Nematodes

General characteristics:

1. Also known as Nemathelminthes.
2. Round worms with cylindrical body.
3. A complete digestive tract including the mouth and an anus.
4. The body is covered with a non-cellular highly resistant coating called cuticle.
5. Have separated
6. Have separated sexes; the female is usually larger than the male. The male has a coiled tail.

The medically important nematodes can divided into two categories according to their primary location in the body:

1. **Intestinal nematodes, include:**

a. *Entrobius* (pinworm)

b. *Trichuris* (whipworm)

c. *Ascaris* (giant roundworm)

d. *Necator* and *Ancylstoma* (hookworm)

2. **Tissue nematodes, include:**

a. *Wuchereia*

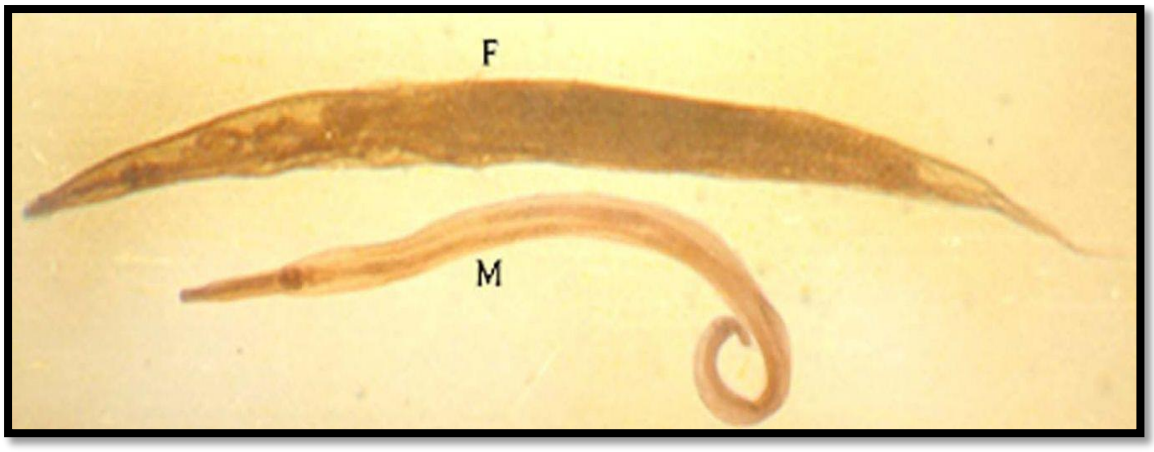
b. *Onchocerca*

c. *Loa loa*

Entrobius vermicularis:

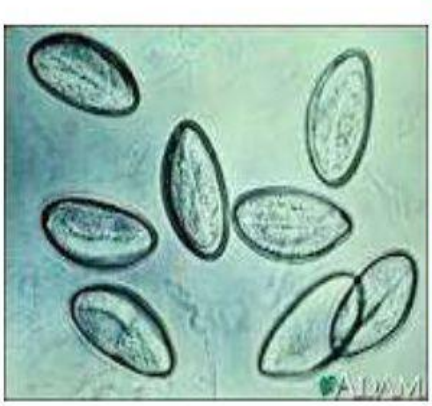
Life cycle

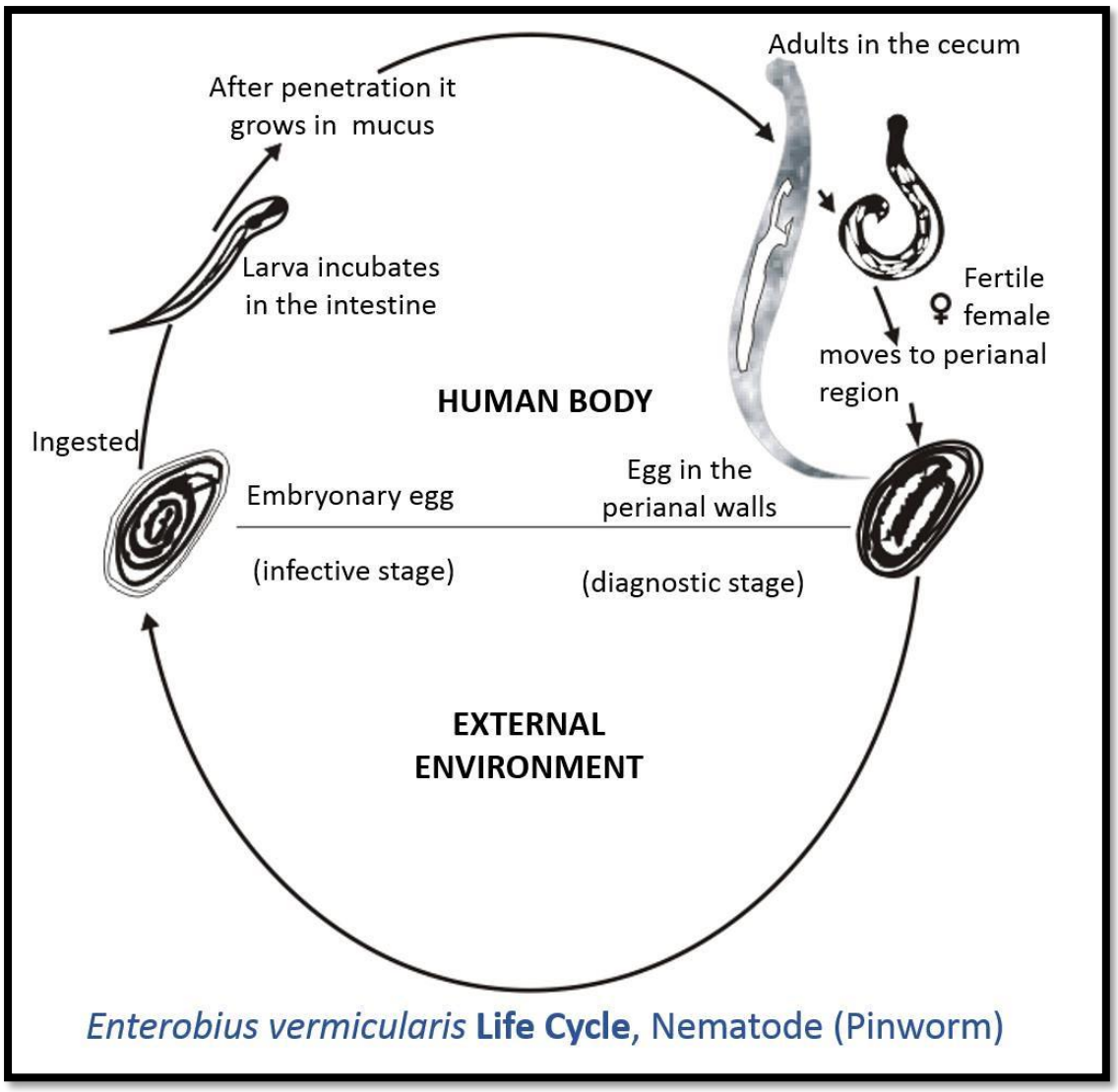
1. *E. vermicularis* causes pinworm infection (entrobiasis).
2. Infection occurs only in humans; there is no animal reservoir or vector.
3. The infection is acquired by ingesting the worm eggs.
4. The eggs hatch in the small intestine, where the larvae differentiate into adult and migrate to the colon.
5. The adult male and female worms live in the colon, where mating occurs.
6. At night the female migrate from the anus and release thousands of fertilized eggs on the perianal skin and into the environment.
7. Within 6 hours, the eggs develop into embryonated eggs and become infectious.
8. Re-infection can occur if they are carried to the mouth by fingers after scratching the itching skin.



E. vermicularis

PINWORM





Pathogenesis & clinical findings:

Perianal pruritus is the most prominent symptom. Pruritus is thought to be an allergic reaction to the proteins of either the adult female or the eggs. Scratching predisposes to secondary bacterial infection.

Epidemiology:

Entrobius is found worldwide. Children younger than 12 years of age are the most commonly affected groups.

Laboratory diagnosis:

The eggs are recovered from perianal skin by using the **scotch tape** technique and can be observed microscopically.

Unlike those of other intestinal nematodes, these eggs are not found in the stool. The small whitish adult worms can be found in the stool or near the anus of diaper children. No serological tests are available.

Treatment:

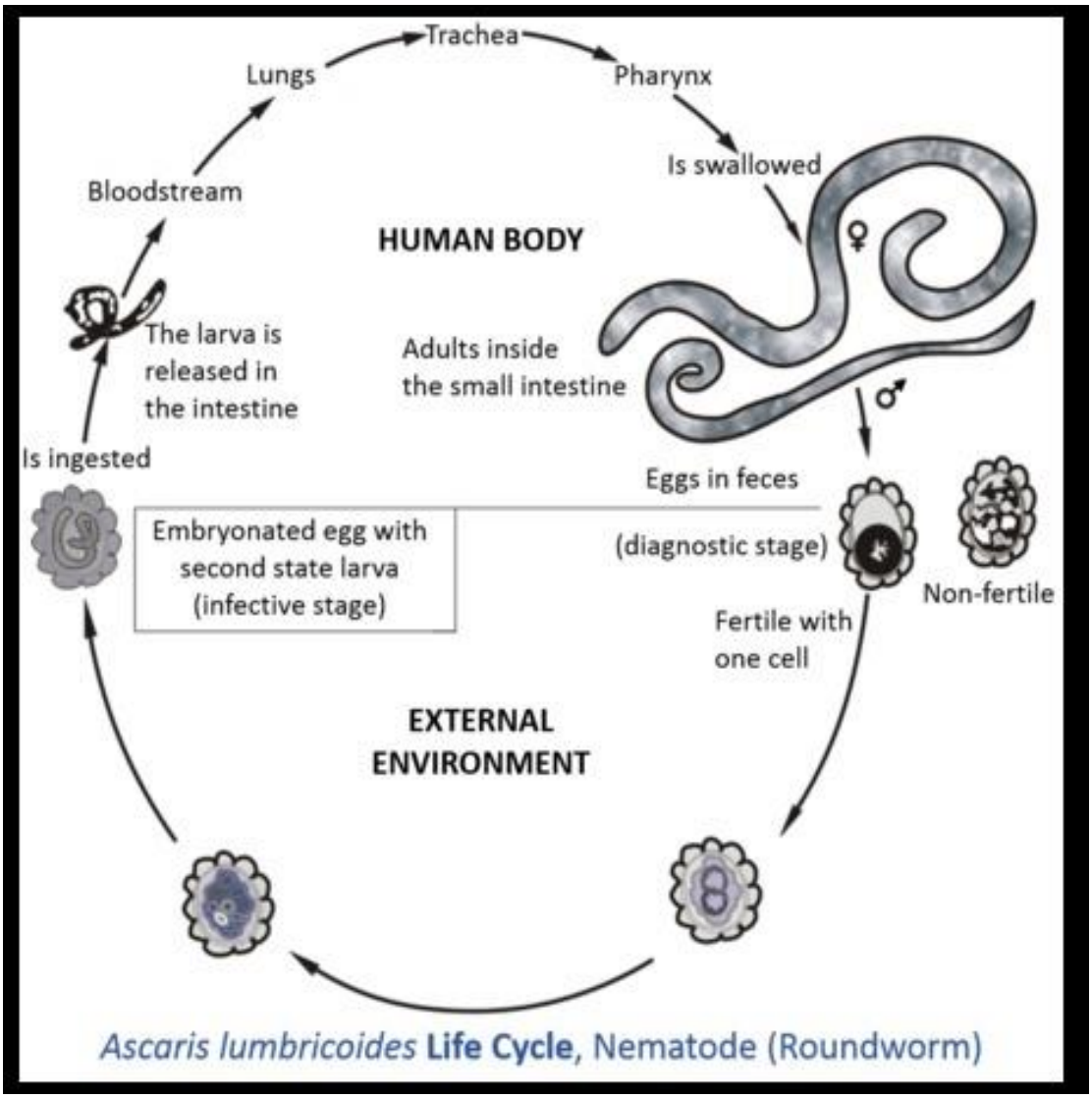
The drug of choice is Albendazole or mebendazole. These drugs kill the adult worm in the colon but not the eggs so re-treatment in two weeks is suggested. Re-infection is very common.

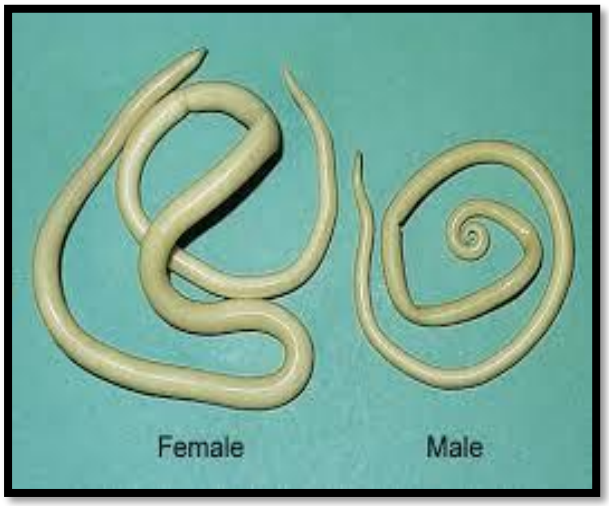
Ascaris lambricoid:

Life cycle:

1. The disease is ascariasis.
2. Humans are infected by ingesting worm eggs in food or water contaminated with human feces.
3. The eggs hatch in the small intestine, and the larvae migrate through the gut wall into the blood stream and then to the lungs, they enter the alveoli, pass up the bronchi and trachea, and are swallowed.
4. Within the small intestine, they become adults. They live in the lumen do not attach to the wall, and driven their sustained from ingested food.
5. The adults are the largest intestinal nematodes, often growing to 25 cm or more, it is called the giant round worm.
6. Thousands of eggs are laid daily, are passed in the feces, and differentiate into embryonated eggs, in warm moist soil.

7. Ingestion of the embryonated eggs complete the life cycle.





Pathogenesis and clinical findings:

The major damage occurs during larval migration rather than from the presence of the adult worm in the intestine. The principal sites of tissue reaction are the lungs, where inflammation with eosinophilic exudates occurs in response to larval antigens. Because the adult derive their nourishment from ingested food, a heavy worm burden may contribute to malnutrition, especially in children.

Ascaris pneumonia with fever, cough and eosinophilia can occur with a heavy larval burden. Abdominal pain and even obstruction can result from the presence of adult worms in the intestine.

Epidemiology:

Ascaris infection is very common, especially in the tropics; hundred of millions of people are infected

Laboratory diagnosis:

Diagnosis is usually made microscopically by detecting eggs in the stool.

The egg is oval with an irregular surface. Occasionally the patient sees the adult worms in the stool.

Treatment:

Albendazole and mebendazole are effective.