



## Lecture – 8

# Intestinal Protozoa



*Microbiology Team 430*

### Done By

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# PROTOZOA

## Features:

- Unicellular
- Single cell for all functions

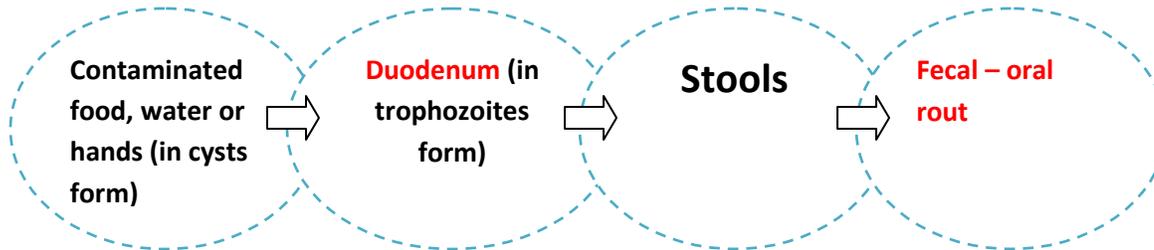
## Types:

1. **Aoebae:** move by pseudopodia.
2. **Flagellates:** move by flagella.
3. **Ciliates:** move by cilia
4. **Apicomplexa(Sporozoa)**→ tissue

## Giardia lamblia:

- Giardia **Cyst** → **in the external environment** → **diagnostic & infective stages**
- Giardia **Trophozoites** → **in the body only** → **diagnostic stage**

## Life cycle:



### ❖ Clinical picture:

- **Asymptomatic infections (majority)**
- Symptomatic Infections:
  - ✓ **Typical picture:** IP 1-2 wks followed by diarrhea for about 6 wks,
  - ✓ **Atypical:** Severe diarrhea, malabsorption especially in children

### ❖ Laboratory diagnosis:

- **Stools examination:**
  - ✓ **Light Microscopy for Cysts or Trophozoits** (Trophozoits can be found in stools but it only survive inside the body)
  - ✓ Detection of Giardia antigens in stools
- Examination of duodenal contents : trophozoites

### ❖ Treatment (chemotherapy):

- Drug of choice: Metronidazole

# Intestinal amoebae

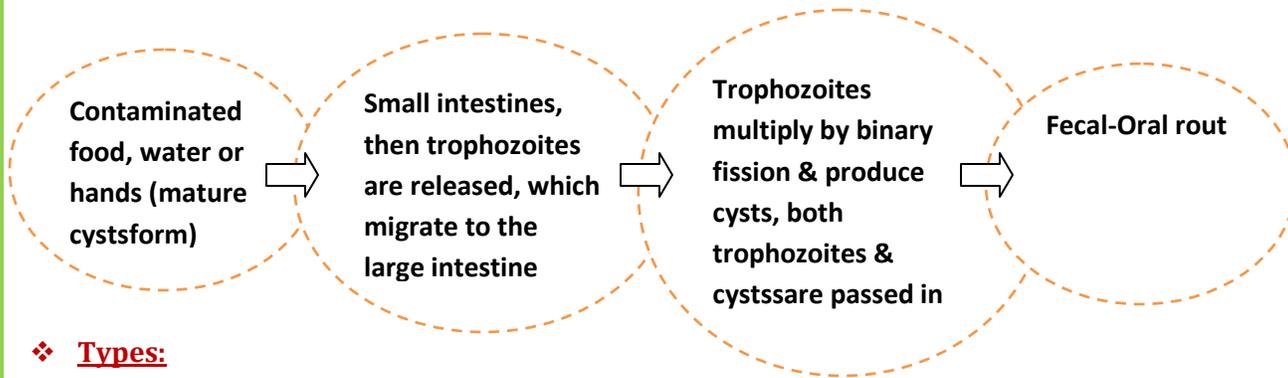
There are 6 species of intestinal Entamoeba → **E.histolytica**, E.dispar, E.hartmanni, E.coli, E.gingivalis & E.polecki

## Entamoeba Histolytica :

- Entamoebahistolytica → amoebae that are **pathogenic** → **invasive**
- E. dispar → **non-invasive form**.

The 2 amoebae **can't be distinguished** by microscopic observation.

**Life cycle:** "explained later with more details"



### ❖ Types:

#### ➤ Trophozoite:

- ✓ **Vegetative stage** (in this stage, the trophozoite will be divide and increase in number)
- ✓ **Diagnostic phase**
- ✓ **Must encyst** (become a cyst) to survive in the environment
- ✓ It is a **fragile structure**.

#### ➤ Cyst:

- ✓ **Infective stage**
- ✓ **Diagnostic stage**
- ✓ Resist to the harsh (hard) conditions of the environment

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### ❖ Features:

- **Worldwide distribution**
- It is a **water-borne infection** (pathogenic microorganisms which are directly transmitted when contaminated fresh water is consumed)
- **Lesions are found in the large intestine** (cecum, colon and appendix) and, **may disseminated to other organs** (Extra – intestine) such as liver, brain and lungs.
- **The infective dose can be as little as 1 cyst** → that mean one cyst can be cause disease
- The incubation period can be from few days to few weeks depending on the infective dose.
- Cysts can survive for weeks at appropriate temperature and humidity.
- **Diagnostic stage** → in Trophozoite or Cyst forms

❖ **Mode of infection:**

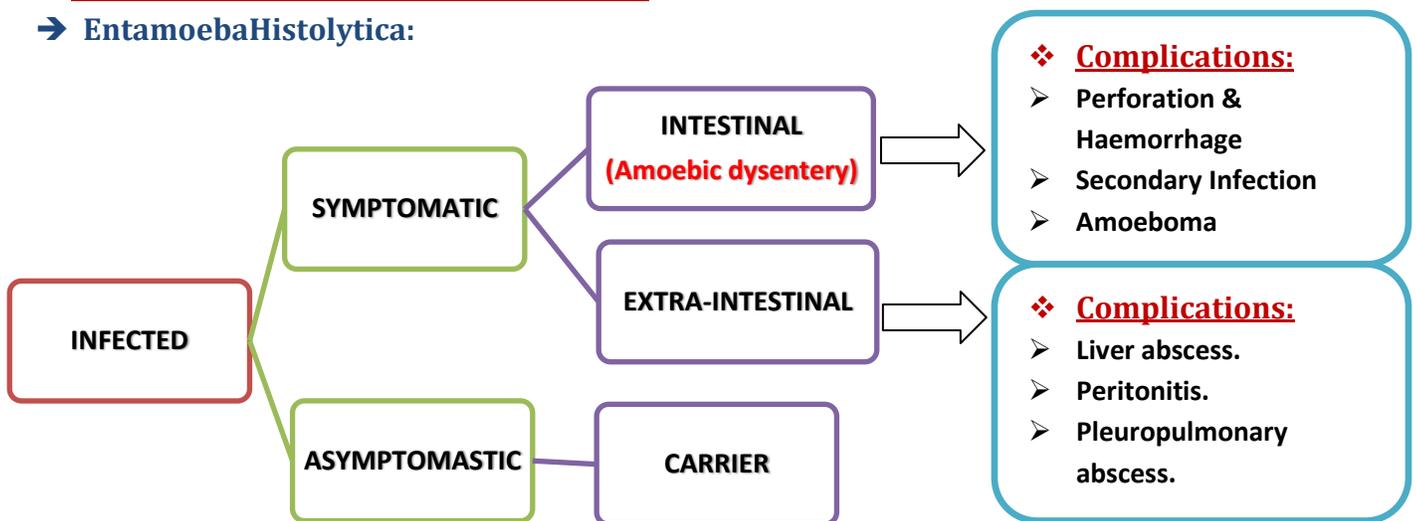
- ✓ Fecal – oral rout
- ✓ Flies can act as vector
- ✓ Can be sexually transmitted person -to -person contacts
- ✓ Not a zoonosis “only in humans”

❖ **Pathogenesis:**

- Ingested contaminated food or water → **muco**sa of large intestine → **hydrolyze host tissues** with their active enzymes present on the surface membrane of the trophozoite → **lesions (flask -like ulcers)** are found in the cecum , colon ,or appendix (**intestinal** ) → may invade other layers of large intestine until reach to blood vessels → **By portal circulation go to liver or may be disseminated to other organs such as brain or lungs (extra – intestinal).**

❖ **The Clinical Outcomes of Infection With**

→ **EntamoebaHistolytica:**



**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**

- **Extra-intestinal:**
  - **Serology: IHA , ELISA**
  - Microscopy of tissues or fluids

**Main Drugs for Treatment of Amoebiasis :**

**Intestinal**

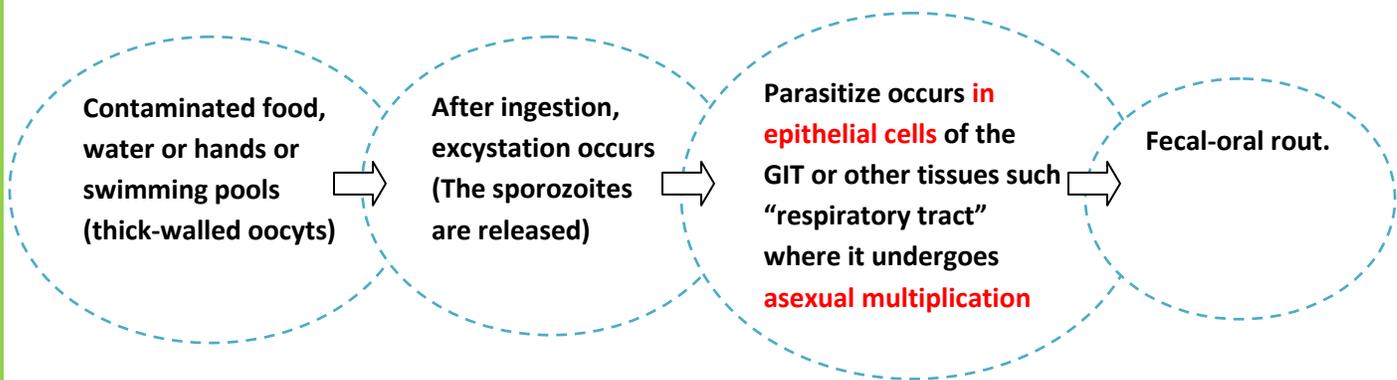
- **Asympromatic (cysts only): diloxanidefuroate (Furamide)**
- **Symptomatic(cysts and trophozoites): metronidazole**

**Extra-intestinal**

**Metronidazole**

# Cryptosporidium Parvum

## Life cycle:



## ❖ Features:

- Fecal – oral route
- Individuals who are most at risk are the **immune suppressed**, infants, children, the elderly, cancer patients, organ-transplant recipients and people who are HIV positive or have AIDS.

## ❖ Laboratory Diagnosis:

- By use certain stains to indicate the organism → acid-fast stain, safranin
- Serology :IFAT(is immunofluorescence test )

## ❖ Treatment:

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

# Summary

- Giardia lamblia are found in Cyst form in the external environment (which is diagnostic & infective stages), and in Trophozoites form in the **duodenum** (diagnostic stage)
- We can diagnose Giardia lamblia infection by **Stools examination** where we can find **both** cyst and trophozoites or we can do examination of **duodenal contents looking for trophozoites**. Then treat it with Metronidazole
- There are 6 species of intestinal Entamoeba. **The invasive form and the one that cause amoebiasis is E.histolytica** where E. dispar specie is harmless and non-invasive.
- Entamoebahistolytica: goes into two forms :
  - **Trophozoite**: which is the **active form** and it only found in the small intestine and the **large intestine** (where it multiply). it goes under **Vegetative stage “ in large intestine “** and the diagnostic phase
  - **Cyst**: is the form that is necessary to survive the environment. It goes under **Infective stage and Diagnostic stage**
- **E.Histolytica** is a water-borne infection with Fecal – oral rout & found **only in humans**
- As Giardia lamblia, E.Histolytica infection **starts** from contaminated food or water as **mature cysts**. And become Trophozoites at the small intestine. When it reach the mucosa of **large intestine as Trophozoites it multiply and hydrolyze host tissues and cause flask -like ulcers lesions**
- **Lesions** which are caused by E.Histolytica infection can be found in the cecum , colon ,or appendix (**intestinal**) and **cause Amoebic dysentery or invade & reach to blood vessels** and then by portal circulation **go to liver or to other organs** such as brain or lungs (**extra – intestinal**).
- In order to diagnose E.Histolytica infection we use **Stools examination for intestinal one and Serology “IHA , ELISA” for both intestinal (if its invasive) and extra intestinal**
- Symptomatic patients with Amoebiasis are treated with Metronidazole as for the Asympromatic (cysts only): **Diloxanidefuroate (Furamide)**
- Cryptosporidium Parvum can be ingested from swimming pools then excystation occurs in epithelial cells of the GIT or others tissues then it undergoes asexual multiplication
- **Cryptosporidium Parvum** , usually occurs in **immune suppressed patients**, infants, children and the elderly ones.
- We can **diagnose C.parvum** by using certain **stains (acid-fast stain, safranin) or Serology (IFAT)**
- C.parvum is Self-limited in immunocompetent patients but **in immune suppressed patients (AIDs) we use paromomycin**
- **Giardislambliia ,C.parvum&E.histolytica** have an **Fecal-oral rout**
- **C.parvum**, Parasitize occurs **in epithelial cells of the GIT** or other tissues such “respiratory tract” where it undergoes **asexual multiplication**.