

- 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*
- *Dientmoea fragilis*
- • **Hemoflagellates**
- *Trypanosoma* species.
- *Leishmania* species.
- • **Genital flagellates**
- *Trichomonas vaginalis*

GIARDIASIS (lambliasis)

Etiology

Giardia lamblia (a flagellate)

Epidemiology

Giardia has worldwide distribution and is common in Iraq. It is the most frequent protozoan intestinal disease in the ward and the most common identified cause of water-borne disease associated with breakdown of water purification systems, drinking from contaminated streams, travel to endemic areas (Russia, India, Rocky Mountains, etc.) and day care centers

Morphology

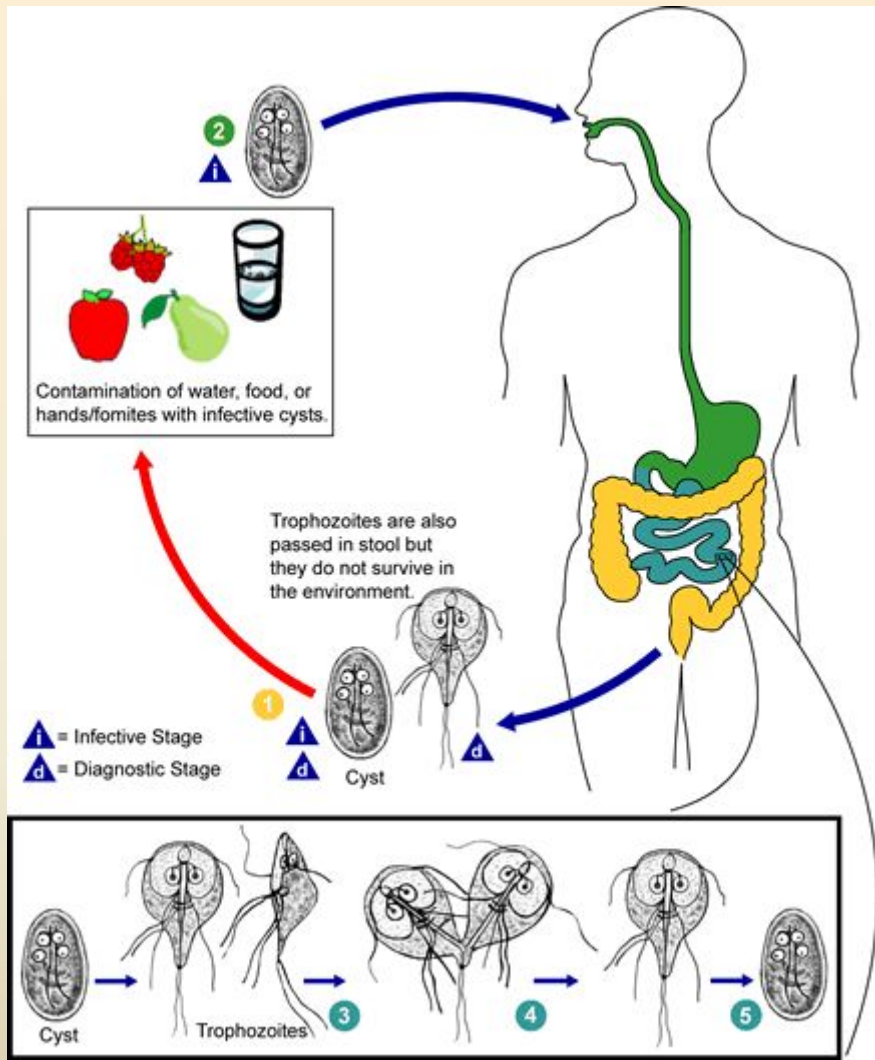
Trophozoite: *Giardia* is a 12 to 15 micrometer, half pear-shaped organism with 8 flagella and 2 axostyles arranged in a bilateral symmetry. There are two interiorly located large suction discs. The cytoplasm contains two nuclei and two parabasal bodies

Cyst: *Giardia* cysts are 9 to 12 micrometer ellipsoidal cells with a smooth well-defined wall. The cytoplasm contains four nuclei and many of the structures seen in the trophozoite.



Lifecycle:

Infection occurs by ingestion of cysts, usually in contaminated water. Decystation occurs in the duodenum and trophozoites (trophs) colonize the upper small intestine where they may swim freely or attach to the sub-mucosal epithelium via the ventral suction disc. The free trophozoites encyst as they move down stream and mitosis takes place during the encystment. The cysts are passed in the stool. Man is the primary host although works, pigs and monkeys are also infected and serve as reservoirs.



Symptoms:

Unlike *Entamoeba histolytica* which can invade the tissues of the large intestine, *G. lamblia* does not invade the tissues of the small intestine. However, the trophozoites adhere closely to the lining of the small intestine, and in heavy infections much of the lining of the small intestine can be covered with trophozoites. The symptoms associated with giardiasis range from none (in light infections) to severe, chronic diarrhea (in heavy infections), but not dysentery.

Early symptoms include flatulence, abdominal distension, nausea and foul-smelling bulky, explosive, often watery, diarrhea. The stool contains **excessive lipids** but very rarely any blood or necrotic tissue. The more chronic stage is associated with vitamin B12 malabsorption, disaccharide deficiency and lactose intolerance, weight reduction.

- Steatorrhea. Steatorrhea is the medical term for the passage of large amounts of fat or greasy-looking material in the stool.
- Discomfort in the stomach or abdomen that is worse after a meal.
- Persistent bad breath or burping that smells like sulfur.
- Ongoing bloating, flatulence, or abdominal cramping.
- Recurrent headaches.
- Malaise (general feeling of sickness), fatigue, or weakness.
- **The symptoms of chronic giardiasis in children include:**
- Failure to grow and abnormal rate of weight for the child's age and sex.
- Recurrent occurrences of pale, foam-covered, foul-smelling diarrhea.
- Loss of appetite.
- Abdominal pain and vomiting.
- Nutritional deficiencies caused by the inability to absorb nutrients in food.



- **Pathology**

Covering of the intestinal epithelium by the trophozoite and flattening of the mucosal surface results in malabsorption of nutrients.

- **Immunology**

There is some role for IgA and IgM and there is increased incidence of infection in immunodeficient patients (*e.g.* AIDS).

● **Diagnosis**

Symptoms, history, epidemiology are used in diagnosis.

Giardia caused dysentery is distinct from other dysenteries due to lack of mucus and blood in the stool, lack of increased PMN leukocytes in the stool and lack of high fever. Cysts in the stool and trophs in the duodenum can be identified microscopically after content has been obtained using a string device (Enterotest[®]). Trophs must be distinguished from the non-pathogenic flagellate *Trichomona hominis*, which is an asymmetrical flagellate with an undulating membrane.

● **Treatment**

Metronidazole is the drug of choice

● TRICHOMONIASIS

● Etiology

:Genus *Trichomonas* has 3 distinct species ●

.*T. hominis* which inhabit large intestine & non pathogenic -1 ●

.*T. tenax* which inhabit oral cavity & commensals -2 ●

● 3- *T. vaginalis* is the urogenital pathogenic flagellate



Trichomonas vaginalis (a flagellate) Common sexually transmitted protozoon.

Common at the age of 16-35 (sexually active period). More pathogenic in ●

.women than men and related with other pathogenic organisms

Epidemiology

Trichomonas vaginalis has a world-wide distribution; incidence is as low as 5% in normal females and as high as 70% among prostitutes and prison inmates.

● Morphology

The trophozoite form is 15 to 18 micrometers in diameter and is half pear shaped with a single nucleus, four anterior flagella and a lateral flagellum attached by an undulating membrane. Two axostyles are arranged asymmetrically. **The organism does not encyst.**

- *Thin axostyle midway crossed by thick parabasal body
- * Four anterior free flagella and a lateral marginal flagellum with an undulating membrane that reach to about half of the body length.

Habitat: *T. vaginalis* trophozoite lives in the vagina, prostate and urethra ●

Lifecycle

T. vaginalis colonizes the vagina of women and the urethra (sometimes prostate) of men. Infection occurs primarily via sexual contact, although non-venereal infections are possible. The organism does not encyst and divides by binary fission which is favored by low acidity (the normal pH is .3.5 to 4.5)

.Suitable pH for the parasite is 4.5 – 6 (low acidic) -1 ●

Rare among young girls / menopause women - parasite requires -2 ●

.estrogenized epithelium for survival

High in population at high risk for other venereal diseases & poor female -3 ●

.hygiene



Normal acidity is due to the action of *Doderlein bacillus* on glycogen ●

.content of vaginal epithelial cells producing lactic acid

.There is no non-human reservoir ●

● Symptoms

Infection is frequently asymptomatic, *T. vaginalis* infection is rarely symptomatic (50%)

- **In men**, symptoms appear when infection involves prostate or higher part of uro-genital tract. Thin discharge, dysuria while it may cause mild urethritis or occasionally prostatitis.
- **In women**, it is often asymptomatic, but heavy infections in a high pH environment may cause mild to severe vaginitis with copious foul-smelling and yellowish, sometimes frothy discharge. Trophozoites feed on mucosal surface of vagina and urethra producing sloughing of squamous epithelial cells. Profuse odourous (foul-smelling) discharge, burning, itching, frequency of urination and dysuria. Excessive discharge, diffuse vulval erythema .Vaginal wall inflammation (Painful sexual intercourse)

● Pathology

The organism causes contact-dependent damage to the epithelium of the infected organ.

Diagnosis ●

- Microscopic examination of wet film from discharge Trophozoites must be distinguished from the non-pathogenic flagellate

Trichomona hominis ●

Culture of discharge. (modified Diamond's media) - ●

.Detection of *T.vaginalis* antigen in discharge by: Enzyme immunoassay - ●

.Direct fluorescent antibody test - ●

Detection of DNA of the parasite by Molecular techniques - ●

Treatment

Metronidazole (although teratogenic) is effective in both males and females. Vinegar douche may be useful. Personal hygiene and the use of condoms are helpful.

