



48

ECHINOCOCCUS GRANULOSUS

48.1 INTRODUCTION

E. granulosus are small tape worms that parasitize the intestines of carnivores like dogs. About one million people are infected with this tape worm worldwide. *E. granulosus* is widespread in the sheep-rearing areas of the world. The definitive host is dog and man is the intermediate host.



OBJECTIVES

After reading this lesson, you will be able to:

- describe the morphology of *Echinococcus granulosus*
- describe the life cycle of *Echinococcus granulosus*
- explain the pathology and laboratory diagnosis of Hydatid cyst

48.2 MORPHOLOGY

- Adult worm:** *E. granulosus* 4-7 mm long. The scolex has rostellum like hooks. It has three to six proglottids
- Ova:** The ova are 30-40 μm in diameter and are spherical in shape and contain an oncosphere. It has a radially striped shell.
- Hydatid cyst:** The cyst is the metacystode stage of the worm. It is a fluid filled cyst which may have a single or multiple chambers. The wall of the cyst is made up of an inner cellular germinative layer and an outer acellular laminated layer. The host connective tissue covers the outer layer. Brood capsules develop inside the cyst on the germinative layer 5-6 months later. Each brood capsule contain 20 or more protoscolices. The brood capsules burst to release free protoscolices in the hydatid fluid.

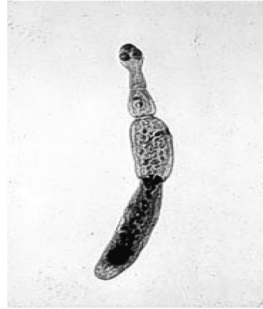
MODULE

Microbiology

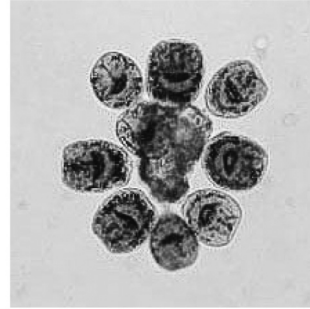
Echinococcus Granulosus



Notes



Echinococcus granulosus

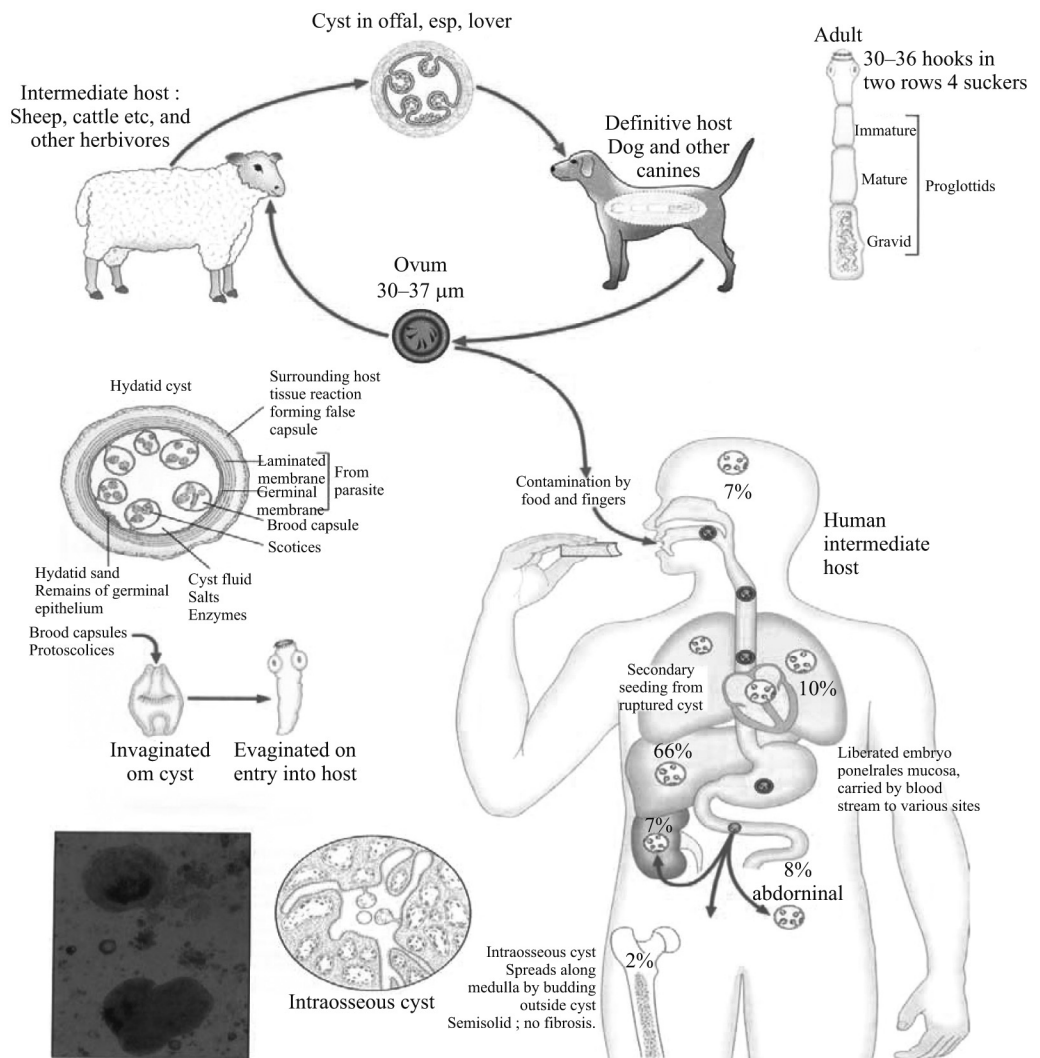


Hydatid sand protoscolices with double row of hooklets and calcareous corpuscles.

Echinococcus granulosus (dog tape worm)

Life cycle

Echinococcus granulosus causes hydatid disease.



48.3 LIFE CYCLE OF E GRANULOSUS

The adult worm is present in the intestines of canine host usually dog. The ova of the worm are passed in the stools of the dog. The ova are then ingested by the intermediate host who could be sheep or man.

The larva hatches from the ova in the intestines of the intermediate host. The oncosphere is released from the ova in the intestines of human beings after ingestion. The larva then penetrates the intestinal mucosa and reaches the blood stream of the host. The larva can reach any organ but commonly reaches and settles in the liver. Here the larva develops into a hydatid cyst. The definitive host i.e. the dog gets infected when it eats the hydatid cyst (protoscolices), mostly from sheep meat. In man the infection reaches a dead end. The protoscolex attaches to the host intestine and develops into a tape worm. The cycle thus continues.



Notes

48.4 PATHOLOGY AND CLINICAL FEATURES OF HYDATID DISEASE

Unilocular cysts. There is usually surrounding inflammatory reaction and fibrosis. After years, the cyst may die, shrink and calcify. There is general allergic reaction with eosinophilia, bronchospasm etc. Pressure effects can cause local tissue damage and obstruction of natural channels. Rupture or leakage of the cyst can accentuate the allergic reaction. There can be anaphylactic shock and secondary implantation in the surrounding tissues like the peritoneum. There can be secondary infection with formation of abscesses.

48.5 LABORATORY DIAGNOSIS

Microscopy of the cyst fluid reveals the typical morphology of the protoscolices. Histopathology of the removed specimen of the hydatid cyst also reveals its typical morphology.

Serology: ELISA based tests are available to detect IgG and IgM antibodies to E granulosus.

DIPHYLLOBOTHRIUM LATUM

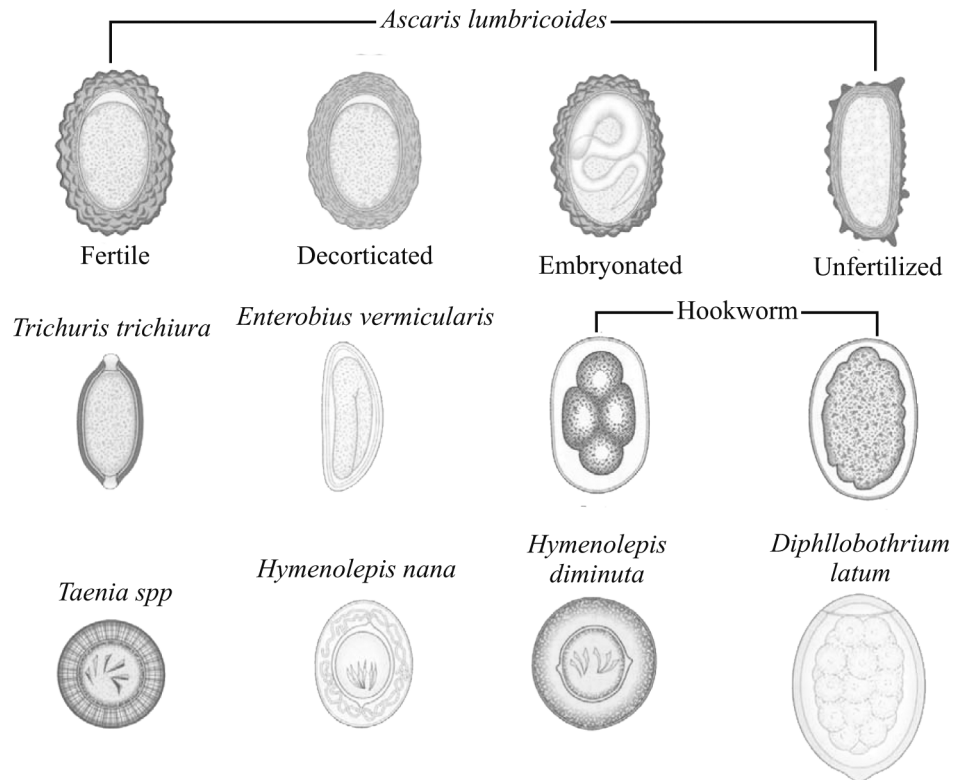
These are also known as fish tape worms or broad tape worms.. It parasitizes the intestines of humans and fish eating mammals such as dogs, cats, pigs. The parasite has two elongated grooves called the bothria on its head. It is 2-15 m long with numerous proglottids (up to 4000). The ova measure $70 \times 50 \mu\text{m}$ and are oval yellow – brown coloured operculated and are similar to the trematodes.

The life cycle includes copepods as primary host and fresh water fish as secondary intermediate hosts. Man gets the infection by eating raw or undercooked fish.

Common helminth ova



Notes



INTEXT QUESTIONS 48.1

1. Intermediate host of Echinococcus granulosus is & definite host is
2. E.granulosus commonly causes in human
3. The natural host of dwarf tapeworm is
4. Tape worm causes anaemia



WHAT HAVE YOU LEARNT

- E granulosus are small tape worms that parasitize the intestines of carnivores like dogs.

Echinococcus Granulosus

- The definitive host is dog and man is the intermediate host.
- The adult worm is present in the intestines of canine host usually dog
- The definitive host dog gets infected when its eats the hydatid cyst mostly from sheep meat.
- Microscopy of the cyst fluid reveals the typical morphology of the protoscolices.
- Histopathology of the removed specimen of the hydatid cyst also reveals its typical morphology
- ELISA based tests are available to detect IgG and IgM antibodies to E granulosus



TERMINAL QUESTIONS

1. Describe the morphological characteristics of Echinococcus granulosus.
- 3 Describe the life cycle of Echinococcus granulosus.



ANSWERS TO INTEXT QUESTION

48.1

1. Man, dog
2. Hydatid
3. Mouse
4. Megaloblastic

MODULE

Microbiology



Notes