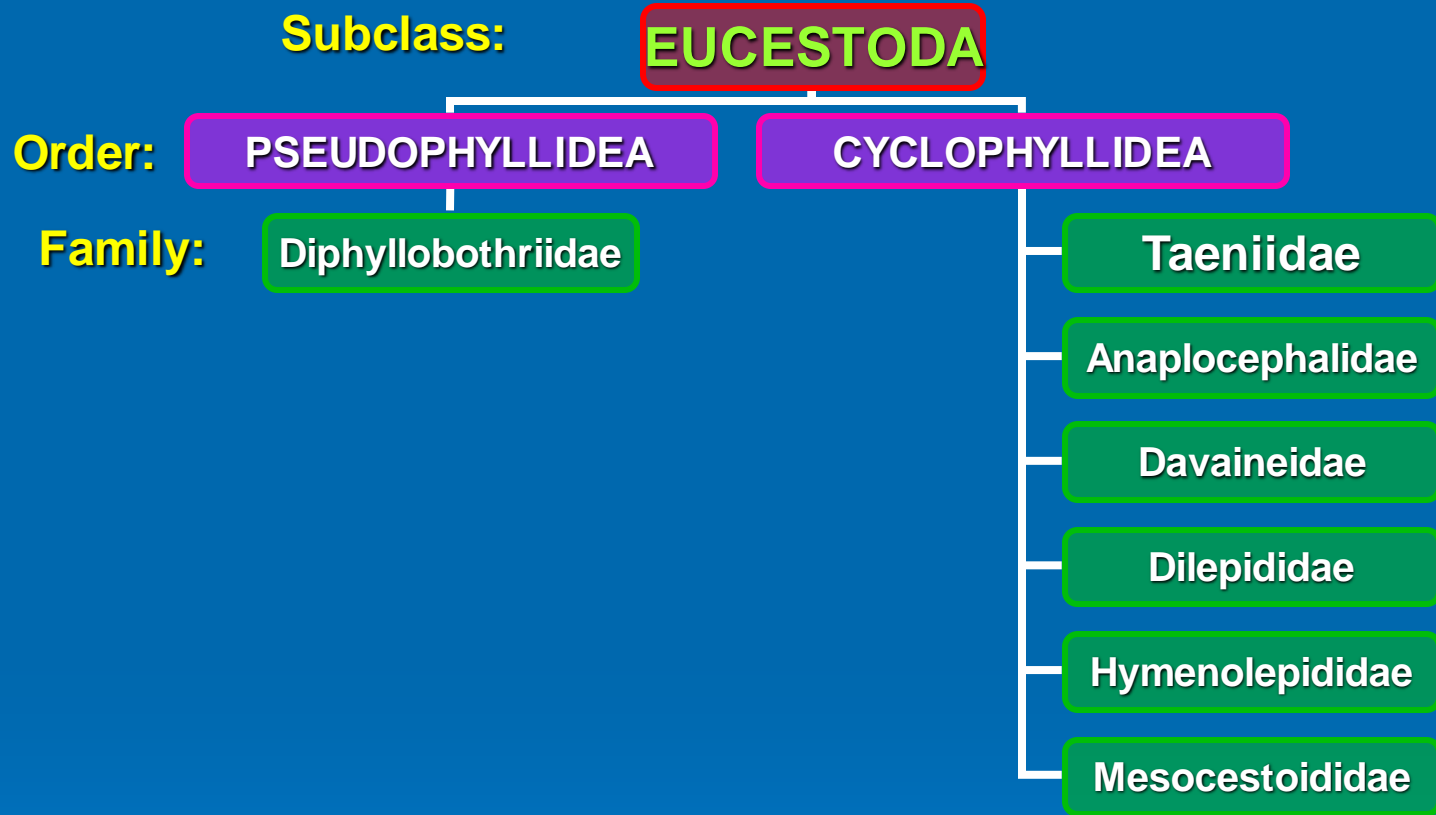
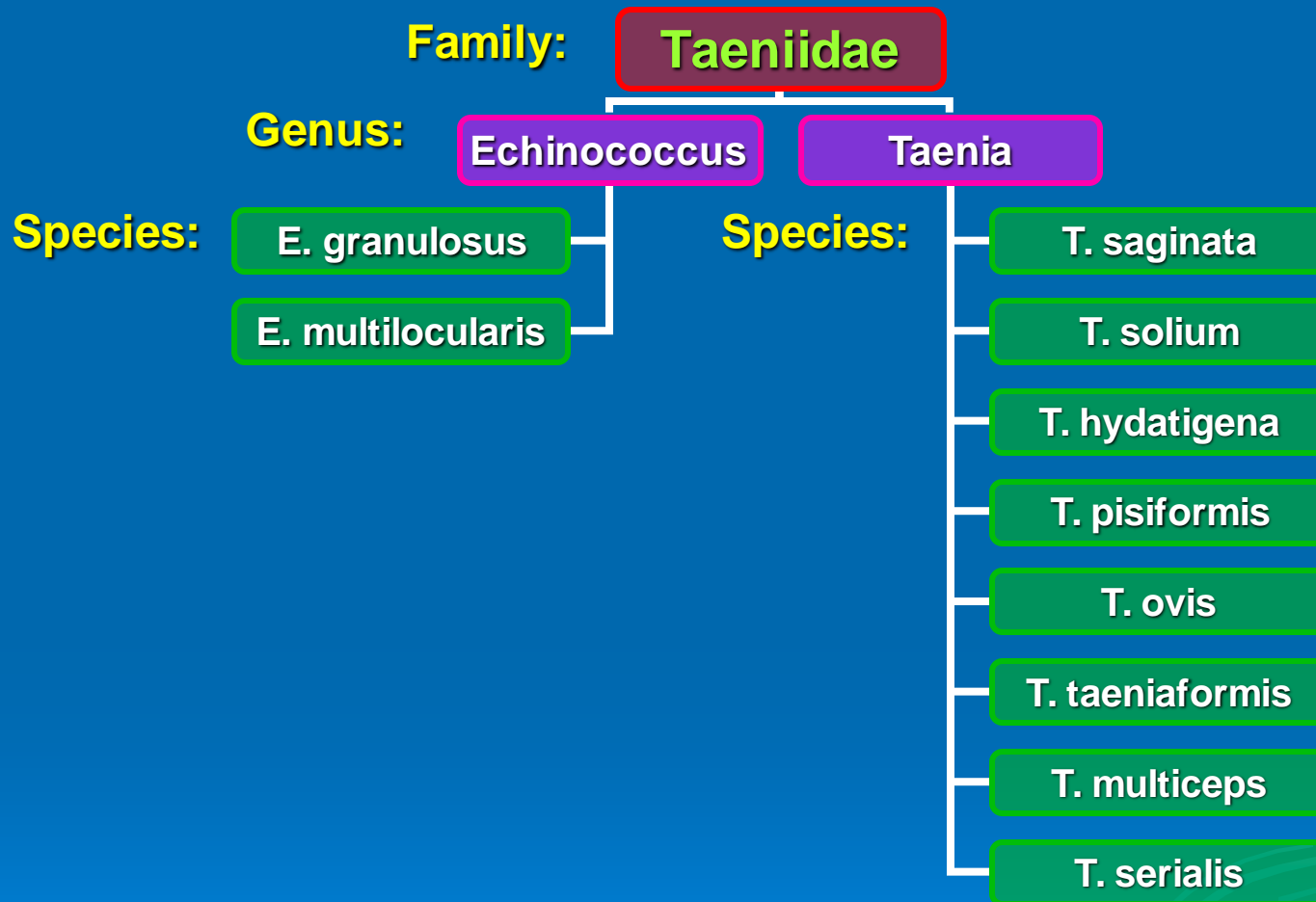


# HELMINTHOLOGY

## CESTODA-3







➤ **Genus: Taenia**

❖ *T. saginata*

❖ *T. solium*

❖ *T. hydatigena*

❖ *T. pisiformis*

❖ *T. ovis*

❖ *T. taeniaformis*

❖ *T. multiceps*

❖ *T. serialis*

***Taenia saginata*** (beef tapeworm)

**Final host:** **Human** / small intestine

**Intermediate host:** Cattle (Giraffe, buffalo, llama, deer)

**Larvae:** **Cysticercus bovis** / Skeletal muscles, heart

**Distribution:** Widespread all over the world

In Turkey \* (West  East)

beef tapeworm  
unarmed tapeworm  
ablution breaking strip

## Morphology:

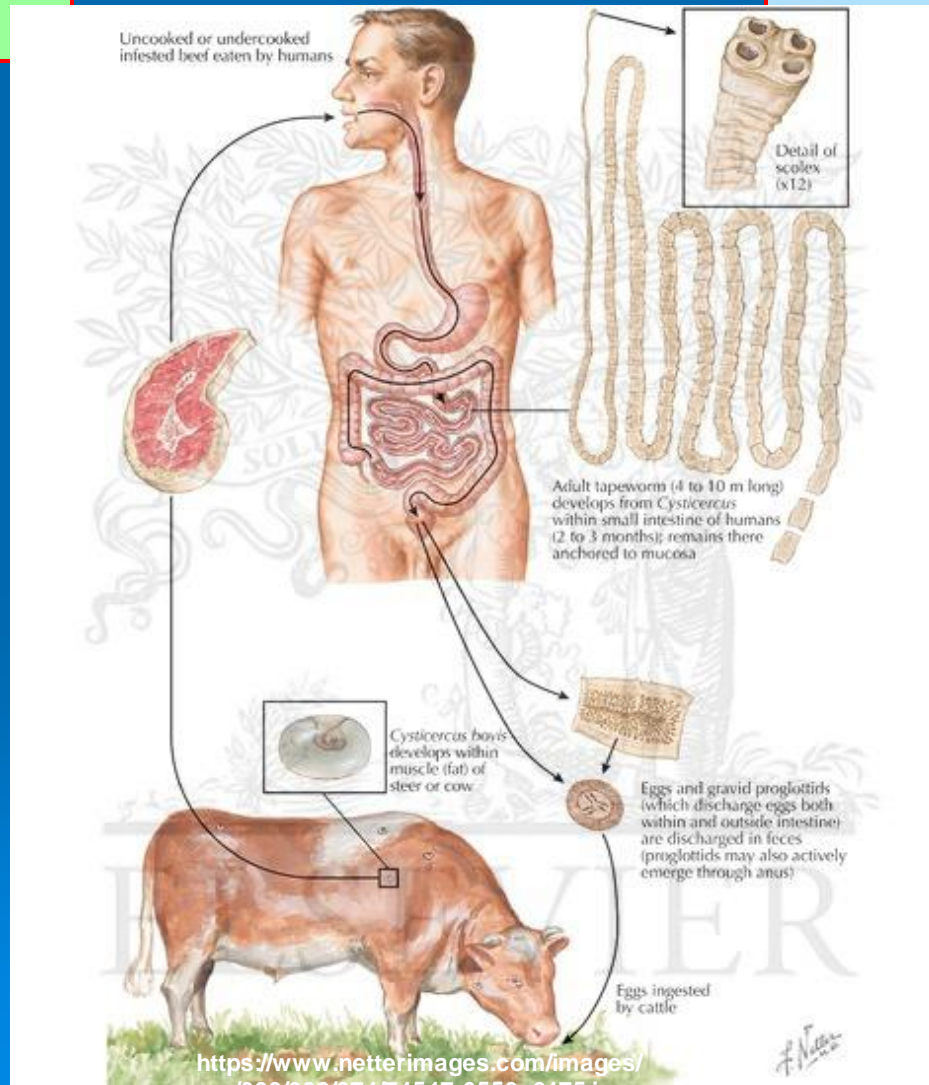
- **Mature:**
- 4 – 12 m. in length
- 1200 – 2000 proglottids
- Scolex pear-shaped,
- 1.2 – 2 mm. diameter,
- no rostellum
- neck thick
- **Proglottids:**
- Genital atrium irregular
- Uterus 15 – 30 branches
- Proglottids individually (rarely piece)
- Number of eggs 250,000
- **Larvae:**
- **C. bovis** 1 cm. diameter, transparent, oval pouch

# Biology:

- Jaw, heart muscle, diaphragm, shoulder, esophagus
- Muscle – connective tissue
- 1mm in 2 weeks
- 1 cm at 12 weeks (infective)
- Surrounded by fibrous capsule (transparent)

**C. bovis remains viable for weeks to months.**  
if it dies

- Calcified
- Caseive



- **Pathogenesis / Clinical signs:**

- **Mature:**

- Digestive system disorders (feeling of hunger, abdominal pain, diarrhea – constipation, proglottid from the anus)
- colitis,
- appendicitis

- **Larvae:**

- asymptomatic,
- muscle stiffness,
- general fondness,
- anorexia,
- increased salivation (Experimental severe infection)

- **Epidemiology:**

- Human ↔ raw, uncooked/unprocessed beef
- Cattle ↔ takes eggs orally
- People defecating on pasture
- Use of human feces, sewage water in agriculture, train toilets
- Seagulls and similar birds
- \*\*PRENATAL infection

- **Protection and Control:**

- meat controls (in slaughterhouse)
- Prevention of illegal slaughter
- **#Cooking degree of meat must be at least +57°C (Cysticercus dies at +57°C and above).**
- - 3 °C ,4 days
- - 8 °C, 4 hours
- - 15 °C, 2 hours
- - 30 °C, 0.5 hours
- Proper preparation of meat products
- Consuming well-cooked meats (Personal habits) Infected person treatment
- The spread of human excrement should be prevented (Sewerage systems, treatment, picnic area toilets)
- Compliance with hygienic rules



## ***Taenia solium***

(pork tapeworm)

- Final host: **Human** → small intestine
- Intermediate host: Pig → **Cysticercus cellulosa** → muscle
- \*Human, dog
- **Distribution:** Countries that consume pork.

## Morphology:

- **Mature**

- **Larvae**

- **Cysticercus cellulosa** 20 x 10 mm / elliptical (larger, milky white in color)

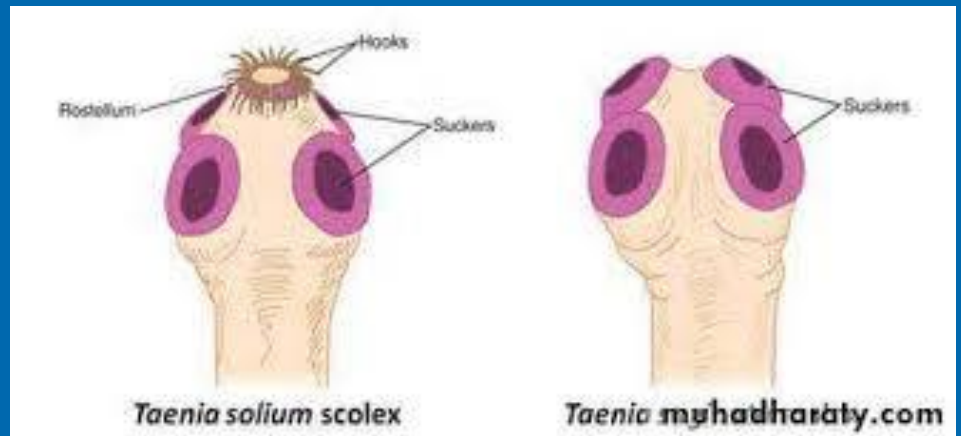
Human Cestod Agents:	<i>Taenia saginata</i>	<i>Taenia solium</i>
<b>Scolex</b>	Bigger	Smaller
	*no rostellum ( <b>unarmed tapeworm</b> )	*have a rostellum
<b>Neck (proliferation zone)</b>	More than half the diameter of the scolex	Half the diameter of the scolex
<b>Strobila and proglottids charecteristics</b>	Taller	Shorter
	Number of proglottids 1200 – 2000	700 – 1000 (Less)
	Genital atrium irregular	Regular
	The number of uterine lateral branches is high (15 – 30)	less (7 – 12)
	Number of eggs in the pregnant proglottid 250,000	40.000
	The proglottids come off one by one.	short proglottids pieces
	Exit without defecation( <b>ablution breaking strip</b> )	come out with feces
	Out proglottids are moving (Active)	no movie

## *Taenia saginata* & *Taenia solium*

*Taenia saginata*  
4 suckers  
Smooth - no rostellum



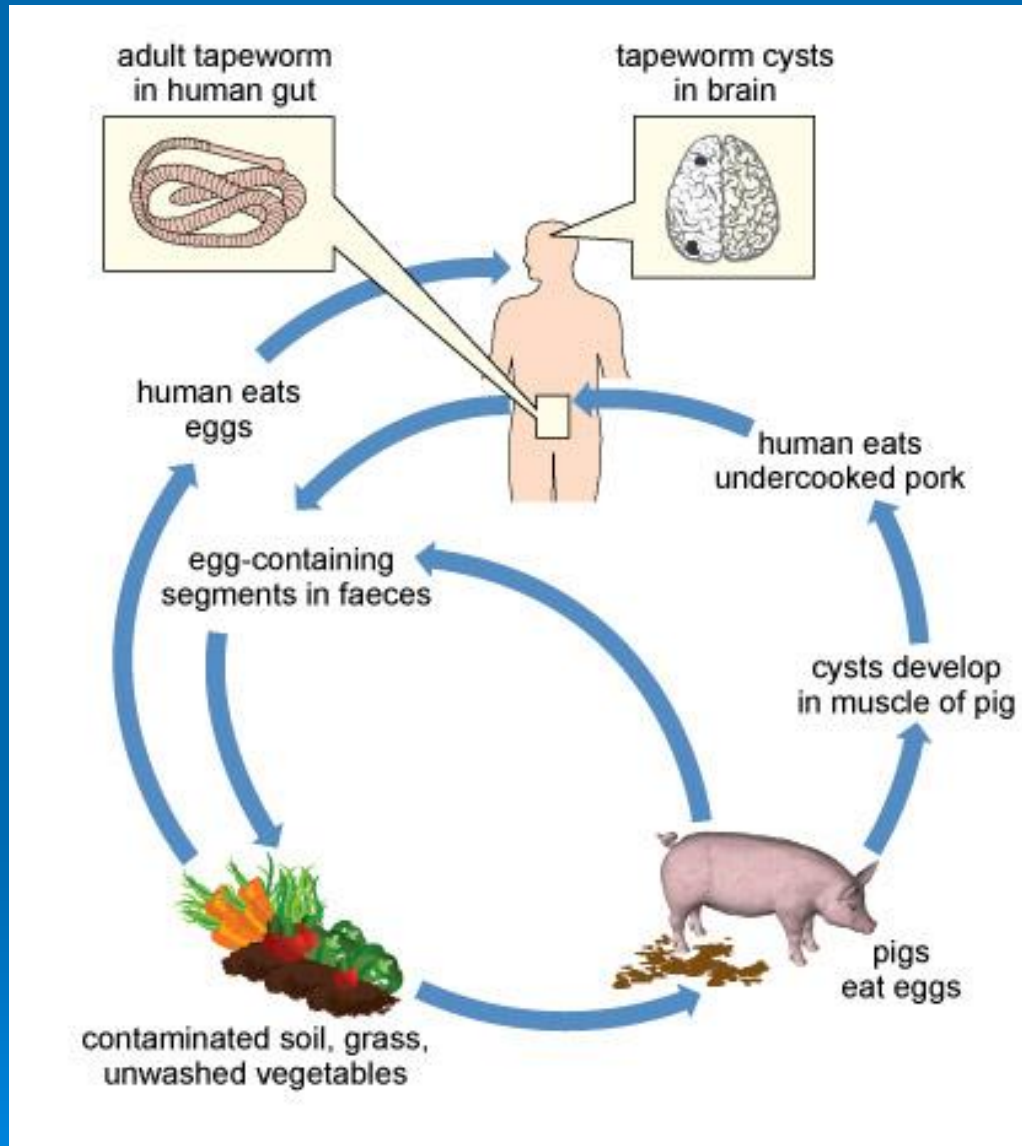
*Taenia solium*  
4 suckers  
Rostellum/ hooks (double crown)



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<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQFNKgA1-XXg0APTyhSK8OeRrTBDu9dJsK0Dw&usqp=CAU>

# Biology:



[https://www.open.edu/openlearn/ocw/pluginfile.php/1399250/mod\\_oucontent/oucontent/72165/b3ee8f97/e82a6287/sdk100\\_topic01\\_sc03\\_f06.eps.jpg](https://www.open.edu/openlearn/ocw/pluginfile.php/1399250/mod_oucontent/oucontent/72165/b3ee8f97/e82a6287/sdk100_topic01_sc03_f06.eps.jpg)

## Epidemiology:

\*Pork (raw, undercooked) important in human infection

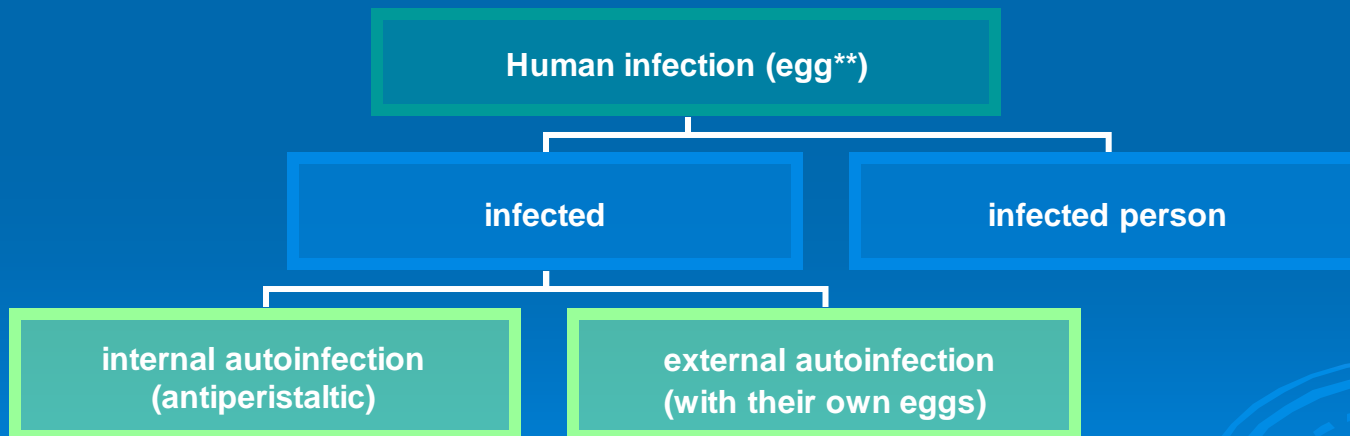
**Cysticercus cellulosae** survives for several years

**T. solium** perennial (lives long time 25 years live)

**T. solium** eggs are resistant

**Cys.cellulosae**\*\* develops in the dog and in HUMAN\*\*\*

(Both definitive and intermediate host - **Cys.rasemosus** (In humans, when cysticerces develop in the brain this cysticerces branched and take a grape clusters form).\*\*\*)



- **Pathogenesis and Clinical signs:**

- **Human:**

- **Mature** - Symptoms of the digestive system

- **Larvae** -

Subcutaneous, eye, brain, muscle, heart, liver, White Infiltration, inflammation, giant cell, fibrous capsule

- **Pig:**

- Asymptomatic (tongue paralysis, convulsion, nasal sensitivity)



- **Diagnosis:**
- Human
- **Mature:** Proglottid / egg in feces
- **Larvae:** Serological / allergic
- **Pig:**
- Not practical before slaughter (Sublingual)
- meat inspection
- **Treatment:**
- Human
- Mature: Lane reducer + slider
- Larvae: Surgery, Praziquantel, mebendazole
- Pig?
- **Protection and Control:**
- Treatment of infected persons
- Keeping feces away from pigs
- Pork control at the slaughterhouse
- Consumption of well-cooked pork



## *Taenia hydatigena*

Final host: Domestic and wild carnivores / small intestine

Rarely reported from the cat

Intermediate host: ruminant animal, pig, monkey, squirrel

**Cysticercus tenuicollis** / omentum, mesenterium

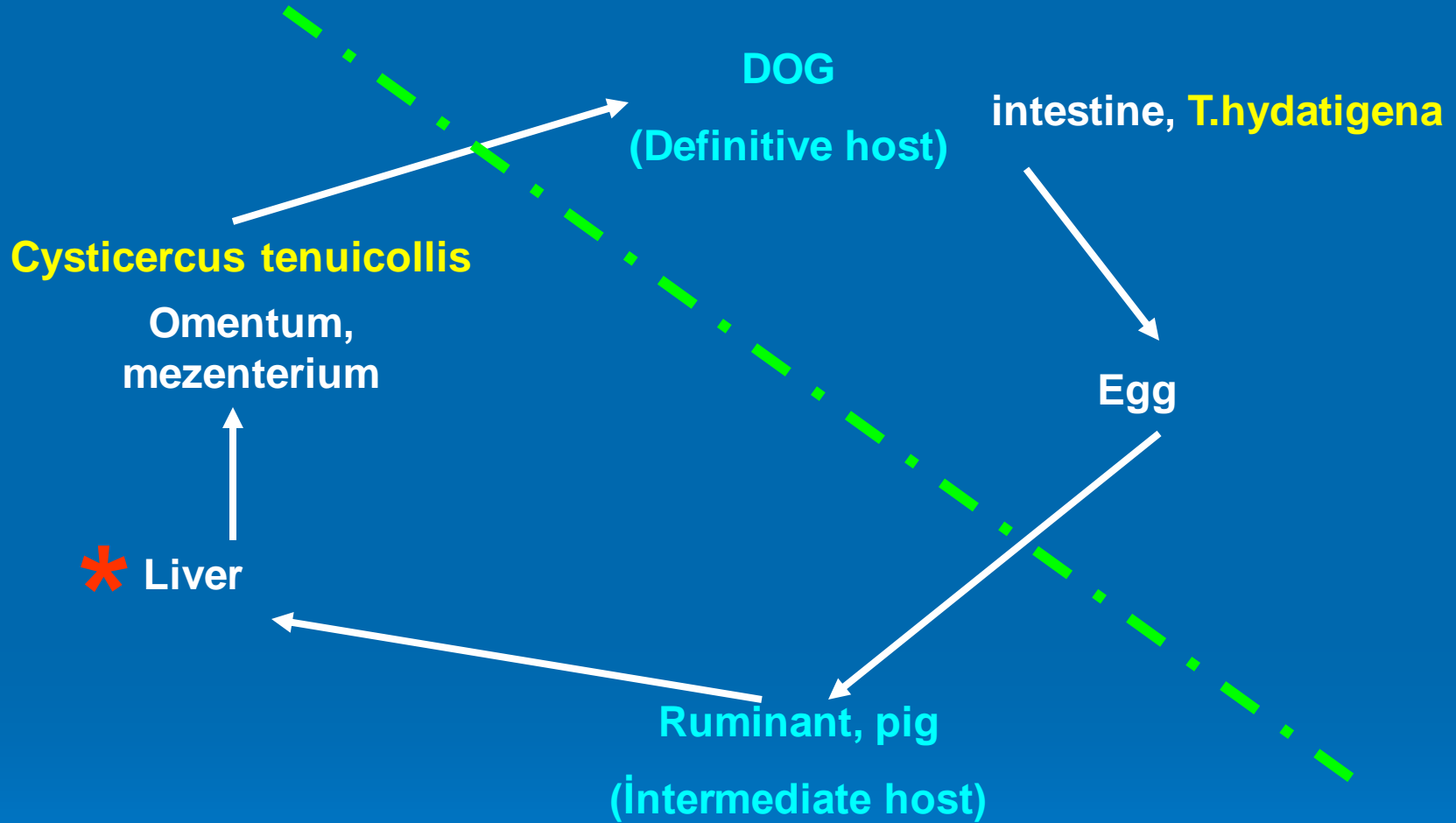
Distribution: Widespread worldwide. There is also in Turkey.

## Morphology:

Mature: 75 cm. → 5 meters  
(The longest tapeworm of dogs)


Larvae: *Cysticercus tenuicollis* =  
Water bladder  
7 – 8 cm. diameter

# Biology:



- **Pathogenesis / Clinical signs:**
- Mature: Diarrhea, constipation, pruritus, intestinal obstruction, nervous symptoms
- Larvae: **Cysticercus tenuicollis**
- **Hepatitis cysticercosa** (During the migration of oncospheres in the liver, pathological events similar to those in acute fascioliasis develop. This is called Hepatitis cysticercosa)
  
- **Diagnosis:**
- Mature: Proglottid / Egg (feces)
- Larvae: Post slaughter
  
- **Protection and Control:**
- Treatment
- Not feeding *Cysticercus tenuicollis* to dogs

# *Taenia pisiformis*

- Final host: Domestic and wild carnivores and cat is also rare / small intestine
- Intermediate host: Rabbit
- **Cysticercus pisiformis** / abdominal cavity, mesenterium, liver, kidney
  
- **Distribution:** Common
  
- **Morphology:**
  - Mature: 20 cm.  2 meters in length.
  - Larvae: **Cysticercus pisiformis**
  - – pea-sized, usually cluster-shaped

# Biology:



*Taenia pisiformis*

**Epidemiology:** Hounds (Rabbit)★

**Pathogenicity:** Mature:

**Larvae: Hepatitis cysticercosa** (?) in rabbits

## ***Taenia ovis***

Final host: Domestic and wild carnivores / Small intestine

Intermediate host: Sheep, goat

**Cysticercus ovis** / Heart, diaphragm, muscle

### **Distribution:**

Widespread in many parts of the World (Larvae common in sheep 0.06%, 0.24% in goats in Turkey)

### **Morphology:**

Mature has a rostellum - 1 m. long

Larvae 6 mm. across,

**Not IMPORTANT for human health!** (Final host carnivores, **Cysticercus ovis** limited distribution)

Economic importance: Very limited



## *Taenia taeniaformis* (*Hydatigera taeniaformis*)

- Final host: Cat and other carnivores / Small intestine
- Intermediate host: Mouse, rat, squirrel /
- **Strobilocercus fasciolaris** / Liver
- **Distribution:** Widespread, also present in Turkey.

- **Morphology:**
- **Mature:** 15 – 60 cm. in length
- Scolex 1.5 – 2 mm.
- have rostellum
- Suckers are well developed
- Proglottids bell-shaped

**Larvae: *Strobilocercus fasciolaris*** – from pea-sized to 30 cm

# Biology:

16 – 18 days



Rodent liver (2 months)

*Strobilocercus fasciolaris*

*Taenia taeniaformis* (*Hydatigera taeniaformis*)

## Importance:

- **Mature** – Digestive system disorders in cats
- **Larvae** – (in lab rats)

## ➤ Control:

- Cat treatment
- Prevention of contamination of mouse food with cat feces

## ***Taenia multiceps*** (Multiceps multiceps)

Final host: Domestic and wild carnivores / Small intestine

Intermediate host: Small and large ruminant (horse, camel, deer, pig, human) **Coenurus cerebralis** / Brain, spinal cord

**Distribution:** Common. In Turkey too.

### **Morphology:**

**Mature:** 40 – 100 cm. in length

Scolex is small, there is rostellum and suckers

**Larvae:** **Coenurus cerebralis**, 5 cm.

# Biology:



*Taenia multiceps*

## Pathogenicity / Clinical signs:

**Mature** – As in other carnivorous tapeworms

**Larvae** – **COENUROSE = TURNING DISEASE**

Heavy inf. → Acute traumatic meningoencephalitis → Death  
(It is necessary to distinguish from hypocalcemia / other meningoencephalitis / listeriosis / looping ill / cerebrospinal nematodiasis / brain abscess and tumors)

Mild inf. → 1-2 oncospheres find a place and time to develop.  
Hemisphere / Cerebellum / M.oblangata

- Blindness
- incoordination
- rotational movements
- Keeping the head up/down/sideways
- semi-paralysis, paralysis
- Recession
- Withdrawal from feed
- weight loss
- lag behind the herd
- Stumble

- **Epidemiology:** Shepherd dogs ★
- **Diagnosis:**
  - **Mature** – Feces egg / proglottid
  - **Larvae** – DIFFICULT (Distinguishing from other diseases)
    - final autopsy
    - shepherd's style
    - head palpation
    - Eye control
- **Control:** Treatment of infected dogs
  - **C. cerebralis** should not be fed to dogs
- **Treatment:**
  - Mature – tapeworm drugs
  - Larvae - ? (not economical)

**Differential diagnosis:**

- Hypocalcemia
- other meningoencephalitis
- listeriosis
- looping ill
- cerebrospinal nematodiasis
- brain abscess and tumors



## ***Taenia serialis*** (*Multiceps serialis*)

Final host: Domestic and wild carnivores / Small intestine

Intermediate host: Rodents such as rabbits and squirrels

**Coenurus serialis** / in intermuscular and subcutaneous connective tissue

**Distribution:** common

**Morphology:**

**Mature:** 20 – 70 cm.

<i>Coenurus serialis</i>	<i>Coenurus cerebralis</i>
Smaller (4 – 5 mm in diameter)	Larger (4 – 5 cm in diameter)
Scolexes appear to be arranged in rows from a central point in the sac.	Scolexes are scattered in the sac.
Internal and external secondary cysts may develop from the main cyst (as in echinococcal cyst).	Secondary cysts is not develop.
The intermediate host is the rabbit	Intermediate host is sheep and goat.
It usually develops in connective tissue.	Develops in the brain and spinal cord

**Subclass:**

**CESTODA**

**Order:**

**PSEUDOPHYLLIDA**

**CYCLOPHYLLIDA**

**Family:**

Diphyllobothriidae

Taeniidae

**Mesocestoididae**

Davaineidae

Dilepididae

Hymenolepididae

Anaplocephalidae

Family: MESOCESTOIDIDAE

### ***Mesocestoides lineatus***

Last host: Dog, cat, and other wild carnivores / Small intestine

Intermediate host:

1) Coprophage arthropods - **Cysticercoid** / Body cavity

2) Various vertebrates (Winged, reptilian, amphibian, cat, dog\*) –

**Tetrathyridium** / Serous cavities,


peritoneum or lung, liver

in cyst or free

(**Tetrathyridium elongatum = T. bailetti**)

**Distribution:** Common. There is also in Turkey.

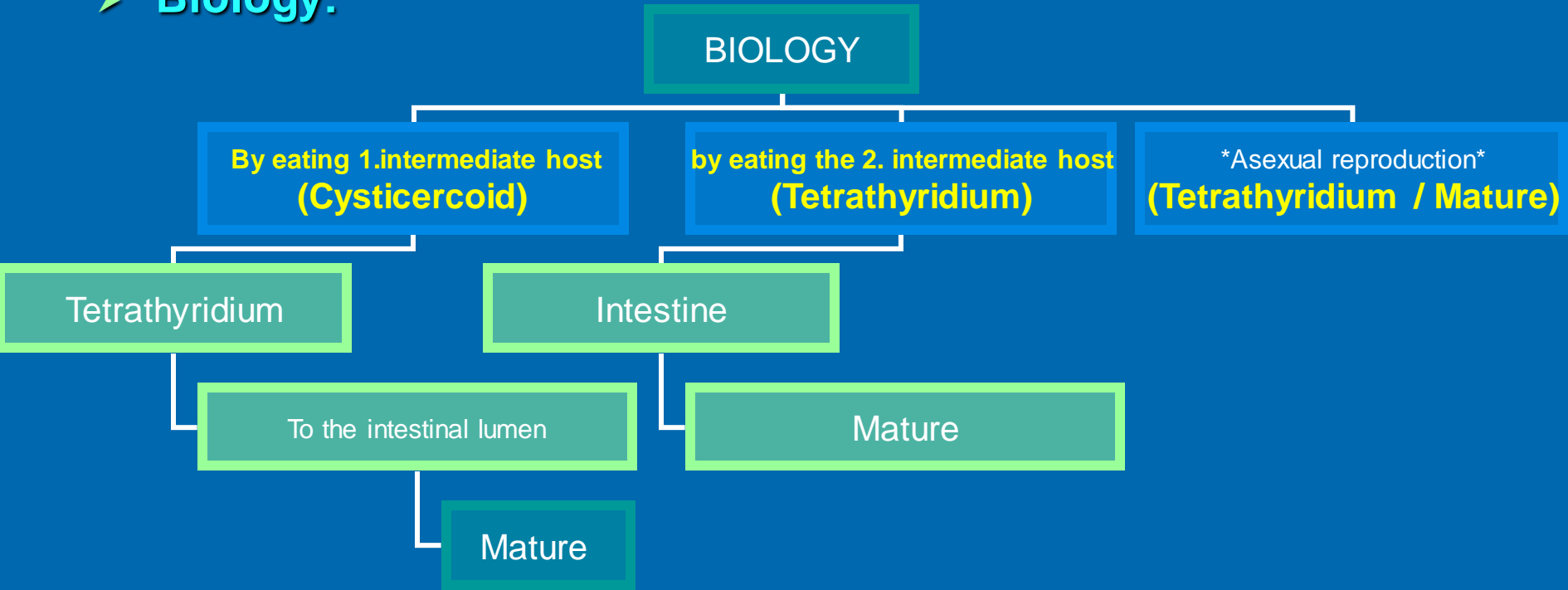
## Morphology:

- **Mature:** 30 cm  1,5 m.
  - No rostellum (haven't hooks)

## Larvae:

- 1 ↔ Cysticercoid
- 2 ↔ Tetrathyridium 1–2 cm → 35 cm.

➤ **Biology:**



## ➤ **Pathogenicity:**

- Mature proglottid      Like other tapeworms
- Tetrathyridium      \* in Cat and Dog
- Abdominal and thoracic cavity (with or without cyst)
- Peritonitis      Ascites
- \*\*\*Often there are also mature proglottid in the intestines.

## ➤ **Diagnosis:**

- Adult – Proglottids
- Tetrathyridium – It should not be ignored in castration and similar operations in cats and dogs.

## ➤ **Treatment and control:**

- **Mature:** One of the convenient proglottid remedies
- **Larvae:** Mebendazole at a dose of 100 mg/kg

*Mesocestoides litteratus*

*Mesocestoides corti*

**Mesogyna hepatica**

Fox / Liver , biliary tract  
15mm. in length