

Histopathological impacts of some Helminthes

by

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NEMATODES (ROUND WORMS)

phylum Nemathelminthes belong to the class Nematoda (round worms). *Ascaris lumbricoides* is a large parasitic roundworm of the genus *Ascaris* , is Parasitic roundworm that infects the small intestine of human. People living in tropical and subtropical countries are at greater risk of infection.

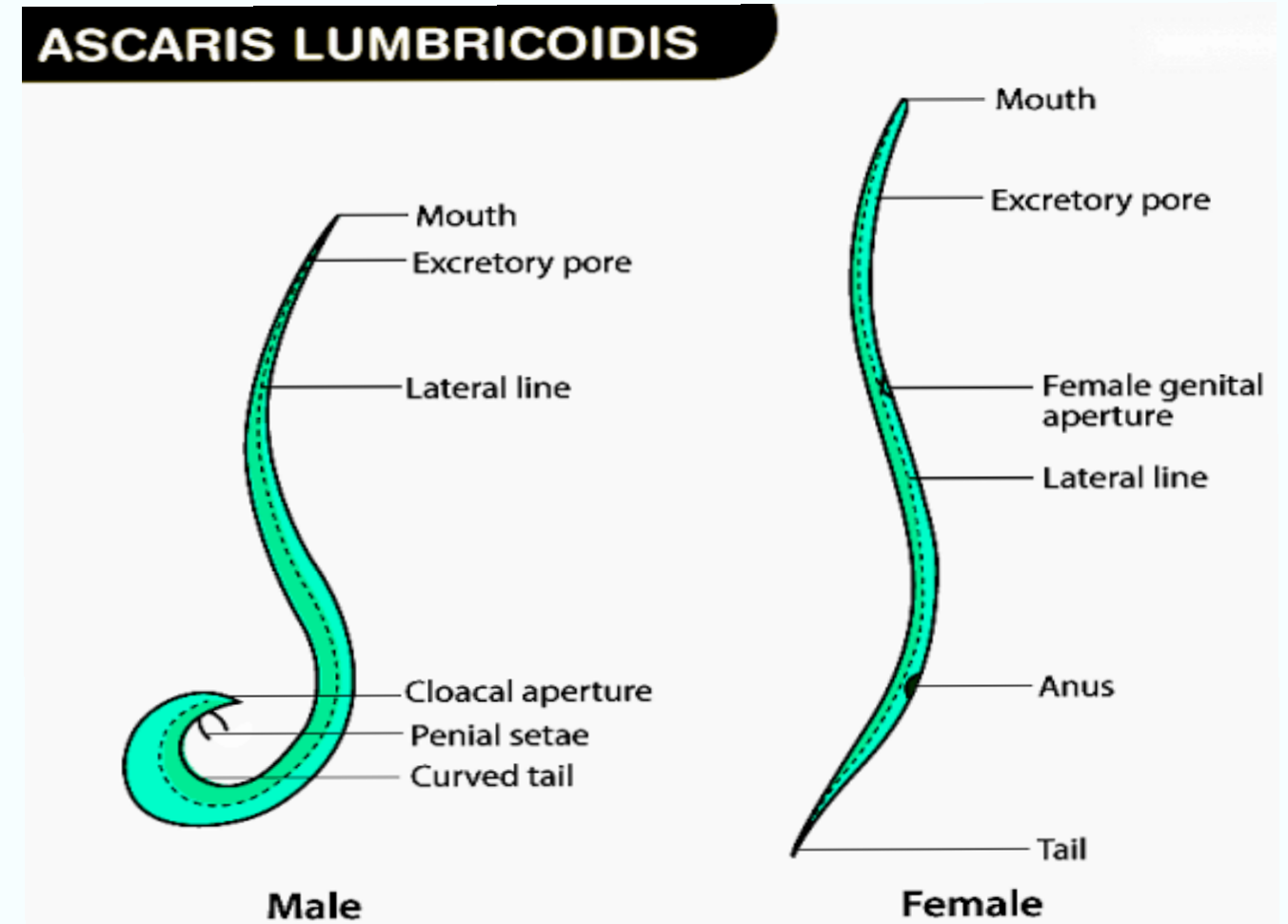
Morphology *Ascaris lumbricoides*

• Adult male

- The adult male worm is little smaller than female. It measures (15- 30) cm in length and (2-4)mm in thickness.
- Its posterior end is curved ventrally to form a hook and carries 2 copulatory spicules

• Adult female

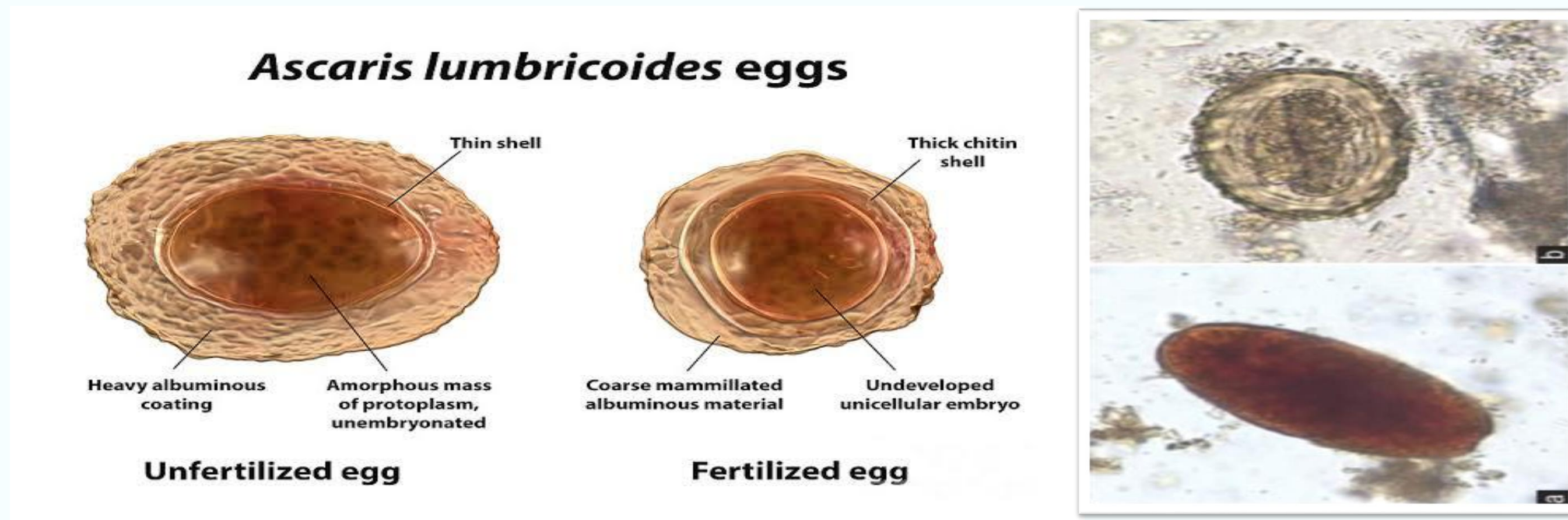
- The female is larger than male, measuring (20- 30)cm length and (3-6)mm in thickness.
- its posterior extremity is straight and conical .



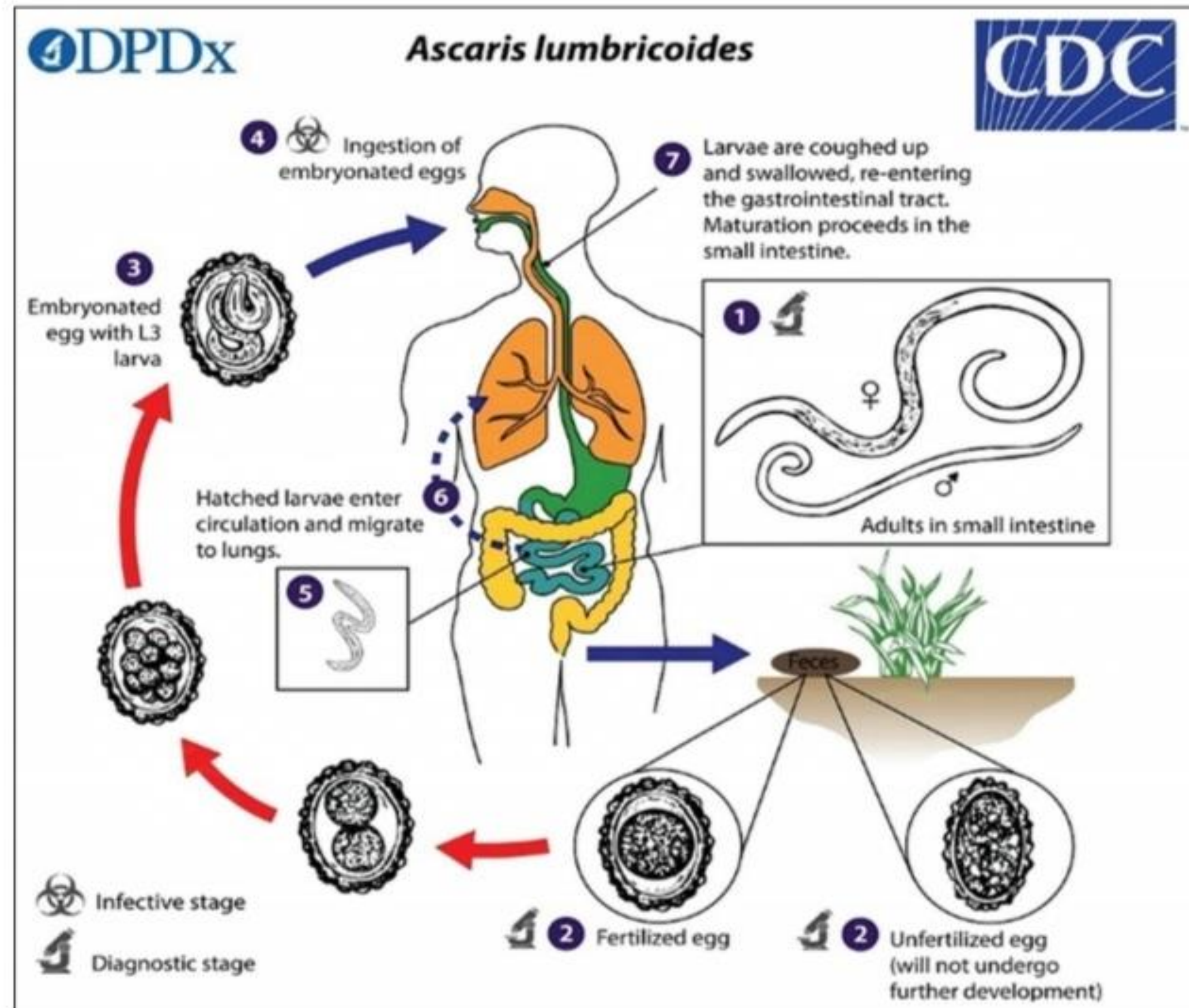
egg

A single worm lays up to 200,000 eggs per day. The egg are passed in feces .

- **fertilized eggs** : laid by female, inseminated by mating with male are embryonated and develop into the infective eggs .
- **Unfertilized eggs** : are laid by un inseminated female. These are non embryonated and can not become infective.



Life cycle



Ascariasis : is a parasitic infection caused by roundworm *Ascaris lumbricoides* , it's one of most common parasitic infection in tropical and subtropical.

Infection

- Ingestion of infective eggs (fertilized eggs) .
- Egg Hatching and larval migration.
- lungs stage
- Maturation in the intestines (Adult) .

Mode Transmission



Children – unwashed hands



Contaminated Water sources



Not carefully cooked , Washed vegetables

Symptoms of Ascariasis

In the lungs, symptoms similar to asthma, such as:

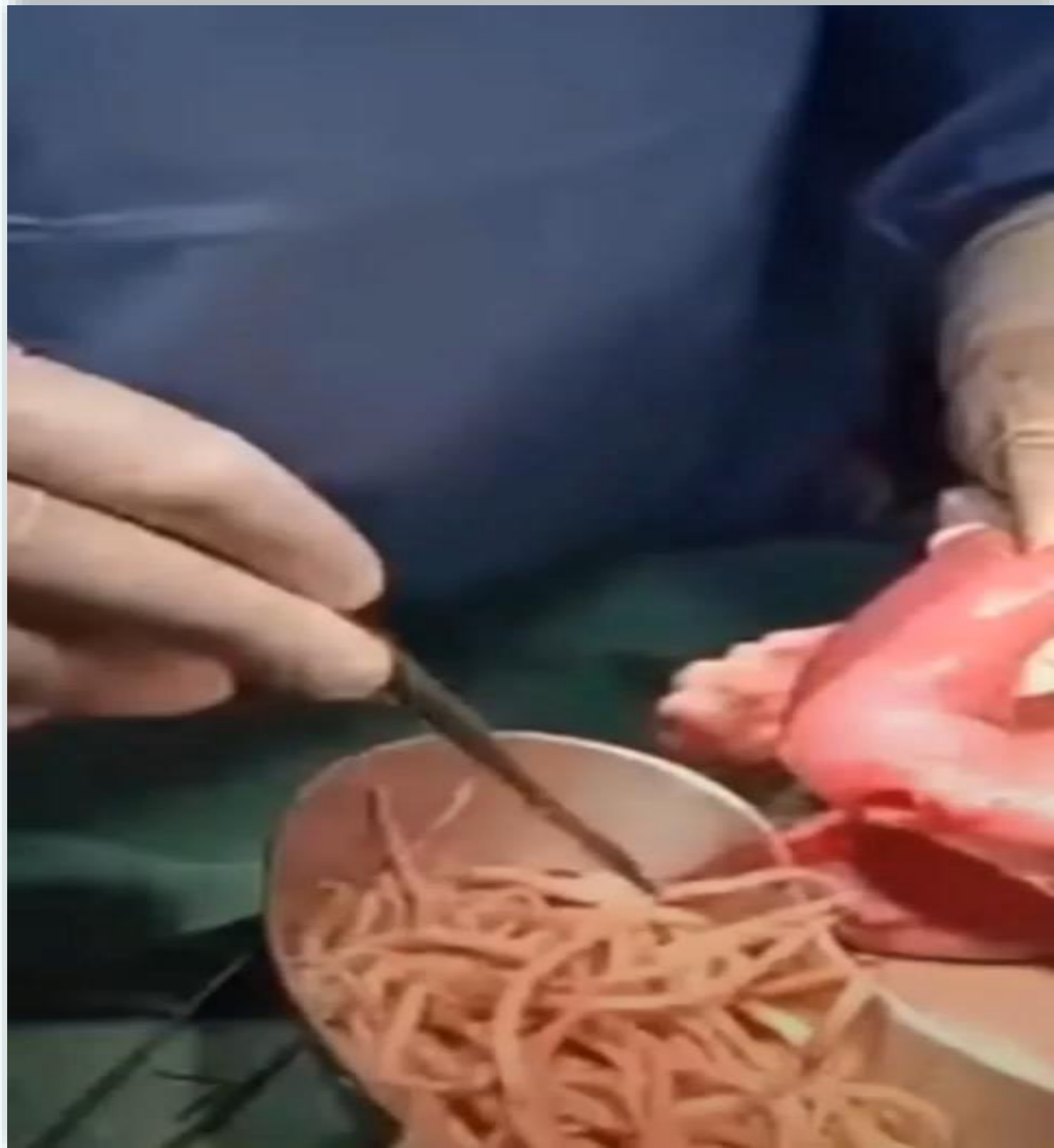
- Persistent cough
- Shortness of breath
- Wheezing

In the intestines, the larvae mature into adult worms in the small intestine that cause

- Nausea and vomiting
- Diarrhea or bloody stools
- Severe abdominal pain
- Fatigue
- Weight loss or malnutrition
- Worms in vomit or stool
- Intestinal blockage



Piece of intestine, blocked by worms, surgically removed from a three-year-old boy in South Africa^[16]



Pathophysiology of Ascariasis

- Ingested *Ascaris lumbricoides* eggs hatch in the duodenum, releasing larvae that penetrate the intestinal wall and migrate through the portal circulation to the liver, heart, and lungs. In the lungs, larvae enter alveolar capillaries, penetrate the alveoli, and move up the bronchial tree to the oropharynx.
- They are then swallowed and return to the small intestine, where they mature into adult worms. The adult worms mate and release eggs into the stool, completing the life cycle in 2–3 months. Adult worms can live for 1–2 years.

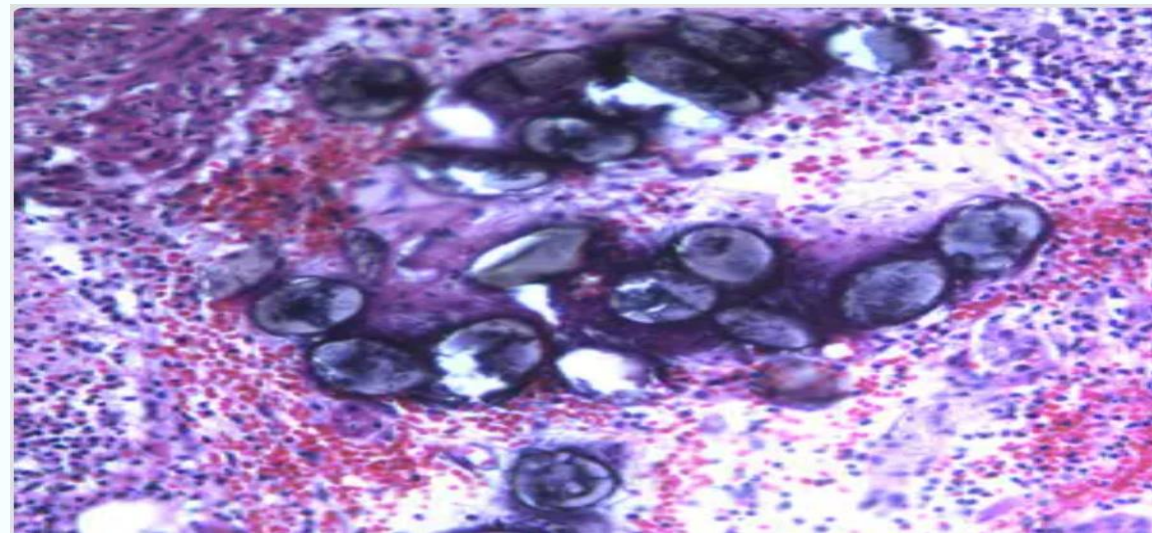
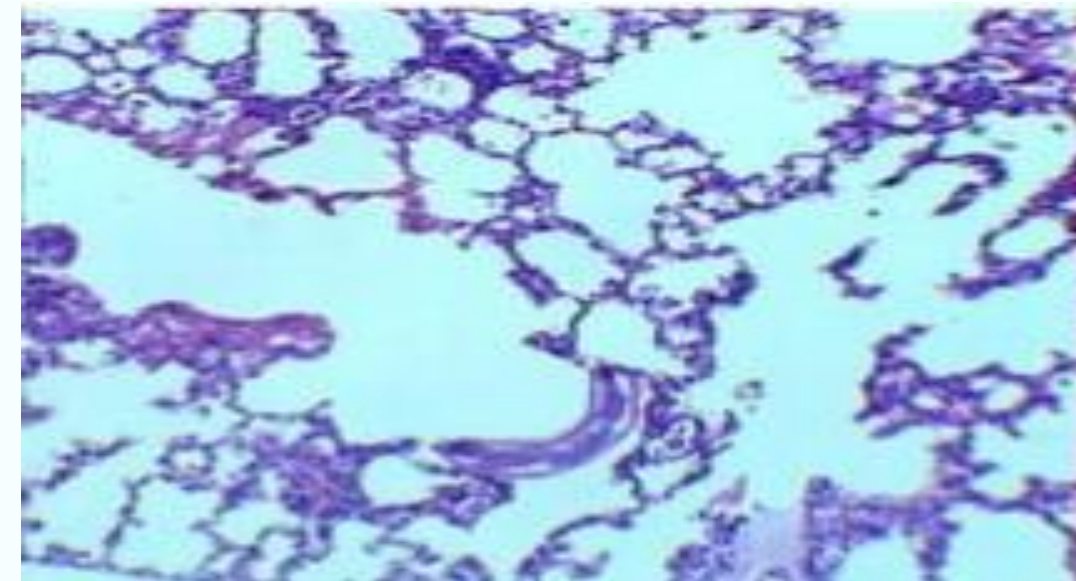


Figure C: Eggs of *A. lumbricoides* in an appendix biopsy, stained with H&E. This image was taken at 200x magnification.



Larva in section of lung

CESTODES (TAPE WORMS)

Phylum platyhelminthes belong to the class (Cestodes) .

Adult tapeworms inhabit the small intestine, where they live attached to the mucosa. Tapeworms do not have a

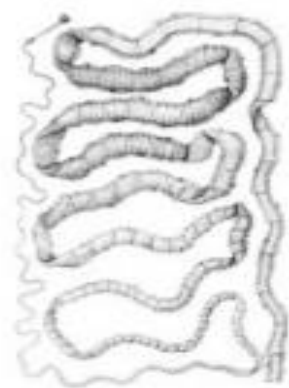
digestive system. Their food is absorbed from the host

Scolex: is the anterior end, contains 4 cup like suckers, rostellum, which contains 20-40 curved chitinous hooks.

Neck: is short, narrow and unsegmented.

Strobilla: is divided into several segments, called proglottids. Each proglottids contains both male and female reproductive organs.

In the posterior region there are several mature proglottids containing fertilized eggs.



Taenia solium adult



Taenia solium scolex
(x400)



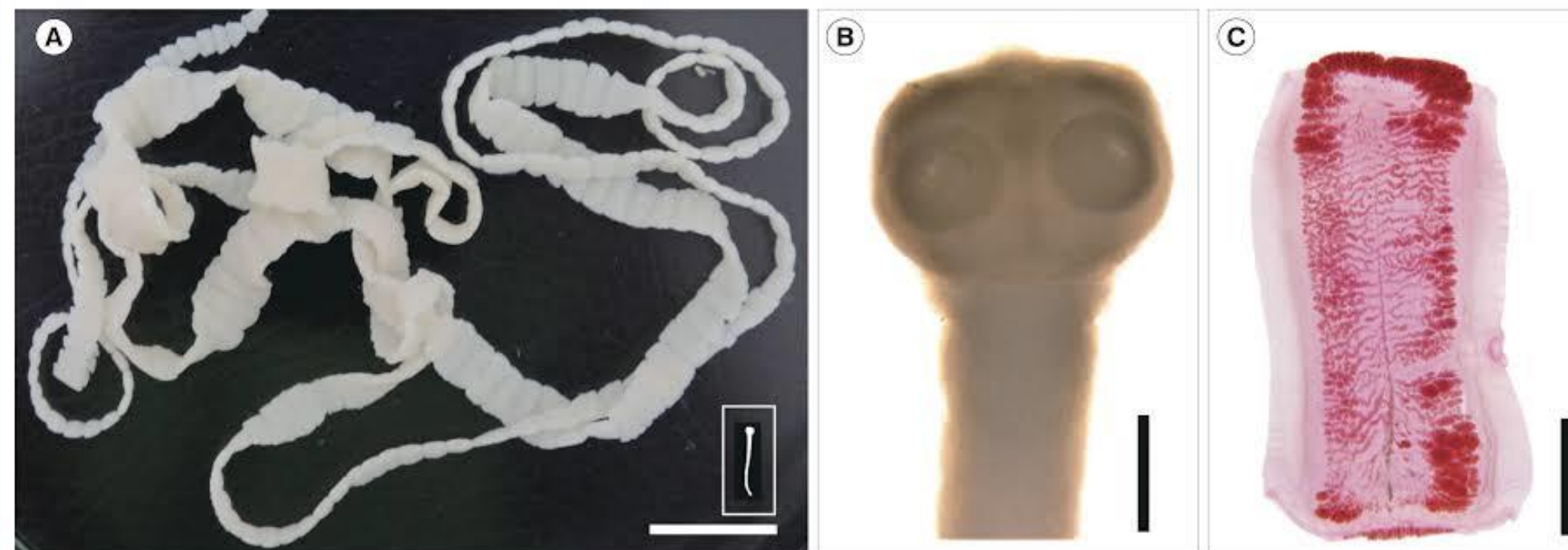
Egg of *T. solium*

Morphology of *Teania saginata*

Scolex: Unarmed, 1–2 mm in diameter, with four hemispherical suckers, lacking a rostellum or hooks.

Proglottids:

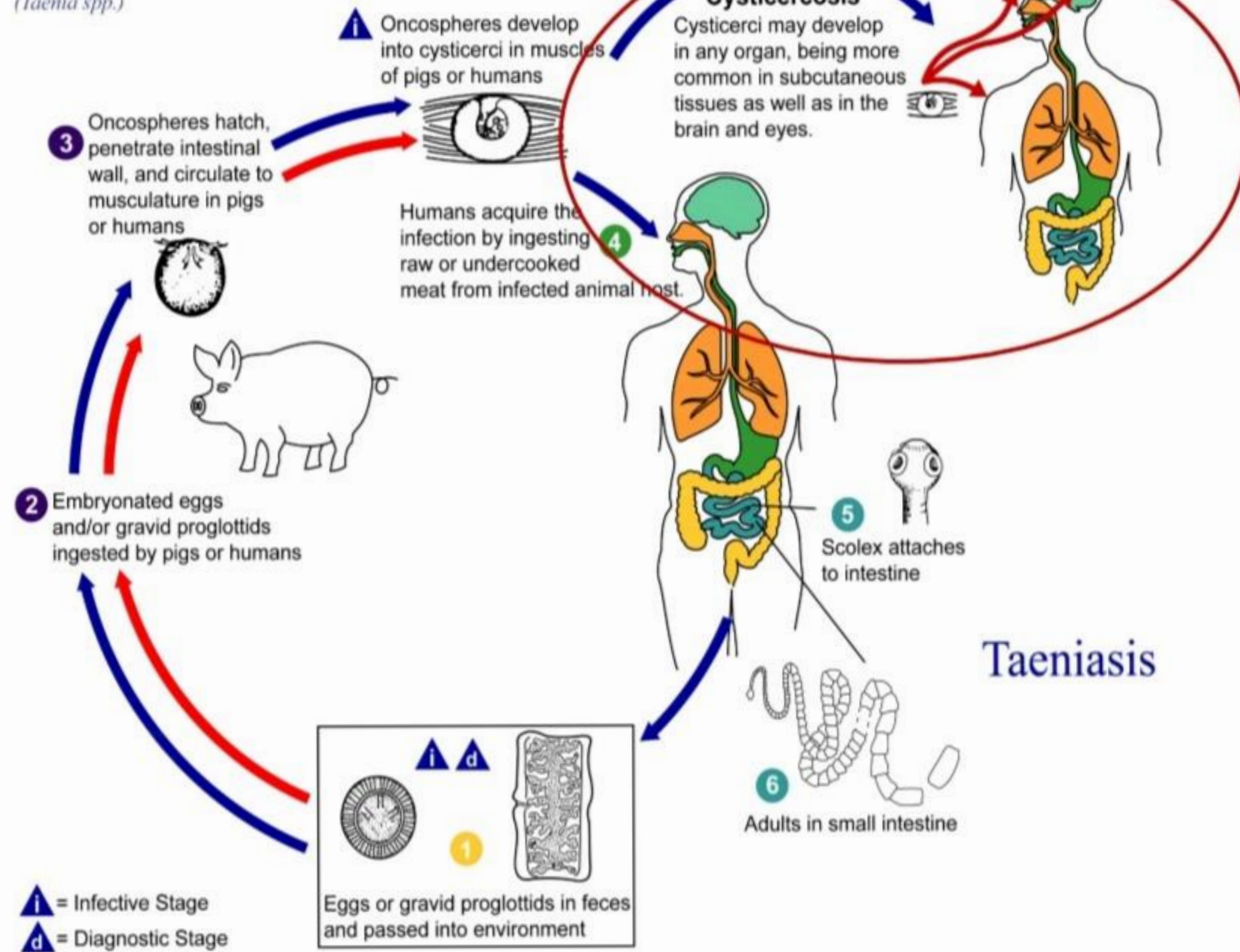
Mature proglottids are about 12 mm wide, with irregularly alternate lateral genital pores, a bilobed ovary, and more testes compared to *Taenia solium*. Gravid proglottids are 16–20 mm long and 5–7 mm wide, with 15–30 lateral uterine branches on each side .



Life cycle

Cysticercosis

(*Taenia* spp.)





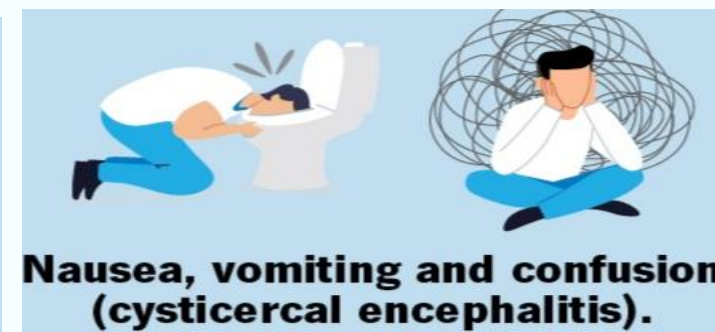
Flat worms (Platyhelminthes)

Symptoms of Teaniasis

1. Digestive Issues:
 - Abdominal pain
 - Diarrhea and Nausea
 - Loss of appetite or increased appetite
2. Weight Loss
3. Fatigue and Weakness: due to parasite consuming nutrients
4. Visible Worm Segments: White, flat segments (proglottids) in stool

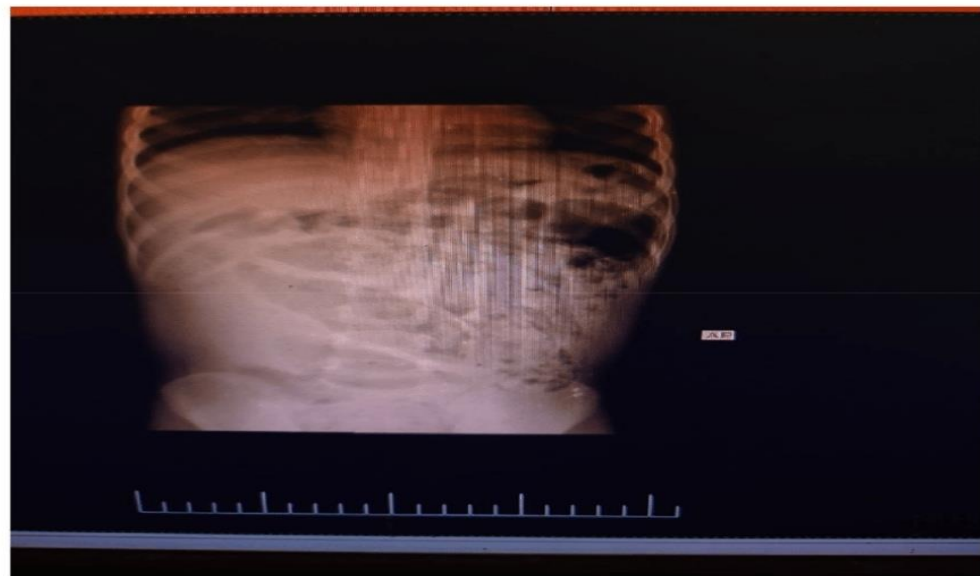
More Severe Symptoms (Rare):

1. Vitamin and Mineral Deficiencies: malabsorption.
2. Allergic Reactions: Hypersensitivity to worm antigens can cause skin rashes or itching.
3. Neurological Symptoms (if *T. solium* eggs lead to cysticercosis):

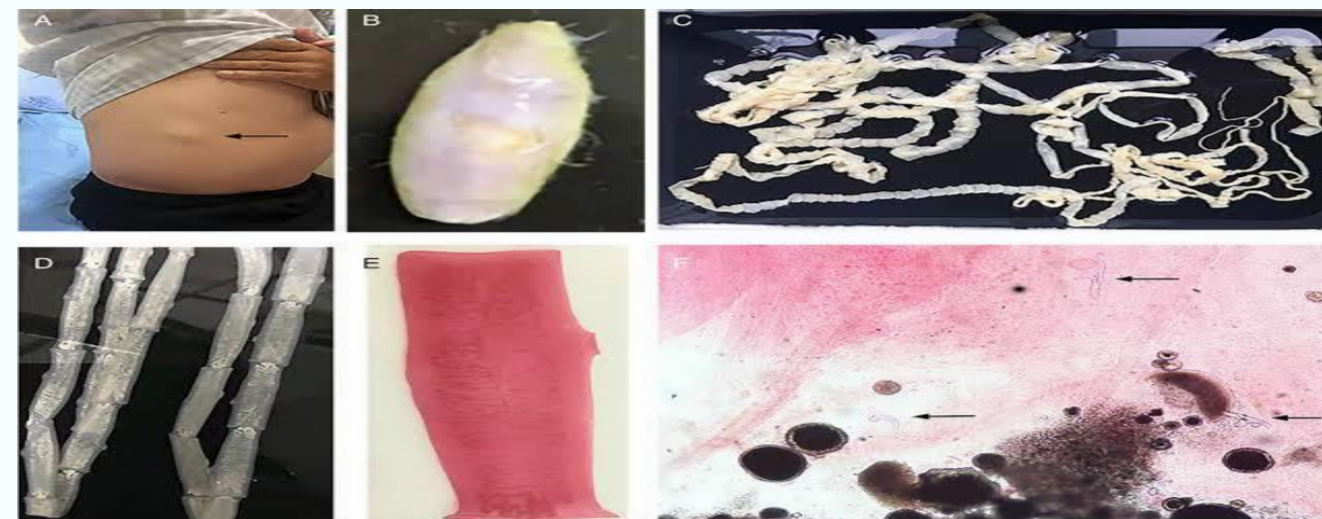


Diagnosis

- 1. Stool tests:** A sample of stool is examined under a microscope to check for eggs or worms.
- 2- Blood test.** Providers may use a blood test to confirm a diagnosis. A lab exam may find immune system antibodies to the larval cysts in a blood sample.
- 3. Imaging tests:**
 - X-rays:** Can reveal large masses of worms in the belly or lungs.
 - CT scans:** Provide detailed images of the inside of the body from various angles to detect worms.
 - Ultrasound:** Uses sound waves to create images, helping locate worms in the liver or pancreas.
- 4. Endoscopy:** A camera on a tube is inserted into the stomach and intestine through the mouth to directly view worms.



Abdominal X-ray showing dilated intestinal loops.



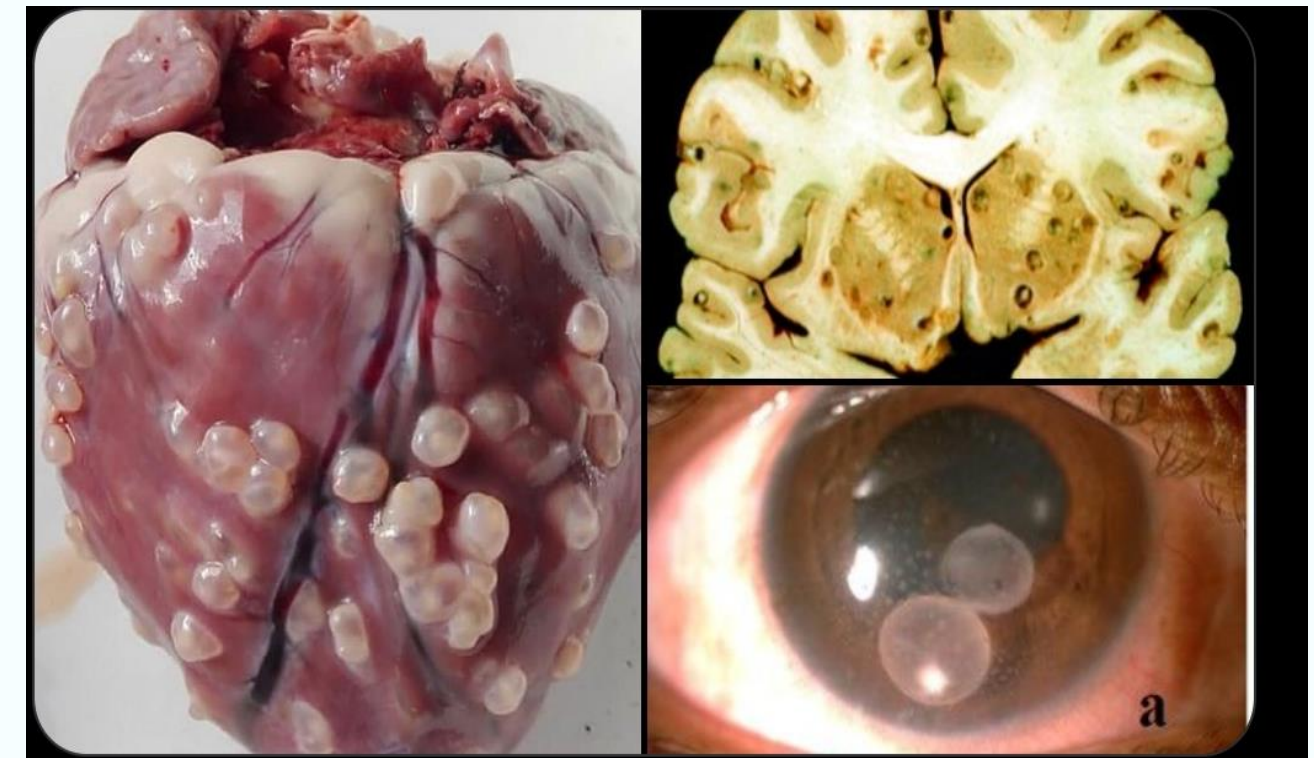
human taeniasis caused by taenia
staghinata with



Pathophysiology of Teaniasis

Cysticercosis (by larval stage) :

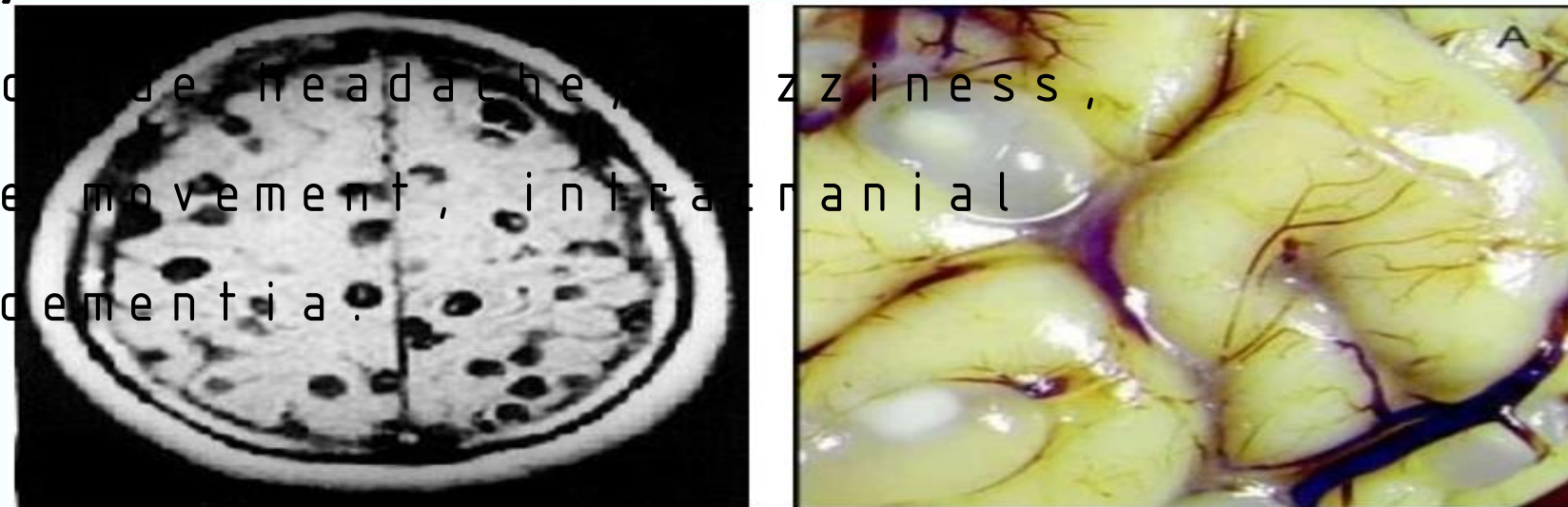
1. The cysticercus is surrounded by a fibrous capsule except in the eye and ventricles of the brain.
2. The larvae evoke a cellular reaction starting with infiltration of neutrophils, eosinophils, lymphocytes,
3. plasma cells, and at times, giant cells. This is followed by fibrosis and death of the larva with eventual calcification.
4. It may affected eyes, brain, and less often the heart, liver, lungs, abdominal cavity, and spinal cord.



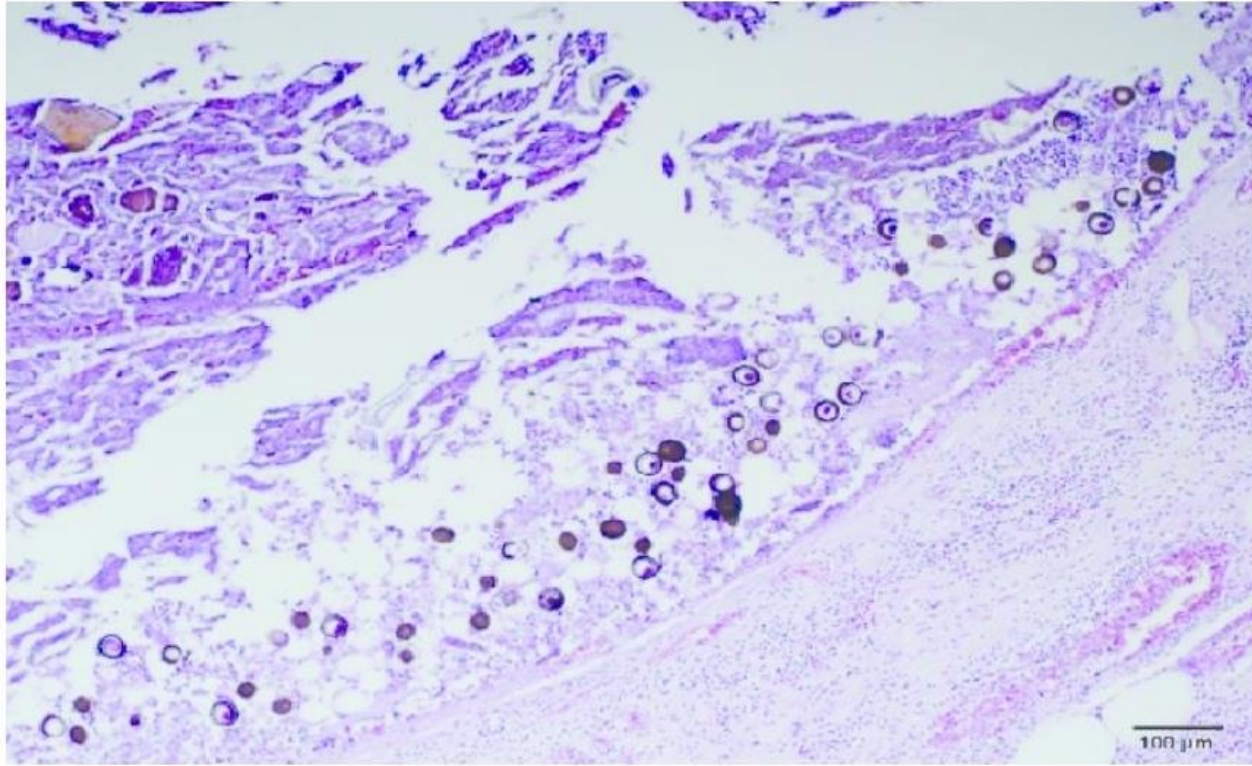
Effect cysticercosis on the heart, b
eyes

Neurocysticercosis (most serious form):

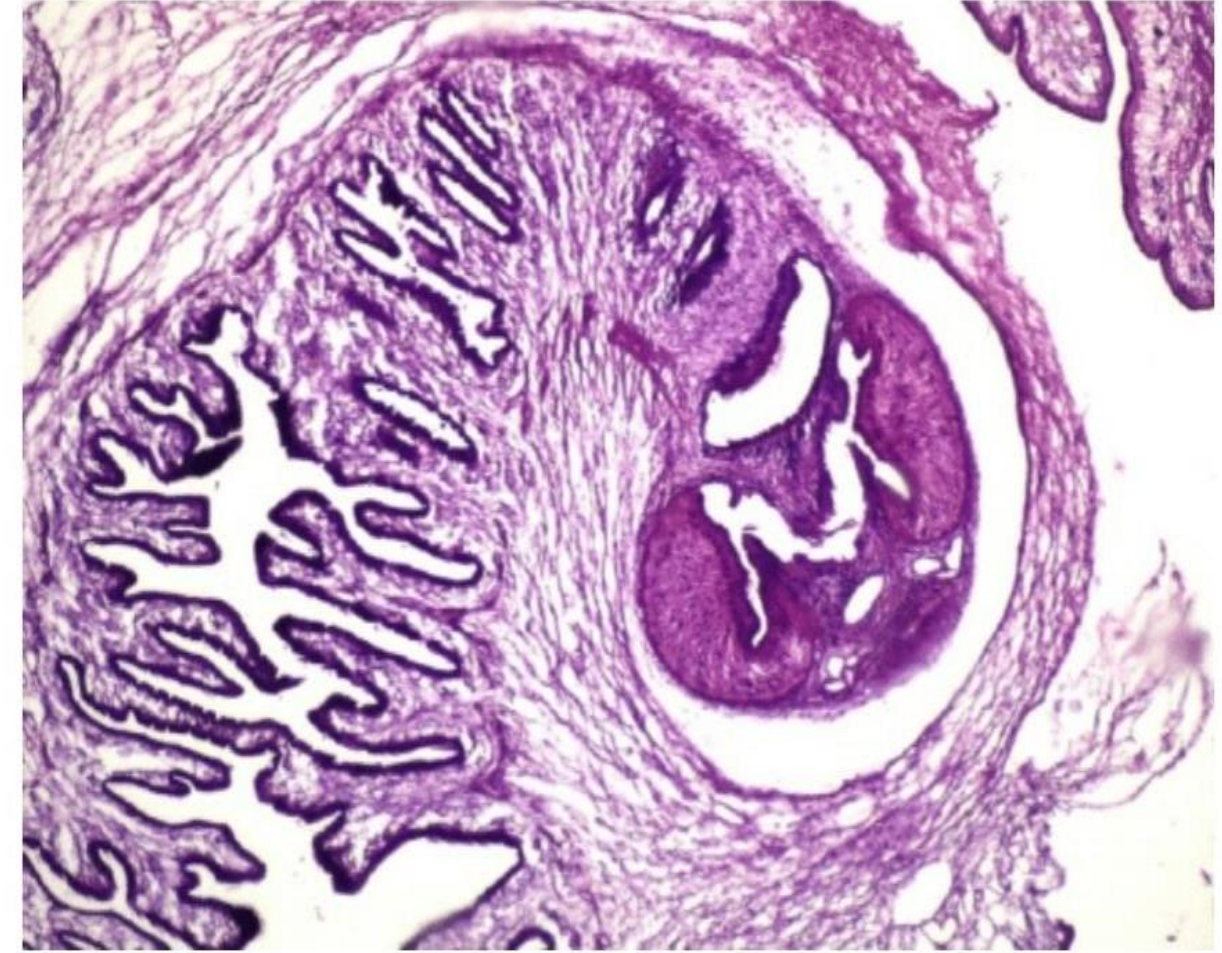
1. It is the most common and most serious form of cysticercosis. About 70% of adult-onset epilepsy is due to Neurocysticercosis.
2. The destruction of parasites induces an inflammatory response, granulomas and fibrous which may result in a sub acute encephalitis.
3. Other commonly associated clinical manifestations include headache, dizziness, involuntary muscle movement, intracranial hypertension and dementia.



Magnetic resonance image of a patient with neurocysticercosis demonstrating multiple cysticerci within the brain



Tapeworm eggs in the appendix lumen, showing acute inflammation in the appendix wall with eosinophils and neutrophils (hematoxylin and eosin stain, X100).



Cysticercosis cellulosa showing scolex and teguments. H&E 100X.



**Thank
You**