Cestodes

Tapeworms from man and animals
*Taenia* sp.

The common (beef) tapeworm is several meters long.

Courtesy Peters W. & Gilles H.
Taeniasis

1. Eggs or gravid proglottids in feces and passed into environment

2. Cattle (T. saginata) and pigs (T. solium) become infected by ingesting vegetation contaminated by eggs or gravid proglottids

3. Oncospheres hatch, penetrate intestinal wall, and circulate to musculature

4. Humans infected by ingesting raw or undercooked infected meat

5. Scolex attaches to intestine

6. Adults in small intestine

i = Infective Stage
d = Diagnostic Stage

Courtesy CDC
Cysticercosis (Taenia spp.)

1. Eggs or gravid proglottids in feces and passed into environment.
2. Embryonated eggs and/or gravid proglottids ingested by pigs or humans.
3. Oncospheres hatch, penetrate intestinal wall, and circulate to musculature in pigs or humans.
4. Humans acquire the infection by ingesting raw or undercooked meat from infected animal host.
5. Scolex attaches to intestine.
6. Adults in small intestine.

Oncospheres develop into cysticerci in muscles of pigs or humans.

Cysticercosis may develop in any organ, being more common in subcutaneous tissues as well as in the brain and eyes.

= Infective Stage
=d = Diagnostic Stage

Courtesy CDC
Taenia sp.

Unstained egg with four (visible) hooklets. It is not possible to distinguish between the eggs of *T. saginata*, *T. solium*, other *Taenia* spp., *Multiceps* and *Echinococcus*. 
Taenia sp.

Unstained egg with three (four) visible hooklets.
*Taenia* sp.

Egg with four (visible) hooklets (stained with Lugol). It is not possible to distinguish between the egg of *T. saginata* and of *T. solium*. 
**Taenia sp.**

Egg with four (visible) hooklets from the hexacanth larva (stained with Lugol).
**Taenia sp.**

Small egg with four (visible) hooklets (stained with Lugol).
*Taenia sp.*

Free unstained proglottid.
*Taenia saginata*

Proglottid with 15 to 20 lateral branches on each side of the uterine stem.
Taenia solium

Proglottid containing an uterus with 13 or less lateral branches.
Taenia saginata

Scolex of the beef tapeworm with suckers (Stained with Eosin).
Taenia solium

Scolex of the pork tapeworm. Four suckers and a rostellum with a crown of hooks. Distinctly smaller than in T. saginata (Stained with Eosin).
*Taenia solium*

Scolex of the pork tapeworm. Four suckers and a rostellum with a crown of hooks

(Courtesy of J.M. Jadin).
Taenia solium

Scolex of the pork tapeworm. The crown of hooks is visible.

(Interference microscopy, courtesy of J.M. Jadin).
**Diphyllobothrium latum**

Unstained egg from the fish tapeworm in stool. Elliptic egg with a thin shell. The operculum is conspicuous. The opposite pole shows a small terminal knob. Length: 65 µm.
Diphyllobothrium latum

Egg from the fish tapeworm in stool. Elliptic egg with a thin shell. The operculum is at the bottom (Unstained).
**Diphyllobothrium latum**

Elliptic egg with a thin shell from the fish tapeworm in stool. The operculum is at the right (Unstained).
Diphyllobothrium latum

Unstained egg from the fish tapeworm in stool. The operculum at the top was forced open by pressure on the coverglass.
Diphyllolobothrium latum

Unstained egg from the fish tapeworm in stool. The operculum at the top was forced open by pressure on the coverglass.
Diphyllobothrium latum

The mature proglottid is somewhat broader than long, and is ivory colored.
LIFE CYCLE of—

Hymenolepis nana

- Adult in small intestine
- Gravid proglottids disintegrate
- Embryonated egg in feces (diagnostic stage)
- Embryonated egg (infective stage)
- MAN
- Cysticercoid develops in villus
- Scolex attaches to intestine
- Cysticercoid emerges from villus
- Ososphere hatches

EXTERNAL ENVIRONMENT

Courtesy CDC
**Hymenolepis nana**

Unstained egg with three (visible) hooklets and several polar filaments between the two shells.
Hymenolepis nana

Unstained egg with several (visible) hooklets and several polar filaments between the two shells.
**Hymenolepis diminuta**

Oval and yellow-coloured egg in faeces. There are no filaments between the embryophore and the outer wall but a clear central and a granular peripheral zone can be distinguished (Unstained).
Echinococcus

- *E. granulosus*
  - Dog, sheep, man
  - Hydatid cyst in liver and other localisations
  - North Africa, Asia, Latin America

- *E. multilocularis*
  - Fox, man
  - Alveolar hydatid
  - Northern hemisphere (where the fox is present)
Echinococcus granulosus

The free brood capsules and the free scolices are collectively referred to as “hydatid sand”.

However recurrence of the disease, due primarily to the development of secondary cysts from scolices spilled from the primary cyst at the time of operation, may be anticipated in 50% of the cases...

Echinococcus granulosus

Brood capsules in hydatid sand from a liver cyst (Stained with Iron Haematoxylin).
**Echinococcus granulosus**

Brood capsule in hydatid sand from a liver cyst (Unstained).
Echinococcus granulosus

Brood capsule in hydatid sand from a liver cyst (Unstained).
Echinococcus granulosus

Free hooklet in hydatid sand from a liver cyst (Unstained).
**Echinococcus granulosus**

Free hooklet in hydatid sand from a liver cyst (Unstained).
Echinococcus multilocularis
Gross pathology of cotton rat infected with E. multilocularis (Necropsy).

Courtesy CDC