الكلية: الطب

القسم او الفرع: الاحياء المجهرية

المرحلة: الثالثة

أستاذ المادة: د. ميساء إبراهيم محمد

اسم المادة باللغة العربية: طفيليات

اسم المادة باللغة الإنكليزية: Parasitology

اسم المحاضرة الاولى باللغة العربية: الأوليات

اسم المحاضرة الاولى باللغة الإنكليزية:Protozoa

محتوى المحاضرة الاولى

Protozoa

Entamoeba histolytica

Dr. Maysaa Ibrahim

PHD. Medical Microbiology

• 1- Protista: The microscopic, single-celled, eukaryotic(having true nuclear membrane) organisms.

• The shape, size, mode of reproduction and type of locomotive organelle have been used to divide these into four major classes:

• A- Sarcodina (amoebae): Organelles of locomotion are pseudopodes and the reproduction by binary fission.

• B- Flagellates: Organelles of locomotion are flagella and the reproduction by binary fission.

• C- Ciliates: Organelles of locomotions are cilia and reproductions by binary fission.

• D- Sporozoa: Without locomotion organelles and the reproductions by sporogony and shizogony.

• 2- Animalia: Helminths are macroscopic, multicellular worms possessing well differentiated tissues and complex organ systems. These vary in length from less than

one millimeter to more than a meter.

• The common helminthic parasites of human being can be placed in one of the three classes:

• A-Trematodes

• B-Cestodes

• C-Nematodes

Protozoa

❖Microscopic,single-celled,eukaryotic organism

❖Include all organisms of the most simple form.

❖Cells assume various forms:

(circular, oval, elliptical and elongated)

The protozoa are then placed into various groups primarily based on how they move:

Phylum

Class

(Endoparasites)

PROTOZOA

SARCODINA

(Amoebas)

Apicomplexa

(Sporozoa)

MASTIGOPHORA

(Flagella)

CILIOPHORA

(Cilia)

Sarcodina (Amoebae)

General Characteristics :

❖These organisms move by pseudopodia .

■

Pseudopodium: Is a cytoplasmic extension of the amoeba which serve both for motility and engulfment of food particles.

❖Have irregular shape.

❖Nucleus consist of a network of fine reticulum enclosed by a nuclear membrane.

❖A sexual reproduction occurs by binary fission.

❖There are trophozoite & cyst stage in their life cycle.

Trophozoite stage: A stage in the life cycle of protozoan in which the cells are taking its nourishment.

Cyst stage: A stage in the life cycle of protozoan in which the organism is surrounded by a distinct membrane and it is relatively resistant to changes in the environment.

❑General classification of intestinal Amoeba :

• Pathogenic Intestinal Amoeba (Entamoeba histolytica)

• Non pathogenic Intestinal Amoeba :

❖Entamoeba coli

❖Entamoeba hartmanni

❖Iodomoeba butschlii

❖Indolimax nana

Entamoeba histolytica

• One of the most important and pathogenic parasites of humans.– Although dogs, cats and primates may be infected, these infections are rare and unimportant. – This parasite is primarily a human parasite and is transmitted from human to human.

Entamoeba histolytica

Eitologic agent of : Amoebiasis , Amoebic dysentery.

Infective stage : Cyst

Active, feeding stage : Trophozoite

Definitive host : Human

Entamoeba histolytica

Trophozoite: 15-30 µm

• Active, feeding stage

• Growing stage

• Amoeboid with blunt pseudopodia

• Uninucleated; nucleus with fine peripheral chromatin

granules, small

central endosome

• The cytoplasm is divisible in two portion, a clear translucent ectoplasm and a granular endoplasm.

• Red blood cells and tissue debris may be occasionally seen inside the cytoplasm.

• The trophozoite has one nucleus which is (4 6µm) in size, spherical in shape and placed centrically. It has a clearly defined nuclear membrane.

Entamoeba histolytica trophozoites

Nu.

Pseu.

K

Entamoeba histolytica

• Dormant/resistant stage

Cyst:12-15 µm

• Spherical

• 1-4 nuclei, (4 in mature cysts)

• The cyst shows (1-4) chromatin bars (cigarette shaped) which are refractive, oblong bodies with rounded ends.

Entamoeba histolytica cysts

- **The cyst initially uninuclear but by binary fission soon developed into a binuclear and Quadri nuclear body.**
- **As the cyst mature both the glycogen and the chromatoidal bars generally disappear.**
- **The cyst containing (1-4) nuclei may be passed in the faces.**

Entamoeba histolytica cysts

Uninucleate cyst

Binucleate cyst

Entamoeba histolytica cysts

Quadrinucleate or mature cysts

Reproduction : various modes of reproduction seen in these organisms include :

- **Excystation:- is the process of transformation of cyst into trophozoite and occurs only in the alimentary canal of the susceptible host.**
- **During excystation a Quadri nucleated cyst gives rise to eight amoebae, each one of which can develop into trophozoite.**
- **Encystation:- is the process transformation of trophozoite into cyst, which occurs in the lumen of an infected individual.**
- **Multiplication:- is occurs only in the**

trophozoite stage, it occurs by simple binary fission first of the nucleus and then of cytoplasm.

Entamoeba histolytica life cycle

• Infective stage: cyst

• Cysts are susceptible to heat (above 40 °c), freezing (below –5 °c), and drying.

• Cysts remain viable in moist environment for 1 month.

Entamoeba histolytica life cycle

• Cyst: ingested with fecal contaminated food or water.

• Excystation occurs in the small intestine in an alkaline environment.

• Metacystic amoeba emerge, divide and move down into the large intestine.

Entamoeba histolytica life cycle

• Trophozoites colonize the large intestine and invade the mucosa.

• They live within the crypts and mucosa of the large

intestinal lining.

Entamoeba histolytica life cycle

• Trophozoites may live and multiply indefinitely within the crypts of the LI mucosa feeding on starches and mucous secretions.

Entamoeba histolytica life cycle

• Cysts form in response to unfavorable environmental conditions, as they move down the LI.

• They are released in formed feces.

Entamoeba histolytica pathology

Amoeba destroy a considerable area of the sub mucosa, leading to abscess formation which breaks down to form an ulcer.

The size of this ulcer ranges from pinhead to almost one inch in diameter. The ulcer has a narrow neck and a broad base and because of this shape is called as Flask Shaped Ulcers

Laboratory diagnosis

- **Examination of stool samples :**
- **Wet preparation**
- **Permanent staining**

(Trophozoites may be seen in a fresh fecal smear and cyst in an ordinary stool sample).

- **Stool culture.**
- **Stool antigen detection**
- **Serology:**

Amoebic antigen—ELISA

Amoebic antibody—ELISA

- **Molecular diagnosis (PCR and real time PCR).**