

## Helminths

### Cestodes (Tapeworms)

Cestodes are multisegmented, dorsoventrally flattened tape-like worms whose sizes vary from a few millimeters to several meters. The adult worms are found in the small intestine of humans.

#### Classification of Cestodes

##### Systemic Classification

Cestodes belong to Phylum Platyhelminthes and class

Cestoidea. The class Cestoidea includes 2 orders:

- Pseudophyllidea
- Cyclophyllidea

#### Tapeworms: General Characteristics

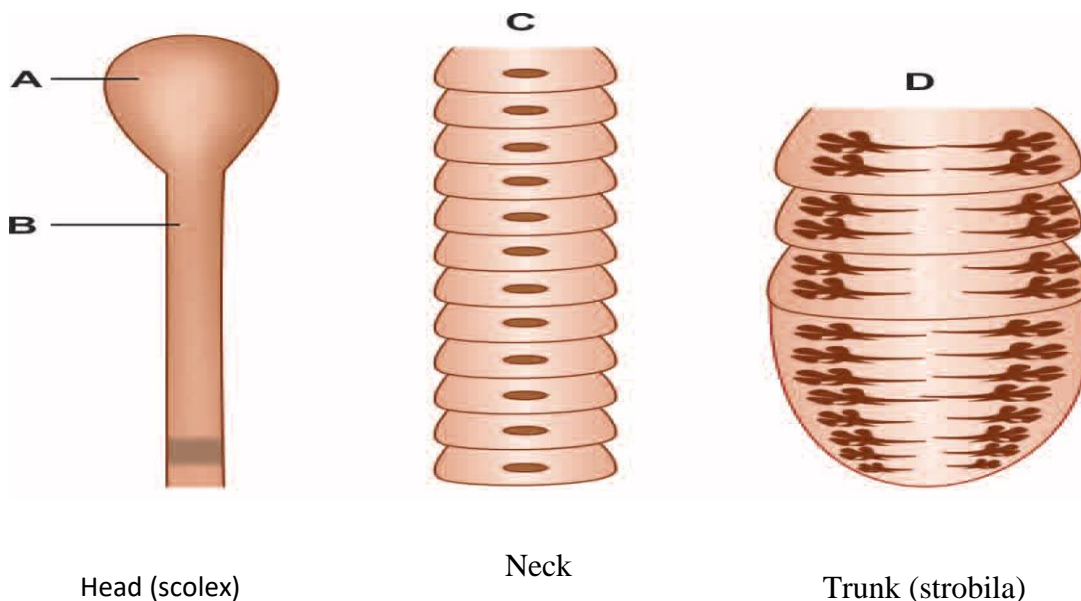
##### Adult Worms

- The adult worm consists of 3 parts:

€- Head (scolex)

€- Neck

€ -Trunk (strobila)





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### Head (Scolex)

It is the organ of attachment to the intestinal mucosa of the definitive host, human or animal

- In parasites of the order cyclophyllidea, the scolex possesses **4 suckers** (or **acetabula**). In some cyclophyllidea like *Taenia solium*, scolex has an apical protrusion called the **rostellum**. The rostellum may or may not be armed with hooks.

- In parasites of the order pseudophyllidea, the scolex does not possess suckers but possesses a pair of longitudinal grooves called **bothria**, by which it attaches to the intestine of the host.

### Neck

It is the part, immediately behind the head and is the region of growth from where the segments of the body (proglottids) are being generated continuously.

### Trunk (strobila)

The trunk also called **strobila** is composed of a chain of *proglottids* or *segments*

- The proglottids near the neck, are the young **immature** segments, behind them are the **mature** segments, and at the hind end, are the **gravid** segments.

- Tapeworms are **hermaphrodites (monoecious)** and very mature segment that contains both male and female sex organs. In the immature segments, the reproductive organs are not well-developed. They are well-developed in the mature segments. The gravid segments are completely occupied by the uterus filled with eggs.

- Tapeworms do not have a body cavity or alimentary canal

- Rudimentary excretory and nervous systems are present. The differences between heads and proglottids of various Cestodes have been illustrated in

### Eggs

Cyclophyllidean egg	Pseudophyllidean egg
<ul style="list-style-type: none"><li>• Covered by 2 layers: egg shell and embryophore</li><li>• Spherical</li><li>• Embryonated from the beginning</li><li>• Eggs are not operculated and the embryo is not ciliated</li></ul>	<ul style="list-style-type: none"><li>• Covered by 1 layer: egg shell</li><li>• Ovoid in shape</li><li>• Freshly passed eggs in feces are unembryonated.</li><li>• Eggs are operculated and the embryo is ciliated</li></ul>



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- The embryo inside the egg is called the **oncosphere** (meaning 'hooked ball') because it is spherical and has hooklets.
- Oncospheres of human tapeworms typically have 3 pairs of hooklets and so, are called **hexacanth** (meaning **6-hooked**) embryos

### Life Cycle

Cestodes complete their life cycle in 2 hosts: definitive host and intermediate host.

- **Humans** are the **definitive host** for most tapeworms, which cause human infection. An important exception is the dog tapeworm, *Echinococcus granulosus*, for which
- **dog** is the definitive host and man is the intermediate host. In *Taenia solium*, man is ordinarily the definitive host, but its larval stages also can develop in the human body.

\*- Cestodes complete their life cycle in 2 different hosts. Exceptions are:

*Hymenolepis* requires only 1 host, man, and *Diphyllobothrium* which requires 3 hosts, the **definitive host**: man; the **first intermediate host**: cyclops; and the **second intermediate host**: fish.

\* \_ Clinical disease can be caused by the adult worm or the larval form. In general, the adult worm causes only minimal disturbance, while the larvae can produce serious illness, particularly when they lodge in critical areas like the brain or the eyes