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Protozoa – Trypanosoma brucei

Kingdom – Protista
Phylum – Protozoa
Class – Mastigophora (flagellates)
Order – Trypanosomatida
Genus – Trypanosoma
Species – brucei

General Characteristics :– This species has been grouped into three sub-sp. T. b. brucei, T. b. gambiense and T. b. rhodesiense. The first is the parasite of non-human vertebrates while the latter two are parasites of human. It is transmitted from one to another host by the vector tse-tse fly (Glossina) in Sub-Saharan Africa and causes African Trypanosomiasis or Sleeping sickness. In animals it causes animal trypanosomiasis. As this parasite can undergo antigenic variations, this causes evasion of host-immunity leading to chronic infection.

Structure — It is unicellular eukaryotic organism having elongated body tapered at both ends. Cell is enclosed by a proteinaceous covering outside the cytoplasm to maintain the shape of the organism. From the basal body arises a single flagellum that run towards the anterior end ~~and comes out~~. Along the body surface the flagellum is attached to the cell membrane forming an undulating membrane. Kinetoplast is present near the basal body which has numerous circular DNA.

Its flagella has normal (9+2) arrangment. It has two-fold function (1) locomotion via oscillations along the attached flagellum and cell body and (2) attachment to the fly gut during procyclic phase. Two morphologies are found at diff. stages of its life cycle

(1) **Epimastigote** – This form is found in Tsetse fly. Its kinetoplast and basal body lie anterior to the nucleus, with a long flagellum attached along the cell body. The flagellum starts from the centre of the body.

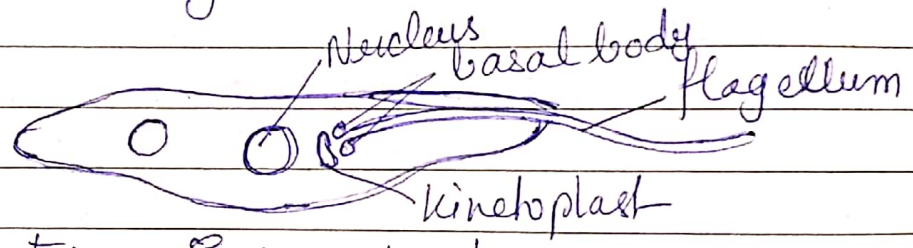

Fig – Epimastigote

(2) **Trypomastigote** – This form is found in mammalian host. Its kinetoplast and basal body are posterior to the nucleus. The flagellum arises from the posterior end of the body

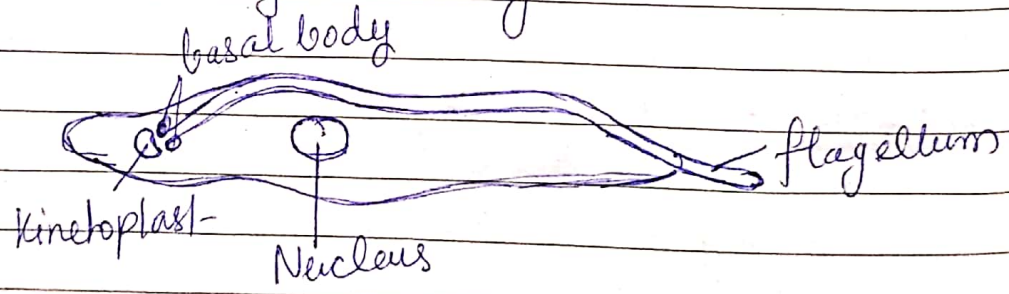

Fig – Trypomastigote

Life Cycle – In Mammalian host – metacyclic trypomastigote form is injected into tissue by tsetse fly bite. Parasite enters into blood & lymphatic system, where they grow into long & slender form and then multiply by binary fission.

Sometimes they crosses the blood-brain barrier and reaches the spinal fluid.

In Tse tse fly — The short & stumpy trypomastigotes are taken by tse tse fly. They enter midgut of the fly, become procyclic trypomastigote and then rapidly divide to become epimastigote. These then migrate to salivary gland via proventriculus. There some parasites transform into short & stumpy trypomastigote and then become infective metacyclic trypomastigote

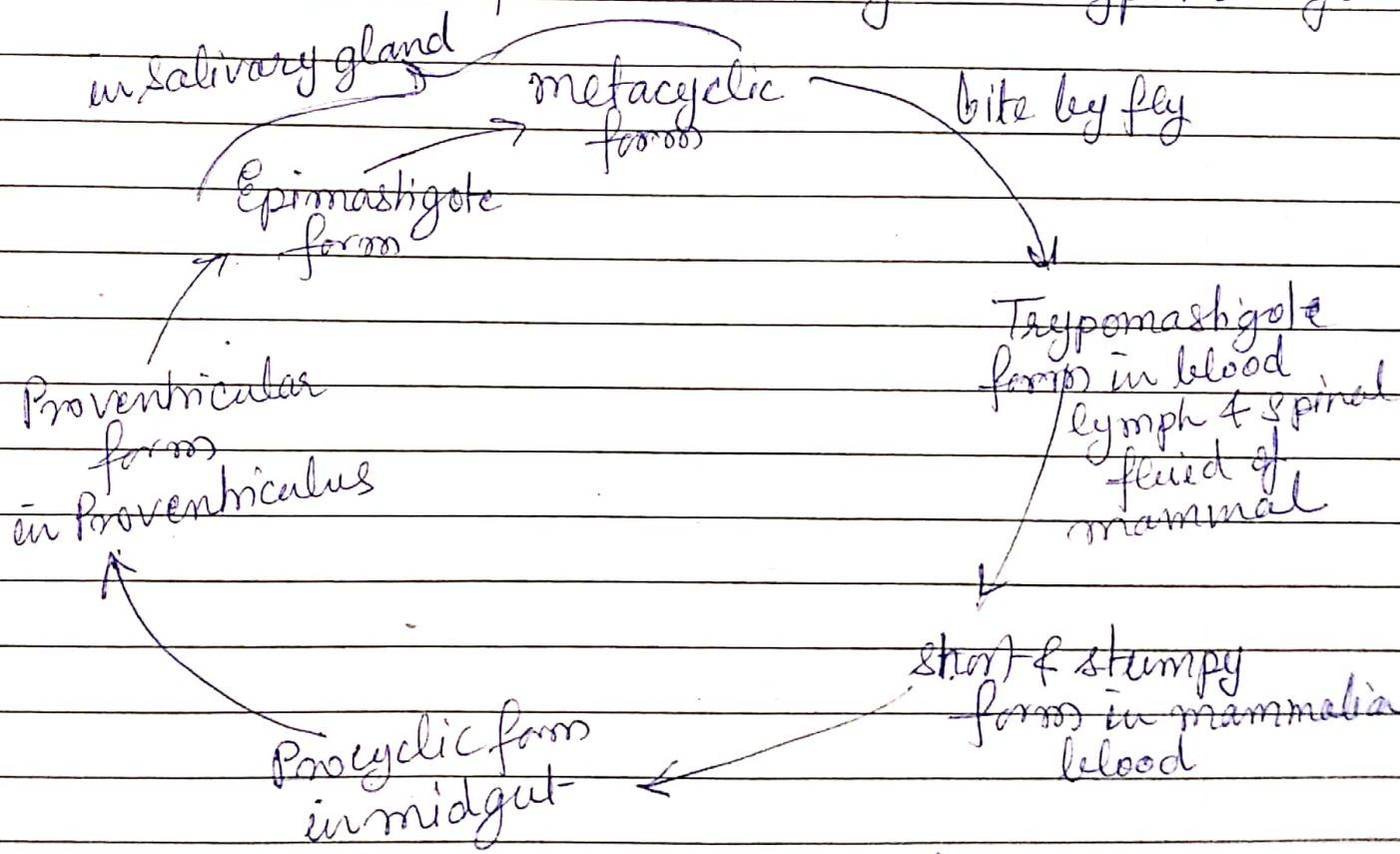

Fig - Life Cycle of T. b. gambience

Pathogenicity — Parasite is first injected into skin tissue from where it enters blood and lymph. In later stage it may migrate to cerebrospinal fluid and produces sleeping sickness.
Symptoms include fever, headache, joint pains and itching and disturbed sleep pattern. It is fatal if not treated. Treatment is done through medicine.