Supplementary material for:

An ER-localised, extensive, essential and immunogenic glycoprotein family in trypanosomes

Harriet Allison[1], Amanda J. O'Reilly[1], Jeremy Sternberg[2] and Mark C. Field1[*]

[1]Division of Biological Chemistry and Drug Discovery, University of Dundee, Dundee, Scotland, DD1 5EH and [2]School of Biological Sciences, University of Aberdeen, Aberdeen, AB24 2TZ, UK.

Corresponding author: Telephone: +44 (0)751-550-7880, email: mcf34@cam.ac.uk

Figure legends

Figure S1: Bioinformatic filters for identification of predicted type I *trans*-membrane domain surface membrane proteins. Firstly, the TREU927 proteome was downloaded from TriTrypDB (http://tritrypdb.org/tritrypdb/). All protein sequences were entered into SignalP HMM (http://www.cbs.dtu.dk/services/SignalP-2.0/) and those protein sequences containing predicted signal peptides and signal anchors were retained, whilst all others were discarded. Mitprot (http://ihg.gsf.de/ihg/mitoprot.html), Predotar (http://www.hsls.pitt.edu/obrc/index.php?page=URL1043959648) and TargetP (http://www.cbs.dtu.dk/services/TargetP/) were then used to remove predicted mitochondrial proteins. Using the output from SignalP HMM, signal sequences were removed and thus the mature protein sequence was generated for all retained protein sequences. These sequences were then entered into TMHMM (http://www.cbs.dtu.dk/services/TMHMM/). Finally, GPI-SOM (http://gpi.unibe.ch) and big-PI (http://mendel.imp.ac.at/gpi/gpi_server.html) were both used to remove all predicted GPI-anchored proteins. Only one GPI-anchored protein was found in this final output; Tb09.v4.0204. The final cohort of 208 protein IDs was parsed through the publicly available web-based mitochondrial proteome database (www.TrypsProteome.org), to check for the absence of mitochondrial-targeted proteins. Accession numbers and details for these sequences are available in Table S2.

Figure S2: Phylogenetic identification of the IGP family. (A) A neighbour joining tree was generated using ClustalW2. Adenylate cyclases are highlighted in pink, ISG and ISG-like proteins are highlighted in blue and light blue respectively. Those proteins which do not form clusters are highlighted in yellow and referred to as singletons. A family of 20 proteins, invariant glycoproteins (IGPs) are highlighted in green. (B) Phylogenetic analysis of IGPs and ISGs, which demonstrates the distinct nature of these two gene families. The IGP family is further divided into three subfamilies, designated IGP34 (two genes), IGP40 (ten genes) and IGP48 (eight genes), based on molecular weight, presence in all Salivarian trypanosomes and *T. cruzi* and also on possession of N-glycosylation sites.

Sequences from the nearest set of genes from the closer analysis in panel A were used as an out group. (C) Phylogenetic analysis of all retrieved IGP orthologs from a range of kinetoplastid genomes (see methods). Leishmania and related species are colour-coded in shades of green, African trypanosomes in shades of red/ochre and south American trypanosomes in shades of blue.

Figure S3: ClustalW alignment of IGP homologues. Panel A: Single representatives of the IGP34, 40 and 48 families are shown to illustrate the homology within the N-terminal region. Panel B: Eighty IGP family sequences, from *T. brucei brucei*, *T. brucei gambiensie*, *T. vivax, T. congolense* and *T. cruzi* were aligned using ClustalW. The alignment was used for building the phylogeny shown in Figure S2C.

Figure S4: IGP48 is a tomato lectin-binding protein. 1 x 10^7 BSF cells over-expressing IGP48 full-length protein, IGP48 ectodomain, dTRIM or wild type cells (negative control) were lysed and HA-tagged proteins immunoprecipitated with anti-HA antibody and Dynabeads® Protein G (Life technologies). This was carried out under both native and denaturing conditions (addition of detergent and heating to 95^{o}C). Samples were separated by SDS-PAGE followed by Western blot with TL-biotin conjugate (1:10,000, Vector Laboratories) and streptavidin-HRP (1:10,000, Sigma Aldrich). Membranes were stripped and re-probed with mouse anti-HA monoclonal antibody. Antibody light (~25kDa) and heavy chains (~50kDa) can be seen for all blots. Bands corresponding to HA-tagged proteins are also seen at the correct molecular weight when probed with mouse anti-HA to verify the immunoprecipitation of HA-tagged proteins. To confirm the specificity of immunoprecipitation, wild type BSF cells were lysed and incubated with mouse anti-HA and then Dynabeads under native and denaturing conditions. Following SDS-PAGE, membrane was probed with rabbit polyclonal antibodies against the highly N-glycosylated VSG221. A protein band corresponding to VSG221 was present in the whole cell sample, and no band was observed in the native or denaturing immunoprecipitated samples, indicating that only HA-tagged constructs were isolated in the immunoprecipitation process. The addition of chitin hydrolysate was used to check the carbohydrate specificity of tomato lectin for proteins containing poly-LacNAc units.

Figure S5: Effects of IGP RNAi on cell cycle progression. Uninduced and cells that have been induced for 24 hrs were fixed and stained with DAPI. Representative images were taken for cells with normal nuclei and kinetoplast content (1K:1N, 2K:1N, 2K:2N), as well as for cells with abnormal DNA content (0K:1N, 1K:0N, 1K:2N, 0K:2N, K:N n>2). The percentage of cells with this type of DNA content out of 200 cells is indicated for induced and uninduced cells beside each image. All images were captured at the same magnification and scale bar represents 2μm.

Figure S6: Induction of IGP48 expression in stumpy and stumpy-like cells. BSF cells ectopically over-expressing HA epitope tagged IGP48 at the C-terminus were incubated at 37^{o}C, 20^{o}C (cold-shock), or in the presence of pCPT-cAMP for 12 hours. A Western blot of

endogenous IGP48 expression levels using rabbit anti-IGP48 antibody (1:100) is shown. Blots were stripped and re-probed with anti-ISG75 whose levels remained unchanged. IGP48 protein levels were determined by densitometry using ImageJ and quantified by normalisation to ISG75. Blots were probed for p67, which is up-regulated in cells treated with pCPT-cAMP and PAD2 (protein associated with differentiation 2), which is under thermoregulated control.

Figure S7: Visualisation of IGP48 by confocal microscopy. Cells were fixed and membranes remained intact (not permeabilised), so that incubation with anti-HA antibody stained only HA epitope-tagged proteins on the surface of the cell, if present. A representative image is shown for each condition of a single optical z-section. Confocal z sections were acquired using an SP2-visible inverted confocal microscope (Leica Microsystems GmbH, Germany). Scale bar is 2μm.

Figure S8: Analysis of glycosylation defects on IGP knockdown. (A) Whole cell lysates were prepared from p2T7 IGP48 RNAi cell lines cultured in the presence (induced) or absence (uninduced) of tetracycline for 24 hrs and proteins separated by NuPAGE® Bis-Tris Gel System (Invitrogen) using 4-12% gradient acrylamide gels, allowing high resolution separation of proteins. Analysis of protein abundance and molecular weight was carried out using ImageJ, and a line profile plot of grey value (the sum of the grey values of all the pixels in the selection) against distance from top to bottom of the blot was generated. (B) Samples were separated by SDS-PAGE and lectin blots were carried out with *Erythrina cristigalli* (EC; 1:1000) or *Ricinus communis* (RC; 1:1000) lectins conjugated to biotin and then incubated with streptavidin-HRP. A line profile plot, using ImageJ, was generated for each blot. Protein gels were also stained with Coomassie blue stain, to show equal protein loading. Each experiment was performed in duplicate with a representative experiment shown here.

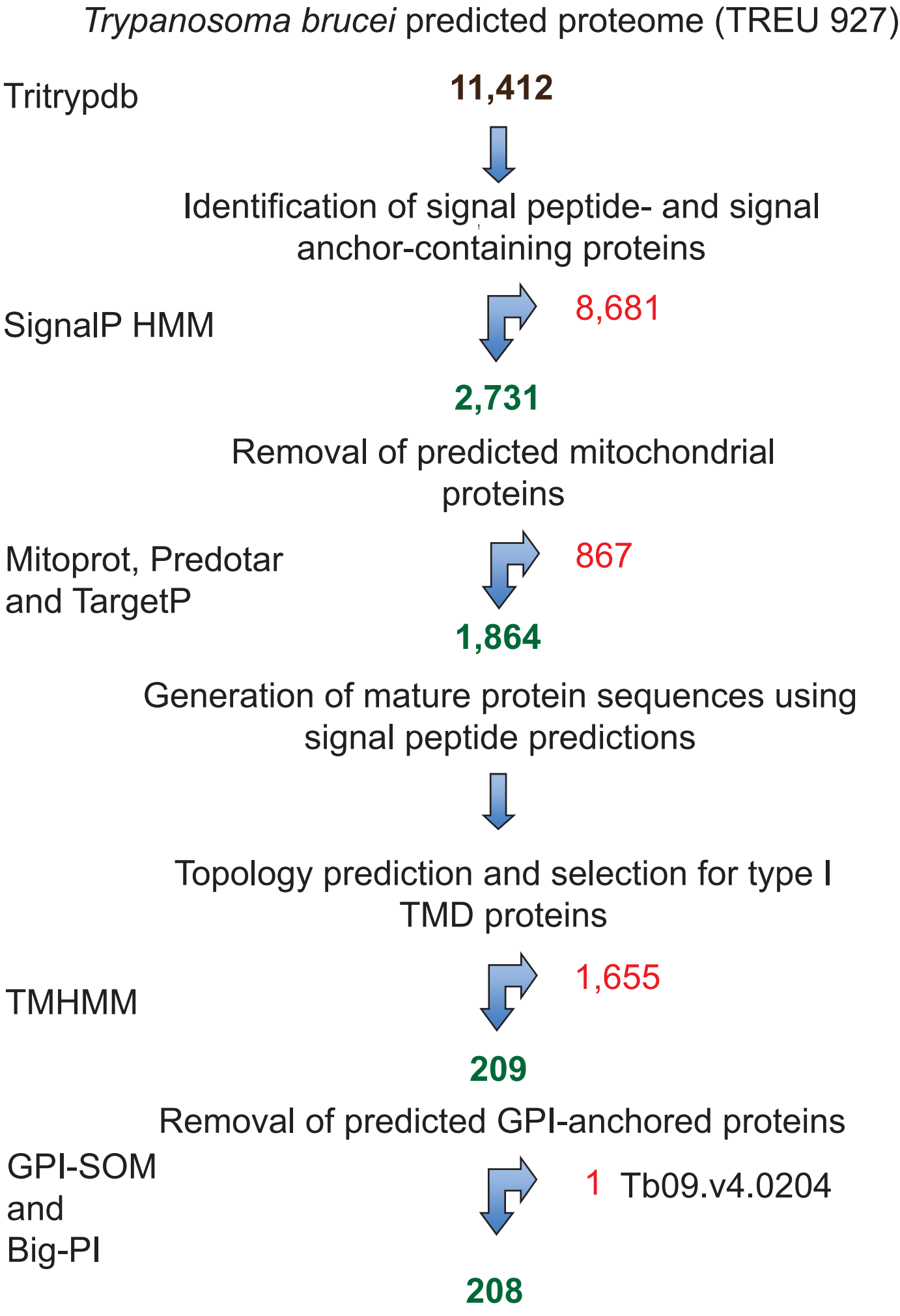
Figure S9: Analysis of intracellular compartment morphology in IGP48 knockdown cells. (Left) Visualisation of ER structure and morphology of cells in *T. brucei* stained with TbBiP. (Centre and right) Distribution of VSG221 in permeabilised cells (intracellular VSG, centre) and non-permeabilised cells (surface VSG, right). Intracellular staining with BiP and VSG was visualised with confocal microscopy. Numbers on the panels indicate the period after induction when cells were taken for analysis. Scale bar, 2μm.

Figure S10: IGP48 knockdown does not induce ATG8-dependant autophagy. BSF IGP48 RNAi cells transfected with YFP-ATG8.2::GL2166. Cells were induced with tetracycline for 48 hours and fixed, permeabilised and stained with anti-GFP. The number of ATG8-positive puncta were counted for induced and uninduced cells (n = 20) and plotted as a bar graph. Error bars denote standard error of the mean. Knockdown of IGP48 is verified by Western blot, using anti-IGP48 antibody and anti-tubulin as a loading control. A Western blot probed with anti-GFP to verify molecular weight of YFP-ATG8 as 41kDa.

Table S1: Primer sequences for the verification of RNAi knockdown and localisation studies. The epitope tag is underlined and restriction sites are shown in bold. Primers are shown in 5' to 3' direction. Designation of primers is shown to the left and restriction sites and epitope tags used are given on the right.

Table S2: Accession numbers of predicted type I proteins in *T. brucei*. The accession numbers of all 208 proteins resulting from the bioinformatics search outlined in Fig. S1 are shown in the table.

Table S3: Serum immunoglobulin responses to IGP48 in *T. b. rhodesiense* patients. Immunoglobulin G and M responses to recombinant IGP48 detected by Western blotting are recorded as either positive (+) or negative (-). For each patient, disease stage, age and thick film parasitaemia (i.e. Number of Giemsa stained parasites observed per 10 fields, at 400x magnification) are recorded.


Trypanosoma brucei predicted proteome (TREU 927)
Tritrypdb
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Identification of signal peptide- and signal anchor-containing proteins
SignalP HMM
8,681
2,731
Removal of predicted mitochondrial proteins
Mitoprot, Predotar and TargetP
867
1,864
Generation of mature protein sequences using signal peptide predictions
Topology prediction and selection for type I TMD proteins
TMHMM
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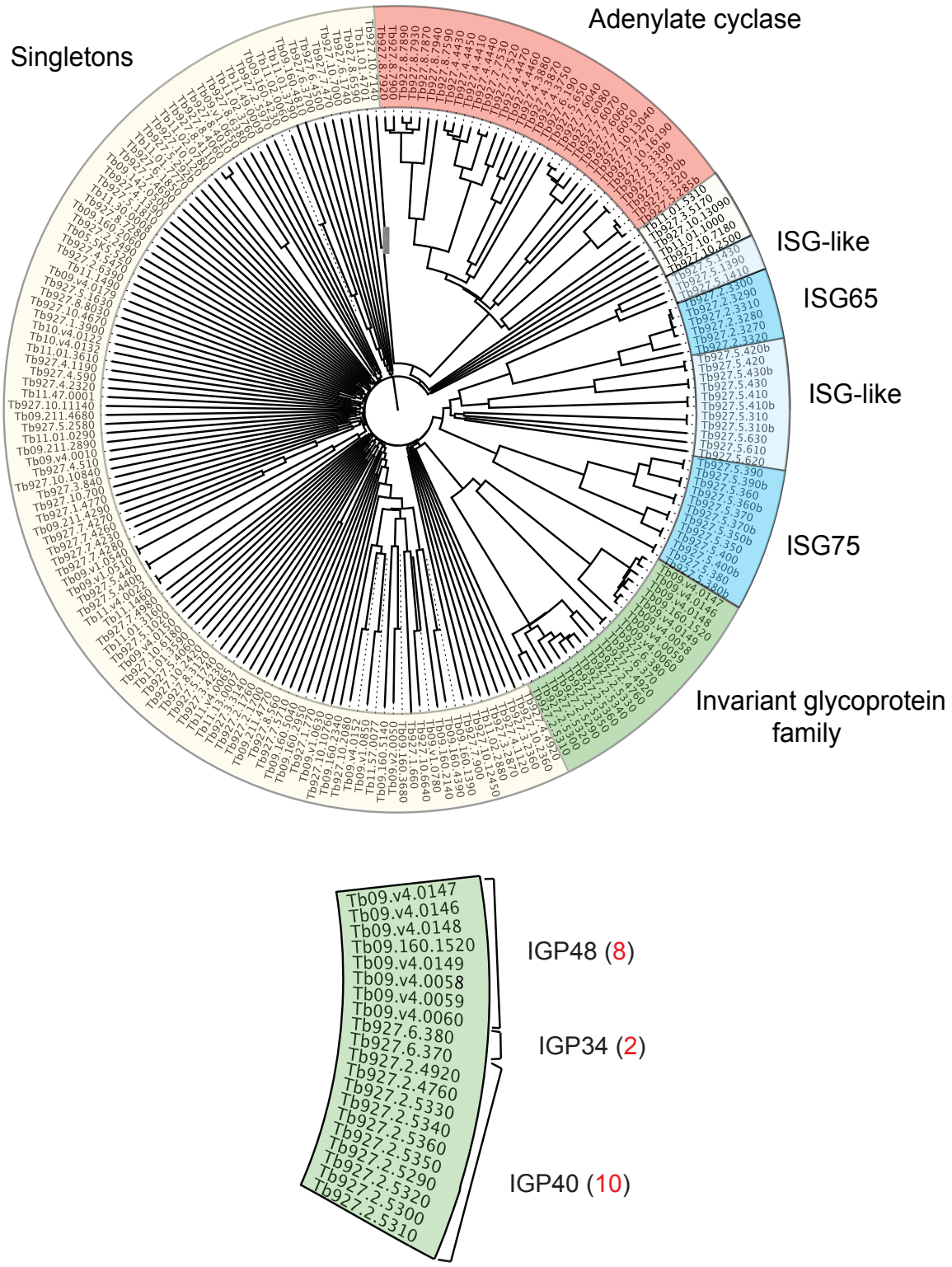
209
Removal of predicted GPI-anchored proteins
GPI-SOM and Big-PI
1 Tb09.v4.0204
208

Figure S1

Figure S2A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ISG65
ISG-like
ISG75
Invariant glycoprotein family
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Tb09.v4.0146
Tb09.v4.0148
Tb09.160.1520
Tb09.v4.0149
Tb09.v4.0058
Tb09.v4.0059
Tb09.v4.0060
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Tb927.6.370
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Tb927.2.4760
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Tb927.2.5360
Tb927.2.5350
Tb927.2.5290
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Tb927.2.5310
IGP48 (8)
IGP34 (2)
IGP40 (10)

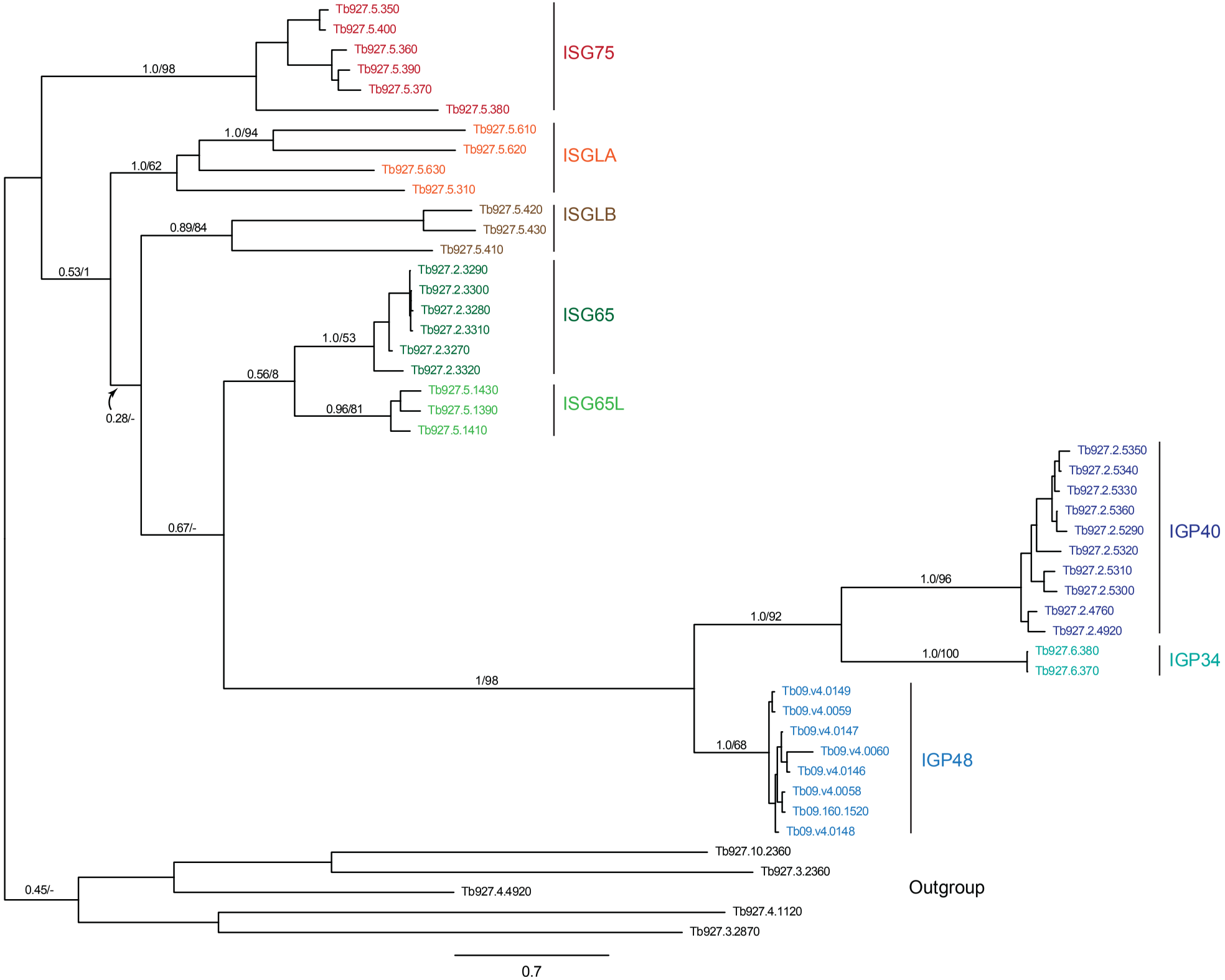
Figure S2B
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1.0/62
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0.56/8
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1.0/92
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Tb927.6.370
IGP34
1.0/100
1/98
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Outgroup
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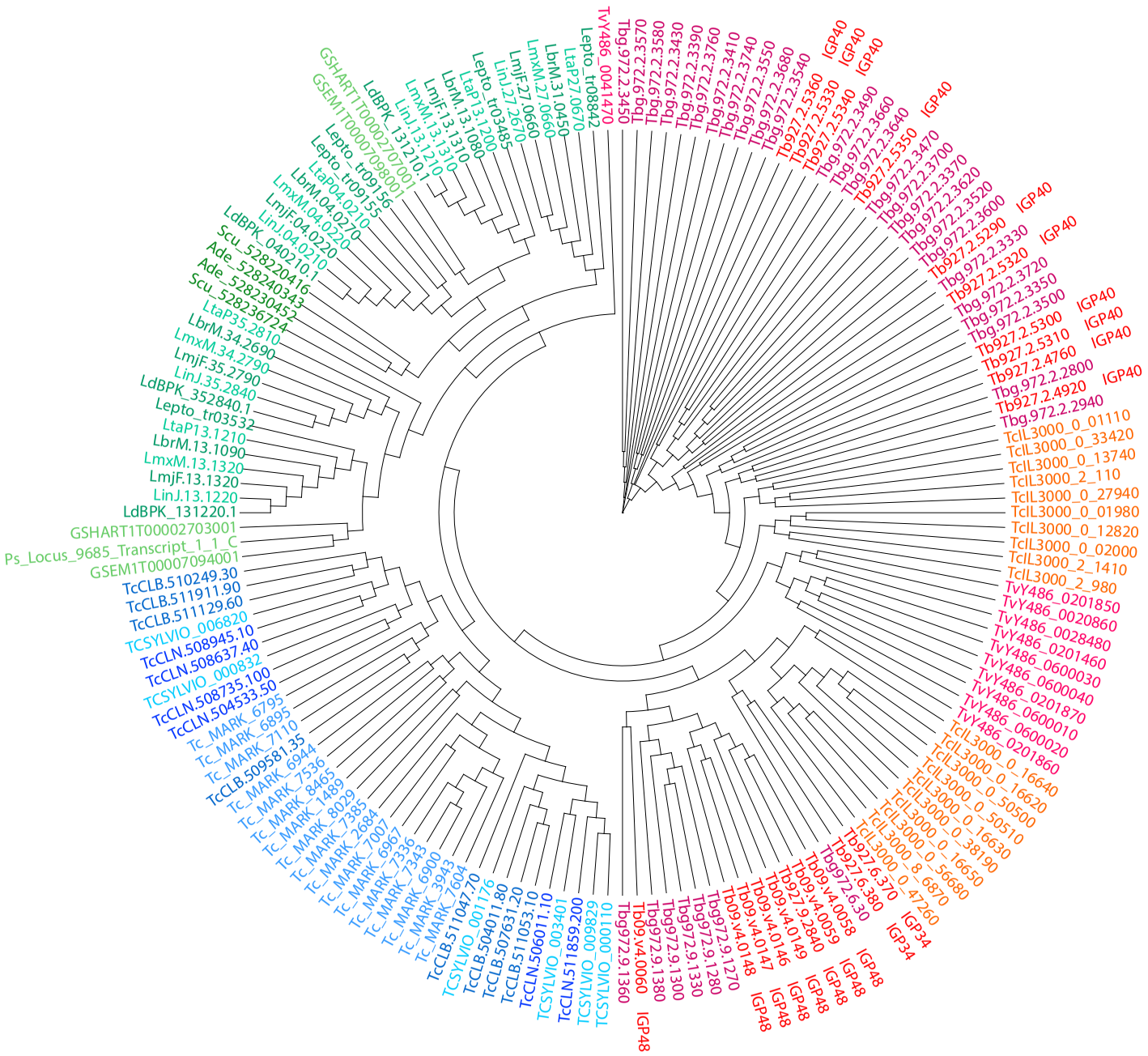
0.7

Figure S2C



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GSEM1	*Phytopomas EM*
GSHART1	*Phytomonas HART*
Ps	*Phytomonas serpens*
LdBPK	*Leishmania donovani*
LinJ	*Leishmania infantum*
LmjF	*Leishmania major*
LmxM	*Leishmania mexicana*
LbrM	*Leishmania braziliensis*
LtaP	*Leishmania tarentolae*
Lepto	*Leptomonas pyrrhocoris*
Tbg	*Trypanosoma gambiense*
Tb	*Trypanosoma brucei*
TcIL	*Trypanosoma congolense*
TvY	*Trypanosoma vivax*
Tc_MARK	*Trypanosoma cruzi marinkellei B7*
TCSYL	*Trypanosoma cruz iSylvio*
TcCLB	*Trypanosoma cruzi CL Brener Esmeraldo like*
TcCLN	*Trypanosoma cruz iCL Brener Non-Esmeraldo like*

Figure S3A


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CLUSTAL 2.1 multiple sequence alignment


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Tb927.2.5290      MSMDTRMVNFGFTRAALLCG-LLLLLTAVCPLHVTAADNGRVIVNVKSYFSMDNFAFAHR
                     :  *.  .*:* . *     **     . :  : .     . .*.*    :  * :

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Tb927.2.5290      GNYFVSYKNAAAYCGDNGAVLPADQTEAAHQSLQSAIKRVITGSDAFSYLGGDAVYSSGE
                  * * *.* *:   *   *  *.:*:::*::. :            ::****** **:.

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Tb927.2.5290      AIEADKRCKPGDAASSRYCVYRWNKGLFAKALPDGQGVAFWRGSYVKYGGAASMNGYPSF
                  . :   **. **  :*  ******.***  :  :.:*********    *:.::..****

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Tb927.2.5290      WGSEYPKRGQLYTLSWYHTGDDVTTWYDGKDMSGRIKWASDNPDTKTENYVILCEVHDSI
                  : . **  *:* .:.      .   *:*. :  *.    .     .   :  ***.

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Tb927.2.5290      STTTTTTTTTTTTTTTTTAAPASGEVPEP------------------------------
                   .  ...    .*:    :.   .    *

Tb09.v4.0147      TTADENTTVDENTTADENTTVDENTTVDENTTVDENTNADEISNGSNEASDKTVPSTASD
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Tb927.2.5290      -----------TVTKDEEVTVT-------TVSLEERSNWHIILIA---------------
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Tb927.2.5290      -----------LISVVSLIVLLLFLLRWFCDYDVKKEIIPMTLREVVGEPLFVLEPTPFV
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Figure S3B

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CLUSTAL W (1.8) multiple sequence alignment


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Tc00104705350763120     ---MEFEAMGIRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGE-EEK
Tc00104705350401180     --------MGIRMRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGE-EEK
Tc00104705351859200     ---MEAEAMGIRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAG---EE
Tc00104705350601110     ---MEAEAMGIRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGE-EEK
Tc00104705351104770     ---MESEAMGIRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGE-EEK
Tc00104705350453350     ---MEVELMGMRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGEEEEG
Tc00104705350508735100  ---MEVELMGMRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGEEEEG
Tc00104705350894510     ---MEVELMCMRTRSATR---NAVRWM---------VLFLLMQYLGSHPSFTAAGKEEEG
Tc00104705350863740     ---MEVELMCMRTRSATR---NAVRWM---------VLFLLMQYLGSHPSFTAAGEEEKG
Tc00104705351112960     ---MEVEFLGMRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGSVEEG
Tc00104705351191190     ---MEVEFLGMRTRSATR---NAVRWT---------VLFLLLQYLGSHPSFTAAGKVEEG
Tc00104705351024930     ---MEVEFLGMRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGKVEEG
Tc00104705350735910     ---MEFEAMGIRTRSATR---NAVRWM---------VLFLLLQYLGSHPSFTAAGKVEEG
TvY486_0201870          ------------------------------------------------------------
TvY486_0600050          ------------------------------------------------------------
TvY486_0028480          ----MTTDARARTAACVR---TAGAWP---------LLLLLCVHVAWHARLASAE---DG
TvY486_0201850          ----MTTDARARTAACVR---TAGAWP---------LLLLLCVHVACHARLASAE---DG
Tbg97223580             ----MSMDTRMGSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223450             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223390             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223430             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223760             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223550             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223410             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223680             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223740             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tbg97223540             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVF-AADGD--DG
Tb92725360              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADGD--DG
Tb92725340              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCSLHVT-AADGD--DG
Tb92725330              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCSLHVT-AADGD--DG
Tbg97223600             ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADGD--DG
Tbg97223520             ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADGD--DG
Tbg97223370             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223470             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223700             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223620             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223490             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223660             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tbg97223640             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLRVT-AADGD--DG
Tb92725350              ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AADGD--DG
Tbg97223330             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AADGD--DG
Tb92725290              ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AAD----NG
Tbg97223720             ----MSMDTRMVSFGFTR---AALLCG---------LLLLLTAVCPLHVS-AADGD--DG
Tb92725320              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCSLHVTAAADGD--DG
Tbg97223350             ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AAADD--NG
Tbg97223500             ----------MVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AAADD--NG
Tb92725300              ----MSMDTRMVNFGFTR---AALLCG---------LLLLLTAVCPLHVT-AADGD--NG
Tb92725310              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADGD---G
Tbg97222800             ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADGI--DG
Tb92724760              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCSLHVT-AADGD--DG
Tbg97222940             ------MDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AAADD--DG
Tb92724920              ----MSMDTRMVNFGFTR---AALLCG---------ILLLLTAVCPLHVT-AADDD--DG
TcIL30002110            RKKEISKQAKISKTTMSSGRNALFACGAILRAVVA-LLLLQCVGRPLCLTASAT-----E
TcIL3000013740          RKKEISKQAKISKTTMSSGRNALFACGAILRAVVA-LLLLQCVGRPLCLTASAT-----E
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TcIL3000027940          RKKEISKQAKISKTTMSSGRNALFACGAILRAVVA-LLLLQCVGRPLCLTASAT-----E
TcIL3000001110          RKKEISKKTKISKTTMSPGRNALFSCGTILRAVVALLLLLQCVGRPLCLTASAT-----E
TcIL3000033420          RKKEISKKAKISKTTMSPGRNALFACGAILRAVVA-LLLLQCVGRPLCLTASAD-----E
Tb9276380               ----MGTEISMTACGFAR---MVVLFT---------ALL-QCLSGSSHLFAFGK-----V
Tbg972630               ----MGTEISMTACGFAR---MVVLFT---------ALL-QCLSGSSHLFAFGK-----V
Tb9276370               ----MGTEISMTACGFAR---MVVLFT---------ALL-QCLSGSSHLFAFGK-----V
TcIL3000050510          ------------------------------------------------------------
TcIL3000050500          -----------MSKGTHA---APYALV---------LAL-LCVVHPLQVAVVAQ-----P
TcIL3000016620          -----------MSKGTHA---APYALV---------LVL-LCVVHPLQVAVVAQ-----P
TcIL3000016630          -----------MSKGTHA---TPCALV---------LVL-LCVVHPLQMAVSAK-----E
TcIL3000047260          -----------MSKGTHA---VPHVLV---------MAL-LCVVHPLQVAASAK-----E


Tbg97291330             PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tbg97291280             PVTTAAKSYAVYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tbg97291270             PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tbg97291300             PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40146              PVTTAAKSYAVYPHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40147              PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb091601520             PVTTAAKSYAIYPHEVFKNNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40149              PVTTAAKSYAVYPHEVFKNNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40059              PVTTAAKSYAVYPHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40058              PVTTAAKSYAVYPHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40148              PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tbg97291380             PVTTAAKSYAVYPHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tb09v40060              PVTTAAKSYAIYPHEVFKNNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIHKLLKPK
Tbg97291360             PVTTAAKSYAIYTHEVFENNGVYNVDYVNSERVCRAEGMNLATDHSEATNSLIYKLLKPK
Tc00104705351105310     HVTIGITKYFHHANSIFSSNFGGRVDYTNSQVSCFNGGGLLASDQTPAAHISIAAQLREL
Tc00104705350763120     HVTIGITKYFHYANSIFSSNFGGRVDYSNSQFSCFNGGGLLAADQTPAAHISIAAQLREL
Tc00104705350401180     HVTIGITKYFHHANSIFSSNFGGRVDYTNSQVSCFNGGGLLAADQTPAAHISIAAELREL
Tc001047053511859200    HVTIGITKYFHHAHSVFKTNFGYRVDYTNSQVSCFNGGGLLASDQTPAAHISIAAELRKL
Tc00104705350601110     HVTIGITKYFHYANSIFKTNFATRVDYTNSQVSCFNGGGLLASDQTPAAHISIAAQLREL
Tc00104705351104770     HVTIVITKYFHHANSIFSSNFGGRVDYTNSQVSCFNGGGLLASDQTPAAHVSIAAELREL
Tc00104705350453350     HVVIEIVKYFNYPNSIFFQNYAGDVSYFSSDDVCHLGGGVLSADQTPAAHVAIADELRKT
Tc001047053508735100    HVVIEIVKYFNYPNSIFFQNYAGDVSYFSSDDVCHLGGGVLSADQTPAAHVAIADELRKT
Tc0010475350894510      HVVIEIVRYFHYSNPIFFDNYAGDVSYFSSDDVCHLGGGVLSADQTPAAHAAIADELRKT
Tc00104705350863740     NVVIEIVKYFHYSNPIFFQNYAGDVSYFSSDDVCHLGGGVLSADQTPAAHVAIADELRKT
Tc00104705351112960     HVAIEIVRYFHYANPIFFENYAGDVSYFSSDDACHLGGGVLSADQTPAAHVAIAGELRKT
Tc00104705351191190     HVVIEIVKYFHYANPIFFENYAGDVSYFSSDDACHLGGGVLSADQTPAAHVAIAGELRKT
Tc00104705351024930     HVVIEIVKYFHYANPIFFENYAGDVSYFSSDDACHLGGGVLSADQTPAAHVAIAGELRKT
Tc00104705350735910     HVAIEIVKYFHYANPIFFENYAGDVSYFSSDDVCHLGGGVLSADQTPAAHVAIADELRKT
TvY486_0201870          ---------------------------------REAGAVLAADQSRAAHKAILQRFYAR
TvY486_0600050          ------------------------------------------------------------
TvY486_0028480          RVTVNVKRYLSLPSEGFRTQHAHRVDYSSSDRLCREAGAVLAADQSRAAHKAILEQFHVL
TvY486_0201850          RVTVNVRRYLSLPSESFRTAYDQRVDYSSSDRLCREAGAVLAADQSDAAHKAIFDQFHSY
Tbg97223580             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223450             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223390             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223430             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223760             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223550             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223410             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223680             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223740             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223540             RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tb92725360              RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCVDNGAVLPADQTEAAHQSLQSAIKRV
Tb92725340              RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCVDNGAVLPADQTEAAHQILQDAMKRV
Tb92725330              RVIVNVKEYFSMPNRAFIRDGEYHVSYYNANAYCVDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223600             RVIVNINTIISLVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223520             RVIVNINTIISLVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223370             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223470             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223700             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223620             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCGDNGAVLPADQTEAAHQSLQDAMKRV
Tbg97223490             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCVGNGAVLPADQTEAAHQILQDAIKRV
Tbg97223660             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCVGNGAVLPADQTEAAHQILQDAIKRV
Tbg97223640             RVIVNINTIISMVNRAFIRDGEYYVSYYNANAYCVGNGAVLPADQTEAAHQILQDAIKRV
Tb92725350              RVIVNINTIISMVNRAFIRDGEYHVSYYNANAYCVDNGAVLPADQTEAAHQILQDAMKRV
Tbg97223330             RVIVNVKSYFSMDNFAFAHRGNYFVSYKNAEAYCVDNGAVLPADQTEAAHQSLQSAIKRV
Tb92725290              RVIVNVKSYFSMDNFAFAHRGNYFVSYKNAAAYCGDNGAVLPADQTEAAHQSLQSAIKRV
Tbg97223720             RVIVNVKSYFSMVYRAFFRNKTYFVSYENAEAYCVENGAVLPADQTEAAHQSLQSAIKRV
Tb92725320              RVIVNVKSYFSMVYRAFFRNKTYFVSYENAEAYCVENGAVLPADQTEAAHQSLQDAMKRV
Tbg97223350             RVIVNVKEYFSMPNYAFIRRRKYMVDQESTNRYCVYFGAEVAADQTEAAHQSLQDAMKRV
Tbg97223500             RVIVNVKEYFSMPNYAFIRRRKYMVDQESTNRYCVYFGAEVAADQTEAAHQSLQDAMKRV
Tb92725300              RVIVNVKEYFSMPNYAFIRRRKYMVDHESTNRYCVYFGAEVAADQTEAAHQSLQDAMKRV
Tb92725310              RVIVNVKTYFSVPTYAFIRKGRYAVNYENANYYCVFFGAVLPADQTEAAHQSLQDAMKRV
Tbg97222800             RVIVNVKEYFSMDNFAFSRHGKYFVSYNNAEAYCRDNGAVLPADQTEAAHQSLQDAMKDV
Tb92724760              RVIVNVKEYFSMDNFAFSRHGKYFVSYNNAEAYCRDNGAVLPADQTEAAHQSLQDAMKDV
Tbg97222940             RVIVNVKEYFSMDNFAFSRHERYIVGYDNAEAYCVDNGAVLPADQTEAAHKSLQDAIKRV
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Tb92724920                RVIVNVKEYFSMDNFAFSRHERYIVGYDNAEAYCVDNGAVLPADQTEAAHQSLQDAMKSV
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TcIL3000013740            KVNVNVKRRFSASNYHFERGESYMVDYRTSRQYCDQNGGVLVADQSDASHADIDKLLKAF
TcIL3000027940            KVNVNVKRRFRTSNFHFNRGERYMVDYRTSRQYCDQNGGVLVADQSDASHADIEKLLKAV
TcIL3000001110            KVNVNVKMRFDASNFNFNRGGRYMVDYKTARQYCEQNGAVLVADQSDASHADIDRLLKAF
TcIL3000033420            KVNVNVKMRFDASNFNFNHGGRYMVDYKTARQYCEQNGAVLVADQSDASHADIDRILKMI
Tb9276380                 YPTAYVKEYILFPNRKFWHGGDYLVDYSNSVHICREAGGTLATDHSQATNERLTAYHLGV
Tbg972630                 YPTAYVKEYILFPNRKFWHGGDYLVDYSNSVHICREAGGTLATDHSQATNECLTAYHLSV
Tb9276370                 YPTAYVKEYILFPNRKFWHGGDYLVDYSNSVHICREAGGTLATDHSQATNERLTAYHLGV
TcIL3000050510            ------------------------------------------------------------
TcIL3000050500            GPIASTKDYIIFPNGRFWNGGQYLVSHGATERICREEGAILATDHSEATDAAIKEVHSTL
TcIL3000016620            GPAASTKDYIIFPNARFWNGGQYLVSHGATERICREEGAILATDHSEATDAAINEVYFKL
TcIL3000016630            GPIASTKEYIILPNGRFNEGGQYLVSHGATERICREEGAILATDHSEATDAAINEVHSTL
TcIL3000047260            GSTVSTKDYIILSDEKFQELGPNTAGHGLSKRACREEGATLATDHSEATGAAITKILKEL


Tbg97291330               NE--LGYLYVYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tbg97291280               NE--LGYLYVYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tbg97291270               NE--LGYLYVYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tbg97291300               NE--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40146                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40147                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb091601520               NE--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40149                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40059                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40058                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40148                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tbg97291380               NE--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tb09v40060                NK--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tbg97291360               NE--LGYLYAYLGGDAKYSASSVHEEKDRCKVGDLASSLNCVYRWNTGLFAPATPDDNGV
Tc00104705351105310       ASNKDETFRSYLGGTAEYTANSTP-PEQRCLRGERRASLKCIYKWNEGAFIDSSSDGHGV
Tc00104705350763120       ASNKDETFRSYLGGTAQYTANSAP-PENRCLRDERRASLKCIYKWNEGAFRDSSSDGHGV
Tc00104705350401180       ASNKDETFRSYLGGTAEYTANSTP-PEQRCLRGNKSASLKCIYKWNEGAFIDSSSDGHGV
Tc00104705351185920O      ASKKVETFRTYLGGTAQYTADSAP-SEQRCLRGERRASLKCIYKWKEGAFLDSSSDGHGV
Tc00104705350601110       ASKEDETFRTYLGGTAEYTANSTP-PEQRCLRGERRASLKCIYKWNEGAFLDSSSDGHGV
Tc00104705351104770       ASKKVETFRSFLGGTAEYTADSAP-SEQRCLRGERRASLKCIYKWNEGAFLDSSSDGHGV
Tc00104705350453350       AVHNYDTSHAYLGGDADHAATPTTDPKKRCGRGLKWATLNCIFKWNQGAFADSSADGLGV
Tc00104705350873510O      AVHNYDTSHAYLGGDADHAATPTTDPKKSCGRGLNLPTLNCIFKWNQGAFADSSADGLGV
Tc00104705350894510       AVRKYKTSHAYLGGDADHAATSTTDLKKRCGRGLKWATLNCIFKWNQGAFADSSADGLGV
Tc00104705350863740       VVPNYDTSYAYLGGDADHAATSTTDPKKRCGRGLKWATLNCIFKWNQGAFADSSDDGLGV
Tc00104705351112960       AVPNYDTSHVYLGGDADHEATPTTDPKKRCGRGLKWATLNCIFKWNKGAFADSSADGLGV
Tc00104705351191190       AVPKYKTSHVYLGGDADHEATPTTDPKKRCGRGLKWATLNCIFKWNKGAFADSSADGLGV
Tc00104705351024930       AVPKYKTSHVYLGGDADHEATPTTDPKKRCGRGLKWASLNCIFRWNKGAFADSSADGLGV
Tc00104705350735910       AVPNYDTSHVYLGGDADHEATPTTDPKKRCGRGLKWATLNCIFKWNQGAFADSSADGLGV
TvY486_0201870            K--NDRPLHSYLGGDARRSASTLEEPARRCKAGDEDASLNCVYRWNKGLFATST-HGRGA
TvY486_0600050            ------------------------------------------------------------
TvY486_0028480            S--VKSVGYSFLGGDALSNAAMRRNPLERCKAGDKTTSLNCVYRWNKGLFAAAS-NGDGA
TvY486_0201850            AK-NNQELYSFLGGDALSNAAVRREPTKWCKAGDKTTSLNCVYRWNKGLFATAS-NGDGA
Tbg97223580               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223450               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223390               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223430               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223760               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223550               IT--GSDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223410               IT--GSDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223680               IT--GSDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223740               IT--GSDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
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Tb92725360                IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDAASSRYCVYRWNKGLFAKALPDGWGV
Tb92725340                IA--ASDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tb92725330                TN--SFVAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223600               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFPKALPDGWGV
Tbg97223520               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFPKALPDGWGV
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Tbg97223700               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGHGV
Tbg97223620               IT--GSDAFSYLGGDAVYSSGGVIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
Tbg97223490               IT--GSDAFSYLGGDAVYSSGEAIVADKRCKPGDAASSRYCVYRWNKGLFAKALPDGHGV
Tbg97223660               IT--GSDAFSYLGGDAVYSSGEAIVADKRCKPGDAASSRYCVYRWNKGLFAKALPDGHGV
Tbg97223640               IT--GSDAFSYLGGDAVYSSGEAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGHGV
Tb92725350                TA--ASDAFSYLGGDAVYSSGGAIVANKRCKPGDIASSRYCVYRWNKGLFAKALPDGHGV
Tbg97223330               IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGQGV
Tb92725290                IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDAASSRYCVYRWNKGLFAKALPDGQGV
Tbg97223720               YS--IFVAFSYLGGDAVYSSSGVIEFNKRCNAGDIASSRYCVYRWNKGLFAKALPDGHGV
Tb92725320                YS--IFVAFSYLGGDAVYSSSGVIEFNKRCNAGDIASSRYCVYRWNKGLFAKVLPDGHGV
Tbg97223350               IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGHGV
Tbg97223500               IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGHGV
Tb92725300                IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDAASSRYCVYRWNKGLFAKALPDGHGV
Tb92725310                IT--GSDAFSYLGGDAVYSSGEAIEADKRCKPGDIASSRYCVYRWNKGLFAKALPDGWGV
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Tbg97222800              LT--GSDAFSYLGGDAVYSSGGAIVADKRCKPGDAASSRHCVYRWNKGLFAKALPDGHGV
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Tbg97222940              IT--GSVAFSYLGGDAVYSSGGVIEADKRCKPGDAASSRHCVYRWNKGLFAKALPDGHGV
Tb92724920               IF--EFEAVSYLGGDAVYSSTRVFEADKRCKPGDAASSRHCVYRWNKGLFAKALPDGHGV
TcIL30002110             AW--NGNVVAYLGGDASYSARPPSSRWDRCVAGDFRTSKYCVYRWNQGLFAGSQPGGQGV
TcIL3000013740           AW--NGNVVAYLGGDASYSARPPSSRWDKCVAGYFRTSKYCVYRWNQGLFADSQPGGQGV
TcIL3000027940           AW--NGNVVAYLGGDASYSARPPSSRWDKCVAGDFRTSKYCVYRWNQGLFADSQPGGQGV
TcIL3000001110           AW--SRNVIAYLGGDALYSTGPPSSRWGRCVAGYFRTSKYCVYRWNQGLFADSQPGGQGV
TcIL3000033420           AW--SKNVISYLGGDALYSTGPPSSRWDRCAAGYLSVSRYCVYRWNQGLFADSQPGGQGV
Tb9276380                A--DGPFIYSYLGGDATYSASAAQDAGIRCTAGDYDTSLNCVYRWNSGLFEASGIEGNGV
Tbg972630                A--DGPFIYSYLGGDATYSASAAQDAGSRCTAGDYDTSLNCVYRWNSGLFEASGIEGNGV
Tb9276370                A--DGPFIYSYLGGDATYSASAAQDAGIRCTAGDYDTSLNCVYRWNSGLFEASGIEGNGV
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TcIL3000050500           P--QVY-IYSYLGGDATFSASDAQDAGSRCKERNSSTSIHCVYRWNRGLFDATTTNGVGE
TcIL3000016620           R--QRY-IYSYLGGDAAFSASEAQDVGSRCKEADNSTSIHCVYRWNRGLFDATTTNGIGE
TcIL3000016630           S--HVHNIYSYLGGDATFSASEAQDAGSRCKEADNSTSIHCVYRWNRGLFDATTTNGIGE
TcIL3000047260           P--YFF-PISYLGGDATLSASEAQDAGSRCRSGDKSTSIHCVYRWNTGLFEATTTNGIGE


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Tbg97291270              AFWRGSYHEVSGAGSMNDYPSFFKN-YPAYGRLNVIAKLDSSD-RVTWFDDDDDFGN---
Tbg97291300              AFWRGSYHEVSGAGSMNDYPSFFKN-YPAYGRLNVIAKLDSSD-RVTWFDDDDDFGN---
Tb09v40146               AFWRGSYYEVTGAGSMNDYPSFFEN-YPAYGRLNVIAKLDSSD-RVTWFDDDDDFGN---
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Tb09v40059               AFWRGSYYEVTGAGSMNDYPSFFEN-YPAYGRLNVIAKLDSSG-RFTWFDDDDDFGN---
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TcIL3000047260           ANETASEELNGTDANETASEELNGTNANETASEELNGTDANETASEELNGTDTNETASEE


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Tb09v40147               ASAVPTPLPP----------------------------------------ASPHSENT
Tb091601520              ASAVPTPLPP----------------------------------------ASPHSENT
Tb09v40149               ASAVPTPLPP----------------------------------------ASPHSENT
Tb09v40059               ASAVPTPLPP----------------------------------------ASPHSENT
Tb09v40058               ASAVPTPLPP----------------------------------------ASPHSENT
Tb09v40148               ASAVPTPLPP----------------------------------------ASPHSENT
Tbg97291380              ASAVPTPLPP----------------------------------------ASPHSENT
Tb09v40060               TSLIVAVAAENLIDADTFVVNERKFVNDKQSSGSNTSAVGNITVREGKRPDGNTSEDKNT
Tbg97291360              TSLTVALAAENLFATDTFAVNERKFVNDKQCSGSNTSAVGNISVREGKKPGENTSDDKNT
Tc00104705351105310      NDEKATWYDG----------------------------------------------------Q
Tc00104705350763120      NDEKATWYDG----------------------------------------------------Q
Tc00104705350401180      SDEKATWYDG----------------------------------------------------Q
Tc001047053511859200     SDKKATWYDG----------------------------------------------------Q
Tc00104705350601110      SDKNATWYDG----------------------------------------------------Q
Tc00104705351104770      SYEKATWYDG----------------------------------------------------Q
Tc00104705350453350      NSGNATWYDW----------------------------------------------------Y
Tc001047053508735100     NSEQATWYDW----------------------------------------------------Y
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Tc00104705350863740      NSENATWYDW----------------------------------------------------Y
Tc00104705351112960      NNGNATWYDW----------------------------------------------------Y
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Tc00104705351024930      NNGNATWYDW----------------------------------------------------Y
Tc00104705350735910      NSGNATWYDW----------------------------------------------------Y
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TvY486_0600050           VQDSISTSTT----------------------------------------------------T
TvY486_0028480           VQDSVSTTGT----------------------------------------------------G
TvY486_0201850           SQDSISSSTT----------------------------------------------------T
Tbg97223580              VHDSIS---T----------------------------------------------------T
Tbg97223450              VHDSIS---T----------------------------------------------------T
Tbg97223390              VHDSIS---T----------------------------------------------------T
Tbg97223430              VHDSIS---T----------------------------------------------------T
Tbg97223760              VHDSIS---T----------------------------------------------------T
Tbg97223550              VHDSIS---T----------------------------------------------------T
Tbg97223410              VHDSIS---T----------------------------------------------------T
Tbg97223680              VHDSIS---T----------------------------------------------------T
Tbg97223740              VHDSIS---T----------------------------------------------------T
Tbg97223540              VHDSIS---T----------------------------------------------------T
Tb92725360               VHDSISTT-T----------------------------------------------------T
Tb92725340               VHDSISTT-T----------------------------------------------------T
Tb92725330               VHDSISTT-T----------------------------------------------------T
Tbg97223600              VHDSIS--------------------------------------------------------
Tbg97223520              VHDSIS--------------------------------------------------------
Tbg97223370              VHDSIS--------------------------------------------------------
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Tbg97223470             VHDSIS-------------------------------------------------------
Tbg97223700             VHDSIS-------------------------------------------------------
Tbg97223620             VHDSIS-------------------------------------------------------
Tbg97223490             VHDSIS-------------------------------------------------------
Tbg97223660             VHDSIS-------------------------------------------------------
Tbg97223640             VHDSIS-------------------------------------------------------
Tb92725350              VHDSISTT-T---------------------------------------------------T
Tbg97223330             VHDSISTT-T---------------------------------------------------T
Tb92725290              VHDSISTT-T---------------------------------------------------T
Tbg97223720             VHDSIST------------------------------------------------------
Tb92725320              VHDSIS-------------------------------------------------------
Tbg97223350             VQRYVTVA-A---------------------------------------------------D
Tbg97223500             VQRYVTVA-A---------------------------------------------------D
Tb92725300              VQRYVTVA-A---------------------------------------------------D
Tb92725310              VQTDIITT-T---------------------------------------------------T
Tbg97222800             VHDSIS-------------------------------------------------------
Tb92724760              VHDSIST------------------------------------------------------
Tbg97222940             VHDSIST------------------------------------------------------
Tb92724920              VHDSIS-------------------------------------------------------
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TcIL3000013740          VHQSIAKPTT---------------------------------------------------T
TcIL3000027940          VHQSIAKPTT---------------------------------------------------T
TcIL3000001110          VHQSIAKS-----------------------------------------------------
TcIL3000033420          VHRSIAKP-----------------------------------------------------
Tb9276380               KSLTYFAALC---------------------------------------------------E
Tbg972630               KSLTYFAALC---------------------------------------------------E
Tb9276370               KSLTYFAALC---------------------------------------------------E
TcIL3000050510          LNGTNTNETA---------------------------------------------------S
TcIL3000050500          LNGTNANETA---------------------------------------------------S
TcIL3000016620          LNGTNTNETA---------------------------------------------------S
TcIL3000016630          RNSTLT-------------------------------------------------------
TcIL3000047260          LNGTDTNETA---------------------------------------------------S


Tbg97291330             TADEN-------TTVDGNTNADG--------------------------------------
Tbg97291280             TADEN-------TTVDGNTNAD---------------------------------------
Tbg97291270             TADEN-------TTADGNTNADE--------------------------------------
Tbg97291300             TADEN-------TTADENTTADG--------------------------------------
Tb09v40146              TADEN-------TTADENTTVDE--------------------------------------
Tb09v40147              TADEN-------TTVDENTTVDE--------------------------------------
Tb091601520             TADEN-------TTVDENTTVDE--------------------------------------
Tb09v40149              TADEN-------TTADENTTADE--------------------------------------
Tb09v40059              TVDEN-------TTADENTTVDE--------------------------------------
Tb09v40058              TVDEN-------TTADENTTVDE--------------------------------------
Tb09v40148              TADEN-------TTADGNTTVDE--------------------------------------
Tbg97291380             TADEN-------TTADGNTTADGNITTDGNTNADGNTNADGNTTADGNTTADGNTNADGN
Tb09v40060              TSHENRSYDD-SSVADGNTSEDKNTTSHENSSHDDSSVADGNTSEDKNTTSHENSSHDDS
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Tc00104705351105310     G--------------VPKYDKE---------------------------------------
Tc00104705350763120     G--------------VPRGDGE---------------------------------------
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Tc001047053511859200    G--------------VPRYDGE---------------------------------------
Tc00104705350601110     G--------------VPRYDGE---------------------------------------
Tc00104705351104770     G--------------VPWYDGE---------------------------------------
Tc00104705350453350     P--------------APKDHGD---------------------------------------
Tc001047053508735100    P--------------APKTHID---------------------------------------
Tc0010475350894510      P--------------APKTHID---------------------------------------
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TvY486_0600050          T-----TTTTTTTTTTTTTTTT---------------------------------------
TvY486_0028480          NGE---SASLASGAKLPFTSTNDAG------------------------------------
TvY486_0201850          TRAPTTTTTTTTTTEAPRTTTTTST------------------------------------
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Tbg97223450             T----------TTTTTTTTTTT---------------------------------------
Tbg97223390             T----------TTTTTTTTTTT---------------------------------------
Tbg97223430             T----------TTTTTTTTTTT---------------------------------------
Tbg97223760             T----------TTTTTTTTTTT---------------------------------------
Tbg97223550             T----------TTTTTTTTTTT---------------------------------------
Tbg97223410             T----------TTTTTTTTTTT---------------------------------------
Tbg97223680             T----------TTTTTTTTTTT---------------------------------------
Tbg97223740             T----------TTTTTTTTTTT---------------------------------------
Tbg97223540             T----------TTTTTTTTTTT---------------------------------------
Tb92725360              T----------TTTTTTTTTTT---------------------------------------
Tb92725340              T----------TTTTTTTTTTT---------------------------------------
Tb92725330              T----------TTTTTTTTTTT---------------------------------------
```

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Tbg97223600             ----------TTTTTTTTTT----------------------------------------
Tbg97223520             ----------TTTTTTTTTT----------------------------------------
Tbg97223370             ----------TTTTTTTTTT----------------------------------------
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Tbg97223620             ----------TTTTTTTTTT----------------------------------------
Tbg97223490             ----------TTTTTTTTTT----------------------------------------
Tbg97223660             ----------TTTTTTTTTT----------------------------------------
Tbg97223640             ----------TTTTTTTTTT----------------------------------------
Tb92725350              T----------TTTTTTTTTTT---------------------------------------
Tbg97223330             T----------TTTTTTTTTTT---------------------------------------
Tb92725290              T----------TTTTTTTTTTT---------------------------------------
Tbg97223720             ----------TTTTTTTTTT----------------------------------------
Tb92725320              ----------TTTTTTTTTT----------------------------------------
Tbg97223350             N----------YTTTTTTTTTTTT------------------------------------
Tbg97223500             N----------YTTTTTTTTTTTT------------------------------------
Tb92725300              N----------YTTTTTT-------------------------------------------
Tb92725310              ----------TTTTTT--------------------------------------------
Tbg97222800             ----------TTTTTTTTTT----------------------------------------
Tb92724760              ----------TTTTTTTTTT----------------------------------------
Tbg97222940             ----------TTTTTTTTT-----------------------------------------
Tb92724920              ----------------TTTTTT--------------------------------------
TcIL30002110            T----------TTTTTTTTTT----------------------------------------
TcIL3000013740          T----------TTTTTTTTTT----------------------------------------
TcIL3000027940          T----------TTTTTTTTTT----------------------------------------
TcIL3000001110          ----------TTTTTTTTTT----------------------------------------
TcIL3000033420          ----------TTTTTTTTTT----------------------------------------
Tb9276380               VT--------VPQPSHPVPGNGNS------------------------------------
Tbg972630               VT--------VPQPSNPVPGNGNSP-----------------------------------
Tb9276370               VT--------VPQPSHPVPGNGNS------------------------------------
TcIL3000050510          EE--------LNGTNANETASEELNGTNTNETASEGLNGTNANETASEELNGTNA-----
TcIL3000050500          EE--------LNGTNANETASEELNGTNANETASEELNGTNANETASEELNGTNA-----
TcIL3000016620          EE--------LNGTNTNETASEELN-------------GTNANETASEELNGTNA-----
TcIL3000016630          G---------IVGHIQHETPVAPPS-------------------------P----------
TcIL3000047260          EE--------LNGTDTNETASEELNGTDTNETASEELNGTNANETASEELNGTDANETAS


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Tbg97291300             ------------------------------------------------------------
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Tb09v40147              ------------------------------------------------------------
Tb091601520             ------------------------------------------------------------
Tb09v40149              ------------------------------------------------------------
Tb09v40059              ------------------------------------------------------------
Tb09v40058              ------------------------------------------------------------
Tb09v40148              ------------------------------------------------------------
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Tb09v40060              SVADG-------------------------------------------------------
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Tc00104705350763120     ------------------------------------------------------------
Tc00104705350401180     ------------------------------------------------------------
Tc00104705351859200     ------------------------------------------------------------
Tc00104705350601110     ------------------------------------------------------------
Tc00104705351104770     ------------------------------------------------------------
Tc00104705350453350     ------------------------------------------------------------
Tc00104705350873510O    ------------------------------------------------------------
Tc0010475350894510      ------------------------------------------------------------
Tc00104705350863740     ------------------------------------------------------------
Tc00104705351112960     ------------------------------------------------------------
Tc00104705351191190     ------------------------------------------------------------
Tc00104705351024930     ------------------------------------------------------------
Tc00104705350735910     ------------------------------------------------------------
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TvY486_0600050          ------------------------------------------------------------
TvY486_0028480          ------------------------------------------------------------
TvY486_0201850          ------------------------------------------------------------
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Tbg97223450             ------------------------------------------------------------
Tbg97223390             ------------------------------------------------------------
Tbg97223430             ------------------------------------------------------------
Tbg97223760             ------------------------------------------------------------
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Tbg97223410             ------------------------------------------------------------
Tbg97223680             ------------------------------------------------------------
Tbg97223740             ------------------------------------------------------------
Tbg97223540             ------------------------------------------------------------
```

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Tb92725360              ------------------------------------------------------------
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Tb92725330              ------------------------------------------------------------
Tbg97223600             ------------------------------------------------------------
Tbg97223520             ------------------------------------------------------------
Tbg97223370             ------------------------------------------------------------
Tbg97223470             ------------------------------------------------------------
Tbg97223700             ------------------------------------------------------------
Tbg97223620             ------------------------------------------------------------
Tbg97223490             ------------------------------------------------------------
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Tbg97223640             ------------------------------------------------------------
Tb92725350              ------------------------------------------------------------
Tbg97223330             ------------------------------------------------------------
Tb92725290              ------------------------------------------------------------
Tbg97223720             ------------------------------------------------------------
Tb92725320              ------------------------------------------------------------
Tbg97223350             ------------------------------------------------------------
Tbg97223500             ------------------------------------------------------------
Tb92725300              ------------------------------------------------------------
Tb92725310              ------------------------------------------------------------
Tbg97222800             ------------------------------------------------------------
Tb92724760              ------------------------------------------------------------
Tbg97222940             ------------------------------------------------------------
Tb92724920              ------------------------------------------------------------
TcIL30002110            ------------------------------------------------------------
TcIL3000013740          ------------------------------------------------------------
TcIL3000027940          ------------------------------------------------------------
TcIL3000001110          ------------------------------------------------------------
TcIL3000033420          ------------------------------------------------------------
Tb9276380               ------------------------------------------------------------
Tbg972630               ------------------------------------------------------------
Tb9276370               ------------------------------------------------------------
TcIL3000050510          ------------------------------------------------------------
TcIL3000050500          ------------------------------------------------------------
TcIL3000016620          ------------------------------------------------------------
TcIL3000016630          ------------------------------------------------------------
TcIL3000047260          EELNGTDTNETASE--------------------EL------------------------


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Tbg97291280             ------------------------------------------------------------
Tbg97291270             ------------------------------------------------------------
Tbg97291300             ------------------------------------------------------------
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Tb09v40147              ------------------------------------------------------------
Tb091601520             ------------------------------------------------------------
Tb09v40149              ------------------------------------------------------------
Tb09v40059              ------------------------------------------------------------
Tb09v40058              ------------------------------------------------------------
Tb09v40148              ------------------------------------------------------------
Tbg97291380             ------------------------------------------------------------
Tb09v40060              ------------------------------------------------------------
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Tc00104705350401180     ------------------------------------------------------------
Tc00104705351859200     ------------------------------------------------------------
Tc00104705350601110     ------------------------------------------------------------
Tc00104705351104770     ------------------------------------------------------------
Tc00104705350453350     ------------------------------------------------------------
Tc00104705350735100     ------------------------------------------------------------
Tc0010475350894510      ------------------------------------------------------------
Tc00104705350863740     ------------------------------------------------------------
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Tc00104705351191190     ------------------------------------------------------------
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Tc00104705350735910     ------------------------------------------------------------
TvY486_0201870          ------------------------------------------------------------
TvY486_0600050          ------------------------------------------------------------
TvY486_0028480          ------------------------------------------------------------
TvY486_0201850          ------------------------------------------------------------
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Tbg97223450             ------------------------------------------------------------
Tbg97223390             ------------------------------------------------------------
Tbg97223430             ------------------------------------------------------------
Tbg97223760             ------------------------------------------------------------
Tbg97223550             ------------------------------------------------------------
Tbg97223410             ------------------------------------------------------------
```

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Tbg97223680             ------------------------------------------------------------
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Tb92725360              ------------------------------------------------------------
Tb92725340              ------------------------------------------------------------
Tb92725330              ------------------------------------------------------------
Tbg97223600             ------------------------------------------------------------
Tbg97223520             ------------------------------------------------------------
Tbg97223370             ------------------------------------------------------------
Tbg97223470             ------------------------------------------------------------
Tbg97223700             ------------------------------------------------------------
Tbg97223620             ------------------------------------------------------------
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Tbg97223640             ------------------------------------------------------------
Tb92725350              ------------------------------------------------------------
Tbg97223330             ------------------------------------------------------------
Tb92725290              ------------------------------------------------------------
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Tbg97223350             ------------------------------------------------------------
Tbg97223500             ------------------------------------------------------------
Tb92725300              ------------------------------------------------------------
Tb92725310              ------------------------------------------------------------
Tbg97222800             ------------------------------------------------------------
Tb92724760              ------------------------------------------------------------
Tbg97222940             ------------------------------------------------------------
Tb92724920              ------------------------------------------------------------
TcIL30002110            ------------------------------------------------------------
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TcIL3000027940          ------------------------------------------------------------
TcIL3000001110          ------------------------------------------------------------
TcIL3000033420          ------------------------------------------------------------
Tb9276380               ------------------------------------------------------------
Tbg972630               ------------------------------------------------------------
Tb9276370               ------------------------------------------------------------
TcIL3000050510          ------------------------------------------------------------
TcIL3000050500          ------------------------------------------------------------
TcIL3000016620          ------------------------------------------------------------
TcIL3000016630          ------------------------------------------------------------
TcIL3000047260          ------------------------------------------------------------

Tbg97291330             ------------------------------------------------------------
Tbg97291280             ------------------------------------------------------------
Tbg97291270             ------------------------------------------------------------
Tbg97291300             ------------------------------------------------------------
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Tb09v40147              ------------------------------------------------------------
Tb091601520             ------------------------------------------------------------
Tb09v40149              ------------------------------------------------------------
Tb09v40059              ------------------------------------------------------------
Tb09v40058              ------------------------------------------------------------
Tb09v40148              ------------------------------------------------------------
Tbg97291380             ------------------------------------------------------------
Tb09v40060              ------------------------------------------------------------
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Tc00104705350401180     ------------------------------------------------------------
Tc00104705351185920O    ------------------------------------------------------------
Tc00104705350601110     ------------------------------------------------------------
Tc00104705351104770     ------------------------------------------------------------
Tc00104705350453350     ------------------------------------------------------------
Tc00104705350873510O    ------------------------------------------------------------
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Tc00104705350863740     ------------------------------------------------------------
Tc00104705351112960     ------------------------------------------------------------
Tc00104705351191190     ------------------------------------------------------------
Tc00104705351024930     ------------------------------------------------------------
Tc00104705350735910     ------------------------------------------------------------
TvY486_0201870          ------------------------------------------------------------
TvY486_0600050          ------------------------------------------------------------
TvY486_0028480          ------------------------------------------------------------
TvY486_0201850          ------------------------------------------------------------
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Tbg97223450             ------------------------------------------------------------
Tbg97223390             ------------------------------------------------------------
Tbg97223430             ------------------------------------------------------------
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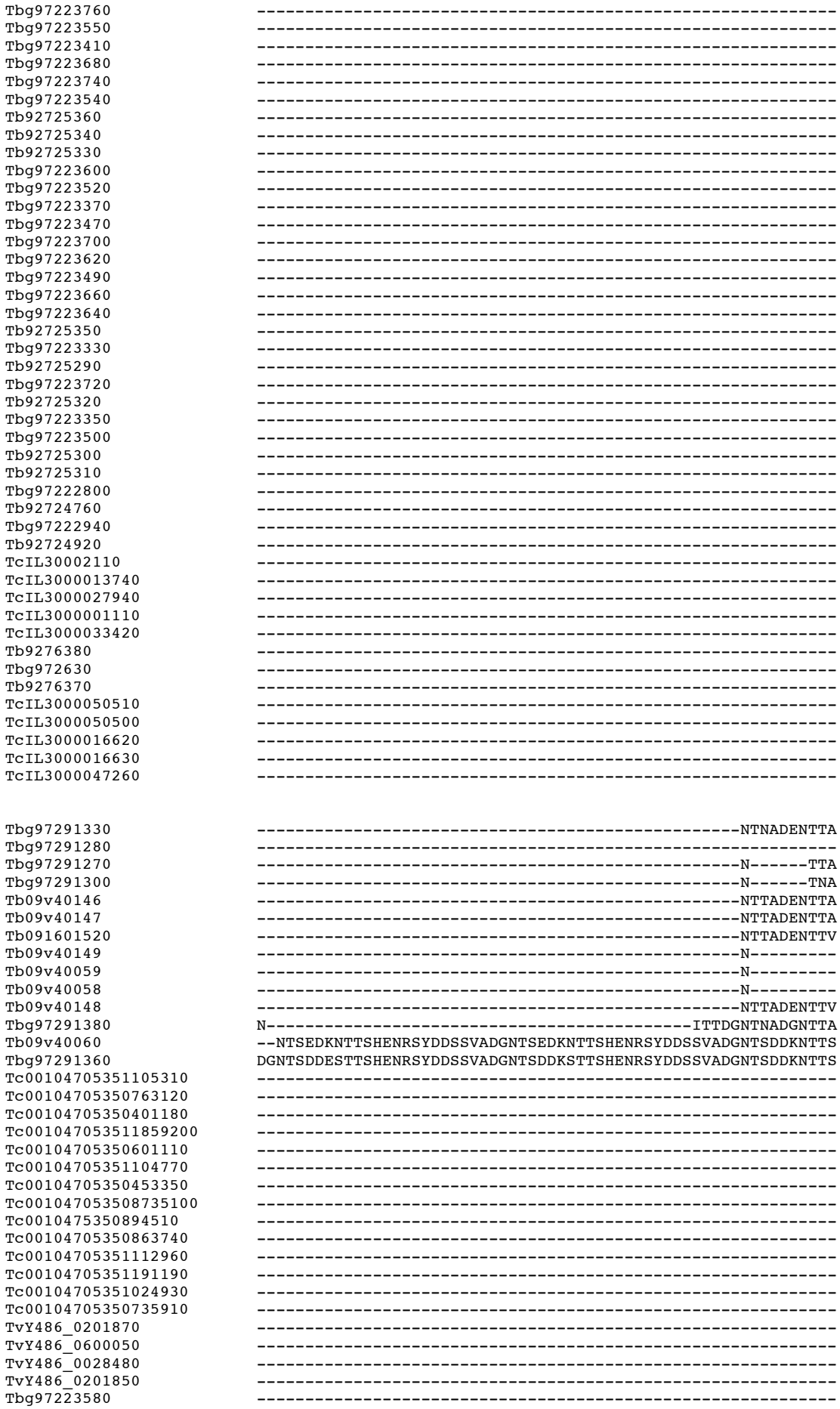
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Tbg97223700
Tbg97223620
Tbg97223490
Tbg97223660
Tbg97223640
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Tbg97223500
Tb92725300
Tb92725310
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Tb92724760
Tbg97222940
Tb92724920
TcIL30002110
TcIL3000013740
TcIL3000027940
TcIL3000001110
TcIL3000033420
Tb9276380
Tbg972630
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Tbg97291270
Tbg97291300
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Tb09v40147
Tb091601520
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Tb09v40059
Tb09v40058
Tb09v40148
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Tb09v40060
Tbg97291360
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Tc00104705350863740
Tc00104705351112960
Tc00104705351191190
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Tc00104705350735910
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TvY486_0600050
TvY486_0028480
TvY486_0201850
Tbg97223580
NTNADENTTA
N------TTA
N------TNA
NTTADENTTA
NTTADENTTA
NTTADENTTV
N---------
N---------
N---------
NTTADENTTV
ITTDGNTNADGNTTA
--NTSEDKNTTSHENRSYDDSSVADGNTSEDKNTTSHENRSYDDSSVADGNTSDDKNTTS
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Tbg97223540             ------------------------------------------------------------
Tb92725360              ------------------------------------------------------------
Tb92725340              ------------------------------------------------------------
Tb92725330              ------------------------------------------------------------
Tbg97223600             ------------------------------------------------------------
Tbg97223520             ------------------------------------------------------------
Tbg97223370             ------------------------------------------------------------
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Tbg97223490             ------------------------------------------------------------
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Tbg97223640             ------------------------------------------------------------
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Tbg97223330             ------------------------------------------------------------
Tb92725290              ------------------------------------------------------------
Tbg97223720             ------------------------------------------------------------
Tb92725320              ------------------------------------------------------------
Tbg97223350             ------------------------------------------------------------
Tbg97223500             ------------------------------------------------------------
Tb92725300              ------------------------------------------------------------
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Tb92724760              ------------------------------------------------------------
Tbg97222940             ------------------------------------------------------------
Tb92724920              ------------------------------------------------------------
TcIL30002110            ------------------------------------------------------------
TcIL3000013740          ------------------------------------------------------------
TcIL3000027940          ------------------------------------------------------------
TcIL3000001110          ------------------------------------------------------------
TcIL3000033420          ------------------------------------------------------------
Tb9276380               ------------------------------------------------------------
Tbg972630               ------------------------------------------------------------AN
Tb9276370               ------------------------------------------------------------
TcIL3000050510          ------------------------------------------------------------NETAS
TcIL3000050500          ------------------------------------------------------------NETAS
TcIL3000016620          ------------------------------------------------------------NETES
TcIL3000016630          ------------------------------------------------------------
TcIL3000047260          ----------------------------------------------------NGTDTNETAS


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Tbg97291280             -EN------TTADGNTNADEN--------------------------------------
Tbg97291270             DENTTADENTTADGNTTADENTTVDEN--------------------------------
Tbg97291300             DENTTADGNTTADGNTNADENTTVDEN--------------------------------
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Tb091601520             DENATVDENTTVDENTTADENTTADEN--------------------------------
Tb09v40149              ---------TTVDGNTNADENTTADEN--------------------------------
Tb09v40059              ---------TTVDENTNADENTTADEN--------------------------------
Tb09v40058              ---------ATVDENTTADENTTVDEN--------------------------------
Tb09v40148              DENTTVDENTTADGNTNADENTTADEN--------------------------------
Tbg97291380             DGNTTADGNTTADGNTNADGNTTTDEN--------------------------------
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Tbg97291360             HENRSCDDSSVADGNTSDDKNTTSHENRSYDDSSVADGNTSDDKNTTSHENRSYDDSSVA
Tc00104705351105310     ----------TPEKTFG------------------------------------------
Tc00104705350763120     ----------TPENTFG------------------------------------------
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Tc001047053511859200    ----------TPEDTFG------------------------------------------
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Tc00104705351104770     ----------TPENTFG------------------------------------------
Tc00104705350453350     ----------TPYRSFG------------------------------------------
Tc001047053508735100    ----------TPYRSFG------------------------------------------
Tc0010475350894510      ----------TPYRSFG------------------------------------------
Tc00104705350863740     ----------TPYLSFG------------------------------------------
Tc00104705351112960     ----------TPYRSFG------------------------------------------
Tc00104705351191190     ----------TPYRSFG------------------------------------------
Tc00104705351024930     ----------TPYRSFG------------------------------------------
Tc00104705350735910     ----------TPYRSFG------------------------------------------
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TvY486_0600050          -----TKPPTTPTPTTT----TTTTTTKP------------------------------
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TvY486_0028480          --GNILIPNSSPSSSTNNAPVSSTLTAMPTVDEASLAASGGGSNGTNGA----------
TvY486_0201850          --TSTTTTKAPTSTTT----STTATVAPTNTTSSSSTTESPSSPTTMADG---------
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Tbg97223450             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223390             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223430             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223760             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223550             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223410             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223680             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223740             ---------TTAAPASGVVPEP-----------------------------------
Tbg97223540             ---------TTAAPASGVVPEP-----------------------------------
Tb92725360              ---------TTAAPASGEVPEP-----------------------------------
Tb92725340              ---------TTAAPASGEVPEP-----------------------------------
Tb92725330              ---------TTAAPASGEVPEP-----------------------------------
Tbg97223600             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223520             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223370             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223470             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223700             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223620             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223490             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223660             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223640             ---------TTAAPASGEVPEP-----------------------------------
Tb92725350              ---------TTAAPASGEVPEP-----------------------------------
Tbg97223330             ---------TTAAPASGVVPEP-----------------------------------
Tb92725290              ---------TTAAPASGEVPEP-----------------------------------
Tbg97223720             ---------TTAAPASGEVPEP-----------------------------------
Tb92725320              ---------TTAAPASGEVPEP-----------------------------------
Tbg97223350             ---------TTAAPASGEVPEP-----------------------------------
Tbg97223500             ---------TTAAPASGEVPEP-----------------------------------
Tb92725300              ---------TTAAPASGEVPEP-----------------------------------
Tb92725310              ---------TTAAPASGEVPEP-----------------------------------
Tbg97222800             ----------AAPASGEVPEP-----------------------------------
Tb92724760              ----------TAPASGEVPEP-----------------------------------
Tbg97222940             ----------AAPASGEVPEP-----------------------------------
Tb92724920              ----------AAPASGEVPEP-----------------------------------
TcIL30002110            ---------TTTTTTTTKKPENTTTSTTT---------------------------
TcIL3000013740          ---------TTTTTTTTKKPENTTTSTTT---------------------------
TcIL3000027940          ---------TTTTTTTTKKPENTTTSTTT---------------------------
TcIL3000001110          ---------TPTTTTTTKQPEN-----------------------------------
TcIL3000033420          ---------TTTTTTTTKQPEN-----------------------------------
Tb9276380               ----------TANEELAVINESLHSDEE-----------------------------
Tbg972630               EDEVSGNGNSTANEELAVINESLHSDEE-----------------------------
Tb9276370               ----------TANEELAVINESLHSDEE-----------------------------
TcIL3000050510          EELNGTNTNETASEGLNGTNANETG---------------------------------
TcIL3000050500          EELNGTNANETASEELNGTNANETASEELNGTNANETESEELNGTSANETESEELN----
TcIL3000016620          EELNGTSANETASEELNGTNVNETE----------------------------------
TcIL3000016630          --LSGPEGSETASEELNGTNVNETE----------------------------------
TcIL3000047260          EELNGTDANETASEELNGTNANETASEELNGTDANETASEELNGTDANETASEELNGTDA


Tbg97291330             ---------TTADENTTVDGD------------TNAD-----------------------
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Tbg97291270             ------------------------------------------------------------
Tbg97291300             ---------TTVDEN-------------------------------------------
Tb09v40146              ---------TTVDENTTVDENTTADGNTNADENTTAD---------------------
Tb09v40147              ---------TTVDENTTADEN------------TTVD---------------------
Tb091601520             ---------TTADEN-------------------------------------------
Tb09v40149              ---------TTADEN-------------------------------------------
Tb09v40059              ---------TTVDENTNADEN------------TTAD---------------------
Tb09v40058              ---------TTVDEN-------------------------------------------
Tb09v40148              ---------TTVDEN-----------------TTVD---------------------
Tbg97291380             ---------TTADENTNADGNTTTDGNTNADGNTTADGNITTDGNTNADGNTTADGNTTA
Tb09v40060              DGNTSDDKNTTSHENSSHDDSSVADGNTSEDKNTTSHENRSHDDSSVADGNTSEDKNTTS
Tbg97291360             DGNSSDDKNTTSHENRSYDDSSVADGNSSDDKNTTSHENRSYDDSSVADGNTSDDKNTTT
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Tc00104705350401180     ------------------------------------------------------------
Tc001047053511859200    ------------------------------------------------------------
Tc00104705350601110     ------------------------------------------------------------
Tc00104705351104770     ------------------------------------------------------------
Tc00104705350453350     ------------------------------------------------------------
Tc001047053508735100    ------------------------------------------------------------
Tc00104753508945l0      ------------------------------------------------------------
Tc00104705350863740     ------------------------------------------------------------
Tc00104705351112960     ------------------------------------------------------------
Tc00104705351191190     ------------------------------------------------------------
Tc00104705351024930     ------------------------------------------------------------
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Tc00104705350735910      ------------------------------------------------------------
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TvY486_0600050           ------------------------------------------------------------
TvY486_0028480           ------------------------------------------------------------
TvY486_0201850           ------------------------------------------------------------
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Tbg97223390              ------------------------------------------------------------
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Tbg97223550              ------------------------------------------------------------
Tbg97223410              ------------------------------------------------------------
Tbg97223680              ------------------------------------------------------------
Tbg97223740              ------------------------------------------------------------
Tbg97223540              ------------------------------------------------------------
Tb92725360               ------------------------------------------------------------
Tb92725340               ------------------------------------------------------------
Tb92725330               ------------------------------------------------------------
Tbg97223600              ------------------------------------------------------------
Tbg97223520              ------------------------------------------------------------
Tbg97223370              ------------------------------------------------------------
Tbg97223470              ------------------------------------------------------------
Tbg97223700              ------------------------------------------------------------
Tbg97223620              ------------------------------------------------------------
Tbg97223490              ------------------------------------------------------------
Tbg97223660              ------------------------------------------------------------
Tbg97223640              ------------------------------------------------------------
Tb92725350               ------------------------------------------------------------
Tbg97223330              ------------------------------------------------------------
Tb92725290               ------------------------------------------------------------
Tbg97223720              ------------------------------------------------------------
Tb92725320               ------------------------------------------------------------
Tbg97223350              ------------------------------------------------------------
Tbg97223500              ------------------------------------------------------------
Tb92725300               ------------------------------------------------------------
Tb92725310               ------------------------------------------------------------
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Tb92724760               ------------------------------------------------------------
Tbg97222940              ------------------------------------------------------------
Tb92724920               ------------------------------------------------------------
TcIL30002110             ------------------------------------------------------------
TcIL3000013740           ------------------------------------------------------------
TcIL3000027940           ------------------------------------------------------------
TcIL3000001110           ------------------------------------------------------------
TcIL3000033420           ------------------------------------------------------------
Tb9276380                ------------------------------------------------------------
Tbg972630                ------------------------------------------------------------
Tb9276370                ------------------------------------------------------------
TcIL3000050510           ------------------------------------------------------------
TcIL3000050500           ------------------------------------------------------------
TcIL3000016620           ------------------------------------------------------------
TcIL3000016630           ------------------------------------------------------------
TcIL3000047260           NETASEELNGTDANETASEELNGTDANETASEELNGTDANETASEELNGTDANETASEEL


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Tbg97291270              ------------------------------------------------------------
Tbg97291300              ------------------------------------------------------------
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Tb09v40147               ------------------------------------------------------------
Tb091601520              ------------------------------------------------------------
Tb09v40149               ------------------------------------------------------------
Tb09v40059               ------------------------------------------------------------
Tb09v40058               ------------------------------------------------------------
Tb09v40148               ------------------------------------------------------------
Tbg97291380              DGNTNADGNTTTD------------------------------------------------
Tb09v40060               HENSSHDDSSVADGNTSEDKNTTSHENRSYDDSSVADGNTSEDKNTTSHENSSHDDSSVA
Tbg97291360              HENRSYDDSSVADGNTSDDKNTTSHENRSYDDSSVADGNTSDDKNTTIHENRSYDDSSVA
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Tc00104705350401180      ------------------------------------------------------------
Tc00104705351859200      ------------------------------------------------------------
Tc00104705350601110      ------------------------------------------------------------
Tc00104705351104770      ------------------------------------------------------------
Tc00104705350453350      ------------------------------------------------------------
Tc00104705350508735100   ------------------------------------------------------------
Tc00104753508735100      ------------------------------------------------------------
Tc00104705350894510      ------------------------------------------------------------
Tc00104705350863740      ------------------------------------------------------------
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Tc00104705351112960      ------------------------------------------------------------
Tc00104705351191190      ------------------------------------------------------------
Tc00104705351024930      ------------------------------------------------------------
Tc00104705350735910      ------------------------------------------------------------
TvY486_0201870           ------------------------------------------------------------
TvY486_0600050           ------------------------------------------------------------
TvY486_0028480           ------------------------------------------------------------
TvY486_0201850           ------------------------------------------------------------
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Tbg97223390              ------------------------------------------------------------
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Tbg97223760              ------------------------------------------------------------
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Tbg97223540              ------------------------------------------------------------
Tb92725360               ------------------------------------------------------------
Tb92725340               ------------------------------------------------------------
Tb92725330               ------------------------------------------------------------
Tbg97223600              ------------------------------------------------------------
Tbg97223520              ------------------------------------------------------------
Tbg97223370              ------------------------------------------------------------
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Tbg97223620              ------------------------------------------------------------
Tbg97223490              ------------------------------------------------------------
Tbg97223660              ------------------------------------------------------------
Tbg97223640              ------------------------------------------------------------
Tb92725350               ------------------------------------------------------------
Tbg97223330              ------------------------------------------------------------
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Tbg97223720              ------------------------------------------------------------
Tb92725320               ------------------------------------------------------------
Tbg97223350              ------------------------------------------------------------
Tbg97223500              ------------------------------------------------------------
Tb92725300               ------------------------------------------------------------
Tb92725310               ------------------------------------------------------------
Tbg97222800              ------------------------------------------------------------
Tb92724760               ------------------------------------------------------------
Tbg97222940              ------------------------------------------------------------
Tb92724920               ------------------------------------------------------------
TcIL30002110             ------------------------------------------------------------
TcIL3000013740           ------------------------------------------------------------
TcIL3000027940           ------------------------------------------------------------
TcIL3000001110           ------------------------------------------------------------
TcIL3000033420           ------------------------------------------------------------
Tb9276380                ------------------------------------------------------------
Tbg972630                ------------------------------------------------------------
Tb9276370                ------------------------------------------------------------
TcIL3000050510           ------------------------------------------------------------
TcIL3000050500           ------------------------------------------------------------
TcIL3000016620           ------------------------------------------------------------
TcIL3000016630           ------------------------------------------------------------
TcIL3000047260           NGTDANETASEELNGTDANETASEELNGTDANETASEELNGTDANETASEELNGTDANET


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Tbg97291270              ------------------------------------------------------------
Tbg97291300              ------------------------------------------------------------
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Tb09v40147               ------------------------------------------------------------
Tb091601520              ------------------------------------------------------------
Tb09v40149               ------------------------------------------------------------
Tb09v40059               ------------------------------------------------------------
Tb09v40058               ------------------------------------------------------------
Tb09v40148               ------------------------------------------------------------
Tbg97291380              ------------------------------------------------------------
Tb09v40060               DGNTSEDKNTTSHENRSYDDSSVADGNTSEDKNTTSHENRSYGDTSVADLSSSDDESTSD
Tbg97291360              DGNTSDDKNTTSHENRSYDDSSVADGNTSDDKNTTSHENRSCDDSSVADGNTSDDESTSD
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Tc00104705350401180      ------------------------------------------------------------
Tc00104705351859200      ------------------------------------------------------------
Tc00104705350601110      ------------------------------------------------------------
Tc00104705351104770      ------------------------------------------------------------
Tc00104705350453350      ------------------------------------------------------------
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Tc00104705350873510O      ------------------------------------------------------------
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Tc00104705351191190       ------------------------------------------------------------
Tc00104705351024930       ------------------------------------------------------------
Tc00104705350735910       ------------------------------------------------------------
TvY486_0201870            ------------------------------------------------------------
TvY486_0600050            ------------------------------------------------------------
TvY486_0028480            ------------------------------------------------------------
TvY486_0201850            ------------------------------------------------------------
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Tbg97223450               ------------------------------------------------------------
Tbg97223390               ------------------------------------------------------------
Tbg97223430               ------------------------------------------------------------
Tbg97223760               ------------------------------------------------------------
Tbg97223550               ------------------------------------------------------------
Tbg97223410               ------------------------------------------------------------
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Tbg97223540               ------------------------------------------------------------
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Tb92725340                ------------------------------------------------------------
Tb92725330                ------------------------------------------------------------
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Tbg97223520               ------------------------------------------------------------
Tbg97223370               ------------------------------------------------------------
Tbg97223470               ------------------------------------------------------------
Tbg97223700               ------------------------------------------------------------
Tbg97223620               ------------------------------------------------------------
Tbg97223490               ------------------------------------------------------------
Tbg97223660               ------------------------------------------------------------
Tbg97223640               ------------------------------------------------------------
Tb92725350                ------------------------------------------------------------
Tbg97223330               ------------------------------------------------------------
Tb92725290                ------------------------------------------------------------
Tbg97223720               ------------------------------------------------------------
Tb92725320                ------------------------------------------------------------
Tbg97223350               ------------------------------------------------------------
Tbg97223500               ------------------------------------------------------------
Tb92725300                ------------------------------------------------------------
Tb92725310                ------------------------------------------------------------
Tbg97222800               ------------------------------------------------------------
Tb92724760                ------------------------------------------------------------
Tbg97222940               ------------------------------------------------------------
Tb92724920                ------------------------------------------------------------
TcIL30002110              ------------------------------------------------------------
TcIL3000013740            ------------------------------------------------------------
TcIL3000027940            ------------------------------------------------------------
TcIL3000001110            ------------------------------------------------------------
TcIL3000033420            ------------------------------------------------------------
Tb9276380                 ------------------------------------------------------------
Tbg972630                 ------------------------------------------------------------
Tb9276370                 ------------------------------------------------------------
TcIL3000050510            ------------------------------------------------------------
TcIL3000050500            ------------------------------------------------------------
TcIL3000016620            ------------------------------------------------------------
TcIL3000016630            ------------------------------------------------------------
TcIL3000047260            ASEELNGTDANETASEELNGTDANETASEELNGTDTNETASEELNGTDANETASEELNGT


Tbg97291330               ----------------------------------------ENTTVDENTTVDEN------
Tbg97291280               ------------------------------------------------TTVDEN------
Tbg97291270               ----------------------------------------TTVDENTTVDEN------
Tbg97291300               ------------------------------------------TTVDENTTVDEN------
Tb09v40146                ----------------------------------------ENTTVDENTTVDEN------
Tb09v40147                ----------------------------------------ENTTVDENTTVDEN------
Tb091601520               ------------------------------------------TTADENATADEN------
Tb09v40149                ------------------------------------------TTADENTTADEN------
Tb09v40059                ----------------------------------------ENTNVDENTTADEN------
Tb09v40058                ------------------------------------------TNVDENTTADEN------
Tb09v40148                ----------------------------------------ENTTVDENTTVDEN------
Tbg97291380               --------------------------ENTTADENTNADGNTTVDENTTADGN------
Tb09v40060                DESTSDYESTADEEYSLYNN----GIWKENTTADENTTADENTNVDENTTADEN------
Tbg97291360               DESTSDYESTADEEYSLYNN----GIWKENTTADENTTVDENTTVDENTTVDENTTVDEN
Tc00104705351105310       ------------------------------------------VVCETQEGYV------
Tc00104705350763120       ------------------------------------------VVCETQEGYV------
Tc00104705350401180       ------------------------------------------VVCETQEGYV------
Tc00104705351185920O      ------------------------------------------VVCETQEGYV------
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Tc00104705350601110       ------------------------------------------VVCETQEGYV------
Tc00104705351104770       ------------------------------------------VVCETQEGYV------
Tc00104705350453350       ------------------------------------------VVCETQKGYV------
Tc00104705350735100       ------------------------------------------VVCETQKGYV------
Tc0010475350894510        ------------------------------------------VVCEAQKGYV------
Tc00104705350863740       ------------------------------------------VVCEAQKGYV------
Tc00104705351112960       ------------------------------------------VVCEAQKGYV------
Tc00104705351191190       ------------------------------------------VVCEAQKGYV------
Tc00104705351024930       ------------------------------------------VVCEAQKGYV------
Tc00104705350735910       ------------------------------------------VVCEAQKGYV------
TvY486_0201870            --------------------------PT----KTTTTT-----TSAPDVSEWV------
TvY486_0600050            --------------------------PT----TTTTTT-----TSAPDVSEWV------
TvY486_0028480            ----------------------GHHPTGSAVTAVTATKPPPPTSAPDVSEWV------
TvY486_0201850            ----------------------SSGPSGGAAGTPSSS--SG-TASATSPGPV------
Tbg97223580               ------------------------------------------TVTKDEEVT--------
Tbg97223450               ------------------------------------------TVTKDEEVT--------
Tbg97223390               ------------------------------------------TVTKDEEVT--------
Tbg97223430               ------------------------------------------TVTKDEEVT--------
Tbg97223760               ------------------------------------------TVTKDEEVT--------
Tbg97223550               ------------------------------------------TVTKDEEVT--------
Tbg97223410               ------------------------------------------TVTKDEEVT--------
Tbg97223680               ------------------------------------------TVTKDEEVT--------
Tbg97223740               ------------------------------------------TVTKDEEVT--------
Tbg97223540               ------------------------------------------TVTKDEEVT--------
Tb92725360                ------------------------------------------TVTKDEEVT--------
Tb92725340                ------------------------------------------TVTKDEEVT--------
Tb92725330                ------------------------------------------TVTKDEEVT--------
Tbg97223600               ------------------------------------------TVTKDEEVT--------
Tbg97223520               ------------------------------------------TVTKDEEVT--------
Tbg97223370               ------------------------------------------TVTKDEEVT--------
Tbg97223470               ------------------------------------------TVTKDEEVT--------
Tbg97223700               ------------------------------------------TVTKDEEVT--------
Tbg97223620               ------------------------------------------TVTKDEEVT--------
Tbg97223490               ------------------------------------------TVTKDEEVT--------
Tbg97223660               ------------------------------------------TVTKDEEVT--------
Tbg97223640               ------------------------------------------TVTKDEEVT--------
Tb92725350                ------------------------------------------TVTKDEEVT--------
Tbg97223330               ------------------------------------------TVTKDEEVT--------
Tb92725290                ------------------------------------------TVTKDEEVT--------
Tbg97223720               ------------------------------------------TVTKDEEVT--------
Tb92725320                ------------------------------------------TVTKDEEVT--------
Tbg97223350               ------------------------------------------TVTKDEEVT--------
Tbg97223500               ------------------------------------------TVTKDEEVT--------
Tb92725300                ------------------------------------------TVTKDEEVT--------
Tb92725310                ------------------------------------------TVTKDEEVT--------
Tbg97222800               ------------------------------------------TVTKDEEVT--------
Tb92724760                ------------------------------------------TVTKDEEVT--------
Tbg97222940               ------------------------------------------TVTKDEEVT--------
Tb92724920                ------------------------------------------TVTKDEEVT--------
TcIL30002110              ---------------------------------------TTTTTAEPENT-T------
TcIL3000013740            ---------------------------------------TTTTTAEPENT-T------
TcIL3000027940            ---------------------------------------TTTTTAEPENT-T------
TcIL3000001110            ---------------------------------------TTTTTKEPENN-T------
TcIL3000033420            ---------------------------------------TTTTTKEPENTTT------
Tb9276380                 ------------------------------------------STNSQDQ--------
Tbg972630                 ------------------------------------------STNSQDQ--------
Tb9276370                 ------------------------------------------STNSQDQ--------
TcIL3000050510            ------------------------------------------SEDSSSG--------
TcIL3000050500            ----------------------GTNANETASEELNGTNANETESDDSSSG--------
TcIL3000016620            ------------------------------------------SDDSSSG--------
TcIL3000016630            ------------------------------------------SDDSSSG--------
TcIL3000047260            NANETASEELNGTDTNETASEELNGTNANETASEELNGTDANETASEDSPSG--------


Tbg97291330               TNTDEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tbg97291280               TNTDEISNGSNEASDKTVPSTSSDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tbg97291270               TNTDEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tbg97291300               TNTDEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tb09v40146                TNADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb09v40147                TNADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb091601520               TIADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb09v40149                TNADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb09v40059                TIADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb09v40058                TIADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tb09v40148                TNADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tbg97291380               TTADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tb09v40060                TNADEISNGSNEASDKTVPSTASDGEGSGGGAGAAVVIIFILLAVLLILLYFCCFAG--H
Tbg97291360               TNTDEISNGSNEASDKTVPSTSSDGEGSGGGAGAAVVIIFILLVVLLVLLYFCCFAG--H
Tc00104705351105310       VSTTTLPPT----------VEISWVHKRWYVILIAILVPVIVAVAIITVCFCRSCGGHDE
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Tc00104705350763120       VSTTTLPPT----------VEIPWVHKRWYVILIAILVPVIVAVAIITVYFCRSCGGHDE
Tc00104705350401180       VSTTTLPPT----------VEIPWVHKRWYVILIAILVPVIVAVAIITACFCRCRGADDE
Tc001047053511859200      VSTTTLPPT----------VEISWVRKNWYFVLIAILVPVIVAVALITVCFCRCRGADDE
Tc00104705350601110       VSTTTLPPT----------VKISWVHKRWYVILIAILVPVIVAVTLITVCFCRCRGADDE
Tc00104705351104770       VSTTTLPPA----------VEISWVQKNWYFVLAAILVPVIVAVVLITACFCRCRGADDE
Tc00104705350453350       VSTTTLPPA----------IVVPWLQKNWYVVLIVVLLPVVVAVALITVCFYRCRGVDDE
Tc001047053508735100      VSTTTLPPA----------VVVPWLQKNWYVVLIVVLLPVVVAVALITVCFYRCRGVDDE
Tc00104753508950894510    VSTTTLPPA----------VVVPWLQKNWYVVLLAVLLPVIAAAALITVCFYRCRGV-DE
Tc00104705350863740       VSTTTLPPA----------VVVPWLQKNWYFVLLAVLLPVIAAAALITVCFYRCRGVYDE
Tc00104705351112960       VSTTTLPPA----------VVVPWLQKNWYVVLMAVLLPVIAAVALITVCFYRCRGVEDE
Tc00104705351191190       VSTTTLPPA----------VVVPWLQKNWYVVLIAVLLPVIAAVALITVCFYRCRGVDDE
Tc00104705351024930       VSTTTLPPA----------VVVPWLQKNWYVVLIAVLLPVIAAVALITVCFYRCRGVDDE
Tc00104705350735910       VSTTTLPPA----------VVVPWLQKNWYFILAAILLPVIAAVALITVCFCRCRGVDDE
TvY486_0201870            SSATFVPPVPGAKGQVGRDASSTWAERYWYVILLGLLVAIAAVVLIVLCLCLRCCAG--D
TvY486_0600050            SSATFVPPVPGAKGQVGRDASSTWAERYWYVILLGLLVAIAAVVLIVLCLCLRCCAG--D
TvY486_0028480            SSATFVPPVPGAKGQVGRDASSTWAERYWYVILLSLLVAIAAVVLIVLCLCLRCCAG--D
TvY486_0201850            GNATSAPPVPGGAGHAGLGASSTWAERYWYVILLVFLSVIVAIVLIVLLFVCRSRSR--D
Tbg97223580               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223450               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN---
Tbg97223390               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223430               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223760               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223550               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223410               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223680               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223740               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223540               VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tb92725360                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tb92725340                VTTVSLEERS-----------------NWHIILIALISVVSLIALLLFLLRWFCDYD--V
Tb92725330                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tbg97223600               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223520               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223370               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFWDYN--V
Tbg97223470               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223700               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223620               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223490               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tbg97223660               VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223640               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tb92725350                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tbg97223330               VTTVSLEERS-----------------NWHIILIALISVVALIVLLLLLLRWFCDYN--V
Tb92725290                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tbg97223720               VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tb92725320                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tbg97223350               VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97223500               VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
Tb92725300                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tb92725310                VTTVSLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYD--V
Tbg97222800               VTTASLEERI-----------------DLLIILIALISVVSLIVLLLFLLRWFCDYN--V
Tb92724760                VTTVSLEERI-----------------DLLIILIALISVVSLIVLLLFLLRWFCDYN--V
Tbg97222940               VTTASLEERS-----------------NWHIILIALISVVALIVLLLFLLRWFCDYN--V
Tb92724920                VTTASLEERS-----------------NWHIILIALISVVSLIVLLLFLLRWFCDYN--V
TcIL30002110              TTTTAQPEASEGK-GSG------------YIILIVLLLLAALIALLLLAYCCFSAG---G
TcIL3000013740            TTTTAQPEASEGK-GSG------------YIILIVLLLLAALIALLLLAYCCFSAG---G
TcIL3000027940            TTTTAQPEASEGK-GSG------------YIILIVLLLLAALIALLLLAYCCFSAG---G
TcIL3000001110            TTTTAQPEASEGSDGSSG-ASTSWGTRNWYIILIVLLLLAALIALLLLAYCCFSAG---G
TcIL3000033420            TTTTAQPEASEGSDGSSG-ASASWGTRNWYIILIVFLLLAALIALLLLAYCCFSAG---G
Tb9276380                 PSATPKPKGE----------------AETTLTSLSHITICVGGELCLLIVFFSLAIV--C
Tbg972630                 PSATPKPKGE----------------AETTLTSLSHITICVGGELCLLIVFFSLAIV--C
Tb9276370                 PSATPKPKGE----------------AETTLTSLSHITICVGGELCLLIVFFSLAIV--C
TcIL3000050510            VSSTEAPAGK----------------VNGGVLAVAILLPIIAIALLLLLWYFCFRRR--D
TcIL3000050500            VSSTEAPAGK----------------VNGGVLAVAILLPIIAIALLLLLWYFCFRRR--D
TcIL3000016620            VSSTEAPAGK----------------VNGGVLALAILLPIIAIALLLLLWYFCFRRR--D
TcIL3000016630            VSSTEAPAGK----------------VNGGVLAVAILLPIIAIALLLLLWYFCFRRR--D
TcIL3000047260            VSSTAAPAGK----------------VNGGVLALAILLPIIAIVLLLLAWYFCVGWK--N
                            :                                 :       :

Tbg97291330               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tbg97291280               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tbg97291270               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tbg97291300               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40146                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40147                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb091601520               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40149                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40059                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40058                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tb09v40148                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tbg97291380               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
```

```
Tb09v40060                EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITNHQQETP
Tbg97291360               EKYITVMSLREKVTSP---VSNVEAAEVAAVP-----------SNGEEHLSITSHQQETP
Tc00104705351105310       SKWVVHMVLREVNGEP---LHPIDGDGGIYND-DSPMMRYSTLGDGVPMTAPSGYENVEV
Tc00104705350763120       SKWVVHMVLREVNGEP---LHPIDGDGGIYND-DSPMMRYSTLGDGVPMTAPSGYENVEV
Tc00104705350401180       SKWVVHMVLREVNSEP---LHPIDGDGGIYND-DSQMMRYSTLGDGVPMTAPSGYENVEV
Tc001047053511859200      SKWVVHMVLREVNGKP---LHPIDGDDGIYND-NSPMMRYSTLGDGVPMNTPFAYENVEV
Tc00104705350601110       SKWVVHMVLREVSSEP---LHPIDGDDGIYND-NSPMMRYSTLGDGVPMNTPFAYENVEV
Tc00104705351104770       SKWVVHMVLREVNGKP---FHVTDRNGGIYND-DSPMMRYSTLGDGVPMTAPFAYENVEV
Tc00104705350453350       SKWVVHMVLREINDNP---LYAIDRNDGIYNN-DGQMKQDSTLGDGMPTTTPSWHENAEV
Tc001047053508735100      SKWVAHMVLREINDNP---LYAIDRNDGIHNK-DSQMKQDLTLGDGMPTTVPSEHENAEV
Tc0010475350894510        SKWVVHMVLREMNDNP---LYAIDRNDRIHNN-NG-LMLDATLGDEVLMTVPPGYESFEV
Tc00104705350863740       SKWVVHMVLREMNDNP---LYAIDRNDRIHNN-NG-LMLDATFGDEVLMNVPPGYESFEV
Tc00104705351112960       SKWVVHMVLREVKREP---LYAIDGNDGIYNN-NGQMLRSLTLGDEVVMTVPSGYESFEV
Tc00104705351191190       SKWVVHMVLREVKREP---LYAIDGNDGIYNNDNSQMLRSLTLGDEVLMTVPSGYENFEV
Tc00104705351024930       SKWVVHMVLREMNDSP---LYAIDGNDGIHNN-NSQMLRSLTLGDEVLTTVPSGYGNFEV
Tc00104705350735910       SKWVVHMVLREVKREP---LYAIDRNDGIHND-ASQMKEDSTLGDGMPMTVSSGHENAEV
TvY486_0201870            GEKVTPMVLRESAGAPLCVVAPVGDGDAYYAD--------------VPPFVPSHADGAGY
TvY486_0600050            GEKVTPMVLRESAGAPLCVVAPVGDGDAYYAD--------------VPPFVPSHADGAGY
TvY486_0028480            GEKVTPMVLRESAGAPLCVVAPVGDGDAYYAD--------------VPPFVPSHADGMWL
TvY486_0201850            GEKVTPMVLRESFHVP-YMVGTANDTGAYYAD--------------APPFVPPQNRGMER
Tbg97223580               KKEIIPMTVREVVGEP---LFVLESTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223450               ------------------------------------------------------------
Tbg97223390               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223430               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223760               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223550               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223410               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223680               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223740               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223540               KKEIIPMTLREVVG----------------------------------------------
Tb92725360                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725340                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725330                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223600               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223520               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223370               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223470               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223700               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223620               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223490               KKEIIPMTLREVVGEP---LFVLESTPFVPPE-----------GFDAPPLALQYYD----
Tbg97223660               KKEIIPMTLREVVGEP---LFVLESTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223640               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725350                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223330               KKEIIPMTLREVVGEP---LFVLESTPFAPPE-----------GFAAPPLALQYYNQMRT
Tb92725290                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223720               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725320                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFDAPPLALQYYNQMRT
Tbg97223350               KKEIIPMTLREVVGEP---LFVLESTPFVPPE-----------GFAAPPLALQYYNQMRT
Tbg97223500               KKEIIPMTLREVVGEP---LFVLESTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725300                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMRT
Tb92725310                KKEIIPMTLREVVGEP---LFVLEPTPFAPPE-----------GFAAPPLALQYYNQMRT
Tbg97222800               KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMMT
Tb92724760                KKEIIPMTLREVVGEP---LFVLEPTPFVPPE-----------GFAAPPLALQYYNQMMT
Tbg97222940               KKEIIPMTLREVVGEP---LFVLESTPFVPPE-----------GFDAPPLALQYYD----
Tb92724920                KKEIIPMTLREVVGEP---LFVLEPTPFAPPE-----------GFDAPPLALQYYG----
TcIL30002110              GKELTPMTLREVTGLP---VRAVEPESYAAPD-----------EAYDIPQPLGYHYAQGN
TcIL3000013740            GKELTPMTLREVTGLP---VRAVEPESYAAPD-----------EAYDIPQPLGYHYAQGN
TcIL3000027940            GKELTPMTLREVTGLP---VRAVEPESYAAPD-----------EAYDIPQPLGYHYAQGN
TcIL3000001110            GKELTPMTLREVCGLP---LCAADSESYAAPD-----------EAYDIPQPLSYHNAQGH
TcIL3000033420            GKELTPMTLREVCGLP---LCAAGSESYAAPD-----------EAYGIPPPQSYHNAQGH
Tb9276380                 ------------------------------------------------------------
Tbg972630                 ------------------------------------------------------------
Tb9276370                 ------------------------------------------------------------
TcIL3000050510            EKEDTPLSLREVYSPA---ECPSPVEAPLTSE-----------GGGAAEGGSPNASPAVA
TcIL3000050500            EKEDAPLSLREVYSPA---ECPSPVEAPLTSE-----------GGGAAEGGSPNASPAVA
TcIL3000016620            EKEDAPLSLREVYSPA---ECPSPVEAPLTSE-----------GGGAAEGGSPNASPVVA
TcIL3000016630            EKEDAPLSLREVYSPA---ECPSPVEAPLTSE-----------GGGAAEGGSPNASPAVA
TcIL3000047260            DKEITCMRLRETFLSP---ACLSPAEVPLTNG-----------GGGVAKAGSPNASPMGA


Tbg97291330               AADE--------------
Tbg97291280               AADE--------------
Tbg97291270               AGDE--------------
Tbg97291300               AGDE--------------
Tb09v40146                AVDE--------------
Tb09v40147                AADE--------------
Tb091601520               AADE--------------
Tb09v40149                AADE--------------
Tb09v40059                AADE--------------
```

```
Tb09v40058              AADE--------------
Tb09v40148              AVDE--------------
Tbg97291380             AGDE--------------
Tb09v40060              AADE--------------
Tbg97291360             AADE--------------
Tc00104705351105310     PRVIKNQETTVYDDGDVL
Tc00104705350763120     PRVIKNQETTVYDDGDVL
Tc00104705350401180     PRVIKNQETTVYDDGDVF
Tc00104705351859200     PRVIKNQENTVYDDGDVF
Tc00104705350601110     PRVIKNQENTVYDDGDVF
Tc00104705351104770     PKVIKNE-----------
Tc00104705350453350     PTVIASQESTVYDLGDVF
Tc00104705350735100     PTVIASQESTVYDLGDIL
Tc00104705350894510     PTVIKNQGSTVYDDGDVA
Tc00104705350863740     PTVIKNQGSTVYDDGDVF
Tc00104705351112960     PTVIKNQGSTVYDDGDVV
Tc00104705351191190     PKVVKNQGSTVYDDGDVA
Tc00104705351024930     PKVIKNQGSTVYDDGDVA
Tc00104705350735910     PKVTASQESTVYDFGDIL
TvY486_0201870          DGAW--------------
TvY486_0600050          DGAW--------------
TvY486_0028480          PQC---------------
TvY486_0201850          VHAW--------------
Tbg97223580             SE----------------
Tbg97223450             ------------------
Tbg97223390             SE----------------
Tbg97223430             SE----------------
Tbg97223760             SE----------------
Tbg97223550             SE----------------
Tbg97223410             SE----------------
Tbg97223680             SE----------------
Tbg97223740             SE----------------
Tbg97223540             ------------------
Tb92725360              SE----------------
Tb92725340              SE----------------
Tb92725330              SE----------------
Tbg97223600             SE----------------
Tbg97223520             SE----------------
Tbg97223370             SE----------------
Tbg97223470             SE----------------
Tbg97223700             SE----------------
Tbg97223620             SE----------------
Tbg97223490             ------------------
Tbg97223660             SE----------------
Tbg97223640             SE----------------
Tb92725350              SE----------------
Tbg97223330             SE----------------
Tb92725290              SE----------------
Tbg97223720             SE----------------
Tb92725320              SE----------------
Tbg97223350             SE----------------
Tbg97223500             SE----------------
Tb92725300              SE----------------
Tb92725310              SE----------------
Tbg97222800             GQSY--------------
Tb92724760              GQSY--------------
Tbg97222940             ------------------
Tb92724920              ------------------
TcIL30002110            GDEW--------------
TcIL3000013740          GDEW--------------
TcIL3000027940          GDEW--------------
TcIL3000001110          EGQW--------------
TcIL3000033420          EGQW--------------
Tb9276380               ------------------
Tbg972630               ------------------
Tb9276370               ------------------
TcIL3000050510          Q-----------------
TcIL3000050500          Q-----------------
TcIL3000016620          Q-----------------
TcIL3000016630          Q-----------------
TcIL3000047260          R-----------------
```

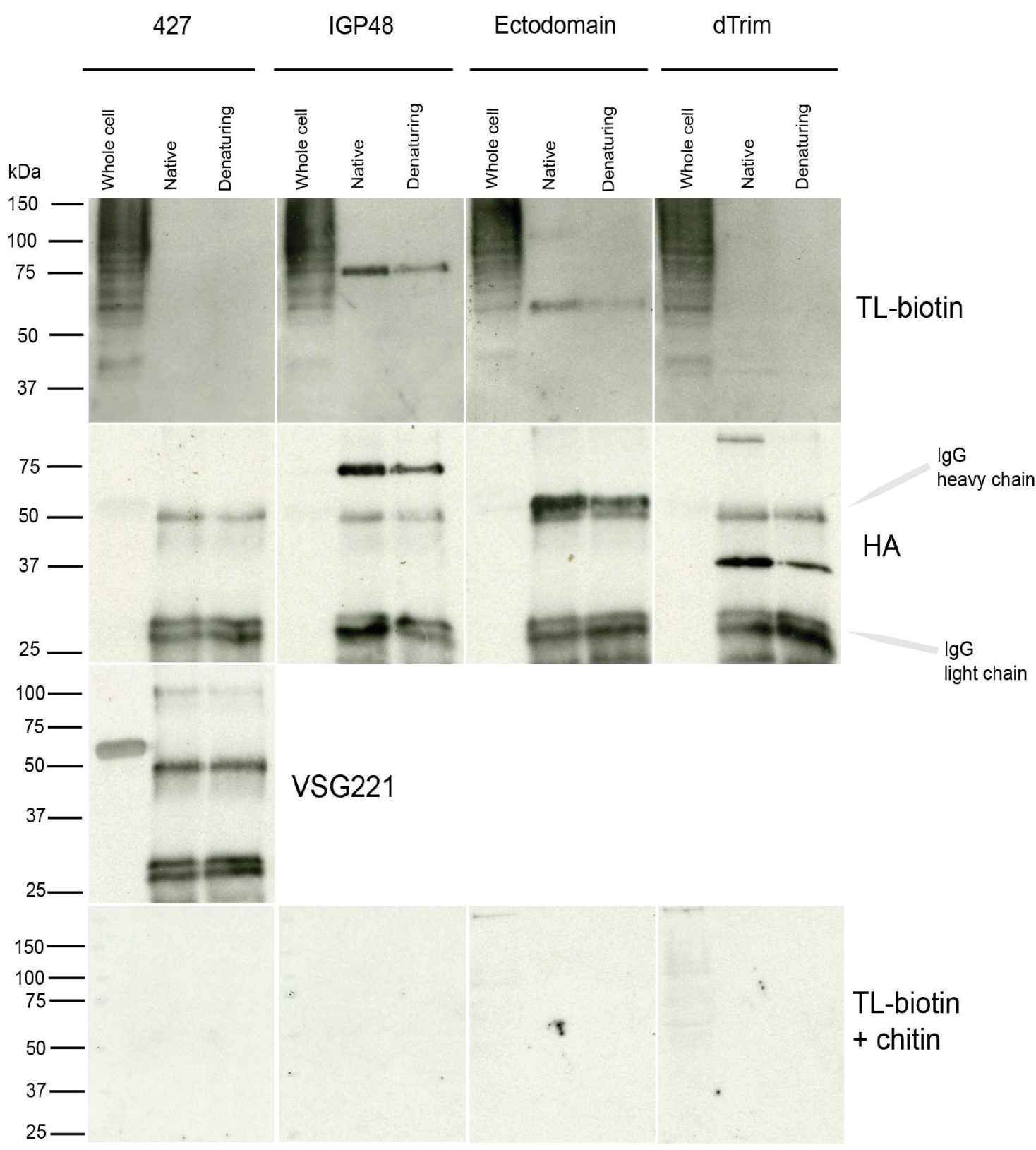

427
IGP48
Ectodomain
dTrim
Whole cell
Native
Denaturing
kDa
150
100
75
50
37
25
TL-biotin
HA
IgG
heavy chain
IgG
light chain
VSG221
TL-biotin
+ chitin

Figure S4

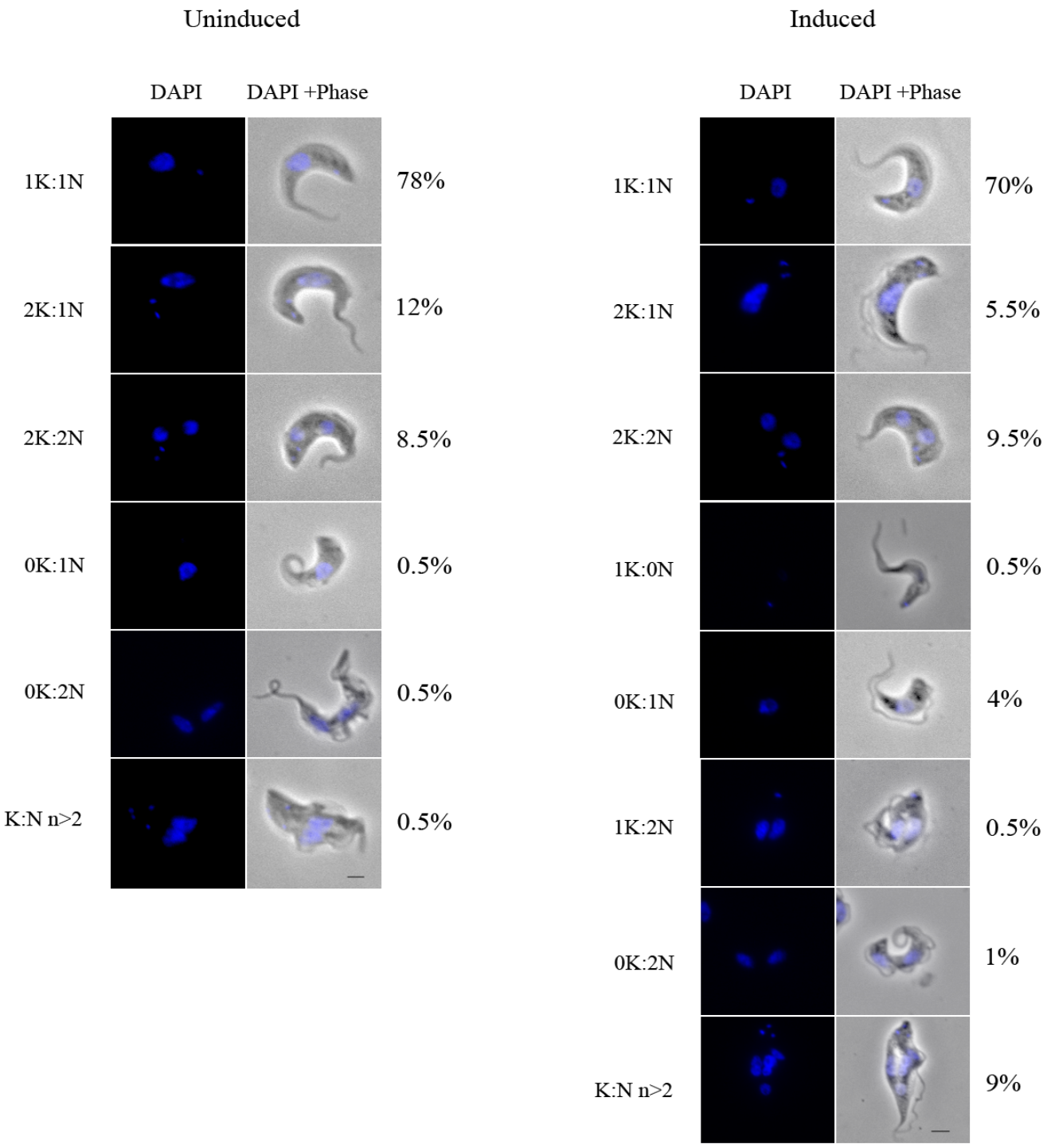

Uninduced
DAPI
DAPI +Phase
1K:1N
78%
2K:1N
12%
2K:2N
8.5%
0K:1N
0.5%
0K:2N
0.5%
K:N n>2
0.5%
Induced
DAPI
DAPI +Phase
1K:1N
70%
2K:1N
5.5%
2K:2N
9.5%
1K:0N
0.5%
0K:1N
4%
1K:2N
0.5%
0K:2N
1%
K:N n>2
9%

Figure S5

Figure S6

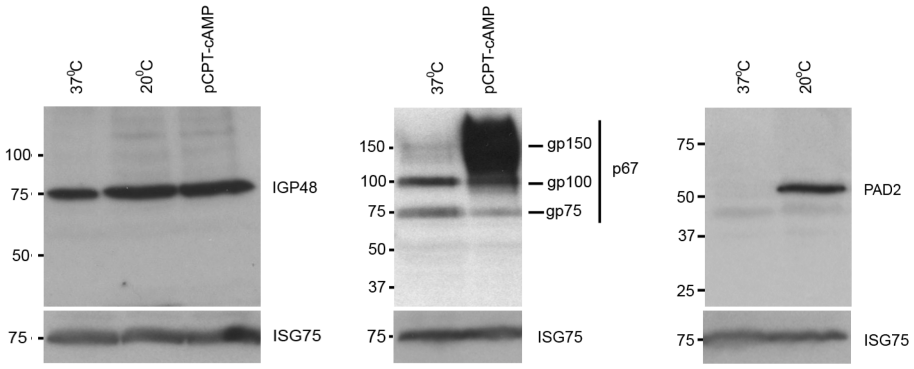

37°C
20°C
pCPT-cAMP
100
75
50
IGP48
75
ISG75
37°C
pCPT-cAMP
150
100
75
50
37
gp150
gp100
gp75
p67
75
ISG75
37°C
20°C
75
50
37
25
PAD2
75
ISG75

Figure S7

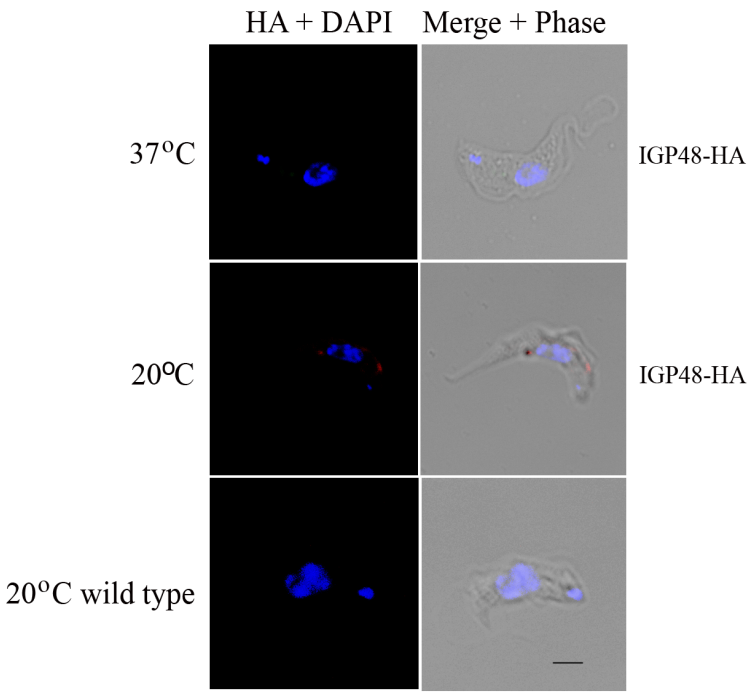


Figure S8

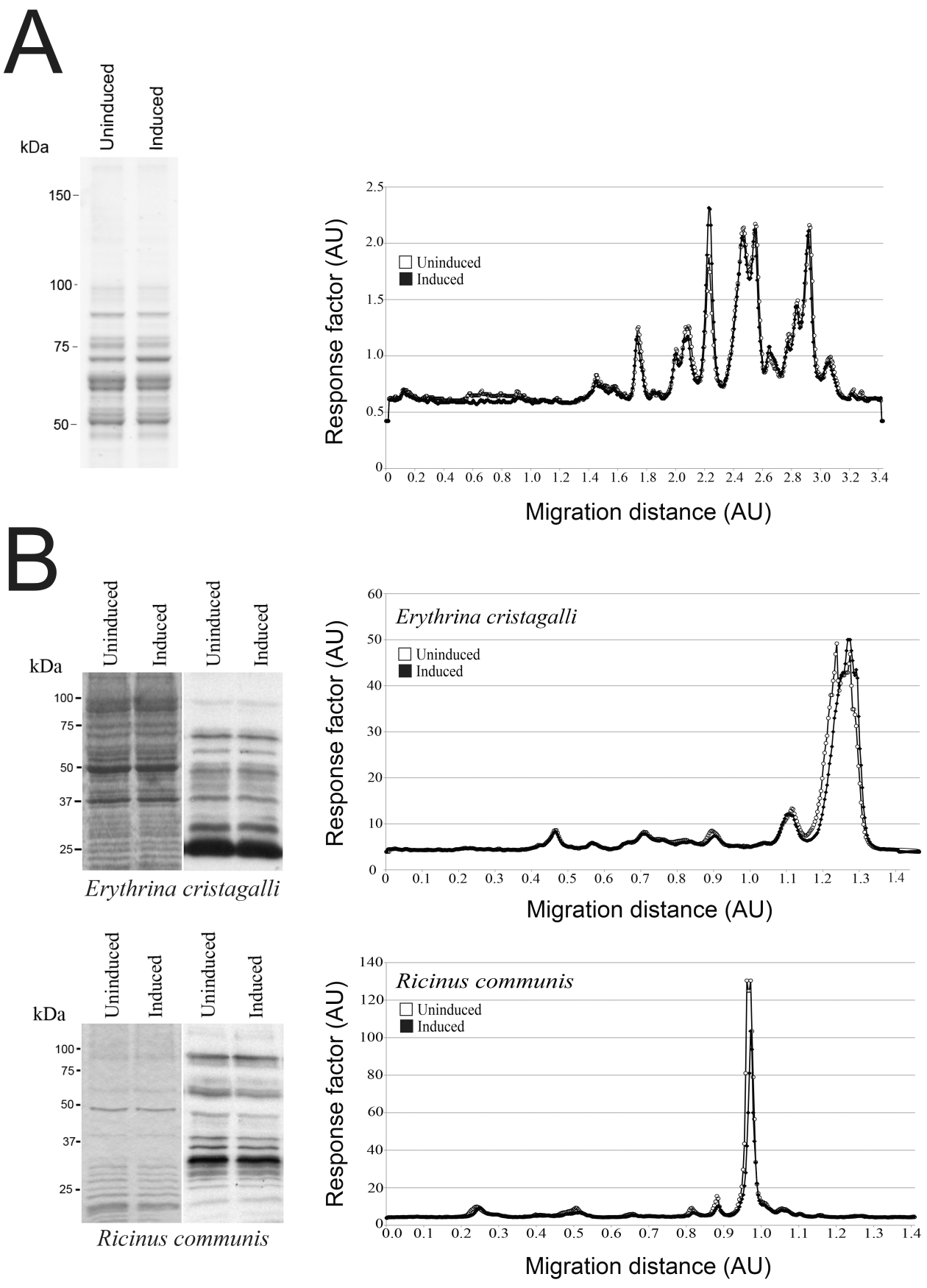

A
Uninduced
Induced
kDa
150
100
75
50
Response factor (AU)
Uninduced
Induced
Migration distance (AU)
B
Uninduced
Induced
Uninduced
Induced
kDa
100
75
50
37
25
Erythrina cristagalli
Erythrina cristagalli
Migration distance (AU)
Uninduced
Induced
Uninduced
Induced
kDa
100
75
50
37
25
Ricinus communis
Ricinus communis
Migration distance (AU)

Figure S9

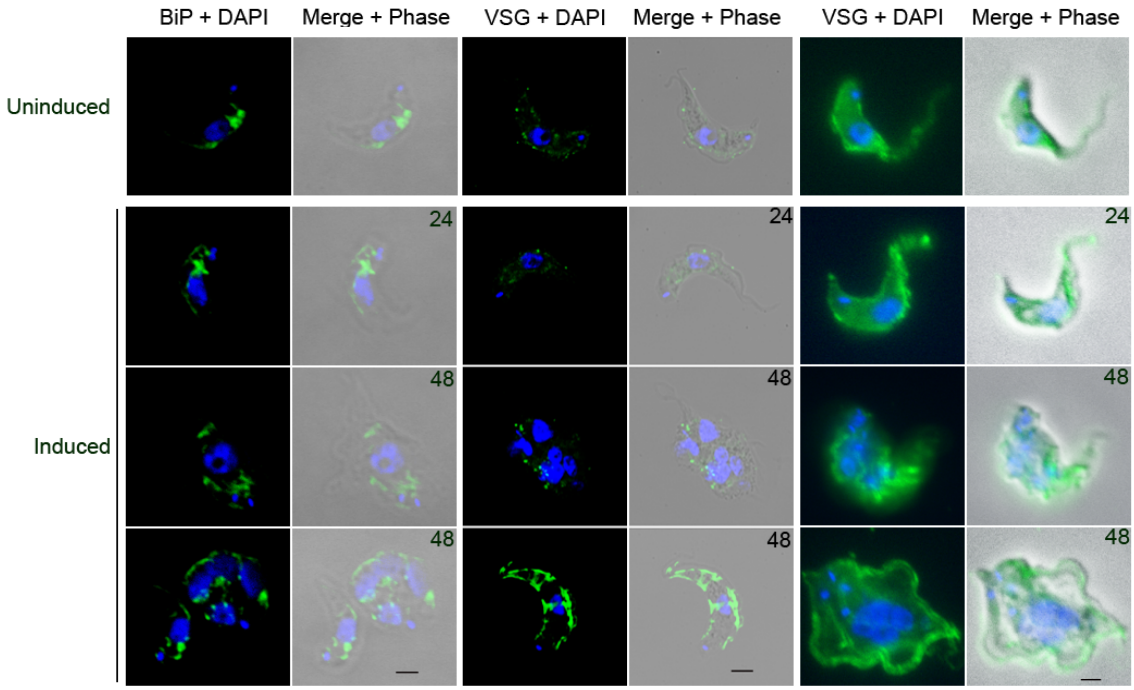
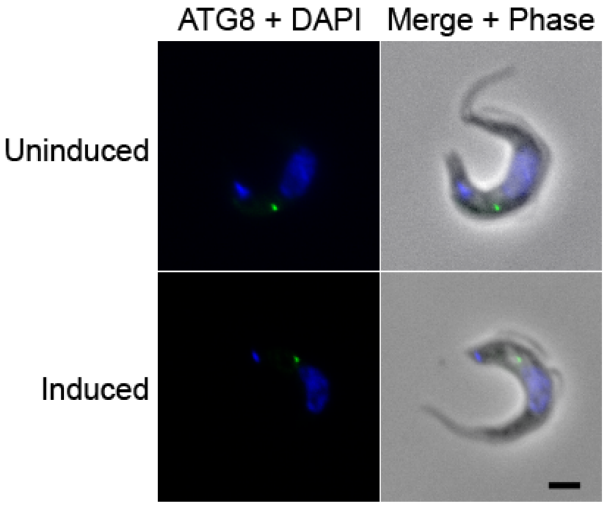
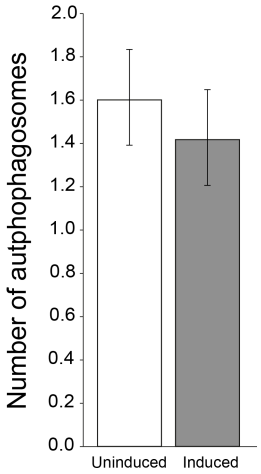
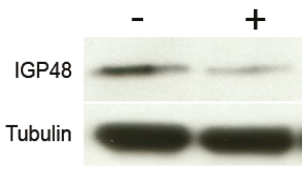

BiP + DAPI
Merge + Phase
VSG + DAPI
Merge + Phase
VSG + DAPI
Merge + Phase
Uninduced
Induced
24
24
24
48
48
48
48
48
48

Figure S10


ATG8 + DAPI
Merge + Phase
Uninduced
Induced


Number of autphophagosomes
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Uninduced
Induced


-
+
IGP48
Tubulin

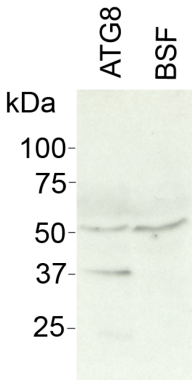

ATG8
BSF
kDa
100
75
50
37
25

Table S1

Oligomers	**Sequence**	**Restriction site**	**Epitope tag**	
RNAi knock-down confirmation				
IGP48:FP	GCCGGTGCTGCTGTTGTTA	-	-	
IGP48:RP	ATACGGGTGAGGTAACCTTTT	-	-	
IGP40:FP	TTGTGTGTATCGTTGGAATAAG	-	-	
IGP40:RP	AGGATGGGTAACCATTCATTG	-	-	
IGP34:FP	CTCAAGATCAACCTTCGGCAA	-	-	
IGP34:RP	GCACACAATTGCGAGGGAAA	-	-	
			-	
Localisation			-	
IGP48-CO_2H:FP	CTCGAA**AAGCTT**ATGGAAATCCGCATGGTGCCA	HindIII	-	
IGP48-CO_2H:RP (HA)	TGCTAT**CCCGGG**TCAAGCGTAATCTGGAACATCGTATGGGTACTCATCAGCTGCTGGAGT	SmaI	HA	
IGP48-CO_2H:RP (FLAG)	AGCCAT**GGATCC**TCACTTGTCGTCATCGTCTTTGTAGTCCTCATCAGCTGCTGGAGTTTC	BamHI	FLAG	
IGP48-65:RP	ACTATCAAAGTCGGCACCACCGCCACTTCCCTC	-	-	
48-ISG65:FP	GGCGGTGGTGCCGACTTTGATAGTCTCCTAGAT	-	-	
ISG65:RP	GCCACC**CCCGGG**TCAAGCGTAATCTGGAACATCGTATGGGTACATTACTACTTTTACGCTAGA	SmaI	HA	
BiP-IGP48:FP	GCGGCC**GCTAGC**AGTAATGAAGCATCAGATAAG	NheI	-	
BiP-IGP48:RP	TGCCTT**GAATTC**TCACTCATCAGCTGCTGG	EcoRI	-	
IGP40-CO_2H:FP	GCTATG**AAGCTT**ATGAGCATGGACACCCGT	HindIII	-	
IGP40-CO_2H:RP	ACTGCA**CCCGGG**TTAAGCGTAATCTGGAACATCGTATGGGTATTCACTGGTTCTCATTTG	SmaI	HA	
IGP40-65: RP	ACTATCAAAGTCGTGCCAATTACTTCTCTCTTC	-	-	
40-ISG65:FP	AGTAATTGGCACGACTTTGATAGTCTCCTAGAT	-	-	
BiP-IGP40:FP	GCAGAT**GCTAGC**GAAGTACCGGAACCAACTGTG	NheI	-	
BiP-IGP40:RP	GACCTA**GAATTC**TTATTCACTGGTTCTCATTTG	EcoRI	-	
dCLECT:FP	TCTATT**GCTAGC**CCAACTCCGCTTCCACCTGCT	NheI	-	
dCLECT:RP	TGCCTT**GAATTC**TCACTCATCAGCTGCTGG	EcoRI	-	
dTRIM:FP	ATCGTC**GAATTC**GTGCCATCTACAGCTTCCGAT	EcoRI	-	
dTRIM:RP	GTACAT**GAATTC**AGCAGGTGGAAGCGGAGTTGG	EcoRI	-	
Supplementary Table S1				

Table S2

Accession Number	Description	Accession Number
Tb927.5.390	ISG75	Tb09.v4.0147
Tb927.5.390b	ISG75	Tb09.v4.0146
Tb927.5.360	ISG75	Tb09.v4.0148
Tb927.5.360b	ISG75	Tb09.160.1520
Tb927.5.370	ISG75	Tb09.v4.0149
Tb927.5.370b	ISG75	Tb09.v4.0058
Tb927.5.350b	ISG75	Tb09.v4.0059
Tb927.5.350	ISG75	Tb09.v4.0060
Tb927.5.400	ISG75	
Tb927.5.400b	ISG75	Tb927.2.4920
Tb927.5.380	ISG75	Tb927.2.4760
Tb927.5.380b	ISG75	Tb927.2.5330
		Tb927.2.5340
		Tb927.2.5360
Accession Number	**Description**	Tb927.2.5350
Tb927.6.1850	Singleton	Tb927.2.5290
Tb09.160.4230	Singleton	Tb927.2.5300
Tb11.01.4701	Singleton	Tb927.2.5310
Tb927.10.7140	Singleton	Tb927.2.5320
Tb11.01.5310	Singleton	
Tb09.160.1390	Singleton	Tb927.6.380
Tb09.v1.0780	Singleton	Tb927.6.370
Tb927.8.4110	Singleton	
Tb927.8.4060	Singleton	
Tb927.8.4010	Singleton	**Accession Number**
Tb11.01.3590	Singleton	Tb927.5.1430
Tb09.160.3680	Singleton	Tb927.5.1390
Tb927.2.1700	Singleton	Tb927.5.1410
Tb927.2.1760	Singleton	Tb927.5.420b
Tb11.57.0077	Singleton	Tb927.5.420
Tb09.v4.0152	Singleton	Tb927.5.430b
Tb11.1460	Singleton	Tb927.5.430
Tb11.v4.0022	Singleton	Tb927.5.410
Tb927.7.4280	Singleton	Tb927.5.410b
Tb927.7.4230	Singleton	Tb927.5.310

Tb927.7.4260	Singleton	Tb927.5.310b
Tb927.5.440b	Singleton	
Tb927.5.440	Singleton	
Tb09.v1.0510	Singleton	
Tb09.v1.0540	Singleton	
Tb927.7.4270	Singleton	
Tb927.10.6180	Singleton	
Tb11.01.3610	Singleton	
Tb927.5.610	ISG-like	
Tb927.5.620	ISG-like	
Tb927.5.630	ISG-like	
Tb927.10.2360	Singleton	
Tb11.1490	Singleton	
Tb927.10.120	Singleton	
Tb927.3.2870	Singleton	
Tb927.10.11140	Singleton	
Tb09.160.2060	Singleton	
Tb927.1.3900	Singleton	
Tb11.47.0001	Singleton	
Tb927.1.660	Singleton	
Tb927.3.5170	Singleton	
Tb927.1.770	Singleton	
Tb09.v4.0010	Singleton	
Tb927.8.8030	Singleton	
Tb927.8.7280	Singleton	
Tb09.160.4390	Singleton	
Tb927.6.1740	Singleton	
Tb927.1.4770	Singleton	
Tb927.3.4230	Singleton	
Tb09.160.4810	Singleton	
Tb09.v1.0630	Singleton	
Tb927.4.590	Singleton	
Tb927.10.2080	Singleton	
Tb927.8.3120	Singleton	
Tb927.5.1810	Singleton	
Tb11.01.0290	Singleton	

Tb927.8.6380	Singleton	
Tb927.5.4060	Singleton	
Tb927.4.2320	Singleton	
Tb09.160.5140	Singleton	
Tb927.5.2580	Singleton	
Tb11.13.0007	Singleton	
Tb927.10.2420	Singleton	
Tb09.160.2950	Singleton	
Tb09.v1.0650	Singleton	
Tb09.160.2340	Singleton	
Tb927.10.10840	Singleton	
Tb09.211.4290	Singleton	
Tb09.160.2140	Singleton	
Tb927.4.1120	Singleton	
Tb927.10.12450	Singleton	
Tb927.3.840	Singleton	
Tb927.7.5710	Singleton	
Tb11.02.2880	Singleton	
Tb09.160.5040	Singleton	
Tb927.4.1390	Singleton	
Tb11.02.3760	Singleton	
Tb09.211.2890	Singleton	
Tb10.v4.0132	Singleton	
Tb927.10.10760	Singleton	
Tb927.3.2360	Singleton	
Tb927.7.900	Singleton	
Tb09.v4.0150	Singleton	
Tb09.v2.0050	Singleton	
Tb927.5.1020	Singleton	
Tb927.3.3140	Singleton	
Tb927.8.560	Singleton	
Tb927.2.6390	Singleton	
Tb927.4.5470	Singleton	
Tb927.10.13090	Singleton	
Tb927.2.5970	Singleton	
Tb927.5.1740	Singleton	

Tb927.7.470	Singleton	
Tb11.01.1000	Singleton	
Tb09.v1.0850	Singleton	
Tb09.211.4680	Singleton	
Tb927.10.700	Singleton	
Tb11.02.0780	Singleton	
Tb09.211.4770	Singleton	
Tb927.6.4500	Singleton	
Tb11.01.7770	Singleton	
Tb927.4.4920	Singleton	
Tb11.01.3160	Singleton	
Tb927.8.6590	Singleton	
Tb927.4.510	Singleton	
Tb11.01.3790	Singleton	
Tb11.49.0009	Singleton	
Tb11.30.0008	Singleton	
Tb09.v4.0179	Singleton	
Tb10.v4.0122	Singleton	
Tb09.142.0500	Singleton	
Tb11.02.0060	Singleton	
Tb927.10.2500	Singleton	
Tb05.5K5.520	Singleton	
Tb927.10.4670	Singleton	
Tb927.5.292b	Singleton	
Tb927.2.2490	Singleton	
Tb927.7.4690	Singleton	
Tb11.v4.0065	Singleton	
Tb927.4.1190	Singleton	
Tb927.6.3700	Singleton	
Tb927.7.4980	Singleton	
Tb927.10.6640	Singleton	
Tb927.5.1630	Singleton	
Tb927.10.7000	Singleton	
Tb927.10.7180	Singleton	

Description	Accession Number	Description
IGP48	Tb927.2.3300	ISG65
IGP48	Tb927.2.3290	ISG65
IGP48	Tb927.2.3310	ISG65
IGP48	Tb927.2.3280	ISG65
IGP48	Tb927.2.3270	ISG65
IGP48	Tb927.2.3320	ISG65
IGP48		
IGP48		
	Accession Number	**Description**
IGP40	Tb927.8.7920	Adenylate Cyclase
IGP40	Tb927.8.7900	Adenylate Cyclase
IGP40	Tb927.8.7890	Adenylate Cyclase
IGP40	Tb927.8.7930	Adenylate Cyclase
IGP40	Tb927.8.7870	Adenylate Cyclase
IGP40	Tb927.8.7940	Adenylate Cyclase
IGP40	Tb927.8.7590	Adenylate Cyclase
IGP40	Tb927.4.4430	Adenylate Cyclase
IGP40	Tb927.4.4450	Adenylate Cyclase
IGP40	Tb927.4.4410	Adenylate Cyclase
	Tb927.4.4440	Adenylate Cyclase
IGP34	Tb927.7.7530	Adenylate Cyclase
IGP34	Tb927.7.7520	Adenylate Cyclase
	Tb927.4.4470	Adenylate Cyclase
	Tb927.4.4460	Adenylate Cyclase
Description	Tb927.4.3880	Adenylate Cyclase
ISG-like	Tb927.4.3870	Adenylate Cyclase
ISG-like	Tb927.4.3750	Adenylate Cyclase
ISG-like	Tb927.6.190	Adenylate Cyclase
ISG-like	Tb927.5.650	Adenylate Cyclase
ISG-like	Tb927.7.6040	Adenylate Cyclase
ISG-like	Tb927.7.6080	Adenylate Cyclase
ISG-like	Tb927.7.6070	Adenylate Cyclase
ISG-like	Tb927.7.6060	Adenylate Cyclase
ISG-like	Tb927.7.6050	Adenylate Cyclase
ISG-like	Tb927.10.13040	Adenylate Cyclase

ISG-like	Tb927.7.7470	Adenylate Cyclase
	Tb927.10.16190	Adenylate Cyclase
	Tb927.5.330b	Adenylate Cyclase
	Tb927.5.330	Adenylate Cyclase
	Tb927.5.320b	Adenylate Cyclase
	Tb927.5.320	Adenylate Cyclase
	Tb927.5.285b	Adenylate Cyclase

Table S3: Serum immunoglobulin responses to IGP48 in *T. b. rhodesiense* patients.

	Patient ID	IgG response to rIGP48 (+/-)	IgM response to rIGP48 (+/-)	Disease stage	Age (years)	Parasitaemia	Serum IgG (g/l)	Serum IgM (g/l)
INFECTED								
	L2	-	-	Late	12	0.25	20.5	9.4
	L3	+	-	Late	15	1	30.1	10.2
	L16	+	+	Early	40	20	25.2	21.7
	L30	+	-	Late	18	3	45.3	7.6
	S3	-	-	Late	12	0	17.3	5.7
	S13	+	-	Early	16	50	16.6	1.3
	S48	+	+	Late	40	100	3.1	18.8
	S69	+	+	Early	15	20	51.3	2.7
	S79	+	-	Late	50	2	17.8	51.6
UNINFECTED								
	LC1	-	-	N/A				
	LC15	-	-					
	EUM1	-	-					
	EUF1	-	-					

a: Disease stage: Later stage (meningoencephalitic) criteria either CSF white cells >5/mm^3 or parasites observed in the CSF.
b: Parasitaemia: Number of Giemsa stained parasites observed per 10 fields, at 400x magnification.