**Platyhelminthes**

Platyhelminthes are divided into two classes: Cestoda (tapeworms) and Trematoda (flukes). There are four medically important cestodes: *Taenia solium, Taenia saginata, Diphyllobothrium latum,* and *Echinococcus granulosus.*

***Taenia***

There are two important human pathogens in the genus *Taenia: T. solium* (the pork tapeworm) and *T. saginata* (the beef tapeworm). Man gets accidentally infected by eating pork meat or beef meat which is under cooked. Man can get the larval infection called cysticercosis by the ingestion of the eggs of *T.solium* tape worm

***T. solium***

- It is 3-4m long and is smaller than *T.saginata*. The scolex has four suckers and circle of hooks . Inside the gravid segments the number of uterine lateral branches are usually 5-10.

- The egg are measure 30-40 μm and are round in shape. The outer shell forms a thick brownish which encloses an oncosphere with three pairs of hooklets. The ova are highly resistant and remain infective in a moist environment for weeks or months.

- Larval stage: It is called A cysticercus consists of a pea-sized fluid-filled bladder with an invaginated scolex.

- The adult form of *T. solium* causes taeniasis. *T. solium* larvae cause cysticercosis.

**Scolex of *T. solium* *T. solium* egg *T. solium* proglotid**



**Life cycle**

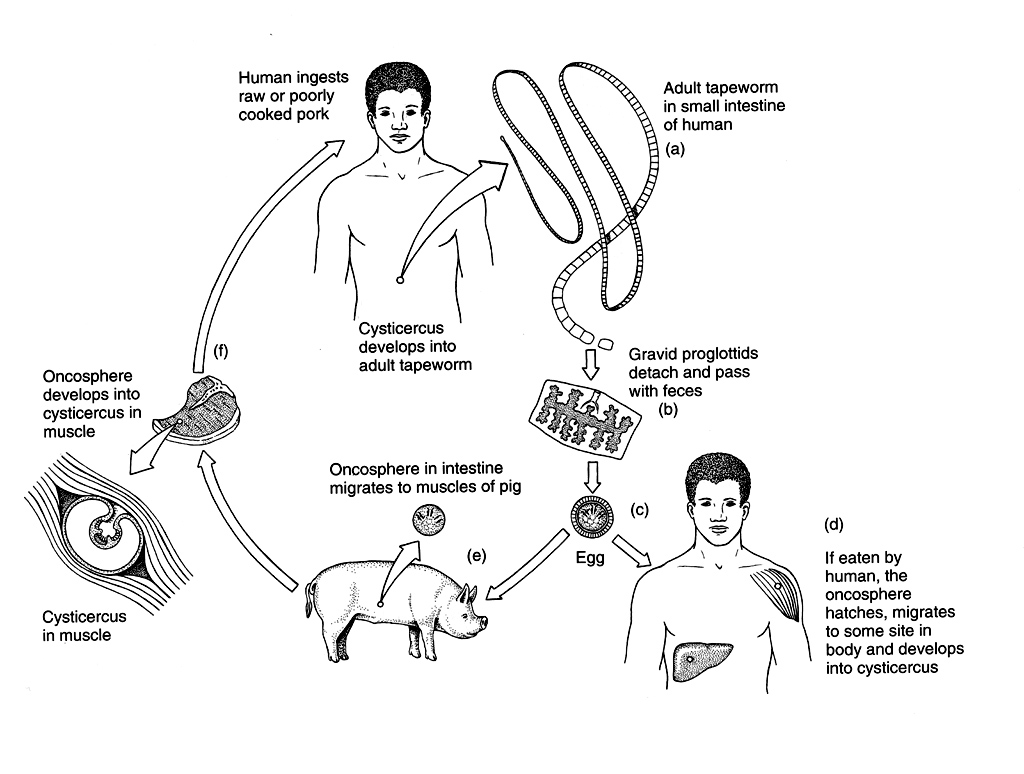
In taeniasis, the adult tapeworm is located in the human intestine. humans are infected by eating raw or undercooked **pork** containing the larvae, called **cysticerci.** In the small intestine, the larvae attach to the gut wall and take about 3 months to grow into adult worms. The gravid terminal proglottids containing many eggs and embryonated eggs passed in the feces and ingested by pig. A six-hooked embryo (oncosphere) emerges from each egg in the pig's intestine. The embryos burrow into a blood vessel and are carried to skeletal muscle. They develop into cysticerci in the muscle, where they remain until eaten by a human. Humans are the definitive hosts, and pigs are the intermediate hosts.

In cysticercosis, a more dangerous sequence occurs when a person ingests the worm eggs in food or water that has been contaminated with human feces. The eggs hatch in the small intestine, and the oncospheres burrow through the wall into a blood vessel. They can disseminate to many organs, especially the eyes and brain, where they encyst to form cysticerci.

**Pathogenesis**

In taeniasis, the adult tapeworm attached to the intestinal wall causes little damage. The most frequent and sever disease caused by *T .solium* is cysticercosis. The severity depends on location , size and number of the larvae in the tissues , as well as the host immune response .

The **cysticerci,** can become very large, especially in the **brain,** where they manifest as a **space-occupying lesion**. Living cysticerci do not cause inflammation, but when they die they can release substances that provoke an inflammatory response. Eventually, the cysticerci calcify.



**Life cycle of *T .solium***

**Clinical Findings**

Most patients with adult tapeworms are asymptomatic, but anorexia and diarrhea can occur. Cysticercosis in the brain causes headache, vomiting, and seizures. Cysticercosis in the eyes can appear as retinitis, or the larvae can be visualized floating in the vitreous. Subcutaneous nodules containing cysticerci commonly occur.

**Laboratory Diagnosis**

Identification of *T. solium* consists of finding gravid proglottids with 5–10 primary uterine branches in the stools. Eggs are found in the stools less often than are proglottids. Diagnosis of cysticercosis depends on demonstrating the presence of the cyst in tissue, usually by surgical removal or computed tomography (CT) scan. Serologic tests, e.g., ELISA, that detect antibodies to *T. solium* antigens are available.

**Treatment**

The treatment of choice for the intestinal worms is praziquantel. The treatment for cysticercosis is either praziquantel or albendazole, but surgical excision may be necessary.

***Taenia saginata***

Adult worm measures about 3 to 10 m in length. *T. saginata* has a scolex with four suckers but, in contrast to *T. solium,***no hooklets.** Its gravid proglottids have 15–25 primary uterine branches. The eggs are morphologically indistinguishable from those of *T. solium.*

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**scolex of *T. saginata***   **proglotid of *T. saginata***

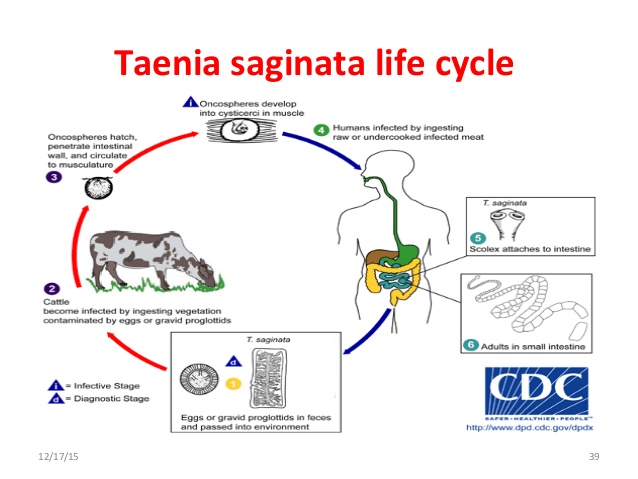
**(note many uterine branches)**

**life cycle**

Humans are infected by eating raw or undercooked **beef** containing larvae (cysticerci). In the small intestine, the larvae attach to the gut wall and take about 3 months to grow into adult worms measuring up to 10 m. The gravid proglottids detach, are passed in the feces, and are eaten by cattle. The embryos (**oncospheres**) emerge from the eggs in the cow's intestine and burrow into a blood vessel, where they are carried to skeletal muscle. In the muscle, they develop into cysticerci. The cycle is completed when the cysticerci are ingested. Humans are the definitive hosts and cattle the intermediate hosts. Unlike *T. solium, T. saginata* **does not cause cysticercosis** in humans.

**Pathogenesis**

The disease is called beef tapeworm infection or taeniasis. Little damage results from the presence of the adult worm in the small intestine.

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**Life cycle of *T.saginata***

**Clinical Findings**

Most patients with adult tapeworms are asymptomatic, but malaise and mild cramps, weight loss, hunger sensation can occur. but because of the large size of the worm, it may responsible for acute intestinal obstruction and because of utlilzing the host s nutrient its responsible for anemia.

**Laboratory Diagnosis**

Identification of *T. saginata* consists of finding gravid proglottids with 15–20 uterine branches in the stools. Eggs are found in the stools less often than are the proglottids.

**Treatment**

The treatment of choice is praziquantel.