Tikrit University

College of Nursing

Basic Nursing Sciences

Second Year - 2023-2024

Mastigophora

By: assistant lecturer

Ayat Munaf Hameed

Mastigophora

INTRODUCTION

Flagellates are unicellular microorganisms. Their locomotion is by lashing a tail-like appendage called a flagellum or flagella and reproduction is by simple binary fission. There are three groups of flagellates:

- Luminal flagellates Giardia lamblia Dientmoeab fragilis
- Hemoflagellates Trypanosoma species. Leishmania species.
- Genital flagellates Trichomonas vaginalis

Giardia lamblia Important features – the life cycle consists of two stages, the trophozoite and cyst. The trophozoite is 9-12 μm long and 5-15μm wide anteriorly. It is bilaterally symmetrical, pear-shaped with two nuclei (large central karyosome), four pairs of flagella, two axonemes, and a suction disc with which it attaches to the intestinal wall. The oval cyst is 8-12μm long and7-10μm wide, thick-walled with four nucleus and several internal fibera? Each cyst gives rise to two trophozoites during excystation in the intestinal tract. Transmission is by ingestion of the infective cyst.

Pathogenesis

Infection with G.lamblia is initiated by ingestion of cysts. Gastric acid stimulates excystation, with the release of trophozoites in duodenum and jejunum. The trophozoites can attach to the intestinal villi by the ventral sucking discs without penetration of the mucosa lining, but they only feed on the mucous secretions. In symptomatic patients, however, mucosa-lining irritation may cause increased mucous secretion and dehydration. Metastatic spread of disease beyond the GIT is very rare.

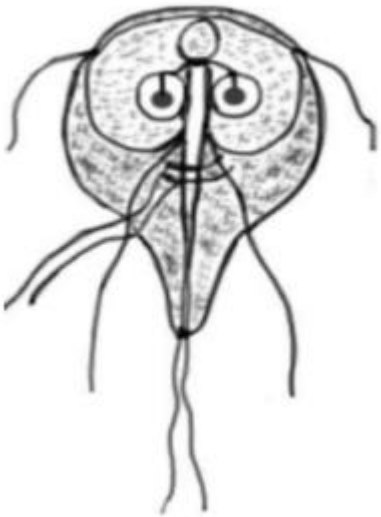
Laboratory diagnosis

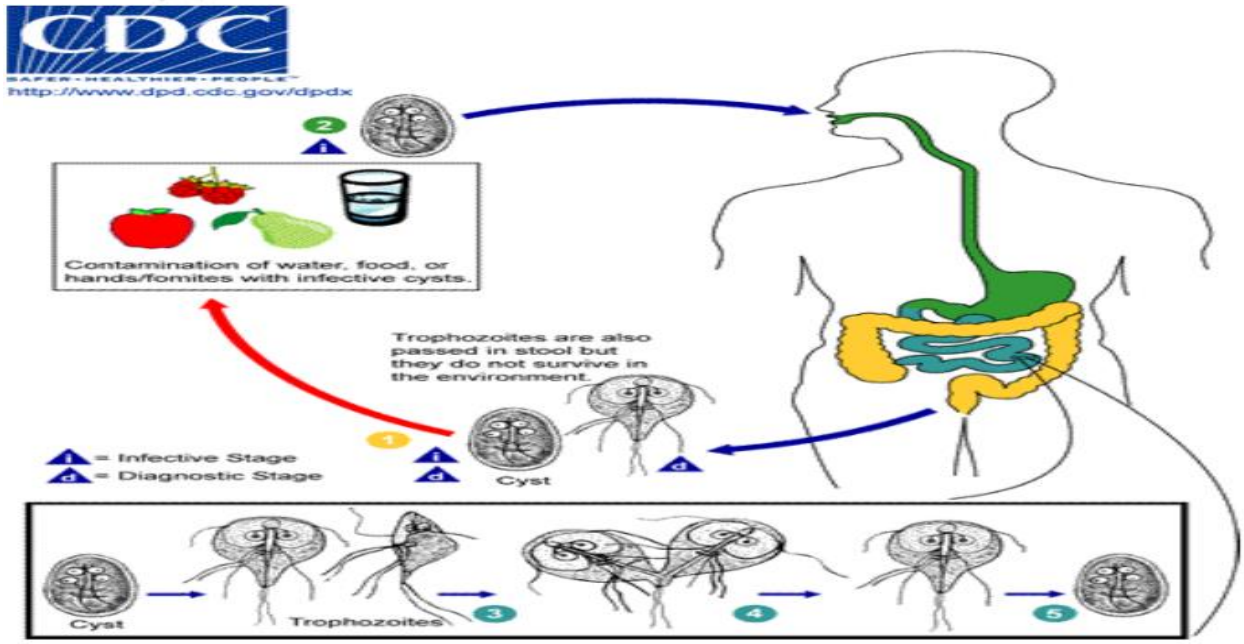
Examination of diarrhoeal stool- trophozoite or cyst, or both may be recovered in wet preparation. In examinations of formed stool (e.g. in asymptomatic carriers) only cysts are seen. Giardia species may occur in “showers”, i.e. many organisms may be present in the stool on a given day and few or none may be detected the next day. Therefore one stool specimen per day for 3 days is important.

Cyst stage Ovoidal in shape Mature cyst, Oval – shape containing four nucleus. The remaining flagellae and sucking disc may be seen inside the cyst stage.

Diagnostic stage:

cyst and Trophozoite in acute infection chronic Infective stage: cys





Giardia lamblia and Trichomonas vaginalis (pathogenic flagellates)

Multiply by longitudinal binary fission.

Luminal flagellate (Trichomonas vaginalis)

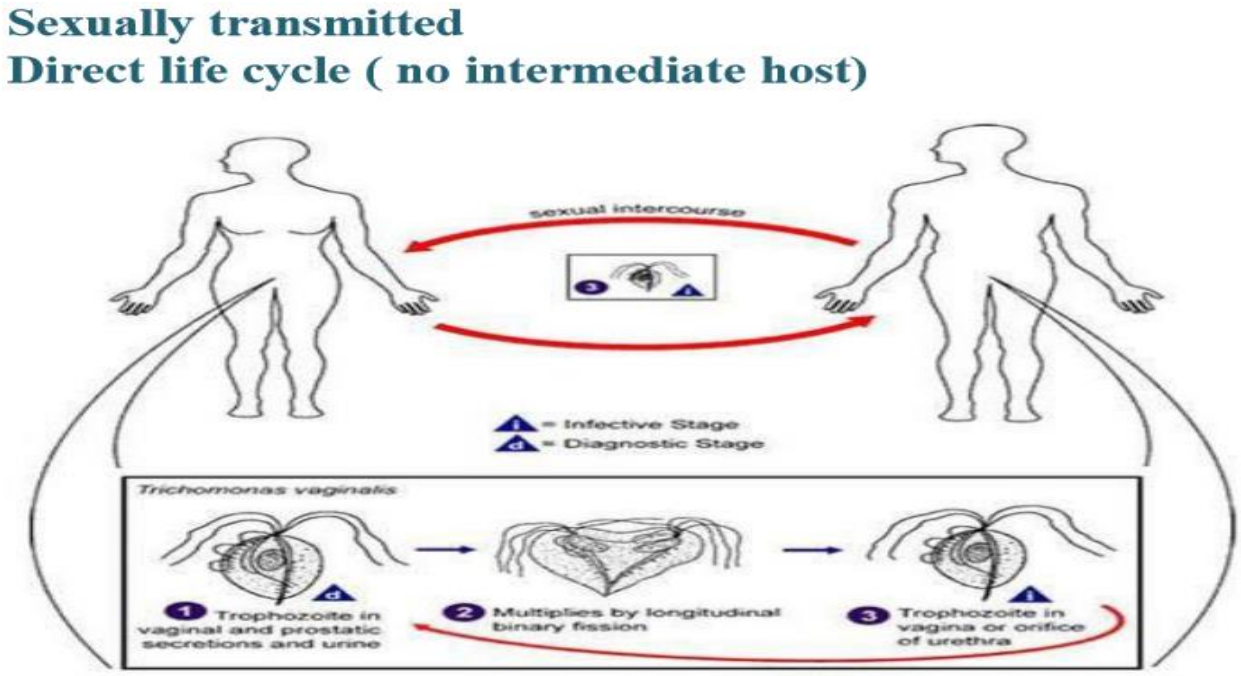
Habitat : Urogenital tract of male and female Cause vaginitis in female, and uritheritis or prostatitis in male.

Trichomonas vaginalis

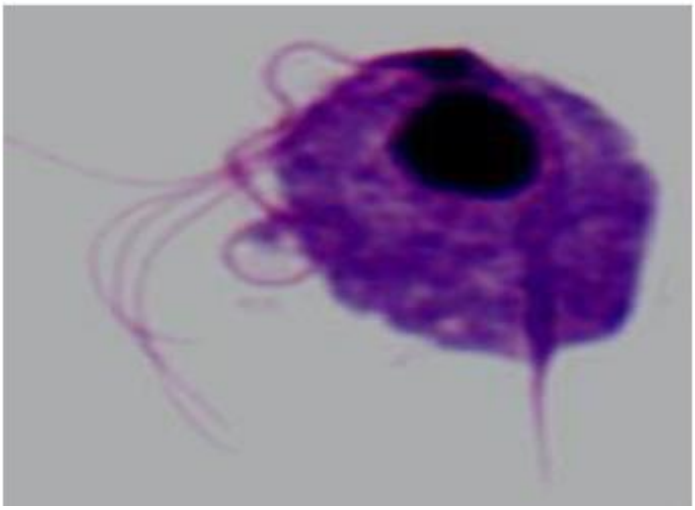
Important features- it is a pear-shaped organism with a central nucleus and four anterior flagella; and undulating membrane extends about two-thirds of its length. It exists only as a trophozoite form, and measured 7-23μm long & 5-15μm wide. Transmission is by sexual intercourse

Only trophozoite stage (infective, diagnostic and pathogenic stage)

Habitat : Urogenital tract of male and female Cause vaginitis in female, and uritheritis or prostatitis in male.



Trophozoite



Half pear shaped with a single nucleus.

Have four anterior flagella, undulating membrane, Two axostyles. The organism does not encysted.

Laboratory diagnosis • In females, T.vaginalis may be found in urine sediment, wet preparations of vaginal secretions or vaginal scrapings. • In males it may be found in urine, wet preparations of prostatic secretions or following massage of the prostate gland. • Contamination of the specimen with faeces may confuse T.vaginalis with T.hominis.

Haemoflagelates

Leishmania Species

Clinical disease

- Veseral leishmaniasis
- Cutaneous leishmaniasis
- Mucocutaneous leishmaniasis

The species of leishmania exist in two forms, amastigote (aflagellar) and promastigote (flagellated) in their life cycle. They are transmitted by certain species of sand flies (Phlebotomus & Lutzomyia)

Visceral leishmaniasis

Leishmania donovani Important features- the natural habitat of L.donovani in man is the reticuloendothelial system of the viscera, in which the amastigote multiplies by simple binary fission until the host cells are destroyed, whereupon new macrophages are parasitized. In the digestive tract of appropriate insects, the

developmental cycle is also simple by longitudinal fission of promastigote forms. The amastigote stage appears as an ovoidal or rounded body, measuring about 2-3μm in length; and the promastigotes are 15-25μm lengths by 1.5-3.5μm breadths.

Leishmania tropica: causes cutaneous leishmaniasis (Baghdad boil, Delhi boil)

Exist in two stages: Amastigote, Promastigote Have two host vertebrate (human), and Arthropods (Sand fly) vector.

Unflagellated

Amastigote (Diagnostic and pathogenic stage)

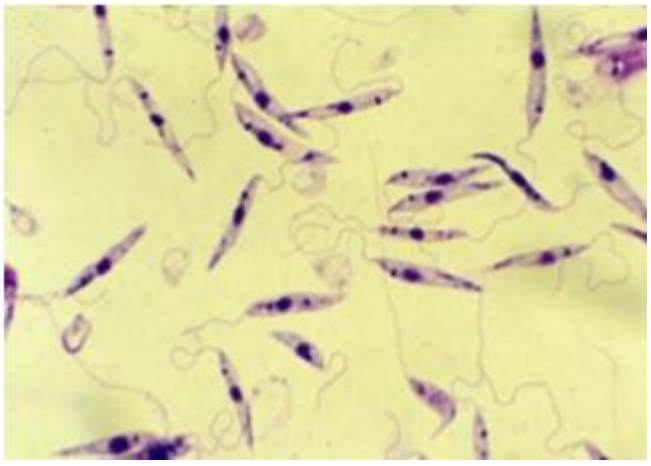
Unflagellated, obligate intracellular phagocytes of human tissues

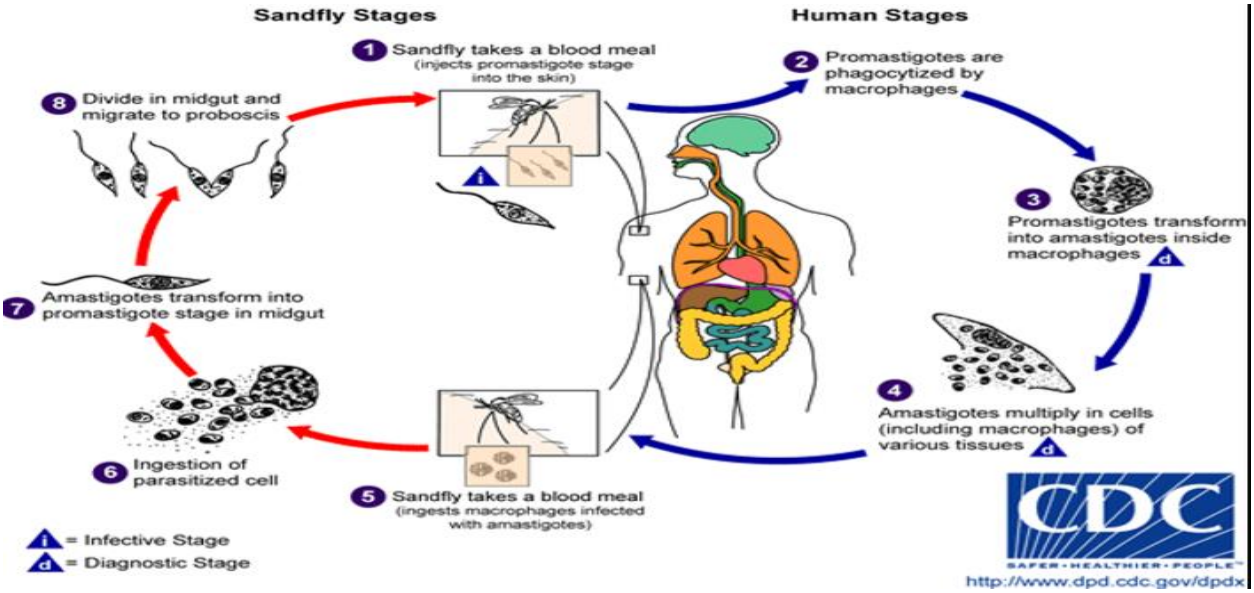
stage, (i.e.

within skin, Reticuloendothelial cells (REC), spleen, liver, lymph nodes, and bone marrow). Appear as round or oval bodies with a single nucleus and kinetoplast

Promastigote (Infective stage).

Extracellular Flagellate in the sand fly intestine, with Spindle shaped. Single centrally located nucleus. Single flagellum originated from anterior end and Kinetoplast is clearly visible.

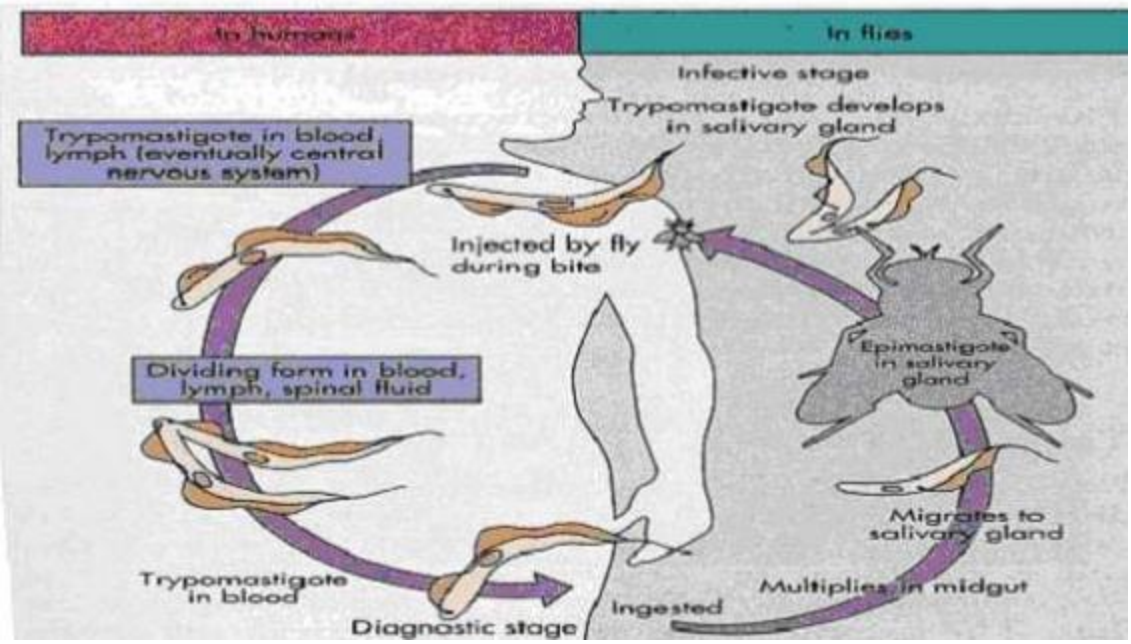




Trypanosomiasis Etiologic agents Trypanosoma brucei complex – African trypanosomiasis (sleeping sickness) Trypanosoma cruzi – American trypanosomiasis (Chagas' disease)

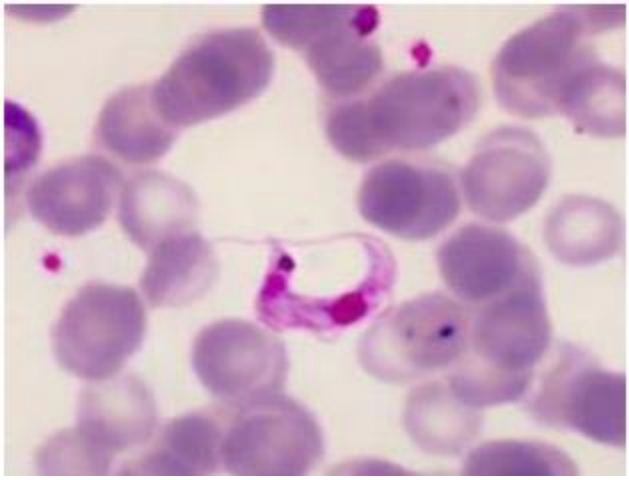
Important features

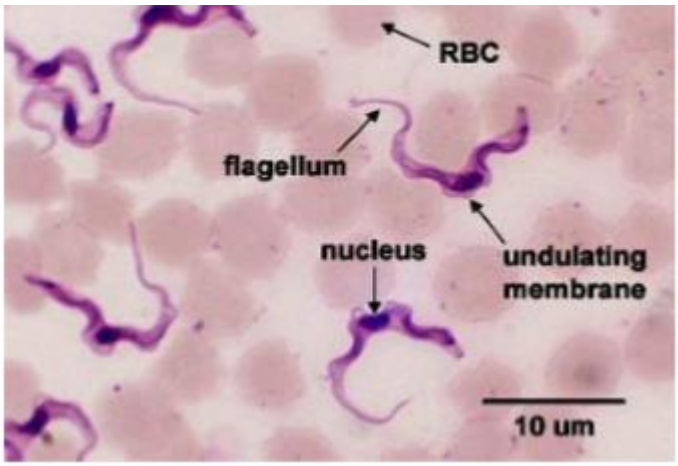
These species may have amastigote, promastigote, epimastigote, and trypomastigote stages in their life cycle. In human trypanosomes of the African form, however, the amastigote and promastigote stages of development are absent. Typical trypanosome structure is an elongated spindle-shaped body that more or less tapers at both ends, a centrally situated nucleus, a kinetoplast posterior to nucleus, an undulating membrane arising from the kinetoplast and proceeding forward along the margin of the cell membrane and a single free flagellum at the anterior end.



Pathogenesis

The trypomastigotes spread from the skin through the blood to the lymph node and the brain. The typical somnolence (sleeping sickness) usually progresses to coma as a result of demyelinating encephalitis. In acute form, cyclical fever spike (approximately every 2 weeks) occurs that is related to antigenic variation. As antibody mediated agglutination and lysis of the trypomastigotes occurs, the fever subsides. With a few remains of antigenic variants new fever spike occurs and the cycle repeats itself over a long period.




RBC
flagellum
nucleus
undulating membrane
10 um