

Intestinal and luminal protozoa

Intestinal and luminal protozoa significant to human health include:

Entamoeba histolytica (Amebae)

Balantidium coli (Ciliates)

Giardia lamblia and *Trichomonas vaginalis*
(Flagellates)

Cryptosporidium parvum and *Isospora belli*
(Sporozoa)

Intestinal and luminal protozoa

Amebas:

At least **six species** of amebas have been definitely established as parasites of man. (1) *E. histolytica* (2) *E. coli* (3) *E. gingivalis*. All live in the **large intestine**, **except E. gingivalis** which is found in **the mouth**.

Only one species, *E. histolytica*,
is an important pathogenic
parasite of humans

Entamoeba histolytica :

Diseases:

Amebiasis, amebic dysentery, amebic hepatitis.

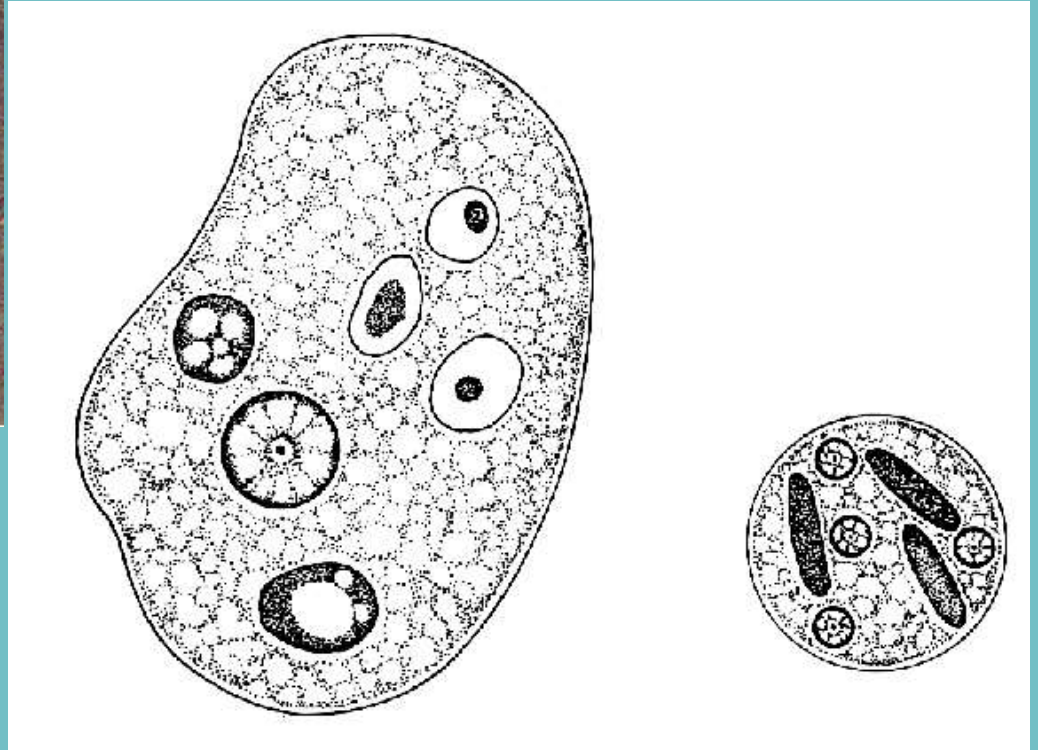
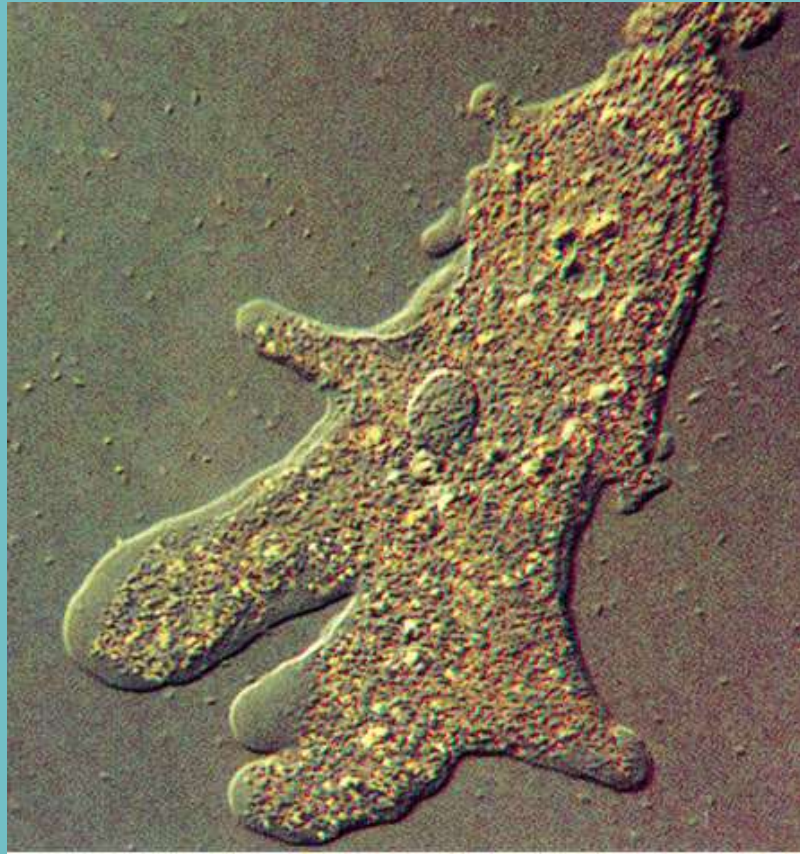
The habitat of the *E. histolytica* trophozoites is the wall and lumen of the colon especially in the rectal regions.

They multiply by binary fission in which the organelles are duplicated and the protozoan then divides into two complete organisms.. The nucleus divides by a modified mitosis. Reproduction via cyst formation.

when the trophozoite of *E. histolytica* first forms a cyst, it has a single nucleus. As the cyst matures nuclear division produces four nuclei and during **excystation** four amebas appear.

Encystment is essential for transmission, since only the mature cyst is infectious.

E. histolytica may be observed in the feces as (1) Trophozoite (2) Precyst (immature cyst) (3) mature Cyst (metacyst).



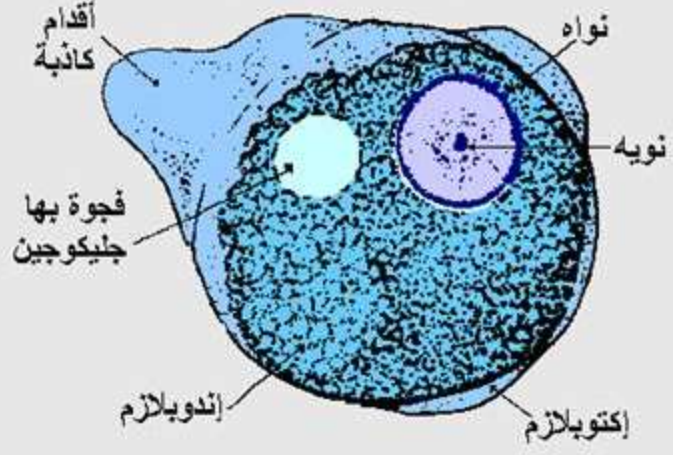
Structure :

The immature cyst has a single big nucleus, while the mature infective cyst contains 4 small nuclei, rarely more.

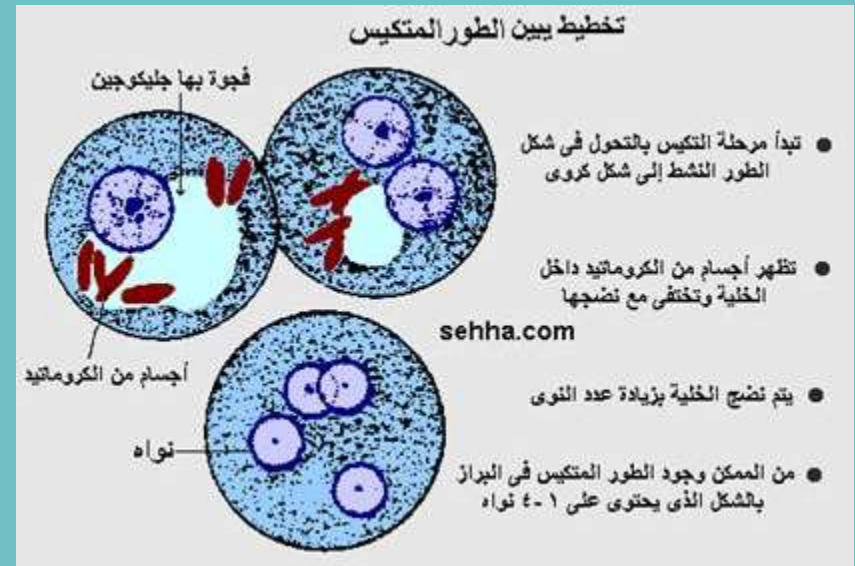
Nutrition:

Amoeba absorb nourishment from the tissues dissolved by its enzymes and ingests red blood cells and fragments of tissue through pseudopodia.

تخطيط يبين الطور النشط (التروفوزويت)

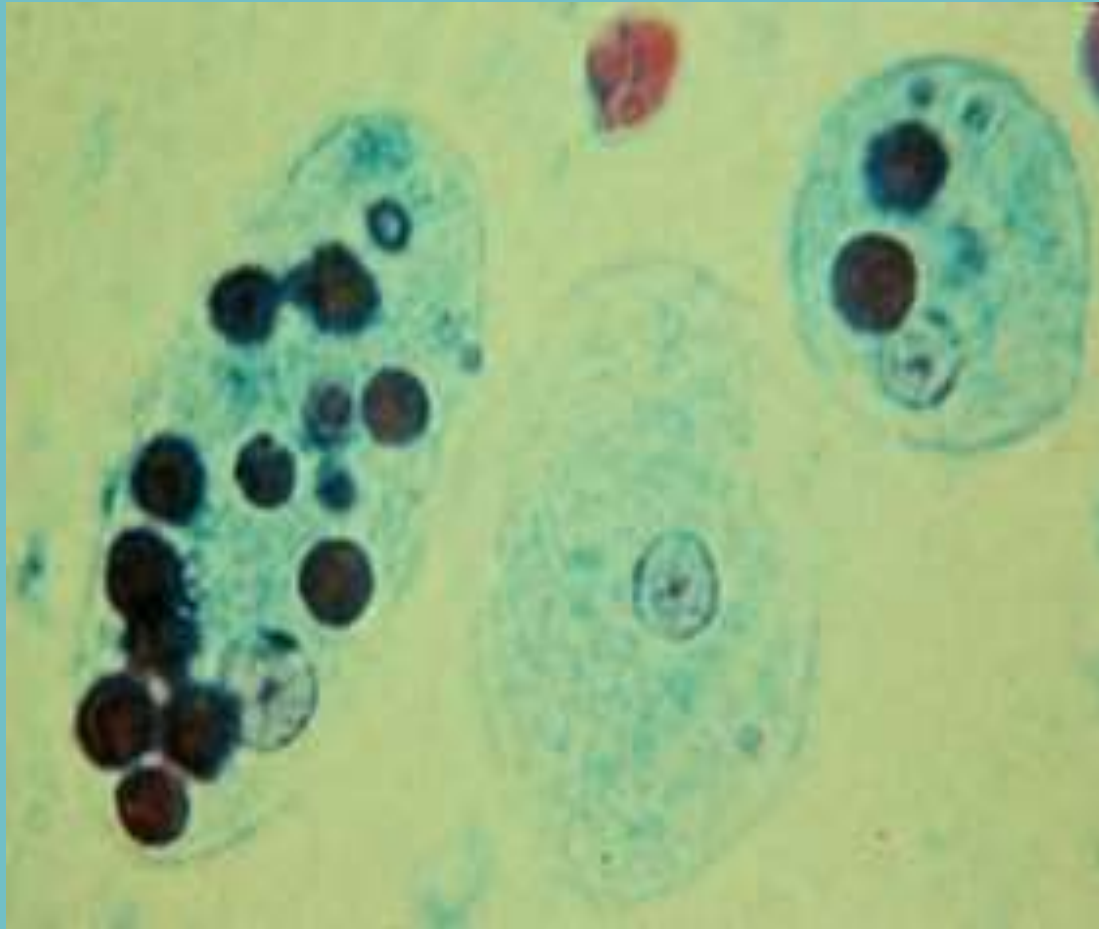


An iodine-stained **cyst** of the pathogen *Entamoeba histolytica* with **4 nuclei** is illustrated.



It can ingest **bacteria** from
the **intestine**.

Trophozoites are more easily destroyed than are cysts, they survive up to 5 hours at 37C° and 100 hours at 0 C° . In contrast the resistant cysts can survive for 2 days at 37C° and up to 60 days at 0 C° . They can withstand freezing temperatures, but survival decreases rapidly at very low and elevated temperature, e.g. 7 hours at -28 C° . and only 5 minutes at 50 C° .



***E. histolytica* Trophozoite, endoplasm containing ingested erythrocytes**

Life cycle: The cysts pass out in the feces and are immediately infective.

-Human beings are the principal host and source of infection.

-Monkeys, dogs, cats, and pigs could be infected.

-On ingestion mature cysts resistant to acidic digestive juice of stomach,

pass to **small intestine** , the cyst wall disintegrate liberating **four nucleated amoebas**, that divide into **8 small trophozoites**, these **immature** amebas pass to the **large intestine**, either **invade** its wall, multiply, pass through **blood vessels** to **liver, lungs and brain**.

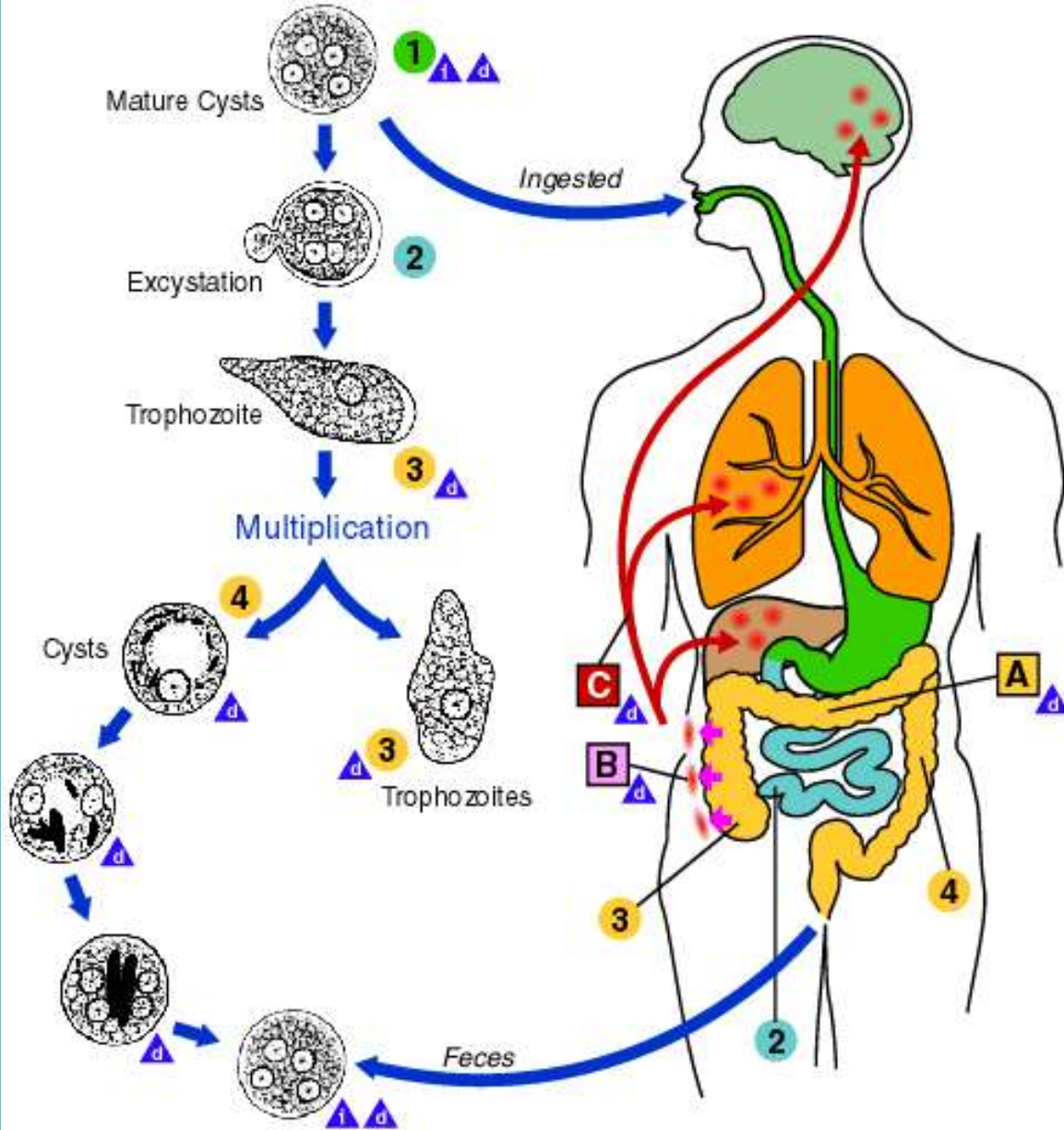
or encysted in the lumen to form cyst stage, then form the mature infective stage (Meta cyst), pass out with stool.

-Cysts reach human through contaminated food or water

Pathology:

The lesions produced are mainly intestinal (caecal and rectal).

Extra intestinal invasion (liver, mainly) or other organs (lungs,brain).



▲ = Infective Stage
▲ = Diagnostic Stage

A = Non Invasive Colonization
B = Intestinal Disease
C = Extra-Intestinal Disease

زئاعا شربوا كطه الانقام السمانى
البيط

التورنوزيف

يتحول الى
الزئاعا الكبير

يتحول من الطردون
الى غير ملائمة

ويخرج البراز
من اجسام الانسان

حويطة ناضجة
على اثنوية

لثة
محتوية
نواة
الحدة

في جسد الانسان

خارج جسم الانسان

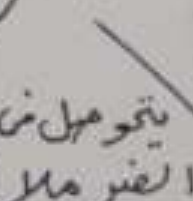
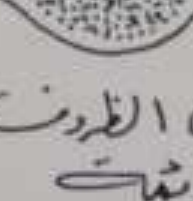
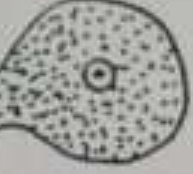
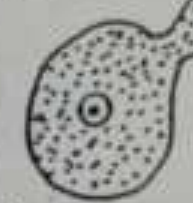
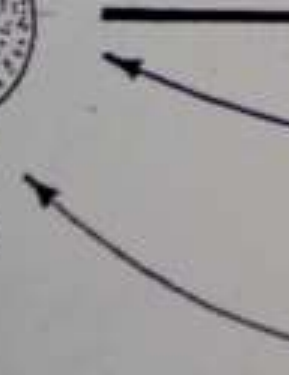
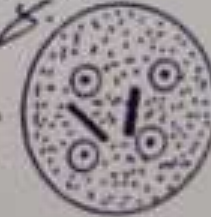
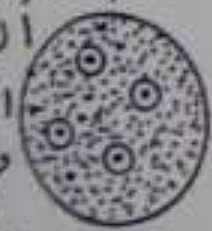
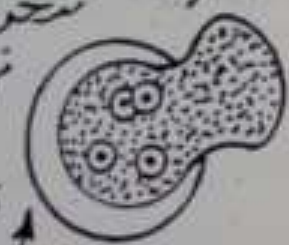
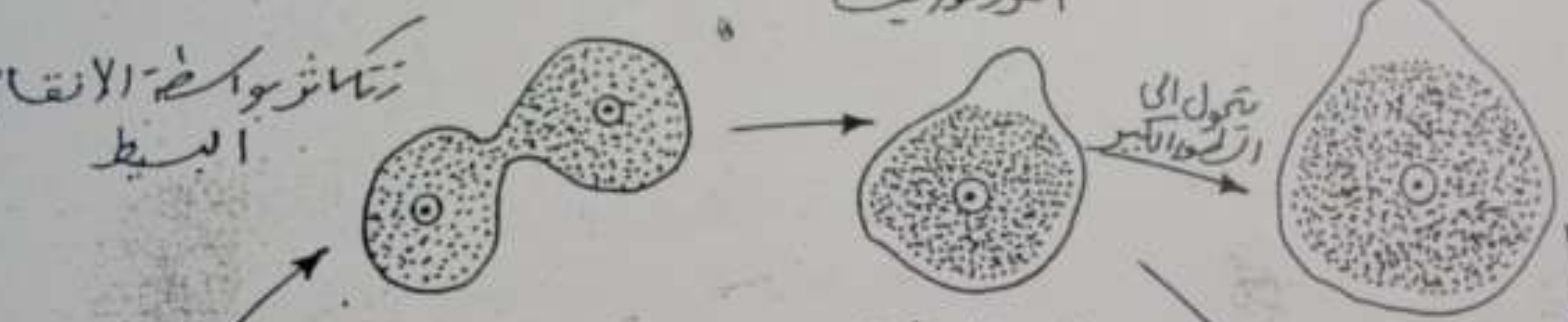
تتحدد من الحويطة
من الامعاء

تسبب الانسا
من طريق

الفقرع
الطعام
والشراب
المملوث

حويطة
ناضجة

حويطة
غير ناضجة
محتوية على نواتج





After ingestion, the trophozoites may penetrate the mucosa of the large intestine causing **ulcerations** and symptoms of dysentery. (intestinal disease)

May result in “**Bloody Diarrhea**”,

Pathogenic activity depend on:

- 1- Resistance of host (innate immunity, nutrition, free from infectious diseases)
- 2- Virulence and number of parasites
- 3- conditions in intestinal tract.

Invasion is facilitated by carbohydrate diet, physical or chemical injury of mucosa. Bacteria produce favorable condition for invasion

Pathogenesis:

Trophozoite invade intestinal wall, with aid of its enzymes , causing ulcers, bleeding (amebic desentry).

Or reach liver , lungs and brain through circulation.

Complications include, appendicitis, intestinal perforation, haemorrhage.

Diagnosis:

Film of stool with blood and mucous ,add drops of iodine or eosin (microscopical), or haematoxylin for structure. (notice red corpuscles in trophozoite).

2- Serological tests (ELISA,IHA, etc).

E. histolytica infection is distinguished from bacillary dysentery (*Shigella*) by the lack of high fever and absence PMN leukocytosis.

Symptoms

Acute: Frequent (repeated) dysentery with necrotic mucosa abdominal pain.

Chronic: Recurrent dysentery with blood and mucous in the feces. There are gastrointestinal disturbances.

Cysts are found in the stool. The organism may invade the liver, lung and brain where it produces abscesses that result in liver dysfunction, pneumonitis, and encephalitis



Treatment:

1-In severe infection, bed rest,
vitamins, fluids

2- **Metronidazole (Flagyl)**.250-500mg
t.i.d (5-10 days)

3- **Tinidazole**, 2gm single dose. (4
tablets).

Prevention:

- 1- Routine stool examination for restaurant workers
- 2- Environmental sanitation to prevent food, water contamination.
- 3- Sanitary methods for feces disposal
- 4- Control of insects and flies
- 5- avoid using feces as fertilizers.
- 6- Boil water in endemic areas.