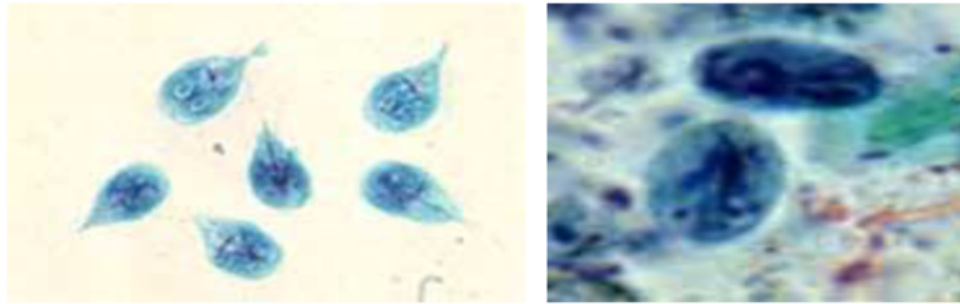


6. Location in the body of the host.

**Intestinal flagellates:**

**Giardia lamblia:** probably the first described protozoan pathogen of humans.



*Giardia lamblia* trophozoites *G. lamblia* cysts

Most common protozoan parasite in the U.S.A.

**Morphology:** very distinctive. Dorsal-ventrally flattened, and Bilaterally symmetrical.

**Cyst:** Measures 9 x 12 micrometers and contain 2 to 4 nuclei; the karyosome is centrally located, with little or no peripheral chromatin; parabasal bodies are present.

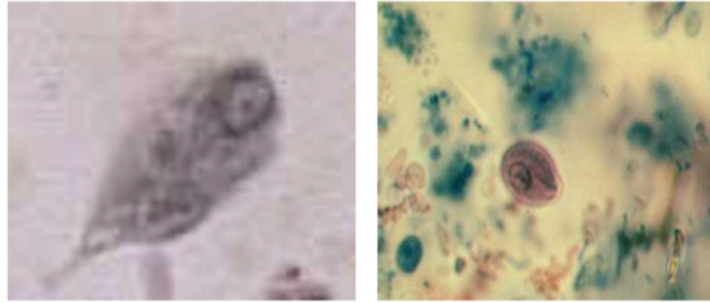
**Trophozoite :-** Four pairs of flagella - one pair located anterior, two pair located ventral, and one pair located posterior. An axostyle and parabasal bodies are present. motility resembles a “falling leaf” uses “sucking discs” to adhere to intestinal wall; interferes with absorption of nutrients.

**Life cycle:** man ingests cysts from fecally contaminated environment; the organism excysts in the upper intestine;

trophozoites multiply and attach to the intestinal mucosa, sometimes entering secretory tubes, even the gall bladder. Trophozoites and cysts are passed in the feces.

experience weight loss, malabsorption of fat, protein, folic acid, and fat-soluble vitamins.

### **Chilomastix mesnili**



*Chilomastix mesnili* trophozoite *C. mesnili* cyst

*Chilomastix mesnili* is cosmopolitan in distribution although found more frequently in warm climates. It is thought to be non-pathogenic although the trophozoite has been associated with diarrhoeic stool. This is the largest flagellate found in man with an incidence of 1-10% being in the large intestine. Found in cecum and colon Transmission by ingestion of mature cysts.

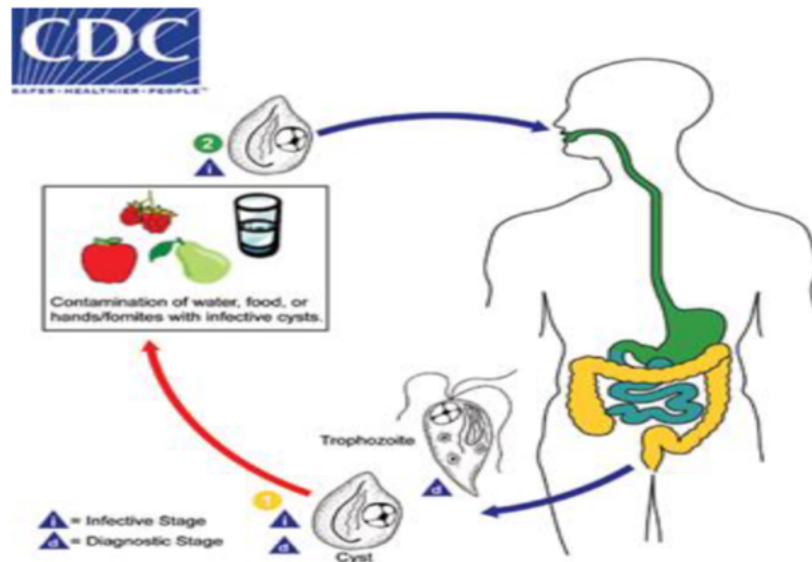
### **Morphology of the Trophozoite:**

The **trophozoites** of *C. mesnili* are pear shaped and measure 6-20m m in length. They have 1 large nucleus with a small karyosome and 3 flagella that extend from the nucleus at the anterior end of the parasite. A distinct oral groove or cytosome can be seen near the nucleus with its sides being supported by two filaments. They are known to move in a directional manner.

**The cysts:** are 6-9m m, they have a large single nucleus with a large

karyosome. They also have a prominent side knob giving it a characteristic lemon shape. The cytosome is evident with a curved shepherds crook fibril. It also has a characteristically coiled filament which when stained is darker in color.

**Laboratory Diagnosis:** The characteristic lemon shaped cysts can be seen in a formol-ether concentrate.



### Life Cycle

The cyst stage is resistant to environmental pressures and is responsible for transmission of *Chilomastix*. Both cysts and trophozoites can be found in the feces (diagnostic stages). Infection occurs by the ingestion of cysts in contaminated water, food, or by the fecal-oral route (hands or fomites). In the large (and possibly small) intestine, excystation releases trophozoites. *Chilomastix* resides in the cecum and/or colon; it is generally considered a commensal whose contribution to pathogenesis is uncertain. Animals may serve as a reservoir for *Chilomastix*.

**Clinical Presentation:**

*Chilomastix mesnili* is considered nonpathogenic. The presence of cysts and/or trophozoites in stool specimens can however be an indicator of fecal contamination of a food or water source, and thus does not rule-out other parasitic infections.

**Trichomonas**

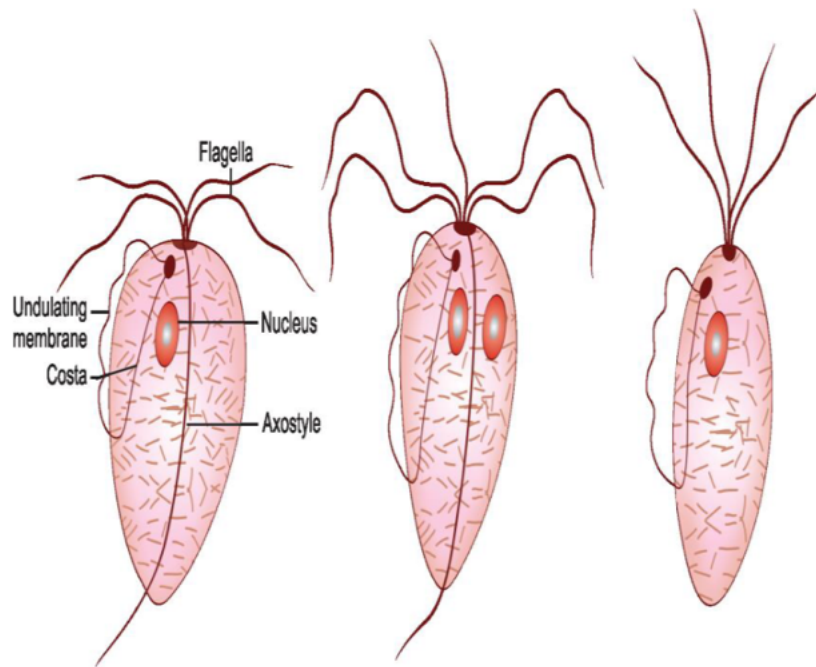
*Trichomonas* differs from other flagellates, as they exist only in trophozoite stage. Cystic stage is not seen.

Genus *Trichomonas* has 3 species, which occur in humans

- *T. vaginalis*
- *T. hominis*
- *T. tenax*

**a. Characteristics:**

- 1) Undulating membrane - protoplasmic membrane with flagellar rim extending out like a fin along outer edge of body. Moves in a wave-like fashion.
- 2) Flagella - several in a tuft, provides locomotion
- 3) Axostyle - functions for support
- 4) Costa - firm rod-like structure running along base of the undulating membrane.
- 5) Cytostome - rudimentary mouth



**Fig. 4.4:** *Trichomonas* species. **A.** *T. vaginalis*; **B.** *T. hominis*; **C.** *T. tenax*

### ***Trichomonas hominis***

This flagellate is non-pathogenic and live in the lumen of the large intestine.

It has an undulating membrane, also, it has 3–5 free anterior flagella, and other flagellum borders an undulating membrane, but becomes free beyond the posterior end. Axostyle projects posteriorly, one anterior nucleus, cytostome small and anterior, has no cyst stage. Mode of infection occurred by ingestion of trophozoites stages which can resist the gastric juice. This parasite exists in the human intestine, and the scientists consider it nonpathogenic, despite its existence cause intestinal disorder and diarrhea.

***b. Trichomonas vaginalis:***



*Trichomonas vaginalis trophozoites*

**[Habitat]**

- found in the vagina, especially when vaginal secretion is less acidic than normal (pH 5 – 7.5, average 5.5).\* It may also live in cervix, uterus or the urethra and urinary bladder.
- In males, it may inhabit the urethra, urinary bladder, prostate and seminal vesicle.

**[Morphology]**

- The trophozoite is similar to that of *T. hominis*, but differs in:
- Larger, may reach up to 30 micron in length.
- Undulating membrane is short reaching about half the body length.
- The fourth flagellum has no free end.

**[Transmission]**

During sexual intercourse, trophozoites stages are transmitted.

**[Pathogenesis & Symptoms]****In female:**

- The patient feels itching in the external genitals, burning feeling and frequency of urination.
- These symptoms are accompanied with milky yellowish exudates from the vagina.

**In male:**

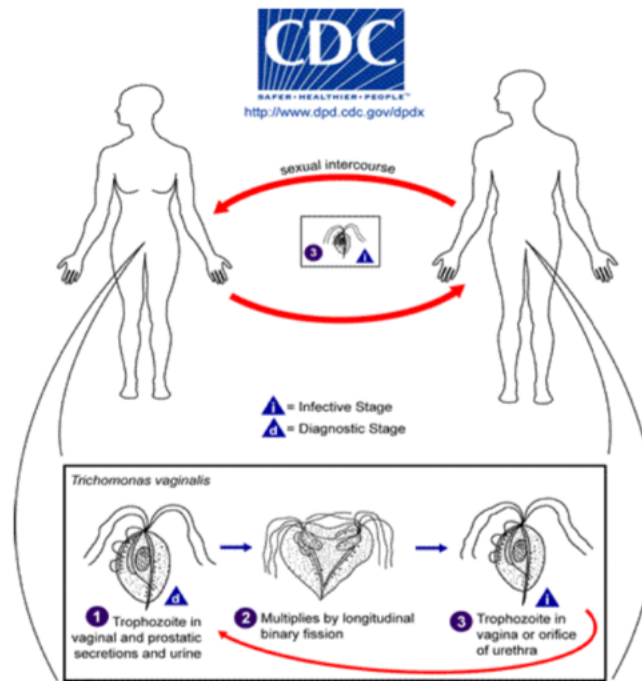
- Infection is generally asymptomatic, when symptoms occur; they consist of burning feeling during urination, accompanied with a yellowish discharge from the urethra.
- If infection extends to posterior urethra and the prostate, urethritis becomes chronic.

**[Diagnosis]**

- In females, detecting trophozoites stages in vaginal discharge or vaginal scrapings.
- In males, by finding flagellates in the urethral discharge got by prostatic massage.

**Life cycle:** - trophozoite lives in the vagina, urethra, epididymis, and prostate; multiplies via longitudinal fission; no cyst stage.



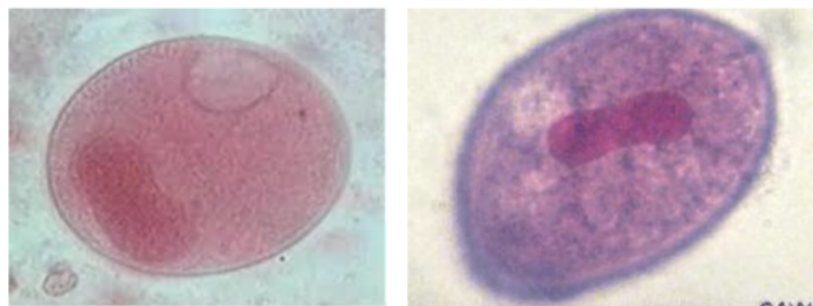


**Diagnosis** - ID of trophs in body fluids - wet mounts of discharges or on PAP smears.

1. *Trichomonas tenax* – was first recovered from the mouth, specifically in tartar from the teeth. There is no known cyst stage. The trophozoite has a pyriform shape and is **smaller and more slender than that of *T.hominis***. Diagnosis is based on the recovery of the organism from the teeth, gums, or tonsillar crypts, and no therapy is indicated.

2. **Class Kinetofragminophora:- The Ciliate**

**1-Balantidium coli**



*Balantidium coli* cyst *Balantidium coli* trophozoite)

**Habitat**

*B. coli* resides in the large intestine of man, pigs, and monkeys.

**Morphology:-**

**Trophozoite stage:** reniform large macronucleus Smaller micronucleus in the concavity of macronucleus 30-300  $\mu\text{m}$  in size, 2 contractile vacuoles Cytostome locate at anterior end as funnel-shape

Locomotion with cilia, embedded in pellicle in longitudinal rows

**Cystic stage:** The cyst is spherical in shape and measures 40–60  $\mu\text{m}$  in diameter. □ It is surrounded by a thick and transparent doublelayered wall. □ The cytoplasm is granular. Macronucleus, micro nucleus, and vacuoles are also present in the cyst. □ The cyst is the infective stage of *B. coli*. □ It is found in chronic cases and carriers.

**Epidemiology:**

Rarely found in USA. This is the only ciliate parasite of humans. It is prevalent in tropical areas, or where poor sanitation, hygiene, and crowding occur. Increase numbers of infections are expected in those with close, continuing contact with swine.

**Pathology & Symptoms:-**

Most infections are asymptomatic.

- Symptomatic disease or **balantidiasis** resembles amoebiasis causing diarrhea or frank dysentery with abdominal colic, tenesmus, nausea, and vomiting.

- *Balantidium* ulcers may be secondarily infected by bacteria.
- Occasionally, intestinal perforation peritonitis and even death may occur.
- Rarely, there may be involvement of genital and urinary tracts.

**Life cycle:**

**Life Cycle**

*B. coli* passes its life cycle in one host only (monoxenous).

**Natural host:** Pig.

**Accidental host:** Man.

**Reservoirs:** Pig, monkey, and rat.

**Infective form:** Cyst.

Infection occurs from close association with pigs , Human to human transmission may also occur , Cyst is the infective stage of this parasite . Excystation occurs in small intestine Multiple in large intestine by binary fission Conjugation at the anterior end for a few minutes