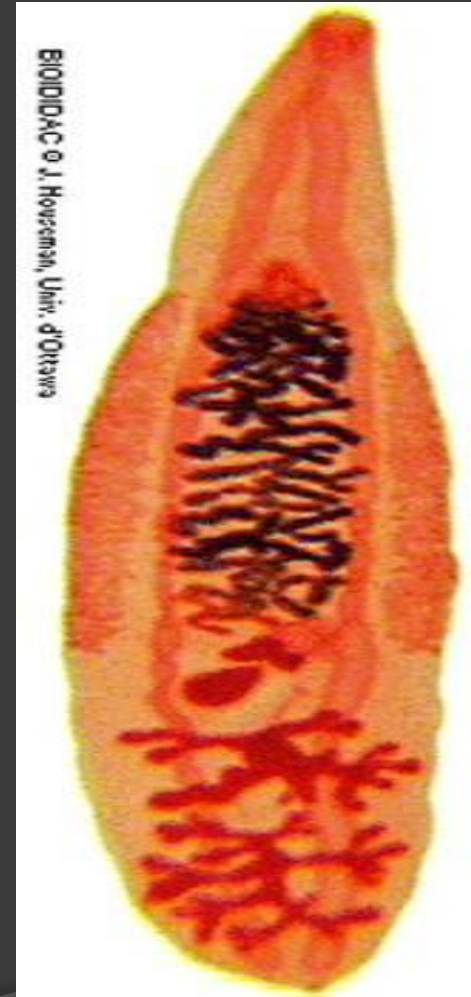


TREMATODES

Trematodes

- multicellular eukaryotic helminths
- unsegmented leaf-shaped worms
- **MONECIOUS** except for schistosomes (**DIECIOUS**)



TREMATODES

- blood flukes

 - Schistosoma mansoni*

 - S. japonicum*

 - S. hematobium.*

- intestinal fluke

 - Fasciolopsis buski*

- liver fluke

 - Clonorchis sinensis*

- lung fluke

 - Paragonimus westermani.*

Trematodes

- Mode of Transmission:

1. cercariae

- FREE SWIMMING LARVAE
- given off by infected snail
- penetrate the skin of the human definitive host

2. metacercariae

- encysted form of the cercariae
- edible plants or animals
 - water plants
 - fishs
 - crustaceans

Treatment

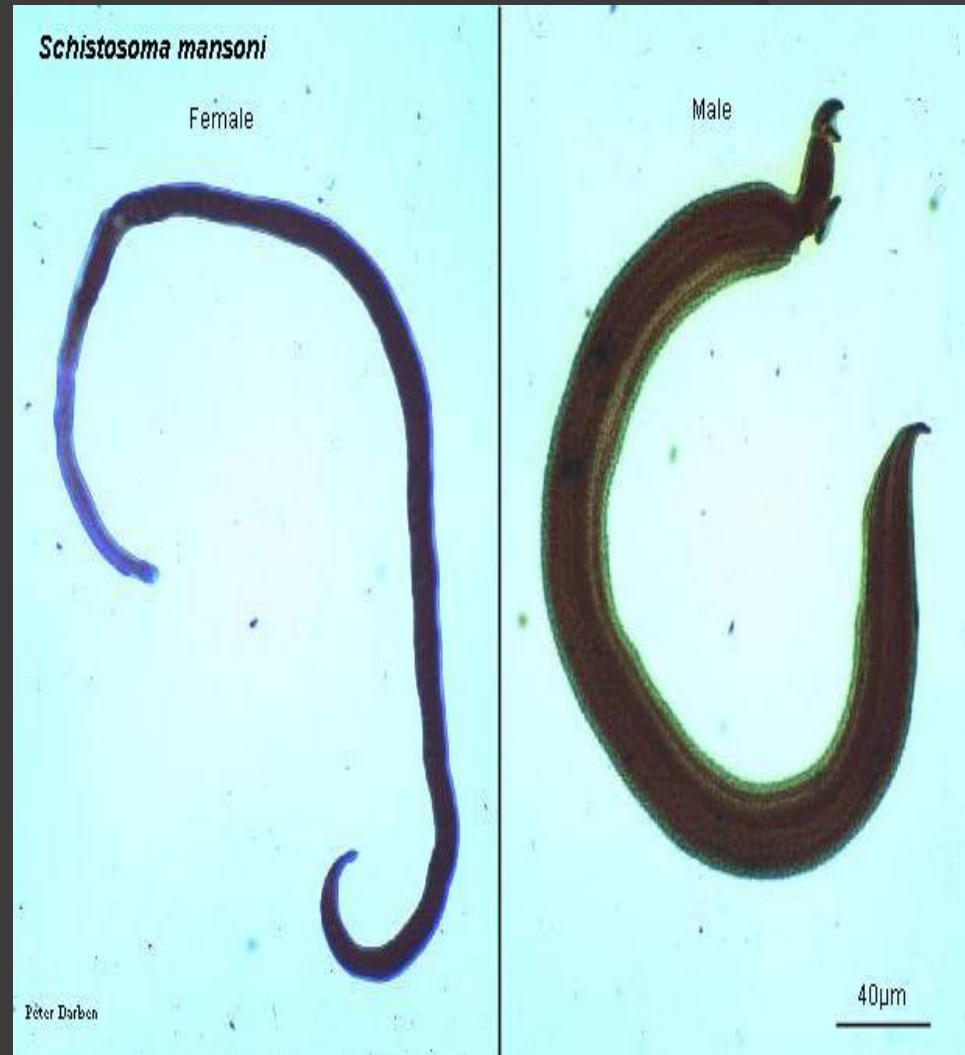
- Praziquantel
 - paralysis of musculature
 - attachment of phagocytes to parasite and death.

Schistosomiasis (Bilharziasis)

- *S. hematobium*: Africa
 - *S. mansoni* : Africa and America
 - *S. japonicum*: Far East.
-
- 250 million people are infected

Morphology

- Adult worms are 10 to 20 mm long
- Male: lamelliform shape with marginal folds

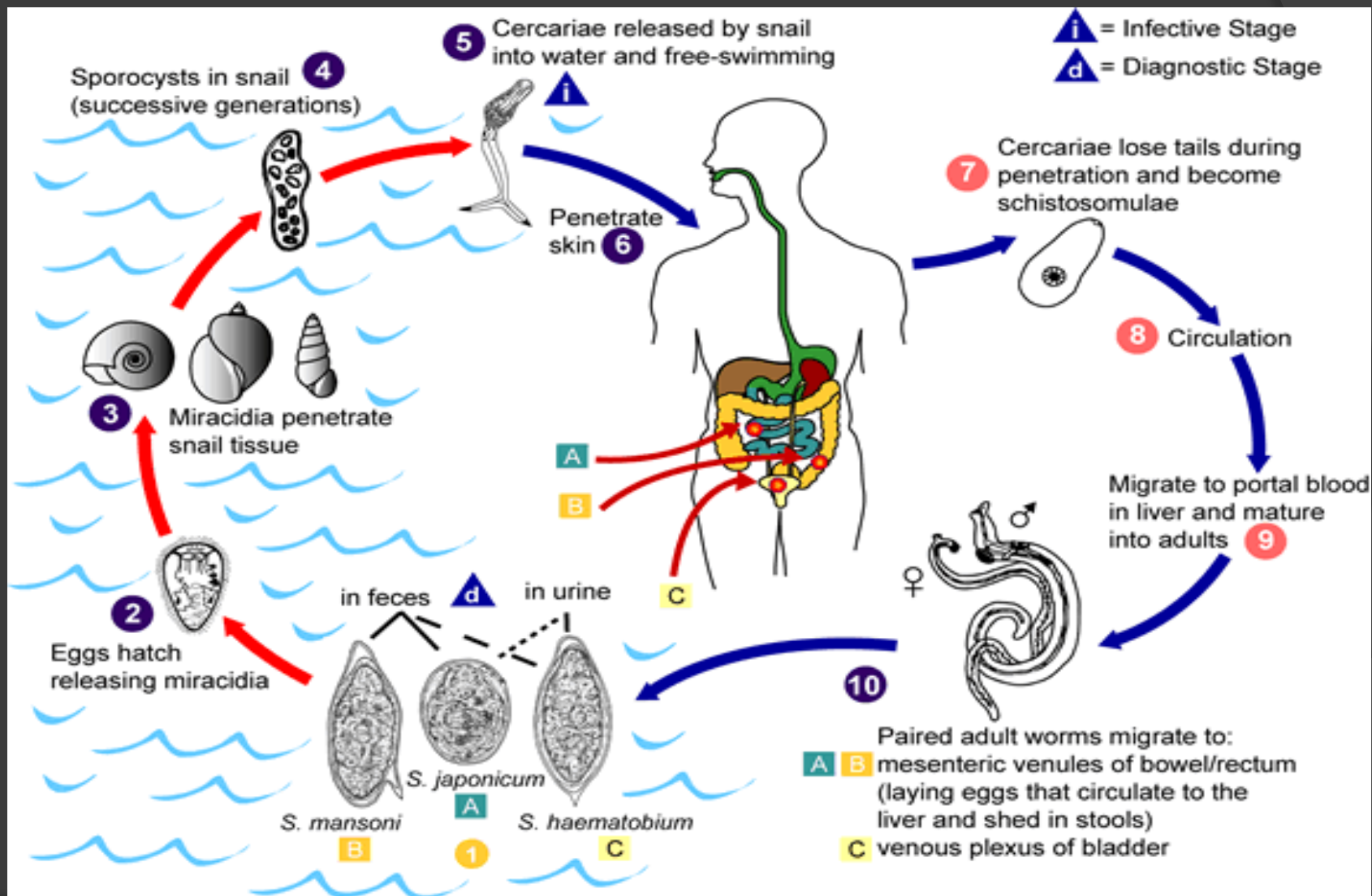


“The sweetest parasites on earth”



SCHISTOSOMES

Mode of Transmission : Skin Penetration by Cercariae



FAVORITE SITES

- ① *S. japonicum* : VEINS OF GIT
- ① *S. mansoni* : VEINS OF GIT
- ① *S. haematobium* : VEINS OF BLADDER

Schistosomiasis

- ⦿ type I and type IV hypersensitivity
- ⦿ Embryonated eggs cause collagenase mediated damage to the vascular endothelium.

Three major disease syndromes occur in schistosomiasis

- ① 1. schistosome dermatitis
- ② 2. acute schistosomias (Katayama fever)
- ③ 3. chronic schistosomiasis.

dermatitis (swimmers' itch): penetration of cercariae



Acute schistosomiasis (Katayama fever)

-4 to 8 weeks after primary exposure

-cough, hepatosplenomegaly

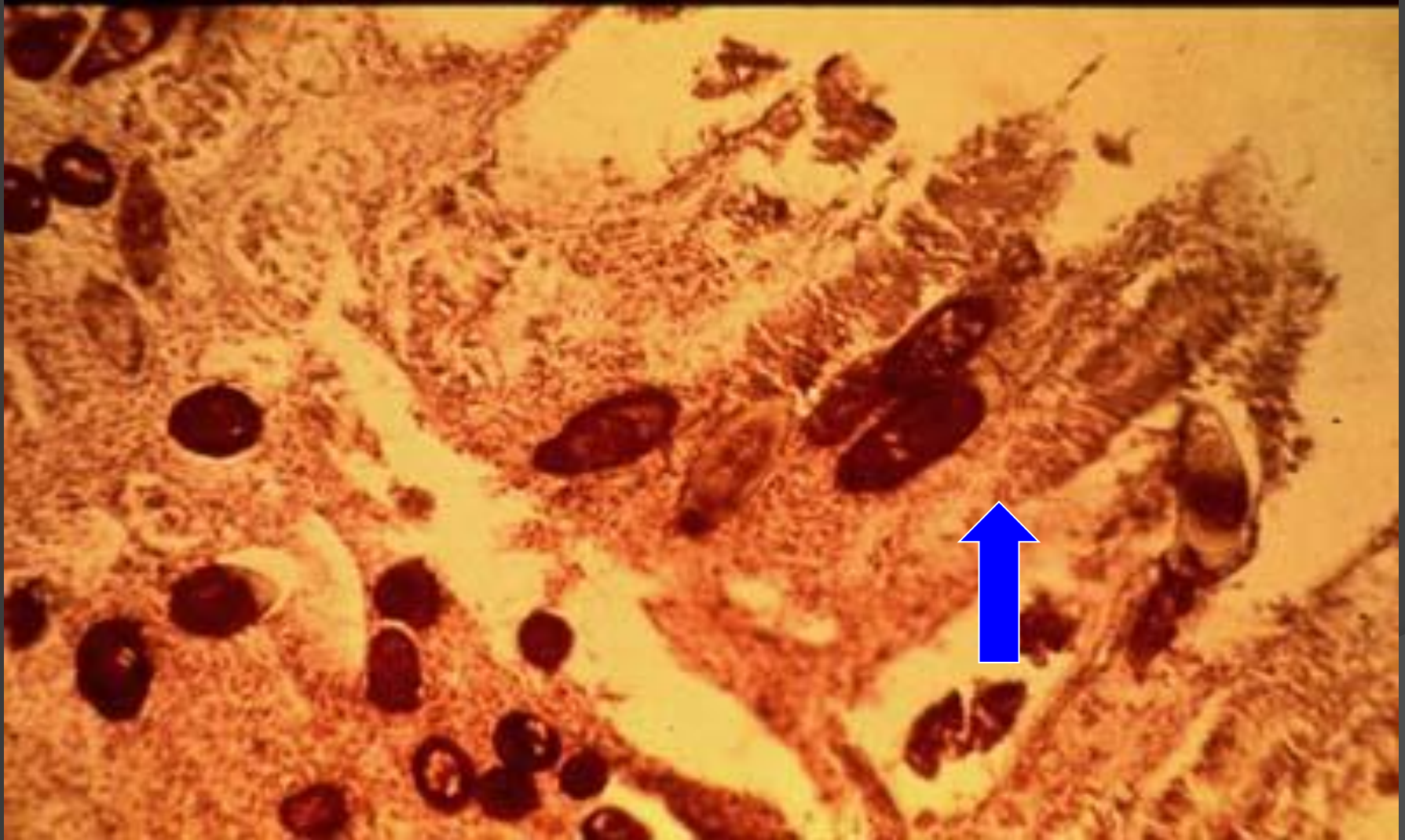
-lymphadenopathy, and eosinophilia

Chronic disease

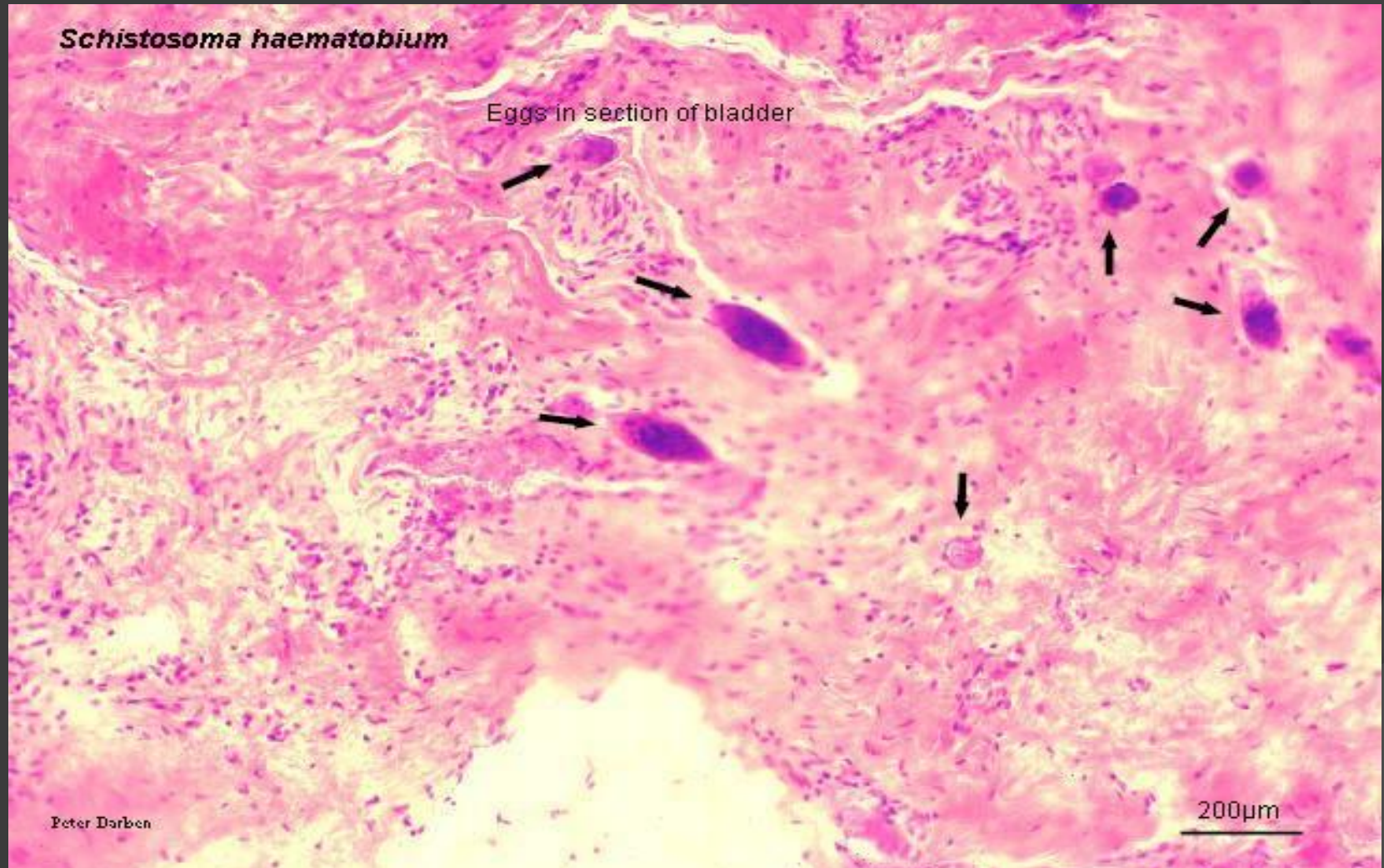
- May appear many years later
- *S. japonica* and *S. mansoni*
 - hepatomegaly
 - splenomegaly
 - portal hypertension
 - esophageal varices (Dilatation of the submucosal veins from hypertension due to cirrhosis)

- Schistosomiasis due to *S. haematobium*
 - inflammation and fibrosis
 - obstruction
 - hydronephrosis
 - uremia

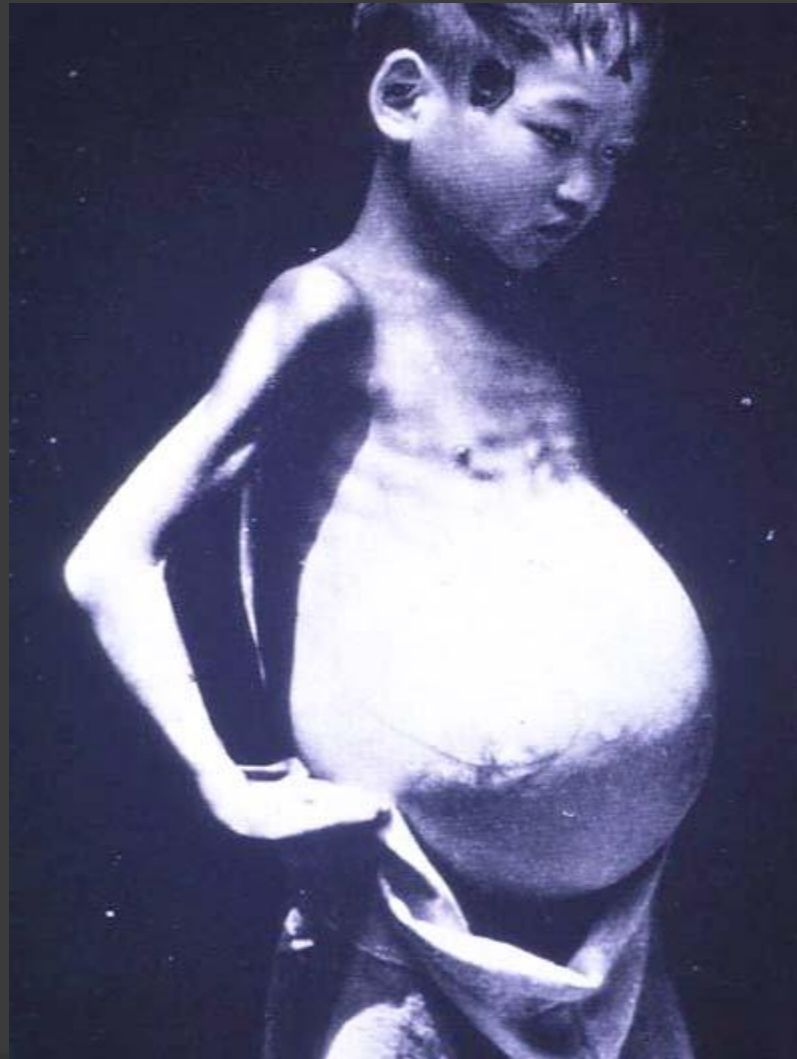
Schistosoma eggs in the intestinal mucosa



S. Haematobium and bladder cancer



Schistosomiasis

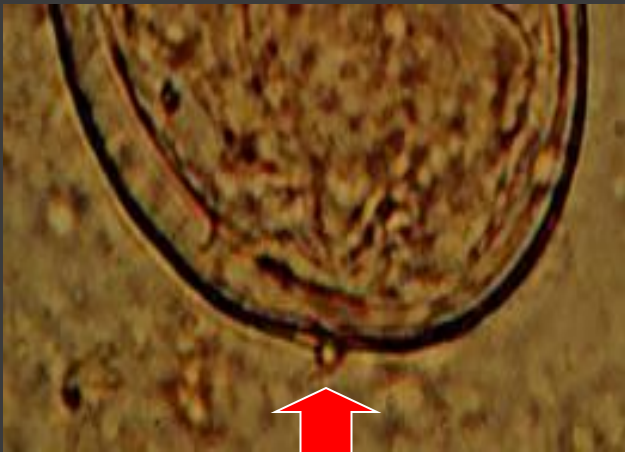




Characteristic eggs: diagnosis



Apical spine: *S. haematobium*



Vestigial spine: *S. japonicum*



Lateral spine:
S. mansoni

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.

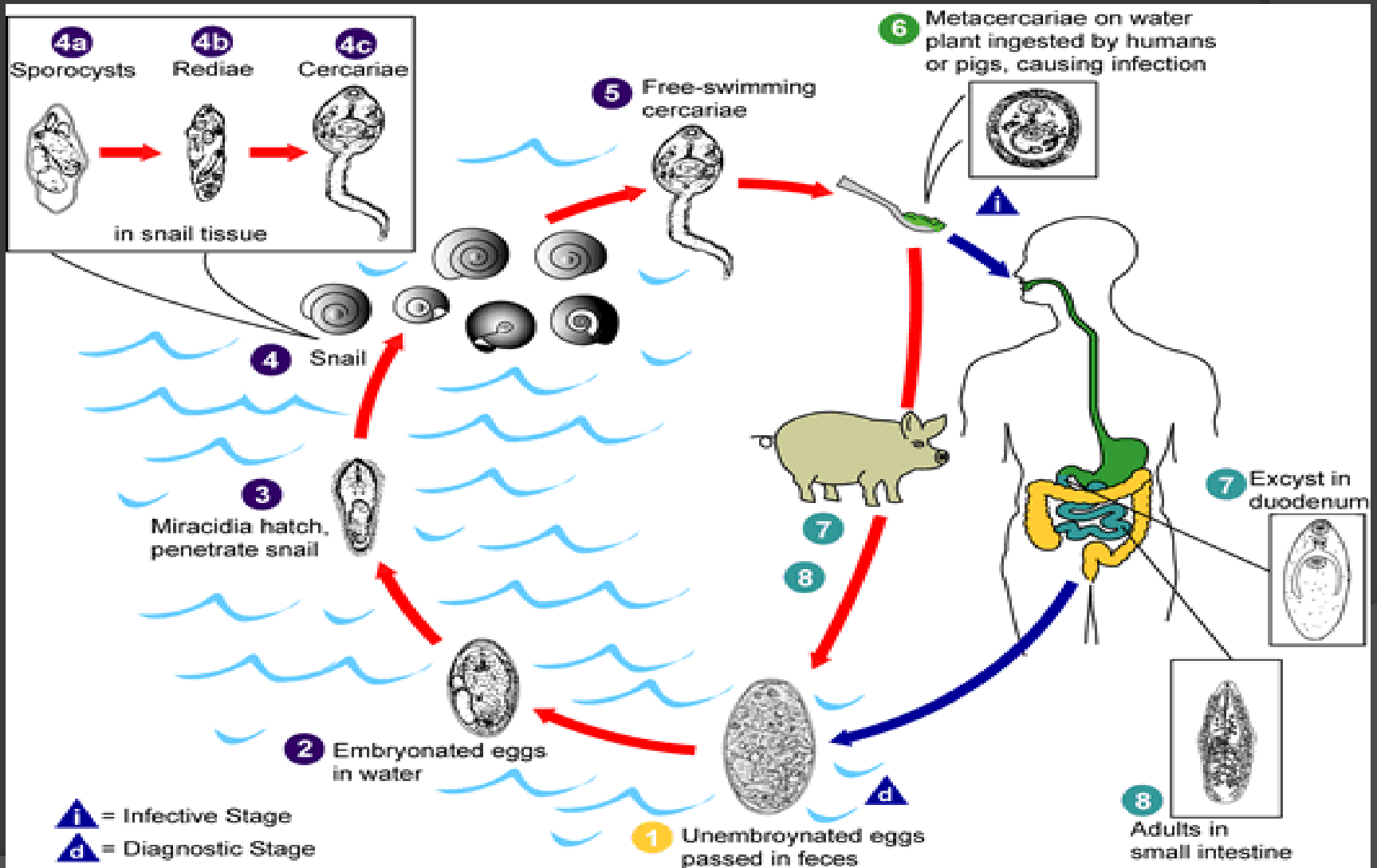
Fasciolopsis buski (Giant intestinal fluke)

- central and southeast Asia.
- elongate oval fluke
- 2 to 7 cm long
- small intestine



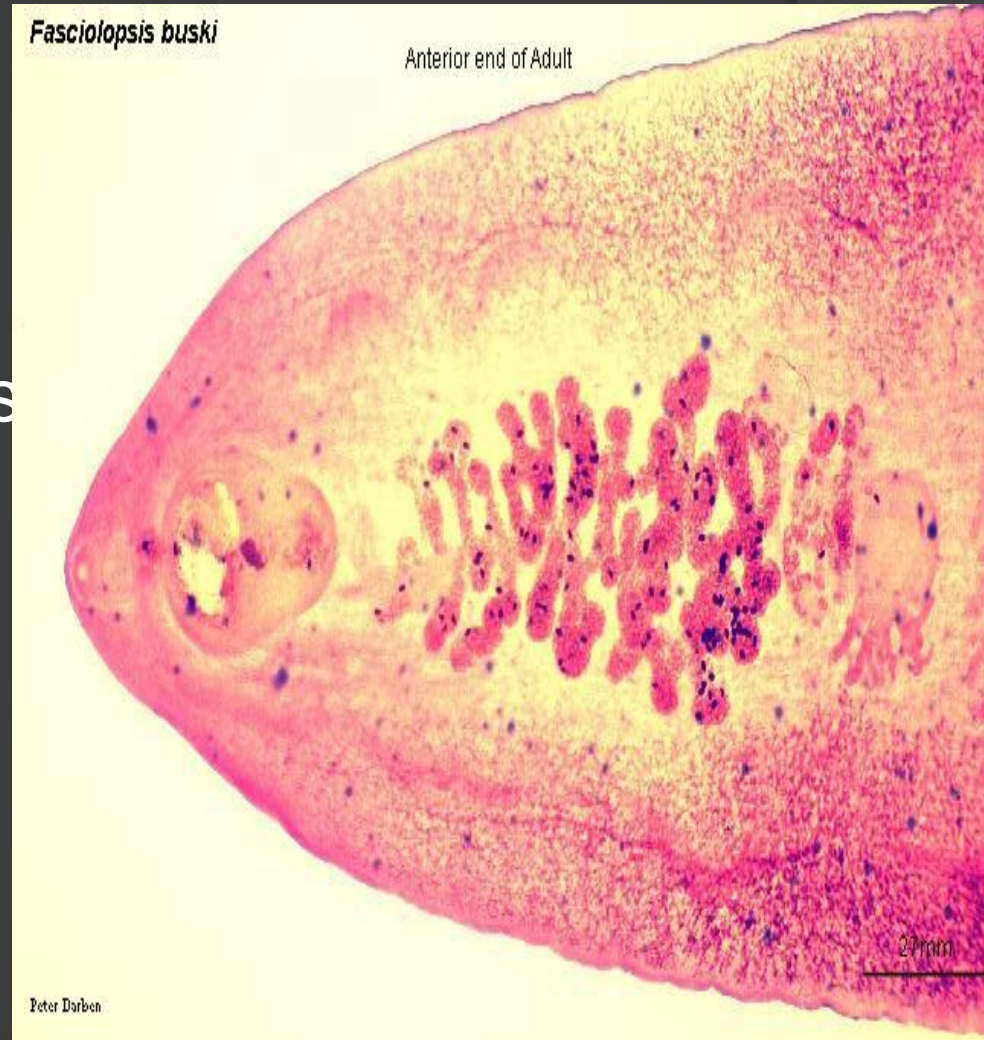
Fasciolopsis buski:

Mode of Transmission: Ingestion of Cysts



Pathology

- attaches itself to the intestinal mucosa
- inflammation, ulceration, abscesses



WATERCRESS



Fasciolopsiasis

- ⦿ **Diagnosis**
Eggs in feces
- ⦿ **Treatment and control**
Praziquantel
- ⦿ Water chestnuts
- ⦿ Sewage treatment

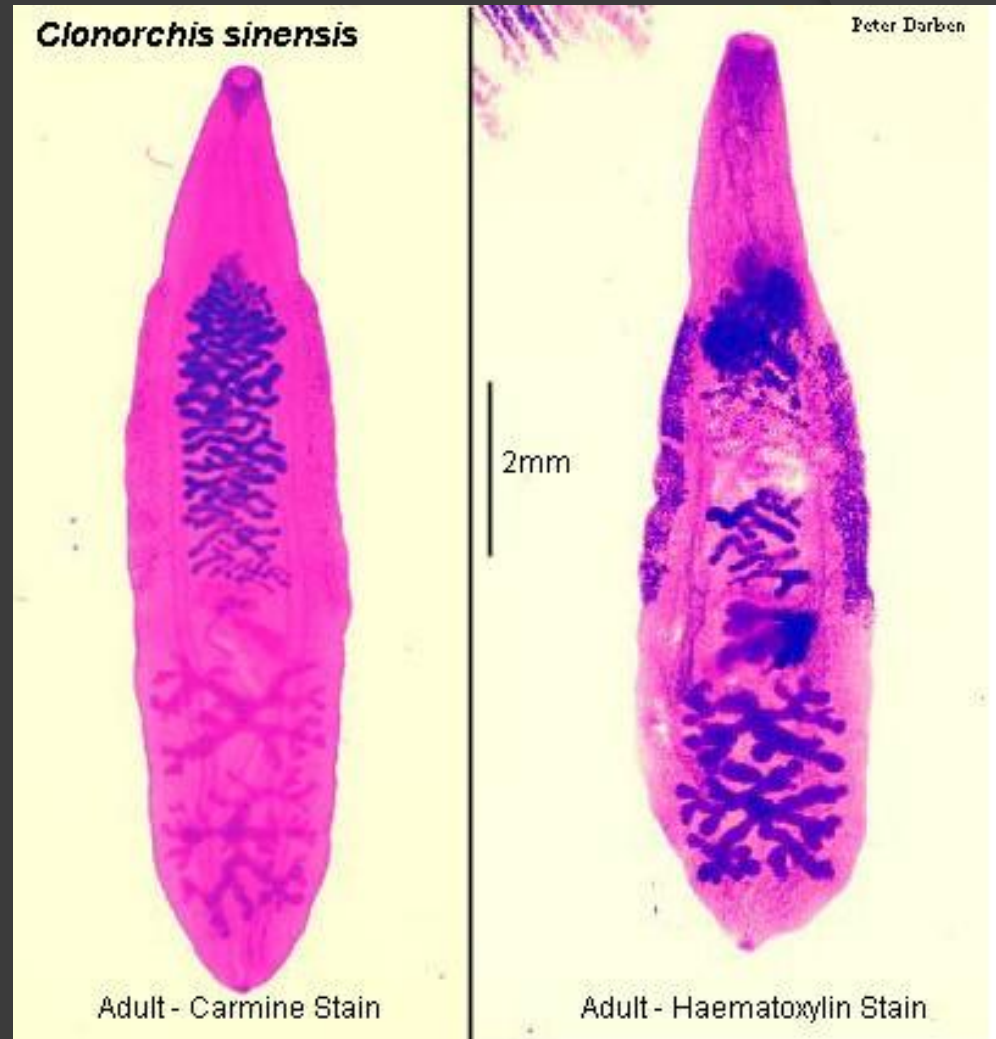


Clonorchis sinensis (Chinese Liver Fluke)

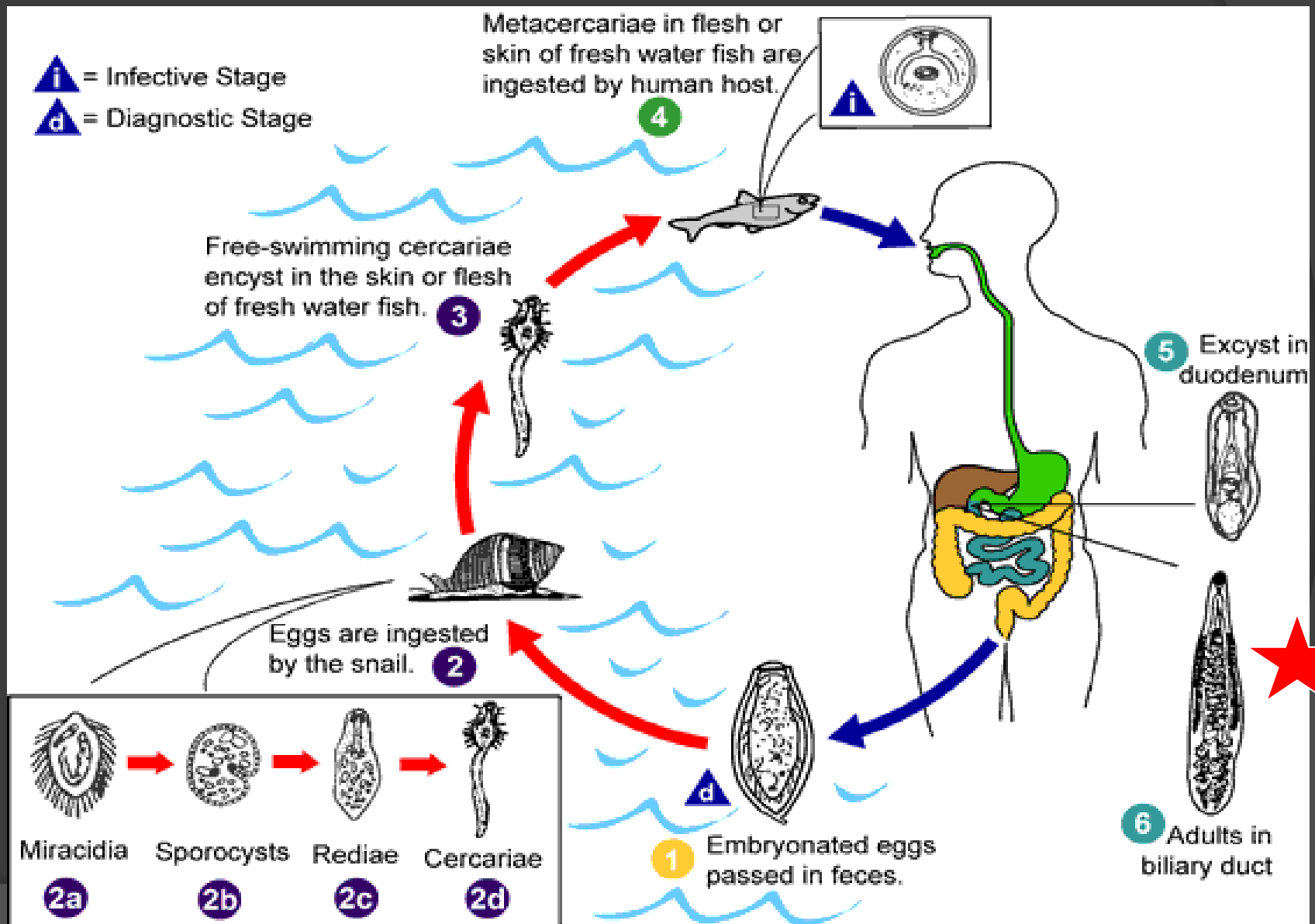
- parasite of man, dogs and cats in the southeast of Asia
- extraordinarily common: China, Korea and Japan

Clonorchiasis

- **Morphology**
- spindloid flukes



Mode of Transmission: Ingestion of Metacercariae



Clonorchis adult worms in the liver



CLONORCHIASIS

- irritation of the bile ducts → dilated
- Liver:
 - enlarged
 - necrotic
 - tender
 - elevated liver enzymes

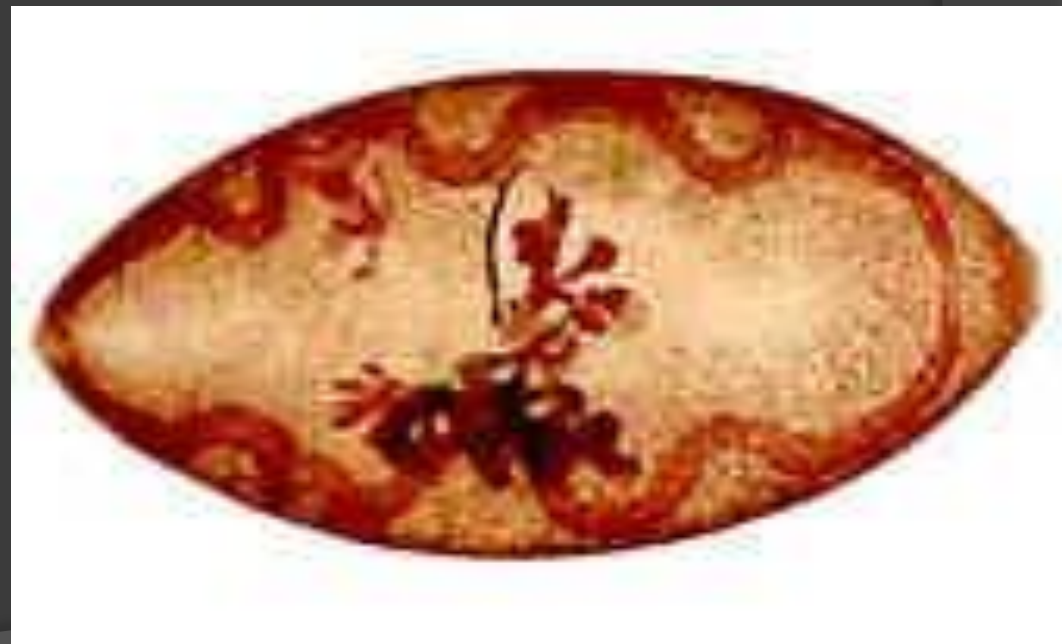
CLONORCHIASIS

- ⦿ **Diagnosis**
eggs in the feces or bile
- ⦿ **Treatment and control**
Praziquantel
- ⦿ Fish should be cooked well before consumption.
- ⦿ Sewage must be treated before disposal.

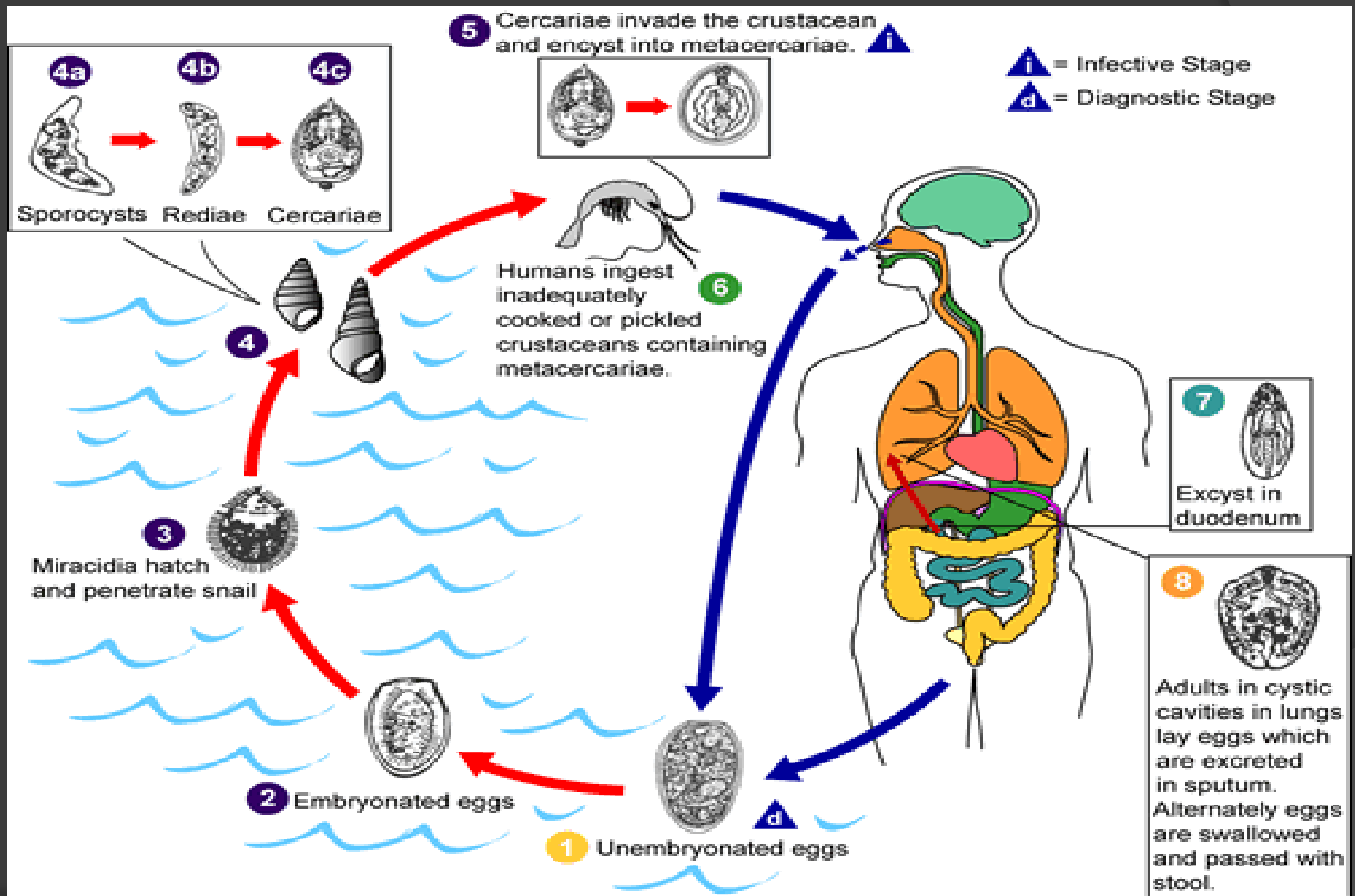


Paragonimus westermani (Lung Fluke)

- most commonly encountered in parts of Asia, Africa and South America.
- plump reddish brown oval worm
- 10 by 4 mm



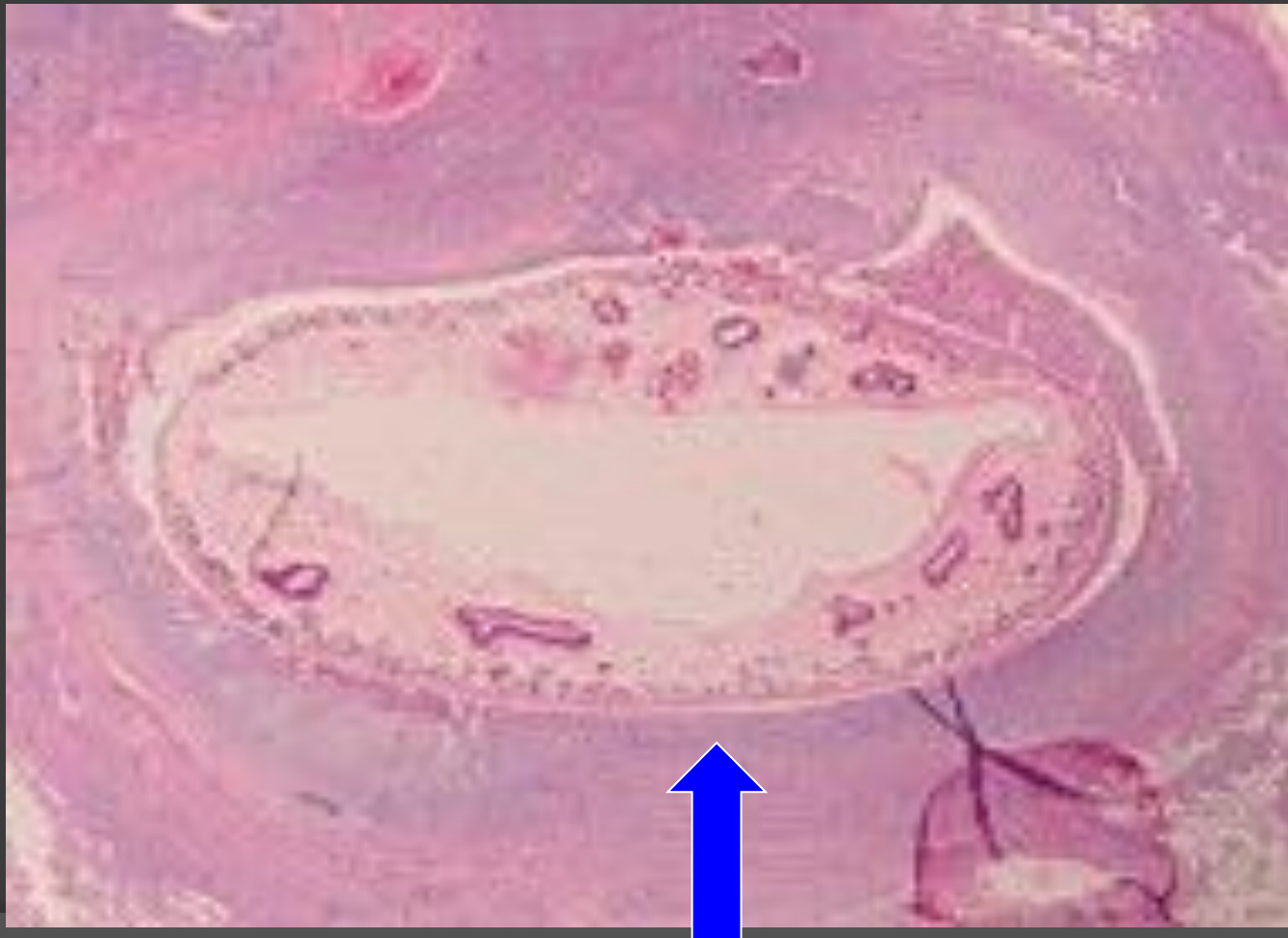
Mode of Transmission: Ingestion of Metacercariae



Paragonimus

- ① migrate by penetrating through the intestinal wall → peritoneal cavity → abdominal wall → diaphragm → lungs.
- ② immature worms settle close to the bronchi → grow → sexually mature hermaphrodite worms → eggs

Paragonimus westermani: lung tissue



Paragonimus

- ⦿ dry cough
- ⦿ blood stained rusty brown sputum
- ⦿ pulmonary pain and pleurisy
- ⦿ Brain: granulomatous abscess → epilepsy

Paragonimus

- ⦿ **Diagnosis**
Eggs are found in rust colored sputum
- ⦿ **Treatment and control**
Praziquantel
- ⦿ Adequate cooking of crustaceans
- ⦿ Improved sanitary conditions

