

# SSU Ribosomal Protein S12E

1            10            20            30            40            50            60

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Naegleria gruberi strain NEG-M KKVVKTSQKGIQKGFKNLLAPRPKDIGIGRDLGAKMNLTRFVKWPVYVRLQRQKRILLK  
 Plasmodium falciparum 3D7 -----  
 Plasmodium knowlesi strain H -----  
 Cryptosporidium parvum Iowa II -----  
 Cryptosporidium hominis TU502 -----  
 Theileria annulata strain Ankara -----  
 Theileria parva strain Muguga -----  
 Leishmania infantum JPCM5 -----  
 Leishmania major strain Friedlin -----  
 Trypanosoma brucei gambiense DAL972 -----  
 Trypanosoma cruzi strain CL Brener -----  
 Giardia lamblia DH\_A2 -----  
 Giardia lamblia WB\_A1 -----  
 Giardia lamblia Pig\_E -----  
 Giardia lamblia GS\_B -----  
 Trichomonas vaginalis G3 -----

Naegleria gruberi strain NEG-M RVKIPPAINQFRIVADKPLAHSVVQFLAKYKPEDEQKKERLRQAAKDKVEGKAATPKKS  
 Plasmodium falciparum 3D7 -----MSDVESADN--NWWWEEKAVFDNVTAIQKVIKNAHV  
 Plasmodium knowlesi strain H -----MSDVESVEN--NWWWEEKTVFDHTTAIQKVLKNAHV  
 Cryptosporidium parvum Iowa II -----MSDVEIDQEGTQVQVEQEVVNDLTTAIRYVVKNSFV  
 Cryptosporidium hominis TU502 -----MSDVEIDQEGTQVQVEQEVVNDLTTAIRYVVKNSFV  
 Theileria annulata strain Ankara -----MAE-DGSPEVINYMDEDEHVTDLSTAIQKVLLFSL  
 Theileria parva strain Muguga -----MAE-DGSPEVINYMDEDEQVTDLSTAIQKVLLFSL  
 Leishmania infantum JPCM5 -----MAEET---VRVEVPAVEENVVVDVAPESLEDAVRIVIQKALE  
 Leishmania major strain Friedlin -----MAEET---VRVEVPAVEENVVVDVAPESLEDAVRIVIQKSLE  
 Trypanosoma brucei gambiense DAL972 -----MAEETSLVADKVPEPAVID-AVADAMPDSLEDALRIVLMKARE  
 Trypanosoma cruzi strain CL Brener -----MADETR-VEKHDEEPTVTQ--QFDVEPENLRDAIRIVRKSLE  
 Giardia lamblia DH\_A2 -----MADTTRENFLKETFKRIHN  
 Giardia lamblia WB\_A1 -----MADTTRENFLKETFKRIHN  
 Giardia lamblia Pig\_E -----MADTTRENFLKETFKRIHN  
 Giardia lamblia GS\_B -----MNSYRLKWSASIPHKMAETIREGFKRIHN  
 Trichomonas vaginalis G3 -----METVIEHGLHQINL

Naegleria gruberi strain NEG-M ESSLIHGINEVVKAVKQASLVVIAHDVEPIELVFLPALCKKLDIPYVIVK-SKSRLG  
 Plasmodium falciparum 3D7 HDGLKIGIREVIKSIKESQKACVFLSDVCSEPAYKKLITTLCAEKNIPLFMVQNSKDLG  
 Plasmodium knowlesi strain H HDGLKIGIREVIKSIKESKACVFLSDVCSEPAYKKLITLCTEKNIPLFMVENDSKDLG  
 Cryptosporidium parvum Iowa II RGGLLRGLNEVVLALDSKKAQVCFVLAESCEEDCYKQLVEALCRERGIPLIMVP-DSKELG  
 Cryptosporidium hominis TU502 RGGLLRGLNEVVLALDSKKAQVCFVLAESCEEDCYKQLVEALCRERGIPLIMVP-DSKELG  
 Theileria annulata strain Ankara HGGLVRGLHEVAKALDSKTAQVCFVLSKGCSEPAYVVKLVQALCKEHSIPLIETDVDSKTLG  
 Theileria parva strain Muguga HGGLVRGLHEVAKALDSKTAQVCFVLSKGCSEPAYVVKLVQALCKEHSIPLIETDVDSKTLG  
 Leishmania infantum JPCM5 ANGLVRGLSEVARTLDCKTAHMCILADDCEDEEYKLVLTALAKQGNIDLINVE-EREKLA  
 Leishmania major strain Friedlin ANGLVRGLSEVARTLDCKTAHMCILADDCEDEEYKLVLTALAKQGNIDLINVE-EREKLA  
 Trypanosoma brucei gambiense DAL972 TNGLICGLSEVTRALDRRTAHLVLAADCEDEEYKLVLTALAKQNNIDLVSMD-EREKLA  
 Trypanosoma cruzi strain CL Brener VNGLVRGLSEVARTLDCKTAHMCILADDCEDEEYKLVLTALAKQANIDFVEVE-SREELA  
 Giardia lamblia DH\_A2 MDGLVTGHRQVFKYLERKRAKICFLASDCEEKQYADIVECLCKEYKVVHLCKKF-TRRTL  
 Giardia lamblia WB\_A1 MDGLVTGHRQVFKYLERKRAKICFLASDCEEKQYADIVECLCKEYKVVHLCKKF-TRRTL  
 Giardia lamblia Pig\_E MDGLVTGHRQVFKYLERKRAKICFLASDCEEKQYADIVECLCKEYKVVHLCKKF-TRRTL  
 Giardia lamblia GS\_B MDGLVTGHRQVFKYLERKRAKICFLASDCEEKQYADIVECLCKEYKVVHLCKKF-SRRTL  
 Trichomonas vaginalis G3 SGNVAKGIRCTIKAILKGGKARLVLLADDCEENKDYKNLVAGLCKKHNVKLQTVK-KKELLG

Naegleria gruberi strain NEG-M QLVHMKNCAVALTEVKKEDRDQFAKIVEAVRGAFFVDRFRTVNTKWGGGQLSKRSIIEQK  
 Plasmodium falciparum 3D7 HWAGLF-----KLDNE-GNARKIIGAS-SVAVVDFG-EDSAEKDFLLSQNQ-TVTA  
 Plasmodium knowlesi strain H QWVGLF-----KLDKE-GNARKIIGAS-SVSIIDFG-EESPERDYLMQQNQPAATA  
 Cryptosporidium parvum Iowa II EMAGLC-----KVDRE-GNPRKVVGAASVAIVDYG-VESEAYHYLQKHIAENCRS  
 Cryptosporidium hominis TU502 EMAGLC-----KVDRE-GNPRKVVGAASVAIVDYG-VESEAYHYLQKHIAENCRS  
 Theileria annulata strain Ankara QWSGLC-----KYDIE-GKPRKIVGAT-SVAVKDFG-EESEALVFLQKHISKLKK-  
 Theileria parva strain Muguga QWSGLC-----KYDIE-GKPRKIVGAT-SVAVKDFG-EESEALVFLQKHISKLKK-  
 Leishmania infantum JPCM5 QWAGLV-----RRDVA-GEVTKTLKCS-SVAIRDVG-ERTKALDYLLSQLH-----  
 Leishmania major strain Friedlin QWAGLV-----RRDVA-GEVTKTLKCS-SVAIRDVG-ERTKALDYLLSQLH-----  
 Trypanosoma brucei gambiense DAL972 QWAGLT-----RMAAD-GSVRKTLLKCS-CLAVRDFG-ERTKALDYLLSQLQ-----  
 Trypanosoma cruzi strain CL Brener EWAGLQ-----KQKSD-GSV-KTFKCS-CVAIRDVG-ERTRALNMLLGLAG-----  
 Giardia lamblia DH\_A2 ELTGQV-----RCLADSDKIIVVPAS-ACVIHNFVGMSSGDVDSFLTKLDEQ---  
 Giardia lamblia WB\_A1 ELTGQV-----RCLADSDKIIVVPAS-ACVIHNFVGMSSGDVDSFLTKLDEQ---  
 Giardia lamblia Pig\_E ELTGQI-----RCLADSDKIIVVPAS-ACVIHNFVGMSSGDVDSFLTKLDEQ---  
 Giardia lamblia GS\_B ELAGQV-----RCLADSDKIIVVPAS-ACVIHNFVGMSPEDVDNFINKLDEQ---  
 Trichomonas vaginalis G3 RALGLT-----HFKAD-GSVRRQMNCG-ACAIIRYGSVDTQELDEFKAFDPAVEE

Naegleria gruberi strain NEG-M NRIKKLKQ  
 Plasmodium falciparum 3D7 -----  
 Plasmodium knowlesi strain H -----  
 Cryptosporidium parvum Iowa II -----  
 Cryptosporidium hominis TU502 -----  
 Theileria annulata strain Ankara -----  
 Theileria parva strain Muguga -----  
 Leishmania infantum JPCM5 -----  
 Leishmania major strain Friedlin -----  
 Trypanosoma brucei gambiense DAL972 -----  
 Trypanosoma cruzi strain CL Brener -----  
 Giardia lamblia DH\_A2 -----  
 Giardia lamblia WB\_A1 -----  
 Giardia lamblia Pig\_E -----  
 Giardia lamblia GS\_B -----  
 Trichomonas vaginalis G3 QA-----







# Protein Translation Elongation Factor 1A

1 10 20 30 40 50 60

Naegleria gruberi strain NEG-M -----  
 Cryptosporidium hominis TU502 -----  
 Cryptosporidium parvum Iowa II -----  
 Theileria annulata strain Ankara -----  
 Theileria parva strain Muguga -----  
 Plasmodium falciparum 3D7 -----  
 Plasmodium knowlesi strain H -----  
 Leishmania infantum JPCM5 -----  
 Leishmania major strain Friedlin -----  
 Trypanosoma brucei gambiense DAL972 -----  
 Trypanosoma cruzi strain CL Brener -----  
 Trichomonas vaginalis G3 -----  
 Giardia lamblia DH\_A2 ---MHLNEYTENVIFK--VFLMPRYISHNNYS--DYSD----DGYYDDYDDYDCGRLLKKS GG  
 Giardia lamblia WB\_A1 ---MHLNEYTENVIFK--VFLMPRYISHNNYS--DYSD----DGYYDDYDDYDCGRLLKKS GG  
 Giardia lamblia Pig\_E -----MPPRYIPHDKYSDDDDYDDYDDYDDYDDYDNCYCGLLKKS GG  
 Giardia lamblia GS\_B MFWVHLKEYTEKVIKSRFFLMPRYTSRSDYS--DYDD----DEYDDYDGYDYGRLKKS GG

Naegleria gruberi strain NEG-M -----  
 Cryptosporidium hominis TU502 -----  
 Cryptosporidium parvum Iowa II -----  
 Theileria annulata strain Ankara -----  
 Theileria parva strain Muguga -----  
 Plasmodium falciparum 3D7 -----  
 Plasmodium knowlesi strain H -----  
 Leishmania infantum JPCM5 -----  
 Leishmania major strain Friedlin -----  
 Trypanosoma brucei gambiense DAL972 -----  
 Trypanosoma cruzi strain CL Brener -----  
 Trichomonas vaginalis G3 -----  
 Giardia lamblia DH\_A2 AVEGRPAWQSKKSSSTGSPSNTGSTTCSTPKTTFFETVSTSTPITPSTSLSSVANIGT MKA  
 Giardia lamblia WB\_A1 AVEGRPAWQSKKSSSTGSPSNTGSTTCSTPKTTFFETVSTSTPITPSTSLSSVANIGT MKA  
 Giardia lamblia Pig\_E AVEARPTWQNKKSSTVTPSNAGSTTCTFPKATYETITTTPTVPVTPSTLSSTATNSVMKA  
 Giardia lamblia GS\_B VVETRSVWQNKKSSTTTTSPNASSTIHSPTPRVTS GSSVPTPVTPTSTLSSTTQTSIMKA

Naegleria gruberi strain NEG-M -----MIEKPTLSIVFLGRVDSGKSTLAGRLLHSLGTV  
 Cryptosporidium hominis TU502 -----MGKEKTHINLVVIGHVDSGKSTTTGHLIYKLGGI  
 Cryptosporidium parvum Iowa II -----MGKEKTHINLVVIGHVDSGKSTTTGHLIYKLGGI  
 Theileria annulata strain Ankara -----MGKEKTHINLVVIGHVDSGKSTTTGHLIYKLGGI  
 Theileria parva strain Muguga -----MGKEKTHINLVVIGHVDSGKSTTTGHLIYKLGGI  
 Plasmodium falciparum 3D7 -----MGKEKTHINLVVIGHVDSGKSTTTGHIIYKLGGI  
 Plasmodium knowlesi strain H -----MGKEKTHINLVVIGHVDSGKSTTTGHIIYKLGGI  
 Leishmania infantum JPCM5 -----MGKDKVHMNLVVVGHVDAGKSTATGHLYKCGGI  
 Leishmania major strain Friedlin -----MGKDKVHMNLVVVGHVDAGKSTATGHLYKCGGI  
 Trypanosoma brucei gambiense DAL972 -----MGKDKVHMNLVVVGHVDAGKSTATGHLYKCGGI  
 Trypanosoma cruzi strain CL Brener -----MGKDKVHMNLVVVGHVDAGKSTATGHLYKCGGI  
 Trichomonas vaginalis G3 -----MGKEKEHINIVVIGHVDAGKSTTTGHLIYKCGGL  
 Giardia lamblia DH\_A2 TPSQQHIAKFIADVERSEEVKGAAGLIKSRNTINLVVGHVDAGKSTIFGHLAVL SGSV  
 Giardia lamblia WB\_A1 TPSQQHIAKFIADVERSEEVKGAAGLIKSRNTINLVVGHVDAGKSTIFGHLAVL SGSV  
 Giardia lamblia Pig\_E TPSQQHIAKFIADVERSEEVKGGATGIIKSKNTTNLVVGHVDAGKSTIFGHLAVL SGSV  
 Giardia lamblia GS\_B TPSQQHIAKFIADVERSEVIGKATGIIKSKNTVNLVGHVDAGKSTIFGHLAVL SGSV

Naegleria gruberi strain NEG-M NDSIIERLQVESREFFGFAKTHYANVLSRTRRETRGRSIIHLAYSRAETKH-----  
 Cryptosporidium hominis TU502 DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWQFETPK-----  
 Cryptosporidium parvum Iowa II DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWQFETPK-----  
 Theileria annulata strain Ankara DKRTIEKFEKESADMGKSFYAWVLDKLNERNERGITIDITLWKFETGK-----  
 Theileria parva strain Muguga DKRTIEKFEKESADMGKSFYAWVLDKLNERNERGITIDITLWKFETGK-----  
 Plasmodium falciparum 3D7 DRRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Plasmodium knowlesi strain H DRRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Leishmania infantum JPCM5 DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Leishmania major strain Friedlin DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Trypanosoma brucei gambiense DAL972 DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Trypanosoma cruzi strain CL Brener DKRTIEKFEKESSEMGGKSFYAWVLDKLAERERGITIDIALWKFETPR-----  
 Trichomonas vaginalis G3 DKRKLAAIEKAEQLGKSSFYAFVMSDLKLAERERGITIDISLWKFEGQK-----  
 Giardia lamblia DH\_A2 SMRETRTQALADTYNKSTFSYAFLLDNTNDEERQRGVMTDVCNHTLTLA FPELGDNY SVP  
 Giardia lamblia WB\_A1 SMRETRTQALADTYNKSTFSYAFLLDNTNDEERQRGVMTDVCNHTLTLA FPELGDNY SVP  
 Giardia lamblia Pig\_E SMREKTRTQTADTYNKSTFSYAFLLDNTNDEERQRGVMTDVCNHTLTLA FPELGDNY SVP  
 Giardia lamblia GS\_B PLREKTRAQTLADTYNKSTFSYAFLLDNTNDEERQRGVMTDVCNHTLTLA FPELGDNY SVP

Naegleria gruberi strain NEG-M FHINIIDAP--AAPFVKMSMIRGISQANVGIIVLDAESGSLEQQT----VKEILLTQTSLG  
 Cryptosporidium hominis TU502 YHYTVIDAPGHRDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Cryptosporidium parvum Iowa II YHYTVIDAPGHRDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Theileria annulata strain Ankara YYYTVIDAPGHRDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Theileria parva strain Muguga YYYTVIDAPGHRDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Plasmodium falciparum 3D7 YFFTVIDAPGHKDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Plasmodium knowlesi strain H YFFTVIDAPGHKDFIKNMITGTSQADVALLVVPADR--FEGAFSKEGQTREHALLAFTLG  
 Leishmania infantum JPCM5 SVFTIIDAPGHRDFIKNMITGTSQADAAILMIDSTHGGFEAGISKDQREHALLAFTLG  
 Leishmania major strain Friedlin SVFTIIDAPGHRDFIKNMITGTSQADAAILMIDSTHGGFEAGISKDQREHALLAFTLG  
 Trypanosoma brucei gambiense DAL972 SVFTIIDAPGHRDFIKNMITGTSQADAAILMIDSTHGGFEAGISKDQREHALLAFTLG  
 Trypanosoma cruzi strain CL Brener SVFTIIDAPGHRDFIKNMITGTSQADAAILMIDSTHGGFEAGISKDQREHALLAFTLG  
 Trichomonas vaginalis G3 HTVFLQDCPGRHDFVPSLIRAVSQPDAAVLVDASPKFEFEKGLSDDQGTREHLQLLMIFG  
 Giardia lamblia DH\_A2 HTVFLQDCPGRHDFVPSLIRAVSQPDAAVLVDASPKFEFEKGLSDDQGTREHLQLLMIFG  
 Giardia lamblia WB\_A1 HTVFLQDCPGRHDFVPSLIRAVSQPDAAVLVDASPKFEFEKGLSDDQGTREHLQLLMIFG  
 Giardia lamblia Pig\_E HTVFLQDCPGRHDFVPSLIRAVSQPDAAVLVDASPKFEFEKGLSDDQGTREHLQLLMIFG  
 Giardia lamblia GS\_B HTVFLQDCPGRHDFVPSLIRAVSQPDAAVLVDASPKFEFEKGLSDDQGTREHLQLLMIFG

Naegleria gruberi strain NEG-M EFQLIFCVNKMDSMFVANSETKFKEIQNSEMSKIYKMHGYKGDPLLI PVSATWGD----  
 Cryptosporidium hominis TU502 VRQMIIVGINKMD--TCEYKQSRFDEIFNEVDGYLKKVGYNTEKIPFVAISGFVGD----  
 Cryptosporidium parvum Iowa II VRQMIIVGINKMD--TCEYKQSRFDEIFNEVDGYLKKVGYNTEKIPFVAISGFVGD----  
 Theileria annulata strain Ankara VKQMICAINKMD--KCDYKEDRYNEIQKEVCGYLKKIGYVNEKVPFPVPSIGFLGD----  
 Theileria parva strain Muguga VKQMICAINKMD--KCDYKEDRYNEIQKEVCGYLKKIGYVNEKVPFPVPSIGFLGD----  
 Plasmodium falciparum 3D7 VKQIVVGVNKMMD--TVKYSEDREYEEIKKEVKDYLLKKVGYQADKVDFIPISGFEGD----  
 Plasmodium knowlesi strain H VKQIVVGVNKMMD--TVKYSEDREYEEIKKEVKDYLLKKVGYQADKVDFIPISGFEGD----  
 Leishmania infantum JPCM5 VKQMIVVCCNKMDDKTVTYQASRYDEISKEVGAYLKRVGYNPEKVRFPVPI S GWQGD----  
 Leishmania major strain Friedlin VKQMIVVCCNKMDDKTVTYQASRYDEISKEVGAYLKRVGYNPEKVRFPVPI S GWQGD----  
 Trypanosoma brucei gambiense DAL972 VKQMIVVCCNKMDDKTVTYQASRYDEISKEVGAYLKRVGYNPEKVRFPVPI S GWQGD----  
 Trypanosoma cruzi strain CL Brener VKQMIVVCCNKMDDKTVTYQASRYDEISKEVGAYLKRVGYNPEKVRFPVPI S GWQGD----  
 Trichomonas vaginalis G3 IKQVIVAVNKMMD-----  
 Giardia lamblia DH\_A2 VKHIMVAVNKLDR--TDWNEGRFVEIVTVLTKVLRKDIQFGGEVTFIPVSGIGEDGSHNL  
 Giardia lamblia WB\_A1 VKHIMVAVNKLDR--TDWNEGRFVEIVTVLTKVLRKDIQFGGEVTFIPVSGIGEDGSHNL  
 Giardia lamblia Pig\_E VKHIIIVAVNKLDR--TDWNEGRFVEIVTVLTKVLRKDIQFGGRTVTFIPVSGIS EDDGSHNL  
 Giardia lamblia GS\_B VKHIIIVAVNKLDR--TDWNEGRFLEIVTVLTKVLRKDIQFGGGFTFIPVSGIGEDGSHNL

Naegleria gruberi strain NEG-M -----NVVDCD--MKWYKGPTLLDAINS LKIPTYLEDKPLRIPISKVYN  
 Cryptosporidium hominis TU502 -----NMVERS D KMPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Cryptosporidium parvum Iowa II -----NMVERS D KMPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Theileria annulata strain Ankara -----NMIDKSDKMPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Theileria parva strain Muguga -----NMIDKSDKMPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Plasmodium falciparum 3D7 -----NLI E KSDKTPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Plasmodium knowlesi strain H -----NLI E KSDKTPWYKGT LVEALDTMEPPKRPDKPLR LPLQDVYK  
 Leishmania infantum JPCM5 -----NMI E RSDNMPWYKGT LLDALDML EPPVPRVDPKPLR LPLQDVYK  
 Leishmania major strain Friedlin -----NMI E RSDNMPWYKGT LLDALDML EPPVPRVDPKPLR LPLQDVYK  
 Trypanosoma brucei gambiense DAL972 -----TMI E KSDKTPWYKGT LLDALDML EPPVPRVDPKPLR LPLQDVYK  
 Trypanosoma cruzi strain CL Brener -----  
 Trichomonas vaginalis G3 -----DKTVTTTRPVS-----  
 Giardia lamblia DH\_A2 TPGNAGRLPDWVRKHTSLGEEIYKTSIRSTSQIKGEKTSPTIILFDVTPDTYEGKKVFA  
 Giardia lamblia WB\_A1 TPGNAGCLPDWVRKHTSLGEEIYKTSIRSTSQIKGEKTSPTIILFDVTPDTYEGKKVFA  
 Giardia lamblia Pig\_E TPGNAGNLPDWVRKHTSLGEEIYKTSIRSTSQIKGEKTSPTIILYDVAPDTYEGKKVFA  
 Giardia lamblia GS\_B TPGNATNLPEWVRQHKSLGEEIYKTSIRSTSQIKGEKTSPTIILYDVTPDTYEGKKVFA

Naegleria gruberi strain NEG-M KRG--KPIVFGKIESGILKLD SKLRCTPNKKVPHVTIESIEIFRERVSEAKAGQFVTIKLQ  
 Cryptosporidium hominis TU502 IGGVGTVPVGRVETGIIKPGMNVTFAPAGVT--TEVKSVMEMHHEQMPEAVPGDNVGFNVK  
 Cryptosporidium parvum Iowa II IGGVGTVPVGRVETGIIKPGMNVTFAPAGVT--TEVKSVMEMHHEQMPEAVPGDNVGFNVK  
 Theileria annulata strain Ankara IGGIGTVPVGRVETGQLKPGMNVTFAPSQIT--TECKSVEMHHEVEVASPGDNVGFNVK  
 Theileria parva strain Muguga IGGIGTVPVGRVETGQLKAGMNVTFAPSQIT--TECKSVEMHHEVEVASPGDNVGFNVK  
 Plasmodium falciparum 3D7 IGGIGTVPVGRVETGILKAGMVLNFAPSAVV--SECKSVEMHHEVEEARPGDNIGFNVK  
 Plasmodium knowlesi strain H IGGIGTVPVGRVETGILKAGMVLNFAPSAVV--SECKSVEMHHEVEEARPGDNIGFNVK  
 Leishmania infantum JPCM5 IGGIGTVPVGRVETGIMKPGDVVTFAPANVT--TEVKSVMEMHHEQLAEAQPGDNVGFNVK  
 Leishmania major strain Friedlin IGGIGTVPVGRVETGIMKPGDVVTFAPANVT--TEVKSVMEMHHEQLAEAQPGDNVGFNVK  
 Trypanosoma brucei gambiense DAL972 IGGIGTVPVGRVETGIMKPGDVVTFAPANVT--TEVKSVMEMHHEQLAEAQPGDNVGFNVK  
 Trypanosoma cruzi strain CL Brener IGGIGTVPVGRVETGIMKPGDVVTFAPANVT--TEVKSVMEMHHEQLAEAQPGDNVGFNVK  
 Trichomonas vaginalis G3 -----  
 Giardia lamblia DH\_A2 ANCVVESGILQLSDSIVHLPSMYL FQIVSIMVDAVEADKAVAYDTVTLYLAPDKRATKLC  
 Giardia lamblia WB\_A1 ANCVVESGILQLSDSIVHLPSMYL FQIVSIMVDAVEADKAVAYDTVTLYLAPDKRATKLC  
 Giardia lamblia Pig\_E ANCVVESGILQLSDSIVHIPS MYL FQIVSIMIDGVNADKAVAYDTVTLYLAPDKRATKLC  
 Giardia lamblia GS\_B ATCVVESGILQLSDSIVHIPS MYL FQIVSISIDGLETEKAIAYDTVTLYLAPDKRATKLC

Naegleria gruberi strain NEG-M N-----VRRSDVKSGMVLSDSRNDPAEVEVCFKAEIIVLKR T-A  
 Cryptosporidium hominis TU502 N-----VSIKDIKRGFVASDAKNDPAKGCEDFTAQVIVL NHPGE  
 Cryptosporidium parvum Iowa II N-----VSIKDIKRGFVASDAKNDPAKGCEDFTAQVIVL NHPGE  
 Theileria annulata strain Ankara N-----VSTSDIRPGHVASDSKNDPAK EANKFDAQVIVL NHPGT  
 Theileria parva strain Muguga N-----VSTSDIRAGHVASDSKNDPAK EANGFDSQVIVL NHPGT  
 Plasmodium falciparum 3D7 N-----VSVKEIKRGYVASDTKNEPAKGCSTFTAQVIVL NHPGE  
 Plasmodium knowlesi strain H N-----VSVKEIKRGYVASDTKNEPAKGCSTFTAQVIVL NHPGE  
 Leishmania infantum JPCM5 N-----VSVKDIRRGNVCGNSKNDPPKEAADFTAQVIVL NHPGQ  
 Leishmania major strain Friedlin N-----VSVKDIRRGNVCGNSKNDPPKEAADFTAQVIVL NHPGQ  
 Trypanosoma brucei gambiense DAL972 N-----VSVKDIRRGNVCGNTKNDDPPKEAADFTAQVIVL NHPGQ  
 Trypanosoma cruzi strain CL Brener N-----  
 Trichomonas vaginalis G3 -----TKSQPK-----  
 Giardia lamblia DH\_A2 NNCDKLDSSVVVKEMPQGSFVLTGILLQQGPVSKGVWINNMILATTVKALVLV LNTPRG  
 Giardia lamblia WB\_A1 NNCDKLDSSVVVKEMPQGSFVLTGILLQQGPVSKGVWINNMILATTVKALVLV LNTPRG  
 Giardia lamblia Pig\_E NNCDKLDSSVVVKEMPQGSFILTGVLLQQGPMSKGVWINNMILATTVKALVLV LNTPRG  
 Giardia lamblia GS\_B NNCDKLDSSIVVKEMPQGSFILTGVLLQQGPISKGVWINNMILATTVKALVLV LNTPQG

Naegleria gruberi strain NEG-M IKIGYKPTFHCHSLQTRCFIQFYECCKMPLKTERKENPSELRRGQVARVLLKPDNPISL  
 Cryptosporidium hominis TU502 IKNGYSPVVDCHTAHISCKFFQITAKMDKRSKGVLEENPKLIKSGDAALVVMQPLKPLCV  
 Cryptosporidium parvum Iowa II IKNGYSPVVDCHTAHISCKFFQITAKMDKRSKGVLEENPKLIKSGDAALVVMQPLKPLCV  
 Theileria annulata strain Ankara IKEGYS PVVDCHTAHISCKFFQIQSRMDKRTGKTLEENPKTIKNGDAAMVT LKPNKPMVV  
 Theileria parva strain Muguga IKEGYS PVVDCHTAHISCKFDKIH SRMDKRTGKTLEENPKTIKNGDAAMVT LKPNKPMVV  
 Plasmodium falciparum 3D7 IKNGYTPVLDCHTSHISCKFLNIDSKIDKRSKGVVEENPKAIKSGDSALVSLPEKKPMVV  
 Plasmodium knowlesi strain H IKNGYTPVLDCHTSHISCKFLNIDSKIDKRSKGVVEENPKAIKSGDSALVSLPEKKPMVV  
 Leishmania infantum JPCM5 ISNGYAPVLDCHTSHIACRFAEIESKIDRRSGKELEKPNKAIKSGDAAIVKMPQKPMCV  
 Leishmania major strain Friedlin ISNGYAPVLDCHTSHIACRFAEIESKIDRRSGKELEKPNKAIKSGDAAIVKMPQKPMCV  
 Trypanosoma brucei gambiense DAL972 IGNGYAPVLDCHTSHIACKFAEIESKIDRRSGKELEKAPKSIKSGDAAIVRMVQKPMCV  
 Trypanosoma cruzi strain CL Brener IGNGYAPVLDCHTSHIACKFAEIESKIDRRSGKELEKAPKSIKSGDAAIVRMVQKPMCV  
 Trichomonas vaginalis G3 -----  
 Giardia lamblia DH\_A2 ISVGDVYDCYVSSRVEARVHKINAQINPSTQEVIRKNPPLVGKSAYV RMTLIFNVAIV  
 Giardia lamblia WB\_A1 ISVGDVYDCYVSSRVEARVHKINAQINPSTQEVIRANPPLVGKSAYV RMTLIFNVAIV  
 Giardia lamblia Pig\_E ISVGDVYDCYVSSRVEARVHKINAQINPSTQEVIRANPPLVGKSAYV RMTLIFNVAIV  
 Giardia lamblia GS\_B ISVGDVYDCYVSSRVEARIHINAQINPATQEIIRKNPPLVGKSAYV RMTLIFNVAIVI

Naegleria gruberi strain NEG-M ETLQNI PKL GK FIMRDN GCVVVGIVK DITFVDEHIC-----  
 Cryptosporidium hominis TU502 EAFTDY PPLGRFAVRDMKQTVAVGVIKSVTKKEATS KKK-----  
 Cryptosporidium parvum Iowa II EAFTDY PPLGRFAVRDMKQTVAVGVIKSVTKKEATS KKK-----  
 Theileria annulata strain Ankara ETFTYE PPLGRFAVRDMKQTVAVGVIKTVDKKEPGSSAKVTKSQA KAAK  
 Theileria parva strain Muguga ETFTYE PPLGRFAVRDMKQTVAVGVIKTVDKKEPGSSAKVTKSQA KAAK  
 Plasmodium falciparum 3D7 ETFTYE PPLGRFAVRDMKQTVAVGVIKTVDKKEPGSSAKVTKSQA KAAK  
 Plasmodium knowlesi strain H ETFTYE PPLGRFAVRDMKQTVAVGVIKTVDKKEPGSSAKVTKSQA KAAK  
 Leishmania infantum JPCM5 EVFN DYAPLGRFAVRDMRQTAVGVIKGVNKK E--GSGGKVT KAAAKAAK  
 Leishmania major strain Friedlin EVFN DYAPLGRFAVRDMRQTAVGVIKGVNKK E--GSGGKVT KAAAKAAK  
 Trypanosoma brucei gambiense DAL972 EVFN DYAPLGRFAVRDMRQTAVGVIKAVTKK D--GSGGKVT KAAV KAAK  
 Trypanosoma cruzi strain CL Brener EVFN DYAPLGRFAVRDMRQTAVGVIKAVTKK D--GSGGKVT KAAV KAAK  
 Trichomonas vaginalis G3 -----  
 Giardia lamblia DH\_A2 KEFSKSKLMGRMILRSDNRSVGLGKIERISEK-----  
 Giardia lamblia WB\_A1 KEFSKSKLMGRMILRSDNRSVGLGKIERISEK-----  
 Giardia lamblia Pig\_E KEFSRSKLMGRMILRSDNRSVGLGKIERISEK-----  
 Giardia lamblia GS\_B KEFSKSKLMGRMILRSDNRSVGLGKIERISEK-----

Fibrillarin

1 10 20 30 40 50 60
MAFEGGRGGGRGGGRGGFGGGRGGRSGGGFGGGDRGGRGGGFGGGRGGGRGGFGGDRGGFG
-----MSSRG-----SPFGGRGRG-----GGGRGGGRGGGGRS
-----MSSRG-----SPFGGRGRG-----GGGRGGGRGGGGRS
-----MGCRI-----SHYNIHVILPFISIIYLINISFFKYFKGGNF
-----MASRI-----SHYNVHAR-----NLS-----KEGTL
-----MTDSFRGSGCNFKRNSNFGKGNNAVRKGSNWKFNGGRGGGGGGRRGGGG
-----MWKGNNG-----GRGGG-GPRGG-----GGPRGGGGPRGGGG
-----
-----MFFFLSFFFFQFMNSHCDIEFKNSAMRGG----FGRGGFR--GGGRGGGS
-----MRGG----FGRGGGSGFRGGRGGGA
--MGTDYRNSGRGGRDGPGRGPGNDRRDSGRSFGDRRPERPDFKRGDGGRGFGDRRGS
--MGTDYRNSGRGGRDGPGRGPGNDRRDSGRSFGDRRPERPDFKRGDGGRGFGDRRGS
--MGTDYRNGGRGGRDGPGRGPGDRRDSGRSFGDRRPERPDFKRGDGGRGFGDRRGS
--MGTDYRNSGRGGRDGPGRGPGDRRDSGRSFGDRRPERPDFKRGDGGRGFGDRRGS
--MSERGGFRGGRGNDRRG--GGDR--GGDFHRRGGN--DRGNRG--GNDKG-G

Naegleria gruberi strain NEG-M GDRGGRGGGRGGGRGGARGGGRGGARGGGRGGGRGGFGGGAAGAAGKKVIVEPHRFEGVYV
Cryptosporidium hominis TU502 PGGGRGGGGSPGGGRGGG-----GKGGRGGGGMKGGSKVIIIP--HRHEGVFM
Cryptosporidium parvum Iowa II PGGGRGGGGSPGGGRGGG-----GKGGRGGGGMKGGSKVIIIP--HRHEGVFM
Theileria annulata strain Ankara KNNKQSGNKFKGRHAQK-----SQKKQHGS--GSNKVVVVP--HRFPGVYI
Theileria parva strain Muguga RITSRD-----QGRHAQK-----PQKKQHGS--GSNKVVVVP--HRFPGVYI
Plasmodium falciparum 3D7 GGRGGGGGGGGGGGGGGG-----GRGNKDRKSFKKDNKSGKIVVVP--HRFPGVYL
Plasmodium knowlesi strain H G-RGGGGGGGGGGGGRGARG--AKFGGNNKKNFKKDGKSGKIVVVP--HRFPGVFL
Leishmania infantum JPCM5 -----MLHPGVFI
Leishmania major strain Friedlin -----MLHPGVFI
Trypanosoma cruzi strain CL Brener SARGRGGASRGAGRG-----PGRGGRG--RGGGAGAKVVVEPHMLHPGVFI
Trypanosoma brucei gambiense DAL972 PSRGRGGAGRGGGRGNAGP-----RGRGGRGGGGGGAGAKVVVEPHLLHPGVFI
Giardia lamblia DH\_A2 PPGGPDRGDRRGRDGPGR-----GGPGPGGGFKGGAKTMVKPHPKYDGIPI
Giardia lamblia WB\_A1 PPGGPDRGDRRGRDGPGR-----GGPGPGGGFKGGAKTMVKPHPKYDGIPI
Giardia lamblia Pig\_E PPGGPDRGDRRGRDGPGR-----GGPGPGGGFKGGAKTMVKPHPKYDGIPI
Giardia lamblia GS\_B PPGGSDRGDRRGRDGPGR-----GGPGPGGGFKGGAKTMIRPHPKYEGIFV
Trichomonas vaginalis G3 RFG--DKGGRGGGRGAPRG-----GGMGG-----RGGGRAAIQPH-KYPCVFI

Naegleria gruberi strain NEG-M VKGRDESIATLNMVPGESVYDEKRVTVKEKFGDSVQKVEYRIWNPFRSKLGAGIIGGVEN
Cryptosporidium hominis TU502 AKGKSDALVTKNMVPVSIYGEKRVETDP--ETNEKIEYRVWNPFRSKLGATIIGGVAN
Cryptosporidium parvum Iowa II AKGKSDALVTNRMMVPGVSIYGEKRVETDP--ETNEKIEYRVWNPFRSKLGATIIGGVAN
Theileria annulata strain Ankara AKGKSDALVTRNMVVGESIYGEKRIEVTN---EDGEKIEYRMWNPFRSKLGATIIGGVAN
Theileria parva strain Muguga AKGKSDALVTRNMVVGESIYGEKRIEVTN---EDGEKIEYRMWNPFRSKLGATIIGGVAN
Plasmodium falciparum 3D7 LKGKSDILVTKNLVPGESVYGEKRYEVMT----EDEKIEYRVWNPFRSKLGACLMMGGVGN
Plasmodium knowlesi strain H LKGKSDILVTKNLVPGESVYGEKRYEVMG----DNEKIEYRVWNPFRSKLGACLMMGGVGN
Leishmania infantum JPCM5 SKAKTDSLCTLNMPGIVSYGEKRIELGATQ--GGDDKKEYRLWNPYRSKLASAIYAGVSS
Leishmania major strain Friedlin SKAKTDSLCTLNMPGIVSYGEKRIELGATQ--GGDDKKEYRLWNPYRSKLASAIYAGVSS
Trypanosoma cruzi strain CL Brener SKGKADSLCTLNMPGIVSYGEKRIELGATQ--GGDEKKEYRLWNPYRSKLAAAIYAGVGS
Trypanosoma brucei gambiense DAL972 SKGKADSLCTLNMPGIVSYGEKRVVVGATQ--SGDEKKEYRLWNPYRSKLAAAIYAGVGS
Giardia lamblia DH\_A2 SHGRGDVLTKSLAPGAVYGEKRISVEG----TESKIEYREWNPFRSKLGAAVRLNVLD
Giardia lamblia WB\_A1 SHGRGDVLTKSLAPGAVYGEKRISVEG----TESKIEYREWNPFRSKLGAAVRLNVLD
Giardia lamblia Pig\_E SHGRGDVLTKSLAPGAVYGEKRISVEG----TESKIEYREWNPFRSKLGAAVRLNVLD
Giardia lamblia GS\_B SHGRGDVLTKSLAPGAVYGEKRISVEG----TDSKVEYREWNPFRSKLGAAVRLNVLD
Trichomonas vaginalis G3 GHQRGDMLLTLNMVPGKSVYNEKLITVDG----PNGQIEYREWNPYRSKIGSCLLVGIDK

Naegleria gruberi strain NEG-M IYIKPGTKLLYLGAASGTTVSHCSDLVGPPEGMVYVELSERCGRDLIEMSKRPNIVPII
Cryptosporidium hominis TU502 MPIKPGAKVLYLGAANGTTVSHVSDMVGPEGSVYAVEFSHRSGRDLTDMAKRRQNIVPIV
Cryptosporidium parvum Iowa II MPIKPGAKVLYLGAANGTTVSHVSDMVGPEGSVYAVEFSHRSGRDLTDMAKRRQNIVPIV
Theileria annulata strain Ankara MPIGIGSKVLYLGAANGTTVSHVSDMVGPTGLVYAVEFSHRSARDLTNMAKRRPNIVPIV
Theileria parva strain Muguga MPIGIGSKVLYLGAANGTTVSHVSDMVGPTGLVYAVEFSHRSARDLTNMAKRRPNIVPIV
Plasmodium falciparum 3D7 MPIKPGSKVLYLGAANGTSVSHVSDMVGDEGVVYAVEFSHRSGRDLTNMSKKRSNIVPIV
Plasmodium knowlesi strain H MPIKPGCKVLYLGAANGTSVSHVSDMVGDEGVVYAVEFSHRSGRDLTNMSKKRSNVVPIV
Leishmania infantum JPCM5 IHMGPAGSKVLYLGGATGTTVSHVSDLVGPEGMVYAVEFSHRVGRDLVEMSKRRPNIVPII
Leishmania major strain Friedlin IHMGPAGSKVLYLGGATGTTVSHVSDLVGPEGMVYAVEFSHRVGRDLVEMSKRRPNIVPIV
Trypanosoma cruzi strain CL Brener IHMGPAGSKVLYLGGASGTTVSHVSDLVGPEGMVYAVEFSNRSGRDLVDMSKRRPNIVPII
Trypanosoma brucei gambiense DAL972 IHMGPAGSKVLYLGAASGTTVSHVSDLVGPEGMVYAVEFSNRSGRDLVDMSKRRPNIVPII
Giardia lamblia DH\_A2 MPIKPGAKVLYLGAASGTTVSHVSDIVGPTGAVYAVEFSQRSGRDLLEVAKARTNVYPII
Giardia lamblia WB\_A1 MPIKPGAKVLYLGAASGTTVSHVSDIVGPTGAVYAVEFSQRSGRDLLEVAKARTNVYPII
Giardia lamblia Pig\_E MPIKPGAKVLYLGAASGTTVSHVSDIVGPTGAVYAVEFSQRSGRDLLEVAKARTNVYPII
Giardia lamblia GS\_B MPIKPGAKVLYLGAASGTTVSHVSDIVGPTGAVYAVEFSQRSGRDLLEVAKARTNVYPII
Trichomonas vaginalis G3 FGKPGASVLYLGAASGTTVSHVSDIVGPTGRVYAVEFSHRVRELCLNLAKSRRPNIVPII

Naegleria gruberi strain NEG-M EDARHPLRYRMLVGSVDTVFADVAQPDQARIVALNAKYFLKPGGKRVISIKANCIDSTVE
Cryptosporidium hominis TU502 EDARTPQKYRMLVPMVDVIFSDVAQPDQARIVALNAHLFLKNNGYFIIISIKASCVDSTAK
Cryptosporidium parvum Iowa II EDARTPQKYRMLVPMVDVIFSDVAQPDQARIVALNAHLFLKNNGYFIIISIKASCVDSTAK
Theileria annulata strain Ankara EDARQPQKYRMLVGMVDIIFADVAQPDQARIVAMNADHFLKPAWYIIAIIKANCVDSTAS
Theileria parva strain Muguga EDARQPQKYRMLVGMVDIIFADVAQPDQARIVAMNADHFLKPAWYIIAIIKANCVDSTAS
Plasmodium falciparum 3D7 EDARQPTKYRMLVDMVDVVFADVAQPDQARIVAMNAHMFLLKTGGWFIIISIKANCVDSTAK
Plasmodium knowlesi strain H EDARQPIKYRMLVDMVDVVFADVAQPDQARIVAMNAHMFLLKTGGWFIIISIKANCVDSTAK
Leishmania infantum JPCM5 EDARYPMKYRMLVPMVDCIFMDVAQPDQARILALNAQAFLQNGGHYVISIKANCIDSTLE
Leishmania major strain Friedlin EDARYPMKYRMLVPMVDCIFMDVAQPDQARILALNAQAFLQNGGHYVISIKANCIDSTLE
Trypanosoma cruzi strain CL Brener EDARYPMKYRMLVPMVDCIFMDVAQPDQARILALNAQAFLKNGGHYVISIKANCIDSTLE
Trypanosoma brucei gambiense DAL972 EDARYPMKYRMLMPMVDCIFMDVAQPDQARILALNAQAFLKNGGHYVISIKANCIDSTLD
Giardia lamblia DH\_A2 ADARHPYKYRMIVPEVDCIFSDVAQPDQARIVAENARYYLLKANGGMLISIKASSVDSTLK
Giardia lamblia WB\_A1 ADARHPYKYRMIVPEVDCIFSDVAQPDQARIVAENARYYLLKANGGMLISIKASSVDSTLK
Giardia lamblia Pig\_E ADARHPYKYRMIVPEVDCIFSDVAQPDQARIVAENAKYYLLKANGGMLISIKASSVDSTLK
Giardia lamblia GS\_B ADARHPYKYRMIVPEVDCIFSDVAQPDQARIVAENAKYYLLKANGGMLISIKASSVDSTLK
Trichomonas vaginalis G3 EDARHPQKYRMLVPMVDYMFADVAQPDQARIFVLNGQFFLKNNGGYMLCVKASCVDSTLD

Naegleria gruberi strain NEG-M AEVVF-----REVEQLQQFGFTCEEQLDLEPFRDHCLVVGTLNNGDCIQF-
Cryptosporidium hominis TU502 PEAVF-----SEIDKLRAEKCKPKEQLTLEPYHRDHAVVIGVYRPIKKE--
Cryptosporidium parvum Iowa II PEAVF-----SEIDKLRAEKCKPKEQLTLEPYHRDHAVVIGVYRPIKKE--
Theileria annulata strain Ankara PEAVFAGLLPTEHNYVAEVDKLRKENCKPREQLTLEPYHRDHAVVIGYRVKKKQAS-
Theileria parva strain Muguga PEAVF-----AEVDKLRKENCKPREQLTLEPYHRDHAVVIGYRVKKKQAS-
Plasmodium falciparum 3D7 PEVVF-----SEMEKLLKENCKPKEKLTLEPFHRHHAIVLGMYS-----
Plasmodium knowlesi strain H PEVVF-----SEMEKLLKENCKPKEKLTLEPFHRHHAIVLGMYS-----
Leishmania infantum JPCM5 APVVIA-----SELNKLKDKLPLEQVSLPEPFRDHAVVVGYYRVPVKKSKQ-
Leishmania major strain Friedlin APVVIA-----SELNKLKDKLPLEQVSLPEPFRDHAVVVGYYRVPVKKSKQ-
Trypanosoma cruzi strain CL Brener APVVIA-----SELNKLKDKLPLEQASLEPFRDHAVVVGYYRVPVKKKTE-
Trypanosoma brucei gambiense DAL972 APVVIA-----AELDKLRKDKLPLEQASLEPFRDHAVVVGYYRSMKKAVQQ
Giardia lamblia DH\_A2 PEAVF-----REIETLREHDFKCKEQLDIDGEFHRNHAIIVGRFRVAAA----
Giardia lamblia WB\_A1 PEAVF-----REIETLREHDFKCKEQLDIDGEFHRNHAIIVGRFRVAAA----
Giardia lamblia Pig\_E PEAVF-----REIETLREHDFKCKEQLDIDGEFHRNHAIIVGRFRVAAA----
Giardia lamblia GS\_B PEAVF-----REIETLREHDFKCKEQLDIDGEFHRNHAIIVGRFRVAAA----
Trichomonas vaginalis G3 PHKVYA-----MAQQELKDAGFQNEEMADIEDHHRGHACIIIGTYRPTPTN---

1 10 20 30 40 50 60

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
Giardia lamblia DH\_A2
Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

-----MVKIGINGFGRIGRLV|
-----MAPIKVGINGFGRIGRMV
-----MAPIKVGINGFGRIGRMV
MSVALFFSSFLTPYFPICLSFCGAEFIRANQTSKRLTTNLMTIKVGINGFGRIGRMV
-----MPIKVGINGFGRIGRMV
-----MSAPKLD FYHRKVRIGISGFGRIGRFA
-----MSAPKLD FYHRKVRIGISGFGRIGRFA
-----MSAPKLD FYHRKVRIGISGFGRIGRFA
-----MEGNKHREWMSAPNLDFYHRKVRIGISGFGRIGRFA
-----MTATL GINGFGRIGRLV
-----MTATL GINGFGRIGRLV
-----MVRIGINGYGRIGRLV
-----MVRIGINGYGRIGRLV
-----MAVTKL GINGFGRIGRLV
-----MAATKL GINGFGRIGRLV
-----MVKVAINGFGRIGRLV

Naegleria gruberi strain NEG-M
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Leishmania major strain Friedlin
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Giardia lamblia DH\_A2
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Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

FRASLER----TDVEVVAINDIMMTPEYMIYMIKYD TVHG-----KF
FQAICDQGLIGTEIDVVAVVDMSTNADYFAYQMKHDTVHG-----RP
LQAICDQGLIGNEIDVVAVVDMSTNAEYFAYQMKYD TVHG-----RP
FQALCDDGLL GNEIDVVAVVDMNTDARYFAYQMKYDSVHG-----KF
FQALCEDGLL GTEIDVVAVVDMNTDAEYFAYQMR YDTVHG-----KF
LRYALTC----PNVEIAA INNRNMERAYFH YLFTHDSVHGPPYGF TCSLSCPGETDCNC
LRYALTC----PNVEIAA INNRNMERAYFH YLFTHDSVHGPPHGFTCSLSCPGETDCNC
LRYALTC----PNVEIAA INNRNMERSYFHYLFTHDSVHGPPHDF TCSLSCPGETDCNC
LRYALTC----PNVEIAA INNRNMERSYFHYLFTHDSVHGPPYGF TCSLSCPGETDCNC
LRACMER----NDITVVAINDPFMDVEY MAYLLKYDSVHG-----NF
LRACMER----NDITVVAINDPFMDVEY MAYLLKYDSVHG-----NF
HRASLAL----ENVEVHVNDPFMTPDYIKYLFKHDSVHG-----SL
HRASLSM----ENVEVHVNDPFMTPDYIKYLFKHDSVHG-----SL
FRAAFGR----KDIEVVAINDPFMDLNHL CYLLKYDSVHG-----QF
FRSAYER----NDVEVVAVNDPFMDIKHL CYLLKYDSVHG-----VF
FRACRKLYP--KDIKVVAIHD--LGDIKTNVYLLKYDTAHR-----AF

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
Giardia lamblia DH\_A2
Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
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Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

HGKLEHTEKS-----IIVNGREIH-VLCERDPEQLPWQHNVEYVVESTGIFTKLDS
KYTVEAVKSSPSVK TADVLV VNGHHIKCVKAQRNPADLPW GKLGDVYVIESTGLFTDKLQ
KYTVEAVKSTPSVKT PDVLV VNGHRIKCVKAQRNPADLPW GKLGDVYVIESTGLFTDKLQ
KHSVSTTKSKPSVAKDDTLV VNGHRILCVKAQRNPADLPW GKLGEVYVIESTGLFTVKSA
KYTVTTTKSSPSVAKDDTLV VNGHRIKCVKAQRNPADLPW GKLGEVYVIESTGLFTAKAA
SGNNSADHNL-----IWFNDKPVY-LFTAGVASEIPWEVAKVDV VLECTGAYLTVES
SGNNSADHNL-----IWFNDKPVY-LFTAGVASEIPWEVAKVDV VLECTGAYLTVES
SGNNSADHNL-----IWFNDKPVY-LFTAGVASEIPWEVAKVDV VLECTGAYLTVES
SGNNSADHNL-----IWFNDKPVY-LFTAGVASEIPWEVAKVDV VLECTGAYLTVES
SGNNSADHNL-----IWFNDKPVY-LFTAGVASEIPWEVAKVDV VLECTGAYLTVES
NGTVEVSGKD-----LCINGKVVK-VFQAKDPAEIPWGASGAQIVCESTGVFTTEEK
NGTVEVSGKD-----LCINGKVVK-VFQAKDPAEIPWGASGAQIVCESTGVFTTEEK
PAELSVTSDH-----LMVGSKKVH-LTFEKDPAIIPWGKNVDV VVAECSGVFTSTEK
PYELSVTSEH-----LMVGSKKVH-LTFEKDPAIIPWGKNVDV VVAECSGVFTSTEK
PCEVTHADGF-----LLIGEKKVS-VFAEKDPSQIPWGKCQVDV VVCESTGVFLTKEL
PAEVT PGDGF-----FTIGNKKIF-VHHEKDPANIPW GKYGIDV VVCESTGVFLTKEL
PEPVTVDEVKQEF TVG--EGADKVVVKSIGGRLGPSQLPWKELGIDV VLESTGIFRTKAQ

Naegleria gruberi strain NEG-M
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Leishmania major strain Friedlin
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Trypanosoma cruzi strain CL Brener
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Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

--AAKHLKG-----GAKR VVISAPAD---TPTFVMGVNNHEYK P---EMTVINNA
--AEGHIK-----GAKKVVVISAPASG--GAKTIVMGVNQHEYSPT---THHVVSNA
--AEGHIK-----GAKKVVVISAPASG--GAKTIVMGVNQHEYSPT---SHHVVSNA
--AEGHLRG-----GARKVVISAPASG--GAKTFVMGVNHN DYNPR---EHHVVSNA
--AEGHLRG-----GARKVVISAPASG--GAKTLMGVNNHHEYNP S---EHHVVSNA
--CMQHMSRP-----NTTVKVVVISAPSKEKT CPTFVYGVNHHK INAGNHTKYSVISNA
--CMQHMSRP-----NTTVKVVVISAPSKEKT CPTFVYGVNHHK INAGNHTKYSVISNA
--CMQHMSRP-----NTTVKVVVISAPSKEKT CPTFVYGVNHHK INAGNHAKY PVISNA
--CMQHMSRP-----NTTVKVVVISAPSKEKT CPTFVYGVNHHK INAGNHVQPVISNA
--ASLHLKG-----GAKKVVISAPPKD--NVPMYVMGVNNTEYDPS---KFNVISNA
--ASLHLKG-----GAKKVVISAPPKD--NVPMYVMGVNNTEYDPS---KFNVISNA
--AKLHLDG-----GAKLVVISAPTS D--STPMYVFGVNH TSYDK---SVRVMSNA
--AKLHLEG-----GAKLVVISAPTS D--STPMYVFGVNH TSYDK---SVRVMSNA
--ASSHLKG-----GAKKVIMSAPPKD--DTP IYVMGINHHQYD T---KQLIVSNA
--SSAHLKG-----GAKKVIMSAPPKD--DTP IYVMGINHDKYDP---KQTIVSNA
KDAEGKITKDG YDGH LVSGAKKVVLSVPSADEIECTLV LVGNDEDLKP---ETRCISNA

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
Giardia lamblia DH\_A2
Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

SCTTNCLAPIAAVLH-ENFGIVEGLM TT VHAVTATQPTVDAPS RK--DWRGGRAAGYNI I
SCTTNCLAPIVHVLTKENFGIETGLM TT IHSYATQKTVDGVSLK--DWRGGRAAAMNI I
SCTTNCLAPIVHVLTKENFGIETGLM TT IHSYATQKTVDGVSLK--DWRGGRAAANI I
SCTTNCLAPLVHVLKVEGF GISTGLM TT VHSYATQKTVDGVSVK--DWRGGRAAALNI I
SCTTNCLAPLAKVIH-ENFGIKQALM STIHAVTATQPVTDSVMKK--RDWRSGRACL SNI I
SCTTNCLAPLAKVIH-ENFGIKQALM STIHAVTATQPVTDSVMKK--RDWRSGRACL SNI I
SCTTNCLAPLAKVIH-ENFGIKQALM STIHAVTATQPVTDSVMKK--RDWRSGRACL SNI I
SCTTNCLAPLAKVIH-ENFGIKQALM STIHAVTATQPVTDSVMKK--RDWRSGRACL SNI I
SCTTNCLAPLAKVIH-DNFGIKQALM STIHAVTATQPVTDSVMKK--RDWRSGRACL SNI I
SCTTNCLAPLAKIIN-DKFGIVEGLM TT VHSL TANQL TVDGPSKGGKDW RAGRCAGNII
SCTTNCLAPLAKIIN-DKFGIVEGLM TT VHSL TANQL TVDGPSKGGKDW RAGRCAGNII
SCTTNCLAPLAKVVN-DNFGIVEGLM TT VHAVTANQL TVDGASRGGKDW RAGRCAGNII
SCTTNCLAPLAKVVN-DNFGIVEGLM TT VHAVTANQL TVDGASRGGKDW RAGRCAGNII
SCTTNCLAPLAKVIN-DRFGIVEGLM TT VHA STANQL VVDGSPKGGKDW RAGRCAL SNI I
SCTTNCLAPIAKVLN-DKFGIVEGLM TT VHA STANQL VVDGSPKGGKDW RAGRCAL TNI I
SCTTNCLGPVAKTLN-NAFGIRNGFM TT VHSYTN DQVVADTMHKD---LRRARAAGMNI I

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
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Giardia lamblia Pig\_E
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Plasmodium knowlesi strain H
Trichomonas vaginalis G3

PSSTGAAKAVGLVIPSLNGK-LTGMAFRVPTVDVS VVDLTCRLEK PATKKQ IDEAMKAAS
PSTTGAAKAVGMVIPSTK GK-LTGMSFRVPTPDVS VVDLTFRATRDTSIQEIDKAIKKA A
PSTTGAAKAVGMVIPSTK GK-LTGMSFRVPTPDVS VVDLTFRSTRETS IQEIDKAIKKA A
PSTTGAAKAVGMVIPSTQ GK-LTGMAFRVPTADVS VVDLTFIATRDTSIKEIDAAL KRAS
PSTTGAAKAVGMVIPSTQ GK-LTGMSFRVPTPDVS VVDLTFIATRDTSIQEIDAAL KRAS
PASTGAASALT LVIPELAGR-ITGTSWRVPVQDVS VVDLVVETEKDT SYAEICAAV KRAC
PASTGAASALT LVIPELAGR-ITGTSWRVPVQDVS VVDLVVETEKDT SYAEICAAV KRAC
PASTGAASALT LVIPELAGR-ITGTSWRVPVQDVS VVDLVVETEKDT SYAEICAAI KRAC
PASTGAASALT LVIPELAGR-ITGTSWRVPVQDVS VVDLVVETEKDT SYAEICATI KRAC
PASTGAAKAVGKVIPALNGK-LTGMAIRVPTPDVS VVDLTCKLAKP ASIIEEYQAVKEAS
PASTGAAKAVGKVIPALNGK-LTGMAIRVPTPDVS VVDLTCKLAKP ASIIEEYQAVKEAS
PASTGAAKAVGKVIPELNGK-LTGMAFRVPSDVS VVDLTVRLAKPAKYEDIVKAVKAAA
PASTGAAKAVGKVIPELNGK-LTGMAFRVPSDVS VVDLTVKLAKPAKYEDIVRVVKDAA
PASTGAAKAVGKVIPELNGK-LTGMAFRVPIGTVS VVDLVCRLQKPAKYEEVAAIEIKKAA
PASTGAAKAVGKVIPELNGK-LTGMAFRVPIGTVS VVDLVCRLQKPAKYEEVAAIEIKKAA
PTSTGAAIALPKVCHGLPPKSLDGFALRVPTITGSLVDLTVNVNAKVTK EEVNAALKKAT

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
Giardia lamblia DH\_A2
Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
Trichomonas vaginalis G3

ESE-RFKGILKFTDEEVSSDFVHDSASSTYDSKAS-ICLN----EHFVKVVA WYDNEWG
QT--YMKGILGFTDDELVSDFINDNRSSVYDSKAT-LQNNLPGERRFFKIVSWYDNEWG
QT--YMKNILGFTDDELVSDFINDNRSSVYDSKAT-LQNNLP GERRFFKIVSWYDNEWG
QT--YMKNILGYTDEELVSADFINDNRSSYD SKAT-LQNNLPNERRFFKIVSWYDNEWG
KT--YMKGILGYTDEELVSADFINDNRSSYD SKAT-LQNNLPKERRFFKIVSWYDNEWG
ETPDEL C GIMAYRDDFCVSSDF LTTTISNFDSKSG-IELH----SRFFKLVSWYDNECG
ETPDEL C GIMAYRDDFCVSSDF LTTTISNFDSKSG-IELH----SRFFKLVSWYDNECG
ETPDEL C GIMAYRDDFCVSSDF LTTTISNFDSKSG-IELH----SRFFKLVSWYDNECG
ESPDEFRGIMAYRDDFCVSSDF LTTTISNFDSKSG-IELH----SRFFKLVSWYDNECG
NGP--MKGIMGYTSDDVVSTDFIGCKYSSI FDKNAC-IALN----DSFVKLISWYDNESG
NGP--MKGIMGYTSDDVVSTDFIGCKYSSI FDKNAC-IALN----DSFVKLISWYDNESG
EGP--MKGVLGYTEDEVVSSDFVDDKRSSV FDKAG-ISLN----DTFVKLVSWYDNEWG
AGP--MKGVLGYTDEEVVSSDFVDDKRSSV FDKAG-ISLN----DTFVKLVSWYDNEWG
EGP--LKGILGYTDEEVVSSDFVHDKRSSI FDKMAG-LALN----DNFFKLVSWYDNEWG
EGP--LKGILGYTDEEVVSSDFVHDKRSSI FDKMAG-LALN----DNFFKLVSWYDNEWG
EEG-SLKGIMTYVTDPIVSSDIIGCQYSSI VDALSTKVL PNPEGQGLTVKVEELSWAHMKMM

Naegleria gruberi strain NEG-M
Leishmania infantum JPCM5
Leishmania major strain Friedlin
Trypanosoma brucei gambiense DAL972
Trypanosoma cruzi strain CL Brener
Giardia lamblia DH\_A2
Giardia lamblia WB\_A1
Giardia lamblia Pig\_E
Giardia lamblia GS\_B
Cryptosporidium hominis TU502
Cryptosporidium parvum Iowa II
Theileria annulata strain Ankara
Theileria parva strain Muguga
Plasmodium falciparum 3D7
Plasmodium knowlesi strain H
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YSNRVLDLIKSTAKIQ-----
YSHRVVDLVR YMAAKDAASAKM-----
YSHRVVDLVR YMAAKDAASAKM-----
YSHRVVDLVRHMAARDRA-AKL-----
YSHRVVDLVRHMASKDRS-ARL-----
YSAKLVDMAAYLGSFVVMDEWAAIEKMKGRGR TSSVLGRDVEDVVGSSK
YSAKLVDMAAYLGSFVVMDEWAAIEKMKGRGR TSSVLGRDVEDVVGSSK
YSAKLVDMAAYLGSFVVMDEWAAIEKMKGRGR TSSVLGRDVEDVAGSSK
YSAKLVDMAAYLGSFVVMDEWAAIEKMKGRGR TSSVLGRDVEDITGSHK
YSNRLVDLAVVYASRGL-----
YSNRLVDLAVVYASRGL-----
YSNRLDLAYYVFQKYSS-----
YSNRLDLAYYVFQKYSS-----
YSNRVLDLAVHITNN-----
YSNRVLDLAIHITKH-----
YSCRCADIFHRLEKYL-----

