

## Taenosis: a neglected parasitic (cestodal) zoonosis in India

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Taenosis is a food borne and obligatory cyclozoonotic disease which is caused by intermediate stages (larval stages) “cysticercus cellulosae” (measly pork) and “cysticercus bovis” (measly beef) of the pig tapeworm “Taenia solium” and cattle tapeworm “Taenia Saginata” respectively. Disease is endemic in India and occurs in two forms in humans: Taenosis (Intestinal tapeworm infection) occurs when man eats the raw or undercooked pork and beef having cysticerci. Cysticercosis (infection of soft tissues such as muscle, eye and brain) occurs as a result of autoinfection when human ingested the eggs of tapeworm Taenia solium through faecal-oral contamination (when man act as an intermediate host). Autoinfection is absent in case of tapeworm Taenia Saginata. Cysticercosis in brain (neurocysticercosis) is the most severe form of Cysticercosis in which cyst develops in brain and cause epilepsy.

As of 2011, the economic and health concern of human neurocysticercosis-associated epilepsy in India contain an annual median loss of rupees 12.03 billion (with Rs. 9.78 billion from the North and Rs. 2.22 billion from the south) and 1.73 DALYs (Daily Adjusted Life Year's) per thousand persons per year respectively. This indicates that human neurocysticercosis causes serious economic and health impact, so, there is necessity of befitting control programs for controlling the disease and abate the socio-economic impact of the disease in India.

Humans are universally susceptible to taenosis and infection is more common in low socio-economic group of people. Taenia can live in human intestine for many years (cysticercus develops over 2 months into an adult tapeworm, which can survive for years) and continuously shed eggs and proglottids in faeces. Length of adult worms is usually 5 m or less for *T. saginata* (however it may reach up to 25 m) and

2 to 7 m for *T. solium*. *T. saginata* adults usually have 1,000 to 2,000 proglottids, while *T. solium* adults have an average of 1,000 proglottids. The eggs contained in the gravid proglottids are released after the proglottids are passed with the feces. *T. saginata* may produce up to 100,000 and *T. solium* may produce 50,000 eggs per proglottid respectively.

Definitive host for Taenia solium are man and rarely dogs and Taenia Saginata are man only. Intermediate host for Taenia solium includes pigs and man and in case of Taenia Saginata are cattle only.

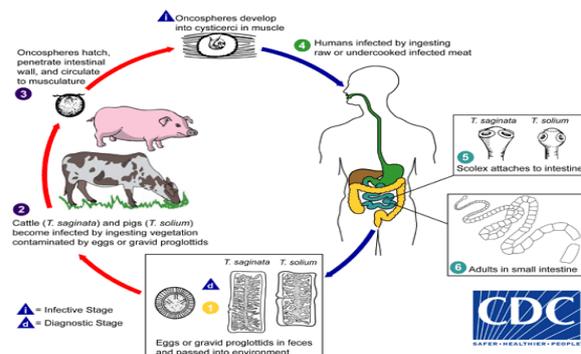


Figure. Life cycle of Taenia Saginata and Taenia Solium

Most people with tapeworm infections have no symptoms or mild symptoms. Patients with *T. saginata* taeniasis often experience more symptoms than those with *T. solium* because the *T. saginata* tapeworm is larger in size (up to 10 meters (m)) than *T. solium* (usually 3 m). Tapeworms can cause digestive problems including abdominal pain, loss of appetite, weight loss, and upset stomach. The most visible symptom of taeniasis is the active passing of proglottids (tapeworm segments) through the anus and in the feces. In rare cases, tapeworm segments become lodged in the appendix, or the bile and pancreatic ducts. Infection with *T. solium* tapeworms can result in human [Cysticercosis](#), which can be a very

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serious disease that can cause seizures (Epilepsy) and muscle or eye damage.

Actually the disease is a disease of poverty and often a neglected disease so prevention and control strategies includes timely diagnosis, treatment and certain preventive measures. Diagnosis of disease can be made on basis of signs and symptoms, stool microscopy, stool tapeworm antigen detection, stool PCR, serum antibody test for taeniasis and imaging. Symptom of Epilepsy in case of NCC (neurocysticercosis) is key area for disease control.

Treatment of disease in humans includes use of drugs niclosamide or praziquantel. Single doses of praziquantel (10 mg/kg) or niclosamide (adults and children over 6 years: 2 g, children aged 2–6 years: 1 g) are beneficial.

Preventive measures includes disease control at farm level (by giving Oxfendazole, when given as a single dose at 30 mg/kg kills all cysts in the pig's muscles), slaughterhouse control (Proper postmortem inspection and dispose of cysted meat), pig corralling (corral pigs to prevent their contact with human stools), health education, meat irradiation (gamma radiation), meat freezing (Cysts die if meat is stored at 4°C for more than 1 month, or -20°C for 1–3 days). Some basic steps to be followed at home level to prevent taeniasis includes:



1. Avoid consumption of raw or undercooked meat



2. Cook food meat thoroughly (This means cooking meat to a temperature above 140°F (60°F) for five minutes or more)



3. Proper hand hygiene. Always wash your hands after using the bathroom and teach your children to do the same.



4. Drink bottled water or treated water during travelling.



5. Proper washing of vegetables with salt water before consumption wash away tapeworms.

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