

Lab.4

PROTOZOOLOGY

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Ph.D. Biology

2-MASTIGOPHORA (FLAGELLATA)

Kingdom: - Protista

Phylum: - Protozoa

Super class: - 2 -Mastigophora (flagellata)

■ 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.

CLASSIFICATION

■ Depending on their habitat , they can be classified into :-

1- Flagellates found in the alimentary and urogenital tracts.

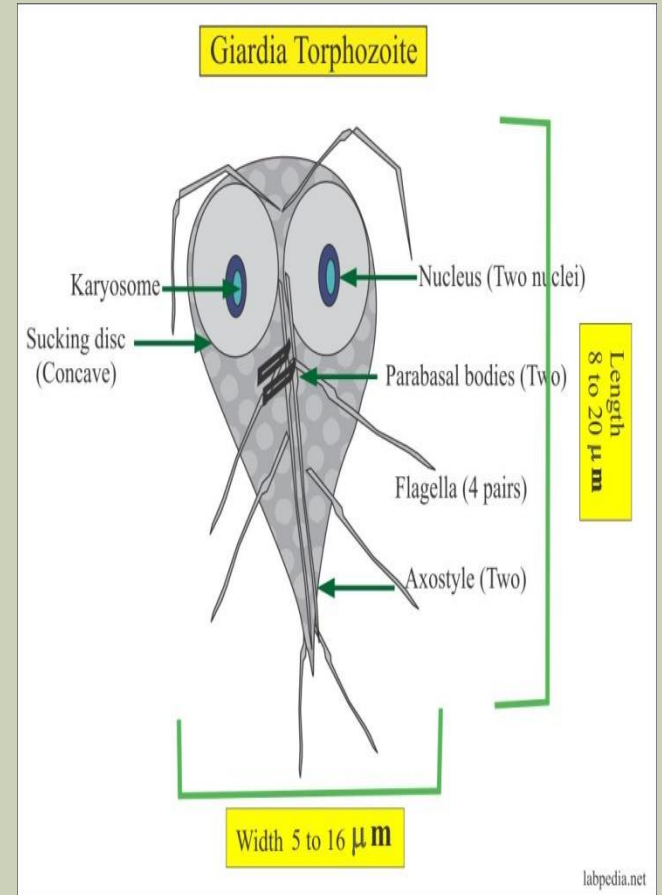
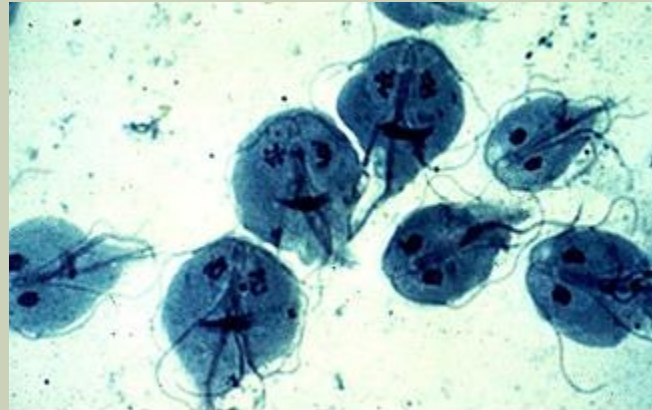
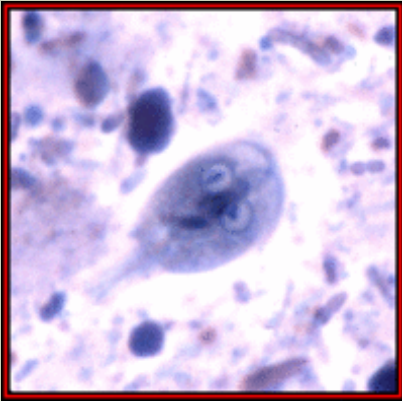
Ex: - *Giardia lamblia*, *Trichomonas vaginalis*, *T. hominis* and *T. tenax*.

2- Flagellates found in blood and tissues.

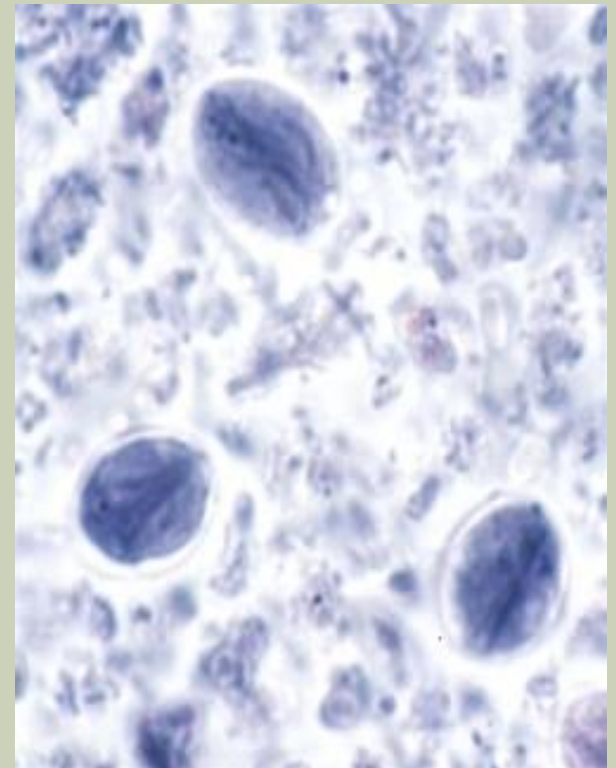
Ex: - *Trypanosoma* Spp. and *Leishmania* Spp.

GIARDIA LAMBLIA :-

- flagellates found in the alimentary tract.
- It occurs in trophozoite and cystic forms.
- The trophozoite is rounded anteriorly and pointed posteriorly (pyriform or heart shaped).
- Dorsally it is convex and ventrally it has a concave sucking disc which occupies almost the anterior half of the body.
- It is bilaterally symmetrical and possesses 2 nuclei, one on either side of the midline, 4 pairs of flagella and 2 sausage shaped median bodies lying transversely.
- The trophozoite lives in the duodenum and upper jejunum .
- The cyst is ovoid and surrounded by tough hyaline cyst wall.
- The young cyst contains 2 and the mature cyst 4 nuclei situated at one end.
- The cyst lives in the colon. And it is the infective stage.
- Consider pathogenic parasite cause diarrhea especially in children, transmitted to human through contaminated water.
- **Diagnosis:** - By the microscopic examination to stool specimens contain trophozoite and cyst stages.

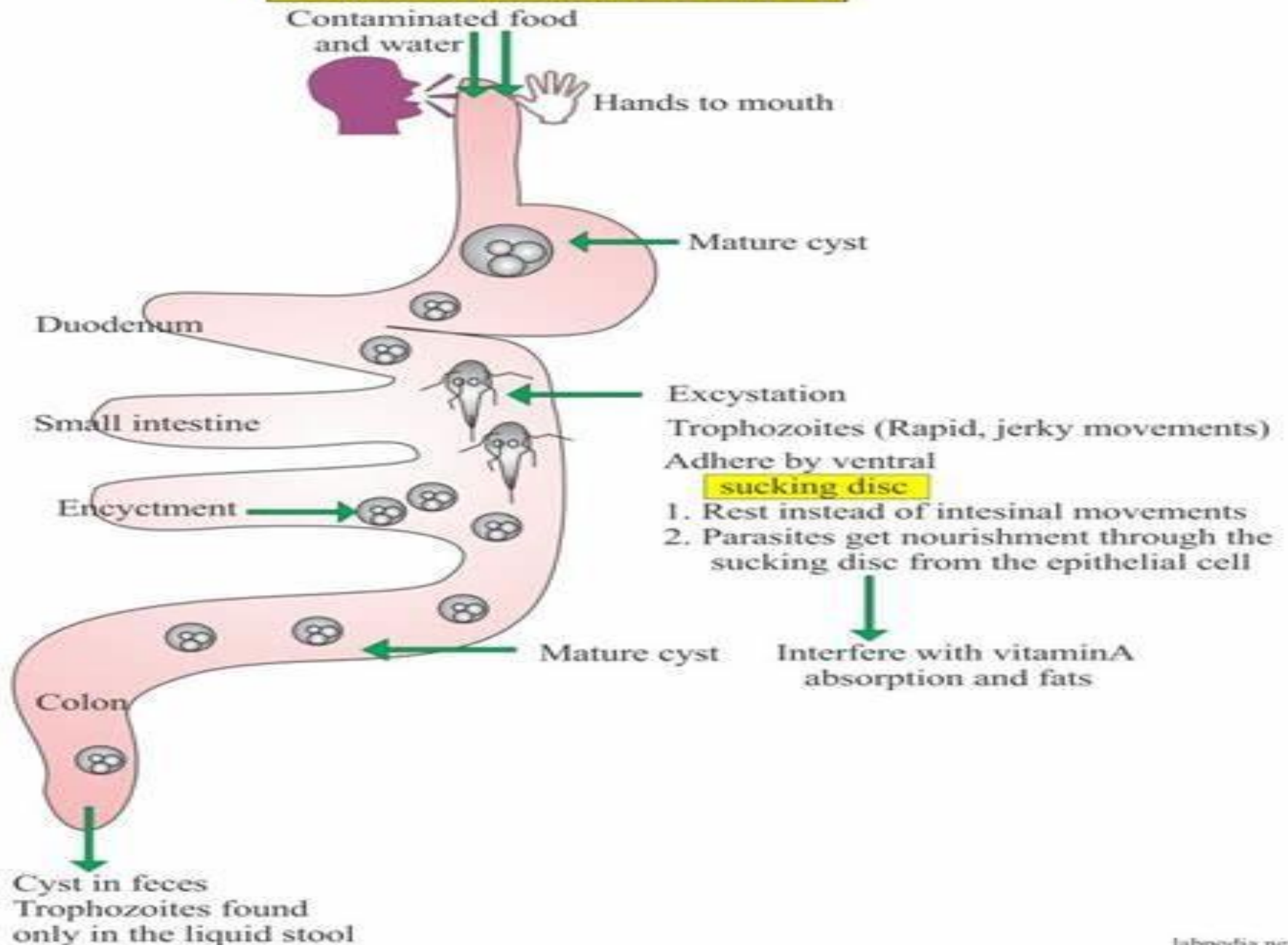


Giardia lamblia trophozoites



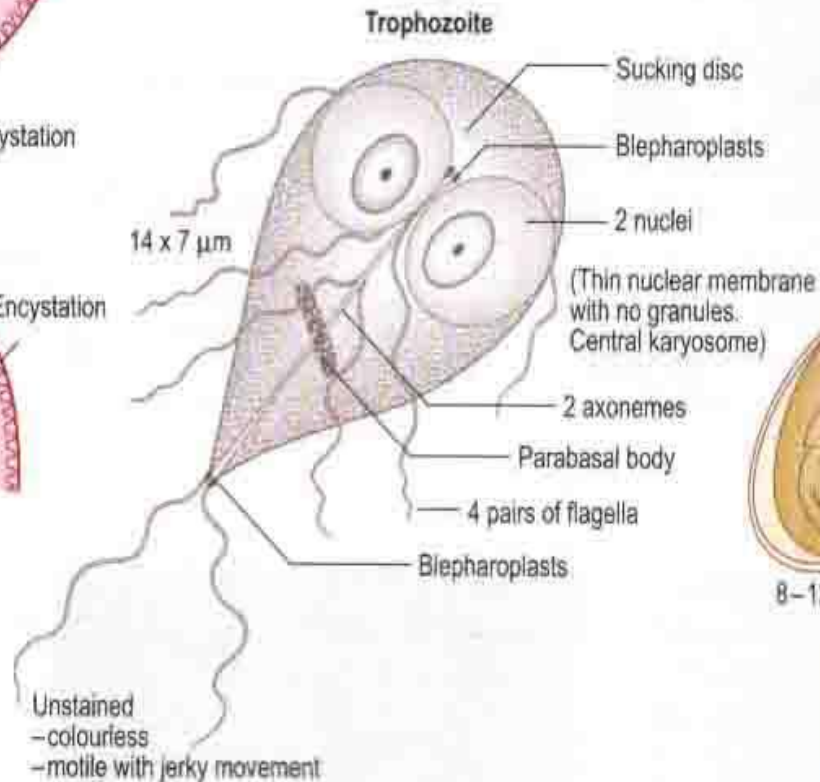
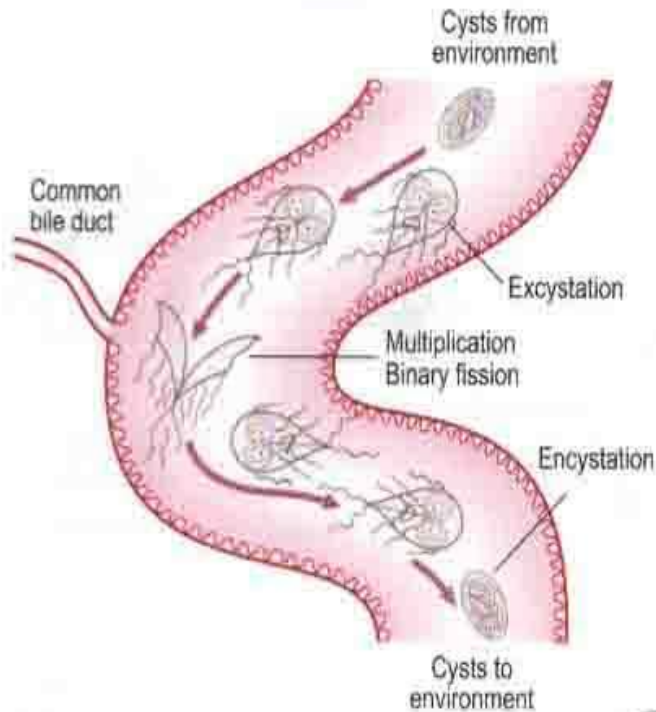
***Giardia lamblia* cysts**

Giardia Lamblia life cycle



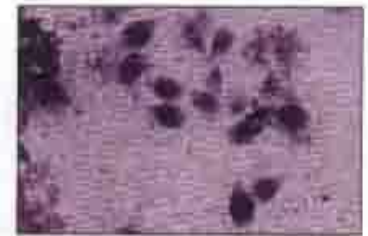
Giardia intestinalis (*G. lamblia*)

Life cycle



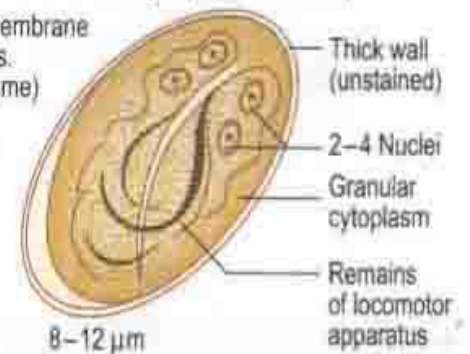
Pathogenicity

Common inhabitant of upper part of small intestine
Enteropathy, diarrhoea, steatorrhoea



G. lamblia trophozoites

Cyst (iodine stained)



G. lamblia cyst

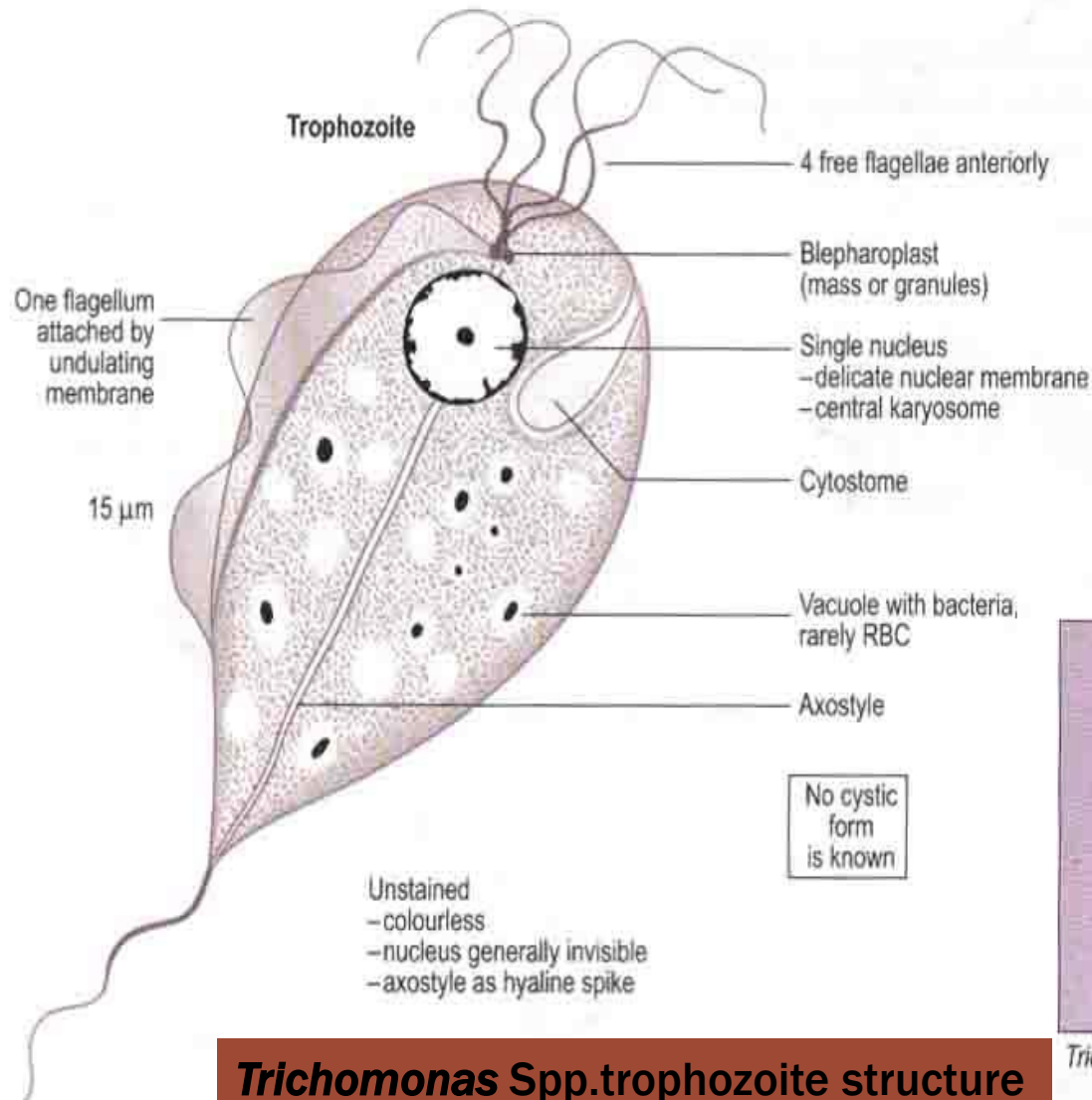
2- *TRICHOMONAS* SPP.

- Trophozoite is the only stage present in the life cycle, cystic stage absent
- 3 species in humans
- *T. vaginalis*
- *T. tenax*
- *T. hominis*
- Characteristic jerky motility • Multiplies by longitudinal binary fission

GENERAL MORPHOLOGY OF TRICHOMONAS TROPHOZOITE

- Pear shaped.
- 7 – 23 μm in length.
- 4 flagella extend anteriorly.
- 1 flagellum extends posteriorly along the cell membrane to form an undulating membrane.
- **Costa** , a rigid cord attaches the undulating membrane to the cell membrane and gives the undulating membrane support.
- **Axostyle** runs down the middle of the body & ends in a pointed tail.
- Round nucleus in the anterior portion.

Trichomonas species

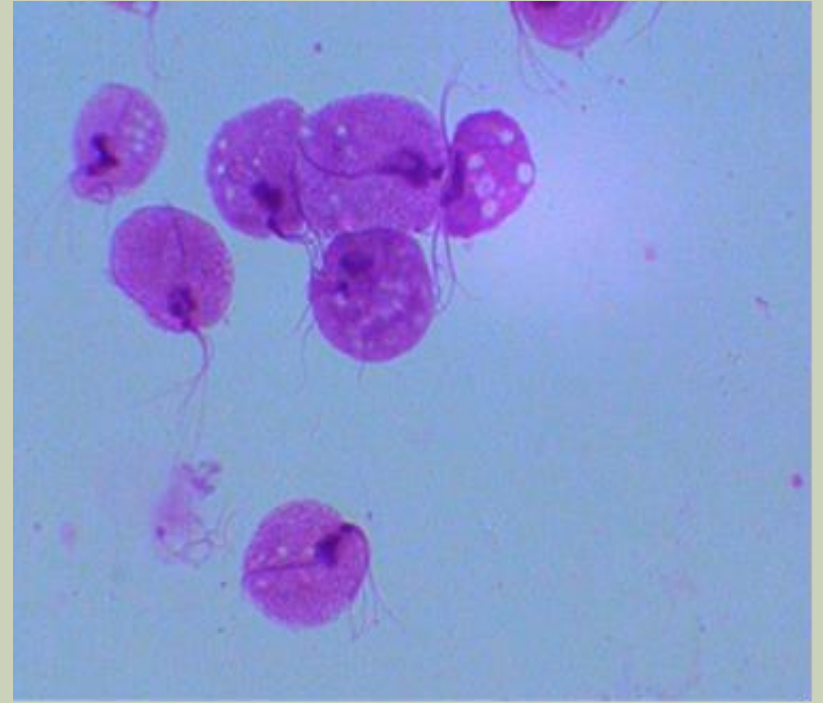


Trichomonas trophozoite

Trichomonas Spp. trophozoite structure



***Trichomonas* Spp.trophozoite**

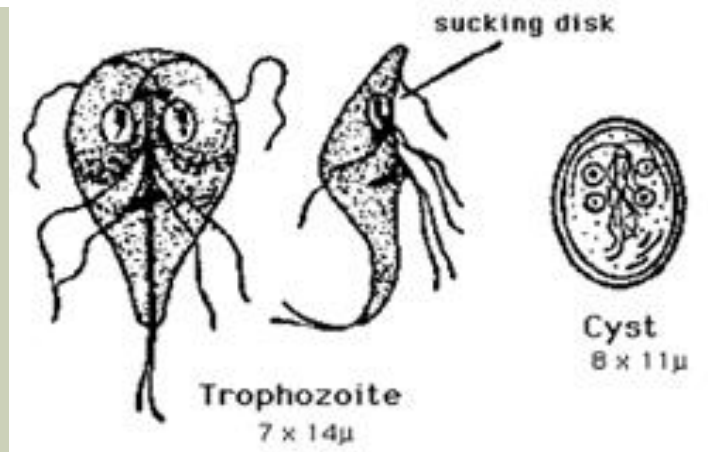


***Trichomonas* Spp.trophozoites**

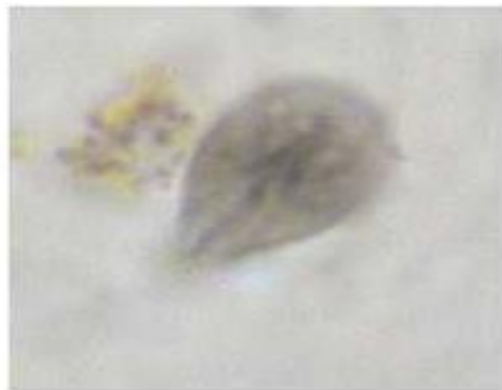
TABLE(2):-COMPARISON BETWEEN THE *TRICHOMONAS* SPP.

	<i>T. hominis</i>	<i>T. tenax</i>	<i>T. vaginalis</i>
Disease	Non pathogenic	Non pathogenic	Trichomoniasis
Trophozoite			
1) Location	Caecum	Mouth	Vagina , cervix in female and urinary bladder , prostate and urethra in male
2) Shape	pyriform or ovoid	pyriform or ovoid	pyriform or ovoid
3) Nucleus	Uninucleate	Uninucleate	Uninucleate
4) Flagella	5 anterior flagella and a sixth running along the margin of the undulating membrane , which is supported at its base by a flexible rod (the costa)	4 anterior flagella and a fifth running along the margin of the undulating membrane , which is supported at its base by a flexible rod (the costa)	4 anterior flagella and a fifth running along the margin of the undulating membrane , which is supported at its base by a flexible rod (the costa)

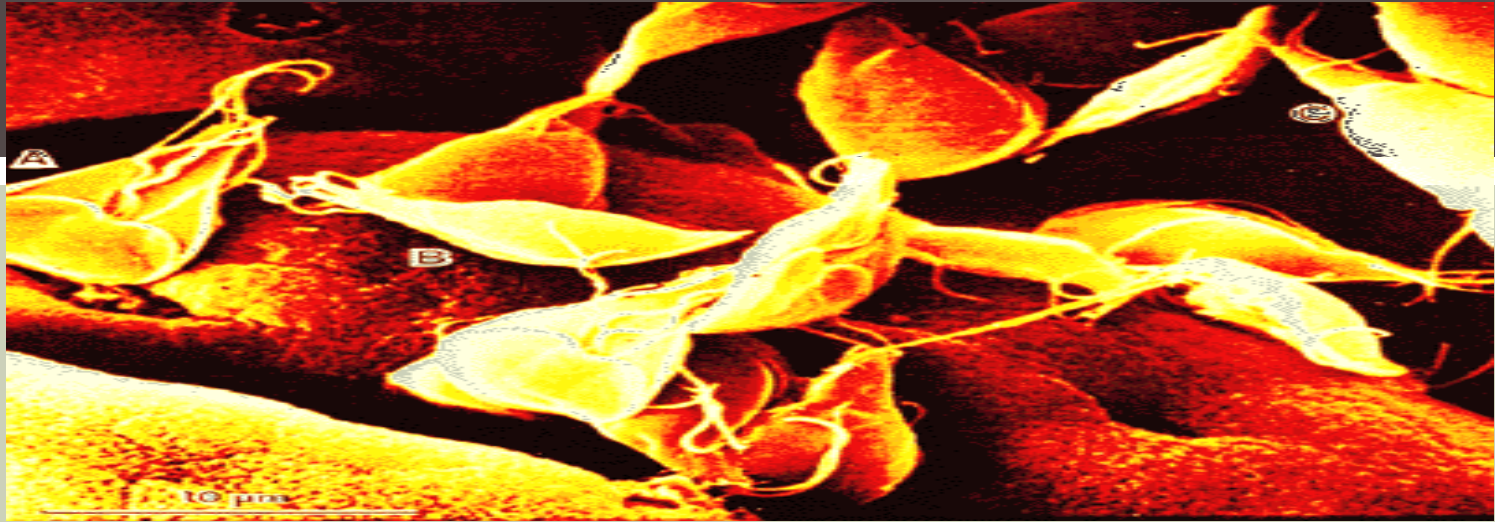
	<i>T. hominis</i>	<i>T. tenax</i>	<i>T. vaginalis</i>
5) Undulating membrane	Reaching to the end of the body	Reaching to the middle of the body	A short undulating membrane reaching up to the middle of the body
6) Axostyle	Runs throughout the length of the body and projects posteriorly	Runs throughout the length of the body and projects posteriorly	Runs throughout the length of the body and projects posteriorly
7) Paracostal granules	Few	Few	Abundant
8) Paraxostylar granules	Absent	Absent	Present
Diagnosis	Microscopic examination of stool specimens contain trophozoite stage.	Microscopic examination of gingival swab contains trophozoite stage.	Microscopic examination of vaginal swab contains trophozoite stage.



Giardia lamblia



Giardia lamblia trophozoites (a)



Giardia lamblia trophozoites (b)



Trichomonas Spp. trophozoites