



MEDICAL PARASITOLOGY

Definitions and Concepts

Medical parasitology

2023-2024

LAB(2)

Protozoa

Phylum: Sarcomastigophora

Subphylum: Sarcodina

Class: Lobosea

Example-1- *Entamoeba histolytica*

Entamoeba histolytica is a common protozoan parasite found in the large intestine of human. It is pathogenic parasite cause disease called **Amoebic dysentery, Amoebiasis, Amebic liver abscess.** This parasite exists in three morphological forms:-

1. Trophozoite(the growing or feeding stage).
2. Pre-cyst.
3. Cyst.

- Trophozoite :-

This stage is present in the tissues only, the cytoplasm can be divided into a clear outer ectoplasm and inner finely granular endoplasm in **which red blood cells, leucocytes and tissue debris are found within the food vacuoles.** Trophozoites are motile, movement results from long finger-like pseudopodial extensions of ectoplasm rapidly. Nucleus is spherical in shape varying in size, inside it there is deeply staining **centric karyosome** in a halo like capsule. The nuclear membrane is delicate and is lined by a single layer of fine chromatin granules.

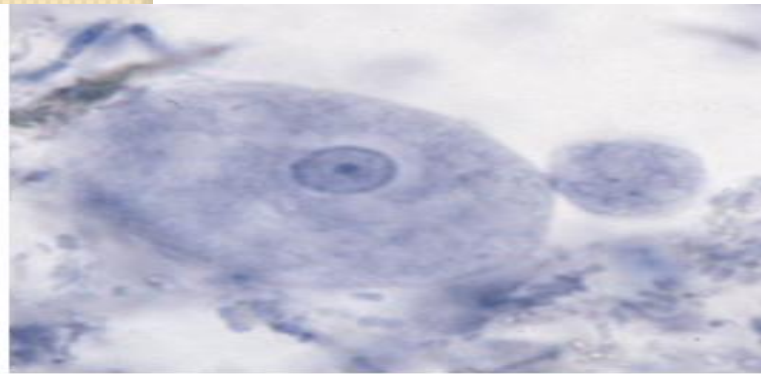
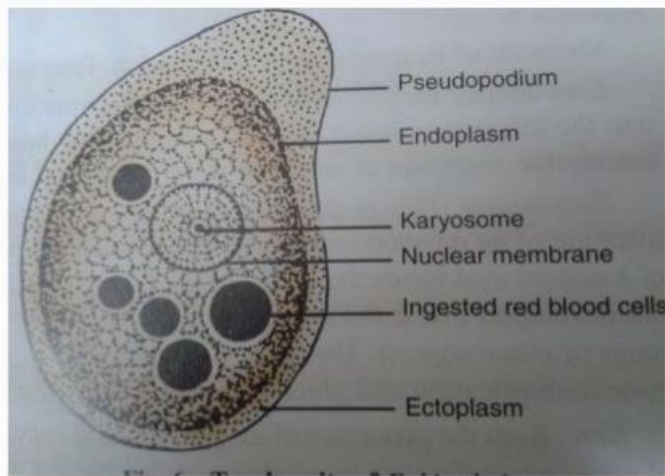


Figure 8.1
Entamoeba histolytica trophozoite in fecal smear is 24 μ m in diameter and contains a single, spherical, 5 μ m diameter nucleus with a discrete, round, centrally placed karyosome. The peripheral chromatin lining the nuclear membrane is uniform. Iron hematoxylin

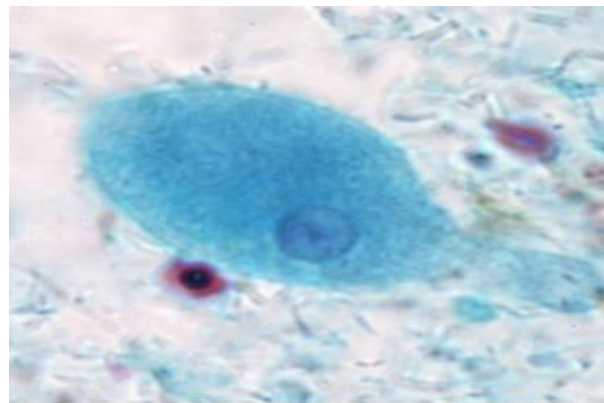
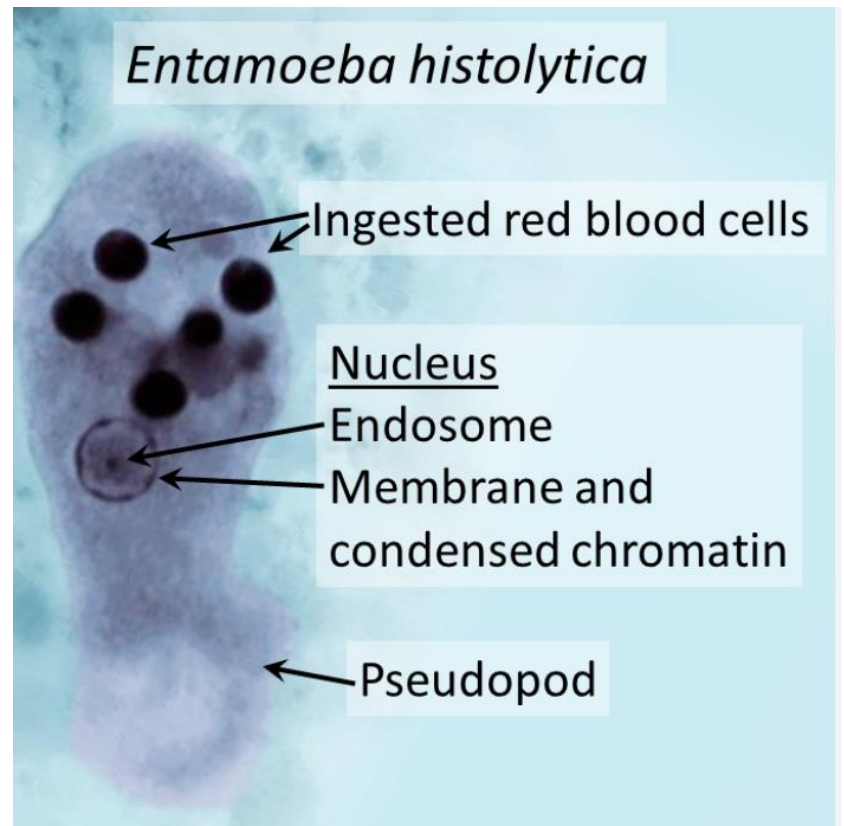


Figure 8.2
Entamoeba histolytica trophozoite in fecal smear producing pseudopodia. Thi

- **Pre-cyst :-**

It is oval shape that is smaller than the trophozoite but larger than the cyst with blunt pseudopodium projecting from the periphery. Food vacuoles disappear; there is no change in the nucleus.

- **Cyst :-**

It is spherical shape and surrounded by a thick chitinous wall which make it highly resistant to the gastric acid environmental conditions. It starts as a uninucleate body, but later the nucleus divides to form two (binucleate) and then four nuclei (**quadrinucleate**)(**mature cyst**). Uninucleate and binucleate bodies contain glycogen vacuole and dark staining sausage shaped bars with rounded ends called chromatoid bodies. As the cyst mature, the glycogen and the chromatoid bodies appear less dense or disappear and become **containing 4 nuclei with centric karyosome**.

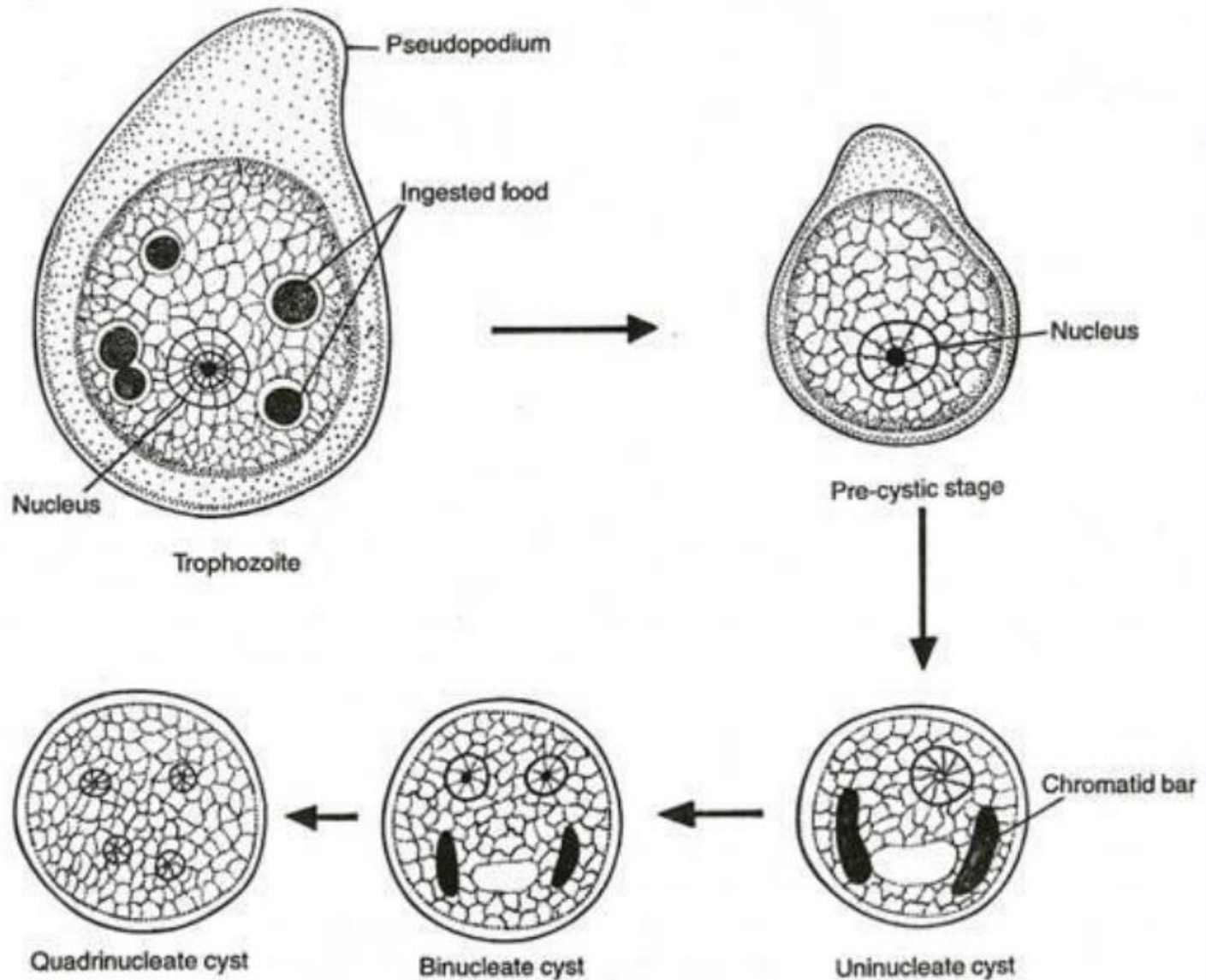


Fig. 174. Stages of life cycle of *Entamoeba histolytica*.

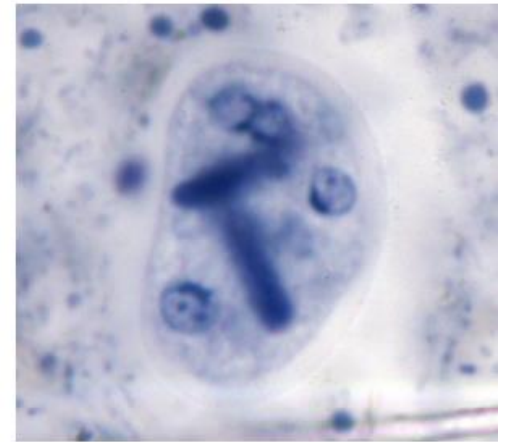
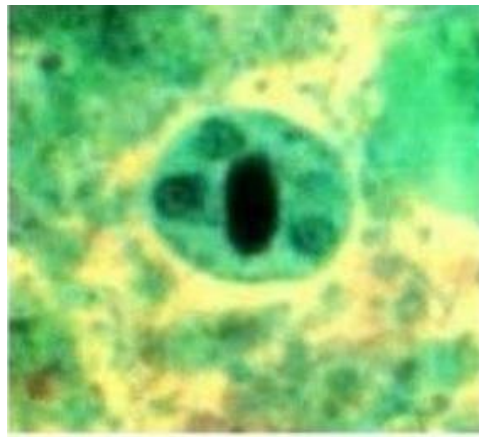
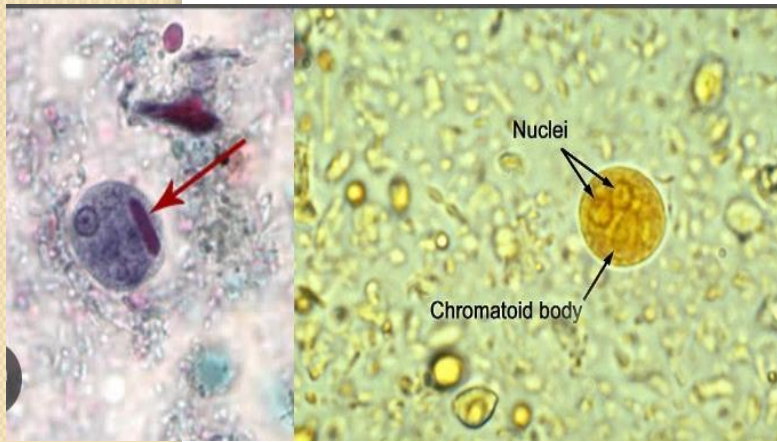


Figure 8.5
Entamoeba histolytica
mature cyst with 4 nuclei and
chromatoid bodies in fecal
smear and surrounded by halo-
like space. The cyst is 19 μ m

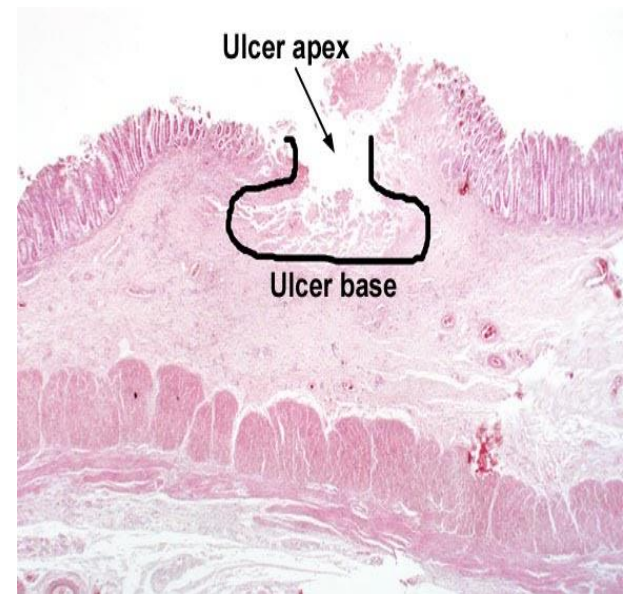


- **Transmission :-**

Food or drink contaminated with stool containing the cysts of the parasite is a common source of infection .

- **Pathology :-**

Entamoeba histolytica cause intestinal and extraintestinal amoebiasis, the early lesion is a tiny area of necrosis in the superficial mucosa or a small nodular elevation with a minute opening that leads to a flask shaped cavity containing cytolyzed cells, mucus and amebas, then there is a downward extension of the ulcerative processes to both superficial and deep layers of the intestine leads to large areas of necrosis.



- **Diagnosis :-**

Examination of stool by direct smear (General Stool Examination GSE) to recovery trophozoites and or cysts stages.

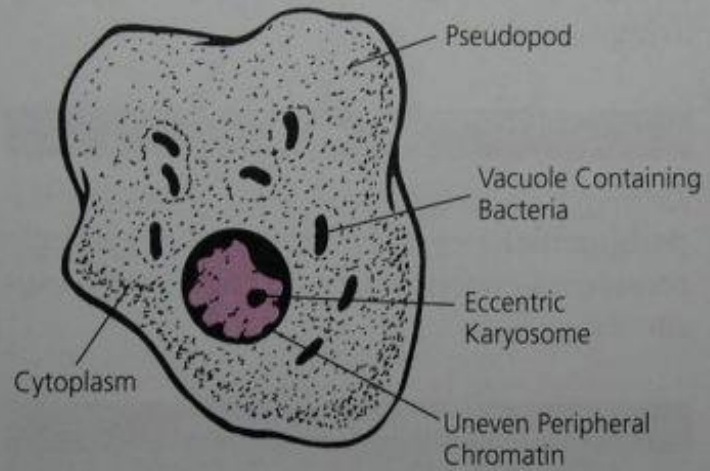
Example-2- *Entamoeba coli*

Entamoeba coli is **non pathogenic parasite**, it lives freely in the lumen of large intestine of man. Like *Entamoeba histolytica*, it exists in three stages:-

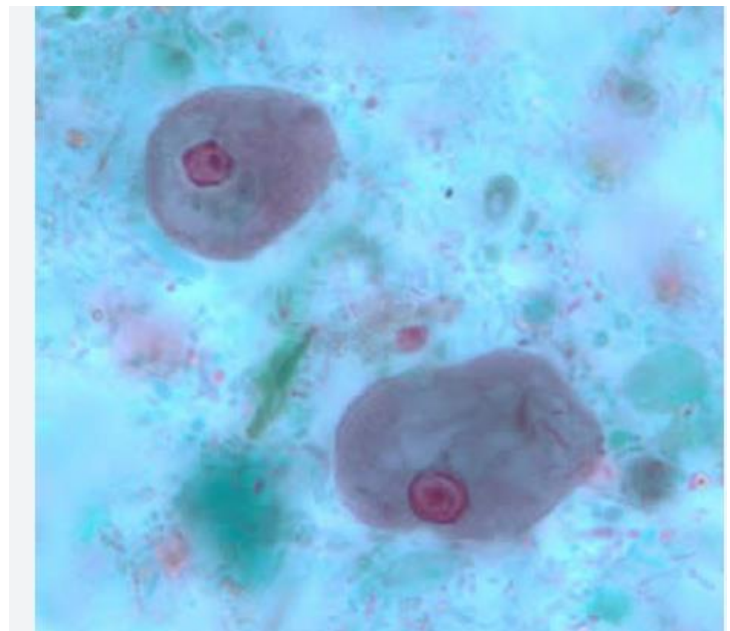
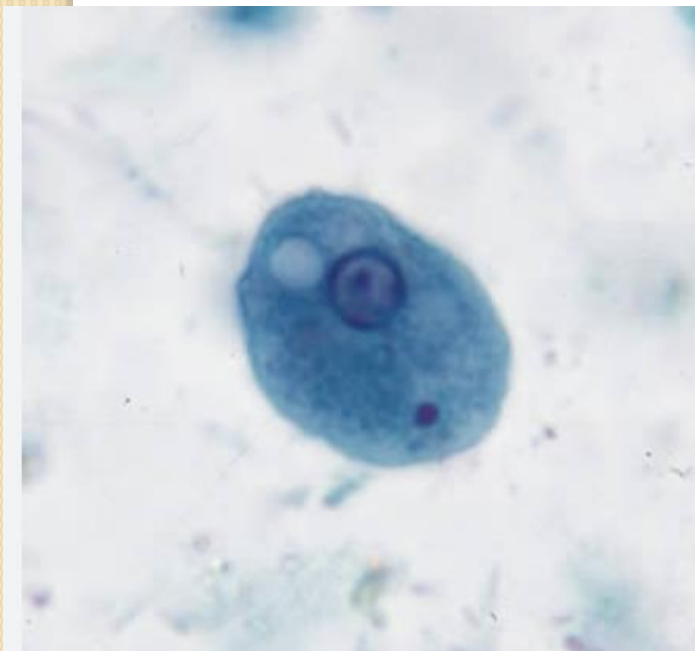
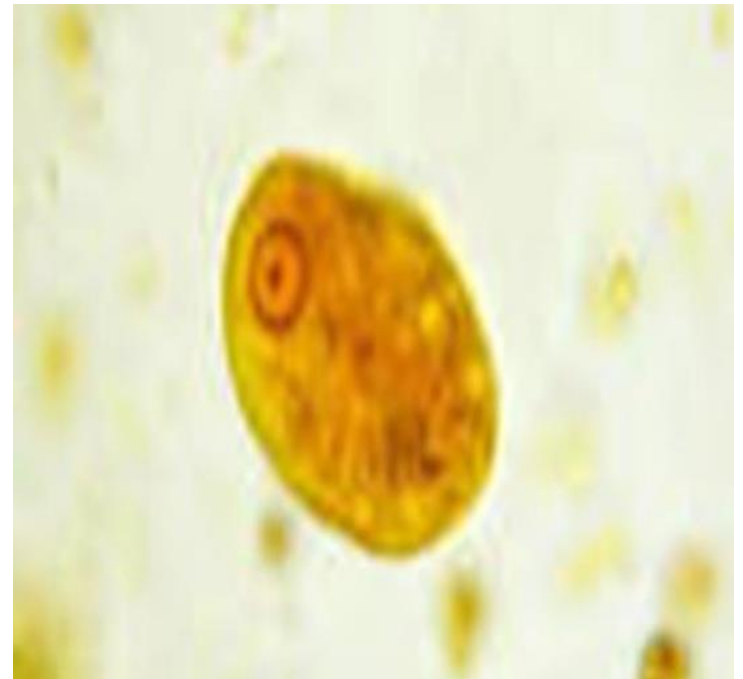
- 1- Trophozoite.
- 2- Pre-cyst.
- 3- Cyst.

- **Trophozoite :-**

This stage is colorless; the ectoplasm is usually difficult to distinguish from the granular and vacuolated endoplasm. The round nucleus has a thick membrane lined with irregularly distributed coarse mass of chromatin and **large irregular eccentric karyosome**. The pseudopodia are short, blunt and granular. Within the endoplasm, there are numerous food vacuoles that usually contain bacteria.



Size Range: 12 – 55 μm
Average Size: 18 – 27 μm



- **Precyst :-**

This stage has the same characters in *Entamoeba histolytica*.

- **Cyst :-**

It is spherical shape. It starts as a uninucleate body, but later the nucleus divides to form two (binucleate), then four nuclei (quadrinucleate) and finally form **eight nuclei (mature cyst)**. Uninucleate, binucleate and quadrinucleate bodies contain glycogen vacuole and sharp ended chromatoidal bodies. As the cyst mature, the glycogen and the chromatoid bodies appear less dense or disappear and become **containing 8 nuclei with eccentric karyosome**.

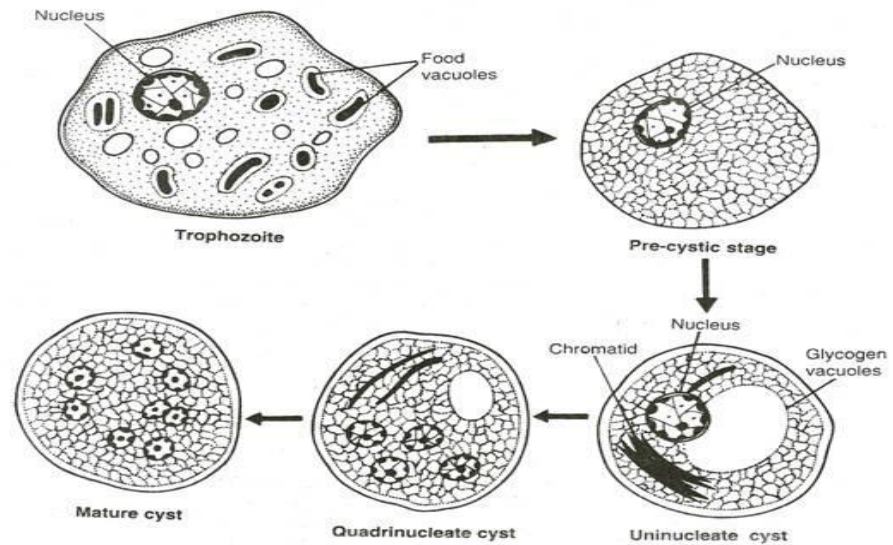
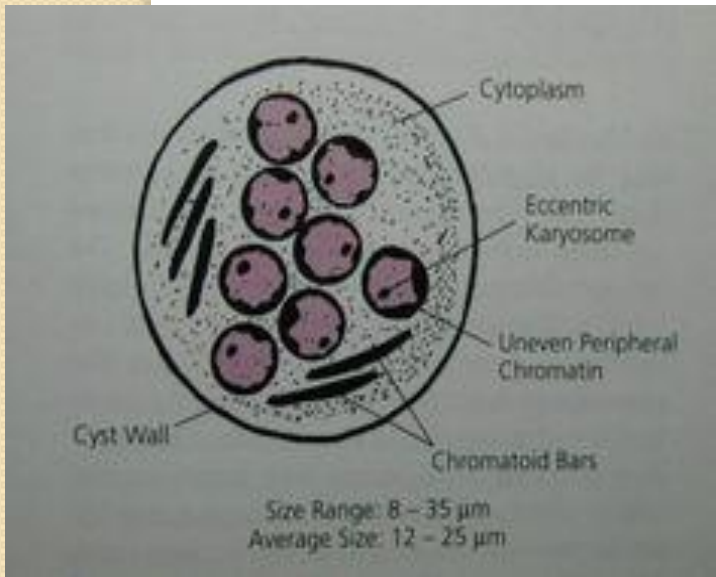
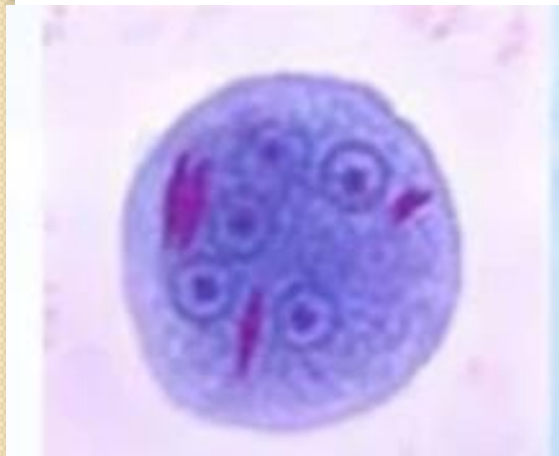
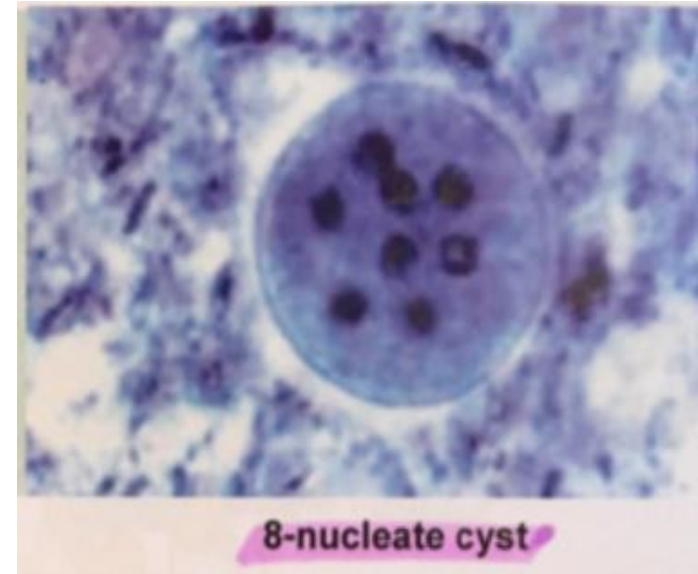
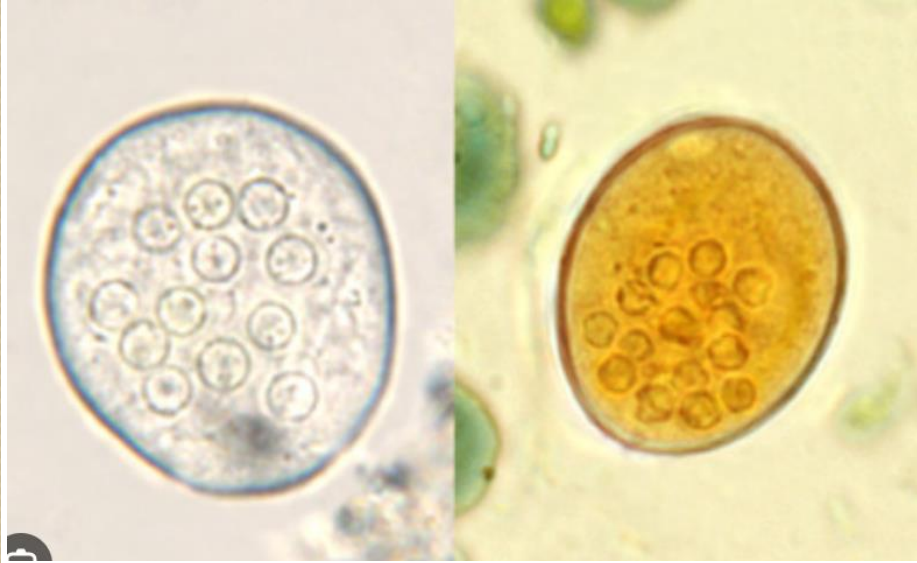


Fig. 177. Stages of life of *Entamoeba coli*.

- **Diagnosis :-**

Examination of stool by direct smear (General Stool Examination GSE) to recovery trophozoites and or cysts stages.



Compare the trophozoite and cyst forms of protozoans (*Entamoeba histolytica* and *Entamoeba coli*)

Characteristics	<i>Entamoeba histolytica</i>	<i>Entamoeba coli</i>
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Trophozoite

Size	12-30 μm	20-40 μm
Nucleus	1, difficult to visualize in unstained smear	1, often visible in unstained smear
Karyosome	Sharp central	Eccentric
Peripheral Chromatin	Fine and dispersed	Coarse and Clumped
Cytoplasmic Inclusions	RBCs, leukocytes and tissue debris but no bacteria	Bacteria and other material but never RBCs

Cysts

Size	10-15 μm	15-25 μm
Nucleus	Mature Cyst=4 nuclei	Mature Cyst=8 Nuclei
Peripheral Chromatin	Fine and dispersed	Coarsely granular or clumped
Chromatoid Bodies	Rounded ends	Filamentous, thread like, pointed ends
Glycogen Mass	Visible in uninucleate stage	Large and visible in binucleate stage



THANK
YOU