



## *Hymenolepis nana*

Common name: Dwarf tape worm

Infection is most common in school children and institutional populations.

- *H. nana* is the **smallest** and the **most common** tapeworm found in the human intestine.
- It is unique that it is the only cestode which completes its life cycle in **one** host humans.

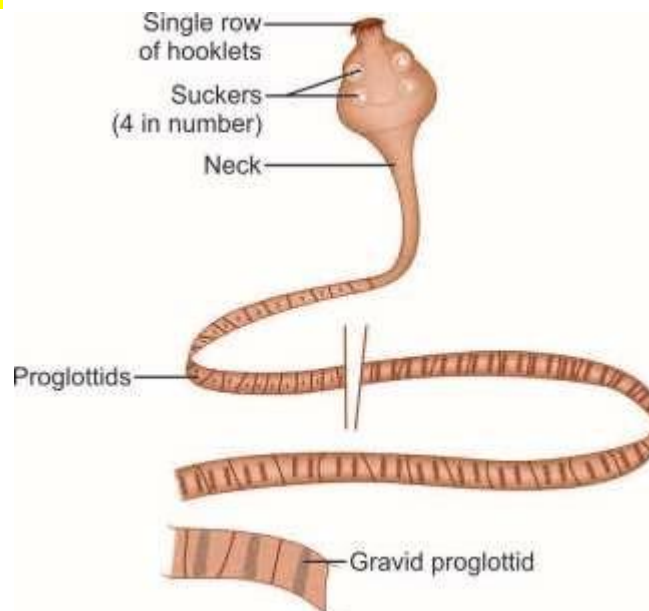
### Habitat

The adult worm lives in the proximal ileum of man. *H. nana* var. *fraterna* is found in rodents like mice and rats, where they are found in the posterior part of the ileum.

### Morphology

#### Adult Worm

*H. nana* is the smallest intestinal cestode that infects man. It is 5–45 mm in length and less than 1 mm thick. The scolex has 4 suckers and a retractile rostellum with a single row of hooklets.



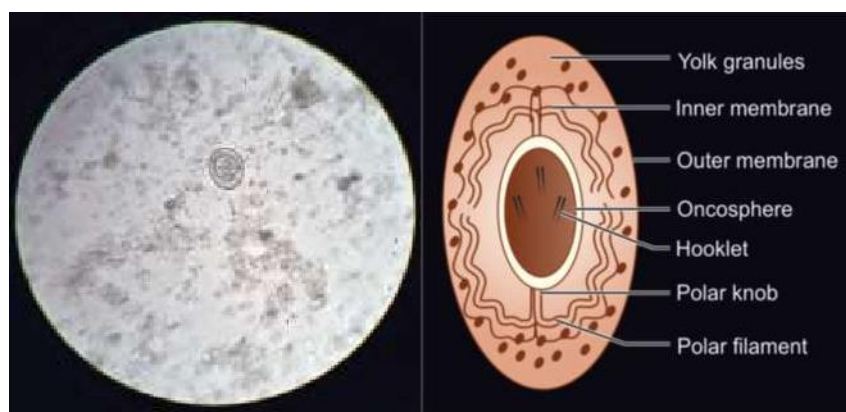
- The long slender neck is followed by the strobila consisting of 200 or more proglottids, which are much broader than long.
- Genital pores are situated on the same side along the margins.

- The uterus has lobulated walls and the testis is round and 3 in number. Eggs are released in the intestine by disintegration of the distal gravid segments.

### Egg

Egg is roughly spherical or ovoid, 30–40  $\mu\text{m}$  in size.

- It has a thin colorless outer membrane and inner **embryophore** enclosing the **hexacanth oncosphere**.
- The space between 2 membranes contains **yolk granules** and **4–8 thread like polar filaments** arising from 2 knobs on the **embryophore**.
- The eggs float in saturated solution of salt and are **non-bile stained**.
- They are **immediately infective** and unable to survive for more than 10 days in external environment.



Egg of *H. nana* ( A. As seen under microscope; B. Schematic diagram)

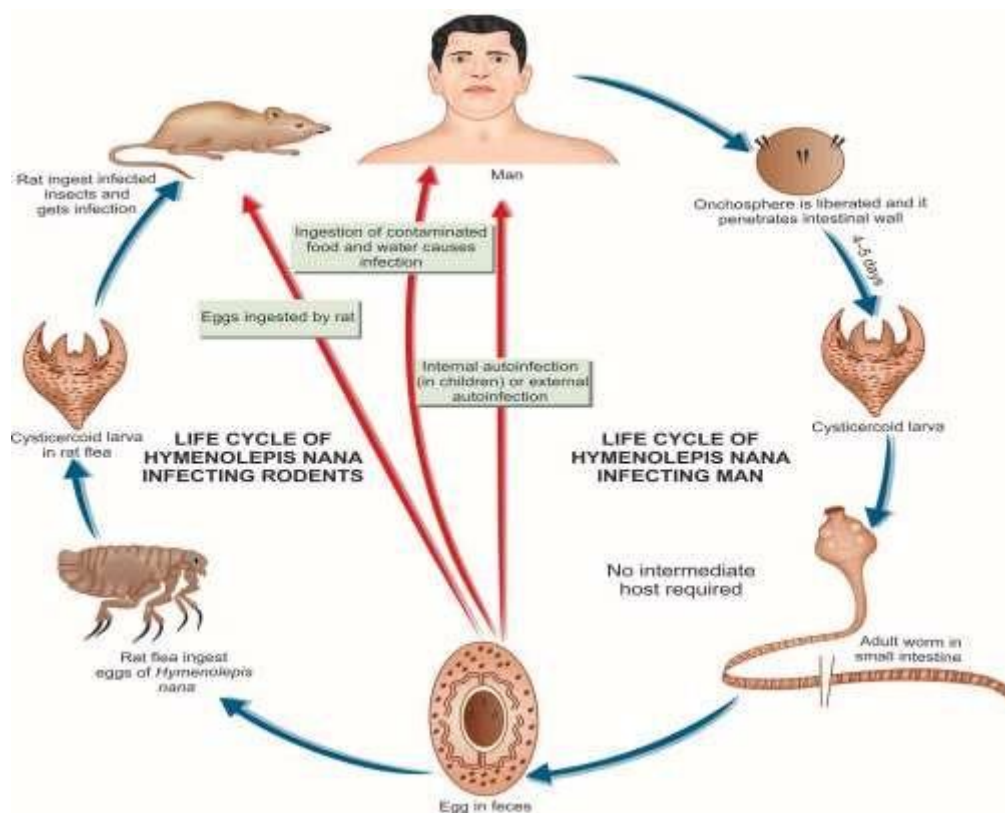
### Life Cycle

**Host:** Man.

- There is no intermediate host.
- **Mode of transmission:** Infection occurs by ingestion of the food and water contaminated with eggs.
- **Internal autoinfection** may also occur when the eggs released in the intestine hatch there itself.
- **External autoinfection** occurs when a person ingest own eggs by fecal oral route.
- *H. nana* is unusual in that it undergoes multiplication in the body of the definitive host.
- When the eggs are swallowed, or in internal autoinfection, they hatch in the small intestine.
- The hexacanth embryo penetrates the intestinal villus and develops into the cysticercoid larva.
- This is a solid pyriform structure, with the vesicular anterior end containing the invaginated scolex and a short conical posterior end.

- After about 4 days, the mature larva emerging out of the villus evaginates its scolex and attaches to the mucosae.
- It starts strobilization, to become the mature worm, which begins producing eggs in about 25 days. A different strain of *H. nana* infects rats and mice. The eggs passed in rodent feces are ingested by rat fleas (*Xenopsylla cheopis* and others), which acts as the intermediate host.
- The eggs develop into cysticeroid larvae in the hemocoel of these insects. Rodents get infected when they eat these insects. The murine الفئران strain does not appear to infect man.

However, the human strain may infect rodents, which may, therefore, constitute a subsidiary reservoir of infection for the human parasite.



## Clinical Features

**Hymenolopiasis** occurs more commonly in children.

- There are usually no symptoms but in heavy infections, there is nausea غثيان, anorexia فقدان شهية, abdominal pain and diarrhea.
- Sometimes pruritus الحكة may occur due to an allergic response.

## Laboratory Diagnosis

The diagnosis is made by demonstration of characteristic eggs in feces by direct microscopy. Concentration methods like salt flotation and formalin ether may be readily used.

ELISA test has been developed with 80% sensitivity.

### *Hymenolepis diminuta*

This is called the rat tapeworm and is a common parasite of rats and mice.

- The name "*diminuta* صغيره جدا" is a misnomer تسمية خاطئة, as it is larger than *H. nana* being 10–60 cm in length.
- Its life cycle is similar to that of the murine strain of *H. nana*.
- Rarely, human infection follows accidental ingestion of infected rat fleas. Human infection is asymptomatic.

### *Dipylidium caninum*

This common tapeworm of dogs and cats, it may accidentally cause human infection, mainly in children.

#### Morphology

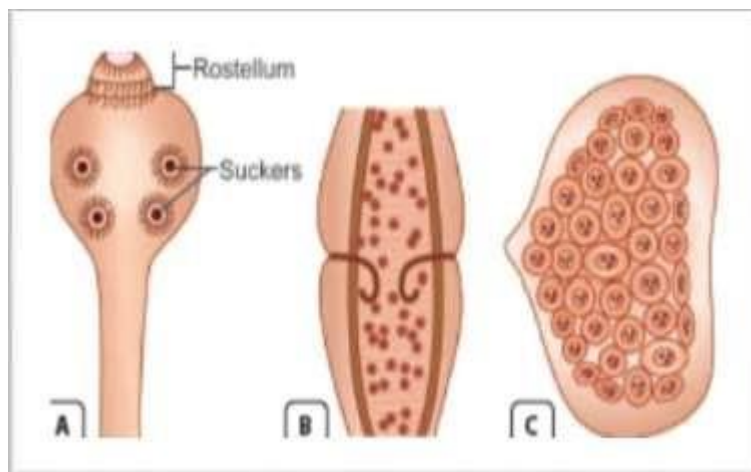
- The adult worm in the intestine is about 10–70 cm long
- The scolex has 4 prominent suckers and a retractile rostellum with up to 7 rows of spines.
- The mature proglottid has 2 genital pores, 1 on either side, hence the name *Dipylidium* (dipylus-2 entrances).
- Gravid proglottids are passed out of the anus of the host singly or in groups.

#### Life Cycle

**Definitive host:** Dogs, cats, and rarely man.

**Intermediate host:** Fleas.

- Man acquires infection by ingestion of flea harboring cysticercoid larva.
- The eggs or proglottids passed in feces of dogs and cats are eaten by larval stages of dog and cat fleas, *Ctenocephalus canis* and *C. felis*.
- The embryo develops into a tailed cysticercoid larva.



*D. caninum*. **A.** Scolex showing 4 suckers and rostellum with multiple rows of hooklets; **B.** Mature proglottid showing 2 genital pores, one on either side; **C.** Eggs found in clusters enclosed in a membrane