

# Genus : Strongyloides

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# Strongyloides : Morphology

- The adults are free-living with blunt-ended tails, and an elongated, straight-sided oesophagus.
- The free-living adult the female slightly larger than the male .
- Both sexes possess a tiny buccal capsule and cylindrical esophagus without a posterior bulb.
- The ovary is didelphic and opens at the vulva.
- Both sexes have a rhabditiform oesophagus but the larvae have a filariform oesophagus . These larvae have a tripartite pointed tail.
- Males can be distinguished from females by two structures: the **spicules** and **gubernaculum**.



# Strongyloides stercoralis

# Strongyloides : life cycle

- The life cycle is more complex .The parasitic cycle is homogonic, while the free-living cycle is heterogonic.

## In the free-living cycle.

- The rhabditiform larvae passed in the faeces can either -
  - (A) Moults twice and become infective filariform larvae by Direct development  
In the direct development, first-stage larvae (L1) transform into infective larvae (IL) after three moults.or
  - (B)Moults four times and become free-living adult males and females.by Indirect development. The adult male and female mate and produce eggs from which rhabditiform larvae hatch.
- The Indirect development results first in the development of free-living adults that mate; the female lays eggs, which hatch and then develop into Infective larva (IL)

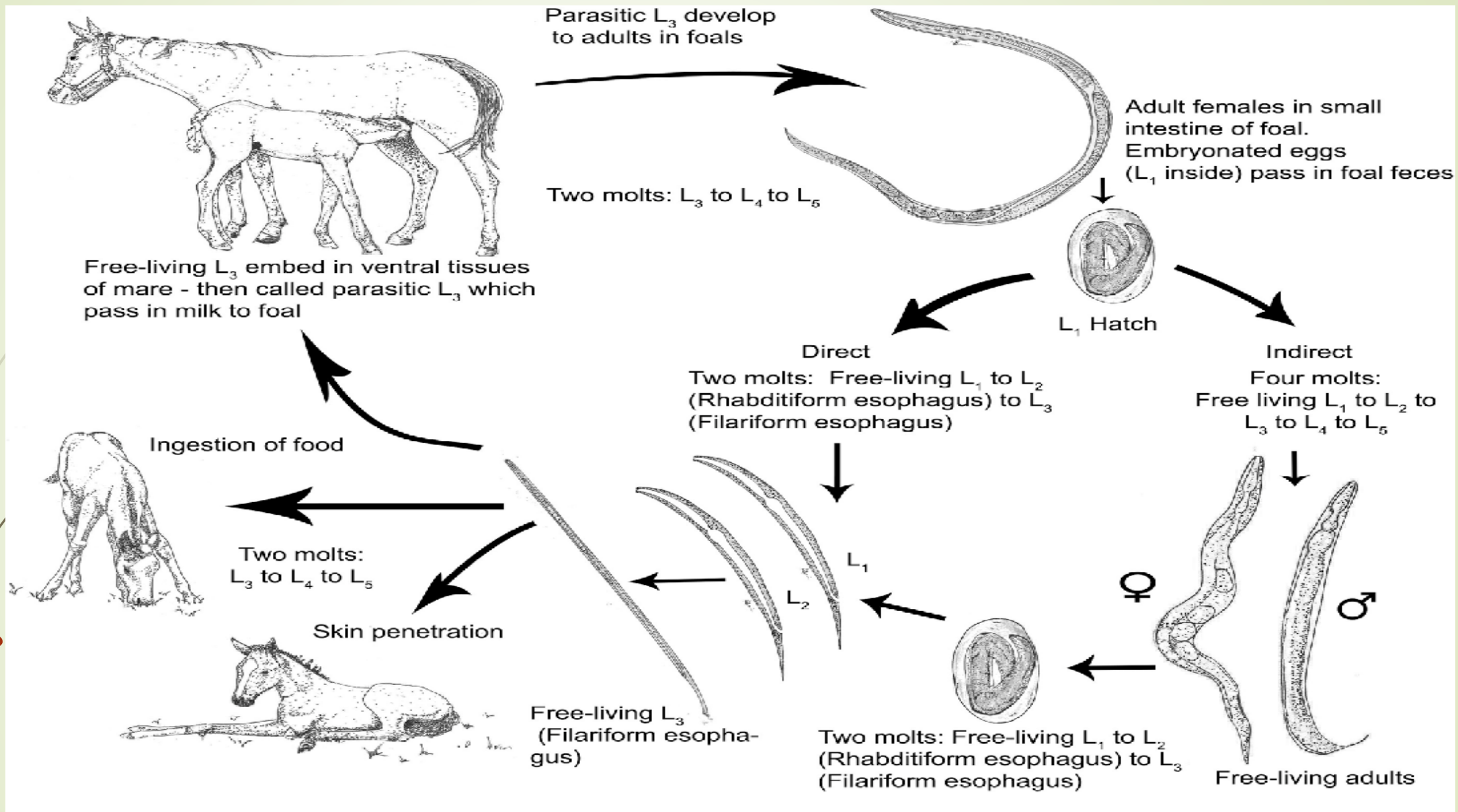
# Strongyloides : life cycle..contd.1

- *The direct development gives IL faster in three days where as the indirect route in seven to 10 days.*
- *In indirect development results in an increase in the number of IL produced than direct development*
- *The free-living males and females die after one generation.*
- The infective larva either develop into a new generation of free-living adults or develop into infective filariform larvae.
- The filariform larvae penetrate the human host skin to initiate the parasitic cycle.
- The infectious larvae penetrate the skin when it contacts soil.
- Then the larva enter the blood circulation then reach to the lungs, where they enter the alveoli.

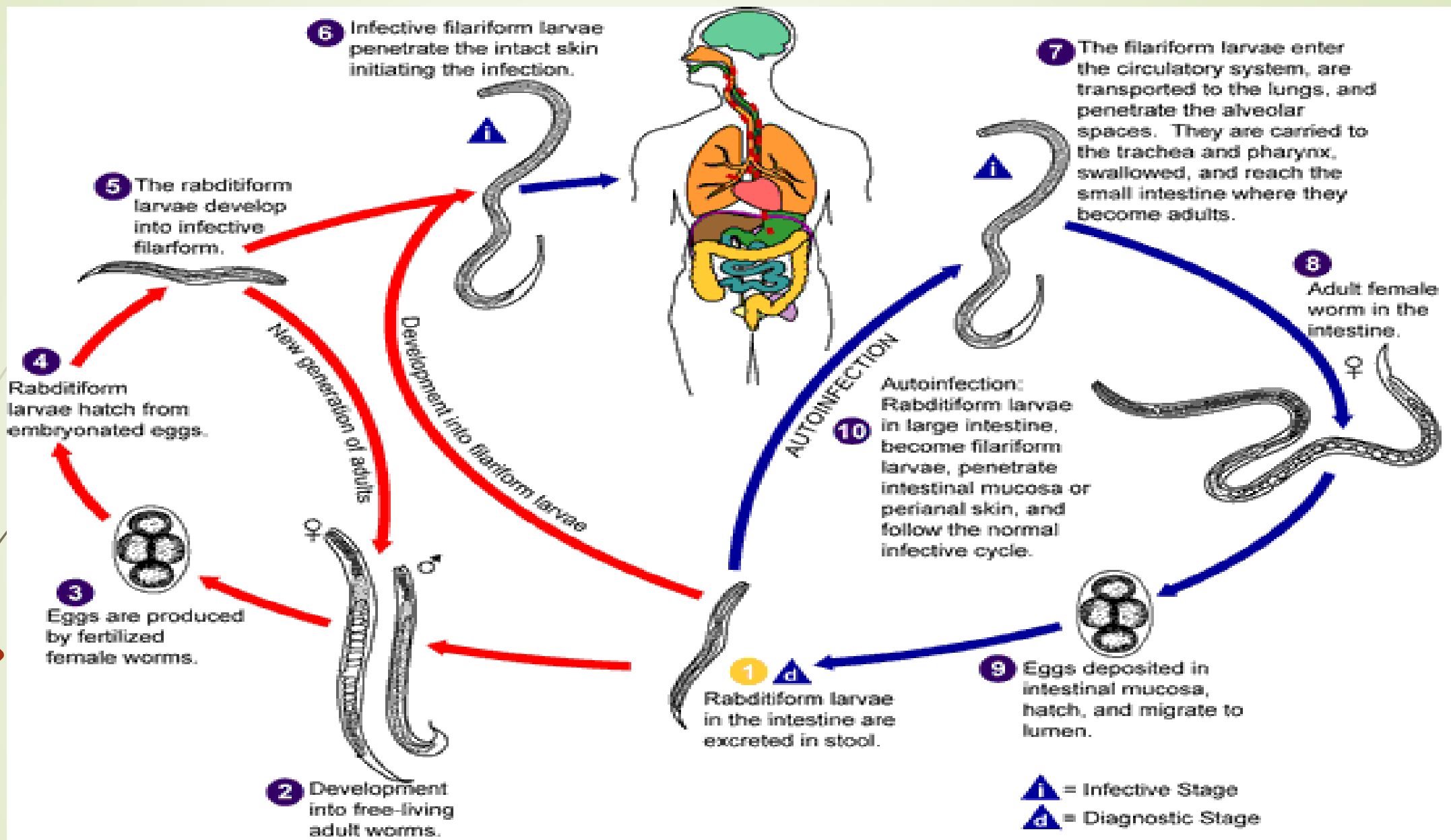
# Strongyloides : life cycle..contd .2

- They are then coughed up and swallowed into the gut, where they parasitise the intestinal mucosa .
- In the small intestine, they moult twice and become adult female worms.
- These females by parthenogenesis produce eggs, only females will reach reproductive adulthood in the intestine. The eggs hatch in the intestine and young larvae are then excreted in the feces. It takes about two weeks to reach egg development to adult stage.

**(C)Autoinfection-** The worms also participate in autoinfection, in which the rhabditiform larvae become infective filariform larvae, which penetrate either the intestinal mucosa (internal autoinfection) or the skin of the perianal area (external autoinfection); in either case, the filariform larvae may follow the previously described route, being carried successively to the lungs, the bronchial tree, the pharynx, and the small intestine, where they mature into adults;.



# Strongyloides life cycle in horse



# Strongyloides life cycle in human



# Strongyloides : Clinical signs

- They may cause intermittent or persistent diarrhea and constipation also.
- Upper abdominal burning or pain.
- Cough, wheezing, chronic bronchitis are another clinical signs.
- In the skin pruritus, urticaria.
- Rashes may occur immediately after contact with the worms.
- Red hives near the anus.
- Vomiting.
- weight loss.

# Strongyloides : Pathogenesis

- Lighter infections remain asymptomatic.
- Severe infections can cause dermal, pulmonary and enteric diseases.
- The migrating larvae under the skin causing *larval currens*, which is characterized by urticaria, pruritis, eosinophilia, dermatitis, and inflammation.
- Pulmonary migration may cause a mild transient pneumonia in man with coughing, wheezing, shortness of breath, and transient pulmonary infiltrates termed as *Loeffler's syndrome*.
- A massive infections may result in necrosis and sloughing of the mucosa, haemorrhage, epigastric pain termed as mimic peptic ulcer or *Crohn's disease*.
- Vomiting, abdominal distention, diarrhoea with voluminous faeces and a *malabsortion* syndrome with dehydration and electrolyte disturbance and arthritis.
- Hyper-infections, when animals are in stressed or immuno-compromised resulting in colitis, pneumonitis or neurological manifestations, such as meningitis and cerebral or cerebellar abscesses.



# Larval currents by strongyloides



# Larval currents by strongyloides

## 2.3 STRONGYLOIDIASIS



Rashes caused by strongyloides

# Strongyloides : Diagnosis

Following tests may be performed to diagnose an infection :

- **Duodenal aspiration** -During this test, after aspiration of fluid from the duodenum, the fluid will examine under microscope .
- **Sputum culture** -Sputum culture can be performed to analyze fluid from lungs or airways for *S. stercoralis*.
- **Examination of faecal sample for ova and parasites.**
- **Complete blood count (CBC) with differential** -It may help to rule out the causes of clinical signs.
- **Blood antigen test.**



# Strongyloides eggs

# Strongyloides : Prevention & control

- The best way to prevent is proper sewage disposal and fecal management .
- Treatment with ivermectin can also be practiced.