Order Pseudophyllidea

1. Adult tapes usually parasites of fish, also other vertebrates.

2. Scolex is variable, but always with longitudinal slits.
   a. Bothria (usually 2) as lateral slits.
   b. Distinct from bothridia - more leaf shaped, often 4.

3. Testes and vitellaria are follicular and scattered on opposite sides of proglottid
   a. testes - dorsal
   b. vitellaria - ventral

4. Genital apertures are ventral - uterine pore is permanent.
Order Pseudophyllidea

5. Eggs are unembryonated when shed – also operculated.
   a. Must mature outside of host.
   b. After development, a ciliated hexacanth hatches – into a coracidium.
   c. Eaten by copepod usually Diaptomus or Cyclops

6. forms procercoid.

Order Pseudophyllidea

7. fish eat copepods develop plerocercoids

8. definitive host infected by eating fish
**Dibothriocephalus latum**

1. The “broad fish tapeworm.”
   a. There are several species with similar appearance and life history.
1. Relatively common among piscivorous vertebrates.
   a. Including bears, raccoons, mink, humans.
3. Infects 9 million humans, worldwide.
   a. Most infections via eating raw or smoked fish (e.g., salmon sushi, Gefilte fish, lutefisk, etc.).
**Dibothriocephalus latum**

1. Life Cycle:
   a. Egg shed in feces
   b. Oncosphere develops in egg
   c. Coracidium hatches, eaten by copepod
   d. Develops to procercoid, eaten by fish
   e. Develops to plerocercoid, eaten by mammal.
   f. Matures to adult worm.

**Vitamin B12 Deficiency**

Testis biopsy from a patient with asemena caused by B12 deficiency due to infestation with fish tapeworm (*Diphyllobothrium latum*). Testis biopsy from the same patient demonstrating recovery of sperm production after treatment.
"sparganosis"
Also called "sparaganum"

a. Where plerocercoid infects man by accident.
   b. Occurs in three ways
      1. Drinking copepods in water
      2. Eating undercooked meat with plerocercoids
      3. When raw meat is used as a poltice
**Spinometra (Diphyllobothrium) mansonoides**

1. Usually definitive host is bobcat.
2. Intermediate host is frog or small aquatic mammal which is infected by eating copepods

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**Spirometra erinacei**

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**Order Cyclophyllidea**

1. Common tapeworm of birds and mammals
   a. also a few reptiles and amphibians
2. Characteristics:
   a. Scolex with 4 suckers
   b. Often a hooked rostellum
Order Cyclophyllidea

2. Other Characters:
   a. Segments of proglottids usually longer than wide.
   b. Proglottids leave host singly, or in groups
      1. Usually motile.
   e. Vitellaria concentrated in a single compact mass posterior to ovary.

Order Cyclophyllidea

2. Still Other Characters:
   f. Genital duct opens into a common, lateral atrium.
   g. Uterine pore is absent.
   h. Gravid uterus is tubular with many lateral branches.
Order Cyclophyllidea

2. Still Other Characters:
   i. Eggs escape by rupture of proglottid
   j. non-operculated eggs are embryonated and
devolve into a bladderworm (cysticercoid) in the
intermediate host.

Two Major Groups

1. Taenioid cestodes (Family Taeniidae)
   a. Eggs with thick shells that
      appear striated
   b. Larval stages with fluid
      filled bladders
      a. cysticercus
      b. strobilocercus
      c. coenurus
      d. hydatid cyst
   2. Can form within mammals
      that have swallowed eggs.
Strobilocercus of *Taenia taeniaformis* removed from an intermediate host (a mouse).

A bottle filled with *Taenia* cysticerci from the peritoneal cavity of a groundhog.

*Taenia multiceps* - coenurus (Cestoda: Cyclophyllidea) cross section through the coenurus. Note the many protoscolecies growing from the germinal layer.

Hydatid cyst of *Echinococcus granulosus*. Note the thick laminated cyst wall and the fibrous host response outside the cyst wall. Also note the daughter cyst with protoscolecies within the main cyst.
Echinococcus multilocularis
This animal was infected 9 weeks ago. The alveolar cysticerci contain small scoleces.

Taenia taeniformis multilocular cysticerci in mouse

Two Major Groups
2. Nontaenioid cestodes - several families
   a. Eggs are variable but never with thick shell
   b. Common larval form - cysticercoid
   c. Usually forms in invertebrates and fish
   d. Definitive host is a mammal.
Non-Taenioid Cestodes

*Hymenolepis diminuta, H. nana*

a. Egg shed in feces
b. Eaten by beetle, oncosphere hatches, into body
c. Matures to cysticercus, eaten by mouse or human
d. Mature worm.

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**Dipilidium caninum**

a. Recognizable by paired gonopores.
b. Often seen crawling on rugs.
**Dipylidium caninum**

- Egg packets
  - The egg packets contain 15-20 eggs in each and are seldom seen free in the feces. They may, however, be readily expressed from the gravid proglottids.

**Dipylidium caninum cysticercoids from flea.**

**Moniezia expansa**

1. A sheep tapeworm; proglottids very wide
2. Odd to have an herbivore with a tapeworm
3. Sheep become infected by eating orbatid mites with grass.
Anoplocephala perfoliata; horse tapeworms, found near ileocecal junction; eggs (right) are eaten by mites, which are consumed by horses in forage.