

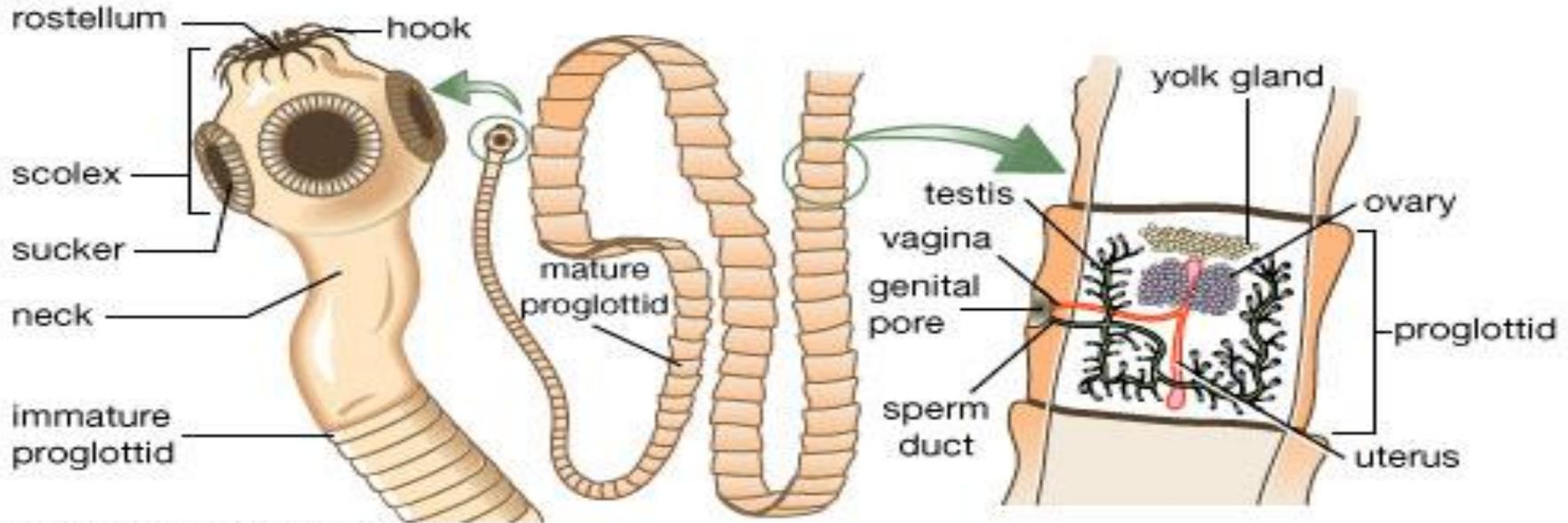


Introduction to Cestodes

Taenia saginata & solium

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Department

General characters



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Adults:

- Flat, ribbon-like, and segmented.
- They have muscular, nervous, and excretory systems.
- Cestodes have neither a **body cavity** nor an **alimentary tract**.
- Cestodes are **hermaphrodites**.

Subclass Cestoda is divided into two orders

Cyclophyllidea

- *Taenia saginata*
- *Taenia solium*

Pseudophyllidea

- *Diphyllobothrium latum*

Cestodes are classified according to habitat into

Intestinal cestodes

(Adult in the small intestine of man)

Man is D.H

Tissue cestodes

(Larvae in the tissue of man)

Man is I.H

Taenia saginata
(Beef Bald Tape Worm)



❖ Distribution:

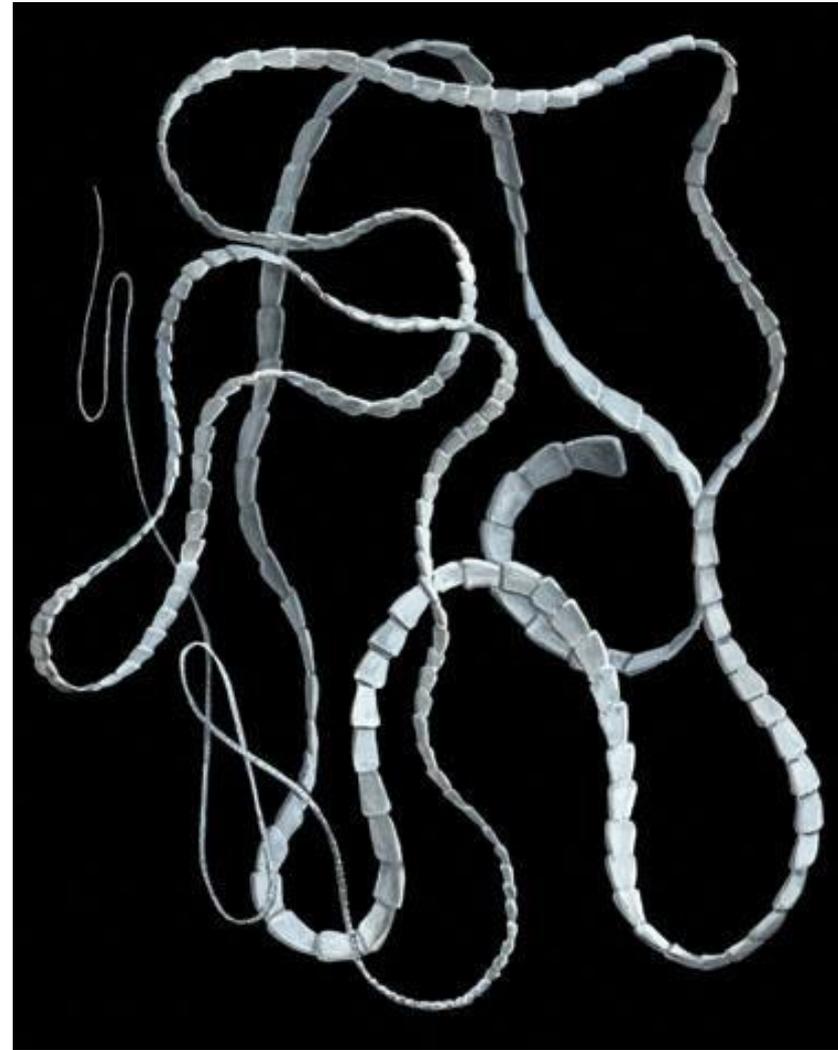
Cosmopolitan where beef is eaten.

❖ Disease:

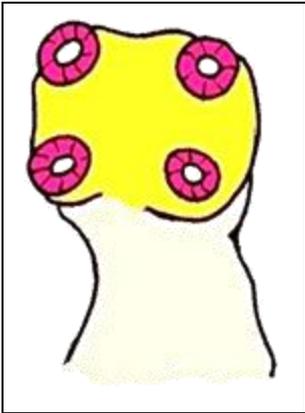
1. *Taeniasis saginata*.

❖ Morphology:

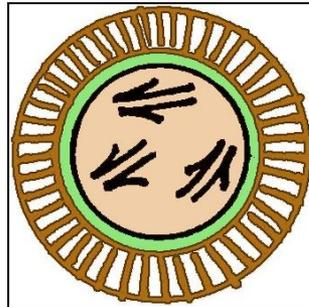
5-10 meters



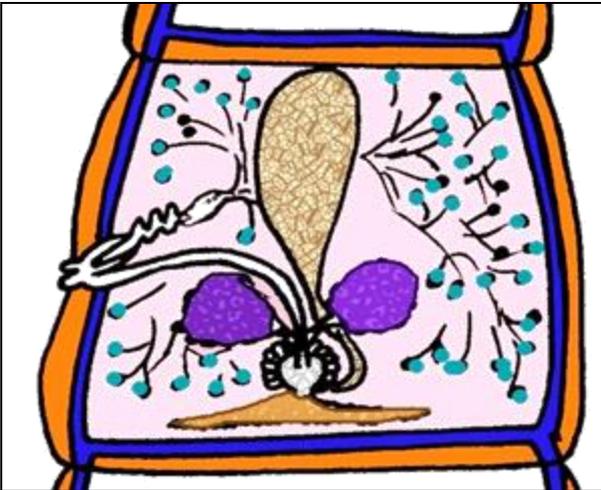
Taenia saginata



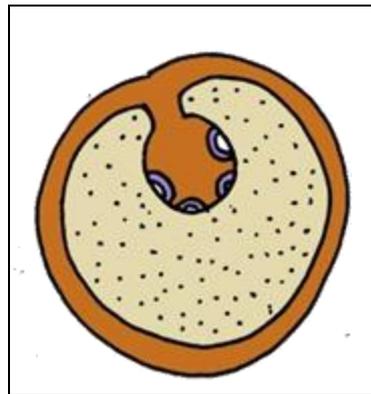
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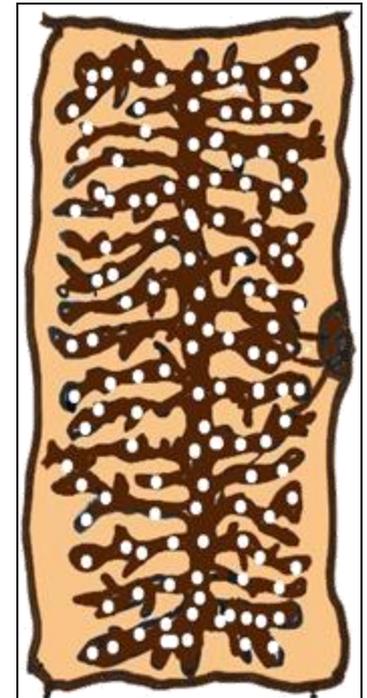
Egg



Mature segment

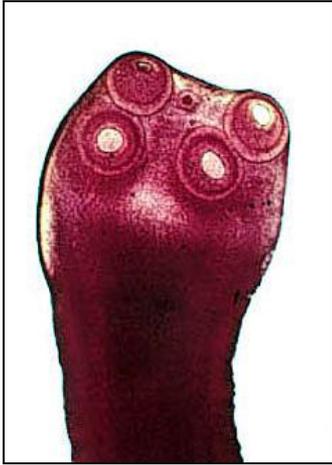


Cysticercus bovis

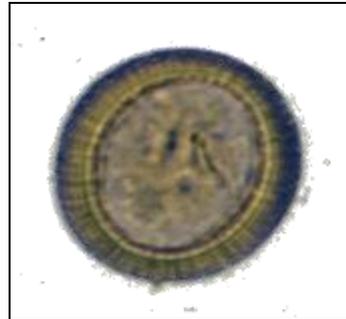


Gravid segment

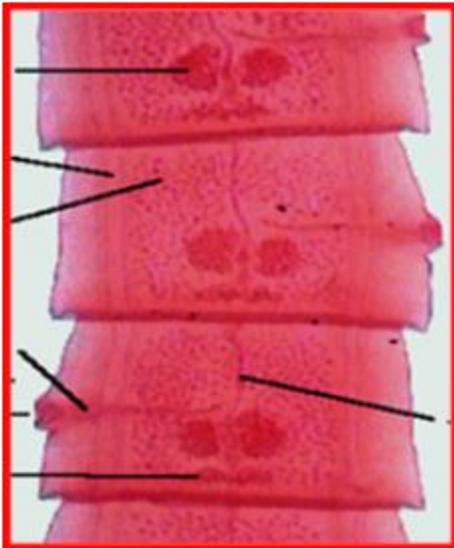
Taenia saginata



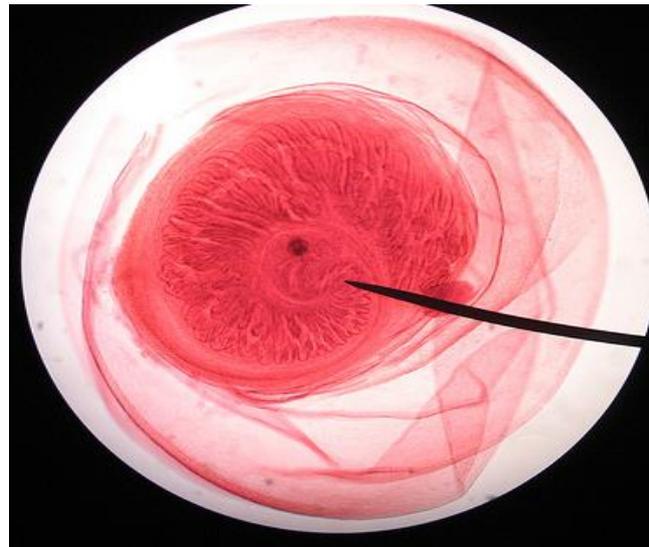
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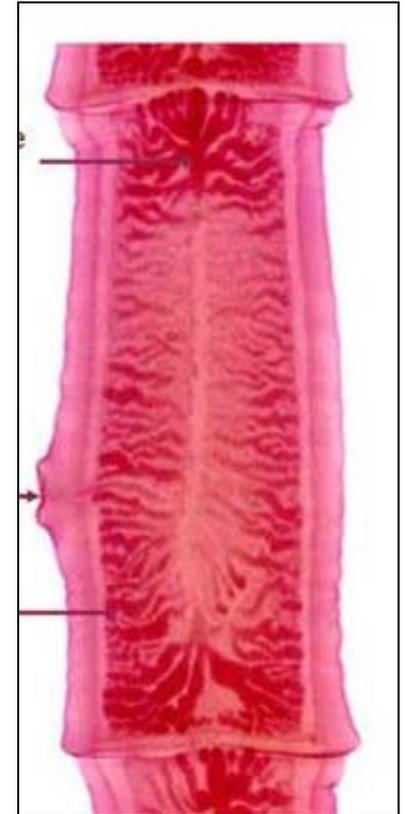
Egg



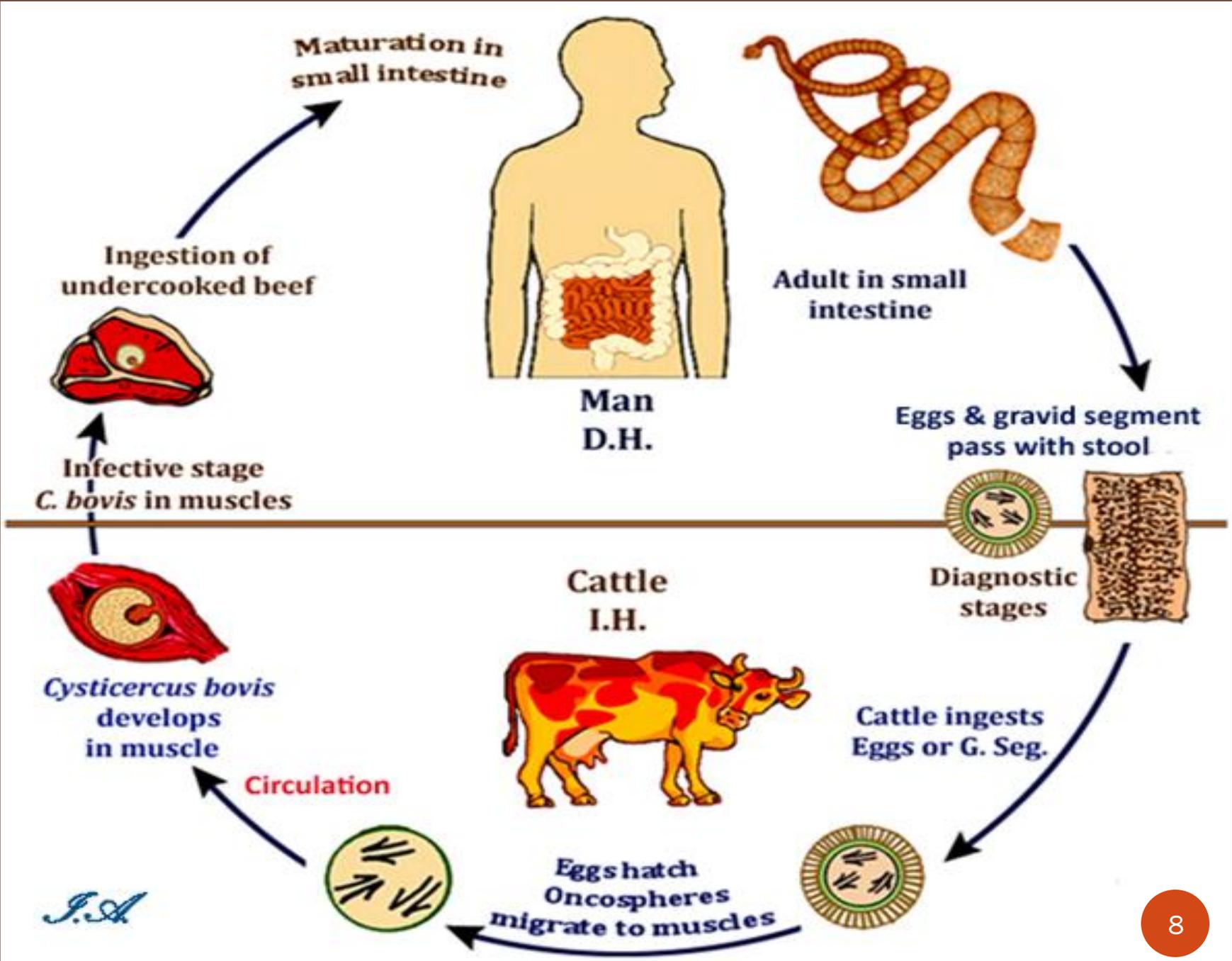
Mature segment



Cysticercus bovis



Gravid segment



Mode of Infection

Man infected by **eating beef** either raw or improperly cooked e.g. steaks, hamburgers or grilled (kabab) containing **viable *cysticercus bovis***.

Clinical aspects of taeniasis:

- The infection may be asymptomatic.
- Loss of weight, constant feeling of hunger and abdominal colic mostly occur.
- In *Taenia saginata*, active creeping of gravid segments from the anus causes perianal itching, mental worry and anxiety.
- **Complications:**
 - Intestinal obstruction and appendicitis.

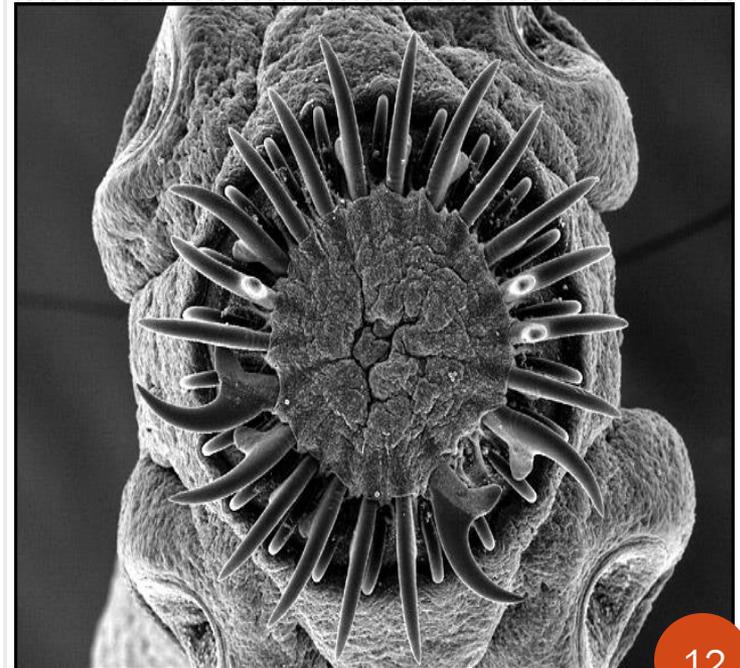
Diagnosis

- 1- Detection of **acid-fast** eggs by stool examination (direct and concentration methods or peri-anal scotch adhesive tape swab and NIH swab).
- 2- Detection of gravid segments in the stool.
- 3- Detection of copro-antigen in stool.

Treatment

- 1) Praziquantel (Biltricide) drug of choice.
- 2) Niclosamide (Yomesan).

Taenia solium
(Pork tape worm)



❖ Distribution:

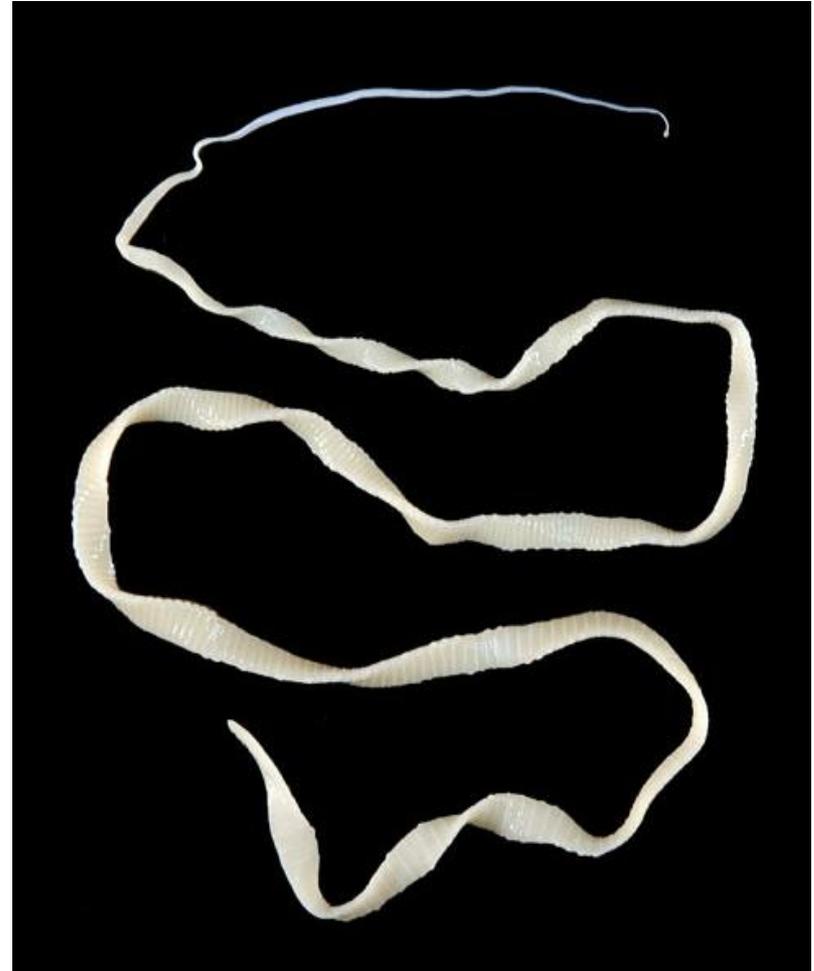
Cosmopolitan where pork is eaten.

❖ Disease:

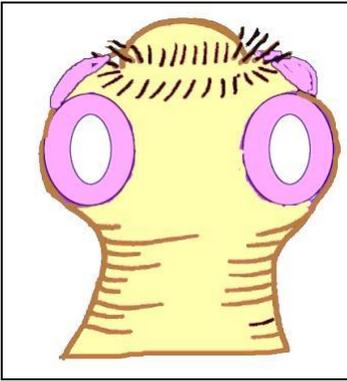
1. *Taeniasis solium*.
2. Cysticercosis.

❖ Morphology:

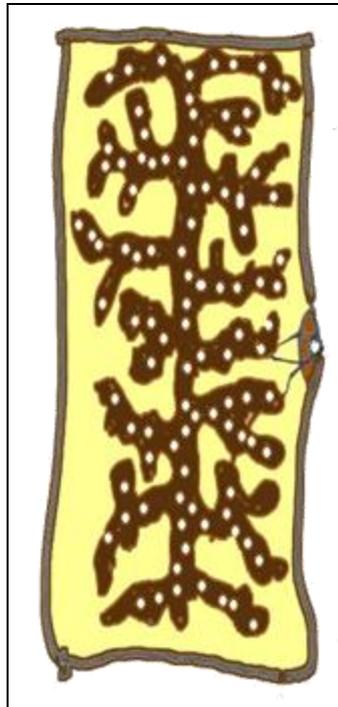
2-4 meters



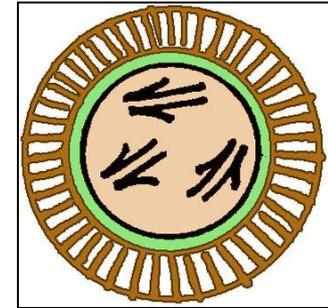
Taenia solium



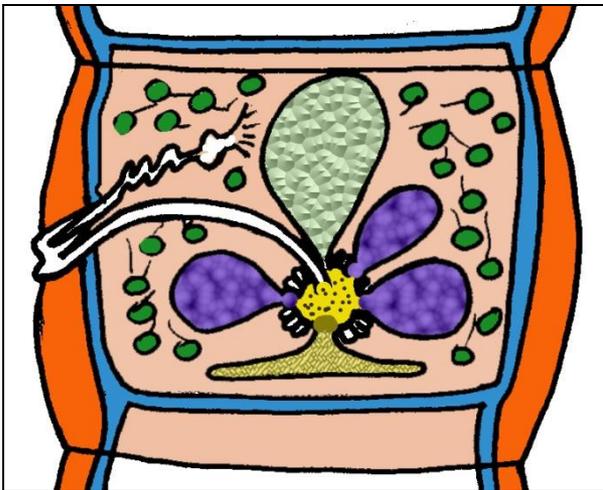
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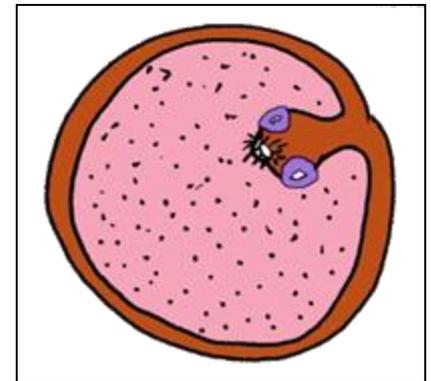
Gravid segment



Egg

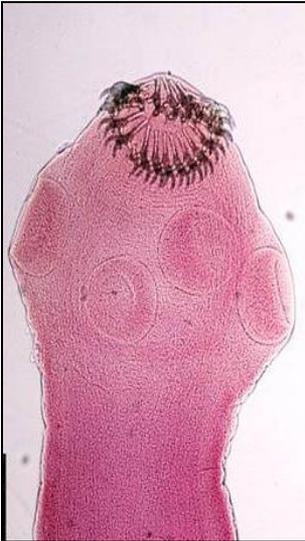


Mature segment

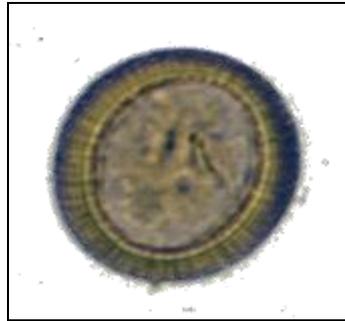


Cysticercus cellulosae

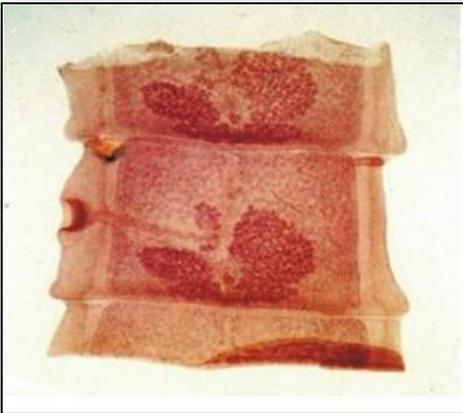
Taenia solium



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Egg



Mature segment



Cysticercus cellulosae



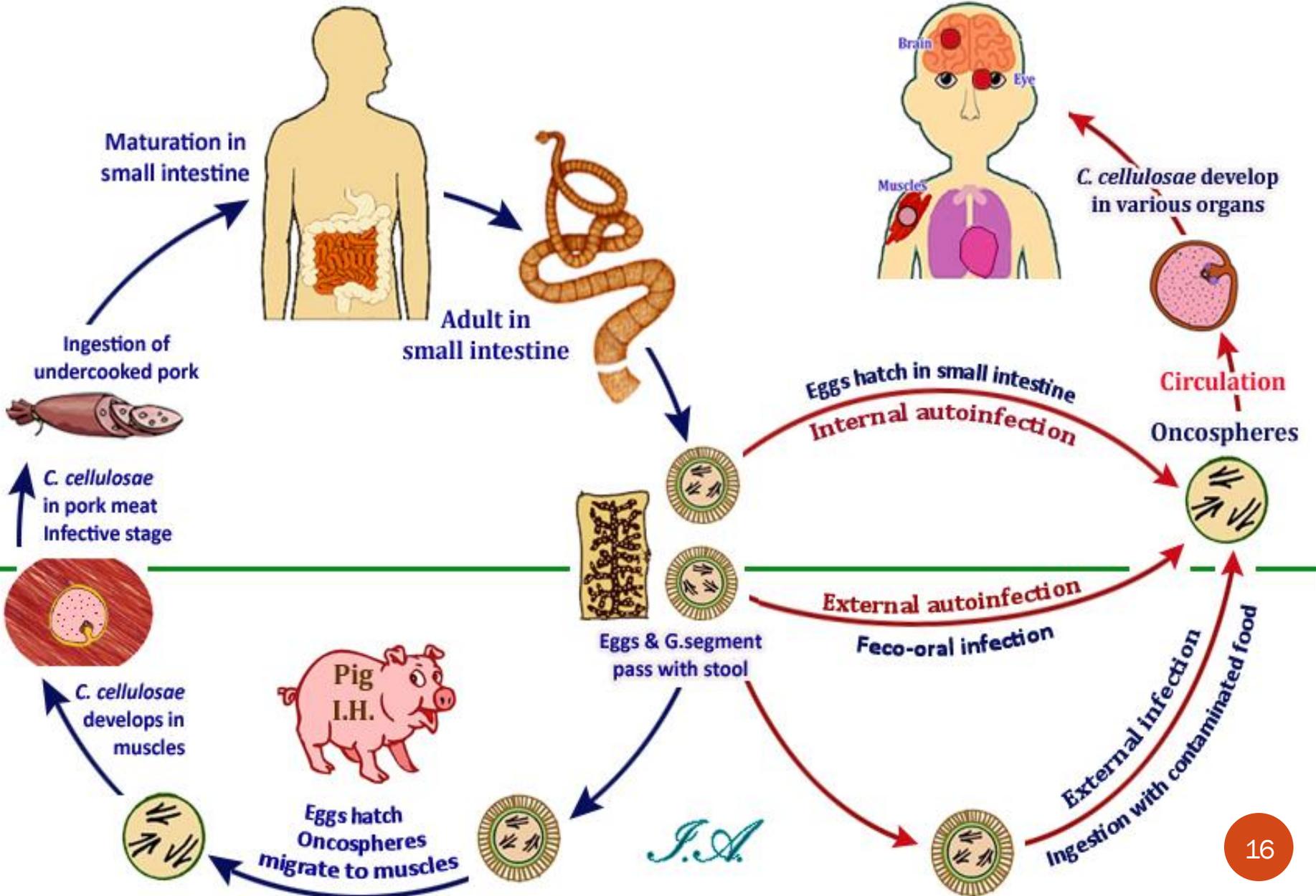
Gravid segment

Taeniasis solium

Man D.H.

Cysticercosis

Man I.H.



Pathogenesis and Symptomatology

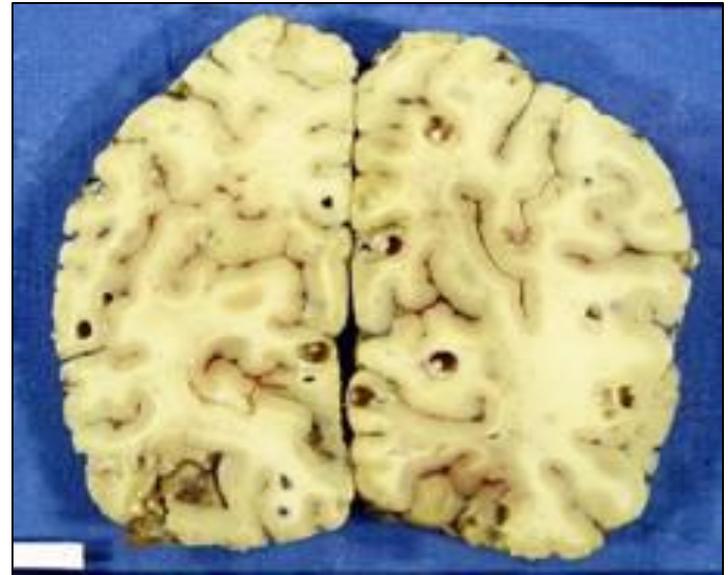
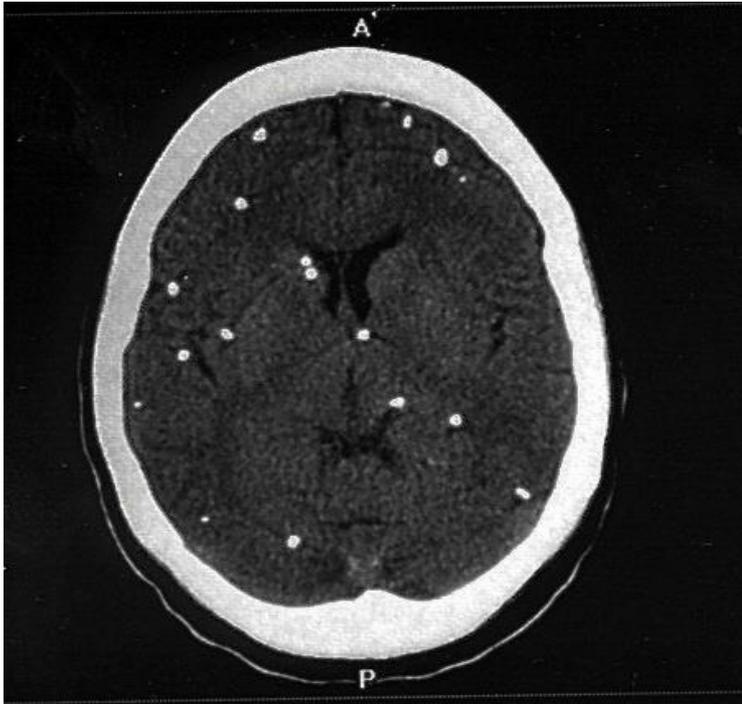
Taeniasis *solium*: Due to ingestion of undercooked pork containing *cysticercus cellulosa* (the same clinical pictures as *taeniasis saginata*).

Cysticercosis: It develops when man ingested the *T. solium* eggs with food or drink or autoinfection → development of larvae (*cysticercus cellulosa*) in his tissues (ms, brain, eye, cutaneous tissues).

Symptomatology of cysticercosis

Symptoms depends on the size of cyst, number & site affected:

- **Muscle:** Myositis with fever, muscle swelling → later, progresses to atrophy and fibrosis.
- **Brain :** Increase of intracranial pressure, epileptic fits and headache.
- **Eye :** Retinal oedema, haemorrhage, decreased vision or even visual loss.
- **Subcutaneous tissues:** Firm, mobile painful nodules mainly on the trunk and extremities.



Diagnosis of taeniasis solium

- 1- Detection of **Non acid-fast** eggs by stool examination (direct and concentration methods)
- 2- Detection of gravid segments in the stool and counting the main lateral branches (less than 15) .
- 3- Detection of copro-antigen in stool.



Treatment

- 1) Praziquantel (Biltricide) drug of choice.
- 2) Niclosamide (Yomesan).

Diagnosis of Cysticercosis

A. Direct methods:

- Biopsy from nodules for detection of larvae.
- CT and MRI for brain infection.
- X ray for calcified cyst.
- Ophthalmoscope for eye infection.
- Surgical removal for detection of the larvae.
- Stool examination for detection of eggs or gravid segments (only in patients having the adult worm).

B. Indirect methods:

- Serological tests.
- Eosinophilia.

Treatment of Cysticercosis

According to the site,

- 1) **Brain cyst:** Anticonvulsant and antiparasitic drugs as praziquantel in combination with corticosteroids to reduce inflammatory reaction.
- 2) **Subcutaneous cyst:** Surgical excision.

	<i>Taenia saginata</i>	<i>Taenia solium</i>
Disease:	Taeniasis saginata	Taeniasis solium
Distribution:	Cosmopolitan where beef is eaten	Cosmopolitan where pork is eaten
Adult : *Size	<ul style="list-style-type: none"> • 5–10 meters (average 6 meters) 	<ul style="list-style-type: none"> • 2–4 meters (average 3 meters)
*Scolex	<ul style="list-style-type: none"> • Quadrate, about 1–2 mm in diameter with no rostellum or hooks 	<ul style="list-style-type: none"> • Globular, about 1 mm in diameter, has a rostellum with 2 rows of hooks
Gravid segment:	<ul style="list-style-type: none"> • Longer than broad. • Uterus with 15–30 (18) lateral branches. • Motile, detach singly and may creep out without defecation. 	<ul style="list-style-type: none"> • Longer than broad. • Uterus with 7–13 (9) lateral branches. • Non-motile, detach in groups of about five segments, pass passively with stool.

	<i>Taenia saginata</i>	<i>Taenia solium</i>
Egg: *Morphology *Zeil Neelsen stain *Infectivity	<ul style="list-style-type: none"> • Spheroid + oncosphere • Acid fast (red) • Not infective to man 	<ul style="list-style-type: none"> • Similar • Non-acid fast (not stained) • Infective to man → cysticercosis
Larval stage:	<ul style="list-style-type: none"> • <i>Cysticercus bovis</i> (scolex without hooks) 	<ul style="list-style-type: none"> • <i>Cysticercus cellulosae</i> (scolex with hooks)
Hosts: *D. H. *I. H.	<ul style="list-style-type: none"> • Man • Cattle 	<ul style="list-style-type: none"> • Man • Pigs and man
D.H. Stages:	<ul style="list-style-type: none"> • Adult 	<ul style="list-style-type: none"> • Adult , larvae or both
Mode of infection:	<ul style="list-style-type: none"> • Ingestion of undercooked beef containing <i>Cysticercus bovis</i> (Taeniasis) 	<ul style="list-style-type: none"> • Ingestion of undercooked pork containing <i>Cysticercus cellulosae</i> (Taeniasis) • Egg ingestion (Cysticercosis)

❖ Prevention of cysticercosis

- Early and effective treatment of persons harbouring the adult worms to avoid the risk of autoinfection.
- In patients harbouring the adult parasite no nauseating drugs are to be given to avoid vomiting and antiperistaltic movements, which may lead to the development of cysticercosis.
- Avoid the use of human excreta as manure.
- Personal cleanliness, insect control and avoiding eating raw vegetables without proper washing.

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Taenia Saginata in the Small Intestine



Mesut Akarsu
Dokuz Eylul University
İzmir, Turkey

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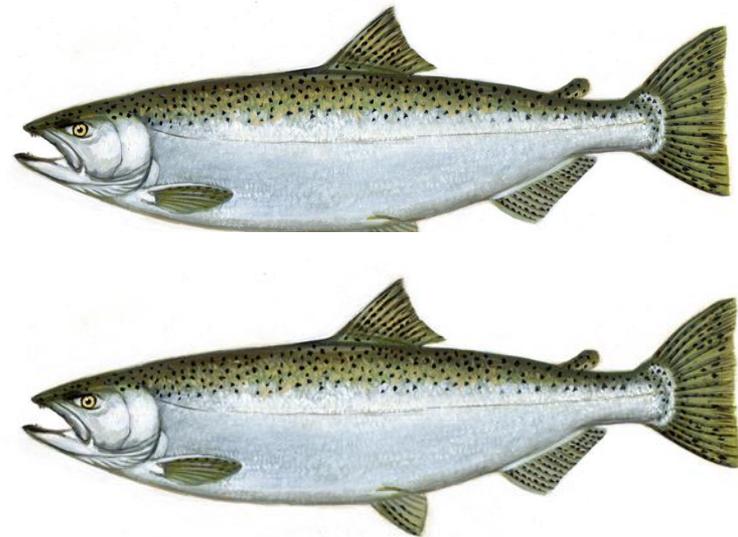
Diphyllobothrium latum

Broad fish tape worm

- **Disease:** Diphyllobothriasis.

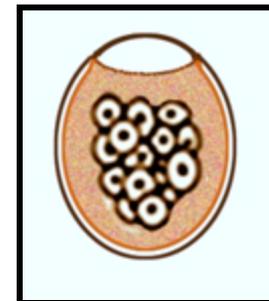
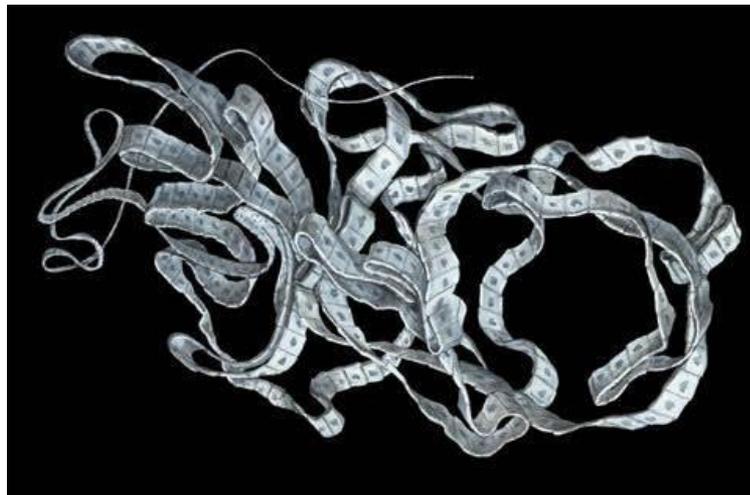
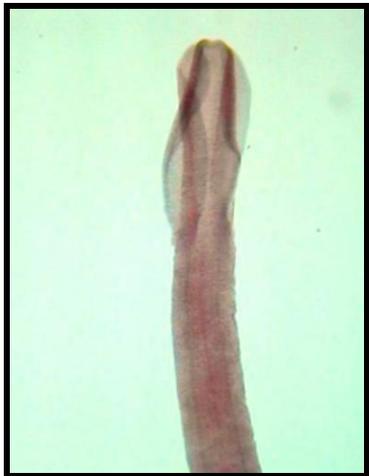
- **Geographical distribution:**

It is prevalent in Northern Europe mostly in Scandinavia and Russia, where pickled or insufficiently cooked salmon fish is prominent in the diet.



Adult

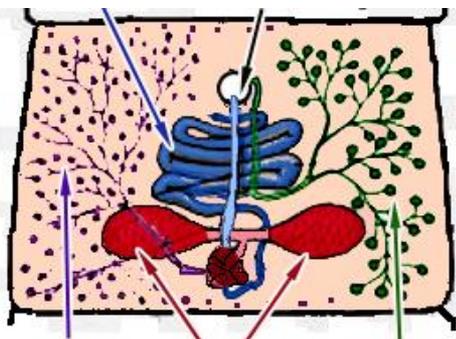
3-10 meters



Egg

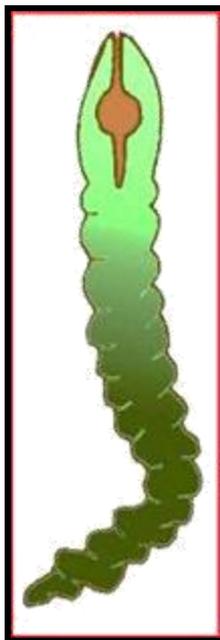
70x50 μ m

scolex

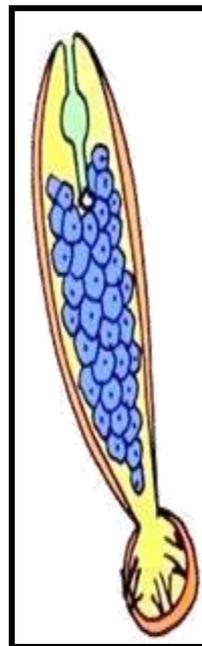


Mature seg.

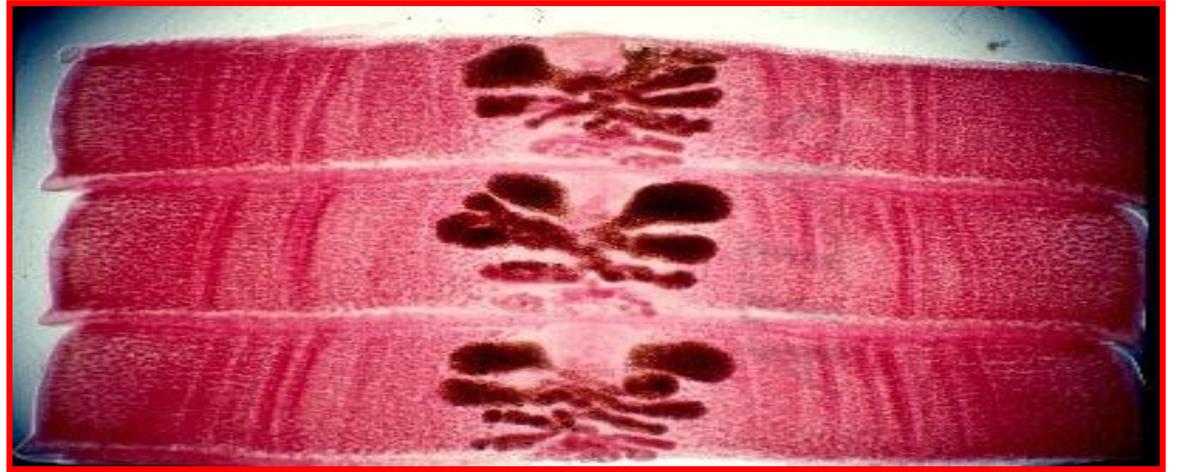
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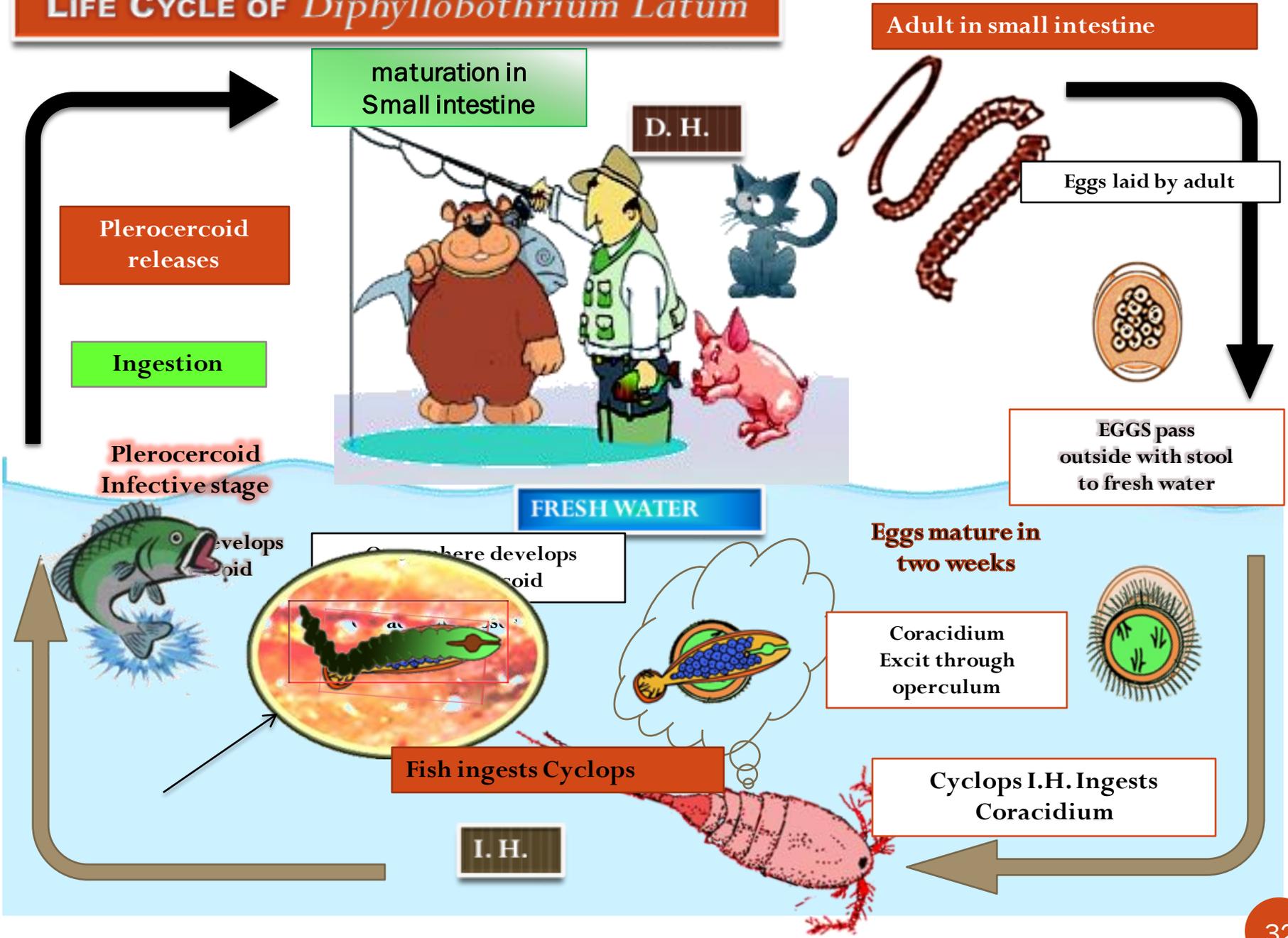
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Coracidium



LIFE CYCLE OF *Diphyllobothrium Latum*



Clinical picture

- Many patients may be clinically free showing no symptoms.
- Vague abdominal pain, diarrhoea and nausea may be present.

Complications:

- In some patients, serious **megaloblastic anaemia** develops due to vitamin B₁₂ deficiency because the worm absorbs a large amount of vitamin B₁₂ and also affects the normal absorptive mechanism for vitamin B₁₂ in the jejunum.
- Intestinal obstruction.
- Neurological manifestations e.g. headache, insomnia and convulsions are caused by absorbed toxins.

Diagnosis:

- Detection of the characteristic eggs in stool samples.
- Segments may be detached and observed in the stool.

Treatment:

- Praziquantel is the drug of choice (Single dose of 10 mg/kg.).
- Niclosamide (Yomesan) is also effective.

Differences between Cyclophyllidea & Pseudophyllidea

Differences are:

- Scolex.
- Mature segment.
- Gravid segment.
- Eggs.
- Intermediate host.
- Larval stages.

Post lecture quiz???

❖ Put true or false:

- Eggs of *Taenia solium* and *saginata* couldn't be morphologically differentiated ().

❖ Explain why?

- Nauseating drugs are contraindicated in cases of infection with *Taenia solium*

❖ Differentiate between *Taenia solium* and *saginata*

