQITKAVKDAVAKFGGIDILVNNASAIISLTPLETDLKRYDLMQN  
TC AGGKALPCVVDVRDEKQVRNAVEAAVAKFGGIDIVNNASAIISLTPPETDMKRYDLMHN  
PP AGGKALPVVMDVRDEANVKSVEEAAVAKFGGIDALVNNASAIISLTPETEIKRYDLMHQ  
CE AGGKALPCIVDVRDEASVKASVEEAAVAKFGGIDILVNNASAIISLTPDTEMKRYDLMHS  
#####

12850 12860 12870 12880 12890 12900  
=====  
AA INTRGTFLVSKECIPYLKKS-NHAHILNISPPLNMSAHWFSNHVAYTMAKYGMSMCVLMG  
AG INTRGTFLVSKECIPYLKKS-NHAHILNISPPLNMAPHWFSNHVAYTMAKYGMSMCVLMG  
AM INTRGTFLVSKACLPLYLKKS-SNPHIVNISPPLNLKPIWFKNHIAYTISKYGMSCAFMG  
AP INTRGTFLVSKMCIPLRKS-KHAHILNISPPLNMNPNWFRDHVAYTMAKYGMSMCVLMG  
BM INTRGTFLASKICLPVLKNS-NHAHILNISPPLNMNPNWFSIHVAYTMAKYGMSMCVLMG  
CQ INTRGTFLVSKECIPYLKKS-NHAHILNISPPLNMNPIWFGNHVAYTMAKYGMSMCVLMG  
DM INTRGTFLVSKVCLPLYLKKS-NHAHILNISPPLSMKPKWFGPHVAYTMAKYGMSMCVLMG  
DP VNTRGTYLTSKLCPLYLKVG-KNPHILNISPPLNMNPNVWFQNHVAYTMAKYGMSMCVLMG  
IS VNIRGTFLASKICIPYLKKS-SNPHILNISPPLIMKPVWFQNHVAYTMAKYGMSMCVLMG  
NV INARGTFLVSKVCLPFLKKS-KNPHIINLISPPLNMHPFWEKHNHAYTMAKYGMSMCVLMG  
PH INTRGTFLVSKVCLPLYLKKG-KNPHILNISPPLNLMNPMWFENHAYTMAKYGMSLCLVLMG  
TC INTRGTFLVSKVCLPLYLKKS-KHAHILNISPPLNMKPHWFQNHVAYTMAKYGMSMCVLMG  
PP VNVRGTFITSKHCIPYLRQSKAGGKIINNSPPLCMSPRWFAPHVAYTMTKFGMSMCAALGM  
CE INTRGTFLMTKTCPLYLKSG-KNPHVNLISPPLLMETRWFANHVAYTMAKYGMSMCVLGQ  
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12910 12920 12930 12940 12950 12960  
=====  
AA AEEFKDNVAVNALWPRTAIYTAAMEMLTG-K---ESNQFSRKPEIMSDAAAYAILCKEFPK  
AG AKELESANIAVNALWPRTAIHTAAMEMLTG-K---ESDQFSRKPEIMADAAAYAILCKEFP  
AM AEEFKNDGIAINTVWPKTAIATAAFEMLVN----ESNDYARKPEIMADAVYALICKDCK  
AP AAEFRSDNIAVNALWPRTAIYTAAVEMLSGST---EAKKLSRKPEIMADAAAYAVLSRSVQ  
BM SEEFKPFNIGVNALWPKTAIATAAMEMLTG-----DTSRSRKPEIVSDAAYLMLCKDFK  
CQ AREYASANIAVNALWPRTAIYTAAMEMLTG-K---ESDQFSRKPEIMSDAAAYAILCKEFP  
DM AAEFRSDNIAVNALWPRTAIHTAAMEMLTG-P---DSAKWSRKPEIMADAAAYAILTREPR  
DP AEEFRSDGVAVNALWPRTGITTAAMDMLGKLMGGEDTVNQLRFPEIMADAAAYVILTRDSK  
IS AEEFRSDGIAVNALWPNQIHTAALDMLMG---SELSRSTSRKPAILADAAAYAILTKPSR  
NV AEEFKDDGVAVNALWPKTAIHTAAMEMLSGK---EASRSTSRKPEIVADAAAYIMCKNSK  
PH HKEFKQDGIANALWPRTAIHTAAMEMLTGP---DSANHSRKPEIVADAAAYAILTKDCK  
TC HEEFRPFNIGVNALWPRTGITHTAAMEMLTG-P---DSAKFNRKPEIVADAAAYAVLISDFK  
PP AEEFLKDNIAVNTLWPKTSIYTAATAMLAGD--ADIAMANSRKPTVMADAAAYAILSK-PN  
CE HEEFRPHGIAVNALWPLTAIHTAAMEMLSDKG---GEAGSRKPSIMADAAAYAVLSKNSK  
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12970 12980 12990 13000 13010 13020
NCTGNFLIDDEVLQAAGITDMKQYACIPENADKLMDFLDVAP-----EKLVE
LVTGKFLIDDEVLQAEGITDLKQYACV PENADKLMDFLDVAP-----EKLVE
SITGKFLIDDEILRNEGITDFDYACN PENKDNMLDLFIDESS-----D--KI
NCTGQFLVDDEVLRQEGITDLDQYSSDPTYKGDLMDFLDVAP-----HDGFN
TYTGNFAIDEDVVKKEAGIKDLLPYACDPSNVQNLDPDFLDVSG-----ESVEP
STNGNFFIDDEVLKKAAGISDMKQYACV PENADKLMDFLDVAP-----EQLVE
QSTGQFFVDEVLESAGITDLTEYACFRENADKLMVDFVVEEK-----GAPVE
NFTRNFCIDEDILREVGVKDFDVYAVKPGTP--LMPDFLDVAP-----EDFSK
SFTGNFCIDERLLKKEGVTDFEQYANVPGA--RLEPDDFI PDDCLKEFDQQPGSGSSPSL
SVTGNFFIDDEVLKKEGITDFLQYACDPTNADNLMDFLDVAP-----T--DL
TVTGNFFIDDEVLKKEGITDFKQYACDPTNADNLMDFLDVAP-----TNYDQ
TTTGNFFIDDEVLKKEGVTDFDQYCVDPKYKDKLMPDFLDVAP-----IKAFS
SFSGNFCIDDEVLKKEGITDFDQYACVPGN--EIMLDFLDVAP-----YY
DFTGNFCIDEDILKAEAGVTDFDRYACVDPAP--LMPDFLDVAP-----YDH
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13030 13040 13050 13060 13070 13080
FAAEGSHAASLKK--AAAPAGKIEGLFQKIESLLSDEIVKKTGAVFEFNVK--EEAG
FAAEGSHAASLKKPAGEAAAGKIEGLFQKIESLLSEI VRKTGAVYEFVKV--EESG
NVLNKIFQKDIND-VNNK-SNEKIAQIFTVIQANLNHELNVNKGAIQFQNVK--NEAG
QKKEKQQAKKLD-----GKDNIEGIFTKINSHLTPEIAKGTNACFLFVVK--DEDR
TIKESDTAG-----EIPALFSLIGKNSADLVKKTQAVFQFNVK--KEEG
FAAEGSHAASLKK--PAA-SGKIEGLFQKIESLLSEI IKKTGAVYQFNVK--AEAG
NEAAAEADAAPAS-----GGDVKIPQLFRKIESLLSPEIVSKTQAVFQFNI SG--AEQG
KSSPKMSAEATQD--VPAGGAGQVQVFKT IMAAANEIIVKKTNAVFAFQVVK--AEEG
SAAAPAPEATGGG-----SGNALDDIVHKIGKKLSTELVSQTGGLFLFQVK--GGE
RIVGG--NKEPAK-VES----GKIASLFSVIEKSNPELVSKTGAIFQFNVK--EEAG
ALVGSAKKQEGSA-SGSVNYEKEIEHVQAIKSNINE DVVRIQAVFQFNVK--PSEG
DGSPLATPKIQG-----DGKIVKIFQGIEANLSPDTVKGTQAVFQFVVTG--EEAG
GGQDKTLETSGGK-----PGLSLERLVFEKVGGLSEELVSKTKGLFLFQIK--EGG
KFSSGAQIGKKNKTHEAGVVEEIKQIFTSKRLLNADIVKKTGFVYEFLLKDPPTKSER
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13090 13100 13110 13120 13130 13140
LWFADLNKGTGKVGKGSFV--TADATLTMSKHFDMFSGKLPASAFMTGKLIKSGDL
TWFDLNKGTGKVGKGNPPA--TADAVLTMSKHFDMFTGKLPANAFMTGKLIKSGDL
TWFDLKTGDGVAGKGNQ--SPDATLTMSSENFAMFSGKLPASAFMLGKLIKSGNL
TYVVDLT--GNGAAGKGPPT--KPDATLTMEADKIEELFDGKLGAGDAYMSGKLIKSGSL
VWHIDLKNGEGTCQGEKPN--PPDATLTMDGKNFTDMFAGKLPKPTAFMMGKLIKGD
VWFADLNKAPGKGVGKGEPPA--TADATLTMSKHFDMFSGKLPASAFMTGKLIKSGDL
TWFDLNLKNGSGSCGAGTPTA--APDATLTMSKHFDMFSGKLPKAAAPYMTGKLIKSGDF
QWYIDLKNGSGSGKGEKPN--PPDATLTMSKHFDMFSGKLPKATAAFMTGKLIKGD
NEFVLDLNGAGSVGKGEPPGAAPDVTFTMDTESLLKMFAGSLKPTAAAFMSGKMIKGD
TWFDLNLKNGKSTGKGEPSQ--PADATLTMSANFAMFSGKLPATAAFMMGKLIKSGNI
VWYIDLKNGKQAGRGKPSV--PPDATLTMSAKDFDLFSGKLPKATAAFMSGKLIKSGM
KWFVLDLNGSGACGRGDAFT--TPDATLTMSKHFDMFSGKLPATAAFMMGKLIKGNM
EYFIDMKTGAGSVGKGPSE--KADVTFITNEESMLSMFTGKLPKATAAFMTGKLIKGD
ITLIDLKNGEGALTDKASG--KADVFTLAPPEHFAPLFTGKLRPTTALMTKQLQISGDM
#####

13150 13160 13170 13180 13190 13200
QKAMKLEKLMGGLKS-KLRYEKIDFLGEGQFATVYKARDIETNE-IVAVKKIKIGNREEA
QKAMKLEKLMGGLKS-KLRYEKIDFLGEGQFATVYKARDAETNE-IVAVKKIKIGNREEA
QKAMKLEKLMQNLKS-KL-----GSRAEA
MKAMKLEKLMKLLKA-KYKYEIEFLGEGQFATVYKAKDSVTGN-IVAVKKIKIGTVEDA
QKAMKLEKMMQSLKK-KARYEKIDFLGEGQFATVYKAKDAKTDK-IVAVKKIKIGSRLEA
QKAMKLEKLMGGLKS-KL-----GSRAEA
QKALKEKLMKALKS-KLRYAKLSFLGEGQFATVYKARDTVTNQ-IVAVKKIKKGSREDA
GKAMKLEKLMGSMQS-KLRYEKIEFLGEGQFATVYKAKDTQNDNKIVAVKKIKLGSREEA
GKAMKLEKLMGLRA-KLRYEKIEFLGEGQFATVYKARDTE TGE-IVAVKKIKLGTRAEA
QKAMKLEKLMNLKS-KLRYEKIDFLGEGQFATVYKAKDTVTDK-IVAVKKIKVGSRAEA
QKAMKLEKLMNSLKS-KLRYEKIEFLGEGQFATVYKAKDVE TDA-IVAVKKIKIGSRLEA
QKALKEKLMMSLKA-KLRYEKIEFLGEGQFATVYKARDVE TDN-IVAVKKIKMGSRQEA
GKAMKLEKLMQMS-QLRQYKIDFLGEGQFATVYKARDSKTDQ-IVAVKKIKIGSRLEA
PGAMKLESLRKFTEGKLYRDTIKHLGEGQFANVYLAQDLESGE-CVAIKKIKLGSREEA
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13210 13220 13230 13240 13250 13260
ADGINRTALREIKLLHELHHEINIIGLLDVFHGKSNVSLVDFMDTDLEI I IKDPKILLTP

AG ADGINRTALREIKLLHELQHENI IGLLDVFGHKSNNVSLVDFMDTDLEII IKDKPKIILT  
AM RDGINRTALREIKLLQELKHDNVI IGLLDVFGHKSNNVSLVDFMDTDLEII IKDNNIVLTA  
AP KDGVNRTALREIKLLIELDHENI IALFDVFGHLSNISLVYDFMDTDLEVI IKDSSIVFTQ  
BM QDGINRTALREIKLLQELQHINL IGLLDVFGQKSNVSLVDFMDTDLEII IKDNTIVLTP  
CQ -----  
DM RDGINRTALREIKLLQELQHENI IGLVDVFGQLSNVSLVDFMDTDLEVI IKDNKIILTQ  
DP RDGINRTALREIKLLQELKHDHI IGLLDVFGHRSNNVSLVDFMDTDLEQIIKDKTSIILT  
IS KDGINRTALREIKLLQELSHANI IGLYDVFGHRSNNVSLVDFYMLTDLEAII RDTSI VLTA  
NV KDGINRTALREIKLLQELKHENI IGLLDVFGHKSNNVSLVDFMDTDLEVI IKDNTIVLTP  
PH KDGINRTALREIKLLQELKHPNI IGLLDVFGHRSNNVSLVDFMDTDLEI IVKDTNIVLTP  
TC QDGINRTALREIKLLQELHHRNVI IGLLDVFGHMSNNVSLVDFMDTDLEVI IKDNTI IILT  
PP RDGINRTALREIKLMQELHHENVLSLLDVFGQSDISLVDFMIADLEALIKDTRVILYP  
CE KDGINRTALREIKLLKEIHHDNI IGLRDVIGHRTSIQLVDFMDTDLEHVIKDKEIILMP

13270 13280 13290 13300 13310 13320  
=====+=====+=====+=====+=====+=====+  
AA ANIKSYMIQTLKGLLEYLHHHWILHRDLKFNLLLSGSGILKIGDFGLAKFFGSPNRINTN  
AG ANIKSYMIQTLRGLLEYLHQHWILHRDLKFNLLISGTVLKIIGDFGLAKFFGSPNRINTN  
AM ANIKAYMIQTLQGLDYLYHNWILHRDLKFNLLVNAEGVLKIGDFGLAKFFGSPNRINTH  
AP SHIKAYITMTLQGLLEYLHMNWILHRDLKFNLLVNKKGILK IADFGGLAKFRFTPDRLHHT  
BM ANVKAYIMTLQGLLEYLHQNWILHRDLKFNLLINREGILKIGDFGLAKAFGSPTRINTH  
CQ -----MLRS-----ERFWSALIVSTKA  
DM ANIKAYAIMTLKGLLEYLHLNWILHRDLKFNLLVNSDGIKIGDFGLAKSFGSPNRIYTH  
DP AHIKAYIMTLQGLLEYLHLLFILHRDLKFNLLVDRQGIKIGDFGLAKSFGSPNRIYTH  
IS GHIKSYTLQTLQGLLEYLHLNWILHRDLKFNLLDDRGILK IADFGGLAKFFGSPTRVYTH  
NV ANIKSFMITLQGLDYLFHNWILHRDLKFNLLISDGIKIGDFGLAKFYGSPNRVNTH  
PH ANVKAYIMTLQGLLEYMHNWFLHRDLKFNLLVNSEGILKIGDFGLAKFFGSPNRIYTH  
TC GNIKAYIIQTLQGLDYLHRNWVILHRDLKFNLLVNSGVKIGDFGLAKLYGSPNRINTH  
PP AHVKCYIIQCLKGLLEYLHMNWILHRDLKFNLLIDENGIKIGDFGLAKFFGSP-RIYTH  
CE AHIKNIIMQMLGLLEFLHVHWILHRDLKFNLLMNMKGRVKLTDGFLARFFGSPNRIYTH  
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13330 13340 13350 13360 13370 13380  
=====+=====+=====+=====+=====+=====+  
AA QVVTRWYRCPPELLFGARQYGTGVDI WAVGCI LAELLLRVFPFLPGESDLDQLTRIFQVMTG  
AG QVVTRWYRCPPELLFGARQYGTGVDI WAVGCI LAELLLRVFPFLPGESDLDQLTRIFQVLTG  
AM QVVTRWYRAPELLYGARLYGTGIDMWAVGCI LAELLLRVFPFLPGESDLDQLTRIFQTLGT  
AP RVVTRFYRAPELLFGARAYGPAVDI WATGCI VAELLLRVFPFLPGESDLDQLTKIFTTLGS  
BM QVVTRWYRAPELLFGARQYGTGVDMWAVGCI LAELLLRVFPFLPGESDLDQLSRIFQVFGT  
CQ CVVTRWYRSPPELLFGARQYGVGVDI WAVGCI LAELLLRVFPFLPGESDLDQLTRIFQVMTG  
DM HVVTRWYRSPPELLFGARQYGTGVDMWAVGCI LAELMLRVFPFPGSDLDQLTRIFSTLGT  
DP QVVTRWYRCPPELLFGARMYGTGVDVWAVGCI MAELLLRPLPFGESDLDQLTRIFTTLGT  
IS QVVTRWYRAPELLFGSRIYGTGIDI WAVGCI LAELLLRVFPFLPGESDLDQLSRIFQTLGT  
NV QVVTRWYRAPELLFGARLYGAGIDMWAIGCI LAELLLRVFPFLPGESDLDQLTKIFQVLTG  
PH QVVTRWYRSPPELLFGARIYGVGVDMWAVGCI LAELLLRVFPFLQGESDLDQLTKIFQVLTG  
TC QVVTRWYRCPPELLFGAKLYSTGVDMWAVGCI LAELLLRVPLPFGESDLDQLTKIFAVFGN  
PP QVVTRWYRAPELLFGAKNYGTGVDI WAVGCI LAELLLRIPPLAGETDLDQISKIFQCMGT  
CE QVVTRWYRAPELLFGARSYGVGIDI WSVGCI IAELLLRNPIFPGESDLDQLVKIFNIGC  
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13390 13400 13410 13420 13430 13440  
=====+=====+=====+=====+=====+=====+  
AA PTDENWPDVKS LPDFVQYKHFPP-I PLRDI FTAASDLDL LANKLLALYPLHRCTCEAL  
AG PNETNWPDVKS LPDFVQYKHFPP-I PLRDI FTAASDLDL IELANKLLALYPLHRCSCTEAL  
AM PTEETWPGMTELPDFIQFKPFPF-TPLKHI FTAAGDLDL LIALSNVNLPLERCTCDQAL  
AP PNEETWPGVAKLSDYVVFKKFPA-I PLREIFTAAPNELLDVIGGMLSVNPLARPTCSEAL  
BM PTEENWPGMKTLDYVQFKLFP-QELRHIFSAASEDLIFLLESLLALYPPNRCDCQAL  
CQ PNEENWPDVKS LPDFVQYKQFPF-I PLRDI FTAAGDLDL LILYKLLALYPLNRCSDAL  
DM PTEAEWPHLSKLDY LQFRNFPF-TPLDNIFTAAGDLDL IHLQRLFAMNPLRRVSCREAL  
DP PNEENWPGLLS LPDFVQKAFPV-I PMRHI FTAAGDLDL QLLSRFLALHPLDRCTCSEAL  
IS PTEKDWAGMTELPDYVQFRFPF-TPFRHIFTAAGDLDL DVIGKMLALNPLSRCSGREAL  
NV PTEETWPGVTKLPDFIQFKPFPF-VPLKDI FTAAGDLDL LIALSNVNLPLERCTCDQAL  
PH PTEETWPGMKG LPDFIQFKPSVG-TSLRDI FTAATNDLLELLSKLMAMCPSHRCTATEAL  
TC PTEENWPGKLS LPSDYVEFKPFTP-I PLKNI FTAAGDLDL DVLEGLLVNPLKRFECSCCL  
PP PTEETWPGVTKLPDYVEFRFPF-TPFEEIFTAAGDLDL LLLKLIAMDPNRCCTCQAL  
CE PTPETWPNMTEMNSYVIKQPTEYMALNYFSAAPQDLDLDMAGMWFDPDKRLTCTQSL  
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13450 13460 13470 13480 13490 13500  
=====+=====+=====+=====+=====+=====+  
AA KMPYFSNKPAPSIGSKLMPASYYAGTK----DKEDKQPTLKRKLAETVDGGTLP--KR  
AG KMAFYFSNKPAPTVGPRLPMPASYYAANS----KPEEKPSLKRKLLD-SIDGGTVP--KR  
AM KMPYFSNKPAPTPGLRPLPTSVK-----RQPEEKPSLKRKLE-SMDGASLA--KR  
AP QMPYFSNRPSPSLGSLPIPSCI RDSNP---EDQDQAKGQKRKFTD-YSEGGTQP--KR  
BM QMAFYSSK PAPSVPKLPMPNSIS-----KLEVEKPSLKRKLLD-NIDGGS LA--KR  
CQ KMPYFSNKPAPTVGDKLPMPASYHAGVKNDAASKEDKQPTLKRKLPD-SVDGGTLP--KR

DM SMPYFANKPAPTVGPKLPMPSAIIAAKEGANPQTGDTKPKLRKLVETTFRNGLAQKKR  
DP QMPYFANKPAPAPGSSLPPLPASLS-----QAAVDKSGTKRKRKVTD--NGEGGSLA--KR  
IS QMPYFANKPAPTEGSLPLPASLT-----QKKEERGTRKRKHAG---DETCLG-VKK  
NV QMTYFANNPPPTPKARLPLMAIR-----RQTEKPSLKRKLE-ATDGATLA--KR  
PH QMEYFRNKPYTPGSQLPLPTSIRS-----RKQERQTLKRKLMDNALEGMSAP--KK  
TC AMPYFANKPAPTPGSKLPLQNIIR-----KTEVERPTLKRKLLD-AVEGGSLA--KR  
PP KMEYFANKPAPSEPSDPLPSKYKQLQEAKRKAETEDSF-IPRKIRFLKNGGSLR--SR  
CE QMEYFRTPQFCCLEELPLP-----KKQQPQKRSRRRLD---DDGTRP-VRR  
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13510 13520 13530 13540 13550 13560  
=====+=====+=====+=====+=====+=====+  
AA YDRLEDEMSADQAEAKASRI LHGLGFDKMQQKAAKDFSGGWRMRI ALARALFVKPHLLLL  
AG YDRLEDEMSADQAEAKASRI LHGLGFDKMQQKAAKDFSGGWRMRI ALARALFVKPHLLLL  
AM YERLEDEMSADTAEARAANI LHGLGFTAKMQKTPTKDFSGGWRMRI ALARALYVKPHLLLL  
AP YERLDDISADTAEARAANI LHGLGFTKAMQNKTKDFSGGWRMRI ALARALYVTPHLLLL  
BM YDRLEDEMSADTAEARAANI LHGLGFTKEMQQKATKDFSGGWRMRI ALARALYVKPHLLLL  
CQ YDRLEDEMSADCAEAKASRL LHGLGFSKEMQEKAAKDFSGGWRMRI ALARALYVKPHLLLL  
DM YERLDDMSADLAEVKAARI LHGLGFDKAMQQKQAKDFSGGWRMRI ALARALFVKPHLLLL  
DP YERLEDEMSADTAEARAANI LHGLGFTKEMQQKSKDFSGGWRMRI ALARALYVKPHLLLL  
IS YDRLEDDISADTAEARAANI LHGLGFTKEMQKDFSGGWRMRI ALARALYVTPHLLLL  
NV YERLDDMSADTAEARAANI LHGLGFTSKMQKPTKDFSGGWRMRI ALARALYVKPHLLLL  
PH YERLEDEMSADTAEARAANI LHGLGFTKEMQKDFSGGWRMRI ALARALYVKPHLLLL  
TC YERLEDEMSADTAEARAANI LHGLGFTKEMQKDFSGGWRMRI ALARALYVKPHLLLL  
PP YERLDDMSADTAEARAANI LHGLGFTKEMQKDFSGGWRMRI ALARALYVKPHLLLL  
CE YERLEDEMSADTAEARAANI LHGLGFTKEMQKDFSGGWRMRI ALARALYVKPHLLLL  
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13570 13580 13590 13600 13610 13620  
=====+=====+=====+=====+=====+=====+  
AA DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI VHMTQKRLKYTGNYEQ  
AG DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI IHMTQKRLKYTGNYEQ  
AM DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGICTNI IHVKNKQLKYSGNYEA  
AP DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGICTNI IHLKRLKSYGNYDA  
BM DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI IHVMSKRLKYTGNYEA  
CQ DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI VHMTQKRLKYTGNYEQ  
DM DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI IHLTKRLKYTGNYEA  
DP DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFMNGVCTNI IHLTKRLKSYGNYDA  
IS DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFMNGVCTNI IHLDNKQLKYSGNYEA  
NV DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGICTNI IHLKRLKSYGNYEA  
PH DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGICTNI IHLTKRLKYTGNYEA  
TC DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI IHVKNKRLKYTGNYEA  
PP DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFLNGVCTNI IHVMSKRLKYTGNYEA  
CE DEPTNHLDDL DACVWLEELKTYKRI LVII SHSQDFMNGVCTNI IHLTKRLKYTGNYEA  
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13630 13640 13650 13660 13670 13680  
=====+=====+=====+=====+=====+=====+  
AA FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
AG FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
AM FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
AP FVTRREEQLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
BM FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
CQ FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
DM FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
DP FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
IS FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
NV FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
PH FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
TC FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
PP FVTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
CE FVKTRMELLENQMKQYNWEQDQIAHMKNY IARFGHGS AKLARQAQSKEKTLAKMVAQGLT  
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13690 13700 13710 13720 13730 13740  
=====+=====+=====+=====+=====+=====+  
AA EKATDEKQLNFCFPSCGTIPPPVIMVQNVSFYRNEKTPYIYKNLEFGIDLDRALVGP  
AG EKAVDEKQLNFCFPSCGTIPPPVIMVQNVSFYRNDKTPYIYKNLEFGIDLDRALVGP  
AM EKAVNDKVLNFFPSCGTIPPPVIMVQNVSFYRNEKTPYIYKNLEFGIDLDRALVGP  
AP DKVTSDKLVTFHFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
BM EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
CQ EKAVDDKQLNFCFPSCGTIPPPVIMVQNVSFYRNEKTPYIYKNLEFGIDLDRALVGP  
DM EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
DP EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
IS EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
NV EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP  
PH EKAVDDKVLNFFPSCGTIPPPVIMVQNVSFYRNDNSPYIYKNLEFGIDLDRALVGP

TC EKVVSDKIVTFYFPSCGKIPPPVIMVQNVFSFRYSDDGPWIYRNLEFGIDLDRALVGFN  
PP EKAVTDKSVSYFPSCGPIPPVIMVQGVFSFRYSDNTPLIYKNLEFGMDLDRVALVGFN  
CE EKAVTETVKQYFFDAGEI PPPVIMVQHVSFRYENENTPWIYKIDDFGIDLDRIVALVGFN  
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13750 13760 13770 13780 13790 13800  
====+====+====+====+====+====+====+  
AA GAGKSTLLKLLYGDLVPTAGMIRKNSHLRIARYHQHLHELDDMDMSPLDYMLKSFPEVVE  
AG GAGKSTLLKLLYGDLVPTSGMIRKNSHLRIARYHQHLHELDDMDASPLDYMLKNFPEVVE  
AM GAGKSTLLKLLYGDLVPTSGMIRKNSHLRIARYHQHLHELDDLDMSPLDYMMKAFPVDVKE  
AP GAGKSTLLKLLYGELFPTGEMIRKNSHLRIARYHQHLHELDDLSPLEYMMNSFPEVKE  
BM GAGKSTLLKLLYGDLVPTSGMIRKNSHLRIARYHQHLHELDDLSPLDYMMKEFPEVRE  
CQ GAGKSTLLKLLYGDLVPTSGMIRKNSHLRIARYHQHLHELDDMDMSPLDYMLKSFPEVVE  
DM GAGKSTLLKLLYGDLVPTSGMIRKNSHLRIARYHQHLHELDDLSPLEYMMRAFPDVKE  
DP GAGKSTLLKIFGDLVPTGEMVRTNSHLKIARYHQHLHEMLDDLSPLDYMMKCFPDVKE  
IS GAGKSTLLKLLCGELVPSDGLIRTHSHLKIARYHQHLSEQLNLNMSALEYMMTSFPEVKE  
NV GAGKSTLLKLLYGDLVPSGSMIRKNSHLRIARYHQHLHELDDLDMSPLDYMMKAFPVDVKE  
PH GAGKSTLLKLLCGEIIPTGEMIRKNSHLRIARYHQHLHELDDLDI SALDYMMKSFPEVKE  
TC GAGKSTLLKLLYGDLVPTGEMIRKNSHLRIARYHQHLHELDDLSPLEYMMKSFPEVKE  
PP GAGKSTLLKLLCGALVPTDGLIRTHSHLKIARYHQHLHESLDDL SALEYMMKSFDPVRE  
CE GAGKSTLLKLLCTDVMPDGLIRRHSHCKIGRYHQHLHEELPLDLSALEFMMKEFPDVKE  
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13810 13820 13830 13840 13850 13860  
====+====+====+====+====+====+====+  
AA REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWKKPHLLLLDEPTNHLDMETI  
AG REEMRKIVGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWKKPHLLLLDEPTNHLDMETI  
AM REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQVPHLLLLDEPTNHLDMETI  
AP REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQTPHLLLLDEPTNHLDMETI  
BM REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQTPHLLLLDEPTNHLDMETI  
CQ REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWKKPHLLLLDEPTNHLDMETI  
DM KEEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQVPHLLLLDEPTNHLDMETI  
DP KEEMRKIVGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQVPHLLLLDEPTNHLDMETI  
IS KEEMRKIIIGRYGLTGRQQICP IRQLSDGQRCRVVFAYLAWQVPHLLLLDEPTNHLDMETI  
NV REEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQVPHLLLLDEPTNHLDMETI  
PH KEEMRKIIIGRYGLTGRQQICP IRQLSDGQRCRVVFAYLAWQCPHLLLLDEPTNHLDMETI  
TC KEEMRKIIIGRYGLTGRQQVCP IRQLSDGQRCRVVFAYLAWQAPHLLLLDEPTNHLDMETI  
PP KEEMRKIIIGRYGLTGRQQICP IRQLSDGQRCRVVFAYLAWQVPHMLLFDEPTNHLDMETI  
CE KEEMRKIVGRYGITGREQVCPMKQLSDGQRCRVSFAYLAWQVPHLLLLDEPTNHLDMESI  
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13870 13880 13890 13900 13910 13920  
====+====+====+====+====+====+====+  
AA DALAEAINDFEGGLVLVSHDFRLINQVANEIWI CEHGTVTWKWGNILDYKEHLKKNIVRD  
AG DALAEAINDFEGGLVLVSHDFRLINQVAEEIIVWCEKGTVTWKWNGILDYKEHLKKNIAKE  
AM DALADAINDFDGGMVLVSHDFRLINQVAEEIIVWCENGTVTKWNGNILDYKEHLKTKVLS  
AP DSLADAINHFDGGMVLVSHDFRLISQVAEEIIVWCENGKATKWQSTILDYKEHLKKNILKN  
BM DALADAINDFDGGMVLVSHDFRLINQVANEIWI CENGTTTKWEGGILKYKDHLSKSKIKD  
CQ DALAEAINDFEGGLVLVSHDFRLINQVANEIWI CENGKVTWKWNGNILDYKEHLKKNIKD  
DM DALADAINDFDGGMVLVSHDFRLINQVAEEIIVWCEKETVTWKWGGILDYKDHLSKKNITSE  
DP DALADAVKDFEGGLVLVSHDFRLINQVAKEIWI CEHGTVTWKWSDILSYKEHLRKRVLNA  
IS DALAEAIAEFDGMVLVSHDFRLISQVAEEIIVWCEKQTVTKWKNILSYKEHLRKKVMAS  
NV DALADAINEFDGGMVLVSHDFRLINQVAEEIIVWCENGTVTKWQGNILDYKEHLKTKVLKD  
PH DALADAINDFEGGMVLVSHDFRLINQVAEEIIVWCENGTITKWNNGNILNYKEHLKSKIKK  
TC DALAEAINDFEGGMVLVSHDFRLISQVANEIIVWCEKETCTKWNGTILEYKEHLKSKILKE  
PP DALADAINNFDGGMVLVSHDFRLISQVAKEIWI CEHQTVTKWPGNIKTYKQHLKKNKVMKE  
CE DALAEAINCFFGMI LVSHDFRLVSVQVAEEVWVCDNQGILKWDGDI FSKHEHLRQIKDKD  
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13930 13940 13950 13960 13970 13980  
====+====+====+====+====+====+====+  
AA ---MEPYDVIINQPVVINDSGMIKAGFAGDHI PKCRFPNY IGRPKHVRVMAGALEGDLF  
AG ---MEPYDIVNQPVIINQPVVINDSGMIKAGFAGDHI PKCRFPNYMGRPKHVRVMAGALEGDMF  
AM NQKMEPYDVIINQPVVINDSGVIKAGFAGDHI PKCRFPNY IGRPKHVRVMAGALEGDLF  
AP NNDMETYDVIINQPVVINDSGGAIKAGFAGEQTPKCCFPNY IGRPKHVRVMAGALEGDTF  
BM NADMELSDVINQPVVINDSGVIKAGFAGDHI PKCRFPNY IGRPKHVRVMAGALEGEIF  
CQ ---MEPYDVIINQPVVINDSGMIKAGFAGDHI PKCRFPNYMGRPKHVRVMAGALEGDVF  
DM NEKMEPYDVVNQPVVINDSGVIKAGFAGEHI PKCRFPNY IGRPKHVRVMAGALEGDIF  
DP NAAMDYDVIINQPVVINDSGGLIKAGFAGDQAPKAHFNYVGRPKHVRVMAGALEGDMF  
IS AEKMETYDVIINQPVVINDSGVIKAGFAGDQVPKCHFPNF IGRPKHVRVMAGALEGDIF  
NV NQK-----MHREGSVIKAGFAGDQI PKCRFPNF IGRPKHVRVMAGALEGDIF  
PH NTNMEPYDVIINQPVVINDSGVIKAGFAGDQTPKCHFPNY IGRPKHVRVMAGALEGDIF  
TC NDK-----MVTGSGVIKAGFAGDQI PKCRFPNY IGRPKHVRVMAGALEGDVF  
PP LEKMEAYDVIINQPVVINDSGGIKAGFAGDQVPKCRFPNF IGRPKHVRVMAGALEGDVF  
CE VRS-MDYDVIANQPVVINDSGVIKAGFAGEQQPKVRFANFVGRPKYHRVMAGGLDGDIF  
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13990 14000 14010 14020 14030 14040  
=====  
AA VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
AG VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
AM VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
AP VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
BM VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
CQ VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
DM VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
DP VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
IS VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
NV VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
PH VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
TC VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
PP VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
CE VGPKAEDYRGLLSIRYPMEHGIVTDWNMDEKIWTYIYSKDELSTFAEEHPVLLTEAPLNP  
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14050 14060 14070 14080 14090 14100  
=====  
AA RKNREKAAEIFFETLGVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
AG RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
AM RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
AP RKNREKAAEIFFETFNVPAFYVSIQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
BM RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
CQ RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
DM RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
DP RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
IS RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
NV RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
PH RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
TC RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
PP RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
CE RKNREKAAEIFFETFNVPAFLVSMQAVLSLYATGRVTGVVLDAGDGVTHAVPIYEGFAMP  
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14110 14120 14130 14140 14150 14160  
=====  
AA HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-VDA  
AG HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-VDT  
AM HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-IET  
AP HGIIRLDLAGRDISRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-SDS  
BM HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-LEN  
CQ HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-VDT  
DM HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-VET  
DP HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-IA  
IS HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-MDT  
NV HSIIRIDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-VDA  
PH HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-VEL  
TC HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEET-VDT  
PP HSIMRVDIAGRDVTRYLRKTLIRKEGFNFRRTTAEFEIVRSIKEKVCYLATNPQKEES-SEM  
CE HAIQRMDLAGRDVTEYLRVLLRREGYEFHRSNEFEIVREMKENACYLALDPTKVEN--NS  
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14170 14180 14190 14200 14210 14220  
=====  
AA EKVKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
AG EKVKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
AM EKVKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
AP NIYQYMLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
BM ERAQYVLPDGTQLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
CQ EKVKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
DM EKFKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
DP DKATYALPDGSSIEVGAARFRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
IS EKAHYVLPDGTQLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
NV EKFKYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
PH ERSQYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
TC EHTNYVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
PP EKTQHLVLPDGNVLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
CE VKSSYALPDGTQLEIGPARYRAPEVLFPHMLGEECEGIHEVLMYSIQKSDMDLRKMLYQ  
#####

14230 14240 14250 14260 14270 14280  
=====  
AA NIVLSGGSTLFGFGDRLLEIRKRVAKDMKIRIAAPQERIYSTWMGGSILASLDTFKKM  
AG NIVLSGGSTLFGFGDRLLEIRKRVAKDMKIRIAAPQERIYSTWMGGSILASLDTFKKM

AM NIVLSGGSTLFRFGDRLLEIRKMAPKDIKIRISAPQERLYSTWIGGSILASLDTFFKKM  
AP SIVLAGGSTLLSGFGDRLLEIKKLAPKNMKLIKILAPQERLYTTWIGGSILASLDTFFRRM  
BM NIVLSGGSTLFRFGDRLLEIRRLAPKDMKIRISAPQERLYSTWIGGSILASLDTFFRRM  
CQ NIVLSGGSTLFRFGDRLLEIRKHVAKDMKIRIAAPQERIYSTWMMGGSILASLDTFFKKM  
DM NIVLSGGSTLFRFGDRLLESEKXKHSKAKDLKIRIAAPQERLYSTWMMGGSILASLDTFFKKM  
DP NIVLSGGSTLFRFGDRLLESEVKKRLAPRDVVRMAAPQERLYSTWIGGSILASLDTFFRQM  
IS NIVLSGGSTLFRFGDRLLECEVKKIGPKGKIRISAPQERLYSTWIGGSILASLDTFFRRM  
NV -----  
PH NIVLSGGSTLFRFGDRLLEIKKNAPKDVKLRISAPQERLYSTWIGGSILASLDTFFKKM  
TC NIVLSGGSTLFRFGDRLLEIKKLSPKDVQKISAPQERLYSTWIGGSILASLDTFFKKM  
PP NIVLSGGSTLFRFGDRLLESEVKKIGPKSVKIRISAPQERLYSTWIGGSILASLDTFFRRM  
CE NIVLSGGSTLFRFGDRLLEGMRKIAPADGKIRISASQERNLSTWIGGSIVASLDTFFRRM

14290 14300 14310 14320 14330 14340  
=====+=====+=====+=====+=====+=====+  
AA WWSKQYEDDQQRRAIHRKTFDNSCMTLTRFVLQEQKQKQATGDLSQLLNCIQTAIKATS  
AG WWSKREFDEDDQQRRAIHRKTFDNSCMTLTRFVLQEQKQKQATGDLSQLLNCIQTAIKATS  
AM WWSKREYEDDQQRRAIHRKTFDSDCI TLRFLVLAEQKRIPTVNGDLSQLLNCIQTAIKGTS  
AP WWSKREFFEEDSRVIRHKTMDNSCMTLTRYVLAEQKQKVP SATGDLSQLLNCIQTAIKAVS  
BM WWSKREYDEEGHRAVHRKTFDVNMATLTRRWVLAQQRATPATGDLTQLLNCIQTAIKAIQ  
CQ WWSKREFDEDDQQRRAIHRKTFDNSCMTLTRFVLQEQKQKQATGDLSQLLNCIQTAIKATS  
DM WISKREYEEEGQKAVHRKTFDNSAMTLTRFVLQEQKQKQATGDLSQLLNCIQTAIKATS  
DP WWSKREWDEEGARAIHRKTFDTNCMTLTRFVLQEQKQKQATGDLSQLLNCIQTAIKAVS  
IS WWSKREYEEEGMRALHRKTFDTNAMTLTRFVLQEQKQKQATGDLTQLLNCIQTAIKAVA  
NV -----DSNCMTLTRFVLEEQKQKVP SATGDLTQLLNCIQTAIKAVS  
PH WWSKREYDEEGHRAVHRKTFDNSCMTLTRFVLQEQKQKQATGDLTQLLNCIQTAIKAVS  
TC WWSKREFDEEGQRAVHRKTFDNSCI TLRFLVLAEQKQKQATGDLTQLLNCIQTAIKAVS  
PP WWSRREYEEENGKALHRKTFDTNAMTLTRFVLQEQKQKQATGDLTQLLNCIQTAIKAVA  
CE WLGGKEYEDMGASAMHRRFFETDSITLQRYVLEEQKQKQATGDLTQLLNCIQTAIKAVA  
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14350 14360 14370 14380 14390 14400  
=====+=====+=====+=====+=====+=====+  
AA SAVRKAGIAKLQGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYSTCLLVSEENDNVIE  
AG SAVRKAGIAKLQGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYATCLLVSEENDNVIE  
AM SAVKKAGITNMYGISGK-KNIHGEEVRKLDILSNELFINMLTSSYTTCLLVSEENADVIE  
AP SAVRRAGLTHLYGMDGS-TNVQGEDVKKLDVLSNEIFINMLASSYTVHMLVSEENETVIE  
BM SAVRKAGIAKLHGISGD-TNVQGEQVKKLDVLSNDFINMLKSSFTTCLLVSEENQTVLQ  
CQ SAVRKAGIAKLQGISGD-TNVQGEQVKKLDVLSNEIFINMLKSSYATCLLVSEENDDVIE  
DM SAVRKAGIAKLHGIFAGD-VNVQGEQVKKLDVLSNEIFINMLKSSYTTCLMVSEENENVIE  
DP SAVRRAGIANLYGIAGQ-VNVQGEQVKKLDVLANELFINMLRSSF TTTCLLVSEEDETVIE  
IS AAVRRAGIAHLYGLAGN-TNVQGEQKTLVLSNDFINMLKSSYTTCLLVSEENDSVVE  
NV SAVRKAGIANMYGIAGT-TNVQGEQVKKLDILSNELFINMLTSSFTTCLLVSEENPSEIE  
PH SAVRKAGIAKLYIAATATNVQGEQVKKLDVLSNEIFINMLKSSYTTCLMVSEENETVIE  
TC SAVRRAGITKLFQTVGH-TNVQGEQVKKLDCLANELFINMLSSYTVALLI SEENETVIE  
PP AAVRRAGIANLYGIAGN-TNVQGEQKLDVLANDFVNMLRSSF TTTCLLVSEEDDKATE  
CE SATQRAGLAKLYGIAGA-TNVQGEQVKKLDVLSNELMINMLKSSYTTCLLVSEENDELIE  
#####

14410 14420 14430 14440 14450 14460  
=====+=====+=====+=====+=====+=====+  
AA IETEKRGKYVVSFDPDLGSSNIDCLVSGSIFGITRQANEATEPSVADALQPGNKMVAAG  
AG IETDKRGKYVVSFDPDLGSSNIDCLVSGSIFAITKQVKENTTPEQDALQPGNKIVAAG  
AM VEIEKRGKYIVCFDPLDGSSNIDCVSVSGSIFGIYKKNELKEPLIANVLQSGKNLIAAG  
AP IETEKRGKYVVSFDPDLGSSNIDCLVSGSIFGIFKKTDESNETVNNFAFPGRNMVAAG  
BM VETERRGKYVVSFDPDLGSSNIECLVSVSGSIFAIYKKSSEGDPVESDALKPGRELVAAG  
CQ IETEARGKYVVSFDPDLGSSNIDCLVSGSIFGITRINDGAEPSEADALQPGNKMVAAG  
DM VEVEKQGYIVCFDPLDGSSNIDCLVSGSIFAIYRKKSDGP-PTVEDALQPGNQLVAAG  
DP VETEKQGYIVCFDPLDGSSNIDCLVSGSIFGIFKKTTEGVPS-VKDALQPGRCVAAG  
IS VETEKQGYIVCFDPLDGSSNIDCLVSGSIFAIYRRTSSGEPSP-AKDALQTRNVVACG  
NV VKTENHGKYIVCFDPLDGSSNIDCLVSVSGSIFGIYKLDNSKPPSVSDALQGGKNLVAAG  
PH VEKDRQGYVVSFDPDLGSSNIDCLVSVSGSIFAIYRKEHDG-FATESDALKPGKSLVAAG  
TC IETDKRGKYIVAFDPLDGSSNIDCLVSGSIFAIMKKT DNSIPS-VKDALQPGNQVVAAG  
PP VDLEKQGYVVSFDPDLGSSNIDCLVSGSIFSIYKLLGD-TVS-ERDALQPGRLVACG  
CE VEEQRRGKYIVTFDPLDGSSNIDCLVSGSIFGIYKRRGDGPAT-VDDVLKPGKEMVAAG  
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14470 14480 14490 14500 14510 14520  
=====+=====+=====+=====+=====+=====+  
AA YALYGSATMIVLSLGE--VHGFMYPDSIGEFVLT DYNMRI PERGNIYS INEGYASAWDP  
AG YALYGSATMIVLSLGN--VHGFMYPDSIGEFVLT DYNMRI PERGNIYS INEGYASTWDE  
AM FALYSATTIILSVG--HGVNGFTYDSAIGEFILTDKNIQIPSRGNVYR-----  
AP YALYGSATMMVLSLKGKGVNGFMFLDPSIGEFLLTESNIKIPSKGNIYS INEGYSHLWDK  
BM YALYGSATMMVLSLKGKGVNGFMYPDSIGEFILTDPNMKIPEKGIYS INEGYAAEWDK  
CQ YALYGSATMIVLSLGE--VHGFMYPDSIGEFVLT DYNMRI PERGNIYS INEGYASTWDK  
DM YALYGSATAIVLGLGSG--VNGFTYDPAIGEFVLT DPNMRYPEKGIYS INEGYAADWED

DP YSLYGSATMMVLST--GNGVNGFLLDPAIGFEVLTDPDMKVKPRGKIYSINEGYTNNWDK  
IS YALYGSATMMVLSL--GSGVNGFMLDPAIGFEILTDRDMKIKPRGKIYSINEGYAGSWDP  
NV YALYGSATMMVLSIG--QGVNGFTYDPAIGFEILTEKNMKIPSRGKIYSINEGNERTWDK  
PH YALYGSATMMVLSG--AGVNGFTLDPAIGFEVLTPEPNMKIPSRGKIYSINEGYTYLWDD  
TC YALYGSATMMVIVSG--NGVHGFMLDPSVGEFILTDKNMTIPKRGKIYAINEGYTHQWDD  
PP YALYGSATMIVLGLK--GSGVNGFMLDPSLGEFILTDPDMRVKPRGKIYSINEGYALWDP  
CE YALYGSATMMVLSG--DGVNGFTLDPISIGFEILTHPNMKCKEKGSIYSLNEGYAQTWSK  
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14530 14540 14550 14560 14570 14580  
=====  
AA SVYNYVQDKKDPD-KGKPYGARYVGSMDVHRTIKYGGIFYPATAAAKNGKLRLLYEC  
AG SVLNIVKDKKDPD-KGKPYGARYVGSMDVHRTIKYGGIFYPATAAAKNGKLRLLYEC  
AM -----  
AP SVTEYVRRKKDPE-CGKPYGARYVGSMDVHRTIKYGGIFMYPATKLSPNGKLRLLYEG  
BM GLQDYIEDKKRPK-TGKAYGARYVGSMDVHRTIKYGGIFMYPATKSPNGKLRLLYEC  
CQ SVLNIVQDKKDPD-KGKPYGARYVGSMDVHRTIKYGGIFYPATAAAKNGKLRLLYEC  
DM GVFNYIAAKKDPD-KGKPYGARYVGSMDVHRTIKYGGIFYPATKSPNGKLRLLYEC  
DP AIQEVVAKKEGP--KPYGARYVGSMDVHRTIKYGGIFMYPATDAPRGLRLLYEC  
IS AVKEYVESKNVAQNTGKPYGARYIGSMADVHRTIKYGGIFMYPASKDAPSGKLRLLYEC  
NV AIKEYVD-LKKNPSSGKPYGARYVGSMDVHRTIKYGGIFMYPATKDNPNGLRLLYEC  
PH CIREYVSEKKKLNKGGKPYGLRYVGSMDVHRTIKYGGIFMYPSSTADPNGLRLLYEC  
TC AVKEYVSNKKDPS-KGKPYNARYVGSMDVHRTIKYGGIFYPATRDSPNGKLRLLYEC  
PP AVKYNVNEKKNP-KGKAYGARYIGSMADVHRTIKYGGIFMYPTTKDAPSGKLRLLYEC  
CE GFAEYIRTRKYPEAGKKAMGQRYVGSMDVHRTILNGGIFYLPPPTVSAPNGKLRLLYEC

14590 14600 14610 14620 14630 14640  
=====  
AA NPMAYIVTKAGGKASAGKDKELLDVVPTSIHQRCPIYLGSKLDVEEALSMIGPGTGPASF  
AG NPMAYLVTQAGGKAYATKGKELLDVMPTS IHQRCPIYLGSKLDVEEALSMIGPGTGPASF  
AM -----MIGPGTGAASF  
AP NPMAYIEEAGGIASNGK-IPILDIQPTALHQRSPIFLGSKEDVNELELVGPRGDASF  
BM NPMSPIVTEAGGLATNGK-VPILDIVPSSIHQRCPIYLGSKLDVEEALSMIGPGTGPASF  
CQ NPMAYIVTKAGGKASAGKDKELLDVVPTSIHQRCPIYLGSKLDVEEALSMIGPGTGPASF  
DM NPMAYLMIQAGGLASDNGK-ISILDIVPKIHERSPIFLGSKSDVEEALSMIGPGTGPASF  
DP IPMAFIMEQAGGAATGGS-IPILDIQPEKIHERCPVILGSKDDVDLDMIGPGTGPASF  
IS IPMAYLVERAGGMATGK-QAILDVQPTSLHGRAPIFLGSKEDVDLDMIGKGTGDASF  
NV IPMAYIIEEAGGLASNGE-INILDIVPKDIHQRSPIYLGSTEDVEDVNLNIGPGTGAASF  
PH NPMAFIITQAGGLASDNGK-KNILDIQPKIHERSPIFLGSKDDVEDLDMIGPGTGPASF  
TC IPMAFIMTQAGGLASNGK-IPILDVQPTSLHGRAPIFLGSKEDVEEVLAMIGPGTGPASF  
PP NPMAFIIMELAGGKASNGR-VPILDVVPTSLHCREPIFLGSKEDVDELLAIIGRGTGDASF  
CE NPMAYIEEAGGLATGK-ERILDIQPTIHRAPILGSKLDVEEALSMIGPGTGPASF

14650 14660 14670 14680 14690 14700  
=====  
AA DAFGTAKYQNRRTMSSDRALIAAFKEISTMADRINLPTIIVDRANNLFKQVHDGKNLKG  
AG DAFGTAKYQNRRTMSSDRALIAAFKEISTMADRINLPTITDRANNLFKQVHDGKNLKG  
AM DAFGASKYQNRRTMSSDRALINAFREINGMADRINLPTIIVDRANNLFKQVHDGKNLKG  
AP DEFGGMKYKNGMVCSTNRSLLNAYREIGLMADRINLPRNIIVDRANVLFKQVHDGKNLKG  
BM DSGFVSKYQNRRTMSSDRALINAFREINTMADRINLPTIIVDRANNLFKQVHDGKNLKG  
CQ DAFGTAKYQNRRTMSSDRALIAAFKEISTMADRINLPTIIVDRANNLFKQVHDGKNLKG  
DM DAFGAPKYQNRRTMSSDRSLISAFKEISSMADRINLPTIIVDRANNLFKQVHDGKNLKG  
DP DEHGVAKYQNRRTMSSDRALVNAFKEISNMADRINLPTIIVDRANNLFKQVHDGKNLKG  
IS DESGTAKYQNRRTMSSDRALVNAFREISNMADRINLTKTIVDRSNLFLKQVHDGKTLKG  
NV DAFGVSKYQNRRTMSSDRTLINAFREINAMADRINLPTIIVDRANNLFKQVHDGKNLKG  
PH DGLGVSKYQNRRTMSSDRALINAFREINAMADRINLPTIIVDRANNLFKQVHDGKNLKG  
TC DSGFVYQNRRTMSSDRALINAFREINGMADRINLPTIIVDRANNLFKQVHDGRNLKG  
PP DESGNAKYANRRTMSSDRALIGAFREIGAMGDRINLPRNIIDRSNALFKQVHDGRSLKG  
CE DSDNLANAQRKSMNNTDRQMTAAMSLIREMSERIHLPRIQDSASRIFKDVLESKALRG  
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14710 14720 14730 14740 14750 14760  
=====  
AA RSNDAKASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
AG RSNDAKASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
AM RANDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
AP RSNDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRVFKLTLKALATSVDLITTD  
BM RANDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
CQ RSNDAKASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
DM RSNDAKASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
DP RSNDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
IS RSNDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
NV RSNDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
PH RANDAIASAALYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD  
TC RSNDAIASACLYIACRQEGVPRTFKEICAVSKISKKEIGRCFKLTLKALATSVDLITTD

PP RSNDAIASACLYIACRQESVPRTFKEICAVSKVSKKEIGRCFKLILKALETSEVFITTTGD  
CE KNNEAQAAACLYIACRKGVPRTFKEICAVSRVSKKEIGRCFKIIVRSLETNLEQITSAD  
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14770 14780 14790 14800 14810 14820  
=====+=====+=====+=====+=====+=====+  
AA FMSRFCANLDELPTVQRAATHIARKAVEMDIVPGRSPISVAAAAIYMASQASDQK--KTH  
AG FMSRFCANLDELPTVQRAATHIARKAVEMDIVPGRSPISVAAAAIYMASQASDNK--KTH  
AM FMSRFCNLGLPNMVQRAATHIARKAVELDIVPGRSPISVAAAAIYMASQASEDK--RSQ  
AP FMSRFCNLGLPNMVQRAATHIARKAVEYDIVPGRSPISVAAAAIYMASQASEK--RSQ  
BM FMSRFCNLGLPNSVQRAATHIARKAGELDIVSGRSPISVAAAAIYMASQASEDK--RSQ  
CQ FMSRFCANLDELPTVQRAATHIARKAVEMDIVPGRSPISVAAAAIYMASQASDQK--KTH  
DM FMSRFCANLDELPTVQRAATHIARKAVEMDIVPGRSPISVAAAAIYMASQASEHK--RSQ  
DP FMSRFCNLGLPTMVQRAASHIARKAVELDIVPGRSPISVAAAAIYMASQASDEKSKKTQ  
IS FMAK--PHLG-----GSRCYLHGIAS-----  
NV FMSRFCNLGLPNMVQRAATHIARKAVDIVPGRSPISVAAAAIYMASQASDDK--KSQ  
PH FMSRFCNLGLPNMVQRAATHIARKAVELDIVPGRSPISVAAAAIYMASQASDDK--RVQ  
TC FMSRFCNLGLPNMVQRAATHIARKAVELDIVPGRSPISVAAAAIYMASQASEDK--RSQ  
PP FMSRFCNLALSTAVQKAATHIARKAVEMDIVAGRSPISVAAAAIYMASQASAEK--KSQ  
CE FMSRFCGNLSLPSIQAATR IAKCAVMDL VAGRTPISIAAAAIYMASQASAEK--RSA  
### #

14830 14840 14850 14860 14870 14880  
=====+=====+=====+=====+=====+=====+  
AA KEIGDIAGVADVTRQSYRLMHPHAAELFPEDFKFTTPIIDQLPQIRDEGVPSALREICL  
AG KEIGDIAGVADVTRQSYRLMYPHAAELFPEDFNFTTPIIDQLPPV--EGVPSALREICL  
AM KEIGDIAGVADVTRQSYKLMYPHAGKLFPEDFRFATPIDQLPQM--EGVPSALREICL  
AP KEIGDIAGVAEVTIKQSYKLILANATLLFPEDFKFVTQISDLPTS--EGVPSALREICL  
BM KEIGDIAGVADVTRQSYKLMYPSAARLFPEDFKFATPIEFPLQM--EGVPSALREICL  
CQ KEIGDIAGVADVTRQSYRLMYPHAAELFPEDFKYTTPIEQPLQM--EGVPSALREICL  
DM KEIGDIAGVADVTRQSYKLMYPHAAKLFPEDFKFTTPIIDQLPQM--EGVPSALREICL  
DP KEIGDIAGVADVTRQSYKLMYPHAAELFPEDFRFTTPIEQPLQL--EGVPSALREICL  
IS -----IGQEVSEK-----  
NV KEIGDIAGVADVTRQSYKLMFPHAAELFPEDFKFTTPIIDQLPQM--EGVPSALREICL  
PH KEIGDIAGVADVTRQSYKLMYPHATKLFPEDFQFSTPIEELPQM--EGVPSALREICL  
TC KEIGDIAGVADVTRQSYKLMYPHAKLFPEDFKFATPIDQLPQM--EGVPSALREICL  
PP KEIGDIAGVAEVTIKQSYKRMYPKVVQLFPEDFNFTTPIEMLP---EGVPSALREVCL  
CE KEIGDVAGAAEITVRQTYKLLYPKALELFPKDFRFTTPIIDALPNS--EGVPSALREICI  
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14890 14900 14910 14920 14930 14940  
=====+=====+=====+=====+=====+=====+  
AA LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDPDVVKSFMYQLLRGL  
AG LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDPDVVKSFMYQLLRGL  
AM LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDLDVVKSFYQLLRGL  
AP LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDPNVVKSFMYQLLRGL  
BM LKELKHKNIVRLYDVLHSEKLLTLVFEHCDQLKKYFDSLNGEIDLDVVKSFMYQLLRGL  
CQ LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDPDVVKSFMYQLLRGL  
DM LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDMAVCRSFMQLLRGL  
DP LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDSEQVQSLMYQLLRGL  
IS LKELKHKNIVRLYDVLHSEKLLTLVFI FC--VRSFFFSHLSVPLLLCFQSFMQLLRGL  
NV LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGVIDLDVVKSFYQLLRGL  
PH LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDLDIN-----  
TC LKELKHKNIVRLYDVLHSDKLLTLVFEHCDQLKKYFDSLNGEIDLDVVKSFMYQLLRGL  
PP LKELPHKNIVRLYDVLHSEKLLTLVFEHCDQLKKYFDSLNGEIDPDVVKSFMYQLLRGL  
CE LRELKHNIVRLYDVLHSEKLLTLVFEYCDQLKKYFDSLNGYMDAQTARSLMLQLLRGL  
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14950 14960 14970 14980 14990 15000  
=====+=====+=====+=====+=====+=====+  
AA AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
AG AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
AM AFCHSRNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
AP AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
BM AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
CQ AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
DM AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
DP AFCHSKNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVRCYSAEVTTLWYRPPDVLV  
IS AFCHSNILHRDLKPQNLLINKNGELKLADFGLARAFGIPVRCYSAEVTTLWYRPPDVLV  
NV AFCHSRNVLHRDLKPQNLLINENGEKLLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
PH -----GELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
TC AFCHSHNVLHRDLKPQNLLINKNGELKLADFGLARAFGIPVKCYSAEVTTLWYRPPDVLV  
PP SFCHSSNILHRDLKPQNLLINKNGELKLADFGLARAFGIPVRCYSAEVTTLWYRPPDVLV  
CE SFCHAHVNLHRDLKPQNLLINTNGTLKLADFGLARAFGIPVRCYSAEVTTLWYRPPDVLV  
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15010 15020 15030 15040 15050 15060  
=====  
AA GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEDTWPGITQ  
AG GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP EENWPGITQ  
AM GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKMLGTP TEETWDFDTT  
AP GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP DETWPNMTT  
BM GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP NEDTWPGVITQ  
CQ GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEDTWPGITQ  
DM GAKLYTTSIDMWSAG--CI LAELADAGRPLFP GSDVDDQLKRI FRVLGTP NEDSWPGVSH  
DP GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP NEEVWPGISQ  
IS GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEDTWSGMTQ  
NV GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKMLGTP TEETWPDIST  
PH GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEESWPGLAQ  
TC GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEETWPGMTQ  
PP GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEDTWPNMSK  
CE GAKLYTTSIDMWSAG--CI FAELANAGRPLFP GSDVDDQLKRI FKLLGTP TEDTWPNMSK  
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15070 15080 15090 15100 15110 15120  
=====  
AA LSDYKFFPLYPPTTSWSQVVPRLNSKGRDLLQKLLICRPDAVVVGAGGAGLRAAFGLVAE  
AG LSDYKFFPLYPPTTSWSQVVPRLNSKGRDLLQKLLVCRPDAVVVGAGGAGLRAAFGLVAE  
AM LPDYKFFPLYHPAQGLAQVTPKLSRGRDLLQRLVLCNPDVVVGAGGAGLRAAFGLVAE  
AP LPDFKPMMPYQPNMTLVQVVPKSTTKMRDLLQRLVLCNPDVVVGAGGAGLRAAFGLVQE  
BM LPDYKPLVYQPSLGLAQVVPRLPARGRDLRLARLLTCNPDALVIGAGGAGLRAAFGLVQE  
CQ LSDYKFFPLYPPTTSWSQVVPRLNSKGRDLLQKLLICRPDAVVVGAGGAGLRAAFGLVAE  
DM LSDYVALPSPFAITWSQVVPRLNSKGRDLLQKLLICRPDAVVVGAGGAGLRAAFGLVAE  
IS LPDYKPLPIYQPTSSFAQVVPKMSPKGRDLLQKLLCNF-----  
NV LPDYKFFPMYHPTTSFAQVVPKLSCKGRDLLQ--VCRSDAVVVGAGGAGLRAASGLVEA  
PH LPDYKFFPYHPTQGLAQVTPKLTARGKDLRLVLCNPDVVVGAGGAGLRAAFGLVEE  
TC LPDYKFFVYHPSMFTQVVPKLSKGRDLLQRLVLCNPDVVVGAGGAGLRAAFGLVAE  
PP LPDYKFFPLYQPNMSLSQVVPKLNKGRDLRLQRLVLCNPDVVVGAGGAGLRAAFGLVAE  
CE LPEYKVFPIYHPTSFSQVVPKLNKGRDLRLQKLLVLCNPDVVVGAGGAGLRAAFGLVEE  
LPDYKPYPIYHPTLWSQIVPNLSRGRDLRLQKLLVLCNPDVVVGAGGAGLRAAMGLAEG  
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15130 15140 15150 15160 15170 15180  
=====  
AA GFKTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
AG GFKTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
AM GFKTAVVTKLFPTRSHTVAAQGGINAALGNMEEDNQQWHMYDTVKGSDWLGDQDAIHYMT  
AP GFKTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYLT  
BM GFKTAVVTKLFPTRSHTVAAQGGINAALGNMEEDSWLWHMYDTVKGSDWLGDQDAIHYMT  
CQ GFKTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
DM GFRTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
DP -----MEKDDWKWHMYDTVKGSDWLGDQDAIHYMT  
IS GFKTACITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
NV GFKTAVVTKLFPTRSHTVAAQGGINAALGNMEEDNQQWHMYDTVKGSDWLGDQDAIHYMT  
PH GFNTAVITKLFPTRSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
TC GFKTAVVTKLFPTRSHTVAAQGGINAALGNMEEDNQQWHMYDTVKGSDWLGDQDAIHYMT  
PP GFKTACITKLFPTGSHTVAAQGGINAALGNMEEDDWKWHMYDTVKGSDWLGDQDAIHYMT  
CE GLKTAVITKLFPTRSHTVAAQGGINAALGNMNPDNWRWHFYDTVKGSDWLGDQDAIHYMT  
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15190 15200 15210 15220 15230 15240  
=====  
AA REAPKAVIELENYGMPFSRTPDGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
AG REAPKAVIELENYGMPFSRTPDGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
AM REAPKAVIELENYGMPFSRTSDGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
AP REAPAAVIELENYGMPFSRTDEGKIYQRAFGGQSLYQYKGGQAHRTCCVADRTGHSLLHT  
BM KEAPHAVIELENYGMPFSRTPEGKIYQRAFGGQSLKYGKGGQAHRCVAVADRTGHSLLHT  
CQ REAPKAVIELENYGMPFSRTPDGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
DM REAPKAVIELENYGMPFSRTQDGKIYQRAFGGQSLKYGKGGQAHRCVAVADRTGHSLLHT  
DP KEAPHAVIELENYGMPFSRTQDGKIYQRAFGGQSLYNYGKGGQAHRCVVADRTGHSLLHT  
IS -----FFRTQEGKIYQRAFGGQSLYNYGKGGQAHRCVAVADRTGHSLLHT  
NV REAPKAVIELENYGMPFSRTTEGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
PH REAPKAVIELENYGMPFSRTDEGKIYQRAFGGQSLNFKGKGGQAHRCVVADRTGHSLLHT  
TC REAPKAVIELENYGMPFSRTSEGKIYQRAFGGQSLKYGKGGQAHRCVVADRTGHSLLHT  
PP KEAPKAVIELENYGMPFSRTTEGKIYQRAFGGQSLYNYGKGGQAHRCVAVADRTGHSLLHT  
CE REAERAVIELENYGMPFSRTTDGKIYQRAFGGQSLNDFGRGGQAHRTCCVADRTGHSLLHT  
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15250 15260 15270 15280 15290 15300  
=====  
AA LYGQSLSYDCNYFIEYFALDMLMENGQ--CVGVIALNLEDGSIHRFRSKNTVLATGGYGR  
AG LYGQSLSYDCNYFIEYFAMDLLMQNGE--CVGVIAMNLEDGSIHRFRKNTVLATGGYGR  
AM LYGQSLSYDCNYFVEYFALDMLMEDGE--CRGVIALCLEDGTLHRFHSKNTVLATGGYGR

AP LYGYSLKFCNCYFVEYFALDLDLIMDKGQ--CVGVIALCLELDTIHRFRKNTVLATGGYAR  
BM LYGQSLRYDCYFIEYFALDLDLIMEDGV--CKGCIAINLEDGTLHRFQAKNTILATGGTGR  
CQ LYGQSLSYDCNYFIEYFAMDLLMENGQ--CVGVIALNLEDGSIHRFRSKNTVLATGGYGR  
DM LYGQSLSYDCNYFVEYFALDLDLIFEDGE--CRGVLALNLEDGTLHRFRKNTVIATGGYGR  
DP LYGQSLRYDCNYFVEYFALDLDLMEEGE--CRGVIALCLELDTIHRFRSKNTVLATGGYGR  
IS LYGQSLSFNCNFFVEYFAMDLLMENGE--CRGVLALSLEDGTLHRFRKNTVLATGGYGR  
NV LYGQSLSFDCNYFIEYFALDLDLIMEDGE--CRGVIALCLELDTIHRFRKNTVLATGGYGR  
PH LYGQSLRYDCNYFIEYFALDLDLIMDKNEKTKGVIALCLELDTIHRFRKNTVLATGGYGR  
TC LYGQSLRYDCNYFIEYFALDLDLIMEDGE--CRGVIALCLELDTIHRIRAKNTVLATGGYGR  
PP LYGRSLAFDCNFFIEYFALDLDLIMDNGI--CKGVITALCLELDTVHRFNANNTVLATGGYGR  
CE LYGASLQYNCNYFVEYFALDLDLIMENGV--CVGVIAMLLEDGTLHRFRSKNTVLATGGYGR  
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15310 15320 15330 15340 15350 15360  
=====+=====+=====+=====+=====+=====+  
AA AYFSC TSAHTCTG DGTAMVARAGLPSEDLFVQFHPTGIYAGCLITEGENVRFYVEE  
AG AYFSC TSAHTCTG DGTAMVARAGLPSEDLFVQFHPTGIYAGCLITEGENVRFYVEE  
AM AYFSC TSAHTCTG DGTAMSRANLPQDLEFVQFHPTGIYAGCLITEGENLRFHIEE  
AP AYFSC TSAHTCTG DGTALASRAGIPMQDMEFVQFHPTGIYAGCLMTEGENLRFHIEE  
BM SYFSC TSAHTCTG DGTAMAARVGLQNE DMEFVQFHPTGIYAGCLMTEGENLRFHIEE  
CQ AYFSC TSAHTCTG DGTAMVARAGLPSEDLFVQFHPTGIYAGCLITEGENVRFYVEE  
DM AFFSC TSAHTCTG DGTAMVARQGLPSQDLEFVQFHPTGIYAGCLITEGENVRFYVEE  
DP TFFSC TSAHTCTG DGTAMVSRAGLPQDLEFVQFHPTGIYAGCLITEGENLRFHVEE  
IS TFFSC TSAHTCTG DGTAMVTRAGLPQDMEFVQFHPTGIYAGCLITEGENLRFHVEE  
NV AYFSC TSAHTCTG DGTAMVSRANLPQDLEFVQFHPTGIYAGCLITEGENLRFHVEE  
PH AYFSC TSAHTCTG DGTAMISRAGLHNE DLEFVQFHPTGIYAGCLITEG-----  
TC AFFSC TSAHTCTG DGTAMVARAGLPQDLEFVQFHPTGIYAGCLITEGENLRFHVEE  
PP TYFSC TSAHTCTG DGTAMVSRVGLPCEDHEFVQFHPTGIYAGCLITEGENLRFHIEE  
CE AFFSC TSAHTCTG DGTALTARAGINNS DMEFVQFHPTGIYAGCLITEGENLRYHLEE  
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15370 15380 15390 15400 15410 15420  
=====+=====+=====+=====+=====+=====+  
AA KGV D ASGNKVKADKDKVKA FRESLAKLGDVYVND AFGTAHRAHSSMMGEGYQRAAGLLL  
AG KGV D ASGNKVKADKDKVKT FRESLAKLGDVYVND AFGTAHRAHSSMMGEGYSQRAAGLLL  
AM KGVGDGKKIKADKTKVDFRKSRLKLDIYVND AFGTAHRAHSSMLGEGYETRASGFL  
AP KGVNAAGEKTKADKEDVKKFRESLQKLG D VYVND AFGTAHRAHSSMMGEGFEKRAAGILL  
BM KGV D ASGAKVKADPEKVKAFRASLRKLG D VYVND AFGTAHRAHSSMVGEGFEQRAAGFL  
CQ KGV D ATGAKVKADKDKVVFRESLAKLGDVYVND AFGTAHRAHSSMMGEGYQRAAGLLL  
DM KGLDASGGKVKADPAKVKEFRASLAKLGDVYVND AFGTAHRAHSSMMGDGFQRAAGLLL  
DP KGV D AAGNKIKAAKEDVQKQESLRR LG D VYVND AFGTAHRAHSSMLGTGFVDRASGFL  
IS KGV D ANGAKVKASPEATAAFQQLSLTSLGDVYVND AFGTAHRAHSSMVGVKLAQRAAGLLM  
NV KGVGPDGSKIKADKDKVTEFRASLRKLG D VYVND AFGTAHRAHSSMMGDGFDIRASGFL  
PH -----RVKASPENVKK FRESLSKLG DLYVND AFGTAHRAHSSMLGEGFEKRAAGFL  
TC KGV D ASGKKIKADPAQVTAFRQSLRKLGDVYVND AFGTAHRAHSSMMGEGFEQRAAGFL  
PP KGV D AAGNKKKADAEVKKFSAALTRLGDVYVND AFGTAHRAHSSMVGITLPERAAGFLM  
CE KGV D ASGAKVKADSAAVKKFRESLTKLGD IYVND AFGTAHRAHSSMVGVESHQRAAGFL  
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15430 15440 15450 15460 15470 15480  
=====+=====+=====+=====+=====+=====+  
AA NKELRYFSQALDNP RPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVLNN  
AG NKELRYFSQALDNP RPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVLNN  
AM KKELEYFAKALENPERPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKISKN  
AP NKELTYFAKALDNP RPFLAILGGAKVADKIQ LIENLLDKVDEMI IGGGMAYTFLKESKG  
BM KKELEYFAKALHEPERPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKETKG  
CQ NKELRYFGQALDNP RPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVLNN  
DM NKELRYFSQALDKP NPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVLNN  
DP KKELEYFAKALDNP RPFLAILGGAKVADKIQ LIENLLDQVNEMI IGGGMAYTFLKVI NG  
IS KKELEYFSKALDNP SRPFLAILGGAKVADKIQ LIENMLDKVNEMI IGGGMAYTFLKV TEN  
NV KKELEYFAKALDNP EK PFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVTKN  
PH KKELEYFAKALDEPERPFLAILGGAKVADKIQ LIENLNKVS ELI IGGGMAYTFLKVLKN  
TC KKELEYFAKALDKPEK PFLAILGGAKVADKIQ LIENLLDKVQEMI IGGGMSY TFLKVTKD  
PP KKELDYFKKALDNP ARPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVNKG  
CE KNELSYFSKALDNP ARPFLAILGGAKVADKIQ LIENLLDKVNEMI IGGGMAYTFLKVAQG  
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15490 15500 15510 15520 15530 15540  
=====+=====+=====+=====+=====+=====+  
AA MEIGGSLFDEEGSKI VQKLVDKAKANNVQLHLPVDFVTGDKFAEDA AVGAATVESGIPAG  
AG MEIGGSLFDAEGAKI VQNLVDKAKANNVQLHLPVDFVTGDKFAEDA ATGEATVASGIPAG  
AM MKIGNSLFDEEGAKI INNLLSKAEKNVQIHLPI D FVTADKFAENATVGAADIESGIPDG  
AP MKIGDSLFD EAGAKI VGKLEKATARNVKIHLPI D FVTADKFDENANTSSATVEEGVDPG  
BM MPIGNSLYDAEGAKI VTKLLEKAEKNVQIHLPI D FVTADKFDENASVGEANVETGIPDG  
CQ MEIGGSLYDEEGSKI VQKLVDKAKANNVQLHLPVDFVTGDKFAEDA AVGAATVESGIPAG  
DM MKIGGSLFDEEGSKI VEKLVKAEKNVQIHLPI D FVCGDKFAENA AVSEATVEAGIPDG  
DP MQIGNSLFDEEGSKI VKDLVAKAEKNVQIHLPI D FVTADKFAEDA ATQSASVESGIPAG



CE LGIPDSNIIIMLAEDVPCNSRNPRPGTVY-AARAGTNLYGSDVEVDYRGEEVTVESFIRV  
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15790 15800 15810 15820 15830 15840  
=====  
AA LTGRNENGTARSKRLSDAGSNVLIYLTGHGGDGF LKFQDSE EITNQELADAIEQM WQKQ  
AG LTGRNENGTARSKRLSDAGSNVLIYLTGHGGDGF LKFQDSE EITNQELADAIEQM WQKQ  
AM LTGR LAPETPRSKLLTDEGSN ILIYLTGHGGNGF LKFQDSE EITSKELADALEQM WQKR  
AP LTGR LAPETPRSKLLTDEGSN ILIYLTGHGGNGF LKFQDSE EITSKELADALEQM WQKR  
BM LTGRVPPDTPRSKQLLTDEGSN ILIYLTGHGGDGF LKFQDSE EITNQELADALEQM WQKQ  
CQ LTGRNENGTARSKRLSDAGSNVLIYLTGHGGDGF LKFQDSE EITNQELADAIEQM WQKQ  
DM LTGR TQNGTARSKLLSDAGSNV LIYLTGHGGDGF LKFQDSE EITSQELADGIQ MW EKK  
DP LTGR LAPASTPRSKLLTDEGSN VLIYLTGHGGDGF LKFQDSE EITNVDLADAIQ MW EKK  
IS LTGR LAPANTPRSKLLTDEHSN ILIYMTGHGGDGF LKFQDAEE ITNVELADAFEQM WQKR  
NV LTGR LAPETPRSKLLTDEGSN ILIYLTGHGGNGF LKFQDSE EITSQELSDALEQM WQKR  
PH LTGR LPPETPRSKQLLTDEGSN ILIYLTGHGGDGF LKFQDSE EITSQELADALEQM WQKR  
TC LTGR LPPGTPRSKQLLTDEGSN VLIYLTGHGGDGF LKFQDSE EITSQEMADALEQM WQKQ  
PP LTGR VPENTPTSKRLQTDEHSN ILVYMTGHGGEGF LKFQDSE KELTSVELADAFEQM WQMR  
CE LTGR HHPATPRSKRLT DHQSNV LIYLTGHGGDSFMKFQDSE EITNVDLAYAIQ TMFEDN  
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15850 15860 15870 15880 15890 15900  
=====  
AA RYNELFFMIDTCQAASMYEKFYSPN ILAVASSLVGEDSLSHHVDPAIGVYI IDRYTY YAL  
AG RYNELFFMIDTCQAASMYEKFYSPN ILAVASSLVGEDSLSHHIDPAIGVYI IDRYTY NAL  
AM RYHEILFIVDTCQAASMYEKFYSPN ILAVASSLVGEDSLSHHLDPAIGVYI IDRYTY YAL  
AP RYHEILFMIIDTCQAASMYEKFYSPN ILAMASSLVGEDSLSHHVDPAIGVYI IDRYTY YAL  
BM RYNEIFFIIDTCQAASMYEKFYSPN ILATASSLVGEDSLSHHVDSAIGVYI IDRYTY YVL  
CQ RYNELFFMIDTCQAASMYEKFYSPN ILAVASSLVGEDSLSHHVDPAIGVYI IDRYTY YAL  
DM RYHEILFMIIDTCQAASLYEKF TSPNVLAVASSLVGEDSLSHHVDPSIGVY MIDRYTY YAL  
DP RYHEMLFIVDTCQAASLYQKFYSPN VLAIGSSLVGEDSLSHHVDPAIGVYI IDRYTY YAL  
IS RYNEIFFIIDTCQAESMYKWFYSPN ILVASSKVGEDSLSHHGDP TIGVYI IDRYTY YAL  
NV RYHEILFIVDTCQAASMYEKFYSPN ILAVASSLVGEDSLSHHVDPAIGVYI IDRYTY YAL  
PH RYHEILFMIIDTCQAASMYEKFYSPN VLAIVASSLVGEDSLSHHMDLAI GVYI IDRYTY YAL  
TC RYHEILFMIIDTCQAASMYERFYSPN ILAVGSSLVGEDSLSHHVDS S IGVYI IDRYTY YAL  
PP RYHEILFIVDTSCHSESMFLT FYSPN ILAVSSSRVNE DLSHHGDSRIGVYI IDRYTY YAL  
CE RYHEMLVIADSCRSASMYEWI DSNVLSLSSSLTHEESYSYDVDT D IGVYI IDRYTY YV  
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15910 15920 15930 15940 15950 15960  
=====  
AA EFLEKVE--VNSKKTMG EFLSVC PKRVCI STVGVRKDLY PKDPYKVP ITDF FGSIRPTEI  
AG EFLEERVE--VNSKKTMG DFLSVC PKRACI STVGVRKDLY PKDPYKVP ITDF FGSIRPTEI  
AM DFLEKVE--PSSSKTLGEFLKVC PKHYCLSTVGVRKDLFRRDPNKVP ITDF FGSIRPV EL  
AP KFLENVVK--LKSRI SMK SFLGVC PKQDCI STVGVRIDL FHRDLAKVP ITDF FGSIRPV EL  
BM EFLENVH--PNSKRTMEFLAVCPK SACLSTVGVRKDLFNRDP SKVP ITDF FGSIRPV EL  
CQ EFLEKVE--VNSKKTMG EEFVSKLL-----  
DM EFLEKVQ--PFSKRT IGEFLQVC PKRVCI STVGVRKDLY PRDPHKVP ITDF FGAIRP TRV  
DP EFLEHVT--PSSNHTLG QFLKVC PKYLCLSTVGFRSDLFQRDPNRV ITDF FGSIRKRIEM  
IS EFLEAVK--SNSNKTMG QFLRVC PKRVCI STVTSRKDLF KRNVDEVPL TDF FGSIRV NVEL  
NV EFLETVE--PSSSKTLSEFLKVC PKHYCLSTVGVRDLFRRDPKTPVP ITDF FGSIRPV EL  
PH EFLEVRD--QHSEKT IDDFLKVC PQVACI STVGVRKDLFLRNTK KVP ITDF FGSIRPV EL  
TC EFLENVD--QHTKKTMG EFLNVC PKRVCI STVGVRDLFARNPHQVP ITDF FGSIRPV EG  
PP QFLERVR--PDSAVSMHEFFKVC PKSQCI STVATRKNLFQRDVKEAQLTEFFGGV RNIEL  
CE NFLTKEVKALNSSANMQDY IDSCPARKCLSN TGVKRDHY PKDVKRV RVTDF FGSIRI FQH  
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15970 15980 15990 16000 16010 16020  
=====  
AA TSGVNVMMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
AG SSDVNVMMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
AM TTNIMTVMMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
AP TDFLDIMKKVLLMGKSGSGKT SMRSII FANYIAKDT SRLGATI DVEHSHVRFLGNLVL  
BM TTDPIIMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
CQ -----MFLFP-----VDVEHSHVRFLGNLVL  
DM STDRI NVMMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
DP AADPIVLMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
IS SRSRVLMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
NV TTNIEIMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
PH TNKTIKLFYFQVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
TC AMSSGSIMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGATI DVEHSHVRFLGNLVL  
PP T YELIDLMMKKVLLMGKSGSGKT SMRSII FANYIARDTRRLGPTIEVEHAHVFLGNLVL  
CE LSEEIVLSKRKVVLLMGKSGSGKT SMRSII FANYIARDCSRLGPTIEVEHAHVFLGNMVL  
#####

16030 16040 16050 16060 16070 16080

====+====+====+====+====+====+
AA NLWDCGGQESFMEQYFASQKDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILQN
AG NLWDCGGQESFMEQYFASQKDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILVN
AM NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILQN
AP NLWDCGGQEAFFMENYFVSQRDNIFRNVEVLIYVFDVESRDEELKRDRLRYETCLSAIYEN
BM NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--EMEKDMHYQSCLEAILQN
CQ NLWDCGGQESFMEQYFASQKDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILQN
DM NLWDCGGQEGFMKQYFAQQRDNIFRNVEVLIYVFDVESQ--EIERDIHYQSCLEAILQN
DP NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--ELEKDMHYQSCLEAILQN
IS NLWDCGGQEAFFMENYFASQKDTIFRNVEVLIYVFDVESR--ELEKDLHYQSCLEAILQN
NV NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILQN
PH NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--ELDKDMHYQSCLEAILQN
TC NLWDCGGQEAFFMENYFASQRDNIFRNVEVLIYVFDVESR--ELEKDMHYQSCLEAILQN
PP NLWDCGGQEVFMENYFQAQRDTIFRSVEVLIYVFDVSM--ECEKDEHYQSCLEAILAN
CE HLWDCGGQESFMENYLVSQKDQIFKNVQVLIYVFDVESR--EFEKDLRYQSCLEAILQN
#####

16100 16110 16120 16130 16140
====+====+====+====+====+====+
AA SPDAKIFCLVHKMDLVAEEQRDIFKEREEDLKRLSK---PLE-----CTAFRTSIW
AG SPNAKIFCLVHKMDLVAEEQRDIFKEREEDLKRCR---PLE-----CTAFRTSIW
AM SPEAKIFCLVHKMDLVQEDQRDLIFREREEDLKRLSL---PLE-----CTCFRTSIW
AP SPSAKVFCLIHKMDLVQEDQRDKIFSDRENEIINMSK---PVD-----CSCFKTSIW
BM SPEARIFCLVHKMDLVAEEQREEIFRAREEDLKGLSK---PLE-----CTCFRTSIW
CQ SPDAKIFCLVHKMDLVAEEQRDIFKEREEDLKRLSK---PLE-----CTAFRTSIW
DM SPEAKIFCLVHKMDLVPEGLRESVFTERMEDLIKLSK---PGN-----VTCFRTSIW
DP SPEAKIFCLVHKMDLVQEDQRDLIFREREEDLKRLSK---PLD-----CTCFRTSIW
IS SAEAKIFCLVHKMDLVPEEERERIFQLRQEDLNKLSK---PLE-----CTCFRTSIW
NV SPDAKVFCLIHKMDLVQEDQRDSIFREREEDLRRLSL---PLQ-----CTCFRTSIW
PH SPEAKVFCLIHKMDLVQEDQRDIFREREEDLKRLSK---PLQ-----CTCFRTSIW
TC SPEAKVFCLIHKMDLVQEDQRDIFREREEDLKRLSK---PLE-----CTCFRTSIW
PP SPSAKVFCLVHKMDLISEKDRQSVFDGRVSTLKTLSR---PIE-----PICFRTSIW
CE SPNAQVFCLIHKMDLIEEDKREETFKRREADVLRYSALAATPLQNERTNAVQCCKSSIW
#####

16150 16160 16170 16180 16190 16200
====+====+====+====+====+====+
AA DETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFLVISHCQRKQHRDS
AG DETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFLVISHCQRKQHRDS
AM DETLYRAWSSIVYMLIPNVKELEQSLKQFTNIIDAVEVLLFERATFLVISHCQRKQHRDV
AP DETLYRAWSSIVYKLIIPNVKELEQSLTLFADLMDGDEVLLFERATFLVISHCQRNLQRDI
BM DETLYKAWSSIVYKLIIPNVKALESSLKQFAAIVDADEVLLFERATFLVISHCQRKQHRDA
CQ DETLYRAWSSIVYQLIPNVKALEHSLNYFANVVDADEVLLFERATFLVISHCQRKQHRDS
DM DETLYKAWSSIVTMLIPNVALENSVTHFGNVEEDEVLLFEKATFLVISHCQSKKNRDS
DP DETLYKAWSSIVYMLIPNVKELECSLTNFADIIDAVEVLLFERATFLVISHCERRPHRDP
IS DETLYKAWSSIVYTLVNPVQQLLETNLQFTNIIDAVEVLLFEKATFLVISHCQRKQHHDV
NV DETLYRAWSSIVYMLIPNVKELEQSLNQFANIIDAVEVLLFERATFLVISHCQRRYHRDV
PH DETLYRAWSSIVYKLIIPNVQLEQSLNEFANIIDAVEVLLFEKATFLVISHCERRHRDV
TC DETLYRAWSSIVYMLIPNVKELENSLQFANIIVDADEVLLFERATFLVISHCQRKHHRDV
PP DETLYKAWSSIVYTLVNPVKELENSLNFQIINAVEVLLFEKATFLVISHCQQREHQDI
CE DETLYKAWSAIVYHLVNPVGTMEDKLLKFGAILDAVEVLLFERATFLVIAHAVLREHKDP
#####

16210 16220 16230 16240 16250 16260
====+====+====+====+====+====+
AA HRFEKVSNIKQFKLSCSKLGAQFSSMEVRNSIFAAFIDTFTSNTYVVMVMSDPSIPSEA
AG HRFEKVSNIKQFKLSCSKLGAQFSSMEVRNSVFAAFIDTFTSNTYVVMVMSDPSIPSEA
AM HRFEKVSNIKQFKLSCSKLAAQFQSMVEVRNINFAAFIDVFTSNTYVVMVMSDPAIPSA
AP HRFEKVSNIKQFKLSCSKVAAQFQSMVEVRNSNFAAFIDLFTTNTYIMVIMSDPHIPSA
BM HRFEKVSNIKQFKLSCSKLAAQFQSMVEVRNSVFAAFIDGFTSNTYVVMVMSDPAIPSEA
CQ HRFEKVSNIKQFKLSCSKLGAQFSSMEVRNSIFAAFIDTFTSNTYVVMVMSDPSIPSEA
DM HRFEKVSNIKQFKLSCSKLGAQFQSMVEVRNSAFAAFIDTFTSNTYVVMVMSDPTLPSEA
DP HRFEKVSNIKQFKLSCSKLAAQFQSMVEVRNSNFAAFIDVFTSNTYVVMVMSDSTIPSA
IS HRFEKVSNIKQFKLSCSKLAAQFHSMEVRNGNFAAFIDAFTPNTYIMVIMADPSMPSAA
NV HRFEKVSNIKQFKLSCSKLAAQFSSMEVRNINFAAFIDVFTSNTYVVMVMSDPTIPSA
PH HRFEKVSNIKQFKLSCSRLLAAQFHSMEVRNSNFAAFIDVFTSNTYVVMVMSDPAIPSA
TC HRFEKVSNIKQFKLSCSKLAAQFQSMVEVRNSAFAAYIDMFTSNTYVVMVMSDPAIPSEV
PP HRFEKVSNIKQFKLSCSKLAAQFQSMVEVRNSNFAAFIDEMFTQNTYVVMVMSDSTIPSES
CE HRFEKVSNIKQFKLSCSKLGAQFSSMEVRNSIFAAFIDTFTSNTYVVMVMSDPAIPSA
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16270 16280 16290 16300 16310 16320
====+====+====+====+====+====+
AA TLINIRNARKYFEELNPNMSIEIESADVIRLIQQYLKESNLHKTQTQEETGVSLSNTV
AG TLINIRNARKYFEELNPNICALFLLSVIRLIQQYLKESNLHKTQTQEETGVSLSNTV
AM TLINIRNARKHFEKLERASMSIEIESADVIRLIQQYLKESNLVKTQTQEETGVSLSNTV
AP TLLNKNARKHFEKLERSSMSIEIESADVIRLIQQYLKESNLKLSQTQEETSLSNTV

BM TLINIRNARKHFEKLEKVSMSIEIESADVIRLIQQYLKESNLTKTLQTLQEETGVTLNTV  
CQ TLINIRNARKYFEELNPNMSIEIESADVIRLIQQYLKESNLHKTTLQTLQEETGVSLNTV  
DM TLVNI RNARKYFEELNPNMSIEIESADVIRLIQQYLKESNLTKTLQTLQEETGVSLNTV  
DP TLMNMKNARKHFEKLEKLSMSIEIESADVIRLIQQFLKESNLMTLQVLQDEETGSLNTV  
IS TLINIKNARKHFEKLEKAG---EIESADVIRLIQQYLKESNLRTLQVLQDEETSISLNTV  
NV TLINIRNARKHFEKLERASMSIEIESADVIRLIQQYLKESNLVKTTLQTLQEETGVSLNTV  
PH TLINIKNARKYFEKLERVA-----  
TC TLINIRNARKHFEKLEKVSMSIEIESADVIRLIQQYLKESNLRTLHTLQEETGVTLNTV  
PP VSLNIRNARKHFDKLDGVRMAIEIEAADVIRLIQQYLKESNLHRSLLQVLQDEETSISLNTV  
CE ITMNVKNARKVFEAIEITKSSSIEIESSDVIRLIEQFLKESNLHRTLAILQEETNVSLNTV  
#####

16330 16340 16350 16360 16370 16380  
=====+=====+=====+=====+=====+=====+  
AA DSVEGFVSDIHNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
AG DSVEGFVSDIHNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
AM DSVDFGVADINNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
AP DSDIGFVADIHNGHWDTVLKAQVSLKLPDSKLI DLYEQVVLELIELRELGAARSLLRQTD  
BM DSVDFGCADINNGHWDTVLKAQVSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTH  
CQ DSVEGFVSDIHNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
DM DSVDFGVQDINNGHWDTVLKVTSKLPDKKLLNLYEQVVLELIELRELGAARSLLRQTD  
DP DSVESFADDILSGHWDTVLKAQVSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
IS DSVDSFVQDILSGHWDTVLKVVSQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
NV DSVDFGVADINNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTE  
PH -----  
TC DSVDFGCADINNGHWDTVLKAIQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
PP DSDIGFVQDILHGHWDTVLKVVSQSLKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD  
CE DSDIGFCNEITSGNWDNVLKVTSKLPDKKLI DLYEQVVLELIELRELGAARSLLRQTD

16390 16400 16410 16420 16430 16440  
=====+=====+=====+=====+=====+=====+  
AA PMIMLKQQAERYIHLENMLQRAYFDPREAYPEGGSKEKRRRAIATALAGEVSVVPSRRL  
AG PMIMLKQQAERYIHLENMLQRAYFDPREAYPEGGSKEKRRRAIATALAGEVSVVPSRRL  
AM PMIMMKQQAEPERYIHLENLLARSYFDPREAYPDGSTKEKRRRAIATALAGEVSVVPSRRL  
AP PMIALKQHEPDRYIHLENLLARSYFDPREAYPEGSTKEKRRRAIATAQSLAGEVSVVPSRRL  
BM PCLLMKQHETDRYMHLENLLARSYFDPREAYGSGGKERRRVAIAASLAGEVSVVPSRRL  
CQ PMIMLKQQAERYIHLENMLQRAYFDPREAYPEGGSKEKRRRAIATALAGEVSVVPSRRL  
DM PMTMLKQQAEPERYIHLENMLQRAYFDPREAYAEAGSKEKRRRAIATAQSLAGEVSVVPSRRL  
DP PMALMKQQAEPDRYLNLENLLARSYFDPREAYPEGGSKEKRRRAIATAQSLAGEVSVVPSRRL  
IS PMIKLKQQAEPERYIHLENLLARSYFDPREAYAEAGSKEKRRRAIATAQSLAGEVSVVPSRRL  
NV PMVMKQQAEPERYIHLENLLARSYFDPREAYPDGSTKEKRRRAIATAQSLAGEVSVVPSRRL  
PH -MIVLKQQAERYIHLENLLARSYFDPREAYPDGSTKEKRRRAIATAQSLAGEVSVVPSRRL  
TC PMIMMKQQAEPERYIHLENLLARSYFDPREAYPDGSTKEKRRRAIATAQSLAGEVSVVPSRRL  
PP PMLMKKADEPERYLNLESLNKSFFDPLEAYPAGSKEKRRRAIATAQSLAGEVSVVPSRRL  
CE PMILLKQIDPDRFARLESILINRPYFDGQEVYG-DVSKEKRRRAIATAQSLAGEVSVVPSRRL  
#####

16450 16460 16470 16480 16490 16500  
=====+=====+=====+=====+=====+=====+  
AA LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIRDQEDMFPTQLSRQIKFGQKSHVECAL  
AG LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIRDQEDESYPTQLARQIKFGQKSHVECAL  
AM LALLGQALKWQQHQGLLPPGTTIDLFRGKAAAVRDQEDKEYPTQLSKQIKFGQKSHVECAR  
AP LALLGQALKWQQHQGLLPPGTTIDLFRGKAAAVRDLEETFPPTQLFKQIKFIQKSHVECSR  
BM LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIRDQEDDLCPPTQLSKI KFGQKSHVECAR  
CQ LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIRDQEDESFPPTQLARQIKFGQKSHVECAH  
DM LALLGQALKWQQHQGLLPPGTTIDLFRGKAAAMKQDEEMYPPTQLFRQIKFGQKSHVECAQ  
DP LALLGQSLKWQQHQGLLPPGTTIDLFRGKAAIKEQBEEQPTQLTKHIKFGQKSHVECAK  
IS LALLGQALKWQQHQGLLPPGTTIDLFRGRAALREQEDERFPPTQLARI IKLGLKAHIECAR  
NV LALLGQALKWQQHQGLLPPGTTIDLFRGKAAAVRDQEDKEYPTQLSKQIKFGQKSHVECAR  
PH LALLGQALKWQQHQGLLPPGTTIDLFRGKAAAMRDQEDKEYPTQLSKQIKFGQKSHVECAK  
TC LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIRDQEDQFPPTQMAKQIKFGQKSHVECAR  
PP LALLGQALKWQQHQGLLPPGTTIDLFRGKAAIKEQBEEQPTMLAKTIKFG-KNSAEACAT  
CE LSLGQSLKWQLHQGLLPPGTTIDLFRGKAAQKEQIEERYPTMMARS IKFSTKSY PESAV  
#####

16510 16520 16530 16540 16550 16560  
=====+=====+=====+=====+=====+=====+  
AA FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAT  
AG FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAT  
AM FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAG  
AP FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLVS  
BM FSPDQYLVTVGSVDGVEVWNFTTGKIRKDLRYQAHDYEMCMEAVLSLAFARDSDTLAA  
CQ FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAT  
DM FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAS  
DP FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAS  
IS FSPDQYLVTVGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMEQAVLMSFSDSEMLAS

NV FSPDGQYLVTGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMMEQAVLSMAFSRDSEMLAG  
PH FSPDGQYLVTGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMMEAVLCSFSDSEMLAT  
TC FSPDGQYLVTGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMMEHAVLCSFSDSEMLVT  
PP FSPDGQYLVTGSVDGFIEVWNFTTGKIRKDLKYQAQDNFMMMEAVLCLFSDSEML--  
CE FSPDANLVSGSKDGFIEVWNFMNGKLRKDLKYQAQDNLMMMDAAVRCISFSDSEMLAT  
#####

16570 16580 16590 16600 16610 16620  
=====  
AA GSQDQGIK----VWKLITGQCLRRFEKAHSGVTCLOFSDNSQILTASFHDLIRLYGL  
AG GSQDQGVK----VWKLITGQCLRRFEKAHSGVTCLOFSDNSQILTASFHDLIRLYGL  
AM GSQDQGIK----VWRVQSGQCLRRFEKAHSGVTCLOFSDNSQILSASFDTTIRIHGL  
AP GSQDQGVK----VWKIQTGQVMRKFEKAHVLTICVQFSDNTQILTGSFDMTIRIHGL  
BM GSNDGKIN----VWKVSTGKVQRKLDRAHSGVTCLOFTRDNTQILSASFDRTIRIHGL  
CQ GAQDQGIK----VWKLITGQCLRRFEKAHSGVTCLOFSDNSQILTASFHDLIRLYGL  
DM GAQDQGIK----VWRIITGQCLRKFEKAHTKGITCLOFSDNSQVLSASFDYTVRHLGL  
DP GSQDQGIK----VWKIQTGQCLRKFEKAHSGVTCLOFSDNSQVLSASFDYTVRHLGL  
IS GSQDQGIKASLTSVWKIQTGQCLRRFEKAHSGVTCLOFSDNSQVLSASFDYTVRHLGL  
NV GAQDQGIK----IWKVQSGQCLRRFEKAHSGVTCLOFSDNSQVLSASFDYTVRHLGL  
PH GSQDQGIK----VWRIQTGQCLRKFEKAHTKGITCLOFSDNSQVLSASFDYTVRHLGL  
TC GSQDQGIK----VWRIQTGQCLRKFEKAHTKGITCLOFSDNSQVLSASFDYTVRHLGL  
PP -----  
CE GSIDGKIK----VWKVETGDCLRRFDRAHTKGVCAVRFKSDNSHILSGGDHVVVRVHGM

16630 16640 16650 16660 16670 16680  
=====  
AA KSGKMLKEFRGHTSFVNEAVFSPDGHNVLSASSDGSVKIWSLKTTECLSTFKALG----  
AG KSGKMLKEFRGHTSFVNEAAVSPDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
AM KSGKTLKEFRGHASFVNEAVFAPDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
AP KSGKTLKEFRGHTSFVNEAVVTVDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
BM KSGKMLKEFRGHTSFVNEAVFVLDGHNVLSASSDGTVKVWVRSGEATLTKPLGS----  
CQ KSGKMLKEFRGHTSFVNEAVFSPDGHNVLSASSDGSVKIWSLKTTECLSTFKALG----  
DM KSGKMLKEFRGHSSVNEAVFVLDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
DP KSGKTLKEFRGHTSFVNEAVFVLDGHNVLSASSDGSVKVWSMKSGEVSTYKSLGGSSG--  
IS KSGKMLKEFRGHTSFVNDVIFTPESNHLSASSDGTVKLWSVKSTECSTFKSLGAAGGS--  
NV KSGKTLKEFRGHTSFVNEVIFSSDAHSIIASSDGTVKVWSLKTTECLSTFKALG----  
PH KSGKTLKEFRGHASFVNEAVFVLDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
TC KSGKMLKEFRGHTSFVNEVIFVLDGHNVLSASSDGTVKVWSLKTTECLSTFKALG----  
PP -----  
CE KSGKCLKEMRGHSSYITDVRYSDEGNHII SCSTDGSIRVWHGKSGECLSTFRVGSSE----

16690 16700 16710 16720 16730 16740  
=====  
AA ---SDLAVNSVLMPLK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGAFICAT  
AG ---THLAVNSVLLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGAFICAT  
AM ---ADLTVNSIHLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
AP ---ADVAVNNVHLFPK-NQDHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GCNFCVCT  
BM ---GEPVNTLLLPK-NPDHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
CQ ---SDLAVNSVLMPLK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
DM ---NELAVNTVLLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGAFISAT  
DP ---GDLTIHTITLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
IS GIGTIDITVNSIHLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
NV ---ADLTVNSVHLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCAV  
PH ---GDLTIHTITLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCAV  
TC ---GDLTIHTITLLPK-NPEHFVVCNRNTVIMNMQGGIVRSFSSGKRE--GGDFVCTV  
PP -----  
CE ---DYPILNVIPKSDPPQMIVCNRNTLVVNSISGQVVRTMTSGKRE--KGDFINCI

16750 16760 16770 16780 16790 16800  
=====  
AA ISPRGEFIYCAGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLATYSEDGLLK  
AG ISPRGEFIYCCGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLASYGCDGLLK  
AM VSPRGEFIYCVGEDLVLYCFVSVTSGKLETLNIHEKDVIGLTHHPQNLASYSEDGLLK  
AP VSPRGDWIYVAEDYLVLYCFVSVTSGKLETLNIHEKDVIGLTHHPQNLCTYCEDGMVR  
BM LSARGRLVYCVGEDLVLYCFVSVTSGKLETLNIHEKDVIGLTHHPQNLATYSEDGLLK  
CQ ISPRGEFIYCVGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLASYSEDGLLK  
DM LSPRGEFIYCVGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLASYSEDGLLK  
DP LSPKGEWYICVGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLCTYSEDGLLK  
IS VSPRGEWYICVGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLCTYSEDGLLK  
NV VSPKGEYIYCVGEDLVLYCFVSVTSGKLETLNIHEKDVIGLTHHPQNLCTYSEDGLLK  
PH ISPRGDWYIYCVGEDLVLYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLCTYSEDGLLK  
TC VSPRGDWIYCVGEDLVLYCFVSVTSGKLETLNIHEKDVIGLTHHPQNLCTYSEDGLLK  
PP -----  
CE LSPKGEWAYIAEDGVMYCFVSVTSGKLETLNVHEKDVIGLTHHPQNLCTYSEDGLLK

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16810 16820 16830 16840 16850 16860
=====+=====+=====+=====+=====+=====+
AA MWKPLSCRFYKQKYPAVEDVVMVNVRSIAEMGAYVYLLEYNNIEGMI LLSLSRRRIRSI
AG MWKPLSCRFYKQKYPEVEDVVMVNVRSIAEMGAYVYLLEYNNIEGMI LLSLSRRRIRSI
AM LWKPLSCRFYKEKYPEVEDVVMVNVRSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
AP LWKPLSCRFYAERYPEIDDDVVMVNVRSIEEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
BM LWKPLSCRFYQEKYPEVEDVVMVNVRSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
CQ MWKPLTCRFYKEKYPEVEDVVMVNVRSIAEMGAYVYLLEYNNIEGMI LLSLSRRRIRSI
DM LWKPLTSRFRYNERYPEIEDVVMVNVLSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
DP MWRPLFCRYYGQKYPEVDVVMVNVRSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
IS LWKPLSCRFYSQKYPEPDDVVMVNVQRQIAEMGAYVRLLEYNDIEGMI LLSLSRRRIRSI
NV LWKPLSCRFYKEKYPEVEDVVMVNVRSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
PH LWKPLSCRFYNEKYPEVDVVMVNVRSIAEMGAYVHLLEYNNIEGMI LLSLSRRRIRSI
TC LWKPLSCRFYREKYPEVEDVVMVNVRAIAEMGAYVHLLEYKNIEGMI LLSLSRRRIRSI
PP ---LTCRFYASKYPEPDDVVMVNVQRQIADMGAYVHLLEYNDIEGMI LLSLSRRRIRSI
CE LWMTMKCRFYENQFPDVEETVVANVKMIADMAYVRLSEYNDKEGMI LLSLSRRRIRSV
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16870 16880 16890 16900 16910 16920
=====+=====+=====+=====+=====+=====+
AA NKLIRVGKTEPVVVIRVDQFKGYIDLKRRVSPEDVEKCTERFAKAKAVNSILRHVADMM
AG NKLIRVGKTEPVVVIRVDKDKGYIDLKRRVSPEDVEKCTERFSKAKAVNSILRHVADIM
AM NKLIRVGKTEPVVVIRVDKKEKGYIDLKRRVSAEDVEKCTERYAKAKAVNSILRHVAELL
AP NKLIRIGKTEPVVVIRVDKEKGYIDLKRRVSPEDIEKCTERFAKAKAVNSILRHVAELL
BM NKLIRVGKTEPVVVIRVDKKEKGYIDLKRRVSAEDIYKCTERYAKAKAVNSILRHVAELL
CQ NKLIRVGKTEPVVVIRVDKFKGYIDLKRRVSPEDVEKCTERFSKAKAVNSILRHVADMM
DM NKLIRVGKTEPVVVIRVDKEKGYIDLKRRVSPEDVEKCTERFAKAKAVNSILRHVADIL
DP NKLIRVGKTEPVVVIRVDKKEKGYIDLKRRVSPEDVDCLEKYSKAKAVNSILRHVAELL
IS NKLIRVGRNECVVVIRVDKDKGYIDLKRRVSPEDITKCEEFARGKAVNSILRHVAETL
NV NKLIRVGKTEPVVVIRVDKEKGYIDLKRRVSAEDVEKCTERYAKAKAVNSILRHVAELL
PH NKLIRVGKTEPVVVIRVDKDKGYIDLKRRVSPEDVEKCTERFAKAKAVNSILRHVADLL
TC NKLIRVGKTEPVVVIRVDKDKGYIDLKRRVSAEDVEKCTERFAKAKAVNSILRHVAELL
PP NKLIRVGRNECVVVIRVDKDKGYIDLKRRVSPEDIVKCEEFKAKAVNSILRHVADKL
CE NKLIRVGRSESVVVIRVDKDKGYIDLKRRVYQKDLKQCDERFANAKMNSILRHVAEQV
#####
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16930 16940 16950 16960 16970 16980
=====+=====+=====+=====+=====+=====+
AA KFS-NEQLEELYEKTAWHFEEKLK-SKAAAYDVFKQCVIEPSLLEDCGLEPEVKELLSN
AG GFD-NQKLEELYEKTAWFEEKHN-YKVTAFAVDFKQCAVDPSLLEDCGLEPEVKESLLSN
AM HYDSDDQLEELYQKTAWHFEEKQKASAYDFFKQSVL-----
AP NFESDAQFEELYHKTAWFYEERTK-KKSSAYDFFKQAVQDPTILAECGLDESTQNVLLNN
BM HYETSEQLEELYKKTAWFEEKQK-KKASAYDFFKQAAVDPSVLEDCGLDEETKDVLLAN
CQ KFT-NEQLEELYEKTAWFEEKQK-SKAAAYDVFKQCVIDPALLDECGLEPEVKELLSN
DM GFEGNEKLEDLYQKTAWHFEEKYN-NKTVAYDIFKQSVTDPTVFDECNLEPETKEVLLSN
DP KYQTDDEELEELYRKTAWLFEEKSK-KQSSSYDVFKQAVNDPSLLEDCGLDDNTKEVLLGI
IS KYETDAQLEELYKKTAWFDEKFK-KTTAAYDVFKLAVTDLVLEDCGLDPTREVLLTN
NV NYESDDQLEELYQKTAWHFEEKQKASAYDFFKQSVLDPSILAECGLDERTKEVLLNN
PH DYENDDQLEELYQKTAWRFEEKLK-MKASSYDFFKQAVVDP SILSECGLDNTREVLFAN
TC KYESDEQLEELYQKTAWFEEKQKASAYDFFKQAVSDPSILAECGLDDRTKEVLLSN
PP DYS-KEQLEDLYMKTAWHFDEKLK-KITAGHDIKAAVTDPKVLEDCGLDVKDVLDDLQTT
CE GYTTDEELEELYQKTAWHFDRKEK-RKAASYDAFKKAITEPITLDECDISADIKKELLED
## #####
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16990 17000 17010 17020 17030 17040
=====+=====+=====+=====+=====+=====+
AA IRRKLTSAVKIRADIECACYGYEGIDAVKOTALRAGLDLSTEELPIKINLIAPPLYVMTT
AG IQRKLVSAVKIRADIECACYGYEGIDAVKOTALRAGLALSTEELPIKINLIAPPLYVMTT
AM -----
AP IRRKLTSAVKIRADIEVACYGYEGIDAVKOTALKAGLACSTEELPIKINLIAPPLYVMTT
BM IRRKLTSAVKIRADIECACYGYEGIDAVRAALKAGLALSTVDMPKINLIAPPLYVMTT
CQ IRRKLTSAVKIRADIECACYGYEGIDAVKOTALRAGLELSTEELPIKINLIAPPLYVMTT
DM IRRKLVSPVKIRADIECACYGYEGIDAVKASLTKGLELSTEELPIKINLIAPPLYVMTT
DP IRRKLTQAVKIRADIEVACYGYEGIGAVKKALKAGIACSTEEPIKINLIAPPLYVMTT
IS IKHRLTPQAVKIRADIEVSCYGYEGIDAVKHALREGMALSTEDMPKINLIAPPLYVMTT
NV IRRKLTSAVKIRADIEVACYGYEGIDAVKAAKAGLALSTDELPIKINLIAPPLYVMTT
PH LQRKLTSAVKIRADIEVACYGYEGIDAVKOTALRAGLSLSTEELPIKINLIAPPLYVMTT
TC IRRKLTSAVKIRADIECACYGYEGIDAVKOTALKAGLSLSTDELPIKINLIAPPLYVMTT
PP INHRLAPQALKCRADIEVSCYGYEGIDAVKHALREGMALSTEEMQIKINLIAPPLYVMTT
CE IRRKLTQAVKIRADIEVSCFYDGDIDAVKAAKIALKNCNGTFFKINLIAPPHVVT
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17050 17060 17070 17080 17090 17100
=====+=====+=====+=====+=====+=====+
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AA STPEKADGLKALEVAIEKIKETIENLGGVFKVQMAPKVVVATDEADLARKMERAEEAENAE  
AG STPEKADGLKALEVAIEVIKIKETIEKLGGVFKVQMAPKVVVATDEADLARKMERAEEAENAE  
AM -----  
AP ATPEKTDGLKALQTAIEEIDKSIQTLGGVFKIQMPKVVVATASDEADLVRQMEKAELENAE  
BM STPEKTDGLKALQDAIDKIQENITEAGGVFNQMAPKVVVATDEAELARQMERAEAEENAE  
CQ STPEKADGLKALETAIEKIQESIIEKLGGVFKVQMAPKVVVATDEADLARKMERAEEQENAE  
DM STTKKTDGLKALEVAIEHIRAKTSEYDGEFKVIMAPKLVTAIDEADLARLLERAEAENAQ  
DP QTPERQDGLKGLELAIEKVKEIIVGLGGVFNQMAPKVVVATAMDEAELARQMEKAELENAE  
IS TTMDRTEGLDALNAAIVKIEETIKKAGGVFTVQNPVKVTEDELELAKQLDRLEQANAE  
NV STPEKTDGLKALSDAIEVIKIKETIIVSMGGVFNQMAPKVVVATDDAELAKQMERAELENAE  
PH STPEKQEGVKALSDAIVKIEETIKSLGGVFNQMPKVVVATLDEAELMRQMERAAEENAE  
TC STPEKQDGLKILNDAIEKIKATISELGGVFNQMAPKVVVATDEAELQRMERAELENTE  
PP TTMDRNDGLDLLNLAIVKVEETIKAGGMFKVQNPVKVTDIDEVELAKQLESLEEANRE  
CE QTLDRREGGIEAVNSILDTIKNAIEGFKGKFTIKEEARIVTDIDDEKKKGDGDEDEESEE

17110 17120 17130 17140 17150 17160  
=====+=====+=====+=====+=====+=====+  
AA IDGDDDEEETLVLLDNLAIRETHSIFFKNLQERGYKLTFFKLADDASLVLSKYGEFLYKH  
AG VSGD-EEDDETLVLLDNLAIRETHSIFFKSLQERGYKLTFFKLADDAGLVLSKYGEFLYQH  
AM -----PTLVLLDNLAIRETHSIFFKTLQDNGYIITFFKLADDANLQLSKYGEYLYQH  
AP IAGD-DDEEETLVLLNLLVIKETHSILFNTLKERGYHLTFKSADDEPTLVLSKYGYFYEN  
BM VAGDSAED-----ERGYGLTFFKLADDANLVLSKYGEYLYKN  
CQ IDGDDDEEETLVLLDNLAIRETHSIFFKSLQERGYKLTFFKLADDASLVLSKYGEFLYKH  
DM VAGDDDEEDNTLVLLDNLAIRETHSIFFKSLQDRGFKLTFFKLADDANLQLSKYGEYLYKN  
DP IAGDDQSDETLVLLDNLAIRETHSVFFKSLTDRGYSLVFKPVDDSNLVLAQYQYLYKN  
IS IDGDDDEEETLVLLDNLAIRETHSIFFKSLQDRGFKLTFFKSADDPALSLKYGEEYLYKH  
NV VAGD-DDEEPTLVLLDNLAIRETHSIFFKILQDSGYTLSFKLADDANLQLSKYGEYLYKH  
PH VAGD-DDDEPTLVLLDNLAIRETHSIFFKSLQERGFLLTYKSADDANLVLFKYGESLYKH  
TC VAGD-DDDENTLVLLDNQVIRETHSIFFKSLQERGNLSFKIADDASLVLSKYGEYLYEN  
PP VDGDDDDNDEDTLVLDVTLATKDTLSLFFKLEERGYKLTFFKQADDAGLTLKKYGEFLYKH  
CE DEDEEEDDRVLVGETAAVKDTHSVFLNSVKERGHVTRRAADSQLALFKHGQLIFDH  
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17170 17180 17190 17200 17210 17220  
=====+=====+=====+=====+=====+=====+  
AA LILFAPSVEEFGGSLVSEAITDFVDNNGNVLVAGSSNSGDALRELAECGFEVDEENAAV  
AG LILFAPSVEEFGGSLVSEAITDFIDNNGNVLVAGSTASGDPRLRELAECGFEVDEEKAAV  
AM LIIIFAPSVEEFGGALSVEITDFIDGNGNVLVAGSSQSGDALHELASECGFEIDEEGSAV  
AP LIIIFAPTVEEFGGSLNIETITQFIDGNGNVLFTGGVSTGSALRELAECGFEVTEENSSL  
BM LIVFAPSVEEFGGQVDESEAITKFIDGNGNLLMAGNAAAGDVYREIASECGFEMDEESA  
CQ LILFAPSVEEFGGSLVSEAITDFVDNNGNVLVAGSSSAGDALRELAECGFEVDEENAAV  
DM VLIIFAPSVEEFGGDSVERLAQFVDDGNGNVLVAGSEKSGDALREFASECGFELDEENAAV  
DP LIIIFSPSVEEFGGSLVSEAITKFVDDGNGNLIAGSINSGDVLREIASECGFEVDEEGA  
IS LILFAPSVEEFGGSLVSEAITDFVDNNGNLIAGSINSGDVLREIASECGFEVDEEGAYV  
NV LIIIFAPTVEEFGGMSVSEAITDFIDGNGNVLVAGSSQSGDALRDLASECGFEIDEEGATV  
PH LIIIFAPSVEEFGGSLVSEVSEFIDRGGNVLIAGSSNSGDAIRELASEVGVLEDDKASV  
TC LIIIFAPAVEEFGGTLNVETITQFIDGNGNVLVAGNSGTGDVLRRELAECGFEVDEEGAYV  
PP LILFTPSTEEFGGNINQALTEFIDNNGNLIATVNSNVGDVMEKLAECGFEVDESEGNQL  
CE LFI LAPGVQVFGGSLSPSEISKFVDAGGNVLVAGSNIGDALREIAAEHGFEEFEAGTSV  
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17230 17240 17250 17260 17270 17280  
=====+=====+=====+=====+=====+=====+  
AA IDHLNYDIS-DSGDHTLVVSPENLIDSEIVVGKKS---VGPLLYKGTGLLADKENPLV  
AG IDHLNYDVS-DAGDHTTIVASPDNLIDASIVGDRAG---VAPLLYRGTGLLADRENPLV  
AM IDHLNYDVS-DNGYHTKIVADPANLIDAPAVGNKN---INSLLYQGTGLIADTENPLI  
AP IDHLNYDAS-DSGKHTLVVTSNLIKSEIIVG-KSN---DKPLLYEGTITDPKNPLV  
BM IDHFNVDVT-DEGDHTRIVVSPKNLIKAPTIVG-EQN---TQPLLFEFTGLIVDKDNLV  
CQ IDHLNYDIA-DGGDHTLVVSPENLIDSEIVVGKKS---VGPLLYRGTGLLADKENPLV  
DM IDHLHYDVS-DAGEHTTILTSAKNLIQADTIVGKANRQADAAPLLYRGTGLIADKENPLV  
DP IDHLNYDVL-DQGKHTLIVADNANLIDAPMIVGAKKT---SPFLFRGTGLIADKENPLV  
IS IDHLNYDVS-DEGKHTTIVAESENINAPTIVVGSKN---IPPVLFVGVGIIISDQDNPLV  
NV IDHMNYDIS-DTGRHTKIVADPSNLIDASIVVGSRN---VPPLLYQGTGLIADSDNPLV  
PH IDHINYDVS-DQGKHTLIVADKKNLIKAPIIVG-NDN---KYPPLLYQGTGLIVVDRKDNPLV  
TC IDHLNYDVS-DEGQHTLRLAISPENLIDSPIIVGSKKD---AKPLLYQGTGLIADPDNPLV  
PP FDHNYDNLDDGDHSTIVIDSSQILNVPSMIGTKK---LSPILYDGIGLITDRKNPLV  
CE IDHNYDQTLDSGDHTTLLVVGKQDLISAEIIVGNSAK---LHPVLFKGI GLVAGKTNNLA  
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17290 17300 17310 17320 17330 17340  
=====+=====+=====+=====+=====+=====+  
AA LQLLTADSTAYSYPDAPIKYEPHAGVKGTLIIAALQARNNARVVVSGSLYFFSDEAFSL  
AG LQLLTADSSAYSYPDAPIKYEPHAGVKGTLIIAALQARNNARVVVSGSLYFFSDEAFSL  
AM LRLLTASSAYSYNPQNSIKYEPHAGVKNLIIAALQARNNARVVVSGSLYFFSDEAFSL  
AP LPIILHAESTAYSYPKPLVVKDYSLGTGKDLLIIAALQARNNARVVVSGSLYFFSDEAFSL  
BM LPIILSADSTAYSYNPKSQVKEYPHAGVGRKTVIIAALQARNNARIVVSGSLYFFSDEAFSL

CQ LQLLTADSSAYSIPDAPIKKEYPHAVGKGTLLIAALQARNNARVVVFGSLHFFSDEAFLA  
DM LKLLTAESTAYSYNPEASVSDYPHAVGRGTLLIAALQARNNARVVVFGSLHFFSDESFTT  
DP LEVLTASSTAYSYPKDSHIEEYPHAVGKNTVLIQARNNARVVVFGSLHFFSDEFFSS  
IS LEVLTASSTAYSYNPDNKIETEPHAVGKNTLLVSALQARNNARVVVFCGSLFFSDFKFTS  
NV LKLLTASSAYTYNTEQPVKEYPHAVGKNTLLIAALQARNNARVLFSGSLYFFSDEAFTS  
PH LQILLTASDTAYSYSTENPIKEYPHAVGKNTVLIQARNNARVIVFGSLYFFSDEAFGA  
TC LPLLTADSTAYSYPDQPIKEYPHAVGKDTVLIAGLQARNNARVVVFGSLHFFSDEFFTS  
PP TTVIHSSATAYSAAPSKPVTSPLVAGKKGALLASLQAQNNARVLFSGSLSDFSDEYLKA  
CE LSIVRASGTAYSYPKAVRATNPSIAGSRTLLVGLQSRNNARIVFTGSSELSFNFFSA  
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17350 17360 17370 17380 17390 17400  
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AA SVQRAQDE-KLHKSQGNQDVATSIKWWVFGENGVI RVRVSVKHFKEGESQPP-AAYTITEP  
AG PVQRAQAGGKHFARSGNQDVAMAIKWWVFGENGVI RARSVSHSKEGESQPP-SSYTVTDP  
AM PIQKAQGG-QYKLKSGNEAVATMIARWVFKENGVI RVS SAHHRVGESEPP-AAYTIMDD  
AP SVQKFDG-KTYNI-SGNQEVASNIWLTKDRGMIRVKSVDHKKVGESEPP-PSYTIMDM  
BM PVTKVHGDKTKSDVSGNKILAIRLTEWVFGERGLRVRNVDRHRQGEKPS-SAYTI TDT  
CQ PVQRAQDN-KLHAKSGNQEVATAISKWWVFGENGVI RVRVSVKHFKEGESNPP-ASYTVTEP  
DM AVQYAQSG-VFHKLAGNRDVAESISKWWVFGETGRLRVASVQHHKEGELLPPDAYTITDP  
DP PVQKALGG-QKYPKSGNQELSDSLTKWVFKEEGVL RVGKVS HKKAGEKDAP-QYYTIMEN  
IS PVQNAHGG-KRYESSGNQALATALSQWVFKEGVLRVRAQNRHHPKQKTPP-EAYTVMDD  
NV PVRKAQDG-KKHEVSGNKAVAEAMARWVFKENGVI RVS FVHHHKEGEAQQP-AAYTIMEN  
PH TVEKIHTGKKS P--SGNKNVAVALSQWVFKHGVLRVKS VSHSLKNGK-T-PNYTVMDK  
TC PVAKSRGGLKSDT-SGNRDVAIAISQWVFKHGVLRVRSVKHKS VGEAKPP-TAYTIMDD  
PP AVK-SSSG-ASAPKSGNKDLIESLARWVFKETGVLRYSDVKH-----GGPYVMDF  
CE KTNVSNVPS-VQGAQSGNADFATAITRWVMKESGVL RVKTVNHHKKGETVPPVEGYFITED  
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17410 17420 17430 17440 17450 17460  
=====  
AA VVYTIETLAADGKWQPFQANDVQLEFVRIDPFVRTTLNHIGGGR-YQAKFKIPDVYGV  
AG VVYTIETIRGSDGKWKAFASDVQLEFVRIDPFVRTTLVPVGGGR-YEARFLIPDVYGV  
AM VVYSIDVQKLAGD-KWIPYETNDLQLEFVRIDPFVRMTMKPVGNR-YEARFKIPDVYGV  
AP AIFLVELEWRWENG-KWIPHNADDVQVEFVRIDPFWRGNLKNLKNKG-YEFTFKIPDYGV  
BM VVYRIEIEELKNG-KWQPFANDVQLEFVRIDPFIRTTLQKKNPVG-YEAVFKVPDVWGV  
CQ AVYTIETLAENGKWQPFVANDVQLEFVRIDPFVRTTLKAI GGGR-YQAKFKIPDVYGV  
DM VVYTIIEEELVQG-EWRAFKASDIQLEFVRIDPFVRTYKQNTNTGA-YQAKFKIPDVYGV  
DP MVEYIEIEKLAKD-KWVPFDADKIQLEFVRIDPFVRTVLSGTDGV-FRTEFKIPDVYGV  
IS VVYSIEVEILKDG-QWVPFDADDLQLEFVRIDPFVTNECVAS TNAGQKYESQFKVPDVYGV  
NV VVYSINVEKLSGD-KWVPFVADDLQLEFVRIDPFVRTTMKHSVNGR-YEARFKIPDVYGV  
PH IYKIEIETLEGE-TWIPFETNDIQLEFVRIDPFVRQFLIHKSNKG-YEAEFTVPDVYGV  
TC VVYKIEIDIKEDG-QWKQFNADDIQLEFVRIDPFVRINLQ--KKGKEYEARFKIPDVYGV  
PP ASFSMKVEMLLDNGKWVAYDAPSIQIEFVRIDPFVRTEMKRKGTDTYEVTFKVPDVYGV  
CE VVYTIIEEELKNG-KWVPFQKDVQLEFVRIDPFVRATLKN-SNGR-LSVAFKLPDVLGV  
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17470 17480 17490 17500 17510 17520  
=====  
AA YQFKVDYDRIGYTHLYSTTQVSVRPLHTQYERFI PSAYPYVSAFMMVGMFLFSIFL  
AG YQFKVNYDRIGYTHLYSTTQVSVRPLHTQYERFI PSAYPYASAFMMVGMFLFSFLFL  
AM YQFKVDYTRIGLTHLYSTTQVSVRPLQHTQYERFI PSAYPYISAFMMGGVFLFSLAF  
AP YQFKVEYNRIGFTAIRSSTMVSVIPLEHTQYERFI LSAYPYSSAFMMGFVIFSFVFL  
BM YQFKVDYDRVGYTRLYHSTQVSVRPLQHTQYERFI PSAYPYVSSAFMMIGVFLFSFVFL  
CQ YQFKVDYDRIGYTHLYSTTQVSVRPLHTQYERFI PSAYPYVSAFMMVGMVVFVFSIFL  
DM YQFKVDYNRVGYTHLYSTTQVSVRPLEHTQYERFI PSAYPYTSAFMMIGVVFVFSVFL  
DP YQLKVDYTRVGYTFLNSATQVSVRPLEHTQYERFI VSAFPYASAFMMGGVFLFSIFL  
IS YQFKVDYNRVGYTHLYTTTQVSVRPLQHTQYERFI PSAYPYLSAFMMGFVLLSCVFL  
NV YQFKVDYTRIGLTHLYSTTQVSVRPLEHTQYERFI PSAYPYVSAFMMGGVFLFSIVFL  
PH YQFKVDYNRIGYTRLYSTTQVSVRPLEHTQYERFI PGAYPYISAFMMGFVIFSFVFL  
TC YQFKVDYDRVGYTRIYNTTQVSVRPLQHTQYERFI ACAYPYAGAFMMAGVFLFSIVFL  
PP YRFKVDHRRRGYDNLVVASQVSVHPLQHTMYERFI PAARPYWSAFMMGLFVFSVFI  
CE FKFLVDYRRVGYTHLYDVQVSVRPLWHTQYERFI RSAYPYASSFMMAGLVFLSIVYL  
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17530 17540 17550 17560 17570 17580  
=====  
AA HFKDDGLSKAKAAKLVRSLVDLFLDLEAETG-IEVQLCKEC IEWAKQEKRTFLRQSLEAR  
AG HFKDDGLSKAKAAKLVRSLVDLFLDLEAETG-IEVQLCKEC IEWAKQEKRTFLRQSLEAR  
AM YKEDTISKAKAAKLVRSLVDLFLDLEAGIG-IEVQLCKEC IEWAKEERTFLRQSLEAR  
AP HYRED-ISKAKAAKLVRSLVDLFLDLEAGIG-IEVQLCKEC IEWAKEERTFLRQSLEAR  
BM YKEDQISKAKAAKLVRSLVDLFLDLEAGIG-IEVQLCKEC IEWAKEERTFLRQSLEAR  
CQ HYKEEGLSKAKAAKLVRSLVDLFLDLEAETG-IEVQLCKEC IEWAKQEKRTFLRQSLEAR  
DM HFKDEPI SKAKAAKLVRSLVDMFLDMDAGTG-IEVQLCKDC IEWAKQEKRTFLRQSLEAR  
DP HYRTNEISKAKAAKLVRGLVDLFLDMEAGTG-TEVQLCKEC INWAVEQKGTFLRQSLEAR  
IS HHKDA P-----  
NV HFKDDTISKAKAAKLVRSLVDLFLDLEAGIG-IEVQLCKEC IEWAKEERTFLRQSLEAR

PH YYKEEPI SKAKAAKLVRSVLDFFLDLESKSK-LEIPLCLECIQWAKDEQRTFLRQSLEAR  
TC HKKDDDISKAKAAKLVRSVLDFFLDLEAGIG-IEVQLCKECIEWAKEERRTFLRQSLEAR  
PP HHKDPVSKAKAAKLVRLVLDLFDMEACTG-LEVELCRECIEWAQKEKRTFLRQSLQTR  
CE YHKDPLGKAKAAKLVRLVLDLCLKIDDDQDGIKVLVKECIEWATEQNRTFLRQTLTAR  
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17590 17600 17610 17620 17630 17640  
=====  
AA LIALYFDTAMYTEALALGSQLLRELKLLDDKNLLVEVQLESKTYHALSNLPKARAALTS  
AG LIALYFDTGMYTEALNLGSQLLKELKLLDDKNLLVEVQLESKTYHALSNLPKARAALTS  
AM LIALYFDTGMYSEALQLGSALLKELKLLDDKQLLVEVQLESKTYHALSNLAKARAALTS  
AP LMHLYFDSGMFSEALQHGAVLLKELKLLDDKNVLDVLLLESKAYHALNNSFKARASLTS  
BM LIALYFDTGMYTEALDLATALLKELKLLDDKNLLVEVQLESKTYHALSNLPKARASLTS  
CQ LIALYFDTGMYTEALALGSQLLRELKLLDDKNLLVEVQLESKTYHALSNLPKARAALTS  
DM LIALYFDTALYTEALALGAQLLRELKLLDDKNLLVEVQLESKTYHALSNLPKARAALTS  
DP LIALYFDTKQYNEALLGATLLKELKLLDDKYLLEVEVQLESKTYHALCNLPKSRAALTS  
IS -----MLVL  
NV LIALYFDTGMFAEALQLGSALLKELKLLDDKQLLVEVQLESKTYHALSNLAKARAALTS  
PH LVALLYDRKMYTEALNLGSTLLKELKLLDDKNLLVEVQLESKTYHALNLPKARAALTS  
TC LIALYFDTGMFTEALQLGSTLLKELKLLDDKNLLVEVQLESKTYHALSNLPKARAALTS  
PP LIALYDTPKYIEALKLIGELLKELKLLDDKDLLEVEVQLESKVYHALSNLPKARAALTS  
CE LVRLYNDLQRYTQALPLAADLIRELKKVDDKDVLEVELEESKAYNLSNIGRARASLTG  
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17650 17660 17670 17680 17690 17700  
=====  
AA ARTTANAIYCAPKVQATLDLQSGILHAADERDFKTAFSYFYEAFFGFDVSVQSPK-ALTAL  
AG ARTTANAIYCAPKVQATLDLQSGILHAADERDFKTAFSYFYEAFFGFDVSVQSSK-ALTAL  
AM ARTTANAIYCPKMQAALDLQSGILHAADERDFKTAFSYFYEAFFGYDSVESPK-ALTAL  
AP ARTTANLIYCPKMQSSLDLQSGILNAADEQDFKTAFSYFYEAFFERFDSVSTSNALKAL  
BM ARTTANAIYCPKMQAALDLQSGILHAADERDFKTAFSYFYEAFFGYDGADSPK-ALTAL  
CQ ARTTANAIYCAPKVQATLDLQSGILHAADERDFKTAFSYFYEAFFGFDVSVQNR-ALTAL  
DM ARTTANAIYCPKQVQALDLQSGILHAADERDFKTAFSYFYEAFFGFDVSVK-ALTSL  
DP ARTTANAIYCPKQALDLQSGILHAADERDFKTAFSYFYEAFFGYDSIDSPR-AVTGL  
IS RQNVARYTLCPCTLQ-----ALIAL  
NV ARTTANAIYCPKMQAALDLMSGILHAADERDFKTAFSYFYEAFFGYDSVECPK-ALTAL  
PH ARTTANAIYCPKMQAELDLQSGILHAADERDFKTAFSYFYEAFFGYDSVESPK-ALVAL  
TC ARTTANAIYCPKMQAALDLQSGILHAADERDFKTAFSYFYEAFFGFDVSVSPK-ALTAL  
PP ARTTANAIYCPKQALDLQSGILHAADERDFKTAFSYFYEAFFCYDSVSPK-AVTAL  
CE ARTTANAIYVPRMQAALDLQSGILHAADERDFKTAFSYFYEAFFGYDSVDEKVSALTAL  
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17710 17720 17730 17740 17750 17760  
=====  
AA KYMLLCKIMLGQSDVDVNIIVSGLKLAITYSGRDIAMKVAEASHKRSLADFQDGLKQYKH  
AG KYMLLCKIMLGQSDVDVNIIVSGLKLAITYSGRDIAMKVAEASHKRSLADFQDALKQYKH  
AM KYMLLCKIMLRTPEDVQSIMSGLKLVKYGKDLDMARVAEASHRRSLADFQAVKQYRE  
AP KYMLLCKIMLNNAVVDVQIIVNGKLLKLYTGRDVEAMKSIARASHKRSLADFQIALNEYKH  
BM KYMLLCKIMLNQAEVATICGSKAALKYAGKELEAMRAVATASHKRSLADFQAAKLYKPK  
CQ KYMLLCKIMLGQSDVDVNIIVSGLKLAITYSGRDIAMKVAEASHKRSLADFQDALKQYKH  
DM KYMLLCKIMLGQSDVDVNIIVSGLKLAITYSGRDIAMKVAEASHKRSLADFQAALEKYRA  
DP KYMLLSKIIILNTPDDVQNILSGLKALRYAGREAEALKATAQSAIKRSLAQFQAALEDYRA  
IS KYMLLCKIMLNPEEVQSLVVGKLLRHRAGPQLEAMKSVARASHRRSLADFEQA-----  
NV KYMLLCKIMLRAPEDVQTIMSGLKLVKYGKDLDMARVAEASHRRSLADFEQAVKQYRQ  
PH KYMLLCKIMLNTPEDVAQIIVSGLKLVKYGKDLDMARVAEASHRRSLADFEQALQNYNN  
TC KYMLLCKIMLNPEEDVQIIVSGLKLVKYGKDLDMARVAEASHKRSLADFQAAVQVFKH  
PP KYMLLCKIMLSPEDVQAIIVSGLKLVKYGKDLDMARVAEASHRRSLADFEQALTKYKH  
CE KYMLLCKVMDLDPDEVNLSAKLALYNGSLLDAMKAIATAAAQKRSKDFQVAFGSPFQ  
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17770 17780 17790 17800 17810 17820  
=====  
AA ELEDDVIVKAHLGTLTYDTMLEQNLRIIEPYARVEVSFIAEQIALPIAQVEKKLSQMILD  
AG ELEDDVIVKAHLGTLTYDTMLEQNLRIIEPYSQCEVSFIAEQIALPIAQVEKKLSQMILD  
AM ELEDDVIVRAHLGSLYDAMLEQNLRLVEPYSRVQVSHIATCISLPLTQVEKKLSQMILD  
AP ELEDIVRAHLDTLYGNMLEQNLRIIEPYSRVQVEYVAKSINLPMENVERKLSQMILD  
BM ELEDVAVRAHLGALYDTMLEQNLRIIEPYMRVQVDHVARCIRLPPVQVEKKLSQMILD  
CQ ELEDDVIVKAHLGTLTYDTMLEQNLRIIEPYARVEVYIAAQIALPIAQVEKKLSQMILD  
DM ELAEDVIVQAHLGTLTYDTMLEQNLRIIEPYSRVQVAHVVAESIQLPMPQVEKKLSQMILD  
DP ELVEDPIIKAHLESYDTMLEQNLRIIEPYSRVQVSHVARIIALPVDQVEKKLSQMILD  
IS -----SLSYALH-----FTSPQVKFI-----  
NV ELKEDVIVRAHLDSLYDTMLEQNLRIIEPYSRVQVSHIASCISLSISQVEKKLSQMILD  
PH ELKEDVIVCAHLGVLYDTMLEQNLRIIEPYSRVQVEHVSRITQLPVSQVEKKLSQMILD  
TC ELEDDVIVRAHLGTLTYDNMLEQNLRIIEPYSRVQVVDVAKTIKLPMPQVEKKLSQMILD  
PP ELVEDPIIAAHLGTLTYDNMLEQNLRIIEPYLKVQVEQIAQVIDLPREKVELKLSQMILD  
CE ELQMDPVVRKHFHSLSERMLEKDLRIIEPYSFVQIEHVAQIGIDRSKVEKKLSQMILD

17830 17840 17850 17860 17870 17880
====+====+====+====+====+====+====+
AA KKFSGILDQGVGLIVFEEAPVDKTYETALETIQHMGKVVDITYQKAKKLRPLVSIYSD
AG KKFSGILDQGGIVGLIVFEEETPVDKTYETALETIQHMGKVVDITYQKAKKLRPLVSVYSD
AM KKLRLVLDQGGEGVLIVFEDTPRDKTYEIALDTHSMGKVVDITYQKAKKLRPLVTIYTD
AP KKFHGILDQGGEGVLIVFEEAEIDETKYKLVLSINSMSKVVDKLYQAKKLRPLVSVYSE
BM KKLNGILDQGGEGVLIVFDESPLDKTYETVLETIHHMSKVVDITYQKAKKLRPLVSVYSE
CQ KKFSGILDQGGIVGLIVFEEETPVDKTYETALETIQHMGKVVDITYQKAKKLRPLVSIYTE
DM KKFSGILDQGGEGVLIVFEEETPVDKTYERVLETIQSMGKVVDITYQKAKKLRPLVSVYTE
DP RKLSGILDQGGDGLVIFFEPTRDSTYEALDTHQNLGKVVDITYQKAKKLRPLIVTYNE
IS -----RPLVNVYND
NV KKLRLVLDQGGEGVLIVFEDTPRDKTYEIALETVHSMGKVVDITYQKAKKLRPLIVTVE
PH KKLNGILDQGGAGVLIVFEEETPLSKTYETALEVIHHMGKVLDITYQKAKKLRPLVTVYND
TC AKFHGILDQGGEGVLIVFEEETPVDKTYEMALETIQSMKVVDITYQKAKKLRPLVSVYNE
PP KKFSGILDQGTGLVIFEDQSIDKTYESA IENIHAIGKVDALYQKAKKLRPLATVFAE
CE QKLSGSLDQGGEMLI VFEI AVPDEAYQTALDTHAMGEVVDALYSNASKINRPLVTVYDE
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17890 17900 17910 17920 17930 17940
====+====+====+====+====+====+====+
AA KNEALKDKNLA LPAVFKAPIRPDVVSEVSQLMRRNRQAYAVSEAAAGHTSAESWGTGRA
AG KNEAVKDKGVALPAIFKAPIRPDVVNEVSQLMRRNRQAYAVSEAAAGHTSAESWGTGRA
AM KNESS-GDTISLPAVFKAPIRPDIVNFVHQVSKNSRQPYCVSKEAGHTSAESWGTGRA
AP KNEET-GETVALATVFKAPIRPDVVSFVHDVNSKNSRQPYAVSKLAGHTSAESWGTGRA
BM KSETVQGA AKPLPFVFKAPIRPDLVNDVHVSMSKNSRQPYCVSKEAGHTSAESWGTGRA
CQ KNEAVKDKNIALPYVFKAPIRPDVVSEVSQLMRRNRQAYAVSEAAAGHTSAESWGTGRA
DM KNEPAKDKNICLPAVFKAPIRPDVVNEVHQLRRNRQAYAVSELAGHTSAESWGTGRA
IS KAEAS-GTSIQLPAIFRAPIRPDIVSFVQQQMSMNRHPYCVSEKAGHTSAESWGTGRA
NV KNELS-GTHVALPAVFKAPIRPDIVNFVHVNMSKNNRQPYAVSKEAGHTSAESWGTGRA
PH KSEAS-GETISLPSVFKAPIRPDVVNFVHQVSKNSRQPYVSKEAGHTSAESWGTGRA
TC KNEST-GTIVLPSVFKAPIRPDVVNFVHDQMAKNKRQPYCVSEKAGHTSAESWGTGRA
PP KSEEVKGETVVLPAVFKAPIRPDVVNFVHQVLSMNRQAYCVSDKAGHTSAESWGTGRA
CE SNE-ASGTNAGMPAVFRAPIRPDLSFVHHQLLKNRRTFYAVSKEAGHTSAESWGTGRA
### KYEAT-QSQIRLPAVFRFTP IRPDVLSFIADQVRRNRQAHAVNTKAGKQHSAESWGTGRA
### #####

17950 17960 17970 17980 17990 18000
====+====+====+====+====+====+====+
AA VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKTWRWRHRKINVNLKRYALVSAIAASG
AG VARI PRVRGGGTHRSGQGAYGNMCRGGRMFAPTKPWRWRHRKININLKRYALVSAIAASG
AM VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKPWRWRHRKINVNQKRYAMVSAIAASG
AP VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTRVWRWRHRKINVTQKRYATVSAIAASG
BM VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKPWRWRHRVNLQRRAALAAVAATG
CQ VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKTWRWRHRKINVNLKRYALVSAIAASG
DM VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKTFRWRHRKINVNQRRYALVSAIAASG
IS VARI PRVRGGGTHRSGQGAYGNMCRGGRMFAPTKIWRWRHRKINVNQKRFALCSAVAASG
NV VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKT YRWRHRKINVAQKRYAICSAVAATG
PH VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKPWRWRHRVNVNQRKYAIVSAIAASG
TC VARI PRVRGGGTHRSGQGAFGNMCRGGRMASPTK PWRWRHRKINLNQRKYAMVSAIAASG
PP VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKPWRWRHRVNVNQRRLALASAVAASG
CE VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKTWRWRHRVNVNQRRHAASAISASG
#####
VARI PRVRGGGTHRSGQGAFGNMCRGGRMFAPTKVFRWRHRVNI AQKRYAVSSAIAASG
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18010 18020 18030 18040 18050 18060
====+====+====+====+====+====+====+
AA VPALVQSRGHVIDGISELPLVSDVQKFKQTKQAVAFLLRSKVVADVQKVYKSQRMRAG
AG VPALVQSRGHIIDGISELPLVSDDIQKFKQTKQAVTFLRSKVVADVQKVYKSQRMRAG
AM VPALVQSKGHMVQEIP ELPLVSDKIQEYNTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
AP VPALVMSKGHVQEVPEPPLVSDKIQEYTKTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
BM VPALVQARGHII EKIP ELPLVSDKIQEYNTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
CQ VPALVQSRGHVIDGISELPLVSDVQKFKQTKQAVAFLLRSKVVADVQKVYKSQRMRAG
DM VPALVQSRGHVIDGISELPLVSDVQKFKQTKQAVAFLLRSKVVADVQKVYKSQRFRAG
IS IP SLVMSKGHVINDVPEMPLVSDKIQEYNTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
NV VPGLVLSKGHVIEIPEVPLVSDKIQDLKKTKEAVLFLKVKAWNDVKEKVYKSRRFRAG
PH VPALVMSKGHVIEIPEVPLVSDKIQEYNTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
TC VPALVMSKGHVIDQVPELPLVSDKIQEYNTKQAVI FLRRIKAWNDIQKVYKSQRFRAG
PP VTALVMAKGHVIEIPELPLVSDKIQEYNTKQAVSLLKSLKAWNDVKEKVYKSRRFRAG
CE IPALLVQARGHVIDQVAEPLVSDKVE SFRKTKEAVV FLRRSHLWADIEKVYNSKRNRAG
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18070 18080 18090 18100 18110 18120
====+====+====+====+====+====+====+
AA RGMKRNRRVQRRGPLVIYAKDEGLRKAFRNIPGVDTMSVNRNLLKMAPGGHVGRLCVW

AG RGKMRNRVRRVQRGRLIYDRDEGLRRAFRNIPGVDTMRVSKMNLKLLAPGGHVGRLCVW  
AM KGKMRNRRIQRGRLIYVHQDQGIKRAFRNIPGVDTLMNINKMNLKLLAPGGHVGRFVIW  
AP KGKMRNRRIQRGRLIYVSKDQGLRKAFRNIPGVDTLNRKLNLLKLLAPGGHVGRFVIW  
BM KGKMRNRRIQRGRLIYFNKDQGLTRAFRNIPGVDELNVNKLNLKLLAPGGHGLGRFVIW  
CQ RGKMRNRVRRVQRGRLIYAKDEGLRKAFRNIPGVDTMKVTRNLKLLAPGGHVGRLCVW  
DM RGTMRDRRIARRGRLVYDQDEGLRKAFRNIPGIETINVDKLNLLKLLAPGGHVGRFVIW  
DP KGKMRNRRTSKLGLPLIYGRDQGLTKAFRNIPGVSMISVNKLNLKLLAPGGHVGRFCIW  
IS KGKMRNRRIQRGRLVVFADNGITRAFRNIPGVDTLRVDKLNLLKMAPGGHVGRFVIW  
NV KGKMRNRRIQRGRLIYVNDQGIKRAFRNIPGVDTLMNINKLNLLKLLAPGGHVGRFVIW  
PH KGKMRNRRIQRGRLIYVSKNQGIKRAFRNIPGVDTLNVSKLDDLKLLAPGGHVGRFVIW  
TC KGKMRNRRIQRGRLVYVHKDQGLRRAFRNIPGIDLISVEKLNLLKLLAPGGHVGRFVIW  
PP KGKMRNRRIQRGRLVYVYEQDNGIVRAFRNIPGVDTLNVNLSLIFKLAPGGHVGRFVIW  
CE KGKLRNRQHKQKLGPIVYGDQAEARAFRNIPGVDTMNVRLNLKLLAPGGHGLRLIIW  
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18130 18140 18150 18160 18170 18180  
=====+=====+=====+=====+=====+=====+  
AA TESAFQALNDIYG-TWKNKSTVKKDYNLFPNLMANTDLARLLKSDEIRKVLNPAKKT--V  
AG TESAFAKLDGLYG-TWEKRSVAKKGYNLPPTIMANTDLTRLLKSEIRVLRAPRKR--V  
AM TKSFAEKLDALYG-TWRKESQLKADYNLFPKMMNTDLSRLKSQEIIRKVLNPAKKT--V  
AP TQSAFQKLDLGLYG-TWKKKATLKSQYNLFPKMSNTDLTRILKSDELKYLPAQRTG--S  
BM TQSAFGRLDPLFG-SWKTSPSKQKKNFLPQPKMANTDLTRLLKSEIRKVLNPAKKT--V  
CQ TESAFQALNEIYG-TWKNKSTVKKDYNLFPNLMANTDLARLLKSDEIRKVLNPAKKT--V  
DM TESAFARLNDLFG-TWKKPSTLKKGYNLPQPKMANTDLSRLKSSEIRKVLNPAKKT--V  
PH TESAFQRLNALYG-TWRLLSKLKSNNLFPQIMTGTDLRLLKSDEIRKVLNPAKKT--I  
IS TESAFRLDLKLYG-TYRKPSEKKNFSLPKPQMTNSDISRLKSDEIRQVIRAPCKK--V  
NV TKSFAEKLDALYG-TWRKEAELKKGYNLFPKPMANTDLSRLKSDEIRKVLNPAKKT--V  
PH TESAFKTLNALYG-SWNKASKMKKGYNLPQPKMSNTDLTRLMKAEELNVLKPKKGG--V  
TC TESAFQRLDLKLYG-SWKTSPAEKKGYNLFPQPKMANTDLARLLKAEIKKVLNPAKKT--V  
PP TEAAFRKLNDFYG-TFNKTSKVKKGYKLSRPMANTDILRLLKSSEIRGAFRKTRESI I  
CE TESAFKLDLTYGTTVANSSQLKKGWSVPLPIMANSDFSRIRSEEVKAIKRAPKKN--P  
##### #

18190 18200 18210 18220 18230 18240  
=====+=====+=====+=====+=====+=====+  
AA HRHVRLNPLTNTQQLIKLNPYAQVTKRRAQLASKKRKYERIIASFARG-MVVKPAARG  
AG YRHVRLNPLTNTKEQMLKLNPLYAAVTKRRAQLMTKLRKCELVAKAEAKK-MVVKPNMVA  
AM VRRVKKLPLNPLNTRAMLRLNPLYAAVLKRAAILTARKRQERELALAEKRG-TAITASGDG  
AP LRRTKLNPLRHRVTRMLRLNPLYIAVQKRVASNENKRLTLARETYLAKKEG-VAFSGSGDS  
BM IRATKLNPLTNNKAMKLNPLYAAVLKRAILELRRRKNLALADAESKSG-MAPKAGGDA  
CQ HRHVRLNPLTNTLQVLKLNPLYAEVTKRRAQLASKKRKYERIVASFARG-MVVKPAARG  
DM FRSVRLNPLTNTVRLIKLNPYAELVTKRRAALAEKRTVAKVLAKAKKQ-MAPKAAVN  
DP RRASVYKRNPLTNNRMLKLNPLYSAVIKKSAAVAEARKSKTALLEKRE-----MAPN  
IS VRRTQKKNPLKNINAMLRNPLYAAVTRRASVLLNQKQKLLKRLLEAEKRG-KAAPFRSSG  
NV IRRVKKLNPLRQTKAMLRNPLYAAVLKRAAILTARKRQNERDALLAEKRG-TGM----DG  
PH KRAVKLNPLTNTTRAMLKLNPLYAAVLKREGILMAQKRMERRAMPKEKREKTASVSGSDN  
TC VRRVRRFNPLANTGAMLRNPLYAAVLKRAAILSSQKQASRDEILAKKRG-TIQASMGDG  
PP ITKKEKKNPLKPNHMLDRLNPLYAIVEKRSVILKKEAEGKN---LAKK--GAVIAAAPS  
CE VLPKVHRNPLKRTLLYKLNPLYASILRKASKANVKK-----AAAAATARQS  
#####

18250 18260 18270 18280 18290 18300  
=====+=====+=====+=====+=====+=====+  
AA MKPQQQAYKDKSKPADIRQSNINAAKAVSDAIRTSLGPRGMDKMIQANGEVITINDGAT  
AG KKVQQQAYKDKSKPADIRLSNINAAKAVSDAIRTSLGPRGMDKMIQANGEVITINDGAT  
AM RNAHQAYKDKSKPDIRSSNINAAKAVSDAIRTSLGPRGMDKMIQANGEVITINDGAT  
AP K-QATNAYKDKSKPAEIRKSNISAACAVADARTSLGPKGMDKMIQANGEVITINDGAT  
BM IKANSVYKDKSKPDIRLSNINAAKAVADARTSLGPRGMDKMIQANGEVITINDGAT  
CQ AKPVGQAYKDKSKPADIRQSNINAAKAVSDAIRTSLGPRGMDKMIQANGEVITINDGAT  
DM IKPTAKAFKDKSKPDIRVLSNIAAQAQVSDAIRTSLGPRGMDKMIQANGEVITINDGAT  
DP VQPKMAFETKSKPAEIRSSNIEAAKAVADARTSLGPRGMDKMIQANGEVITINDGAT  
IS GAGEKATYKDKKPSQVRQSNITAACAVADARTSLGPRGMDKMIQANGEVITINDGAT  
NV RRGNRQAYKDKSKPDIRFSNINAAKAVSVAIRTSLGPRGMDKMIQANGEVITINDGAT  
PH KNQQGSAYKDKKAKPDIRASNINAAKAVAAIRTSLGPRGMDKMIQANGEVITINDGAT  
TC NKARGVYKDKSKPSDVRLSNINAACAVCDARTSLGPRGMDKMIQANGEVITINDGAT  
PP GGNKNVYQDRDKPAQVRSNIAAQAQVSDARTSLGPRGMDKMIQANGEVITINDGAT  
CE ASGRERNFKDKKPESVRNSNIAAQAQVSDARTSLGPRGMDKMIQANGEVITINDGAT  
#####

18310 18320 18330 18340 18350 18360  
=====+=====+=====+=====+=====+=====+  
AA ILKQMNVIHPAAKMLVLSRAQDVEAGDGTTSVVVVAGALLEAVEKLLQMGIHPTAISDA  
AG ILKQMNVIHPAAKMLVLSRAQDVEAGDGTTSVVVVAGALLEAVEKLLQMGIHPTAISEA  
AM ILKEMNVVHPAAKMLVLSKAQDVEAGDGTTSVVV IAGSLEAAERLLQKGIHPTAISDS  
AP ILKQMNVIHPAAKMLVLSNAQDVEAGDGTTSVVV IAGALLEASEKLLQKGIHPTAISDG  
BM ILKQMSVHPAAKMLVLSRAQDIEAGDGTTSVVV IAGALLEASAKLLQKGIHPTAISDG  
CQ ILKQMNVIHPAAKMLVLSRAQDVEAGDGTTSVVVVAGALLEAAEKLLQMGIHPTAISDA

DM ILKQMNVLHPAKMLVLSRAQDVAAGDGTTSVVVIAGALLEACEKLLQKGLHPTAISDS  
DP ILKQMKLVHPAKMLVLSKAQDVEAGDGTTSVVVLGAGSFLAQAQKLEKGIHPTVISES  
IS ILKQMQLVHPAKMLVLSKAQDVEAGDGTTSVVVICGSLLDAAKLLKGIHPTVISES  
NV ILKEMNVIHPAKMLVLSRAQDIEAGDGTTSVVVIAGALLEAVEERLLQKDIHPTLISDA  
PH ILKQMNVIHPAKMLVLSKAQDIEAGDGTTSVVVIAGALLEASEKLLAKGIHPTAISDS  
TC ILKQMNVIHPAKMLVLSRAQDVEAGDGTTSVVVAGALLDAAEKLLTRGIHPTAISDS  
PP ILKQMQLVHPAKMLVLSKAQDVEAGDGTTSVVVIAGALLDAAKLLYRGIHPTVISES  
CE ILNQMSVIHPTAKMLVLSKAQDIEAGDGTTSVVVMAGALLDAAQNLLSKGIHPTVISES  
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          18370      18380      18390      18400      18410      18420
=====+=====+=====+=====+=====+=====+
AA FQKCSAKAVDILTEMSR----PIELSDRESLIKASTSLNSKVVVQHSQQLAPIAVEAVL
AG FQRCSAKAVEILTEMSR----PVELNDRETLIKASTSLNSKVVVQHSQMLAPIAVDAVL
AM FQKAAAKAVEILTNMSI----PVDLRDKQSLIRAAATSLNSKVVVQSSLLAPLAVDAVL
AP FQKAAAKSIEI IKNMAT----PILLTDRESLVKASTALNSKVVVQSSLLAPLAVDAVL
BM FQKALQLALQVVENMST----PVDLNNEDALLKAAATSLNSKVVVQHSQTLAPIAVQAIR
CQ FQRCSAKAVEILNEMSQ----PIELTDRETLIKASTSLNSKVVVQHSQQLAPIAVDAVL
DM FQRCSNKAVEILQVMSST----PIELDDRETLIKASTSLNSKVVVQSSLLAPIAVDAVL
DP FQKASVKAVEILEAMAT----PMKLEDRHSLMSATTSLGSKVVVQHSALLAPLAVDAVL
IS FQRAASMAVEVLMSMAH----PLDLSDRDSLKSAATTALSSKVVVQHQGLAPMAVDAVL
NV FQKASAKAVEVLISMSK----AIDMTNRSVLVMTAATSLNSKVVVQHSQQLAPIAVDAVL
PH FQRAASKAVEILSNMSV----PVDLNDKESLIKASTALNSKVVVQHSVVLAPMAVEAVL
TC FQRAAKHAVDVLTISIK----PIQLDNREQMVKSASTSLNSKVVVQSSLLAPLAVDAVL
PP FQKASAKAVEVLISMSK----AIDMTNRSVLVMTAATSLNSKVVVQHSQQLAPIAVDAVL
CE FQSAAAEAEKILDEMSS----PVDLSNDALLNKMAATSLNSKVVVQHSWLLAPMAVNAVK
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          18430      18440      18450      18460      18470      18480
=====+=====+=====+=====+=====+=====+
AA KVTE---PGHESGVDLKNVKI IIRSLGGTIDDETELDGLVFTQRSCG-VNGPKRVEKAKIG
AG KVTE---SHEQSGVDLKNIKLIRSLGGTIEDTELDGLVFTQRSSG-INGPKRLEKAKIG
AM KVTE---EGKESTVDLNNIKVIKKLGTTVEDETELDGLVFTQRSSG-VNGPKRIEKAKIG
AP KVVD---PAKDTNVDLKD IKVIKKLGTTVEDETELDGLVFTQRSSN-VNGPKRIEKAKIG
BM AVMEPIVSGVGRVDRDVKVIERIGGTVEDAELIQGLVIPHRAAN-VNGPHRIEKAKIG
CQ KVTE---AGLEAGCDLKNIKTIRSLGGTIEDTELDGLVFTQRSSG-VNGPKRLEKAKIG
DM KVTD---PGKETSVDLKNIKVISSLGGTVEDETELDGLVFTCRSAG-SNAPKRIEKAKIG
DP KVID---PLKDHVDLDRDIRVIEKLGTTVDDTELDGLVFDQRSAG-SGGPSRMEKAKIG
IS RVVD---PTRDTNVDLRDIKVRKLGTTVEDETELDGLVFTQRLAG-SGGPHRVEKARIG
NV KVTE---PGKEQAVDLKDIKVRKLGTTVEDETELDGLVFTQRSSN-INGPKRIEKAKIG
PH KVIN---PARNFNCDLKDVKVIKKLGTTVEDETELDGLVFTQRSSG-VNGPKRIEKAKIG
TC KVVE---PGREQVLSLSDIKVIKQIGTTVEDETELDGVVFPQKVAN-VNGPKRIEKAKIG
PP RVID---PSKDTNVDLRDIKIKKLGTTVEDETELDGLVFTERLAGGPNAPHRMEKAKIG
CE KIIN---SENDSNVNLMKIKI IKKMGDTVEESELIEGALIDQKTMG-RGAPRIEKAKIG
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          18490      18500      18510      18520      18530      18540
=====+=====+=====+=====+=====+=====+
AA LIQFCISAPKTDMDHSDVIVSDYAAMDRVLKEERAYILNMDSKGRNVI VCDNGTGFVKCGY
AG LIQFCISAPKTDMDHSDVIVSDYAAMDRVLKEERAYILNMDSKGRHVI VCDNGTGFVKCGY
AM LIQFCISPPKTDMDHNVIVSDYAAMDRVLKEERTYILNMDSKGRKVI VCDNGTGFVKCGY
AP LIQFCISPPKTDMDYNVVVSDYTAMDRVLREERAYILNMDSRGRKVI VCDNGTGFVKCGY
BM LIQFCISPPKTDMDHNVIVSDYAAMDRVLKEERQYILNMDDKGRKVI VCDNGTGFVKCGF
CQ LIQFCISAPKTDMDHSDVIVSDYAAMDRVLKEERAYILNMDSKGRNVI VCDNGTGFVKCGY
DM LIQFCISAPKTDMDHNVIVSDYAAMDRVLKEERSYILNMDSKGRNVI VCDNGTGFVKCGY
DP LIQFCISPPKTDMDNQQVIVSDYAMDRVLREERAYILNMDSQGRKVI VCDNGTGFVKVGY
IS LIQFCISPPKTDMDHQVIVSDYTAMDRVLREERAYILNMDSQGKVI VCDNGTGFVKCGY
NV LIQFCISPPKTDMDHNVIVSDYAAMDRVLKEERAYILNMDSQGRKVI VCDNGTGFVKCGY
PH LIQFCISPPKTDMDHSDVIVSDYAMDRVLKEERVYILNMDSRGRKVI VCDNGTGFVKCGY
TC FIQFCISAPKTDMDHNVIVSDYAAMDRVLKEERTYILNMDSQGKVI VCDNGTGFVKCGY
PP MI?FCISPPQPNMDHQVIVSDYAAMDRVLREERAYLLNMDSQGRKVI VCDNGTGFVKCGY
CE LIQFCISPPKTDMDNQQV IITDYAQMDRALKEERQYLLEMSQGRKVI VVDNGTGFVKCGY
#####
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          18550      18560      18570      18580      18590      18600
=====+=====+=====+=====+=====+=====+
AA AGSNFPAHIFPSMVGRI IIRAVNKIGDIEVK-----DLMVGDEASQLRSLLEVSYPMEN
AG AGSNFPAHIFPSMVGRI IIRAVNKIGDIEVK-----DLMVGDEASQLRSLLEVSYPMEN
AM AGSNFPAHIFPSIVGRPI IIRAVNKIGDIDVKDVLNMPDLMVGDEASKLRSMLEISYPMQN
AP AGTNFPAHIFPSMVGRI IIRAHNKIGDIEVK-----DLMIGDEASQLRSMLEISYPMEN
BM AGSNFPAHIFPSMVGRI IIRAVNKIGDIDVK-----DLMVGDEASKLRSMLEVSYPMEN
CQ AGSNFPAHIFPSMVGRI IIRAVNKIGDIEVK-----DLMVGDEASQLRSLLEVSYPMEN
DM AGSNFPTHIFPSMVGRI IIRAVNKIGDIEVK-----DLMVGDEASQLRSLLEVSYPMEN
DP AGSNFPAHIFPSLVGRPI IIRAVNKIGDIEVK-----DLMVGDDASKLRSMLEVSYPMEN
IS AGSNFPAHIFPSLVGRPI IIRAAHKIGDIEIK-----DVMVGDEASKLRSMLEVSYPMEN
NV AGANFPAHIFPSIVGRPI IIRAVNKIGDIDVN-----DLMIGDEASKLRSMLEISYPMQN
PH AGSNFPAHIFPSMVGRI IIRAVNKIGDIEVK-----DLMVGDEASKLRSMLEVSYPMEN
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TC AGSNFPAHIFPMSVGRPIIRAVNKIGDIEVK-----DLMVGDEASALRSLLVNYPMEN  
PP AGSNFPAFTFPSLVGRPIIRASSRVGEMEVK-----DLMIGDEASKLRSMLEVNYPMEN  
CE AGTNFPAHIFPMSVGRPIVRSRQVRVGNIEIK-----DLMVGEESQLRQMLDINYPMDN  
#####

18610 18620 18630 18640 18650 18660  
-----+-----+-----+-----+-----+-----+  
AA GVVNRWEDMCHVWDYTFGPKKMNIDPTNTKILLTEPPMNPTKNREKMIEMVFEKYGFDS  
AG GVVNRWEDMCHVWDYTFGPKKMNIEPSNTKILLTEPPMNPTKNREKMIEMVFEKYGFDSA  
AM GIVNRWEDMCHVWDYTFGKEKMNINPRECKILLTEPPMNPTNREKMIEMVFEKYGFAGT  
AP GIVNRWDDMCHVWDYTFGPKKMNIDPKECKIMLTEPPMNPIKNREKMIEMVFEKYEFNAV  
BM GVVNRWEDMCHVWDYTFGPKKMNIDPKECKILLTEPPMNPTKNREKMIEMVFEKYEFDSA  
CQ GVVNRWEDMCHVWDYTFGPKKMNIDPTNTKILLTEPPMNPTKNREKMIEMVFEKYGFDS  
DM GVVNRWDDMCHVWDYTFGPKKMNIDPTNTKILLTEPPMNPTKNREKMIEMVFEKYGFDSA  
DP GIVNRWEDMCHVWDYTFGPEKMNIDPRQCKVLLTEPPMNPLKNREKMIEMVFEKYGFAGT  
IS GIVNRWDDMLVWDYTFGEQKLNIDPGECKVLLTEPPMNPLKNREKMIEMVFEKYQFDSA  
NV GIVNRWEDMCHVWDYTFGPEKMNIDPRECKILLTEPPMNPTNREKMIEMVFEKYQFAGT  
PH G-----IMNVNPRDCKILLTEPPMNPTKNREKMIQVMFEKYQFSGA  
TC GVVNRWEDMCHVWDYTFGPRKMNLDPTDAKILLTEPPMNPTKNREKMIEMVFEKYGFAGA  
PP GMVNRWDDMLHVWDYTFGPQKMNLETKGCKILLTEPPLNPLRNREKMLEVMFERYEFDGA  
CE GIVNRWDDMAHVWDHTFGPEKLDIDPKECKILLTEPPLNPNRNREKMQVMFEQYGFNSI  
# #####

18670 18680 18690 18700 18710 18720  
-----+-----+-----+-----+-----+-----+  
AA YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
AG YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
AM YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEEYALPHLTRRLDIAGRDI TMYLIK  
AP YVAVQAILTLYAQGLLSGVVDSGDGVTHICPVYEEYVPLPHLTRRLDIAGRDI TRYLIK  
BM YVAVQAVLTLYAQGLISGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
CQ YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
DM YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
DP YVAVQAVLTLYAQGLTGVVDSGDGVTHICPVYEEGFAMPHLTRRLDIAGRDI TRYLIK  
IS YIAIQAVLTLYAQGLYTG VVDSGDGVTHICPVYEEFALNHLTRRLDIAGRDI TRYLIK  
NV YIAIQAVLTLYAQGLISGVVDSGDGVTHICPVYEVYPLPHLTRRLDIAGRDI TMYLIK  
PH YIAIQAVLTLYAQGLLSGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
TC YIAVQAVLTLYAQGLLSGVVDSGDGVTHICPVYEEFALPHLTRRLDIAGRDI TRYLIK  
PP YIAIQAVLTLYAQGLYTG VVDSGDGVTHICPVYLYGALPHLARRLDIAGRDI TRYLIK  
CE YVAVQAVLTLYAQGLTGVVDSGDGVTHICPVYEEGFALHHLTRRLDIAGRDI TYLIK  
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18730 18740 18750 18760 18770 18780  
-----+-----+-----+-----+-----+-----+  
AA LLLRGYAFNHSADFETVRMMKEKLCYIGYDIEMEQRLETTVLVESYTLPDGRVATQFL  
AG LLLRGYAFNHSADFETVRMMKEKLCYIGYDIEMEQRLETTVL----LPDGRMATQFL  
AM LLLRGYAFNHSADFETVRMLKEKLCYIGYNIETEKLLETTVLVESYTLPDGRVAMAMFW  
AP LLLRGYAFNHSADFETVRMMKEKLCYVAYNIETEQLKLETTVLVQSYTLPDGRVAAQFL  
BM LLLRGYAFNHSADFETVRMMKEKLCYIGYNIETEQRLETTVLVEPYTLPDGRVAAQFL  
CQ LLLRGYAFNHSADFETVRMMKEKLCYIGYDIEMEQRLETTVLVESYTLPDGRVATQFL  
DM LLLRGYAFNHSADFETVRIMKEKLCYIGYDIEMEQRLETTVLVESYTLPDGRVAAQFF  
DP LLLRGYAFNHTADFETVRQLKEKLCYIGYNIETEQLKLETTVLVESYTLPDGRVAAQFF  
IS LLLRGYVFNHSADFETVRMIKEKLCFVSYNVEQDQKLETTVLVESYTLPDGRGRT----  
NV LLRGYAFNHSADFETVRMIKEKLCYIGYDIETEKLLETTVLVESYTLPDGRVAAHFL  
PH LLLRGYAFNHSADFETVRIMKEKLCYIGYNIETEQLKLETTVLVEPYTLPDGRVAAQFF  
TC LLLRGYAFNHSDDFETVRIMKEKLCYIGYDIETEQRLETTVLVEPYTLPDGRVAAQFL  
PP LLLRGYVFNQSAADFETVRMMKEKLCYVAYNVEQEQLGLETTFLVEPYTLPDGRVATQVF  
CE LLQRGYNFNHSADFETVRQMKEKLCYIAYDVEQEERLETTVLVSQQYTLPDGRVAAQKL  
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18790 18800 18810 18820 18830 18840  
-----+-----+-----+-----+-----+-----+  
AA NRIGQLGLGVAIVGGVNSALYNVDGGHRAVIFDRFTGVKQVSGEGTHFFVPWVQRPII  
AG NRIGQLGLGVAIVGGVNSALYNVDGGHRAVIFDRFSGVKQVVTGEGTHFFVPWVQRPII  
AM NRIQLGLGLTGTGIVANNALYNVDGGHRAVIFDRFTGINKQVVGEGTHFFIPWVQRPII  
AP NRIGQLGLGLAVAGSVANTALYNVDGGHRAVIFDRFTGINKVTVGEGTHFFIPWVQKPII  
BM NRIGQVGLGVALVGGVNSALYNVDGGHRAVIFDRFAGVKQLVVGEGTHFFIPWVQRPII  
CQ NRIGQLGLGVAIVGGVNSALYNVDGGHRAVIFDRFTGVKQVTVSGEGTHFFVPWVQRPVI  
DM NRIGQMLGVALVGGVNSALYNVDGGHRAVIFDRFTGINKVTVGEGTHFFIPWVQRPII  
DP NRIQLGLGVALTAGVINSALYNVEGGHRAVIFDRFSGVKNEVVGEGTHFFIPWVQKPII  
IS NRIQLGLGVALTAGVINSALYNVDGGHRAVIFDRFTGVKNYVVGEGTHFFIPWVQRPII  
NV NRIGQFGLGVALVGGVNSALYNVDGGHRAVIFDRFVGVKNVTVGEGTHFFIPWVQKPII  
PH NRIGQLGLTAVAGGVLNSALYNVDGGHRAVIFDRFAGVKQVIGEGTHFFIPWVQRPII  
TC NRIGQFGLGVALVGGVNSALYNVDGGHRAVIFDRFSGIKKQVIGEGTHFFIPWVQRPII  
PP NMLGLGLGVAIVAGGNSALYNVDGGHRAVIFDRFTGVKNVTVGEGTHFFIPWVQKPII  
CE GRLGTVGVGLS IAGGIAQTALYNVDGGQRAVIFDRFSGVKNEVVGEGTHFFIPWVQKPII  
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18850 18860 18870 18880 18890 18900  
=====  
AA FDIRSQPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
AG FDIRSQPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
AM FDVRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTNEV  
AP FDIRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
BM FDIRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPRIYITLGDYDERVLPSTSEV  
CQ FDIRSQPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
DM FDIRSQPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
DP FDIRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPRIYITLGDYDERVLPSTNEI  
IS YDVRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPRMYTTLGDYDERVLPSTNEV  
NV FDIRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
PH FDIRSRPRNVPVITGSK-----GNIVIIPLPEQLPRIYITLGDYDERVLPSTTEV  
TC FDVRSRPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPRIYITLGDYDERVLPSTTEV  
PP YDVRSQPRNVPVITGSKDLQNVNITLRLILFRPVPDQLPKIYITLGDYDERVLPSTTEV  
CE FDIRSTPRAVTTITGSKDLQNVNITLRLILHRSPDRLPNIYLNIGLDYAEVLPSTNEV  
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18910 18920 18930 18940 18950 18960  
=====  
AA LKAVVAQFDAGELITQREMVSQKVSDDLTERAAQFGVILDDISITHLTFGKEFTQAVEMK  
AG LKAVVAQFDAGELITQREMVSQKVSDDLTERAAQFGVILDDISITHLTFGKEFTQAVEMK  
AM LKAVVAQFDAGELITQREIVSQKVEDLTERATQFGLILDDISITHLTFGKEFTQAVEMK  
AP LKAVVAQFDAGELITQREIVSRKVSETLERAGQFGVILDDISITHLTFGKEFTQAVELK  
BM LKAVVAQFDAGELITQREIVSQKVNDSLTERAAQFGLILDDISITHLTFGKEFTQAVELK  
CQ LKAVVAQFDAGELITQREMVSQKVSDDLTERAAQFGVILDDISITHLTFGKEFTQAVEMK  
DM LKAVVAQFDAGELITQREMVSQKVSQELTVRAKQFGVILDDISITHLTFGREFTLAVEMK  
DP LKAVVAQFDAGELITQREVVVSQKVSEALTERAGQFGLILDDISITHLTFGKEFTQAVELK  
IS LKAVVAQFDASEMITQREVVVSQKVCELTERASQFGVILDDISITHLTFGKEFTQAVEMK  
NV LKAVVAQFDAGELITQRELVVSQKVEDLTERASQFGVILDDISITHLTFGKEFTQAVELK  
PH LKAVVAQFDAGELITQREVVVSQKVSEELTDRASQFGVILDDISITHLTFGKEFTQAVELK  
TC LKAVVAQFDAGELITQRDLVVSQKVSEDLTERASQFGVILDDISITHLTFGREFTLAVELK  
PP LKAVVAQFDASEMITQREFVVSQKVSQELTVRAKQFGVILDDISITHLTFGREFTQAVELK  
CE LKAVVAQFDASEMITQREVVVSQKVSQELTVRAKQFGVILDDISITHLTFGREFTQAVEMK  
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18970 18980 18990 19000 19010 19020  
=====  
AA QVAQQEAEKARFMVEKAEQMKKAAIISAEGDAEAAALAKSFADSGDGLVELLRRIEAAED  
AG QVAQQEAEKARFMVEKAEQMKKAAIITAEGDAQAAQLARSLKESGDGLIELLRRIEAAED  
AM QVAQQEAEKARFLVEKAEQHKKAAIISAEGDAQAAASLAKSLGEAGDGLVELLRRIEAAED  
AP QVAQQDAERARFLVEKAEQKQASISAQGDSEAAASMLAKSFGDAGEGLVELLRRIEAAED  
BM QVAQQEAEKARFLVEKAEQKKAIVIAAEGDAQAAVLLAKSFGSAGEGLVELLRRIEAAED  
CQ QVAQQEAEKARFMVEKAEQMKQAAIISAEGDAEAAALAKSFGDAGEGLVELLRRIEAAED  
DM QVAQQEAEKARFLVEKAEQKQKASISAEGDAEAAAGLLAKSFGAGEGLVELLRRIEAAED  
DP QVAQQEAEKARFLVEKAEQKKAIVISAEGDSQAAASLLAKAFGDAGEGLVELLRRIEAED  
IS QVAQQEAEKARFLVEKAEQKKAIVITAEGDSQAAALLAKAFGEAGDALVELLRRIEAAED  
NV QVAQQEAEKARFLVEKAEQKKAIVITAEGDAQAAASMLAKSLGEAGDGLVELLRRIEAAED  
PH QVAQQEAEKARFLVEKAEQKKAIVISAEGDAQAAALLAKSFGAGEGLVELLRRIEAAED  
TC QVAQQEAEKARFLVEKAEQKKAIVISAEGDAQAAATLLAKAFGDAGEGLVELLRRIEAAED  
PP QVAQQEAEKARFLVEKAEQKQKAAIISAEGDSQAAATLLAKAFGEAGDALVELLRRIEAAED  
CE QVAQQEAEKARYLVEKAEQMKIAAVTTAEGDAQAAKLLAKAFASAGDGLVELLRKIEAAEE  
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19030 19040 19050 19060 19070 19080  
=====  
AA IAYQMSRSRGVAYLPAGQTTLLQLPALPNSLLVDISDALSEKERVKFTVHTRTNLPGFA  
AG IAYQMSRSRGVAYLPAGQTTLLSLPALPNSLLVDISDALSEKERVKFTVHTRTNLPGFD  
AM IAHNLSRSRQVAYLPPGQNVLLNLPDLSDKSLQVDISDALSEKDKVKTFTVHTTTLPDFQ  
AP IAYQLSRSRQVSYLPPGQNVLLNLP-LSDNSLQVVISDALSEKDRVKTFTVLSKTTLPDFQ  
BM IAYQLAKSRNVYLPNGQTTLLSLPDLNDNTLQVDISDALSEREKVKTFTVHTKTTLPDFQ  
CQ IAYQMSRSRGVAYLPAGQTTLLNLPPLPNSLLVDISDALSEKERVKFTVHTRTNLPGFA  
DM IAYQLSRSRGVAYLPSGQSTLLNLPVLGENALHVEISDALSEKERVKFTVHTRTNLPGFS  
DP IAYQLSRSRNVYLPNGQTTLLSLPDLNDNTLQVDISDALSEREKVKTFTVHTKTTLPDFQ  
IS IAYQLSRSRNVYLPNGQTTLLSLPQSVADSLVDISDALSERDKVKTFTVHTKTTLPDFQ  
NV IAYQLSRSRQVSYLPPGQTTLLSLPEHNDKALQVDISDALSEKDKVKTFTVHTKTTLPDFQ  
PH IAYQLSRSRQVSYLPPGQNVLLNLPYLPQNEIKVEISDALSEKDKVKTFTVHTKTTLPDFQ  
TC IAYQLSRSRQVSYLPPGQNVLLNLPVLDNTLQVDISDALSEKDKVKTFTVHTKTTLPDFQ  
PP IAAQLSRRNVYLPNGQTTLLNLPENVPALVIEISDALSEREKVKTFTVHTKTTLPDFQ  
CE IAERMKNKNVYLPNGQTTLLNLPQNSDEAICVDISDALSEREKVKTFTVHTKTTLPDFQ  
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19090 19100 19110 19120 19130 19140  
=====  
AA KSDFLVVRQHEEFVWLHDFEENEYAGYIIPPCPPRPFDFASREKLQRLGEGGNMTKE  
AG KSDFLVVRQHEEFVWLHDFEENEYAGYIIPPCPPRPFDFASREKLQRLGEGGNMTKE



DP -----HKDVADHF IKISSCLEMATADTN-QLERFATKSADIFEKARKIENR  
IS -----HKNVADSY IKISSCLTQLATVESS-ELEKFFPKVSESEFEKARKIEGR  
NV -----HKDVADSY IKISTNLLQLATDTG-KLEKLLTKIAETFEKLRKVEGR  
PH -----HKDVADCYLHISAGFTQLSTIDHK-DLDKFLVKVTETFEKARKLEAR  
TC -----HKELADSY IKISGGVQLANNDPG-PLDKFLAKVSDTFERARKVESR  
PP -----QKNLANSY IKISTAVMQLVPLEMNDLEVFYPSIAEFFEAARKIEGR  
CE VTVTVFI FGEIFKI TEDVVASFSKIGDSFERIARGE PNKSLARTFAQQADAMFKLKKVESR  
#####

19390 19400 19410 19420 19430 19440  
=====+=====+=====+=====+=====+=====+  
AA VASDQDLKLGDTLRY YQRDSNAAKALLIRRLRCLTAYETANRNLEKARAKNKDVHAAETA  
AG VASDQDLKLGDTLRY YQRDSNAAKALLIRRLRCLAAEYEAANRNLEKARAKNKDVHAAESA  
AM VASDEDLKLSDTLRY YMRDTAAAKRLLFRRLKALHAYESANRALEKARGKNKDVHAVSIL  
AP VASDEDLKLSDTLRY YVGDSPAARLLYRRLRCLANRYETANRNLEKARAKNKDVHAAEAT  
BM MASDQDLKLGDTLRY YMRDAHAAKAVLVRRLRCLAAEYEAANRNLEKARAKNKDVHAAEQG  
CQ VASDQDLKLGDTLRY YQRDSNAAKALLIRRLRCLAAEYEAANRNLEKARAKNKDVHAAETA  
DM VASDQDLKLGDTLRY YQRDSNAAKALLIRRLRCLAAEYEAANRNLEKARAKNKDVHAAETA  
DP VSTDEDLKLSDTLRY YMRDTTAAKNLLYRRLRCLADYEANRALEKARAKNKDVHAAEWS  
IS VATDEDLKLSDTLRY YMRDTSAAKDLLYRRLRCLANYENANRALEKARAKNKDVQAAEVL  
NV VASDEDLKLSDTLRY YMRDTAAAKRLLIRRLKALHETANRALEKARAKNKDVHAAEQA  
PH VASDEDLKLSDTLRY YMRDLSAAKRLLYRRLRCLAEYTNANRNLEKVRTKNKDVHAAEKT  
TC VASDQDLKLGDTLRY YMRDSQAARALLVRRLKCLVYENANRTLEKARAKNKDIHAAEAAA  
PP KGSDFDLKLDLTLRY YLRESGAAQALLYRRLRCLANYEGTNRALEKARIKNKDVPHTEEL  
CE S SNDEELKLGDTLRY FARDTQAADLLYRMRCLANYEAANKNLERARAKNREIPKAEAE  
#####

19450 19460 19470 19480 19490 19500  
=====+=====+=====+=====+=====+=====+  
AA QTQACEKFESMSARGKEELVS FRLRRVAAFKKSLIELAELEMKHAQTQYEF LRQSLALQ  
AG QTQACEKFESMSARGKEELVS FRLRRVAAFKKSLDLAELE IKHAKGQYEF LRQSLALQ  
AM FIT-----  
AP QQI SCEKFEVMSDKGKEELIDFKARRVSTFNKNLLELAWE IKHAQHQI DILKTSLEMIN  
BM QAEACAKFEQL SARAREELIDFRTRRVAAFRKS LIELAELE IKHARSQQLFRKSLQVLR  
CQ QTQACEKFESMSARGKEELVS FRLRRVAAFKKR-----  
DM QAEACEKFESMSARGKEELIGFRNRVAAFKKSLVLESELE IKHAKTQYEF LRQSLALQ  
DP QHQAACEKFESMSARGKEELMDFKVRRVAAIKKNLVELCELELKHANTHSQLLKASIAALR  
IS QQEACESFENISKQAKQELTDFKTRRVNFRKNLIELAELELKHAKAQVQLKSSIALVK  
NV QTEACSKFEQMSDKGKEELLD FKTRRVAAFKKNLIDLTEFE IKHAKAHAEMLKCLSLVQ  
PH QINACNLFQQMDKABEELNFKDRRIADFRKNLVELAELE IKHAKSQVSLKTKCLASLK  
TC QSQACEQFEAISQAQAKELLD FKTRRLHAFRKS LIELAELE IKHARTQQDLKKSQVSLR  
PP QKAAACEKFESMSARGKEELKDFRSTRVRLNKKSLIDLSELQ LKHCKAELSLRETI GKMK  
CE QSEACKKFEETGLSKNELKELKTRRVQAFKKNLTLAELE IKHAKAELSLLRDVVERLK  
#

19510 19520 19530 19540 19550 19560  
=====+=====+=====+=====+=====+=====+  
AA YMKREHSLFKPYQSGGMTI PYWDFIGSTFVTNSYIRLTPDLQSKSGAIWNQMPCT SINWE  
AG YMKREHSLFKPYQSGGMTI PYWDFIGSTFVTNSYVRLTPDLQSKNGAIWNHVPCT SINWE  
AM YMKREHSLIRPYQSGMSI PYWDFIGSTI VTNNYVRLTPDLQSKQGA IWNVPC HARNWE  
AP YMKREHSLKPYQSGGI TVPNWDFMGSTLVTDKYVRLTPDLQSMGSGS IWNSLPCYVNNWE  
BM YIRREHSLTKPYQSGMSL PYWDFIGSTI VTSNRYVRLTPDLQSKAGALWNTVPCNTRNWE  
CQ YMKREHSLIRPYQSGMTI PYWDFIGSTFVTNSYVRLTPDLQSKSGAIWNQMPCT SINWE  
DM YMKREHSLVRPFQGVGVILPHWDFLGNMTVTSNRYIRLTPDLQSKSGALWNYSPVMTRNWE  
DP YLKRHSLMKPYTGSGLSMPFDFL GSTVVISNRYIRLTPDLQSKSGAIWNI VPCSKNWE  
IS YMKREHSLVKPYQAGMTI PNWDFLGNMTVGTQYIRLTPDRQSSKGA IWNVPCSKNWE  
NV YMKREHSLIRPYQSGMTI PYWDFMGSTMTVNNYIRLTPDAQSQQGA IWNVPCNVRNWE  
PH FMKREHSLIKPYQATGTSI PYWDFILGNTIVTNYVRLTPDSQSKRGAVWNAVPCKVRNWE  
TC FMKREHSLIKPYGSGIEIPFWHFTGSTI VTPNYIRLTPDLQSKVGA IWNVPCNVRNWE  
PP FVKEHSLVKPYQSGMSI PNWDFIGSTMTVSNRYIRLTPDAQSQQGS IWNVPCNVMYVNW  
CE YKREHSLIKPYTGS GADIPNWNII GSTFVSNQIRLTADEQSKAGALWNTQPVNSRDWE  
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19570 19580 19590 19600 19610 19620  
=====+=====+=====+=====+=====+=====+  
AA VQVNFVKVHGKGD-LFGDGFAI WYARDRLNTGPVFGSRDNFLGLAII LD TYSNHNGPHNH  
AG LQVNFVKVHGKGD-LYGDGFALWYSRDLQTGPVFGSKDNFMGLAII LD TYSNHNGPHNH  
AM LQVNFVKVHGKGD-LFGDGFTI WYARERMSKSPVFGNQDYFQGLAII LD TYSNHNGPHNH  
AP LQVFKI HGKGDLSLHGDGMAI WYTRERMKNQGPVFGNKDLFEGGLAVI LD TYSNHNGEHNH  
BM LQVQFKVHGRGKE-LFGDGFAI WYVKERMESGPVFGSKDYFNGLAII LD TYSNHNGAHHH  
CQ VHSFKVHGKGD-LFGDGMAI WYAKDLQTGPVFGSRDPFQGLAII LD TYSNHNGPHNH  
DM VHVGFVKVHGKGT-LFGDGFAI WYTKERMQTPVFGSKDHFSGLAII LD TYSNHNGPHNH  
DP LQVQFKVHNGKGD-LFGDGLAFWYARDRMVKGPFVFGSKDYFYGLAII LD TYSNHNGPHNH  
IS MHVHFKVHSGSKE-LFGDGFAI WYAKEALQLGPVFGSKDKFSGLAIFPD TYANQNGPHNH  
NV LQVHFKVHNGKGD-LFGDGLAI WYSKERMQGPVFGSKDYFNGLAVI LD TYSNHNGPHNH  
PH LQVHFKVHNGKGD-LYGDGLAI WYQSRMIPGSVFGNMDYFQGLAII LD TYSNHNGPHQH  
TC LQVHFKVHGKGD-LFGDGFAI WYAKDRMKEGPVFGNDDFFHGLAII LD TYSNHNGPHNH

PP VQIDFRVHGKGD-LFGDGLAIWYTKDPLQPGPVFGSKDHFQGLAVFLDITYANQNGHHNH  
CE LQVSKFVGTSTGD-LFGDGMAIWYTSEPNILGPVFGKDYFRGLAVFLDITYSNHNGPHQH  
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19630 19640 19650 19660 19670 19680  
=====+=====+=====+=====+=====+=====+  
AA QHPYISAMVNNGLSYDHDHRDGTHTQLAG----CEAKFRNVVDYDTMISIRYENDVLTVST  
AG QHPYISAMVNNGLSYDHDHRDGTHTQIAG----CEAKFRNVEFDQINIRYENDVLTVFT  
AM QHPYISAMVNNGLSYDHDHRDGTHTQIAG----CEANFRNLEHDTHISVRYERDTLTVST  
AP QHPYISSMVNNGSLQYDHDHRDGTHTELAG----CEVVRNLPETHVLRITGNTLTVMT  
BM QHPYISAMVNNGLTHYDHDHRDGTHTQLSG----CEAKFRNFNHDHSISIVYRDDTLIVST  
CQ QHPYISAMVNNGLSYDHDHRDGTHTQLAG----CEAKFRNVVDYDTMIAIRYENDVLTVST  
DM QHPYISAMVNNGLSYDHDHRDGTHTQLAG----CEVFRNVEYETLVSIRYENDILSVST  
DP AHPYISAMVNNGLTYDHDHRDGTHTQLAG----CEARFRNVEHETYLAVRYENDKLSVST  
IS GHPYISAMVNNGLSYDHDHRDGTHTELAG----CEAKFRNLDDHTHIAVRYENDVLTVST  
NV QHPYISAMVNNGLSYDHDHRDGTHTQLAG----CEAKFRNLEHDTHISIRYERDTLTVST  
PH QHPYISAMVNNGLSYDHDHRDGTHTQIAG----CEAKFRNVVDYDTMIAIRYERDTLTVST  
TC QHPYISAMVNNGLTHYDHDHRDGTHTQLAG----CEAKFRNLVDYDTMIAIRYERDTLTVST  
PP GHPYISAMVNNGLSYDHDHRDGTHTELAG----CEAKFRNSESETHSIRYEQDTLVST  
CE GHPYISAMVSDGLSYDHDHRDGTHTQLGGENTGCTAKFRNKDHTQVLRIVGDTLSIFS  
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19690 19700 19710 19720 19730 19740  
=====+=====+=====+=====+=====+=====+  
AA DLENKNTWKQCFQVTGVKLPPTYGYPGVSATTGDLSDNHDLIAIKFYELAP-ALLAE--D  
AG DLENKATWKECFRVEGVKLPPTYGYPGVSATTGDLSDNHDIISIKFFELEAP-SLLAE--D  
AM DFANKAAWKECFSVKDIKLPPTYGYPGVSATTGDLSDNHDIISIRLFELEAP-PLDLP--D  
AP DLEDKAVWKPCFVGGVELPTGYYPGVSATTGDLSDNHEILAVRLEYVSD-DPNEALKD  
BM DLEGNNAWKECFVGVNLLPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
CQ DLENQNTWKQCFQVTGVKLPPTYGYPGVSATTGDLSDNHDLIAIKFYELAP-PLDLP--D  
DM DLENRNEWKNCFFVANVELPTGYYPGVSATTGDLSDNHDIHSEKFDLNL-VNHDEIR  
DP DIDNKAGWKPCFVGVNLLPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
IS DLEGNNAWKECFVGVNLLPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
NV NIANKAWKECFVGVNLLPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
PH DFENKAAWKCFVQSKGILPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
TC DIENKAAWKCFVQSKGILPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
PP DIVGKKEWKECFVGVNLLPTGYYPGVSATTGDLSDNHDIISIKMFELEAP-ESQKDED  
CE DIENKGIWNLCSVNVNQLPTGYYPGVSATTGDLSDAHDVSLKMFQEFAHVERVGEAD  
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19750 19760 19770 19780 19790 19800  
=====+=====+=====+=====+=====+=====+  
AA RSRIIPSAETFDAPREHKEDPKQ-GGMSNVKIFFLILLVMLIVVVLVVGIMIFYQKHQEN  
AG RRQIVPSAATFEAPREHKDDPKP--GMSNVKIFFLILLVMLIVVVLVVGIMIFYQKHQEN  
AM RSNILPSAAYFDAPREHVDPKQS-ALSRIMFFLLMLVAALALIAICVVGIMIFYQKHQEN  
AP RSKIIIPNAKVFSPPREHIEDTKSQ-SWSGLKIFFLIVLVLVILIAALIVGGVWYWEYQQQTQ  
BM RSHIIPSAASFEAPREHIEDAKP--AMSGIKTFLWMMFVAIIVIIVLVLVVGIMIFYQKHQEN  
CQ RSQILPSAASFEAPREHKSDPKSSGAANSIKIFFLILLVMLIVVVLVVGIMIFYQKHQEN  
DM RSNIIIPNAKTFFPPREHKEDPKP--GMSNAKIFFLILLVWVVAVAIAFISYFKDR--N  
DP RSNIMPAAQSFPPREHVDPKPS-SMSGVLFLLMLLGVLVGFACIIVGIFYQKHQEN  
IS RSKIVPSAASFEAPREHIEDPPP--AMSGTKLFLVLVLAAILGLVLCIIVGVVIFVQKHQEN  
NV RSKIIIPSAAYFESPRDHVEDPKPS-SLSGVKIFLLMLVLAALIAICVVGIMIFYQKHQEN  
PH RSHVLPVSAVFFPPRGEIEDPKPS-SWSGIKFLVLMMLGSLTIAIVVIGIMIFYQKHQEN  
TC RSNIVPSAATFEPPRHDVEDPKPS-SLSGFKVFLMLVLSIAVAVCVLVGIMIFYQKHQEN  
PP REFITPQAEHFAPHRDHVEDPSP--GMSGTKFFVMLFVLCAGIGGFYQKHQEN  
CE RSNVPHAQFTASPRDHTDDARPS-SLWGGTIALVIVGVIVLVGLGFGFYFQKHQEN  
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19810 19820 19830 19840 19850 19860  
=====+=====+=====+=====+=====+=====+  
AA SRKRFYMAAGPIAERNQDATIYVGLLDDKVSETLLWEMFVQAGPVVNVHMPKDRVTQMHQ  
AG ARKRFYMAAGPIAERNQDATIYVGLLDDKVTELLWELFVQSGPVVNVHMPKDRVTQMHQ  
AM SRKRFYMAAGPIAERNQDATIYVGLLDDKVTELLWELFVQSGPVVNVHMPKDRVTQMHQ  
AP SHKTFYMAAGPIAERNQDATIYVGLLDEKVSDTLMWELFVQAGPVVNVHMPKDRVTQSHQ  
BM SRKRLY-----  
CQ ARKRFYMAAGPIAERNQDATIYVGLLDDKVSETLLWEMFVQAGPVVNVHMPKDRVTQMHQ  
DM ARKRFYMAAGPIAERNQDATIYAGGLDDKVSETLLWELFVQAGPVVNVHMPKDRVTQMHQ  
DP SRKRFYMAAGPVSERNQDATIYVGLLDEKVTPELLWELFVQSGPVVNVHMPKDRITLLHQ  
IS SRKRFYMAAGPIAERNQDATIYVGLLDEKVSDTLMWELFVQAGPVVNVHMPKDRVTGHQ  
NV SRKRFYMAAGPIAERNQDATIYVGLLDDKVSETLLWELFVQSGPVVNVHMPKDRVTQMHQ  
PH SRKRFYMAAGPIAERNQDATIYVGLLDDKVTEPLWELFVQSGPVVNVHMPKDRVTQMHQ  
TC KRKRFYMAAGPIAERNQDATIYVGLLDDKVTELLWELFVQSGPLVNVHMPKDRVTMMHQ  
PP ARKRFYMAAGPIAERNQDATIYVGLLDEKVSNTLLWELFVQAGPIVSVHMPKDRITGLHQ  
CE QRKRFYMSAGPIVERNQDATIYVGLLDEKVSILLWELMVQAGPVVNVHMPKDRVTANHQ

19870 19880 19890 19900 19910 19920  
====+====+====+====+====+====+====+  
AA GYGFVEFLGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
AG GYGFVEFLGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKSLDVGANIFIGNLDLEVDEK  
AM GYGFVEFMGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
AP GYGFVEFLAEDDADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNVIFIGNLDSEVDEK  
BM -----MGEEADADYAIKVMNMIKLYGKPIRVNKASAHQKNLDVGNVIFIGNLDPEVDEK  
CQ GYGFVEFLGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
DM GYGFVEFLSEEDADYGIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDVEVDEK  
DP GYGFVEFLSEEDADYACKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
IS GYGFVEFLGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
NV GYGFVEFMGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
PH GYGFVEFMGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
TC GYGFVEFMGEEADADYAIKIMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
PP GYGFVEFPGEEADADYAIKVMNMIKLYGKPIRVNKASAHQKNLDVGNIFIGNLDPEVDEK  
CE GFGFVEFMGEEADADYAIKILNMIKLYGKPIRVNKASAHQKNLDVGNIFVGNLDPEVDEK  
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19930 19940 19950 19960 19970 19980  
====+====+====+====+====+====+====+  
AA LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFEASDAAMDAMNGQYLCNRPISV  
AG LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFEASDAAMDAMNGQYLCNRPISV  
AM LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFDASDAIEAMNGQYLCNRPISV  
AP LLYDTFSAFGVILQTPKIMRDPDTGNSKGFAPINVASFEASDAIEAMNGQHLCNRAVSI  
BM LLYDTFSAFGVILQTPKIMRDPETGNSKAFAPINFASFEASDAIEAMNNGQYLCNRPISV  
CQ LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFEASDAAMDAMNGQYLCNRPISV  
DM LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFEASDAAMDAMNGQYLCNRPISV  
DP LLYDTFSAFGVILQTPKIMRDPDTGNSKGFAPINFASFDASDAIEAMNGQYLCNRPITI  
IS LLYDTFSAFGVILQTPKIMRDPDTGNSKGFAPINFASFEASDAIEAMNGQYLCNRAITI  
NV LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFDASDAIEAMNGQYLCNRPISV  
PH LLYDTFSAFGVILQTPKIMRDPDPSGNSKGFAPINFASFDASDAIEAMNGQYLCNRPISV  
TC LLYDTFSAFGVILQTPKIMRDPDTGNSKGFAPINFASFEASDAIEAMNGQYLCNRPISV  
PP LLYDTFSAFGVILQTPKIMRDPETGNSKGFAPINFASFEASDAIEAMNGQYLCNRAISI  
CE LLYDTFSAFGVILQTPKIMRDPDVSSTGNSKGFAPINFASFEASDAIEAMNGQYLCNRAITV  
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19990 20000 20010 20020 20030 20040  
====+====+====+====+====+====+====+  
AA SYAFKKDSKGERHGSAAERLLAAQNPLSHADRPQLFADAPEDEDFIKRKSNTVFLGYT  
AG SYAFKKDSKGERHGSAAERLLAAQNPLSHADRPQLFADAPEDEDFIKRKSNTIIFLGYT  
AM SYAFKRDKGERHGSAAERLLAAQNPLSQADRPQLFADAPEKDFIKRKSNTIIFLGYT  
AP SYAFKKDKGERHGSAAERLLAAQNPLSQADRPQLFADAPEDEDFIKRKSNTMFLGYT  
BM SYAFKKDKGERHGSAAERLLAAQNPLSHADRPQLFADAPEEDQFIKKTNTCTIIFLGYT  
CQ SYAFKKDSKGERHGSAAERLLAAQNPLSHADRPQLFADAPEEDDFIKRKTNTCTIIFLGYT  
DM SYAFKKDKGERHGSAAERLLAAQNPLSHADRPQLFADAPEEDDFIRRRSCTVFLGYT  
DP SYAFKKDSKGERHGSAAERLLAAQNPLAQTDPRPHQLFADAPEEDDFIKRKSNTIIFLGYT  
IS SYAFKKDSKGERHGSAAERLLAAQNPLAHSDRPHQLFADAPEEDDFIRRYGCTIIFLGYT  
NV SYAFKRDKGERHGSAAERLLAAQNPLSQADRPQLFADAPEDEDFIRRRHGTIIFLGYT  
PH SYAFKKDSRGERHGSAAERLLAAQNPLSQADRPQLFADAPFDEWPCPKSNTIIFLGYT  
TC SYAFKKDSKGERHGSAAERLLAAQNPLSQADRPQLFADAPNEDPFIGVKNCAIIFLGYT  
PP SYAFKKDSKGERHGSAAERLLAAQNPLSIGDRPHQLFADAPEEDQFIQRRSCTIIFLGYT  
CE SYAFKRDKGERHGTAAERMLAAQNPLFPKDRPHQVFSVDFPYPYEGRQKRCTIIFLGYT  
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20050 20060 20070 20080 20090 20100  
====+====+====+====+====+====+====+  
AA SNMVS CGVRETIRFLVQH KMVDCIVTTAGGVEEDLIKCLAPTYLGSFELGKRLREQGIN  
AG SNMVSAGVRETIRFLVQH RMVDCIVTTAGGVEEDLIKCLAPTYLGSFELAGRELREGIN  
AM SNMASCGRDTRIRFLVQH KMIDCIVTTAGGVEEDLIKCLAPTYIGDFHLEGSLRQHGIN  
AP SNMVS CGNRDAIRFVVQH KMVDCIVTTAGGVEEDLIKCLAPTYIGDFQLKGSTLREDGLN  
BM SNMIS SGLRDTIRFLVQH KLVDCIVTTAGGVEEDLIKCIAPTYVGFNLSGKVLRTRGIN  
CQ SNMVS SGVRETIRFLVQH KLVDCIVTTAGGVEEDLIKCLAPTYVGSFELGKRLREQGIN  
DM SNLV S SGLRETIRFLA EHRMIDCIVTTAGGVEEDLIKCLAPTYFMGSFELSGRDLREGIN  
DP SNMCS SGRDTRIKFLVQH KLVDCIVTTAGGVEEDLIKCLAPTYVGNFELGKSTLRESGIN  
IS SNMASAGIRDIIRFLVH SMVDCIVTTAGGVEEDLIKCLAPTYVGFSLRGGPLRDLGIN  
NV SNMASCGRVRETIRFLA EHRMIDCIVTTAGGVEEDLIKCLAPTYVGFHLDGKTLRDKGIN  
PH SNMIS SGLRETIRFLVQH KLVDCIVTTAGGVEEDLIKCLAPTYLGNFNLGKTLREKGIN  
TC SNIV S SGLRETIRFLVQH KLVDCIVTTAGGVEEDLIKCMAPTYLGNFALDGVNLSRNGIN  
PP SNIV S SGLRDIIRFLVQH KMVDCIVTTAGGVEEDLIKCLAPTYLGNFNLGKSTLREKGIN  
CE SNLVTSGLREVLRYCVQRNLVDCIVTSAGGVEEDLIKCLKPSYLGTFMMDGAKLRSNGMN  
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20110 20120 20130 20140 20150 20160  
====+====+====+====+====+====+====+  
AA RIGNLLVPNDNYCKFENWVILPDEMLEEQRS SGLWTPSKVIQRLGERINDESSVYIWA  
AG RIGNLLVPNDNYCKFENWVILPDEMLAEQKSNGLWTPSKVIARLGEKINDETSIYYWA  
AM RIGNLLVPNNYCLFEDWVILPDEMLETEQTKDILWTPSKVITRLEKINNEDSIYYWA

AP RIGNLLVPNNYCKFENWVMPILDKMLEEQN--IAWTPSKIIERLGLLEINDEQSIYWA  
BM RIGNLLVPNDNYCLFEWVTPLLDEMI SEQMKEGTWVSPSRITARLGERINNESSVYCYWA  
CQ RIGNLLVPNDNYCKFENWVIPLLEDEMLQEQTNGTLWTPSKVIQRLGERINDESSICYWA  
DM RIGNLLVPNDNYCKFEDWVMPILDEMLEEQKSGGT IWSPSKIIHRLGERIGDPSSIIYWA  
DP RIGNLVTI PNDNYCFEDWVMPILDEMVTEQKEKTKWTPSRIEKLGRAINNPESVYYWA  
IS RIGNLLAPNDNYCLFENWII PVLNKMLDEQRSRGTWVSPSKMIERFGLEIDDPRSIIYWA  
NV RIGNLLVPNDNYCLFEDWVMPILDKMLEEQK-KGVLWTPSKVIARLGEIINNRSIIYWA  
PH RIGNLLVPNNYCLFEDWILP I FDKMVEEQEKEKNI IWSPSSIIARLGEIINNTDSVYYWA  
TC RIGNLLVPNDNYCFENWIMPLLEDEMLEVEQ-KEGALWSPSKVITRLGERINNDSEIIYWA  
PP RIGNLLVPNDNYCKFEDWII P ILSSEMLKEQQENGHWTPSKIIINRLGEIKINDKQSIYWA  
CE RAGNVLIPNDNYCAFEDWMLPILDECLVEQEEKHLNWTSPSKLIQRLGERIGDESSIIYWA  
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20170 20180 20190 20200 20210 20220  
====+====+====+====+====+====+====+  
AA AKNKIPVFPALTDGSLGDMMYFHSFRN-PGLVLDIISDLRRLNTMAVKAVNSGIIIGG  
AG AKHRI PVFSPALTDGSLGDMMYFHSFRN-PGLVVDIVSDLRRLNTMAVKAVQSGIIIVGG  
AM AKNKIPVFPALTDGSLGDMMYFHSFRN-PGLIIDIIISDLRRLNTMAMKAVKSGMIIGG  
AP AKNKIPVFPALTDGSLGDMMYFHSFRN-PGLIIDILKDLRRLNTMAVKAANSGMIIIGG  
BM WRNNIPIFSPALTDGSLGDMMYFHSFKR-PGLIIDILGDLRRLNTMAVKANNTGVIIIGG  
CQ ARNKIPIFSPALTDGSLGDMMYFHSFRN-PGLVLDIISDLRRLNTMAVKAVNSGIIIVGG  
DM AKNKIPVFPALTDGSLGDMMYFHSFRQ-PGLVVDIISDLRRLNTMAVKAVNSGMIIVGG  
DP AVNNI PVFSPALTDGSLGDMMYFHSYKN-PGLVVDILEDLRRLNTMAVKASNSGMVILGG  
IS ARNKIPVFPALTDGSLGDMTYFHSFRN-PGLVVDIAQDIRRLNTMAVKAVKSGMVIIVGG  
NV AKNKIPVFPALTDGSLGDMMYFHSFKN-PGLVVDIVSDLRRLNTIAMKAIRSGVIIIGG  
PH AKNKIPVFPALTDGSLGDMMYFHSYKN-PGLVVDILSDLKINSISLKSCKTGMILIGS  
TC AKNKIPVFPALTDGSLGDMMYFHSFRN-PGLVLDIISDLRQLNLMAMKAINTGMIIGG  
PP AVNKIPVFPALTDGSLGDMVYFHSFKE-SGLIIDIAADIRINTIAVKAQKSGMVIIGG  
CE AKHRI PVFSPALTDGSLGDMLYFHSVKSSPGLRVDIVEDVRHINTIAVKSFKTGSIIIGG  
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20230 20240 20250 20260 20270 20280  
====+====+====+====+====+====+====+  
AA GVIKHHICNANLMRNGADFSVFINTASEYDGSDSGARPDEAVSWGKIKKDATPVKVYAEA  
AG GVIKHHICNANLMRNGADFSVFINTASEYDGSDSGARPDEAVSWGKIKKDATPVKVYAEA  
AM GVVKHHICNANLMRNGADYSVFINTASEFDGSDSGARPDEAISWGKIRMDAKPVKIYAEA  
AP GVIKHHICNANLMRNGADYAVYLNNTASEYDGSDSGARPDEAVSWGKIKADASPVKIYGDA  
BM GLIKHHICNANLMRNGADYAVYVNTASEFDGSDAGARPDEAVSWGKIRPNANPVKLYADA  
CQ GVIKHHICNANLMRNGADYSVFINTASEFDGSDSGARPDEAISWGKIKKDATPVKVYAEA  
DM GVIKHHICNANLMRNGADYSVFINTASEFDGSDSGARPDEAISWGKIRKDATPVKVYAEA  
DP GLIKHHICNANLMRNGADFAVFINTACDFDGSDSGAKPDEAVSWGKIKKDATPVKVCADA  
IS GVVKHHICNANLMRNGADFAVYLNNTGSEFDGSDSGASPEAVSWGKIKKDAHPVKVCAEA  
NV GVVKHHICNANLMRNGADFGVFLNTASEYDGSDSGARPDEAVSWGKIRKDSKAVIFAEA  
PH GVVKHHICNANLMRNGADYSVFINTSNEFDGSDSGARPDEAISWGKIKKNANPVKVYADA  
TC GVVKHHICNANLMRNGADFCVFLNTASEFDGSDSGARPDEAKSWGKIKKEATPVKIYAEA  
PP GIKHHICNANLMRNGADYSVFINTANEFDGSAGARPDEAVSWGKIKENTKSVKVNDA  
CE GVVKHHINANLMRNGADHTVYINTQEFDGSDSGAQPDEAVSWGKVKPSAGAVKVHAEA  
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20290 20300 20310 20320 20330 20340  
====+====+====+====+====+====+====+  
AA TLVFPILVGETFVKNHFMVEILDAKNS-KPIGKCRVQ-GDTSIKALKNEVQN-MKSLT  
AG SLVFPILVGETFVKNDHY--IEFLDAKSS-KSLGKCRVS-GDTTLQALKTEVQK-LKPALT  
AM SLVFPILLVGETFARHYHMEIQILLTAKSS-KLIANVSVK-SNTTIQEIKEELFK-LKKAPH  
AP TLIFFLLVGETFAKRYHMEIEIVTTDDKN---IGKIKVTDASQISDIKKISIKV-KSALY  
BM TLVFPILVAQTFAKHHFMEIEILSVSSAKP--LGIHVTEGESSIKNVKEIKQSVKKSly  
CQ SLVFPILVAETFVKEHFMEIEILDVKN--RSLGKCRVQ-GDTTVKALKNDVEK-LKPALT  
DM SLVFPILVGETFAKRHMEIEILNAKNS-KPYGKVKVPSGATPIGDLRALIHKTQKTPH  
DP SLVFPILVAETFAKHHFMEIEIGILSTSGGKQ--LATLVDPNSTLKEKLTQIHR-LKSHLY  
IS TLVFPILVAETFVKEHFMEIEILVKN--RSLGKCRVQ-GDTTVKALKNDVEK-LKPALT  
NV SLVFPILL-----MELEVVSAGSS-KSIAVTVS-PTTTIABIQQQLHS-LKKAPY  
PH TLVFPILVAQTFAKHHFMEIEFLSSAGS-KSLGRFNASSSTTVVQLKKEVYK-LNKKLH  
TC SLIFFLLVAQTFVKEVQMALELEVVTSGKPVGKVSLSA--SSATVVDLKEIEFK--NFRLG  
PP TIVFPILVAETFARFVHMEIEIVKSGSNETVIATLFDVSPSSKIRDIKKLIHKQ-KKSLY  
CE TLVFPILVAETFVKEHFMEIEIVKSGSNETVIATLFDVSPSSKIRDIKKLIHKQ-KKSLY  
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20350 20360 20370 20380 20390 20400  
====+====+====+====+====+====+====+  
AA VHRQALRLEPRGKILKSDTLQSLN--FTSGGKLYVKDLGQIISWKGVFLAEYAGPIFVY  
AG VHRQSLRLEPRGKPPKESLTKSLN--VAAGKLYVVDLGPQIISWKGVFLAEYAGPIFVY  
AM IHRQSLRLDAGKALPDSSETLKNLS--ISNGGKLYFKDLGQIISWKTFLVEYAGPLILY  
AP PDRQSLRLEARGKSLKDTDKVLDL--LKNNGKLYVKDLGQIISWKTFLVEYAGPLIFVY  
BM PDRQALKLEAKGKTLKDEDTLNSLN--IQDQSKFLKDLGQVSWRNVFLAEYAGPLIFVY  
CQ IHRQSLRLEPRGKTLKSDTLQSLG--ISSGGKLYVKDLGQIISWKGVFLAEYAGPIAVY  
DM ANRQSLRLELKGKSLKDTDTLESLS--LRSGDKIYVKDLGQIISWKTFLVEYAGPLIVY  
DP PDRQEFRQEPKGLDESKTVAALG--LKDKSKLYLKDLPQIAWKTFLVEYAGPLIFVY



CE WIFFSIMVQSLPAIIFTTAGFAQMAIWAQGHKRNYLKEFPDYPKNRKAIVPFVLKQAKYA  
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20650 20660 20670 20680 20690 20700  
====+====+====+====+====+====+====+  
AA IVMGYSGVNYLGMQRNPGTKTIEEELLVAMLKHNWISSEAFNQPQQIQFQRAARTDKGVS  
AG ILLGYSGVNYFGMQRNPGTKTIEEDLLRAMQKREWINDEGFRPQQIQFQRAARTDKGVS  
AM MVLGYLGKNYSGMQINRGIKTIEGSLLSALLKADFITKNEFEDLKEIKFQRAARTDKGVS  
AP ILLAYSGLGYLGLQRNKGVKTEVEELLALKSKNLITDEGFQIQTMQFQRAARTDKGVS  
BM MLLGYSGVEYYGMQRNPGVQTIEEELLKALLDAKYITQEDFENAQNAQFQRSRTDKGVS  
CQ ILMGYSGVNYFGMQRNPGTKTIEEELLVAMLKNEWISDEAFKQPQQIQFQRAARTDKGVS  
DM ILLSYCGANYYGMQRNPGMTIEEELFKAMLKHKWITEDSFEQIQISCFQRAARTDKGVS  
DP ILLSYSGQNYLGMQRNPGTKTIEEDLLQAFMKLEIMDDSEFKSPQTVHFQRAARTDKGVS  
IS LCMSYNGKDYLGQRNPGTKTIEDDLLQAMYKGDLLILKEHVDVPQAMKFQRAARTDKGVS  
NV MMLGYCGKNYGMQRNPGFNTIEEELIKAMLKADLITSEAFETIQINIFQRAARTDKGVS  
PH LLMAYGNSNYHGMQRNLDKFKTIEYELLNALVKANLIPSEAI DNPLIHFQRAARTDKGVS  
TC VLLGYSGTNYGMQRNPTPTIEEELFKALYKNNYISEENFTQVQTMQFQRAARTDKGVS  
PP MCLSCCGKGYLGLQRNPGCKTIEEDLLTACLKAGFVTEDSFNSPRVISFQRAARTDKGVS  
CE MLLGYQGGKYYGMQLQKDLPTIESKLLLEAMETAGWITTAQKEKPFDFFFQRAARTDRAVS  
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20710 20720 20730 20740 20750 20760  
====+====+====+====+====+====+====+  
AA AATQVVS IKL-----PDNVDIDALNKDLPEQIRVFAVAVKRVTKGFNSKSNCDARTYTYTL  
AG AAMQVVS IKL-----PDNLDIEALNSELPEDIRVYAVKRVTKGFNSKTNCDARTYTYTL  
AM AVRQIVSLQL-----PNHVNKEDINKHLPKDIKVFDIKRVTRNFNSKNKCDARTYRVL  
AP ALRQIISL-----PEDVDKQVINTALPEQIRVLDIRRVTKGFNSKSNCDGRTYSYTC  
BM AAEQVVS LKL-----PLEVNVEEINKRLEPETIKVFAVAVKRVTRNFNSKSKCNARSYSYTL  
CQ AATQVVS IKL-----PENLDIAGLNKDLPEQIRVFAVAVKRVTKGFNSKSNCDARTYTYTL  
DM AARQVCSVKL-----PEELDLLEAFNADLPQIQIRLFGVERVTKGFNAKDOCNARTYTYTL  
DP AVRQIVSLKIRT---PDEDLVNQLNSLPLNCIKVFAMRKTGGFNSKIACDSRSYSYVM  
IS AVRQIVSLKLPNT--LTVEEMVDKINSHLVDQIRVIDIKRTRGFCNKNSCDARTYTYVL  
NV AVRQIVSLKLPNT--PEDPSKDSINETLPEDIRVFAIKRVTKGFNSKSNCDARTYSYTM  
PH AAKQVVSFKI-----AENFQVEKINMFLPEDIRVFSIKRVTKGFNSKSNCDARTYSYTL  
TC AARQVVS LKL-----REDIDISKINEQLPEVIRVFGIRRVTKGFNSKSNCDARTYSYTL  
PP AARQIISLKLPTT--RDSPEQMVKEKINEHLVDQIRVIGLKRVTKNFNSKNNADARTYLYIC  
CE AARQMGCMQLPRDDAKYAEGAGILNNILPADIRVFGMRRTTNFFHPQKQCDHRTYSYTC  
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20770 20780 20790 20800 20810 20820  
====+====+====+====+====+====+====+  
AA PTMAFALH-----EDKVD--MESYRVPEERLKVVEETLKLFEFGT  
AG PTIAFAPN-----EEKVD--IQTYRLPAERLARVNEVLALYVGT  
AM PTFALASE-----DPNGKPYNEFRLNSDMLDKLNEILKLFEGT  
AP PTFAFAPA-----ETTID--FSYRIDATVIDRINEVVKSFLLGC  
BM PTYVFEPS-----LVTHE--KRKAYRIPAEKIEKLSILGVYKGT  
CQ PTVAFAAH-----DEEVS--VETRAPEDRIKQVQETLKLFEFGT  
DM PTVAFAPP-----EEKVDDVHDTFRISPELLQVKVETLKLFEFGT  
DP PTFAFATSK-----EVAPT--HGVRVTSKILDEVNSLLSVFKGT  
IS PTFAFAPP-----ESPAAE--SYRITEERIGEVNNVLALYKGC  
NV PTFALAPENLELFQEMSEYNDVEKRMELQSTIDGKPFHEYRLPQERKEKLTLLKVLGEGT  
PH PTFALAPE-----FHDEYPKNYRIDKLTIQKTNEILSQYLGT  
TC PTVSFTP-----HDQLM--VQKGFRLDSDTLNRINDLQKYLGT  
PP PTFAFATPT-----DQVVNE--SFRLPSEKVDITINRLQMYRGC  
CE PSFVFAKP-----TELTNSSFRLSPETLAEVNSILSIYLTG  
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20830 20840 20850 20860 20870 20880  
====+====+====+====+====+====+====+  
AA KNFHNFTSRKEFIDPSSKRFIMSFCEAFPVPEG----STVEFATLKIKGQSFMLHQIRK  
AG KNFHNFTSRKEFLDPSVKRFIMSFCECDPPFPEG----STAEFATIKIKGQSFMLHQIRK  
AM HNFHNFTSKIRPMDPRAKRYIVYFRCIETFIAN-----NMEFVVLEVQGGQSFMLHQIRK  
AP HNYHNYTSKKKPGDPSAQRVMVSFYCDKPFVEK-----GVELISLYVRGQSFMLHQIRK  
BM KSYHNFTSKKHHQDPSSSRYMMSFVSVKVFVYS-----DMEFAVLIKVGQSFMLHQIRK  
CQ KNFHNFTSRKEFIDPSSVKRFIMSFCEAFPVPEG----TTVEFATIKIKGQSFMLHQIRK  
DM HNFHNFTSKKFLDPSKRFIMSFCEAFPVPEG----QDIEFVTLKVKGQSFMLHQIRK  
DP RNYHNYTSGRPAQDPSCRYITQFSCGDPFMIK-----EVEFVKITIKGQSFMLHQIRK  
IS HNYHNYTSKSKSEDPSAMRYIISAECAQPFVQ-----GDQEFVQVQIKGQSFMLHQIRK  
NV HNFHNFTSKVPLDPRAKRYIMSFIAEPEFLVN-----NMEFITLKVKGQSFMLHQIRK  
PH HFFHNFTSKKGRDPSAKRYIMSFIAEPEFLVN-----EEFITLKVKGQSFMLHQIRK  
TC KNFHNFTSKKQATDPSAKRYIMKTLCIKKPFVVD-----DVEFALIKIRGQSFMLHQIRK  
PP HNFHNFTSGKAFNDPSSKRYIFEIECGMFMV-----NELEYVQVRIRGQSFMLHQIRK  
CE HNFHNFTAKRAYDDMSSNRYIISFECKEPLFRDDFRKEDVEFVQIVIKGQSFVHLHQIRK  
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20890 20900 20910 20920 20930 20940



BM IAELYVQGRNVLCNFHGMDLTTDKLRSMVKKWQTLIEANIDVKTDDGYVLRVFCIGFTNKD  
CQ IAEDVHGRNVLCNFHGMDLTTDKLRSMVKKWQTLIECSVDVKTDDNYLLRVFCIGFTIKD  
DM IAEDVQDRNVLCNFHGMDLTTDKYRSMVKKWQTLIEAIVEAKTVDGYLLRVFCIGFTA  
DP ISEDEVQGRNLLTNFHMMDMTTDLKLRSMVKKWQSLIEASVEVKTSDGYLLRVFCIGFTKKE  
IS IAEEVQGRNVLTNFHGMDLTTDKLRSMVKKWQVALKAALYMLLQDGAFLRLHCHYLRFQ  
NV IAEDVQGRNVLTNFHGMDLTTDKLRSMVKKWQTLIEAVVDVKTDDGYSLRVFCIGFTNKD  
PH IAEDVQGRNVLTNFHGMDLTTDKLRSMVKKWQTLIEAHVDVKTDDGYLLRVFCIGFTNKD  
TC IAEDVQGRNVLTNFHGMDLTTDKLRSMVKKWQTLIEASADVKTDDGYLLRVFCIGFTNKD  
PP VCEEVQGRHCLTNFHMMDLTTDKLRSMVKKWQTLIEAQVDVKTDDGYLLRVFCIGFTKKT  
CE IAEDVQGRNVLTNFHGMMDLTKLCSIVKKWHTLIEANTAVKTDDGYTLRVFVIAFTKKS  
#####

21190 21200 21210 21220 21230 21240  
=====+=====+=====+=====+=====+=====+  
AA SVSQRKT CYA QHSQ I E IRRKMTT I ITRDVTSSDLKEVVNK--LLPDSIAKDIEKSCQGI  
AG SMSQRKT CYA QHSQ I KNIRAKMTAI IKREITSTDLKGVVEK--LLPDSIAKDIEKACQV  
AM QLSTRKT CYA QHAQVKKIRQKMDVTITNDVTKSDLKGVVSK--LLPDATAKDIEKASQGI  
AP QSSTRKT CYA QHTQVRAIRKKMVEITIEEIVKSDLKEVVNK--LRPDSIAKEIEKCCQSI  
BM SLSQRKT CYA QHTQVRAIRKKMCEIITRDVTNSLREVVNK--LIPDSIAKDIEKACHGI  
CQ QVSQRKT CYA QHSQ I KAIRKNMTQIITNNVTSSDLKEVVNK--LLPDSIAKDIEKACQGV  
DM QQSQRKT CYA QQSQRKIRARMTDIITNEVSGADLKQLVNK--LALDSIAKDIEKSCQRI  
DP AESTRKT CYA QHAQ I KSIKKMVDIITREVGSDLEKVVSK--LIPDSISKDIEKSCQGI  
IS --PRKRWIFENNC FVRVLSRGGCAI STAESHSENIKDTIFRNICIPGSIGKDIEKSCQHI  
NV PQSSRKT CYA QHAQVRSIRKMMVELITDEVNKSDLKGVVSK--LLPDAIAKDIEKACQGI  
PH QMSQRKT CYA QHTQVRAIRKKMTEIITKEVTDSDLKDVVQK--LLPDSIAKEIEKYCQKI  
TC QLSQRKT CYA QHTQVIRKKMVEIITRDITGSDLKEVVNK--LLPDSIAKDIEKACQGI  
PP QSQVKT CYA QHAQVRTIRRRMVEIQREVS CDLKDVVSK--LIPESIGKDIEKACNVT  
CE VNQVKT SYTKTSKIRKIRSEMI GCIKEVTCGLDKEVVSK--LIPDSIGKDIEKTC SKL  
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21250 21260 21270 21280 21290 21300  
=====+=====+=====+=====+=====+=====+  
AA YPLHDVY IRKVKVLKPRFDLANLLELHGDGGGKGAEVSTGAAEGG---VTIDRPEGYEP  
AG YPLHDVY IRKVKVLKPRFDLSSLMELHGDGGGKAAEVSTGAAAG---VVDRPEGYEP  
AM YPLHDVY IRKVKVLKPRFELSKLLELHGDGAGSKSEEVGEGSGK-----VDRPEGYEP  
AP YPLHDVY IRKVKVLKPRMDIGKLMFHSDEGVTVVVDEETGVQ-----VDRPEGYEP  
BM YPLRDVC IRKVKVLKPRFEISKLMELHGGG--GKGE---AGDK-----SERPEGYEP  
CQ YPLHDVY IRKVKVLKPRFDLANLLELHGDGGGKGAEVSTGAAEGG---VVDRPEGYEP  
DM YPLHDVY IRKVKVLKPRFDVSKLLELHGDGGGKSAEVAVV--SSEG-----AVIDRPEGYEP  
DP YPLHDVY IRKVKVLKPRFDIGKLELHGDGKSGVGGEGGVS GS-----VDRPEGYEP  
IS YPLHDVY IRKVKVLKPRFELGKLELHGGGTSKGGAASTA AVAKGEEGVKDRPEGYEP  
NV YPLHDVY IRKVKVLKPRFELSKLLELHGDGSAKGGEGGEGTGSK-----VERPEGYEP  
PH YPLHDVY IRKVKVLKPRFDL SKLLELHGDGSK--AASDE---PGAK-----VDRPKGYEP  
TC YPLHDVY IRKVKVLKPRFELSKLLELHGDGKSGGSEGEAGAK-----VDRPEGYEP  
PP YPLHDVY IRKVKVLKPRFELSKLLELHGDGSKGSS--GAKTADGM-----AVDRPDDYEP  
CE YPLQEVY IRKVKI IRKPKVDLGRHLHGDGSI TVGADG-----EK-----VDRPDDYEP  
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21310 21320 21330 21340 21350 21360  
=====+=====+=====+=====+=====+=====+  
AA PVQESVMAKKWQAGS AFCEAAANLHAKAG-SRHDAATNFVDASNCYKKTDPNEAVSCLLK  
AG PVQASVMAKKWSQAGS AFCEAAANLHAKAG-SRHDAATNFVDASNCYKKTDPNEAVNCLLK  
AM PVQESVMAKNWSSAGS AFYEAELHAKAG-NRHDAATNFVDAANCFKKSNIENAI SCLLK  
AP PVQESVMAKKWSQAGRAFILAADLNSKSG-RKHDAATNFVDSANCFKKTDPNEAATCLEK  
BM PVQESVMAKKWQAGQAFCAAAQLHLKAG-VRHDAATNFVDASNCYKKTCDANEAVSCLLK  
CQ PVQESVMAKKWSQAGS AFCEAASLHAKAG-SRHDAATNFVDASNCYKKTDPNEAVNCLLK  
DM PVQEA VMSKNWTKAGECFCEAATLHARAG-SRHDAAGTCYVDASNCYKKTVDVESAVNCLMK  
DP PVQESVMAKKWSQAGQAFCEAAALHLKAA-GRHDAATNFVDAANCFKKSNIENAI SCLLK  
IS PVLETVMAKKWSAAGS AFCEAASLHLKNG-SRHDAATNFVDAAGTCYKKS DPNEAVNCLLK  
NV PVQESVMSKKGWAGNAFCQAATLNAKAG-SKHDAATNFVDAANCFKKS DPTEAVNCLLK  
PH PVQESVMAKKWQAGS AFCEAASLHAKAG-SRHDAATNFVDAANCFKKS DPNEAVNCLLK  
TC PVQESVMAKNWTQAGS AFCEAAANLNSRSG-ARHDAATNFVDAANCFKKS DPNEAVNCLLK  
PP PVLDTVMAKKWSGAGS AFLKAGNLQMKAG-NRHEAGTNFVDAGNCFKKS DPTEAVCYQK  
CE PVQEVMAKNWQAGDAFLAEEFYAKNGDSKHDCATQYAEANCFRKTQPERAVQCLEK  
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21370 21380 21390 21400 21410 21420  
=====+=====+=====+=====+=====+=====+  
AA AID IY TDMGRFTMAAKHHQSI AEMYENEANDLQRAVQH YEQAADYFKGEESTSSANKCML  
AG AID IY TDMGRFTMAAKHHQSI AEMYENEANDLQRAVQH YEQAADYFKGEESTSSANKCML  
AM AIE IY TDMGRFTMAAKHHQSI AEMYESEAVDLERAVH YEQAADYFRGEESNSSANKCLL  
AP AID IY TDMGRFTMAAKQHONI AEMYETEAVDLERAITNYEKASDYFMAEESKSSANKCKL  
BM AIE IY TDMGRFTVAAKQHONI AELYETECVDLARAMQH YEQAADYFRGEESTSSANKCML  
CQ S I D I Y TDMGRFTMAAKHHQSI AEMYENEANDLARAVQH YEQAADYFKGEESTSSANKCML  
DM S I D I Y TDMGRFTMAAKHHQSI AEMYESDPNNLAKSIQH YEQAADYFKGEESVSSANKCML  
DP AIE IY TDMGRFSAIAKHHQTI AIEIYETELADLERAVQH YEQAADYFKGEESNSSANKCLL  
IS AIE IY TDMGRFTIAAKHHMTIAE IYEQEVVDIEKAMTHYEQAADYFKGEESTSSANKCML



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	21670	21680	21690	21700	21710	21720
AA	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH
AG	TQSYTG	YEPTSM	RAIRAR	YHPFLQ	TRHRVE	QKQLGH
AM	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH
AP	-----	?SMRAI	RAHYNP	YVQTRH	RVEQLK	QLGHNV
BM	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH
CQ	-----	-----	-----	-----	-----	-----
DM	TQSYTG	YEPTSM	RAIRAR	YDPFLQ	TRHRVE	QKQLGH
DP	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH
IS	TQSYTG	YEPTSM	RAIRAR	YDPFLQ	TRHRVE	QKQLGH
NV	-----	-----	-----	-----	-----	-----
PH	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH
TC	TQSYTG	YEPTSM	RAIRAR	YDPFLQ	TRHRVE	QKQLGH
PP	TQSYTG	YEPTSM	RAIRAR	YDPFLQ	TRHRVE	QKQLGH
CE	TQSYTG	YEPTSM	RAIRAR	YNPFLQ	TRHRVE	QKQLGH

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	21730	21740	21750	21760	21770	21780
AA	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
AG	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
AM	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
AP	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
BM	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
CQ	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
DM	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
DP	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
IS	WFVRS	LHDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
NV	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
PH	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
TC	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI
CE	YFIRNL	HDALS	GHTSSS	VAAVRY	SEKSH	TTCIGI

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	21790	21800	21810	21820	21830	21840
AA	EIGVQ	SV---	-----	-----	-----	-----
AG	EIGVQ	SVMLK	VPYHRR	LGWQK	PEITP	PFENL
AM	EIGVQ	SVMLK	VPYHRR	LGWQK	PEITP	PFENL
AP	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
BM	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
CQ	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
DM	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
DP	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
IS	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
NV	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
PH	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
TC	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
PP	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS
CE	EIGVQ	SVMLK	VIHYDK	HAGGW	KPYITP	MEHLS

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	21850	21860	21870	21880	21890	21900
AA	-----	MAAAN	LFVCGS	-----	-----	-----
AG	RLFRPE	MNMAR	MNVTA	YRSGL	PTFEGE	EELIKAM
AM	RLFRPE	MNMAR	MNVTA	YRSGL	PTFEGE	EELIKAM
AP	NLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
BM	RLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
CQ	RLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
DM	RLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
DP	RLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
IS	RLFRPD	ANVRR	LLNSA	DRGLP	KFHSEE	FLKCLM
NV	RLFRPD	ANVRR	LLNSA	DRGLP	KFHSEE	FLKCLM
PH	RLFRPD	ANVRR	LLNSA	DRGLP	KFHSEE	FLKCLM
TC	RLFRPD	ANVRR	LLNSA	DRGLP	KFHSEE	FLKCLM
PP	RLFRPE	LNRRL	NSSAER	I GLPA	IDSGIL	LRGIER
CE	RMFRPE	MNMAR	MNVTA	YRSGL	PTFEGE	EELIKAM

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	21910	21920	21930	21940	21950	21960
AA	-----	-----	-----	-----	-----	-----

AA -QPTLGVASSDSALLYTILSPVGAYFK-PGS-GGLKLYANPNYTRAWHGGVDRKVGSNY  
AG IEPTLGVASSDSALLYTILSPVGPYFK-PGA-KGLKLYAEPKYTRAWPGGVDRKVGSNY  
AM IDPILGVTSSESALLYVILSPVGSYFKKTKKDI GISSLLADPRYTRAWPGGCCGNKYVGSNY  
AP TEGTLGV AQTN TALLYVIMCPVGSYFS-EKFK-SVRLMANPKFTRAWPGGCCDFKIGANY  
BM IEPTFGIMAPESALLFVILSPVSAYYK-ASSDGA VSI FADPNVVRAFPGGVGNRNVGSNY  
CQ IEPTLGVASSDSALLYTILSPVGAYFK-PGA-GGLKLYADPKYTRSWHGGVDRKVGSNY  
DM IDPTLGVASSDSALLYTILSPVGSYFK-TGSSGAVSLLADPSYVRAWPGGVGNRMKGSNY  
DP TDP SLGVASPNQALLYVLLCPVGPYFT-SGFK-PI SLLADPQYVRAWPGGCCGAMKMGANY  
IS VEPSLGVAKSNEAMLFVLTGPVGPYYS-TGMK-PV SLLADPKYVRAWPGGTDGSKLGCNY  
NV IDPTLGVATS DSAMLYVILSPVGSYFKSKESLRGVSLLADPRYTRAWPGGCCDRKMGSNY  
PH TDPALGVITSE SALLFAICSPVDSYFS--GGFKST SLLADPRYTRAWPGGCCDRKMGNY  
TC IDGTLGVAQSE SALLFTILCPVGNYSFS-GGS-ESV SLLADPQYTRAWPGGVDRKMGSNY  
PP VEPTLGVARSSEAFLYVITGPVSAYYA-TGIK-PV SLLADPQYVRAWPGGTDGKLLGCNY  
CE TDPTLGVGCATEAKMFVITGPVGAYYS-TGFQ-PV SLLADSRFIRAFPGGVGAYKMGNY  
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21970 21980 21990 22000 22010 22020  
=====+=====+=====+=====+=====+=====+  
AA GPTIHVQKEALKEGCHQVLWLYGDQHE TETKGTVLIKSADELKSFSGEENLLETQIKAI  
AG GPTIHVQQEALRHGCHQVLWLYGDDHQ TETKGTVLIKSADELKTF SQEENLLEAQIKAI  
AM GPTVYVQKEALKEKGLQQVLWLYGDDNE TETKGTVLIKTAD ELMKFSRGEESLLESQIKAI  
AP ATTLYPQEI ASKLGCHQMLWLYGEDRQ TETKGTVLIKSAEELQNF SRGEEMLLEQIKAI  
BM GPTIEATARA AKLGHHQVWLWLF GPDHQ TETKGTVLIKSADELLNFSKGEESLLEKQIKDI  
CQ GPTIHVQKEALKQGC HQVLWLYGDDHE TETKGTVLIKSAEELKFSRGEENLLEQQIKAI  
DM APTIN VQKEAAAKGLQQVLWLYGEDH Q TETKGTVLIKSADELLSFS SGEESLLESQIKAI  
DP APTIY IQKQSEL LGHQVWLWLYGADHQ TETKGTVLIQSSKELIDFSRGEENMLEKEIAAI  
IS APTLMVQQEAE RQKQLQQVLWLFGEDE Q TETKGTVLLQSAQELRDFS RGEENLLESQVKAV  
NV APTIHVQKEATEKGLQQVLWLYGDDHQ TETKGTVLIKSADELLNFSRGEESLLESQIKAI  
PH APAVKIQRQAVDQGLQSVLWLFGE DDQ TETKGTVLIKTAEELKDFSRGEECLLESQIKAI  
TC GPTIRVQSTANSKGRQQVLWLYGPDHQ TETKGTVLIKTAD ELMNFSRGEENLLEIQIKSI  
PP APTLAV?KEADALGLQQVLWLF GPDQQTETKGTVLIKSAQELTDFSGEESLLEDQVKAI  
CE APTIIVVQKEAASKNCQVLWLYGENED TETKGTVIENADELRNFSKGEAEVEEQVKAI  
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22030 22040 22050 22060 22070 22080  
=====+=====+=====+=====+=====+=====+  
AA ADTGAKVIVAGGKFGDMALHYMNKYGLMAVR LNSKFDLRRLSKAVNGTVLPR LTPPSTEE  
AG VDTGATVIVAGAKFGDMALHYMNKYGLMAVR LNSKFDLRRLSKAVGGTVLPR LTPPSTEE  
AM ADSGASVIVSGGKFGDMALHYMNKYNLMAVR IPSKFDIRRLCKTVGATALS KLAPPSKEE  
AP ADAGVTVIVAGGKFGDMALHYLNKYKIMGVRLNSKFDLRR LCKSVATALPR LTPPNKEE  
BM SDGKVKVIVAGAKFGDMALHFLNKNYIMAVR LNSKFDIRRLAKTVNATVLPRL TPTTQE  
CQ ADTGAKVIVAGGKFGDMALHYMNKYGLMAVR LNSKFDLRRLSKAVNGTVLPR LTPAPSTEE  
DM ADAGVTVVAGGKFGDMALHFLNKYGLMAVR LNSKFDLRR LRSVNATVLPRI TTPSQEE  
DP AAAGVVKVIVSGGKIGDCLHYLNKYGIMGVRLQSKFDLRR LCKAINATALPR LTPPSAEE  
IS ADTGAKVIVAGGKFGDMALHYLNKHGLMVRLT SKFDVRRRCRVVGA TPLPKLTPPRPED  
NV ADSGATVIVSGGKFGDMALYVKNYMMMAVR IPSKFDLRR LCKAIGATALPKLIQPSKEE  
PH ADTGAVNIVAGGKFGDMALHYLNKNYMLGVR LNSKFDVRRICKTVGATALPRMTPPTAEE  
TC ADTGAKVIVAGAKFGDMALHY IHKYGLMAVR LNSKFDVRR LSKTVGATVLPRLTAPTQE  
PP AETGCKVMVTGGKVGELALHYLNKNYMLVRLPSKFDVRRVCKIVNATPLPKMCTPTPED  
CE ADNGVKVVAAGKFGDMYLFHFLNKYKIMAVR LNSKFDLRR LCRVGAQPQARICAPAVNL  
#####

22090 22100 22110 22120 22130 22140  
=====+=====+=====+=====+=====+=====+  
AA LGYCDNVFNELGDT SVCI FRSEGS D-SRIATIVIRGSTDNYMDDIERAID DGVNTFKGL  
AG LGYCDNVYLHELGDTSVTIFKSEGTE-SRIATVIRGSTDNYMDDIERVID DGVNTFKGL  
AM LGYADSVYIDEVGDITVVKFAISGKD-SRVSTIVIRGSTDNYMDDIERAID DGVNTFKGI  
AP LGYADCYVDELGDTSLVVFRLDGN D-SRMTIVVRGATDNYMDDIERAID DGVNTFKGI  
BM LGYCDAVHVDEVGDTRVVVFKMESSE-SRISTIVIRGSTDNYMDDIERAID DGVNTFKGI  
CQ LGYCDNVYVDELGDT SVCI FKSEGAD-SRIATIVIRGSTDNYMDDIERAID DGVNTFKGL  
DM LGYCDKVCIEELGDTTIVAFRNEGKD-SRIATVIRGATDNFMDDIERALDDAINNFKCL  
DP VGYADHIYTD E-----SRIATIIVRGATDNFLDDIERAID DGINNFKVL  
IS LGLCDSVYVDELGDT SVVVFQEGAHRSKVATVLLRGSTDSLLDDAERAVDDGVNAFKAA  
NV LGYADTVHVDELGDTNVVVVQLHQE-SRISTIVIRGSTDNYMDDIERAID DGVNTFKAI  
PH IGYADSVFVDEVGETSVTIFEINGKE-SRIATIVIRGSTDNYMDDIERAID DGVNTFKAM  
TC LGYCDVVCVEELGDTPIVVFRLGKE-SRISTVVRGATDNYMDDIERAID DGVNTFKGL  
PP LGLCDLVYVDEIGDTPVVVFKQEGRE-SRIASVIRGSTDNYMDDVERAID DGVNFKAL  
CE LGHCDSVAVQEIGDENVVVFDKSET-GKVATIIIRGSSQSRIDDVERAVDDAVNTYKAL  
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22150 22160 22170 22180 22190 22200  
=====+=====+=====+=====+=====+=====+  
AA TRDGRFLAGAGAVEIELARQLAEYADTLPGLDQYAVRKFVALEAFP KALAENSGVNA-T  
AG TRDGRFLPGAGAVEIELAQQLAEYADTLPGLEQYAVRKFVAKALEYFP KALAENSGVNA-T  
AM TRDGRFVPGAGATEIELASQLSTYADTLPGLEQYAVRRFATALEVF PKTALAENSGSYA-S  
AP SRDGLKLLPGAGAIEMELAYQVGLYADTLPGLEQYAKRFAVALEGFVKILADNTGVKS-N  
BM ARDGRFVPGAGATEIELAQQLLEFADTLPGLEQYAVRKFVALESIPHALADNSGANA-T

CQ TRDGRFLPGAGASEIELAKQLAEYADTLPGLDQYAVRKFVALEHFPKALAENSGVNA-T  
DM TRDGRFLPGAGATEIELATQLSAYADTLPGLDQYAVRKFANALEVFPKALAENSGING-T  
DP SRDGRFLVPGAGAVEVELARQINQFADKCPGLDQYAIQRFAQALETFPRLSDNAGLKT-T  
IS TRDGRFLVPGAGAAEIELAKRIASWAETLPGLEQYAAHKFAQALEQLPRTLHNSGASRPE  
NV TRDGRFLPGAGATEIELASRI SAFADTIPGLEQYAVRKFSTALEVFPKTLSENSGTQA-Q  
PH TRDGRFLPGAGATEIELARQISSFADTRPGLDQYAIKRFAYALETFPKTLAENSGVNA-N  
TC SRDGRFLPGAGAVEAELAHQLTQYADTLPGLEQYAVRKFATALESFPKTLADNSGHR-S-T  
PP CRDGRVLVAGAGAFEIELARRIQAFGDTLPGMEQYAVKKFADAIECVPKALSENSGIKH-M  
CE TKDGRLLAGAGAVEIELAKEIESFGAKAPGLEQYAIKKFAHALETLPKAIENAGMPT-T  
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22210 22220 22230 22240 22250 22260  
=====  
AA EIVNKLYLAHK-EGKLNDFDIDAEQ--PSTIDVTSTKIYDLFQTKYWGKLYAVGATCTI  
AG EVVHQLYLAHK-QGKKEGFDIESEQ--PATIDVTTKNIFDLYTKYWGKLYAVGAACTI  
AM ELLSKLYSAHK-EGKKNYGFNIDQK---GGLIDTVESGLLDLFLTKQWGLKYAVGACTV  
AP ETLAELYSQHS-KGNKNAGFNIEPKG--SSLIDVTKAGIVDSYLSKFVGLQYATQAACTI  
BM EVVNKIYKAHK-EGQKNAGFDIDSEN--NGVCDAKEKGIIDSYLLKFWGIKYAVGAACTI  
CQ EIVNKLYLAHK-EGKKNDFDIDAEQ--ASTIDVTSSKLYDLFQTKYWGKLYAVGAACTI  
DM EIVNQLYLAHNEAGKTIGFDIEAEK--ASTIDTTKAKLFDLYQSKFVGLQYAVGAACTI  
DP ETVAALLAAHQ-EGKATGICVDDQG--G-LIDAVESGVVDLFAAKYWGMYATAAACTV  
IS ELLAQLRAAHQ-NEQKNVGVDDIDAEQ----NALEAGLLDLDLVTKHVGLQYATNAASTV  
NV ELLSKLYAAHK-EGKVNHFDFDIESTGV-ATIVDAEKAGILDLYLTKLWAIKYAVNAACTI  
PH EVITKLYASHE-EGNKNFGFDVE-KD--TLIFDAAANEILDLFITKYWALKYVNAACTI  
TC VVLEKILQAHQ-NEQKNVGVDDIDAEQ--T-ICDALEKNILDLYSCKYWGKLYAVGAACTI  
PP DILTKLQAAHHE-GKTNIGFNIDGDNESGLFIDAVESKIFDLLLLTKQWALRYAVDAATTV  
CE ETLTKLYAEHV-AGKKNAGIDIWKRE---TMDAVVNNIFDLYAGKRLAIKLTDAASTI  
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22270 22280 22290 22300 22310 22320  
=====  
AA LKVDQIIMAKRA-GGPKPRAGGANSDDSESGDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
AG LKVDIIMAKRA-GGPKPRAGGPGSDDESDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
AM LKVNQIIMAKRA-GGPKVPGGGIRDDDESDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
AP LKVDQIIMAKRA-GGPKAPGGRAPDNDDESDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
BM LKVDQIIMAKRA-GGPKPR-APAGSDDESDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
CQ LKVDQIIMAKRA-GGPKPRQGGANSDE-----  
DM LKVDQIIMAKRA-GGPKVR-QAAGSDDE-GDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
DP LRVDQIIMAKRA-GGPKPRDAGAQAADDSESNPLRKFVFLVFLGQSVGKTSLITRFMY  
IS LRVDQIIMSKPA-GGPKPKAGGDWDEDSGDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
NV LKIDQIIMAKRA-GGPKPRAGKANSDDSESGDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
PH LKVDQIIMAKRA-GGPKNKPPEGMDDD-SGDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
TC LRVDQIIMAKRA-GGPKPR-QAAGSDDESDFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
PP LKVDQIMAKAAA-GGPKPKENK-NWDEDS-DFGNPLRKFVFLVFLGQSVGKTSLITRFMY  
CE LKVDQIIMSKQATGGPKPRGPKAQDEDDMSDFGNPLKKFVFLVFLGQSVGKTSLITRFMY  
#####

22330 22340 22350 22360 22370 22380  
=====  
AA DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
AG DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
AM DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
AP DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
BM DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
CQ -----MYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
DM DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
DP DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
IS DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
NV DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
PH DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
TC DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
PP DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
CE DSFDNTYQATIGIDFLSKTMYLEDRTVRLQLWDTAGQERFRSLIPSYIRDSVAVVVYDI  
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22390 22400 22410 22420 22430 22440  
=====  
AA TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
AG TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
AM TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLDGKRQVSMEEGERKAKELNVMFIET  
AP TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLTKRQVLAEDGHEKAKELNVMFIET  
BM TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
CQ TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
DM TNTNSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
DP TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
IS TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET  
NV TNANSFHQTSKWI DDVTERGSDVI IMLVGNKTDLSDKRQVSTEEGERKAKELNVMFIET

PH TNANSFHQTSKWI DDV RTERGSDVI IMLVGNKTDLSDKRQVSSEEGVKKAKELNVKFIET  
TC TNANSFHQTSKWI DDV RTERGSDVI IMLVGNKTDLSDKRQVSSEEGVKKAKELNVKFIET  
PP TNSNSFHQTSKWI DDV RTERGSDVI IMLVGNKTDLSDKRQVTTEDEGERKAKELQVMFIET  
CE TNSNSFHQTSKWI DDV RTERGSDVI IMLVGNKTDLSDKRQVTTEDEGERKAKELNVKFIET  
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22450 22460 22470 22480 22490 22500  
=====+=====+=====+=====+=====+=====+  
AA SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAEG--DMPTFKCVLVGDGGTGKTTFVK  
AG SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAEA--DMPTFKCVLVGDGGTGKTTFVK  
AM SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAQE-ADIPTFKCVLVGDGGTGKTTFVK  
AP SAKAGYNVKQLFRRVAAALPGMDVAENRPPEDMNV-DDVPTFKCVLVGDGGTGKTTFVK  
BM SAKAGYNVKQLFRRVAAALPGMDSAEN----MA--DMPTFKCVLVGDGGTGKTTFVK  
CQ SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAEG--DMPTFKCVLVGDGGTGKTTFVK  
DM SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAEQEQDIPTFKCVLVGDGGTGKTTFVK  
DP SAKAGYNVKQLFRRVAAALPGMEADK-KPPEDMAAE-PDMPTFKLVLVGDGGTGKTTFVK  
IS SAKSGYNVKQLFRRVAAALPGMENTE-RTKEDLTDQGDCTPTFKCVLVGDGGTGKTTFVK  
NV SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMSQE-ADVPTFKCVLVGDGGTGKTTFVK  
PH SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDM--GDHDIPTFKCVLVGDGGTGKTTFVK  
TC SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDMAQE-QEMPTFKCVLVGDGGTGKTTFVK  
PP SAKSGYNVKQLFRRVANALPGMENTE-RSKQDMSAGEDNVPTFKCVLVGDGGTGKTTFVK  
CE SAKAGYNVKQLFRRVAAALPGMDSTENKPPEDM--SGGDGIPTFKLVLVGDGGTGKTTFVK  
#####

22510 22520 22530 22540 22550 22560  
=====+=====+=====+=====+=====+=====+  
AA RHMTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
AG RHMTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
AM RHLTGEFEKKYVATLGVEVHPLVFHTNNGPIRFNVWDTAGQEKFGGLRDGYIQQQCAVI  
AP RHLTGEFEKKYVATLGVEVHPLVFHTTRGVIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
BM RHLTGEFEKKYVATLGVEVHPLVFHTNNGPIRFNVWDTAGQEKFGGLRDGYIQQQCAI I  
CQ RHLTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
DM RHMTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAVI  
DP RHLTGEFEKKYVATLGVEVHPLVFHTNNGPIRFNVWDTAGQEKFGGLRDGYIQQQCAI I  
IS RHLTGEFEKKYVATLGVEVHPLVFHTNNGPIRFNVWDTAGQEKFGGLRDGYIQQQCAIV  
NV RHLTGEFEKKYVATLGVEVHPLVFHTNNGPIRFNVWDTAGQEKFGGLRDGYIQQQCAIV  
PH RHLTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
TC RHLTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
PP RHLTGEFEKKYVATLGVEVHPLVFHTNNGAIRFNVDWDTAGQEKFGGLRDGYIQAHCAM I  
CE RHLTGEFEKKYVATLGVEVHPLVFHTNNGQIRFNVDWDTAGQEKFGGLRDGYIQQQCAI I  
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22570 22580 22590 22600 22610 22620  
=====+=====+=====+=====+=====+=====+  
AA MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKAIVFHRKKNLQYYD  
AG MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
AM MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
AP MFDVTSRVTYKPNWHRDLVRVCEGIPIVLCGNKVDIKDRKVKAKTIVFHRKKNLQYYD  
BM MFDVTSRVTYKPNWHRDLVRVCEGIPIVLCGNKVDIKDRKVKAKTIVFHRKKNLQYYD  
CQ MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKAIVFHRKKNLQYYD  
DM MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
DP MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
IS MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
NV MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
PH MFDVTSRVTYKPNWHRDLVRVCENIPMVLCGNKVDIKDRKVKARSIIIFHRKKNLQYYD  
TC MFDVTSRVTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKSIVFHRKKNLQYYD  
PP MFDVTARITTYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKAIVFHRKKNLQYYD  
CE MFDVTARVITYKPNWHRDLVRVCENIPIVLCGNKVDIKDRKVKAKTITFHRKKNLQYYD  
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22630 22640 22650 22660 22670 22680  
=====+=====+=====+=====+=====+=====+  
AA ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVKMDKDWQQQIEKDLQEAMDIP  
AG ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVKMDKDWQVQIEKDLQEAMDIP  
AM ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVTMDPQWQQQIEKDLQEAMDIL  
AP ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALVPEIKMDPQWQDQIEQDLKEAINVP  
BM ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVTMDPQWQDQIEKDLQDAMDIP  
CQ ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVKMDKDWQQQIEKDLQEAMDIP  
DM ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVKMDKDWQAQIERDLQEATDIP  
DP ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALQPPEVQMDPNWQKQIEGELEEATSIP  
IS ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALAPPEVTMDPEWQAKLENMDKATDIS  
NV ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALLPPEVTMDPQWQQQIEKDLKEAMDIT  
PH ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALVPEVTMDPQWQQQIEKDLKVVTDIP  
TC ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALVPEVTMDPQWQQQIEKDLKEAMDIP  
PP ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALAPPEVQMDPEWQSKLENMDKAKTYP  
CE ISAKSNYNFEKPFLLWARKLVGDPNLEFVAMPALAPPEVQMDPAMIAEYKDLDNAIDVS  
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22690 22700 22710 22720 22730 22740  
====+====+====+====+====+====+====+  
AA KRLMLSLSLLKKELELSKLQAKIGREVEEKVKQHRKYLQEQQLKVIKKELGIEKEDDKDA  
AG KRLMLSLSLLKKELELSKLQAKIGREVEEKVKQHRKYLQEQQLKVIKKELGIEKEDDKDA  
AM KRLRLSLALLKKEYELSKLQQKIGREVEEKVKQHRKYLHEQLKVIKKELGLEKDDKDA  
AP KRLLLALGCVKKLELSEIQIKISKEVDEKVKQHRKYLQEQQLKVIKKELGLEKDDKDS  
BM KRLMLSLSLLKKEYELSKLQQKIGKEVEEKVKQHRKYLHEQLKVIKKELGLEKDDKDA  
CQ KRLMLSLSLLKKELELSKLQAKIGREVEEKVKQHRKYLQEQQLKVIKKELGIEKEDDKDA  
DM ERLQALATLLKKELELSRLQQKIGREVEEKVKQHRKYLQEQQLKVIKKELGIEKEDDKDA  
DP KRLVLSLSLLKKELELSRLQQKIGREVEEKVKAQHRKYLQEQQLKVIKKELGLEKEDDKDA  
IS KRLLLALSLKKEYELSKLQQKIGKEVEEKVKSQHRRYMLQEQQLKAIKKELGLEKDDKDA  
NV KRLRLSLALLKKEYELSKLQQKIGREVEEKVKQHRKYLHEQLKVIKKELGLEKDDKDA  
PH KRLMLSLSLLKKEFELSKLQAKIGREVEEKVKQHRKYLHEQLKVIKKELGLEKDDKDA  
TC KRLMLSLSLLKKEYELSKLQQKIGKEVEEKVKQHRKYLQEQQLKVIKKELGLEKEDDKDA  
PP RGCINPLLCSKRSNQN--CSKKIGKEVEDKVKQHRKFLQEQQLKVIKKELGLEKEDDKDA  
CE KRLKIALLLIQKEKAVAKLYDINKDVEKVKVQDHRKYLQEQQLKVIKKELGIEKDEKTT  
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22750 22760 22770 22780 22790 22800  
====+====+====+====+====+====+====+  
AA IGEKYRERIKDKVVPKAVADVIEEELNKNLFLESHSSEFNVTRNYLDWLTTLPGWVMSEE  
AG IGEKYRERIKDKVVPKAVADVIEEELNKNLFLESHSSEFNVTRNYLDWLTTLPGWVMSEE  
AM IGEKYRERIREKTVPKTVMDVLEEEELNKNLFLESHSSEFNVTRNYLDWLTSPWGVSTSTE  
AP IVEKFRDRIKDKQVPKIVMEVIEEELTKLSFLEQHSSEFNVTRNYLDWLTQLPWGTTSDDE  
BM IGEKFRERLADKTVPAQVQTVIEEELNKNLFLESHSSEFNVTRNYLDWLTSLPWGITSSEE  
CQ IGEKYRERIKDKVVPKAVSDVIEEELNKNLFLESHSSEFNVTRNYLDWLTTLPGWVMSEE  
DM IGEKYREKLDKDKVPEAIMTVIEEELTKNLFLESHSSEFNVTRNYLDWLTSLPWGIVISTE  
DP IDEKFRARLKDKTVPETAIMEVIEEELNKMGLFDNHSSEFNVTRNYLDWLTTLPGWVTSKE  
IS IEEKFKQLKDLVVPKPVMEVIEEELNKNLFLDNHSSEFNVTRNYLDWLTSLPWGKTSEE  
NV IEEKYRERIKDKVVPKPVMDVIEEELNKNLFLSHSSEFNVTRNYLDWLTSLPWGVMSPPE  
PH IEEKFRERIKGKVPKAVEDVLEEEELNKLGFLESHSSEFNVTRNYLDWLTSLPWGVTSPPE  
TC VGDKFRERIKDKVLPKAVNSVIEEELNKNLFLESHSSEFNVTRNYLDWLTSLPWGVYSEE  
PP IEEKCRQKMKELKMPQVTKVMEEEELNKNLFLDGHSSSEFNVTRNYLQWLISLPWGFSESEE  
CE IIEKIDERIKTLAVPEYALKVINEEKTKLQFLDPHSSEFNVTRNYLEWLTSLVPGWLTSPPE  
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22810 22820 22830 22840 22850 22860  
====+====+====+====+====+====+====+  
AA NLDIDRATEILDSHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
AG NLDIDQASKILDEDHYGMDDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
AM NLNLQQAIEILDKDHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIAKSI  
AP NFDLKRATTILDEDHYGMEEVKKRILEFIAVSKLKGSTHGKILCFHPPGVGKTSIAKSI  
BM NLKLEDAQVILDQDHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
CQ NLDIDRATEILDADHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
DM NLCLEKATETLNDHYGMEDIKKRILEFIAVSSLKGSTQGGKILCFHPPGVGKTSIAKSI  
DP NLDLKAADVLEDHYGMEDVKKRILEFIAVSELKSTQGGKILCFHPPGVGKTSIARSI  
IS NLDLARAKEVLEEDHYGMDDVKKRILEFIAVSQKGTQGGKMLCFHPPGVGKTSIARSI  
NV NLELQQAIEILDKDHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
PH NLDLTRATSILNEDHYGMEDVKKRVLEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
TC NLNLQRASEILDQDHYGMEDIKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIARSI  
PP NLDLERAKNALEEDHYGMDDVKKRILEFIAVSQKGTQGGKILCFHPPGVGKTSIAKSI  
CE NRRLSVAKKALDEGHYGMKDVKERIMEFIAVNLRLRKSIGGKILCFHPPGVGKTSIAKSI  
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22870 22880 22890 22900 22910 22920  
====+====+====+====+====+====+====+  
AA ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
AG AKALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
AM SRALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
AP ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
BM ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
CQ ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
DM ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
DP AKALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
IS ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
NV SRALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
PH ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
TC ARALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
PP AKALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLVQCLNKVQTENPLVLIDEVDKIG  
CE ATALNREYFRFSVGGMTDVAEIKGHRRTYVGAMPKGLIQCLKKTKTENPLVLIDEVDKIG  
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22930 22940 22950 22960 22970 22980  
====+====+====+====+====+====+====+  
AA -KGYQGDPSALLELLDPEQNVNFLDHYLDVVDLSKVLFICTANVIETIPEPLRDRMEM

AG -RGYQGDPSALLELLDPEQNVNFDHYLDVVDLSKVLFICTANVIDTIPEPLDRMEM  
AM -KGHQGDPASALLEMLDPEQANFLDHLYLDVVDLSKVLFICTANVIDTIPEPLDRMEM  
AP -RGHQGDPASALLEMLDPEQANFLDHLYLDVVDLSKVLFICTANVIDTIPEPLDRMEM  
BM -K-----YVPLLDPEQNSNFDHYLDVVDLSRVLFICTANVVEQIPEPLDRMEM  
CQ -KGYQGDPSALLELLDPEQNVNFDHYLDVVDLSKVLFICTANVIDTIPEPLDRMEM  
DM -KGYQGDPSALLELLDPEQANFLDHLYLDVVDLSRVLFICTANVIDTIPEPLDRMEM  
DP -KGYQGDPSALLELLDPEQNFNFDHYLDVVDLSKVLFICTANVLDTIPEPLDRMEM  
IS -RGYQGDPSALLEVLDPEQANFLDHLYLDVVDLSKVLFICTANVDTIPEPLDRMEM  
NV -KGHQGDPASALLEMLDPEQANFLDHLYLDVVDLSKVLFICTANVIDTIPEPLDRMEM  
PH -KGYQGDPSALLEMLDPEQNFNFDHYLDVVDLSKVLFICTANVVEQIPEPLDRMEM  
TC -KGYTGDPSALLELLDPEQANFLDHLYLDVVDLSKVLFICTANVVEQIPEPLDRMEM  
PP -RGHQGDPASALLEVLDPEQANFPDHYLDLNDLSKVLFICTANVLYTIPDPLDRMEM  
CE GAGFHGDPASALLELLDPEQANFNFDHYLDVVDLSRVLFICTANEISKIPGLDRMEM

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22990 23000 23010 23020 23030 23040  
=====+=====+=====+=====+=====+=====+  
AA IDMSGYVAEEKVAIAKQYLIPQAKNNGLEDKHNITDEALNVLIRS YCRESGVRNLQKQ  
AG IDMSGYVAEEKLAIKQYLIPQAKRDSGVEDKHISITDDALHALIKSYCRESGVRNLQKQ  
AM IDMSGYVAEEKLAIKQYLVQAMNDSGLNNGQININDNALHALIKSYCRESGVRSLOKQ  
AP IDVSGYVAEEKMAIAKQYLIPQGLKSTGLKKEQIEIADDSLSTLIRS YCRESGVRNLQKQ  
BM IDMSGYIAEEKLAIKQYLVPTARQNCGLSQQLAVSEFALLALVRS YCRESGVRNLQKQ  
CQ IDMSGYVAEEKVAIAKQYLIPQAKKDCGLEDKHNITDEALSVLIRS YCRESGVRNLQKQ  
DM IEMSGYVAEEKIATARQYVLPQAMKDCGLTDKHNISEDALNMLIRS YCRESGVRNLQKQ  
DP IDVSGYVAEEKMNAIEKYLIPQARRDTGVADTQVTESDALQTLIRS YCRESGVRNLQKQ  
IS IEVSGYVAEEKMAIAERYLIPQARNTSGVAESQLVIQPELQHLIKSYCRESGVRNLQKQ  
NV IDMSGYVAEEKLAIKQYLVQSMKDSGLTEDHIEIDNALVTLIRS YCRESGVRNLQKQ  
PH IDVSGYVAEEKLAIKQYLVQAMKDAGLKTEQLKHDDSLTTLIKSYCRESGVRNLQKQ  
TC IDMSGYVAEEKLAIATKYLQAMKDSGLNDQHIKIDDEALNTLIRS YCRESGVRNLQKQ  
PP IEVSGYVPEEKVPIQMYLIPQAKTATGLTDEITVDKEAHNLIH YARESGVKNLQKQ  
CE IDVSGYLAEEKVIAHQHLIPQLRKDTSLATEQLKIEDSALEELIKHYCRESGVRNLQKQ  
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23050 23060 23070 23080 23090 23100  
=====+=====+=====+=====+=====+=====+  
AA IEKVVVKVTFKIVRKEMTLPS SARVYADVNSHKPREYWDYENYVVDWANQDDYQLVRKLG  
AG IEKIVRKVAFKVVVKEMTLPS SARVYADVNSHKPREYWDYENYVVDWANQDDYQLVRKLG  
AM IEKIVHRKVAFKVVVKEMALPSR ARVYADVNSHKSRDYWDYESYVVDWQDDYQLVRKLG  
AP VEKMLRKLWALKIVEGEMALPSR ARVYADVNSHKPREYWDYESYVVDWQDDYQLVRKLG  
BM IEKIVARKVAYKIVKEMALPSR ARVYADVNSQRPREYWDYESYVVDWQDDYQLVRKLG  
CQ IEKIVRKVTFKIVRKEMTLPS SARVYADVNSHKPREYWDYENYVVDWANQDDYQLVRKLG  
DM IEKIVRKVAFKVVVKEMTLPSAARVYADVNSHKPREYWDYENYVVDWANQDDYQLVRKLG  
DP VEKIFRKAALQIAEQPPIPSR ARVYADVNSHRAREYWDYESHVIEWQDDYQLVRKLG  
IS IEKILRKAALFRIVSKEMPLPSR ARVYADVNSHRPRDYWDYESHVIEWQDDYQLVRKLG  
NV IEKIVHRKVAFKVVVKEMALPSR ARVYADVNSHKPREYWDYESYVVDWQDDYQLVRKLG  
PH IEKVVVKVAYKVVQEMAITSR ARVYADVNSHKPREYWDYESYVVDWQDDYQLVRKLG  
TC IEKVVVKVAYKVVKEEMAVPSR ARVYADVNSHKPREYWDYESYVVDWQDDYQLVRKLG  
PP IENIFRKAALQIAEQPPIPSR ARVYAEVNP SRPREYWDYEAHMI EWQDDYQLVRKLG  
CE IERIFRKAALQIAEQPPIPSR ARVYAEVNP SRPREYWDYEAHMI EWQDDYQLVRKLG  
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23110 23120 23130 23140 23150 23160  
=====+=====+=====+=====+=====+=====+  
AA RGKYSEVFEAIKITSNEKCVVKILKPVKIKREIKILENLRGGTNIITLLAVKDPVS  
AG RGKYSEVFEAIKITSNEKCVVKILKPVKIKREIKILENLRGGTNIITLLAVKDPVS  
AM RGKYSEVFEAINITNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
AP RGKYSEVFEAIDVTNSEKCVVKILKPVKIKREIKILENLRGGTNIISLQAVKDPVS  
BM RGKYSEVFEAINITNEKCVVKILKPVKIKREIKILENLRGGTNIISLQAVKDPVS  
CQ RGKYSEVFEAIKITSNEKCVVKILKPVKIKREIKILENLRGGTNIITLLAVKDPVS  
DM RGKYSEVFEAINITTEKCVVKILKPVKIKREIKILENLRGGTNIITLLAVKDPVS  
DP RGKYSEVFEAINVTNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
IS RGKYSEVFEAYNITNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
NV RGKYSEVFEAINITSNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
PH RGKYSEVFEAVNTNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
TC RGKYSEVFEAVNTNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
PP RGKYSEVFEAVNTNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
CE RGKYSEVFEAVNTNEKCVVKILKPVKIKREIKILENLRGGTNIITLQAVKDPVS  
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23170 23180 23190 23200 23210 23220  
=====+=====+=====+=====+=====+=====+  
AA RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH  
AG RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH  
AM RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH  
AP RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH  
BM RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH  
CQ RTPALIFEHVNTDFKQLYQTLTDYDIRYYLYELLKALDYCHSMGIMHRDVKPHNVMDH

DM RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
DP RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
IS RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
NV RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
PH RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
TC RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
PP RTPALIFEYVNDTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDH  
CE RTPALIFEHVNNTDFKQLYQTLTDYDIRYLYELLKALDYCHSMGIMHRDVKPHNVMIDA  
#####

23230 23240 23250 23260 23270 23280  
=====  
AA ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
AG ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
AM ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
AP ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
BM EHRMLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
CQ ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
DM ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
DP ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
IS ECRRRLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
NV ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
PH ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
TC ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
PP ENRKLRLIDWGLAEFYHGPQYENVRVASRYFKGPELLVDYQMYDYSLDMWSLGCMLASMI  
CE EKRELRLIDWGLAEFYHPRQYENVRVASRYFKGPELLVDYQCYDYSLDMWSLGCMLASMI  
#####

23290 23300 23310 23320 23330 23340  
=====  
AA FRKEPFTIEWDMMDKFKFPLSMLSFSVRCALFPLTVIKTQLQVQYKNDVYKGMIDAGV  
AG FRKEPFTIEWDMMDKRRKFFPLSMLSSFVRCALYPLTVIKTQLQVQVFNNDIYKGMIDAGV  
AM FRKEPFTIEWDMMDKTKFFPLSMLSSFVRCCLYPLTVIKTRLQVQRHNYMNGMIDACK  
AP FRKEPFTIEWDMMDKTKFPLSMLSFCVRCCLYPLTVIKTRLQIQKHGEMYGKGLDAAN  
BM FRKEPFTIEWSMMDKSKFFPLYTMSFSTG-----GERLNKGVTDAAFT  
CQ FRKEPFTIEWDMMDKFKFPLSMLSSFVRCALFPLTVIKTQLQVQYKNDIYKGMIDAGL  
DM FRKEPFTIEWDMMNKTKFPLSMLSSFVRCCLFPLTVIKTQLQVQHKSDVYKGMVDCAM  
DP FRKEPFTIEWEMLDKFKFPLSITSSCMVRTSLYPLTVIKTRLQIQKGNVYKGTWDAFR  
IS FRKEPFTIEWEMMNKSRFLMFMSINSFTLRCLVYPLTVIKTRLQVQKPKGLYRGTVDAYY  
NV FRKEPFTIEWDMMDKTKFPLSMLSSFVRCCLYPLTVIKTRLQIQRRSHMYTGMIDAYR  
PH FRKEPFTIEWDMMDKRRKFFPLSMLSSFVRCCLYPLTVIKTRLQIQKHGEMYGTVDAFK  
TC FRKEPFTIEWDMMDKTKFPLSMLSSFVRCALYPLTVIKTRLQVQKHNNDIYTGMDFDAYG  
PP ?RKEPFTIEWEMLDKPRFVTFVFNLSLRLCLVYPLTVIKTRLQVQVQAYN-VNGTSDALR  
CE FRKEPFTIEWEHLNLYKFYPALCSSWTRCMLYPMSPVVKSLRLQLQRQNNYNGMRDAFV  
#####

23350 23360 23370 23380 23390 23400  
=====  
AA KIYRHGVPGLYRGFWISSVQIVSGVFIYISTYEGVRHLLNQYGAS---QRTKSLVAGGA  
AG KIYRAEGVPLYRGFWISSVQIVSGVFIYISTYEGVRHVLGQYGAN----QVKS LAAGGC  
AM KIYKIEGISGLYRGFWISSIQQIVSGVFIYISTYEGVRYILRQNDVIGNIDSRVKS LAAGGA  
AP RIYHTEGMSGLYRGFWISSAQLVSGAAYIGAYEQTRHMTAPYLQO---WPEIRSMVAGGV  
BM KIYASEGVSGLYRGFWLSS--IISGVFIYISTYEGVRFELGKYDIS----PKWKSFIGGGC  
CQ KIYRAEGVPLYRGFWISSVQIVSGVFIYISTYEGVRHVLNQQGAS---QRTKSLVAGGC  
DM KIYRSEGVPGLYRGFWISSVQIVSGVFIYISTYEGVRHVLNLDLQAG---HRMKALAGGGC  
DP KIVYEGFKGLYKGFVWNLFSIVSGTFVVLTYENVRHLLQTNGVT---DSRIRALVAGGC  
IS KILRHGEGGLYRGFWINTIQMFSGIGYIFTYEVKVRDMLSRHADHID---RRLKGLIAGGC  
NV KIYKLEGFSGLYRGFWISSIQQIVSGVFIYISTYEGVRHILNREAMTSQLDSRIKALIG---  
PH KIYAFEGIAGLYRGFWISSVQIVSGVFIYISTYEGIRHMMQAQKNID----CRIRALIGGGC  
TC KIYRYEGFSGLYRGFWISSVQIISGVFIYISVYEGVRHLLAQKNID---SRVVALIAGGS  
PP KILKVEGFKTLYRGFWINSMQIISGIGYIVTYEKVRDSLHQQRG-VSD--LRLKGLVGGGV  
CE KIIRQEGIGALYKGFWMPLPQLSASFYLSAYERVRDLQLTHLHTN---HSVVALAGGI  
#####

23410 23420 23430 23440 23450 23460  
=====  
AA ASLVGQTIIVPFVDVISQHAMVLGMAAGGVKGG--SCNPLGIDFERS-NRLRITMDIARE  
AG ASLVGQTIIVPFVDVISQHAMVLGMAAGGVKGG--AVNPLGIDFERS-NRLRITMDIARE  
AM ASLVGQTIIVPFVDVISQHAMVLGMLVGLINNKQGGYIDKMGMNPLGLILEPGKSRAQISIDIKS  
AP ASVFGQTIIVPFVDVVSQHLMLLGLSTSSIDKNKIYFRPLGHLDISKSKFRITLDIAQC  
BM ASIVGQTIIVPFVDVLSQHLMLVGLVKGRGTGGVS--TTINPLGIDLKRRSKAALAREVAVR  
CQ ASLVGQTIIVPFVDVISQHAMVLGGM--GVARGSS--SVNPLGIEYDKGRSRLRITVDIARE  
DM ASLVGQTIIVPFVDVISQHAMVLGMSAHAGSKG--DINPLGIKSWPGRSRLRISMDIGRE  
DP ASLVGQTIIVPFVDVISQHLMMGQKIGGVTQN----IKPNLQNGMGSKTQLALAITKD  
IS SSLVSGQTIIVPFVDVVSQHMMLVGL--RSSKSGIMVMNPLNITIDFNKHL--IFAAIVRE  
NV -----  
PH ASVVSQTIIVPFVDVISQHLMLVGLIINQKTSKVQ--ASINELGVVIE--GKSWINITKELVTO

TC ASIVGQTIIVPFDVLSQHLMMMGVQ----NGDKLAFNLTGLIAIKPGTSKLALTLLEIAKE  
PP SSLIGQTLIIPFDVVSQHIMVLG----RNG-----INFLNLPPEVLQSRRLTFSRVCSCE  
CE ASPCAQLIFVPTDIVAQHMMVHNNPEA-FGGGKNI PVADAI RKGDLGEGRRTLGLRVRIRA

	23470	23480	23490	23500	23510	23520
	=====+=====+=====+=====+=====+=====+					
AA	VMRRDGFYRGYRQVYASLMAYVPNSAMWWAFYHLYQDELRLVCPVWVSHLF-----					
AG	ILRRDGVYRGYRGTASLMAYVPNSAMWWAFYHLYQDELRLVCPVWVSHLF-----					
AM	IYQRDGYRGYRGCASLCAAYVPNSALWWGLYTSYQDELVRLPPEWVSHLF-----					
AP	VYQQDGFYRGYRQVYASVCTYAPNSALWWSFYTFQDQLEKRCPVNTSLLF-----					
BM	VYRQHGLPGYRGTASLAAYVPNSALWVALYTAQDELRLVCPVWVSHLL-----					
CQ	IVRMDGFYRGYRGTASLMAYVPNSAMWWAFYHLYQDELRLVCPVWVSHLA-----					
DM	IMRRDGFYRGYRGTASLMAYVPNSAMWWAFYHLYQDELFRICPVWVSHLF-----					
DP	IYHTDGLRGYRQVYASLFTYVPSSALWWTFYHLYQDHLNLPVWVFPQLG-----					
IS	LYRRDGLRGYRQVYASLLAYVPGSALWWMFYPVYSDGLRRVVPDWPQML-----					
NV	-----					
PH	IYIKDGIQGFYRGLASLAAYVPNSAMWWAFYHLYQDEIKISPIWVSHLF-----					
TC	IFRRDGIQGFYRGLASLAAYVPNSALWWGFYHLYQDELHVMVPSWVSHLF-----					
PP	VYRRDGLLGFRYGFASLIAYVPGSAFWWAFYPVYQEAALISLSPPTPLLA-----					
CE	VYKVDGIFGFYRGLSAILMYIPSTMVFWSTYNSLAVFRMIREKVTLEYGVKPTSPSE					

	23530	23540	23550	23560	23570	23580
	=====+=====+=====+=====+=====+=====+					
AA	-----VQCVAGSLGGFTTITVNPLDIVRARLQVQRLDSMQVAFRELWHEEHFH-MF					
AG	-----VQCVAGSFGGFTTITVNPLDIVRARLQVQRLDSMSVAFRELWHEEHFH-MF					
AM	-----IQAVAGTLGGFTTITVNPLDIVRARLQVQRLDSMFSAFKVLWVEEKLQ-MF					
AP	-----LQISGVLAGFTTITVNPLDIVRARLQVQRTNSIVGTFNALWKEEGMF-MF					
BM	-----IQCVAGTLGGFTTITVNPLDIVRARLQVEGVGTMKQVFKLWAEGLFLGLY					
CQ	-----VQ-----GFTTITVNPLDIVRARLQVQRLDSMQVAFRELWHEEHFH-MF					
DM	-----IQCVAGSLGGFTTITVNPLDIVRARLQVHRLDSMSVAFRELWQEEKLN-CF					
DP	-----IQCTSAIILGGITTTITVNPLDIVRARLQVQRLDSIGQTFRILWREERFY-TF					
IS	-----VQCMAGPMSTIVCLITNPMVVRARIQVQRMNSVTQTFWQLWNEEKMR-MF					
NV	-----TTTITVNPLDIVRARLQVQRLDSMCNAFVRLWLEEGHL-MF					
PH	-----VQCIAATLGGFTTITVNPLDIVRARLQVQRTGSMATFHVLTWTEEKLRI-F					
TC	-----IQTVAGTLGGFTTITVNPLDIVRARLQVQRIESMKCAFRLWVEEGVR-MF					
PP	-----VQCMAGPLSGITTCVLTNPADIVRARLQVQRLNSWRRAFVYVWQTEGYR-IF					
CE	VDDRNFLDQAVSGSIGGVASAMVTNPLEMLRIRLQVHRT-TYRETIIVRLWKYEAQ-VF					
	#####					

	23590	23600	23610	23620	23630	23640
	=====+=====+=====+=====+=====+=====+					
AA	FKGLTARLVQSAAFSFSIILGYETIKRVSVNEQYRHLIKWMTERHTFGGNLNPITCHAWN					
AG	FKGLTARLVQSAAFSFSIILGYETIKRVSVNEQYRHLIKWMTERHTFGGTVSPITCHAWN					
AM	TKGLSARLVQSAAFSFSIILGYETIKRFSIVEEYKNCIRWMTVEVHNLGV--DAISCHAWN					
AP	SKGLSARLVQSAAFSFSIILGYETIKRVSVLEHEYKDHVRW--MEYNLGD--NPVTSHAWN					
BM	AKGLSARLVQSAAFSFSIILGYETIKRMAISDEYRPRVRWMAQTLTFGDSCAPITCHAWN					
CQ	FKGLTARLVQSAAFSFSIILGYETIKRVSVNEQYKHLIKWMTERHTFGG-LNPITCHAWN					
DM	TKGLSARLVQSAAFSFSIILGYETIKRIVADDEQYKHQIRWMAETFTFGTSLASITCHAWN					
DP	TKGLTARLIMSFTYSFSIILGYESVKRVSVEKQYREQIRWMPESLSFGI--DPIAHAWN					
IS	QIGLSARVMSLISFLALGNETLKRWSVHEEYKDKIRW-----					
NV	TKGLSARLVQSAAFSFSIILGYETIKRVSIIHEEYRNYVRWMTVEVNLGV--DAVTCHAWN					
PH	TKGLSARLVQSAAFSFSIILGYETIKRVSITDEYKHHIKWMSERYSGFV--NPITYFAWN					
TC	SKGLSARLVQSAAFSFSIILGYETIKRVSVNDYKEYVVRWMTQHRFQTVVSPITCHAWN					
PP	TIGLSARMLQSSITSFLLVSGYESLKRWSVNEEYKHRVVRWMAIHFSFGVD--PVSCHAFN					
CE	TKGLAPRMVNNALYSVLVLAYESVKRFSVLPKFNKIIVWGVVPLHWNFGIPITCHAWN					
	#####					

	23650	23660	23670	23680	23690	23700
	=====+=====+=====+=====+=====+=====+					
AA	KDRSQIAISPNNNEVHIYKREG--SEWKLLDVLNQHDLRVMGIDWAPNTNRIVTCAVDRN					
AG	KDRSQIAISPNNNEVHIYKRTG--SEWKLLDVLNQHDLRVMGIDWAPNTNRIVTCAVDRN					
AM	KDRKEVAICPNNNEIQVYKRTS--SGWKLLQNLQEHDMHVMGIDWAPNTNRIVTCSADKN					
AP	ANRQTQIAVIPSNSNEVQIYKYEPNLSDWTLNLDLQHGLLVTGIDWAPNTNRIVTCSADRN					
BM	KDRSQIAFSPNNNEVHIYKKEG--NDWKQTNLVEHDLRVMGIDWAPNTNRIVTCSVDRN					
CQ	KDRSQIAISPNNNEVHIYKREG--SEWKLRDVLNQHDLRVMGIDWAPNTNRIVTCAVDRN					
DM	KDRTQIALSPNNNEIHIYSREG--SDWKLDVLNQHDLRVMGIDWAKNTNRIVSCAADRN					
DP	KDRTKLAI SPNSPEVHIYHFQR--GEWKLEELKHEHDLKVTGIDWAPNTNRIVTCSADRN					
IS	---MEVALCPNSHEVQLFGCEPG--GSWQPGQTLQSDHLRVTSMDWAPNSNRIVTCSADRN					
NV	EGHNGIALCPNNNELHVKQEA--SNWKLSEVLQEHQDRIMGIDWAPNTNRIVTCAADKT					
PH	KDRTQIALSPNNNEVHIYEKTN--DDWREVDVLNQHDLRVTGIDWAPNTNRIVTCAADRN					
TC	KDKTQIAISPNNNEVHIYQRSQ--SDWKPLDVLNQHDLRVMGIDWGPNTNRIVTCAADRN					
PP	KDRSQIIVALSNDVTVYTKDQVQWQPNTQTLTKHDLRVTSIDWAPNSNRIVTCSADRN					
CE	KDRTQIAVSASSNDIHI FEWRN--GDWQSIHTLSEHDLVPTGLDWGKTNRIVSCSQDKN					
	#####					

	23710	23720	23730	23740	23750	23760
AA	AYVWTQGGDDG-----	KWKPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES			
AG	AYVWTQGGDDG-----	KWKPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES			
AM	AYVWTQEGDG-----	KWNPAWVLLRINRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
AP	AYVWTIDDKG-----	KWKPTLVLLRISRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
BM	AYVWTQGGDDG-----	KWATTLVLLRINRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
CQ	AYVWTQGGDDG-----	KWKPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES			
DM	AYVWTQGGDDG-----	KWKPALVLLRINRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
DP	AYVWTQSEEK-----	KWRPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES			
IS	AYVWTLAEDAPGARGAKRWTPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES				
NV	AYVWSQNEEG-----	KWTPAWVLLRINRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
PH	AYVWTQGGDDG-----	KWKPTLVLLRINRAATCVRWSPLENKF	AVGSGGARLISVCYFES			
TC	AYVWTLDKDK-----	KWKPTLVLLRINRAATCVKWSPLENKF	AVGSGGARLISVCYFES			
PP	GYVWNW-DGQ-----	KWDVPLVHLRINRAATYVWSPLENKF	AVGSGGARLISVCYFES			
CE	AFVWTFDKNV-----	WKPELVLRINRAATYVWSPLENKF	AVGSGGARLISVCYFES			
	#####	#####	#####	#####	#####	#####

	23770	23780	23790	23800	23810	23820
AA	ENDWVSKHIKPIRSTVTSLDWHPNNVLLVAGSTDYKVRVFSAYIKDIEQ	HPETTAWG				
AG	ENDWVSKHIKPIRSTVTSLDWHPNNMLLVAGSTDYKVRVFSAFIKDIEQ	HPETTAWG				
AM	ENNNWQCKHIKPLRSTVTVDWHDPNKVVLVAGSTDYKVRVFSAFISDMED	APGNPWWG				
AP	ENDWVSKHIKPIRSTVTSALDWHNNMVLATGTADFVRLFNHVMKEVDQ	CQKVKTEWD				
BM	ENNNWVSKHIKPIRSTVTSIDWHPNNILLVAGSADFVVRVFSAYIKDIED	QPGPNVWG				
CQ	ENDWVSKHIKPIRSTVTSLDWHPNNMLLVAGSTDYKVRVFSAFIKDIEQ	HPETTAWG				
DM	ENDWVSKHIKPIRSTVTSLDWHPNNVLLVAGSTDYKVRVFSAFIKDIEE	PPTPTPWG				
DP	ENDWVSKHIKPIRSTVTSCLDWHPNVLLVAGSADFVVRVFSAYIKEIEE	RPSSTSWG				
IS	GNNWVLSKHIKPIRSTVTSLDWHPNNCLLACGSTDVTRIFVFSAYIREVDS	PPEQSPWG				
NV	ENNNWVSKHIKPIRSTVTAIDWHPNNMILLVAGSADFVVRVFSAFVKEVDK	NNSDSSWG				
PH	VNDWVSKHIKPIRSTVTTIDWHPNNILLVAGSADFVVRVFSAYIKEIEE	VPTATEWG				
TC	ENDWVSKHIKPIRSTVTTLDWHPNNVLLVAGSADFVVRVFSAYIKDIEK	TPEPTPWG				
PP	GNNWVLSKHIKPIRSTVMCLDWHNNVLLVAGSADFVTRVFSAYIKDIED	KPEPTPWG				
CE	ENDWVSKQIKPIRSTVTSCLDWHNNVLLVAGSADFVVRVFSAYVKEVDE	KPSFNPWG				
	#####	#####	#####	#####	#####	#####

	23830	23840	23850	23860	23870	23880
AA	PKKP-LGQMLAEFKNS-TGGGWVHVSFSADGNRCVWVGHDSAINIAEANGGNVAI	KL				
AG	PKKP-LGQMLAEFKNS-STGGGWVHVSFSADGNRCVWVGHDSAINIEMANGGNVTV	KQ				
AM	HSNT-LGTLAEFQNT-PNGGGWIHVSFAFSPCGNKICWVAHNSIICADATKGNVAI	RL				
AP	TDDTSVPLVAEFTNS-SRGGGWVHVSFAFSPCGNRCVWVGHDSAINIADVSKGSIVVKNL	SKLP				
BM	SKLP-LGQMLAEFKNS-PSGGGWVHVSFSADGNRCVWVGHDSAINIVTATKGRAVI	KL				
CQ	PKKP-LGQMLAEFKNS-TSGGGWVHVSFSADGNRCVWVGHDSAINIAEANGGNVAI	KI				
DM	NRKP-LGQMLAEFRNSQTSGGGWINSVFSADGNRCVWVGHDSAINIADATNGNTVI	RC				
DP	SKMP-LGLMMAEFSNSTNGAGGWVHVSFSGDGRVAVWVGHDSAINIADASKGMAVS	MI				
IS	EKPGTFGNLMAELASAS--GAGWVHVSFSADGNRCVWVGHDSAINIADASKGMAVS	SV				
NV	SSSN-LGNMFVDFCNS-PNGGGWVHVSFAFSPCGTKVWVGHDSAINIADASKGMAVS	RL				
PH	SKMV-LGTLAEFSNP--SCGGWIHVSFSADGNRCVWVGHDSAINIADASKGMAVS	KL				
TC	SKMP-LGHLAEFANS-NAGGGWVQVSVFSPDGVR-----					
PP	ARMP-LGQMLAEF----PSGGGWVHVSFAFSPDGNRCVWVGHDSAINIADASKGMAVS	SL				
CE	QKMP-FGQLMSEYSVG----GWVHRVAFSPSGCRLAFAVSHDSSVFDVSTVDSQKVQNL					
	###	#####	#####	#####	#####	#####

	23890	23900	23910	23920	23930	23940
AA	KTEYLPFLCCEWIS PQSILVGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
AG	KTEYLPFLCCEWIS PQSILVAGHSCVPLIYTVGEDGKVVLAAKLDQSTKKEQS--GISAM					
AM	YTEHLFPLSCVWMSNSIVAVGHSCMPLMYSIDHDGQYLVFVSKLDNTQKKEA--GLSAM					
AP	KTNELPFISCIWVSDRALVAAGHGCCPMLYCVDSNNKVFVSKIDSSQKKEA--GLSAM					
BM	KTEYLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
CQ	RTEYLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
DM	RTGYLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
DP	RTDLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
IS	RTPFLPFLSCLWVSPSRIVVAGYDCCPMVYEYS-NGQVSVFDKLDKSKRKEVD--GVSAM					
NV	LTEYLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
PH	KTEYLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
TC	-----GLTAM					
PP	NTTGLPFLCCEWIS PQSILVAGHSCVPLIYTFD-GSRIVLAAKLDQSTKKEQS--GISAM					
CE	LTIHLPFTTVEWITENSIVTAGHDCSPVLFVVS-QDVLKEVCKLDVPSAAKSS-TVNSAL					
						####

	23950	23960	23970	23980	23990	24000
AA	RIFQSLDRNSRTENS-----TNLESIHQNAITCVCIYSGDKGSAGRISTSGLDGQLVIW					
AG	RIFQSLDRNLRTENS-----TNLESIHQNAITCVCLYSGEKGQVQVSTSGLDGQLVIW					



DP MEKLLKDMTCLELKEAAKIYYIVHDEVKDKNFELELSWVAVTQGRHQKVSQEVFAEV  
IS MEKQQLRDLCCCKDLIKEAAKIYYIIHDEVKDKNFELELSWVCEASKGNHEFPKDVVFQEA  
NV IEKLLKLSMDYKDIVREAARIYYLVHDELKDKQFELEMSWVGKHTNGKHEKIPNDIKIEA  
PH IEKLLKFKNMNCKDLVMEAAARIYYLVHDELKDKQFELELSWVCEESRQVHERVPESVFAEA  
TC IEKLLKLSMGTRELVKEAAKIYYLVHDELKDKNFELELSWVCEESGRHEKVPHEVFLVA  
PP MEKLLKFSNMTCRELVKEAAKIHYIVHDEVKDKDFELELSWVCEESEGLHQAVPQALYNEA  
CE IEKLLKIEELDVNLVKEAARIIMVVRDENKDKNVQIEMGWVGEQTNKYEEVPSVVTAA  
#####

24250 24260 24270 24280 24290 24300  
=====+=====+=====+=====+=====+=====+  
AA TRAGQEA-DEDDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTEGVKHSMNPFDEIAVEEA  
AG NRAGQEA-DEDDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTEGVKHSMNPFDEIAVEEA  
AM EAKAKQAMAEDSDSDRALVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
AP LKYAKASLDDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
BM ENQAKQALADIEDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
CQ TRAGQEA-DEDDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTEGVKHSMNPFDEIAVEEA  
DM RKAGDAAN-KDESDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
DP ERYAKSALEDDSDSGRILVGVKRVIDYAVKIRVKPKDSGVVTEGVKHSMNPFDEIAVEEA  
IS ETYAKTALEESDT-RVMVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
NV ESKARQALADSDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
PH EKLAKDAMEADTSDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
TC EKAQAMEADSDSDRVLVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
PP EAFARQAMEADSDSGRILVGVKRVIDYAVKIRVKPKDSGVVTDGVKHSMNPFDEIAVEEA  
CE EEWATAKLEDDMDDKILVGVKRVVYAVKIRVKPDRSGVVTEGVQHSMNPFDEIALVEEA  
#####

24310 24320 24330 24340 24350 24360  
=====+=====+=====+=====+=====+=====+  
AA VKMKEKKIASEVVAVSVGPAQSQEVLRTALAMGADRGIHIEVSGKDYELLQPIHVSKILA  
AG VKLKEKKIATEVVAVSVGPAQSQEVLRTALAMGADRGIHVEVAGKFDLLQPIHVSKILA  
AM IRMKEKKLVQEIIVAVSCGPPQCQDVIRTALAMGADKGIHVEISGSEYETLQPIHVSKILA  
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 CQ QAGATVADVVDALVAKLKEGGH  
 DM LAGAKVENVDMMEKLLKALGH  
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 IS QAGSILPDVDTLVAKLKEGGH  
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 PH QAGAILPDVDALVGKLEGGH  
 TC EAGSKVKDVDELLGKLELGR  
 PP QAGGFVDDVSALVAKLKEKGF  
 CE

**Parameters used**

Minimum Number Of Sequences For A Conserved Position: 8  
 Minimum Number Of Sequences For A Flanking Position: 8  
 Maximum Number Of Contiguous Nonconserved Positions: 8  
 Minimum Length Of A Block: 10  
 Allowed Gap Positions: None  
 Use Similarity Matrices: Yes

**Flank positions of the 238 selected block(s)**

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New number of positions in pasted\_alignment-gb: **18416** (75% of the original 24501 positions)

**b) FASTA file of amino acid residues from 14 species resulting from masking using Gblocks (above). This data has been used for the phylogenetic analysis at the thesis Chapter 3 - A Devonian origin of parasitic mites estimated using expressed sequence tags of the predatory mite *Phytoseiulus persimilis* (Phytoseiidae, Mesostigmata, Acari).**

**Number of amino acid positions 18416 (75% of the original 24501 positions from above section).**

Generated by [Gblocks Server](#)

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>AA
DQLINANHAQ SAAILKRHED VLTRWQKLRA DSEARKYRLL AMQEQFRQIE DLYLTFACKA
SAFNWSWFENA EEDLTDVPRC NSIEEIKALR EAHAQFQASL SSAQYDFQAL ADLDRKIKSF
NVGPNPYTWF TMEALEDTWR NLQKIEEERD AELAKEVHRQ EENDKLRKEF AKHANLFHQW
LTETRTSLMD GSGSLEEQFE ALCHKANEIR ARRGLKKEIE ELGATLEEHL ILDNRYTEHS
TVGLAQQWDQ LDQLAMRMQH NLRQQIQARN QSGVSEDSLK EFSMMFKHFD KDKSGKLNHQ
EFKSCLRALG YDLPVVEEQG PDPEFEEILN VVDPNRDGHV SLQEYIAFMI SKETENVQSY
EEIENAFRAI TASDRPYVTK DELYSNLTGD MADYCVQRMK PFNDPKTGHP ITGALDYVEF
TRTLFQNGTI LWRLNNSAK VRQQAADLIS RIAVVMKTCQ EEKLMGHLGV VLYEYLGEEY
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PEYVSAREWM RICFLKAHKK AIRRATVNTF GYIAKAIGPH DVLATLNNL KVQERQNRVC
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LLEDALMDRD LVRQQTACAA IKHMALGVYG FGCEDALIHL LNYVWPNI FE TSPHLVQAFM
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YVYKGGKIAK VPVQKEALA SDLGMFKEKR RFRNFLIYVQ DFIQEDPKTW KDFDPMSKSM
QELYDHFGLD KNTQDFVGH A LALYRDDDYL VEPAVKTINR IKLYSDSLAR YGKSPYLYPM
YGLGELPQFA RLSAIYGGTY MLDKPIDEIV GKVVGVRSGE EVAKCKQVYC DPTYVPDKVR
IKGKVIKRC LLDHPIANTK DALSTQIIP QKQMPGLMAC RKKYGPQKVL KGARIAVLIE
TLVELGAEVQ WSSCNIFSTQ DHAATAIAKT GVPVYAWKGE TDEEYMWCI QDQQLNMIL
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QIFVTTTGTG DIIMGEHFMN MKDSDIVFDC EVNVAVLEQN EKVNIKQVQD RYLLPSGNHV
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KKEGTPEGYLL LLPQVTPHTR CRLKLLKLER IKDYLLMEEE FIRNQRERLKP QDEKNEEERS
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>AP

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LCNRAVSIYS	AFKDKVGER	HGSAAERLLA	AQNPLSQADR	PHQLFADAPE	EDEFIKRRSN
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TKGFNSKNSC	DGRYYSYTCP	TFAFAPYRID	ATVIDRINEV	VKSFLGCHNS	HNYSKSKKPG
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**>IS**

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EVKEKEEMRK	IIGRYGLTGR	QQICPIRQLS	DGQRCRVVFA	WLAWQVPHLL	LLDEPTNHL
METIDALAEA	IAEFDGGMVL	VSHDFRLISQ	VAEIIWVCEK	QVTVKWKGN	LSYKEHLRKK
VMAIDNGSGV	IKAGFAGDQV	PKCHFNFNFI	RPKHRRVMAG	ALEGDIFVPG	KAEHRGLLS

IRYPMEHGIV TDWNDMERIW QYIYSKEQLQ TFAEEHPVLL TEAPINPLRN RERSAEIFFE  
TFNVPALFVS MQAVLSLTYAT GRRTGVVLDG GDGVTHAVPI YEGFAIPHSI MRVDVAGRDV  
TSYLRHLLRK EGTNFHLLYAE FEIVKTVKEK ACYLANNPQR EEDTEKAHYT LPDGTTLLEIP  
ARFRAPEVLV DTNAMTLTRF VLAEQRKVPK ATGDLTQLLT SIQSAIKAVA AAVRRAGIAH  
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RLHDLVHSEK KLTLVFIFCV RSFFFSHLSV PLLLFCFGLK LADFLARAF GIPVRCYSAE  
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>NV

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