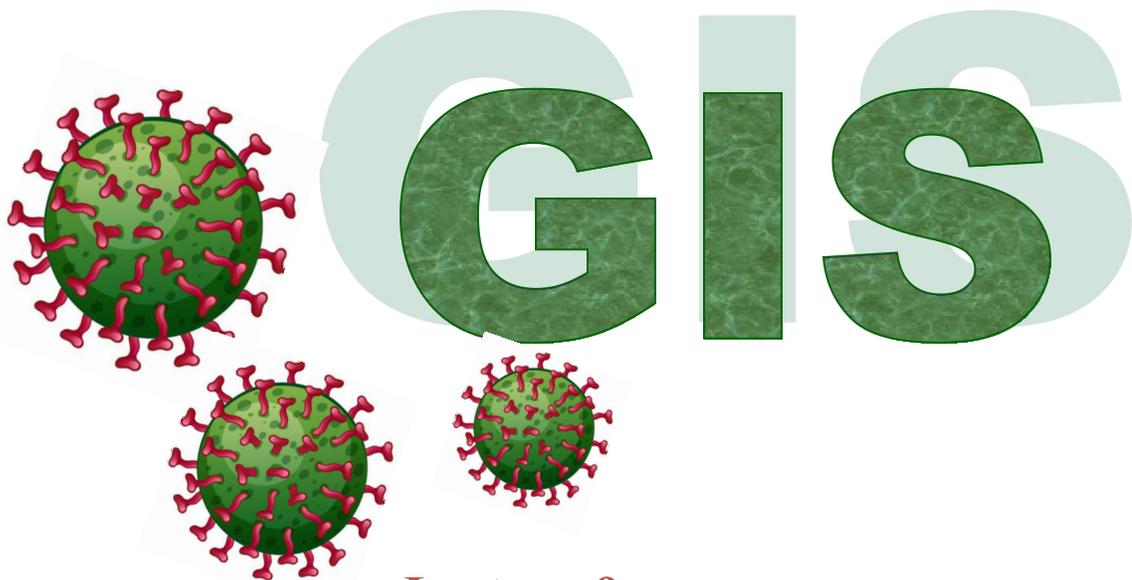


Al Balqa Applied University
College of Medicine



Lecture 9
Entamoeba histolytica

SUB-SYSTEM: MICROBIOLOGY

LECTURE: Entamoeba histolytica – SHEET 8

DOCTOR: HALA AL DAGHISTANI

DATE: 25-4-2019

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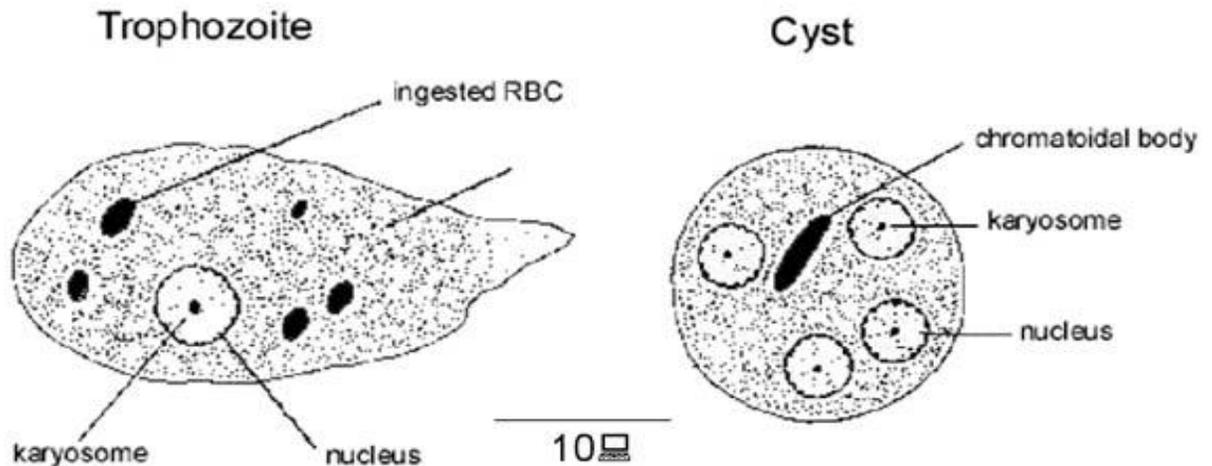
#SHEET NOTE IN YELLOW

#we talked about Entamoeba histolytica Previously in shigella to differentiate between it and shigella dysenteriae by calling shigella dysenteriae bacillary dysenteriae (shigellosis) and calling amebic dysenteriae Entamoeba histolytica (amoebiasis).

many people affected by Entamoeba histolytica in summer season and it could turn into chronic infection by keeping the cyst in the body and become reactive from time to time.

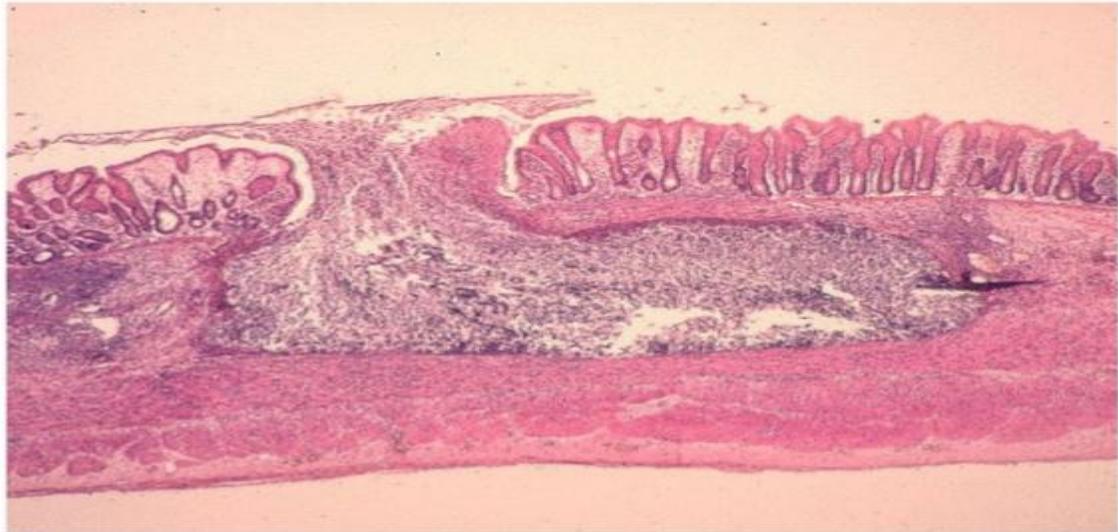
- **Entamoeba histolytica** الزحار الأميبي cysts are present only in the lumen of the colon
- The cyst may contain a glycogen vacuole and chromatoid bodies with characteristic rounded ends.
- Nuclear division occurs within the cyst, resulting in a quadrinucleated cyst, and the chromatoid bodies and glycogen vacuoles disappear.
- Diagnosis in most cases rests on the characteristics of the cyst, as trophozoites usually appear only in diarrheic feces in active cases and survive for only a few hours.
- The ameboid trophozoite is the only form present in tissues. The cytoplasm has two zones, a hyaline outer margin and a granular inner region that may contain red blood cells but ordinarily contains no bacteria. #it eat the bacteria , feed on the bacteria in the large intestine.
- The nuclear membrane surrounded a small central body (karyosome).#from the eukaryote .

vary important#to differentiate between entamoeba histolytica and Entamoeba coli (it from the same genus of entamoeba histolytica) by the cyst . if the cyst contain 8 nucleus then it >>>>>Entamoeba coli (normal flora in most people) and if it contain 4 nucleus then it>>>>>entamoeba histolytica.



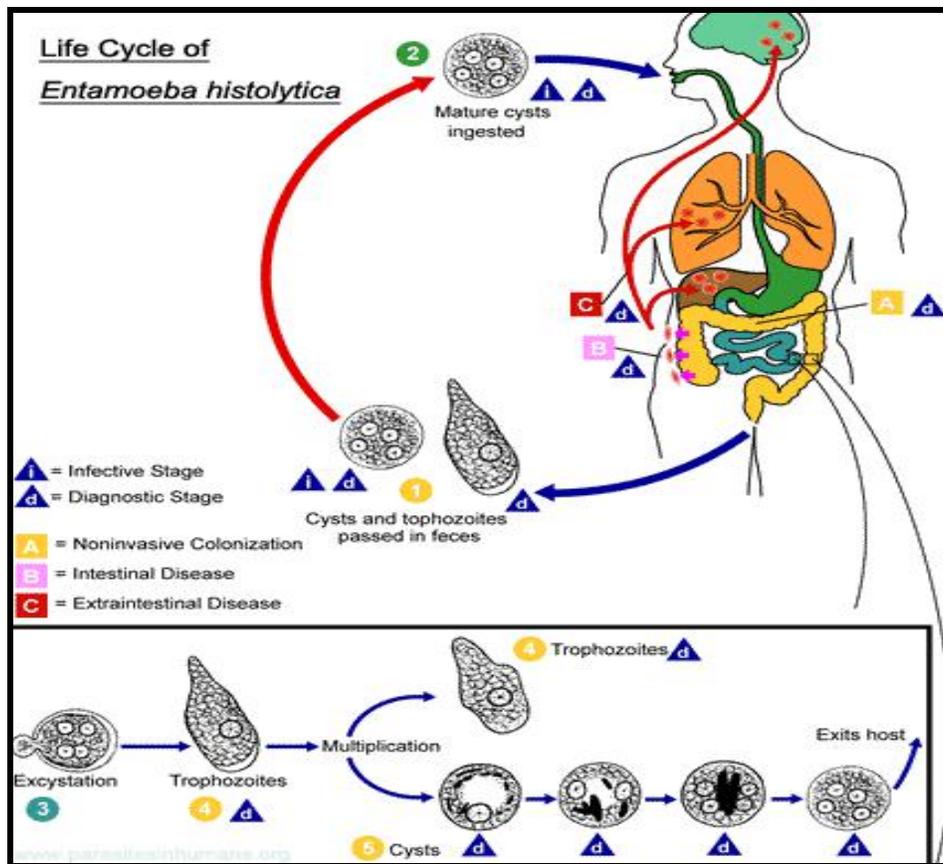
Pathology and Pathogenesis of Invasive Amebiasis

- ✚ It is estimated that approximately 50 million cases of invasive disease occur each year. #the infection come from eating contaminated vegetable with *Entamoeba histolytica* cyst which will turn in to trophozoit in human body.
- ✚ Disease results when the trophozoites of *E. histolytica* invade the intestinal epithelium and form discrete ulcers with a pinhead-sized center and raised edges, from which mucus, necrotic cells, and amebae pass.
- #the ulcer invaid the mucosa and submucosa and may continue to muscular area & serosa in sever cases .
- ✚ The trophozoites multiply and accumulate above the muscularis mucosae.
- ✚ Rapid lateral spread of the multiplying amebae follows, producing the characteristic “flask-shaped” ulcer of primary amebiasis: a small point of entry, leading via a narrow neck through the mucosa into an expanded necrotic area in the submucosa.



Flask shaped ulcers -Base in submucosa and small opening on the mucosal surface

- ✦ Subsequent spread may occur, undermining large areas of the mucosal surface.
- ✦ Trophozoites may penetrate the muscle layers and occasionally the serosa, leading to perforation into the peritoneal cavity.
- ✦ Subsequent enlargement of the necrotic area produces gross changes in the ulcer, #تتغير طبيعته مع العمق which may develop shaggy over hanging edges, secondary bacterial invasion, and accumulation of neutrophilic leukocytes.
- ✦ **Secondary intestinal lesions** may develop as extensions from the primary lesion (usually in the cecum, appendix, or nearby portion of the ascending colon). (علا غالب تصيب الكبد).
- ✦ The sigmoid colon and rectum are favored sites for later lesions.
- ✦ An amebic inflammatory or **granulomatous tumor-like mass (ameboma)** (تنمو وتكون شبه كتله) may form on the intestinal wall, sometimes growing sufficiently large to block the lumen.



1-Contamination of food and water with cyst .

2-Primary infection is in the intestine and the secondary infection is in the liver (in rare cases it can reach the lung by the mean of circulation)

3-Excystation>>trophozoites >>multiplication >>either to trophozoites>> or cysts.

4-In order for it to exist the host it needs to have 4 nucleus inside (exit by stool full of cyst)

#in normal cases the primary infection is rare to develop into secondary infection

Factors that determine invasion of amebae include the following:

- the number of amebae ingested
- the pathogenic capacity of the parasite strain
- host factors such as gut motility, immune competence, and the presence of suitable enteric bacteria that enhance amebic growth.

Correct and prompt identification of the *Entamoeba* species remains a critical problem.

#iodine can be used to differentiate between different species of *Entamoeba*.

- ✓ Trophozoites, especially with red blood cells in the cytoplasm, found in liquid or semiformed stools are pathognomonic.

✓ Symptoms vary greatly depending on the site and intensity of lesions.

- **Extreme abdominal tenderness**
- **Fulminating Dysentery**
- **Dehydration**
- **Incapacitation occur in serious disease.**

- In less acute disease, onset of symptoms is usually gradual and often includes episodes of diarrhea, abdominal cramps, nausea and vomiting, and an urgent desire to defecate.

- **More frequently, there will be weeks of cramps and general discomfort, loss of appetite, and weight loss, with general malaise.**

- Symptoms may develop within 4 days of exposure, may occur up to a year later, or may never occur.

#If it last for a long period of time it becomes chronic.

- Extra intestinal infection is metastatic and rarely occurs. By far the most common form is **amebic hepatitis or liver abscess** (4% or more of clinical infections). #Extra intestinal infection is most likely in the liver.

- A true amebic abscess is **progressive, nonsuppurative** unless secondarily infected, #it will be suppurative because it feeds on bacteria and **destructive**. The contents are necrotic and bacteriologically sterile, active amebae being confined to the walls.

- A characteristic **“anchovy paste”** is produced in the abscess and seen on surgical drainage.



#photo from google #

#Anchovy paste: when they do a surgery to remove the infected part (in the liver), an aggregation of RBCs is found that appears like a stain of ketchup.

##google >>on cross examination , amobic liver abscess appears as a pastous , thick, inodorous ,or similar to fresh meat smell , red_ brown, likened to anchovy paste.

Suppurative:
pus forming

- Rarely, amebic abscesses occur elsewhere (eg, lung, brain, spleen, or draining through the body wall). Any organ or tissue in contact with active trophozoites may become a site of invasion and abscess. (في الحالات الطبيعية ما يتوصل لهاي المرحلة واكثر مكان ممكن تصوير فيه هو الكبد)

OTHER INTESTINAL AMEBAE

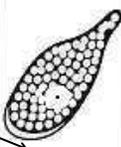
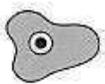
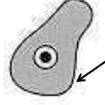
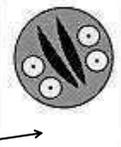
- Invasive or pathogenic *E. histolytica* is now considered a species distinct from the more common nonpathogenic commensal species .
#like *Entamoeba coli*.
- *Entamoeba dispar* and the related *E moshkovskii* are differentiated by isoenzyme and genetic analyses.
- *Entamoeba histolytica* must be distinguished not only from all *E. dispar* and *E moshkovskii* but also from four other ameba-like organisms:

(1) *Entamoeba coli*, which is very common

(2) *Dientamoeba fragilis* (a flagellate), the only intestinal parasite other than *E. histolytica* that has been suspected of causing diarrhea and dyspepsia but is not invasive

(3) *Iodamoeba bütschlii*

(4) *Endolimax nana*.

		Amebae					
		<i>Entamoeba histolytica</i>	<i>Entamoeba hartmanni</i>	<i>Entamoeba coli</i>	<i>Entamoeba polecki</i> *	<i>Endolimax nana</i>	<i>Iodamoeba bütschlii</i>
Trophozoite							
Cyst							

*Rare, probably of animal origin

Elongate

كثيرة

4nucleus

8 nucleus

4 nucleus but its smaller than histolytica

Diagnosis

- ✦ Enzyme immunoassay (EIA) kits are available commercially for serodiagnosis of amebiasis when stools are often negative.
- ✦ EIA tests to **detect amebic antigen in the stool** are also sensitive and specific for *E histolytica* and can distinguish between pathogenic and nonpathogenic infections.

EIA= enzyme immune assay

Epidemiology

- ✦ *Entamoeba histolytica* occurs worldwide, mostly in developing countries where sanitation and hygiene are poor.
- ✦ Infections are transmitted via the **fecal–oral route**; cysts are usually ingested through contaminated water, vegetables, and food; flies have also been linked to transmission in areas of fecal pollution.
- ✦ Most infections are asymptomatic, with the asymptomatic cyst passes being a source of contamination for outbreaks where sewage leaks into the water supply or breakdown of sanitation occurs (as in mental, geriatric, or children’s institutions or prisons).

واللي يشربو مياه غير صحيه معرضين للاصابه