



BLOOD & TISSUE FLAGELLATES

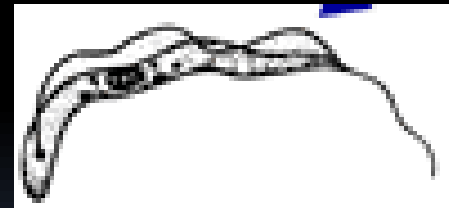
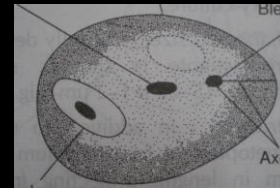


Taxonomy

- Phylum Mastigophora
- Sub-Phylum Sarcomastigophora
- Class Zoomastigophora
- Order Kinetoplastidae
- Genus Trypanosoma

Developmental stages

- Amastigote
- Promastigote
- Epimastigote
- Trypomastigote
- Metacyclic form of Trypomastigote



TRYPANOSOMES



Trypanosoma – infecting human

No.	Parasite	Vector	Disease
1	T.brucei (gambiense); (rhodesiense)	Tsetse fly	African trypanosomiasis (sleeping sickness)
2	T.cruzi	Reduvid bug	South american trypanosomiasis (Chagas' disease)
3	T.rangeli	Reduvid bug	Non pathogenic – south america

Trypanosomes of animals

- *T. brucei brucei* – “nagana” in cattles
- *T. evansi* – “surra” in horses
- *T. equiperdum* – “stallion’s disease” in horses

T. Brucei

- African Sleeping Sickness
- *Ngana*

T. cruzi

- South American Sleeping Sickness
- *Chagas Disease*

General properties

- Exist in body as trypomastigote form, some (*T.cruzi*) can exist in tissues as amastigote form
- Life cycle : 2 hosts
- 2 types of development seen
 - Anterior station
 - Posterior station

African Sleeping Sickness

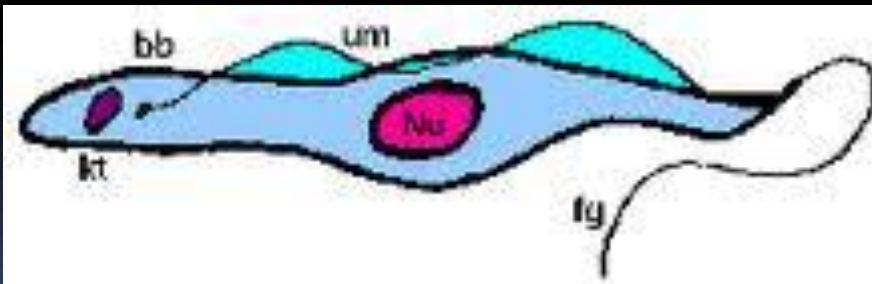
- **Parasite** - *Trypanosoma brucei* ssp
Trypanosoma brucei rhodesiense
Trypanosoma brucei gambiense
- **Vector** - Tse Tse fly
 - *Glossina mortisans* (Eastern Africa)
 - *Glossina palpalis* (Western Africa)
- **Habitat** - Connective tissue → lymph node
Brain ← Blood stream

Morphology

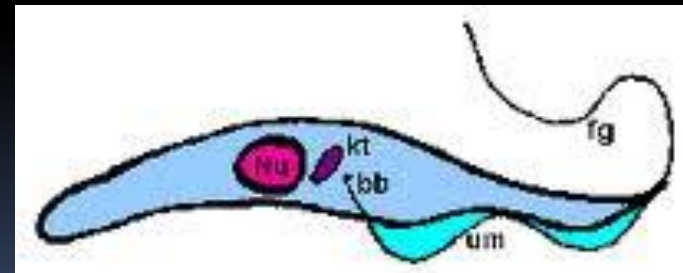
- Polymorphic spindle-shaped
- Nucleus
- Kinetoplast
- Flagella & undulating membrane

→ Polymorphism → s,t,s
→ l,s

→ Antigenic variation



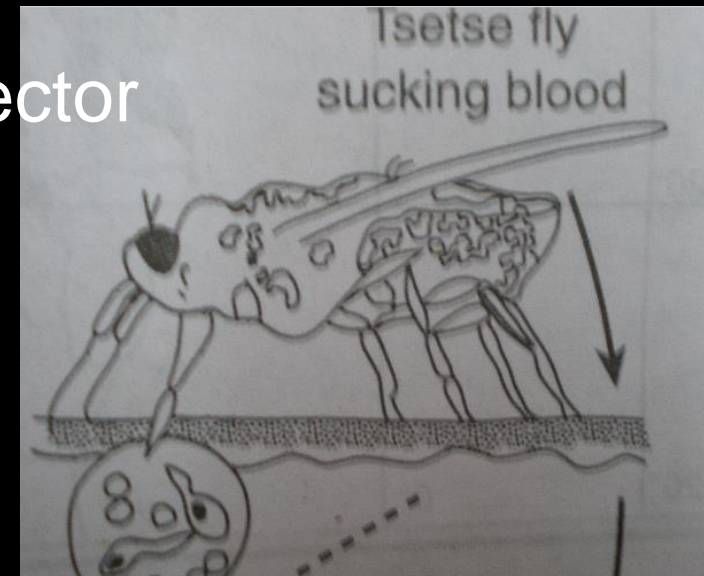
Trypomastigote



Epimastigote

T. brucei

Vector



- Two forms:
 1. Trypomastigote – In Human / animal & tsetse fly
 2. Epimastigote form – In tsetse fly
- ⇒ T.b.Gambiense – only man is reservoir
- ⇒ T.b.Rhodesiense – wild animals and domestic cattle



The Vectors

Glossina

22 species - hatchet wing cell

Shady habitat (20-30°C)

Viviparous - 12 offspring

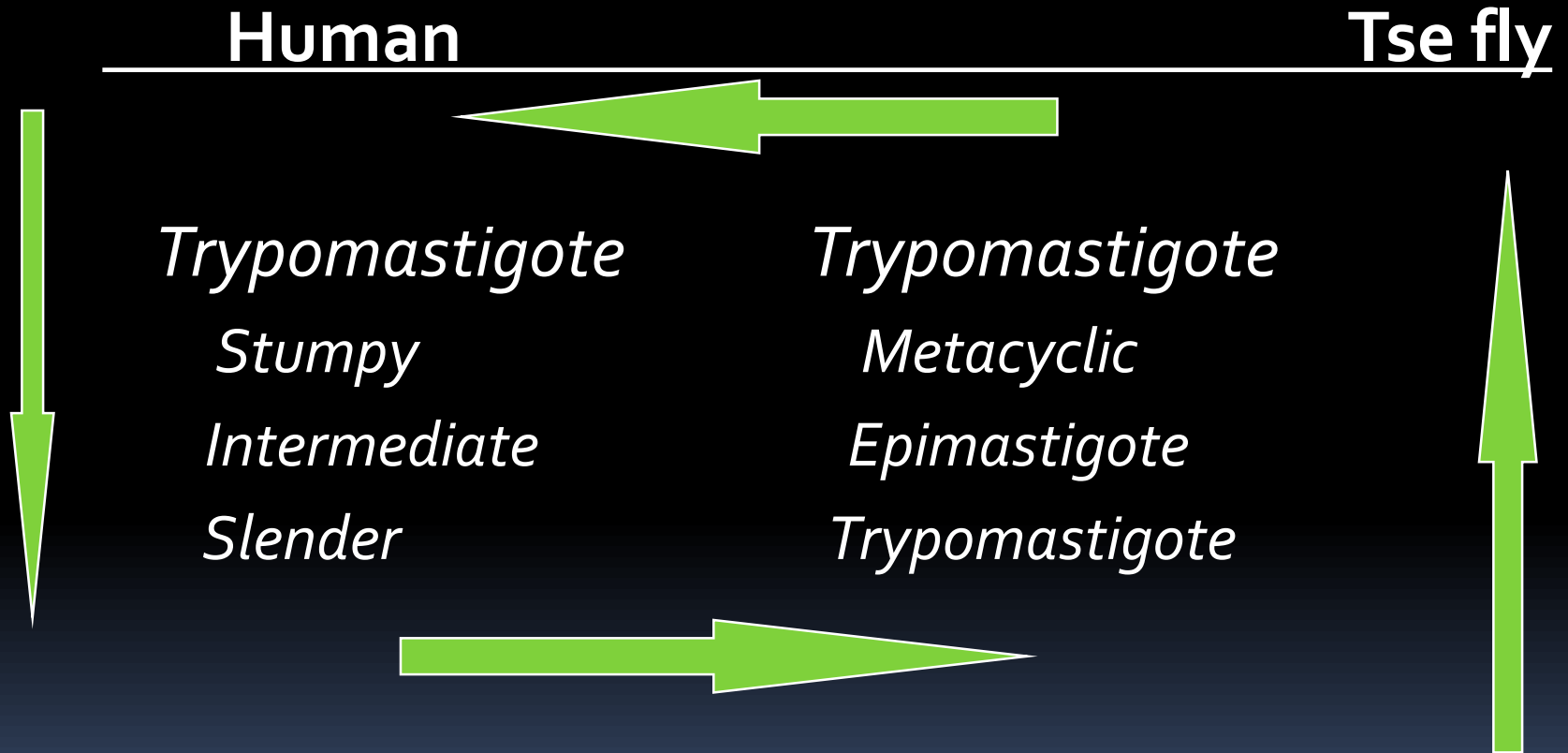
Diurnal feeders (1mg/sec)

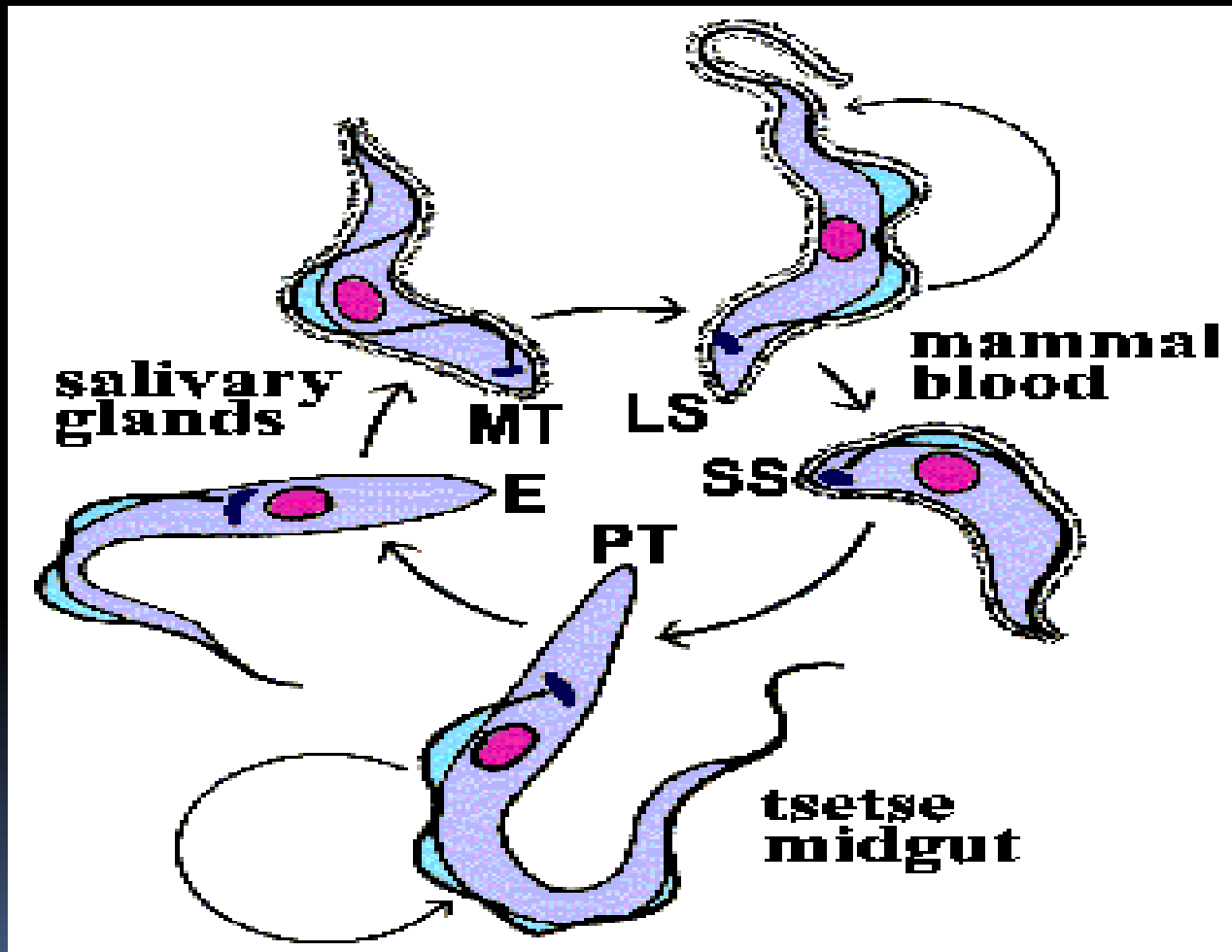
Parasite development 10-14 days



African Trypanosomiasis

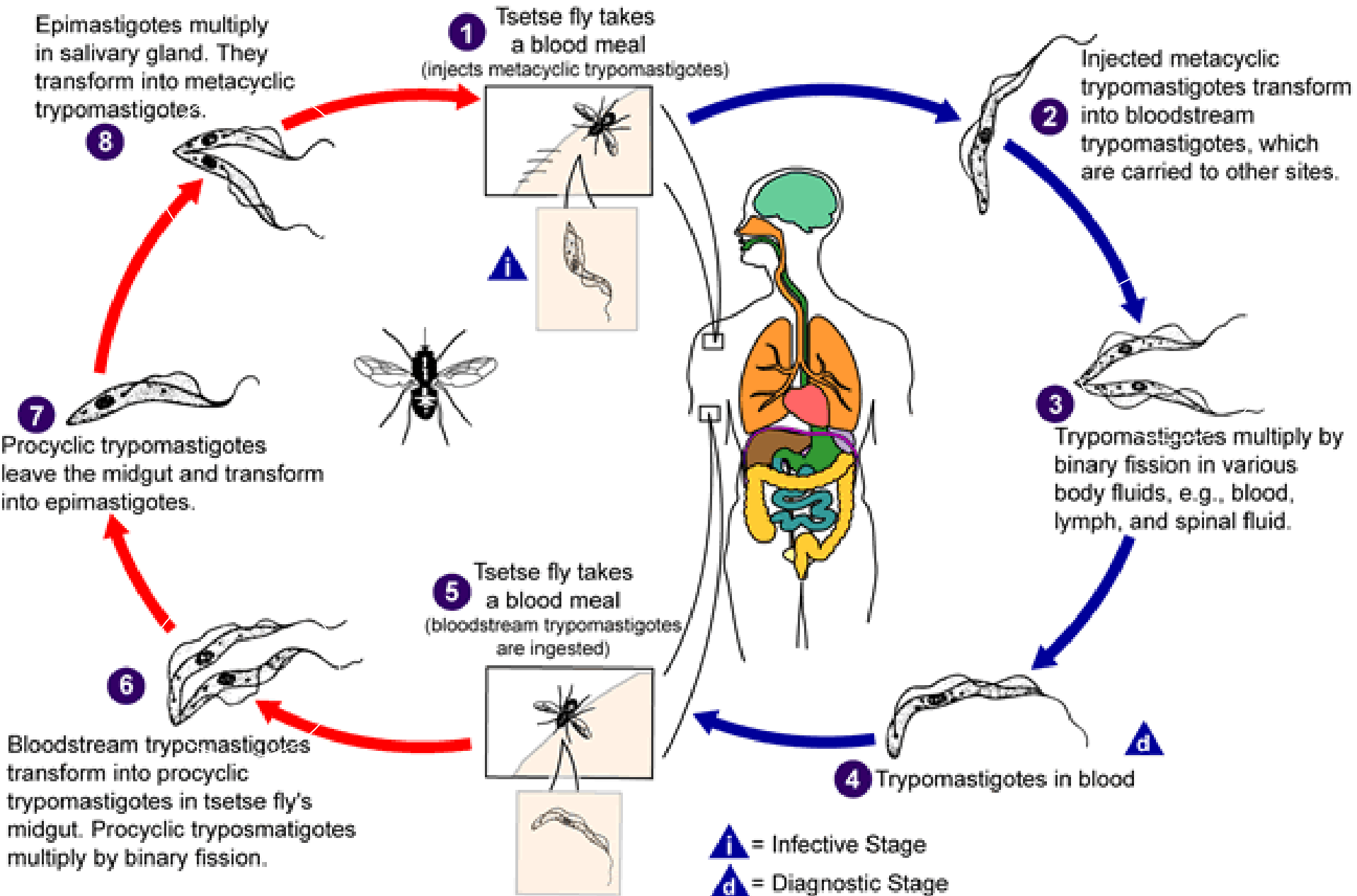
The Life Cycle





Tsetse fly Stages

Human Stages



T.brucei - pathogenesis

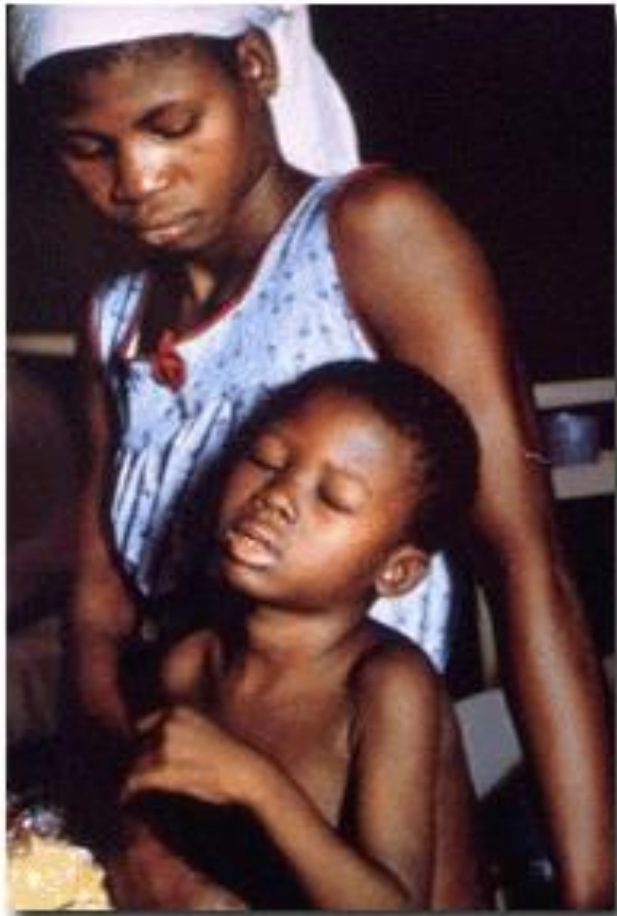
- First invade lymph nodes and then passes through lymphatic into blood stream and finally may involve CNS.
- Incubation period one to several weeks
- At site of bite – nodule / chancre after few days last for 1 to 2 weeks
- Followed by symptoms free parasitaemia – one month. May followed by cure or CNS involvement. - meningoencephalitis

T. Brucei - clinical

- Chancre
- Febrile paroxysms
- Lymphadenopathy
- CNS – Confused status of mind (Sleeping sickness), fatigue, insomnolence
- Rare – Edema, Myocarditis




African Sleeping Sickness (Trypanosoma brucei)



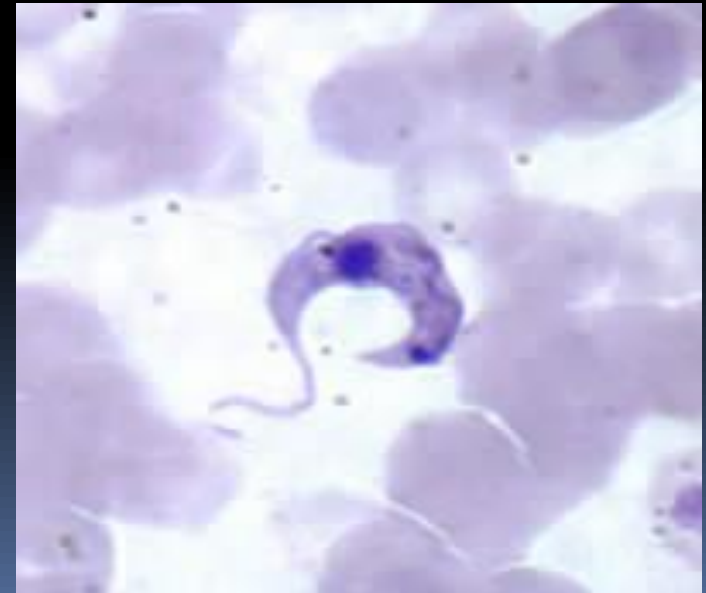
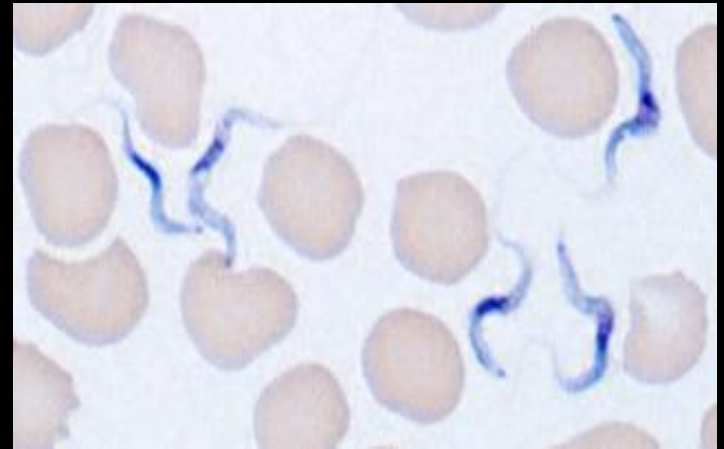


Laboratory diagnosis

- Peripheral blood
 - Bone marrow
 - Lymph node aspiration
 - CSF
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Laboratory diagnosis

- Microscopic examination
 - Smear stained by Giemsa / Field's stain
- Cultivation
- Animal inoculation
- Serology



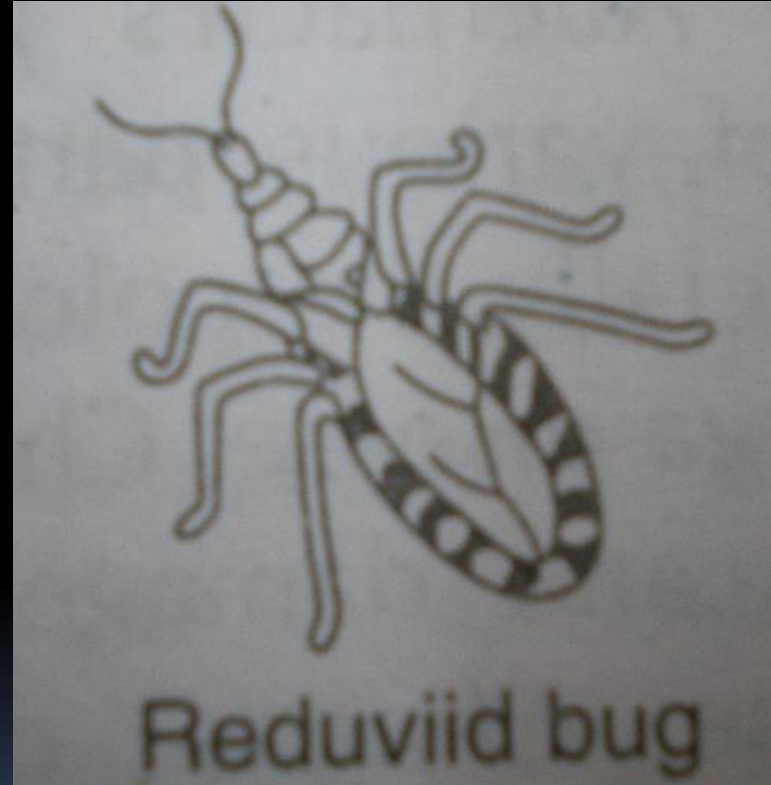
South american trypanosomiasis

(Chagas' disease)

- Parasite - *Trypanosoma cruzi*
- Vector - Reduviid bugs
- Habitat - Muscular and nervous tissue

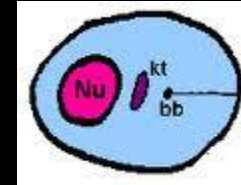
T. Cruzi

- South American Trypanosomiasis (Chagas' Disease)
- Reservoirs – Animals – dogs, cats, armadillos etc.
- Vector: Reduviid bugs

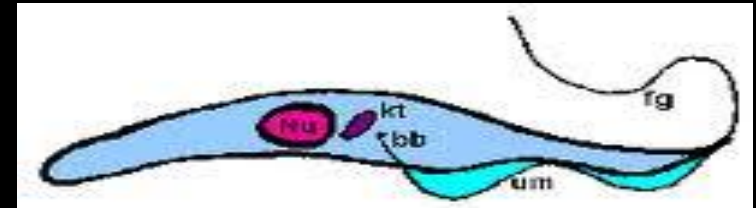


Morphological forms

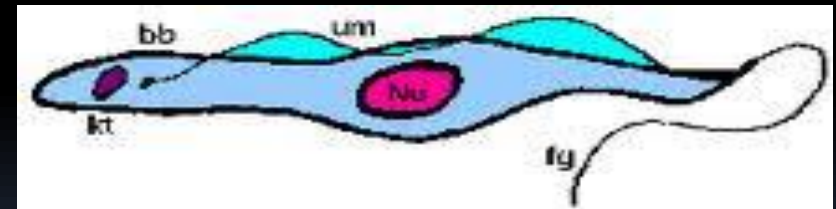
- Amastigote form –
in tissue of Human



- Epimastigote form –
In gut of Reduviid bug

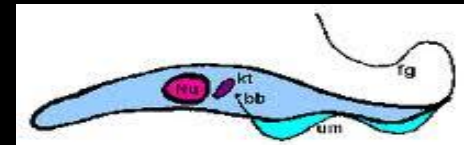
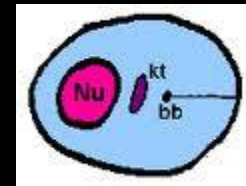
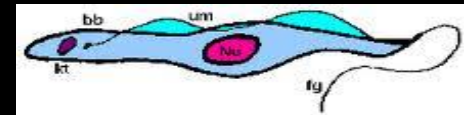
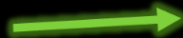


- Trypomastigote form –
in Human – get transformed from
amastigote form



- Metacyclic form of Trypomastigote form excreted
from faeces of infective bug.

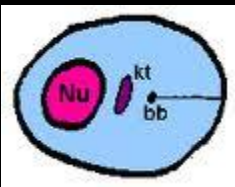
Mode of transmission



Metacyclic form



Man



Triatomine Bug Stages

Human Stages

1 Triatomine bug takes a blood meal (passes metacyclic trypomastigotes in feces, trypomastigotes enter bite wound or mucosal membranes, such as the conjunctiva)

2 Metacyclic trypomastigotes penetrate various cells at bite wound site. Inside cells they transform into amastigotes.

3 Amastigotes multiply by binary fission in cells of infected tissues.

Trypomastigotes can infect other cells and transform into intracellular amastigotes in new infection sites. Clinical manifestations can result from this infective cycle.

4 Intracellular amastigotes transform into trypomastigotes, then burst out of the cell and enter the bloodstream.

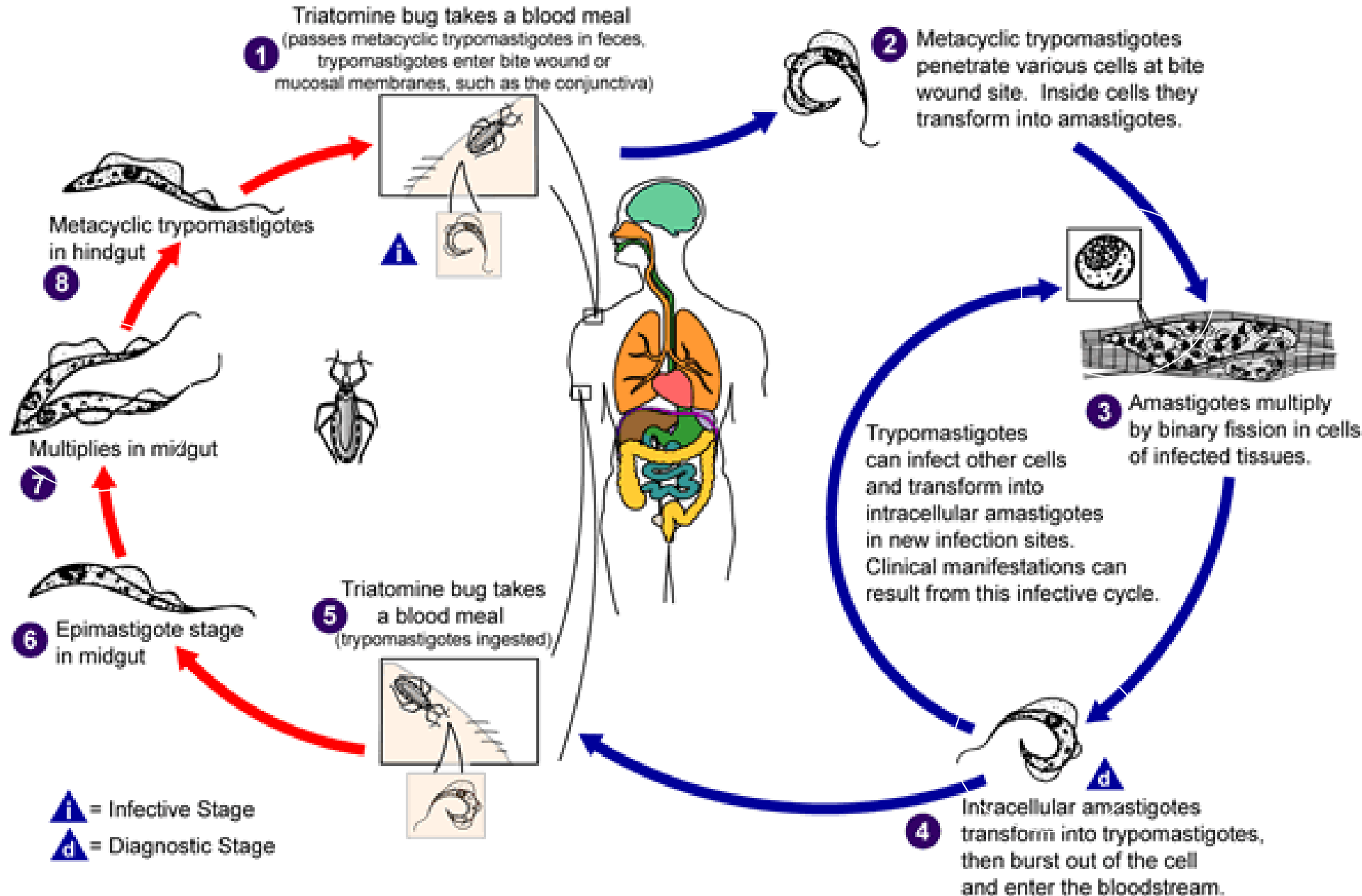
5 Triatomine bug takes a blood meal (trypomastigotes ingested)

8 Metacyclic trypomastigotes in hindgut

7 Multiplies in midgut

6 Epimastigote stage in midgut

i = Infective Stage
d = Diagnostic Stage



Pathogenicity

- Mode of infection – Contaminative method
- Portal of entry - Skin / Conjunctiva

Swelling (chagoma)

Romana's sign

- Pathogenic lesion

Heart

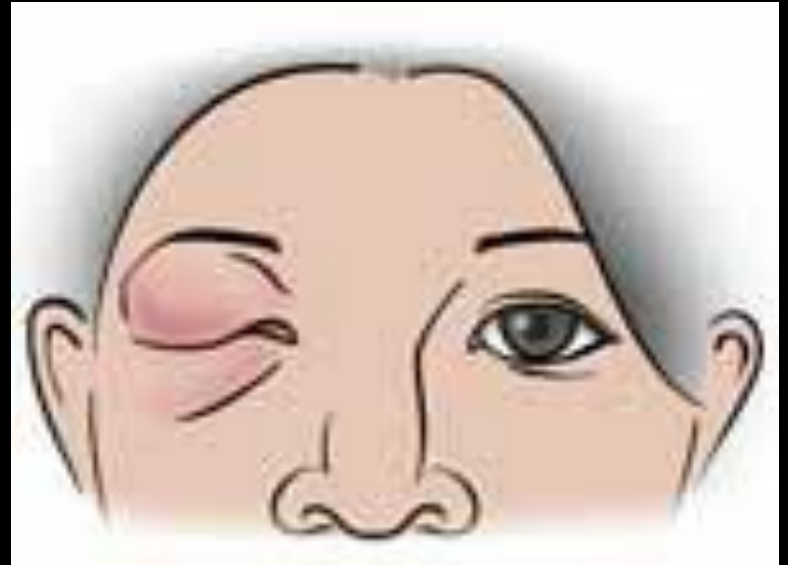
Skeletal muscle

Nervous tissue

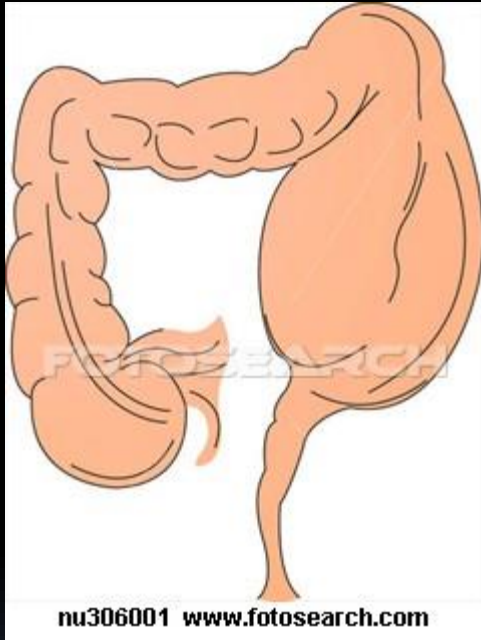
R-E system

Clinical features

- Incubation period – 7 – 14 days
- Pathogenesis – due to multiplying amastigote form in RE / Tissue cells and parasitemia
- Acute stage: At site of entry produce – dusky red firm swelling called Chagoma, Generalised lymphadenopathy, fever, Hepatosplenomegaly
- Chronic stage: Dilatation of various parts of colon, cardio myopathy etc.



Megacolon



Lab. Diagnosis

- Thick or thin film of blood – Giemsa stain – Trypomastigote form – C or U shaped.
- Serological tests – detection of antibody by card agglutination test.
- Animal inoculation
- Molecular method - PCR
- Intradermal test
- Biopsy of muscle / lymph node



Thank

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