Trichuris trichiura
Trichinella spiralis

Trichuris trichiura

Whipworm (*Trichuris trichiura*) is an intestinal parasite of humans. The larvae and adult worms live in the intestine of humans and can cause intestinal disease. The name is derived from the worm's distinctive whip-like shape.

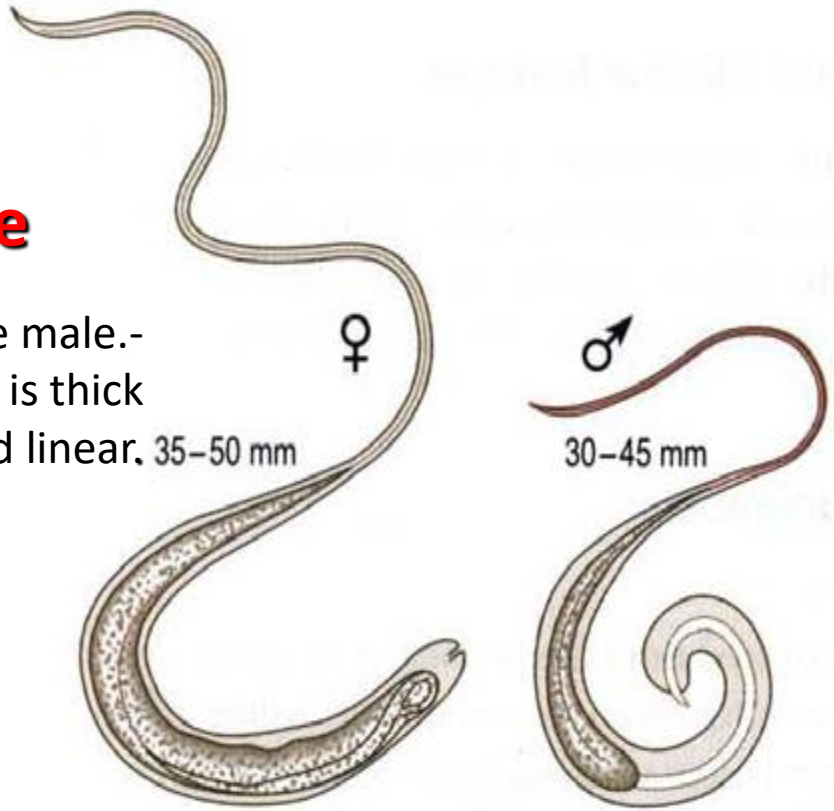
Transmission

Whipworms live in the intestine and whipworm eggs are passed in the feces of infected persons. If the infected person defecates outside (near bushes, in a garden, or field), or if the feces of an infected person are used as fertilizer, then eggs are deposited on the soil. They can then mature into a form that is infective. Roundworm infection is caused by ingesting eggs. This can happen when hands or fingers that have contaminated dirt on them are put in the mouth, or by consuming vegetables or fruits that have not been carefully cooked, washed or peeled.

- The anterior end two-thirds of the body being very thin (looks like a whip).
- Adult worm penetrates into and embed its whip-like anterior portion in the intestinal mucosa, By small spear

Adult female

Longer than the male.-
- posterior end is thick and linear.



Adult male

Shorter than the female.- posterior end curved and has a single spicule- enveloped with sheath.

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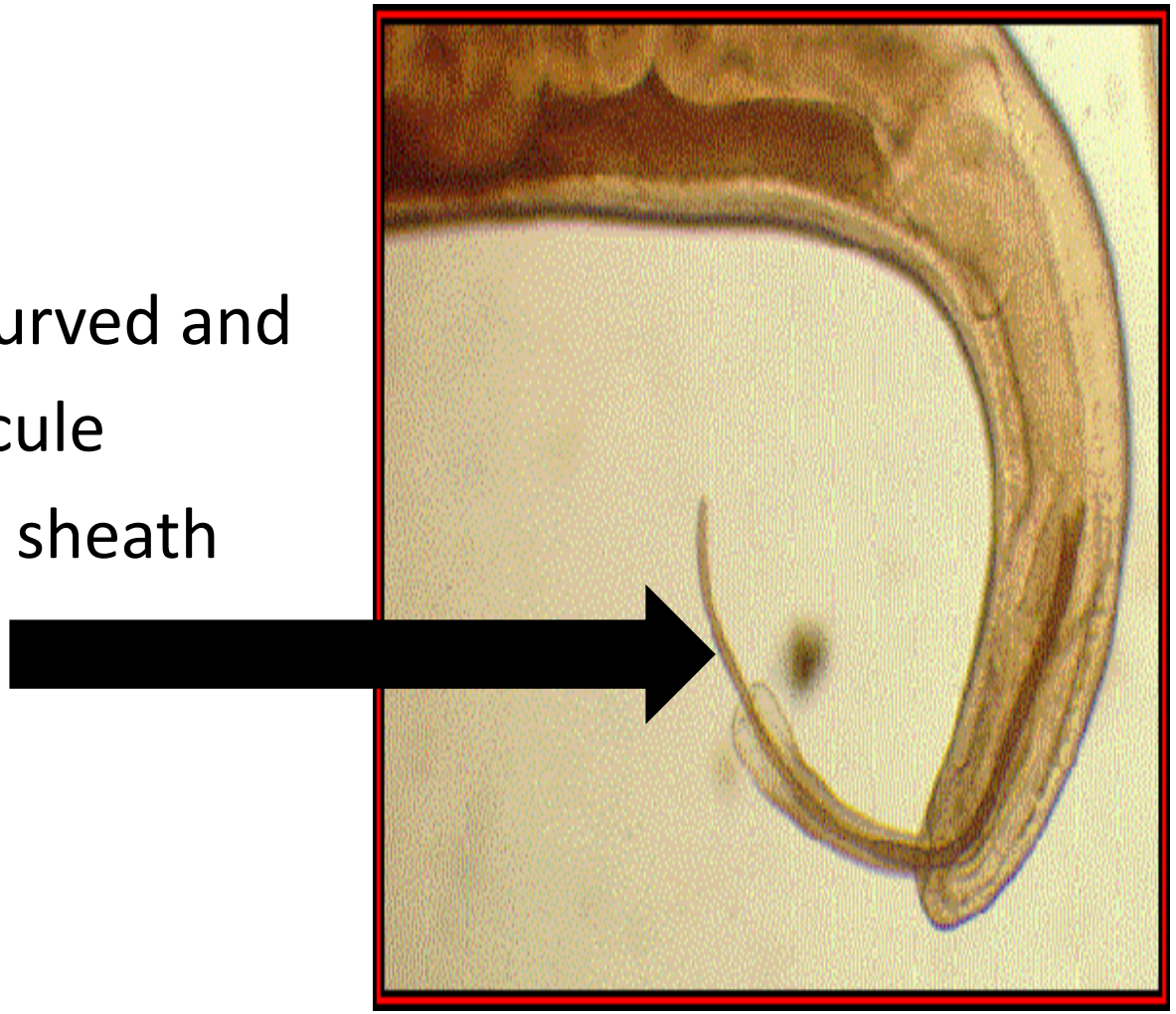
posterior end curved and has a single spicule enveloped with sheath



Eggs:

Shape: barrel–shaped

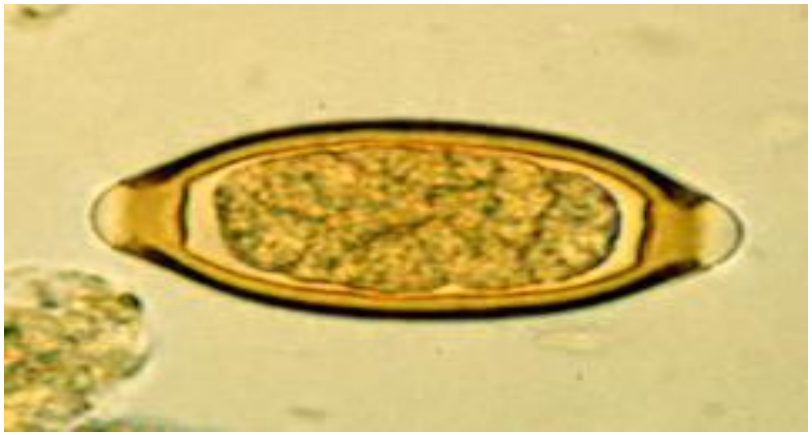
Size: 50-55 x 25-30µm

Shell: thick egg shell with 2 polar plugs

Color: Yellow-brown

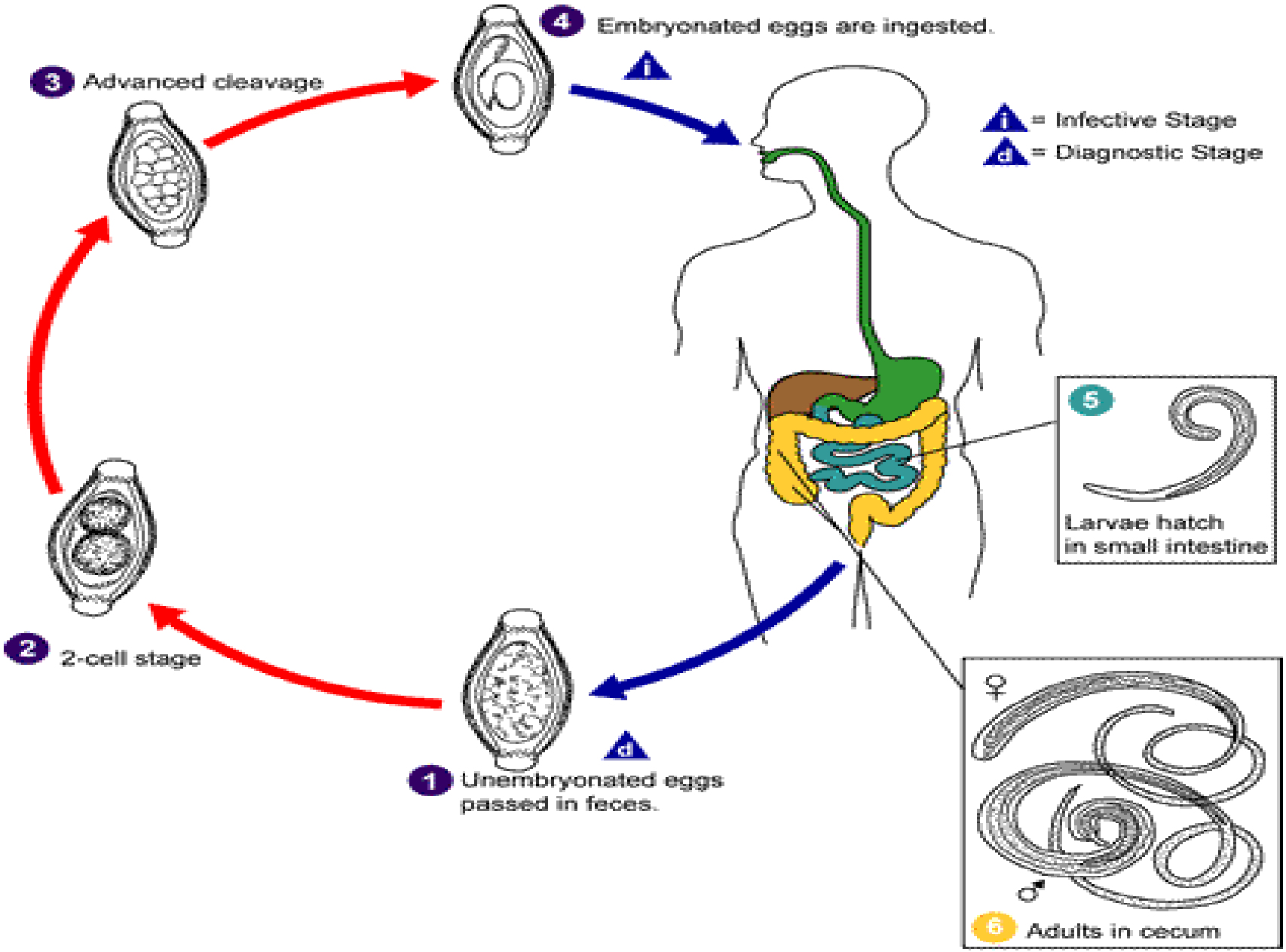
Content: immature egg cells

3000-10000 eggs daily output



Life Cycle

The unembryonated eggs are passed with the stool . In the soil, the eggs develop into a 2-cell stage ,and then they embryonate ; eggs become infective in 15 to 30 days. After ingestion (soil-contaminated hands or food), the eggs hatch in the small intestine, and release larvae that mature and establish themselves as adults in the colon . The adult worms live in the cecum and ascending colon. The adult worms are fixed in that location, with the anterior portions threaded into the mucosa. The females begin to oviposit 60 to 70 days after infection. Female worms in the cecum shed between 3,000 and 20,000 eggs per day. The life span of the adults is about 1 year.


4 Embryonated eggs are ingested.
i
i = Infective Stage
d = Diagnostic Stage
3 Advanced cleavage
5
Larvae hatch
in small intestine
2 2-cell stage
d
1 Unembryonated eggs
passed in feces.
♀
♂
6 Adults in cecum

Clinial Signs

- Light infection with Trichiuris are asymptomatic
- Havier infections are characterized by

1- diarrhea,

2- anorexia,

3- nausea

4- abdominal pain

5- anemia may be the result of hemorrhaging when the worms penetrate the intestinal wall(damage)

Rectal prolapse.

Children's infection can cause rectal prolapse, The reason is the cecum is damaged by the worm, the cecum can be pushed out from the anus.

Laboratory diagnosis

1- Eggs or worm in feces. Eggs are oval, barrel shaped,
2- Eosinophilia may occur.
3- In heavy infection proctoscopy or sigmoidoscopy, can show the worms attached to the mucosa.
4- Visual detection of adult worms on prolapsed rectum.

- **Treatment**

- Antihelminthic medications (drugs that rid the body of parasitic worms), such as albendazole and mebendazole, are the drugs of choice for treatment. Infections are generally treated for 3 days. The recommended medications are effective. Health care providers may decide to repeat a stool exam after treatment. Iron supplements may also be prescribed if the infected person suffers from anemia.

Trichinella spiralis

Trichinellosis, also called trichinosis, is caused by eating raw or undercooked meat of animals infected with the larvae of a species of worm called *Trichinella*. Infection occurs commonly in certain wild carnivorous (meat-eating) animals such as bear or cougar, or omnivorous (meat and plant-eating) animals such as domestic pigs or wild boar.

Epidemiology

The worldwide prevalence of trichinosis infection has declined largely due to legislation requiring proper preparation of garbage used as hog food, storage of pork products, public awareness, and possibly a decline in the consumption of pork [3]. Reported cases of trichinosis today occur mainly in developed countries, including Europe, Asia, and North America

Morphology

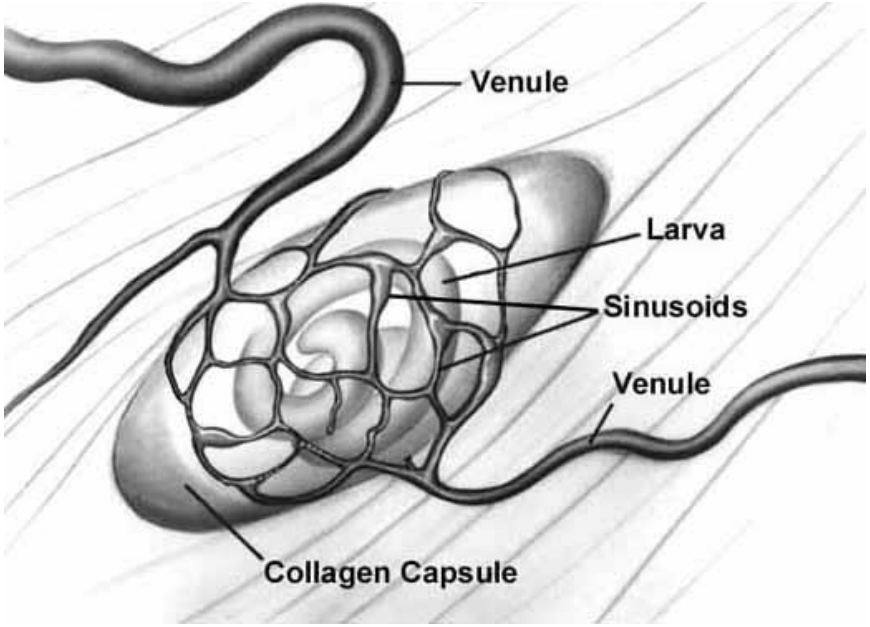
The adult male nematodes have claspers at their posterior end and measure 1.4mm to 1.6 mm long while adult females are twice as long, with the uterus at the posterior end and hatching eggs at the anterior end. Both worms are more slender at the anterior than posterior end]

Male

Female

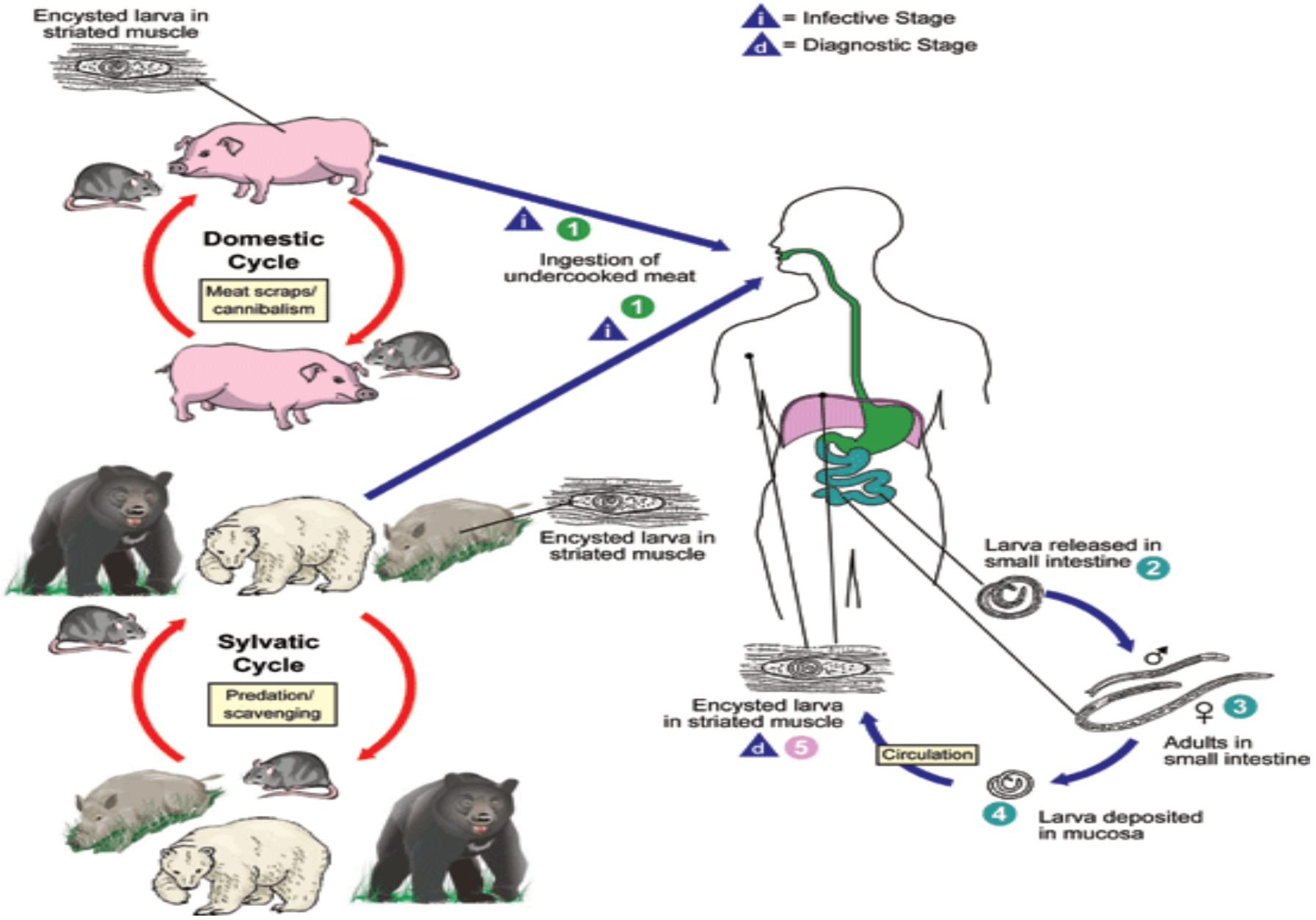
Female worms deposit larvae into:

- The mucosa of small intestine
- Directly into the lymphatics
- Blood stream.
- The larvae carried to all parts of body,
- but the larvae developing only in striated muscle.



Life Cycle

Trichinellosis is acquired by ingesting meat containing cysts (encysted larvae) of *Trichinella*. After exposure to gastric acid and pepsin, the larvae are released from the cysts and invade the small bowel mucosa where they develop into adult worms . After 4 week, the females release larvae that migrate to the striated muscles where they encyst,Encystment is completed in 4 to 5 weeks and the encysted larvae may remain viable for several years. Ingestion of the encysted larvae Live the cycle. Rats and rodents are primarily responsible for maintaining the endemicity of this infection. Carnivorous/omnivorous animals, such as pigs or bears, feed on infected rodents or meat from other animals. Different animal hosts are implicated in the life cycle of the different species of *Trichinella*. Humans are accidentally infected when eating improperly processed meat of these carnivorous animals (or eating food contaminated with such meat).


Encysted larva in striated muscle
i = Infective Stage
d = Diagnostic Stage
Domestic Cycle
Meat scraps/ cannibalism
i 1
Ingestion of undercooked meat
i 1
Encysted larva in striated muscle
Sylvatic Cycle
Predation/ scavenging
Larva released in small intestine 2
♂
♀ 3
Adults in small intestine
Encysted larva in striated muscle
d 5
Circulation
4
Larva deposited in mucosa

Symptoms

The signs, symptoms, severity and duration of trichinellosis vary. Nausea, diarrhea, vomiting, fatigue, fever, and abdominal discomfort are often the first symptoms of trichinellosis. Headaches, fevers, chills, cough, swelling of the face and eyes, aching joints and muscle pains, itchy skin, diarrhea, or constipation may follow the first symptoms. If the infection is heavy, patients may experience difficulty coordinating movements, and have heart and breathing problems. In severe cases, death can occur.

For mild to moderate infections, most symptoms subside within a few months. Fatigue, weakness, muscle pain, and diarrhea may last for months.

Diagnosis

Laboratory diagnosis of *Trichinella* infection is most often made by a *Trichinella* antibody test. In some cases a muscle biopsy may be performed.

Treatment

Mebendazole is the drug of choice