



Trichuriasis

Species *Trichuris trichiura*

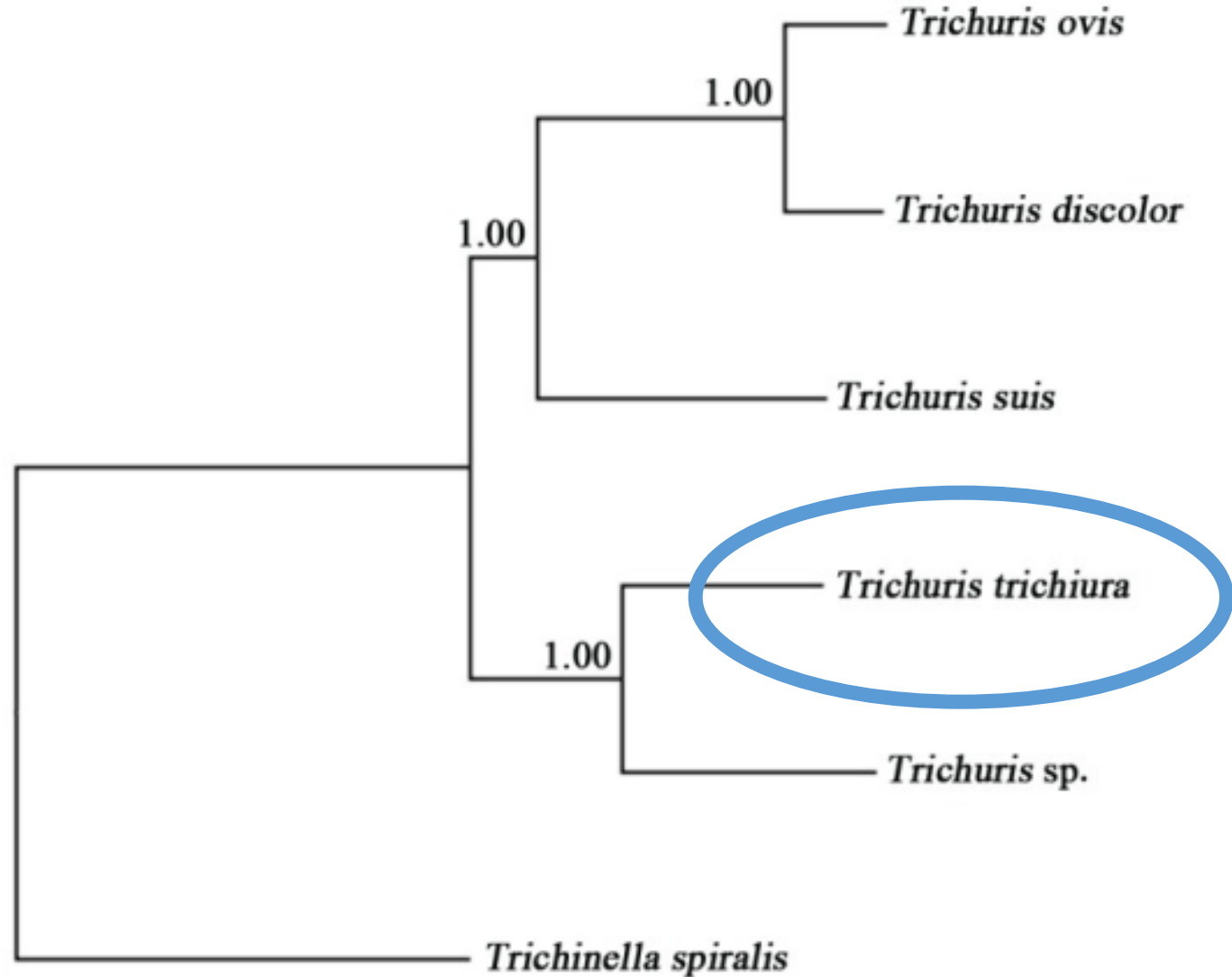
Trichuris trichiura

Phylum Nematoda

Class Enoplea

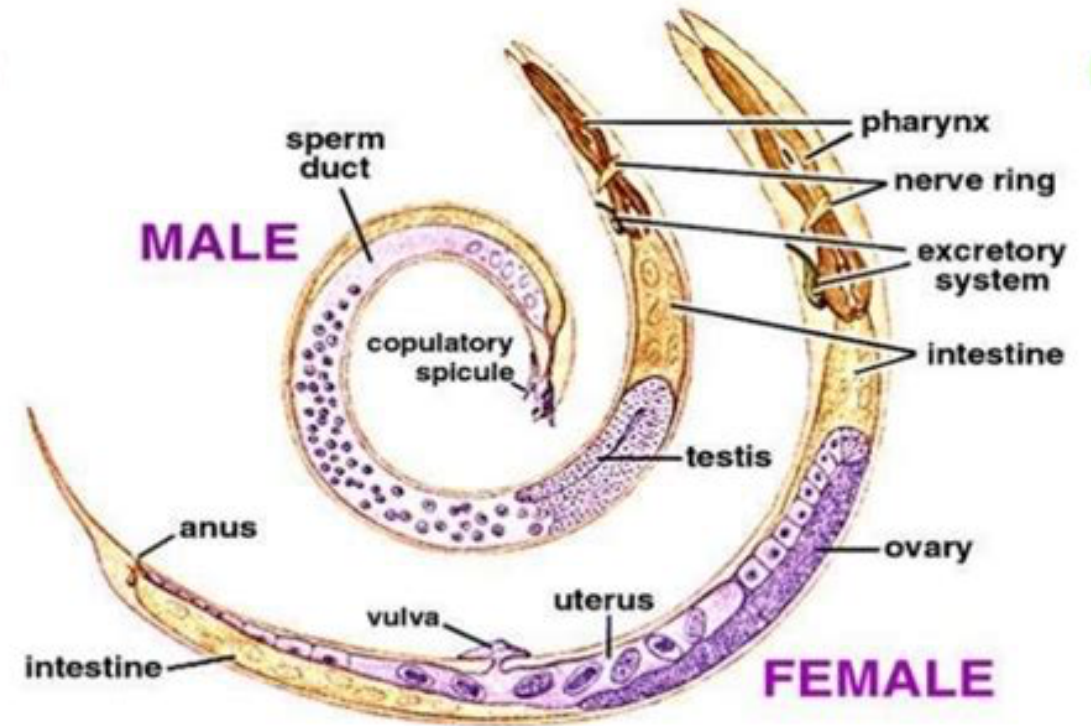
Order Trichocephalida

Family Trichuridae



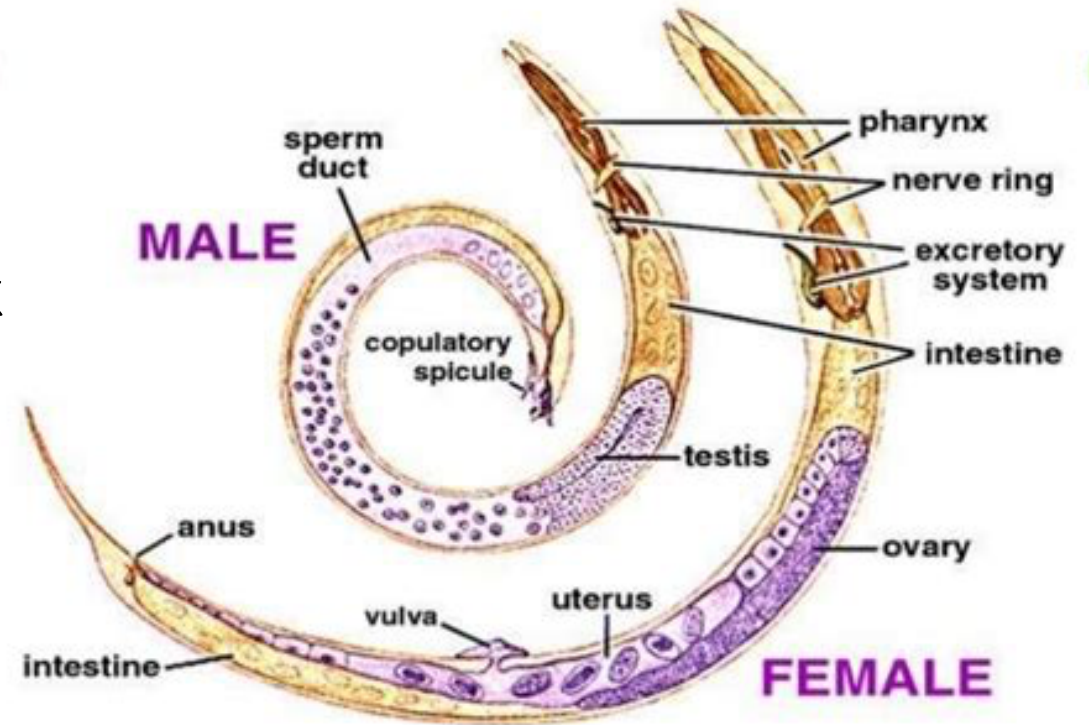
Anatomy

- Endoparasites
- Can be found in the digestive tract of the host
- Only the adults eat,
 - They feed on tissue secretions of intestinal epithelium



Anatomy

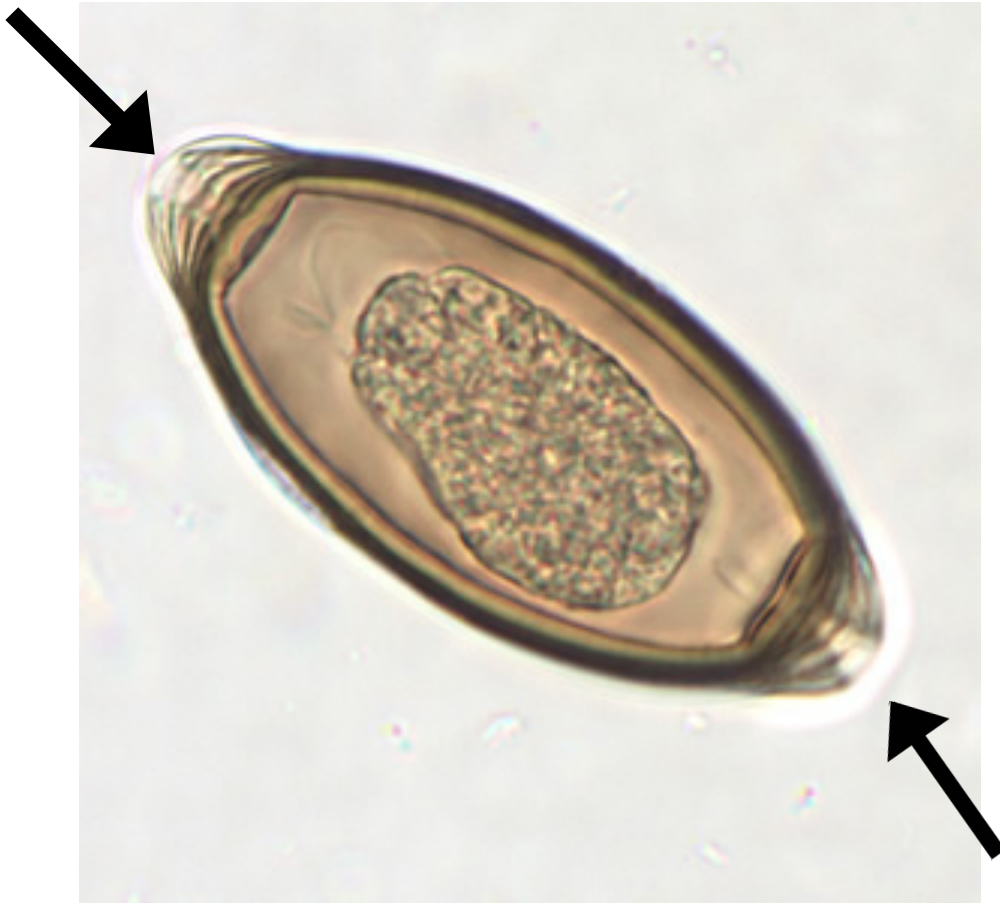
- Dioecious
 - Females typically larger than male.
 - Male has curled posterior end.
- Common name: Whipworm
 - Narrow anterior esophagus and a thick posterior anus.
- Attach to host via slender anterior end.
- Size varies from 3 to 5 cm.
- Typically pink



Reproduction

- Each female produces 2,000-6,000 eggs per day.
 - Life expectancy of a worm within a host is ~ 1-3 years.
- Females may produce a pheromone to attract males.
- Males have a spiracle surrounded by a sheath with an ejaculatory duct
- The curved portion of the male coils around the females genital pore.
- The male uses spicules to hold the female in place during copulation.

Egg Anatomy



- Barrel shaped
- Thick walled
- Plug at each pole

Transmission

- The main mode of transmission is through contaminated water, soil, and food.
 - Touching contaminated soil, typically in areas with poor sanitation practices.
- Children are the most effected by whipworms

Epidemiology

- Soil-transmitted helminthes are considered a **neglected tropical disease**, despite their prevalence.
 - Most prevalent in the under developed countries.
 - Chronic illness, not an acute illness.
 - Effect of this infection on economic and education burden is not quantified.
- STH prevalence is generally higher in rural areas due to,
 - Poor sanitary measures
 - Inadequate water supply
 - Overcrowding

Geographic Distribution

- The global prevalence of *Trichuris trichiura* was 795 million (2003)
- 3rd most common round worm of humans.
- Most frequent in areas with tropical weather and poor sanitation practices.
- Most prevalent in equatorial Africa and Southeast Asia.

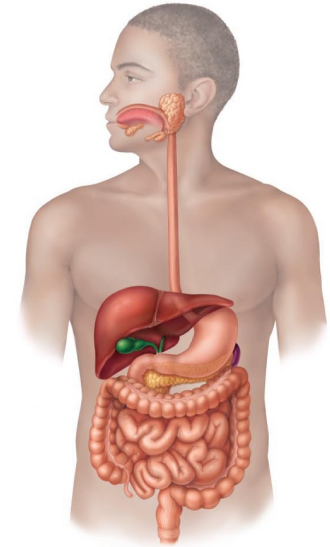


Lifecycle

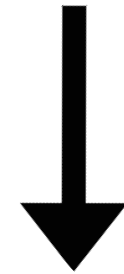
Eggs pass out of
body via feces



Become infective
after embryonation



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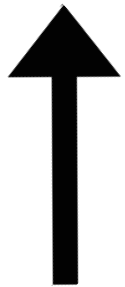
Eggs hatch in
small intestine
& migrate to
large intestine



Molt to become adults
in large intestine



Reproduce
with nearby
worms



Trichuriasis

- Infects;
 - Wild/domestic canines
 - Wild/domestic pigs
 - Humans
 - Non human primates

Host species	Sampled numbers	
	Host	Parasite ^{a, b}
Golden snub-nosed monkey (<i>Rhinopithecus roxellana</i>)	1	1 (1)
Anubis baboon (<i>Papio anubis</i>)	3	4 (1/1/2)
Vervet monkey (<i>Chlorocebus aethiops</i>)	1	2 (2)
Northern pig-tailed macaque (<i>Macaca leonina</i>)	1	3 (3)
Rhesus monkey (<i>Macaca mulatta</i>)	2	4 (2/2)
Northern white-cheeked gibbon (<i>Nomascus leucogenys</i>)	1	2 (2)
Hamadryas baboon (<i>Papio hamadryas</i>)	2	2 (1/1)
Black snub-nosed monkey (<i>Rhinopithecus bieti</i>)	2	2 (1/1)

Xie, Y. et al. Genetic characterization and phylogenetic status of whipworms (*Trichuris* spp.) from captive non-human primates in China, determined by nuclear and mitochondrial sequencing.

Disease



- **Trichuriasis**
- Abdominal colitis
- *Trichuris* dysentery syndrome

Symptoms

Light Infections

- Asymptomatic

Heavy Infections

- Diarrhea
- Abdominal pain
- Malnutrition (anemia)
- Rectal prolapse



Pathology

Diarrhea/Malnutrition

- Burrowing of worm heads into intestinal epithelium can result in increased fluid secretion and decreased absorption of fluid in colon.

Abdominal Pain

- Adults burrow through mucosa in large intestine.
- Leads to cell destruction and immune response

Rectal Prolapse

- High numbers of worms embedded in the rectum can lead to excess fluid in the body, leading to rectal prolapse.

Diagnosis

- Microscopically identifying the presence of eggs in a stool sample.
 - Difficult to identify in light infections.
 - Kato-Katz technique, a thick smear of stool sample is prepared prior to searching for parasite eggs.
- Proctoscopy
 - Examination of rectal mucosa can occasionally demonstrate adult worms.
- Colonoscopy
 - Identify adults worms embedded in colon



Adult *T. trichiura* found during colonoscopy.

Treatment

- Albendazole (egg/larval/adult stages)
 - Anthelmintic agent
 - Blocks egg production and development.
 - Impairs uptake of glucose by the larval and adult stages and depletes glycogen stores.
- Ivermectin
 - Used in combination with Albendazole
 - Interferes with nervous system and muscle function
- Mebendazole (larval/adult stages)
 - Anthelmintic agent
 - Poorly absorbed into blood stream.
 - Used alone in mild to moderate cases, kills parasites slowly with limited adverse side effects.
 - Selectively and irreversibly blocks glucose uptake and other nutrients in the intestine.

References

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