

جامعة الانبار

كلية: الصيدلة

قسم: العلوم المختبرية السريرية

اسم المادة باللغة العربية: الاحياء المجهرية

اسم المادة باللغة الإنكليزية: **microbiology**

المرحلة: الثانية

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عنوان المحاضرة باللغة العربية: الديدان الشريطية

عنوان المحاضرة باللغة الإنكليزية: **Cestodes (tapeworms)**

Cestodes (tapeworms)

Hymenolepis nana, echinococcus granulosus, echinococcus multilocularis

Cestodes are tape- like worms whose size vary from a few millimeters to several meters. The adult worm consists of three parts, the head, neck and trunk. The head (scolex) carries grooved or cub- like suckers which are organs of attachment to the intestinal mucosa of the definitive host, human or animals. The neck, behind the scolex is the region of growth, where the segments of the body are being continuously generated. The trunk (strobila) is composed of a chain of proglottides or segments. The segments near the neck are the young immature segments, behind them are the mature segments and at the hind end are the gravid segments.

(Hymenolepis nana) Dwarf tapeworm:

Is the smallest and the most common tape worm found in human intestine especially the children. It is cosmopolitan in distribution and it unique that it completes its life cycle in one host. The disease caused by this parasite named as hymenolepiasis.

Hymenolepis nana is the only cestode that parasitizes humans without requiring an intermediate host. The definitive hosts include human, mice and rats. While, fleas and beetles considered intermediate host (**optional**).

Morphology

The adult worm lives in the human intestine, often in large number. It is only 10- 45 mm long and 0.5- 1 mm width. The scolex has 4 suckers and a retractile rostellum with a single row of hook lets. The long slender neck is followed by strobila consisting of 100- 200 proglottids which are much broader than long. The mature segments contain a single genital pore situated laterally toward the anterior border on the same side of each segment. Each segment contains three dorsally located teste, vas deferens, ovary, mehlis gland, uterus and vagina. The gravid segment contain sacculated uterus which holds from 80- 180 ova.

Eggs generally measure between 30 to 45 microns in diameter. They are round to oval with thin colorless outer membrane and inner embryophore enclosing the hexacanth oncosphere (six- hooked). The space between the two membranes contains yolk granules and 4- 8 polar filaments arising from two knobs on the embryophore.

Method of transmission

- By accidentally ingesting tapeworm eggs.
- By ingesting fecally contaminated foods and water
- By touching your mouth with contaminated fingers
- By ingesting contaminated soil.

Once the infection occurs, the dwarf tapeworm may cause auto infection where the tapeworm may reproduce inside the body and continue the infection.

Diagnosis

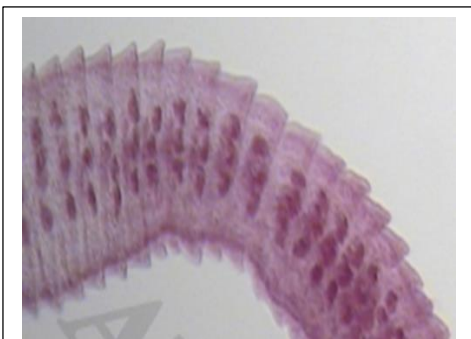
- Detection of eggs in feces.
- Seeing tapeworm in intestine.



Scolex of *Hymenolepis nana*



Scolex and neck of *Hymenolepis nana*



Strobila segments of *Hymenolepis nana*



Egg of *Hymenolepis nana*

***Echinococcus granulosus* (dog tapeworm or hydatid cyst worm)**

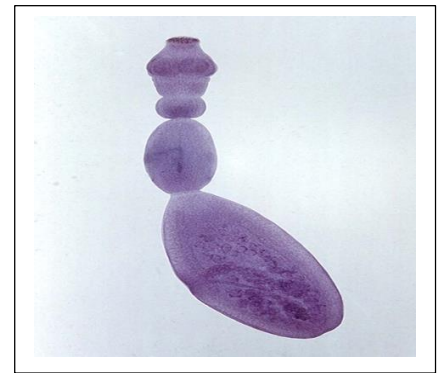
Human Echinococcosis is caused by the larval stages of cestodes (tapeworms) of the genus *Echinococcus*. *Echinococcus granulosus* has definitive host: dogs and other carnivores and intermediate host mammals, including humans or herbivorous species.. *Echinococcus granulosus* cause unilocular echinococcus or hydatid disease.

Morphology

The adult worm is small, measuring about 3- 6 or 2.5- 9 mm in length. It consists of a scolex which is pyriform provided with 4 suckers and a prominent rostellum bearing two circular rows of hook lets, short neck, and the trunk called strobila composed of three proglottides, the anterior immature, the middle mature and the posterior gravid proglottid.

The mature segment contain male and female reproductive organs. The gravid segments is completely occupied by uterus filled with eggs (12- 15 lateral uterine branches or pouches).

The eggs are indistinguishable from of those of *Taenia* spp. They are passed in dog feces. Sheep and cattle ingest them while grazing.



Diagnosis

1- clinical diagnosis by hydatid thrill this is very indicating sign.

2- radiological diagnosis by x- ray examination, C. T. scan and others.

3- laboratory diagnosis by:

- Direct method by finding the protoscolices , broad capsule in the hydatid fluid by aspiration but its dangerous method.
- Indirect method, such as Casoni intradermal test, this done by injection of 2 ml of bacteriologically sterile hydatid fluid intradermally in one arm and equal volume of saline in the other arm as control

--- 20- 30 minutes immediate reaction.

--- 6- 8 hours intermediate reaction.

--- 24- 48 hours delayed hypersensitivity reaction.

--- false positive result.

4- Serological test: Detection of antigens in feces by ELISA is currently the best available technique

5- Newer techniques like polymerase chain reaction (PCR) is also used to identify the parasite from DNA isolated from eggs or feces



Echinococcus multilocularis

- The adult stage slightly smaller than *E. granulosus* (max. length of approx 4 mm and consisting of 4-5 proglottids).
- Intermediate host: mice.
- Final host: fox and wolf (in the small intestine).
- Length 1.2- 3.7 mm.
- Composed of 4- 5 segments.
- Gravid segment without lateral uterine branches.
- The larval stage is alveolar hydatid cyst in human.
- Humans get infected by eating contaminated berries and mushrooms collected in forests populated by foxes.