TRYPANOSOMA

Trypanosomes are hemoflagellates that reside in peripheral blood and tissues of their host.

1. ***Trypanosoma cruzi :*** It is the causative agent of South American trypanosomiasis (also called as **Chagas' disease**) in man and transmitted by insect vector reduviid bug
2. ***Trypanosoma brucei:*** It causes African trypanosomiasis, transmitted by tsetse fly. It has three important subspecies out of which only two of them infect humans

- ***Trypanosma brucei rhodesiense:*** is the causative agent of East African sleeping sickness
- ***Trypanosma brucei gambiense:*** It is the causative agent of West African sleeping sickness
- ***Trypanosoma rangeli:*** It is a nonpathogenic species .

1- Trypanosoma cruzi

Habitat

- In humans, *T. cruzi* exists in two forms: (1) amastigote and (2) trypomastigote form.

- Amastigotes are intracellular parasite found in reticuloendothelial cells of spleen, liver, lymph node, bone marrow, and myocardium. They are also found in cells of epidermis and striated muscles

- Trypomastigotes are extracellular and found in peripheral blood.

Morphology

In vertebrate host, it exists mainly in two forms—(1) trypomastigote form and (2) amastigote form

In insect vector (reduviid bug), it exists as all four forms, i.e. (1) trypomastigote, (2) amastigote, (3) promastigote and (4) epimastigote form.

Figs 5.11A and B: *Trypanosoma cruzi* (schematic diagram) (A) trypomastigote form (B) amastigote form

Life cycle (Fig. 5.12)

Host: *T. cruzi* passes its life cycle in two hosts—(1) humans and (2) vector reduviid bugs or kissing bugs

Infective form: form is the infective forms, found in feces of Metacyclic trypomastigote reduviid bugs.

Mode of transmission:

- Reduviid bugs are nocturnal in habitat and humans get infection when abraded skin, mucous membranes, or conjunctivae become contaminated with reduvid bug's feces containing infective form of the parasite.

- *T. cruzi* can also be transmitted by the blood transfusion, organ transplantation or very rarely by ingestion of contaminated food or drink, and most importantly by laboratory accidents.

Development in Man

1. The parasite invades the reticuloendothelial cells and other tissues like muscle (cardiac, skeletal and GIT muscles) and nervous tissue and transforms into amastigote form.
2. In these tissues, the amastigotes multiply by binary fission forming a cyst like mass of growth known as pseudocyst

3. Many amastigotes within the pseudocyst are transformed into motile C shaped nonmultiplying trypomastigote forms.

4. On rupture of the pseudocyst, the trypomastogotes are liberated to blood.

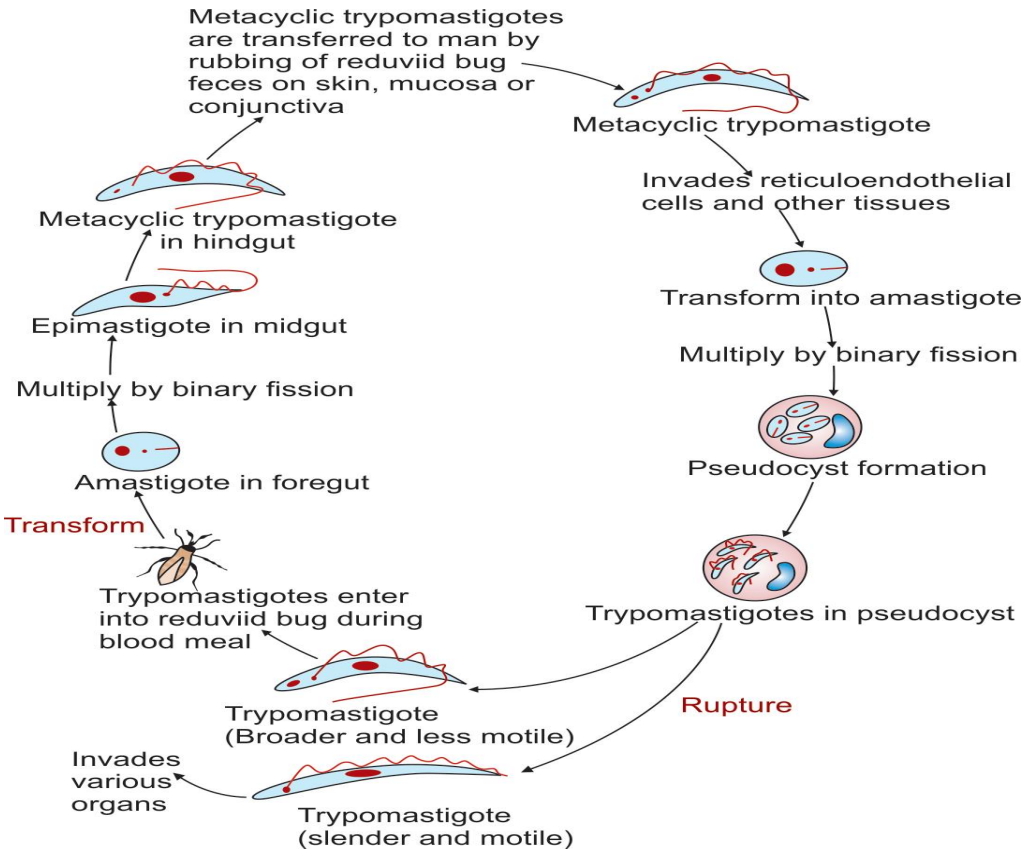

Fig. 5.12: Life cycle of *Trypanosoma cruzi*.

❖ **Symptoms of the parasite**

- **Acute Chagas' disease** : It is characterized by:

1. **Chagoma:** An erythematous subcutaneous nodule is formed at the site of deposition of bug's feces.

2. **Romana's sign:** When the parasites enter through conjunctiva, there occurs an unilateral painless edema of the eye lid and conjunctivitis (Fig. 5.14)
3. Generalized lymphadenopathy and hepato-splenomegaly
4. Severe myocarditis and neurologic signs like meningoencephalitis especially in children

- **Chronic Chagas' disease**

It occurs due to multiplication of the parasites in the muscles (skeletal, cardiac and GIT) and nervous tissue.

Cardiac form: Occurs in 30% of the patients. Patient develops cardiomyopathy, and thromboembolism

Gastrointestinal form:

- Involvement of muscles of GIT leads to megaesophagus (manifested as dysphagia, chest pain)
- megacolon (manifested as abdominal pain and chronic constipation).

2. TRYPONASOMA BRUCEI COMPLEX

1. ***T. brucei gambiense:*** Agent of West African sleeping sickness
2. ***T. brucei rhodesiense :***Agent of East African sleeping sickness
3. ***T. brucei brucei***

Life cycle (Fig. 5.16)

Host: *T. brucei* passes its life cycle in two hosts.

1. The **vertebrate host** is man and other animals

2. **Invertebrate host** is the **tsetse fly** (genus *Glossina)* (Fig. 16.6.) Both male and female flies bite man and serve as vectors.

Infective form: The metacyclic trypomastigote forms are found in salivary gland of tsetse fly

Mode of transmission: By the bite of tsetse fly, trypomastigote forms are transmitted to the punctured wound from the saliva of the tsetse fly (Fig. 5.16)

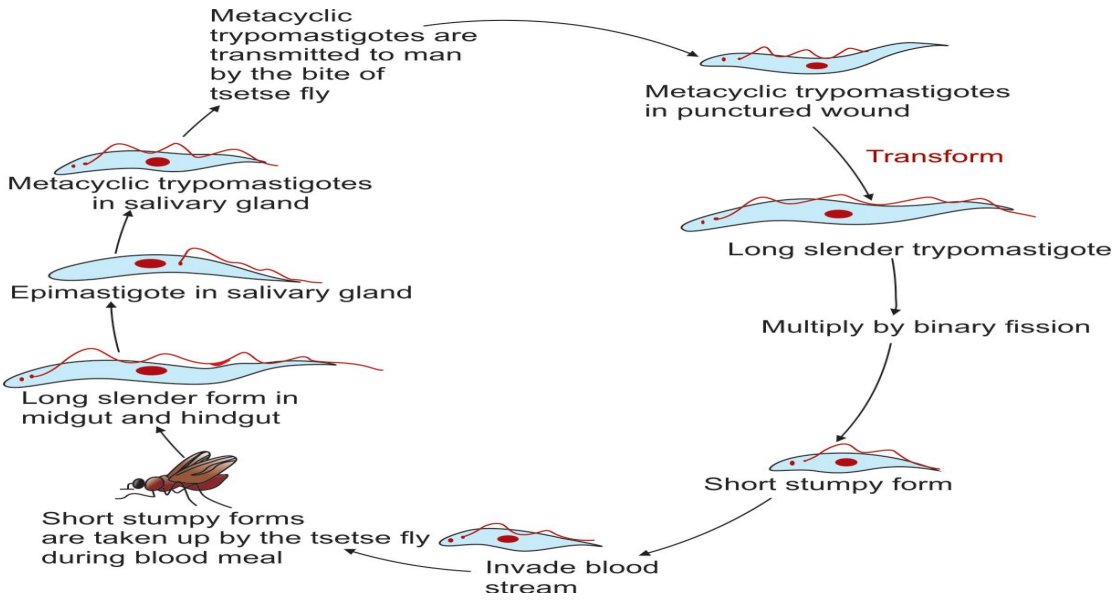

Fig. 5.16: Life cycle of *Trypanosoma brucei*.

Symptoms of the parasite

- ***Stage I Disease***

1. **Lymphadenopathy** is prominent in West African trypanosomiasis. The posterior cervical nodes are commonly involved and become soft, called as winterbottom's sign
2. Delayed sensation to pain is noted (Kerandel's sign)
3. Hepato-splenomegaly may be seen in few cases
4. Hematologic manifestations include moderate leukocytosis, thrombocytopenia, anemia and production high levels of polyclonal IgM.

- ***Stage II Disease (Sleeping Sickness)***

It involves invasion of the CNS.