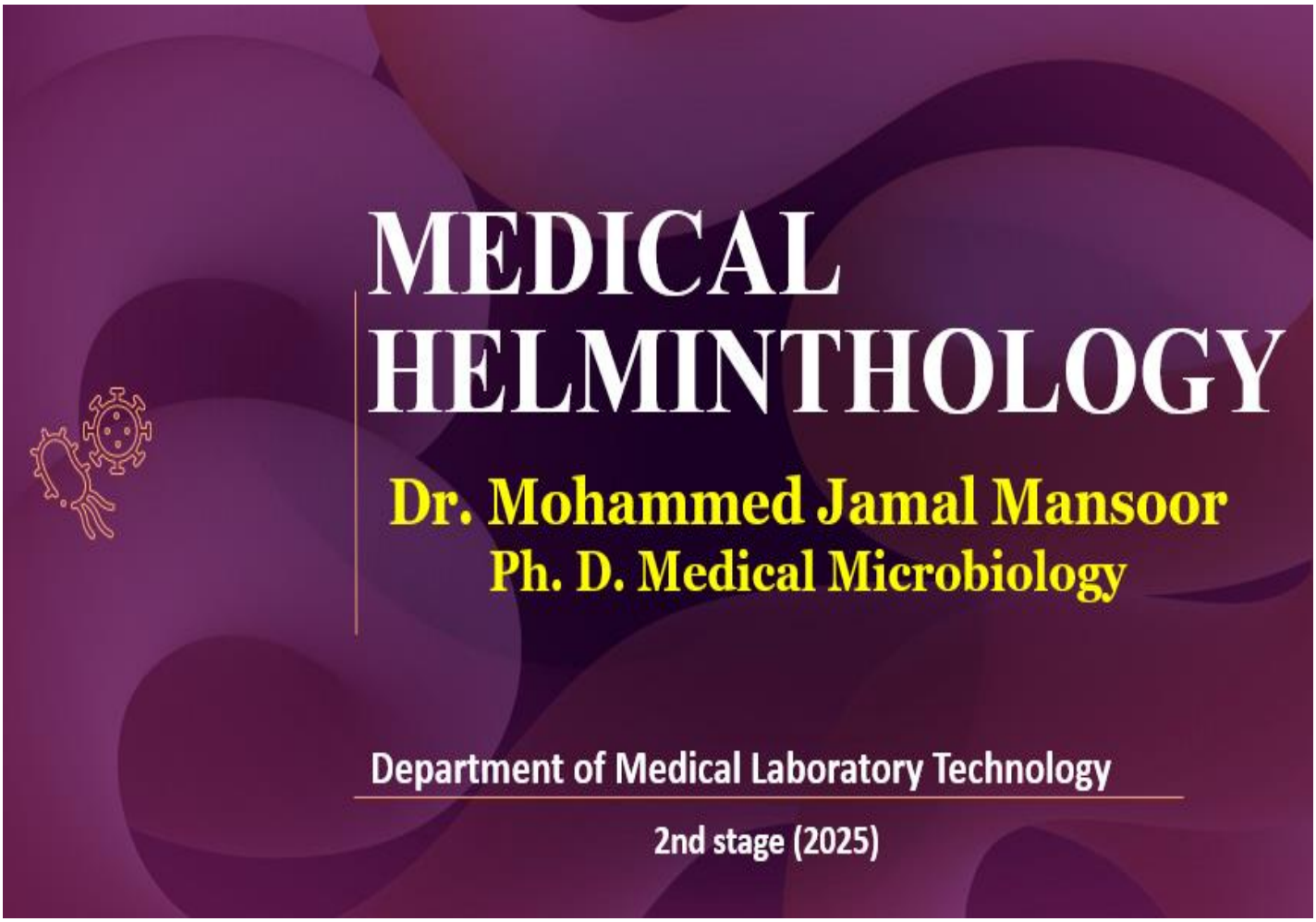
MEDICAL
HELMINTHOLOGY
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2nd stage (2025)

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Lec. (1-2)

Differences between heads and proglottids of various Cestodes

	Taenia solium	*Taenia saginata*	*Hymenolepis nana*	*Hymenolepis diminuta*	*Diphyllobothrium latum*	*Echinococcus granulosus*
Heads						
	4 suckers 2 rows of hooks	4 suckers No hooks	4 suckers single row of 20–30 hooks	4 suckers No hooks	2 Suctorial grooves or bothria, no suckers, No hooks	4 suckers 2 rows of hooks
Proglottids						
	Longer than broad 7–12 uterine branches on each side	Longer than broad 15–30 uterine branches on each side	Broader than long	Broader than long	Broader than long Uterus coiled	Longer than broad

Q: All cestode absorption nutrient from elementary canal by one from following.

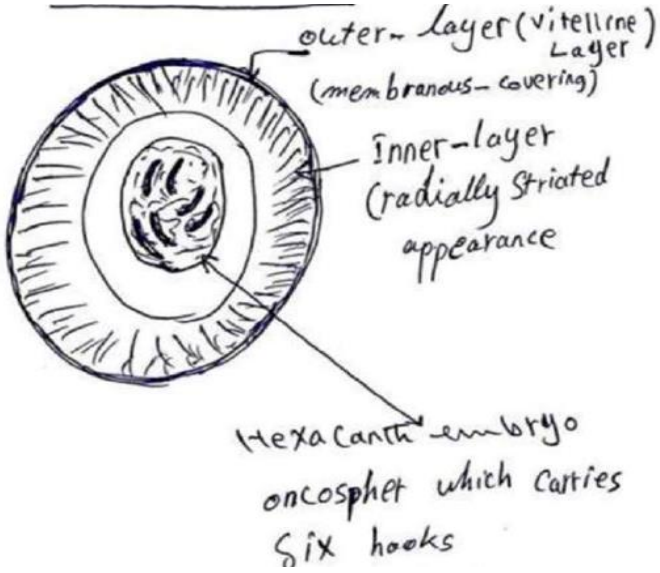
A- Cuticle cove the body

B- Through sucker in scolex

C- Tegument cell

D- Digestive system

E- Nervous system



- The embryo inside the egg is called the **Oncosphere** (meaning hooked ball) because it is spherical and has hooklets.
- **Oncosphere** of human tapeworms typically have **three pairs** of **hooklets** and so, are called hexacanth (meaning six-hooked) embryos.

Infective stage:

1- Larva stage **(cysticercus-bovis)** in the infected meat of cattle.

2- Larval stage **(cysticercus-cellulosae)** in the infected meat of pig, also They cause **cysticercosis disease** in human (*T. solium*)

1- Human acquired the eggs of *Taenia solium* by

ⓐ **Auto infection**. Gravid segment which rupture with in the definitive host, in the small intestine, hatching the eggs which contain hexacanth-embryo, produce Oncosphere, which migrate to the host tissue via blood stream to form **cysticercusis disease (cysticercosis)** in human specially in eye, brain, and muscular tissue.

ⓑ **Accidental ingestion eggs of *Taenia solium* with contaminated food and water with eggs**, the eggs loss their outer covering in digestive system to developing the Oncosphere, migrate by perforation the wall of small intestine, via blood stream to form cysticercus in all body specially in brain, eye and muscular system cause **cysticercus disease (cysticercosis)** in human.

Fig. 1: Rt eye showing smooth, horizontally oval subconjunctival swelling.

Q: Larval stage of *Taenia solium* is called
A- Cysticercoid
B- Hydatid cyst
C- Cysticercus cellulosae
D- Cysticercus bovis
E- Plerocercoid

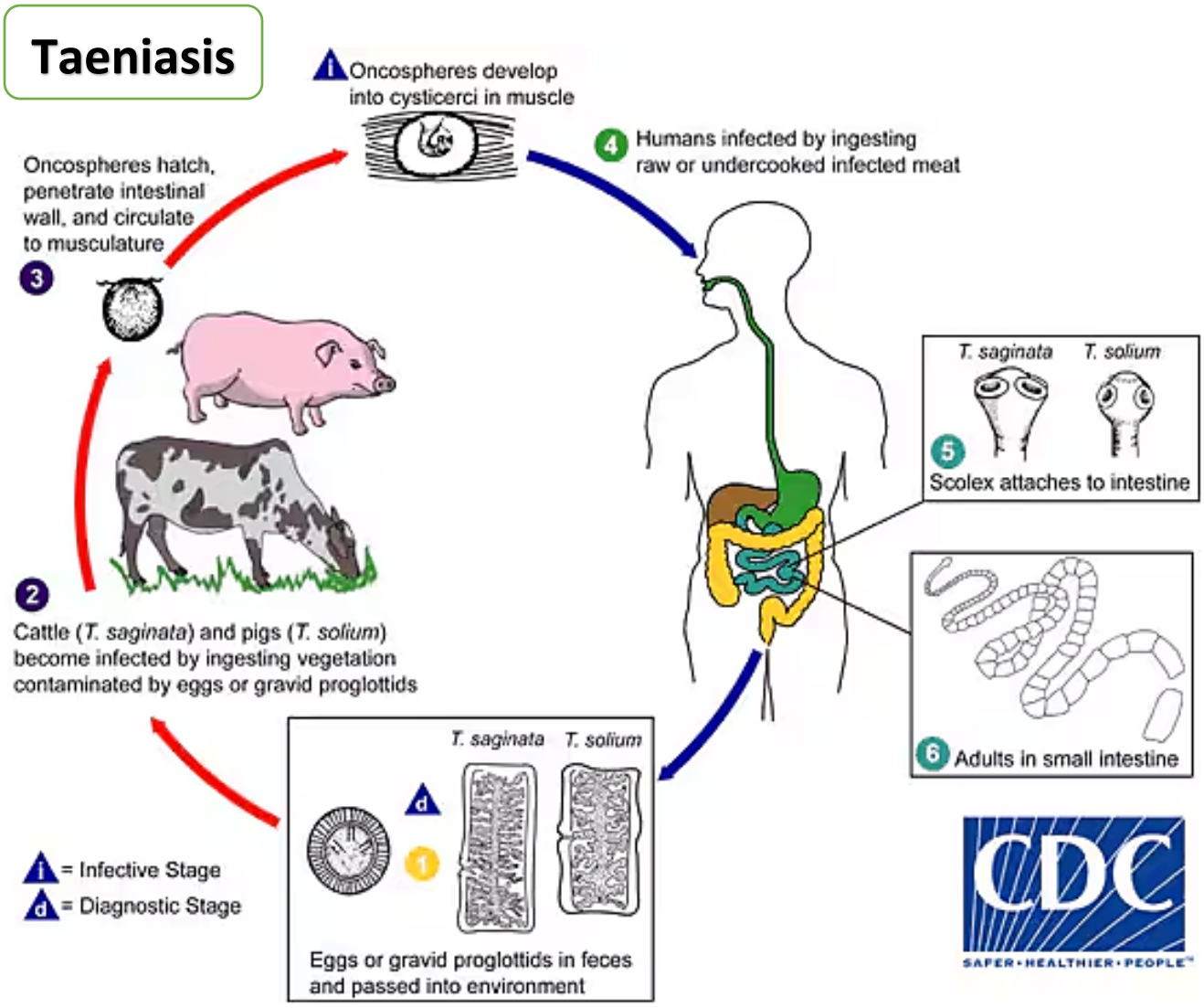
Q: The Cysticercosis disease of human causes by all of the excepted one
A- Acquired infection by contaminated of food or water by eggs of *T. solium*
B- Auto infection
C- Consumption meat contain cysticercus-cellulosae
D- Consumption meat contain cysticercus - bovis
E- None of them

داء الكيسات المذنبة

The life cycle *Taenia saginata* and *Taenia solium* are indirect, human is definitive host. Cysticercus in muscle of cattle or pig as intermediate host.

1. **Human infected** by ingestion raw or undercooked infected meat contain the cysticercus.
2. Due to digestive enzymes in small intestine release the scolex (head) and **attaches to small intestine**.
3. After **2-3** month become **adult** in small intestine.
4. Eggs or gravid segment (proglottids) passed with **feces**.
5. The eggs can survive days to months in the environment.
6. **Cattle and pigs**, become infected ingesting vegetation (plants) contamination with eggs or gravid proglottids, in the *small intestine the eggs hatch, hexacanth embryo invade the intestinal wall and migrate to the striated muscles, where they develop into cysticercus.*
7. **(Cysticercus - bovis)** develop in muscular system or organ of the cattle. **(cysticercus - cellulosa)** in muscular system of the pig, cysticercus can survive for **several years** in the animal.
8. Human become infected by ingesting raw or undercooked infected meat contain the cysticercus.

Taeniasis



- **In the human. in the intestine the cysticercus develops over 2- 3 month into adult tapeworm, which can survive years.**
- **The gravid proglottids are released with feces, in the *T. saginata* may produce up to 100, 000 eggs and in the *T. solium* 50,000 eggs per proglottids.**
- **Cysticercosis is an infection caused by the larvae of the parasite Taenia solium. This infection occurs after a person swallows tapeworm eggs. The larvae get into tissues such as muscle, brain, and eye, and form cysts called cysticercus.**

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The different between *T. saginata* and *T. solium*

	T. saginata	***T. solium***
Length	5–10 m	2–3 m
Scolex	Large quadrate	Small and globular
	Rostellum and hooks are **absent**	Rostellum and hooks are **present**
	Suckers may be pigmented	Suckers **not** pigmented
Neck	**Long**	**Short**
Proglottids	**1,000–2,000**	**Below 1,000**
Measurement (Gravid segment)	20 mm × 5 mm	12 mm × 6 mm
Expulsion	Expelled **singly**	Expelled passively in chains of **5 or 6**
Uterus	Lateral branches 15–30 on each side; thin and dichotomous	Lateral branches 5–10 on each side; thick and dendritic
Vagina	**Present**	**Absent**
Accessary lobe of ovary	**Absent**	**Present**
Testes	**300–400** follicles	**150–200** follicles
Larva	**Cysticercus bovis**; present in cow not in man	**Cysticercus cellulosae**; present in pig and also in man
Egg	Not infective to man	Infective to man
Definitive host	Man	Man
Intermediate host	**Cow**	**Pig**, occasionally man
Disease	Causes intestinal taeniasis	Causes intestinal taeniasis and cysticercosis

The main symptom tapeworm infection in human:

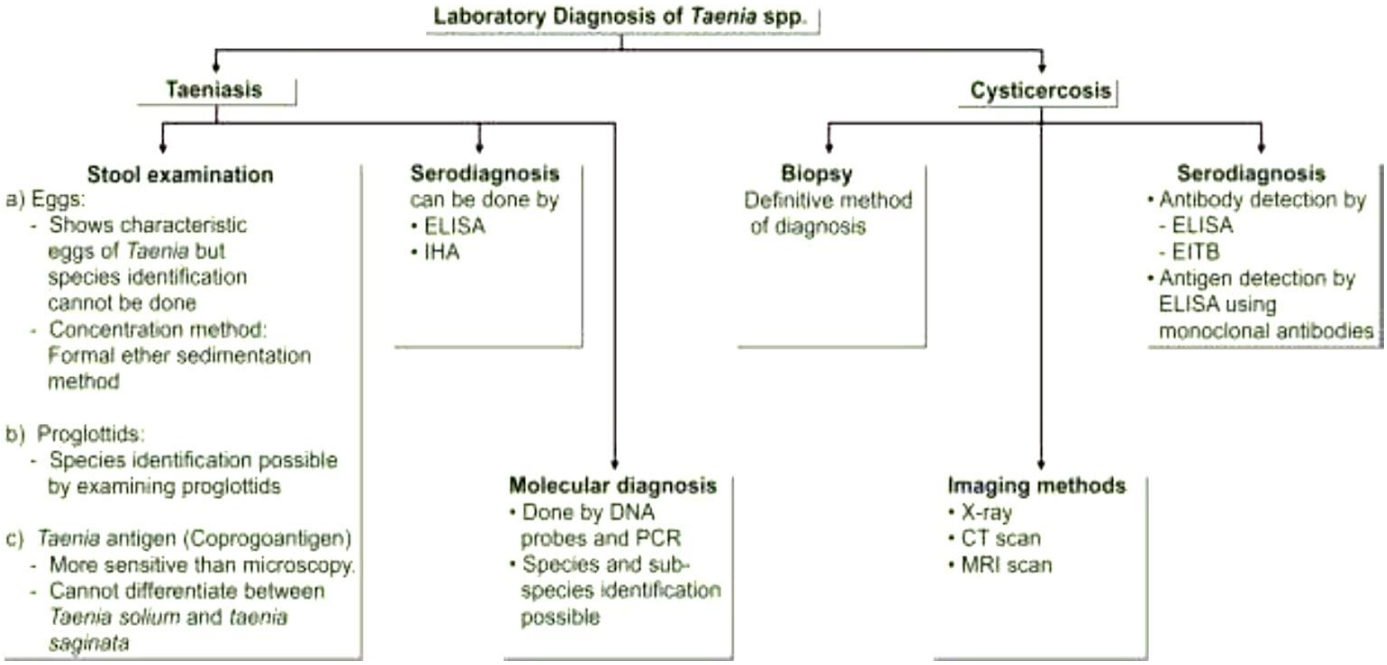
1- Cause **digestive problem**, **abdominal pain loss of appetite**, **weight loss**, **anemia**, **intestinal obstruction**.

2- The most visible symptom of **taeniasis** in active passing of proglottids through the **anus** and in feces.

3- Infection with ***Taenia-Solium*** can result in human **cysticercosis disease,** which can be **cysticercus cellulosa**.

The **larva Stage** is subcutaneous, muscular or in all organs of the body also in **neurocycticercosis**, and **ocular (loss of vision)** and **conjunctivitis very serious disease infected the eye or brain damage.**

Laboratory diagnosis of *Taenia* spp.



IHA: indirect hemagglutination
CT: Computed Tomography
PCR: Polymerase Chain Reaction
MRI: Magnetic resonance imaging
EITB: Enzyme-linked immune-electro-transfer blot **More sensitivity and specificity than ELISA**

Q: Definitive host of beef tapeworm is
A- Cattle
B- Man.
C- Bird
D- dog.
E- All of the above
Q: The intermediate host of *Teania solium*
A- Snail
B- Fish
C- Pig
D- Man
E- Sheep
Q: *Taenia saginata*
A- Beef tapworm
B- Intermediat host (pig)
C- Infective stage (cysticercus cellulsae)
D- Transmission by ingestion pork meat
E- All of the above
Q*: Taenia solium*
A- Man is the final host and pig is intermediate host
D- Small cestode
B- Protozoa E- Hook-worm
C- Trematoda

Treatment

- Single dose of **praziquantel** (**10–20 mg/kg**) is the **drug of choice**.
- **Niclosamide** (**2 g**), single dose, is another effective drug.
- Purgation (Cleaning) is not considered necessary.

Which type of organism has a shape that is leaf-like and unsegmented

a) Cestodes
b) Trematodes
c) Nematodes
d) Flatworms

What is the characteristic feature of trematodes regarding their body cavity

a) Filled with spongy undifferentiated mesenchymatous cells
b) Well-developed buccal capsule with teeth
c) Complete with anus
d) Pseudocele

How many hosts do cestodes typically require?

a) 1
b) 2
c) 3
d) None

Which group of parasites has individuals that are dioecious?

a) Trematodes
b) Cestodes
c) Nematodes
d) All of the above

In which species is the pig an intermediate host?

a) *Taenia saginata*
b) *Taenia solium*
c) Both have pig as an intermediate host
d) Neither has pig as an intermediate host

Which characteristic differentiates *Taenia saginata* from *Taenia solium* regarding length?

a) *Taenia saginata* is longer
b) *Taenia solium* is longer
c) Both have similar lengths
d) Length is not a distinguishing factor

Q: What is the distinguishing feature of the scolex of *Taenia solium*?

a) Large quadrate shape
b) Small and globular shape
c) Absence of rostellum
d) absence of hooks

Q: How are the suckers of *Taenia saginata* different from those of *Taenia solium*?

a) Both have pigmented suckers
b) Suckers of *Taenia saginata* are pigmented, while those of *Taenia solium* are not
c) Suckers of *Taenia solium* are pigmented, while those of *Taenia saginata* are not
d) Both have non-pigmented suckers