

Introduction to Trematodes

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Helminthes

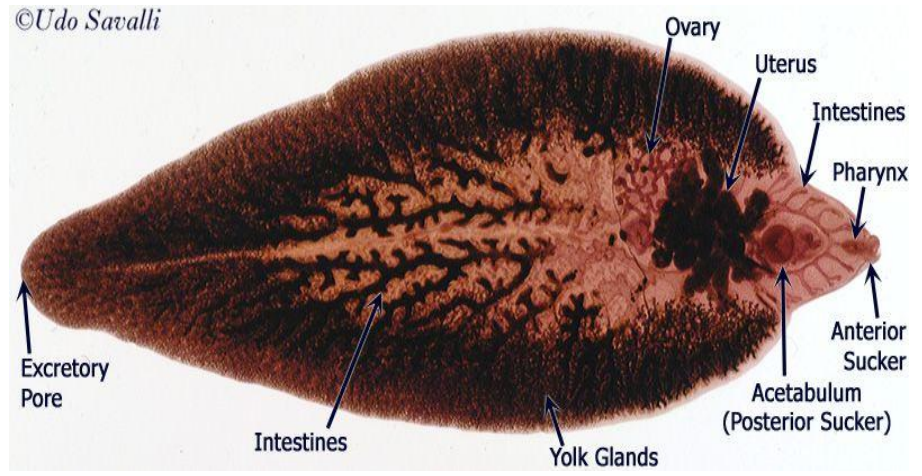
- Three groups of helminthes
 - Cestodes (tapeworm)
 - Trematodes (flake)
 - Nematodes (roundworm)



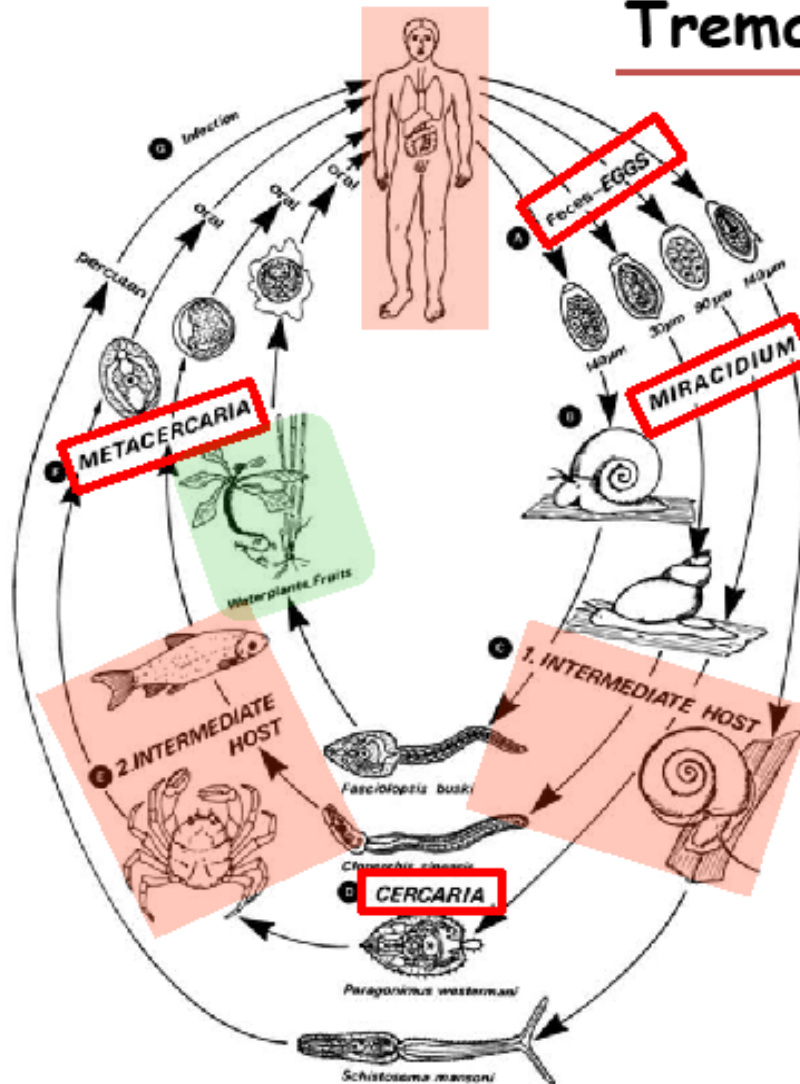
Trematodes (flukes)

- Flat, unsegmented and covered with a cuticle.
- Leaf-like (except *Schistosoma* females).
- Ranging from few millimeters to ~8 cm.
- Have two muscular suckers (organs of fixation):
 - i. Oral sucker around mouth opening.
 - ii. Ventral sucker.
 - * a 3rd “genital sucker” may be present around genital opening.
- Hermaphrodites (except *Schistosoma*).

Schistosomiasis vs Fasciola



Trematodes general life cycle



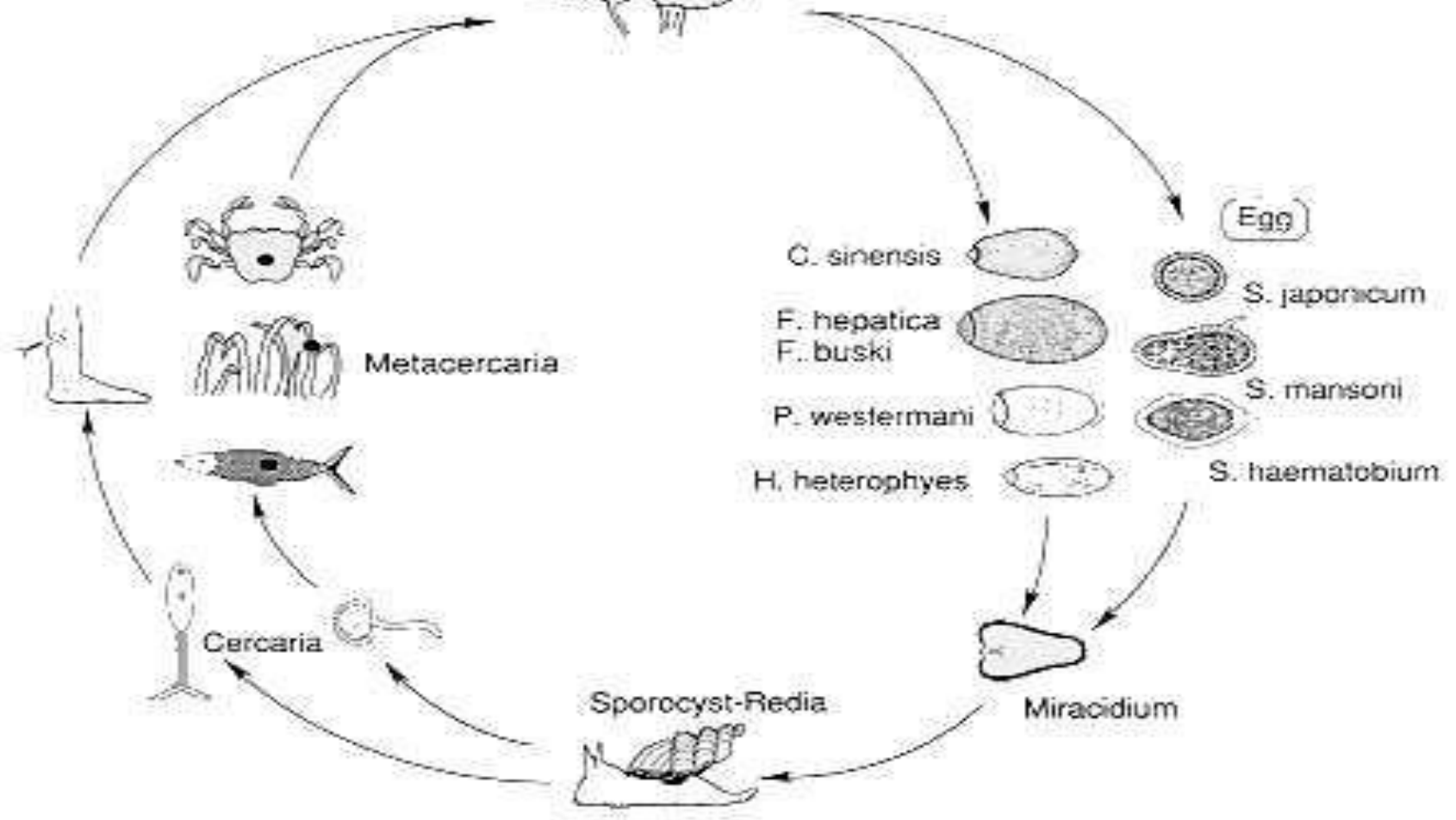
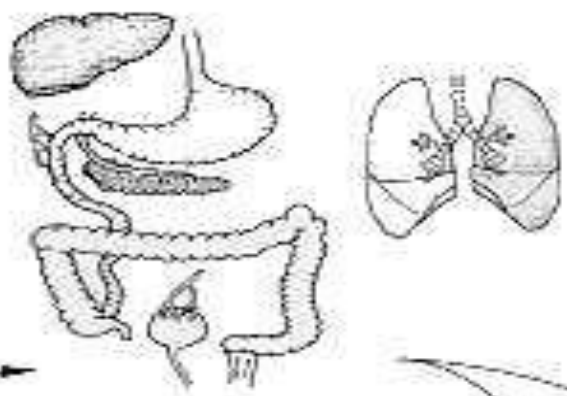
Life cycle stages:

- **Egg**: usually diagnostic stage.
- **Miracidium**: hatches from egg.
- **Cercaria**: infective in *Schistosoma*.
- **Metacercaria**: infective stage in other species.
- **Adult worms**: in DH and RH.

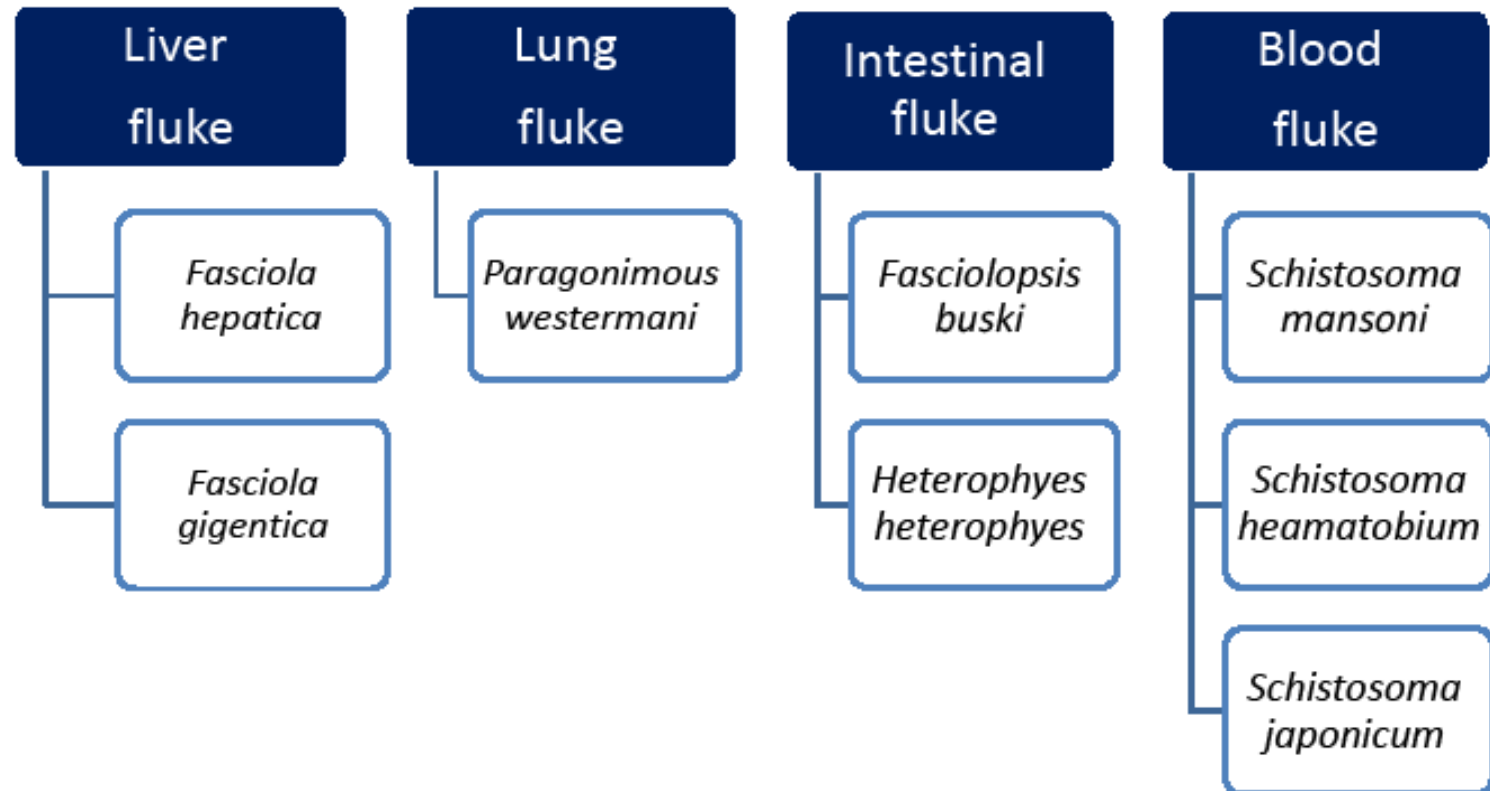
Trematodes' life cycles involve:

- Snail: intermediate host (IH) in which asexual generations occur.
- Some, involve a 2nd IH.
- Definitive host (DH): ?
- Reservoir host (RH): ?

Adult:
Blood, Intestine
Liver, Lung



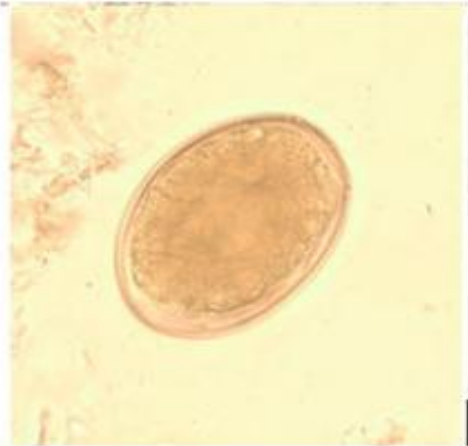
Medically Important flukes



Diagnostic stage

- **Egg**
 - Mostly large sized eggs (exception *Heterophes*)
 - Ovoid
 - Operculum (exception of that of *Schistosoma*)
 - Content: ovum , vitelline cells, or miracidium

Operculated eggs



*Fasciola
hepatica*



*Paragonimus
westermani*



*Fasciolopsis
buski*

Non operculated eggs



*Schistosoma
japonicum*



*Schistosoma
Mansoni*



*Schistosoma
haematobium*

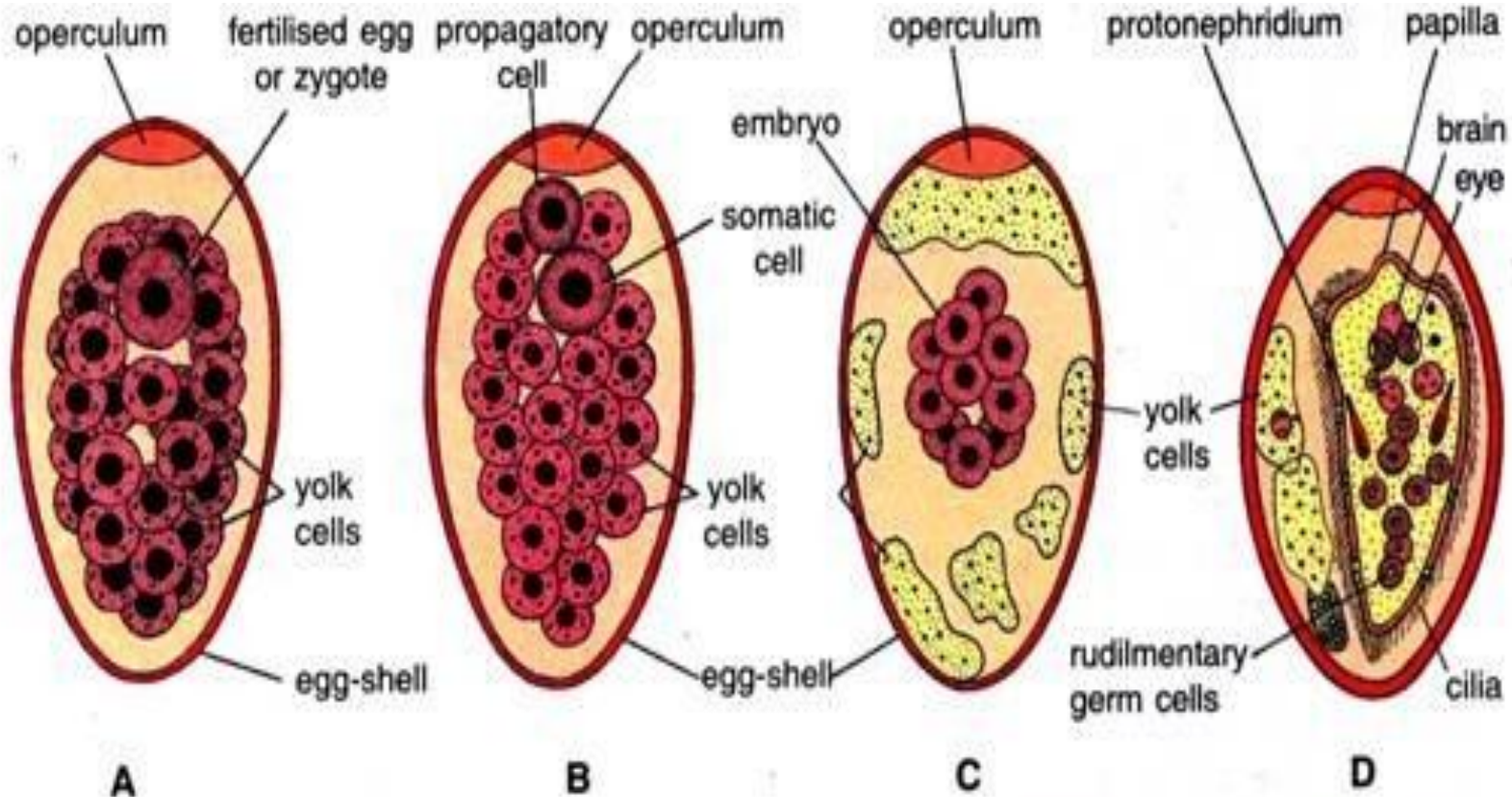


Fig. 41.14. *Fasciola hepatica*. Early stages of development. A—Fertilised egg; B—Two cell stage; C—Many cell stage; D—Miracidium in capsules.

**Intestinal
Flukes**



**Small size
Intestinal fluke**

**Large size
Intestinal fluke**



(~1.5x0.5 mm)



(up to 8 cm)

1- Large sized intestinal fluke

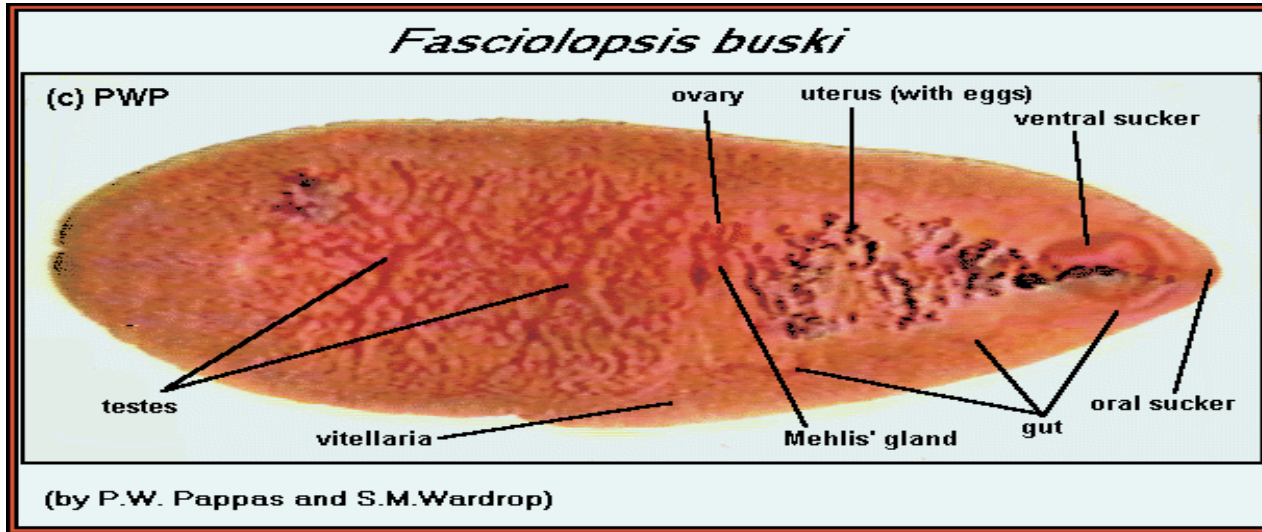
Fasciolopsis buski

(Fasciolopsiasis)

Fasciolopsis buski

- called the giant intestinal fluke
- **Habitat:** small intestine but in heavy infestations can also be found in the stomach and lower regions of the intestine.
- **cause :** fasciolopsiasis

Morphology



which may range in **size** from 20 to 75 mm by 8 to 20 mm. flat, leaf-shaped, blunt anterior end, undulating, tandem, dendritic testes, poorly-developed oral and ventral suckers, branched ovaries, vast vitelline follicles, can be distinguished from other fasciolids by a lack of cephalic cone or "shoulders" and the unbranched ceca

Morphology

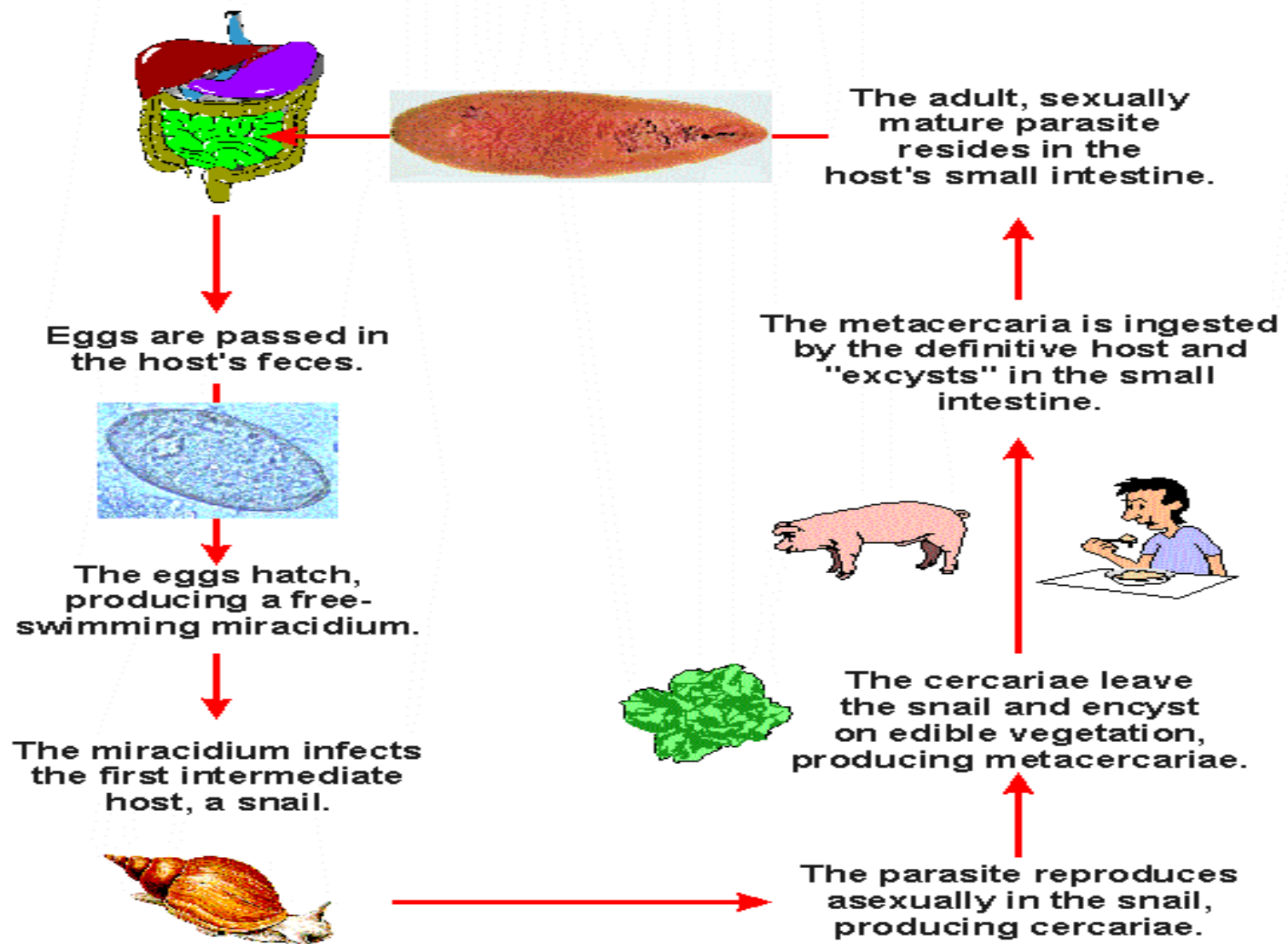
- yellow-brown, ellipsoidal, thin shell, operculated, filled with yolk cells, microscopic, about 130–160 micrometers (μm) long



Life cycle

- **Infective stage: metacercaria**
- **Definitive hosts: humans**
- **Intermediate hosts: snails, water plant**
- **Diagnostic stage: egg**
- **Transmission: eating raw water plants with metacercariae**
- **The adult remain in intestine, attaching to the mucosa of the duodenum and jejunum.**

THE LIFE CYCLE OF *FASCIOLOPSIS BUSKI*



1- Liver flukes

Fasciola hepatica

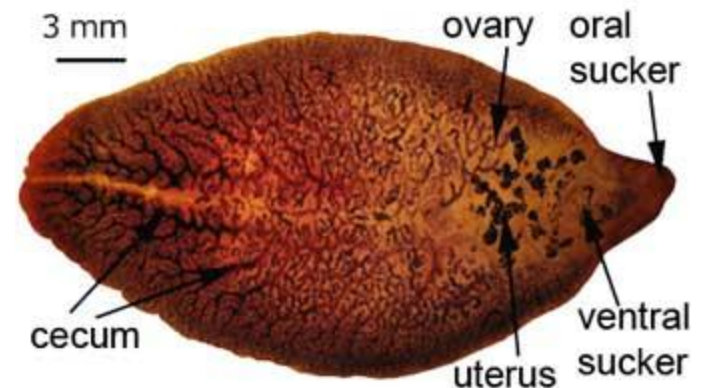
Fasciola gigantica

(Fascioliasis)

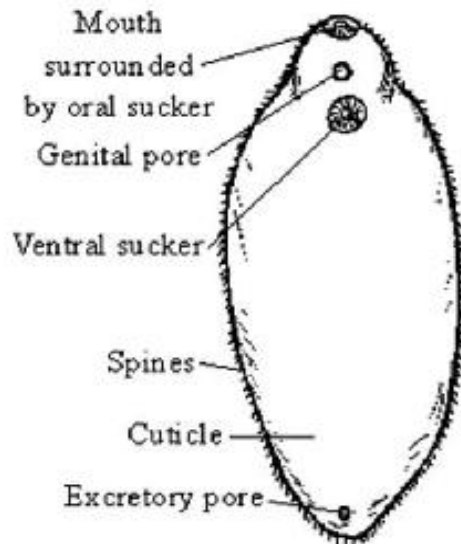


Fasciola hepatica

- known as the **common liver fluke** or **sheep liver fluke**
- In addition to humans it infects cows and sheep
- **Cause:** fascioliasis
- have indirect life cycles
- **Transmission:** occurs through the ingestion of raw, fresh-water vegetation



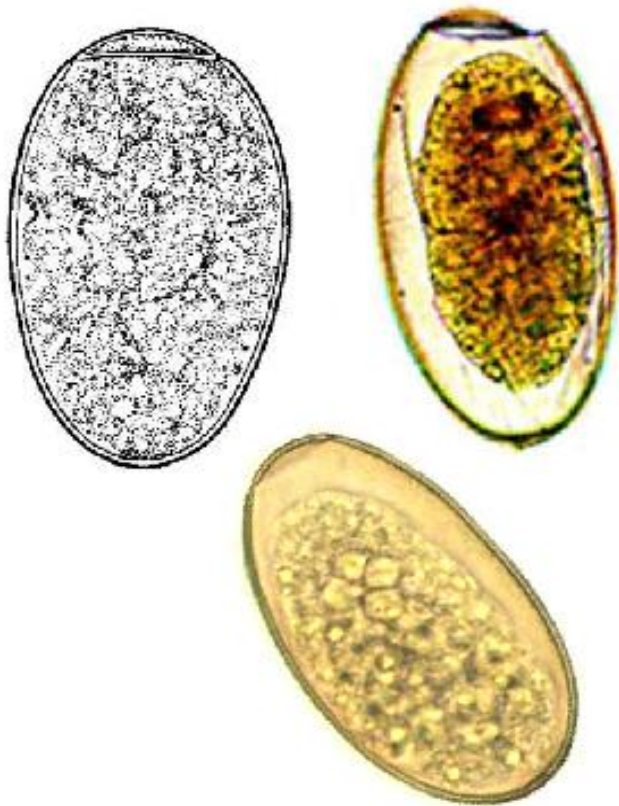
Morphology



Adult

- Is large, flat and leaf-like.
- Size: about 3x1 cm
- A distinct conical projection at the anterior part.
- A leaf-shaped posterior part with converging sides..
- An oral & ventral suckers equal in size.
- An esophagus divided into two caeca ending blindly.
- Highly branched caeca & testes

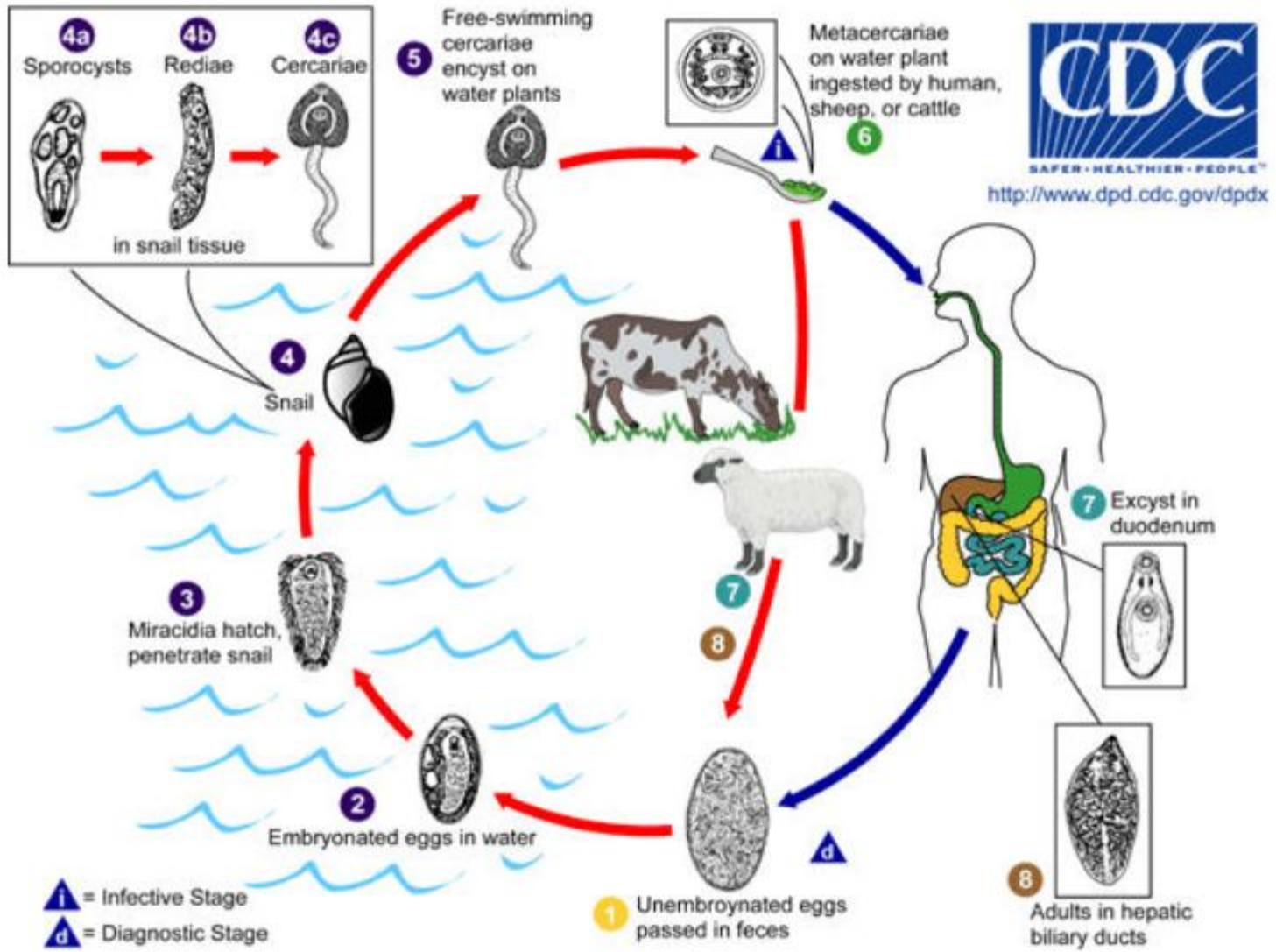
Morphology



Eggs

- Shape: oval.
- Size: about 150x90 μm .
- Shell: operculated.
- Color: light yellowish to brown
- Content: passed in feces unembryonated.

○ **Eggs: Diagnostic stage**

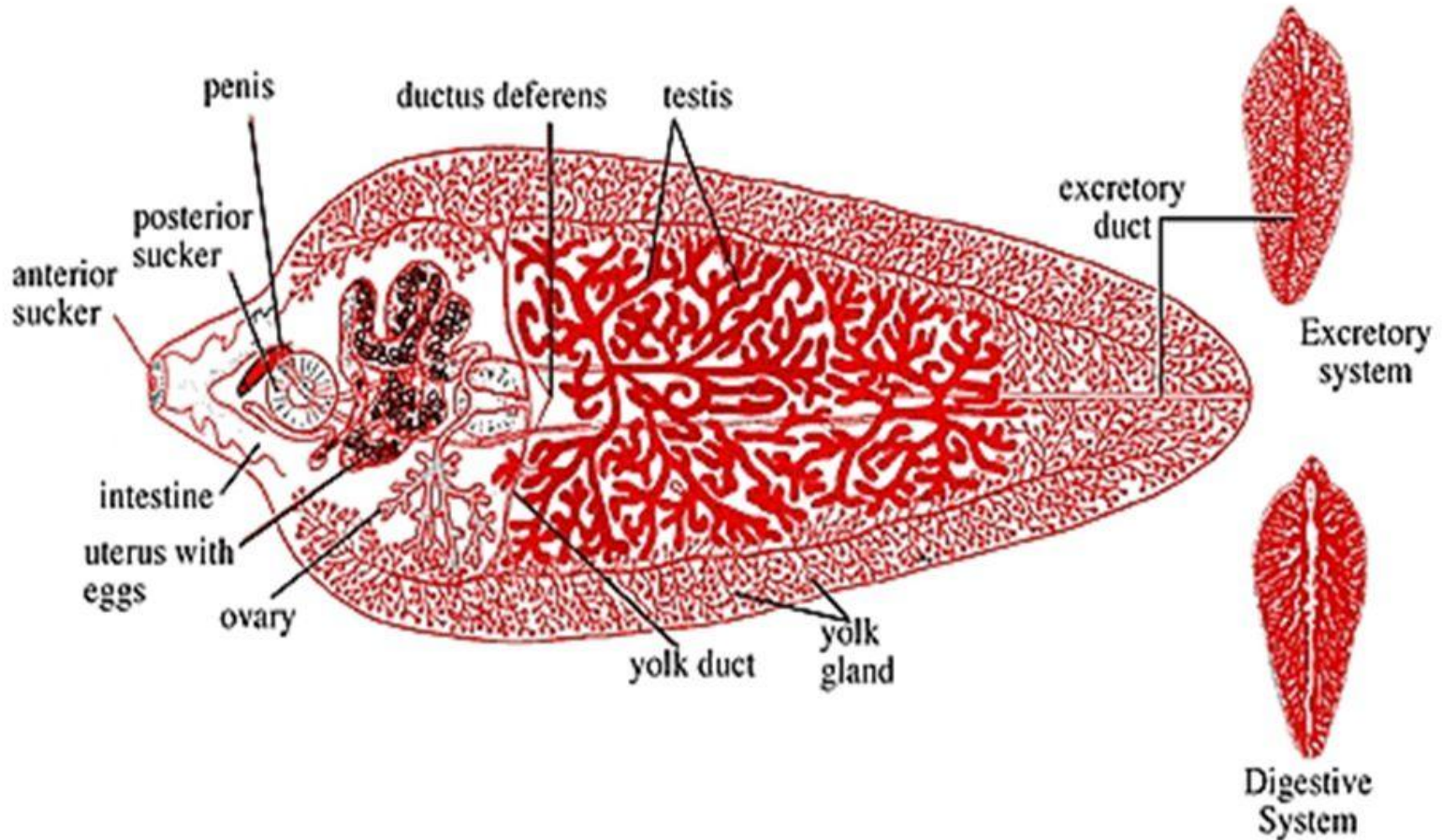


Diagnosis

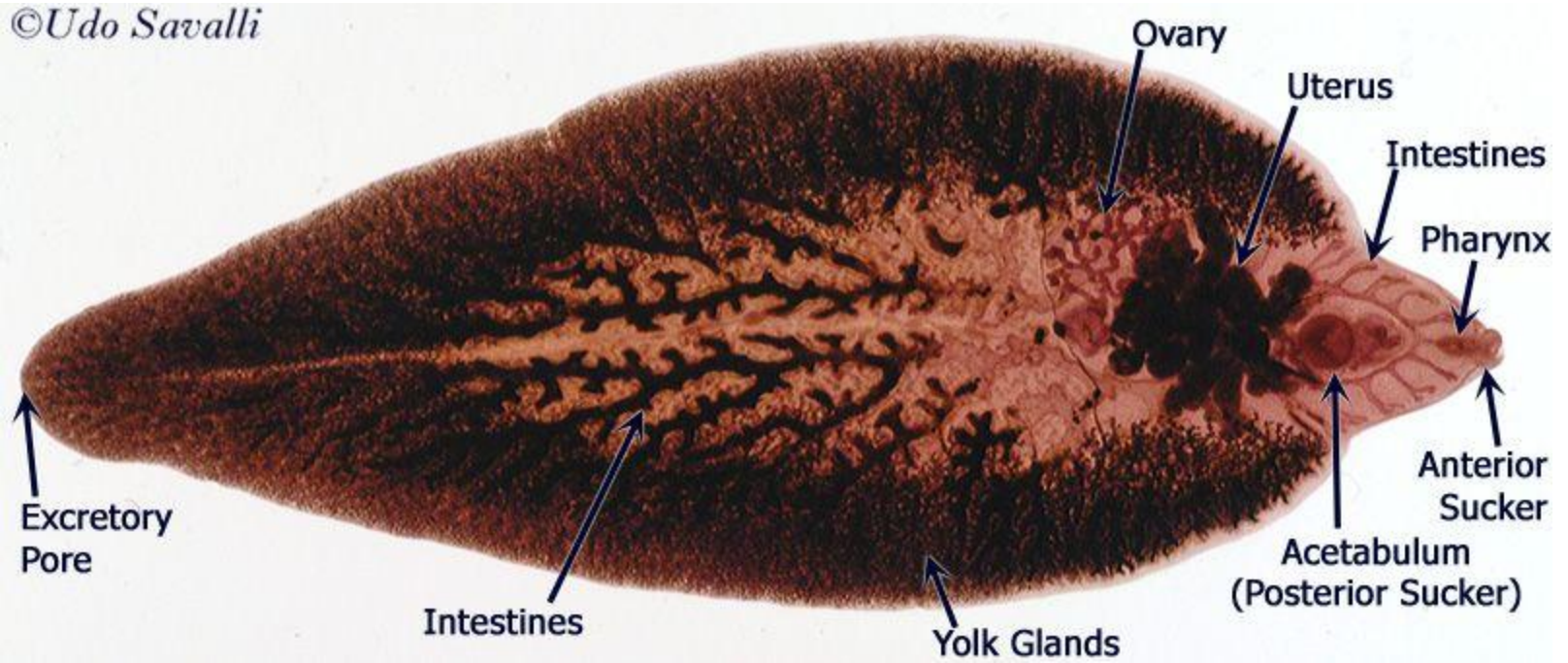
- Eggs in a stool sample.
- Early stage of the infection can be **diagnosed** from a blood sample, if antibodies are found

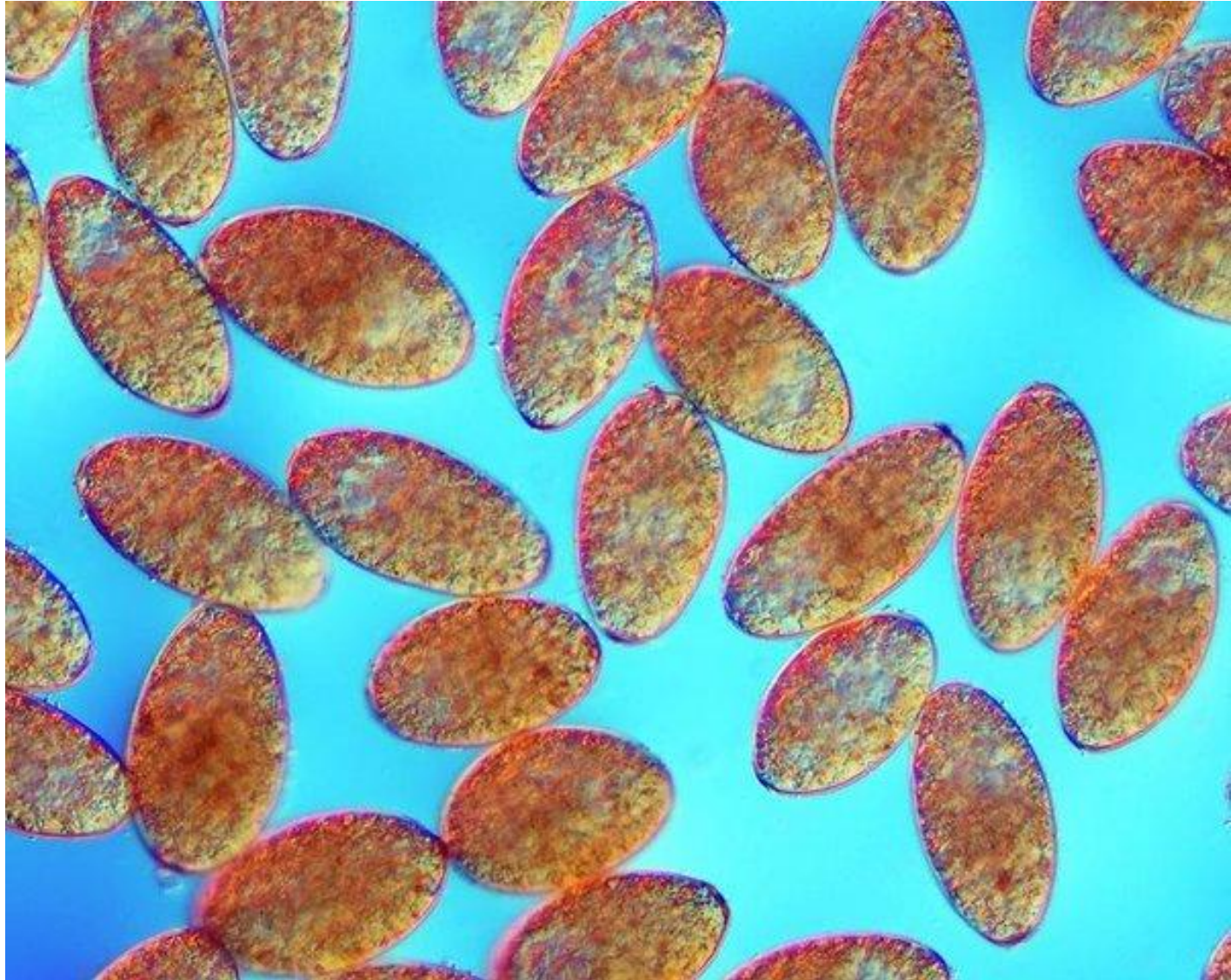
Lab slides

Fasciola Body Plan

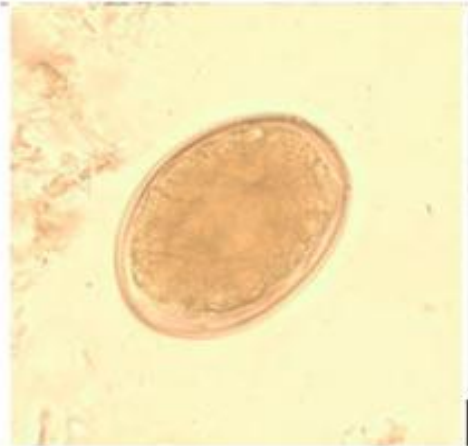


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Operculated eggs



*Fasciola
hepatica*



*Paragonimus
westermani*



*Fasciolopsis
buski*

Fasciola hepatica Miracidium



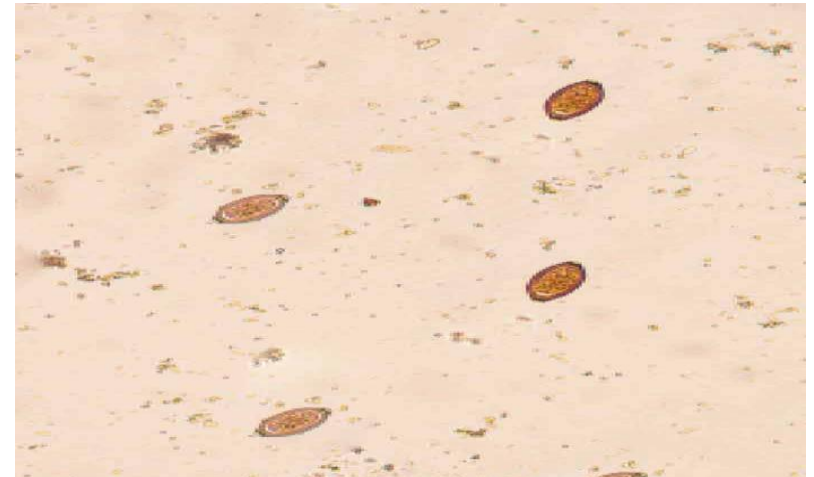
cercaria which is the infective stage



metacercaria which is the infective stage



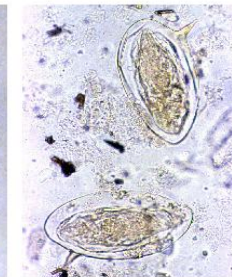
Schistosoma/cercaria and eggs



Non operculated eggs



Schistosoma japonicum

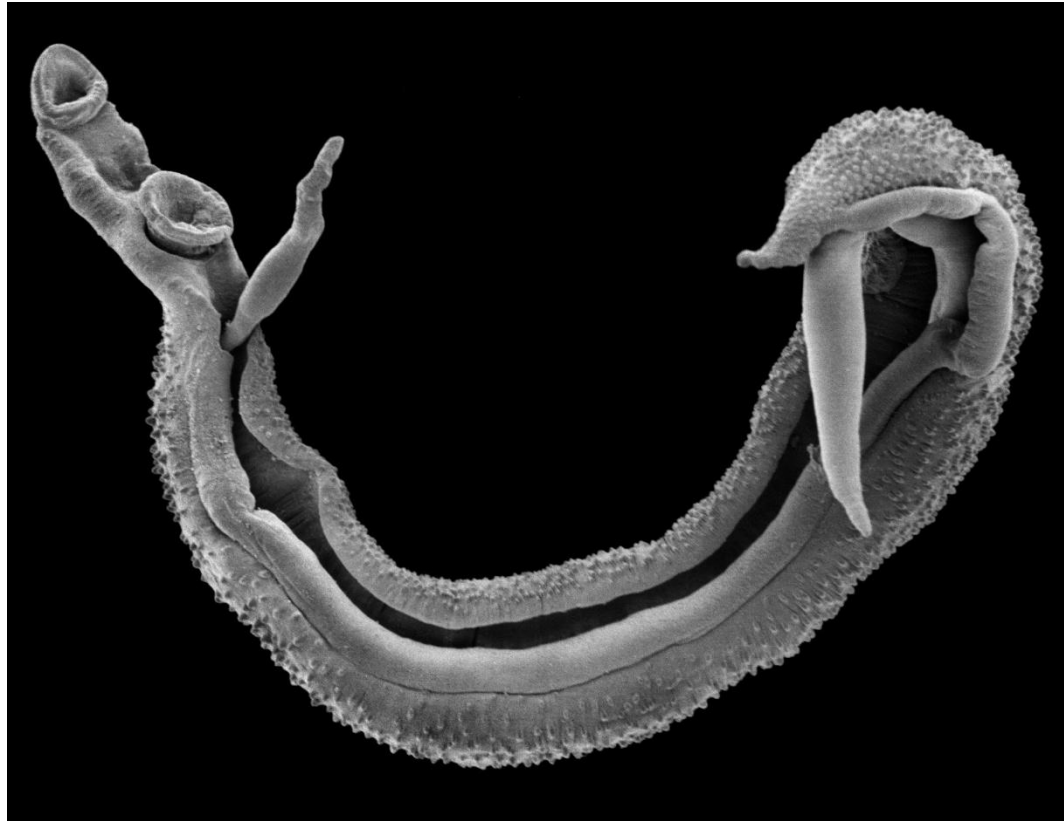


Schistosoma Mansoni



Schistosoma haematobium

Schistosoma/male and female



Cercaria in water

