

T-COFFEE, Version\_5.49Wed Dec 19 12:12:01 2007

Cedric Notredame

CPU TIME:16 sec.

SCORE=55

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**B** **A** **D** **A** **V** **G** **G** **O** **O** **D**

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CES	:	59
CPC	:	60
CUP	:	60
ChPV	:	60
CHL	:	54
CHY1A	:	61
CHY1C	:	61
CHY1B	:	56
CHY1D	:	61
CHY1E	:	59
ChAG	:	48
ChAM	:	44
ChBT	:	59
ChPO	:	57
ChCF	:	41
ChPC	:	49
ChPH	:	50
ChRP	:	46
JoDM	:	48
TBT	:	57
TSS	:	57
CHY1F	:	58
CHY1G	:	56
CHY1H	:	59
cons	:	55

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CES      -----L-LLALVAAA-SA-----A-----EWRWQ
CPC      -----M-IATLSL-LLACVAVA-SGNPAVGK-----PWHWK
CUP      -----M-IVKLAL-ILVCVALA-SGNPAAGT-----EWRWK
ChPV     -----LVCVAVAAASGNPAAGK-----PWHWK
CHL      -----MK-----FLLVFALALATTSAFQH-----PASIF
CHY1A    -----MKVLAI-VLVAFVVA-----QVAAR-----DLSKY
CHY1C    -----MKVLAI-VLVAFVVA-----QAAAW-----DLSKY
CHY1B    -----MN-VSAAVV-LLVAIVFA-----QAAAR-----DLARY
CHY1D    -----MKVFAI-VFVAIAVA-----QASGL-----DLSKY
CHY1E    -----MKFLAAALLFAVVVA-----QVAAR-----DLSKY
ChAG     MRIKDAAGATSQYTTTVR MKTFAL-LVALFAVA-----SAEWI-----DIDWS
ChAM     -----MKL-SL-IILVAVALC-----EARPR-----D-VD
ChBT     -----
ChPO     -----MGI-----LSCLAFA-----GAAYG-----
ChCF     -----MKII-V-ALCLVAFV-----ACESV-----PTF--
ChPC     -----MKVALV-VLALFGVS-----LAASI-----D--NI
ChPH     -----MKGFFA--LCFIIA-----TAVLA-----EAYYP
ChRP     -----MKTVAV-FLCVIAIV-----LAE-----
JoDM     -----MKLF-V-FLACLAVA-----SAGVV-----PSESA
TBT      -----MHPL-L-ILAFVGAA-----VAFP-----
TSS      -----MISL-V-FVLLIGAA-----FA-----
CHY1F    -----MKFLAL-VLALAVAA-----QAAVNM-----PHKKI
CHY1G    -----MKFLVA-VLALAVLS-----QAAEIP-----MRRNL
CHY1H    -----MKIAAL-ILVAVALA-----QAAEIPKLRNFRNPANL

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cons 

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CES      FRHPTVTPNPRA-KNPFrvTKSsPV-QPPAVRGTKAVENCGPV--A-PRNKIVG
CPC      SPKPLVTP-----IGPV-----KSQRIVG
CUP      SPKPLMTP-----IGPV-----KSSRIVG
ChPV     SPKPLVDA-----RGPAP-N-AGAKIVG
CHL      EL-----REGRIIN
CHY1A    QPRSVLYPRLPS-KNTNSF--VPI-KRSATVNTRGFC--GQAN-V-TSSRIVG
CHY1C    QPRSVLFPRAPT-KNTNSF--VPV-KRSPTVDTRGFC--GQAK--SASRIVG
CHY1B    KPRGVLFPRPPS-RNKKPI--FPV-KHTATINTRGFC--GREN-S-TNSRIVG
CHY1D    QPRSVLYPRAPV-ENPNRW--VPP-KVAPTVDTRGFC--GQVQ-S-APSRIVG
CHY1E    QPRSVLFPRPPV-TQKNQY--VPV-KRAATVDTRGFC--GTAK-TSNQDRIVG
ChAG     QVRPI-----EEFDHYWAR-----LPAELQ-----VYRTK-L-PSHRITN
ChAM     -----L-----TARAS-V-AAPFIIN
ChBT     -----CGVPA-----IQPVL-S-GLSRIVN
ChPO     -----CGSPA-----IPPVI-T-GYSRIVN
ChCF     -VHPN-----AE-----LIAQA-----KNMMT-Q-KSSRIVY
ChPC     EIPPS-----KN-----IYVEPI-----NQPEV-D-PSLEIVN
ChPH     EAPLR-----AG-----L-----R-RRPKVVG
ChRP     -----G-----V-LDKRIVN
JoDM     RAVPV-----KD-----M-----PRAG-K-IEGRITN
TBT      -----S-----D-DDDKIVG
TSS      -----T-----EDDKIVG
CHY1F    FPRGELFPRAQVPQGPgyf--TPT-KVAPTVDTRGFC--GQSK-V-DSSRIVG
CHY1G    RPRSELFPRAPVAPGPGHI--VVT-EPAKPVDMRGFC--GQAK-V-DSSRIVG
CHY1H    PPRSALFPRPSQVQGPgyf--VPTGEHAHVfSTRGVC--GQVKNQ-ESErIVG

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cons 

CES GMEVTPHAYPWQVGLFID ---D--- MYFCGGSIISDEWVLTAAHCMDG ---  
 CPC GQEATPHTWVHQVALFID ---D--- MYFCGGSLISSEYVLTAAHCMDG ---  
 CUP GVEAVPNSWPHQAALFID ---D--- MYFCGGSLISPEWILTAAHCMDG ---  
 ChPV GTEAVPHSWPHQVALFID ---G--- MYFCGGSLISSEWVLTAAHCMDG ---  
 CHL GYEAYTGLFPYQAGLDITLQDQR ---RVWCGGSLIDNKWILTAAHCVHD ---  
 CHY1A GTEAVPNSLPWQVALFID ---D--- QYFCGGSLISNEWVLTAAHCADA ---  
 CHY1C GTEAVPNSLPWQVALFID ---D--- KYFCGGSLISNEWVMTAAHCADG ---  
 CHY1B GTEAEPHSLPWQVALFVD ---D--- RFFCGGSLISNEWILTAAHCAED ---  
 CHY1D GTEATPHSAPWQVAIFID ---G--- QYFCGGTLISNEWVLTAAHCADN ---  
 CHY1E GTEAVPNSRPWQVALFID ---D--- QYFCGGSLISPDWVLTAAHCADN ---  
 ChAG GQEATPGQFPYQIALLSNFA-TG-- TGLCGGSVLTNNYILTAAHCVISGATTL  
 ChAM GSPADISNFPYQCCLR Y---AG-- SHTCGGSVLTNAGVVLTAAHCVDRV  
 ChBT GEEAVPGSWPWQVSLQD-K---TG-- FHFCGGSLINENWVVTAAHCVGT  
 ChPO GEEALPHSWPWQVSLQD-Y---TG-- FHFCGGSLINENWVVTAAHCNVR  
 ChCF GDDAQISDFKWQASLRR---SG-- SHICGAAIVSDKHAITAHCVDGTS  
 ChPC GQEVVPHSIPYQIFLVA-SAGET---SWTCGGSLITKRYVLTAAHCIQG  
 ChPH GTEAVPHSVPYQLGLLL-N---GSFCGGSLITKRFVLTAAHCGVV  
 ChRP GEKAELYAHPHQASLQL-FQ-DSHGWHYHICGAVLVGPNKLVTAAHCVQGQD  
 JoDM GYPAYEGKIPYIVGLS---FN-DG-- GYWCGGSIIDHTWVLTAAHCTNS  
 TBT GYTCAENSVPYQVSL---N-AG-- YHFCGGSLINDQWVVSAAHCYQY  
 TSS GYECKAYSQTHQVSL---N-SG-- YHFCGGSLVNNENWVVSAAHCYKS  
 CHY1F GEEAIPHEFPWQVSVLID---G--- SGFCGGSLISPDWVLTAAHCADG  
 CHY1G GVEAVPHEFPWQVAVTID---G--- SSFCGGTLISDEWVMTAAHCADG  
 CHY1H GVEAVPHEFPWQVALVVD---N--- SWFCGATIISADWILTAAHCTDG

cons \* : : \* \* : : : \* \* \* \*

CES AGFVEVVMGAHSIH--DETEATQ--VRATSTDFFFTHENWN--SFTLSNDLALIK  
 CPC AGFVEVVMGAHNIR--EDEASQ--VSMSTSTNFAIHENYN--AFTITNDVAYIR  
 CUP AGFVDVVLGAHNIR--EDEATQ--VTIQSTDFTVHENYN--SFVISNDIAVIR  
 ChPV AGFVDVVMGAHNIR--ENEDTQ--VTMTSTDFFFTHENWN--SFLLTNDLALIR  
 CHL AVSVVVYLGS AVQY-----EGE--AVVNSERIISHSMFN--PDTYLNDVALIK  
 CHY1A AVFFDIYLGSHNVRLTAAEEPTR--VEIRSTQYTVHPDWA--SLRIRNDVALIK  
 CHY1C AVFFNILLGSHNVRLAAADEPTR--VEVTSFDYTVHPDWA--SLRIRNDVALIK  
 CHY1B AGFFDILLGSHNVRLNATEEPSR--FEIRSNVSIHVPGWS--SFRFMNDIALVK  
 CHY1D AIFFNIIYLGSHNVRLTAAEEPTR--VEVRSTQYTVHPNWG--SIRIINDVALIK  
 CHY1E ATFFNIMLGAHNVRLTAAEEPNR--VEYRSEVYTIHPNWG--STLLRNDLALIK  
 ChAG ATSGTAIMGAHNRNV---NEPTQQRIGFTSAGIRAHPGYN--PTNIRNDIAVVR  
 ChAM ATAFSVLAGSTDRTV---SGD--IDASGFTMNSAYDGN--AGGFPNDIATVA  
 ChBT -TSDVVVAGEFDQGS---SSEKI--QKLKIAKVFKNSKYN--SLTINNDITLLK  
 ChPO -TSHRVILGEHDRSS---SAEDI--QVMKVGVKVFKHPRYN--GYTINNDILLIK  
 ChCF ASSLSLRVGSSYH---KNGGTI--VGVQT--IRVHERYNGNAPGYPN DIAILV  
 ChPC AKSVHVTLGAHNLAK---HEASK--VTVNGRSWVIHEKYD--STNIDNDIGVIO  
 ChPH TKHPVVVMGAHKITE---KEPNQ--VAMTGKNVVVHKQYS--PNTLRNDIALVE  
 ChRP ATKLRVEVGALNLLD---PPNAYE--QTIPVEFFIIHPLYNEKGNAYPN DIAAILY  
 JoDM ANHVLIYFGAS-FRH---EAQYT--HWVSRSDMIQHPDWN--DF-LNNDIALIR  
 TBT --HIQVRLGEYNIDV---LEGE--QFIDASKIIRHPKYS--SWTLDNDILLIK  
 TSS --RVEVRLGEHNIKV---TEGSE--QFISSSRVIRHPNYS--SYNIDNDIMLIK  
 CHY1F AGRFLITLGDHDRT---VTEPSQ--IAVTTTTTYTVHPGWN--SATLADDLALIR  
 CHY1G ANRFTLLLGAHDRT---VAEPSQ--LTIQTTVHATHPNWN--PSTLANDVALIR  
 CHY1H GRSFEVILGAHNKN---IVESTQ--VRITATQFTMHKPNW--SAKLQNDVALIK

cons \* : : \* \* : :

CES MPAPIEF-NDVIQPVCL-PTYTDASDDFVGESVTLTGWGKPSDSAF-GIAEQLR  
CPC LPSPVTF-DANIGAVAL-PT-SDPA---VGTTVTPSGWGMDSDSAF-GISDILR  
CUP LPVPVTL-TAAIATVGL-PS-TDVG---VGTVVTPGTWGLPSDSAL-GISDVLR  
ChPV LPNAVEF-TDNISTVKL-PS-SDVA---VGTTVTPGTWGRPSDSTG-SISNVLR  
CHL IP-HVEY-TDNIQPIRL-PSGEE LNKFENIWATVSGWQSN----TDTVILQ  
CHY1A LPAPIEF-TPEIQPVCLAPT-SETD--HVDDILHISGWGKPSDAAA-GISPVLR  
CHY1C LPAPIEF-TPEIQPICMAPS-TEPD--HVG DILHNSGWGKPSDAAA-GISPTLN  
CHY1B IPQPIKF-TPEIQPVCLAPP-SEPD--HVDDILHVSGWGRHSELTP-GISQVLR  
CHY1D LPAPIEF-TPEIQPICMAPS-TEPD--HTGDILHISGWGKPSDAAA-GISPVLR  
CHY1E LPESVTF-TDAISPICLAPA-TEPL--HAGDPLHVSGWGKPSDAAT-GISPVLR  
ChAG LNSPITF-TARIQPIRLPG-RSD-SRQFGGFTGTVSGFGRRTNTG--ATSPVVM  
ChAM LTSNLNLGDPNIAAASLPP-NNN--DQFVGSQCTITGWGRGTGS-N-ILPATLQ  
ChBT LSTAASF-SQTVSAVCLPS-ASD--DFAAGTTCVTTGWGLTRYTNA-NTPDRLQ  
ChPO LAAPAQM-NMRVSPVCVAE-TSD--NFAGGMKCVTSGWGLTRHNAP-DTPALLQ  
ChCF VAGSLTS-NVNAEAVDLPQ-NPN--ENYNGADCEITGWGRTE--LG-GLPDILQ  
ChPC LERNLTL-TRSIQLARLPS-LRDVGINLEGRATVSGWGLTNGIFQ-TTDDVLR  
ChPH LPEDAPL-SQYVQLVKLAA-VDA--GLFVGETARVSGWGRAYDSST-TISPVLR  
ChRP LSSPVTY-NKNVQPAELAP-KG--SSFANEQCIITGWGR TIGG-G-PTAAHLK  
JoDM IPH-VDF-WSLVNKVELPS-YNDRYNSYSGWAVASGWGLTDN-NS-GMSNYLN  
TBT LSTPAVI-NARVSTLLPS-ACA---SAGTECLISGWGNTLSSGV-NYPDLLQ  
TSS LSKPATL-NTYVQPVALPT-SCA---PAGTMCTVSGWGN TMS-ST-ADSNKLQ  
CHY1F LPSPVTL-TPEIQPICLAPA-TEPT--HVGDTLLVSGWGKTADGVLQGISDVLM  
CHY1G LPEPITF-SPEISPLCMSPA-TEPD--HVGDTLLVSGWGKTADGAFQGISPVLM  
CHY1H LRPVVSF-TPEIAPICLAPN-TESD--HVG DILLASGWGLDSDSAS-STVANLR

cons : : : . : \* : \*

CES EVDVTTITTADCQAY----YG--IVTDKILCI----D-SEGGH-GSCNGDSGGP  
CPC QVDVPIMSVVDCDAV----YG--IVSNNQICI----D-STGGR-GTCNGDSGGP  
CUP QVDVPIMSNADCDAV----YG--IVTDGNICI----D-STGGK-GTCNGDSGGP  
ChPV QVDVPIMTNDDCNAV----YG--IVGNGVVICI----D-SEGGK-GTCNGDSGGP  
CHL YTYNLVIDNDRCAQE---YPPG-IIVESTICG----D-TC DGK-SPCFGDSGGP  
CHY1A EVDAPCISNEECALT----YGN-TIQPGNICV----N-TTGGH-SSCNGDSGGP  
CHY1C EVYMPCMSNDECAAY----FGN-TIQPGNICT----D-TTGGH-SACNGDSGGP  
CHY1B EIDVPCISNEECALT----YGE-TITDGIICI----S-TAGGR-GSCNGDSGGP  
CHY1D EVDVPCISNAECAAT----YGA-TITAGNICV----D-TTGGK-GSCNGDSGGP  
CHY1E EVDVVGITNQECVAA---YSILTIRDSNLCV----S-TLGGK-SSCNGDSGGP  
ChAG FTSNPVMTNADCIA---RWNTALIQQNVCL----S-GDGGR-SSCNGDSGGP  
ChAM QVTMPIISNAECASRMSSVSG-ANVNDGHICI----YNGDS-GSCNGDSGGP  
ChBT QASLPLLSNTNCKK----YWG-TKIKDAMICA----G-ASGV--SSCMGDSGGP  
ChPO QAALPLLTNDDCRR----YWG-NKISNLMICA----G-ASGA--SSCMGDSGGP  
ChCF VANTNVLSQSECTN----YWG-SNINTGHVCV----RTGNN-GACQGDSSGGP  
ChPC -ANNTIISNKECND---VF--KIVQPTEVCL----S-IAGGR-SACSGDSGGP  
ChPH VVESNILTNEEERK---RFG-FAVFKSVICL----D-GSQQK-SSCNGDSGGP  
ChRP QAYISKITRSQCNLRW-ALYG-QLITDKHICVYEASD-PAGTRP-SACQGDSSGGP  
JoDM CVDVQIIDNNDCRN---YYGSNYITDNTICI----N-TDGGK-SSCSGDSGGP  
TBT CLVAPLLSHADCEA---SYP-GQITNMICA----GFLEGGK-DSCQGDSSGGP  
TSS CLNIPILSYSDCNN---SYP-GMITNAMFCA----GYLEGGK-DSCQGDSSGGP  
CHY1F KVTAPGITTADCAAT----YGD-IITDNILCI----D-TTGGK-GSCNGDSGGP  
CHY1G KVTAPAISTADCAAT----YGD-IITDNILCI----D-TTGGH-GSCNGDSGGP  
CHY1H KVNAPGISSADCRAV----YGN-NVQDTVLCI----D-TTGGH-GTCNGDSGGP

cons : \* : . \*

CES MNYVTGG-VTQTRGITSFGSST---GCETGYPDGYTRVTSYLDWIESNTGIA-I  
 CPC LNY--GG-T--TVGITSFGASA---GCEAGYPDAFTRVSAAYLDWIQANTGVT-P  
 CUP LNY--NG-L--TYGITSFGAAA---GCEAGYPDAFTRVTYFLDWIQTQTGIT-P  
 ChPV LNL--NG-M--TYGITSFGSSA---GCEAGYPDAFTRVYYLDWIQQKTGVT-P  
 CHL FVLS<sup>SD</sup>KN-L--LIGVVSFVSGA---GCESGKPVGF<sup>SR</sup>VTSYMDWIQQNTGII-F  
 CHY1A LTFVNGG-VHNQVGIVSFGSSA---GCEVGYPAAFARVSYFAEWISSVTGLL-I  
 CHY1C LSYINGG-VYNQVGIVSFGSSA---GCEVGYPAA<sup>Y</sup>TRVSYADWISSVTGLV-I  
 CHY1B LTFVNDG-VHNQVGIVSFGSSM---GCDKNLPAGFSRVSFYAEWISSITGLI-I  
 CHY1D LTYVANG-VHNQVGIVSFGSSA---GCEVGLPAGFSRVSYFAEWISSVTGLV-I  
 CHY1E LSFINNG-VYNQVGIVSFGSNQ---GCELEIPAGFARLSSFSDWISSVTGLV-I  
 ChAG LTVQDG--GSLQIGIVSFGSAA---GCSIGMPSVYARVSFYLDWIDANSDFN-A  
 ChAM MNC--QG---YVAGVTSWGIS<sup>S</sup>ALGN<sup>CM</sup>VSYP<sup>SV</sup>YTRTSYFLSWIANN<sup>S</sup>---  
 ChBT LVCKKN-GAWTLVGIVSWGSS---TCSTSTPGVYARVTALVNWVQQTLAN--  
 ChPO LVCQKA-GAWTLVGIVSWGSG---TCTPTMPGVYARVTELR<sup>AW</sup>MDQTIANN--  
 ChCF LTC--SG---VLVGVTWGY<sup>S</sup>---DCRVSHPSVYTRITTFLDWINDNMSR--  
 ChPC LVIDN-----VQHGI<sup>V</sup>SYGSSY---CR-STPSVFTRVSSYLNWLQTHSEWRAQ  
 ChPH LVVKTE-EGEVQVGIVSYGSSA---GCEKGF<sup>P</sup>PAGFSRVTSFVDWVKD<sup>NS</sup>DYTD  
 ChRP LMC--GADFKLLAGVTSWGLA---SCTGGMPSVYTRVSEYVDWVEAN---  
 JoDM LVLHDNN---RIVGIVSFGSGE---GCTAGRPAGFTRVTGYLDWIRDHTGIV-Y  
 TBT VAC--NG---QLQGIVSWGYGC---AQK<sup>G</sup>KPGVYTKVCNYVDWIQETIAAN-S  
 TSS VVC--NG---ELQGVVSWGYGC---AEPGNPGVYAKVCI<sup>F</sup>NDWLTSTMASY--  
 CHY1F LSFVNAG-VYNQVGIVSFGARA---GCAAGFPAGFTRISSY<sup>T</sup>QWISD<sup>TT</sup>GLI-F  
 CHY1G LSF<sup>D</sup>NNG-VYNQVGIVSFGSSA---GCTRGLPAGFTRVSSYAQWISLV<sup>T</sup>TGLV-I  
 CHY1H LSYINNG-VYNQVGLV<sup>S</sup>FGSAS---GCELGYPTGF<sup>S</sup>R<sup>ISS</sup>SFVDWIVSV<sup>T</sup>TGLV-V

cons . . . . . \* : . \* : . . . . . \* : . . . . . \* : . . . . .

CES DP  
 CPC --  
 CUP --  
 ChPV --  
 CHL --  
 CHY1A --  
 CHY1C --  
 CHY1B --  
 CHY1D --  
 CHY1E --  
 ChAG QP  
 ChAM --  
 ChBT --  
 ChPO --  
 ChCF --  
 ChPC --  
 ChPH --  
 ChRP --  
 JoDM --  
 TBT --  
 TSS --  
 CHY1F --  
 CHY1G --  
 CHY1H --  
 cons