

Introduction to nematodes

Enterobius vermicularis

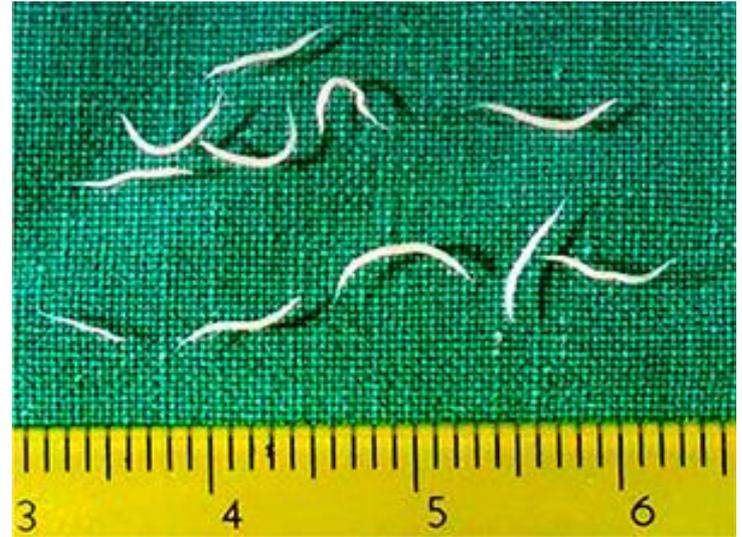
By

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General Characters:

- **Bilaterally symmetrical.**
- **Rounded, elongate unsegmented with variable size.**
- **Separate sex (males are smaller than females with curved posterior end while the females have straight posterior end).**
- **Has body cavity, complete alimentary tract and tubular genital system, simple excretory and nervous system.**



Systems of the body

Digestive:

Mouth



Esophagus



Intestine



Anus

Male:

Testis



Vas deferens



Seminal vesicle



Ejaculatory duct

Female:

Ovary



Oviduct



Uterus

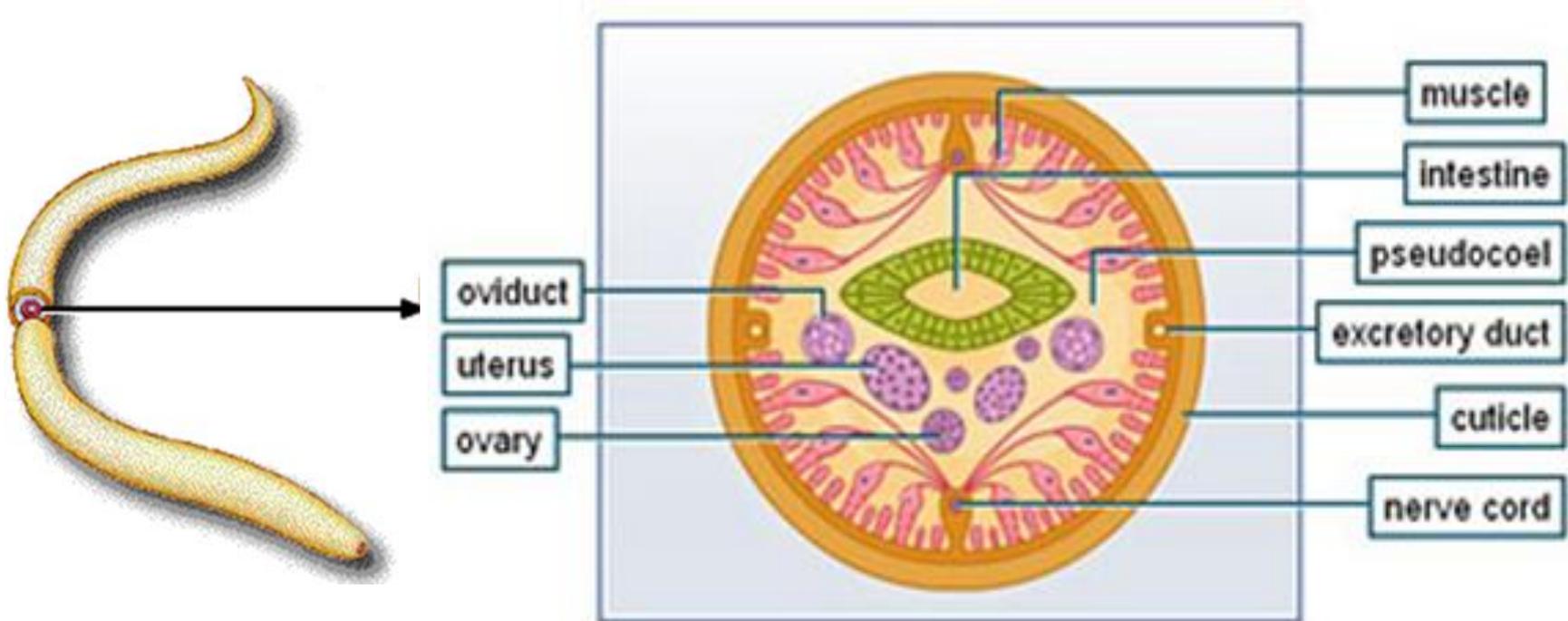


Vulva

(Accessory copulatory organs)

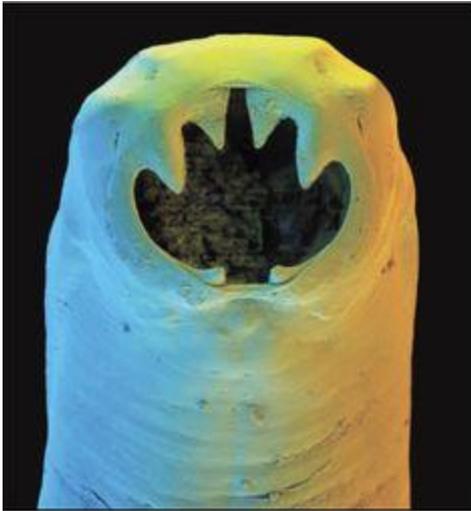
Sets of gent.

Body wall & cavity

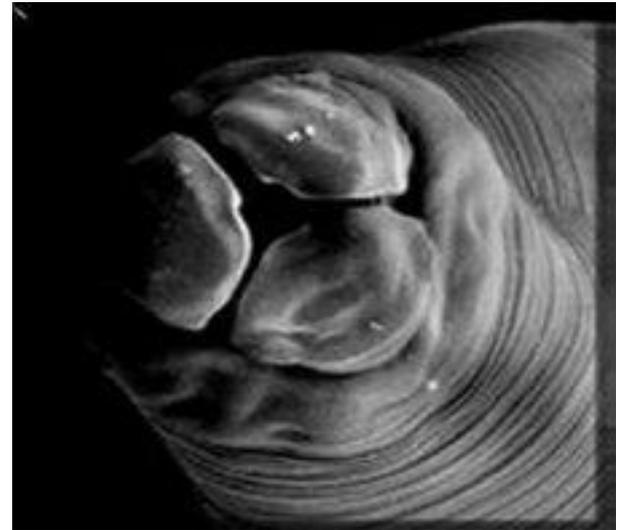


The digestive system

The mouth



Equipped with teeth or plates



Surrounded by lips or papillae

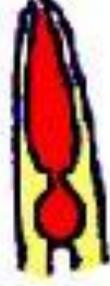
The oesophagus



Club shaped



Double bulbed



Rhabditiform

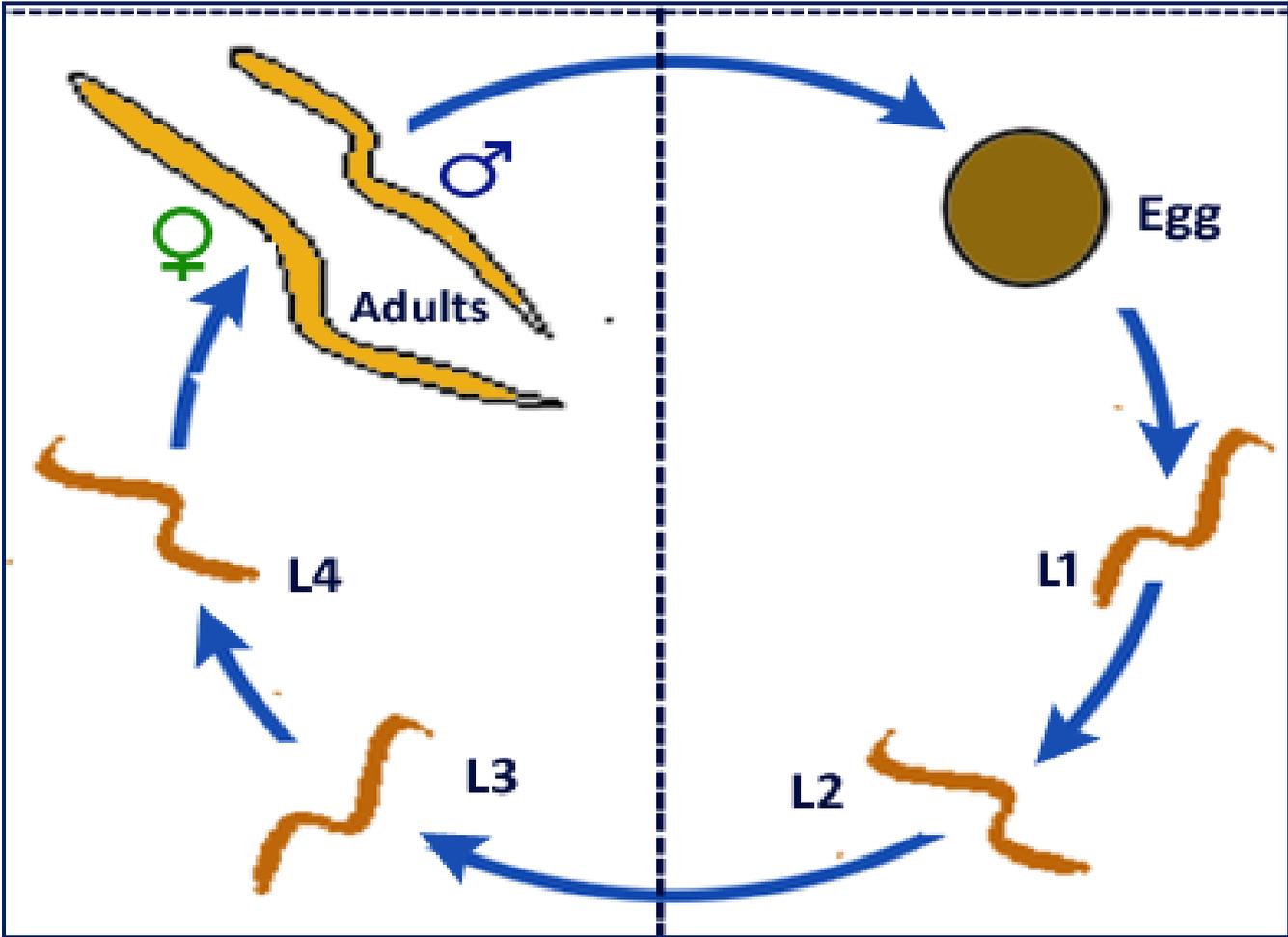


Cylindrical



Cellular

Life Cycle



Enterobius vermicularis

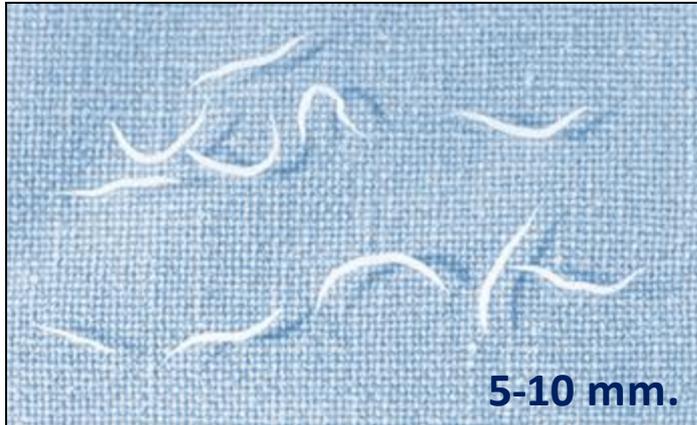
Pin worm

Enterobius vermicularis (Oxyuris-pin worm)



- **Geographical distribution:** Cosmopolitan

Two sets of genitalia

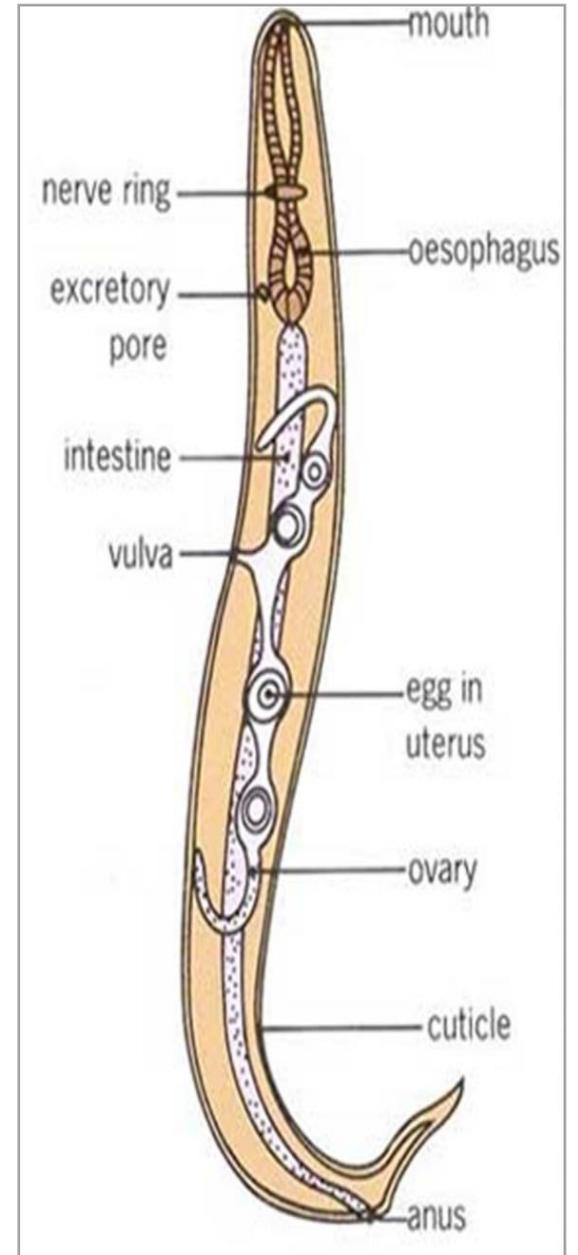
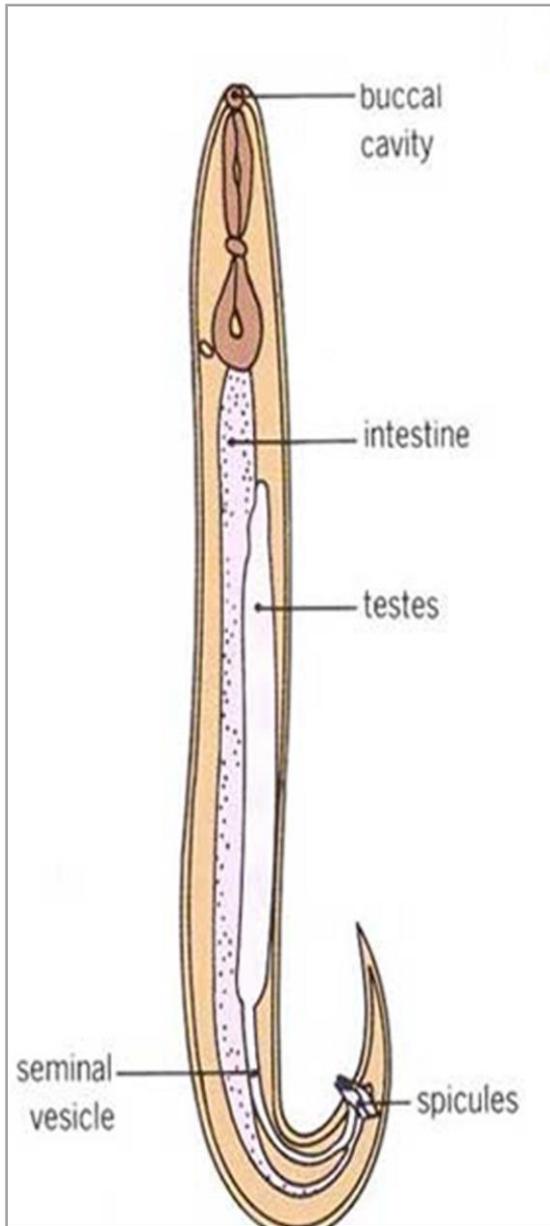


- Double bulbed esophagus
- Two cephalic alae
- Three lips

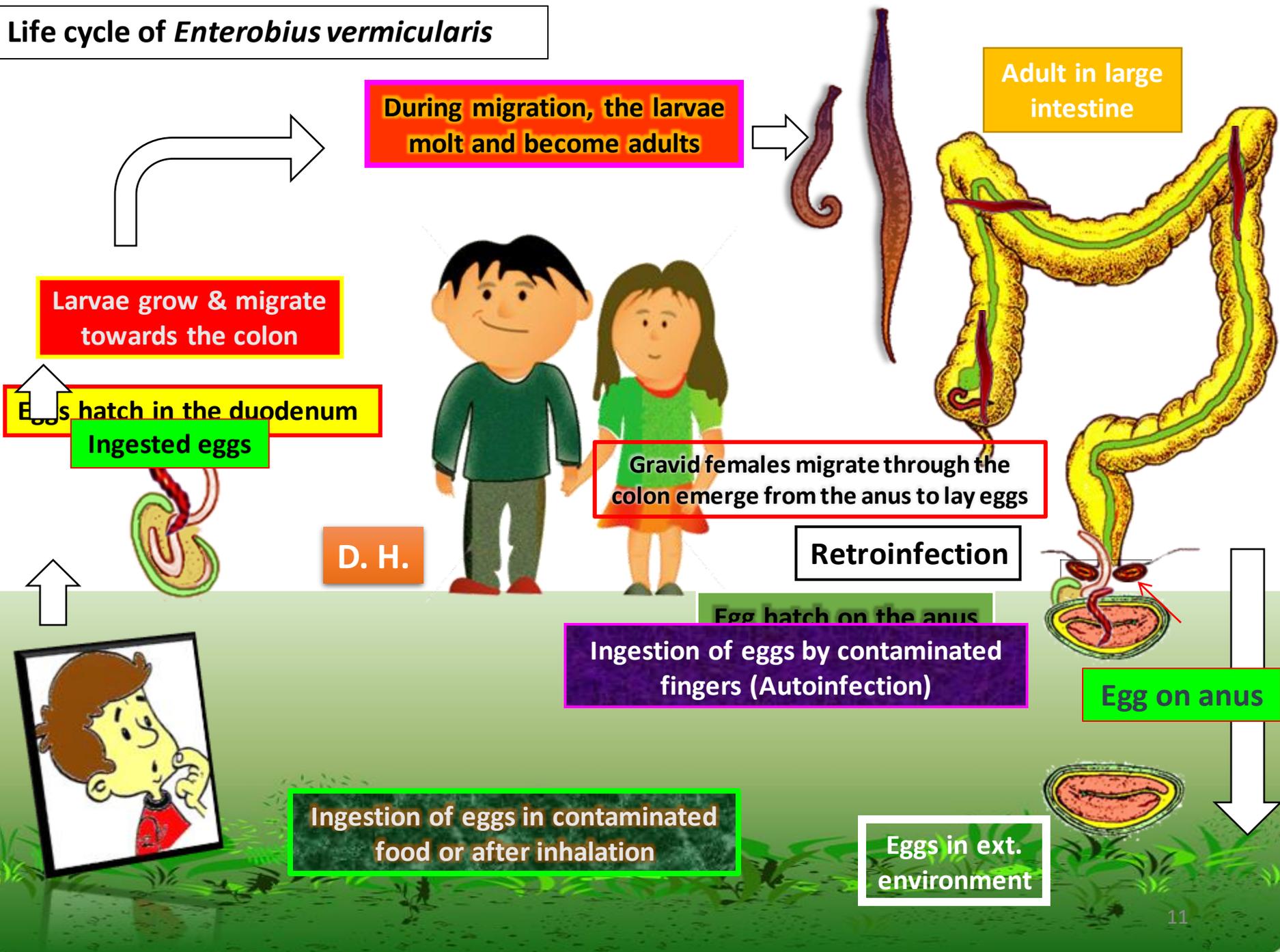
Size: 50x20 μ
Shape: Planoconvex (D shape)
Colour: Translucent
Content: Mature larva



Single spicule
Subterminal cloaca



Life cycle of *Enterobius vermicularis*



Enterobius vermicularis



- **Habitat:** Large intestine especially caecum and adjacent parts of ileum and appendix.
- **Hosts:**
 - D.H: Man
- **Diagnostic stages:**
 - Eggs
 - Adults
- **Infective stage:** Mature embryonated egg containing larva
- **Mode of infection:**
 - Autoinfection (retro-infection-external autoinfection)
 - Ingestion of contaminated food
 - Inhalation of eggs in dust.

Enterobius vermicularis



Clinical aspect:

- Due to the migration of worms, they cause perianal, perineal & vaginal itching (pruritis) worsens at night and may cause urinary tract inflammation.
- Insomnia, restlessness and nocturnal enuresis.
- Worms in the appendix can cause appendicitis.

Prevention and control:

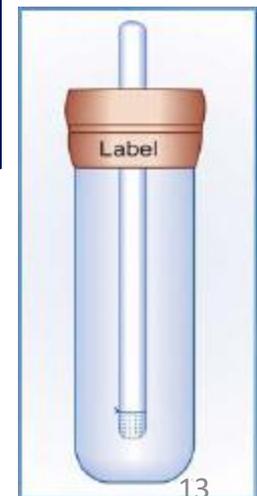
- Treating all members of a family in which infection has occurred.
- Washing hands before eating.
- Children wear tight underwear to prevent scratching of perianal skin during the night.

Treatment

- White precipitate ointment ????
- Albendazole

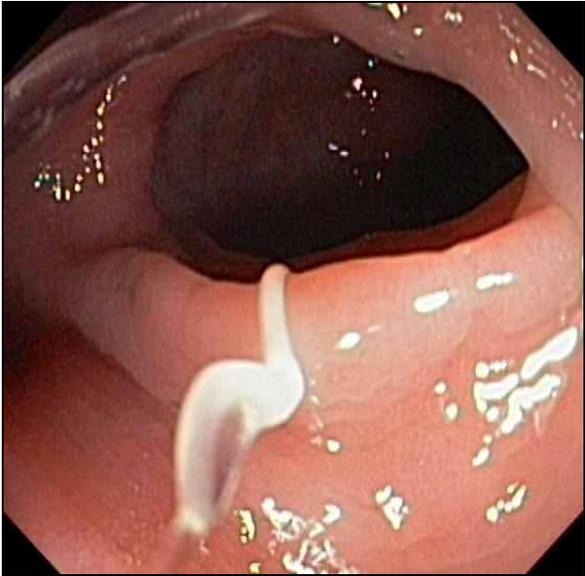
Laboratory diagnosis:

- Finding eggs from perianal skin using cellulose adhesive tape or NIH swab.
- Finding eggs and adult worms in the faeces.
- Eggs could be detected in urine.

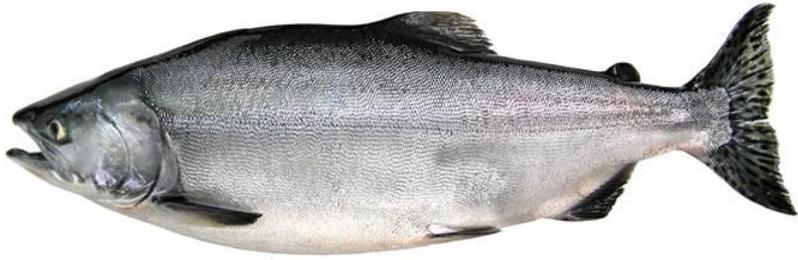




E.V. adult in perianal region



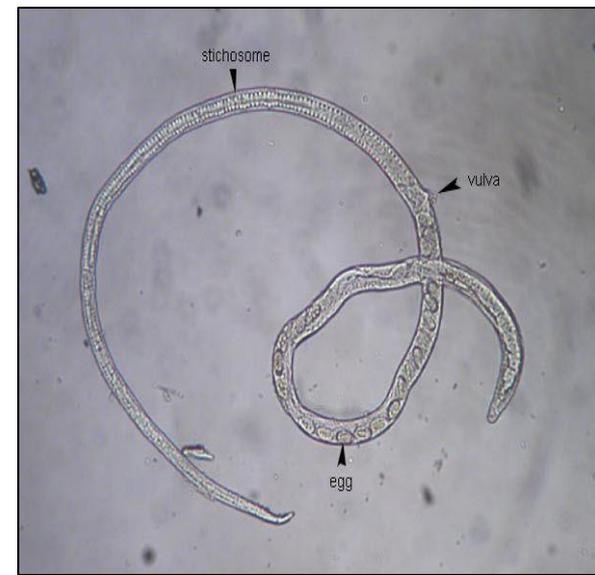
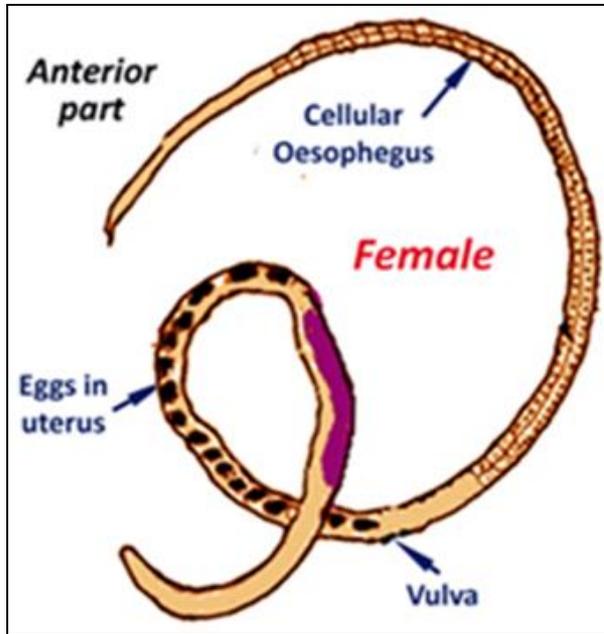
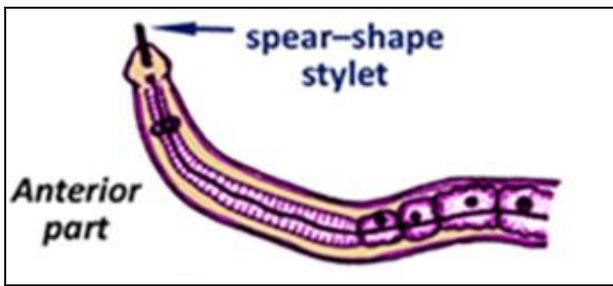
E.V. By colonoscopy



Capillaria philippinensis

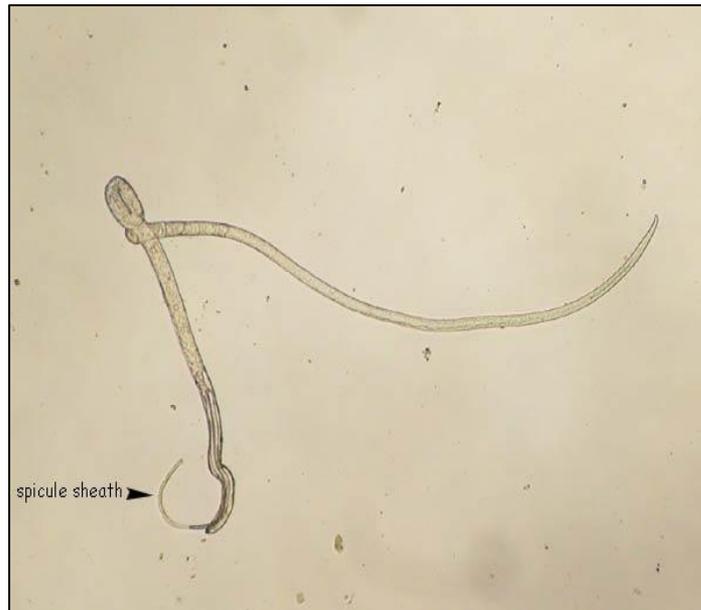
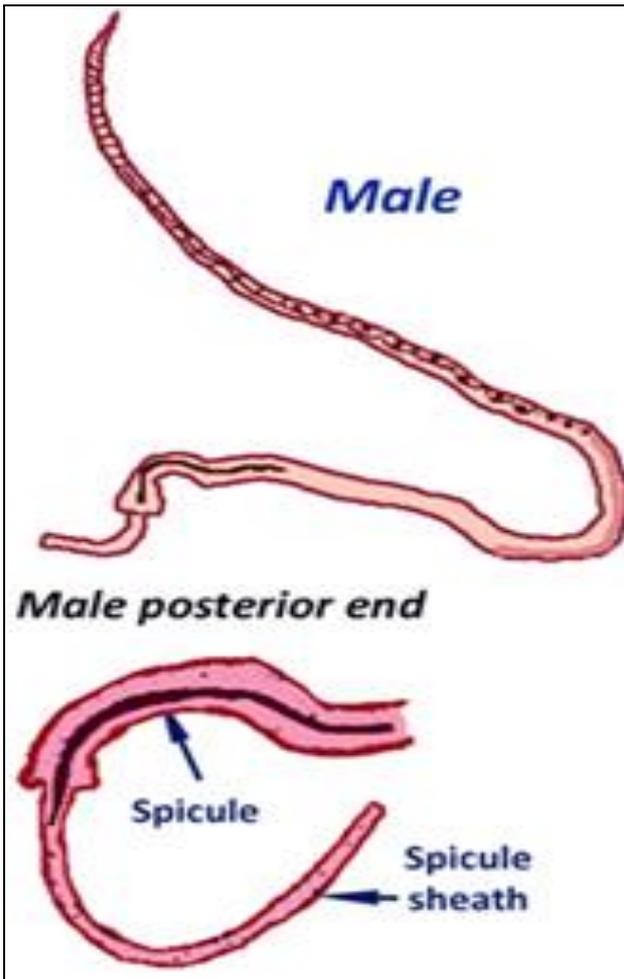
Geographical distribution

- *Capillaria philippinensis* is endemic in the Far East. Sporadic cases have also been found in Egypt, Iran, Spain, and Italy.
- Migratory birds are probably the means by which the infection has spread to other countries



♀ **3.5 mm**

Females are oviparous or larviparous



♂ **2.5 mm**

Morphology

Immature egg

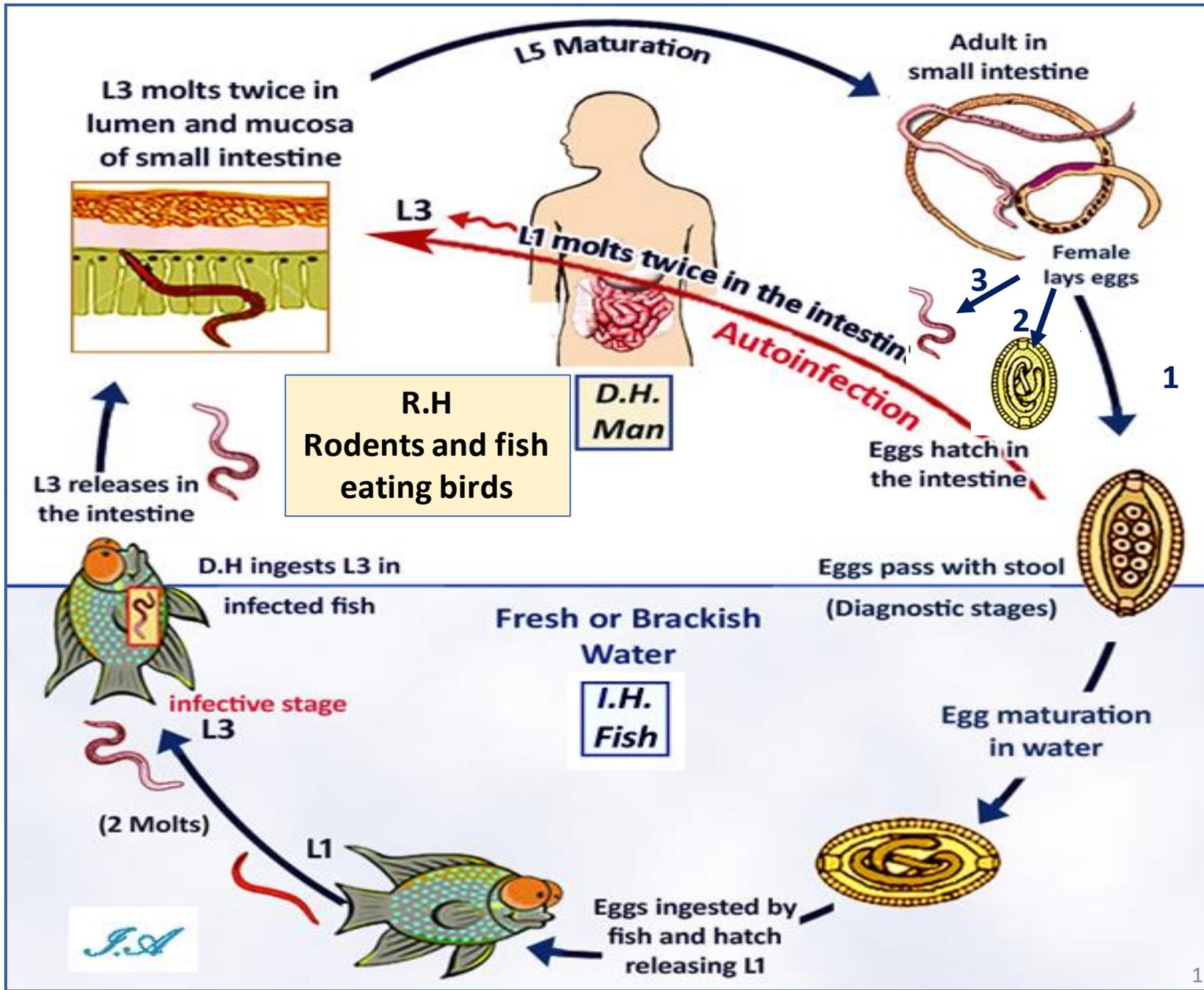


Egg:

- **Size:** $40 \times 20 \mu\text{m}$.
- **Shape:** Barrel shape with small and flat bipolar plugs.
- **Shell:** Thick.
- **Color:** Yellowish brown.
- **Content:** Immature embryo (one cell stage).



Embryonated egg



Disease: Capillariasis philippinensis

Extensive epithelial erosions with chronic inflammation ➔ malabsorption of protein, fat, sugars & electrolytes loss ➔ fequent diarrhea (protein lossing entropathy), vomiting, abdominal pain, anorexia, oedema of lower limbs & weight loss.

Death may occur due to:

- **Hypokalaemia.**
- **Heart failure.**
- **Cerebral oedema.**

***Capillaria philippinensis* is the most virulent helminths of human** due to hyperinfection and progressive damage of the mucosa caused by repeated penteration of the mucosa by the adult worm.

Laboratory Diagnosis

Direct methods

- **Stool examination:**
Detection of eggs, larvae and adults.
- **Jejunal aspiration or biopsy for eggs, larvae and adults**

Indirect methods

- **Serological diagnosis.**
- **PCR.**
- **Blood examination:**
Hypoproteinaemia, high eosinophilia.

Treatment

Albendazole
mebendazole

or



Fluid and electrolyte:

(especially potassium)
replacement is usually
needed.



TEST YOUR *Knowledge*



- **Mention**

- D.S and I.S in E.V and C.P.
- Complications of E.V and C.P

- **Explain why??**

- White precipitate ointment is used in the treatment of E.V