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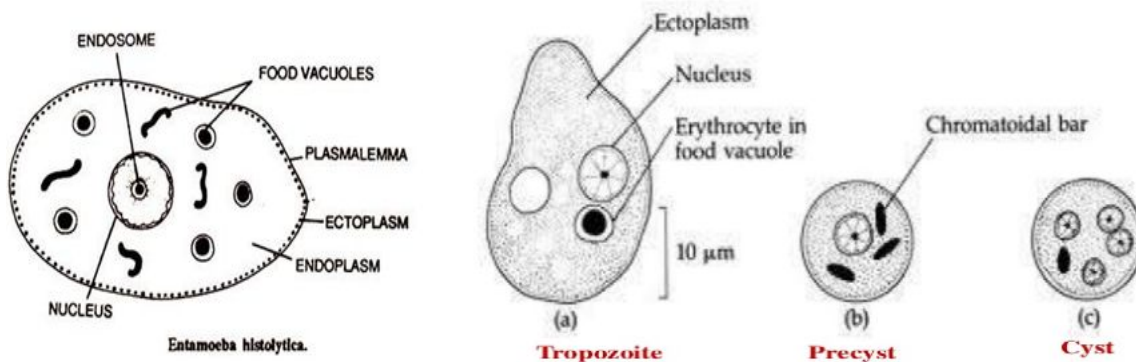
The classification, structure, life cycle and Pathogenicity of *Entamoeba histolytica*.

Entamoeba histolytica is the organism always refers to the connection with such terms as dysentery amoeba, amoebic colitis or amoebiasis and is the species involved in the extra-intestinal amoebiasis.

Classification of *Entamoeba histolytica*

Phylum - Sarcomastigophora
Sub Phylum-Sarcodina
Super class-Rhizopoda
Class-Lobosea
Orders-Euamoebida
Genus-Entamoeba
Species-Histolytica

Structure of *Entamoeba histolytica*



Ultrastructure

Electron microscopy has revealed differences in subcellular organization between *E. histolytica* and metazoan cells or the larger free-living amoebae. Neither mitochondria of the type seen in other cells nor the Golgi complex has been observed in *E. histolytica* or in other species of *Entamoeba* that have been investigated. On the other hand, histochemical studies of *E. histolytica* have revealed small granules that appear to have a mitochondrial function. The endoplasmic reticulum seems to be poorly developed. The cytoplasmic membrane is in the form of a typical unit membrane consisting of 3 layers. The limiting membrane of the food vacuoles has the same structure as the cytoplasmic membrane.

E. histolytica, like the other amoebae with limax-type movement, has a differentiated tail region or uroid. This organelle is the site of protein contraction, and produces the flow of cytoplasm that enables the organism to move. It also has excretory functions.

The arrangement in the nucleus of peripheral and karyosomal (endosomal) material has essentially the same appearance, whether observed by electron microscopy or by conventional light microscopy. The nuclear membrane is 2-layered, and presents a discontinuous appearance as if perforated by a series of pores.

Various numbers of helical bodies representing an array of ribosomes have been observed. Polycrystalline bodies representing a mass of ribosomes have been seen in amoebae of the related species *E. invadens*, and the chromatoidals of the cyst appeared as a much larger polycrystalline mass of ribosomes. Whorl-like structures have been seen and interpreted either as viruses or as membranes remaining after the disappearance of food vacuoles.

The modifications of the typical subcellular organization that are found in *Entamoeba* may reflect changes due to the mode of locomotion, and may also be related to adaptation to the parasitic environment. The electron microscope observations will be better understood when the localization of enzymes and other biochemical or physiological information can be related to subcellular organization. Of particular interest in connexion with tissue invasion is the localization of enzymes in the cytoplasmic membrane.

Habitat

Large intestine of man : Trophozoite Forms : Mucous and submucous layer

Morphology

The parasite exists in three morphological forms:

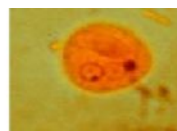
- Trophozoite
- Precyst
- Cyst

Trophozoite

- Up to 60µm in diameter
- Endoplasm granular
- Food vacuoles: RBCs, leucocytes and tissue debris
- Motile
- Blunt single Pseudopodia
- Single Large nucleus
- Only Trophozoite present in the tissues

Precyst:-

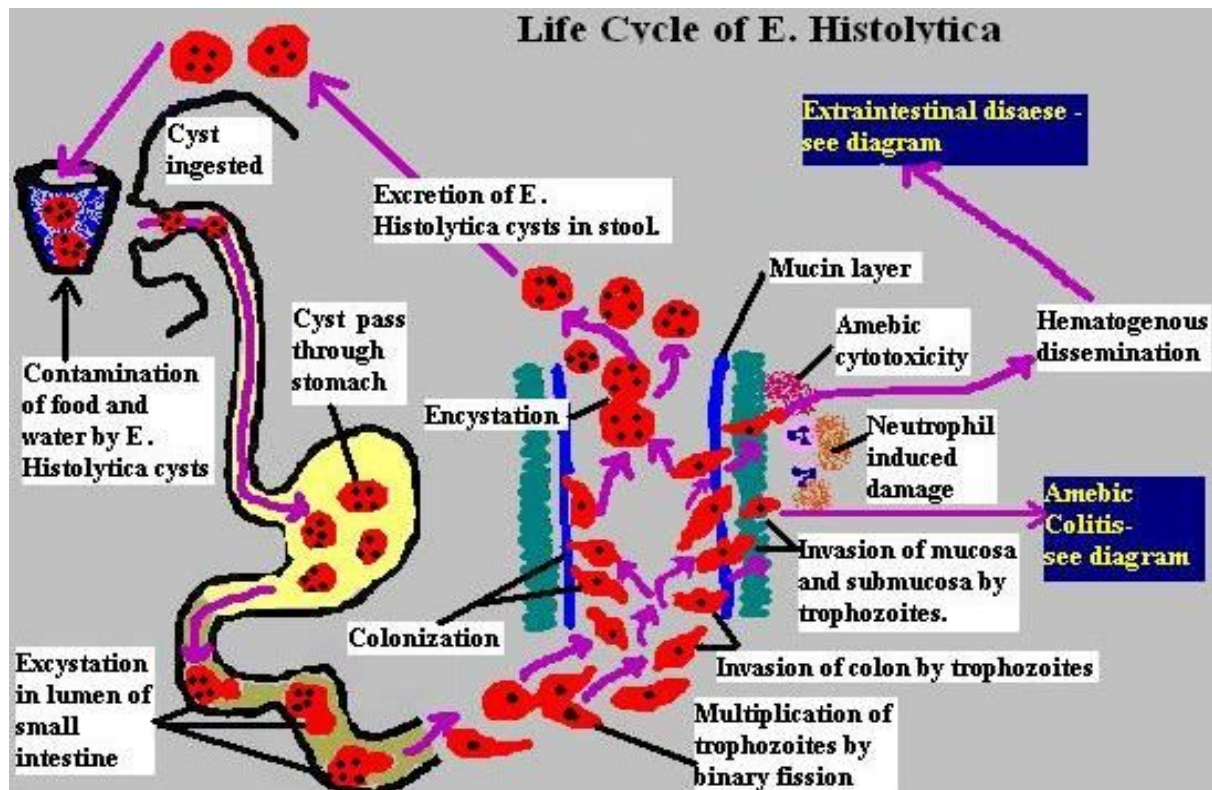
- Smaller in size
- 10-20µm in diameter
- Oval with a blunt pseudopodium
- Food vacuoles disappear
- Characteristics nucleus



Cyst



- Spherical, 1-15 μm in diameter
- Surrounded by a thick chitinous wall
- Uni nucleated \rightarrow Bi nucleated \rightarrow tetra nucleated
- Cyst are present only in the lumen of the colon and in



Pathogenicity

Mode of Transmission: Feco-Oral Route: By Ingestion of contaminated food and Drinking water

Intestinal amoebiasis :

- Intestinal amoebiasis indicate that organism are confined to gastrointestinal tract.
- Incubation period :1-4 weeks
- The amoebae invade the colonic mucosa , producing characteristic ulcerative flask shaped lesions and a profuse bloody diarrhea (amoebic dysentery).

Extra intestinal amoebiasis:-

- About 5% individuals
- 1. Hepatic amoebiasis: Acute Liver Abscess: Develop after 1-3 Months
- Transmit through portal veins from intestine to Liver
- **Pus of liver abscess:** Anchovy Sauce appearance: Contain few Pus cells
- 2. Pulmonary Amoebiasis: Transmitted from Liver and develop pulmonary Lesions

3. Cerebral Amoebiasis: Transmitted from Liver to heart then Brain and develop cerebral lesion

Mild symptoms include:

- Loose stools/diarrhoea, including slimy diarrhoea with pus (which is often foul smelling) and painful passage of stools (tenesmus)
- Stomach pain
- Stomach cramps (colic)
- Nausea

Severe symptoms include:

- Amoebic dysentery (associated with severe abdominal pain, bloody stools, and fever)
- Profuse diarrhoea (patients may pass about 10-12 stools during an acute episode, and still constantly feel an urgency to pass stools)
- Liver abscess
- Severe ulceration
- Severe gastric distention of the bowel
- Peritonitis (inflammation of the intestinal wall and its lining) or colitis (inflammation of the colon, specifically)
- Megacolon (very rare, in 0.5% of the cases)
- Ameboma (which results from formation of annular colonic granulation tissue and may mimic carcinoma of the colon)

Serological tests :-

- IHA,
- IFA,
- ELISA,
- Slide agglutination test,
- Co agglutination test.

Molecular methods :-

- DNA probes
- PCR

TREATMENT

Treatment of amoebiasis is based on the use of amoebicides drugs

Amoebicides with luminal action

- Di-iodohydroxyquin
- Diloxanide furoate
- Paromomycin

Amoebicides effective in the liver, intestinal wall and other tissues

- Emetine
- Dehydroemetine

Amoebicides effective only in the liver

- chloroquine

Amoebicides effective in both tissues and the intestinal lumen

- Metronidazole
- Nitroimidazole

Prevention

- The amoebic infection can be prevented by avoiding faecal contamination of food and water
- There should be proper disposal of human faeces through proper drainage system
- Contamination may result from discharge of sewage into rivers. Purified water should be distributed through pipelines to avoid contamination. Boiled water is safe.
- The amount of chlorine normally used to purify water is insufficient to kill cysts, higher levels of chlorine are effective but the water thus treated must be dechlorinated before use.
- Vegetables that are usually eaten raw should be cleaned with uncontaminated running water and treated with 5% acetic acid before consuming