

# *Taenia saginata*

(Beef Tapeworm)

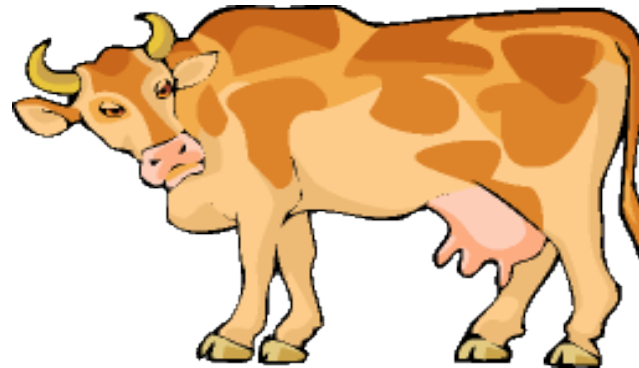


Table of Contents

<a href="#"><u>History of Discovery</u></a>	<a href="#"><u>Morphology</u></a>	<a href="#"><u>Incubation Period</u></a>	<a href="#"><u>Transmission</u></a>
<a href="#"><u>Symptoms</u></a>	<a href="#"><u>Diagnostic Test</u></a>	<a href="#"><u>Management/Therapy</u></a>	<a href="#"><u>Epidemiology</u></a>
<a href="#"><u>Public Health</u></a>	<a href="#"><u>Clinical Presentation</u></a>	<a href="#"><u>Web Links</u></a>	<a href="#"><u>References</u></a>

## History of Discovery [\(return to top\)](#)

Tapeworm infections have been recorded in history from 1500 B.C. and have been recognized as one of the earliest human parasites. *Taenia saginata* was differentiated from *Taenia solium* infection by the late 1700s. However, the exact life cycle of *T. saginata* was discovered around 1863 when the cattle was identified as the immediate host.

## Morphology [\(return to top\)](#)

*T. saginata* is a long flattened ribbon-like tapeworm that is white in color. It is about 6 to 7 millimeters in width. The adult *T. saginata* usually grows to be about 4 to 8 meters in length, with about 1000 segments called proglottids. Unlike the *T. solium*, the scolex (or mouth) is "unarmed" because it has 4 suckers but no hooks.

As the tapeworm grows in the human intestine, mature proglottis called gravid proglottis will be casted off out of the human body. Each gravid proglottids contains both male and female reproductive organs and houses 80 thousand eggs. Each round egg measures 31-43 micrometers and contains an embryo (an oncosphere).

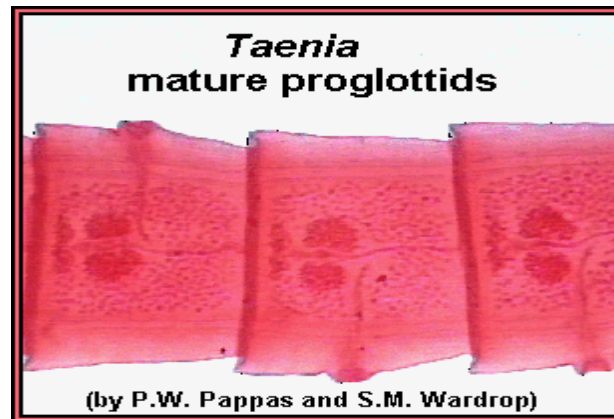
(compare *T. saginata* with [T. solium](#))



Picture of a *T. saginata* egg. Identical to the *T. solium* egg to the naked eye.

## **Incubation Period** [\(return to top\)](#)

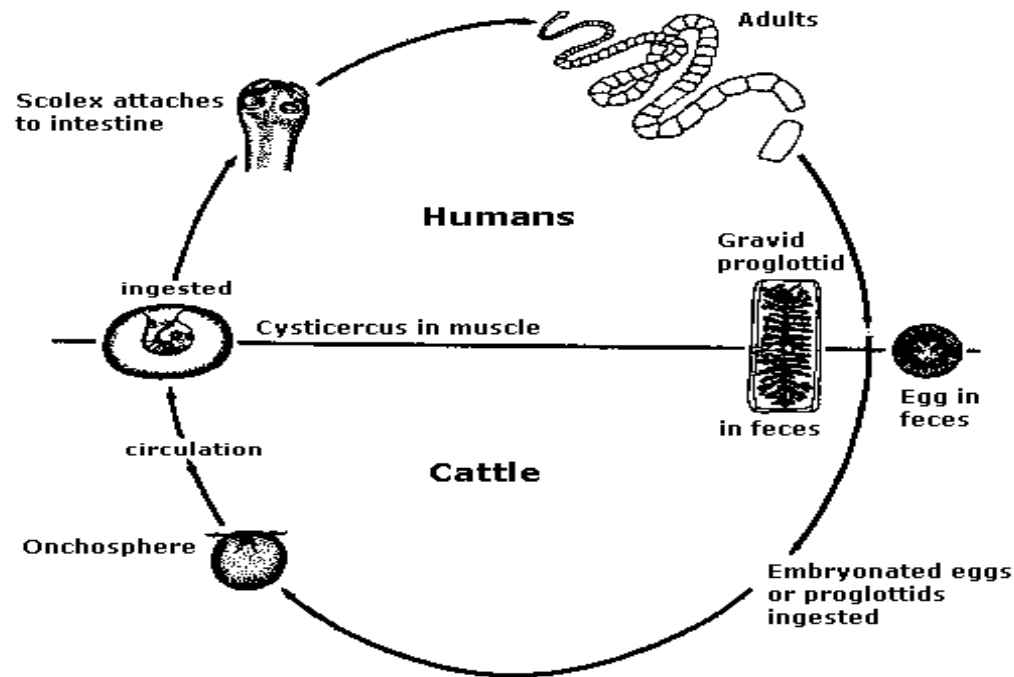
It takes about 5 to 12 weeks for the worm to mature into adulthood in the human intestine. Usually only a single worm is present at a time. However, multiple worms have been known to inhabit the human body.



**Click on the picture above to see labels of Proglottid segments.**

## Transmission/Reservoir [\(return to top\)](#)

*T. saginata* and *T. solium* have very similar transmission patterns. Humans are the only known definitive hosts for *T. saginata*. The life cycle begins with the ingestion of raw or undercooked beef containing *T. saginata* larvae. The larvae gets digested out of the beef in the human intestinal system. The worm then attaches on the intestinal mucosa of the upper small intestine. The tapeworm will digest food and grow longer. Mature tapeworms will release 10 single gravid proglottids daily via the feces or will spontaneously be released from the anus. Proglottids are motile and will shed eggs as it moves. These eggs (containing the oncosphere) can remain viable for several days to weeks in sewage, rivers, and pastures.



Cattles are the only intermediate host of the *T. saginata*. Cattle will eat the eggs and the oncospheres will hatch in the duodenum under the influence of gastric juices. It will invaginate into the intestinal walls and travel via the general circulatory system. The embryos will disseminate all over the body and develop cysticercus in striated muscles of the cow within 70 days. Human beings will be infected if they eat the cow meat at this time. Cysticercus begins to degenerate in 4 to 6 months. By the 9th month, most infected cows will die. Click on [T. solium](#) to check out their life cycle.

## **Symptoms** [\(return to top\)](#)

For humans in good health, there are few serious symptoms associated with tapeworm infection. For both the *T. saginata* and *T. solium*, patients have had diarrhea, constipation, flatulence, hunger pain, weight loss, and appendicitis. The most common complaint has been the embarrassment and discomfort of the proglottids crawling out of the anus. Taeniasis infection may also compromise the immune system. Especially in young children, this may have a profound effect on their health.

## **Diagnostic Tests** [\(return to top\)](#)

Most patients do not know they are infected until a single proglottid crawls out of the anus or individual proglottids are spotted on the surface of the stool. Taeniasis is then diagnosed by recovering eggs or gravid proglottids from the feces of the infected human host.

*T. saginata* and *T. solium* are virtually identical in morphology. However, identification at the species level can be made by the number of lateral uterine branches in the gravid proglottids and differing scolexes. Compare the two in the picture



*T. saginata* has 15 to 20 branches and no hooks in the scolex.



*T. solium* has 7 to 13 branches and 4 hooks in the scolex.

## Management and Therapy [\(return to top\)](#)

Both *T. saginata* and *T. solium* are treated with oral medication, usually in a single dose of the drug niclosamide. Therapy is usually very successful and most cases are completely eradicated. However, if the proglottids reappear, retreatment is administered.

**Epidemiology** [\(return to top\)](#) *T. saginata* exists everywhere in the world where humans are close to cows. Since the 1930s, the rate of bovine cysticercosis has been at 0.37% in all federally inspected cattle in the United States

## Public Health and Prevention Strategies [\(return to top\)](#)

Several steps can be taken to minimize *T. saginata* infection:

- A reliable method to prevent endemic spread of *T. saginata* is to detect infected cattle. The recommended method is for routine serologic surveillance of cysticercosis by the ELISA.
- Because egg can be viable from 16 days in untreated sewage to 159 days in grass, cattle should not be allowed to graze on contaminated grounds.
- Since human infection is acquired from consuming infected beef, it is advised that all beef products be inspected for cysticerci growths.
- Through cooking of the beef also provides complete protection.



Sources: <https://web.stanford.edu/group/parasites/ParaSites2001/taeniasis/saginata3.html#discovery>