Flagellates Protozoa
(Mastigophora)

- The flagellates protozoa that are parasites of man including:

1- Flagellates of digestive tract and genital organs such as:

a- Flagellates of digestive tract:

- *Giardia lamblia*,
- *Chilomastix mesnili*,
- *Trichomonas hominis*.

b- Flagellates of genital organs:

- *Trichomonas vaginalis*.

2- Flagellates of blood and tissue.

- The flagellates protozoa are distinguished by having in their trophozoite stage one to several thread-like extensions of the ectoplasm.
(flagella) each of which contains an axial structure “axoneme” arising from a basal body, associated with kinetoplast.

- The flagellum, basal body and kinetoplast constitute the neuromotor apparatus.

**Flagellates of the digestive tract and genital organs**

- The flagellate inhabiting the mouth, intestine and genital tract are lumen parasites.

- Although no member of this group is a tissue invader, *Giardia lamblia* in the duodenum and *Trichomonas vaginalis* in the vagina may evoke symptoms.

**Giardia lamblia**

- The disease is called giardiasis.

[The morphology]: *Giardia lamblia* has trophozoite and cystic stages in their life cycle.

- The trophozoite is delicate, very active (9-21µm in length by 5-15 µm in width), when it seen from the ventral aspect appears broadly rounded anteriorly and tapering to a point posteriorly, when viewed in profile it is concave ventrally and convex posteriorly.

- It bears 4 pairs of flagella, all arising from a complex system of axonemes extending along the midline. Approximately in the center of
the trophozoite, there is deeply staining, short, rod-shaped organelle that is believed to be parabasal body. In the anterior portion of the body there are 2 avoid nuclei, each with central karyosome, one nucleus lying on each side of the midline.

-By means of 8 flagella, *Giardia* is able to move very actively (jerky movement), by applying its cup-shaped anterior ventral disc, it becomes firmly attached to the epithelial surface.

-Multiplication is by longitudinal binary fission.

-The primary habitat of the troph. is the epithelial brush border of the upper 2/3 of small intestine.

-The trophozoite is looked like common a pear-shaped or balloon shape or monkey face.

-The **cystic stage**: it is long ovoid in shape (8-12µm in length by 7-10 µm in width). In the cystic stage, the flagella are retracted into their respective axonemal components and appears as stiffly curved fibrils situated in parallel pairs, the protoplasm is condensed and a thin hyaline membrane is secreted around, the mature cyst contains 4 nuclei.

-The stage commonly recovered in the feces is the cystic stage.

-The trophozoites are seen in stool only when it is diarrheic.

-Mature cyst is the infective stage to man.
**Symptomatology**: *Giardia lamblia* infections usually are asymptomatic, but occasionally cause diarrhea, epigastric pain, abdominal cramps, weight loss and steatorrhea.

**Pathogenesis**: although the trophozoite don’t invade the tissues, they form a pavement-like sheet covering and damaging the mucosa, causing functional derangement and reducing brush boarder enzymes.

- Diarrhea and malabsorption may be caused by this mechanism, together with factors such as synergism with other agents like salmonella and rotavirus.

- Chronic giardiasis occasionally is the cause of failure to thrive in children.

**Diagnosis and treatment**: the diagnosis is based in recovery of typical cyst and less frequently the trophozoite in the stool.

- The infection may disappear spontaneously but usually eradicated following therapy with metronidazole. Furazolidone as a suspension is the drug of choice for small children.

**Chilomastix mesnili**

- It is a cosmopolitan protozoa of human intestinal tract.

- It has both trophozoite and cystic stages in their life cycle.

- Infection usually occurs from cysts (mature cysts) in contaminated food and water.
Morphology:

The trophozoite stage: is rounded anteriorly and spirally twisted posteriorly, it measures 20 microns in length when in progressive forward movement and only 3 – 10 microns when quiescent.

-In the anterior rounded end there is a distinct longitudinal cleft called the cytostome.

-Arising from the anterior pole, one long and two short flagella, a delicate flagellum lies within the cytoplasm and two stiffer curved fibrils one on each side of the cytostome.

-The nucleus situates at the extreme anterior end.

-The movement is called jerky movement.

-Multiplication is by longitudinal binary fission.

The cyst stage: is lemon shaped, it has a thick hyaline wall and having the characteristic internal features of the trophozoite.

-The natural habitat of *Chilomatix mesnili* is the colon.
Trophozoite

Sucking disc
Dientamoeba
2 nuclei
2 axonemes
Parabasal body
4 pairs of flagella

Cyst of G. lambia

Thick wall
2-4 nuclei
Granular cytoplasm
Remains of locomotiv organs

Size Range: 5 - 25 μm by 5 - 10 mm
Average Length: 9 - 15 μm