

Trichuris trichiura

- *Trichuris trichiura* commonly called the whipworm because of its characteristic whip-like shape.
- It causes Trichuriasis in human which is an intestinal infection caused by invasion of the colon by the adult worm.

Habitat:

- The adult worm lives in the large intestine (caecum) of human
- It can also be present in the vermiform appendix and rectum.

Morphology

- The adult worms resemble the whip. The anterior $3/5^{\text{th}}$ of the end is very thin hair like and the posterior $2/5^{\text{th}}$ is thick and stout resembling the handle of a whip.
- The anterior ends penetrate the mucosa layer and remain deeply embedded.
- Adult worms are pinkish in color.
- The anterior end consists of a long oesophagus which is a minute channel while the posterior end contains the intestine and sex organs.

Male worm:

- The adult males are 3-4 cm in length and are recognized by their characteristic coiled posterior end.

Female worm:

- Female worms are longer than males measuring 4-5 cm in length.

- The caudal extremity is either comma shaped or an arc shaped

Eggs

- Egg of *Trichuris trichiura* has diagnostic value. Egg is barrel shaped with a mucous plug at each end.
- It is brown colored (bile-stained) and has a double shell.
- The egg measures 50-54 μm in length and 22-23 μm in breadth.
- Eggs contain an un-segmented ovum when it leaves the human hosts.
- The freshly passed eggs are non-infective to human.
- Eggs float in saturated NaCl solution.

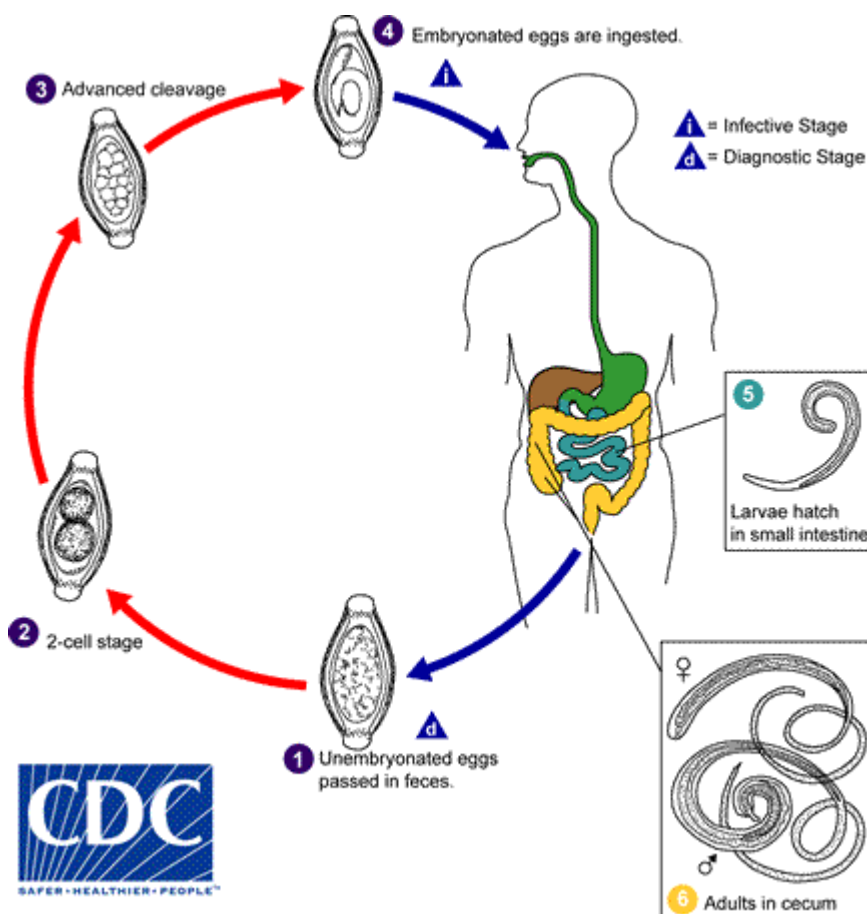
Trichuris trichiura (Eggs)



Life cycle of *Trichuris trichiura*:

- The life cycle of *T. trichiura* is simple and is completed in single host, the man. However, change of host is needed for the continuation of species.
- No intermediate host is required.
- Human acquires infection by ingestion of food or water contaminated with embryonated eggs.
- The digestive enzymes dissolve the eggs shell and the larva emerges out through one of the poles of the eggs.
- The liberated larva then pass down into the caecum which is their site of the localization.

- In caecum the larvae develops into adult worm and become sexually mature within a month from the time of ingestion of eggs.
- The female worm after being fertilized by the male begins to lay the eggs, which is about 3 month after infection.
- The freshly laid eggs are un-embryonated and excreted out with the faeces.
- Each adult female can produce about 5000-7000 eggs per day for upto 5 years.
- Embryogenesis within eggs occur in outside environment in the water or damp soil.
- In tropical climates larva develops within the egg in the course of 3-4 weeks. In temperate climates, the larva takes a long time (6-12 month) to complete its development.
- Once the egg is embryonated, it is infective to human.



Mode of transmission:

1. The food, water and soil contaminated with embryonated eggs are the chief sources of infection.
2. Ingestion of embryonated eggs in the contaminated food and water
3. Contaminated fingers during soil works

Pathogenesis

- The adult worm invades the intestinal mucosa by its thin, thread like anterior end and feeds on tissue secretions but not on blood.
- It causes petechial hemorrhage, inflammation, oedema and mucosal bleeding in the intestinal mucosa at their site of attachment.
- The lumen of appendix can be blocked in case of severe worm load.
- Presence of worms in the mucus membrane irritates the nervous plexus of mucosa causing diarrhea and cramps.
- Occasional eosinophilia can be present
- Approximately 0.005 ml of blood per worm per day is lost in the infected man.

Clinical manifestation

- The clinical manifestation of *Trichuris trichiura* depends upon the intestinal worm load of the person.
- Infection is asymptomatic in case of light infection with 100-200 worms.
- For moderate infection the number of worm should be more than 200 worms and this can manifest as vague abdominal discomfort and diarrhea (rarely bloody), vomiting, headache etc.
- **Trichuriasis:** In case of heavy infection with more than 800 worms, serious complications especially in children are observed.

- It causes bloody diarrhea with profuse mucus, abdominal pain and tenesmus weight loss leading to the cachexia, severe anaemia.
- Distribution of a large number of worms throughout the colon and rectum may cause prolapse of the rectum.
- Migrating worms can occasionally cause appendicitis.

Diagnosis

- Specimen: stool, blood
- **Microscopy:**
 - Finding of characteristic barrel-shaped eggs in the faeces on light microscopy.
 - Stool concentration methods may be required to detect light infection
 - Adult worms may occasionally be present in the stool.
 - The degree of infection can be determined by egg count.
 - In heavy infection stool is frequently mucoid and contains charcot-Leyden crystals.
- **Proctoscopy:** adult worm can be obtained from rectal mucosa sample.
- **Blood test:** shows eosinophilia