

الكلية: الطب

القسم او الفرع: الاحياء المجهرية

المرحلة: الثالثة

أستاذ المادة: م.م سارة أياد أحمد

اسم المادة باللغة العربية: الطفيليات الطبية

اسم المادة باللغة الإنكليزية: **Medical Parasitology**

اسم المحاضرة الرابعة باللغة العربية: الديدان الشريطية

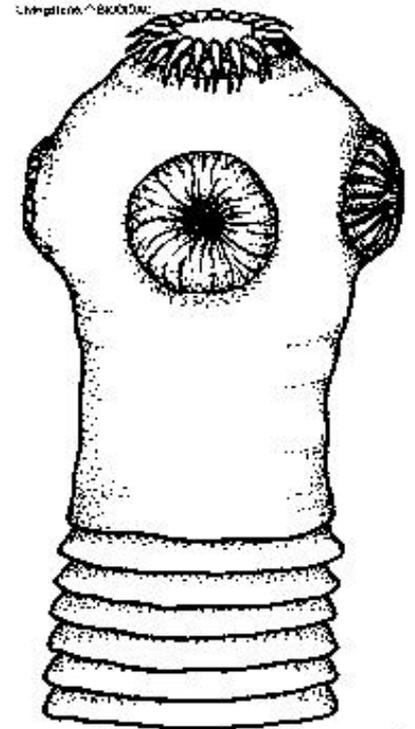
اسم المحاضرة الرابعة باللغة الإنكليزية: **Tapeworms**

محتوى المحاضرة الرابعة

Tapeworms

Cestodes

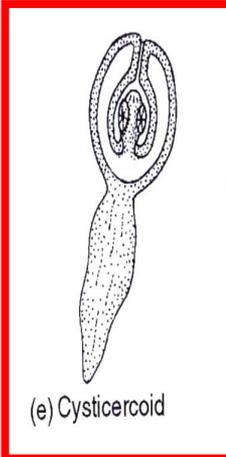
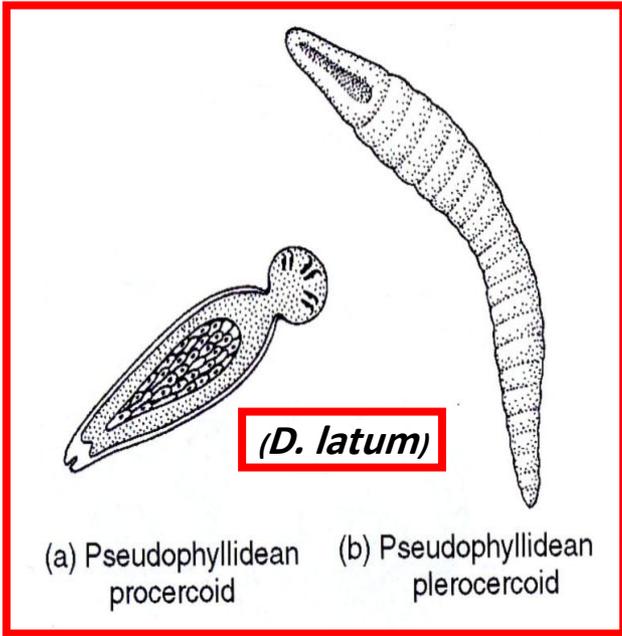
***Assistant Lecturer: Sara Ayad Ahmed
M.Sc. Med. Microbiology
College of Medicine- Dep. of Microbiology***



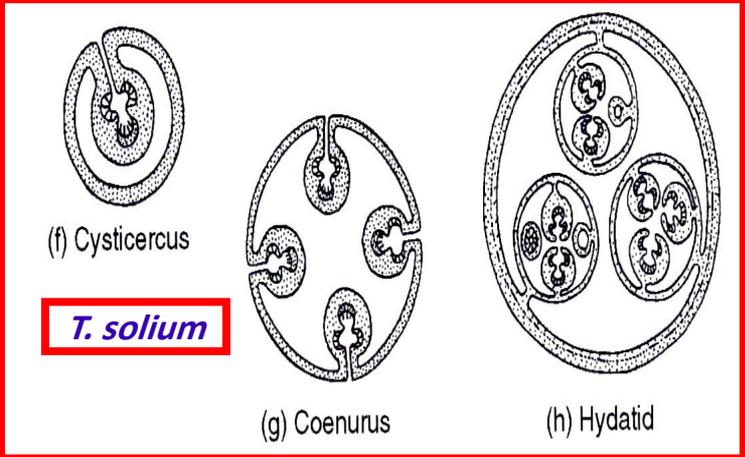
General Features of adult cestodes

- ◎ **Adult worm is flattened ribbon-like, segmented , without body cavity.**
- ◎ **They are hermaphroditic. There is a set of female and male reproductive organs in every mature proglottid.**
- ◎ **Digestive tract is absent. Nutrition is absorbed through their external covering (tegument).**
- ◎ **All adult worms live attached to the mucosa of small intestine of definitive host while larval stages inhabit the tissues of the intermediate host .**

- The developing stages in intermediate hosts are called metacestode such as cysticercus, hydatid cyst, cysticercoid, proceroid, plerocercoid.



(Hymenolepis sp.)



E. granulosus)

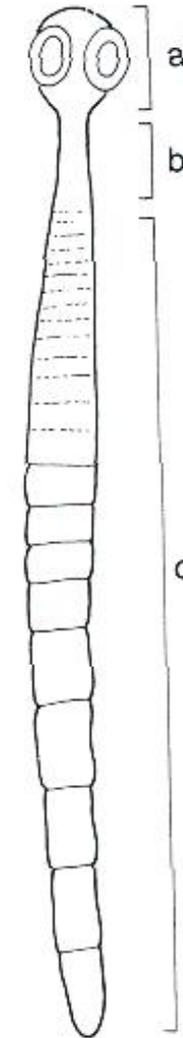
The body of adult worm consist of three parts :

scolex(head), neck and segmented strobila.

A-The head has attachment organs like suckers, rostellum and hooklets or sucking grooves .

B-The neck is region of growth from which segments are formed.

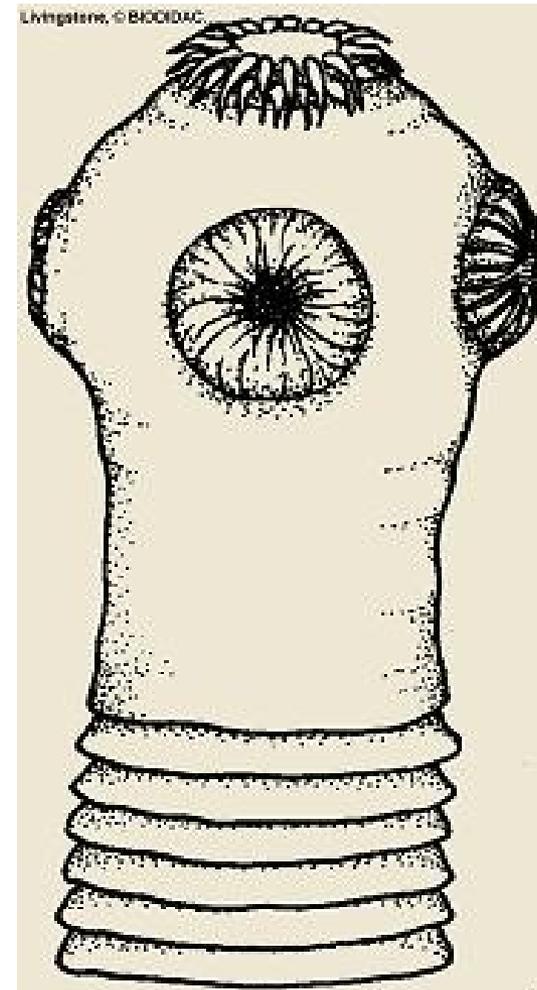
C-The strobila consists of immature, mature and pregnant proglottides.



- **Sucker like Organs of Scolex:**

- **Acetabula** – Cup shaped, circular with heavy muscular wall; usually four in number.

- **Rostellum** _ is mostly provided with hooks, which help in the fixation of the scolex to the host gut.



- **Sucker like Organs of Scolex:**

- **Bothria** – is slit-like grooves capable of some sucking action and usually two in number.



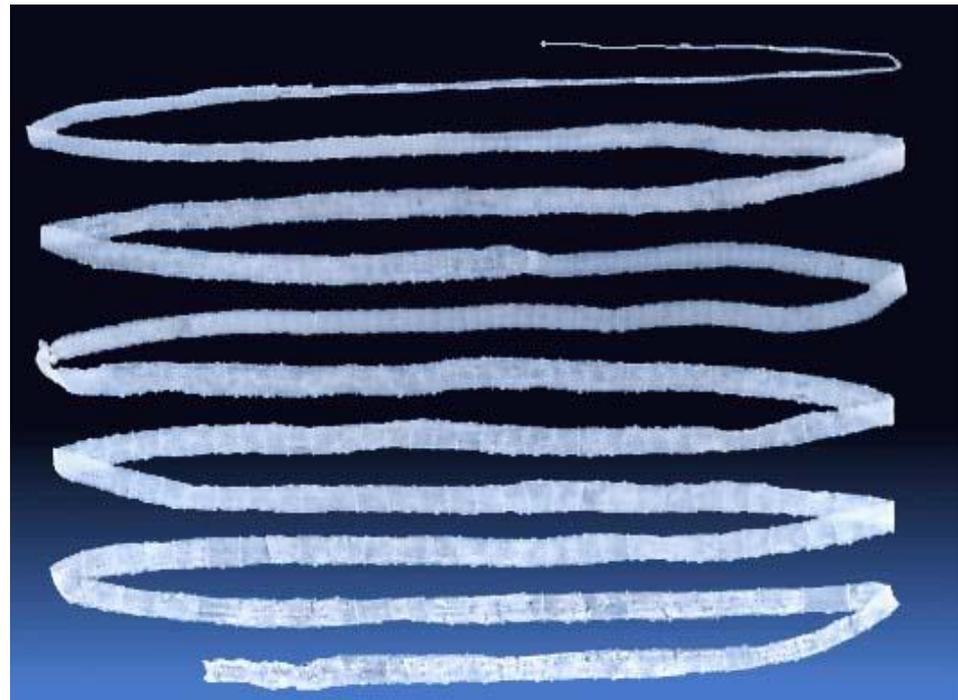
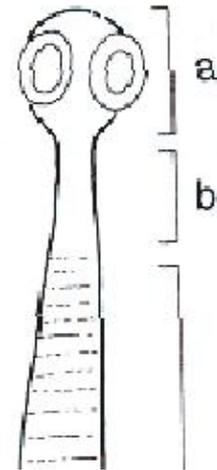
- **Neck:** Unsegmented region that give rise to proglottids in strobila.

- **Proglottids:**

- **Immature:** contain undeveloped male&female reproductive organ.

- **Mature:** contain differentiated male and female reproductive organ.

- **Gravid:** contain uterus filled with eggs.



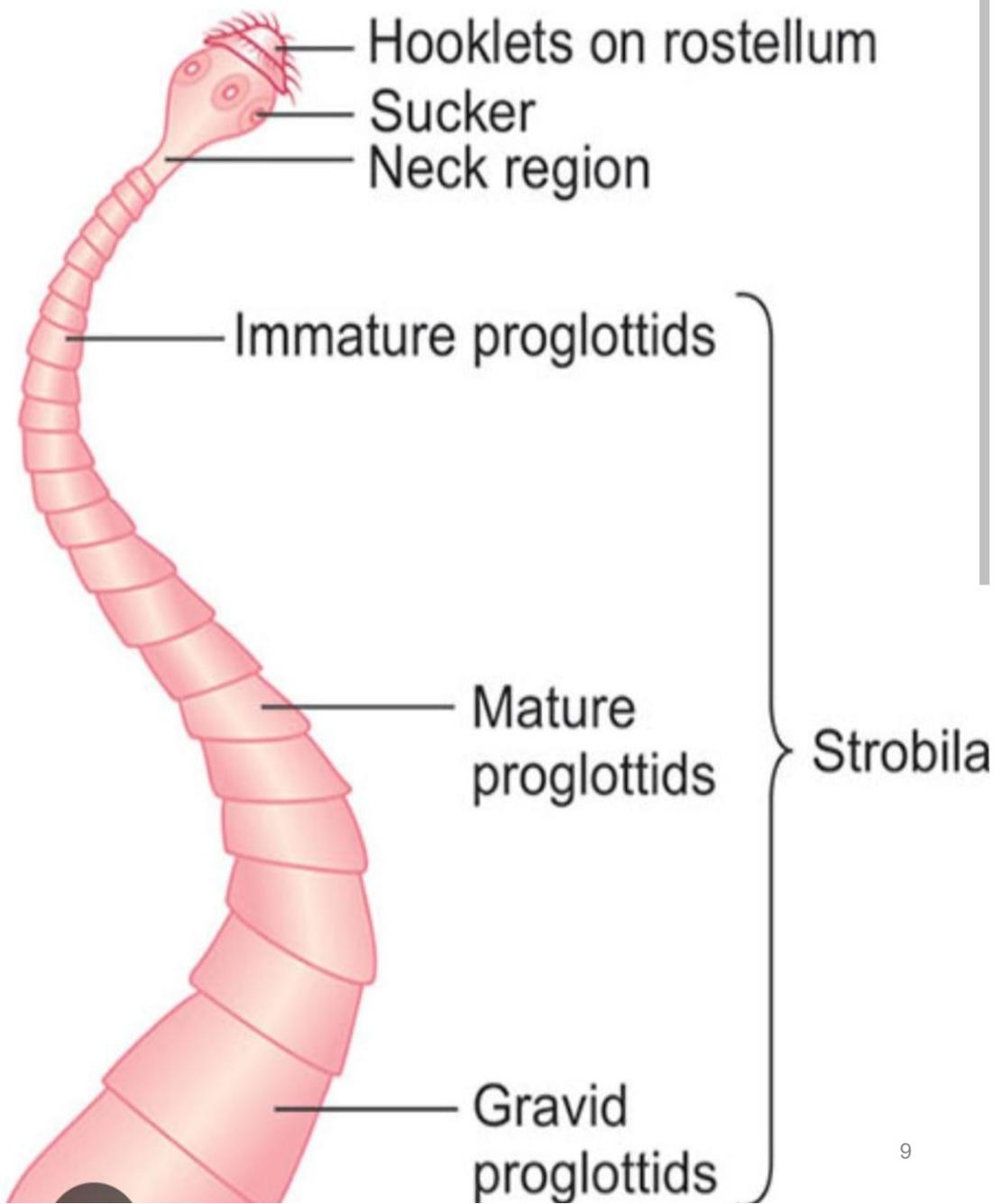
Tapeworms are classified into two orders:

1-Cyclophyllidea:

The head is Globular with suckers, hooklets. One intermediate host is required. The eggs contain an oncosphere .They are medically important, such as *Taenia solium* ,*Taenia saginata* and *Echinococcus granulosus*.

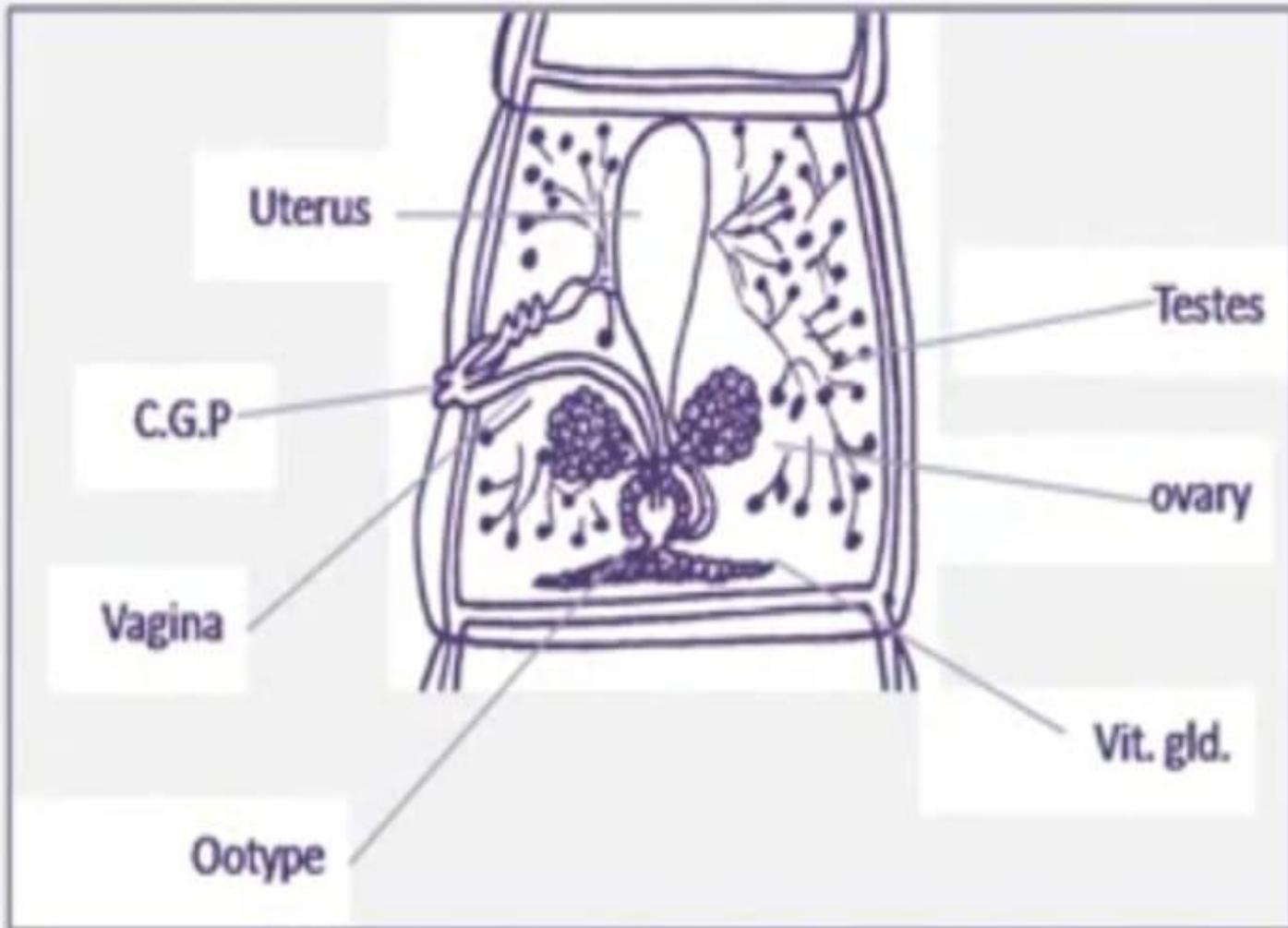
2-Pseudophyllidea:

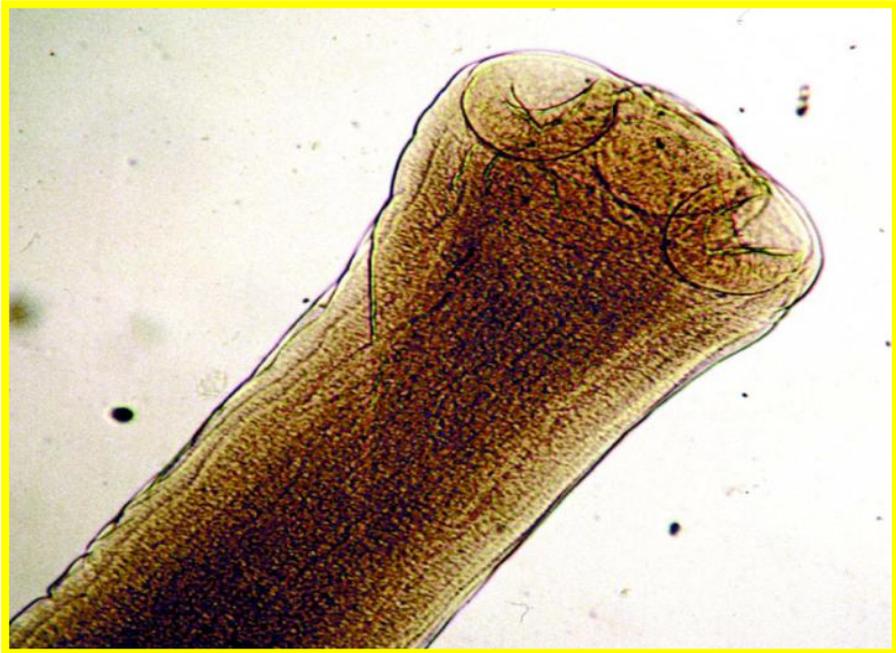
The head is spear-like with sucking grooves. Two or more intermediate hosts are required. The eggs contain a coracidium and have to get into water to develop. This worms include *Diphyllobothrium latum*.



Taenia saginata

- Beef tapeworm
- Taeniasis saginata
- Ranges in length from 4-10 m.
- the scolex is called unarmed (not contain hooks and rostellum)
- The organ of attachment includes four oval muscular suckers.
- Transmission: Ingestion of larval form (*Cysticercus bovis*) in undercooked beef.
- Strobila about 5 m, and composed of up to 1000-2000 segments each segment contain up to 100,000 fertile eggs .
- Immature segments, contain undifferentiated genital organs.
- Mature segments possess completely developed male and female reproductive organs.
- Gravid segment, it is long with median uterus which has number of lateral branches (15-30) .





Eggs of Taenia spp

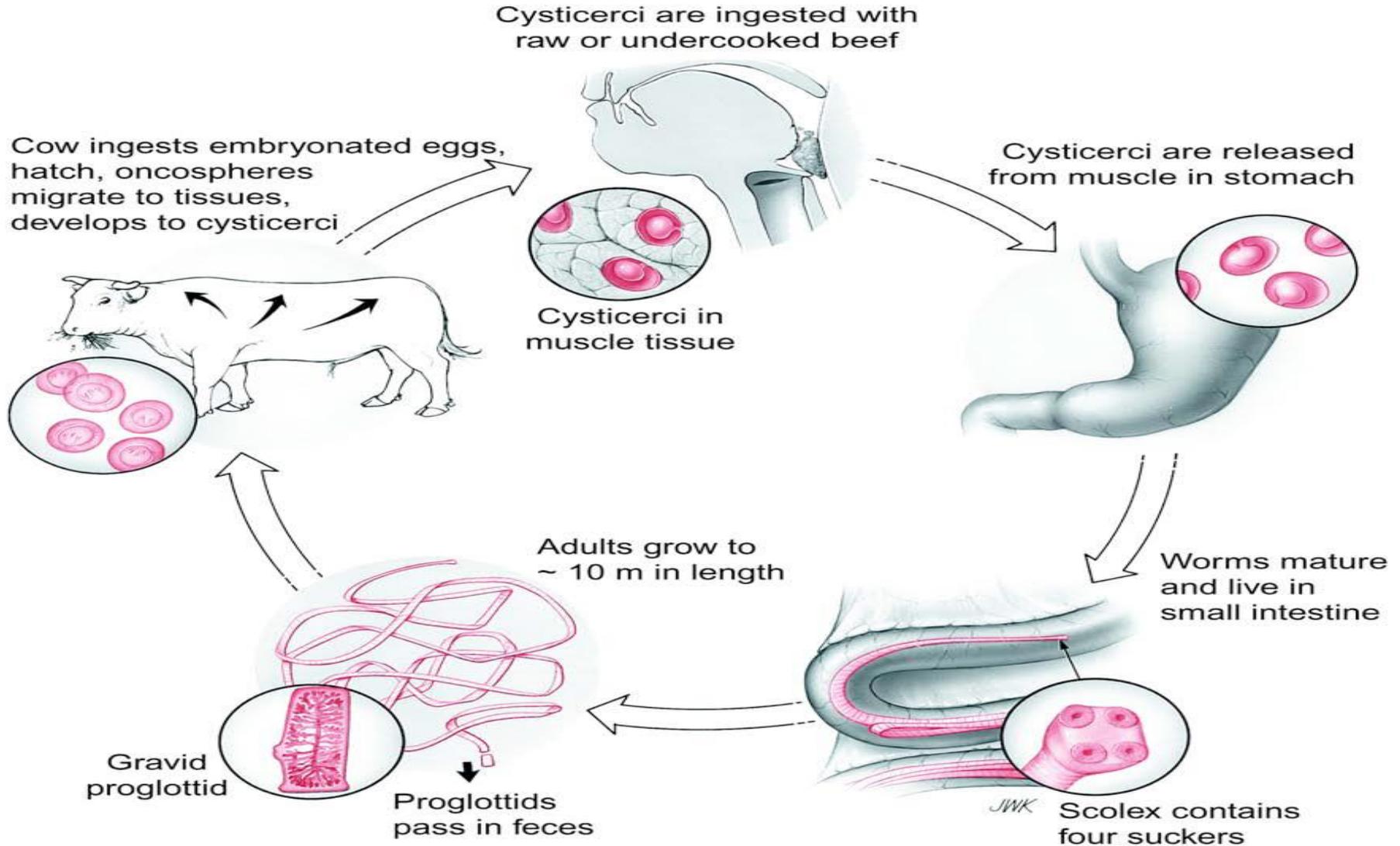
- ❖ It is very diagnostic to this parasites. Is called Taenia spp. Eggs, because the high similarity between these eggs of species make difficult to diagnose between them.
- ❖ Size 35 μm in diameter.
- ❖ Spherical or sub spherical shape.
- ❖ Brown or yellowish color.
- ❖ It Surrounded by inner thick radially striated wall called embryophore.
- ❖ The egg contain hexacanth embryo (hooked ball oncosphere).
- ❖ The egg has a delicate outer shell , it is lost when the egg become free (out of)the segment.

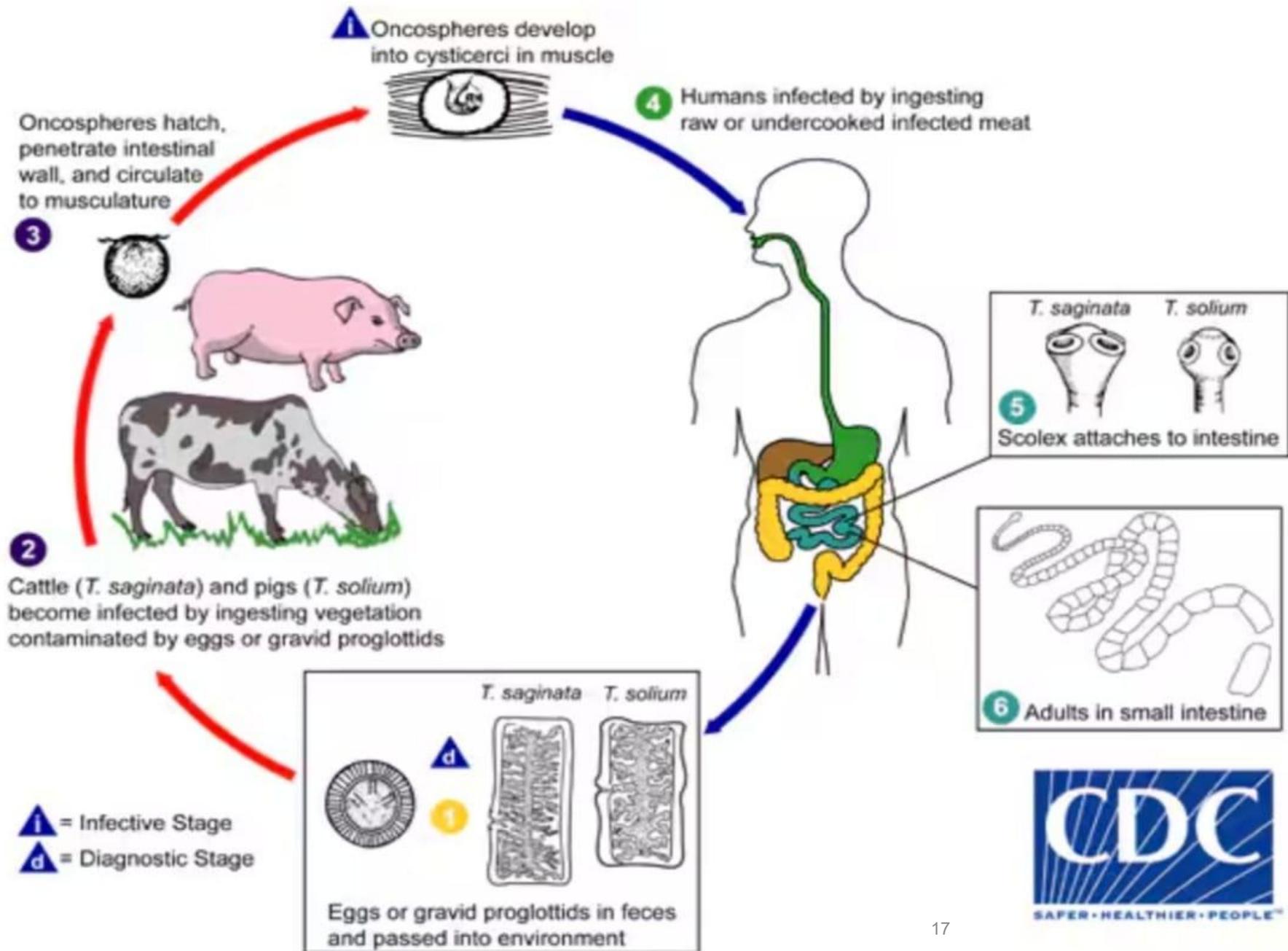


Life cycle

- Man is considered as only definitive host of this parasite.
- Cattle is considered as intermediate host of this parasite.
- The adult worm found in the small intestine of human.
- The eggs and detached gravid segments passed with feces.
- The contamination is huge when using the human feces as fertilizer.
- These eggs will contaminate soil, vegetables and grass.
- The intermediate host become infected when grassing on contaminated plants.
- In the duodenum hatching of eggs takeplace, the release of the embryo occur by disintegration of the embryophore.
- Hexacanth embryo penetrate the intestinal wall by hooks and lytic secretion.
- Through the circulation carried to different parts of the body including striated muscles where they developed to larval stage.

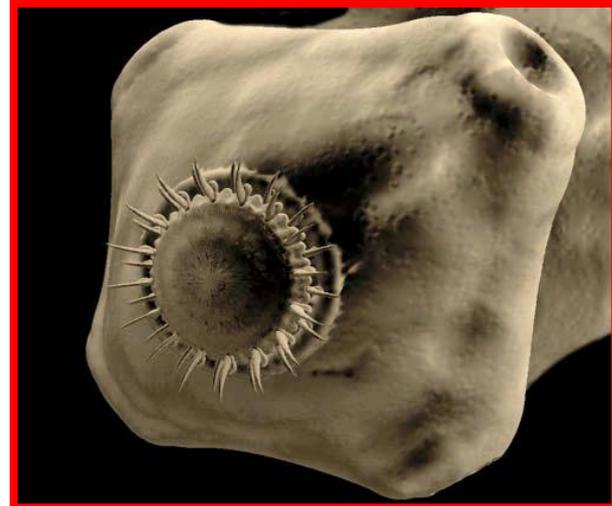
Taenia saginata





Taenia solium

- *Pork tapeworm* .
- *Taeniasis solium* .
- *T. solium* has a armed scolex with four suckers and a double crown of hooks, a narrow neck, and a large strobila (2-4 m) consisting of several hundred proglottids up to 1000 segment.
- About 2 months after ingestion, proglottids begin to detach from the distal end and are excreted in the feces.
- Each segment contains 50,000 fertile eggs.
- the number of lateral uterine branches is 7-13 .



Life cycle

- ❑ Man is considered as only definitive host of this parasite. But sometimes the human act as intermediate host.
- ❑ pig is considered as intermediate host of this parasite.
- ❑ The adult worm found in the small intestine of human.
- ❑ The eggs and detached gravid segments passed with feces
- ❑ These eggs will contaminate soil, vegetables and grass.
- ❑ The intermediate host become infected when grassing on contaminated plants.
- ❑ In the duodenum and jejunum hatching of eggs take place, the embryo escape through the embryophore and penetrate the intestinal wall by hooks and secretion of secretory glands.
- ❑ Through the circulation carried to different parts of the body including striated muscles where they developed to larval stage.
- ❑ The larval stage is the bladder type which is called cysticercus cellulosae .
- ❑ The man get infection by ingestion of raw or not well cooked meat which contain cysticercus cellulosae (larval stage). In the stomach the larvae are release , and by suckers attach to the intestinal mucosa, and strobilization starts to form adult worm.

- **Distinct difference with *T. saginata*** is that humans can be infected with egg stage and oncosphere migrates to some site in the body tissues and develops into cysticercus.
- This can be serious and called **Cysticercosis**
 - *subcutaneous tissues
 - *heart
 - *liver
 - *brain

Diagnosis

1-Clinical : history of ingestion of undercooked beef or pork meat.

2-Laboratory :

A)Direct:

1- Find eggs or proglottids(gravid segments) by the general examination of the stool.

2. Identify species based on proglottid morphology, after formalin and India Ink, gravid segments differentiated by the number of lateral uterine branches.

3. Identify scolex.

4. Perianal swab examination by examination of eggs deposited around the anal area.

5.Ziehl-Neelsen stain can differentiate between the eggs of both species.

T.Saginata eggs are acid fast (takes the red stain) while T.solium eggs are non acid fast.

B)Indirect:

1-The detection of specific antigen in stool (coproantigen) by ELISA techniques .

2- Neuroimaging diagnosis: CT and MRI provide objective evidence on number and location of cysticerci .

•Treatment :

• The drug of choice is praziquantel (single oral dose of 10 mg/kg of body weight) .

Thank
you