

MEDICAL PARASITOLOGY

Definitions and Concepts

Medical parasitology

2023-2024

LAB(8)

Helminths

Phylum: Platyhelminthes

Class: Cestoidea (Tapeworms)

Order: Cyclophyllidea

- ***Echinococcus granulosus* :-**

E. granulosus causes **cystic echinococcosis** or **hydatidosis** or **hydatid disease** in man, it represents larval form of the parasite.

- **Common names :**

The dog tapeworm, the hydatid worm.

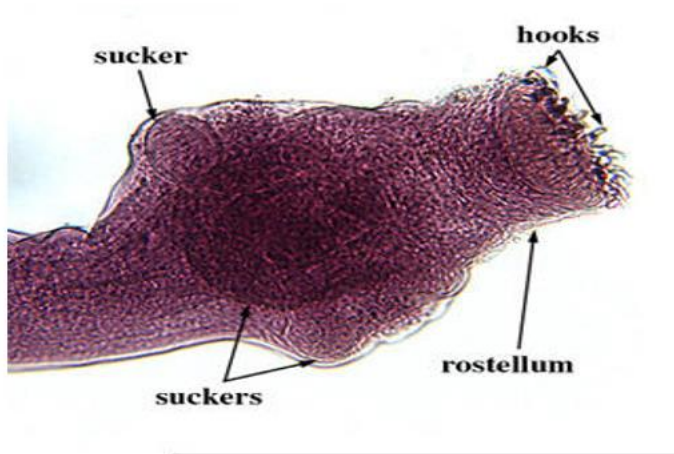
- **Habitat :**

Adult worm live in small intestine of dog and other canine animals(wolf, fox) which act as final hosts, while larval form is seen in man and other intermediate hosts(sheep, cattle, goat, pig).

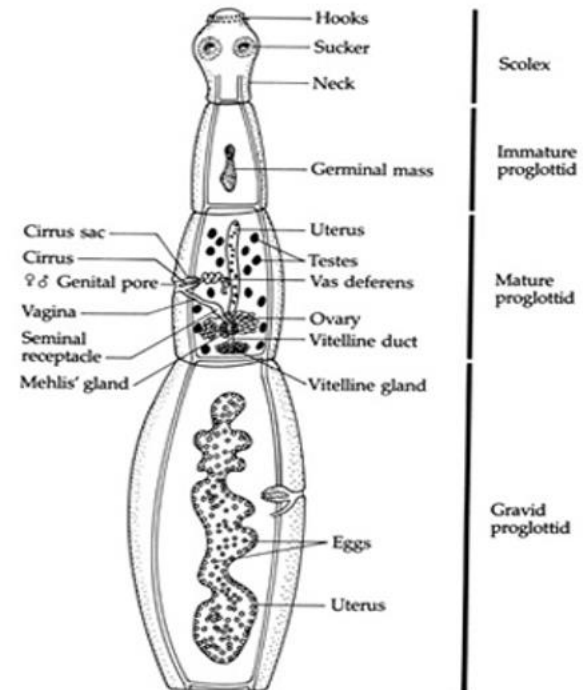
- **Morphology :**

- **Adult worm :** It is small tapeworm consists of :-

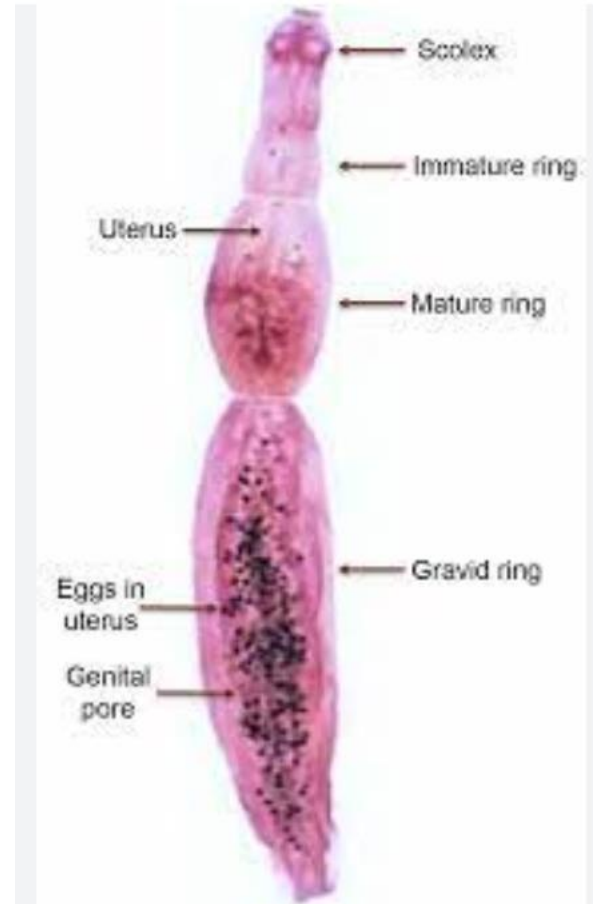
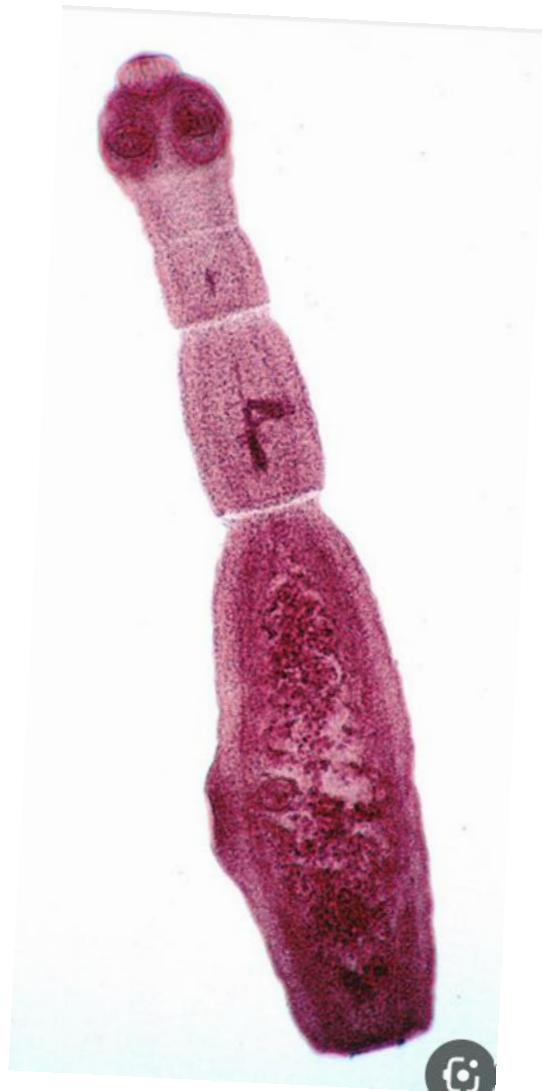
1. **Scolex** :- It is pyriform in shape and possesses four suckers with a protruding rostellum and two circular rows of hooklets.
2. **Neck** :- It is short and thick.
3. **Strobila (body)** :- It consists of three segments(occasionally four). The first segment is immature, the second is mature and the third (and the fourth when present) is gravid.



Scolex of *E. granulosus*



Adult of *E. granulosus*



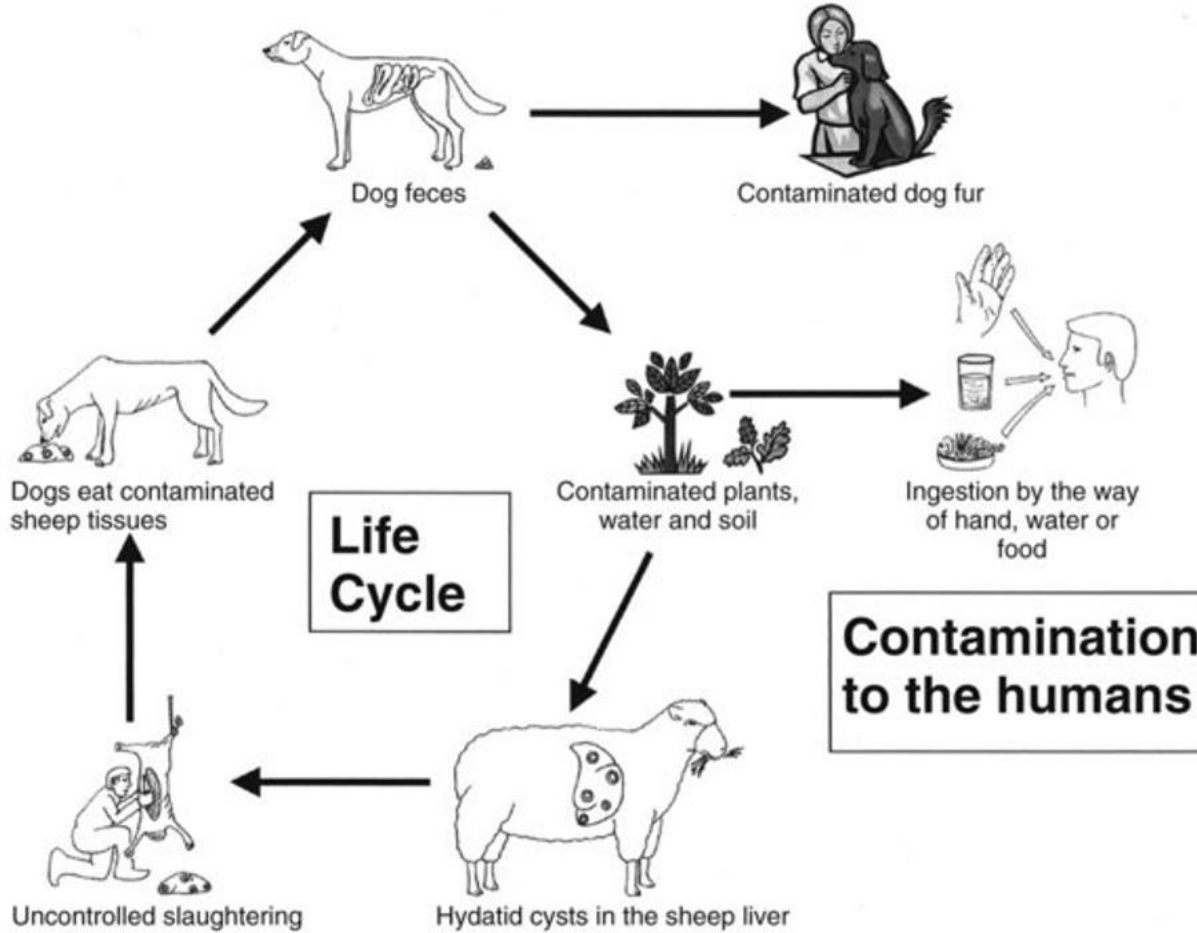
- **Life cycle:-**

E. granulosus passes its life cycle in two hosts, the adult worm lives attached to the mucosa of small intestine of dog and other canine animals. The eggs discharged in the faeces, these are swallowed by the intermediate hosts while grazing in the fields. Man acquires infection by a direct contact with infected dog or by ingesting water and food contaminated with dog's faeces containing eggs of *E. granulosus*.

In the duodenum the hexacanth embryos hatch out. These penetrate the intestinal wall and enter into the radicles of portal vein and are carried to the liver. The liver acts as the first filter in human, some embryos may pass through the hepatic capillaries and enter the pulmonary circulation. Lungs act as the second filter. A few of these embryos may pass pulmonary circulation and enter general circulation and may lodge in various organs like brain, heart, spleen, kidney, bones, etc.

Wherever the embryos settle, an active cellular reaction consisting of monocytes, giant cells and eosinophils takes place around the parasites.

A large number of the parasites may be destroyed by host defence mechanism, some of the embryos develop into hydatid cysts. The cellular reaction in these cases followed by the appearance of fibroblasts and the formation of blood vessels which envelops the growing embryo, this is known as **pericyst**.



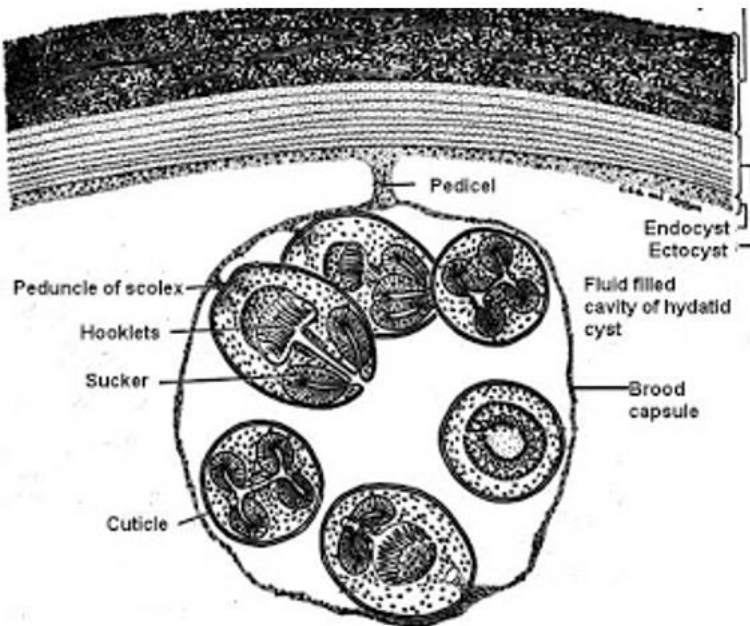
Life cycle of *E. granulosus*

- **Hydatid cyst wall :-**

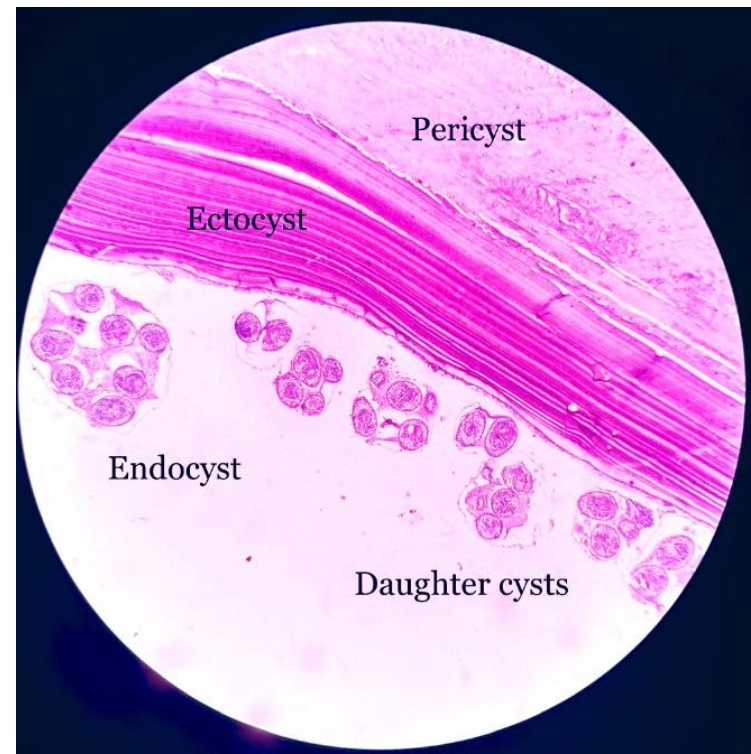
The cyst wall secreted by the embryo consists of two layers:-

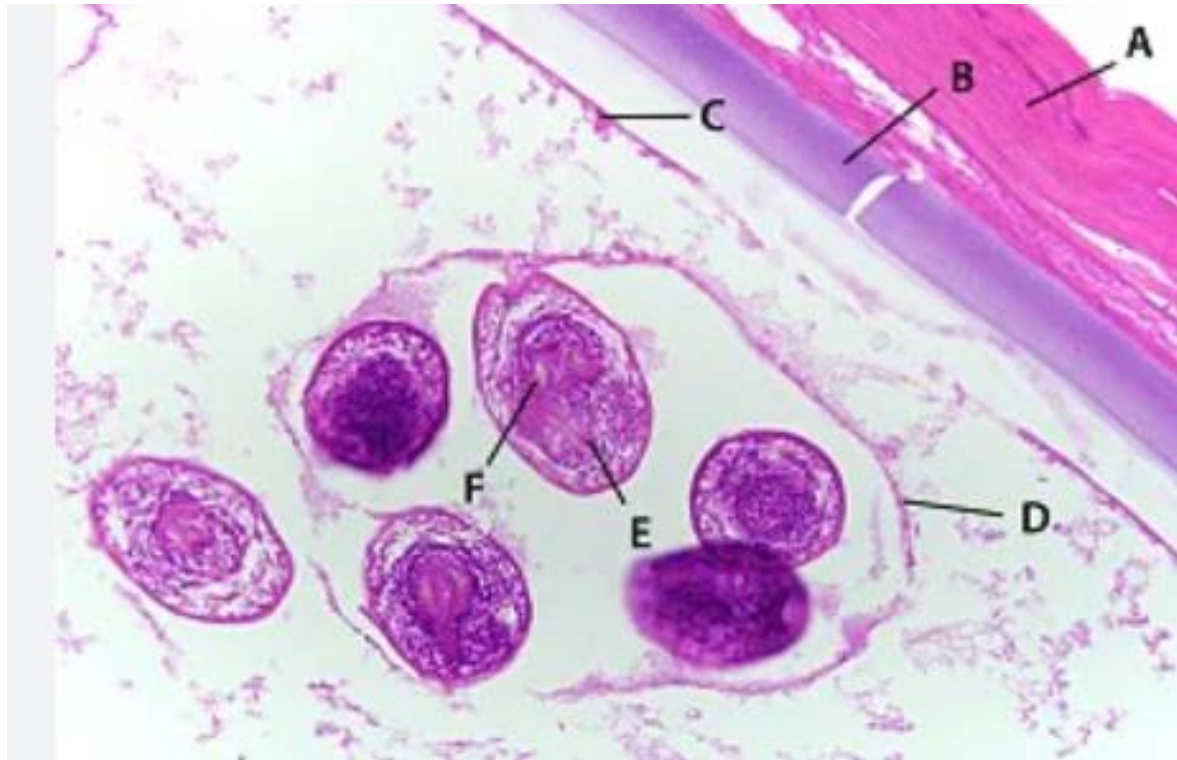
1. **Ectocyst :-** It is outer layer, tough, acellular, laminated, hyaline membrane, thus exposing the inner layer containing brood capsules, scolices and daughter cysts.
2. **Endocysts :-** It is inner or germinal layer. It consists of a number of nuclei embedded in protoplasmic mass. It gives rise to ectocyst on outside and brood capsules and scolices on inside.

When the embryos break free from the membrane and float in the fluid within the cyst, they are known as **hydatid sand**, it also secretes **hydatid fluid**.



Hydatid cyst wall



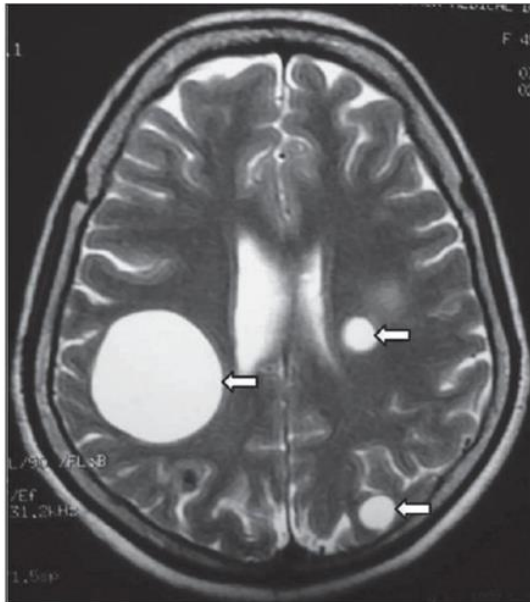


- **Diagnosis :-**

It can be carried out by the following methods :-

1. Casoni test.
2. Differential leucocytes count.
3. Serological tests.
4. Examination of cyst fluid.
5. Histological examination.

Radiodiagnosis



Cerebral hydatid cyst (MRI)



Liver hydatid cyst

Helminths

- **Nematodes**

- ***Enterobius vermicularis* :-**

Disease produced by this parasite is known as **Enterobiasis or pinworm infection.**

- **Common names :**

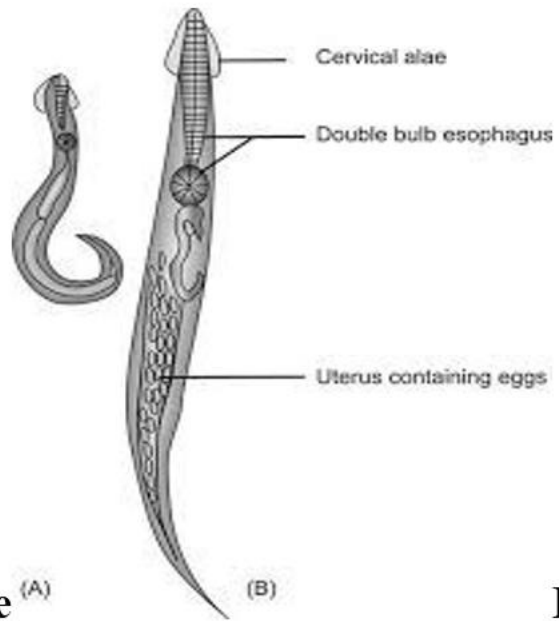
Pinworm, seat worm.

- **Habitat :**

Adult worms inhabit the caecum, appendix lying closely applied to the mucosal surface.

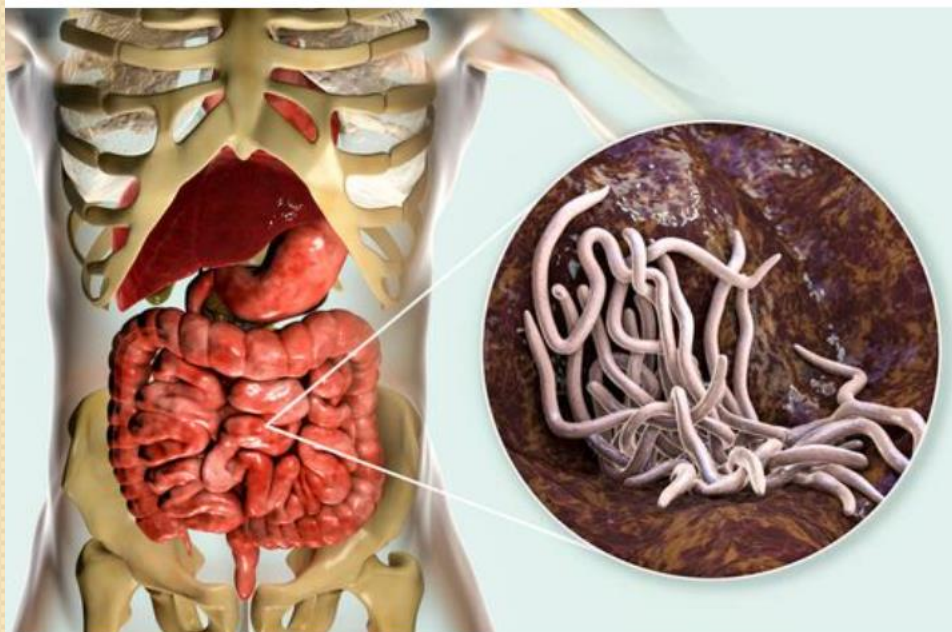
- **Morphology :-**

The adults worms are small, white, spindle shaped. At the anterior end, both male and female worms possess a pair of wing-like expansions known as cervical alae. In male the posterior one – third of the body is curved. The female is longer and the posterior end is straight and thin pointed pin-like tail.



Male

Female

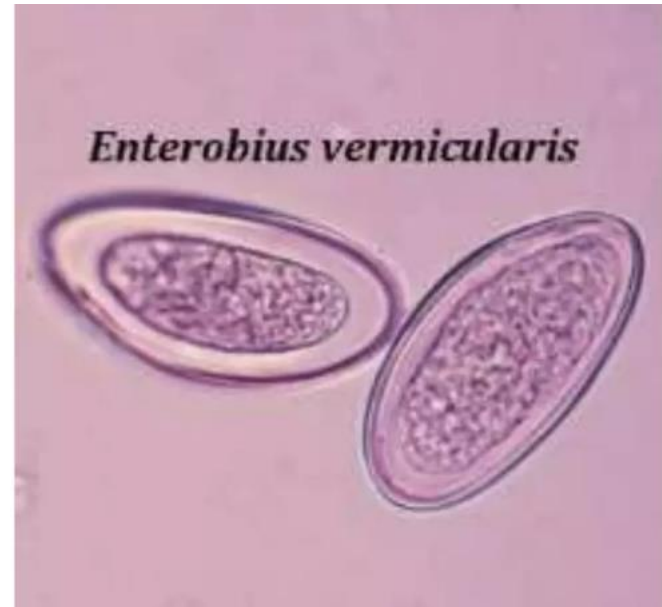


- **Eggs :-**

Colorless flattened on one side (D shape), they are surrounded by a thin, smooth, transparent shell and contain developed larvae.



Enterobius vermicularis (Ova)



- **Man acquired infection by :-**

1. **Autoinfection:** - these individuals may develop autoinfection by direct anus – to – mouth transfer by finger contamination.
2. **Retroinfection:** - this accrued when the eggs laid o perianal skin and hatch into infective stage larvae then ascend through anus to develop into young worms in the caecum and appendix.



THANK
YOU