Helminths
Trematoda
Schistosoma spp.

The family Schistosomatidae : include the genus Schistosoma which has three species parasitized on man, they are:

1. ***Schistosoma mansoni*** (Manson's blood fluke)

It causes intestinal Schistosomiasis.

2. ***Schistosoma haematobium***

It causes vesicle Schistosomiasis or called urinary Bilharziasis.

3. ***Schistosoma japonicum*** (orient blood fluke)

It causes orient Schistosomiasis.

Schistosomiasis

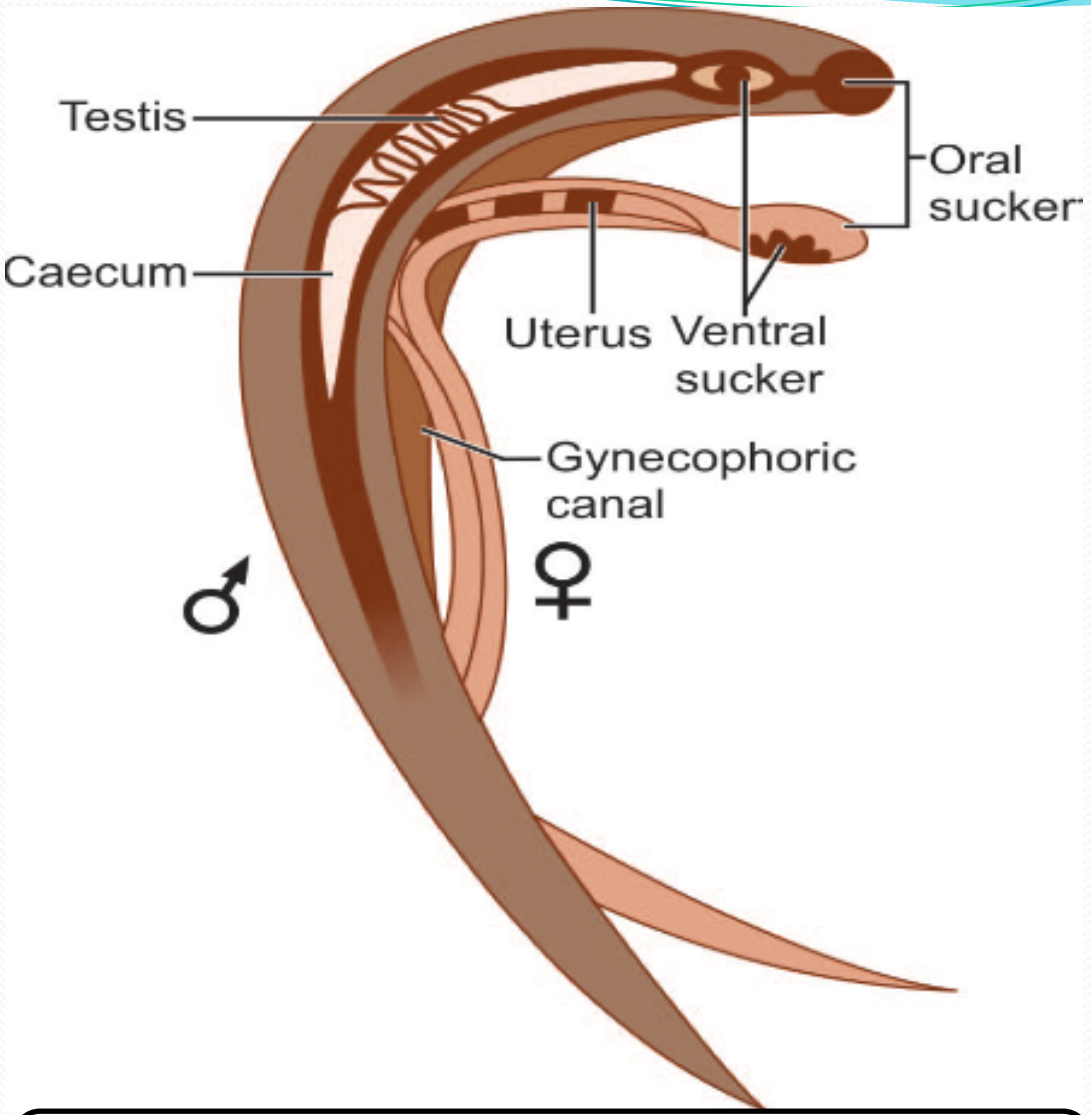
- **Water borne helminthic infection.**
- **Definitive host : Humans.**
- **Intermediate host : freshwater snails.**
- **Infective form : cercariae.**

Morphology

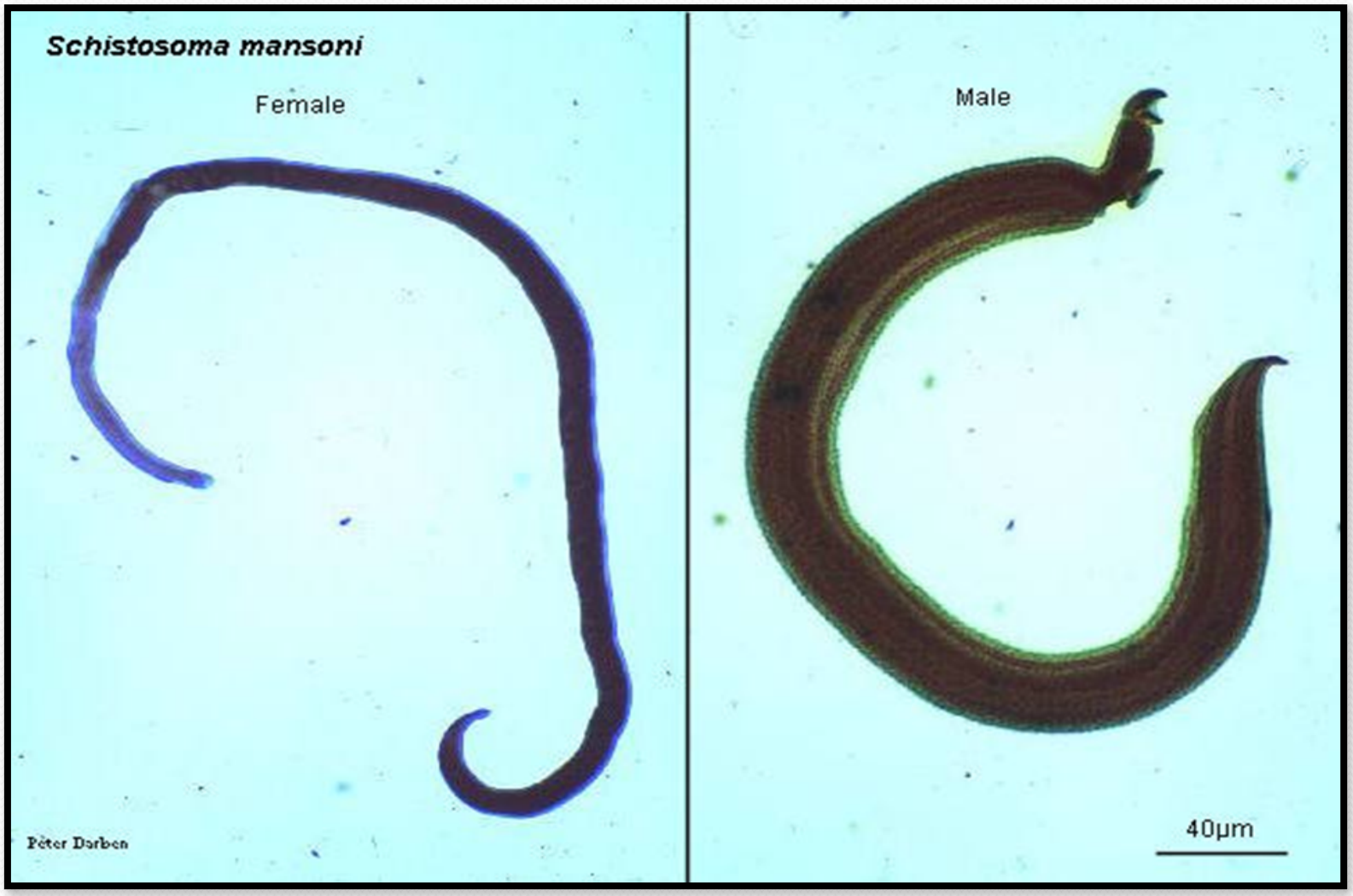
- **Sexes** : separate.
- **Female** : cylindrical .
- **Male** : flattened folded , shorter and thicker than the female body.

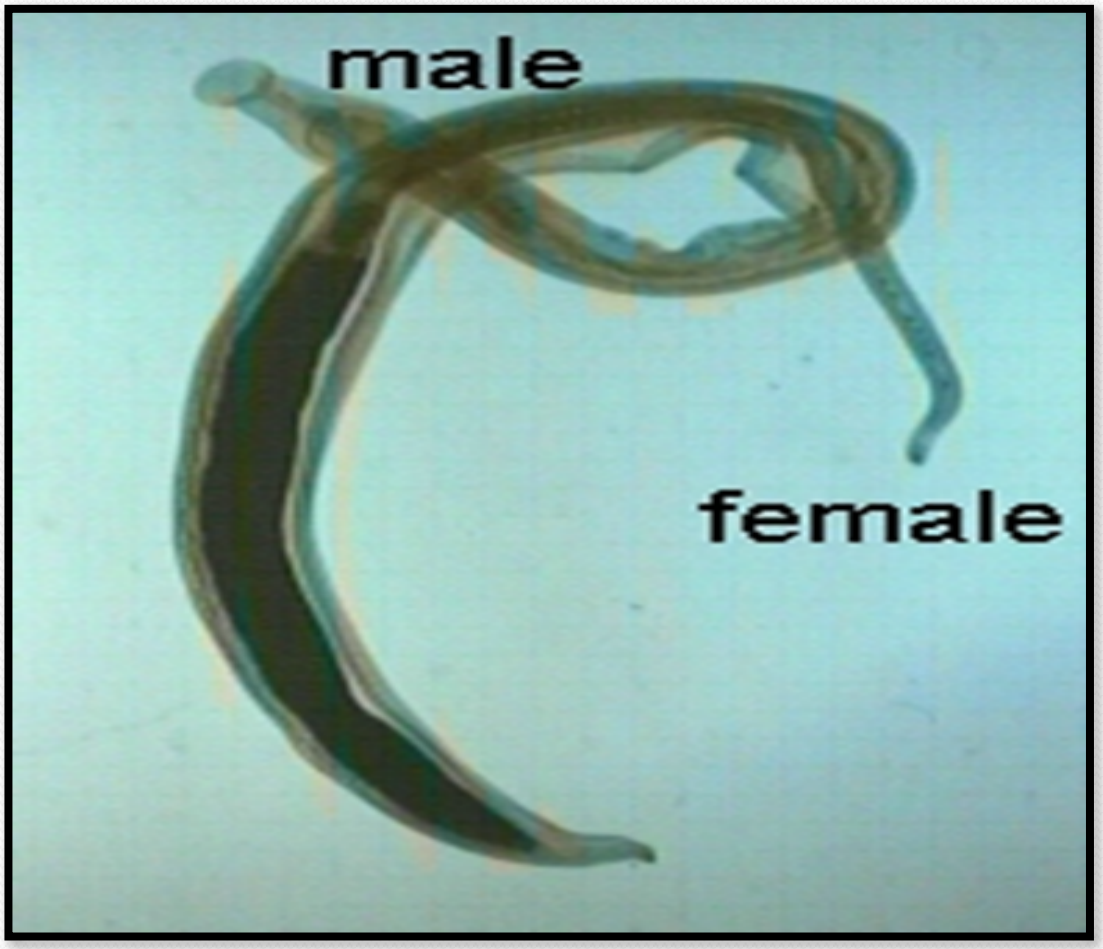
there is a split like canal in the ventral side of the male, behind the ventral sucker, it is called **gynecophoric canal or groove** which is used to held the female.

- **Suckers** : oral (in the anterior end) & ventral (smaller in female).



Morphology of schistosomes : male and female in copulas


Schistosoma mansoni
Female
Male
Peter Darben
40µm



Schistosoma japonicum **adults. both male and female worm can be seen. female is held by gynecophoral .canal of male**

- The mouth leads to oesophagus surrounded with oesophageal glands, the intestine branched in front of the ventral sucker into two caecal branches, then they band together again to consists one branch extends in the middle of the body, the joining area considered an important character to differentiate the three species.

- The eggs larger in size with relatively thin-shelled, non-operculated, covered with tubercles and have a spine different in position according to the species. The worms may live for (30) years in the human hosts, however the average life span in possibly less than (5) years.

Schistosome Eggs

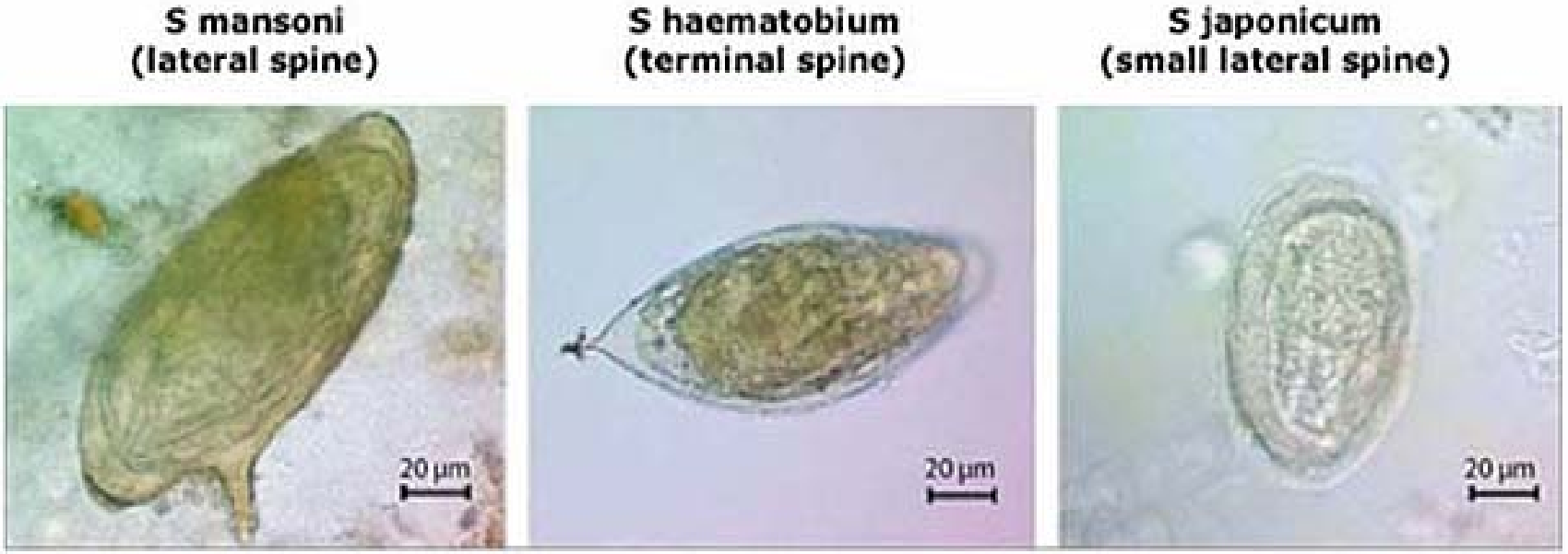
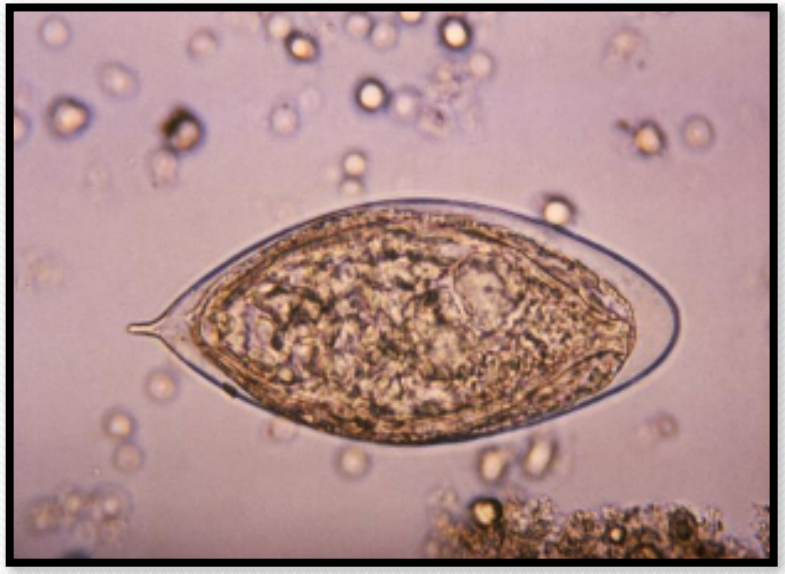


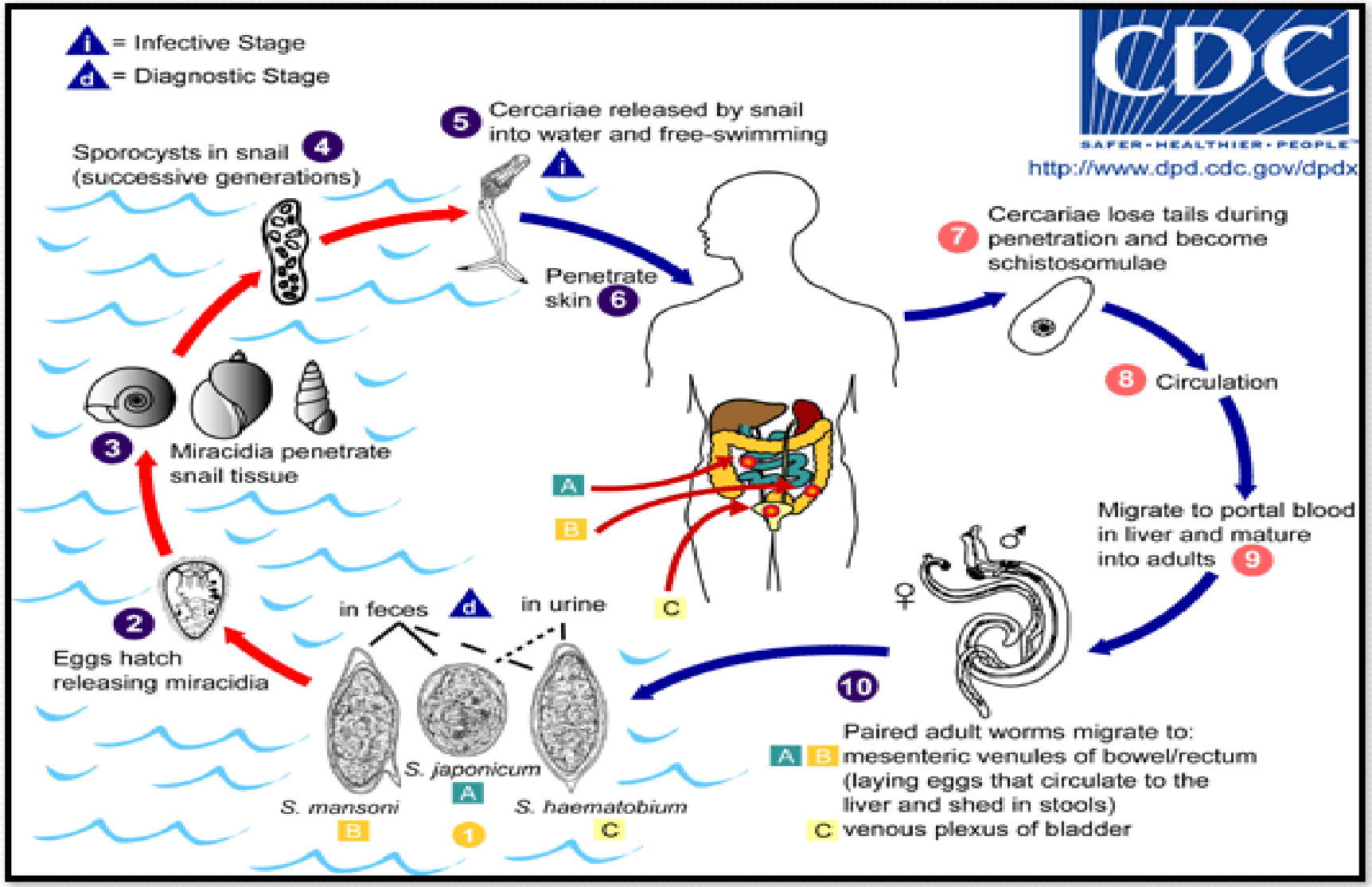
Image courtesy: Gryseels B, et al., Human schistosomiasis, *Lancet* 2006; 368:1106.

***schistosoma mansoni* (eggs)**



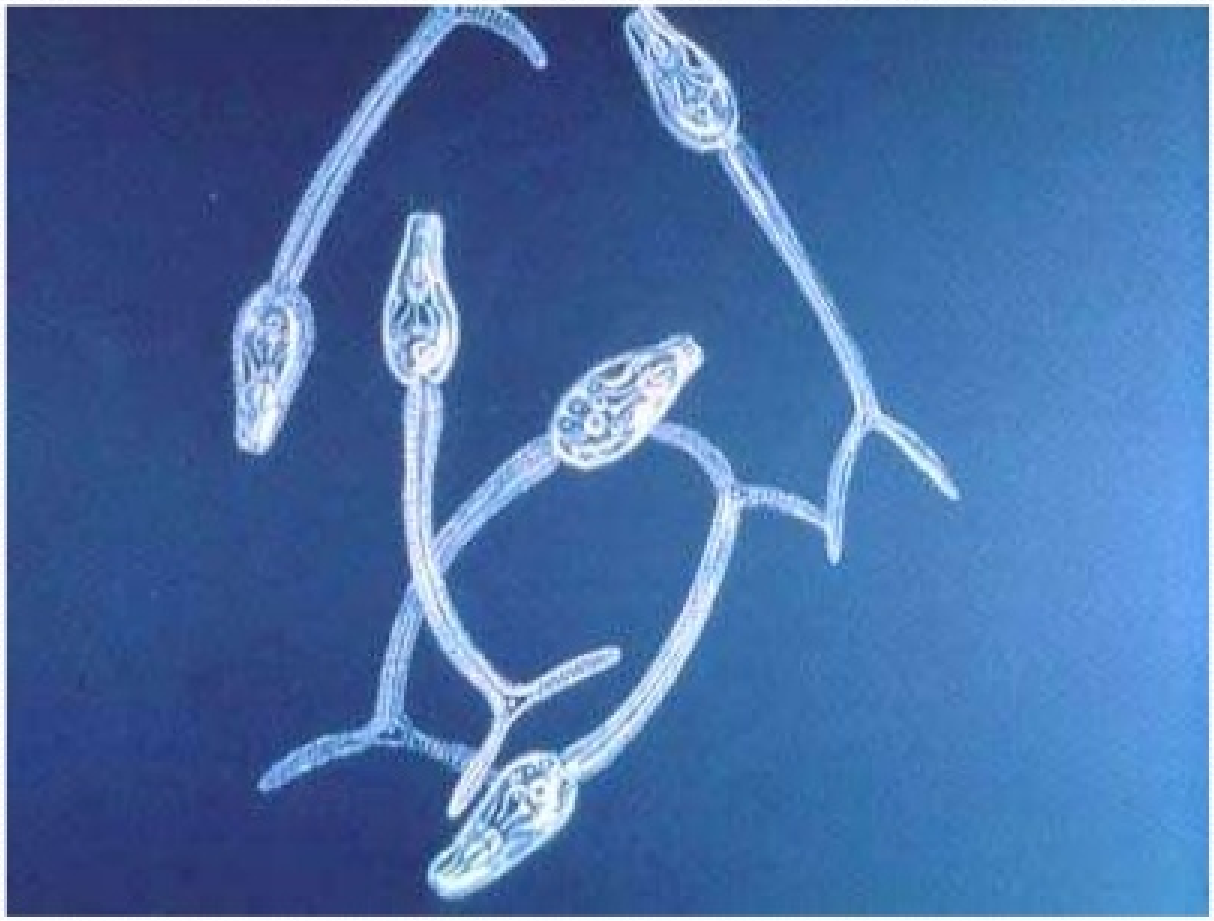
schistosoma haematobium **(eggs)**

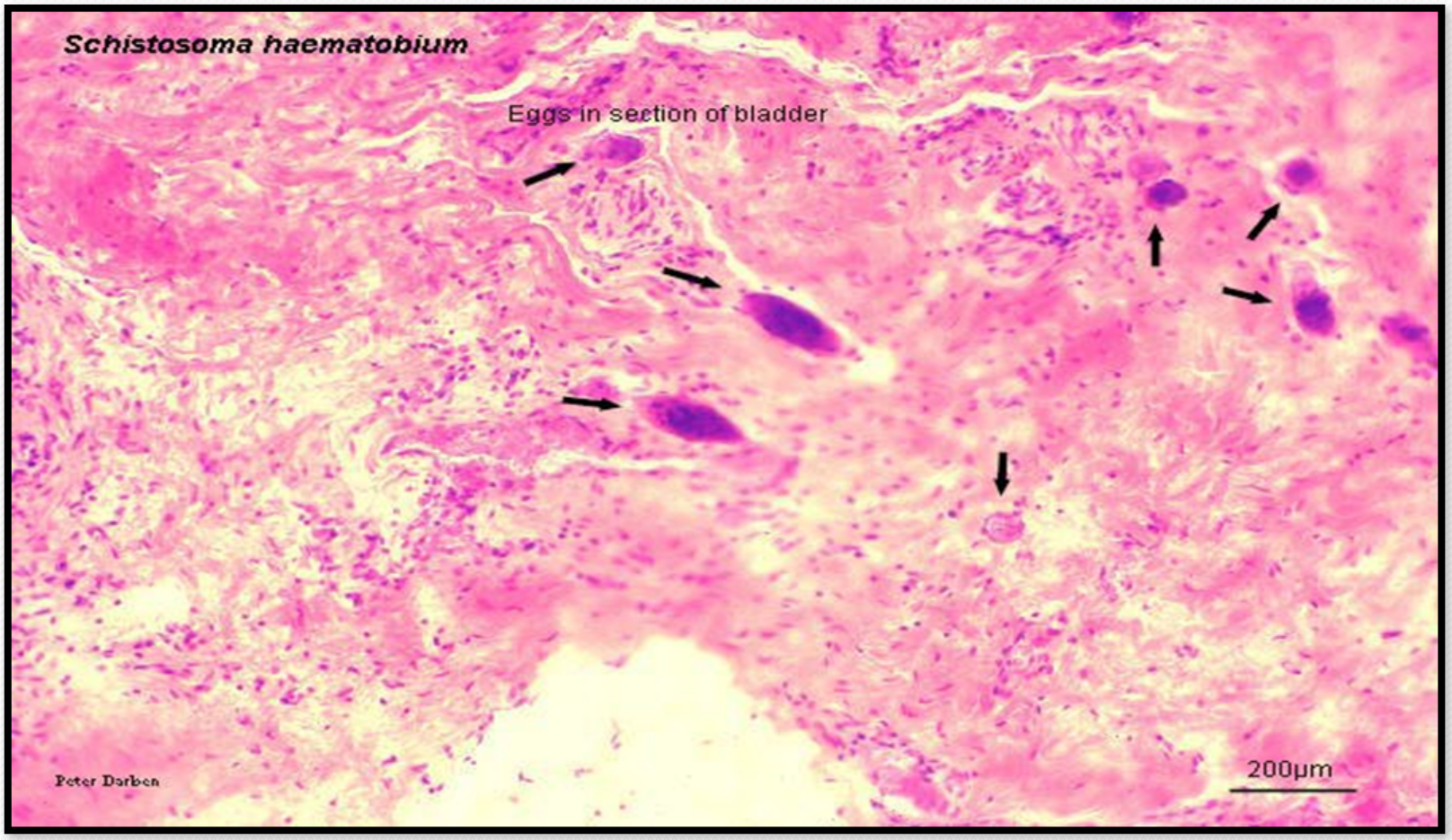
schistosoma japonicum **(eggs)**


i = Infective Stage
d = Diagnostic Stage
CDC
SAFER · HEALTHIER · PEOPLE
http://www.dpd.cdc.gov/dpdx
5 Cercariae released by snail into water and free-swimming
Sporocysts in snail (successive generations) 4
Penetrate skin 6
7 Cercariae lose tails during penetration and become schistosomulae
8 Circulation
Migrate to portal blood in liver and mature into adults 9
3 Miracidia penetrate snail tissue
A
B
C
in feces
in urine
2 Eggs hatch releasing miracidia
10
Paired adult worms migrate to:
A B mesenteric venules of bowel/rectum (laying eggs that circulate to the liver and shed in stools)
C venous plexus of bladder
S. japonicum
A
S. mansoni
B
S. haematobium
C
1

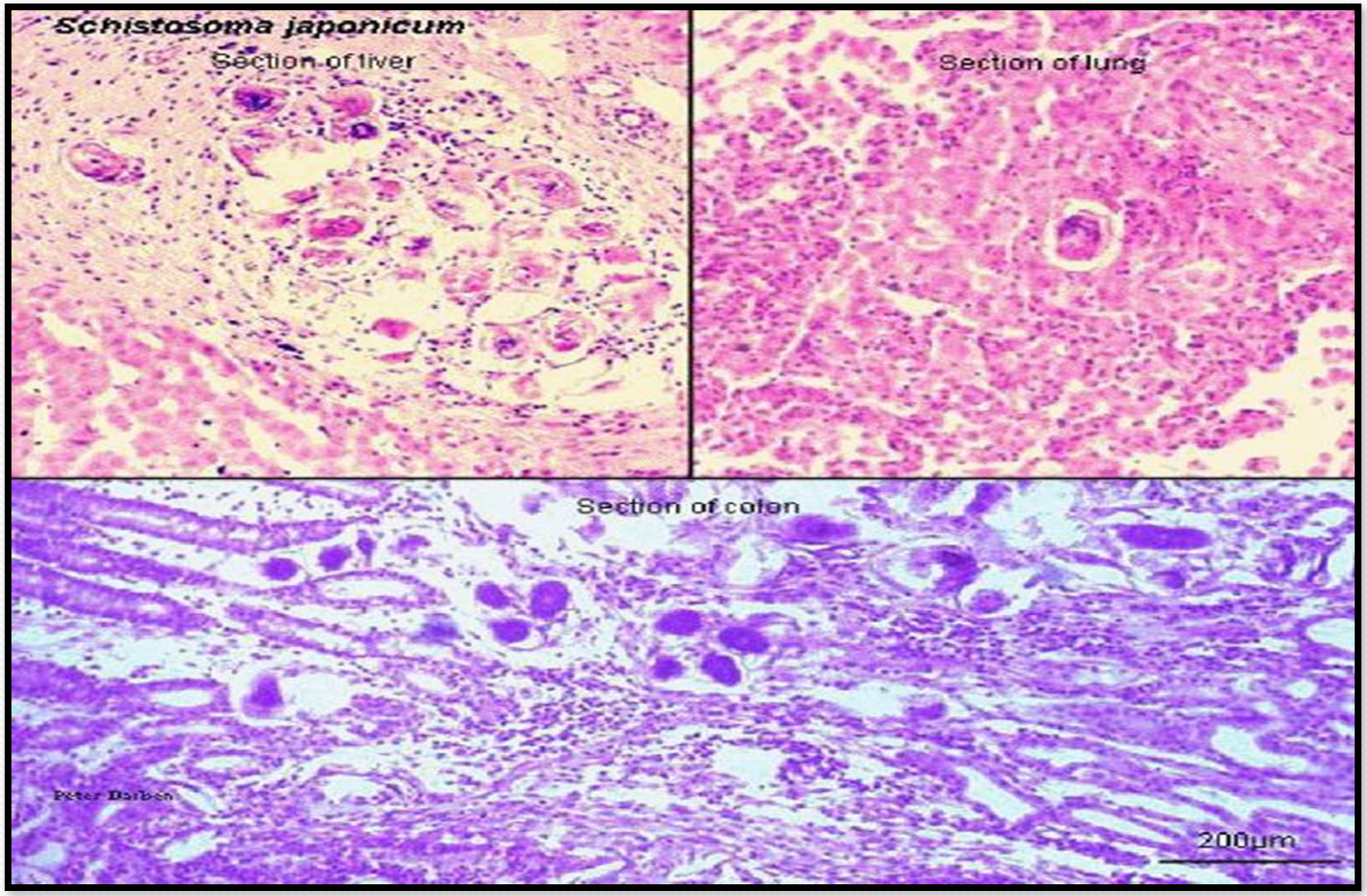
Schistosoma spp.: miracidium

3. Cercaria is infective stage. It is composed of the body and forked tail (including tail stem and fork) and has 5 pairs of penetrating glands in the body.





Histopathological section in bladder showing
S. haematobium (eggs)


Schistosoma japonicum
Section of liver
Section of lung
Section of colon
Peter Darben
200µm

The character	S. haematobium	S. mansoni	S. japonicum
The male length & width	(10-15)mm length× (1)mm width	(6.4-9.9)mm× (1.1)mm	(12-20)mm× (0.5)mm
Body surface of the male	Rough=covered with tubercles(small tubercles)	Rough=covered with smaller tubercles	Smooth
No. of testes	(4-5) arranged nearby	(6-9) as cluster or bunch	(9) arranged vertically in one line
The female length & width	(20)×(0.25)mm	(7.2-14)×(0.16)mm	(15-30)×(0.2)mm
The position of the union between the 2 intestinal caeca	In the middle of the body	In the first half of the body	In front of the posterior half of the body
The spine of the egg (or ovum)	Large, terminal	Large, lateral	Small, lateral
The size & morphology of the egg, and number	Oval, large,(20-30)	Oval, large, one egg	Somewhat spherical to oval,(50) or more
The intermediate host	Snail from genus Bulinus or Physopsis	Snail from Biomphalaria	Snail from Oncomelania
The final hosts and the reservoir hosts	Man, monkeys, and other primates animal	Usually the man, sometimes the monkeys	Man, monkeys, rats, cattles, buffalo, cats and dogs
The position in the final host	Inferior mesenteric vein & pelvic vessels	The branches of the inferior mesenteric veins in the large intestine	The branches of the superior mesenteric veins, and may be in the gastric mesenteric veins

Bulinus truncatus

Biomphalaria

Oncomelania

Diagnosis

- In the acute stage , eggs can usually be detected in the feces (S. mansoni , and S. japonicum) and urine (S. haematobium) and sometimes in the feces ; the recovery of the eggs could be carried out by (sedimentation method)or by making thick smear .
- Biopsy for the rectum.
- Serological tests which used the schistosomes antigen

Ex. (immunodiffusion (ID), immunoelectrophoresis , Indirect haemagglutination (IHA).

S. japonicum eggs in hepatic portal tract.