

## ENTAMOEBIA HISTOLYTICA

1.

*Entamoeba histolytica* is parasitic protozoan infecting man and other primates. *Entamoeba histolytica* was first discovered by Lamb (1859) and its pathogenic nature was described by Loech (1875). It enjoys the world wide distribution but is more common in tropical countries due to poor sanitary conditions. It is found in the mucous and submucous layer of the large intestine (Colon) of man. The parasite has both histolytic and cytolytic power. It secretes a toxic substance which dissolve and destroys the mucus lining of the intestine causes abscess or ulcer in the intestine. The disease caused by *Entamoeba histolytica* is called Amoebic dysentery or Amoebiasis, In addition to diarrhoea and dysentery this endoparasite causes abscesses in the lung, liver, spleen and brain. The systematic position of the *Entamoeba histolytica* is as follows -

Phylum - Protozoa  
Class - Sarcodina  
Sub-class - Rhizopoda  
Order - Amoebina or Lobosa  
Type - *Entamoeba histolytica*

### MORPHOLOGY -

The young *Entamoeba histolytica* is a microscopic, naked parasitic amoeba. In its entire life cycle it passes through three distinct morphological stages or forms -

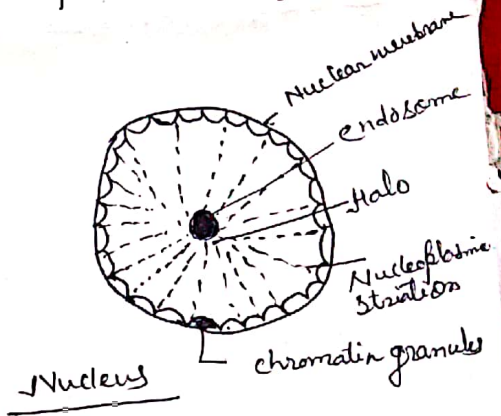
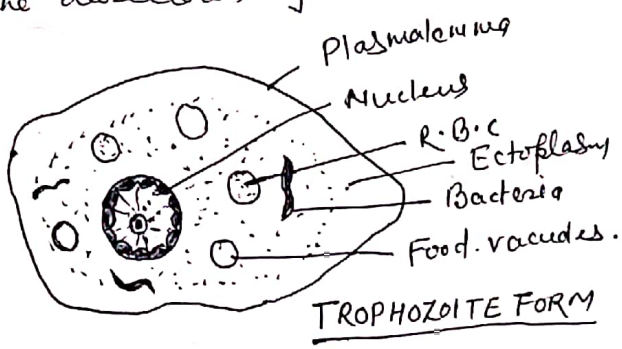
- ① Trophozoite stage - Magna form
  - ② Pycnospic stage
  - ③ cystic stage
- } Minuta forms.

① Trophozoite stage :- The tissue living forms reside in the mucosa of intestinal wall are larger in size and represent the trophic form or trophozoite form. It is the active motile growing and feeding form which is pathogenic to man. It is colourless transparent and irregular mass of living substance measuring about 20-30  $\mu$  in diameter. Its outer surface is covered by an exceptionally thin transparent, elastic and semipermeable membrane called plasmodium. It permits changes in form but delimits cytoplasm from the surroundings.

The interior of the body is filled with a colourless substance differentiated into ectoplasm and endoplasm. Ectoplasm is outer, clear, hyaline nongranular and more solid layer which forms 1/3 of the organism. Endoplasm is the central granular and liquid part of the cytoplasm.

Inside the endoplasm is found a large rounded and vesicular nucleus. It is delimited by a thin and delicate nuclear membrane which is encrusted with a fine peripheral layer of chromatin granules. It consists of a central dot like endosome or nucleolus surrounded by a clear halo area. The nucleoplasm is marked by spoke like striations running between the endosomes in the nuclear membrane.

*Entamoeba histolytica* is holozoic in nutrition. In the endoplasm there are one or more food vacuoles with R.B.C in various stage of digestion. The contractile vacuole is absent as the parasite needs no osmo-regulation. *Entamoeba* is monopodial and the ectoplasmic pseudopodium is formed in the direction of the movement.



**Minuta form:- (Precystic form):-** The Precystic or minuta form of *E. histolytica* is small, spherical non-motile creature measuring 10 to 20  $\mu$  in diameter. It is non-feeding and non-pathogenic to man. Its endoplasm is devoid of red blood cells and food vacuoles are absent. The endoplasm contain black rod like chromatoid bodies. The nucleus is same like the young trophozoite. The minuta form lives only in the lumen of the large intestine. It develops into the young trophozoite by penetrating the mucosa and submucosa of the host intestine ingesting erythrocytes and growing in size. On the other hand it also undergoes encystation and is concerned with the infection of the new host.

CYSTIC FORM :- Trophozoite form engulfs and get transformed into cystic form. The cyst wall is then highly refractile resistant flexible structure in nature. One or two glycogen mass appear in the cytoplasm starts to disappear. The nucleus within the characteristic of prokaryotes. Chromatin bodies present.

### Life cycle

The life cycle of the *E. histolytica* is monogenetic (single host is involved in its life cycle). Transition from host to host occurs during cystic stage either through the contaminated food and water or by the feces and excretions. The mode of reproduction is binary fission (asexual).

Multiplication :- The trophozoite form from the host tissue multiplies by mitosis in which six chromosomes are formed. The nuclear membrane does not disappear. Trophozoites placed by appropriate. The young trophozoite start feeding upon the host tissue.

Excystation :- Some of the trophozoites from the stool are liberated into the lumen of the intestine. They are surrounded by smaller in size and they get converted into trophozoites and cysts form by secreting a thin cyst wall. The cyst contains four to eight forming quadrinucleate cyst. This cyst is passed from host to host. The cyst are voided out with the faeces. The faeces cyst are green and refractile and appear as shiny spheres.

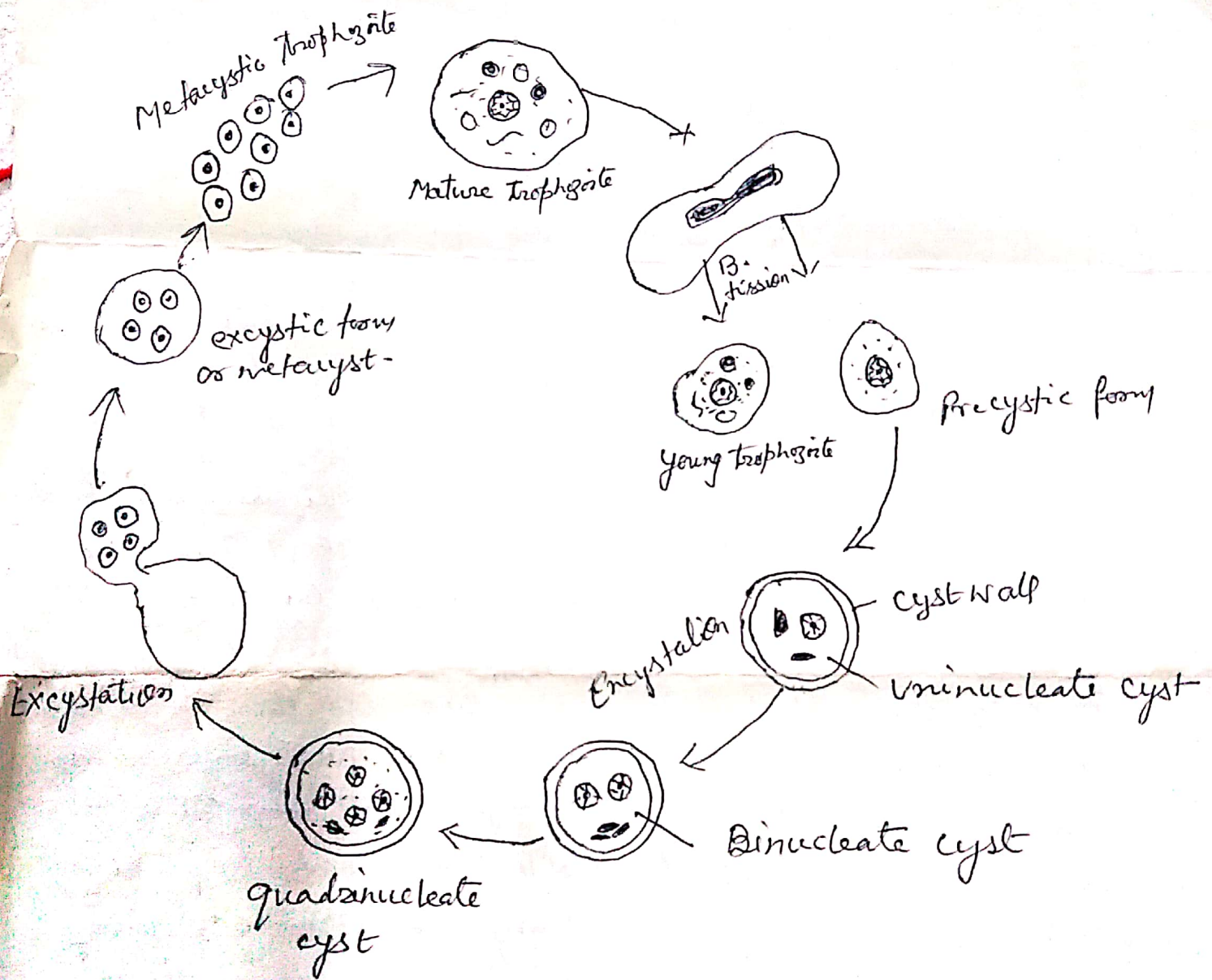
Although apparently the cyst multiply within the host intestine, they are often passed before maturity and

are capable of completing their development outside the body. The cyst can live for a number of week outside the body until they reach the new host.

Excystation and infection :- The cyst are swallowed with the contaminated food or water. They pass unchanged through the stomach and hatch in the small ~~bowel~~ intestine, where the cyst wall gets dissolved by the action of trypsin. As a result, the quadrinucleate metacystic forms come out.

Metacyst :- Each metacyst with four nuclei divide by binary fission and eight young uninucleate amoeboid trophozoite emerge out. They make their way into the colon and invade the intestinal wall. Metacyst undergoes binary fission with only one nucleus dividing resulting into two daughter nuclei. In this way a single metacyst produces 8 little uninucleate daughter amoebule called metacystic trophozoite. These young amoebule being actively motile, make their way into large intestine, invade the mucous lining and grow into young feeding trophozoites.

Pathogenicity - *E. histolytica* causes amoebic dysentery and causes abscess in the intestinal wall. Sometimes in the acute condition parasite carried to liver, spleen, lungs and to brain along with the blood vessels streams and forms local abscess. Formation of abscess in brain is fatal to man.



Life-cycle of *E. histolytica*.