



Intestinal protozoan

**College of Health Sciences
Department of Medical Laboratory Analysis
Medical Parasitology
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Lecture: 2**

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Entamoeba histolytica

- **Distribution:** *Entamoeba histolytica* has a worldwide prevalence, especially where sanitation is poor and is more common in developing countries of the **tropics**.
- **Habitat:** *Entamoeba histolytica* is found in the human colon (large intestine).
- **Morphology**

Entamoeba histolytica occurs in 3 forms:

1. Trophozoite
2. Precyst
3. Cyst

Entamoeba histolytica Trophozoite

- It is irregular in shape and varies in size.
- It has a **cytoplasm** which consists of ectoplasm and endoplasm.
- The Ectoplasm is **clear** and transparent.
- Endoplasm is finely **granular** and contains nucleus, food vacuoles and phagocytosed erythrocytes.
- **Pseudopodia** are finger-like projections formed by movements of ectoplasm in one direction.
- Its nucleus is **spherical** and contains **central karyosome**.
- The **nuclear membrane** is lined by a rim of evenly distributed chromatin.
- It reproduces by binary fission. It is killed by drying, heat and chemical sterilization.

Entamoeba histolytica cyst

Before encystment, the trophozoite **extrudes** its food vacuoles and rounds up to form a **precystic stage**. It secretes a cyst wall to become cyst.

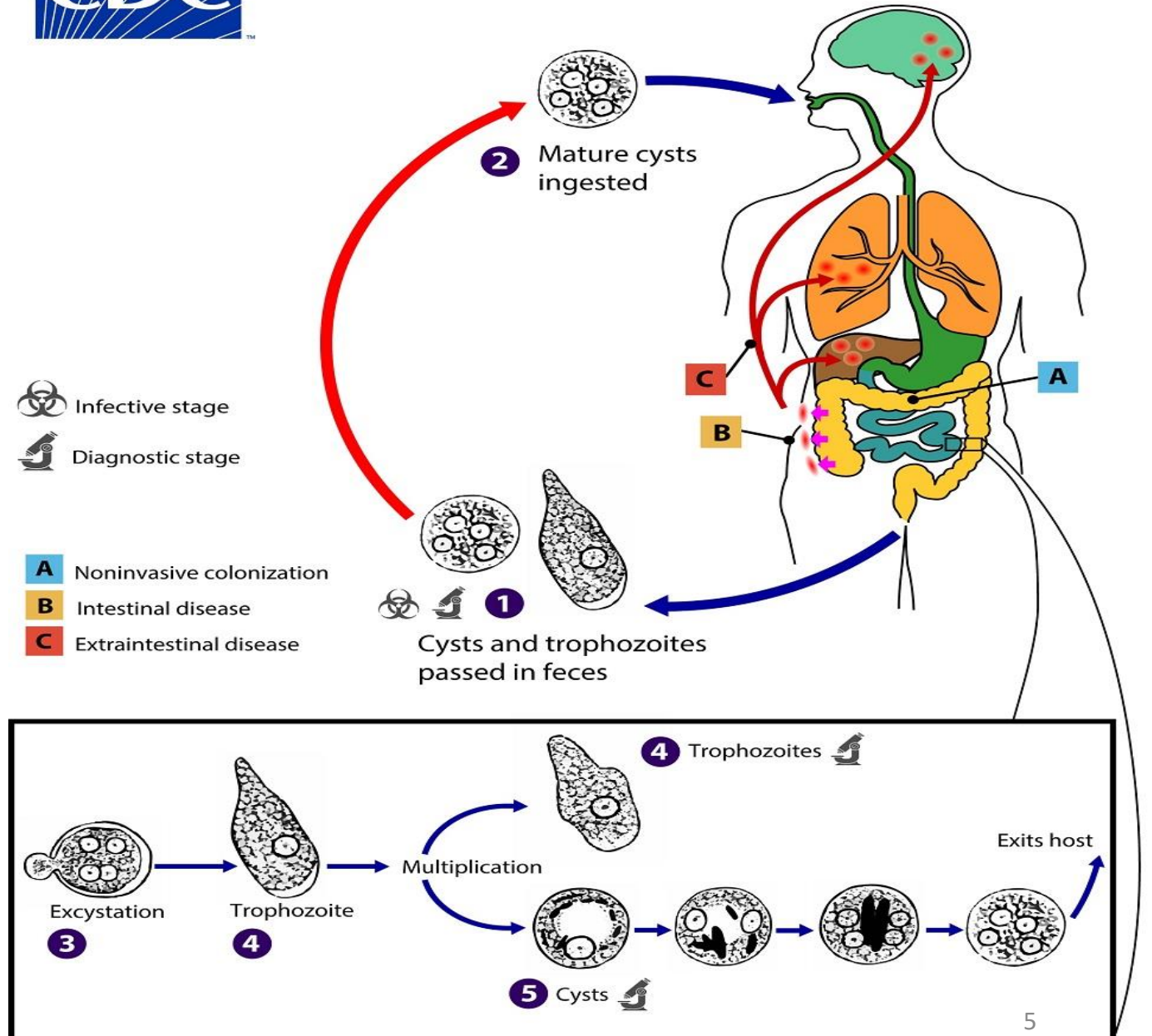
- The **cyst** is spherical in shape. **Immature** cyst contains a **single nucleus**, a **glycogen vacuole** and **chromatoid bars** which are **cigar shaped** with rounded ends.
- The chromatoid bars are visible in **saline**.
- When stained with **iodine**, the glycogen mass appears golden brown while the nuclear chromatin and karyosome bright yellow.
- **Mature** cyst contains 4 nuclei. The **glycogen mass** and **chromatoid bars disappear** in mature cyst.
- The cyst wall is **highly resistant to** gastric juice and unfavorable environmental conditions.

Entamoeba histolytica Life cycle

1. The cysts and trophozoites are passed out in stool of infected human.
2. Cysts are **ingested via** contaminated food or water.
3. In the intestine, the cysts undergo **excystation** and form trophozoites.
4. As the trophozoite passes down the intestine, it undergoes **encystation** and is excreted in the faeces.



Amebiasis



Pathogenesis and Clinical Features

- *Entamoeba histolytica* causes **intestinal** and **extraintestinal** amoebiasis.
- The **lumen-dwelling** amoebae do not cause any illness. They cause disease only when trophozoites **invade** the intestinal tissues.
- The trophozoite penetrates the epithelial cells in the colon, aided by **its movement** and **histolysin**, a tissue lytic enzyme, which damages the mucosal epithelium. **Amoebic lectin** mediates **adherence**.
- **Intestinal amoebiasis** may cause **amoebic dysentery** or **diarrhea**.

Diagnosis

- Microscopic examination
- Antigen-based diagnosis
- Molecular diagnosis Polymerase chain reaction (PCR) to detect *E. histolytica* in stool and to differentiate between the other species that are non-pathogens (*E. dispar* and *E. moshkovskii*).

Entamoeba histolytica

Treatment

Metronidazole, tinidazole and ornidazole.

Prevention and Control

1. Boil drinking water.
2. Wash fruits and vegetables in clean water before eating.
3. Detection and treatment of carriers and prohibit them from food handling.
4. Health education.

Giardia lamblia

Distribution

- It has a global distribution. It is endemic in the **tropics** and **subtropics** where sanitation is poor. Visitors to such areas develop **traveller's diarrhoea**.

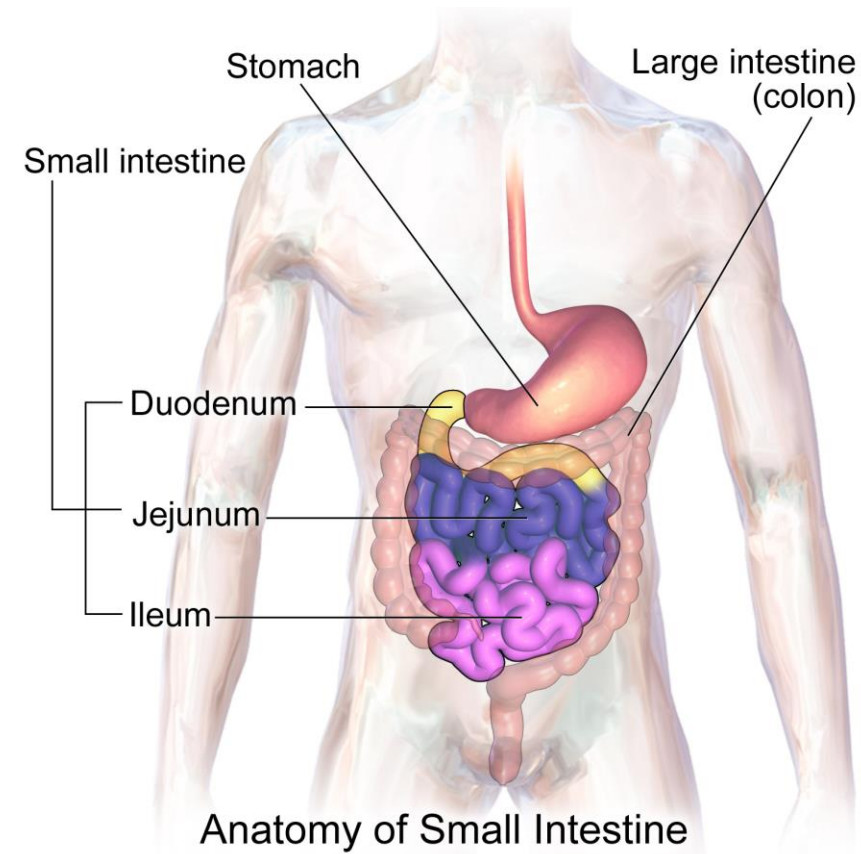
Habitat

- *Giardia lamblia* lives in the **duodenum** and **upper jejunum**.

Morphology

It exists in 2 forms:

1. Trophozoite
2. Cyst



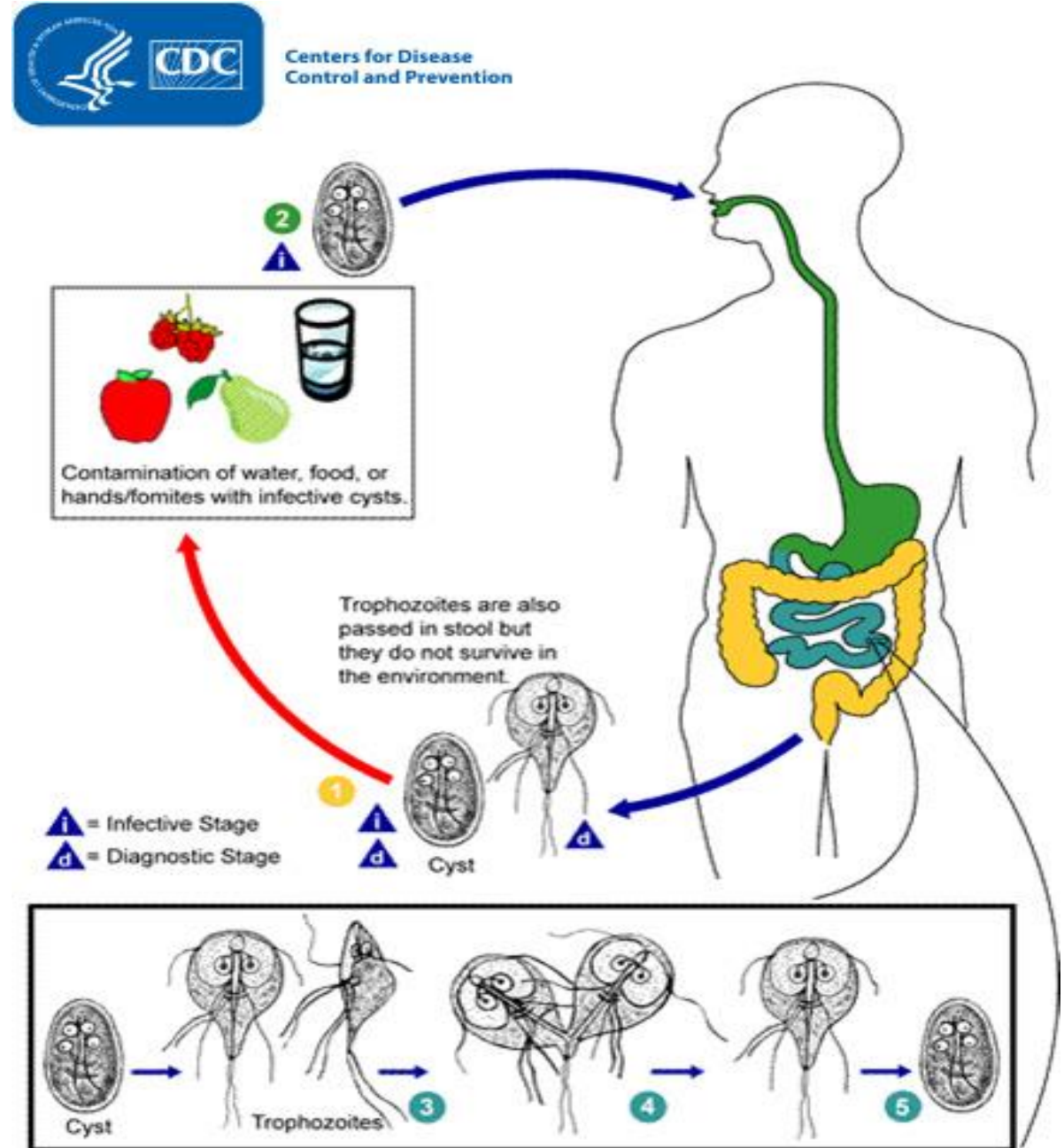
Giardia lamblia trophozoite and cyst

- Trophozoite is **pyriform in shape**, rounded anteriorly and pointed posteriorly.
- It has a concave **sucking disc** for its attachment to the intestinal mucosa.
- It is bilaterally symmetrical, possesses **2 nuclei, 4 pairs of flagella, 1 pair of axostyles** running along the midline and 2 parabasal or **median bodies**.
- Cyst is the infective form of the parasite.
- The cyst is oval, a **young cyst** contains 2 nuclei. A **mature cyst** contains 4 nuclei. The **axostyle** lies diagonally.

Giardia lamblia Life Cycle

- (1) Cysts are passed out in stool of an infected human.
- (2) Infective cysts are ingested.
- (3) The cyst excysts to release trophozoite in the small intestine.
- (4) The trophozoites multiply by binary fission.
- (5) The trophozoite encysts to become cyst which is passed out in the stool.
Trophozoites are passed in loose stools.

- Infective stage is the mature cyst.
- Human acquires infection by ingestion of cysts in contaminated water and food.



Pathogenesis and Clinical Features

Trophozoite does **not invade** the tissue but remains adhered to intestinal epithelium by means of the sucking disc causing stunting and shortening of the villi.

Patients are usually asymptomatic, but in some cases, **giardiasis** may cause:

1. Diarrhoea.
2. Fat malabsorption (steatorrhea).
3. Dull epigastric pain and flatulence.

The stool contains excess mucus and fat. **Children** may develop chronic diarrhoea, malabsorption of fat and vitamin A and weight loss.

Diagnosis

- Microscopic examination.
- Antigen-based diagnosis.
- Molecular diagnosis PCR on stool specimen.

Giardiasis treatment and control

- **Treatment**

- Metronidazole or tinidazole is the drug of choice.

- **Prevention and Control**

1. Proper faecal disposal
2. Personal hygiene
3. Boiling of drinking water
4. Filtration of drinking water
5. Wash fruits and vegetables