THE FLAGELLATES

Lab 3

Phylum:Sarcomastigophora

Subphylum: Mastigophora (flagellates)

Class:Zoomastigophora

1-Order: Diblomonadia

ex: *Giardia lamblia*

2-Order:Retortamonadida

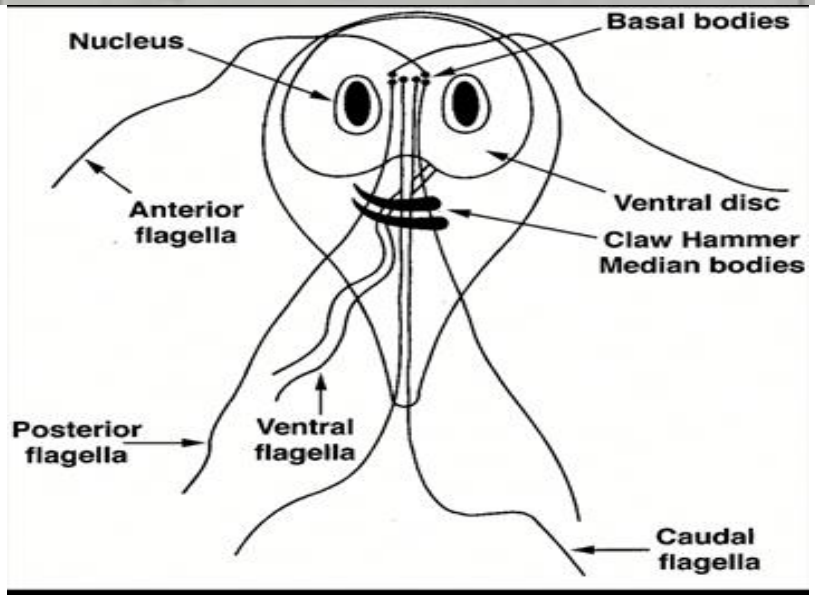
ex: *Chilomastix mesnili*

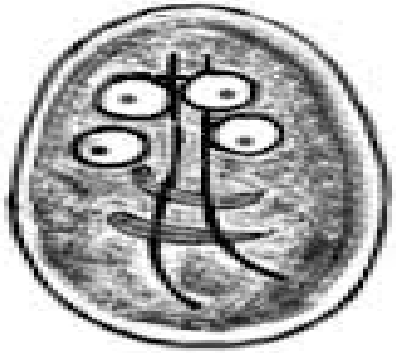
3-Order:trichomonadidia

ex: *Trichomonas vaginalis ,Trichomonas hominis ,Trichomonas tenax*

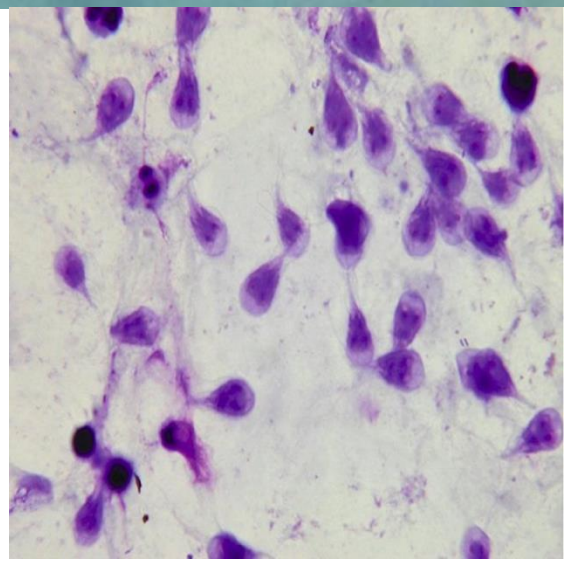
Giardia lamblia: it exists in two forms: trophozoite and cyst

Characteristic	Trophozoite	Cyst
Size	Large in size 10-20um (length) by6-15um (breadth)	Small in size 8-14um(length) b 6-10um (breadth)
Shape	Pear :broadly rounded anteriorly and taper to a point posteriorly	Ovoid ,round or ellipsoidal
Flagella	Four pairs of flagella (anterior, lateral, ventral and posterior)	Lack the flagella surrounded b smooth -wall
Motility	Falling leaf	Non motile
Nucleus	Spherical or ovoid two nuclei with large central karyosome and no peripheral chromatin	Four nuclei located on one en with small karyosome and no peripheral chromatin
Other structure in cytoplasm	Two sucking disk or ventral disk, two axonemes and 2 claw-shaped median bodies	jumble of axonemes and four median bodies






Giardia Lamblia



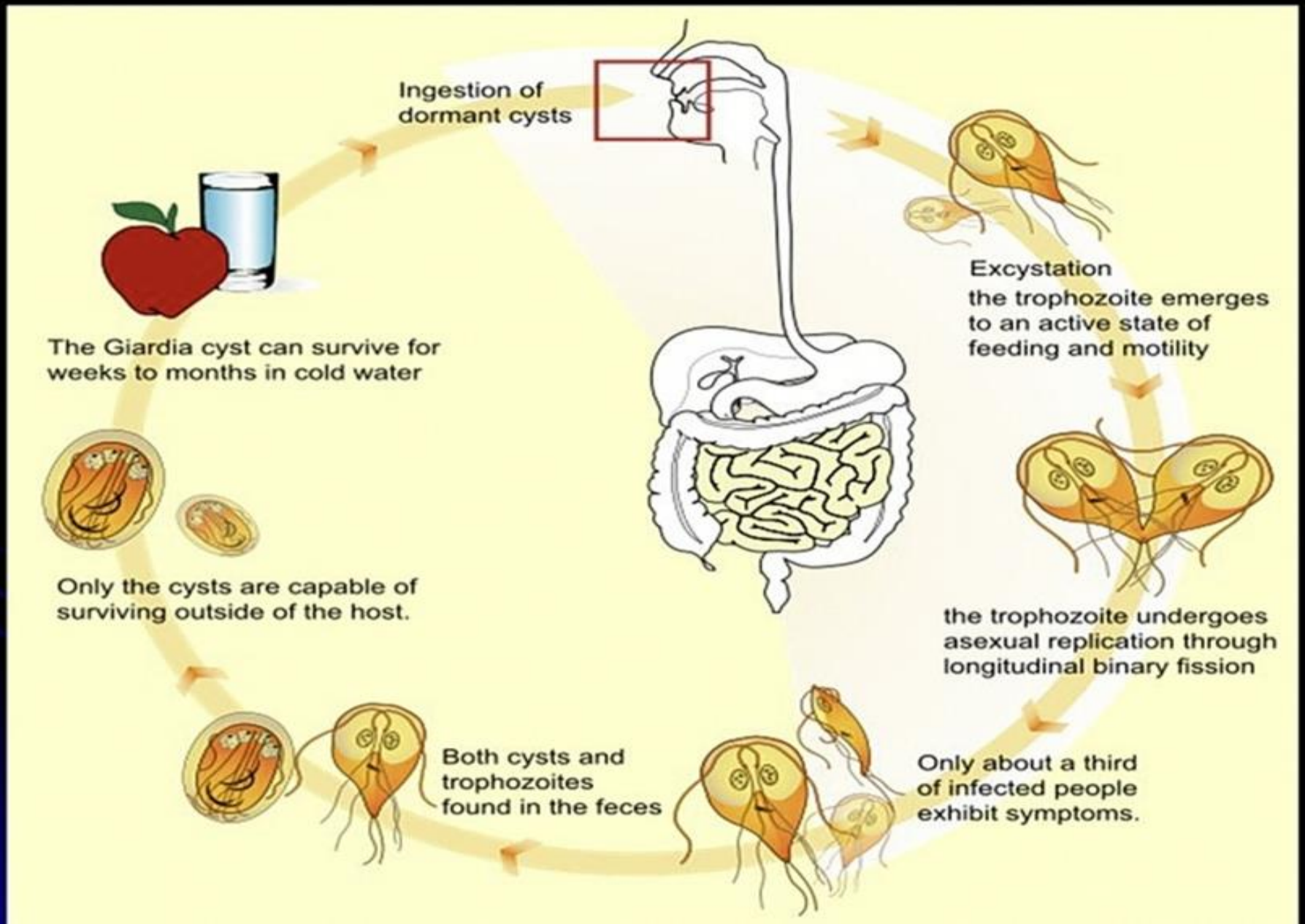
LIFE CYCLE AND PATHOGENESIS

G. lamblia has two morphological forms: cysts and trophozoites. Cysts are the infectious form of the parasite; these can survive in moist environments for prolonged periods. Ingestion of 10 to 25 cysts can lead to giardiasis; hypochlorhydria predisposes to infection. Following cyst ingestion, excystation occurs in the proximal small bowel with release of trophozoites.

Trophozoites are pear-shaped, binucleate, multi-flagellated parasite forms capable of division by binary fission. An adhesive disk on the ventral surface of the trophozoite facilitates attachment to the mucosal surface of the duodenum and jejunum, although the trophozoite does not invade the mucosal epithelium. Trophozoites that do not adhere to the small bowel move forward to the large intestine where they revert to the infectious cyst form; conjugated bile salts appear to foster encystation . Cysts are passed back into the environment in excreted feces; in the setting of diarrhea, trophozoites can also be found in the stool.

Since Giardia is not an invasive organism, the pathogenesis of diarrhea and malabsorption that can occur in giardiasis is not fully understood; diarrhea may be a result of both intestinal malabsorption and hypersecretion. The small intestine is the site of the major structural and functional abnormalities associated with giardiasis.

The Life Cycle of *Giardia Lamblia*



Giardia lamblia is favorable small intestine

- PH is suitable, have ventral sucking disc help the parasite to attachment with epithelial cell and resistant movement of intestine, attachment of *Giardia* to the duodenal mucosa also may be facilitated by a lectine produced by the parasite and activated by duodenal secretions, and the presence of the bile salt, it require to growth and development and unable to synthesis.
- Note : *G. lamblia* produce lysis enzyme lead to change in the architecture of intestinal villi (shorten).

Lab. diagnosis

-The mainstay of diagnosis of giardiasis is stool microscopy. This can be for motile trophozoites or for the distinctive oval *G. lamblia* cysts.

-The entero-test uses a gelatin capsule with an attached thread. One end is attached to the inner aspect of the patient's cheek, and the capsule is swallowed. Later, the thread is withdrawn and shaken in saline to release trophozoites which can be detected microscopically.

-immunologic test, enzyme-linked immunosorbent assay (ELISA), is now available. These tests are capable of a 90% detection rate or more .

-Because *Giardia lamblia* is difficult to detect, often leading to misdiagnoses, several tests should be conducted over a one-week period .

String Test for Giardiasis

For this test, you swallow a gelatin capsule attached to a long string. The end of the string remains outside the mouth and is taped to your cheek. The capsule dissolves in the stomach and the string passes into the upper part of the small intestine (duodenum).

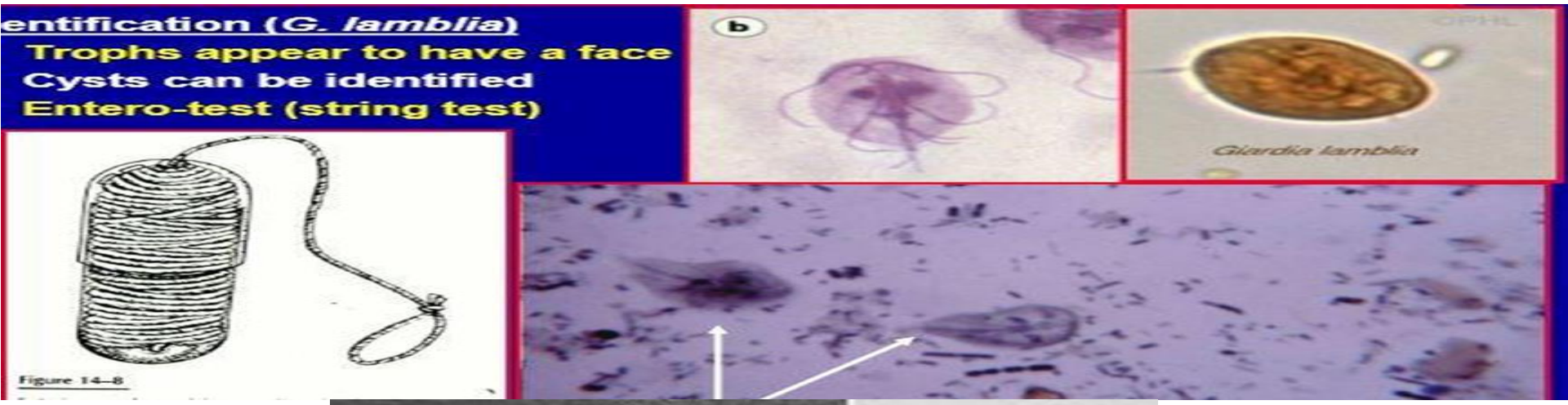
The string is left in place for 4 to 6 hours or overnight. Then it is withdrawn and the end is examined under the microscope for parasites that are attached to it.

This test is also called the **Enterotest.**

Why It Is Done

The string test may be done if other methods (especially examination of stool samples and antigen tests) have failed to detect giardiasis.

This test is rarely done. If a small sample of the small intestine is needed to confirm the diagnosis, endoscopy is usually done.



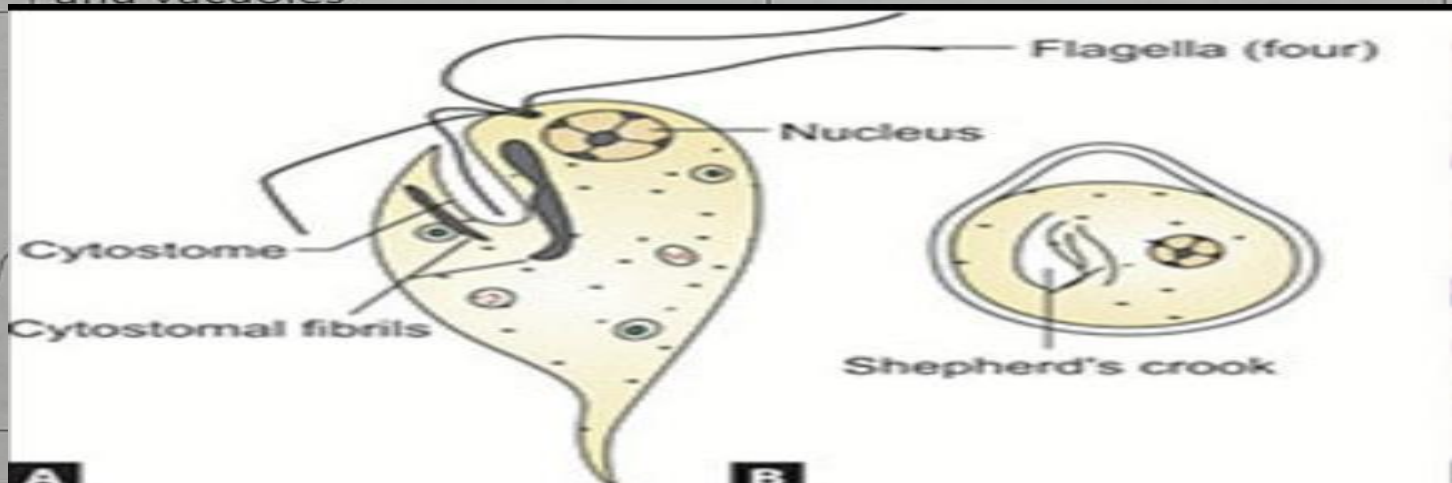
Chilomastix mesnili

It is considered non pathogenic to human

Habitat: caecum and colon of human

Morphology: it exists in two forms: trophozoite and cyst

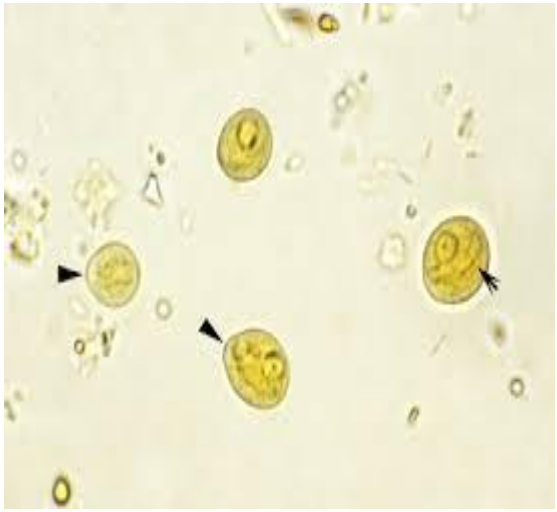
Characteristic	Trophozoite	Cyst
Size	Large 10-20um (length) by3-10um(breadth)	Small 6-10um(length) by 4-6um(breadth)
Shape	pear	Lemon shaped with anterior hyaline knob (nipple)
Flagella	3 anterior ,1in cytostome (mouth),2 surrounded it	Lake to flagella
Motility	Rotating, wobbling motion	Non motile
Nucleus	1 nucli with small centric karyosome, nuclear chromatin may appear in the granules, it may form plaques	1 nucli with chromatin condensed appear as a large central karyosome
Other structure in cytoplasm	Cytostome extend over one – third of the body, bordered by cytostomal fibrils and short flagellum, the cytostomal fibrils curving posteriorly around cytostome resembles a shepherds crook, spiral groove and vacuoles	Curved cytostomal fibrils (shepherds crook)
Form		



Chilomastix mesnili

Trophozoite

Cyst



Trichomonas vaginalis: causes urogenital tract infection

Trichomonas hominis :found in diarrheal stool

- *Trichomonas tenax*: present as commensal in human mouth

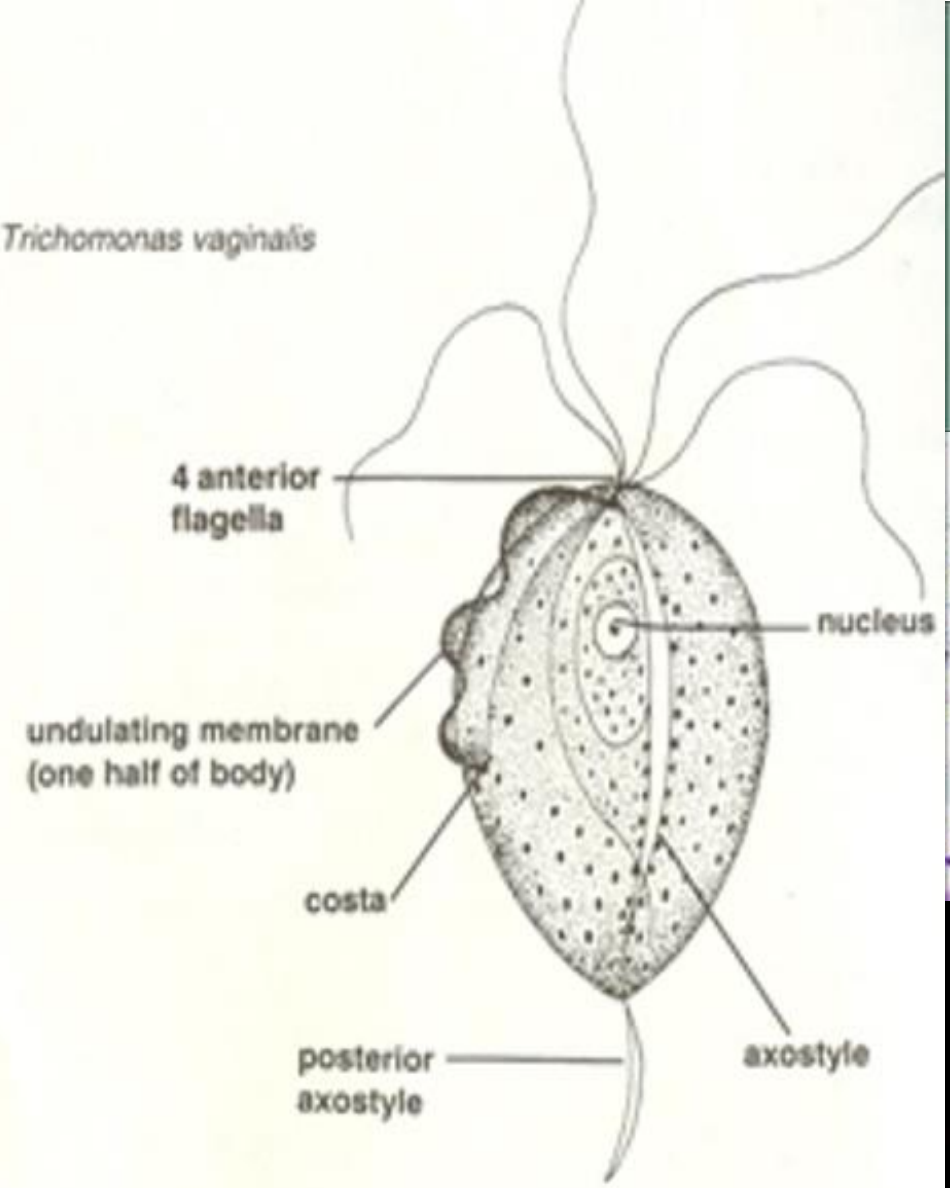
Morphology of *Trichomonas vaginalis*: it has only trophozoite

Characteristics	Trophozoite
Habitat	Vagina, cervix and urethra of the female and urethra, epididymis and prostate of male
Size	10-30um(length)by 5-10um (breadth)
Shape	pear
Motility	Very rapidly with jerky and non directional motion
Number of anterior flagella	4anterior free flagella
Undulating membrane with recurrent flagellum	Short extends one-halve of the body length , recurrent flagellum attached to the body of undulating membrane and not extends
Para basal body	Single and has a filament associated with it
Axostyle	Slender and extends beyond the posterior of the body
Cytostome	inconspicuous
Metachromatic granules (hydrogenosomes)	Numerous around the costa and axostyle
Nucleus	One, uniformly distributed chromatin
Form	

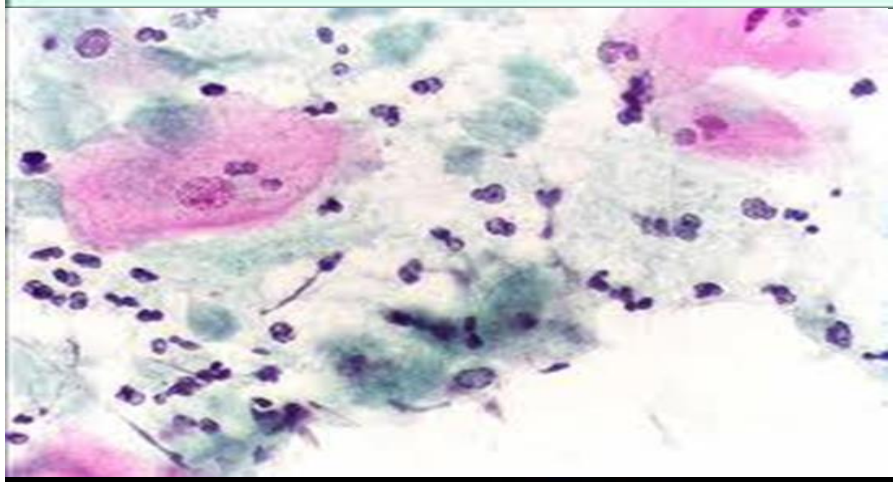
Note: The acidity of the normal vagina (PH 4to 4.5) discourage infection, the organism itself causes a shift toward alkalinity (PH 5 to6) which encourages its growth.

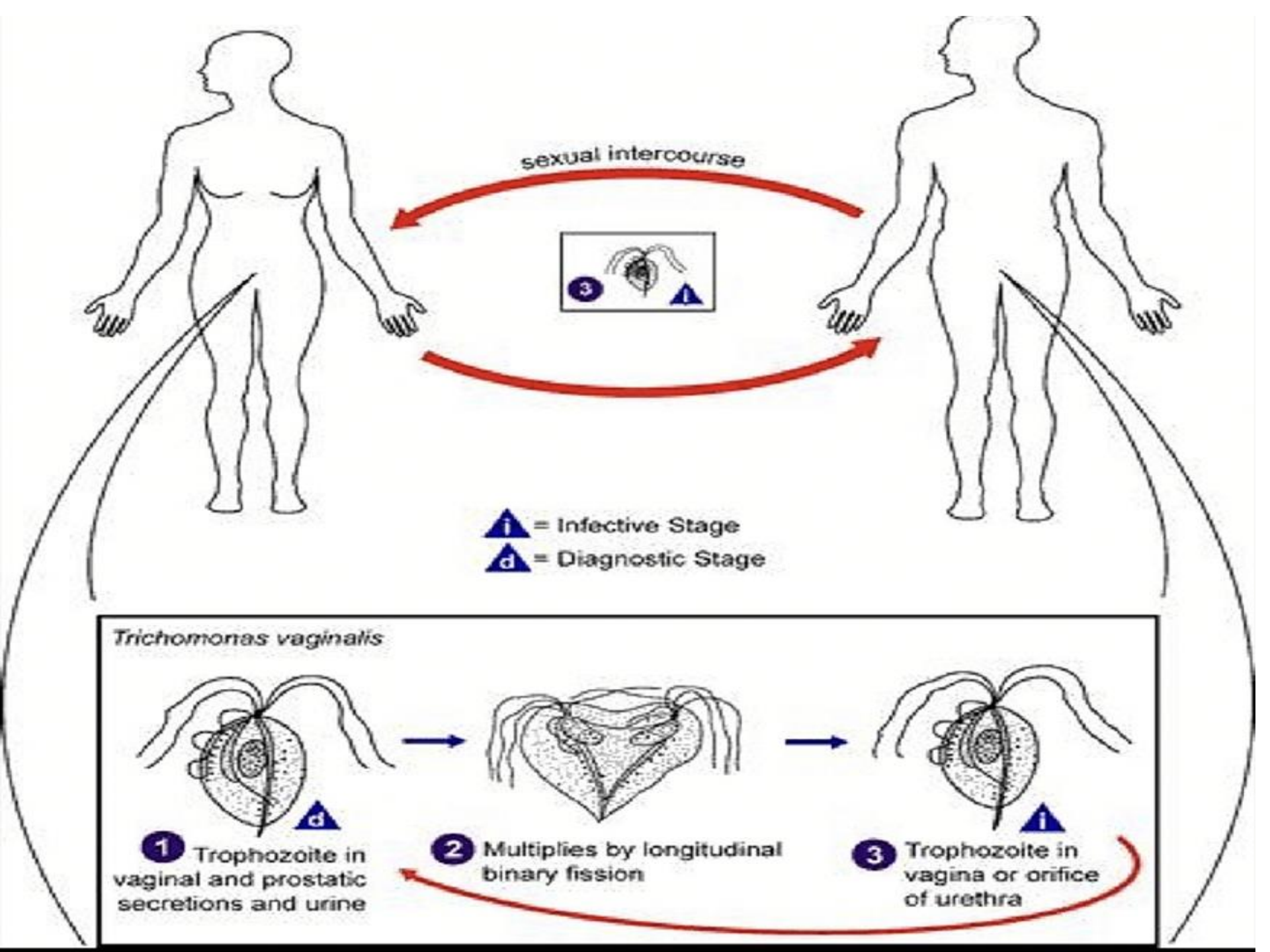
Life cycle: Consist only of a trophozoite which is transmitted by direct contact during sexual intercourse, and newborns may get infected during birth. There is some evidence that under unhygienic conditions, transmission may take place. The trophozoite attached to the epithelium of the urogenital tract, where they replicate by binary fission .

Trichomonas vaginalis



Trophozoite (no cyst stage f
15 μm




sexual intercourse
3
i
i = Infective Stage
d = Diagnostic Stage
Trichomonas vaginalis
d
1 Trophozoite in vaginal and prostatic secretions and urine
2 Multiplies by longitudinal binary fission
i
3 Trophozoite in vagina or orifice of urethra

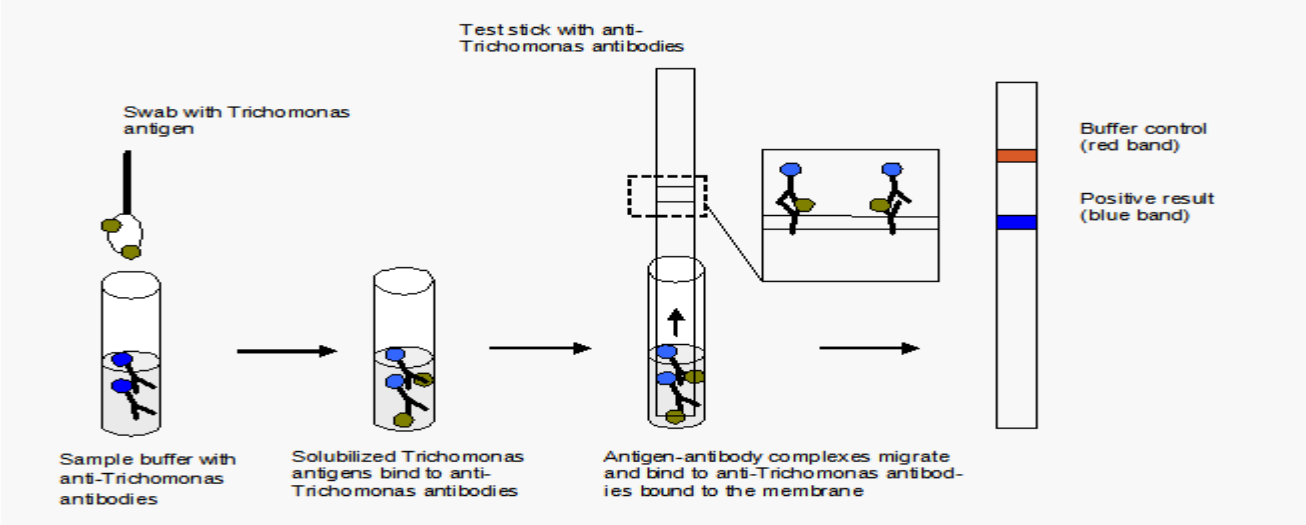
Lab. diagnosis

1-microscopic exam. of vaginal and urethral discharge and prostatic secretion

2- GUE to see trophozoite

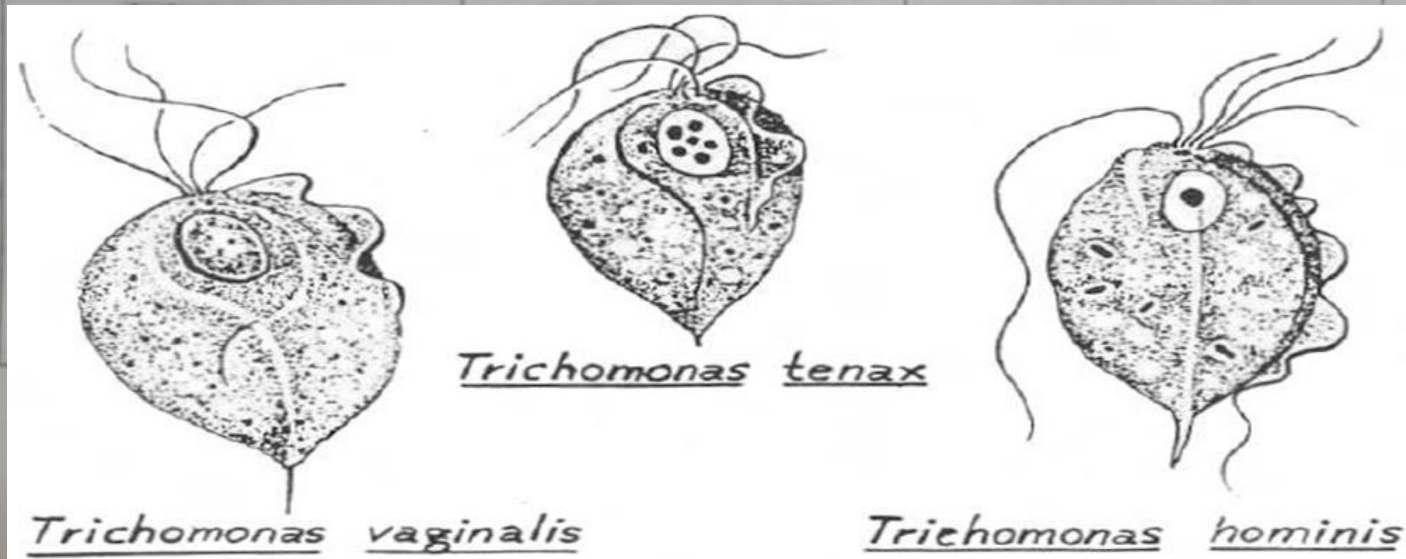
3-culture (modified Diamonds medium, modified thioglycolate medium)

4-serology (EIA),(DFA),and (LA)

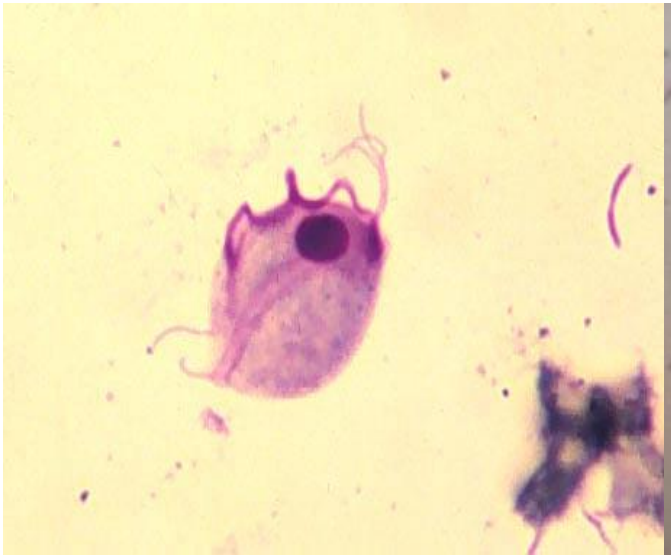


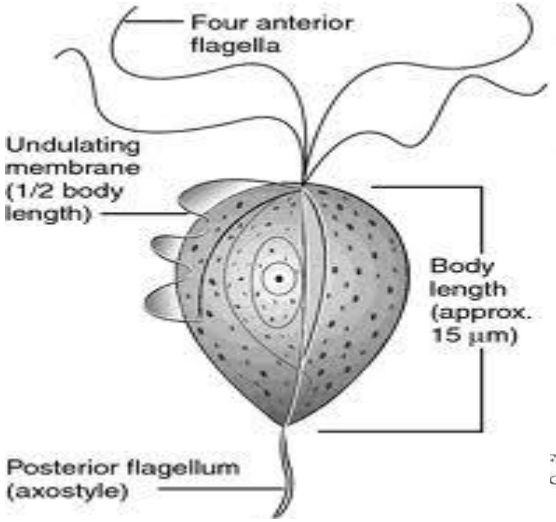
The differences between the 3 species of *Trichomonas*.

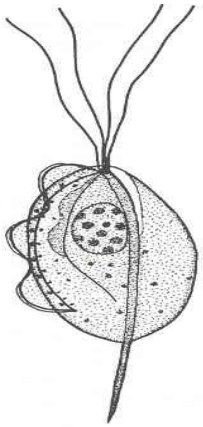
characteristics	*T. vaginalis*	*T. hominis*	*T.tenax*
Size	10-30um (length)	7-15 um (length)	6-10 um (length)
Number of anterior flagella	4 anterior flagella	5 anterior flagella	4 anterior flagella
Undulating membrane with recurrent flagellum	Short extends one-halve of the body length , recurrent flagellum not extend	Extends to full length of its body, recurrent flagellum extend	Extends to full length of its body, recurrent flagellum not extend
Metachromatic granules (hydrogenosomes)	Numerous around the costa and axostyle	Para costal hydrogenosomes	Concentration of Para costal hydrogenosomes
Form			



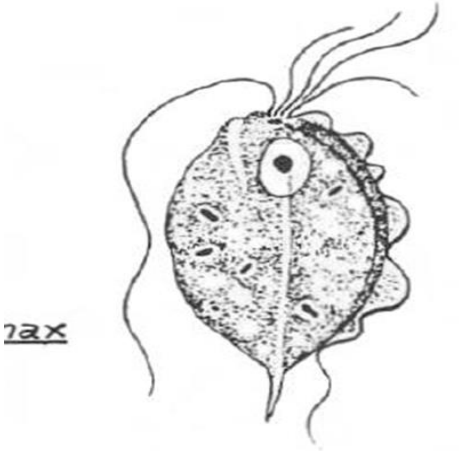
The differences between the 3 spp.







ig. 9-5. *Trichomonas tenax*. (Unos 1.600 aumen-os.) (Según Wenrich, Am. Jour. Trop. Med.; por cortesía de Williams and Wilkins Co.)



Trichomonas hominis