BIOLOGICAL factors influercing person

Author of lectures –Doctor of Biology, Professor

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2.PARASITIC diseases caused by parasitic worms (HELMINTHES):

biology, developmental cycles of parasites, laboratory diagnostics

TYPE PLATHYHELMINTHES (THE FLATWORMS) - TYPE flatworms

Class Trematoda - Flukes Class

Subclass Digenea (the digenetic trematodes)

Order Echinostomatiformes

Family Fasciolidea

Trematodosis(distomiasis) **- diseases of humans and animals that cause the representatives of**

Type Flatworms **(Plathelminthes)**

Class Flukes **(Trematodes)**

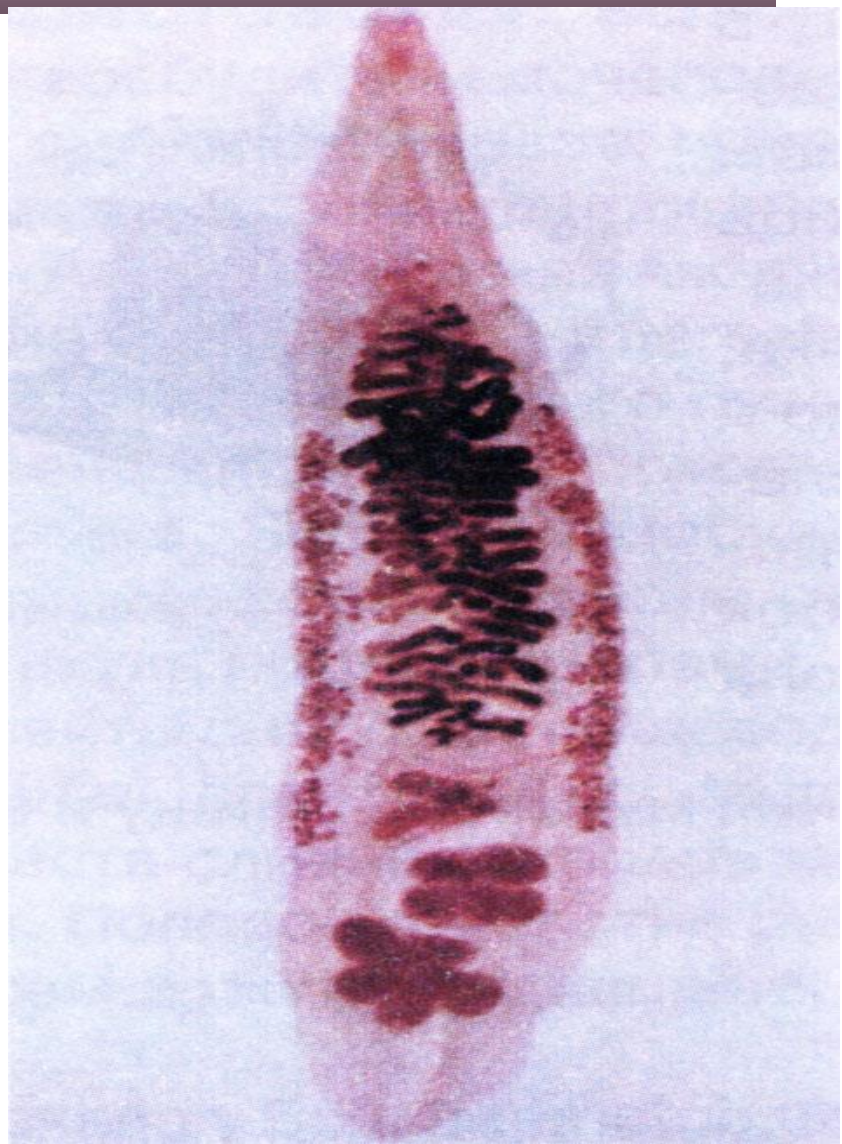
The most common trematodos

- ***Opistarchosis is caused by*** ***Opisthorchis felineus siberian (cat fluke);***
- ***Paraganimosis is caused by*** ***Paragonimus westermani (lung fluke)***
- ***Shistomosis is caused by*** ***Schistosoma spp. (the schistosomes or blood flukes***

Opisthorchis felineus

Opisthorchis felineus siberian (cat fluke);

Opisthorchis felineus



- ***The life cycle of a Siberian or cat fluke,***

stages:

1. Egg is released into the pond

2. Miracidia in shellfish, in the digestive gland of the clam-

sporocysts

rediya,

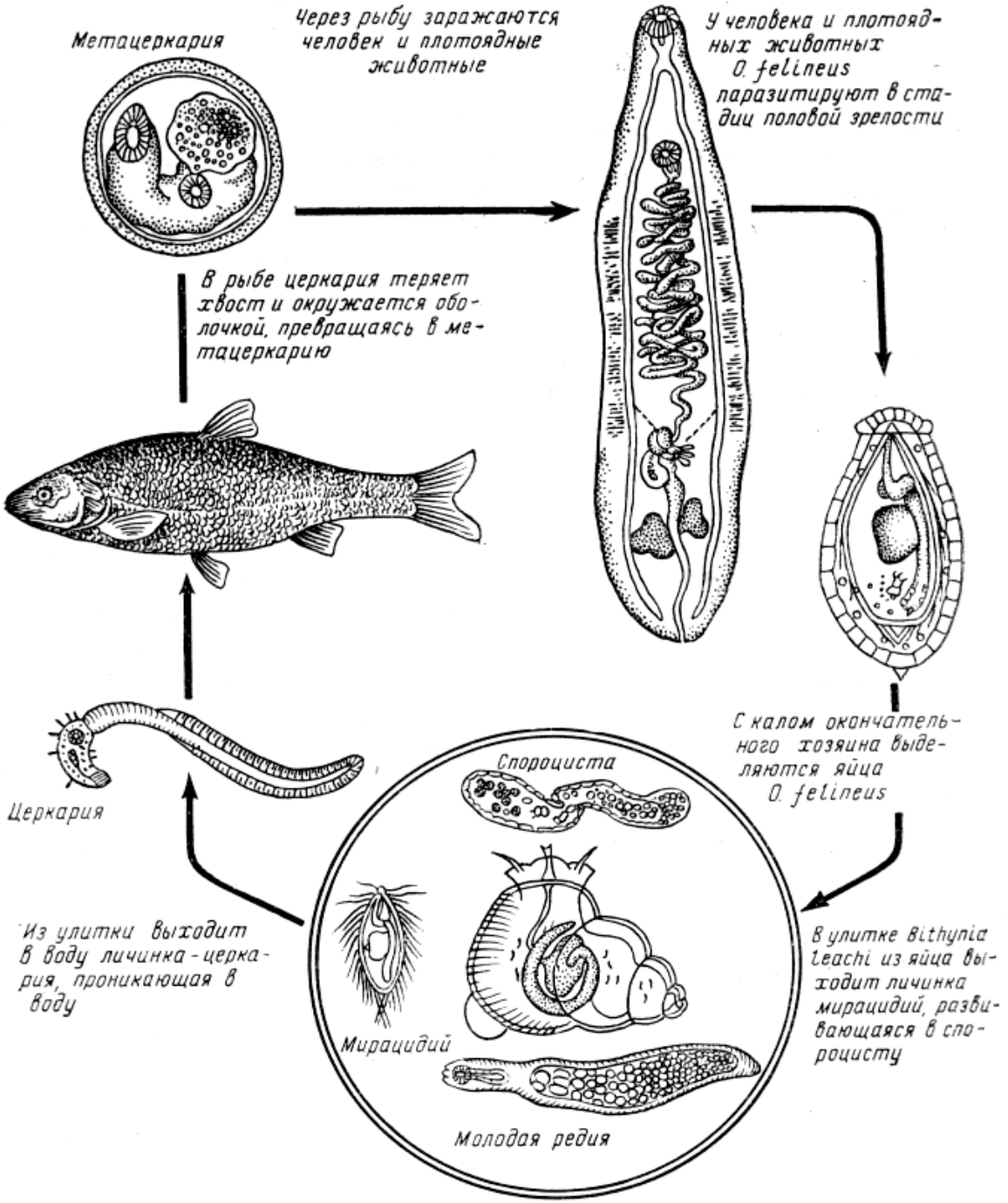
cercariae

3. Cercariae come out in pond

4. Cercariae bore into fish

5. Fish muscle with metacercariae

6. Puberal form in bile duct in liver of Human while eating fish



Encysted **Opisthorchis**

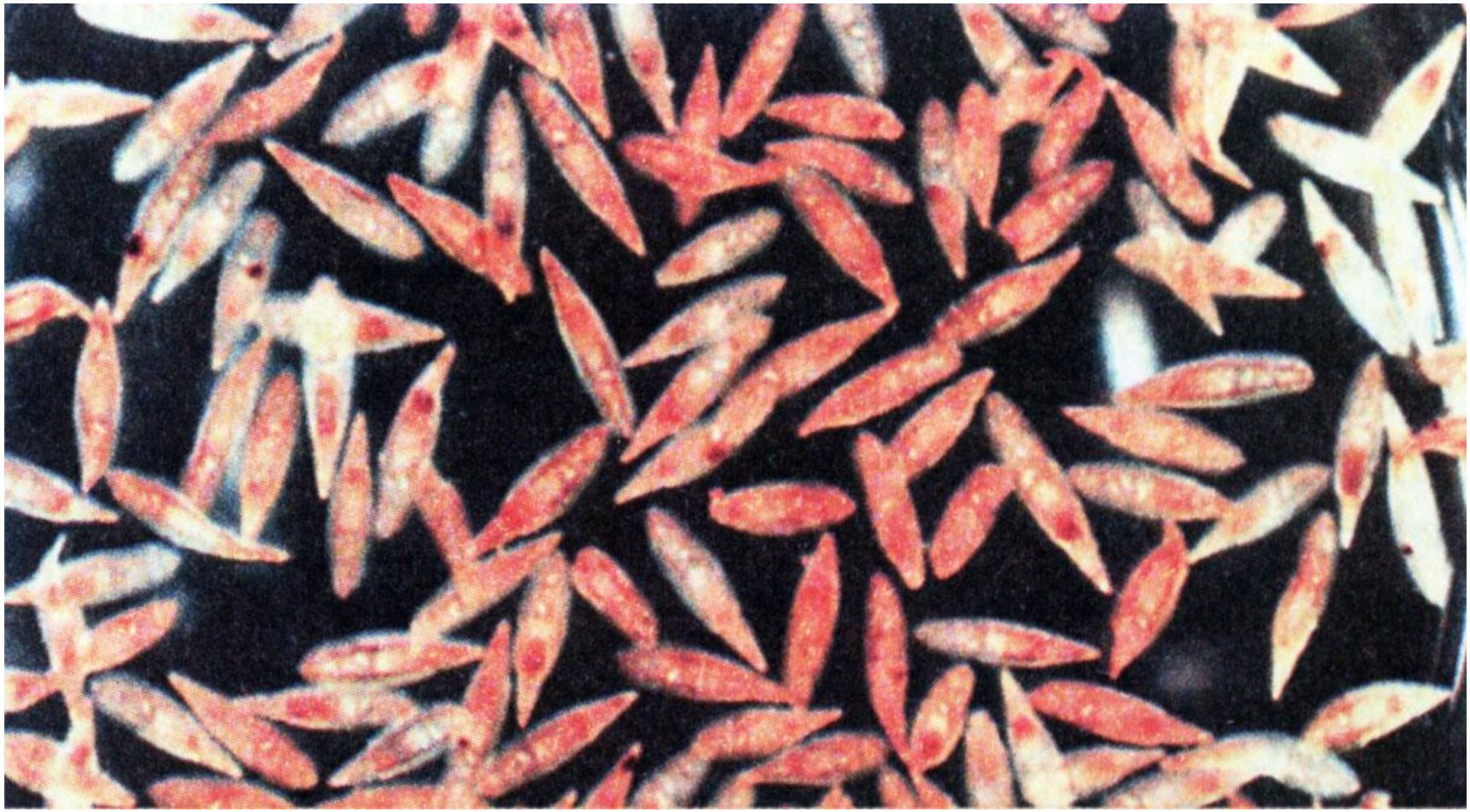
Siberian fluke -

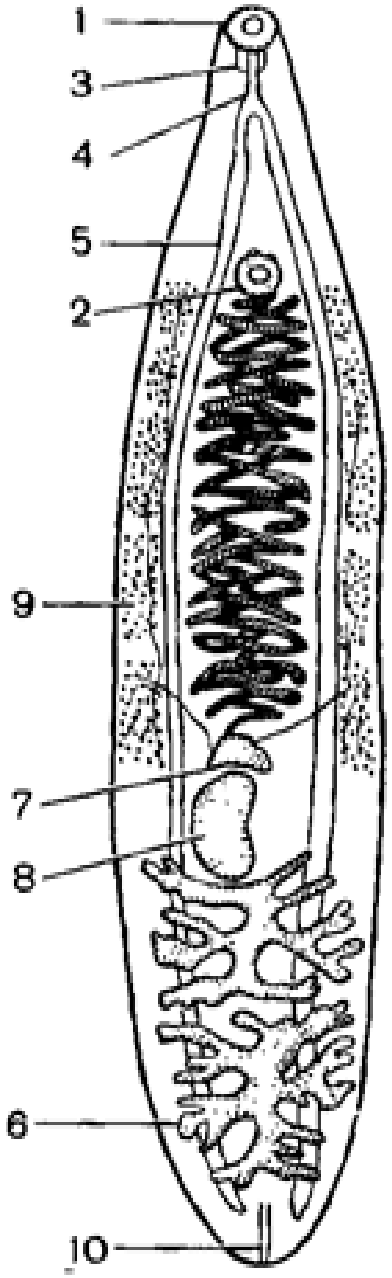
Opisthorchis(*2ekz*)
in the human organism parasites in the liver tissue by sticking surculus and tissue.

Clonorchiasis is caused by Chinese fluke - Clonorchis sinensis

- **Victims of klonorchis - people, cats, dogs, fish-eating carp (sometimes pike) and badly thermally treated;**
- **The life cycle of the two hosts: 1st shellfish; 2nd cyprinids;**
- **A parasite in the bile ducts of the liver, pancreas ducts suffer;**

Chinese fluke - Clonorchis sinensis





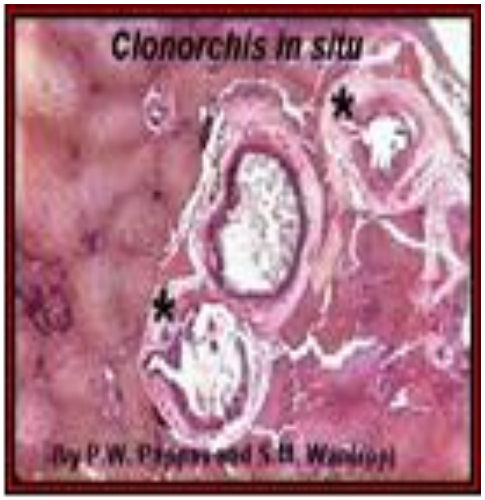
1 - oral surculus;
2 - ventral surculus;
3 - sip;
4 - esophagus;
5 - intestine;
6 - testes;
7 - ovary;
8 – spermatotheca
9 - and vitellarium;
10 - excretory duct

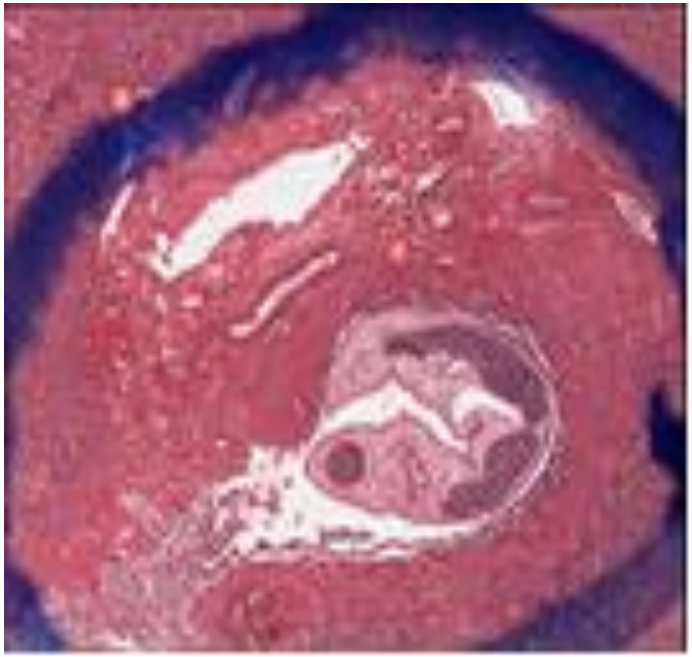
development cycle

- ***Pathogen*** - Chinese fluke (Clonorchis sinensis). The front end of the body is narrower than that of the Siberian fluke. Body size 10-25 x 2-5 mm. Testes as feline flukes, lies to the rear of the body behind one another, but unlike opisthorchis branched.
- ***Klonorchis*** has small eggs (0,027-0,035 x 0,012-0,020 mm), light yellow. At the upper pole has a lid, the edges of which are clearly visible protrusions (cap is smaller than necessary). On the lower pole there is well expressed hump.

- ***Life cycle*** is similar to opistorhis development cycle . Daily egg production by one clonorchis ranges from 1100 to 2400 . Eggs contain developed miracidia . First intermediate hosts - freshwater shell Bithynia fuchsiana, B.longicornis and others in which there is a development stage to cercariae . Second intermediate hosts are various species of fish of the carp family , and gobies herrings families .
- ***Cercariae penetrate*** into the muscles of fish , where during 35 days they encyst in metacercariae . Unlike opistorhisis , second intermediate host of clonorchis may be freshwater crayfish , and even shrimp in China .

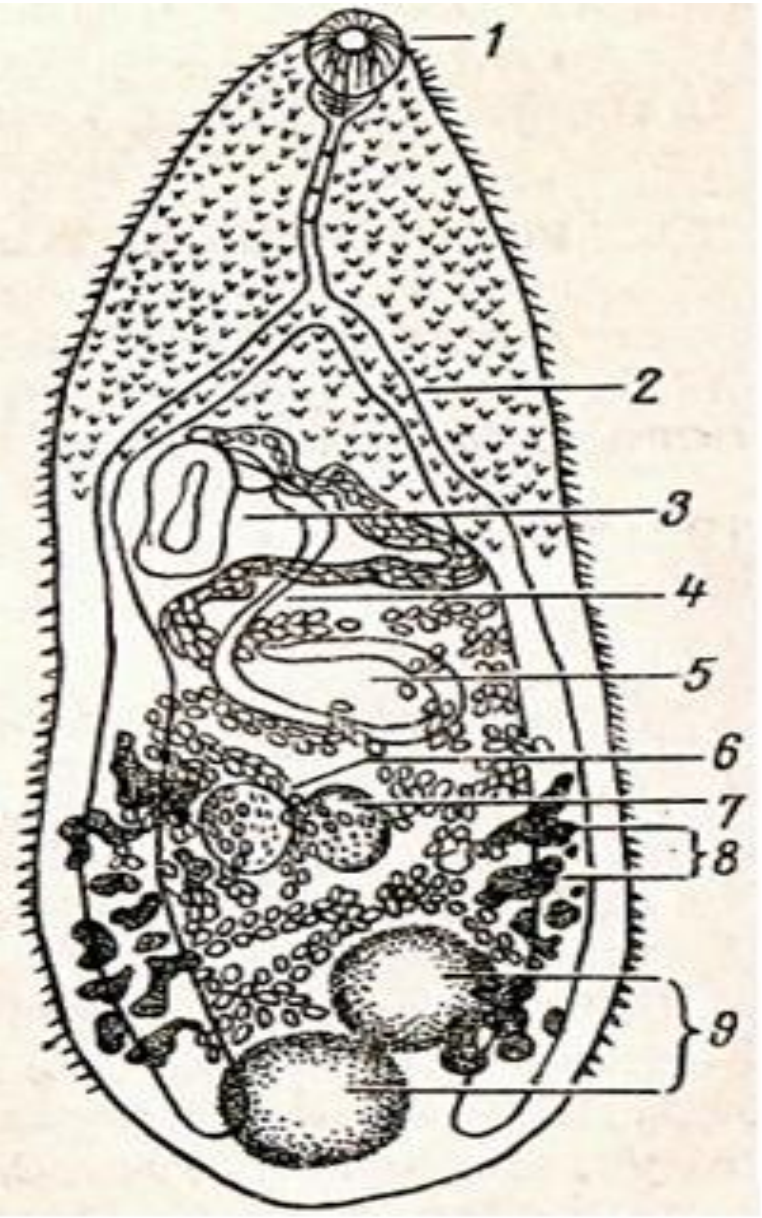
- ***In definitive hosts*** clonorhis parasite in the bile ducts and gall bladder, affect the liver and pancreas. Oviposition begins 25 days after infection. Period of a person's life - up to 25 years.
- Clonorchiasis is widely distributed in Japan, China, Korea, and the Indian subcontinent. On the territory of Russia is found in Amur River Basin.


Clonorchis in situ



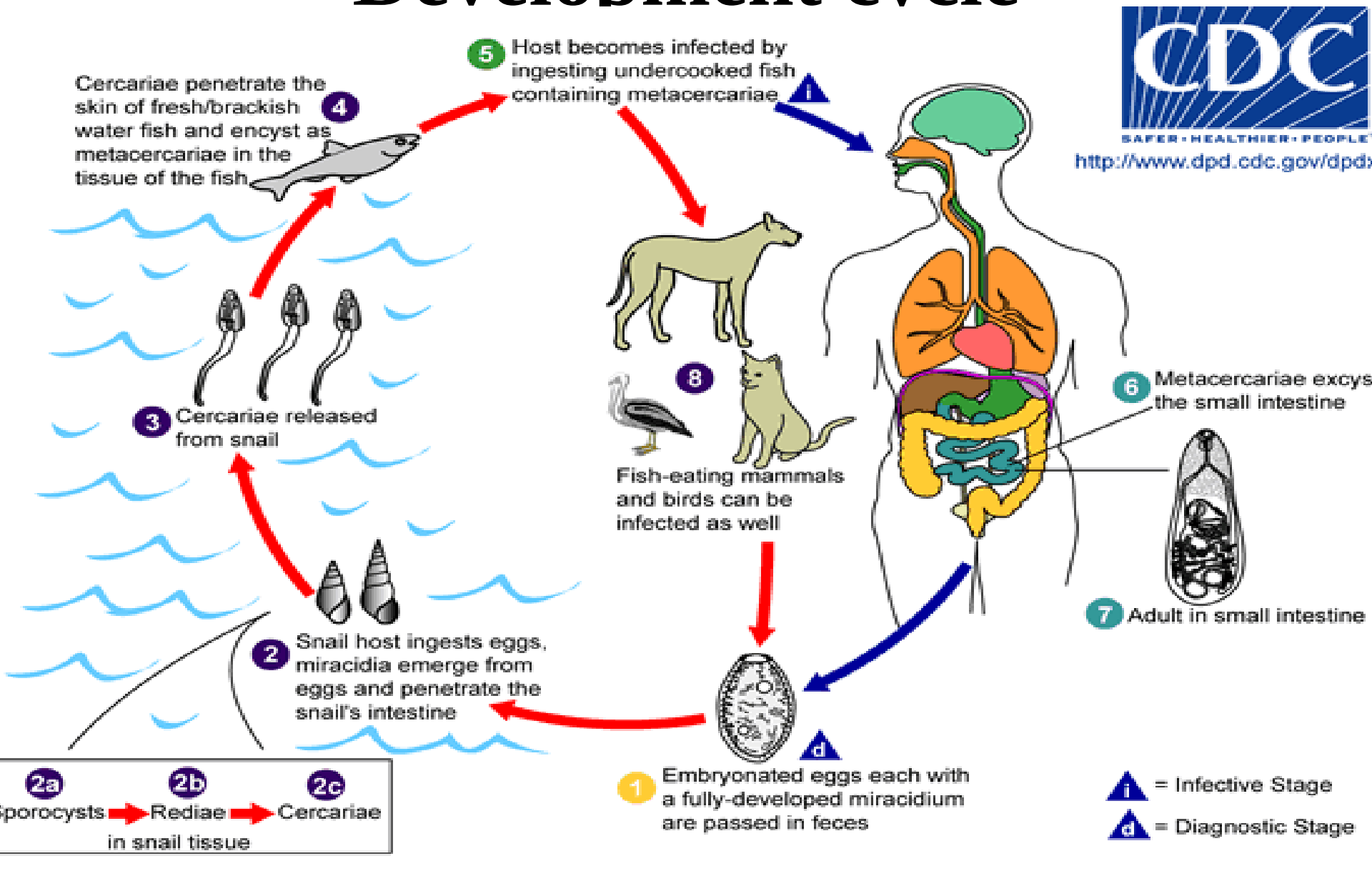
Metagonimus causative agent of metagonimosis

. Size of fluke 1-2.5 x0,4-0, 75 mm. Body has narrowed front, rear rounded with small spines on the cuticle. Ventral surculus turned into gonotyl and lies to the side of the midline



1 - oral surculus;
2 - intestine;
3 - gonotyl;
4 - deferent canal
5 - seminal vesicle;
6 - spermatheca;
7 - ovary;
8- yolk;
9 - testes.

Development cycle



- ***Development cycle.*** Metagonimosis natural focal disease.
- ***The first intermediate host*** **-** freshwater shell Melania libertine so on.
- ***The second intermediate host*** **-** different types of fish (whitefish, carp, ide, bream, etc.)
- ***Metacercariae helminth localized*** in the scales, fins and gills of fish, as well as in the subcutaneous tissue and muscle. Metacercariae in fish remain viable for two years

- ***Final hosts of metagonimus*** - people as well as fish-eating mammals (dog, cat, pig, etc.) and birds.
- ***Infests the upper third*** of the small intestine. People become infected by eating raw or badly cooked fish - ides, grass carp, mirror carp, crician carp, so on.
- ***Metagonimosis is distributed*** mainly in the eastern parts of Asia

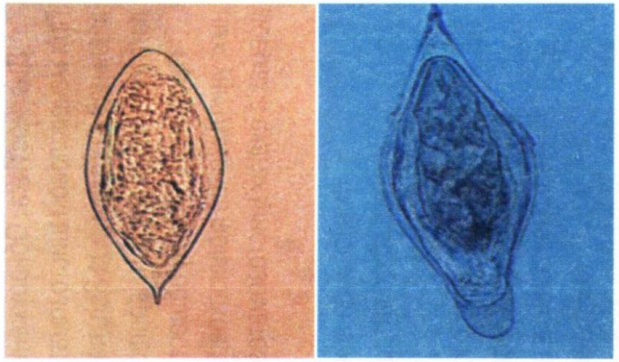
Clinical manifestations

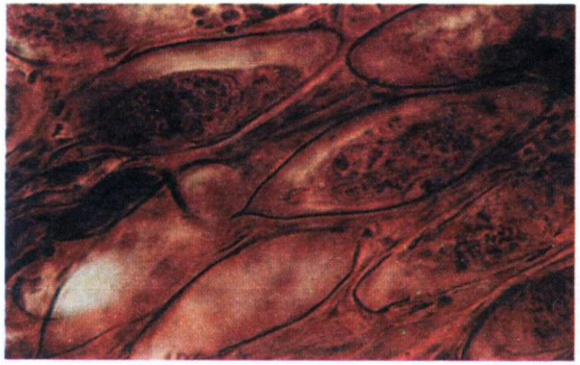
- Metagonimuses cause inflammation of the small intestine, resulting in a dyspeptic disorders and diarrhea. Patients complain of abdominal pain and sometimes very persistent recurrent diarrhea with mushy or liquid stools 5-6 times a day

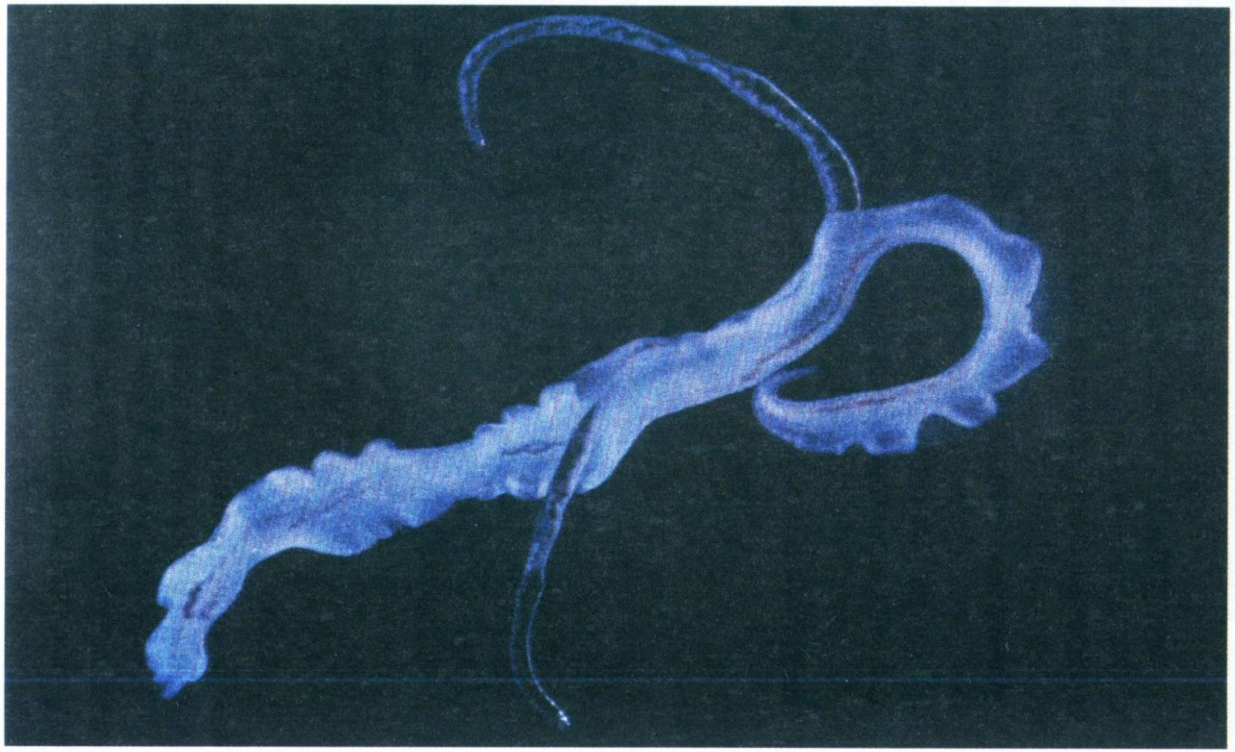
laboratory diagnosis

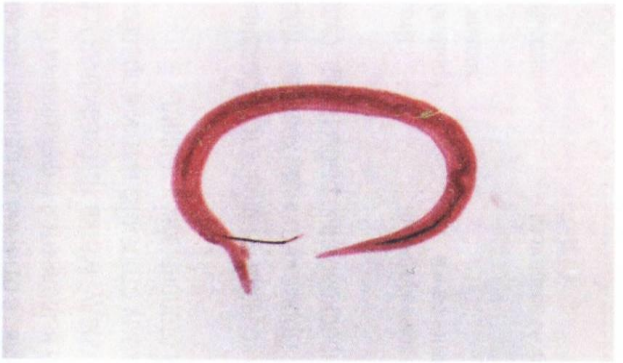
- Metagonimusis eggs are small, with a large proportion similar to the Chinese liver fluke eggs, but projections shell around the caps are less clear.
- In their feces they are detected with great difficulty. Flotation methods are inapplicable. With a weak invasion smears are ineffective. Diagnosis of metagonimosis is same as opisthorchiasis and clonorchiasis.

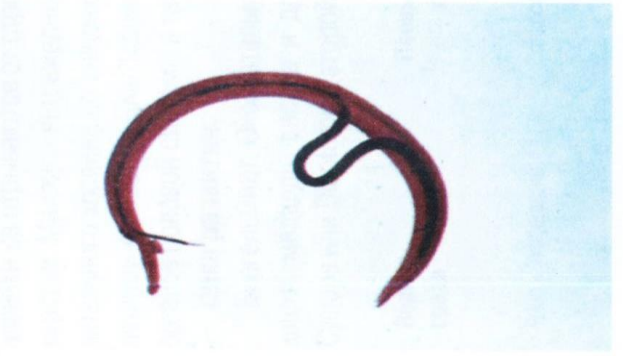
Schistosomiasis











Shistozomis is caused by three types of blood flukes ,

which are parasitic in the bladder in the veins in the gut and cause symptoms, proper to place of location.

Parasite eggs **are detected in the urine, faeces or blood.**

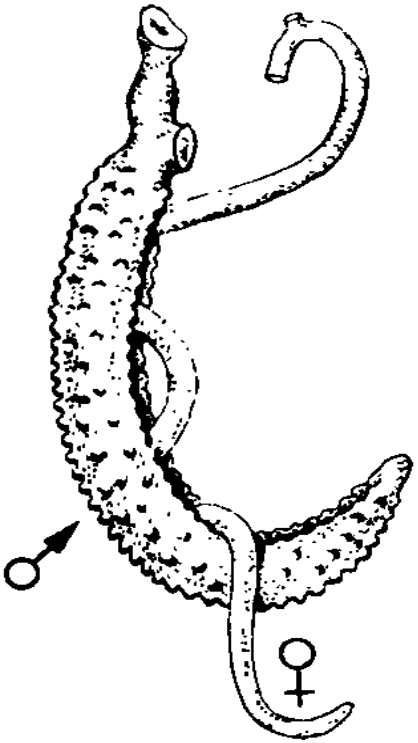
- ***Schistosoma haematobium*** – **urogenital pathogen, or *urinary schistosomiasis;***
- ***Schistosoma mansoni*** – ***causative agent* of intestinal schistosomiasis;**
- ***Schistosoma japonicum*** – ***pathogen of Japanese schistosomiasis.***

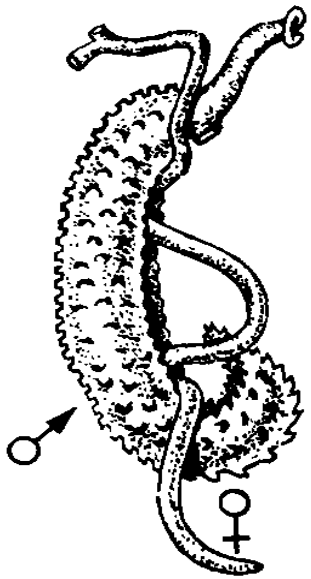
Schistosomosis agent

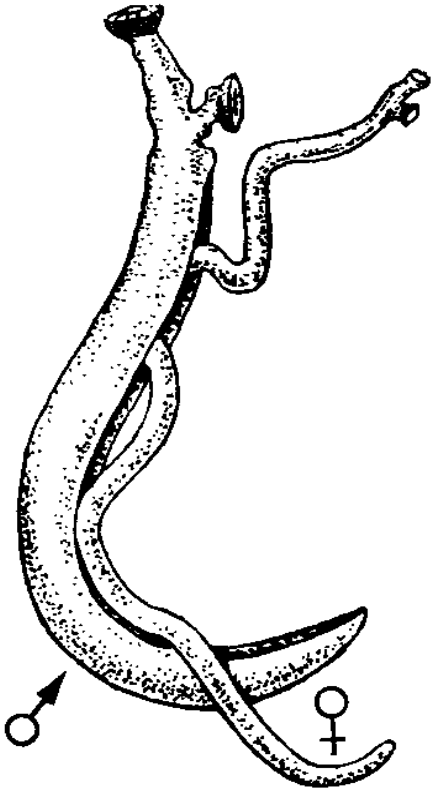
а)*Schistosoma haematobium* –urogenital pathogen, or urinary schistosomiasis;

б) *Schistosoma mansoni* –causative agent of intestinal schistosomiasis;

в) *Schistosoma japonicum* – pathogen of Japanese schistosomiasis.







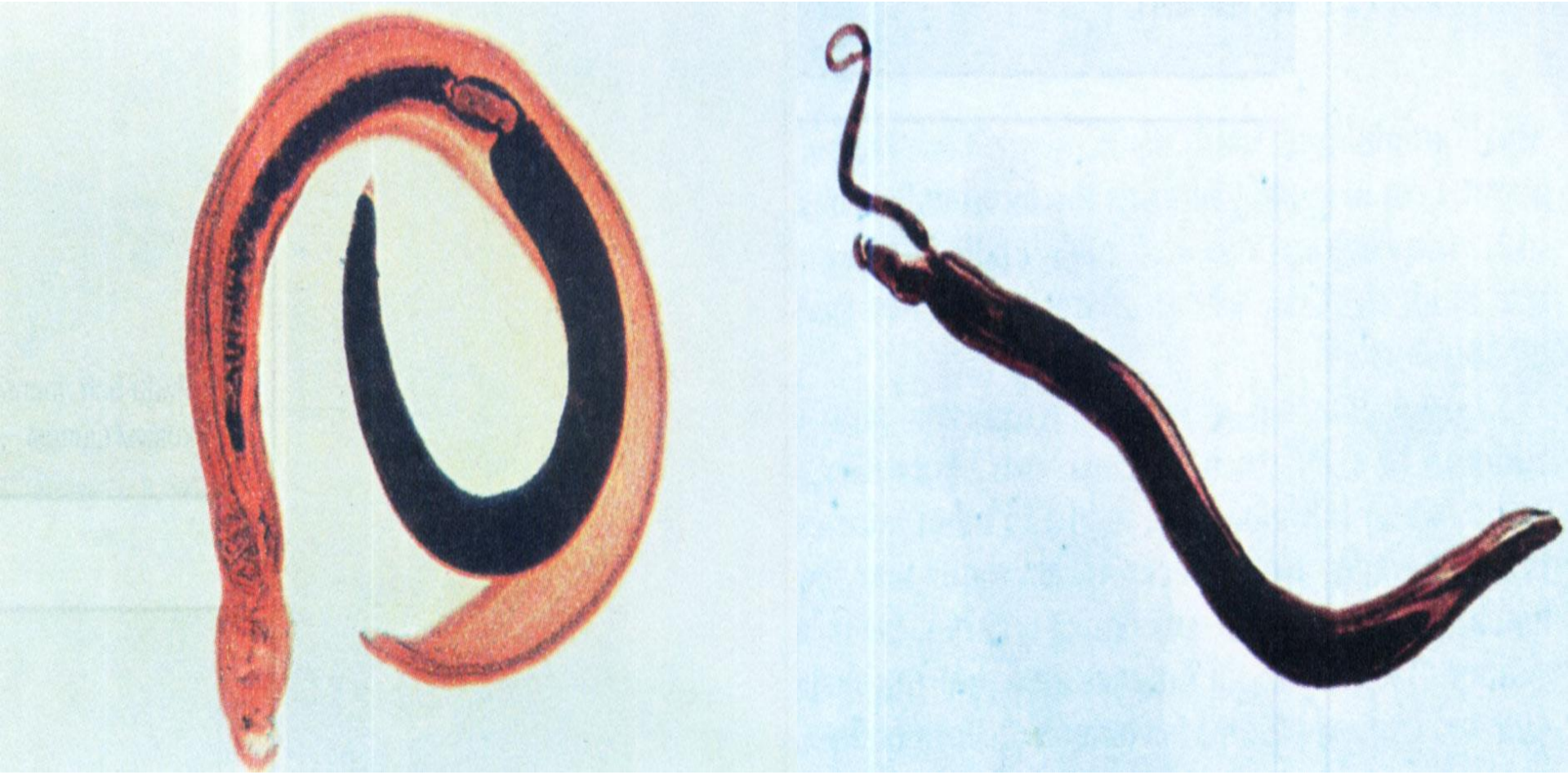
The disease occurs in tropical areas of Africa, Asia, Australia, India. Pathogens are a family of schistosomiasis Schistosomatidae, they infest the smallest branches of the blood vessels.

Representative of shistosomes - heterosexual fluke. The male body is strongly expanded behind abdominal surculus; the sides of the body bent to the ventral side and almost completly closed, resulting in a cuticular chute – gynecophoral canal. It has filamentary female.

- ***Disease:***

  schistosomiasis parasites in the smallest branchesof the blood vessels. Representatives of shistosomes - heterosexual fluke.

The male and female Japanese schistosomes

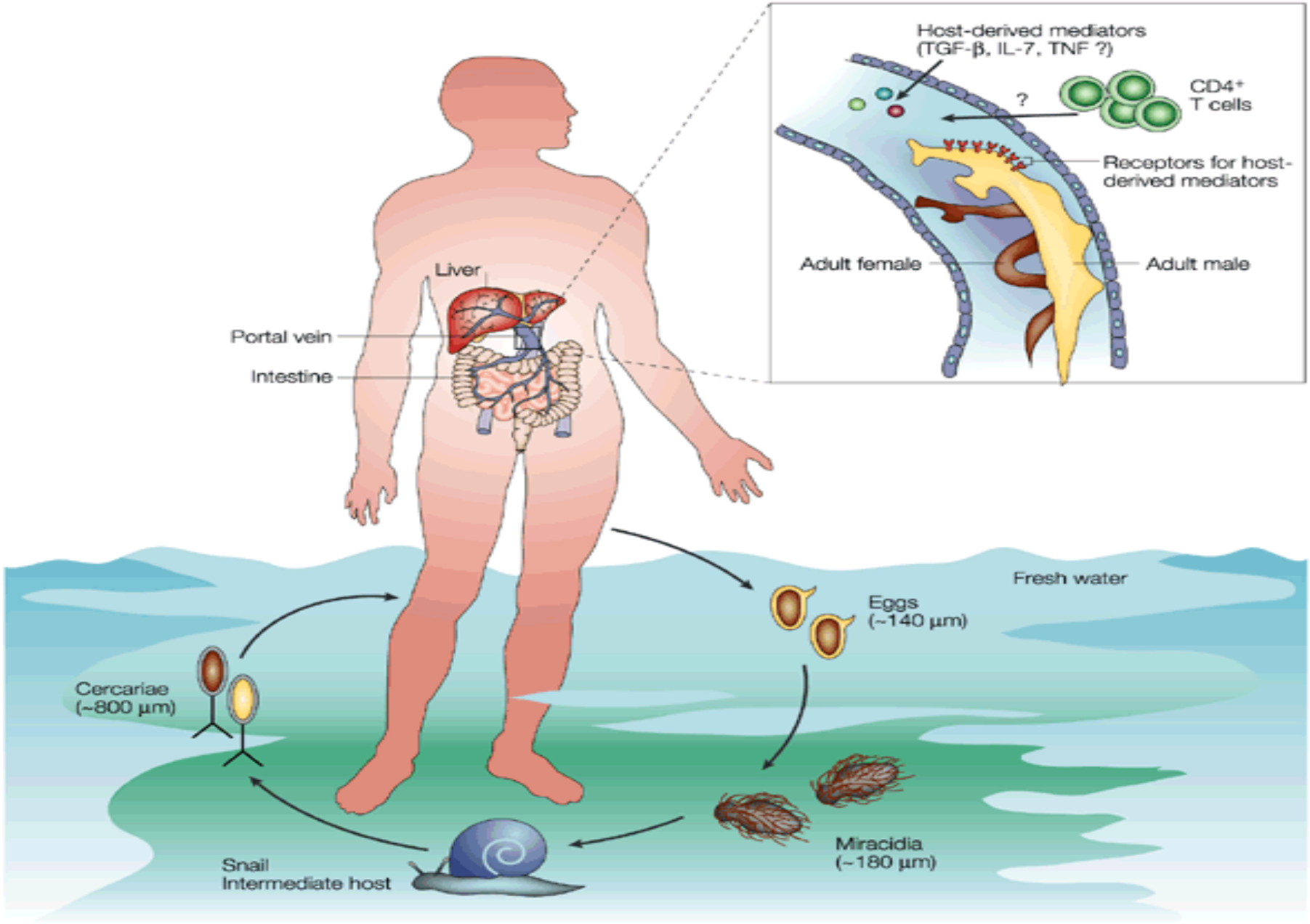


Genitourinary, or urinary chistosomiasis

- ***Causative agent - Schistosoma blood(Schistosoma haematobium).***
- Infests the small veins of the urogenital system of humans and some monkeys.
- Male body size - 10-15x1 mm. Female 20X0 has size 25 mm. Most of its body is placed in the gynecophoral cannel of male

Development cycle

- Females lay eggs in immature walls of veins. Eggs go through the tissue by the action of proteolytic enzymes and spine. Most of them fall back into the bloodstream and can be entered in the liver, spleen, lungs, brain and spinal cord, eyes and other organs. There embryos die and then encapsulated. Another part of the egg falls into the ureter. To exit miracidia need an environment with a lower osmotic pressure than urine.
- Therefore, for the future development of the eggs should definitely get into the water



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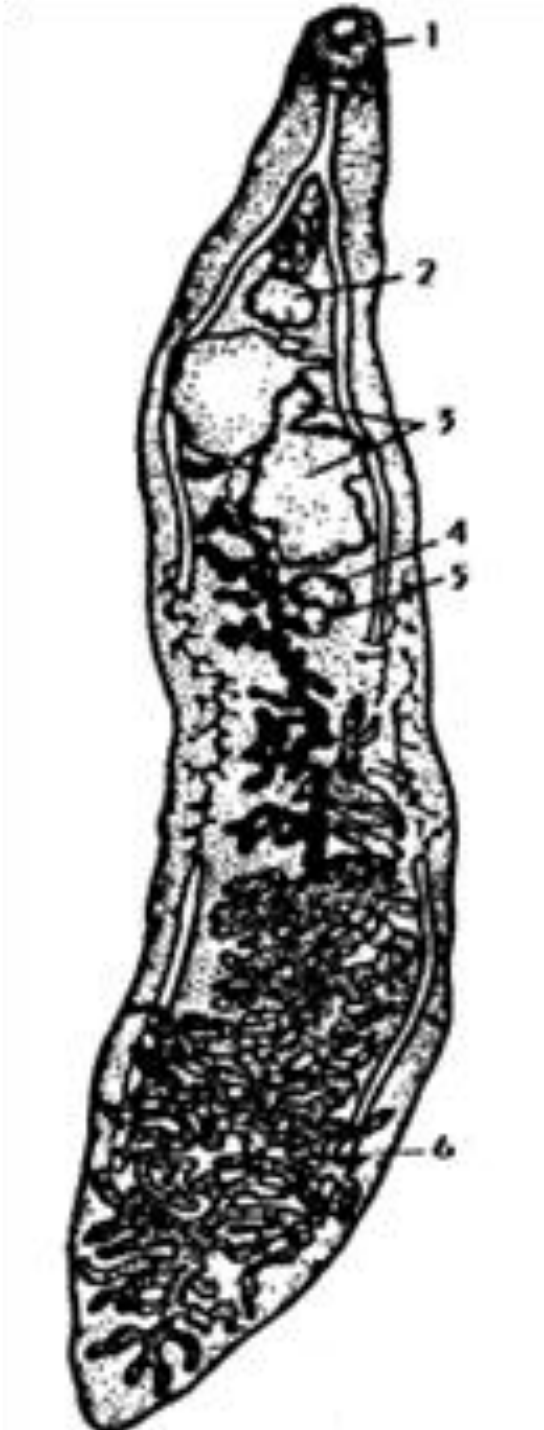
- *In a pond miracidia come from the eggs and penetrate tissue of intermediate hosts - various freshwater snails. The formation of sporocysts I and II order, and cercaria, which are infective for the definitive host. (Person).*
- *Schistosomiasis in man always starts with the introduction of cercariae through the skin or mucous membranes (percutaneous way) that occurs when bathing, working in rice paddies or drinking raw water containing cercariae.*

- ***In place of the introduction*** **of cercariae irritation occurs -** ***shistosomosis dermatitis*** -
- petechiae, itching, hives, swelling of tissues. In the future, develop a fever, cough, chest pain, eosinophilic infiltrates in the lungs.
- Depending on the intensity of infestation of these symptoms persist for 3 to 6 weeks and gradually subside. After 4-6 months of symptoms from the bladder - blood in the urine (hematuria due to damaging effects on the mucous terminal spike), dysuria, pain in the lower abdomen, perineum, blood eosinophilia. Daily blood loss can be significant - up to 126 millilitres
- Males can be affected by the seminal vesicles, the prostate.
- Women marked papilloma vagina and other genital organs. In endemic foci of schistosomiasis bladder cancer occurs 11 times more frequently than in other areas.

- ***Dicroceliasis is*** ***caused by***

Dicrocoelium dendriticum* (the lancet fluke)** ***-lancet fluke



Dicrocoelium dendriticum

1 - rotovaya surculus

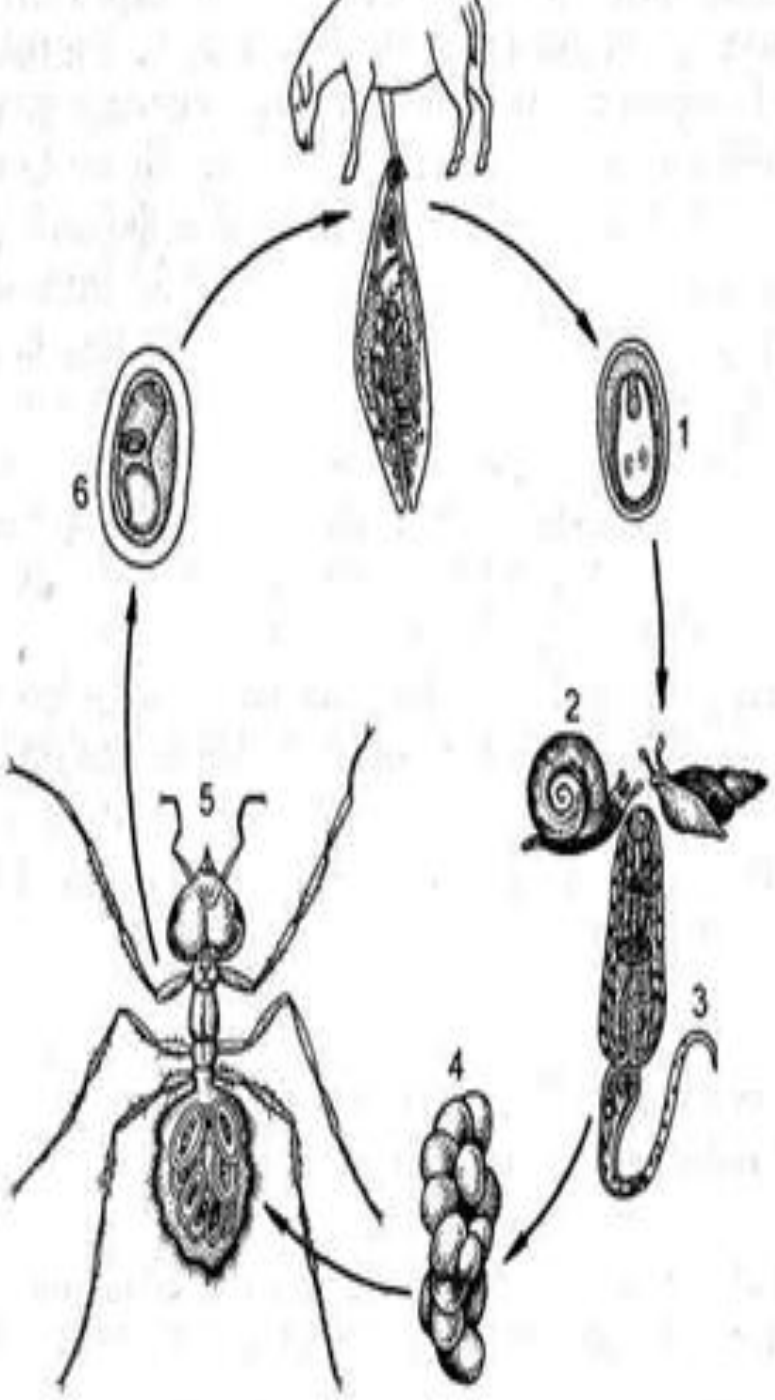
2 - ventral surculus,

3 - testes,

4 - ovary

5 - spermatheca,

6 - uterus.



Lifecycle of lanceolate fluke

- *1. - egg with miracidia;*
- *2 - 1st intermediate host (shellfish);*
- *3 - cercariae;*
- *4 - prefabricated cysts;*
- *5 - 2nd intermediate host;*
- *6 - metacercariae.*

The causative-lancet fluke (Dicrocoelium lanceatum)

Body length - 5-12 mm, 1-2.5 mm. Dikroselis - parasite of the bile ducts of the liver, gall bladder. Weak infestation may be asymptomatic. When intensive invasion we can observe the pathological changes in the bile ducts of the liver, inflammation lead to cirrhosis. In the gallbladder bile is thick and there is a large number of parasites.

Development cycle

- Dikrotselisis egg is expelled from the gut main host (cattle and small cattle, pigs, horses, donkeys, dogs, cats, marrmots, squirrels, rabbits, bears, deer, fallow deer, moose, monkey, human) through the digestive tract with the already developed miracidia .

The first intermediate host

- After ingestion of eggs the first intermediate hosts are terrestrial shells of various kinds, miracidia hatching eggs are introduced into the liver, where the development of sporocysts with two stages (first and second generation) and parthenogenetic reproduction of larval stages.

- Formed cercariae migrate into the mantle cavity, where covered with slime and go outside in the form of acinar clumps consisting of 3-12 balls - "modular cysts" with diameter 1.5-2 mm

The second intermediate host - ant

•Formed cysts (containing from 100 to 300 cercariae) ingested by the second intermediate host - the ant genus Formica or Proformica. Period of development from miracidium to cercaria from 4.5 months to a year. Most shellfish die because they do not stand a parasitic infection.

In ants (second intermediate host)

•After ingestion of cysts in muscle teams or in the fat body of an ant through 35-55 days developed metacercariae (one ant to 261 cysts). After that, with decreasing ambient temperature ant falls into a stupor. During torpor ants are most commonly found on the tops of herbaceous plants, which facilitates contact with definitive hosts. With increasing temperature ants return to an active state.

Definitive host

When an ant gets infested with grass to the final master metacercariae opened in the duodenum, and the young dicrocelii migrate to the liver through the common bile duct. However, the case is marked when dicrocelii migrate through the abdomen hematogenous way is possible. There are cases of human infection by dicroceliasis (randomly by alimentary) on all continents, mainly in the southern latitudes.

a

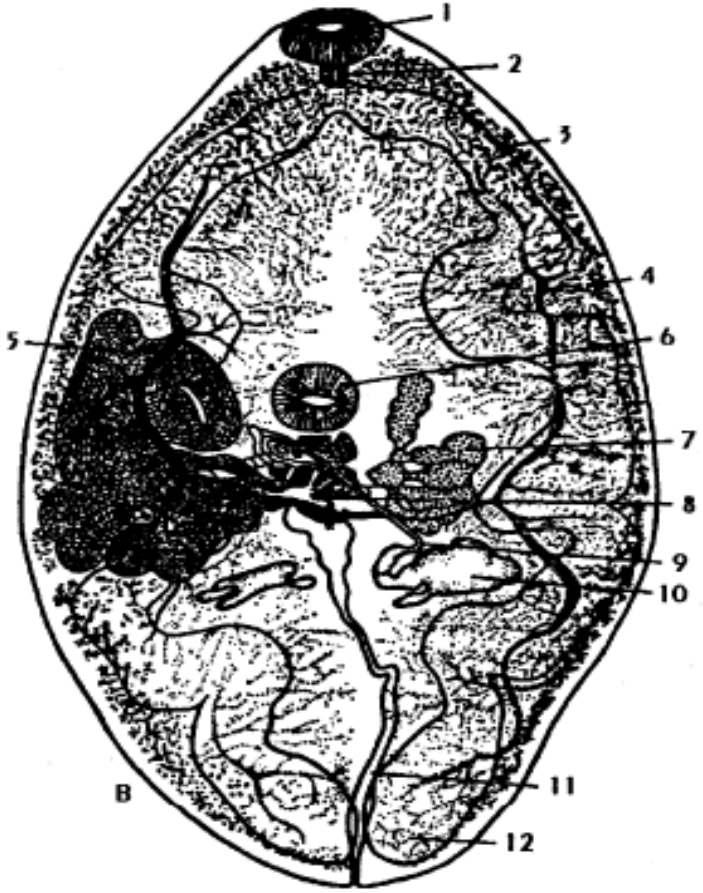
laboratory diagnosis

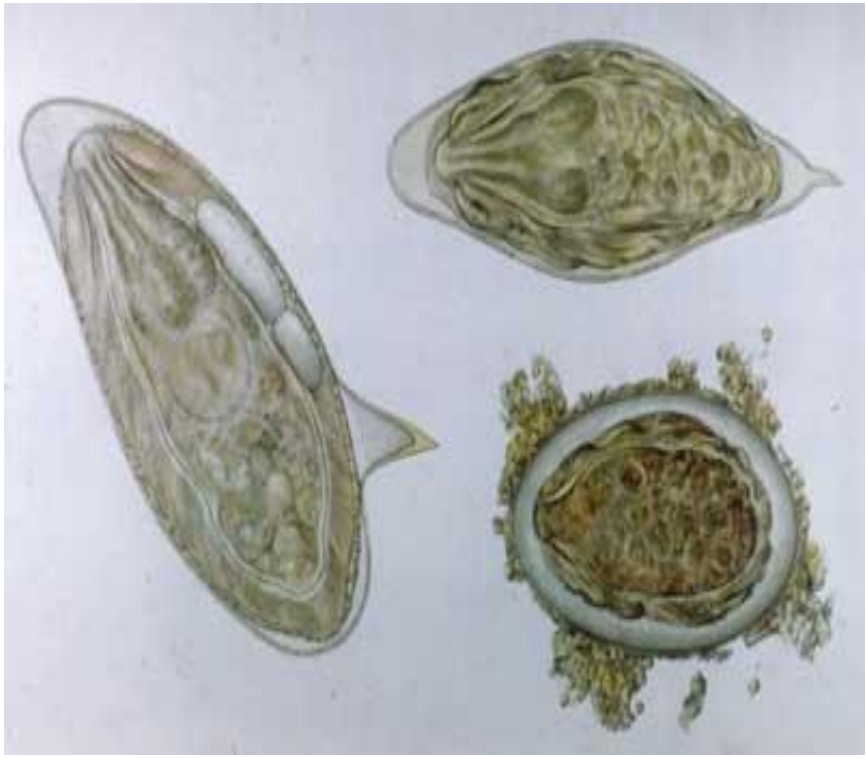
- Diagnosis is by finding eggs in the duodenal juice and in the faeces. Chance finds transit eggs that people have used in food with an infected animal liver patients. Egg size 38-45 to 25-30 microns. Eggs are slightly asymmetric, with a thick skin, dark brown, with lids. Tubercle on the pole opposite a lid is invisible.

Paraganimis is caused by

Paragonimus westermani,

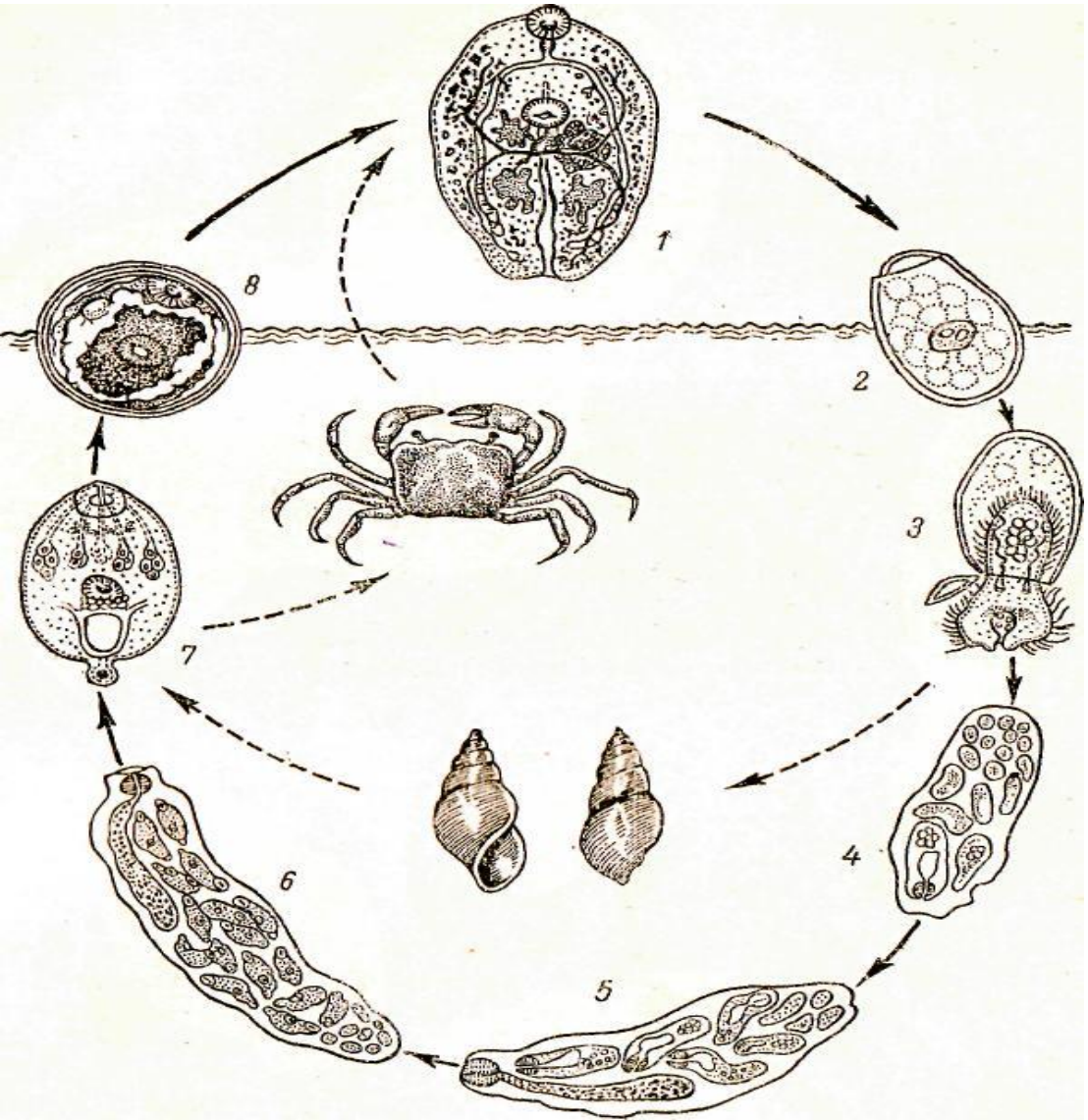
lung fluke





Development cycle

Paragonimus westermani



1 – Marit

2 – egg

3 - miracidia coming out;

4 - sporocysts;

5 - parent rediya;

6 - daughter rediya in shellfish

7 - cercariae;

8 - metacercariae in the body of the crab.

Paraganimsis is caused by ***Paragonimus westermani*** **– typical nidal diseases. In paragonimosis area includes China, Taiwan, Indonesia, India, the Philippines, South America (Peru, Ecuador, Colombia, Venezuela, Russia).**

Paragonimusis *localized in the lungs in the pleural cavity, pancreas, intestine, mesenteric lymph nodes, prostate, liver, skin, brain, so on.*

In this regard, there are a variety of symptoms and varying degrees of impact on the body.

Development of mature parasite takes half to three months after infection.

- ***Paragonimiasis** can stimulate bronchiectasis, pleurisy, tuberculosis, so on., with benign course. It is very difficult to treat paragonimiasis with helminth eggs in human brain. In this case develop symptoms of brain pathology - meningoencephalitis, encephalitis, etc.*

Laboratory diagnosis

lung form of pulmonary distomiasis is diagnosed by finding eggs in sputum Intestinal localization,accompanied by diarrhea, eggs are found only in the feces. Very complicated diagnosis of brain infections which in its final form may sometimes be set only when the craniotomy or Patala anatomical dissections.