

Tikrit University

College of Nursing

Basic Nursing Sciences



Second Year - 2023-2024

Microbiology

Helminthology

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Helminthology

INTRODUCTION

Medical helminthology is concerned with the study of helminthes or parasitic worms. Helminthes are trophoblastic metazoa (multi-cellular organisms). Helminthes are among the common parasitic causes of human suffering. They are the cause of high morbidity and mortality of people worldwide. They cause different diseases in humans, but few helminthic infections cause life- threatening diseases. They cause anemia and malnutrition.

The sources of the parasites are different. Exposure of humans to the parasites may occur in one of the following ways:

1. Contaminated soil (Geo-helminthes), water (cercariae of blood flukes) and food (Taenia in raw meat).
2. Blood sucking insects or arthropods (as in filarial worms).
3. Domestic or wild animals harboring the parasite (as in echinococcus in dogs).
4. Person to person (as in Enterobius vermicularis, Hymenolopis nana).
5. Oneself (auto-infection) as in Enterobius vermicularis.

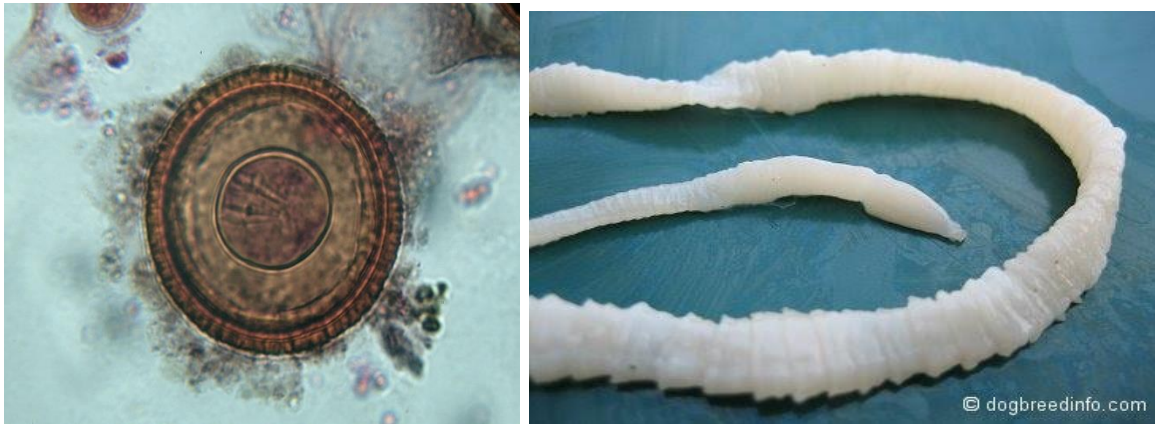
The helminthes are classified into three major groups. These are: 1. Trematodes (Flukes) 2. Nematodes (Round worms) 3. Cestodes (Tape worms)

CESTODES (TAPEWORMS)

The tapeworms are hermaphroditic and require an intermediate host. The adult tapeworms found in humans have flat body, white or grayish in color. They consist of an anterior attachment organ or scolex and a chain of segments (proglottids) also called strobilla. The strobilla is the entire body except the scolex. The scolex has

suckers or grooves. It has rosetellum, which has 1 or 2 rows of hooks situated on the center of the scolex.

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's intestine.



. HYMENOLEPIS NANA (DWARF TAPEWORM)

Morphology

Adult worm measures 1-3 cm in length. It is made up of head (scolex), neck and segmented body. The head carries four suckers and a rostellum armed with one row of hooks. The segments of the body are divided into mature and gravid segments. In the mature segment, there are three testes in the middle.

Infective stage and mode of infection

The egg, which is immediately infective when passed by the patient, is rounded, about 40 microns in diameter. It contains a six- hooked oncosphere within a rigid membrane (the embryosphere).

Pathogenecity

Light infections produce no symptoms. In fairly heavy infections, children may show lack of appetite, abdominal pain and diarrhea.



Echinococcus granulosus (dog tape worm)

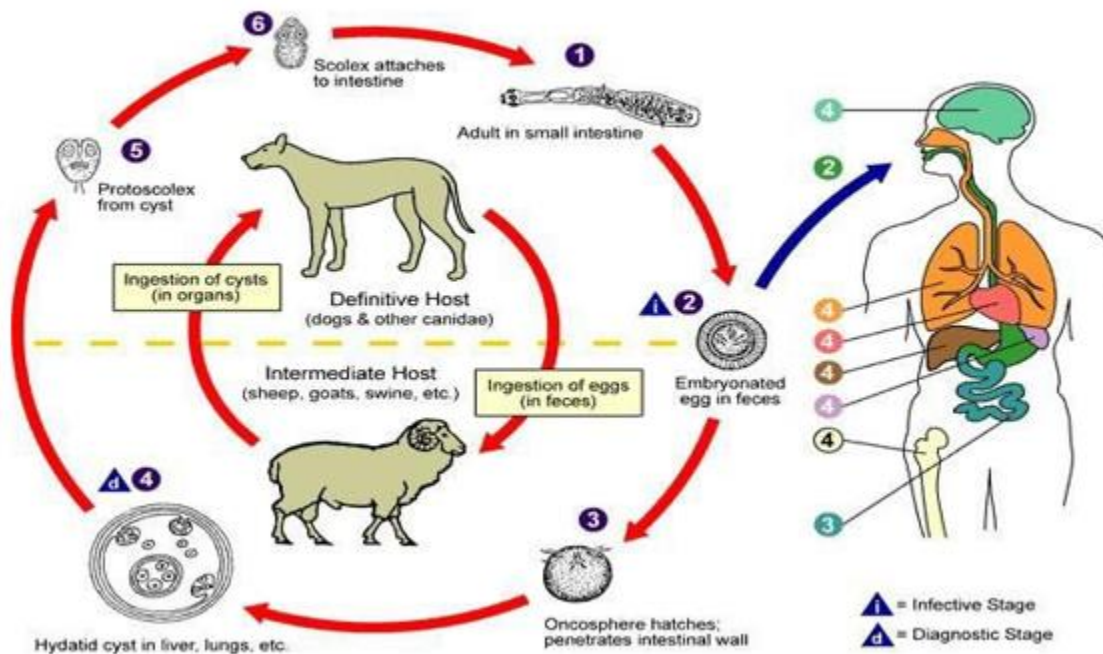
Responsible for most cases of echinococcosis. Echinococcosis is caused by larval tapeworms. The disease is common in East Africa (the highest prevalence is seen in Kenya: 10-15%).

Morphology

The adult worm measures 3-6 mm in length (up to 1 cm). It has scolex, neck and strobilla. Adult worms live in small intestine of definitive host (dog). Man is an intermediate host - carrying the hydatid cyst (larva). Man contracts infection by swallowing eggs in excreta of definitive host.

Life cycle and Pathogenicity

Disease: Hydatid disease



- * Disease: Dog tapeworm infection in dogs or Hydatidosis in (I.host).
- * It is world wide specially in dogs regions.
- * Infective stage to human and cattle is: ova by food and water
- * Mode of infection: contaminated food and water with ova.
- * Rout of infection: mouth.
- * Intermediate host: human, sheep cattle, camels all carry hydatid cyst.
- * Larval stage is hydatid cyst in intermediate host.
- * Habitat: adult worm in the small intestine of dogs.
- * Final host: is only the dogs .

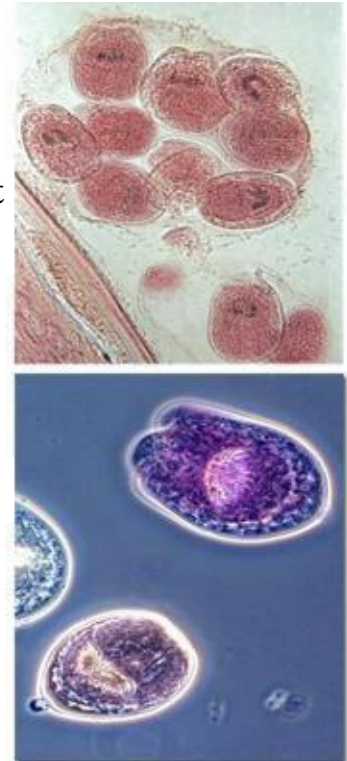
Hydatid cyst
(layers of hydatid cyst)

Host tissue
Laminated layer
germinal layer
Hydatid fluid

- **Brood capsule**
- **Hydated sand**
- **Daughter cyst**

Daughter cyst

Hydated sand



TAENIA SAGINATA (BEEF TAPEWORM)

In adult stage, *T. saginata* inhabits the upper jejunum where it may survive for as long as 25 years. It causes intestinal infection, Taeniasis. It has worldwide distribution. These are one of the true and segmented tapeworms. Their body is divided into three regions; 1. Scolex: the hold fast organ 2. Neck: posterior to the scolex 3. Stobilla: the main bulk, made up of proglottids.

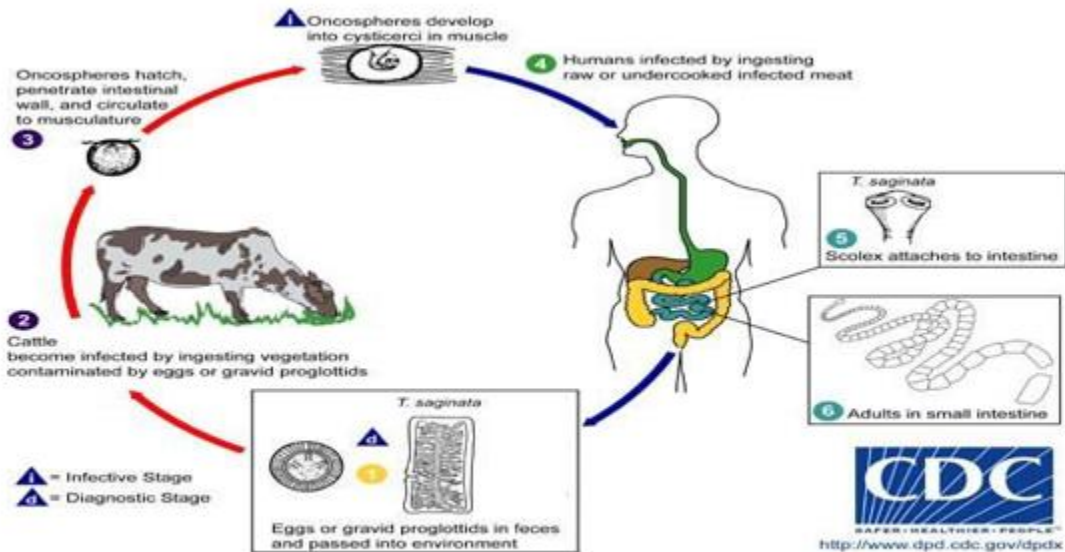
Morphology:

Adult worm measures 5-10 meters in length. The pyriform scolex has 4 suckers but no rostellum. The mature segments have irregularly alternate lateral genital pores. Each of the terminal segments contains only a uterus made up of a median stem with 15-30 lateral branches.

Taenia saginata: (Beef tapeworm).

- Common name: called the beef tapeworm.

- Disease: beef tapeworm infection or beef taeniasis.
- Infective stage to human is called cysticercus bovis
- Rout of infection: mouth.
- Habitat: adult worm in the small intestine of human.
- Cysticercus bovis larvae in the muscle of different organs of cows.



Taenia solium (Pork tapeworm).

- Common name: called pork tapeworm.
- * Disease: Pork tapeworm infection or pork taeniasis or Cysticercosis (in cysticercosis find out larvae in muscles and brain of human)
- * Infective stage to human: *Cysticercus cellulosae*
- * Intermediate host : human, pigs.
- * Final host is: human only.
- * Habitat: adult worm in the small intestine of human.
- * *Cysticercus cellulosae* larvae: in the muscle of different organs for pigs and human.
- * Human may be as intermediate and final host.

Cysticercosis

(*Taenia spp.*)

