Intestinal` Protozoa

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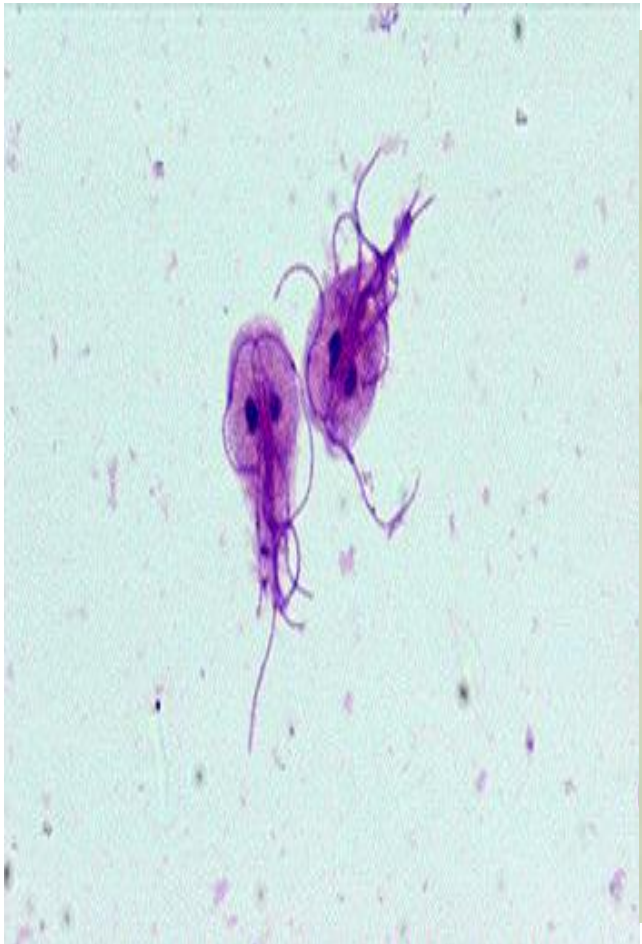
CLASSIFICATION OF PARASITES

PROTOZOA	HELMINTHS
Unicellular Single cell for all functions	Multicellular Specialized cells
1:Aoebae: move by pseudopodia. 2:Flagellates: move by flagella. 3:Ciliates: move by cilia 4:Apicomplexa(Sporozoa) tissue parasites	Round worms (Nematodes): - elongated, cylindrical, unsegmented. Flat worms : - Trematodes: leaf-like, unsegmented. - Cestodes: tape-like, segmented.

Giardia Lamblia

Trophozoite

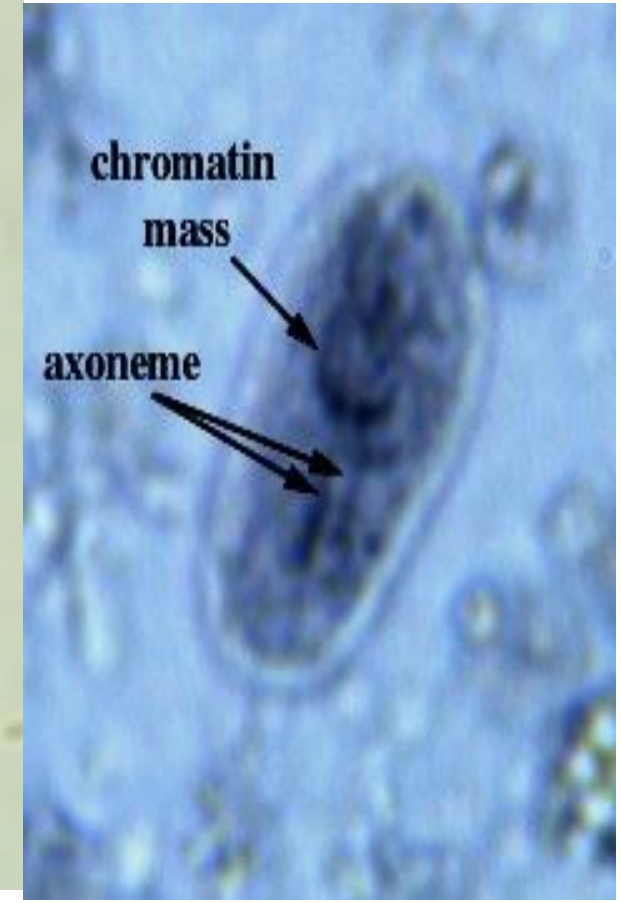


Cyct

***Giardia* cyst**

(light microscope)

INFECTIVE STAGE



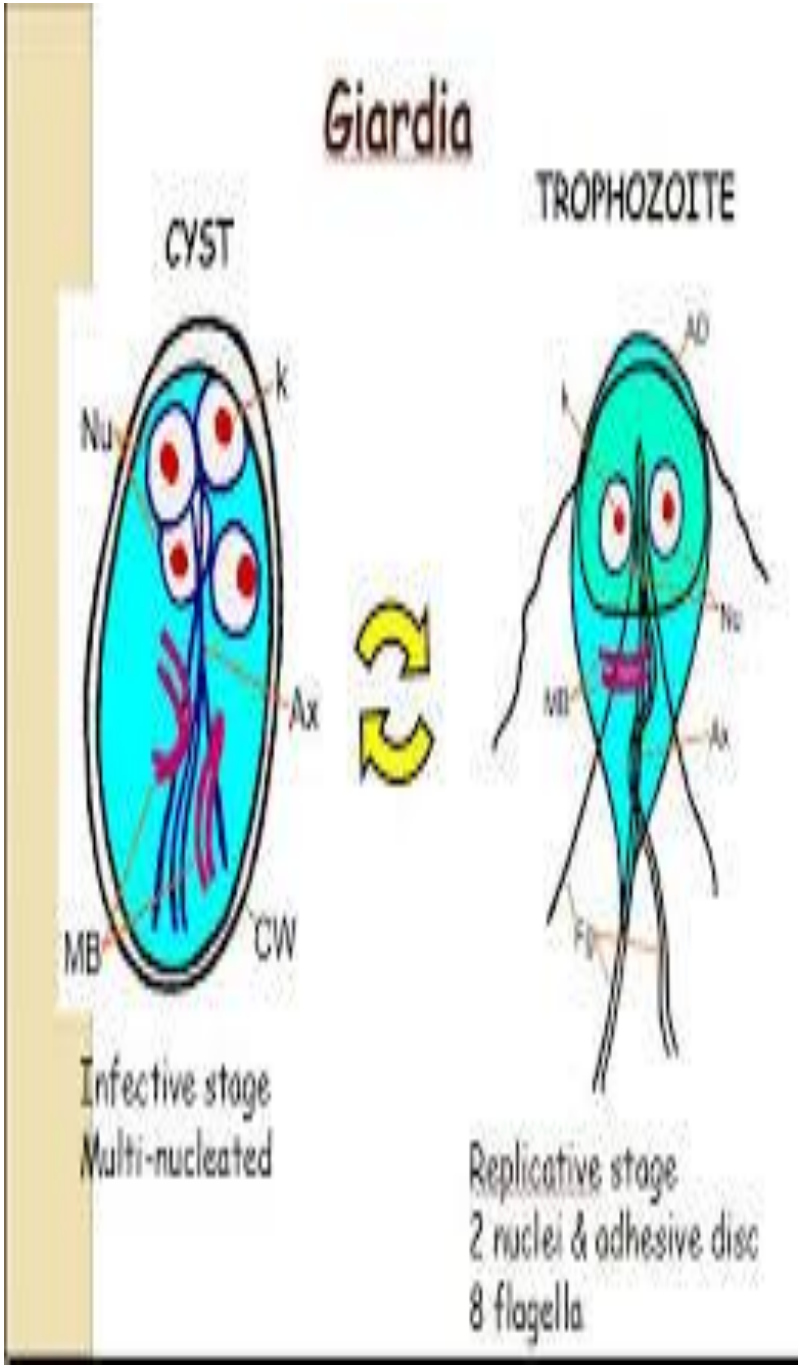
Giardiasis is transmitted via the fecal-oral route with the ingestion of **CYST(the infective stage).**

These cysts can stay infectious in the environment for more than 3 months

These cysts can resist the stomach acidity.

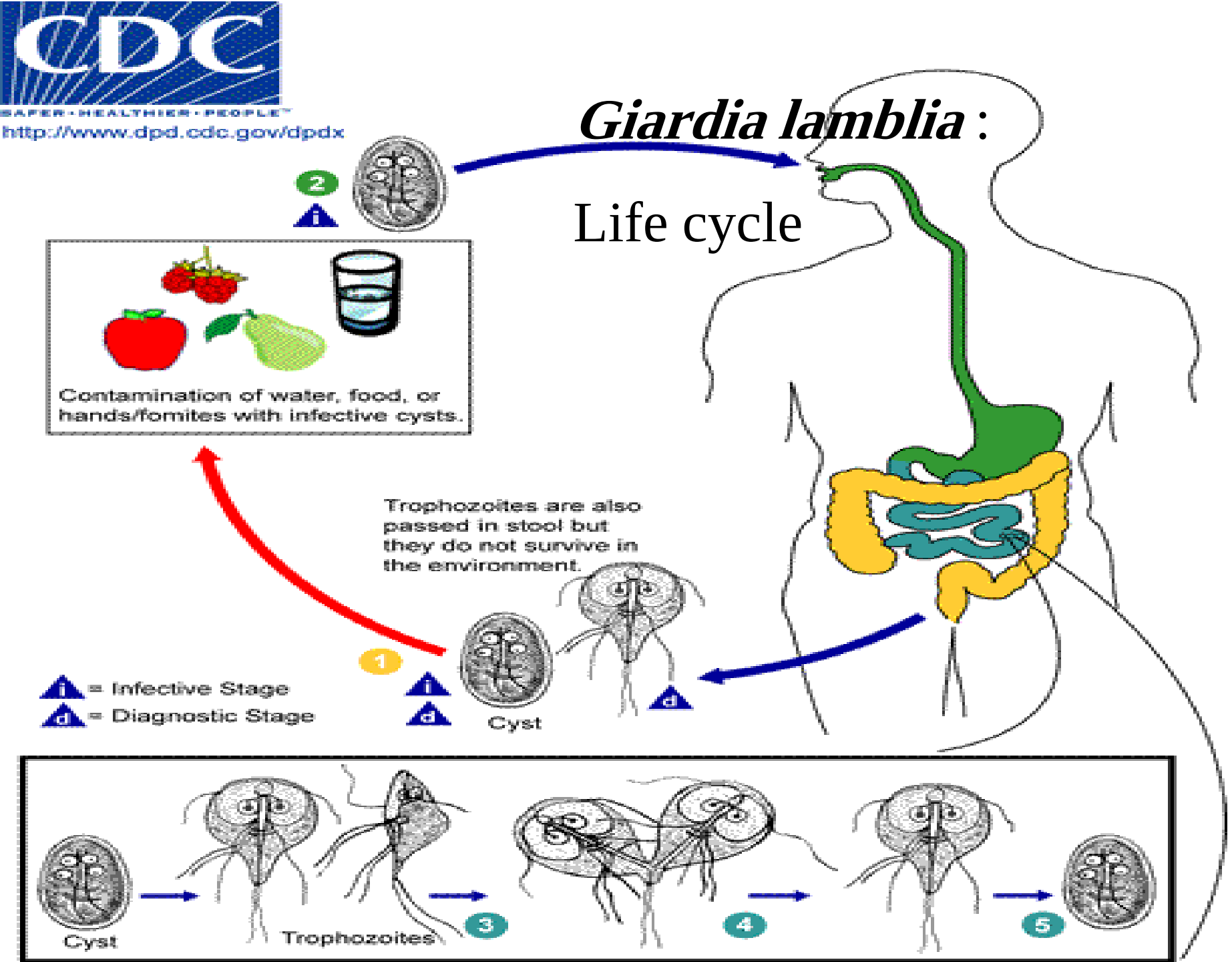
After ingestion of the cysts and then cysts pass the stomach acidity , ex-cystation take place in small intestine to produce **TROPHOZOITE**

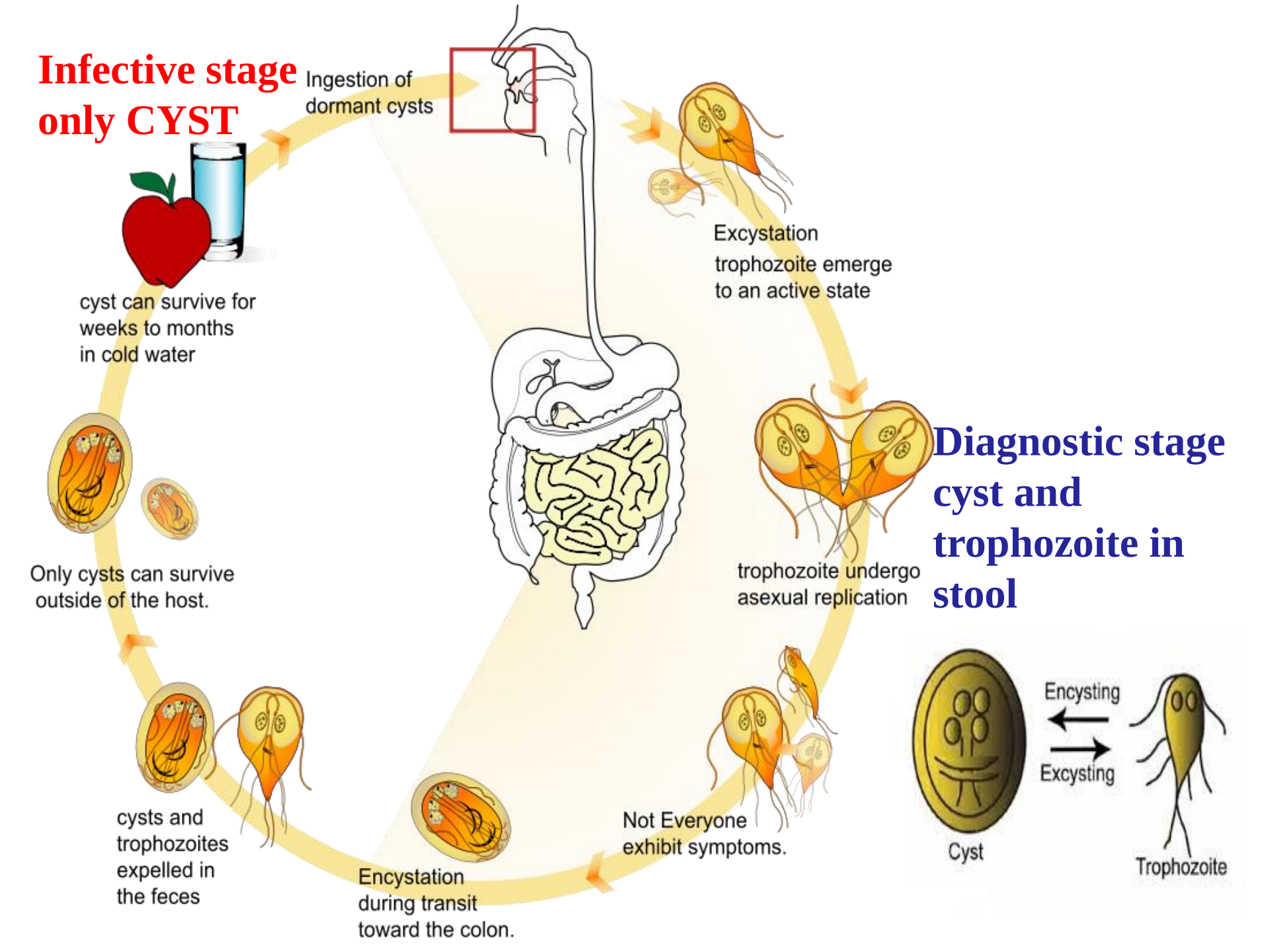
Trophozoite can multiply by binary fission and responsible for causing the disease : diarrhea ,vomiting ,excessive gas and loss of appetite especially in children.



Giardia lamblia :

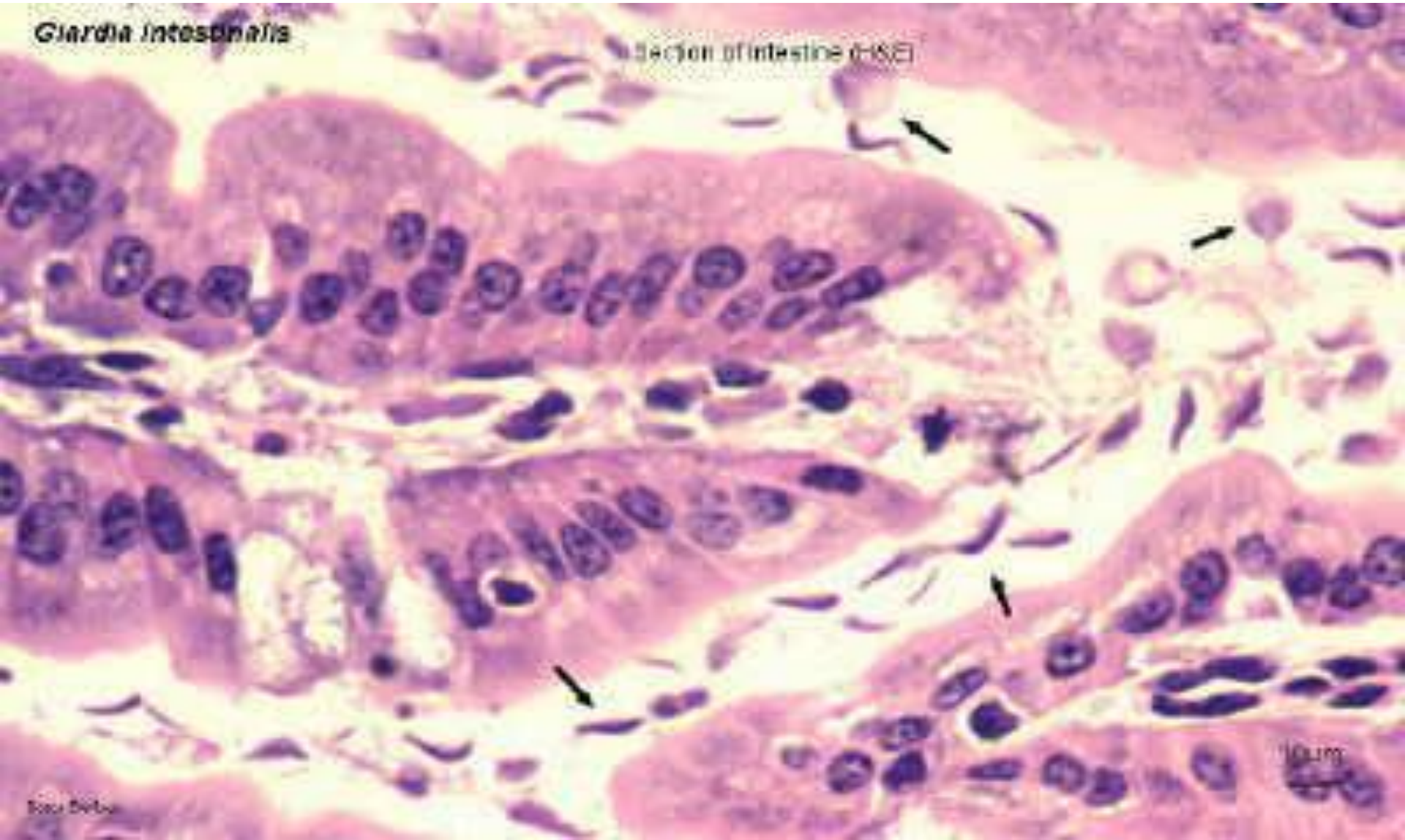
Life cycle




Infective stage only CYST
Ingestion of dormant cysts
cyst can survive for weeks to months in cold water
Excystation trophozoite emerge to an active state
trophozoite undergo asexual replication
Diagnostic stage cyst and trophozoite in stool
Only cysts can survive outside of the host.
cysts and trophozoites expelled in the feces
Encystation during transit toward the colon.
Not Everyone exhibit symptoms.
Encysting
Excysting
Cyst
Trophozoite

Giardia **trophozoites in tissue section**

Seen by duodenal aspirate



Giadriasis: Clinical Picture.

The parasite mostly asymptomatic or can produce a wide range of gastrointestinal symptoms especially in children. .

Symptomatic Infections:

<u>Typical picture:</u> IP 1-2 wks followed by diarrhea ,vomiting &flatulence for about 6 wks,

<u>Atypical :</u> Severe diarrhoea , malabsorption especially in children and cholecystitis.

Giardiasis: Laboratory diagnosis

- **Stools examination :**
  - **Microscopy for cysts or trophozoits**
  - **Detection of Giardia antigens in stools**
- **Examination of duodenal biopsy : trophozoites**

Giardiasis: Chemotherapy

- **Drug of choice: Metronidazole**

Intestinal Amoebae

Stained

	Entamoeba coli	*Endolimax nana*	*Iodamoeba bütschlii*	*Dientamoeba fragilis*	*Entamoeba histolytica*	*Entamoeba dispar*	*Entamoeba hartmannii*
Cytoplasm inclusions	With haematoxylin, stains bluish-grey Stain black except glycogen as clear area				RBCs also stain black		
Nuclear characteristics							
Membrane	Thick	Thin	Thick	Very delicate		Delicate	
Chromatin on membrane	Coarse	None	Sometimes granular	None		Fine granules	
Karyosome	Coarse, generally eccentric	Large irregular	Large lateral	Central granules		Small central	
Fibril network	May be chromatin particles	No chromatin	No chromatin	Delicate fibrils		Not often seen	
Pathogenicity	Harmless commensal	Harmless commensal	Harmless commensal	Disputed	Invasive	Harmless commensal Non-invasive	Harmless commensal Non-invasive

ENTAMOEBA HISTOLYTICA…

500 million people are infected. 100,000 deaths per year. Worldwide distribution but is seen more often in tropical countries with poor sanitary conditions. It is a waterborne infection.

There are 6 species of *Entamoeba:*

E.histolytica

E.dispar

E.hartmanni

E.coli

E.gingivalis

E.polecki

E. histolytica vs E. dispar

***Entamoeba histolytica* :**

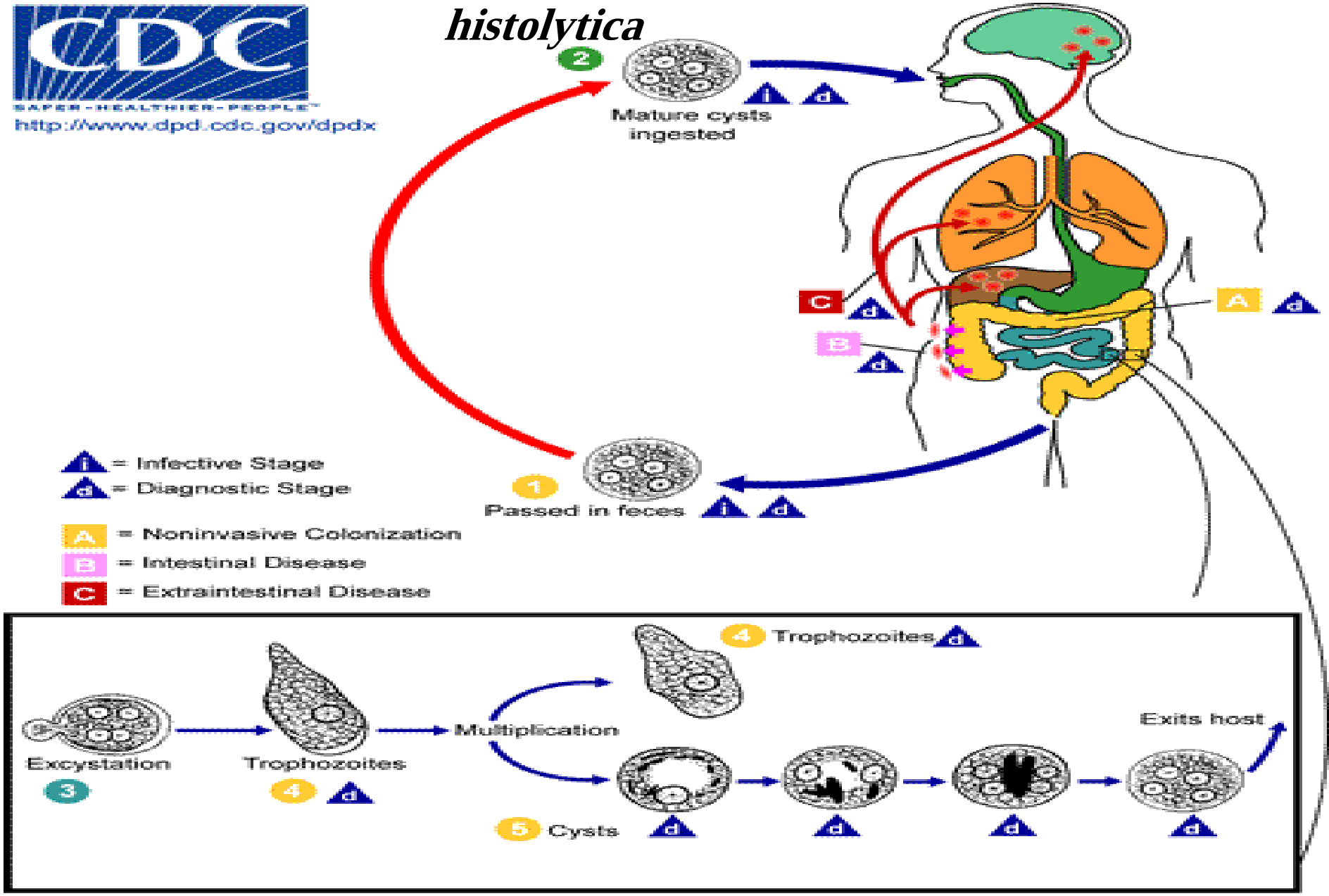
Amoebae that are pathogenic and invasive.

***E. dispar* :**

The nonpathogenic ,non invasive form .

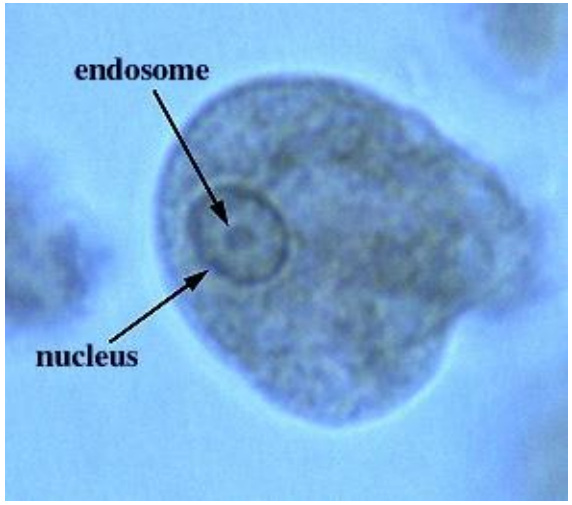
The 2 amoebae can't be distinguish by microscopic observation.

Entamoeba histolytica

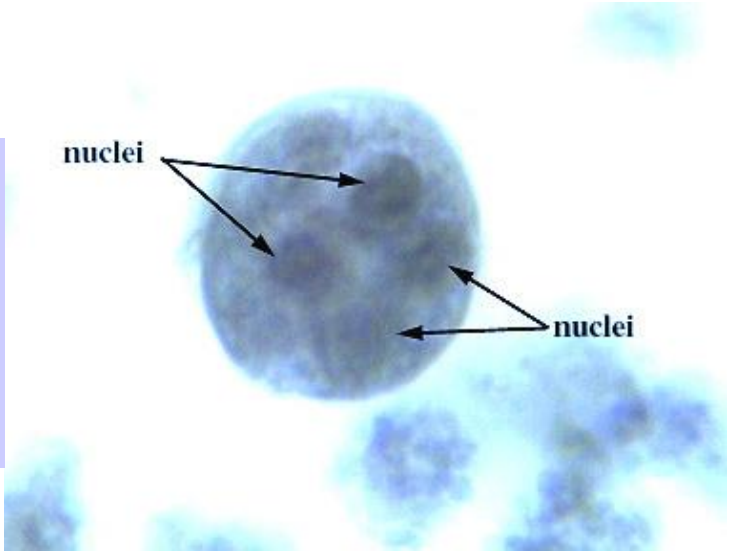


Entamoeba histolytica

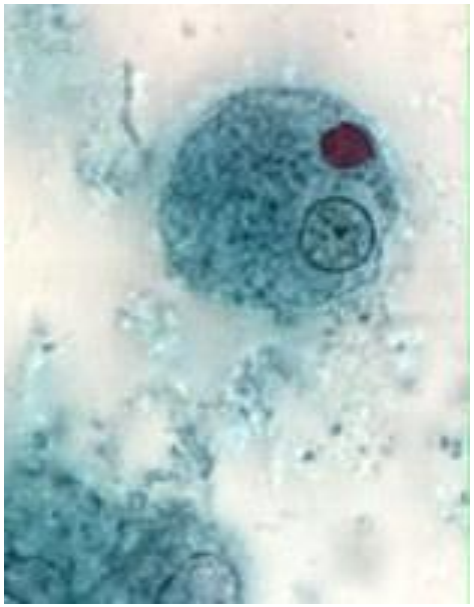
Trophozoite: vegetative stage, must encyst to survive in the environment. It is a fragile structure.

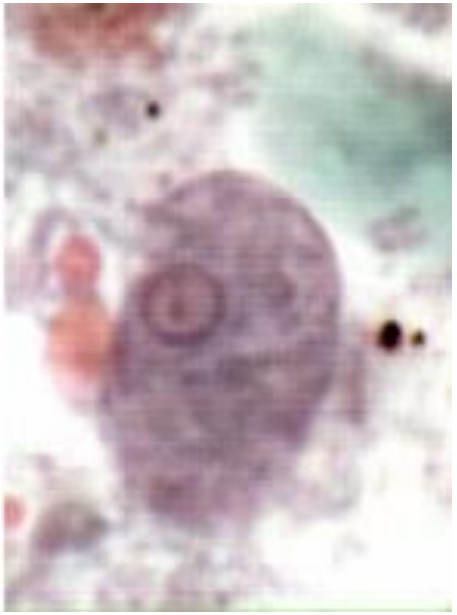


Cyst: infective stage. Resist the harsh conditions of the environment.



E. histolytica cyst





E. histolytica trophozoite

The infective stage is the cyst but we can detect both in the stool cysts &trophozoites

Entamoeba histolytica

Mode of infection (faecal-oral route)

- **Water, food**
- **Flies can act as vector.**
- **Can be sexually transmitted person -to - person contacts**
- **Not a zoonosis**

Entamoeba histolytica

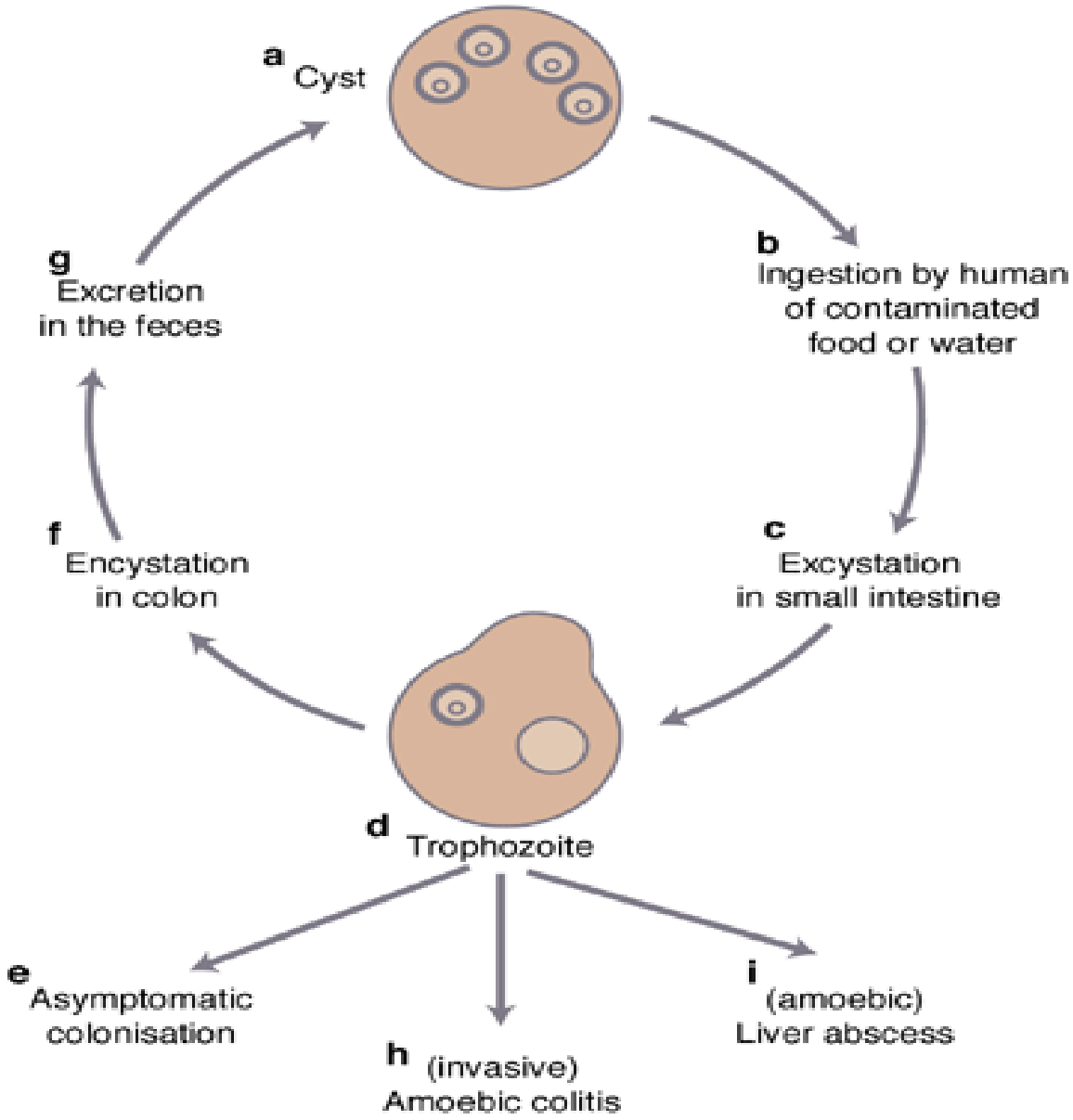
The infective dose can be as little as 1 cyst.

The incubation period can be from few days to few weeks depending on the infective dose. IF the TROPHOZOITE is ingested it is disintegrates in the stomach without producing infection.

Excystation occurs in the lower region of the small intestine and then production of 8 small amoebae which enter the large intestine and may :(1)invade the tissue,

(2) live in the lumen *of large intestine* without invasion ,or (3) encyst (become cysts and pass in the stool).

Only the Cysts can survive in the environment for weeks at appropriate temperature and humidity after excreted from stool of infected patients.



Life cycle of *Entamoeba histolytica* and the clinical manifestations of infection in humans

Entamoeba histolytica

Intsetinal amoebiasis (Acute amoebic dysentry) :

Trophozoite has the ability to hydrolyze host tissues with their active enzymes present on the surface membrane of the trophozoite (causing ulcer and tissue perforation), also trophozoite has the ability to ingest blood cells.

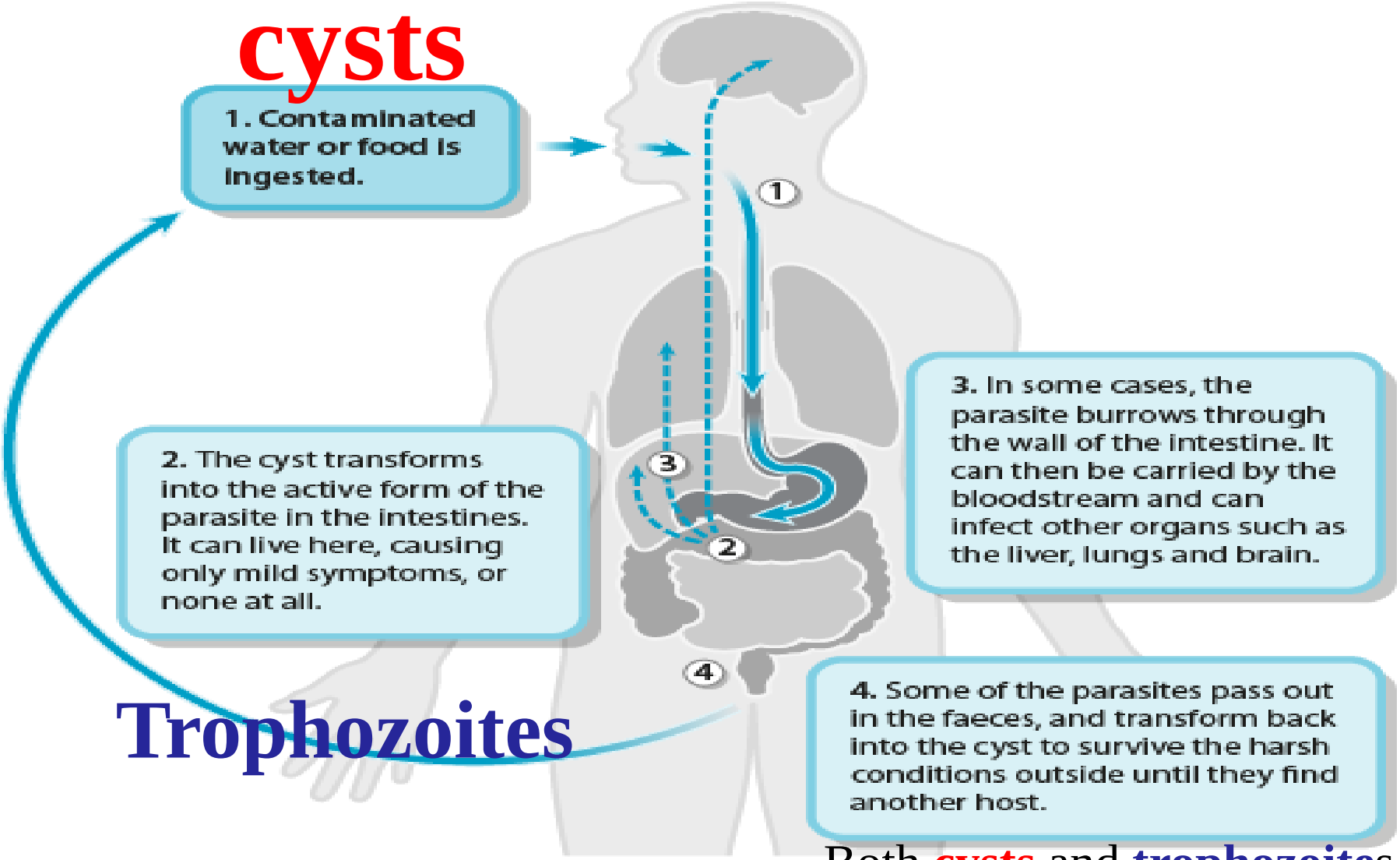
The presenting symptom is diarrhea which is accompanied by blood ,mucus and some times tenesmus.

As a complication ,severe intestinal hemorrhage or rarely perforation may occur ,lesions are found in cecum ,appendix or colon.

They may heal. If perforation of the colon occurs, this may lead to peritonitis that can lead to death.

Amoeboma :Granulomatous mass obstructing the bowel.

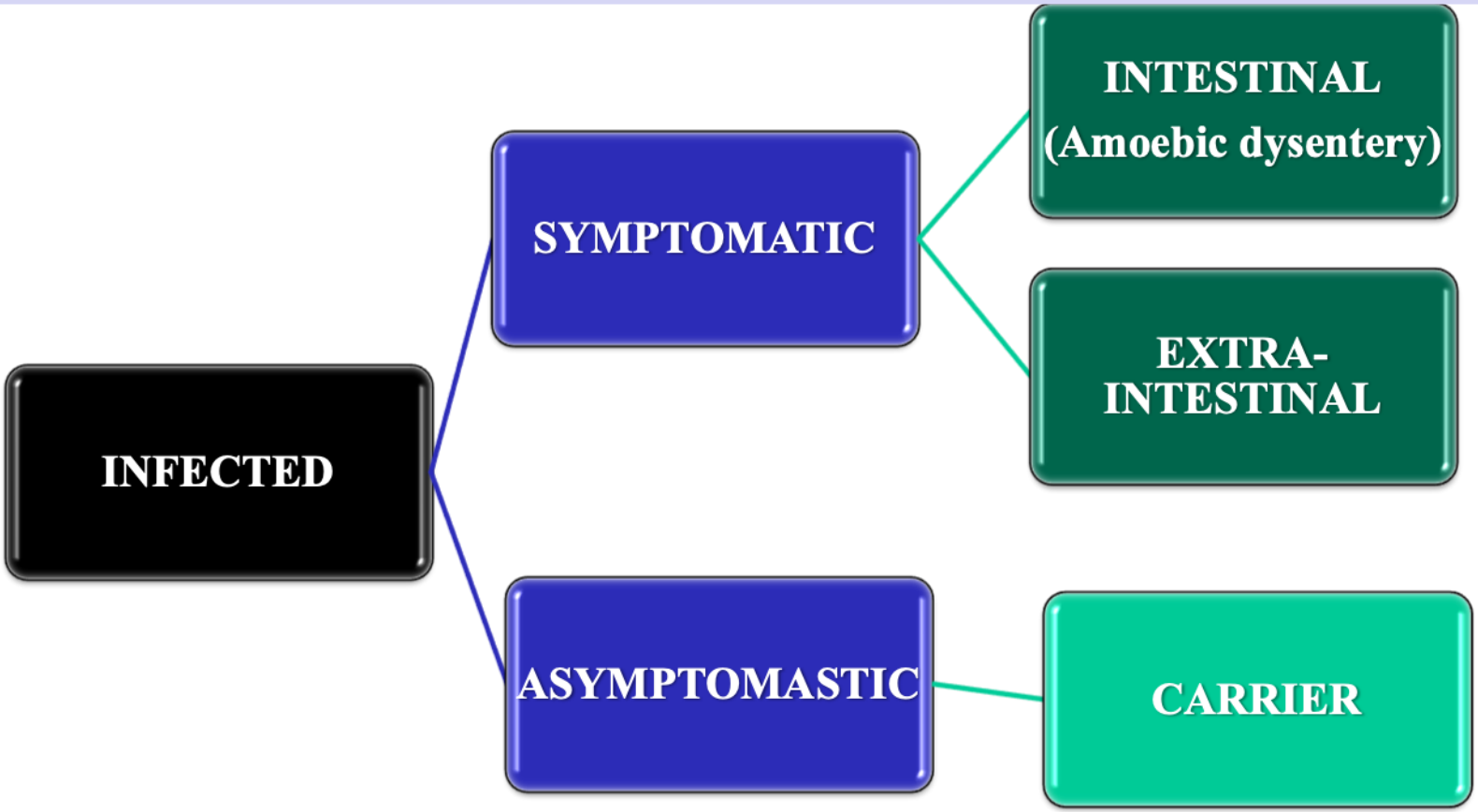
Entamoeba histolytica



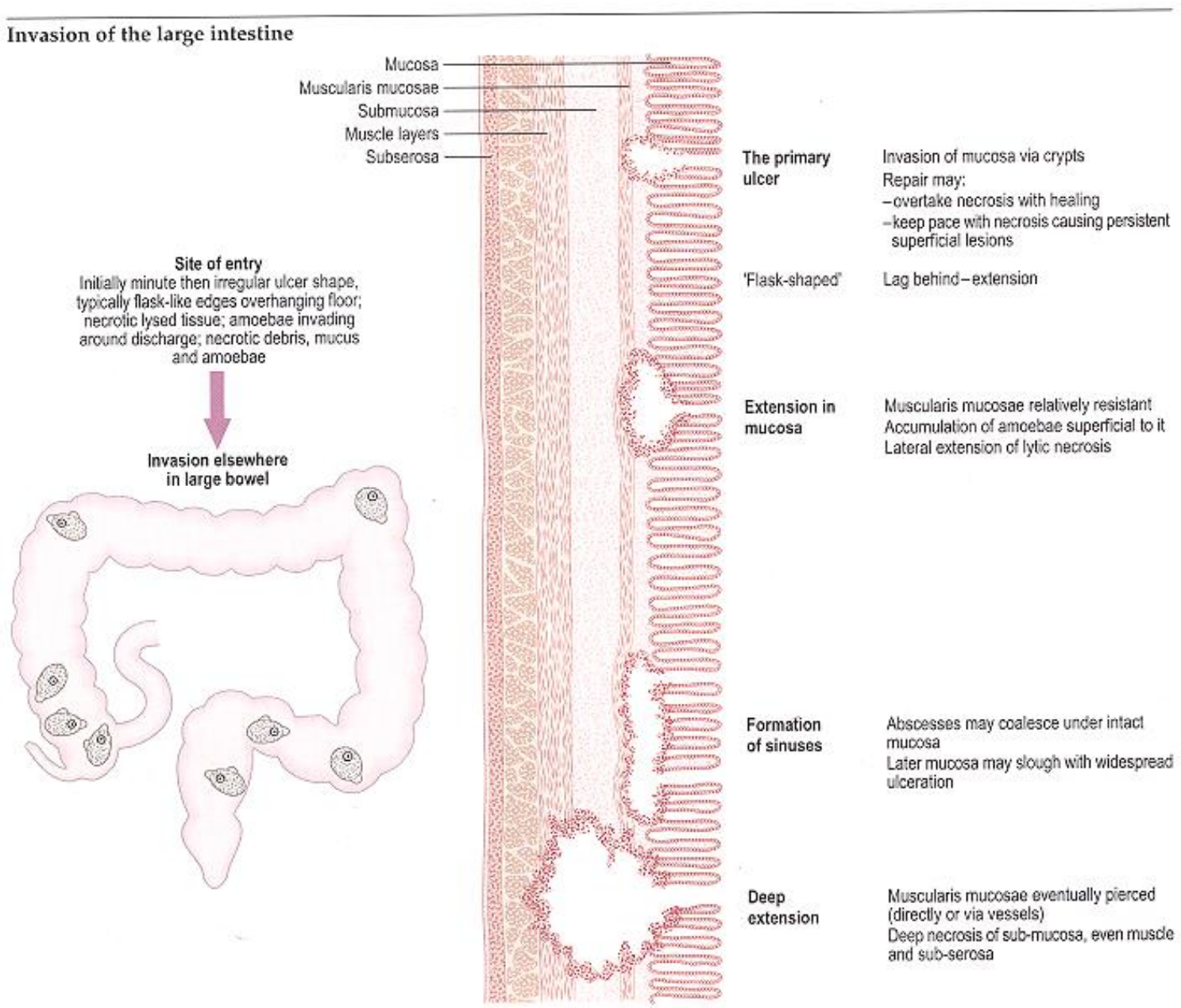
Both **cysts** and **trophozoites**

THE CLINICAL OUTCOMES OF INFECTION WITH

Entamoeba histolytica



PATHOLOGY: Intsetinal amoebiasis :



PATHOLOGY : Intsetinal amoebiasis

Complications

Complications and sequelae

Perforation
Haemorrhage (rare)

Peritonitis
Haemorrhage

Secondary infection

Surrounding inflammatory reaction and fibroblastic proliferation

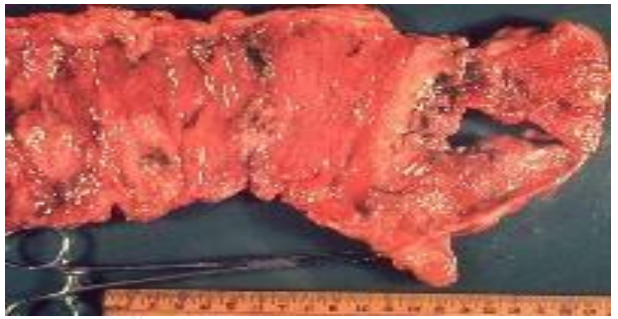
Amoeboma (rare)
(Clinically simulates neoplasm)
– intussusception
– obstruction

A mass under oedematous mucosa with
– internal abscesses of necrotic tissue and amoebae
– surrounding granulomatous tissue zone with eosinop
lymphocytes and fibroblasts
– outer firm nodular fibrous tissue

Invasion of blood vessels

Extraintestinal lesions-page 52

Direct extension outside bowel



Intestinal perforation

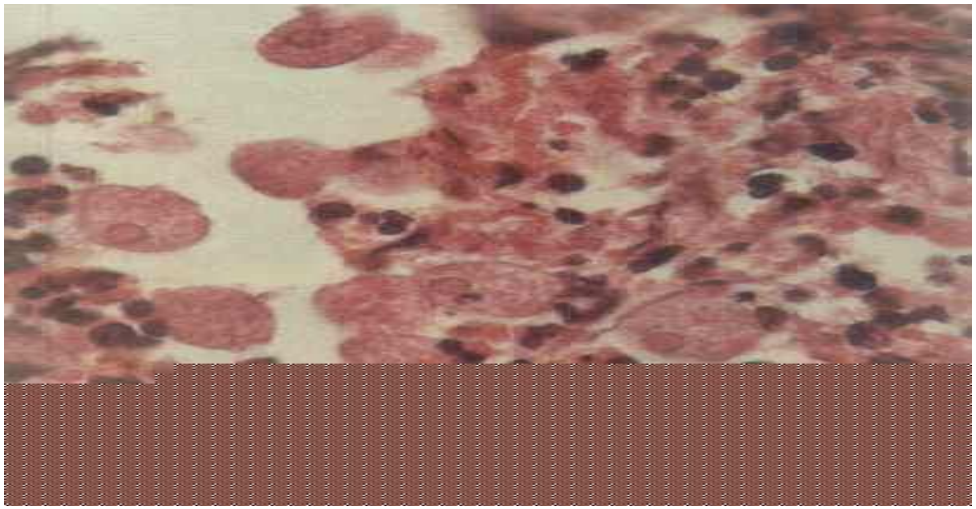
Flask shape ulcer in large intestine

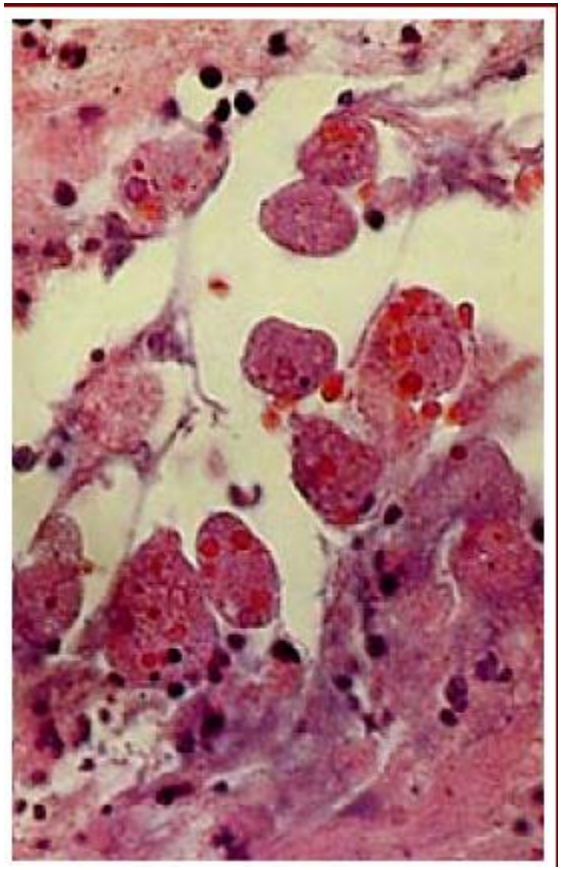
PATHOLOGY

Intsetinal amoebiasis :

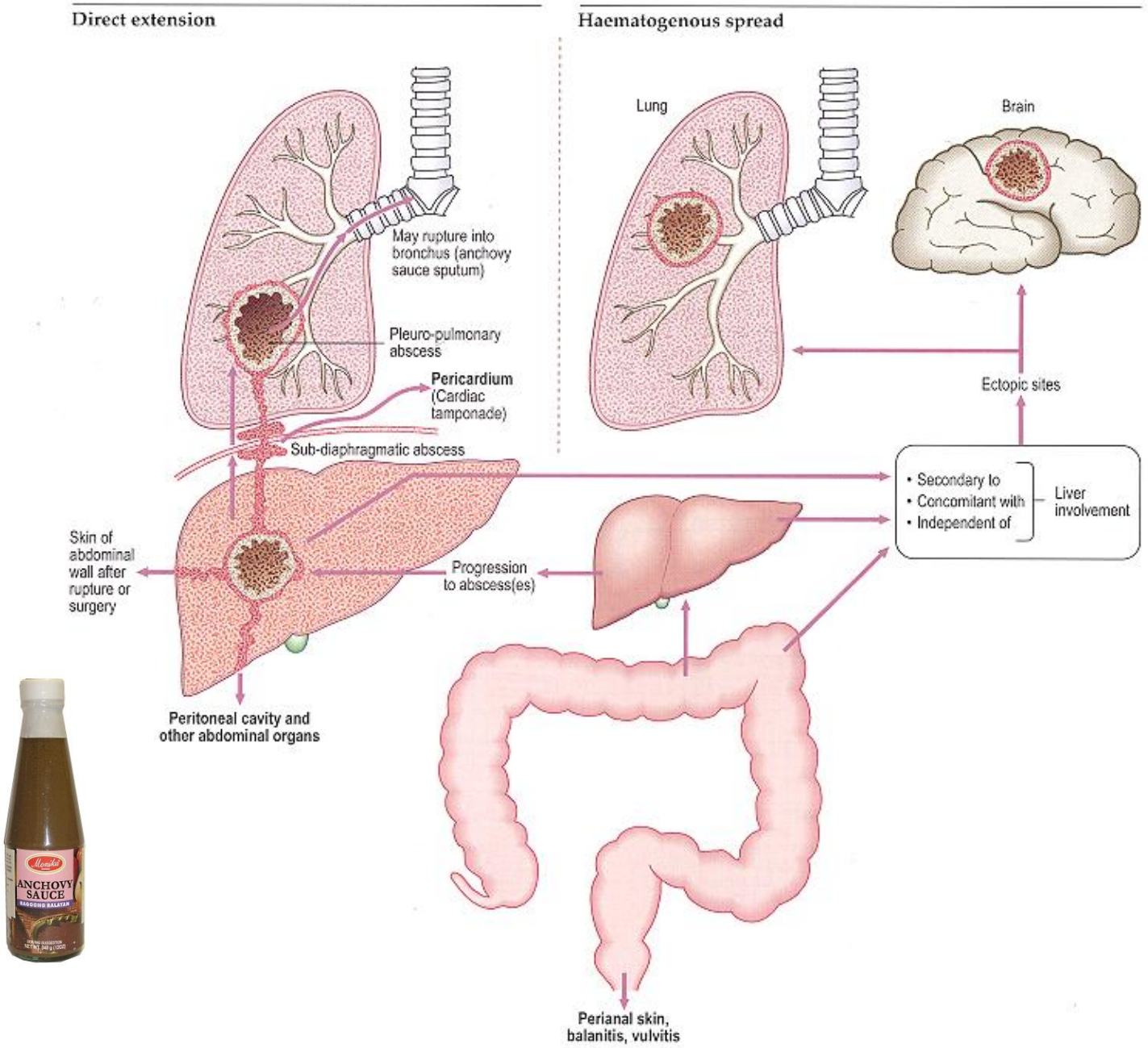
E. Histolytica **in mucosa.**

Numerous trophozoites can be seen with ingested erythrocytes.





PATHOLOGY: Extra-intsetinal amoebiasis :



A 30-year-old male experienced diarrhea for two weeks with fever of 39° C, nausea, vomiting, malaise and right upper abdominal pain. Physical examination revealed hepatomegaly 6 cm below the right costal margin. CT scan showed a single hypodense mass in the rigth lobe of 7.8 x 5.2 cm, round, with well defined borders. Serology was positive for Enamoeba histolytica at 1/512.

Amebic liver abscess was diagnosed.

Laboratory Diagnosis of Amoebiasis

- Intestinal :
  - Stools examination :
    - Wet mount (cysts and trophozoites)
    - Concentration methods (only cysts)
  - Serology (mainly for invasive infections): IHA , ELISA
- Extra-intestinal:
  - Serology: IHA , ELISA
  - Microscopy of tissues or fluids

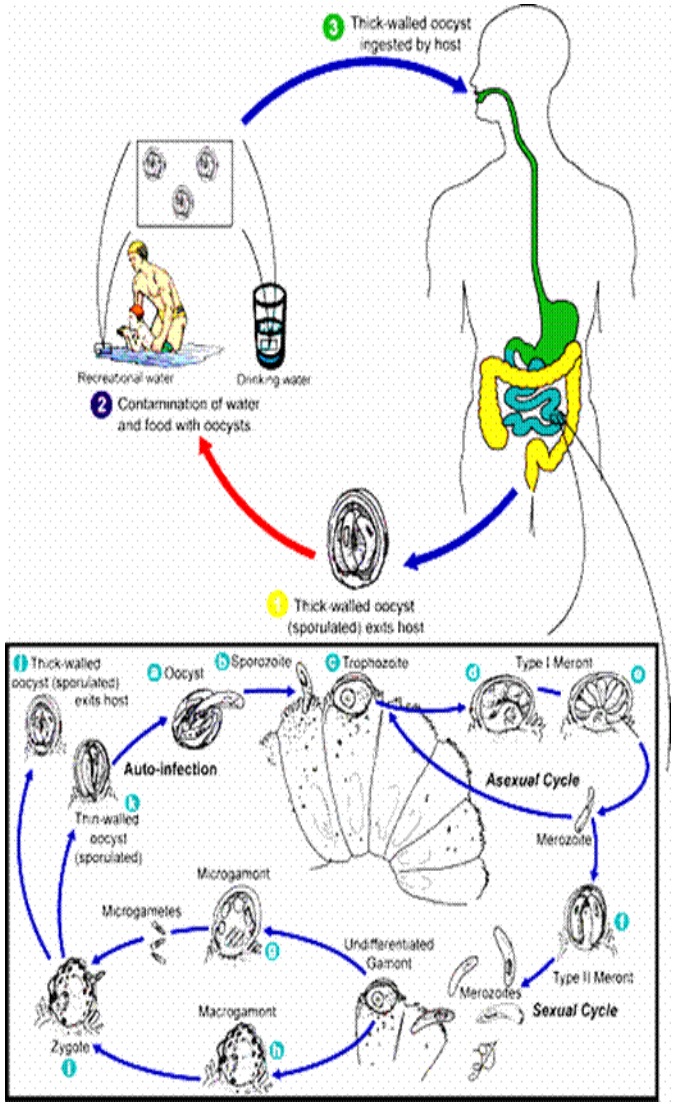
Main Drugs for Treatment of Amoebiasis

- Intestinal :
  - Symptomatic(cysts and trophozoites): **Metronidazole**
- Extra-intestinal:
  - **Metronidazole**

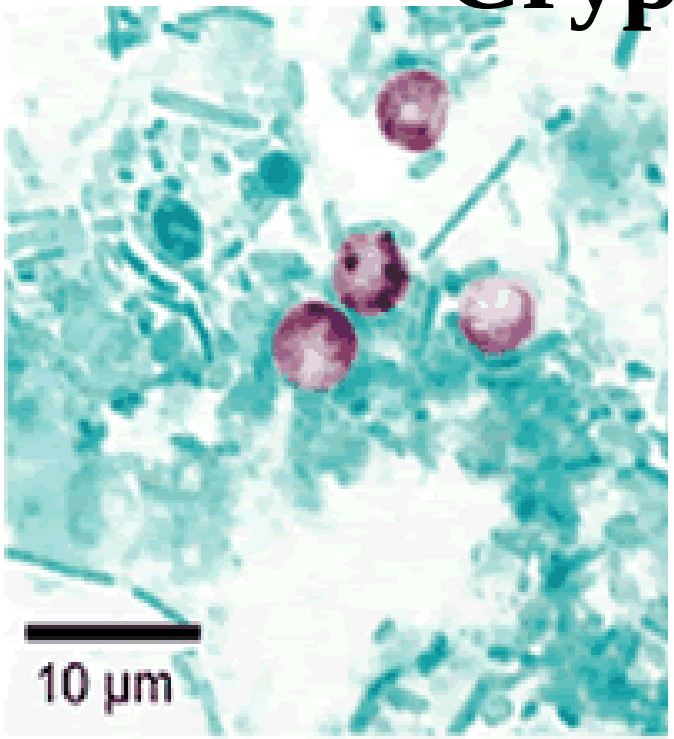
Cryptosporidium Parvum

Infection is caused by ingestion of sporulated oocysts transmitted by the faecal-oral rout

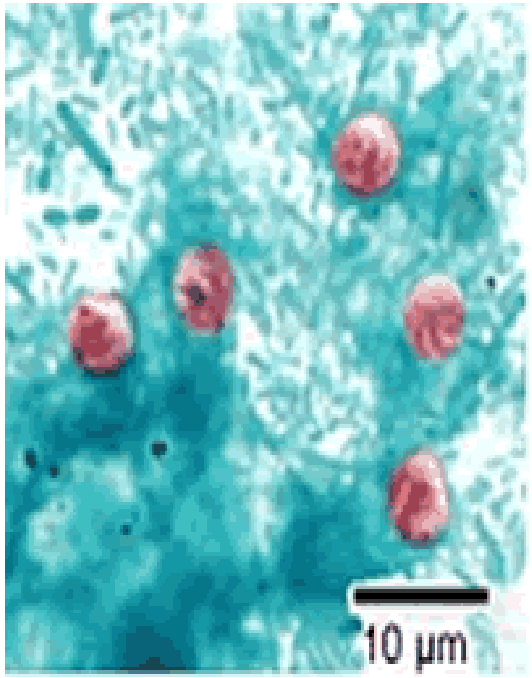
Infection is generally self-limiting in immunocompetent people. In immunocompromised patients, such as those with AIDS or those undergoing immunosuppressive therapy, infection may not be self-limiting, leading to dehydration and, in severe cases, death



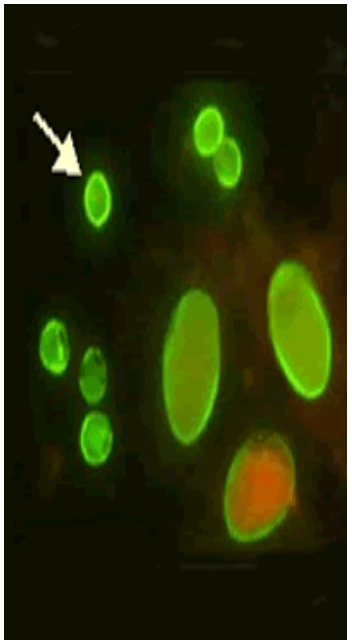
Cryptosporidium Diagnosis



Cryptosporidium **oocyst in feces by stain acid-fast stain**



Cryptosporidium **, safranin Ziehl-Neelsen**



Crypto-Gardia FAT

Cryptosporidiosis Treatment& prevention

The most effective way to prevent the spread of *C. parvum* is to avoid contact with contaminated feces. Avoiding this contact, especially with young children, Hygiene is the most effective way to combat this difficult-to-prevent parasite

- Self-limited in immunocompetent patients
- In AIDS patients : paromomycin