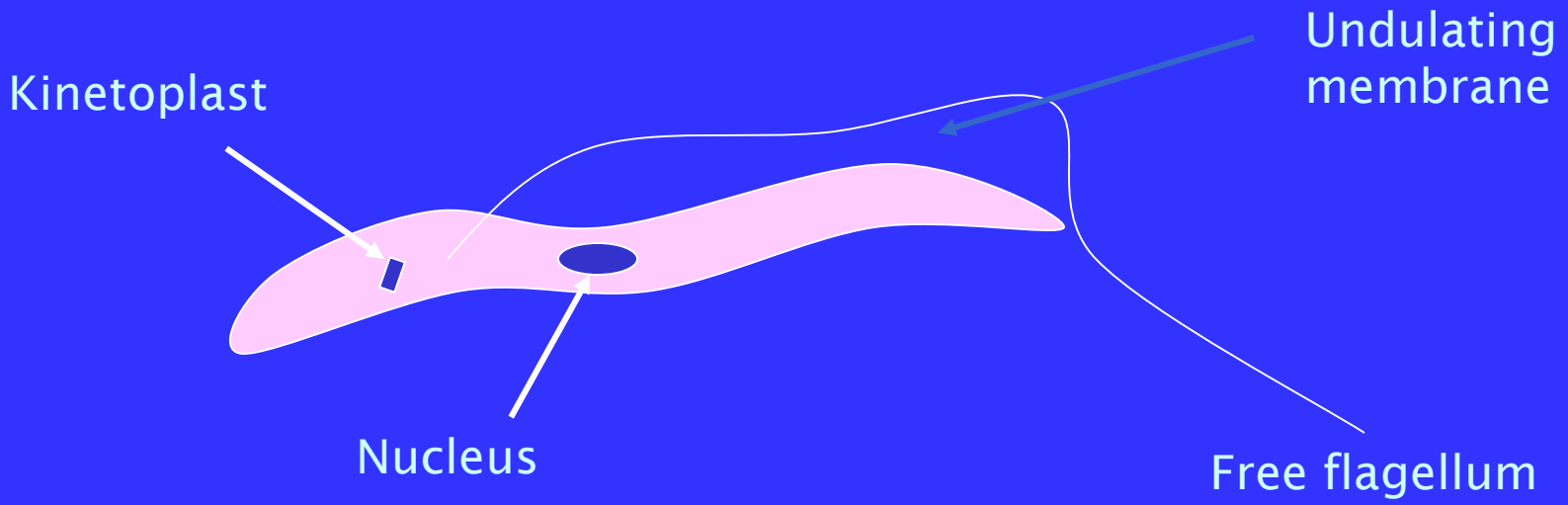
Trypanosomiases

- African trypanosomiasis
  - 'sleeping sickness'
  - caused by *Trypanosoma brucei* group
  - Vector is the tsetse fly (*Glossina* spp)
- South America trypanosomiasis
  - 'Chagas disease'
  - caused by *Trypanosoma cruzi*
  - Vector is the reduviid (triatomine) bug

No trypanosomiasis in Asia

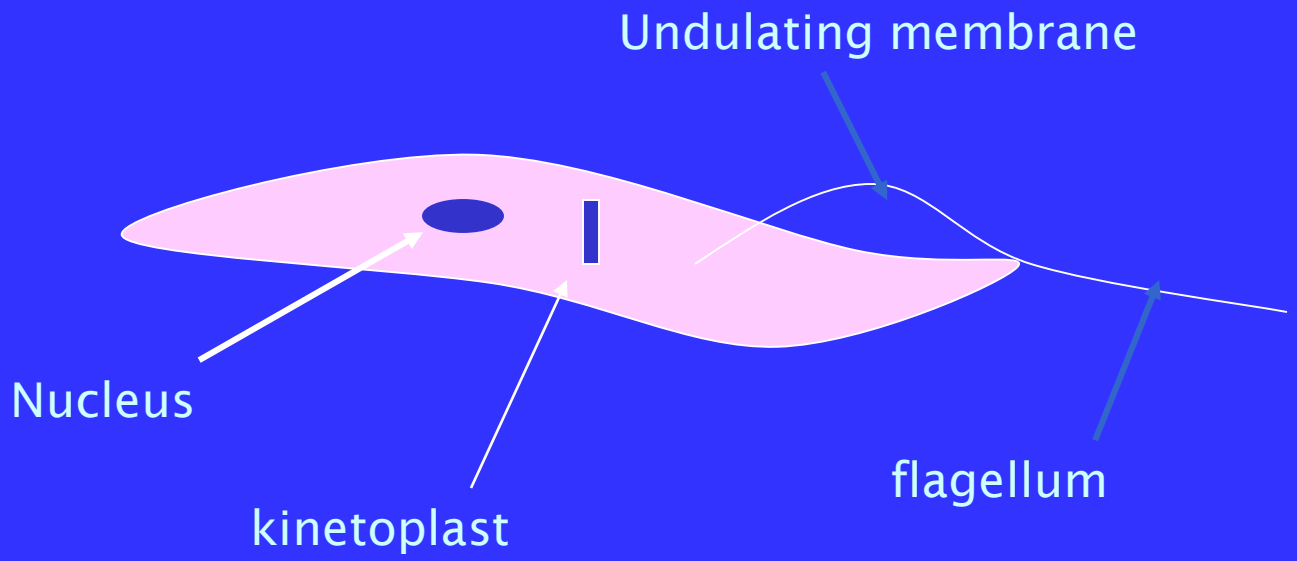
Morphological forms

Trypomastigote (17 – 30 microns)



Found extracellularly in blood stream – infective stage

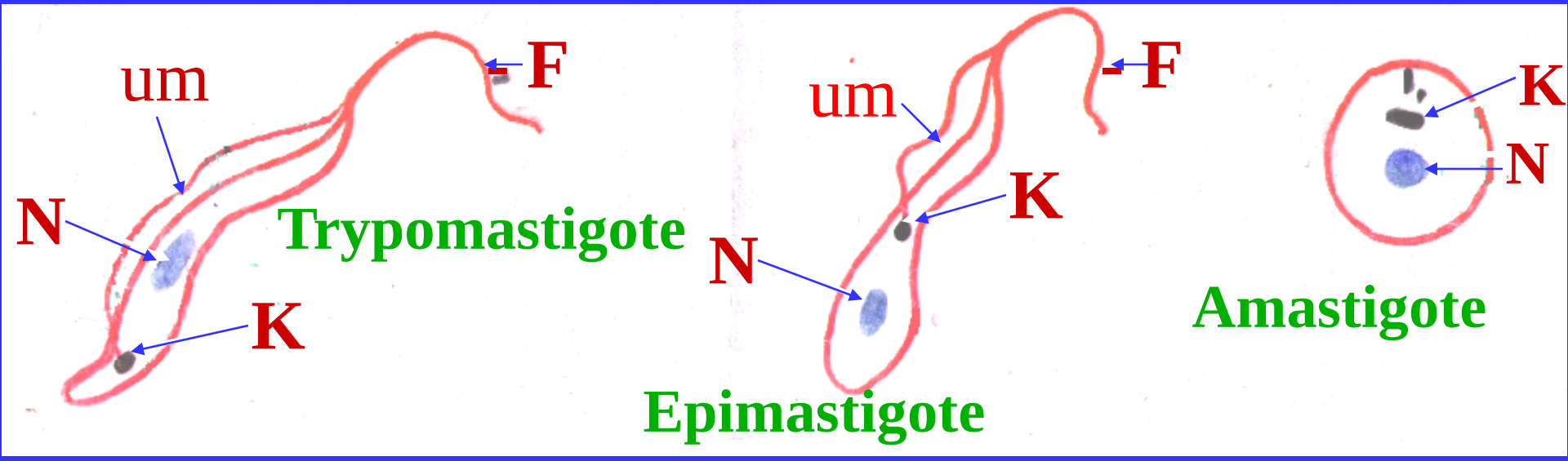
Epimastigote form



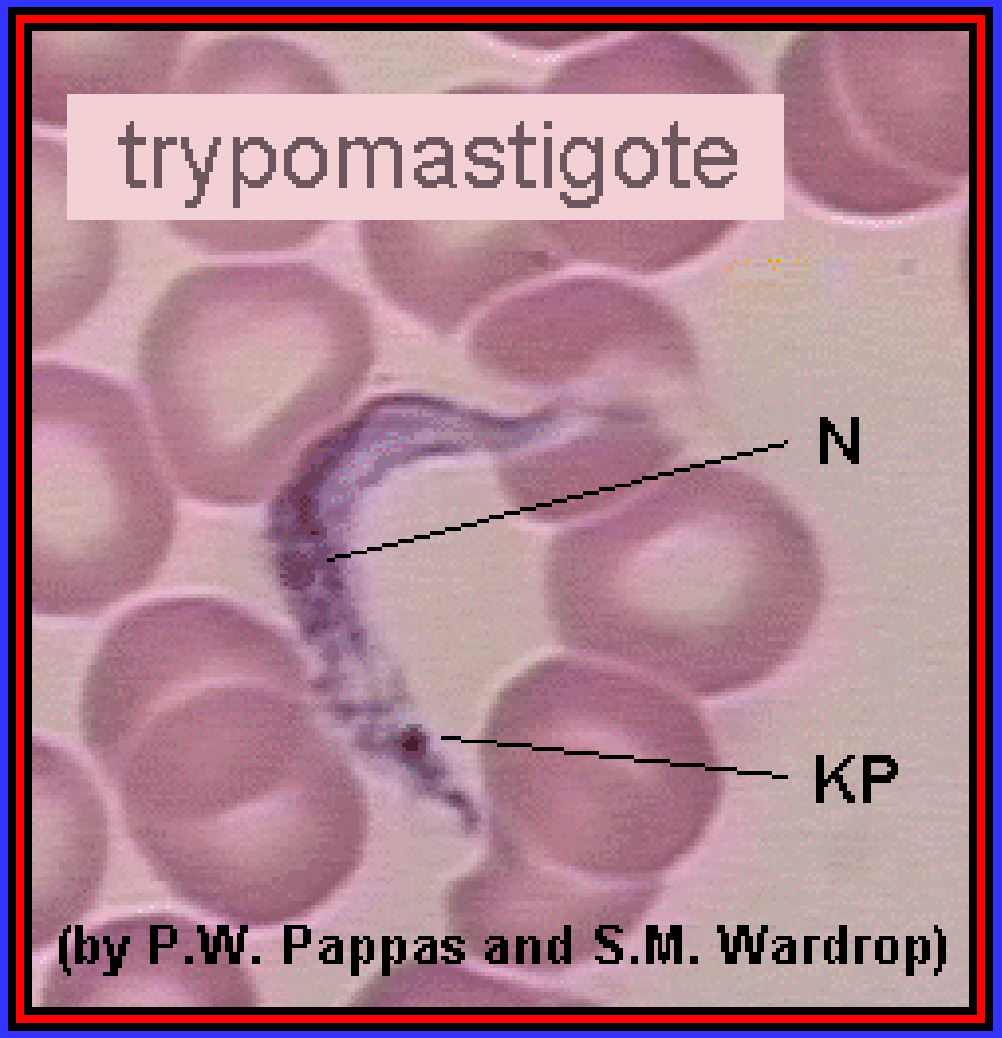
Occurs in vector only

Amastigote form – as in *Leishmania* spp.

Developmental Forms



Um= undulating membrane


trypomastigote
N
KP
(by P.W. Pappas and S.M. Wardrop)

Scanning Electron Micrograph of trypomastigotes

African trypanosomiasis

Occurs in Sub Saharan Africa

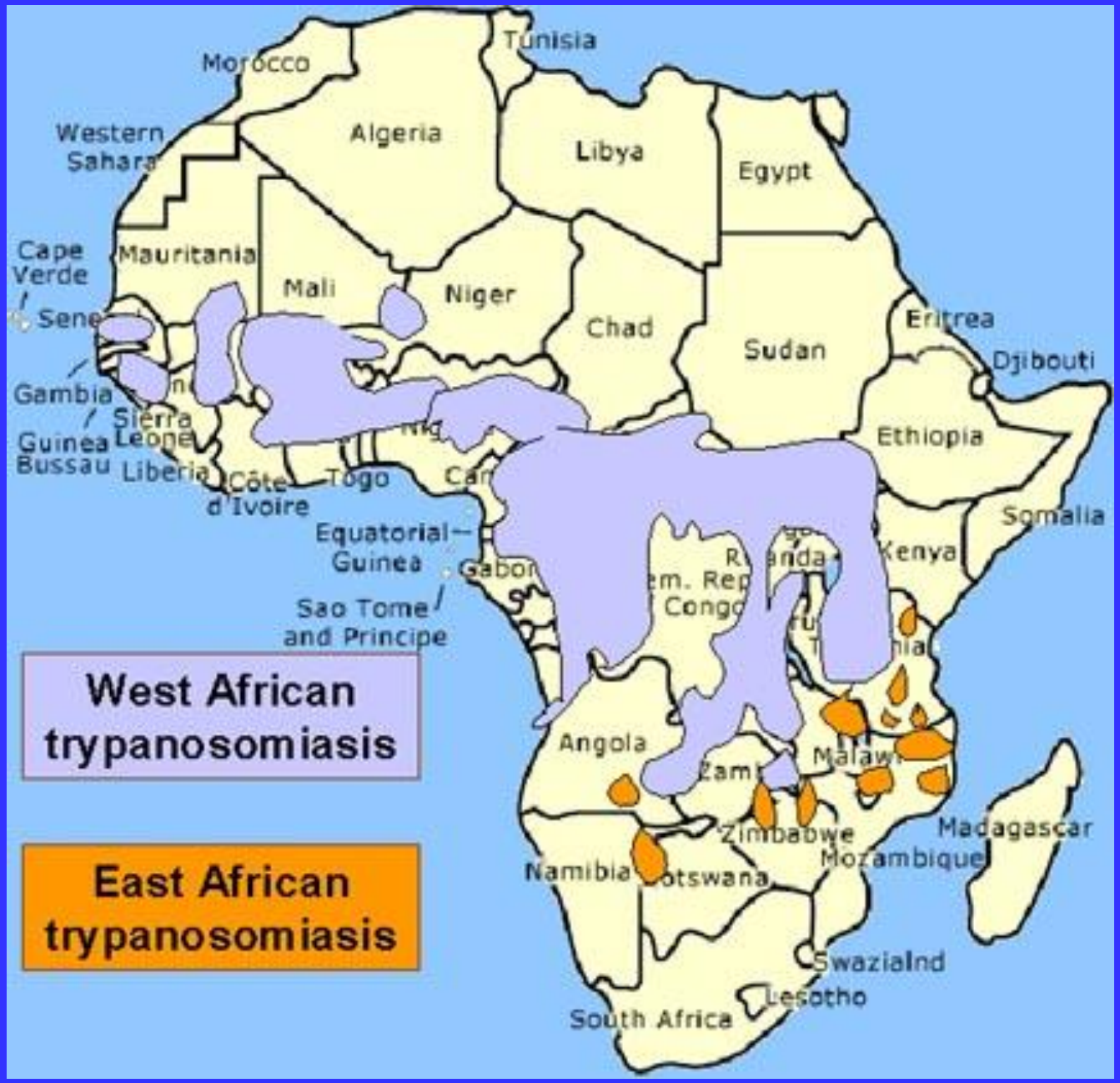
Two types of disease

- Chronic sleeping sickness caused by
  - *T. brucei gambiense*
- Acute sleeping sickness caused by
  - *T. brucei rhodesiense*

Both types are fatal if left untreated

T brucei gambiense

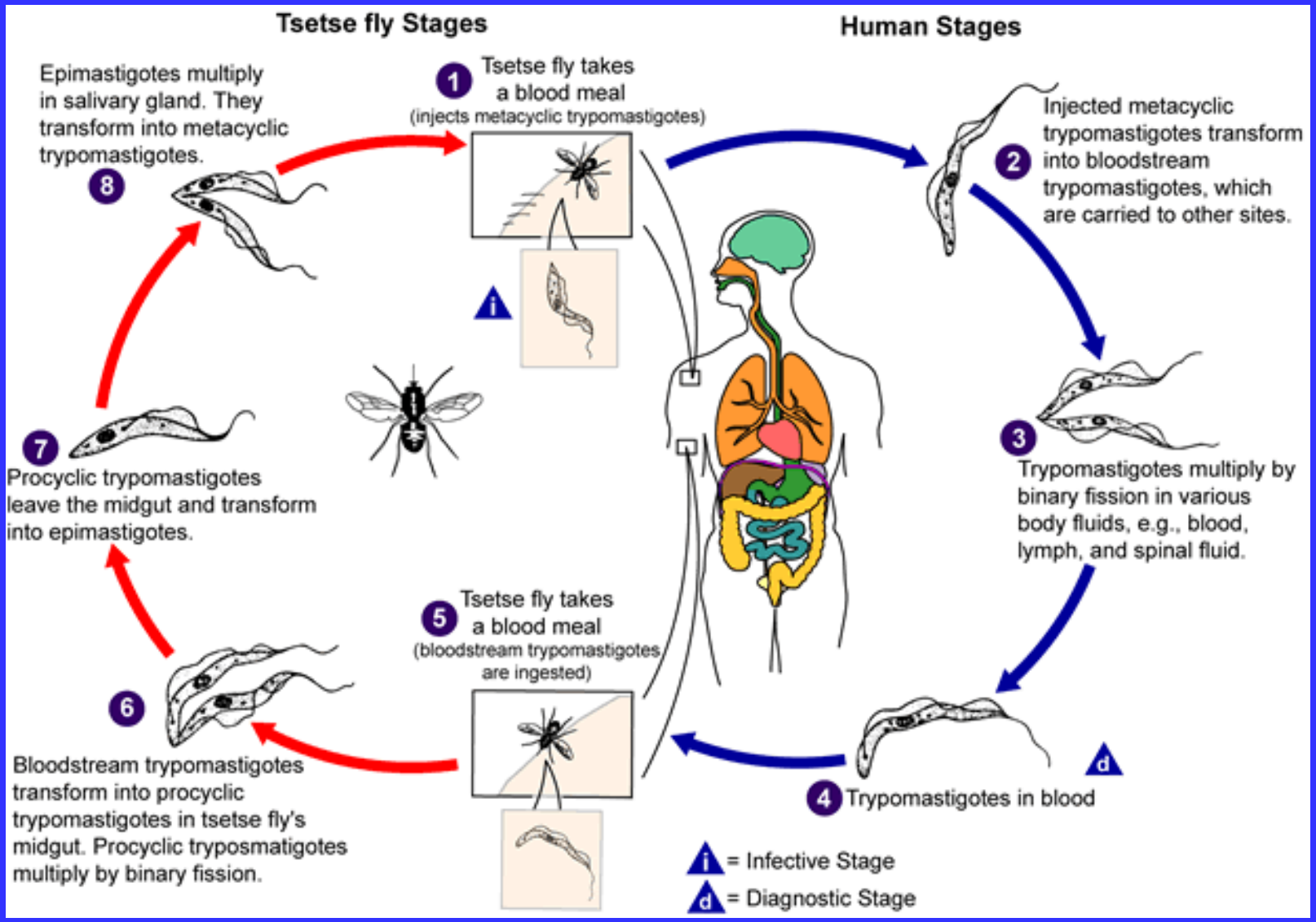
T brucei rhodesiense



Epidemiology

- Gambiense infections are largely confined to humans (vectors found in and around villages)
- Rhodesiense infections are mostly zoonotic (wild herbivores in savanna)
- Related subspecies (*T. brucei brucei*) causes ‘nagana’ in cattle

Life cycle of *Trypanosoma brucei* group



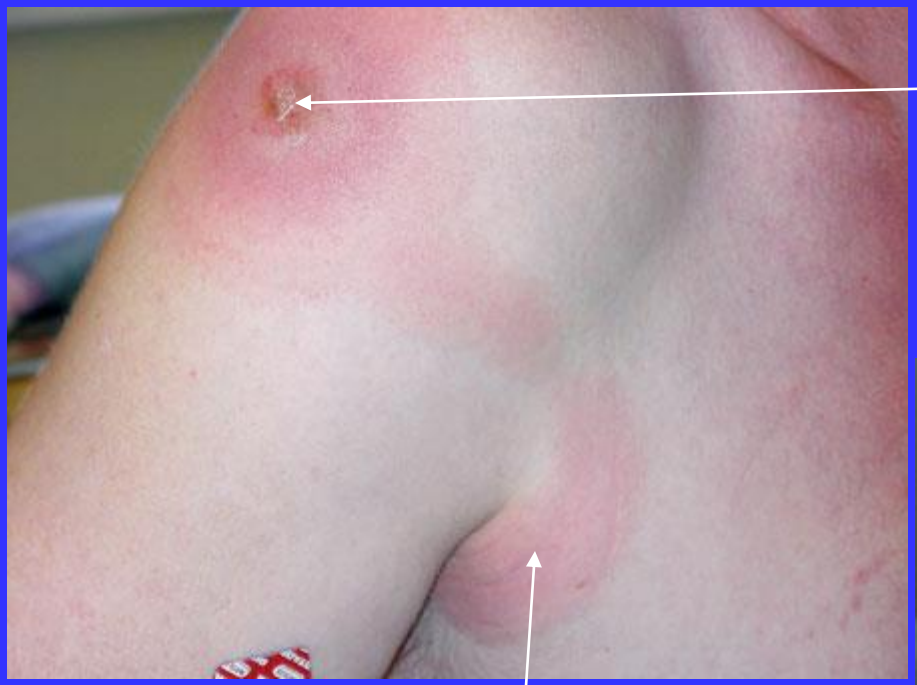
Transmission

- Parasites transmitted with saliva while taking blood meal

Clinical features

- Trypanosomal chancre (ulcer) at site of bite – last a few weeks
- Lymphadenopathy, especially in posterior triangle of neck (Winterbottom's sign)
- Intermittent fever (when parasites are in blood stream)
- Mild-moderate hepatosplenomegaly

Trypanosomal chancre



Site of tsetse fly bite

Path of spread to lymph nodes

Clinical features ctd

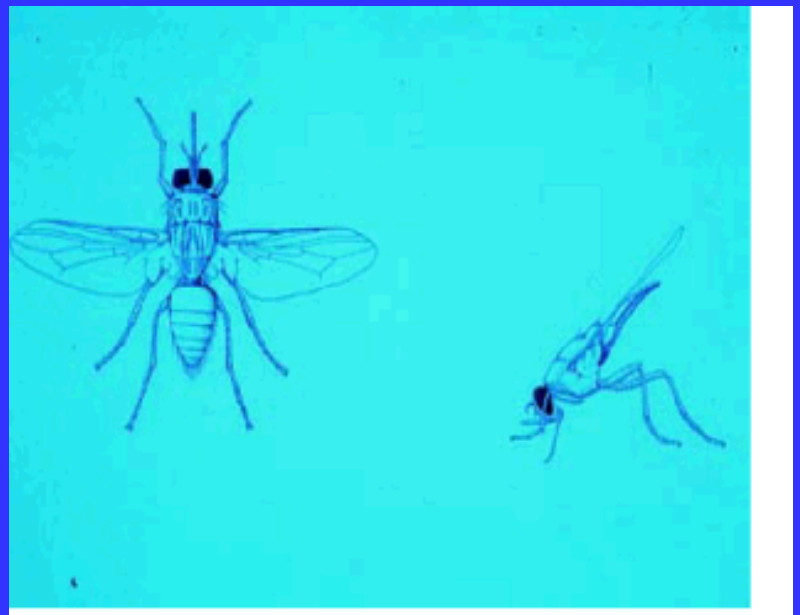
- Neurological involvement when trypanosomes enter CNS
  - Behavioural changes, altered diurnal rhythm
  - Increasing lethargy and drowsiness
  - Coma and convulsions at end stage
  - Often die of intermittent infections
- Natural course of illness takes about 2 years for chronic form, 6 months for acute form

Lab diagnosis and treatment

- Parasitological diagnosis: demonstrate trypanosomes in blood, enlarged lymph nodes or CSF
- Serological tests to demonstrate antibodies
- Treatment: suramin, pentamidine, melarsoprol

Tsetse fly (*Glossina* species)

- Looks like house fly but larger
- Both sexes feed on blood ('pool' feeder) – bite is very painful
- Female gives birth to a single live larva at a time – larva buries itself immediately in the soil and pupates
- Breeds in relatively dry areas, usually jungle habitat



Glossina morsitans, a tsetse fly
WHO/TDR/Davies

South American Trypanosomiasis (Chagas' disease)

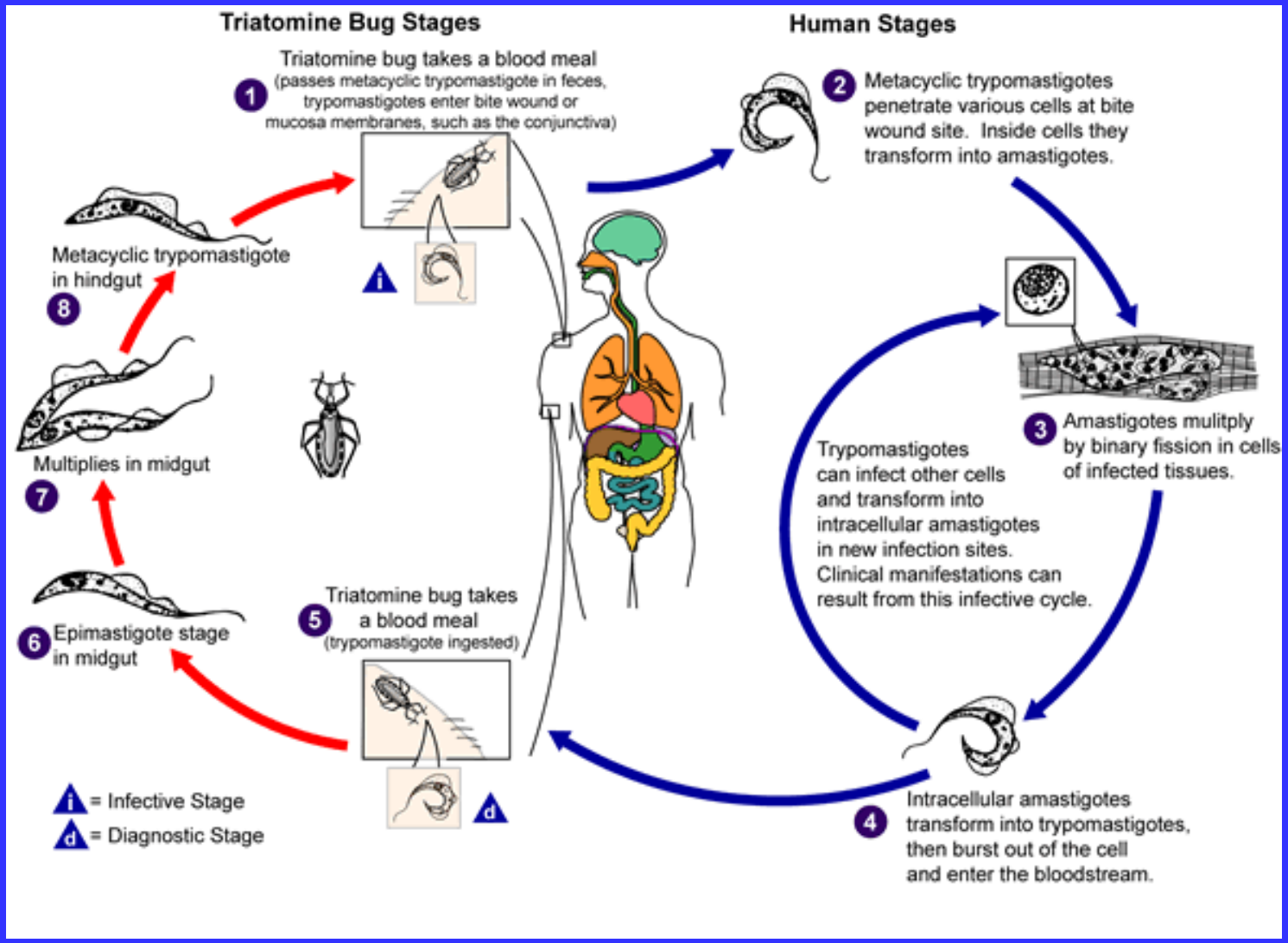
- Caused by *Trypanosoma cruzi*
- Morphological forms same as *T. brucei* gp
  - Trypomastigotes in blood stream
  - Amastigotes intracellularly in mammalian host
  - Epimastigotes in vector (reduviid bug)

Geographical distribution of Chagas Disease

Infections are mainly zoonotic

Found in rural areas with poor housing

Life cycle of *Trypanosoma cruzi*



Transmission

- Bug picks up trypomastigotes while feeding
- After parasite multiplies in bug, infective stages are passed out in the faeces (bug defaecates while feeding)
- Infective faeces may be rubbed into bite wound, or conjunctiva of eye

Clinical features

- Acute phase – immediately after bite – swelling around bite
- Latent phase – parasite remains dormant or multiplies very slowly as amastigotes

Romana's sign

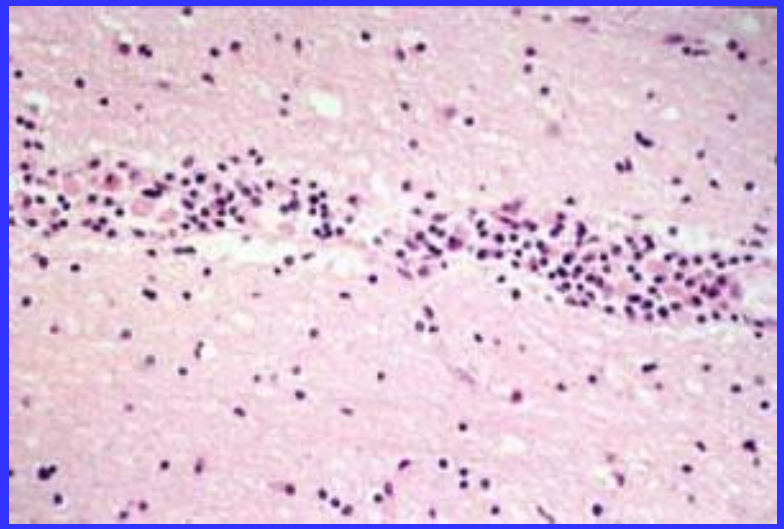
Peri-orbital oedema after parasites enter through conjunctival mucosa

Clinical features ctd

- Chronic phase – seen many years after infection – 'mega' syndrome'
  - **Cardiomegaly, mega-oesophagus, mega-colon**
  - **? auto-immune reaction to cells of the autonomic nervous system triggered by parasites**

Trypanosoma cruzi

Trypomastigotes in blood



amastigotes in heart muscle

Lab diagnosis and treatment

- Parasitological diagnosis: demonstrate trypanosomes in blood, enlarged lymph nodes or CSF
- Serological tests to demonstrate antibodies
- Treatment: no effective specific treatment

  Nifurtimox & Benznidazole

Triatomine (reduviid) bugs

- Large insects (2-3 cm)
- Both sexes and nymphs feed on blood
- Feeding takes about 10 – 15 minutes, usually while host is asleep
- Live in jungle areas or in cracks and crevices of walls in poor housing

Triatomine bug

The kissing bug *Rhodnius* transmits Chagas disease to humans (Courtesy Dr. Philippe Rossignol, Oregon State University).