Gastro Intestinal System

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If you have been showing one of the following symptoms your doctor might ask for a stool sample:

1) **diarrhea that lasts more than a few days .**
2) **Stools that contain blood or mucus .**
3) **Stomach pain or cramping.**
4) **Nausea**
5) **Throwing up**
6) **fever**

The patient will be given a special wide mouth container with a label of the patient's name , birthdate and the time of sample collection.

Steps to collect the sample:

1) **make sure that the sample does not touch the inside of the toilet**
2) **place the sample into the container using a small disposable spoon or spatula (Make sure to throw them after using them)**
3) **Don't overfill the container and avoid getting urine mixed up with the stool**
4) **Return the sample to the lab as soon as possible (it can be kept at the patient's refrigerator but not for more than 24 hours)**

Stool Collection & culture

- Stool should be collected in clean wide mouth container not sterile

Stool should be added to Selenite broth

Why? ?

- ❑ Inhibits the growth of coliforms
- ❑ Enhances the growth of Pathogen

❖ Most common pathogens (Bacteria) :

- E.coli
- Salmonella
- Shigella
- Vibrio
- Proteus
- Yersinia , Campylobacter , Clostridium, Bacillus …etc

* The following bacteria are not normal inhabitants of the gastrointestinal tract and are known to cause G.I. infections.

Stool sample should be cultured on the following media using streak plate method

*MacConkey media is considered as a selective and differential media for enterobacteriaceae looking for E.coli .

S-S agar

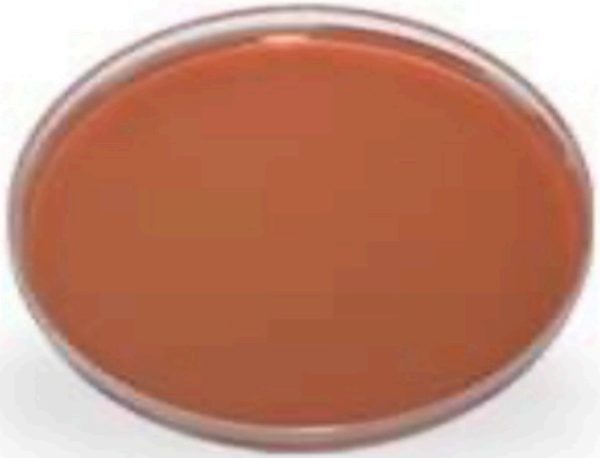
Hekton agar

T.C.B.S
(Selective and differential for vibrio spp.)

Selective + differential media for salmonella and shigella spp.

S-S agar

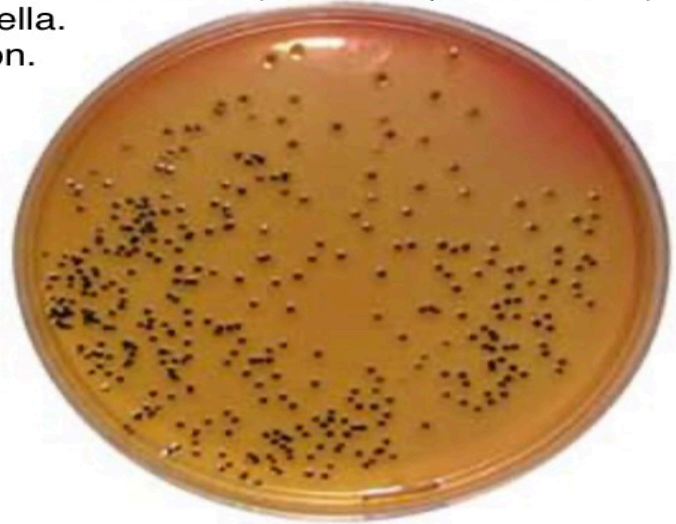
Stands for salmonella -shigella agar : Highly selective and differential for salmonella and shigella. It contains an indicator to detect H2S production.



SS Agar Plate
(Salmonella–Shigella Agar)

Salmonella

Salmonella colonies appear colorless with black center (related to the production of H2S)



Shigella

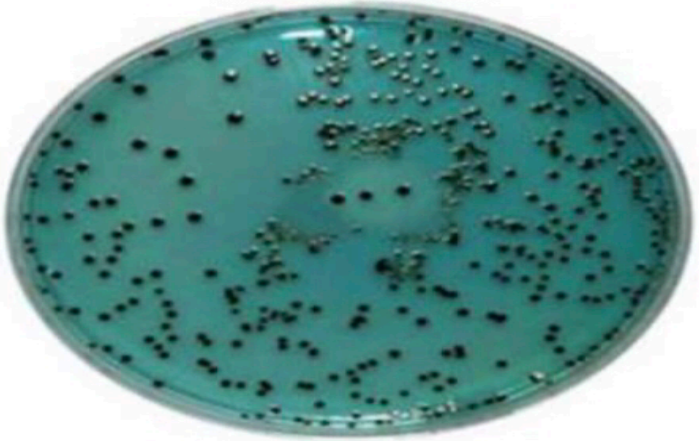
Shigella colonies appear colorless only

Hekton enteric agar

Highly selective and differential for salmonella and shigella. It contains an indicator to detect H2S production.

Salmonella

Green colonies with black center



Shigella

Green colonies only

T.C.B.S media

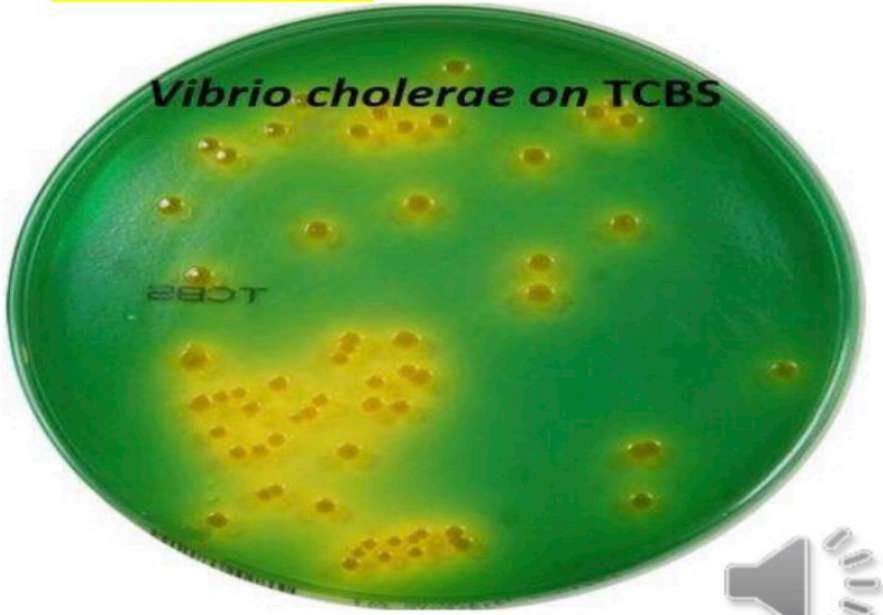
Thiosulfate-citrate-bile salts-sucrose media .

TCBS agar is highly selective for the isolation of V. cholerae and V. parahaemolyticus as well as other Vibrio species.

- Selective for Vibrio Spp. (Since its Ph is alkaline (8.5-10))
- Ph (8.5-10)

And differential due to the presence of sucrose and dyes such as Bromthymol blue .
For example sucrose fermentation produces acid which convert the color of Bromthymol blue into yellow colonies in the case of vibrio cholerae .

- **When Vibrio ferment sucrose it turns the media from green to Yellow**



Salmonella

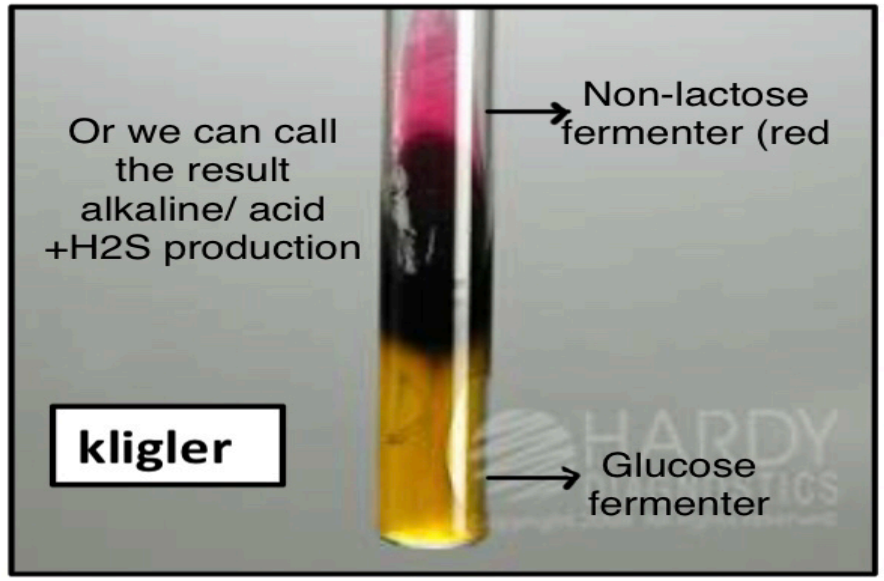
Additional biochemical tests to be 100% sure about the type of the bacteria (for salmonella) :

- **Kligler : red/Yellow + H2S**
- **Urease : Negative**
- **Citrate : Positive**
- **SIM : Positive / Negative / Positive**

It can produce H2S

Motile

stands for: Sugar ,Indole and Motility



Yellow -> yellow

Urease test

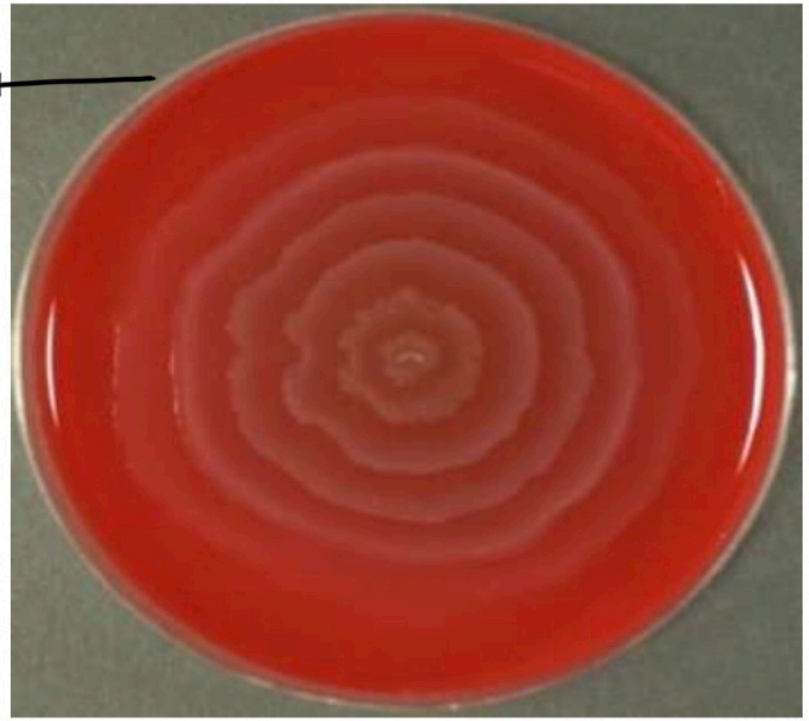
Green-> blue

citrate test

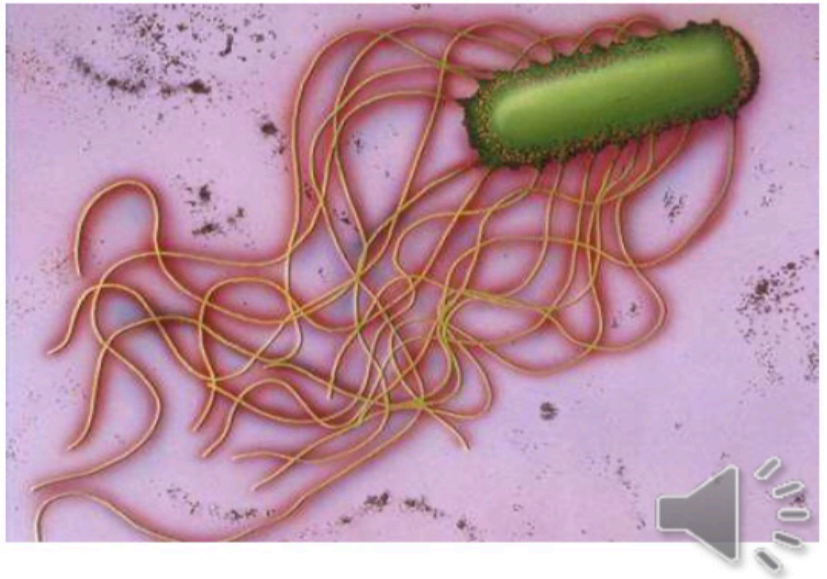
SIM test

Proteus

Blood agar media (enriched media)
Proteus grow on the Blood Agar plate in successive waves to form a thin filmy layer of concentric circles (swarming) due to the presence of flagella and high motility.



- Gram negative rods , non lactose fermenter
- **Swarming motility (flagellated)**
- Prevent swarming by culturing it on CLED or MacConkey media



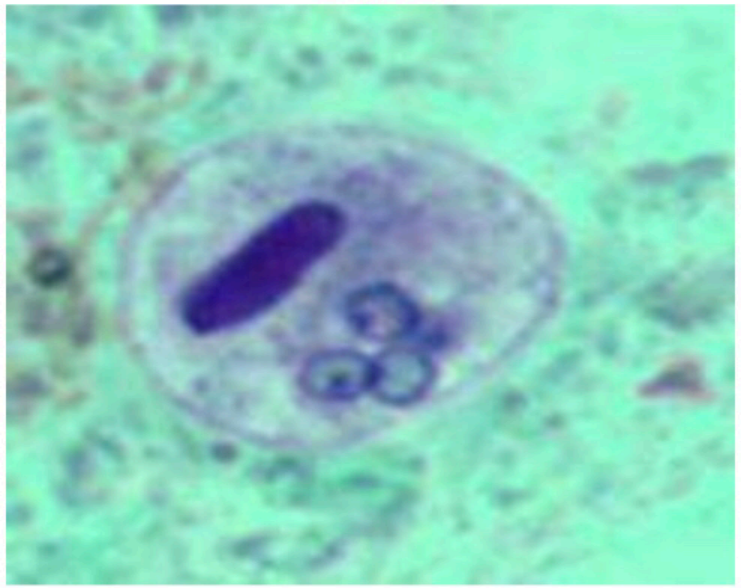
Parasites that are pathogenic to GI system

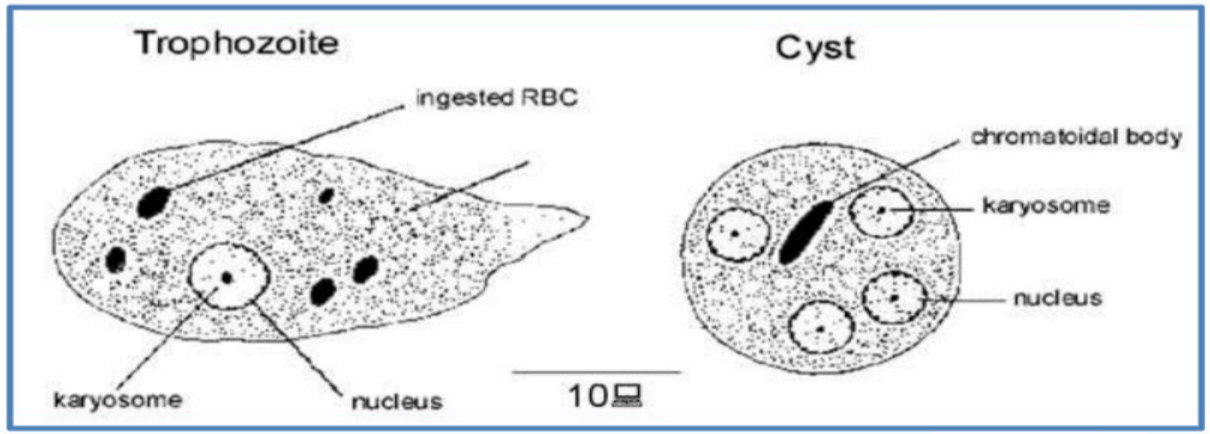
Entamoeba histolytica

Trophozoite

- trophozoites
  - 15-20 μm
  - extended pseudopodia
  - progressive movement

Cyst



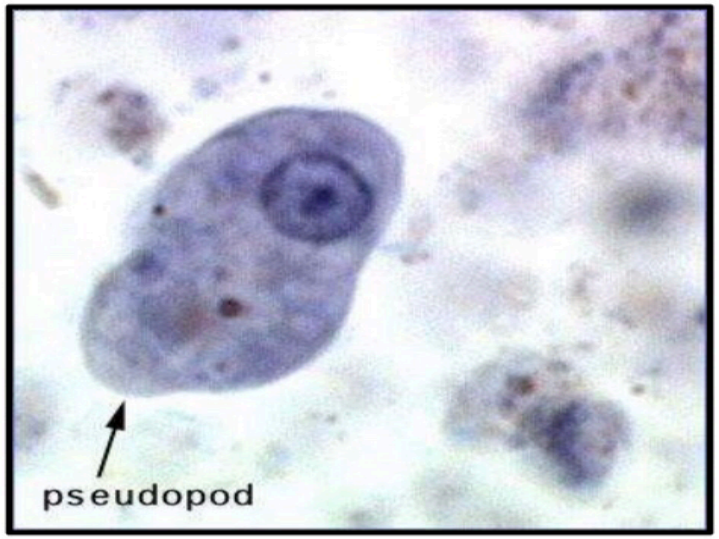


- cysts
  - 12-15 μm
  - 4 nuclei (mature)
  - blunt chromatoid bodies

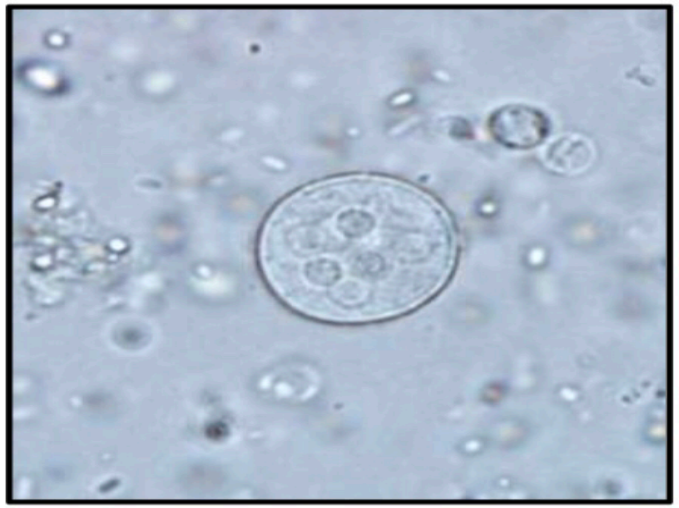
Entamoeba Coli

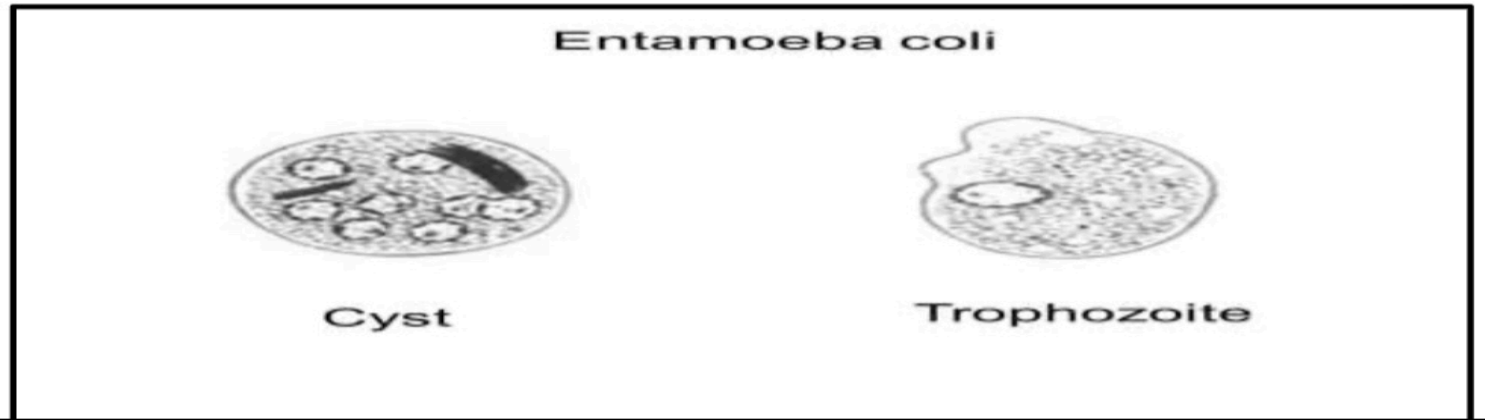
Trophozoite

- trophozoites
  - 20-25 μm
  - broad blunt pseudopodia



Cyst

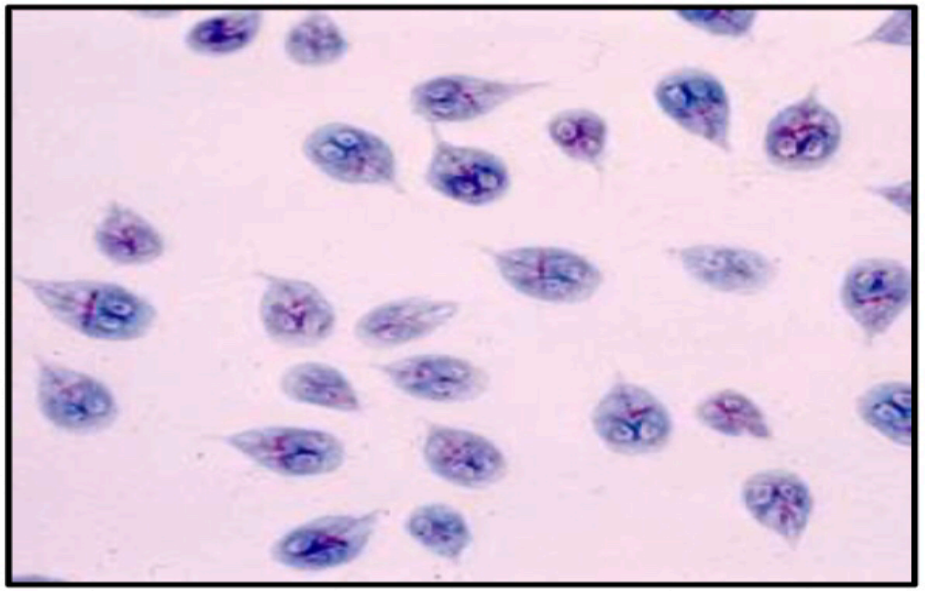




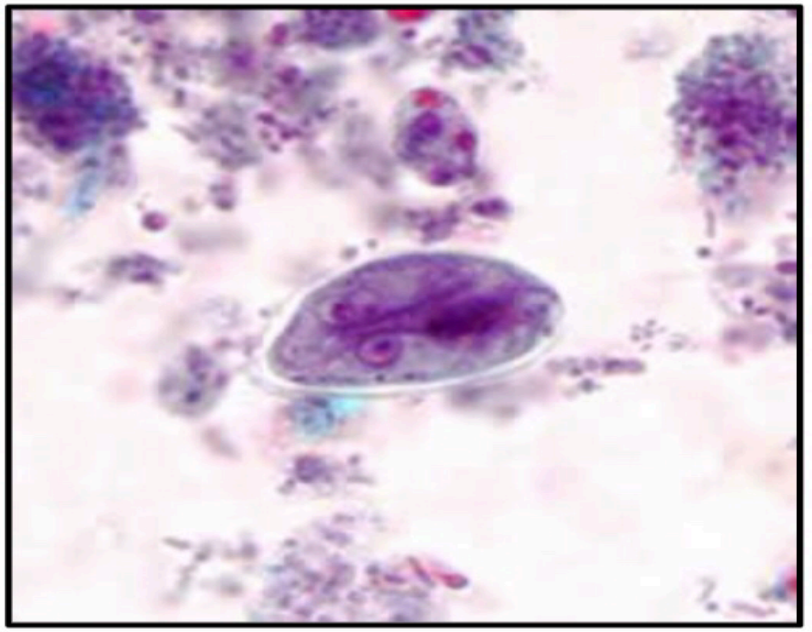
- cysts
  - 15-25 μm
  - 8 nuclei (mature)
  - pointed chromatoid bodies (less prominent)

Giardia lamblia

Trophozoite



Cyst



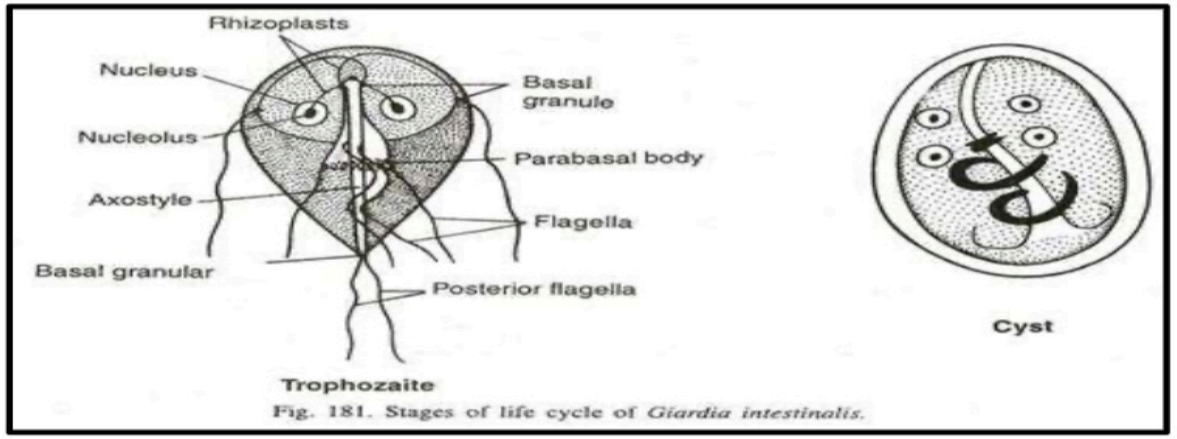
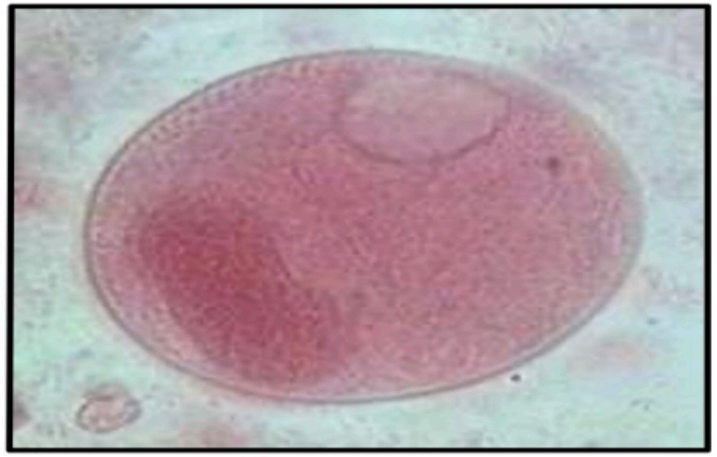


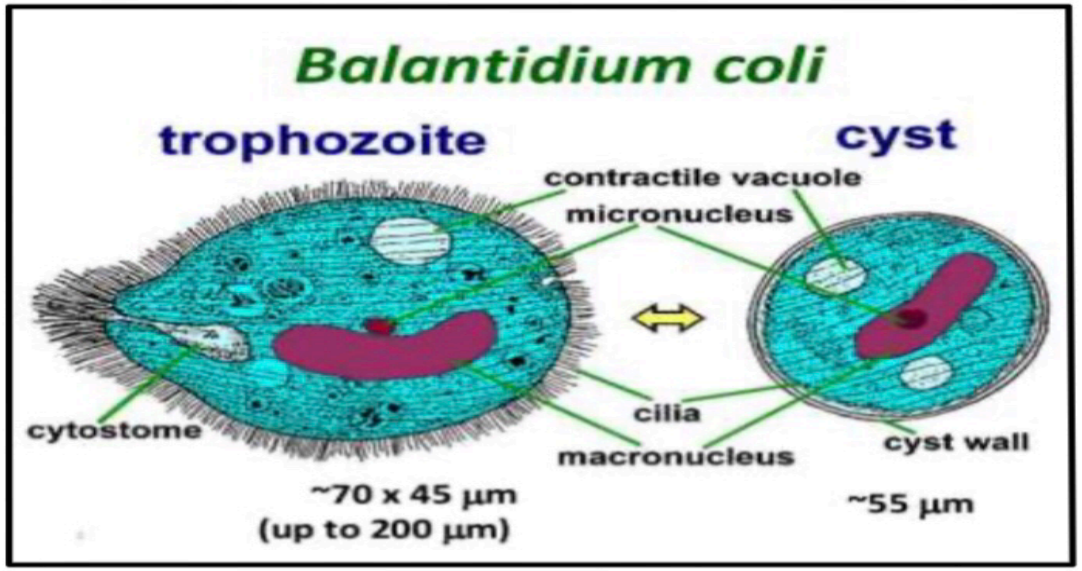
Fig. 181. Stages of life cycle of *Giardia intestinalis*.

Balantidium coli

Trophozoite

Cyst

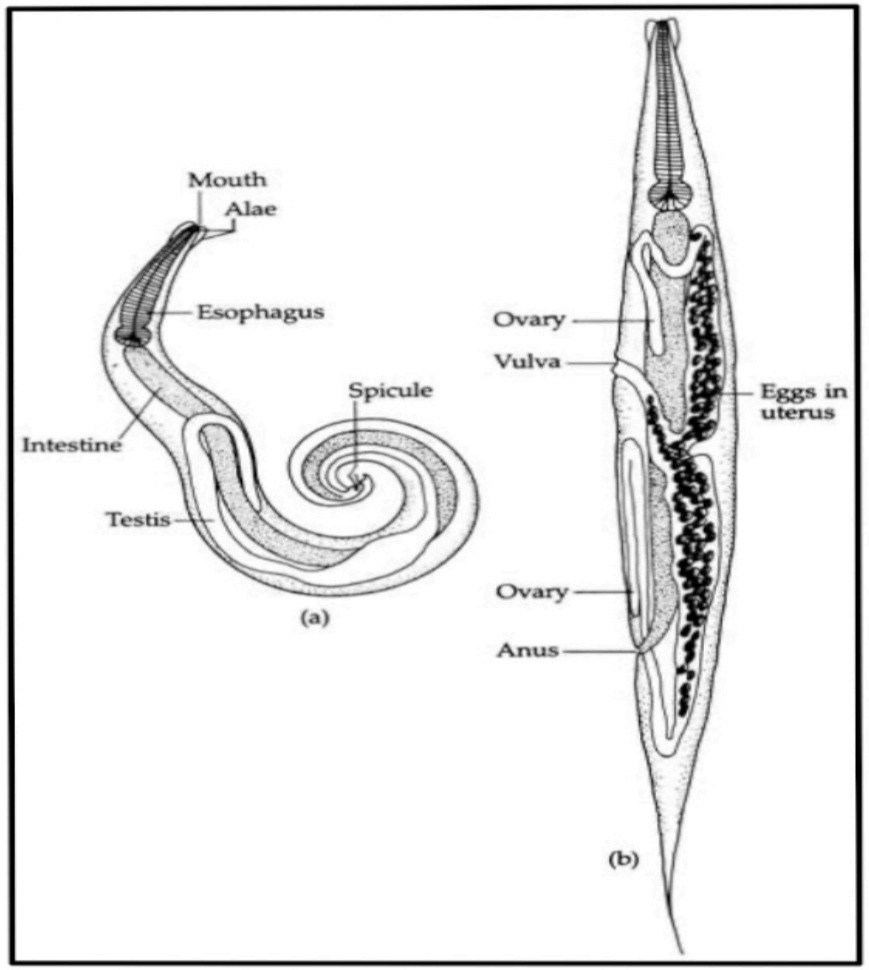




Enterobius Vermicularis

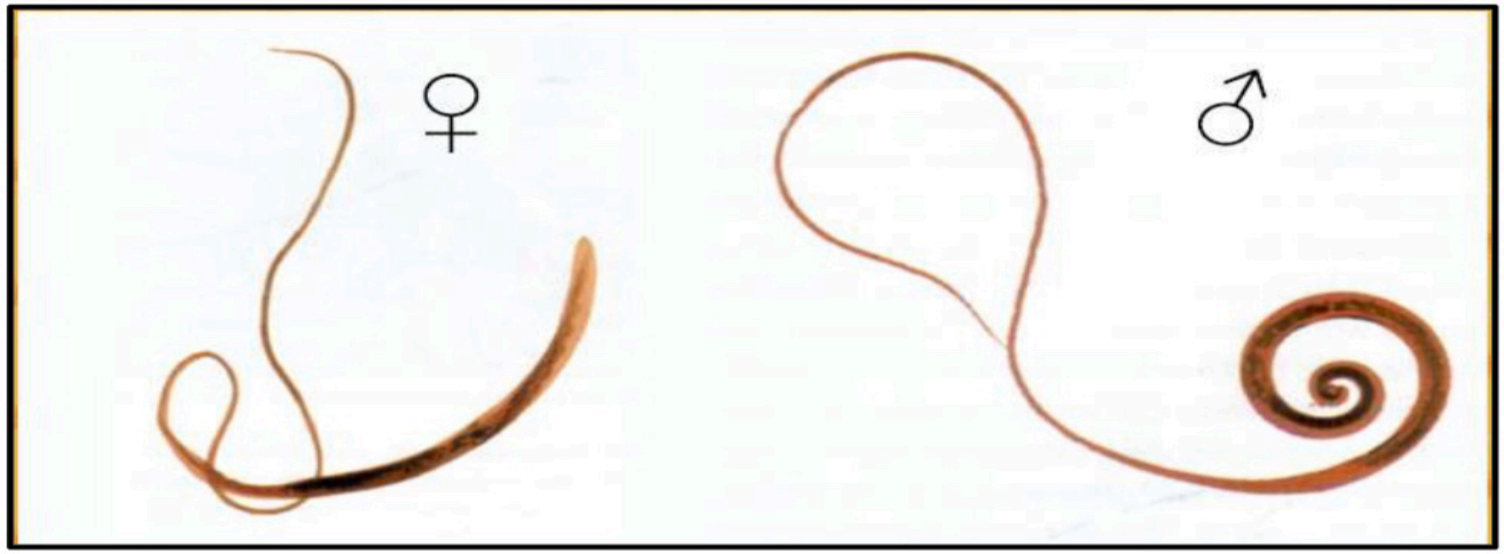
Worm

Egg



Trichuris Trichiura

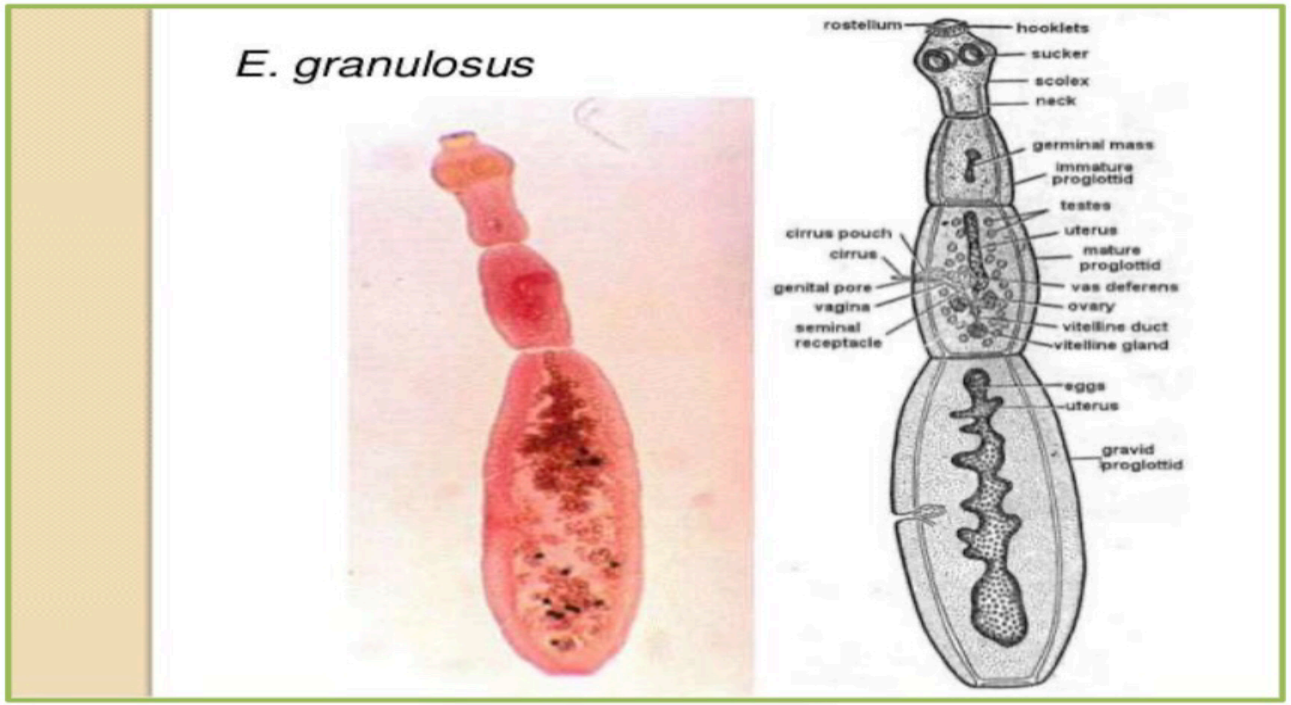
Worm



Egg

Echinococcus granuloses

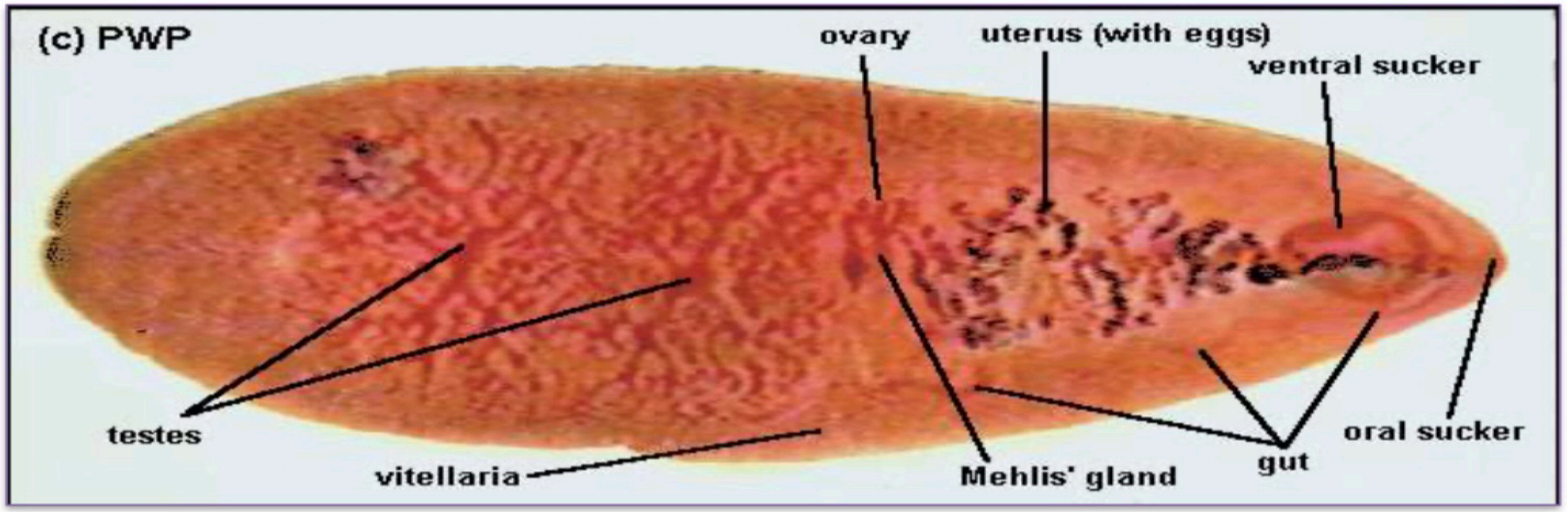
Ova



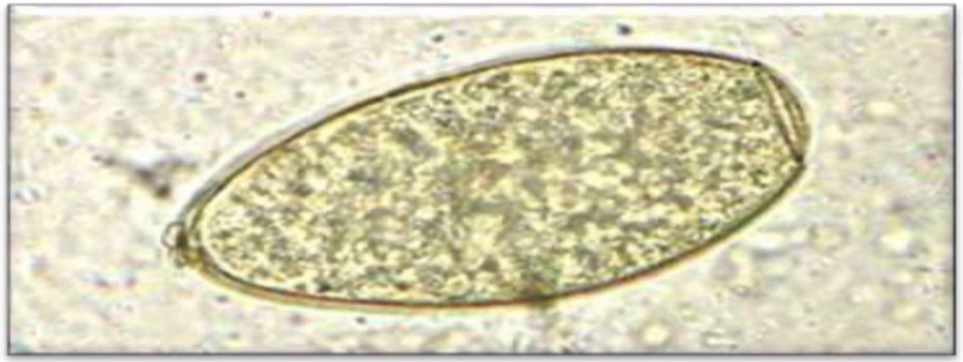
Worm

fasciolosis buski

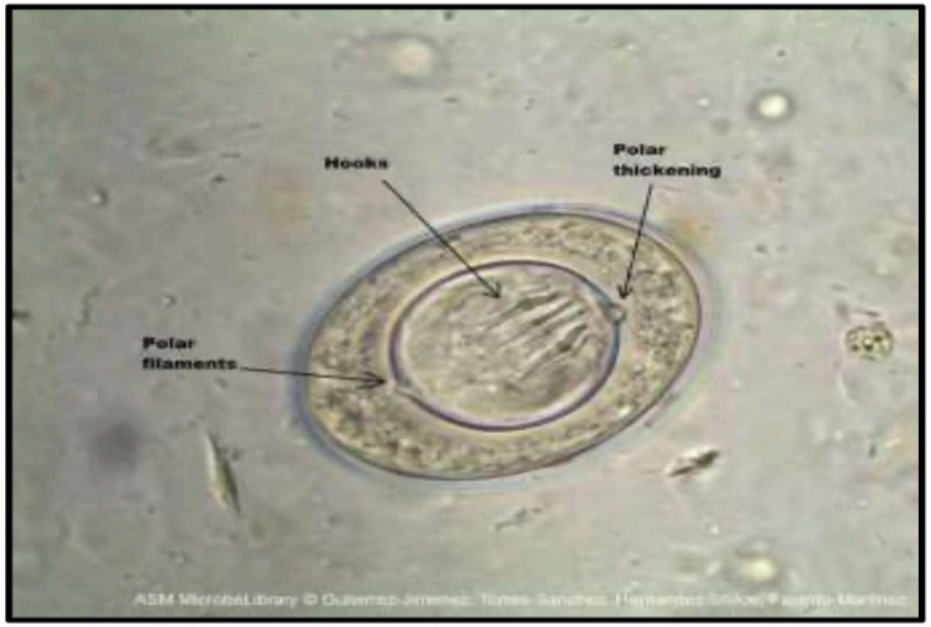
Worm



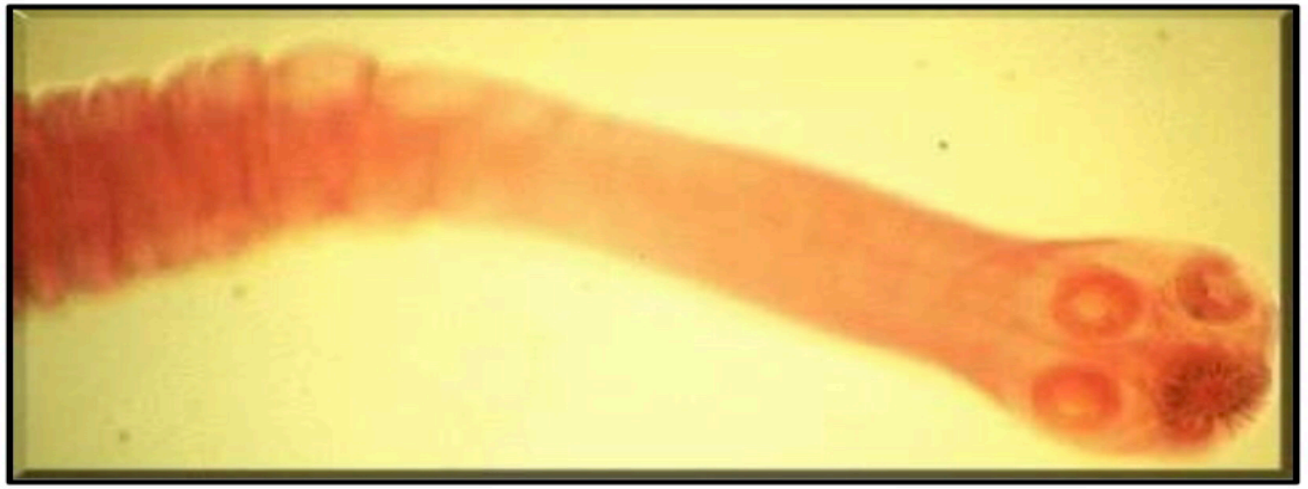
Worm

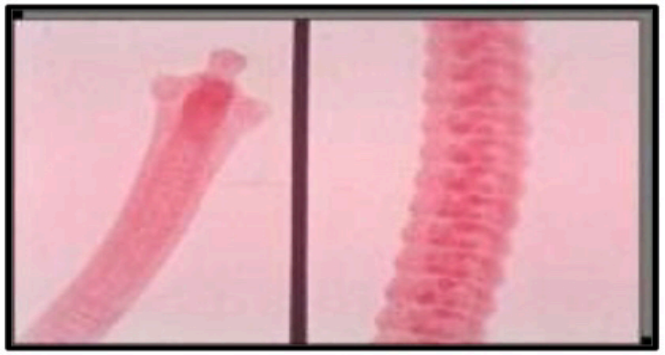


Hymenolepis Nana



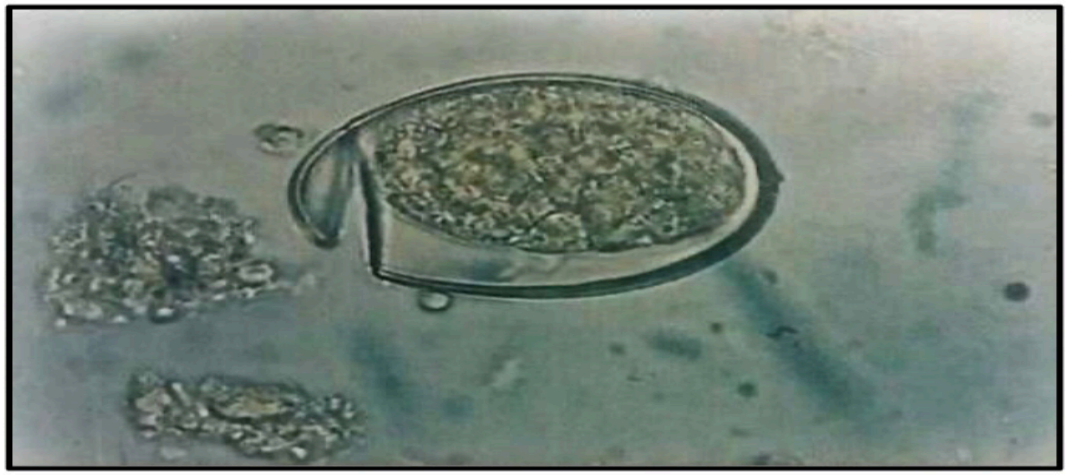
Ova



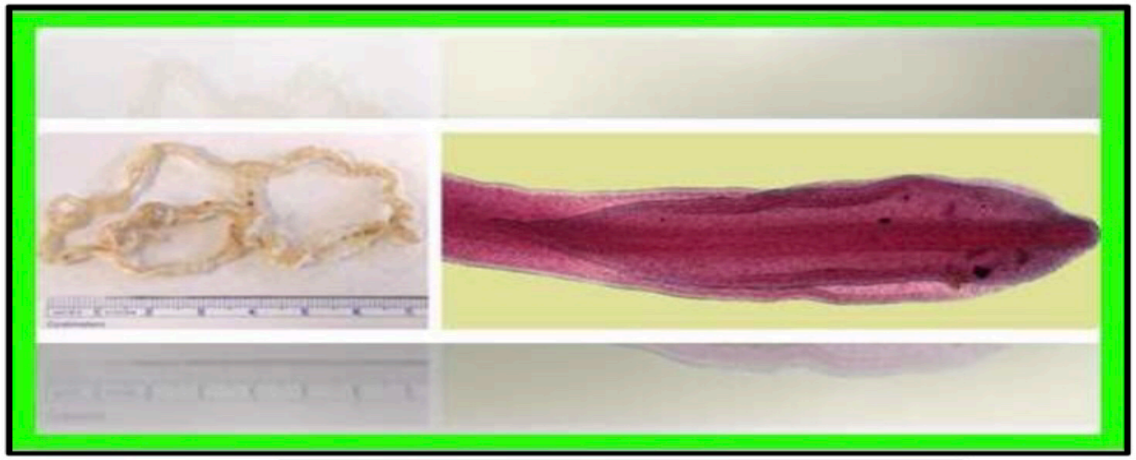


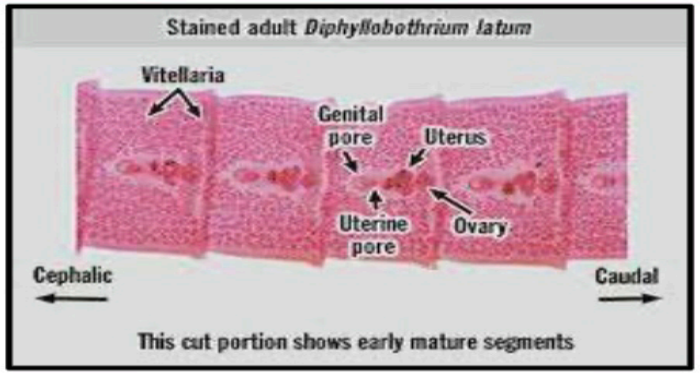
Worm

Diphyllobothrium latum



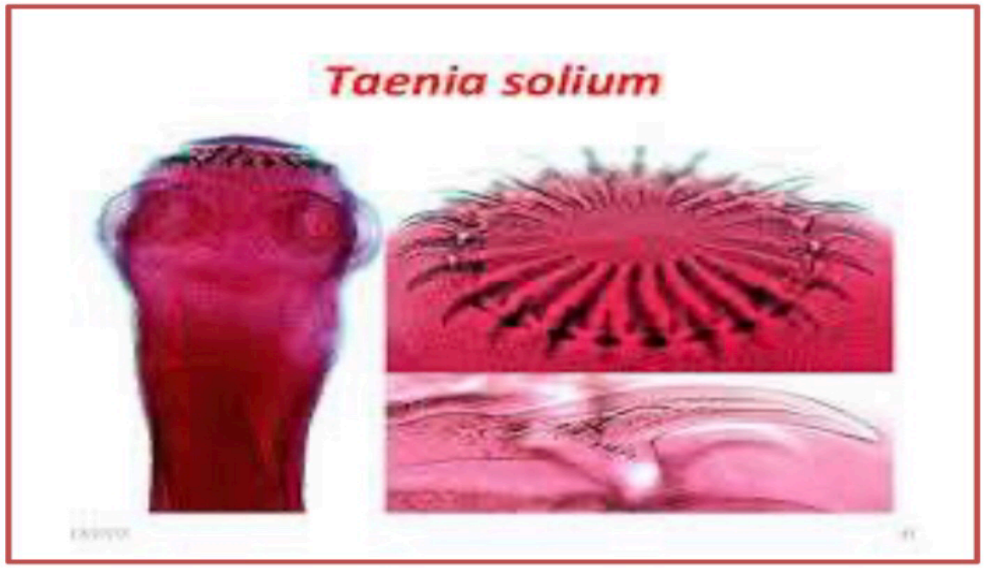
Egg

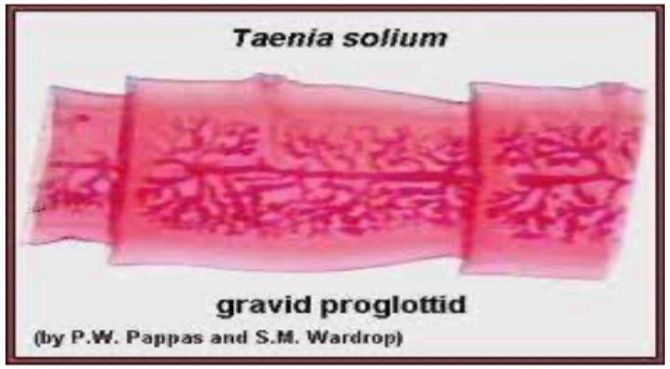




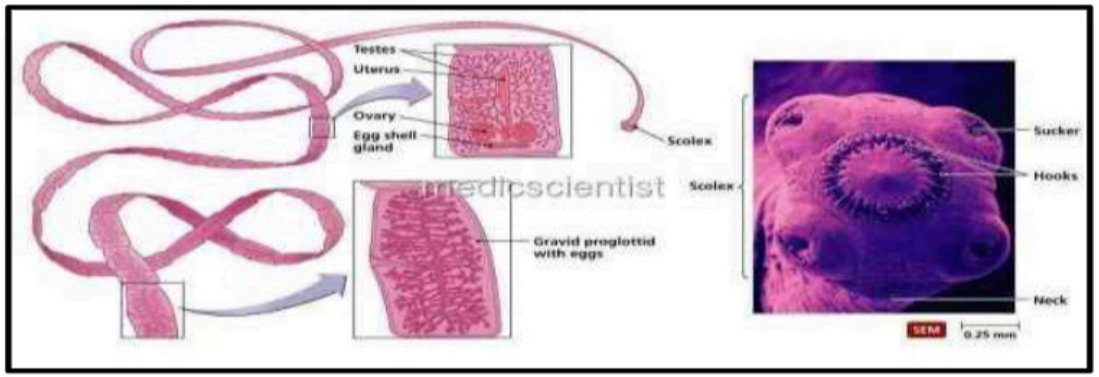
Worm

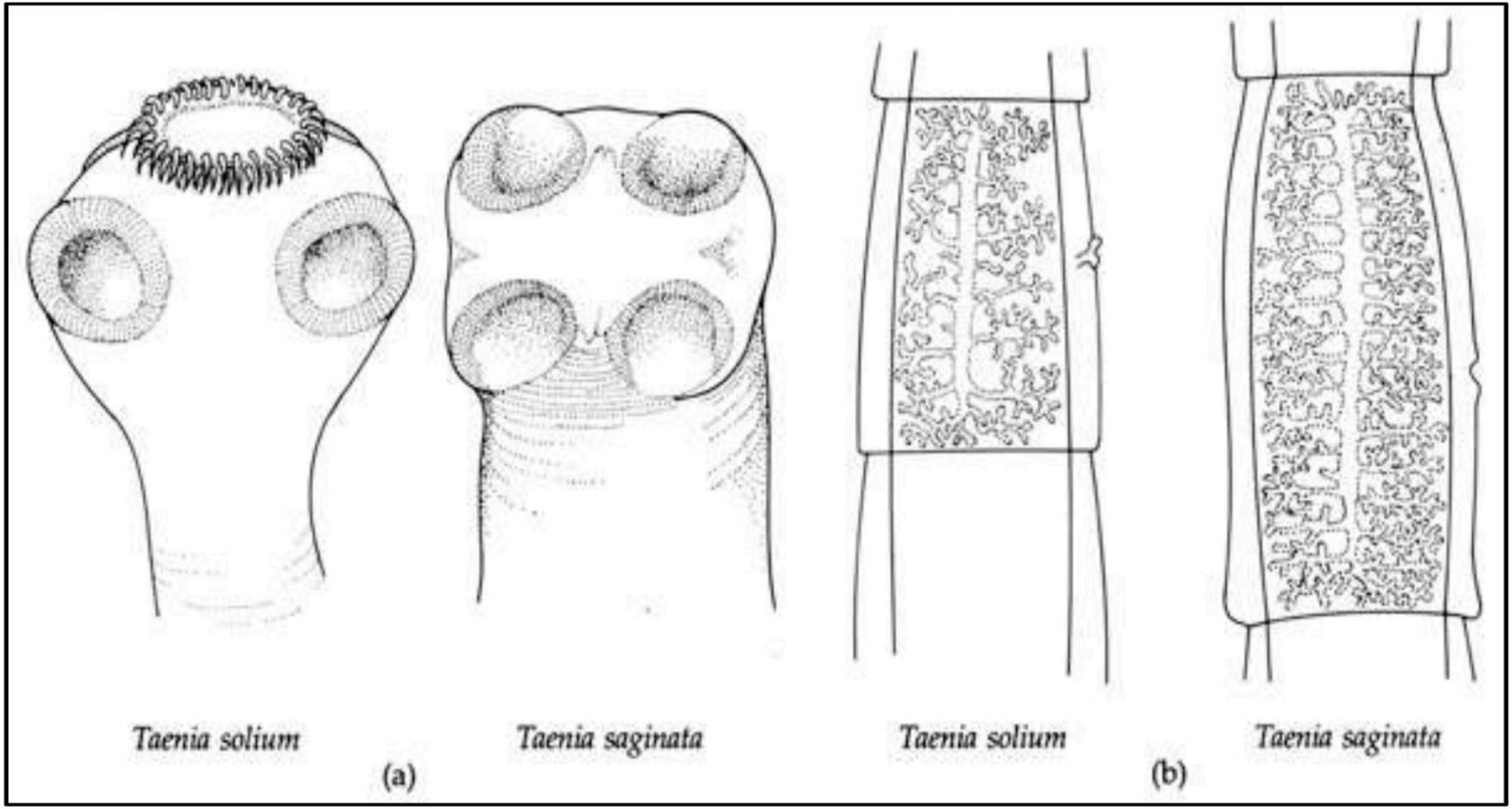
Taenia solium





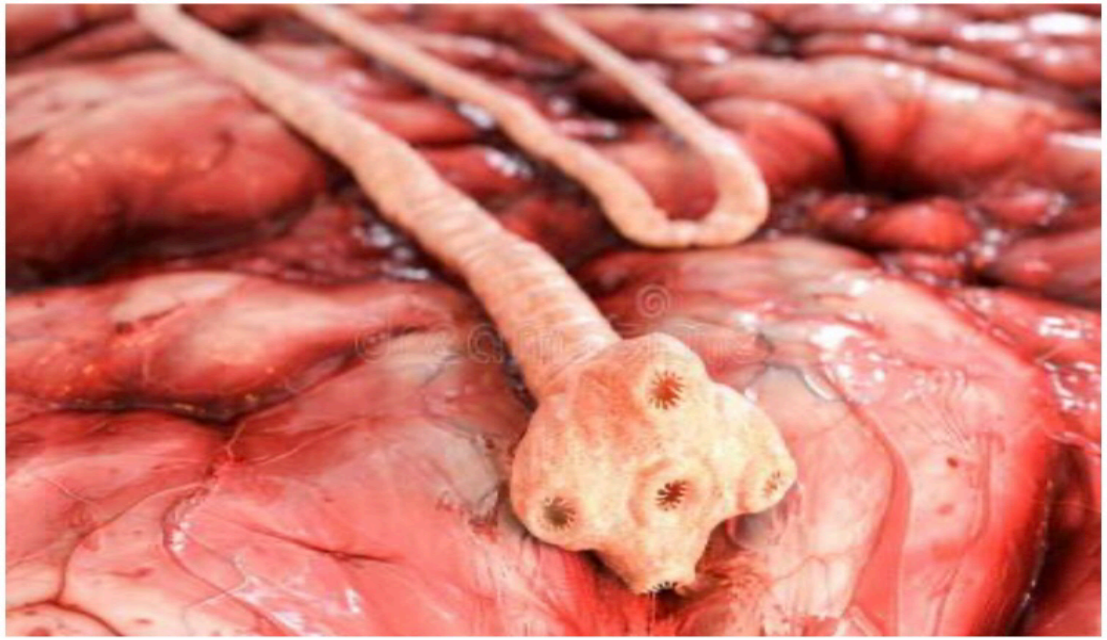
Taenia saginata

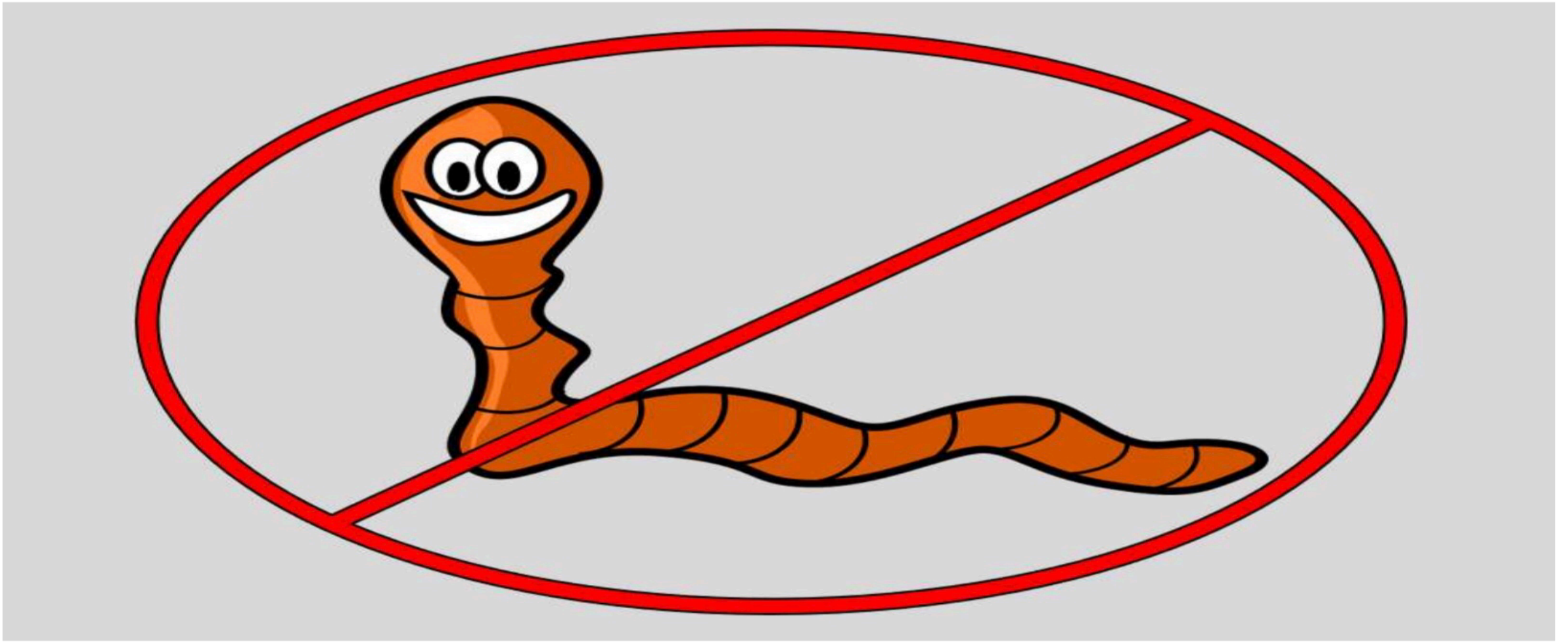



Taenia solium
Taenia saginata
(a)
Taenia solium
Taenia saginata
(b)

Taenia Solium

Taenia saginata





Thank you for listening!

QUESTIONS?

ALWAYS WELCOME!