



# MEDICAL PARASITOLOGY

Definitions and Concepts

## **Medical parasitology**

**2023-2024**

**LAB(4)**

## Protozoa

Phylum: Sarcomastigophora

Subphylum: Mastigophora (Flagallata)

Class: Zooflagellata

(Blood and tissue flagellates)

### Example-1- *Leishmania*

*Leishmania* is a pathogenic parasite cause **leishmaniasis**, it spread through sand flies (*Phlebotomus*) which act as intermediate host or vector for this parasite, and their final hosts are vertebrates( such as rodents and human).



*Phlebotomus* (sand fly)

There are many species for this parasite:-

1. ***Leishmania donovani*** : It is an obligate intracellular parasite of reticuloendothelial cells, predominantly of liver, spleen, bone marrow and lymph nodes, cause **visceral leishmaniasis called (Kala-Azar)**.
2. ***Leishmania tropica*** : It occurs inside reticuloendothelial cells of the skin, cause **Cutaneous leishmaniasis called (oriental sore or Baghdad Boil)**. There are two types for this species (Dry type and Moist type).



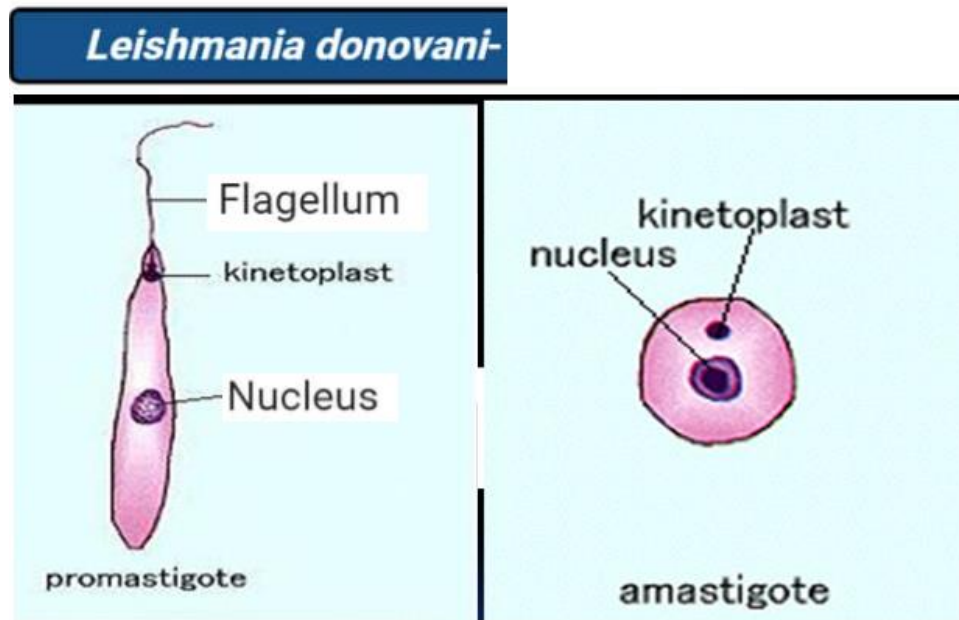
***Leishmania braziliensis*** : These occur as intracellular parasites inside the macrophages of the skin and mucous membrane of the nose and buccal cavity, cause **mucocutaneous leishmaniasis called (American leishmaniasis)**.

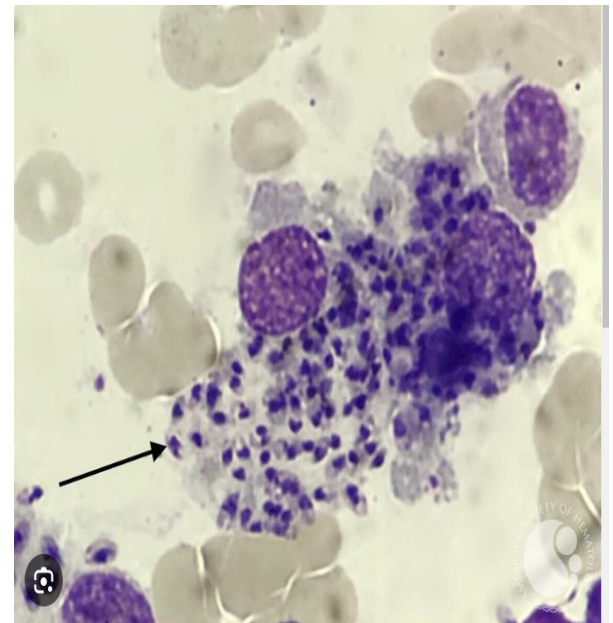
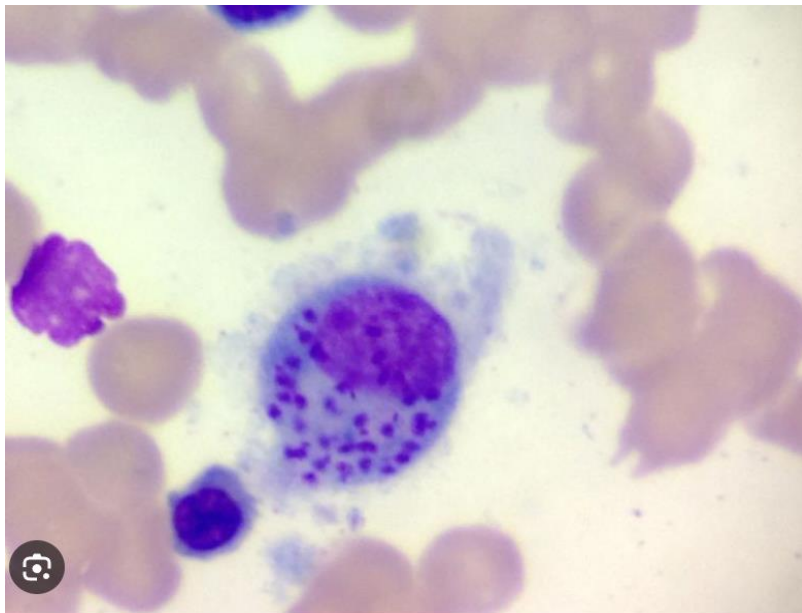
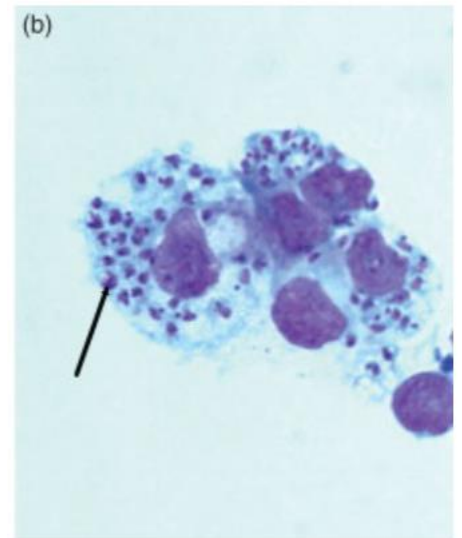
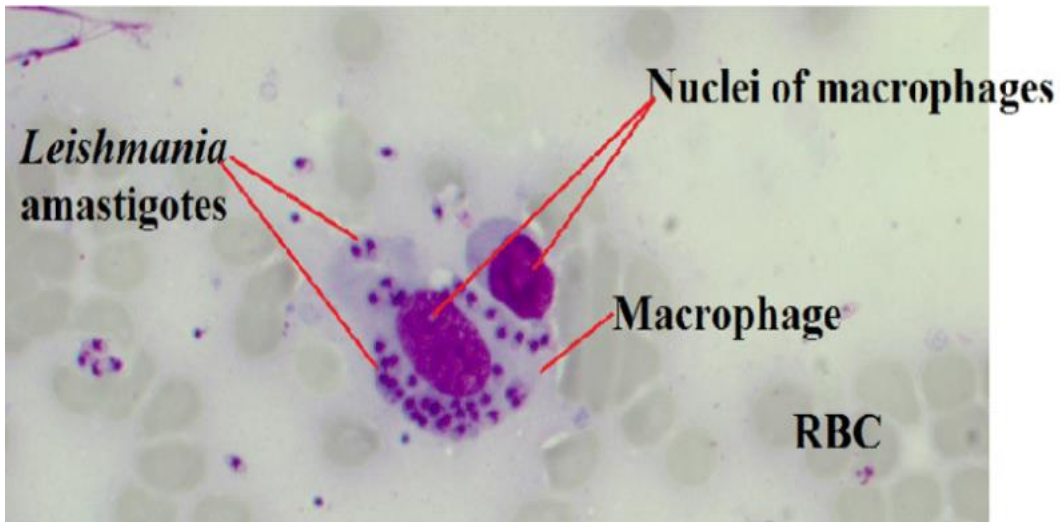


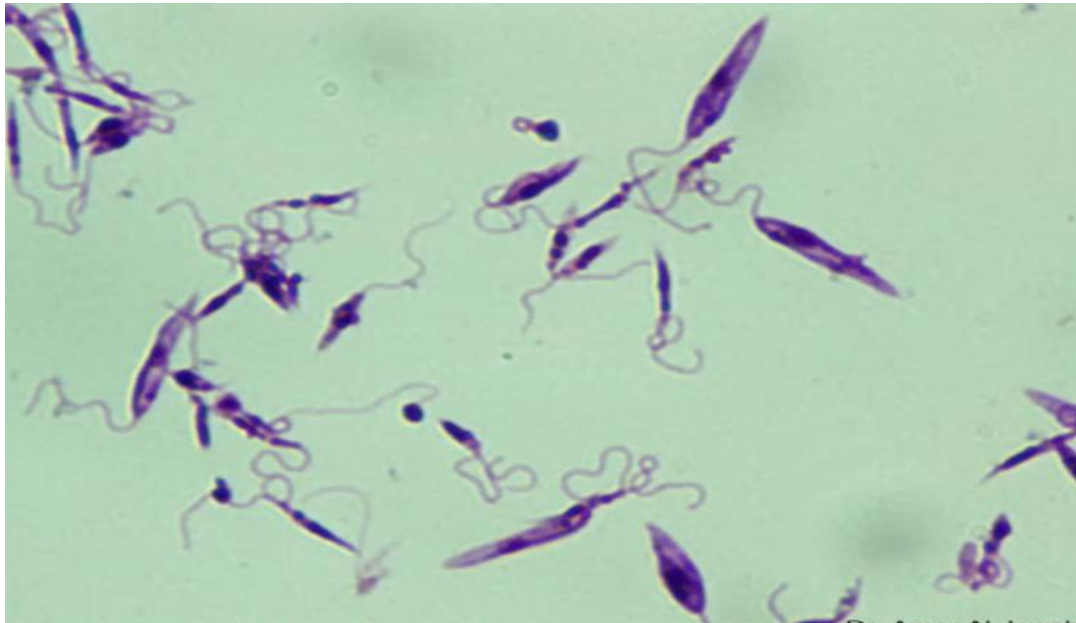
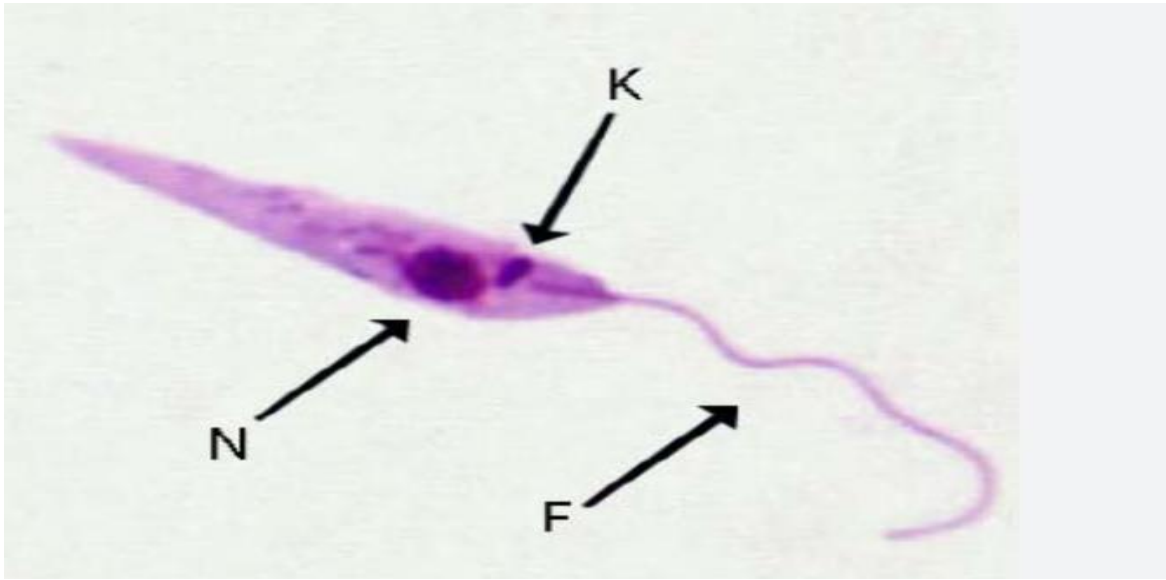
- **Morphology :-**

**This parasite have two morphological stages :-**

1. **Amastigote stage :** It is non-motile, round or oval body, nucleus is round or oval shape situated in the middle of the body , kinetoplast present in front of nucleus extend from it short flagellum and not have undulating membrane (this stage present in human).
2. **Promastigote stage :** It is motile, spindle shape nucleus situated in the middle of the body, the kinetoplast is located in front of the nucleus ear the anterior end of the body. The flagellum is found anterior of nucleus and not attached to the cell body, this stage not have undulating membrane. (found in the sand fly).







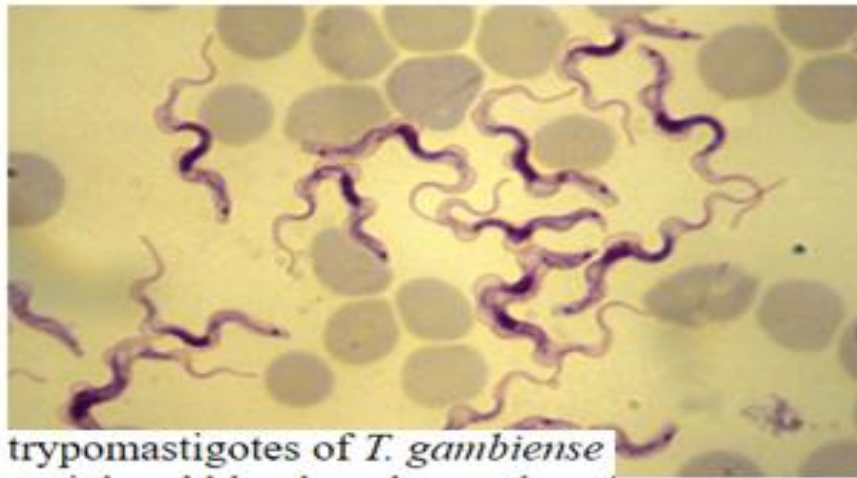
- **Diagnosis :-**

Various tests which can be carried out for the laboratory diagnosis of Kala-Azar such as parasitological diagnosis (peripheral blood film by thick film; needle biopsy/aspiration from liver, spleen, lymph node ; Immunological tests). On the other hand, *L. tropica* and *L. braziliensis* diagnosis by the microscopic examination of material obtained by puncture of the indurated edge of the sore and stained with Giemsa or wright stain, amastigote stage will be seen in large numbers inside the macrophages.

## Example-2- *Trypanosoma*

1- *Trypanosoma brucei gambiense* : it causes **African trypanosomiasis or sleeping sickness** in human. It is transmitted by the Glossina sp. Or tsetse fly. Man develops infection by the bite of infected tsetse fly, both male and female insects suck blood and transmit infection.

2-*Trypanosoma brucei rhodesiense* : this genus has the same characters and causes of disease in *gambiense* , however there are differences in the clinical manifestations of the disease they cause.

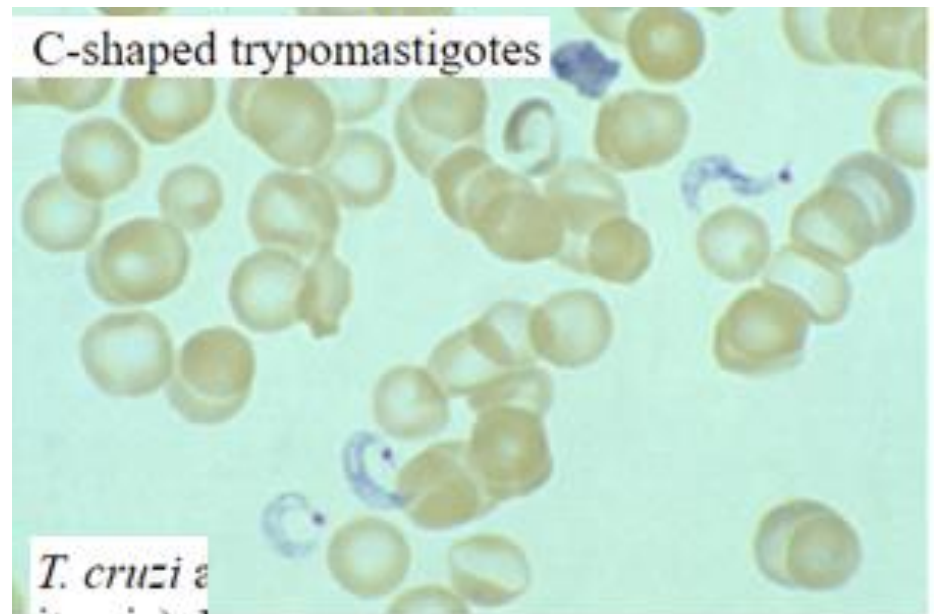
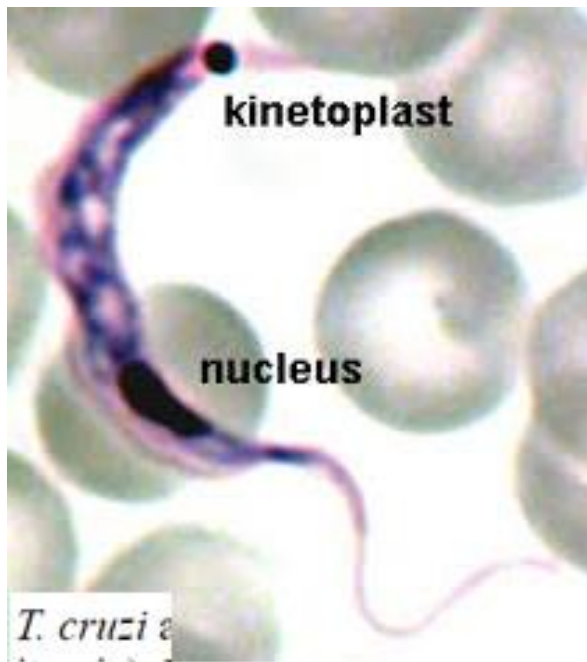


**Trypanosoma gambiense in mouse blood  
(Giemsa)**





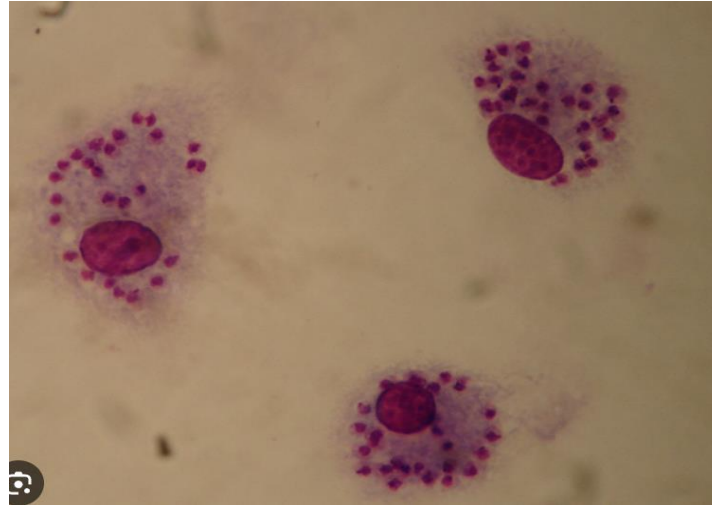
**3-*Trypanosoma cruzi*** : it causes American trypanosomiasis or Chagas disease in human, the most frequent locations of the parasites are reticuloendothelial cells of spleen, liver, lymph nodes and myocardium, transmission of disease occur by triatomine bugs when deposits its feces on the skin surface and subsequently bites, the human the scratches the bite area, which facilities penetration of the infected feces.



- **Morphology :-**

**This parasite have four morphological stages :-**

- 1. Amastigote stage**



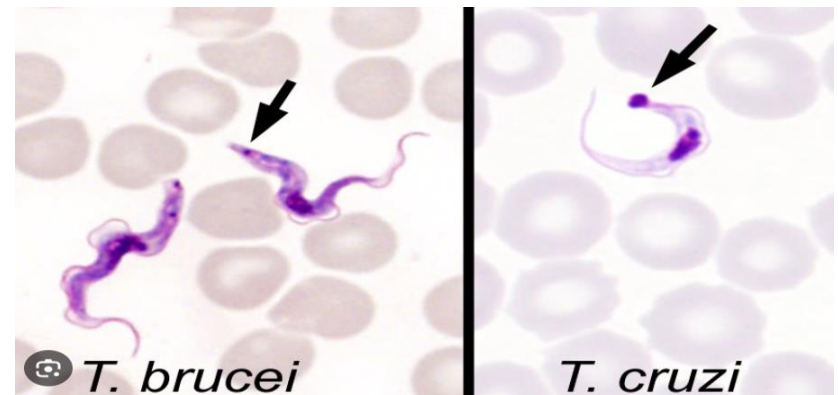
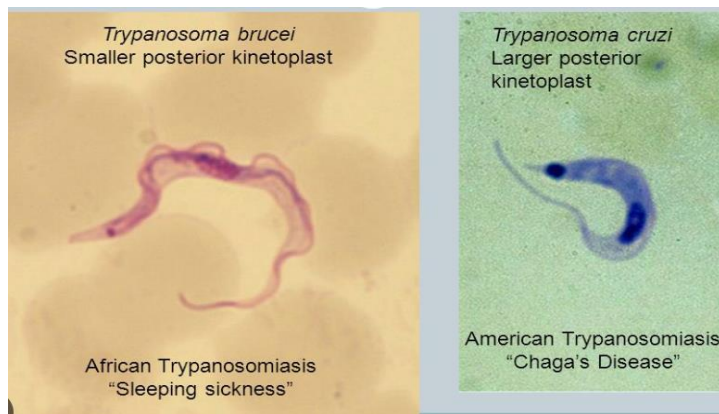
- 2. Promastigote stage**

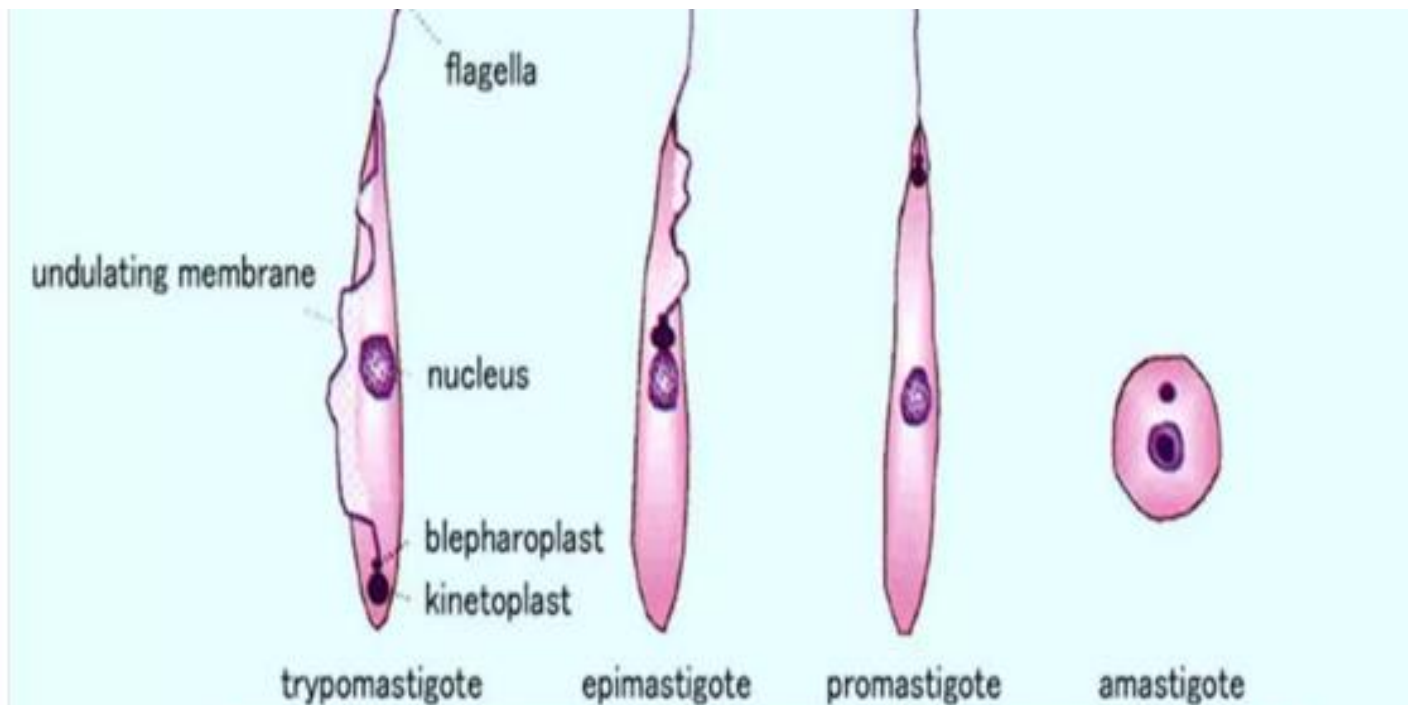


3. **Epimastigote stage** : Elongated body, the nucleus present near the posterior end of the body. The kinetoplast is located between the nucleus and the anterior end, the flagellum is connected to the cell body for part of its length by an undulating membrane and then extend freely outside the body.



4. **Trypomastigote stage**: Spindle shape, nucleus present in the middle of the body, the kinetoplast is near the posterior end of the body and the flagellum lies attached to the cell body for most its length body by undulating membrane then extend freely outside the body. This stage in *Trypanosoma cruzi* appear as – C – shape has a central nucleus and a large kinetoplast situated at the posterior end.





**Differences between Various Morphological Stages of Hemoflagellates**

- **Diagnosis :-**

The diagnosis of African trypanosomiasis depends upon demonstration of the parasite in blood, lymph node aspirates, fluid aspirated by direct microscopic examination of unstained and stained films, as well as serologic techniques. While in American trypanosomiasis the diagnosis occur by direct microscopic examination of peripheral blood, stained and unstained wet blood film, in addition to other tests such as (immunoassay and serology detections). In all species during diagnosis, if the parasites are scanty and cannot be detected in thin stained, thick film should be made.

Hemoflagellates	Disease	Vector
<i>Trypanosoma brucei rhodesiense</i>	African sleeping sickness (acute)	Tsetse fly
<i>T. brucei <u>gambiense</u></i>	African sleeping sickness (chronic)	Tsetse fly
<i>Trypanosoma <u>cruzi</u></i>	Chagas disease	Kissing bug
<i>Leishmania</i> spp.	Cutaneous, mucocutaneous, visceral leishmaniasis	Sand fly



THANK  
YOU