

# Practical parasites

## Lab-4 (Protozoa)

MSc. Zainab Abboodi

**Parasites can be divided in to three main groups:-**

1-Protozoa ----- Protozoology

2-Helminths ----- Helminthology

3-Arthropods ----- Entomology

### **Protozoa classes**

#### **Intestinal protozoa (unicellular eukaryotic organisms)**

- a. Amoebas
- b. Flagellates
- c. Ciliates
- d. Sporozoa

### **Amoeba**

a-*Entamoeba histolytica*

b-*E . coli*

c-*E . gingivalis*

#### **Intestinal Amoeba**

### ***Entamoeba histolytica* (pathogenic)**

#### **Causes :**

- **Intestinal disease** (amoebiasis , amoebic dysentery)
- **Hepatic Disease** (liver abscess)

**Geog.Distribution:** Parasite has worldwide distribution but is most common in the tropical and subtropical areas of the world.

**Natural Habitat :** duodenum of human

**Infective stage :** cyst.

**Mode of infection:** contamination of food and water with cyst. Sexual transmission can also occur .

**Reproduction mechanism:** asexually by binary fission

**Incubation Period:** Intestinal diseases due to *E. histolytica* may occur within a few days or may take months . Amebic liver abscess usually appears 8 to 20 weeks after the patient has left an endemic area

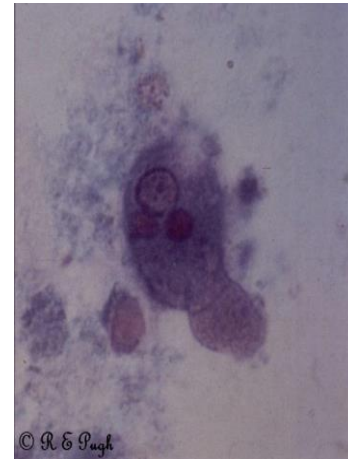
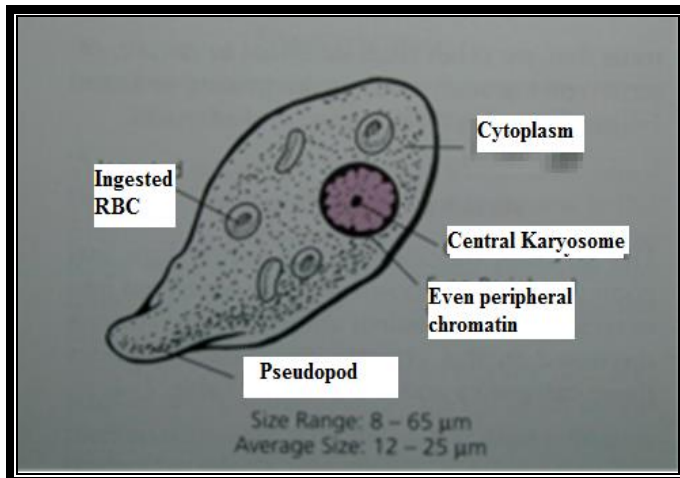
**Morphology:** Parasite occurs in three stages; a motile trophozoite, precyst and cyst that can survive outside the body.

### **1. Trophozoite(vegetative form)**

1-The trophozoite exhibits rapid , unidirectional progressive movement , achieved with the help of finger like hyaline pseudopods.The pseudopodium is formed by the clear glass like ectoplasm which forms the outer layer of the body of the amoeba.

2-The single nucleus typically contain small and central karyosoms

3-Red blood cells in the cytoplasm are considered diagnostic because *E. histolytica* is the only intestinal amoeba to exhibit this characteristic.

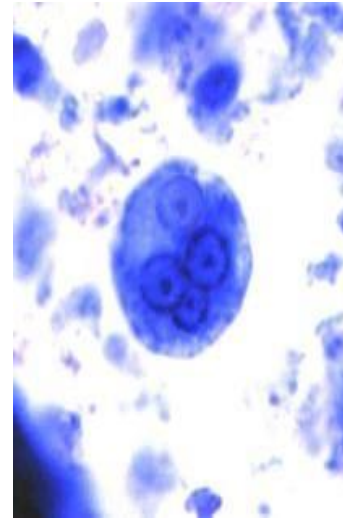
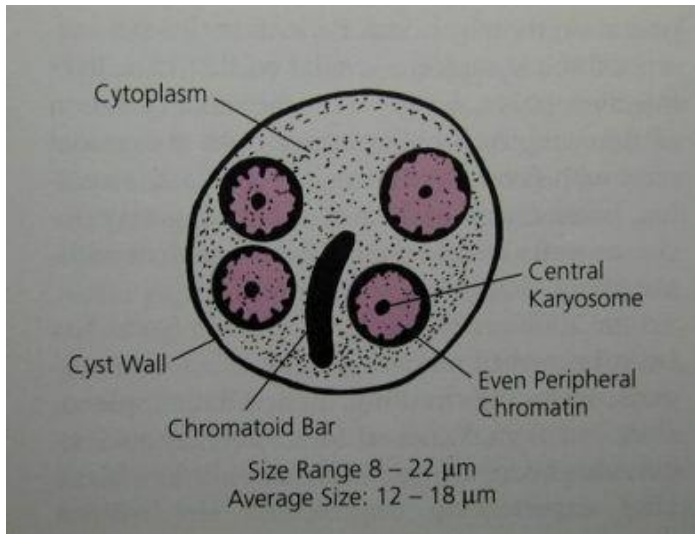


**2. Pre cyst:** It is the intermediate stage between trophozoite and cyst. It is smaller in size; 10-20 $\mu$ . It is round or slightly ovoid with blunt pseudopodium projecting from periphery. No RBC or food materials are found on its endoplasm.

### **3. Cyst (mature cyst):**

It is the infective form of parasite.

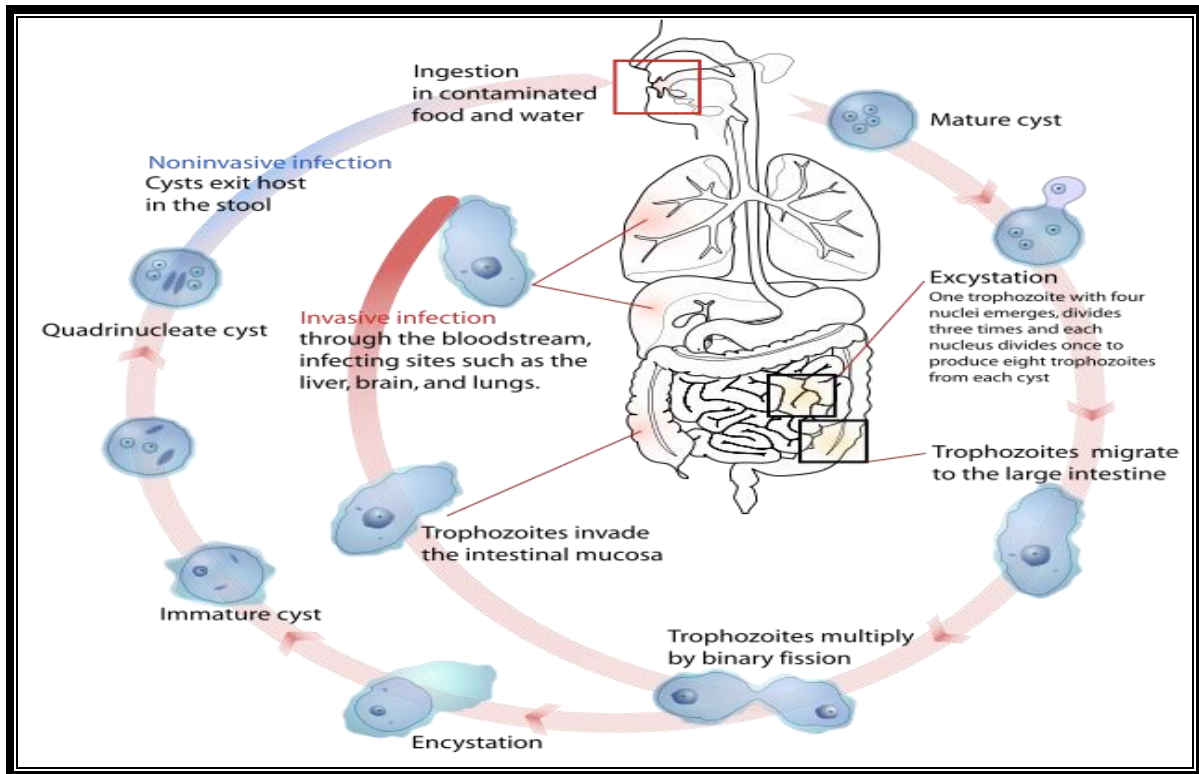
- Shape: It is round or round or oval in shape
- Size: 12-15  $\mu$ m in diameter
- It is surrounded by a highly refractile membrane called cyst wall. The cyst wall is resistant to digestion by gastric juice in human stomach
- Nucleus: A mature cyst is quadrinucleated.
- Cytoplasm: Cytoplasm shows chromatid bars and glycogen masses but no RBCs or food particles.
- Mature cyst passed out in stool from infected patient and remained without further development in soil for few days.



### **The life cycle of *E. histolytica***

The infective cyst is ingested , **excystation** occurs in the small intestine. As a result of the nuclear division , a single cyst produce eight motile trophozoite. These motile amoebae settle in the lumen of the large intestine , where they replicate by binary fission and feed on living host cells. Trophozoites migrate to other organs in the body such as liver , and my causes abscess formation. These trophozoites return to the lumen of the large intestine.

**Encystation** occurs in the intestinal lumen , and cyst formation is complete when four nuclei are present. These infective cysts are passed into the environment in human feces and are resistant to a variety of physical conditions. Survival in a feces contaminated environment for up to a month is common.



## Diagnosis

➤ Stool characterization recovered from patients with amoebiasis

1-The appearance: consists of blood and mucus

2-Coloured: dark red

3-Odor: offensive (foul smell)

4-Chemical reaction: acidic

5-Presence of pus cell: scanty

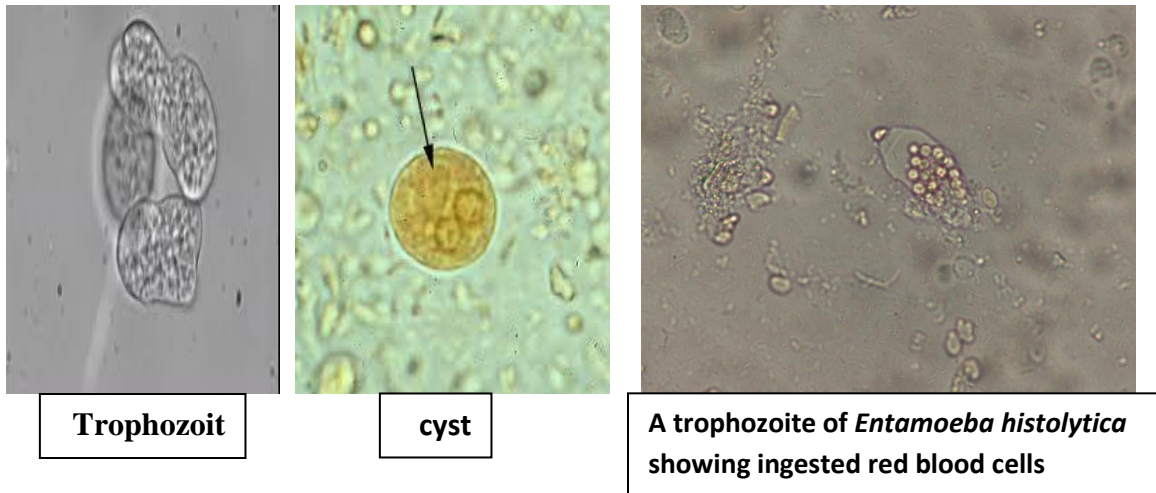
6-Presence of R.B.Cs : numerous

7-Presence of macrophage: nil

8-Presence of eosinophils: present (scanty)

**1. Microscopy:** Normal saline preparation of fresh faecal material reveals trophozoites with RBCs in its cytoplasm and its amoebic motility. (with iodine and microscopically examined for cysts).

**The presence of trophozoites containing red blood cells is strongly suggestive of invasive (symptomatic) amoebiasis**



**2. Biopsy :** fluid from large intestine aspirates also be examined microscopically for trophozoites .

**3. Stool culture:** Robinson’s medium and NH polyxenic culture medium are used to culture *E. histolytica*

**4. Serology:** EIA (enzyme immunoassays) , IHA(indirect haemagglutination), IFA(immunofluorescenceassays ) etc are used to detect antibody in serum against *E. histolytica*.

**5. PCR (Polymerase Chain Reaction):** It is sensitive test , used to differentiate *E. histolytica* with other *Entamoeba* species.

**6. Radiological finding:** X-rays, CT scan, ultrasonography ,etc for extra intestinal amoebiasis.