



الكلية: الطب

القسم او الفرع: الاحياء المجهرية

المرحلة: الثالثة

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اسم المادة باللغة العربية: الطفيليات الطبية

اسم المادة باللغة الإنكليزية: **Medical Parasitology**

اسم المحاضرة الثانية باللغة العربية: السوطيات

اسم المحاضرة الثانية باللغة الإنكليزية: **Flagellates- (Intestinal and Genital)**

محتوى المحاضرة الثانية

Flagellates

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General Features



Flagellates are characterized by the possessing of one or more flagella, which are long, hair-like projections that act as organelles of locomotion and feeding.

This flagellate is usually spherical or ovoid, flagellum running posteriorly the length of the body, can swim in a jerky manner. The centrally located nucleus has a large nucleolus. The cytoplasm is filled with small, darkly staining granules.

Classification Of Flagellates

1-According to internal structure

Flagellates are divided in to two groups:

- **Kinetoplastida:** They possess a kinetoplast from which arises a single flagellum like *Trypanosomes* and *Leishmania* which transmitted to the human by insect and cause systemic or local infections.
- **Flagellates without kinetoplast:** they have multiple flagella such as *Giardia lamblia*, *Trichomonas* and other intestinal flagellates.

2- Classification Based on Habitat:

1. **Lumen dwelling (Intestinal, oral and genital flagellates)**: This include the following parasites with their habitat:

- *Giardia lamblia* (duodenum, jejunum)
- *Trichomonas vaginalis* (vagina, urethra)
- *Trichomonas tenax* (mouth)
- *Trichomonas hominis* (caecum)
- *Chilomastix mesnili* (caecum)
- *Enteromonas hominis* (colon)
- *Retortamonas intestinalis* (colon)
- *Dientamoeba fragilis* (colon)

Except *Giardia lamblia* and *Trichomonas vaginalis* all are non-pathogenic.

2- **Haemoflagellates (Blood and tissue flagellates)**: These flagellates infect the vascular system and various tissues of the body. Two important genera pathogenic to man are:

Trypanosomes

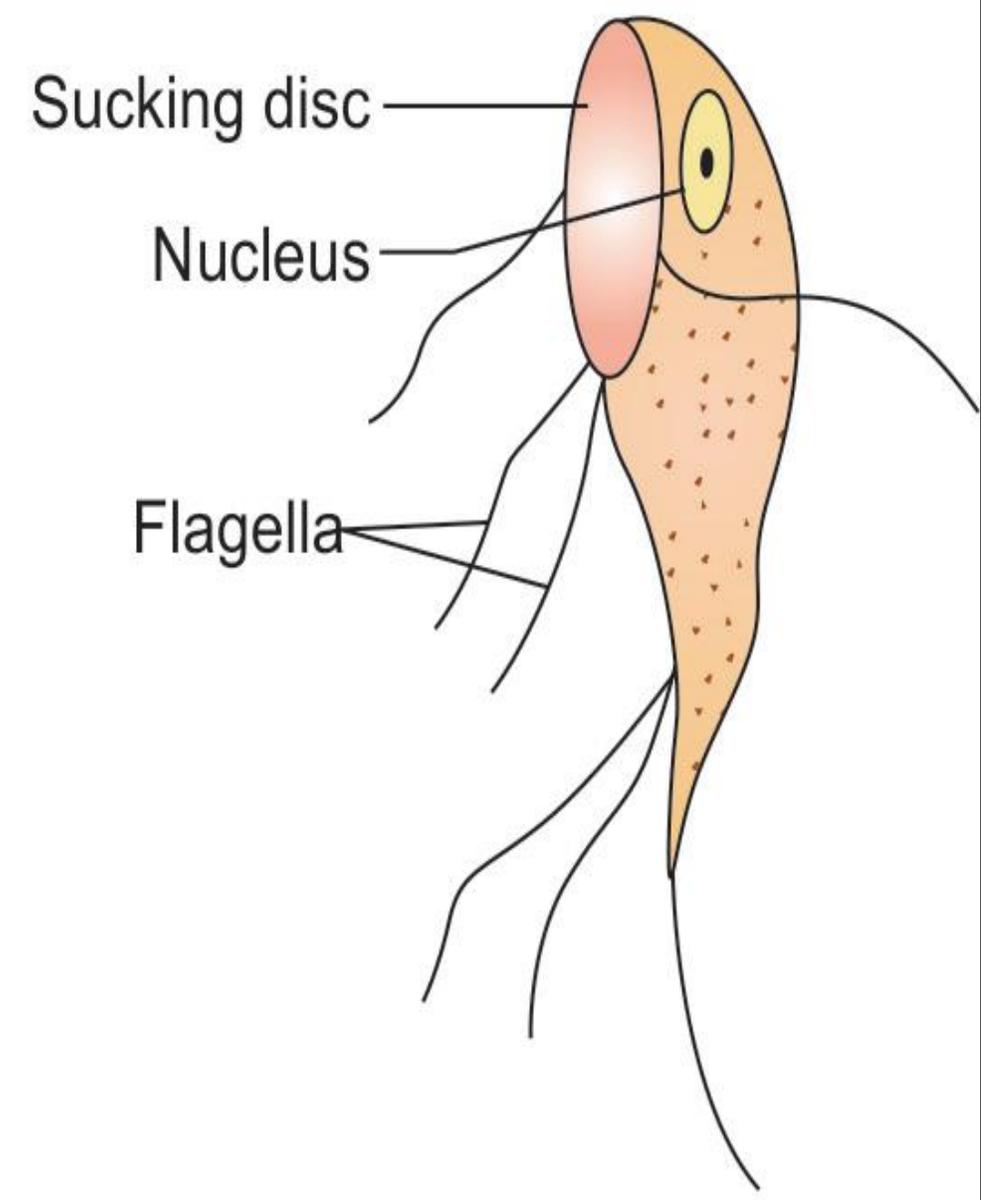
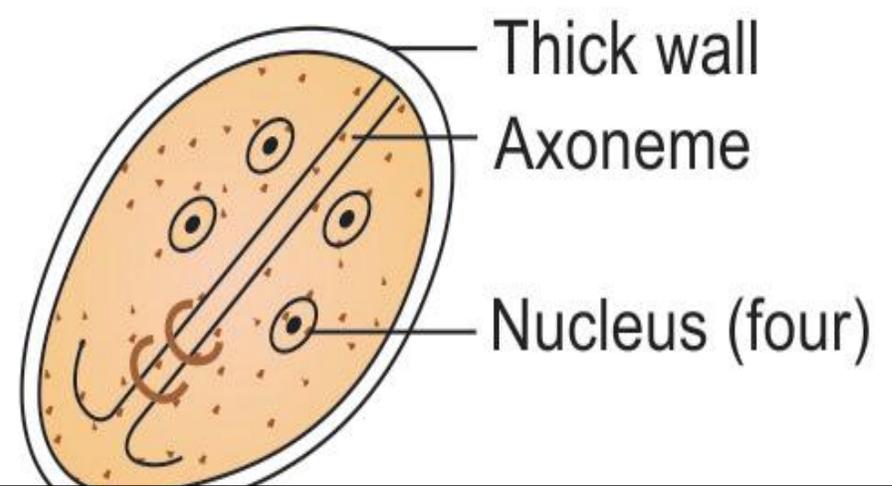
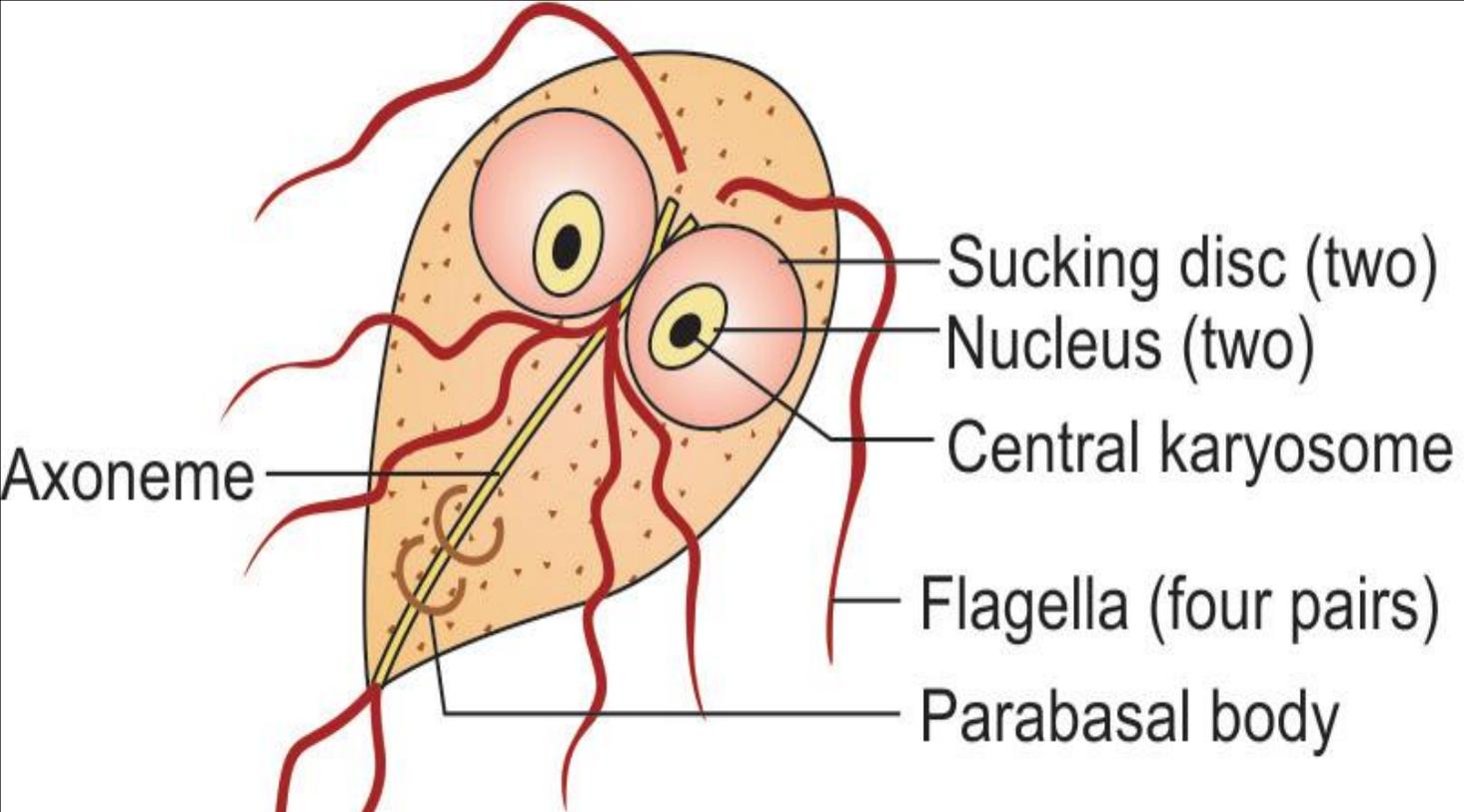
Leishmania

INTESTINAL FLAGELLATES



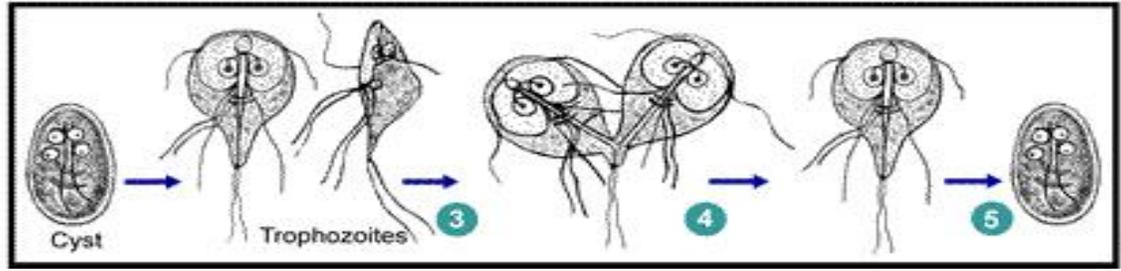
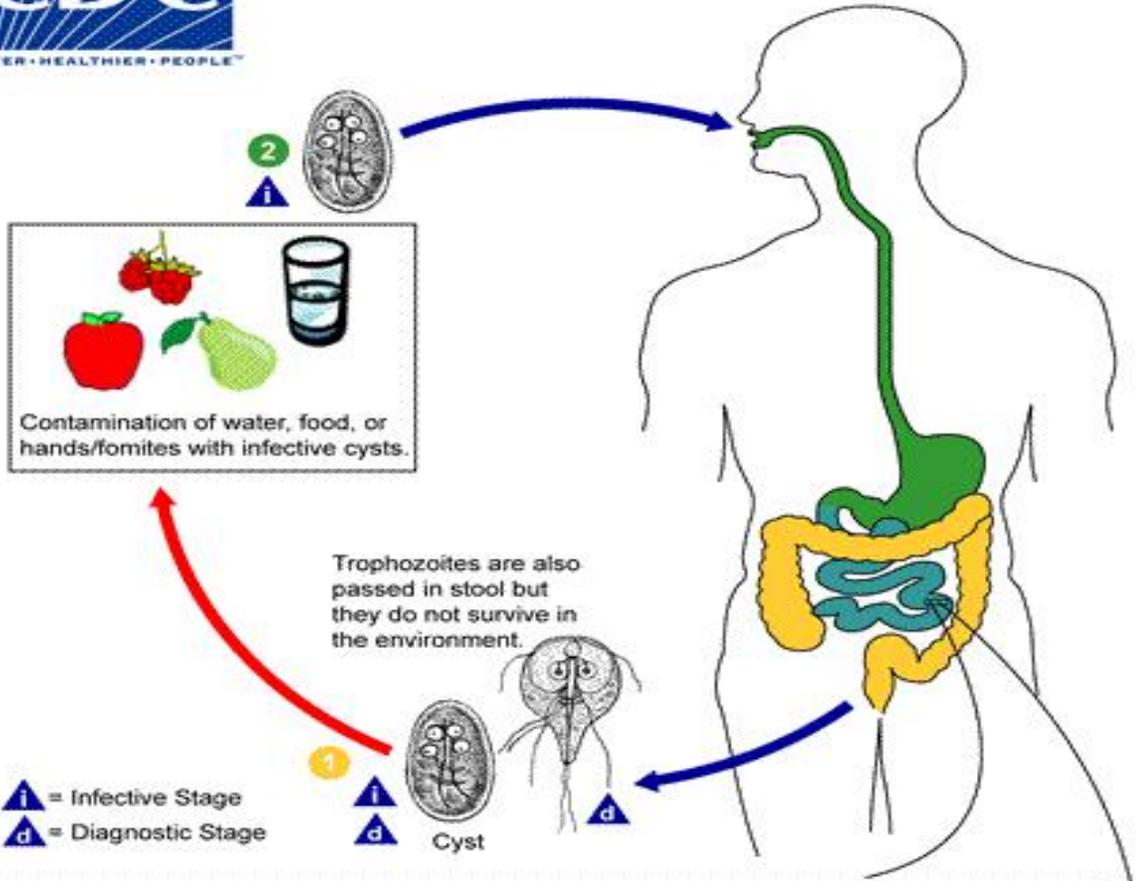
Giardiasis is an intestinal illness caused by a microscopic parasite called Giardia. It is a common illness that causes diarrhea. The most common way people get sick with giardiasis is by swallowing contaminated water, contaminated food, surfaces, and objects.

trophozoite is drop or pear shaped, 2 nuclei, with four couples of flagella, 2 anterior, 2 posterior, 2 ventral and 2 caudal. a convex dorsal surface . Its ventral surface bears sucking disk to adhere to intestinal mucosa . The cystic form has an ovoid shape, thick wall measures 11–15 μm and has four nuclei.



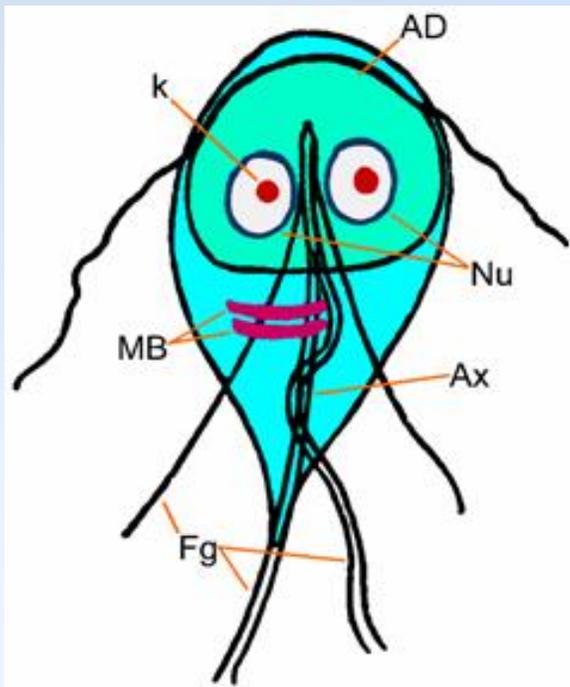
parasites with direct life cycle and oro-faecal route of infection.

Both cysts and trophozoites can be found in the feces (diagnostic stages) The number 1. Infection occurs by the ingestion of cysts in contaminated water, food, or by the fecal-oral route The number 2. In the small intestine, excystation releases trophozoites (each cyst produces two trophozoites) The number 3. Trophozoites multiply by longitudinal binary fission, remaining in the lumen of small bowel where they can be free or attached to the mucosa by a ventral sucking disk The number 4. Encystation occurs as the parasites transit toward the colon. The cyst is the stage found most commonly in nondiarrheal feces(formed) The number 5. *G. lamblia* cysts can survive in the environment for weeks or even months.

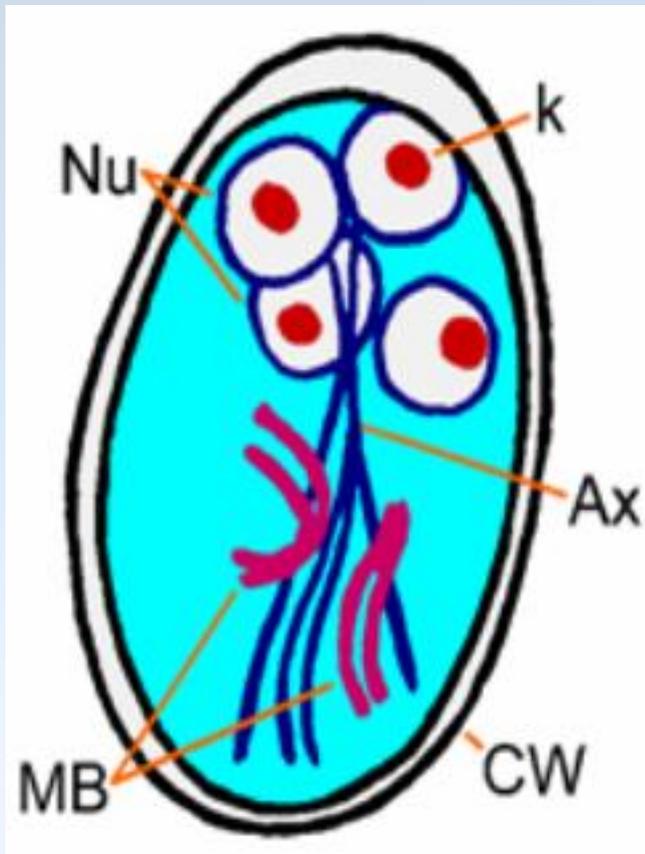


Giardia lamblia (Giardiasis)

Trophozoite stage



Cyst stage



Diagnosis

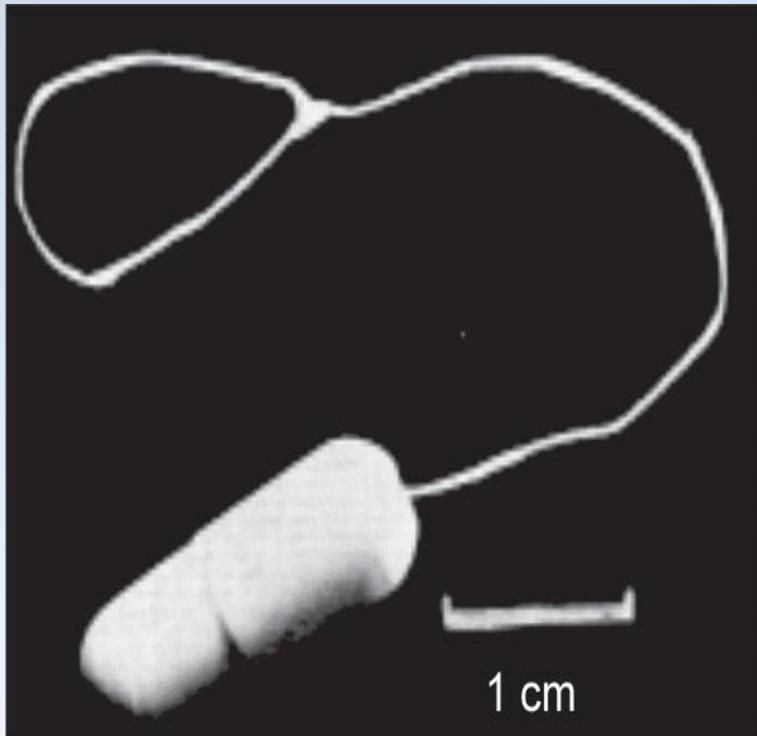
- **Stool examination—detects cysts and trophozoites**
- **Antigen Detection in Stool—ELISA**
- **Antibody detection in serum—ELISA, IFA**
- **Molecular method—PCR**
- **X-ray**
- **String test entero test**

several different stool samples must be tested because the number of Giardia being passed in the stool, which varies from day to day, may be too low to detect from any single sample.

Mode of transmission of Giardia

Transmission occurs from person to person and animal to person via hand-to-mouth transfer of cysts from infected faeces or faecally contaminated food or water.

Entero-test



Entero-test equipment showing duodenal capsule attached with thread at other end

TRICHOMONAS

Trichomonas differ from other flagellates as they lack the cyst stage. They exist as only trophozoites.

Three species of Trichomonas infect humans, they are:

1. *Trichomonas vaginalis* is the only pathogen. It resides in the genital tract
2. *Trichomonas hominis*: Non-pathogen, resides in large intestine
3. *Trichomonas tenax*: Non pathogen, resides in mouth (teeth and gum).

Trichomonas Vaginalis

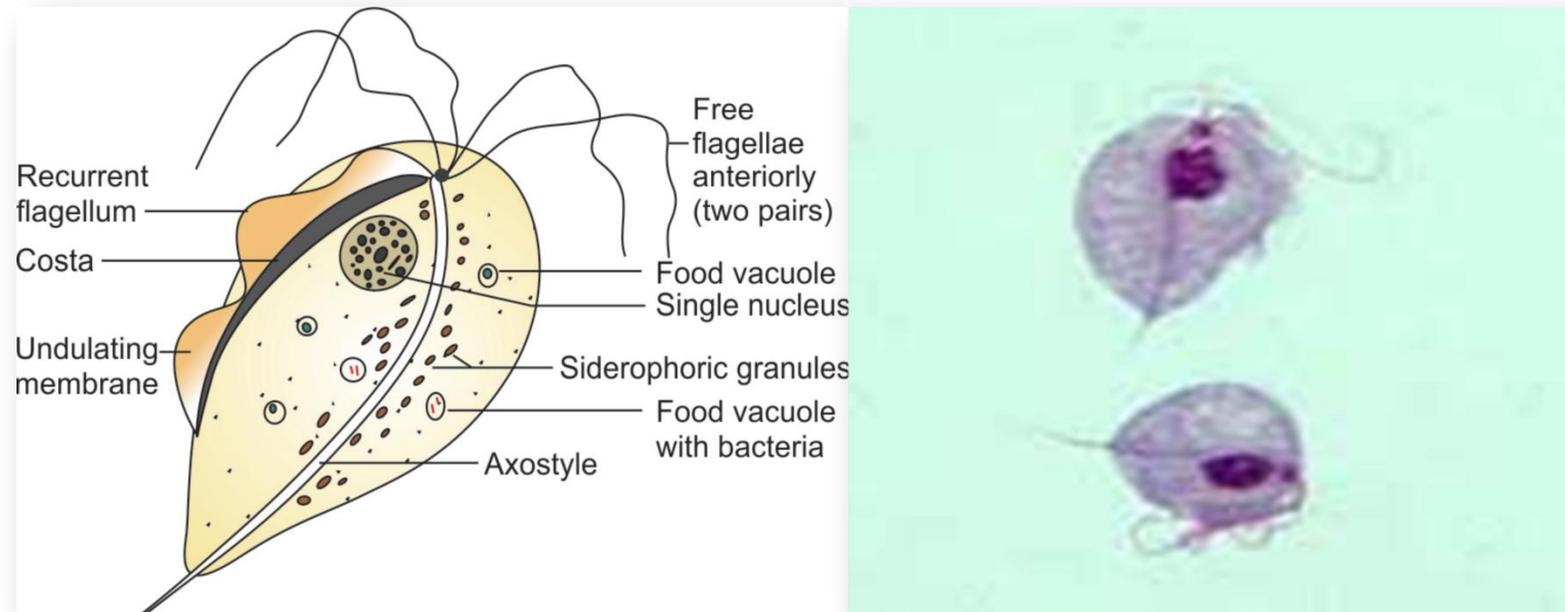
It is the most common parasitic cause of sexually transmitted diseases (STDs). An etiological agent of vaginitis, urethritis, Trichomoniasis. Females are commonly affected than males.

Infective stage : Trophozoite

Transmission by sexual intercourse or contact with contaminated objects.

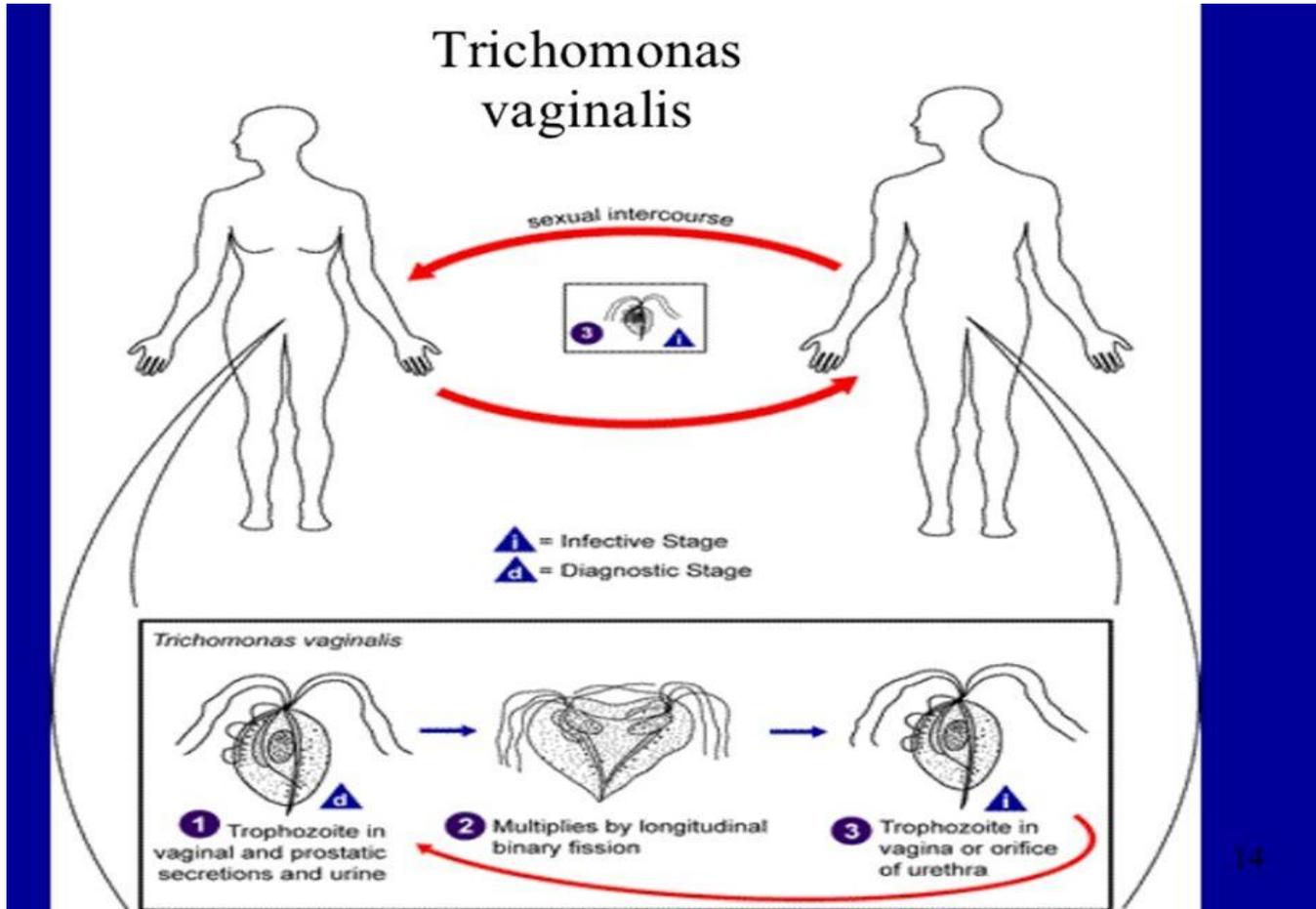
Trophozoites

It is pear (pyriform) shaped, measures 7–23 μm and 5–15 μm wide, resides in vagina and urethra of women and urethra, seminal vesicle and prostate of men. It shows characteristic jerky or twitchy motility in saline mount preparation. Contain Five flagella four of these extend outside the cell together, while the fifth flagellum wraps backwards along the surface of the organism. The trophozoite has short undulating membrane reaching up to the middle of the body. It has a single nucleus containing central karyosome.



Life Cycle

Trophozoites are the infective stage as well as the diagnostic stage. Asymptomatic males or females are the reservoir of infection and transmit the disease by sexual route. Trophozoites divide by longitudinal binary fission giving rise to a number of daughter trophozoites in the urogenital tract which can infect other individuals.



Laboratory diagnosis

Samples: Vaginal discharge, urethral discharge, urine and prostatic secretions can be examined

-Direct microscopy:

*Wet mount preparation

*Permanent stain

-Direct fluorescent antibody test

-Culture— gold standard method. It is highly sensitive 95% and specific (100%). It is positive even in microscopy negative samples.

-Antigen detection in vaginal secretion—ELISA

-Antibody detection—ELISA

-Molecular method—PCR

Trichomonas hominis

It is commensal parasite lives in ceacum. Considered to be a non-pathogen. The shape is pyriform and has an axostyle, runs from the nucleus down the center of the body and extends from the end of the body. Undulating membrane which extends the entire length of the body and projects from the body like a free flagellum. It has 4 free flagella and a single nucleus at the anterior end.



Trichomonas tenax

A species that lives as a commensal in the mouth of humans smaller than *T.vaginalis* , non pathogenic. The trophozoite is oval to pear shape The single ovoid nucleus is filled with several chromatin granules and is usually located in the center anterior portion of the organism.

Trophozoite is equipped with five flagella. Four of the flagella extend anteriorly and one extends posteriorly. An undulating membrane that extends two thirds of the body length. A thick axostyle runs along the entire body length, curving around the nucleus, and extends posteriorly beyond the body of the organism.

The specimen of choice for diagnosing *Trichomonas tenax* trophozoite is mouth scrapings. Microscopic examination of tonsillar crypts and saliva of patients suffering from *T. tenax* infections often yields the typical trophozoites



Thank
You!