

Tapeworms (Cestodes)

As members of the platyhelminths, the cestodes, or tapeworms, possess many basic structural characteristics of flukes, but also show striking differences. Figure 86-3 shows the general features of the structure and development of tapeworms.

1-adult tapeworms are **flattened, elongated**, and consist of **segments** called **proglottids**.

2-Tapeworms vary in length from 2 to 3 mm to 10 m, and may have three to several thousand segments.

3-cestodes are divided into a **scolex, or head**, which bears the **organs of attachment**,

4-**neck** that is the region of **segment proliferation**, and a chain of proglottids called the **strobila**.

5- The **segments nearest the neck** are **immature** (sex organs not fully developed) and those more **posterior are mature**. The **terminal segments are gravid**, with the egg-filled uterus.

6-The **scolex** contains the **cephalic ganglion, or "brain,"** of the tapeworm nervous system.

7- Externally, the **scolex** is characterized by **holdfast organs**. Depending on the species, these organs consist of a **rostellum, bothria**, or **acetabula**.

- A **rostellum** is a retractable, conelike structure that is located on the anterior end of the scolex, and in some species is armed with hooks.

- **Bothria** are long, narrow, muscular **grooves** that are characteristic of the pseudophyllidean tapeworms.

- **Acetabula** (suckers like those of digenetic trematodes) are characteristic of cyclophyllidean tapeworms.

- Differential features of **pseudophyllidean** and **cyclophyllidean** tapeworms are listed in Table 86-3. **Most human tapeworms are cyclophyllideans**.

TABLE 86-3 Differences between Pseudophyllidean and Cyclophyllidean Tapeworms

Differentiating Feature	Pseudophyllidea	Cyclophyllidea
Scolex	Two sucking grooves (bothrial)	Four muscular suckers (acetabula)
Genital pore	Center of each proglottid	Margin(s) of each proglottid (may be located On both sides in an irregular pattern (<i>Taenia</i> spp); all on the same side (<i>Hymenolepis</i> spp); or each proglottid may have a pore on each side (<i>dipylidium caninum</i>))
Uterine pore	Center of proglottides on ventral surface	Absent; uterus ends blindly
Uterus (gravid)	Relatively long and coiled	Saclike, highly branched
Eggs	Operculate	Nonoperculate
Oncosphere	Ciliated (coracidium)	Nonciliated
Larvae	Procercooid and plerocercoid; both forms solid	Cysticercooid, cysticercus, hydatid; all forms cystic

8- A characteristic feature of adult tapeworm is the **absence of an alimentary canal**. The lack of an alimentary tract means that substances enter the tapeworm across the **tegument**.

(This structure is well adapted for transport functions, since it is covered with numerous **microvilli** resembling those lining the lumen of the mammalian intestine.

9-The **excretory system** is of the **flame cell type**.

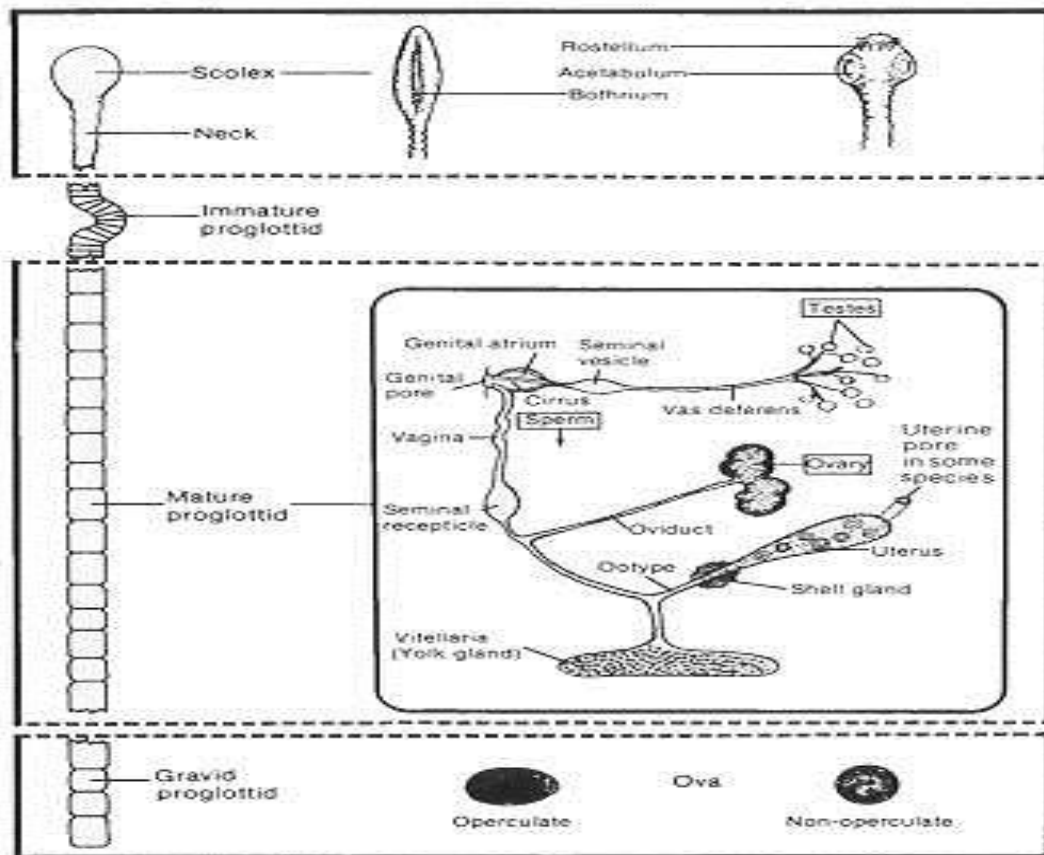
10- Cestodes are **hermaphroditic**, each **proglottid** possessing **male and female reproductive systems** similar to those of digenetic flukes.

11- tapeworms **differ** from flukes in the mechanism of **egg deposition**.

- **Eggs of pseudophyllidean** tapeworms **exit** through a **uterine pore** in the center of the **ventral surface** rather than through a genital atrium, as in flukes.

- In **cyclophyllidean** tapeworms, the female system includes a uterus **without a uterine pore** (Fig. 86-3). Thus, the cyclophyllidean **eggs are released only when the tapeworms shed gravid proglottids into the intestine**.

-Some proglottids disintegrate, releasing eggs that are voided in the feces, whereas other proglottids are passed intact.



12- however, Eggs of all tapeworms, contain at some stage of development an embryo or **oncosphere**.

13-The oncosphere of **pseudophyllidean** tapeworms is ciliated externally and is called a **coracidium**. The coracidium develops into a **procercoid** stage in its micro-**crustacean** first immediate host

14-and then into a **plerocercoid larva** in its next intermediate host which is a **vertebrate**. The **plerocercoid larva** develops into an **adult worm** in the definitive (**final**) host.

15-The **oncosphere of cyclophyllidean** tapeworms, depending on the species, develops into a **cysticercus larva, cysticercoid larva, coenurus larva, or hydatid larva (cyst)** in specific intermediate hosts. These larvae, in turn, become adults in the definitive host.

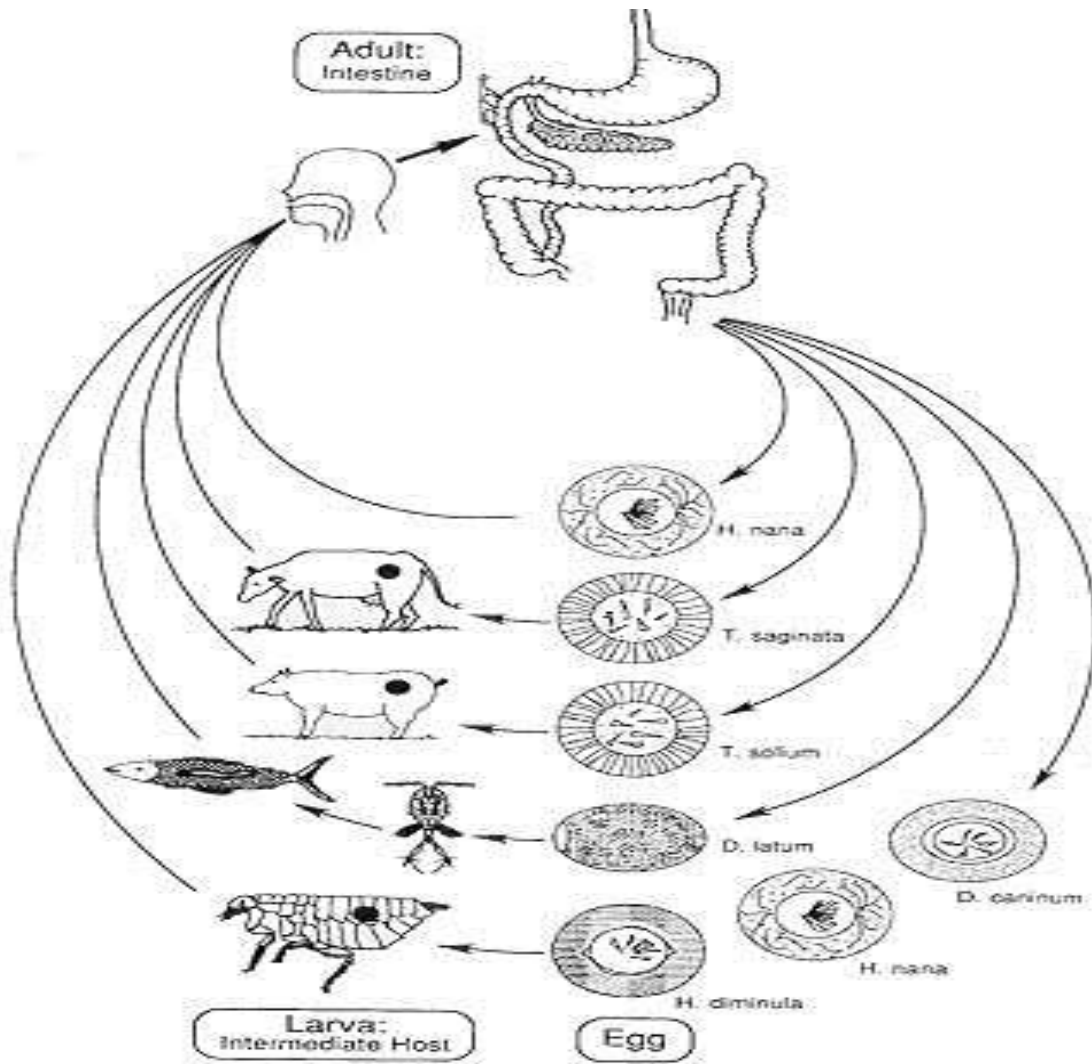


FIGURE 86-4 Generalized life cycle of tapeworms. *Hymenolepis nana*, *H. diminuta*, *Taenia saginata*, *T. solium*, *Diphyllobothrium latum*, *Dipylidium craninum*. Note hexacanth embryos. Cysticercus larva in cow and pig; proceroid larva in copepod, plerocercoid (sparganum) larva in fish; cysticercoid larva in insect.

