

Trematoda (Flukes)

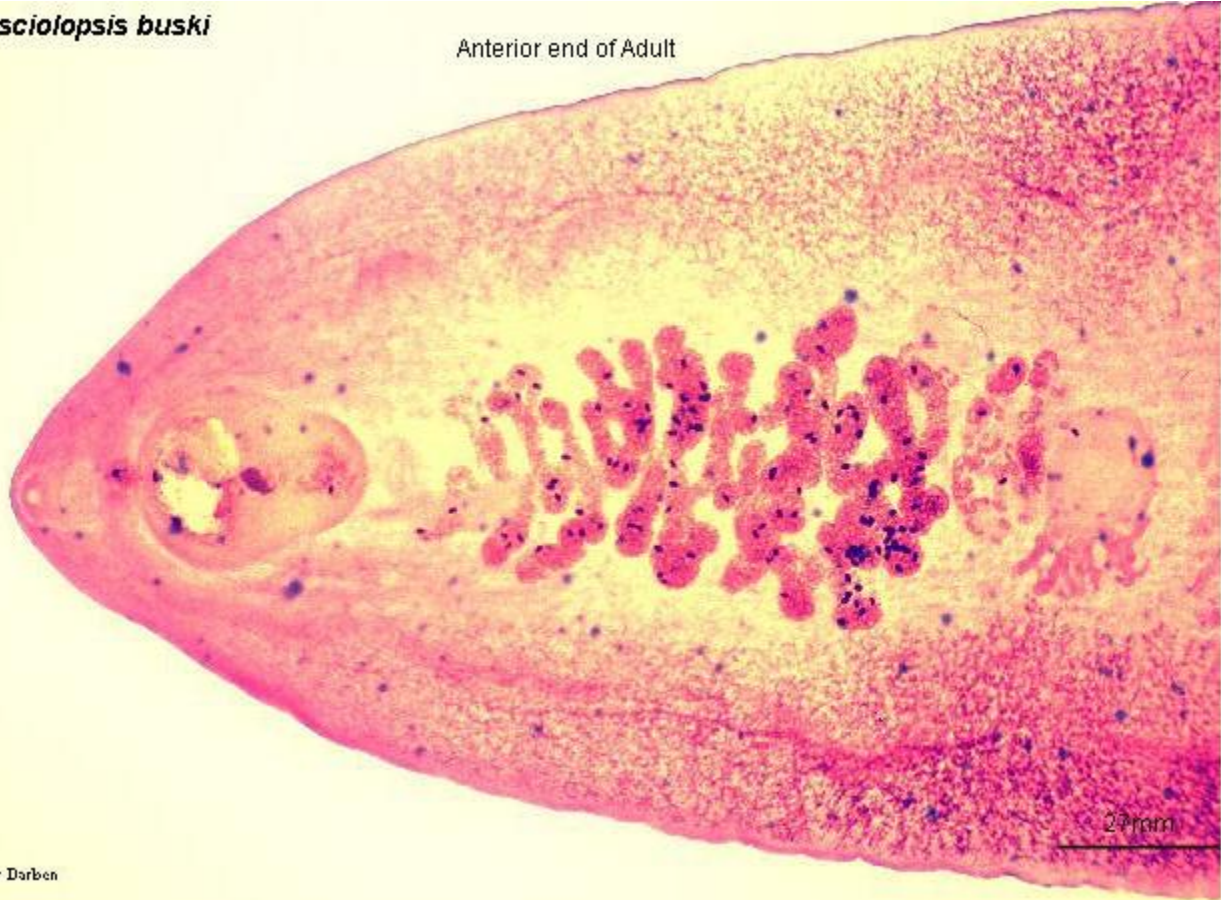
Most are hermaphrodite: both sex organs are in the same individual

Body structures: oral, ventral suckers, mouth, pharynx, esophagus, branched intestine, ovary, uterus, 2 testes.

Schistosomes are dioecious

Fasciolopsis buski

Anterior end of Adult



20µm

Peter Darben

Liver Flukes

Epidemiology

Fasciola hepatica, *Opisthorchis* (previously named *Clonorchis*) affect humans in various parts of the world.

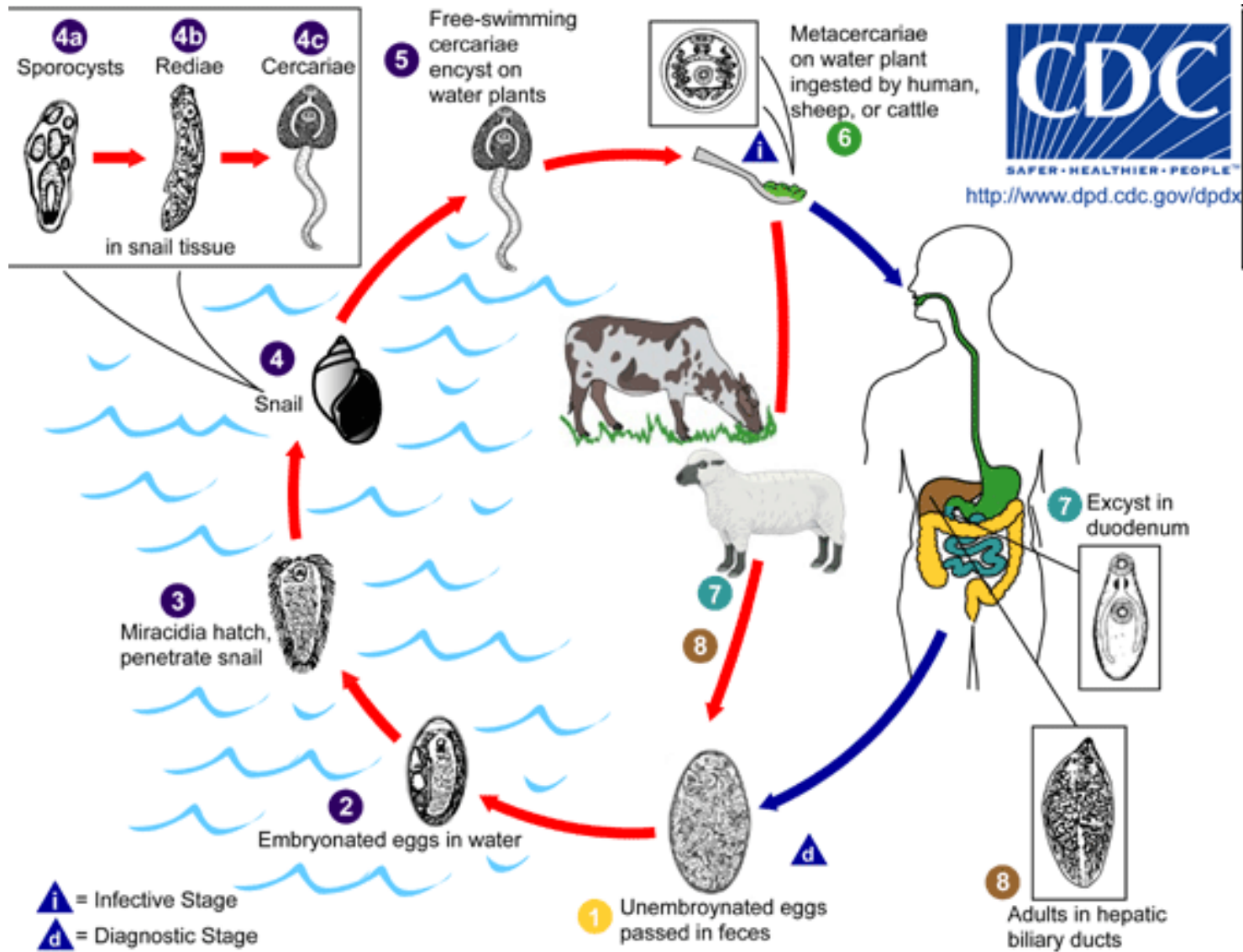
Fasciola hepatica

Morphology

F. hepatica is leaf shaped and measures approximately 1 x 3 cm. The eggs measure 80 x 150 μm .

Life cycle

Humans are infected by the consumption of improperly cooked watercress that harbors encysted larval metacercariae. The larval fluke penetrates the duodenal wall and migrates to the peritoneal cavity, penetrates the liver capsule and migrates into the bile duct where it matures. The adult fluke passes its eggs in stool that hatch in water to produce miracidia. The miracidium must find an appropriate snail to continue the life cycle. In the snail, the miracidium divides and gives rise to cercariae which exit the snail and encyst as metacercariae attached to watercress leaves.



i = Infective Stage
d = Diagnostic Stage

Fasciolopsis buski

Egg

25µm

Peter Barben



Symptoms

Hepatomegaly, upper quadrant pain, chills and fever accompanied with eosinophilia. The toxic secretions cause hepatitis. Bile obstruction.

Diagnosis

Eggs in the stool

False fascioliasis

Treatment

F. hepatica is not responsive to praziquantel. However, Triclabendazole is effective.

Heterophyes heterophyes

The smallest trematode of human 1.7 mm
2nd intermediate host (IH): fresh water fish
Egg is small 15 x 30 micron

Echinostoma

Body is spiny
1 cm
2nd IH is snail

Schistosomiasis (Bilharziasis)

The three species of *Schistosoma* have different geographic distributions. *S. hematobium* is prevalent in Africa, *S. mansoni* is found in Africa and America and *S. japonicum* is common in the far east.

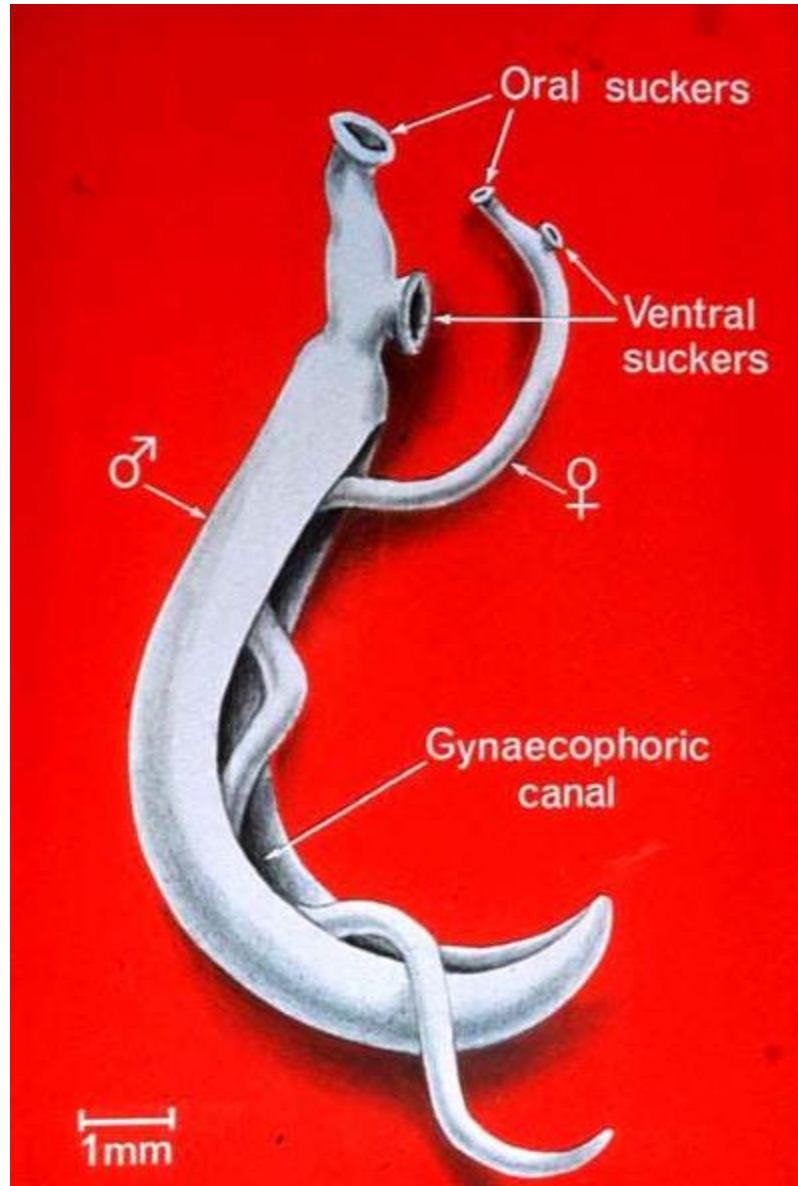
Epidemiology

Approximately 250 million people are infected with schistosomes and 600 million are at risk.

Morphology

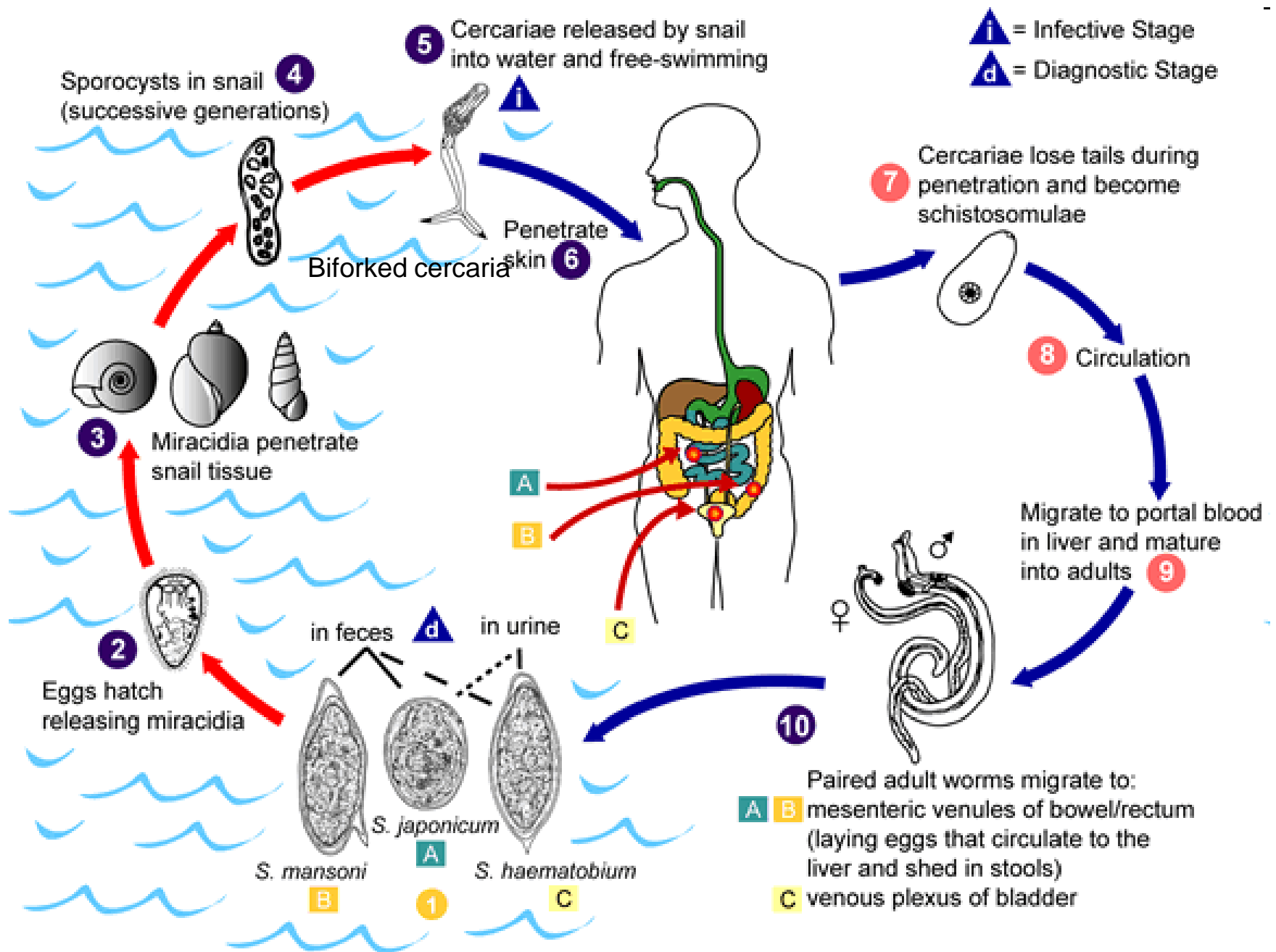
Adult worms are 10 to 20 mm long; the male has a canal in which the slender female worm resides. Unlike other trematodes, schistosomes have separate sexes (figure 1).

Separate sexes is in contrast to hermaphrodite (male and female sex structures exist in the same individual)



Life cycle

Man is infected by cercaria in fresh water by skin penetration. The cercaria travel through the venous circulation to the heart, lungs and portal circulation. In about 3 weeks, they mature and reach the mesenteric (*S. japonicum* and *S. mansoni*) or the bladder (*S. hematobium*) vessels where they live and ovulate for the duration of the host's life. Eggs germinate as they pass through the vessel wall into the intestine or bladder and are excreted in feces (*S. japonicum* and *S. mansoni*) or urine (*S. hematobium*). In fresh water, the larval miracidium hatches out of the egg and swims about until it finds an appropriate snail. After two generations of multiplication in the snail, the fork-tailed cercariae emerge into the water and infect another human (figure 2).



Schistosoma mansoni

Cercaria

Peter Darben

200µm



Symptoms

The symptoms due to a reaction against the eggs and include splenomegaly, lymphadenopathy and diarrhea.

In the bladder, they produce granulomatous lesions, hematuria and sometimes urethral occlusion.

Most bladder cancers in endemic areas are associated with chronic infection.

Diagnosis

The eggs are very characteristic and confirm diagnosis. *S. hematobium* eggs in urine (55 to 65 by 110 to 170 micrometers) have an apical spine or knob. *S. mansoni* eggs in feces (45 to 70 by 115-175 micrometers) have a spine on the side. *S. japonicum* eggs (55 to 65 by 70 to 100 micrometers) are more round with a vague spine on the side.

Treatment and control

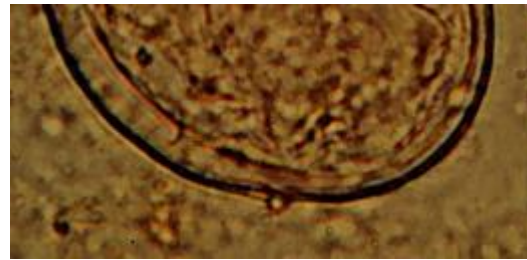
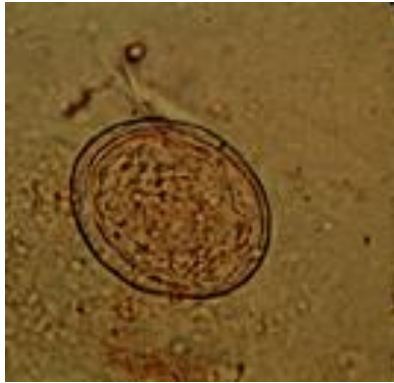
Praziquantel is effective against all species.

Contaminated water should be avoided. Control measures include sanitary disposal of sewage and destruction of snails. No vaccine is available.

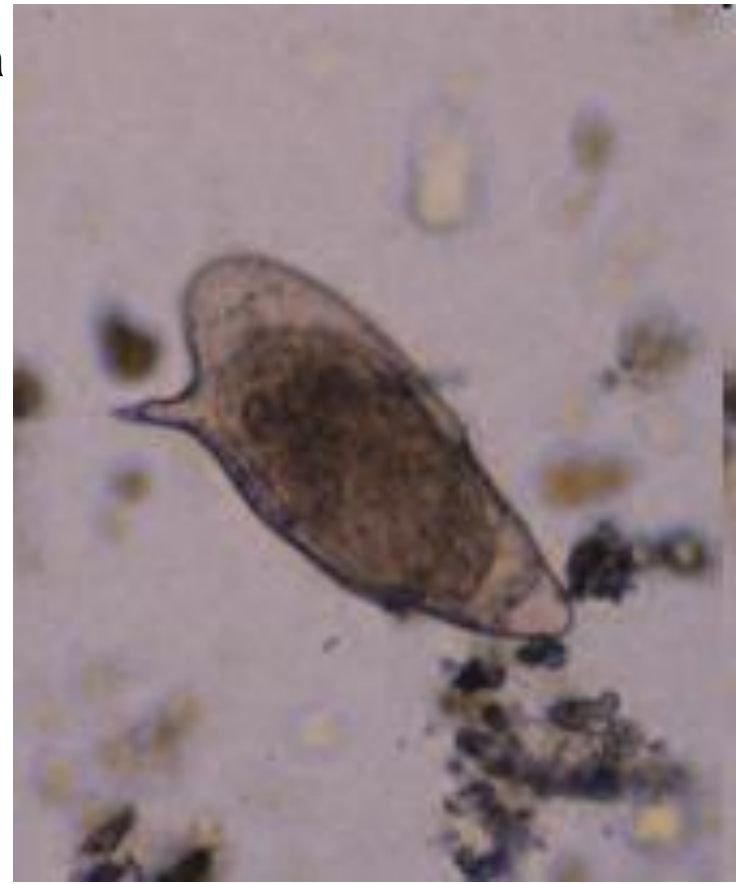
Eggs of Schistosoma



S. haematobium



S. japonicum



S. mansoni