

# Latarozoeba histolytica

Pathogen

Latarozoeba histolytica is a pathogenic, Parasitology parasite, occurs in the large intestine (colon) in man and causes a disease named as amoebic dysentery (= amoebiasis).

## 2. Systematic position

Phylum - Protozoa  
Class - Rhizopoda  
S. Class - Cobasa  
Order - Amoebozoa  
Genus - Latarozoeba  
Sp. - histolytica

3. Distribution - world wide (= cosmopolitan); in tropical and temperate zone.

Incidence of infection is high in Mexico, China, India and part of South America and the places where sanitation is poor.

4. Habit and Habitat - Small microscopic endoparasite of man; found in the upper part of large intestine. It invades the mucosa and sub-mucosa of the intestinal wall and exhibits ulcers (in large number) in intestine. The parasite also secretes tissue dissolving substance.

5. Structure - It occurs in three distinct forms -

- Active trophozoite form = Mature form.
- Pre-cystic or minute form
- Cystic form.

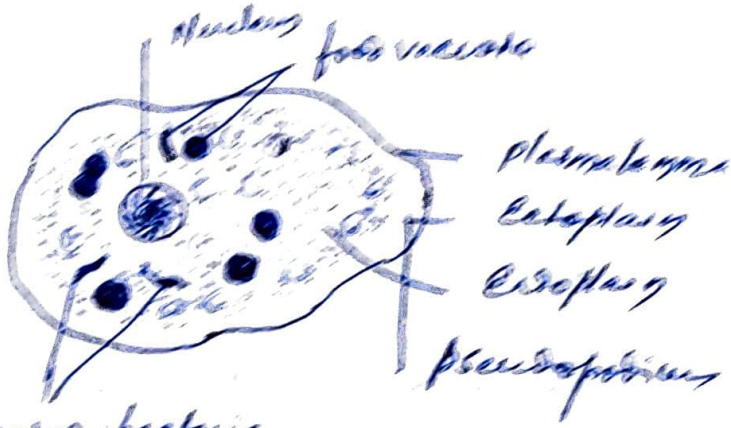
### 1. Trophozoite (= Mature form)

- Most active, motile and feeding form<sup>20</sup>. Pathogenic to man.
- Live in the mucosa and sub-mucosa layers of the intestine.
- It measures about 20-30  $\mu$  in diameter.
- Body is covered with thin, elastic and semipermeable membrane called plasmalemma.
- Cytoplasm is differentiated into:
  - Ectoplasm - Outer, clear, non-granular part.
  - Endoplasm - Central, granular (like raw fluid) part.

(b) Endoplasm contains a nucleus, bound by a thin, delicate nuclear membrane; a dot like Karyosome at the centre and spoke like striations of chromatin material in between the nuclear membrane and endosome (= karyosome).

Endoplasm also contains food vacuoles that engulf the RBC & loose fragments of epithelial cells of bacteria.

- (1) no osmoregulation organ (absence of contractile vacuole) as the osmotic concentration of its body protoplasm equals to that of extrinsic fluid of the body - a large, broad, blunt
- (2) locomotion with the help of Pseudopodium (= monopodial) which is found anteriorly at the ant. end
- (3) Nutritive Holozoic; food particles are engulfed at the posterior end



ingested bacteria  
 Fig (A) *Entamoeba histolytica* (trophozoite form)

(2) Pre-cystic or Miroplā form

- (1) small, spherical, non-motile and non-feeding form
- (2) It measures about - 12-15  $\mu$  in diameter.
- (3) Food vacuoles absent
- (4) lives in the lumen of large intestine and is non-pathogenic stage.
- (5) Endoplasm contains RNA.

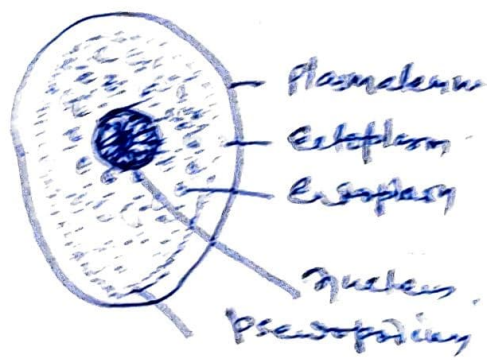


Fig. B. Miroplā form (*E. histolytica*)  
 (= Infective or resting stage)

- (3) Cystic form - Under normal conditions Miroplā form undergo encystation, which is -
  - 1) round, surrounded by a thin, highly resistant and refractile cyst wall
  - 2) cyst is a spherical body as its measure about 10-12  $\mu$  in diameter; Smallest hence called minute form.
  - 3) Non-viable stage; no formation of pseudopodia

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- (8) no osmoregulation occurs (absence of contractile vacuole) as the osmotic concentration of its body protoplasm equals to that of intestinal fluid of the host. a large, broad, blunt
- (9) locomotion with the help of pseudopodium (= non-podopod) which is found anteriorly at the ant. end.
- (10) Nutrition Hologoric; food particles are engulfed at the posterior end

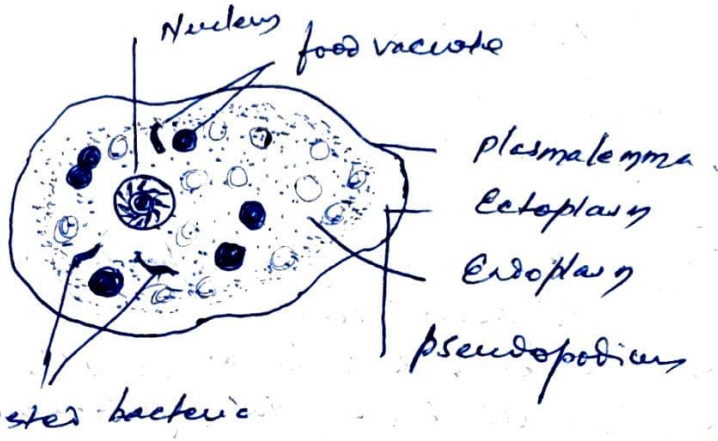


Fig (A) *Entamoeba histolytica* (Trophozoite form)

## (2) Pre-cystic or Minuta form

- (1) Small, spherical, non-motile and non-feeding form
- (2) It measures about - 12-15  $\mu$  in diameter.
- (3) Food vacuoles absent
- (4) lives in the lumen of large intestine and is non-pathogenic stage.
- (5) Endoplasm contains RBC.

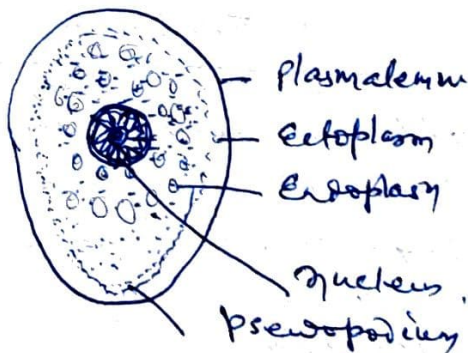


Fig. B. Minuta form (*E. histolytica*)  
(Infective and resting stage)

- (3) Cystic form - Under normal conditions Minuta forms undergo encystation, which is
  - 1) round, surrounded by a thin, highly resistant and refractile cyst wall
  - 2) cyst is a spherical body which measures about 10-12  $\mu$  in diameter; Smallest hence called minute form
  - 3) Non-motile stage; no formation of pseudopodium



Cytoplasm clear and contains one or two glycogen masses (= reserve food) and one or more chromatin bodies with nuclear bars (Characteristic feature)

- (5) Nucleus retains the charactrs of trophozoite.
- (6) The cyst is uninucleate binucleate or a tetranucleate.
- (7) resistant to stomach acid as can survive long enough in the stomach

LIFE CYCLE

*E. histolytica* is a <sup>parasite</sup> monogenetic hence its life cycle is completed in one host (Man)  
pigs, dogs, rats and rabbits are supposed to be the reservoir host.

The life cycle is completed in following stages: -

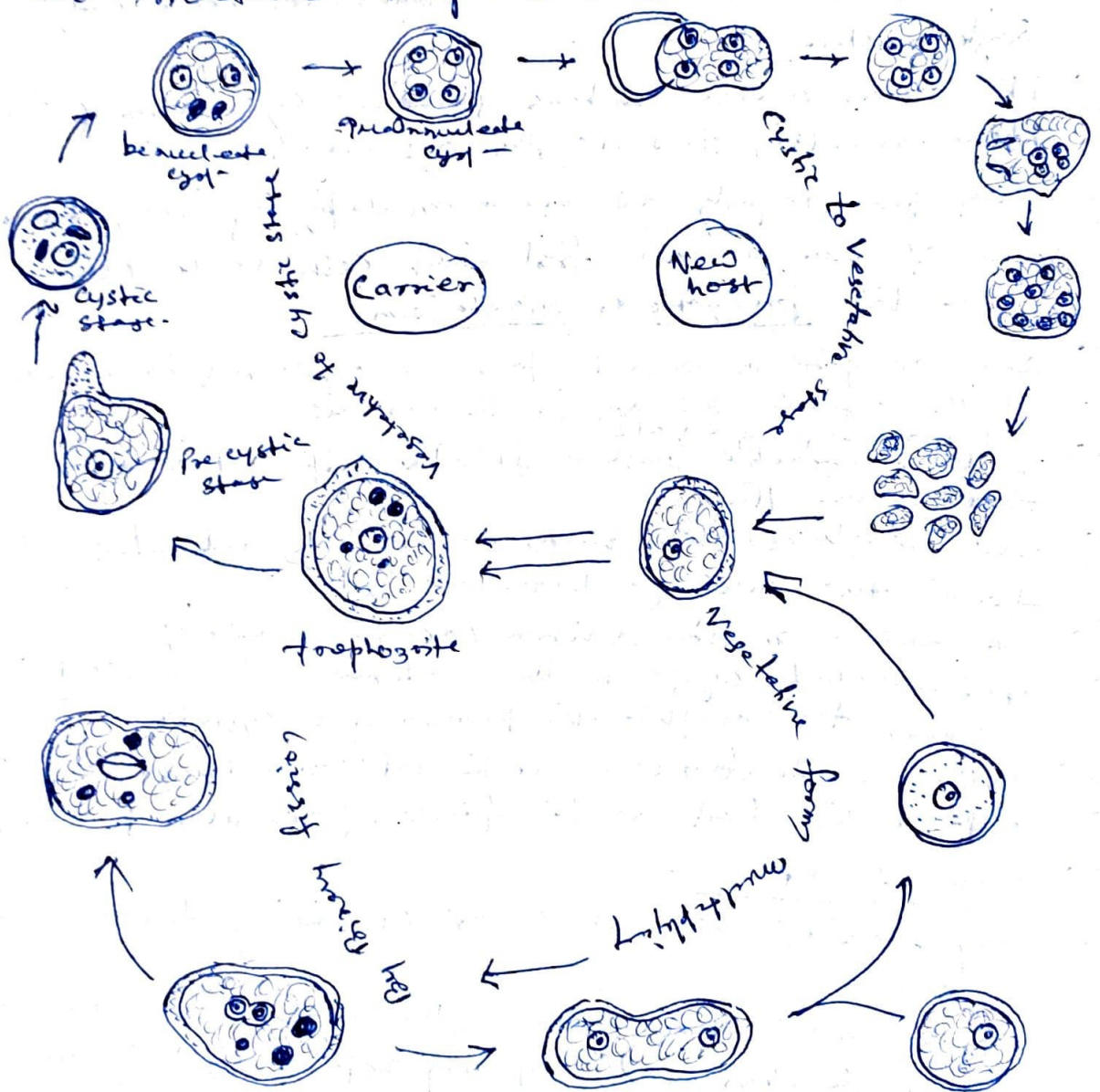
- (1) Trophozoites multiply asexually by binary fission within the wall of large intestine. Trophozoites bear only single nucleus.
- (2) The nucleus undergoes mitosis followed by division of cytoplasm, resulting two daughter organisms.
- (3) They grow rapidly and again multiply by binary fission. Some of them invade fresh host cells while others become the pre-cystic or minute form.
- (4) The pre-cystic or minute forms encyst only in lumen of the intestine and not in the tissues.
- (5) a thin, retractile, tough or flexible cyst wall is formed <sup>which surrounds the</sup> ~~which~~ around them.
- (6) The single nucleus divides mitotically into two to form two nuclei (= binucleate cyst)
- (7) A second mitotic division occurs resulting tetranucleate cyst in the intestine. It takes only few hours to complete the process of encystation.
- (8) Tetranucleate ~~for~~ cysts are the infective stage. They pass out of the host in the faeces. (can survive for 10 days)

Mode of Infection

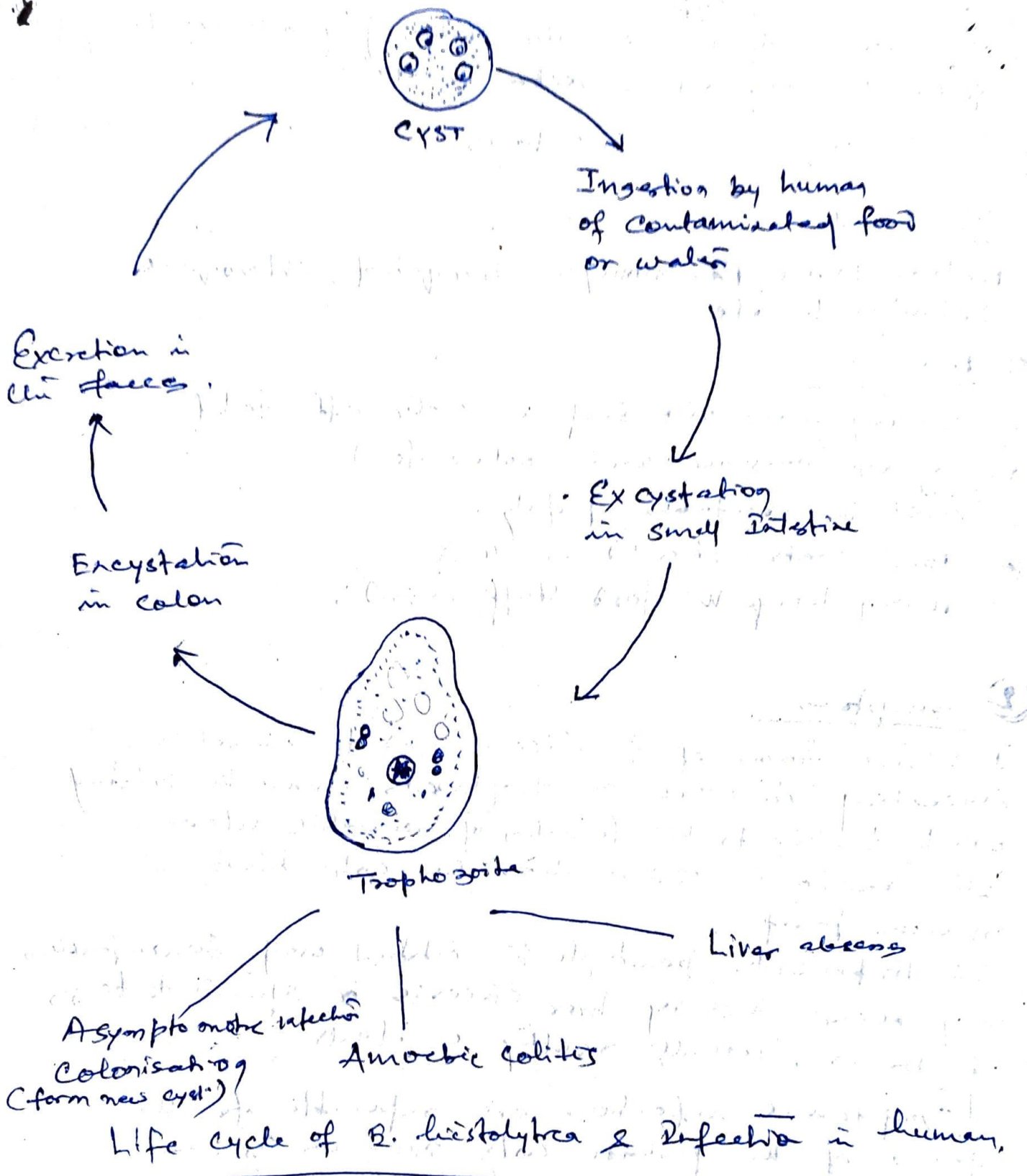
- (a) By ingesting food or water containing tetranucleate cyst -
- (b) May be through food handlers (like cooks, sweetmeat seller, hawkers etc); they may act as cyst passers -
- (c) Untreated human faeces voided by children and adults on open grounds or in crops at vegetable fields is a common source of infection.
- (d) House fly & cockroaches may act as vector sometimes,



- 9) In new host the ingested cysts pass down the alimentary canal and reach the small intestine.
- 10) The cyst wall protects them from the action of digestive juices during their passage through stomach.
- 11) Cyst wall is digested by trying to small intestine releasing the tetranucleate trichocysts called metacyst.
- 12) Each metacyst proceeds to divide by binary fission resulting 8 small uninucleate metacystic trophozoites.
- 13) These metacystic trophozoites pass into the large intestine, invade the mucus lining and grow into mature trophozoites.



Entamoeba histolytica: Reproduction at life history.



Asymptomatic infection  
Colonisation  
(form new cysts)

Amoebic colitis

Liver abscess

Life cycle of *B. histolytica* & *Dissecta* in human.

## 1) Mode of infection

- a) Oral-faecal cycle
- b) By ingesting food and water containing quadrinucleate cysts
- c) House fly may act as vector sometimes.

② Incubation period - 4-5 days

## 3) Treatment

Metronidazole, Paramomycin, Iodoquinol, chloroquine  
Schmidazole etc

## 4) Prevention

- a) washing hand with soap and water after toilet
- b) do not consume under cooked food
- c) <sup>shy</sup> wash the vegetables properly.
- d) Boil water should be used.
- e) always keep the food stuff covered.

## ② Symptoms

Invasive forms of the disease lead to amoebic dysentery in which the trophozoites invade the intestinal wall leading to the formation of amoebic ulcers. This results in severe diarrhoea with blood and mucus present.

If trophozoites penetrate the intestinal wall, serious problems may occur, including liver abscesses or spread to lungs and brain, usually resulting in death.

Asymptomatic infections are responsible for the spread of the parasite with numerous cysts being passed in normal stool.