Cyclospora cayetanensis and *Trichuris trichiura*

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Cyclospora cayetanensis

Distribution

- It was first reported from Nepal, where it caused outbreaks of prolonged diarrhoea.
- It is most common in **tropical** and **subtropical areas**.

Habitat

- In human, the parasite is present in the small intestine.

Morphology

- Sporulated oocyst is the infective form to humans.
- Sporulated oocyst contains **2 sporocysts** and each sporocyst contains **2 sporozoites**.

Life Cycle

1. Excretion of unsporulated oocysts in stool of infected humans.

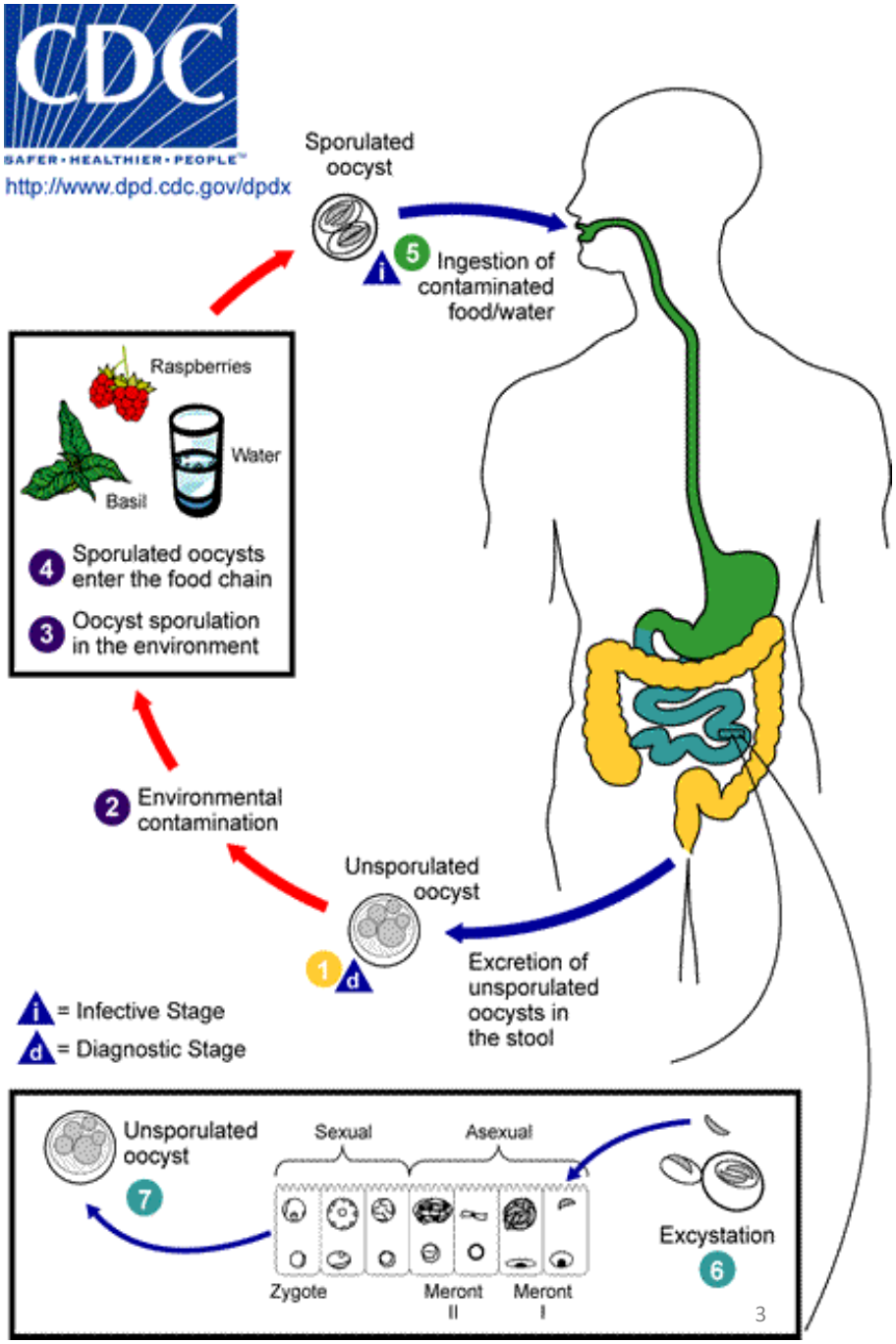
2. Oocysts contaminate and sporulate in the environment.

3 and 4. Sporulated oocysts enter the food chain.

5. Human acquires infection by ingestion of food and water contaminated with **oocysts**.

6. **Excystation** of the sporocyst releases sporozoites which infect **enterocytes of the small intestine** where sexual and asexual phases occur.

7. After the **sexual phase**, unsporulated oocysts develop and are excreted in faeces.



Pathogenesis and Clinical Features of *Cyclospora cayetanensis*

- Infection is through **faecal oral route** by ingestion of contaminated water and vegetables.
- It causes **prolonged diarrhoea** with abdominal pain, **low-grade fever** and **fatigue**.
- The infection is more severe in **immunocompromised** hosts, especially AIDS patients. Incubation period is 1–7 days.

- **Diagnosis**

1. Microscopic examination.

2. Biopsy.

Cyclosporiasis

Treatment

- Co-trimoxazole (a combination of trimethoprim and sulfamethoxazole).

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 with clean water before eating.
6. Health education.

Nematodes: roundworms general characteristics

- Nematodes are **cylindrical** or **filariform** in shape and **bilaterally symmetrical**.
- The **adults** vary greatly in size, from a few millimetres to a metre long**.**
- **Male** is generally **smaller than** female and its posterior end is curved or coiled ventrally.
- Its body is covered with an **outer cuticle**. The middle layer is **hypodermis** and the inner layer is the **somatic muscular layer**.
- The nematodes have **separate** sexes.
- The **male reproductive system** consists of testis, vas deferens, seminal vesicle and ejaculatory duct, which opens into the cloaca. It also includes copulatory structures such as spicules or bursa or both.
- The **female reproductive system** consists of the ovary, oviduct, seminal receptacle, uterus and vagina.

Nematodes: roundworms general characteristics, cont.

- Female nematodes may produce eggs (**oviparous**), larvae (**viviparous**) or lay eggs containing larvae, which immediately hatch out (**ovoviviparous**).

- Modes of infection are **ingestion** of **infective eggs** or **encysted larvae** in muscle.
- Eggs can also be **inhaled** and **swallowed**.

- Infection can occur via **skin penetration** by infective filariform larvae or transmitted by **blood-sucking insects** as seen in filarial worm infection

Trichuris trichiura

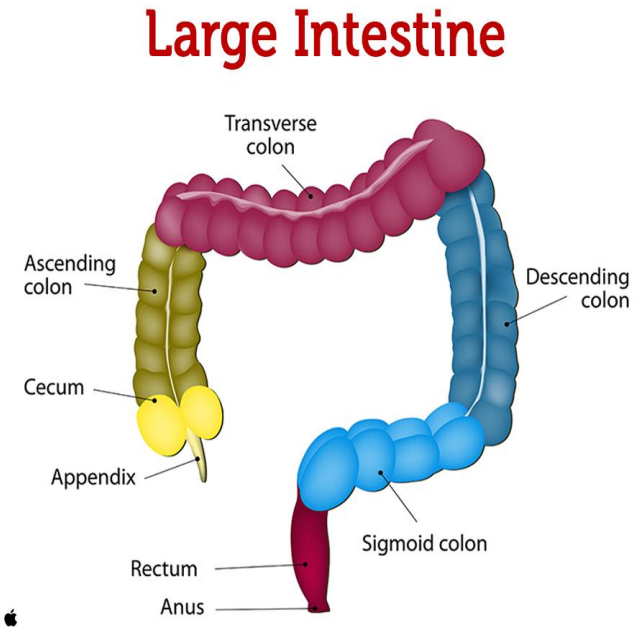
- Common name: **whipworm**

Distribution

- It is distributed **globally** but more common in the tropics and subtropics.

Habitat

- ***Trichuris trichiura*** lives in the large intestine, **mainly in the cecum.**



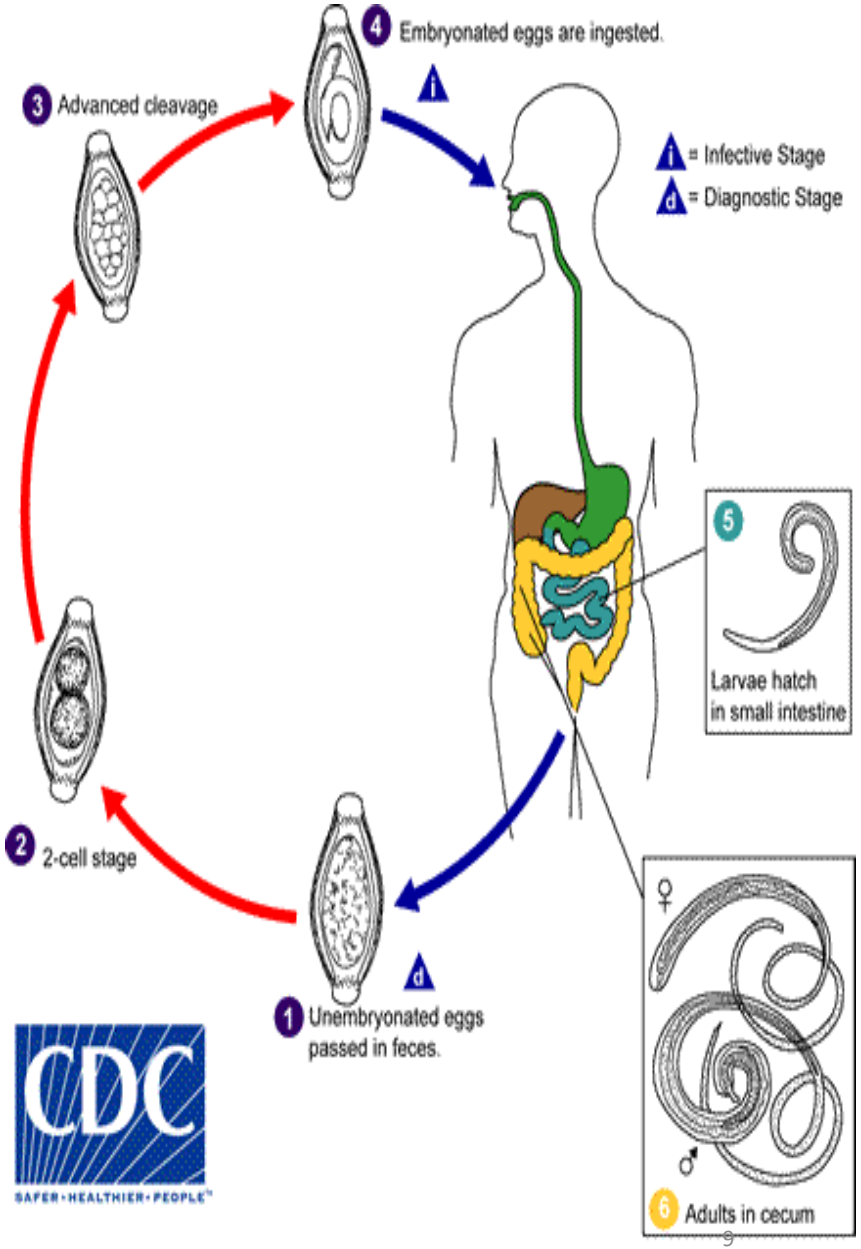
Trichuris trichiura morphology

- The adult **male** worm is smaller than the adult **female**.
- The worm resembles **a whip**, with the anterior portion thin and **thread-like** and the posterior portion **thick and fleshy**.
- The posterior end of the male is **coiled ventrally**, while in the female it is **straight and rounded**.
- The worm has a lifespan of **5–10 years**.
- Its **egg** is **barrel** shaped measuring, with **bipolar plugs** containing an unsegmented ovum when passed in faeces.
- It is **brown** in colour due to bile-stain.

Trichuris trichiura life cycle

1. **Unembryonated eggs** are passed out in faeces of infected human.
2. In the soil, the egg develops into a two-cell stage.
3. It undergoes advanced **cleavage**.
4. Humans acquire infection by ingesting the **embryonated eggs**.
5. The egg hatches into **larva** in the intestine.
6. Larva matures into adult in about **2–3 months** in the **large intestine (caecum)**. Female worm produces eggs which are passed out in the faeces.

- Human is its natural host. No intermediate host is required. The embryonated eggs are the **infective stage** to human.



Pathogenesis and Clinical Features of trichuriasis

- Infection with *Trichuris trichiura* is **usually asymptomatic**, except in heavy infection.
- Blood may ooze out at the site of attachment of the anterior part of the worm.
- It is not a blood feeder like hookworm.
- In heavy and chronic infections, **iron deficiency anaemia** may develop.
- **Mechanical blockage** of the **appendix lumen** by adult worms may cause acute appendicitis.
- The worm may be found even up to the rectum in heavy infection.
- In *Trichuris* dysentery syndrome (TDS), there is heavy colonic infection which causes **mucoid diarrhoea**, **dysentery**, rectal prolapse, and **iron deficiency anaemia.**
- Children with severe *Trichuris trichiura* infection have **growth retardation**, impaired mental development and cognitive function.

Trichuriasis

- **Diagnosis**

1. Microscopic examination.

2. Sigmoidoscopy

- **Treatment**

Mebendazole, albendazole, or ivermectin.

- **Prevention and Control**

1. Proper faecal disposal.

2. Wash fruits and vegetables before consumption.

3. Personal hygiene.

4. Treatment of infected persons.