



Kingdom: Anamalia
Phylum: Platyhelminthes
Class : Cestoda

Prof. Dr. Munira M. Jori



General Characteristics:





- * Multicellular animals characterized by a flat, bilaterally symmetric body. It is dorsoventrally flattened and solid (no body cavity).
- * Most are hermaphroditic, having both male and female reproductive organs in the same individual.
- * The name given to a class of parasitic flatworms, commonly called tapeworms, looking very much like a narrow piece of adhesive tape.
- * Tapeworms do not have a mouth.
- * Do not have a head or a digestive tract or digestive enzymes, food is absorbed through the surface tegument.



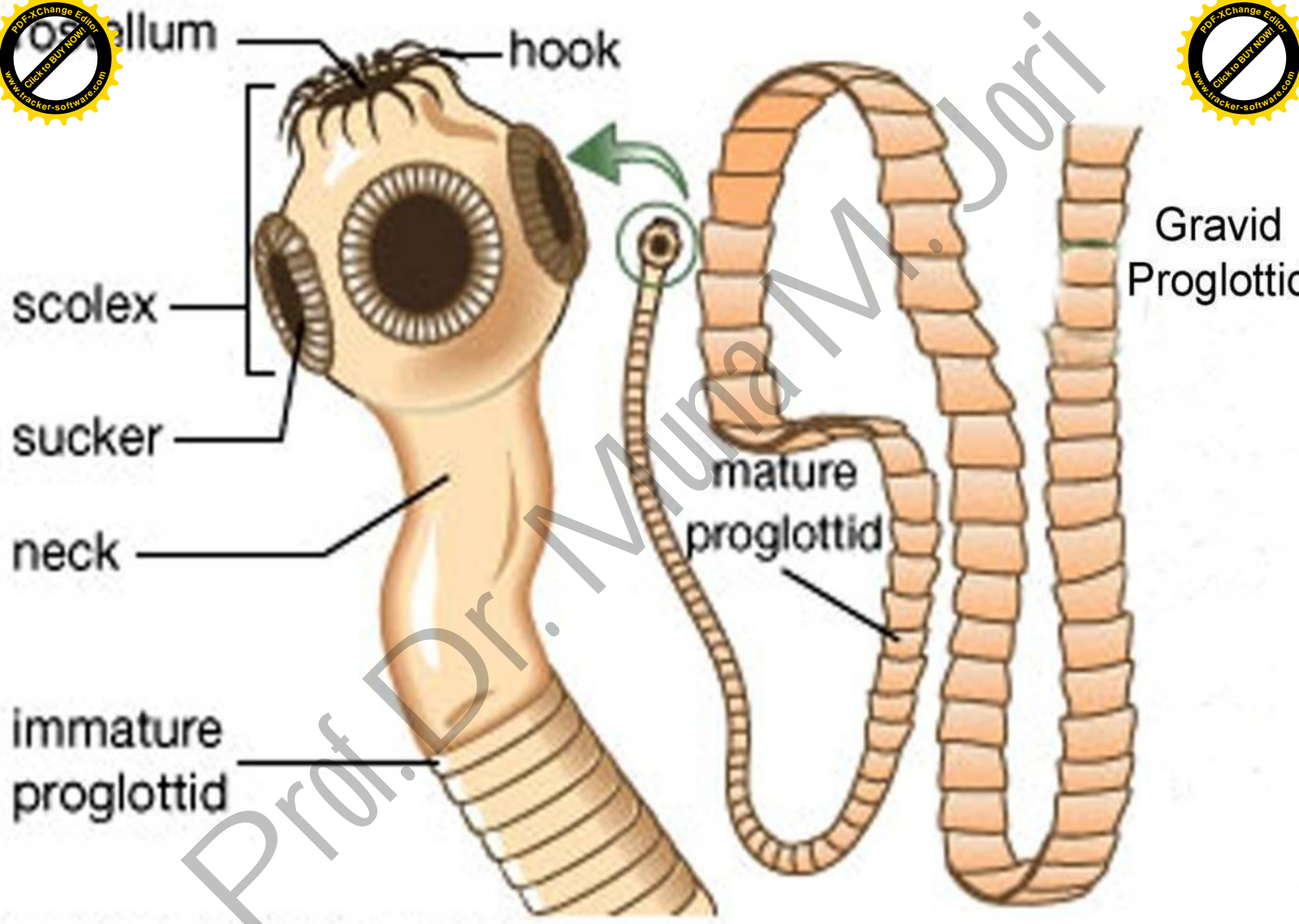
The ends differ, but neither has any organs or sensors that could be associated with what is commonly thought of being a "head." However, through a segment called a scolex.

- * The scolex attaches to the intestinal wall by hooks or suckers.
- * The body contains hundreds of segments (proglottids), and each is a sexually complete unit that can reproduce, if necessary.
- *The life cycle of tapeworms is simple in the sense that there are no asexual phases .
- *Required at least one intermediate host as well as the definitive host.

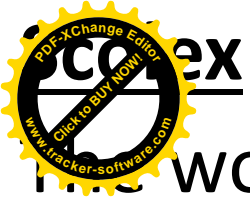


Some tapeworms have reached lengths of more than 20 meters, while other members are as small as 1mm .With a lifespan inside a host of 30 years or more.

- * Cestodaria is the unsegmented subclass of tapeworm affecting various fish and some reptiles.
- * Larvae found in animal hosts, while the adult worm found in humans, except *Echinococcus granulosus* and *E. multilocularis* differ from the rest tapeworms were the adult worm infects an animal host, while the larvae form produces slow growing cysts in humans.



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The worm's scolex attaches to the intestine of the definitive host. In some species, the scolex is dominated by bothria (tentacles), which are sometimes called "sucking grooves", and function like suction cups.

Other species have hooks and suckers that aid in attachment. Cyclophyllid cestodes can be identified by the presence of four suckers on their scolex.

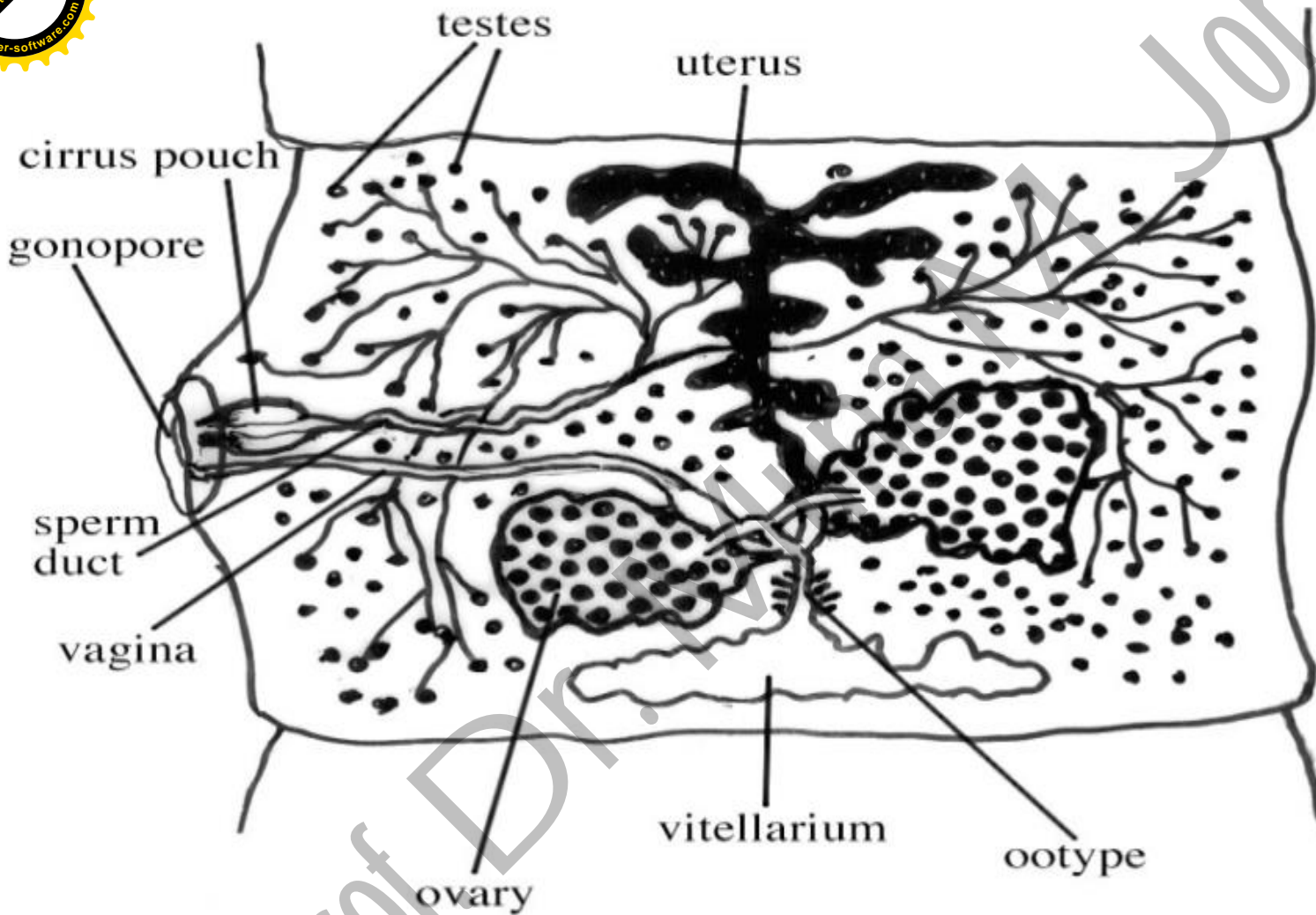
Proglottids

*The body is composed of segments (proglottids). The sum of the proglottids called a strobila, which is thin, and resembles a strip of tape. From this is derived the common name "tapeworm".

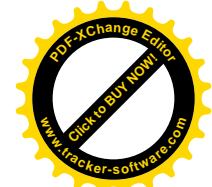


Each proglottid contains the male and female reproductive structures.

- * Like some other flatworms, cestodes use flame cells (protonephridia), located in the proglottids, for excretion.
- * Mature proglottids released from the tapeworm's posterior end and leave the host in feces.
- * Older segments pushed toward the tip of the tail as new segments produced by the neckpiece. By the time a segment has reached the end of the tail, only the reproductive tract is left. It then drops off, carrying the tapeworm eggs to the next host, since, in essence, each segment, by that point, and the proglottid is simply a sac of eggs.



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The nervous and sensory system

The main nerve centre of a cestode is a cerebral ganglion in its scolex.

Motor and sensory innervation depends on the number and complexity of the scolex. Smaller nerves emanate from the commissures to supply the general body muscular and sensory ending.

Prof. Dr. Minakshi Sri

Reproduction and life cycle:

Tapeworms are exclusively hermaphrodites (Dioecious); they have both male and female reproductive systems in their bodies.

The reproductive system includes one or many testes, cirrus, vas deferens and seminal vesicle as male organs, and a single lobed or unlobed ovary with the connecting oviduct and uterus as female organs.

There is a common external opening for both male and female reproductive systems, known as genital pore, which is situated at the surface opening of the cup-shaped atrium.

Even though they are sexually hermaphroditic, self-fertilization is a rare phenomenon. In order to permit hybridization, cross-fertilization between two individuals is often practiced for reproduction.





Tegument

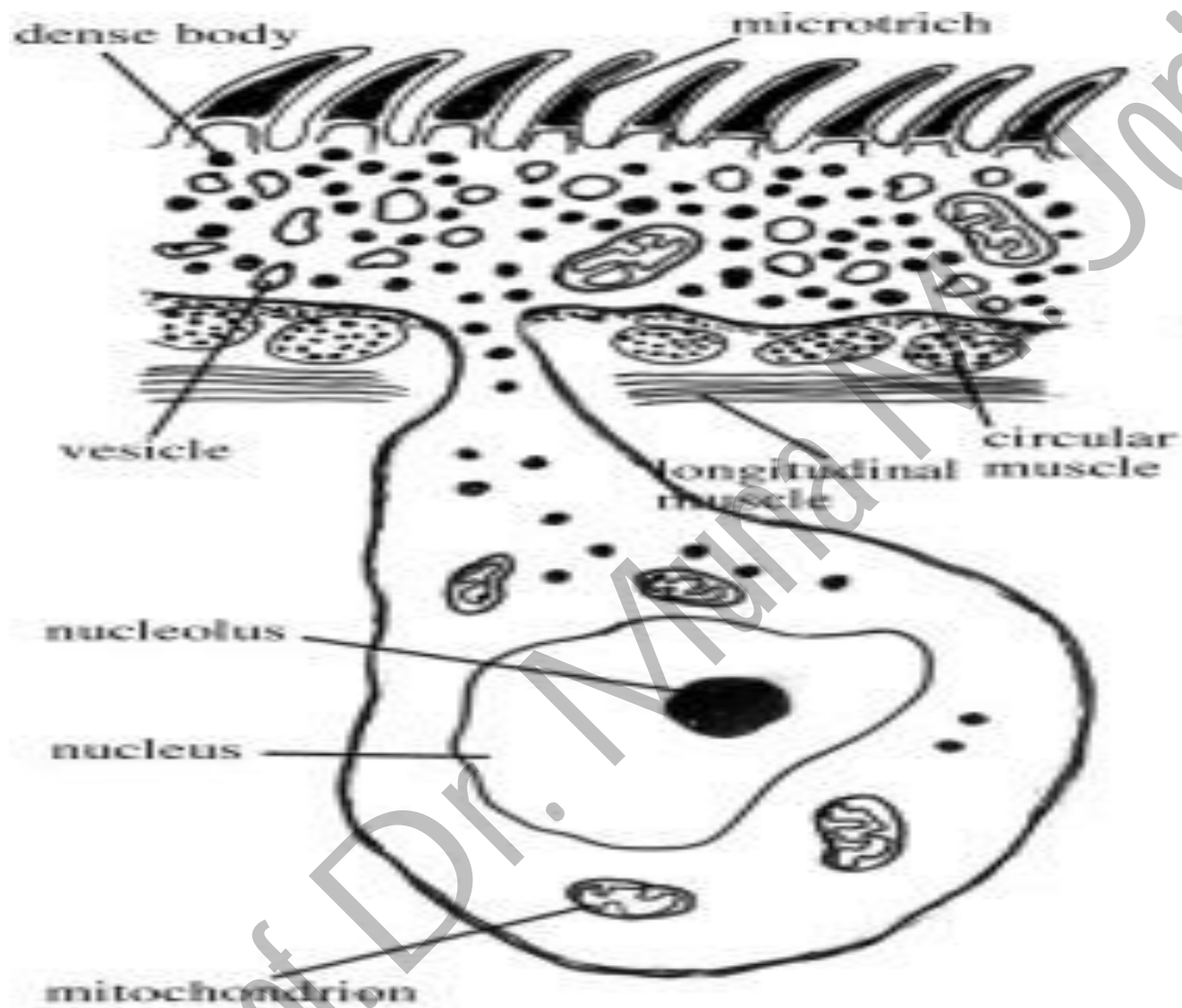
1- Syncytium- cytons connected by trabeculae (cytoplasmic bridges) to distal cytoplasm.

2- Microtriches (singular microtrix) are the highly specialized microvilli covering the entire surface of the tegument of cestodes. They are: fine hair-like filaments distributed throughout the surface of the body.

All cestodes lack digestive and excretory systems, therefore, the tegument with its microtriches constitute the principal site of absorption of nutrients and elimination of waste materials.

3-The surface carbohydrate complex called Glycocalyx





Section in cestode tegument

Excretion and Osmoregulation

The cestodes have the protonephridial flame bulb system typical of the flatworms. A flame cell protonephridium is embedded throughout the parenchyma.

The excretory ducts are lined with microvilli involved in the transport of excretory wastes and they may help to regulate ionic concentrations of the excretory fluid.

Treatment

Tapeworms are treated with medications taken by mouth, usually in a single dose.

The drug of choice for tapeworm infections is niclosamide. Praziquantel and albendazole can also be used.



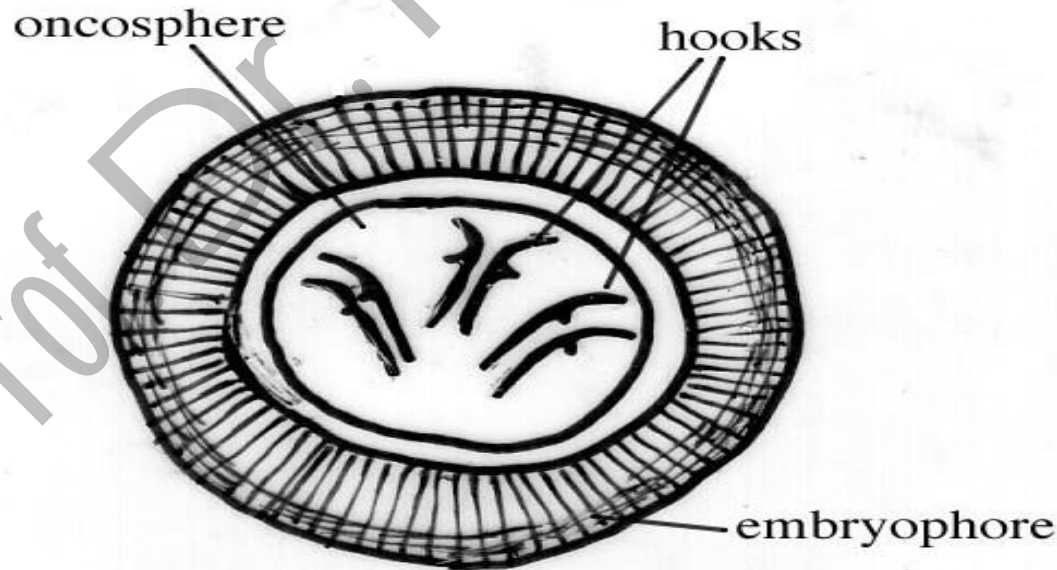
Some Difinitions:

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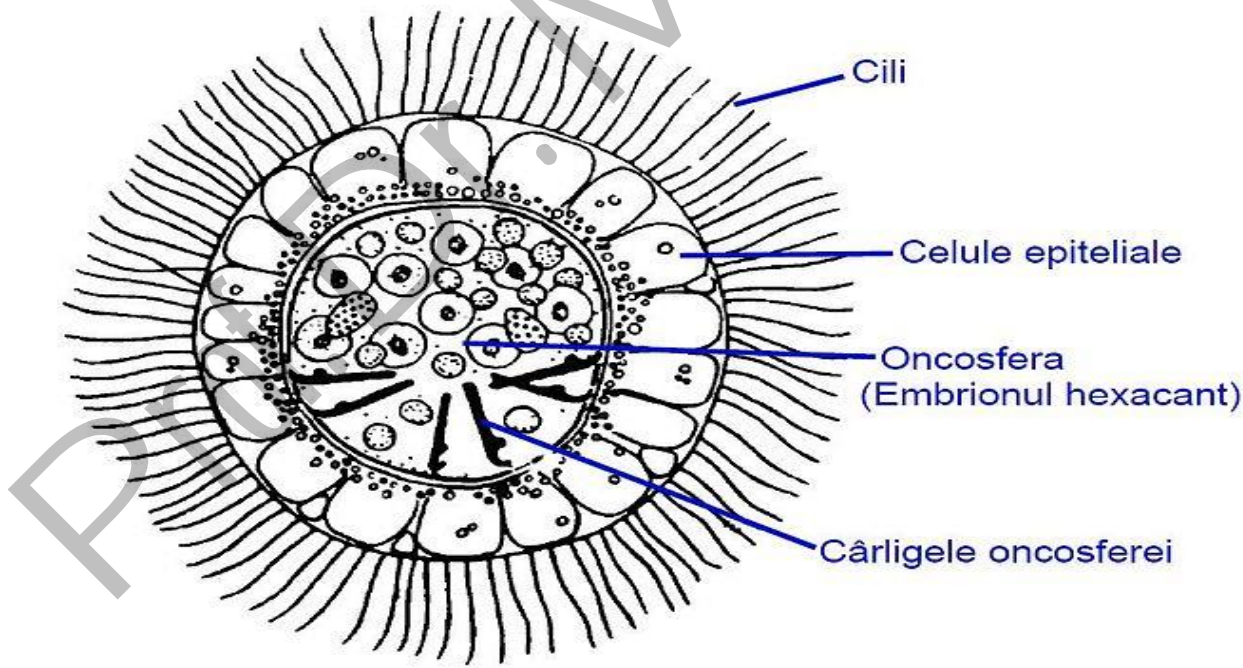
Embryophore :

A membrane or wall around the hexacanth embryo of tapeworms, forming the inner portion of the eggshell. In the genus *Taenia*, the embryophore is exceptionally thick; in the genus *Diphyllobothrium*, the embryophore is ciliated and enhances the aquatic life-cycle.



Coracidium :

The ciliated first-stage aquatic embryo of pseudophyllid and other cestodes with aquatic cycles; within the ciliated embryophore is a hooked larva, the hexacanth, that develops in the aquatic intermediate host.





Cysticercus

the larva of certain tapeworms, parasitic in an intermediate host, in which the scolex and neck are partly enclosed in a bladderlike cyst; bladderworm.

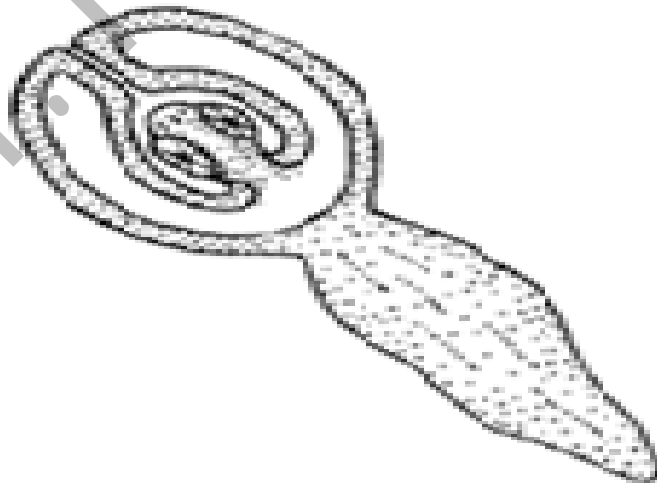


Cysticercus



Cysticercoid

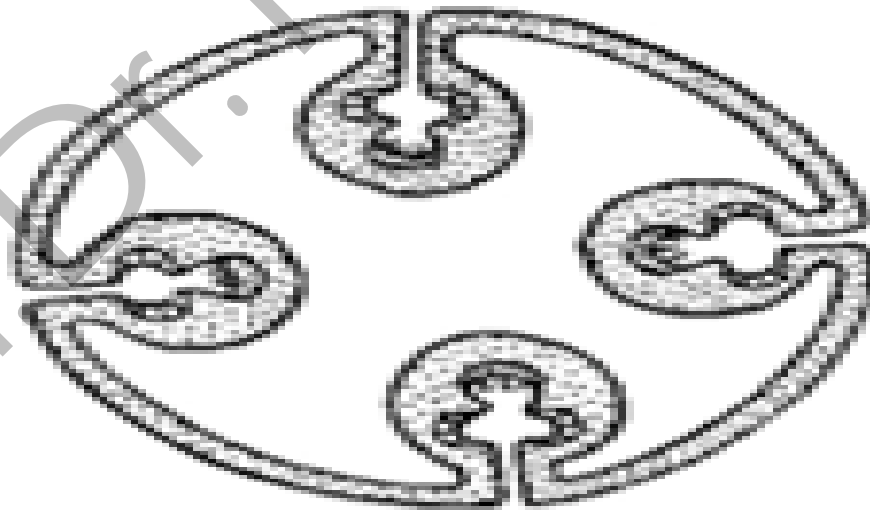
is the larval stage of certain tapeworms, similar in appearance to a cysticercus, but having the scolex filling completely the enclosing cyst. In tapeworm infestations, cysticercoids can be seen in free form as well as enclosed by cysts in tissues such as the intestinal mucosa. Also referred to as a metacestode.



Cysticercoid

Coenurus:

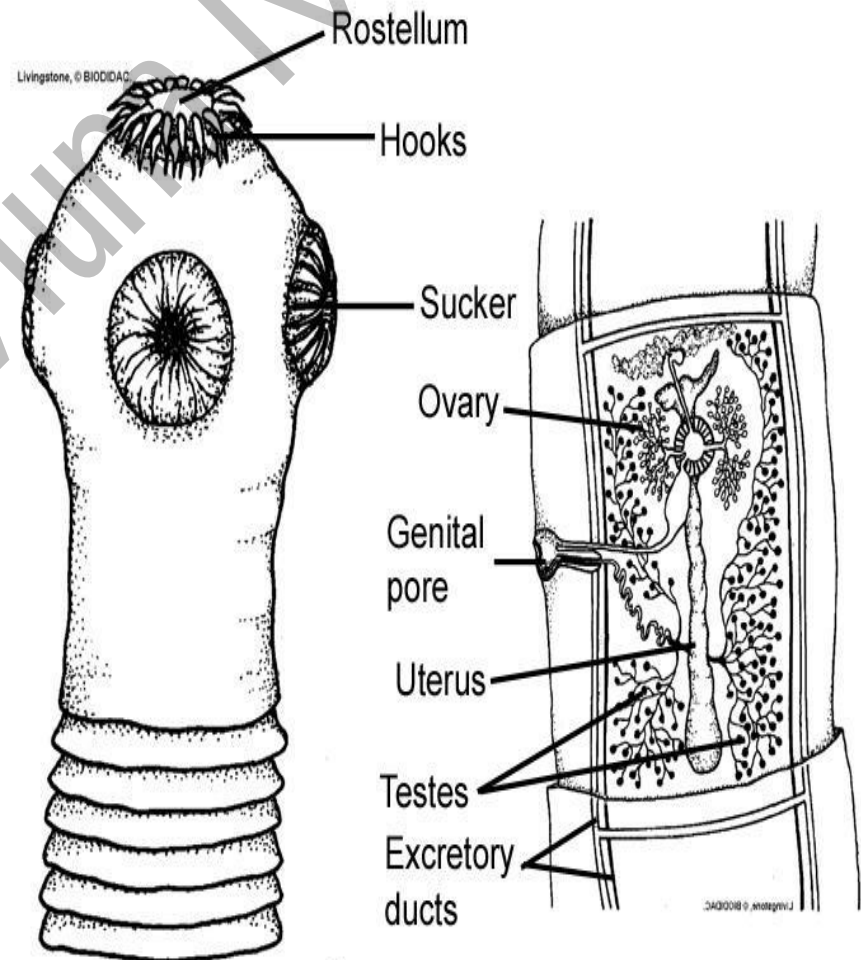
The larval stage of tapeworms of the genus *Multiceps*, a semitransparent, fluid-filled, bladderlike organism that contains multiple scoleces attached to the inner surface of its wall and that does not form brood capsules. It develops in various parts of the host body, especially in the central nervous system.



Coenurus

EUCESTODA

Circosphere with 6 hooks, tegument covered with microtriches. Human Tapeworms belong to 2 medically important orders: **Cyclophyllidea** and **Pseudophyllidea**





	Cyclophyllidean	Pseudophyllidean
Scolex	Bears 4 cup-like suckers	Bears 2 slit-like grooves
Uterus	Branching May or may not be present	No branching Convoluted uterine tubes assume the form of rosettes
Uterine pore	Absent	present
Common genital pore	Lateral	Ventral; in the midline
Eggs	Not operculated; do not give rise to ciliated larvae	Operculated; gives rise to ciliated larvae



Phylum: Platyhelminths

Class: Cestoda

Order: Cyclophyllidea

Family: Taeniidae

Genus: *Taenia*



Includes tapeworms of great medical importance.

Rostellum, if present, is non-retractable.

Mature proglottids have lateral genital pore, numerous testes, bilobed ovary, compact vitellarium .

Diagnosis is presence of egg with thick embryophore.



Taenia species



Both humans and cattle or pigs are necessary to the complete life cycle of *Taenia* species.

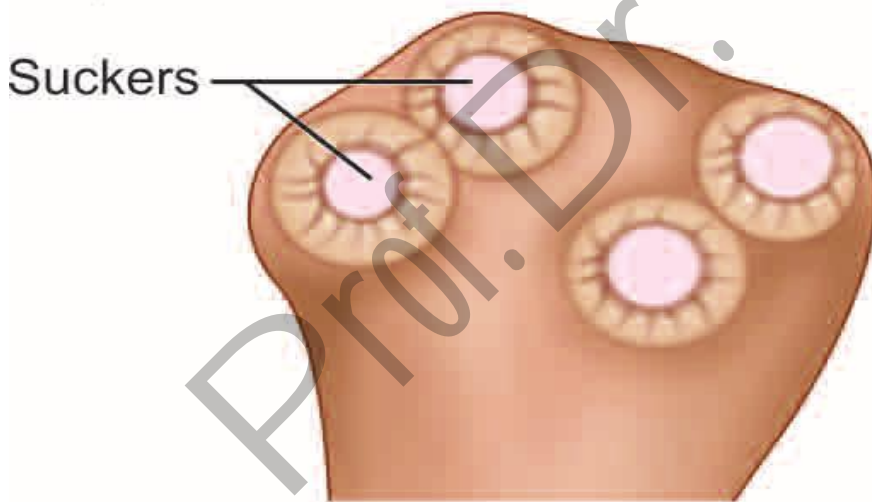
Eggs ingested by the intermediate hosts usually contain oncospheres.

The oncospheres then hatch out in the duodenum, pass into the intestine where they penetrate the intestinal wall and are then carried by the circulation to be deposited in tissues (usually muscle). There they develop into **cysticerci** larva which are white and ovoid.

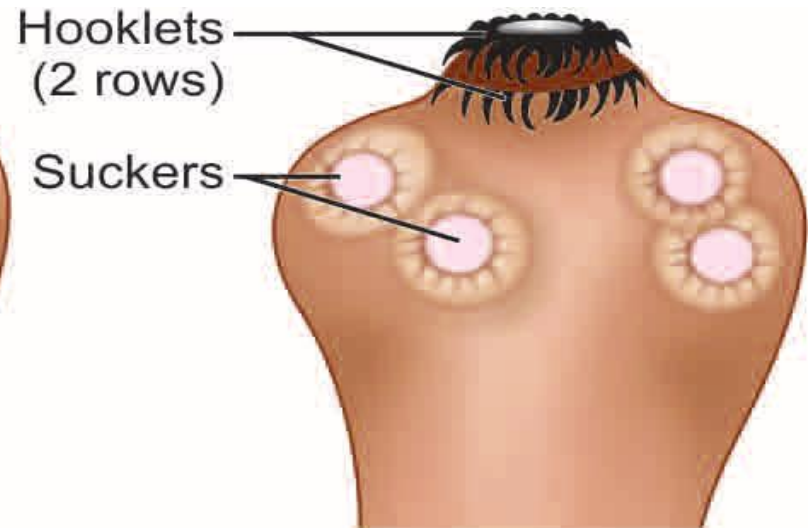
Humans become infected by ingesting inadequately cooked beef or pork with cysticerci, containing an invaginated protoscolex.

The protoscolexes evaginate and pass into the small intestine where they attach themselves to the mucosa and develop into adult worms.

Eggs and proglottids are passed out in the feces, and are then eaten by the intermediate host.



Taenia saginata



Taenia solium



Thank You

And

Good Luck

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