

**A**

```

      20      40      60      80
Hp_26695  --MDK I I I QGARENN LKN I FLE I PKNQFV VFTGLSGSGKSTLAFD TLYAEGQRRY L ESSL S YARQFLDKV GKPNDVK I EGL TPA I A I DQK TTS 91
Cj_NCTC_11168 --MND T I K I I GARENN LKN I HLE I PKNK L I VFTGLSGSGKSTLAFG TLYAEGQRRY I ESSL S AYARQFLDKV GKPNDVK I EGL TPA I A I DQK TTS 92
Ec_K12     --MDK I EVRGAREN LKN I NLV I PRDK L I VFTGLSGSGKSS LAFD TLYAEGQRRY V ESSL S AYARQFLSLMEK PPDVDH I EGL SPA I S I EQK STS 91
Sa_N315   MKEP S I VVKGARAH N LKD I D I ELPKNK L I VMTGLSGSGKSS LAFD T I YAEGQRRY V ESSL S AYARQFLGQMDK PPDVD T I EGL SPA I S I DQK TTS 93

      100      120      140      160      180
Hp_26695  KNPRSTVGT I TE I YDY L RLL F ARVGE QFC PTCLEP I SSMSTSD I ISQ ICHLEENSKI I I LAP I I KDK KGSFNDKLE SLRL KGYVRAF VDGVMV 184
Cj_NCTC_11168 KNPRSTVGT I TE I YDY L RLL Y ARVGI QHCHRCGQK I SSMVSVD I VSE I LKFPKGAK I I I YSP L I REKKGTYADLLENLRNKG YVRAQ I DGLV 185
Ec_K12     HNPRSTVGT I TE I HDY L RLL F ARVGE PRCPDHQDV LPAQTSQMV DNVLSQPE GKRLMLLAP I I I KERKGEHTKTLENLRSQGY I RAR I DGEV 184
Sa_N315   KNPRSTVATVTE I YDY I RLL Y ARVGP KPYC PNHNI E IESQT VQQMVD R I MELEARTK I QLLAP V I AHRKGSHEKLI ED I GKKG YVRL R I DGE I V 186

      200      220      240      260
Hp_26695  RLDEE I LHKT KKHT I EAVVDRVVNNENASRIASA I EKAL KE SYGELEVE I LQDNAPS I RKH - - Y SEHKACFKCKMS FEELEP LS FSNFSPK 275
Cj_NCTC_11168 RLDEE I ELAKTKKHT I KLV I DRLE I QEDLLSRLASD I EKG LQESFGEI E I EVLNHEE I NLNKHYHF SEHSACFDCK I SFVPLEP LS FSNFSPK 278
Ec_K12     DLSDP PKLELQKKHT I EVVDRF KVRDDLTQRLAES FETAL ELSGGTAVVADMDPK - - - AEE L LF SANFACPI CGYSMRELEPRL FSNFNPA 274
Sa_N315   DVNDVPT LDKNKNHT I EVVDR L VVKDGI ETRLADS I ETAL ELSGQLTV DVID - - - - GEDLKF SESHACPI CGFS I GELEPRM FSNFSPF 273

      280      300      320      340      360
Hp_26695  GACESC LGLGTFKSLD I SKIL -DPNTP L NQGA I KV I FGYNRSY Y AQMFEGFCEYNG I DSALCFNEL NKEQQDAL L YGNG - TE I S FHKNSP - - 364
Cj_NCTC_11168 GACEACDGLG I RYTLDMKK I I -DENLSLENGAVKI MYGFNKSY Y YKFL I AFCEQNE I P I K I PFMQL NEVQKRLV L YGNA - KT I EFLWKRNR - - 367
Ec_K12     GACPTCDGLGVQYFDPDRV I QNPELS LAGGAI RGW -DRNFY Y FQMLKSLADHYKFDVEAPWGS L SANVHKV V L YGSGKEN I EFKYMNDRGD 366
Sa_N315   GACPTCDGLGQKLTVD I LVVPDKDKT L NEGA I EPWIPTSSDF Y PTL LKRVCEVYK I NMDKPFK L TERQRDI L L YGSGDKE I EFTFQRQGG 366

      380      400      420      440      460
Hp_26695  - - - LKR PWKGI I Q I AYDMFK E - - - - QKDLSDY MSEKT C SSGEGHRL KASSL S VQVAGLKMADFLTKPI EEVYHFFNDP THFSY LNEQEKKI 448
Cj_NCTC_11168 - - - LKRT FEGVVKMAY EMLKD - - - - EKDLAEY MSEK I CKDCGGHRL KPESLAVKVAKSLGEI LDMST IEDSTAFFADEKNFSY LSEQQKLI 451
Ec_K12     TS I RRRPFEGVLHNMERRYKETESSAVREELAKFI SNRPCASCEGTR L RREARH VY VENTPLPA I SDMS IGHAMEFFNNLK - - - - LAGQRAKI 455
Sa_N315   TRKRTMVFEGVVPNI SRRFHESPSEY TREMMSKYMTLPGET CHGKRL SREAL S VYVGLNI GEVVEYS I SQALNY YKN I D - - - - LSEQDQAI 455

      480      500      520      540
Hp_26695  AEP I LKEI LERV FLYD VGLGYLT LGRDART I SGGESQR I R I ASQIGSGL TGVLYVLD EPS I GLHEKDTLKL I NTLRN LQKKGNTL I VVEHDK 541
Cj_NCTC_11168 SKP I LKEI NERL FLYD VGLGYLS LGRDART I SGGEAQR I R I ASQIGSGL SGVMYVLD EPS I GLHERDTAKL I KTLRN LQKKGNTL I VVEHDK 544
Ec_K12     AEK I LKEI GDR LKFLVN VGLNYLT LRS AETLSGGEAQR IRLASQIGAGLVGVMYVLD EPS I GLHQRDNERLLGTL IHLRDLGNTV I VVEHDE 548
Sa_N315   ANQ I LKEI I SRLT FLNNVGL EYLT LNRASG T LSGGEAQR IRLATQIGSRL TGVLYVLD EPS I GLHQRDNDRL I NTLKEMRDLGNTL I VVEHDD 548

      560      580      600      620      640
Hp_26695  ET I KHADFVVD I GPKAGRHGGEV V FSGSVKELLQNNHS - T AL YLNGTKK I ERPKFELPKE - KHFL E IKNVNI NN IKNLSVQ I PLKQLVC I TGV 632
Cj_NCTC_11168 MT I EEA D F IVD I GPKAGKFGGEV V FSGTYKELLKSKSE - T AL YMN GKKQ I SQLQNR TQKE - - - WLELKNVNI NN I QDLSVKF PLQNLVA I TGV 633
Ec_K12     DA I RAADHVI D I GPGAGVHGGEV V AEGPLEA IMAVPESL TGGYMSGKRK I EVPK KRV PANPEKV LKLTGARGNN LKDVTL TLPVGLFTC I TGV 641
Sa_N315   DTMRAAD YLVD I GPGAGEHGGQ I VSSGTPQKVMKDKKSL TGGYLSGKRK I DVPEYRRPAS - DRK I S I R GARS NN LKGI D VDI PLS I MTVV TGV 640

      660      680      700      720      740
Hp_26695  SSGSGKSSL I LQTL PTAQ TLLNHAKKTQSLNGVE I VGLEHL D KVI YLDQAPI GKTPRSNPATY TGVMD E I R I LFAEQKEAK I LGYSASRFSFN 725
Cj_NCTC_11168 SSGSGKSSL I LQTL LPFAQEELNR AKKVKKLG VQ I EGGLEKLDKVI YLDQSPI GRTPRSNPATY TGAMDE I RNL FAATKEAKMRGY KAGRFSFN 726
Ec_K12     SSGSGKSTL I NDT LFP I AQRQLNGAT I AEPAPYRDI QGLEHFDKVI D I DQSPI GRTPRSNPATY TGVFTPVREL FAGVPE SRARGY TPGRFSFN 734
Sa_N315   SSGSGKSSL VNEV L YKS LAQK I N KSK - VKPGLYDK I EGI DQLDK I I D I DQSPI GRTPRSNPATY TGVFDD I RDVFAQTNEAK I RGYQKGRFSFN 732

      760      780      800      820
Hp_26695  YKGGRC EKCQGGDI K I EMHFLPDV L VQCD SCKGAKYN PQTLE I KVKGKS I ADV LNMSV EEA YEFFAKFPKI AVK LKTLMDVGLGY I TLGQNA 818
Cj_NCTC_11168 YKGGRC EKCQSGDGE I K I EMHFLPDV M VVCDT CGGKRYNDATLE I KYKGN I SE I LNMSV LEASE FFFAVPKI KQKLD T L V K VGLDY L TLGQNA 819
Ec_K12     VRGGRC EACQGGDI K I VEMHFLPD I YVPCDQCKGKRYNRETLE I KYKGT I HEV LDMT I EEA R E F F DAVPALARKLQTLMDVGLGY I RLGQSA 827
Sa_N315   YKGGRC EACKGGDI K I EMHFLPDV YVPC EVDGKRYNRETLE I VYKGN I AD I LEMTVEEATOFFEN I PKI KRK LQTLVDVGLGY I TLGQQA 825

      840      860      880      900      920
Hp_26695  TTLSGGEAQR I KLAKE LSKKDTGKTLY I LDEPTTGLHFEDVNH L LQVLHS LVALGNSMLV I EHNLD I IKNADY I I DMGPDGGDKGGKVI ASGT 911
Cj_NCTC_11168 TTLSGGEAQR I KLAKE LSRSDTGKTLY I LDEPTTGLHFEDV NKL I LVLQHLVDLKN SVFV I EHNLDV IKNADY I I DMGPEGGKGGKVI STGS 912
Ec_K12     TTLSGGEAQRV KLAREL SKRGTGQTLY I LDEPTTGLHFAD I QKLDV LHLKLRDQNGT I VV I EHNLDV IKTADWI VDLGPEGGSGGGE I LVSGT 920
Sa_N315   TTLSGGEAQRV KLASELHKRSTGKS I Y I LDEPTTGLHVD I I SRLKVLNRLV RENGDTV I I EHNLDV IKTADY I I DLGPEGGSGGGT I VATGT 918

      940
Hp_26695  PLEVAQNCEKTSYTGKFLALEL K - - - - - 935
Cj_NCTC_11168 VEKVAKEHKKTRSYTGYYLDLELKN TQKS - - - - 941
Ec_K12     PETVAEC - - - EASH T ARFLK PML - - - - - 940
Sa_N315   PEDIAQT - - - KSSYTGKYLKEVLERDKQNTEDK 948

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**B**

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      20          40          60          80
Hp_26695  - - - - -MPLFDLKSPYPPAGDQPQAI EALTKSLKNNHYQTLVGVTGSGKTYTMAN I IAQTNKPAL IMSHNKLCAQLYSEFKAFFPHNRVEYF 88
Cj_NCTC_11168 - - - - -MLELTSEFKPSPDQQAEIKGIVKSIKKGNYQTLLVGTGSGKFTMANVIKELNIPTL IMSHNKLCAQLYSEFKGFFSKNHVEYF 86
Ec_K12  - - -MSKPFKLNSAFKPSGDQQAEIRRLEEGLEDGLAHQTLLVGTGSGKFT IANVIADLQRPTMVLAPNKTLAAQLYGEMKEFFPENAVEYF 89
Sa_N315  VTMVEHYPFK IHSDFEPQGDQPQAIKEIVDGIKAGKRHQTLLGATGTGKFTMSNVIKEVGKPTL IAHNKLAGQLYSEFKEFFPENRVVEYF 93

      100      120      140      160      180
Hp_26695  ISHFDYYQPESY IPRRDLFIEKDSINDDLERLRLSATSLLGYDDV IVIASVSAN YGLGNPEEYLKVMEKIKVGEKRAYKSFLLLVEMGYS 181
Cj_NCTC_11168 ISYYDYYQPEAY IPRTDVFIEKDSSTNEDLERLRLSATSLLSYDDVVC IASVSAN YGLGNPNEYIGMVL IFELGMQ ISQKELLKKLVDMGYK 179
Ec_K12  VSYYDYYQPEAYVPSDTFIEKDSVNEHIEQMRLSATKAMLERRDVVVASVSA IYGLGDPDLYLKMMLHLTVGM IDQRA ILRRLLAELQYA 182
Sa_N315  VSYYDYYQPEAYVPSDTFIEKDSINDEIDQLRHSATSALFERDDV I IASVSCIYGLGNPEEYKDLVSVRVGMEMDRSELLRLKLVDVQYT 186

      200      220      240      260
Hp_26695  RNEVVFDRGSFRATGECVD IFPAYNDAEF IRIEFFGDE IERIAVFDALEKNEIKRLDSVMLYAASQFAVGSERLNLAIKS IEDELALRLKFFK 274
Cj_NCTC_11168 RNDNFFDRADFRVQGDIDIYPAYEDEVRLEFFGDELDAMYHYNVLENKKGKDLKRF ILYPTSQFSVGETRLKQAIKD IKAELNERLAYFE 272
Ec_K12  RNDQAFQRGTFRVRGEV IDIFPASEDDIALRVELFDEEVERLSLFDLTGQIVST IPRFT IYPKTHYVTPRERIVQAMEEIKELARRKVLL 275
Sa_N315  RNDIDFQRGTFRVRGDVVEIFPASKEELCIRVEFFGDE IDRIREVNYLTGEVLKEREHFAIFPASHFVTREEKLKVA IERIEKELERLKELR 279

      280      300      320      340      360
Hp_26695  EQDKMLEYNRLKQRTEHDLEM ISATGVCKG IENYARHFTGKAPNETPFCLFDYLG IFEREFLVIVDESHVSLPQFGGMYAGDMSRKSVLVEYG 367
Cj_NCTC_11168 HENKLVEYQRLKQRVEFDLEMLTSTGMCKGVENYARHLTGLKEGDTPYTLFDYFA IKDRKFLVIVDESHVSLPQFRGMFAGDRSRKQTLVDYG 365
Ec_K12  ENNKLLEEQRLTQRTQFDLEMMNELGYCSGIENYSRFLSGRGPGEPPTLFDYLP - - ADGLVVDESHVTIPQ IGGMYRGDRARKETLVEYG 365
Sa_N315  DENKLLEAQRLEQRTNYDLEMMREMGFCSGIENYSVHLLTRPLGSTPYTLLDYFG - - DDWLVMIDESHVTLPQVRGMYNGDRARKQVLVDHG 369

      380      400      420      440      460
Hp_26695  FRLPSALDNRPLKFDEF IHKNCQFLVSATPNKLELELSKKNVAEQI IRPTGLLDPKFEVRDSDKQVQDLFDEIKLVVARGERVLITTLTKKM 460
Cj_NCTC_11168 FRLPSALDNRPLMFDEF IHKNCQFLVSATPAPLELELSKENIFHQIMRPTGLLDPL IELKDSDNQVE ILFDEAKKV IQRNERVLVTLTKKL 458
Ec_K12  FRLPSALDNRPLKFEEFEALAPQTIYSATPGNYELEKSGDVDQVVRPTGLLDP IIEVRPVATQVDDLLSE IRQRAAINERVLVTTLTKKM 458
Sa_N315  FRLPSALDNRPLKFEEFEEEKTKQLVVYSATPGPYEIEHTDK-MVEQ IIRPTGLLDPK IEVRPTENQ IDDLLSE IQTRVERNERVLVTTLTKKM 461

      480      500      520      540
Hp_26695  AEELCKYYAEWLKARYMHSEIDA IERNH IIRSLRLKEFDIL IGINLLREGLDLPEVSLVA IMDADKEGFLRSETSLIQTMGRAARNANGKVL 553
Cj_NCTC_11168 AEELTRYYLELGIKVKYMHSD IDA IERNE IIRGLRSGAFDML IGINLLREGLDLPEVSL IAIMDADKEGFLRSTTSLIQTMGRAARNVNGKVL 551
Ec_K12  AEDLTEYLEEHGERVRYLHSD IDTVERMEI IRDLRLGEFDVLVGINLLREGLDMPEVSLVA ILDADKEGFLRSERSLIQT IGRAARNVNGKAI 551
Sa_N315  SEDLTTYMKEAGIKVNYLHSE IKTLERIEI IRDLRMGTYDVIVGINLLREGID IPEVSLVVILDADKEGFLRSNRSLIQT IGRAARNDKGEVI 554

      560      580      600      620      640
Hp_26695  LYAKK ITQSMQKAFEITSYRRAKQEEFNKIHN ITPKTVTRALEEELK - - LRDEIRI - AKAL - - - - - KKDKMPKSEREKI IKELDKK 632
Cj_NCTC_11168 LFCKK ITKSMQEAMDTTNERRKLQMAYNKKYN ITPTSVKRHIEESLK - - NEEDLGE IYRKGK - - - - - KLEKMPASERAKLVKELRKQ 631
Ec_K12  LYGDK ITPSMAKAIGETERRREKQQKYNEEHG ITPQLNKKVDILA - - LGQNIAKTKAKGRGKSRPIVEPDNVPMDMSPKALQQK IHELEGL 642
Sa_N315  MYADKMTDSMKYA IDETQRRRE IQMKHNEKHGITPKTINKK IHDLISATVENDENDKAQTV - - - - - IPKKMTKKERQKTIDNIEKE 636

      660      680
Hp_26695  MRECTKNLDFEEAMRLRDE IAQLRTL - - - - - 658
Cj_NCTC_11168 MLEAAKALEFEKAAA IRDEINKLRDL - - - - - 657
Ec_K12  MMQHAQNLEFEEAAQ IRDQLHQLRELFIAAS 673
Sa_N315  MKQAAKDLDFEKATELRDMLFELKAEG - - - - - 663

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C

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                20          40          60          80
Hp_26695  ---MADLLSSLKNLPNSSGVYQYFDKNRQLLYIGKAKNLKKRISKYFSIRNNEITPNHRASLRIQMMVKQIAFLETILVENEQDALILENSL 89
Cj_NCTC_11168  LT--KENLENE LKTLPNSTGVYQYFNQEGKLLYVGKAKNLKNRVRSYFAFTPN-LHANPRNSLRIQKMI EETVHLEFIATNSEADALILENSF 90
Ec_K12      VSD-QFDAKAF LKTVTSQPGVYRMYDAGGTVIYVGKAKDLKKRRLSYFRSNLA-----SRKTEALVAQIQQIDVTVTHTETEALLEHNY 84
Sa_N315     LEDYKQR IKNKLNVVPMEPGCVLMKDRNDQVIYVGKAKKLRNRLRSYFTGAHD-----AKTTRLVGEIRRFEFIVTSSSETESLLELNL 84

                100        120        140        160        180
Hp_26695  IKQLKPKYNI LLRDDKTYPIYMDFSTDFPIPLITRKILKQPGVKYFGPFTSG--AKDILDSL YELLPLVQKKNCIK--DKKACIF YQIERCK 178
Cj_NCTC_11168  IKQLHPKYNILLRDDKTYPIYVDFEEEFPRFEITRKLVKKSKEYFGPFFKG--ARELLDALYLYYPLKQKASC----KSPCIF YQISRCL 176
Ec_K12      IKLYQPRYNVLLRDDKSYPIIFLS-GDTHPRLAMHRG-AKHAKGEYFGPPNGYAVRETLALLQKIFPIRQCENSVYRNRSRPCLQYQIGRCL 175
Sa_N315     IKQYQPRYNILLKDDKSYPIIKIT-KEYPRLLVTRT-VKQGTGKYFGPPNAYS AQETKKLDR IYPRKCDKM---PDKLCLYHIGQCL 171

                200        220        240        260
Hp_26695  APC-ENKITKEEYLKIAKECLEMIENKDR-LIKELELKMERLSNNLRFEEAL IYRDRITAKIQKIAPFTCMDLAKLYDLDFAFY GASNKAVLV 269
Cj_NCTC_11168  APC-DKLSIREKEYLEILDEA I HALLNPSV-LLKNLEKQMLVLAQNENY EEA AKVRDQIAMI KDLEVKVEIDI AKLEDFEVFALAFKNSV LSTL 267
Ec_K12      GPCVEGLVSEEEYAQQVEYVRLF LSGKDDQVLTQLISRMETASQNL E FEEAARI RDQIQAVRRVTEKQFVSNTG-DDLDVIGVAFDAGMACVH 267
Sa_N315     GPC-VYDVL SKYAQM TKEITDFLNGEDKTI LKSL EERMLTASESLDFERAKEYRDL IQHIQNL TNKQKIMSSDKTIRDFVGYCVDKGMCIQ 263

                280        300        320        340        360
Hp_26695  KMFMRGGK IIS--SAFEKIHSLNGFDTEAMKQAI INHY--QSHLPLMPEQI LLNACSNETLKE LQEFISHQYSKKI IALSIPKKGDKLALIEI 358
Cj_NCTC_11168  RFVVQNGK IISANSKITPIKNDIQWDQNEIYKQLILENF--SMDIP LLANVIYVYEEFEDRVL-LEEILSQRFDK IISIKIPKIGEKRRI CDL 357
Ec_K12      VLFIRQGGKVLGSRSYFPKVPG--GTELS EVVETFVGGFY LQGSQMRTLPGEL LLDFNLSDKTL-LADSLSELAGRKI INVQTKPRGDRARYLKL 357
Sa_N315     VFFIRQGNMIKRD TTMIP LQ---QTEEEEFY-TFI GGFY--SLNQHILPKEVHVPRNLD-----KEMIQSVVDTKIIV--QPARGPKKDMVDL 342

                380        400        420        440        460
Hp_26695  AMKNAQE IFSQEKTSNEDLILEEARS LFKLECM-----P--YRVEIFDTS HHS SSQC VGGMVVYENNAFQKNS YRRYHLKG---SDEY TQ 438
Cj_NCTC_11168  AFQNA LLNIEKEQKNHDFTIQKELKSYFEL ENL-----P--NDIEIFDN SHLQGVANVGAMV TYRINSWDKSKYRK FHLKH---KNDY DQ 437
Ec_K12      ARTNAATALTS-KLSQSTVHQRLTALASVLK L-----PEVKRMECFDI SHTMGEQTVASCVVFDANGPLRAEY RRYNITGITPGDDYAA 441
Sa_N315     AAHNAKVS LNN---KFELISRDESRTIKAIEELGTQMGIQTP--IRIEAFDNSNIQGVDPVSAMVTFVDGKPKDKKNYRKYKIKTVKGPDDYKS 430

                480        500        520        540
Hp_26695  MSELLTRR---ALDFAKEPPP NLWIDGGRAQLNIALEILK-SSGSFVE-----VIAISKEKRDSKAYRSKGGAKDI IHTPSDT-FKLLP SDK 521
Cj_NCTC_11168  MREVLTRR---ALDFDKIPPPDLWLIDGGKALLDLAKEIIV-SSGVNVD-----ILAISKEKIDAKAHRAKGGAKDKI HSLKGE-FSL SINDK 520
Ec_K12      MNQVLR RRYGKAIDDSKI--PDVILIDGGKGLAQAKNVFA-ELDVSWDKNHP LLLGVAKGA-----DRKAGLET LFFEP EGEGFSLPPDSP 525
Sa_N315     MREVVR RRYSRVLN-EGLPLPDLIIVDGGKGHMNGVIDVLQNELGLDIP-----VAGLQKND-----KHQTS ELLYGASAEIVPLKKN SQ 509

                560        580        600        620        640
Hp_26695  RLQWVQKL RDESHRYA I N FHRSTKLKNMKQIALLKEKGI GEASVKKLLDYFGSFEAIEKASEQEKN AV-----LKKRI----- 594
Cj_NCTC_11168  KLQFLQKL RDEAHRFA I SFHQNTKKKQDLKSSKLANLGLSSGVMQKLLAYYGNFESIYKADF KDLTML--VGRKAAQKI KEN--- 600
Ec_K12      ALHVIQH IRDESHDHA IGGHRKKRAKVKNTSSLETIEGVGPKRRQMLLKYMGGLQGLRNASVEEIAKVPGISQGLAEKIFW SLKH 610
Sa_N315     AFYLLHR IQDEVHRFA I T FHRQTRQKTGLKSI LDDIDGIGNKRKTL LRSFGS I KMKKEATLEDFKNI-GIPENVAKNLHEQLHK 593

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**D**

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                20          40          60          80
Hp_26695  - - - - - S H I Q G P L L I L A G A G S G K T K T L T S R L A Y L I G V C G V P S E N T L T L T F T N K A S K E M Q E R A L K L L K N Q A L I P P L L C T F H R 75
Cj_NCTC_11168  - - M N L F E D L N D S Q K Q A V S H I D G A M L I L A G A G S G K T K T I T T R L A Y L I G E V G I P S H N T L T L T F T N K A A S V M R H R A L N F L Q G N H N - - P L L C T F H K 88
Ec_K12  M D V S Y L L D S L N D K Q R E A V A A P R S N L L V L A G A G S G K T R V L V H R I A W L M S V E N C S P Y S I M A V T F T N K A A A E M R H R I G Q L M G T S Q G G - M W V G T F H G 92
Sa_N315  - - M N A L L N H M N T E Q S E A V K T T E G P L L I M A G A G S G K T R V L T H R I A Y L L D E K D V S P Y N V L A I T F T N K A A R E M K E R V Q K L V G D Q A E V - I W M S T F H S 90

                100          120          140          160          180
Hp_26695  F G L L F L R Q H M N L L K R A C D F S V L D S D E V K T L C K Q L K I S - - - - - N F R A S I S Q I K N G M M D L S - - - - - M Q D S E C Y - - - - - K 137
Cj_NCTC_11168  F G L L F L K L H F E R L E R K N S F I V I D T D D T K K I I K D L I H D K N K D N V Y - - - D I Q Y I S Y C K N E G K R V S N V F E D L N L L K E H N F E K Y Q N E Y - - - K F A N 174
Ec_K12  L A H R L R A H H M D A N L P Q D F Q I L D S E D Q L R L L K R L I K A M N L D E K Q W P P R Q A M W Y I N S Q K D E G L R - - - - - P H H I Q S Y G N P V - E Q T W A K 172
Sa_N315  M C V R I L R R D A D R I G I E R N F T I I D P T D Q K S V I K D V L K N E N I D S K K F E P R M F I G A I S N L K N E L K T - - - - - P A D A Q K E A T D Y H S Q M V A T 171

                200          220          240          260
Hp_26695  A Y E L Y Q N A L K K D N L V D F D D L L F L S L K I L Q D N E T I A K E T S E R Y H Y I M V D E Y Q D T N A L Q L E F L K K L S F T H H N L C V V G D D D Q S I Y G F R G A D I S N I L 230
Cj_NCTC_11168  Y Y R A Y E E Y L L K Q N F V D F D D L L L L S H I L E N D I N F A K E Q S L L Y N Y I T V D E Y Q D T N T L Q Y K I L K N L C C M H E N I T V V G D D D Q S I Y S W R G A K I E N I L 267
Ec_K12  V Y Q A Y Q E A C D R A G L V D F A E L L L R A H L W L N K P H I L Q H Y R E R F T N I L V D E F Q D T N N I Q Y A W I R L L A G D T G K V M I V G D D D Q S I Y G W R G A Q V E N I Q 265
Sa_N315  V Y S G Y Q R Q L S R N E A L D F D D L I M T T I N L F E R V P E V L E Y Y Q N K F Q Y I H V D E Y Q D T N K A Q Y T L V K L L A S K F K N L C V V G D S D Q S I Y G W R G A D I Q N I L 264

                280          300          320          340          360
Hp_26695  N F S K H F K G A K I V K L E T N Y R S S A E I L A C A N S L I S H N Q H R H I K T Q S F K G S H K S V V C K E Y L T Q K E E S L D V A Y Q I K A L L K K G E N L E N I A I L Y R L N G 323
Cj_NCTC_11168  N F Q N D F K N V K L V K L E Q N Y R S V G T I L Q A A N N L I S H N E Q R L G K T L I C T K D T G E N I K I L K N E N E K D E G L Y I A Q E V K L L N S G V E A K E I A I L F R V N A 360
Ec_K12  R F L N D F P G A E T I R L E Q N Y R S T S N I L S A A N A L I E N N N G R L G K K L W T D G A D G E N I S L Y C A F N E L D E A R F V V N R I K T W Q D N G A L A E C A I L Y R S N A 358
Sa_N315  S F E K D Y P E A N T I F L E Q N Y R S T K T I L N A A N E V I K N N S E R K P K G I W T A N T N G E K I H Y E A M T E R D E A E F V I R E I M K H Q R N G K K Y Q D M A I L Y R T N A 357

                380          400          420          440          460
Hp_26695  L S R S I E E S L N A L N I P Y R L I G A L S F Y E R A E I K D A L A F M H L V A K K D R F F I K R V L N K P P R G L G K I T Q E W I F S L L D E E G L N L E E A L K L G A F K D K L - 415
Cj_NCTC_11168  L S R A I E E A F M K K Q I S Y K L L S G M R F Y E R L E I K D L I S Y L R L I L N P S D D L S F K R I I N R P K R S I G E K A L K N L E E Y A K R Q I S L F D A L C E S D G G V G I L 453
Ec_K12  Q S R V L E E A L L Q A S M P Y R I Y G G M R F F E R Q E I K D A L S Y L R L I A N R N D A A F E R V V N T P T R G I G D R T L D V V R Q T S R D R Q L T L W Q A C R E L L Q E K A L - 450
Sa_N315  Q S R V L E E T F M K S N M P Y T M V G G Q K F Y D R K E I K D L L S Y L R I A N S N D D I S L Q R I I N V P K R G V G P S S V E K V Q N Y A L Q N N I S M F D A L G E A D F - I G L - 448

                480          500          520          540
Hp_26695  - N P K N E Y A L K Q F I A M I G R L - R E A F E I S V E E F C S R F L E E T N L L K S Y E K E D N Y E E R E G F - - V K E L L T L V K E Y F K T N P T - - - H S L L D F L N E S V L D A 501
Cj_NCTC_11168  T T K K A Q N E A N I F I Q N I H T L K S Y D N A K K V F D N I E E L F K I K D Y F S - - E Q D D G D E - - R I R N L D E F Y A N L R E K L K E D P E - - - A S L E D L L S E I S L L S 538
Ec_K12  - A G R A A S A L Q R F M E L I D A L A Q E T A D M P L H V Q T D R V I K D S G L R T M Y E Q E K G E K G Q T R I E N L E L V T A T R Q F S Y N E E D E L M P L Q A F L S H A A L E A 542
Sa_N315  - S K K V T Q E C L N F Y E L I Q S L I K E Q E F L E I H E I V D E V L Q K S G Y R E M L E R E N T L E S R S R L E N I D E F M S V P K D Y E E N T P L E E - Q S L I N F L T D L S L V A 539

                560          580          600          620          640
Hp_26695  H N T E N - - - A Q K V S C M S V H M S K G L E F K H V F V I G L E E G F F P H R G F - - - N Q E S D L E E E R R L A Y V A I T R A K E E L Q L S Y V K E R S Y F G R K I S C S P S V F L 588
Cj_NCTC_11168  D Q D N L D - - - E E C V C L M S I H A S K G L E F D Y V F I I G F D E G F F P L - - - - - N S E E N L E E E R R L A Y V A I T R A K K F L T I S V A N S R F Y H G S R A N I N P S R F L 623
Ec_K12  G E G Q A D T W Q D A V Q L M T L H S A K G L E F P Q V F I V G M E E G M F P S Q M S L - - D E G G R L E E E R R L A Y V G V T R A M Q K L T L T Y A E T R R L Y G K E V Y H R P S R F I 633
Sa_N315  D I D E A D T - E N G V T L M T M H S A K G L E F P I V F I G M E E S L F P H I R A I K S E D D H E M Q E E R R I C Y V A I T R A E E V L Y I T H A T S R M L F G R P Q S N M P S R F L 631

                660          680          700          720          740
Hp_26695  E E - - - - - A Q L L N Q D N P P K Q D H Q K D A P I K V G D L I R H K I F G T G R V L G V E K G L S G L C L K I N C G G N V Y D K I S E K F V E 656
Cj_NCTC_11168  E E - - - - - S K L I N E K - - - S K N Q N I Q K T S F C K G D L V K H K I F G I G R V V E A N K S G K E E K L N I N F G G - I M R V I M A S F V E 688
Ec_K12  G E L P E E C V E - - - - - E V R L R A T V S R P V S H Q R T M G T P M V E N D S G Y K L Q Q R V R H A K F G E G T I V N M E G S G E H S R L Q V A F Q G G I K W L V A A Y A R 716
Sa_N315  K E I P E S L L E N H S S G K R Q T I Q P K A K P F A K R G F S Q R T T S T K K D Q V S S D W N V G D K V M H K A W G E G M V S N V N E K N G S I E L D I I F K S Q G N P V L L A Q F A P 724

Hp_26695  K V D N G F 662
Cj_NCTC_11168  K A V - - - 691
Ec_K12  L E S V - - 720
Sa_N315  I E K K E D 730

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