

MEDICAL PARASITOLOGY

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Lec. 5

Phylum: Mastigophora

The flagellates; members of this phylum can inhabit mouth, bloodstream, tissues, gastrointestinal, or urogenital tracts.

Morphological Characteristics:

1. Flagellum - characteristic organelle of locomotion. It is an extension of ectoplasm and resembles a tail; moves with a whip-like motion.
2. Axostyle - a supporting mechanism; a rod-shaped structure; not all Genera exhibit these.
3. Undulating membrane - a protoplasmic membrane with a flagellar rim extending out like a fin along the outer edge of the body of some flagellates. Moves in a wave-like motion.
4. Costa - a thin, firm rod-like structure running along the base of the undulating membrane in some flagellates.
5. Cytosome - a rudimentary mouth; also referred to as a gullet.

Note: Identification of a flagellate is based upon:

1. Size.
2. Shape.
3. Motility.
4. Number and morphology of nuclei.
5. Number and location of flagellae.
6. Location in the body of the host.

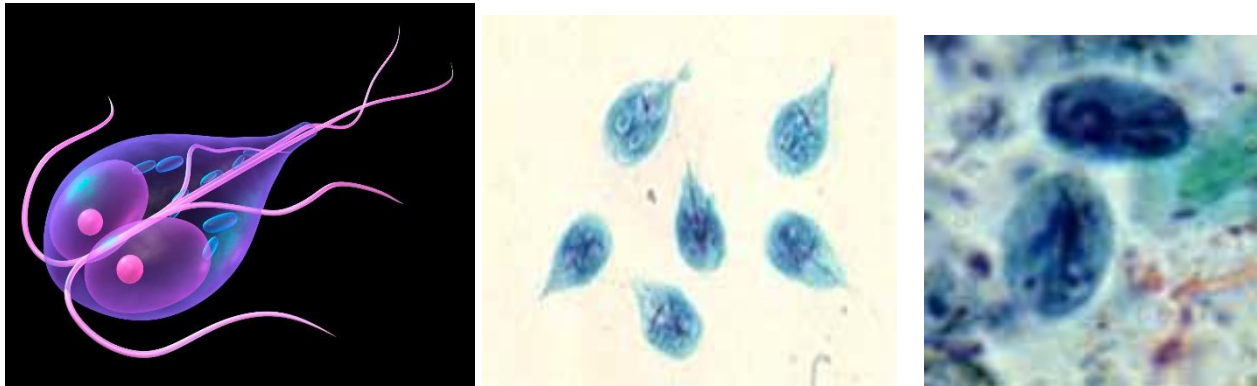
Intestinal-urogenital flagellates

Found to parasitize in the intestinal and urogenital, there are three important flagellates are present to cause disease in human *Giardia lamblia*, *Entamoeba fragilis*, *Trichomonas vaginal*.

A. Intestinal flagellates:

Giardia lamblia

History: probably the first described protozoan pathogen of humans and it is one of the most common clinically parasite identified in the laboratory examination



Giardia lamblia trophozoites

G. lamblia cysts

Distribution and habitat

Giardia lamblia is a flagellate of world-wide distribution, **appear shape**. its prevalence 1 to 30%, depending upon the population surveyed and more prevalent in children than adult. Its more common in warm climates than temporal climates. Often occurs in epidemics, especially in children's day care centers; can be transmitted in water. It is most common protozoan parasite in the U.S.A. Cysts remain viable as long as 3 months when protected from direct sunlight and excess heat; resistant to chlorination. Sexual transmission has been well documented.

Disease: **giardiasis** which is infected the upper small bowel and cause diarrhea, the stools contain lipids due to disturbance in digestion.

Morphology: very distinctive. Dorsal-ventrally flattened, and Bi-laterally symmetrical.

- **Trophozoite:** Four pairs of flagella; one pair located anterior, two pair located ventral, and one pair located posterior. An axostyle and parabasal bodies are

present. motility resembles a “falling leaf” uses “sucking discs” to adhere to intestinal wall; interferes with absorption of nutrients.

- **Cyst:** Measures 9 x 12 micrometers and contain 2 to 4 nuclei; the karyosome is centrally located, with little or no peripheral chromatin; parabasal bodies are present.

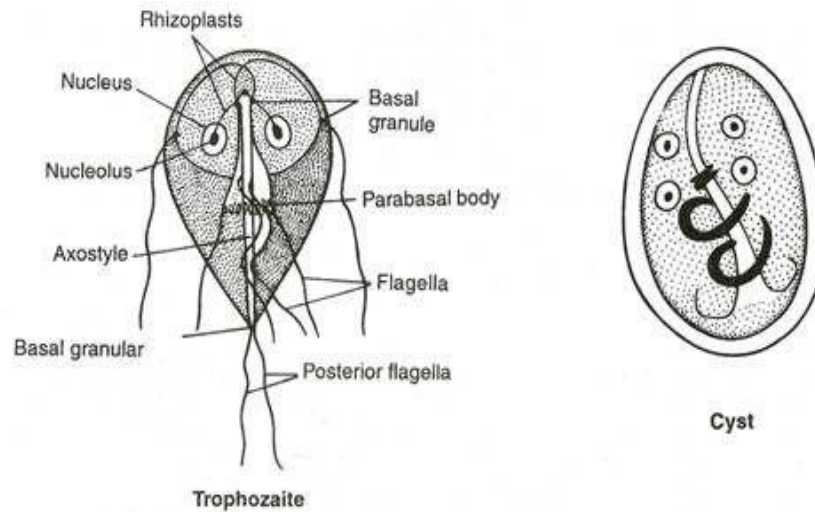
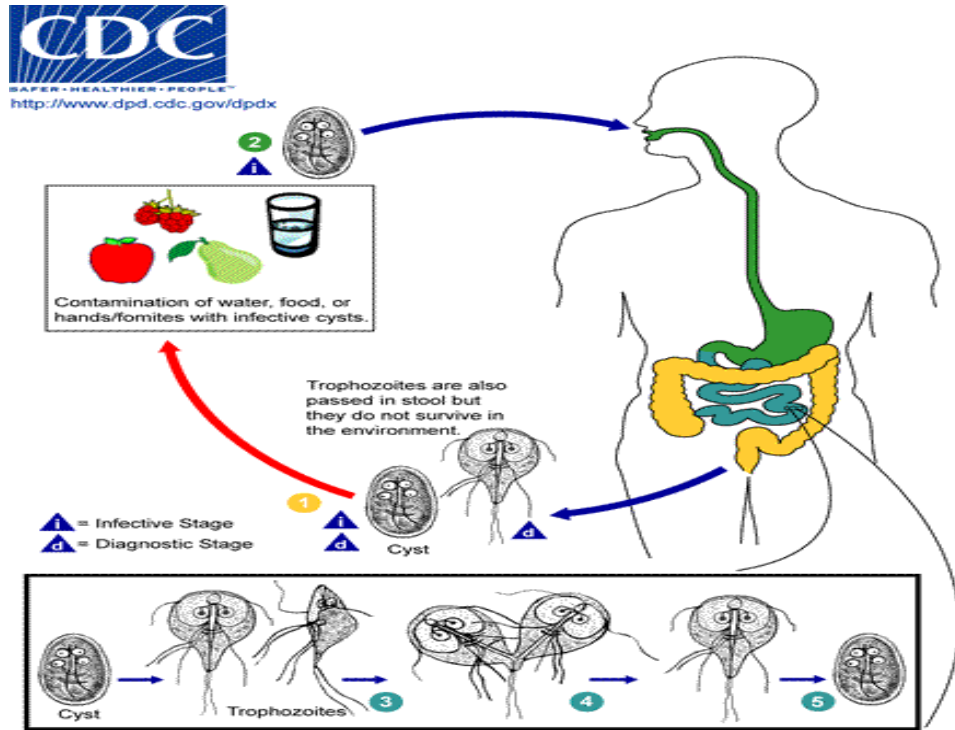


Fig. 181. Stages of life cycle of *Giardia intestinalis*.

Transmission: giardia infection can occur through

- The ingestion of mature cysts in the contaminated water and food.
- Fecal-oral route.
- Swimming in contaminated streams or lakes.

Life cycle: man ingests cysts from fecally contaminated environment; the organism excysts in the upper intestine; trophozoites multiply by binary fission and attach to the intestinal mucosa by their disc-like suckers, sometimes entering secretory tubes, even the gall bladder. Trophozoites and cysts are passed in the feces, the cyst can survive for weeks to months in cold water



Pathology and Clinical features: symptoms can be severe; diarrhea, foul - smelling, greasy, mucus-laden stools, swelling, nausea, cramps. Most infections are asymptomatic; chronic cases experience weight loss, malabsorption of fat, protein, folic acid, and fat-soluble vitamins.

Diagnosis: identification of cysts or trophozoites in stool specimens or duodenal contents. Irregular shedding pattern results in a “showering” of organisms at times, while being difficult to detect at other times.

Treatment: treat the infection with proper drugs (Metronidazole, Tinidazole, Nitazoxanide).

Prophylaxis and control: depend on

- Consuming of clean water.
- Prevent using human feces for cultivation of farms.
- Use good hygiene.

B. Urogenital flagellates

Trichomonas vaginalis

Is an aerobic flagellated protozoan parasite and the causative agent of trichomoniasis.



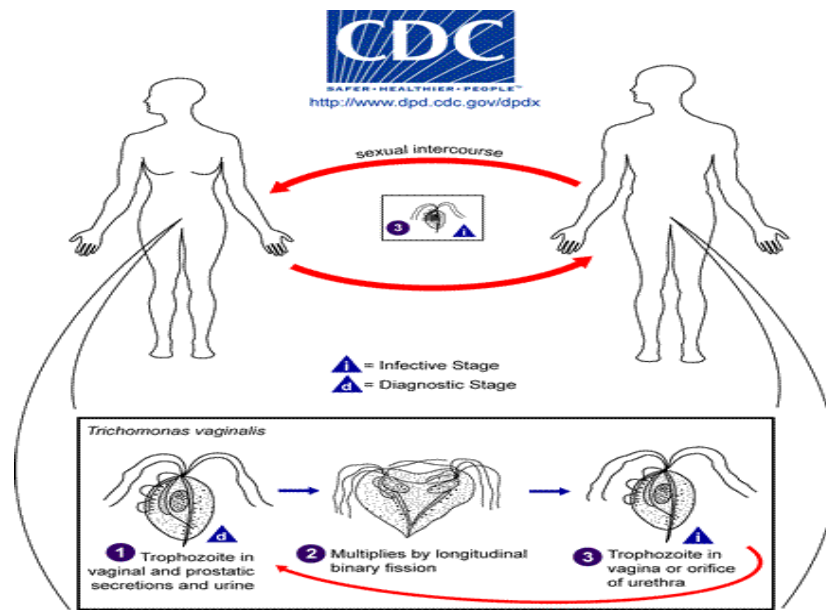
Trichomonas vaginalis trophozoites

Distribution: it is the most common pathogenic protozoan infected human in industrialized countries. The WHO has estimated that 160 million cases of infection are acquired annually worldwide. In Iraq, they found about 10-15 % of women are infected with this parasite. It inhabits the female uro-genital tract, also infects urinary tract and prostate of man, as well as infects newborn female and female children. Infection rates between men and women are similar with women being symptomatic, while infection in men are usually asymptomatic.

Morphology: exists only in trophozoite stage has an axostyle and short undulating membrane that extends less than half the body length; exhibits 4 flagellae, arranged in a tuft.

Transmission: sexual or fomites, skin to skin contact with an infected individual (most often through vaginal intercourse).

Life cycle: *Trichomonas vaginalis* is a pathogen in the genitourinary tract. In women, trophozoite lives in the vagina, urethra and epididymis, whereas in men, it lives in urethra and prostate. Incubation period is typically 5 to 28 days, multiplies via longitudinal fission when vaginal conditions become more basic than usual (normal pH is 3.8 to 4.2). It may survive in a host for 2+ years, no cyst stage.



Pathology and Clinical Features:

- **Females:** vaginal discharge; burning, Itching, or chafing. Frequency of urination or dysuria. Relationship between trichomoniasis & cervical cancer.
- **Males:** frequently asymptomatic. If the prostate is involved, the patient may develop discharge, dysuria, and enlargement of prostate with tenderness.

Diagnosis: by studying a genital discharge to observe trophozoite in body fluids by (1) wet mounts of discharges, (2) cervical smears (because of low sensitivity, diagnosis via a wet mount), (3) via overnight culture (greater sensitivity but are not widespread use), (4) diagnosis by PCR.

Treatment: infection is treated and cure by metronidazole or tinidazole.

Prophylaxis and control:

1. Good hygiene is very important to prevent infection.
2. Screening pregnant women who do not have symptoms and treated who test positive for the infection may decrease women risk of preterm birth.
3. Self-cleaning is very important.
4. Avoid contamination with towels, physician utensils.
5. Prevent wearing other underwire.
6. If wife is infected, husband should take drugs and vasa-vasa.