

INTESTINAL NEMATODES

1- INTESTINAL NEMATODES WITH TISSUE STAGE

Ascaris lumbricoides

Morphology :

Adult:

- 1- separate sexes , MALE nematodes are generally smaller in size than female.
- 2- cylindrical in shape, creamy-white or pinkish in color.
- 3- The female averages 20-35cm in length, the largest 49cm.
- 4- The male is smaller, averaging 15-31cm in length and distinctly more slender than the female.
- 5- The typical curled tail with a pair sickle like copulatory spines. On the tip of the head there are three lips, arranged as a Chinese word “ 品 ”

Eggs

The egg is ovoidal, 75x60 microns, covered by albuminous mamillatins

Development is similar in all nematodes. Consists of 4 larval (=juvenile) stages between the egg and adult. Each stage is separated by a molt of the cuticle.

M₁ M₂ M₃ M₄

Egg → L₁ → L₂ → L₃ → L₄ → Adult

Life cycle:

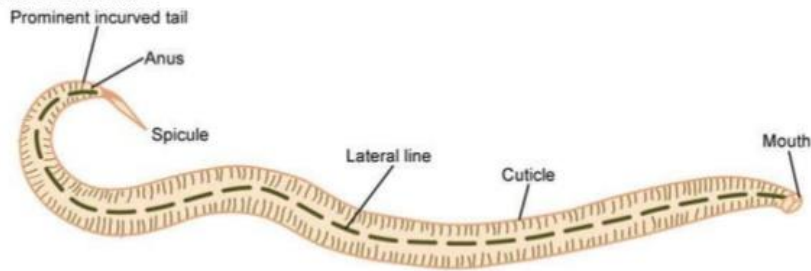
Direct life cycle with migration , the host is human. Ingested eggs hatch in the duodenum. The larvae penetrate the intestinal wall and circulate in the blood. From the heart they migrate to the lungs, ascend to the trachea, descend to the esophagus and finally reach the small intestine to become adult. The female pass immature eggs which pass to the soil and mature in 2 weeks.

infective stage :embryonated eggs

diagnostic stage : eggs or adult

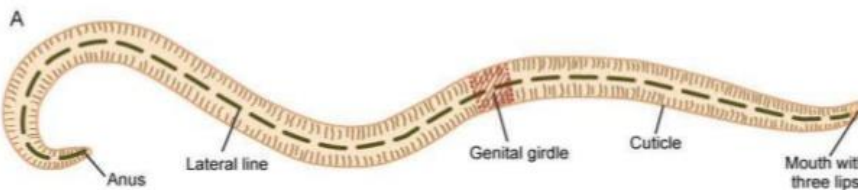
disease: ascariasis .

Adult male



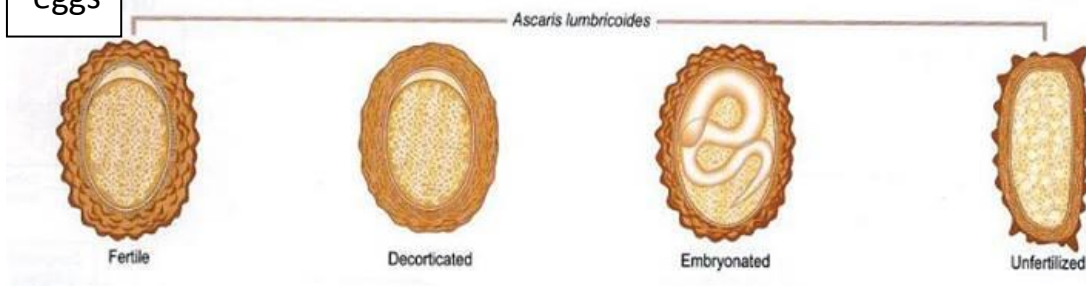
Average size: length is seldom up to 30 cm
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Adult female

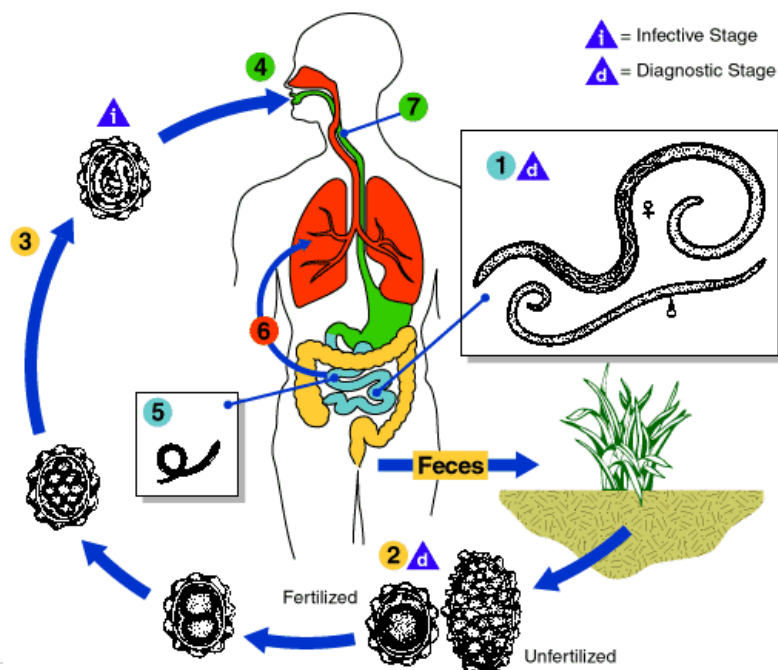


Average size: 22-35 cm long
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eggs



Life cycle



Pathogenecity and clinical features:

Adult worms in the intestine cause abdominal pain and may cause intestinal obstruction especially in children. Larvae in the lungs may cause inflammation of the lungs (**Loeffler's syndrome**) – pneumonia-like symptoms.

Diagnosis

1. Examination of stool for eggs by direct saline smear method.
2. Demonstration of adult worms

Ancylostoma duodenale:

1. They look like an odd piece thread and are about 1cm. They are white or light pinkish when living. ♀ is slightly larger than ♂. The male's posterior end is expanded to form a copulatory bursa.

2-Head is slightly bend (hook) and the 'mouth' carries characteristic teeth.

3-The posterior end of the male worm is elaborated into a copulatory bursa.

4. Eggs: 60×40 µm in size, oval in shape, shell is thin and colorless. Content is 2-8cells.

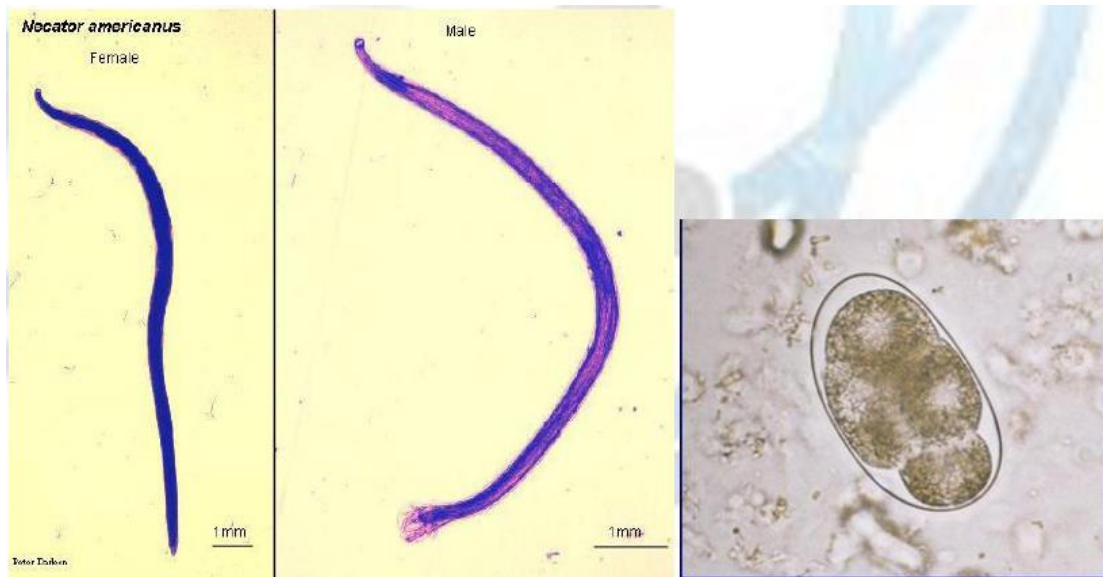
host: human.

Infective Stage: filariform larva.

diagnostic stage : eggs.

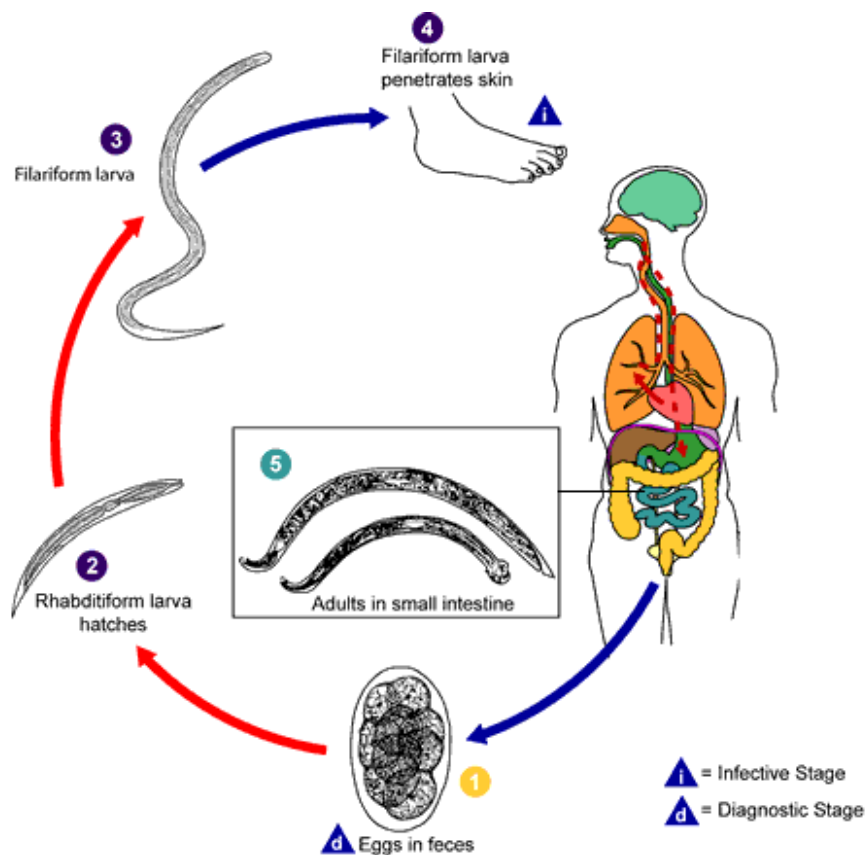
Infective Route: by skin.

Blood-lung migration: skin, cavum, right heart, lungs



Life cycle

Adult male and female worms live in the small intestine. The female lays eggs (oval, 60x40 microns), which contain immature embryo in the 4 cell stage. When the eggs pass in the stool to the soil and under favorable conditions of temperature, moisture and oxygen, they hatch into larvae, which molt twice and become infective. When the filariform larvae penetrate the skin, they circulate in the blood, reach the lungs, ascend to the trachea, descend to esophagus to reach the small intestine and become adults.



Pathogenecity

- 1- (**Adult worms**) in the intestine feed on blood causing iron deficiency anemia.
- 2- (**The larvae**) may cause inflammation of the lungs.

Diagnosis:

Examination of stool by direct saline smear to detect the eggs.

2- INTESTINAL NEMATODES WITHOUT TISSUE STAGE

***ENTEROBIUS VERMICULARIS* (PIN WORM OR THREAD WORM)**

Enterobius vermicularis is a small white worm with thread-like appearance. The worm causes enterobiasis. Infection is common in children.

Morphology

Male: The male measures 5 mm in length. The posterior end is curved and carries a single copulatory spicule.

Female: The female measures 13 mm in length. The posterior end is straight.

Infective stage : embryonated eggs

Mode of infection :

- 1- By direct infection from a patient (Fecal-oral route).
- 2- **Autoinfection:** the eggs are infective as soon as they are passed by the female worm. If the hands of the patient get contaminated with these eggs, he/she will infect him/herself again and again.
- 3- Aerosol inhalation from contaminated sheets and dust.



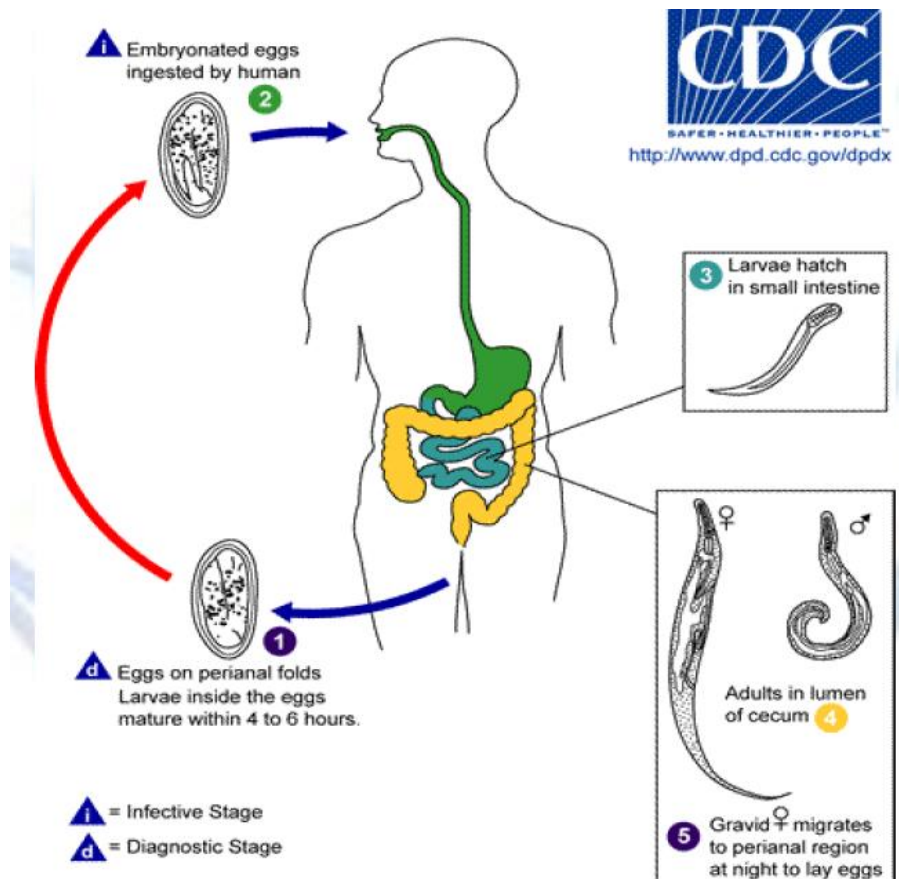
Eggs



Adult

Life cycle

Adult worm lives in the large intestine. After fertilization, the male dies and the female moves out through the anus to glue its eggs on the perianal skin. This takes place by night. The egg is 50x25 microns, plano-convex and contains larva. When the eggs are swallowed, they hatch in the small intestine and the larvae migrate to the large intestine to become adult.



Pathogenicity and Clinical presentation

- 1- The migration of the worms causes allergic reactions around the anus.
- 2- During night it causes nocturnal itching (pruritus ani) and enuresis. The worms may obstruct the appendix causing appendicitis.

Diagnosis

- 1- Eggs in stool: Examination of the stool by direct saline smear to detect the egg: this is positive in about 5% of cases because the eggs are glued to the peri-anal skin.
- 2- Peri-anal swab: The peri-anal region is swabbed with a piece of adhesive tape (cellotape) held over a tongue depressor. The adhesive tape is placed on a glass slide and examined for eggs. The swab should be done in the early morning before bathing and defecation.

***TRICHURIS TRICHIURA* (Whip Worm)**

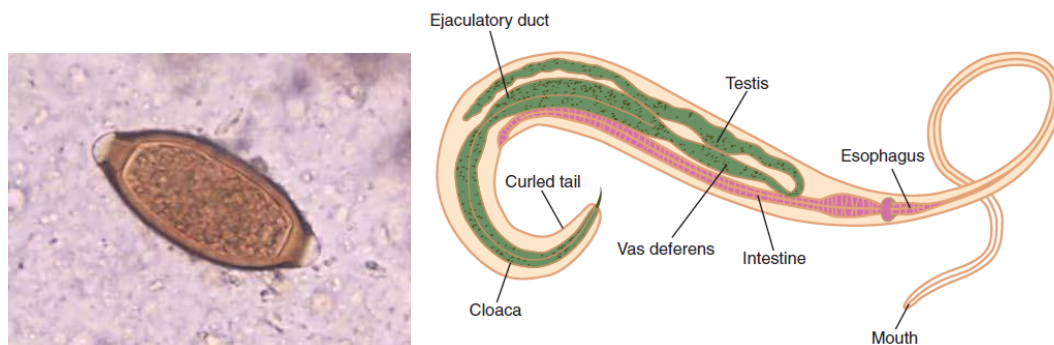
The worm is divided into a thin whip-like anterior part measuring 3/5 of the worm and a thick fleshy posterior part of 2/5 the length.

Male: The male measures 3-4.5 cm in length. Its posterior end is coiled and possesses a single cubicle.

Female: The female measures 4-5 cm in length. Its posterior end is straight

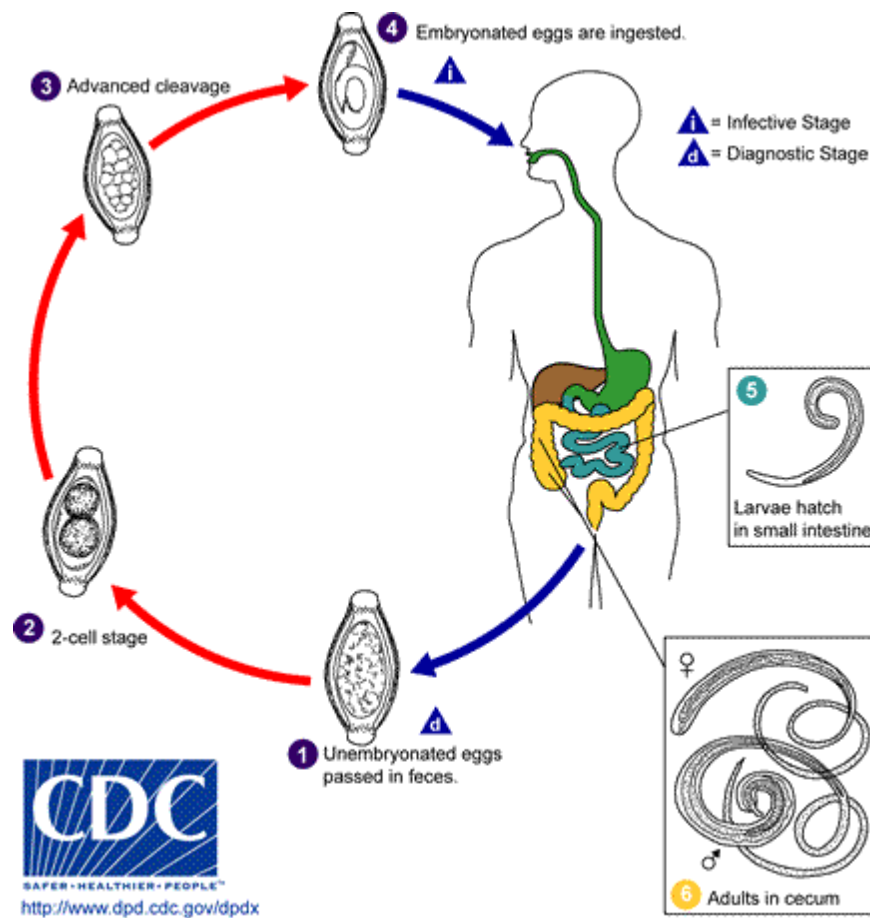
Infective stage and mode of infection

Infection is by ingestion of embryonated eggs (containing larvae) with contaminated raw vegetables.



Life cycle:

Ingested eggs hatch in the small intestine and the larvae migrate to the large intestine to become adult. After mating, the female lays immature eggs, which pass with the stool to the soil and mature in 2 weeks.



Symptoms

- 1- The patient complains of dysentery (blood and mucus in stool together with tenesmus).
- 2- **(Rectal prolapse)** تدلي المستقيم is also possible.

Diagnosis

Stool examination : Finding of characteristic eggs. The egg of trichuris is barrel-shaped, 50x25 microns. The shell is thick with a one mucoid plug at each pole.