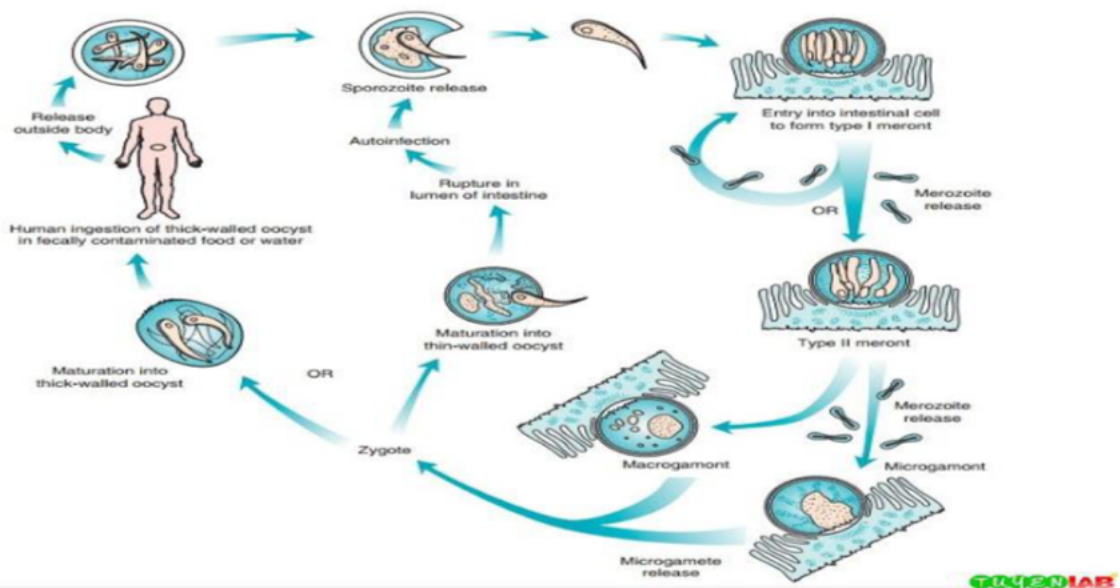


The sporozoites infect enterocytes in the small intestine.

The sporozoites develop into unsporulated oocysts, which are excreted in feces.

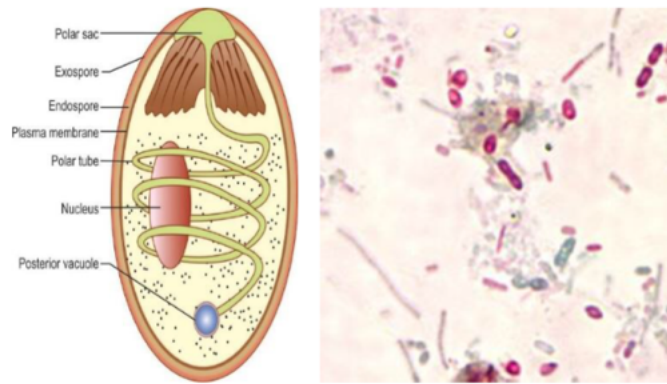


**Transmission:-** Contaminated food or water , person-to-person.

**Pathology:-** Infected individuals experience a diarrhea similar to that experienced with *Cryptosporidium* infections. While some cases were less debilitating than others, asymptomatic cases were not thought to have occurred.

**Identification:-** Oocysts are spherical, 7 - 10 microns in diameter, and present as variably acid-fast. Acid-fast procedures utilizing carbol-basic fuchsin proved superior in demonstrating this parasite.

### **5-Microsporidium:-**



*Microsporidium spp. spores*

General – as of this time, infections are thought to be limited to AIDS patients.

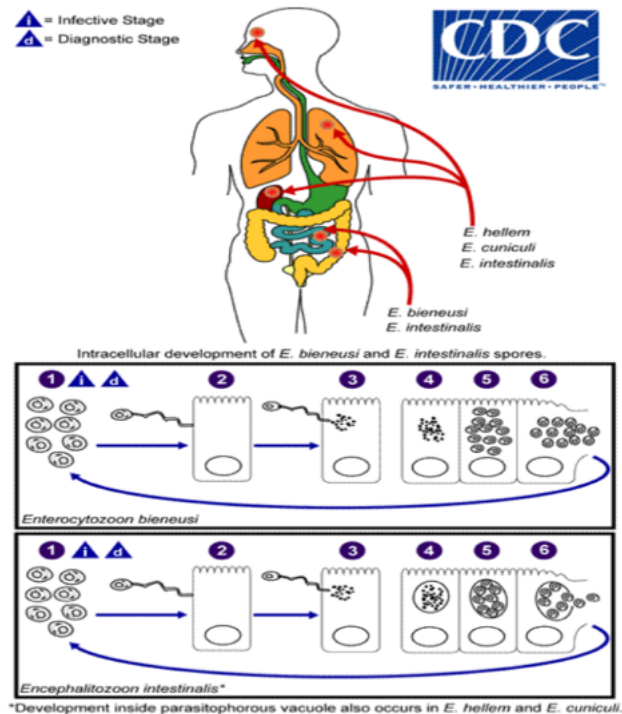
### **Morphology:-**

Microsporidia are unicellular, obligate intracellular parasite. They reproduce in host cells by producing spores→ (sporogony) Spores are 2–4  $\mu\text{m}$  in size and oval to cylindrical in shape,→ with a polar filament or tubule (Fig. 8.1). The spores are the infective stage of microsporidia→ and the only stage of life cycle capable of existing outside the host cell. The polar tubule is an extrusion mechanism for injecting infective spore contents into the host cell. Spores are surround by thick double-layered cyst wall Outer layer (exospore) is proteinaceous and electron-dense Inner layer (endospore) is chitinous and electronlucent Spores are Gram-positive and acid fast.

### **Life cycle:-**

Life Cycle Infection in host is probably by ingestion or inhalation of spores. In the duodenum, the spore with its nuclear material is→ injected through the polar tubule into the host cell. Inside the cell,

the microsporidia multiply by repeated binary fission (merogony) and produce large number of spores (sporogony). During sporogony, a thick spore wall is formed that provides environmental protection to the cyst. The spores are then liberated free from the host cell and infect other cells.



### **Clinical Presentation:-**

Human microsporidiosis represents an important and rapidly emerging opportunistic disease, occurring mainly, but not exclusively, in severely immunocompromised patients with AIDS.. The clinical manifestations of microsporidiosis are very diverse, varying according to the causal species with diarrhea being the most common.

## **Laboratory Diagnosis**

Microscopy Diagnosis of microsporidiasis is made by demonstration of the spores in stool, urine, cerebrospinal - uid (CSF), or small intestine biopsy specimen.

## *Blood & Tissue Protozoa – The Hemoflagellates*

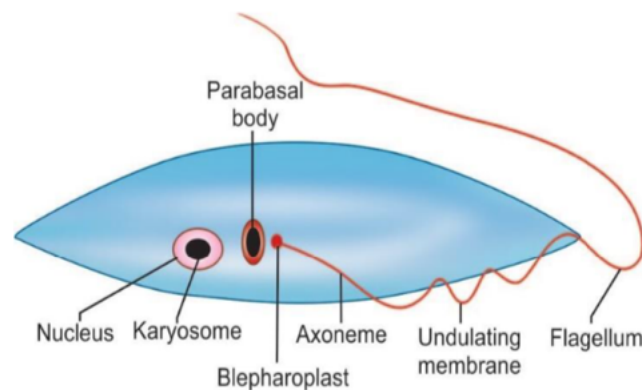
### *Introduction*

1. The family Trypanosomatidae, (includes hemoflagellates) contain only two genera that parasitize humans.
  - a. Genus *Leishmania* are always intracellular, principally in cells of the reticuloendothelial system.
  - b. Genus *Trypanosoma* contains members that may be found both in the circulating blood and intracellularly in cardiac muscle. African - blood; American - cardiac muscle.
2. In all probability, the hemoflagellates were originally parasites of insects. They are transmitted by insects, and in them undergo a developmental cycle (the arthropod serves as intermediate host).
  - a. "Old World" leishmaniasis - transmitted by the bite of various species of sandflies of the genus *Phlebotomus*.
  - b. South American leishmaniasis - carried by *Lutzomyia* spp. sandflies.
  - c. American trypanosomiasis - transmitted by **reduviid bugs**; transmission occurs when infective feces of the bug contaminates the wound made by the insect's bite or an abrasion of the skin.
  - d. African trypanosomiasis - transmitted by *Glossina* spp. tsetse flies.

## Morphological forms of hemoflagellates

### General Characteristics

1. **Nucleus:** is round or oval and is situated in the central part of the body.
2. **Kinetoplast:** consists of a deeply staining parabasal body and adjacent dotlike **blepharoplast**. The parabasal body and blepharoplast are connected by one or more thin fibrils (Fig 5.1).
3. **Flagellum:** is a thin, hairlike structure, which originates from the blepharoplast. The portion of the flagellum, which is inside the body of the parasite and extends from

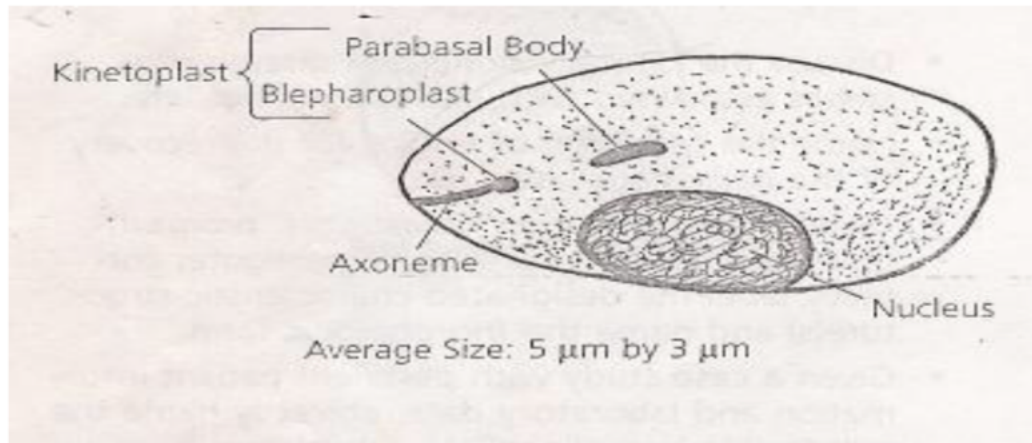


Hemoflagellates exist in two or more of four morphological stages. These forms were formerly called the **leishmanial, leptomonad, crithidial, and trypanosomal stages**. But as these names are also given to different genera within the family, they were changed to **amastigote, promastigote, epimastigote and trypomastigote**.

### 1- Amastigotes:

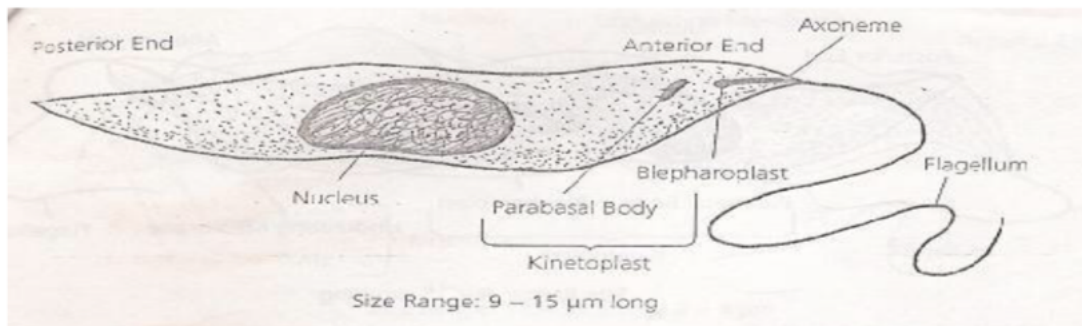
Rounded or ovoid, without any external flagellum. The nucleus, kinetoplast, and axial filaments can be seen. The axoneme extends

upto the anterior end of the cell



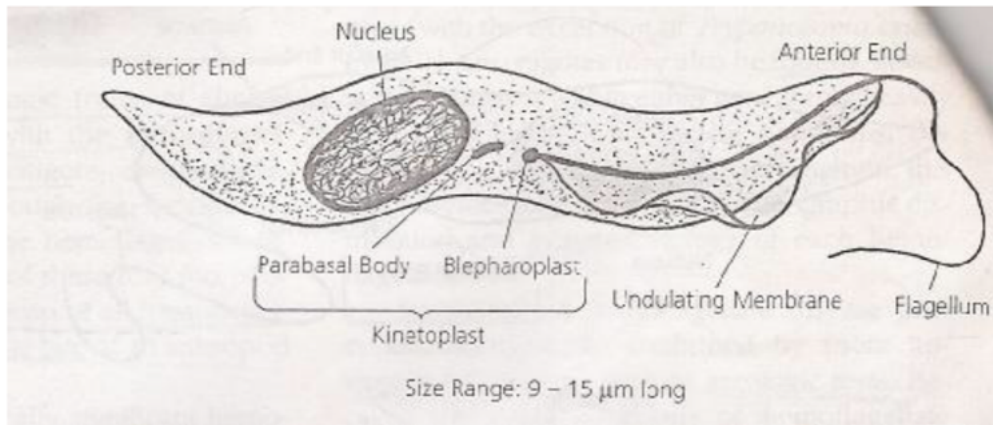
### 2- Promastigotes :-

Lanceolate in shape. Kinetoplast is anterior to the nucleus (antenuclear kinetoplast) near the anterior end of the cell, from which flagellum emerges. There is no undulating membrane



### 3- Epimastigotes :-

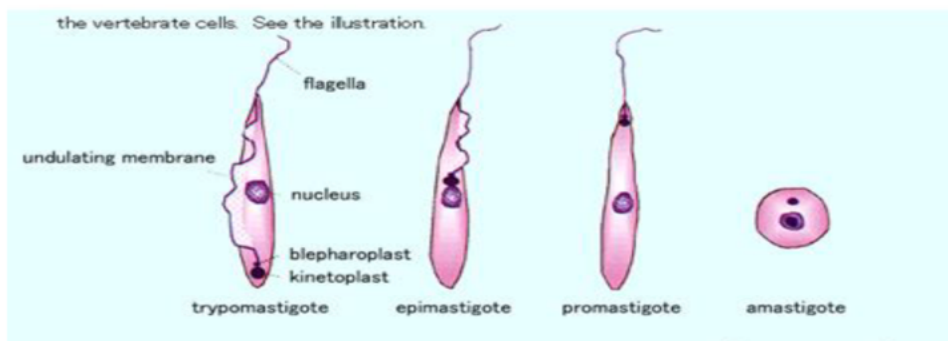
Elongated, with the kinetoplast placed more posteriorly, though close to and in front of the nucleus. The flagellum runs alongside the body as a short undulating membrane, before emerging from the anterior end



#### 4- Trypomastigotes :-

This stage is elongated, spindle-shaped with a central nucleus. The kinetoplast is posterior to the nucleus (postnuclear kinetoplast) and situated at the posterior end of the body. The flagellum runs alongside the entire length of the cell to form a long undulating membrane before emerging as a free flagellum from the anterior end.

#### Different stages of Haemoflagellates



#### 1- Trypanosoma:-

In the vector, the trypanosomes follow one or two modes of development and are accordingly classified into 2 groups

1. **Salivaria (anterior station):** In salivaria, the trypanosomes