

The Ciliate Protozoa

Class: Ciliata

Genus: *Balantidium*

Balantidium coli

It has a cosmopolitan distribution in pigs and monkeys. In man, it is found in warm climates causing balantidial dysentery or balantidiasis.

It is the largest protozoan infecting man. The normal habitat is the large intestine.

Morphology:

There are 2 stages:

Trophozoite: It is ovoidal, greenish-gray, covered by a short cilia. It has a vigorous forward movement even in a thick liquid faeces. The cilia are generally short hair like ectoplasmic prolongation. There is a funnel – shaped cytostome (simple mouth) at the anterior tip of the organism. A minute cytophyge (anus) is situated at the opposite end. One or 2 contractile vacuoles are found in the cytoplasm. It has 2 nuclei, one big kidney in shape called the macronucleus and a small spherical nucleus called the micronucleus.

Cyst: Spherical with a lost cilia. It is similar to trophozoit but slightly smaller.

Balantidium coli (Causing balantidiasis)

Classification

Class

PROTOZOA

Ciliata

Move by cilia

Generally have mouth (cytosome)

Oesophagus and anal opening

Balantidium

Ovoid

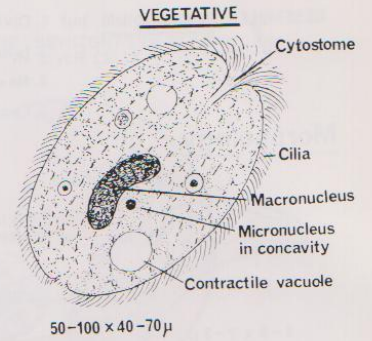
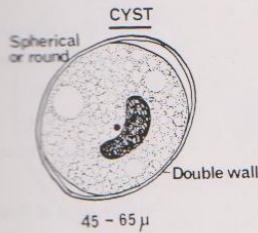
Coarse cilia

Contractile vacuoles

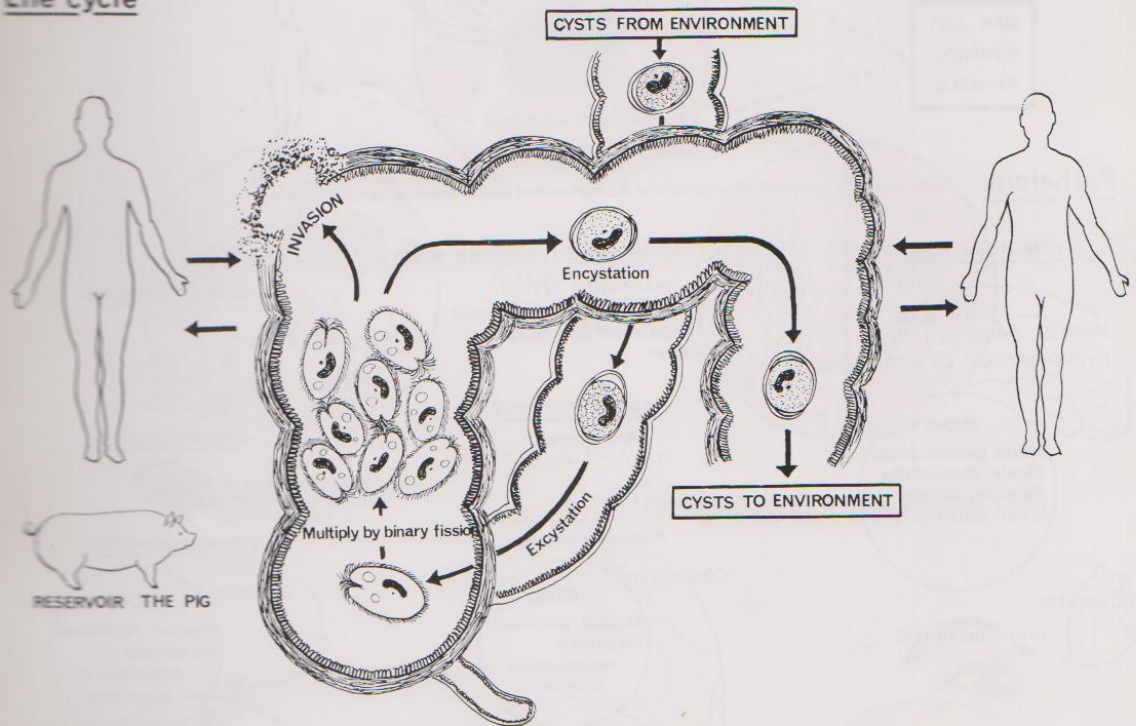
Horseshoe or kidney shaped macronucleus

Reproduce by binary fission

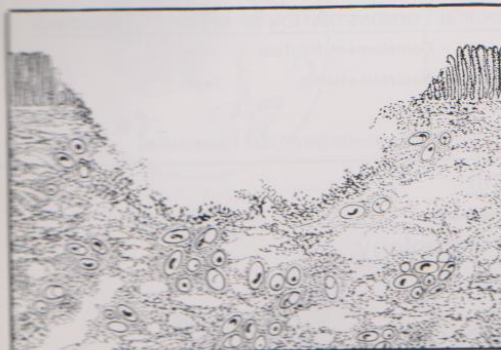
Genus



Life cycle



Pathology



INVADE like *E. histolytica* by { MOTILITY
CYTOLYTIC FERMENT

ULCERS wider-mouthed than in amoebic dysentery

SECONDARY INFECTION frequent so cellular infiltration around

LOCALISED to intestine

NO extra-intestinal spread

COMPLICATIONS-perforation

Pathogenesis and symptoms:

- Submucosal destruction due to penetration of the parasite by boring process. Since the parasite is larger in size than *E.histolytica*, it produces a bigger opening in the intestinal mucosa (wider mouthed ulcer). Therefore, extra-intestinal involvement is seldom while secondary bacterial infection is frequent.
- Symptoms includes abdominal colic associated with bloody diarrhea (dysentery)
- There are cases of asymptomatic patients.

Diagnosis:

1. Clinical picture.

Recovery of trophozoite or cyst in the stool by doing stool examination.

Treatment:

1. Tetracycline 500mg q.i.d for 10 days.
2. Diiodohydroxyquine 650mg t.i.d for 20 days.

Control:

Care in handling pigs and to avoid contaminating hands, food or drink of man.

Intestinal flagellates

1. *Giardia lamblia*, (pathogenic, small intestine).
2. *Chilomastix mesnili*, (non-pathogenic, large intestine).
3. *Trichomonas hominis*, (non-pathogenic, large intestine).
4. *Dientamoeba fragilis*, (non-pathogenic, large intestine).
5. *Trichomonas tenax*, (non-pathogenic, mouth cavity).

Giardia lamblia

- They are intestinal lumen parasites, infects man and experimentally could infect rats and mice.
- The normal habitat is the small intestine mainly duodenum.
- During heavy infection, parasite can be present in the gall bladder and bile duct.
- Mode of infection is by ingestion of contaminated food and water with cyst stage.
- Peak prevalence occurs at about 10 years of age and declines thereafter.

Geographical distribution:

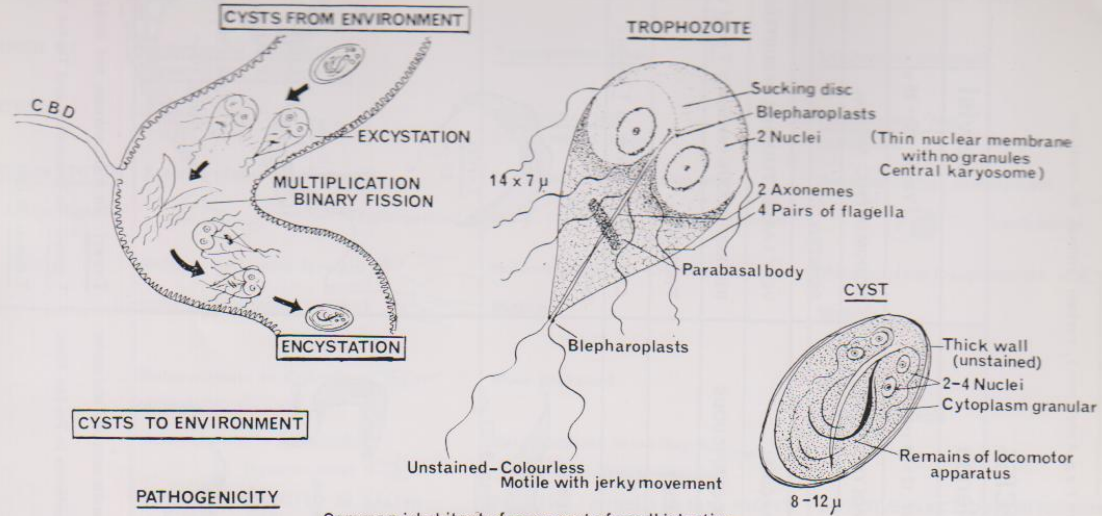
It has a cosmopolitan distribution but is common in warm climates. In Iraq, the prevalence rate is 15%.

Morphology:

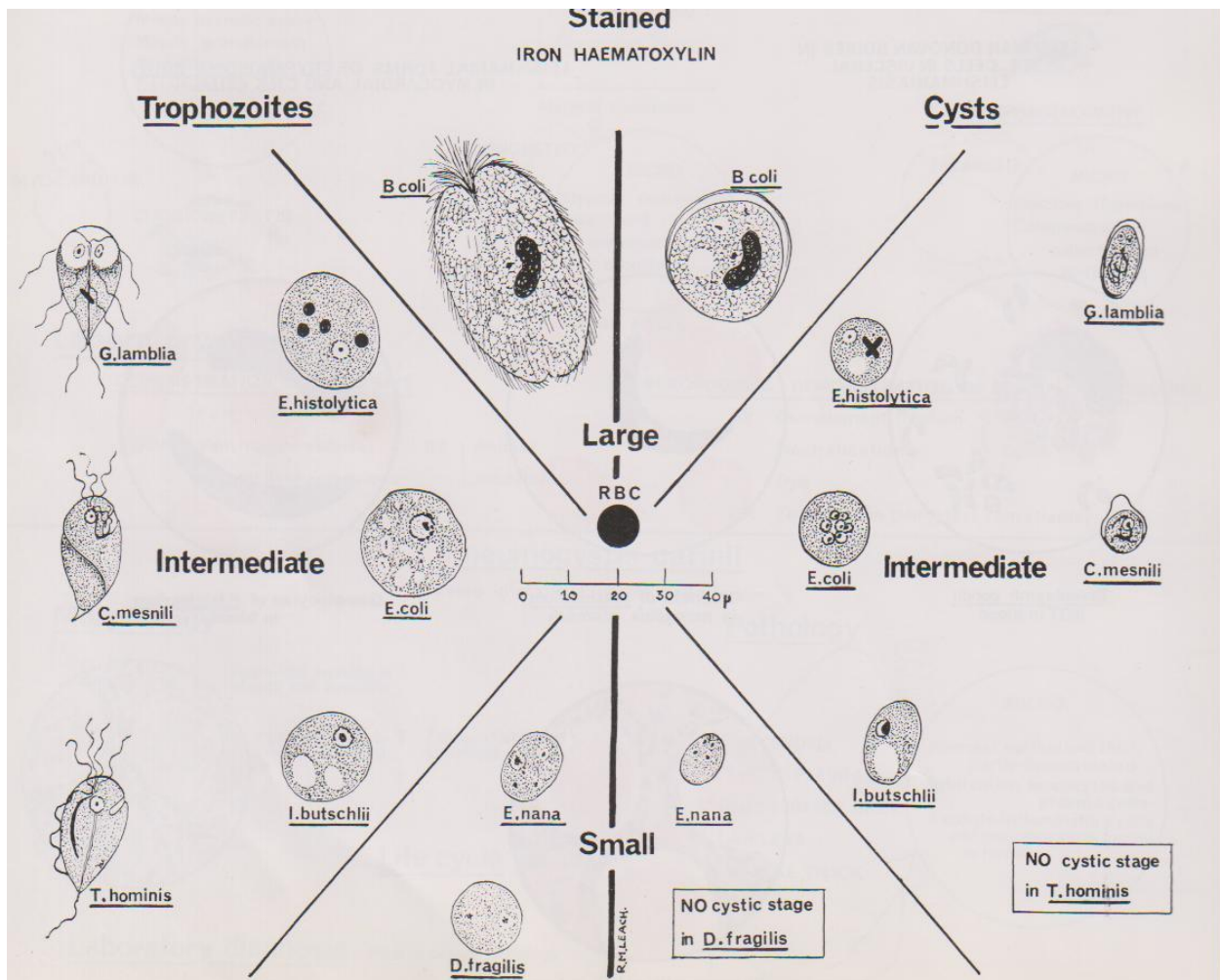
Trophozoite: Pear in shape with broad anterior end and tapering posterior end. In the anterior end, there are 2 ovoidal nuclei with centrally situated karyosome on either side of the median line. Each nucleus lies in a depression called the adhesive disc. There is a longitudinal rod runs from the anterior till the posterior end called the axostyle. There are 4 pairs of flagella, the first pair originated just anterior to the nuclei, the second just behind the nuclei, the third from the middle of the body while the fourth from the tip of the posterior end. In the centre of the trophozoite, there is short oblique rod with unknown function called the parabasal body. Multiplication is by longitudinal binary fission.

Cyst: Ovoidal in shape has a thick cyst wall. There are 4 nuclei situated at one end. Some fibrils representing the axostyle and the flagella. Cysts can survive for several weeks in fresh water at 8⁰C.

Giardia lamblia



Chlamydomonas



Pathogenesis and symptoms:

The organism is not invasive. By applying its adhesive disc, it becomes firmly attached to the mucosal surface of the intestine forming a pavement-like membrane which prevents the absorption of the readily digested nutrients from the intestine mainly food of a large particles i.e fat. Therefore the fat passes to the outside via the stool leading to a condition called fatty diarrhea or steatorrhea.

A great majority of persons harboring *G.lamblia* are asymptomatic. The incubation period is 2 weeks. Others show epigastric or right upper quadrant pain, fatty diarrhea, water, yellow and offensive stool. Anorexia, nausea, abdominal discomfort and distension with weight loss are present. The most

common complication is malabsorption. When the present in the gall bladder and bile duct, patients will suffer from colic and jaundice.

Diagnosis:

1. Stool examination.
2. Duodenal aspirates or biopsy.
3. Detection of IgG, IgM and IgA.

Treatment:

Drug of choice is metronidazole 250mg t.i.d for 5 days.

Uro-genital flagellates

Trichomonas vaginalis

- The normal habitat is vagina in women, urethra and prostate in men leading to trichomoniasis.
- It is cosmopolitan in its distribution. The incidence peak occurs between the ages of 16-35 years.
- 100% of female sexual partners of men with trichomoniasis have the infection.
- 9% among Iraqi women.
- 2.5 million cases/year in USA.
- 50-75% among prostitutes.
- 3-15% among asymptomatic women.
- Venereal transmission is by mean of sexual intercourse.
- Non-venereal transmission is by communal bathing, sharing douche equipments, toilet seats, exchange of under wear, wet towels and unclean gynecological examination.

Morphology:

It has trophozoite stage only. It is pear in shape, broad anterior end and pointed posterior end. There are 3-5 anterior flagella directed anteriorly except one directed posteriorly attaching to the body of the organism forming what is called the undulant membrane which is never extend beyond the posterior end as the case in *Trichomonas hominis*. There is a single spherical nucleus at the anterior end. Axostyle which protrudes a short distance through the posterior extremity.

Pathogenesis and symptoms:

Male: is often asymptomatic although at times it is associated with urethritis and prostatitis.

Femal: In the vagina, the parasites feed on the mucosal epithelium, ingesting bacteria and leukocytes leading to degeneration and desquamation of the vaginal epithelium. The incubation period is 4-28 days. Vaginal secretion is liquid, greenish or yellow and contains a large number of gram positive and gram negative bacteria and leukocytes. 90% of women develop cervical erosion which is a predisposing factor for cervical cancer. The onset of vulvar and vaginal pruritis and abnormal vaginal discharge is acute. The condition can be complicated by the involvement of bacteria, fungus or spirocheats. There is leukorrha, dysuria and burning sensation. The vaginal pH will change from slight acid to alkaline.

The highest infection was observed among pregnant women rather non-pregnant because the hypertrophy and hyperplasia of the vaginal epithelium as well as the increase of glycogen deposits in such cells produced due to high estrogen level.

Among pregnant women, the infection can lead to:

1. Premature rupture of fetal membrane.
2. Preterm labor.
3. Low birth weight.

Diagnosis:

- 1. General urine examination.**
- 2. Wet saline preparation for vaginal or urethral discharge in both male and female.**
- 3. *In vitro* cultivation of vaginal or urethral discharge.**
- 4. Serological examination which is useful in female and useless in case of male. The reason probably due to the organism is invasive in case of female and not invasive in case of male i.e there is no stimulation to the immune system.**

Treatment:

Metronidazole orally 250mg t.i.d for 7 days. Female patients should also receive 500mg as vaginal suppository daily for 7 days.