

Parasitic infections of the GI tract

Entamoeba Histolytica (Protozoa)

- **Transmission:** feco-oral | contaminated water (most common) and food, auto-infection, homosexuality
- **D.H:** man
- **R.H:** dogs, pigs, rats and monkeys
- **Disease:** amoebiasis or amoebic dysentery
- **Hallmark of pathogenesis:** invasion of mucosa and submucosa, **flask-shaped ulcers**
- **Morphological characters:** 1- **trophozoite stage:** active, motile, feeding form, inside the body [RBC inside] 2- **cyst stage:** outside the body for protection and resistance a) **immature cyst** (uninucleate or binucleate): non-infectious b) **mature cysts** (quadrinucleate): infectious
- **Infective stage:** mature cyst
- **Diagnostic stage:** cyst (+ trophozoite in acute forms)
- ****excystation: 1cyst —> 8 trophozoites **encystation: —> cyst**
- **Clinical presentation:** 1- **intestinal amoebiasis:** asymptomatic infection (most common) (healthy carrier/ **cyst passer**), dysentery (stool containing blood, mucus, WBCs) 2- **extra-intestinal amoebiasis:** liver, lung and brain abscesses
- **Laboratory diagnosis: intestinal amoebiasis:** direct (macroscopic, stool sample, **O & P**) (microscopic, stool examination + sigmoidoscopy/ biopsy + X-ray after barium enema), indirect (serological tests, antigen detection, effective only if there is invasion)
- **Treatment: metronidazole** (flagyl), if asymptomatic paromomycin can be used
- **Prevention:** clean water, amoebic cysts are not killed with low doses of chlorine or iodine, bringing water to a boil ensures the absence of amoeba

Giardia duodenalis (Protozoa)

Common cause of intestinal infection worldwide especially in children, daycare centers and patients with immunodeficiency syndromes, related to poor hygiene, homosexuality, etc.

- **Transmission:** feco-oral | contaminated water (most common) and food
- **Disease:** giardiasis [in Canada, beaver fever]
- **Hallmark of pathogenesis:** colonization and attachment (not invasion)
- **Morphological characters:** trophozoite + cyst, has 4 pairs of flagella, parabasal bodies, two nucleus (mature cyst has four nucleus), axonemes, ventral disc for attachment
- **Infective stage:** mature cyst
- **Diagnostic stage:** cyst + trophozoite

Infectious dose is 10 | **excystation: 1 cyst —> 4 trophozoites**)

- **Clinical presentation:** asymptomatic (most common) / symptomatic (**watery diarrhea —> steatorrhea**)
- **Lab diagnosis:** stool analysis (cysts + trophozoites), antigen detection
- **Treatment:** metronidazole or tinidazole

Cryptosporidium (Protozoa)

One of the sporozoa (has sexual and asexual life cycle)

- **C. Parvum, C. Hominis**
- **Clinical presentation:** immunocompetent → self limited/ severe | immunocompromised → severe intractable diarrhea
- **Infective stage:** oocyte
- **Lab diagnosis:** oocytes can't be seen under microscope, have to be stained with modified **acid-fast stain**
- **Treatment:** usually self limited with oral or intravenous rehydration | **Nitazoxanide** is used for immunocompromised individuals e.g **HIV patients**

1 oocyst → 4 sporozoites

Ascaris Lumbricoides (helminths /round worms)

- **disease:** ascariasis
- **Hallmark of pathogenesis:** blocking
- **Morphological characters:** female adult worm is larger than male adult worm, the posterior end of male adult worm is curved, each female produces 200,000 eggs / day, **eggs with bumps**
- **Diagnostic stage:** eggs
- **Infective stage:** fertilized eggs, which are **not immediately infectious, they need a stage in the soil 1-2 weeks** (soil-transmitted helminths)
- **Transmission:** feco-oral
- **Life cycle:** when eggs are ingested, they hatch (the **larvae** are produced) in small intestine → they cross the mucosa and submucosa to reach blood circulation → migrate through the venous system to **lungs** capillaries → they ascend to trachea... Before they are swallowed to return to the stomach and small intestine where they mature (they become **mature adults**)
- **Clinical presentation:** many infections are asymptomatic | if symptomatic → pulmonary symptoms (**loeffler's syndrome**, which is respiratory symptoms, infiltrates and eosinophilia (hypersensitivity reaction)), GI symptoms (abdominal cramps, **malabsorption**, malnutrition)
- **Lab diagnosis:** looking for eggs, adult worm may also be identified in feces, larvae may be found in sputum or gastric aspirates
- **Treatment:** albendazole

Enterobius vermicularis (helminths / pinworm)

Commonly identified in group settings of children **ages 5 to 14 years**

- **Morphological characters:** the female worms with a pointed “pin” shaped tail
- **Transmission:** feco-oral, auto-infection, sexual transmission, retroinfection
- **Life cycle:** female worms migrate through the anus during night, they lay their eggs on the perianal area, eggs are immediately infectious
- **Infective stage:** embryonated eggs
- **Diagnostic eggs:** immature eggs
- **Clinical presentation:** **the most common complaint is perianal itching**
- **Diagnosis:** by microscopic identification of the characteristic ***flat- sided* eggs** (O& P), scotch tape
- **Treatment:** albendazole

echinococcus granulosus (helminths/ tapeworms)

- **Disease:** hydatid cysts
- **Definitive host:** the canine (dogs)
- Humans are typically accidental hosts and are considered dead-end leading to hydatid cyst
- Majority occurs in **liver** and **lungs**
- **Diagnosis:** incidentally by radiology, serology
- **Treatment:** **surgery**, albendazole
- Hydatid cysts – slow growing: 2-3 cm/ yr

Schistosoma (helminths)

- **Disease:** schistosomiasis
- **Caused by:** 1- schistosoma mansoni (mainly GIT) 2- schistosoma japonicum (mainly GIT) → stool 3- schistosoma haematobium (mainly UTS) → urine
- **Adult worm inhabits the portal venous system**
- **Hallmark of pathogenesis: eggs**, they lay eggs everywhere in the body, mainly liver → granuloma formation
- **Life cycle:** Miracidium → 1st intermediate host → cercariae → 2nd intermediate host → metacercariae (**infective stage**) → **skin (not through ingestion)**
- **Morphological characters:** male worms are folded to form **gynacophoric canal** which enfolds the slender female for almost its entire length
- **Clinical presentation:** skin penetration causing itchy rash, granulomatous reaction and sclerosis in portal venous system
- **Diagnosis:** detection of eggs (with spine) in stool or tissue biopsy
- **Treatment:** praziquantel