



محاضرة رقم: 2

¹ Lecture No : 2

Practical

Advanced laboratory technique

PRACTICAL CLINICAL PARASITE

Sawa University

College of health and medical techniques

Department of Medical Laboratories

. Stage

جامعة ساوة الاهلية

كلية التقنيات الصحية

والطبية

قسم تقنيات المختبرات الطبية

المرحلة الرابعة

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The groups of the parasites

Protozoa

They are unicellular eukaryotic organisms, have all the essential organelles that help them in their essential activities. All of them are microscopic; most of them live singly, but many others living in colonies. Each cell unit performs all the necessary functions of life. The main groups of parasitic protozoa are **Amebae**, the **Flagellates** and **Ciliates**.

I- Amebae

The members of amebae group are move by means of cytoplasmic extensions called pseudopodia (the single is pseudopodium). These extensions are projected and retracted in response to external stimuli. ➤

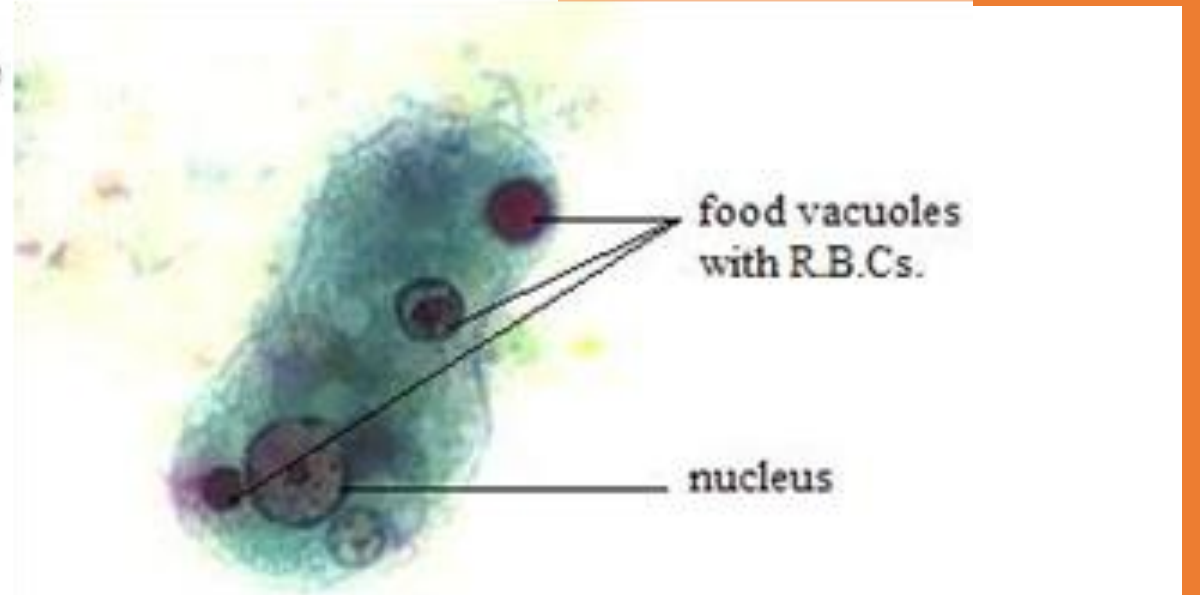
All amebae have a trophozoite stage in which they multiply by binary fission as long as the environmental conditions are favorable. Many species have an encysted stage which is more resistant to unfavorable conditions and provides an opportunity to transfer from one host to the next. ➤

1. *Entamoeba histolytica*

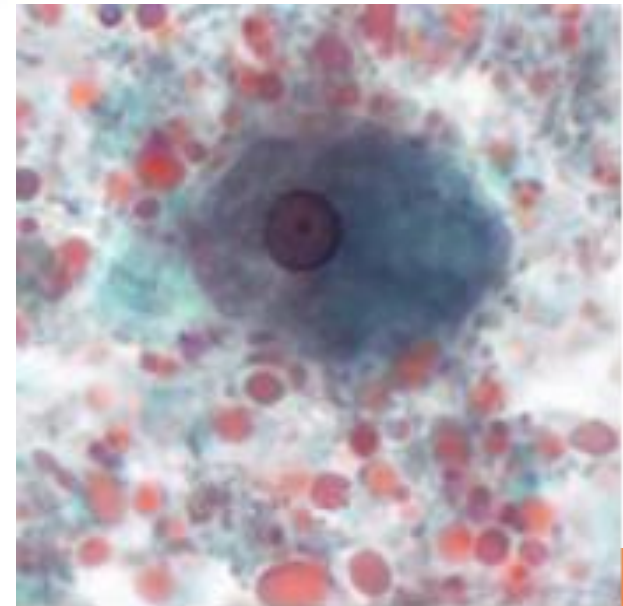
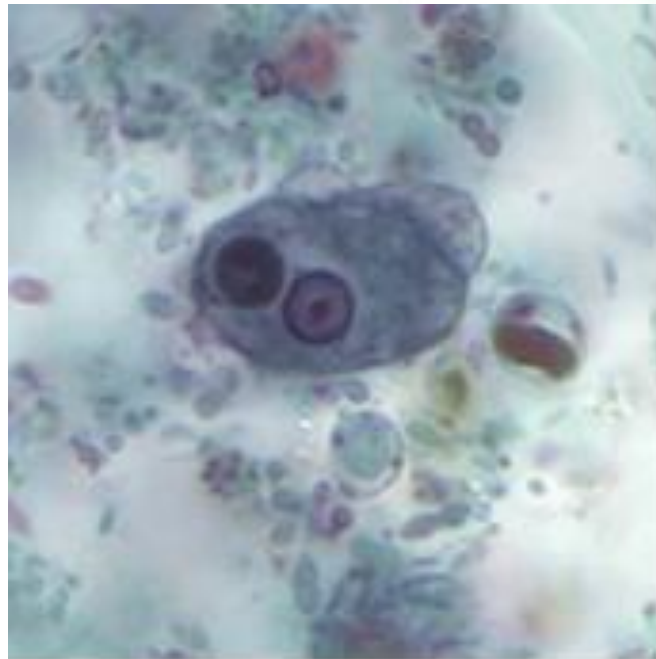
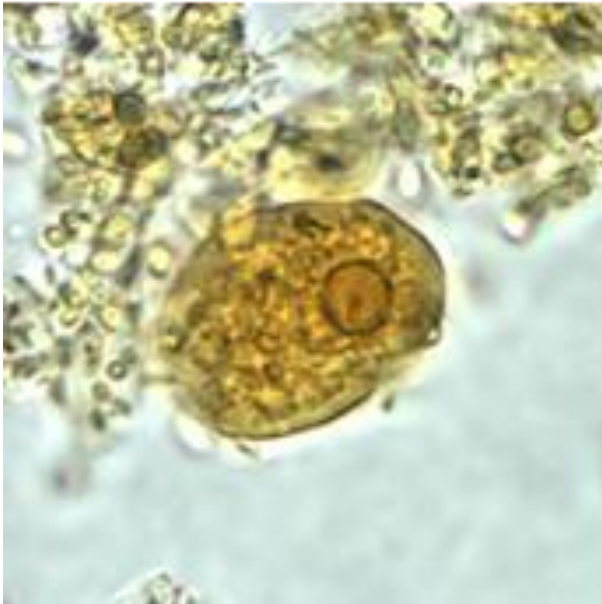
- It is called dysentery ameba because it causes a disease called amebic dysentery.
- The parasite has a cosmopolitan distribution (worldwide distribution) especially in the warm area. It infects the human as well as the cats, pigs and monkeys.
- The parasite has 2 distinct stages (trophozoite and cyst) which are commonly recognized in the feces of the patient, but only the trophozoite is present in the tissue.
- The trophozoite lives in the last part of the small intestine and in the large intestine stuck on the mucosa, especially in the caecum and sigmoidorectal area.
- Many food vacuoles containing parts of epithelial cells, Bacteria and sometimes many R.B.Cs. and leukocytes found in the cytoplasm of the parasite.
- In the center of the nucleus, there is a single dense bead-like chromatin body, the karyosome (centric karyosome).



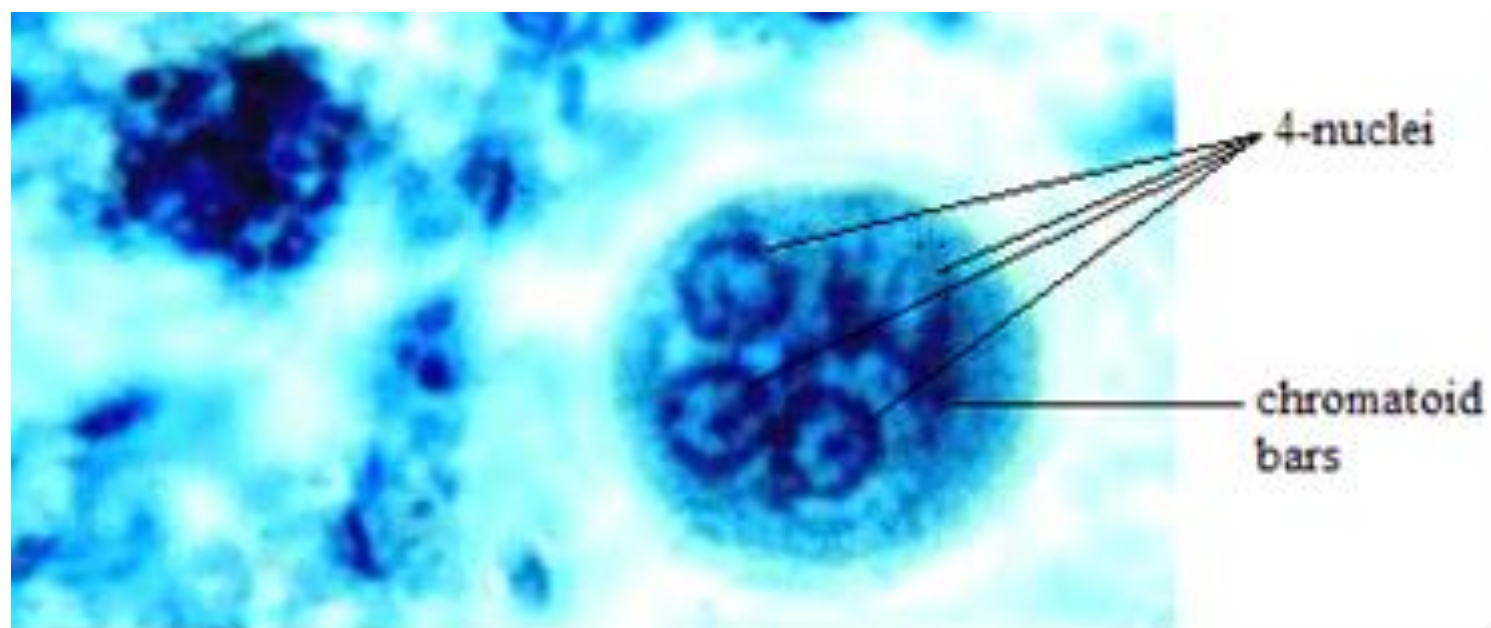
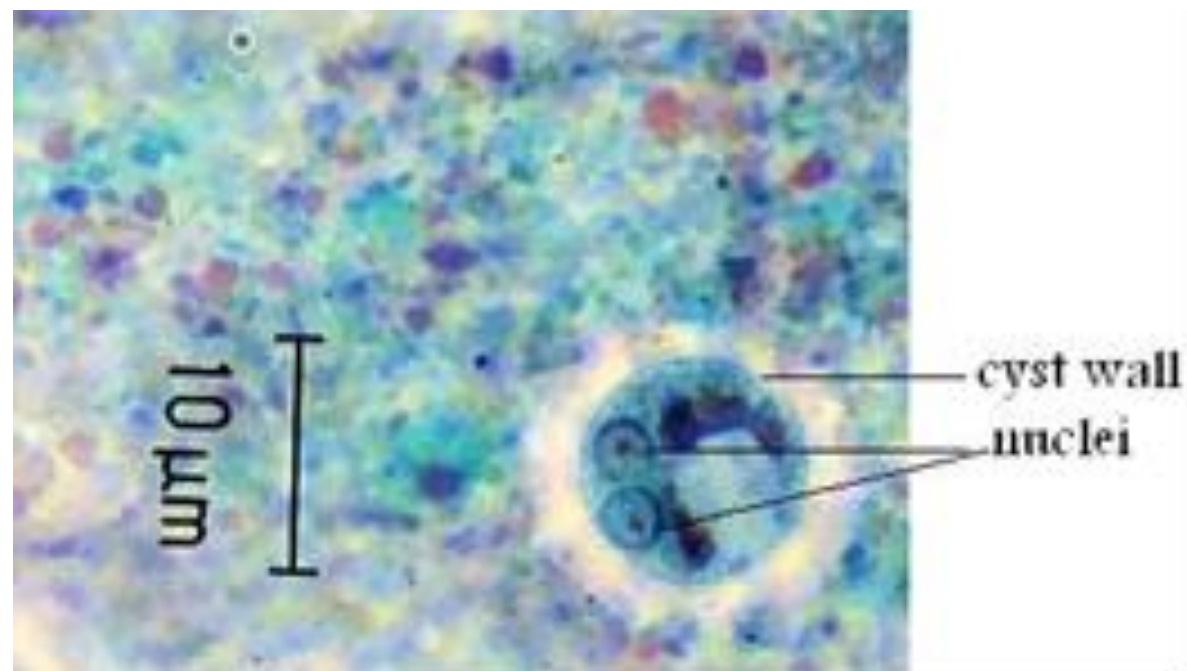
food vacuole
endoplasm
ectoplasm
nucleus



food vacuoles
with R.B.Cs.
nucleus



- The trophozoite grow and multiply continuously in the intestine, but sometimes it is encysting in the intestine; whenever, the trophozoite will discharge the undigested food and become spherical, then it secretes a delicate solid membrane and become a cyst.
- The cyst contains a nucleus (the same one of the trophozoite), glycogen mass and some chromatoid bars or bodies with hazy margin and rounded ends.
- The nucleus will firstly divide into 2 nuclei then each of the two daughter nuclei divides once again, so, the mature cyst typically has 4 nuclei.
- The cyst is spherical or may have an oval shape.



Life cycle

The cyst is the infective stage of this parasite, when swallowed with the foods or drinks, **excystation** occurs and the freeing of the young trophozoites will occur in the duodenum where the pH is neutral or weakly alkaline, as well as the effects of the digestive enzymes which destroy the cyst wall.

The young freeing trophozoites will arrive to the large intestine and some of them will be in contact with the mucosa. When these cysts evacuated in the feces of the infected patient it will arrive to the environment and the cycle will be repeated again.

Multiplication of this species is thus seen to occur at two stages during the life cycle: by binary fission in the intestine-dwelling (mature trophozoite stage) and by nuclear division followed by binary fission (in the metacystic

Pathology

The trophozoite has the ability to destroy the host epithelial cells causes their lysis (**the cause of the name**). It may be reached to the submucosa, start in feeding and attack the blood capillaries and feed on the R.B.Cs. The blood will then flow to the lumen of the intestine and exit with the stool, which is the first important symptom of the infection (the bloody stool).

After a period, the parasite may invade other body organs, where it produces abscesses. For instance, they may reach the liver and causes abscesses and a disease called **hepatic amebiasis** and liver dysfunction, or it reaches to the lungs and causes **pulmonary amebiasis** and pneumonitis, or it can reach to the brain and causes encephalitis, or to the spleen, heart, joints, bones, muscles, urogenital system and even the skin.



***Entamoeba histolytica* (flask shaped ulcer in the intestine).**



***Entamoeba histolytica*
(amebic-abscess).**

In the individual who develops dysentery, the mucosal ulceration may penetrate deeper into the intestinal tissue, causing vast areas of tissue to be destroyed. The overlying mucosal epithelium then may be sloughed off, exposing these necrotic areas.

This destructive process is usually followed by a regenerative period, resulting in a thickening of the intestinal wall as a result of the deposition of fibrous connective tissue.

Symptoms

A wide spectrum from asymptomatic infection "**luminal amebiasis**" to **invasive intestinal amebiasis** which causes dysentery, colitis, appendicitis, toxic megacolon, amebomas, to **invasive extraintestinal amebiasis** represented by liver abscess, peritonitis, pleuropulmonary abscess, cutaneous and genital amebic lesions.

However, symptoms can mainly be divided to:

Chronic cases: Abdominal discomfort or soft stool for variable periods, may be suddenly developed to dysentery or acute abdominal pain. Recurrent episodes of dysentery with blood and mucus in the feces. Interfering gastrointestinal disturbances and constipation. Cysts can be found in the stool.

Acute cases: Frequent dysentery with necrotic mucosa and abdominal pain. Severe diarrhea (i.e., blood and mucus in liquid feces) usually develops after an incubation period of 1 to 4 weeks and is commonly accompanied by a fever.

Diagnosis

- The typical stool in amebic dysentery consists of exudates, mucous, blood and may be little fecal material; however, we are mainly looking for the cyst stage. In the liquid stool, the trophozoite may also be found, but only cyst stage is present in the solid stool.
- For the diagnosis procedure, a fresh stool sample is required to prepare a wet mount. Concentrates from fresh stool can be used for the wet mounts, with or without iodine stain. For permanently stained preparations we use trichrome stain. Concentration procedures, however, are not useful for demonstrating trophozoites.
- In addition, *E. histolytica* trophozoites can also be identified in aspirates or biopsy samples obtained during colonoscopy or surgery.

Treatment: Metronidazole (Flagyll).

Any questions?

*Thank
You*