

HELMINTHS

CESTODES and TREMATODES

Tapeworms (cestodes)

- long, segmented and a tape-like worms
- are found in the intestinal lumen as adults
- are hermaphrodites (has both testes and ovaries)
- have:
 - ⇒ head (**scolex**) with suckers / grooves / hooks / spines
 - ⇒ **neck** contains germinal cells that give rise to new proglottids
 - ⇒ **strobila** with body segments (proglottids)
- tapeworms lack any trace of a digestive tract □ must absorb all substances through their external covering
- common symptoms:
 - abdominal discomfort
 - diarrhea
 - nausea
 - weakness
 - » competition with the host for nutrients
 - » mechanical obstruction or migration to the unusual sites
 - » evocation local inflammatory reactions
- the **larval forms of cestodes** (hydatid, cysticercus) may be located in various organs



Adult tapeworms usually inhabit the alimentary canal of their hosts (though they occasionally are found in the bile or pancreatic ducts)

Have a benign course (often asymptomatic)

Taenia solium,
Taenia saginata,
Hymenolepis nana,
Diphyllobotrium latum

Larvae being found in almost any organ of both vertebrate and invertebrate hosts Have a severe course with a poor outcome

Echinococcus granulosus , alveolaris
Cisticercus
Sparganosum

Taenia saginata

- ***T. saginata*** has a cosmopolitan distribution, but is more common in developing countries where hygiene is poor and the inhabitants have a tendency of eating raw or insufficiently cooked meat.
- *T. saginata* is the most common adult tapeworm found in man.

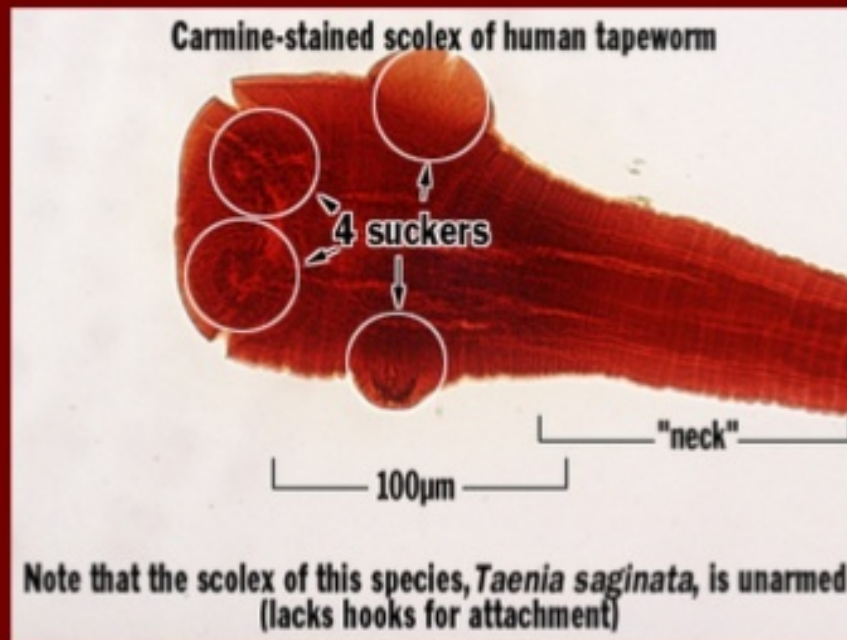
Taenia saginata

- **3 m - 5 m length, \approx 20m;**
- **lifespan 25 years**
- **scolex is composed of 4 powerful suckers**
- **definitive host: man**
- **intermediate: cattle**
- **ingestion of raw or poorly cooked meat of infected cattle**

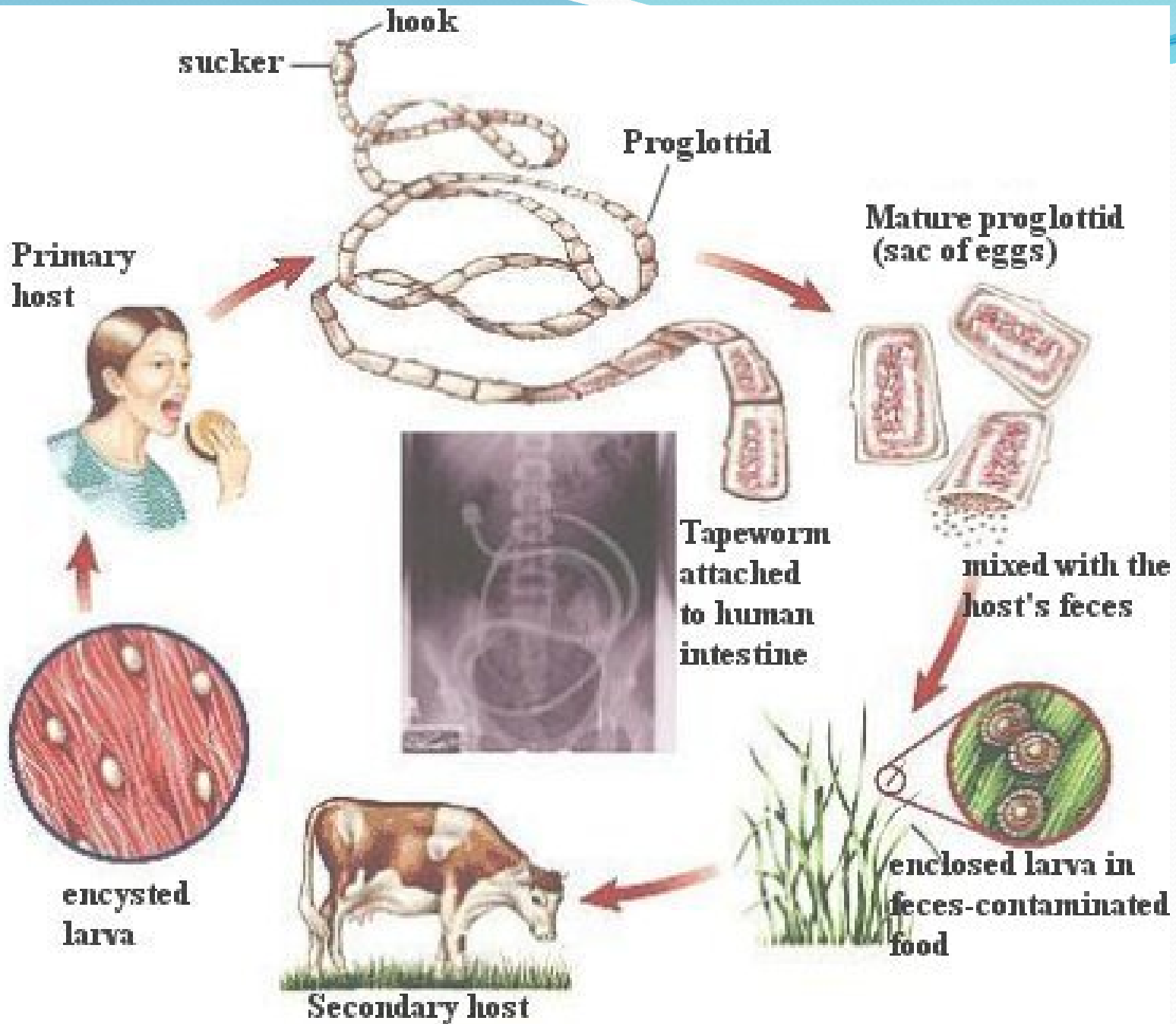


Tenia saginata

- este fara coroane de carlige
- *Tenia narmata* (inermis)



***Taenia saginata* - inermis**



CLINICAL DISEASES

- Incubation 2,5-3 months
- Usually asymptomatic
- Gravid segments active detach and passed in the feces
- In heavy infection:
 - » weight loss, headaches, dizziness, loss of appetite
 - » intestinal upset, nausea, abdominal pain, diarrhea / constipation, chronic indigestion
- Intestinal obstruction
- Allergic reaction in the individual
- Slenderize
- Neurological symptoms: headache, dizziness, irritability, insomnia, visual and tactile hallucinations

Complications:

Acute appendicitis,

Necrotizing pancreatitis,

Obstructive jaundice,

Intestinal obstruction,

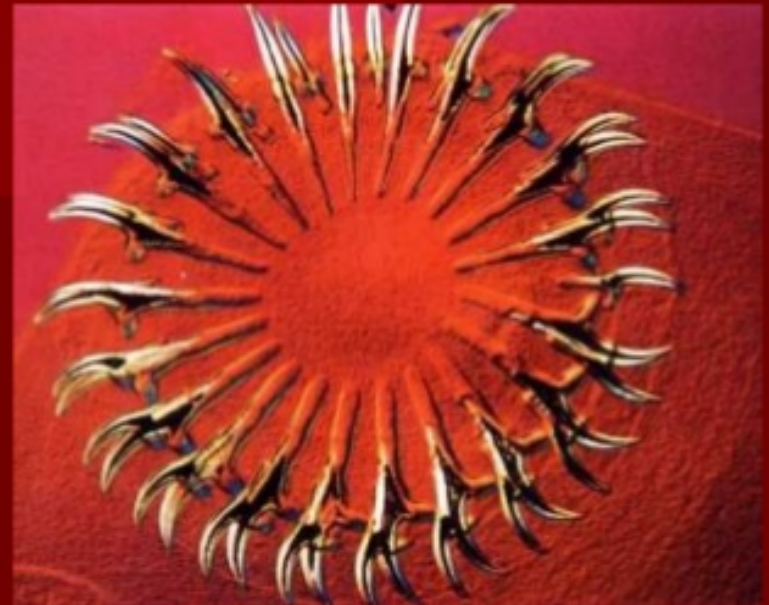
Bowel perforation with peritonitis

Taenia solium

- pork tapeworm
- 2-4 meters long, the proglottids can be identified by the number of uterine branches 7 - 13 for *T. solium*
- scolex with 4 suckers and rostellum of 20-50 hooklets
- microscopical appearance of the ova of *T. saginata* and *T. solium* are identical.
- definitive host: man
- intermediate host: pig, man
- human - ingesting cysticerci in raw pork
- adults ⇒ small intestine; egg laying □ in 2-3 months
- taeniasis - asymptomatic, only sign ⇒ proglottids in feces

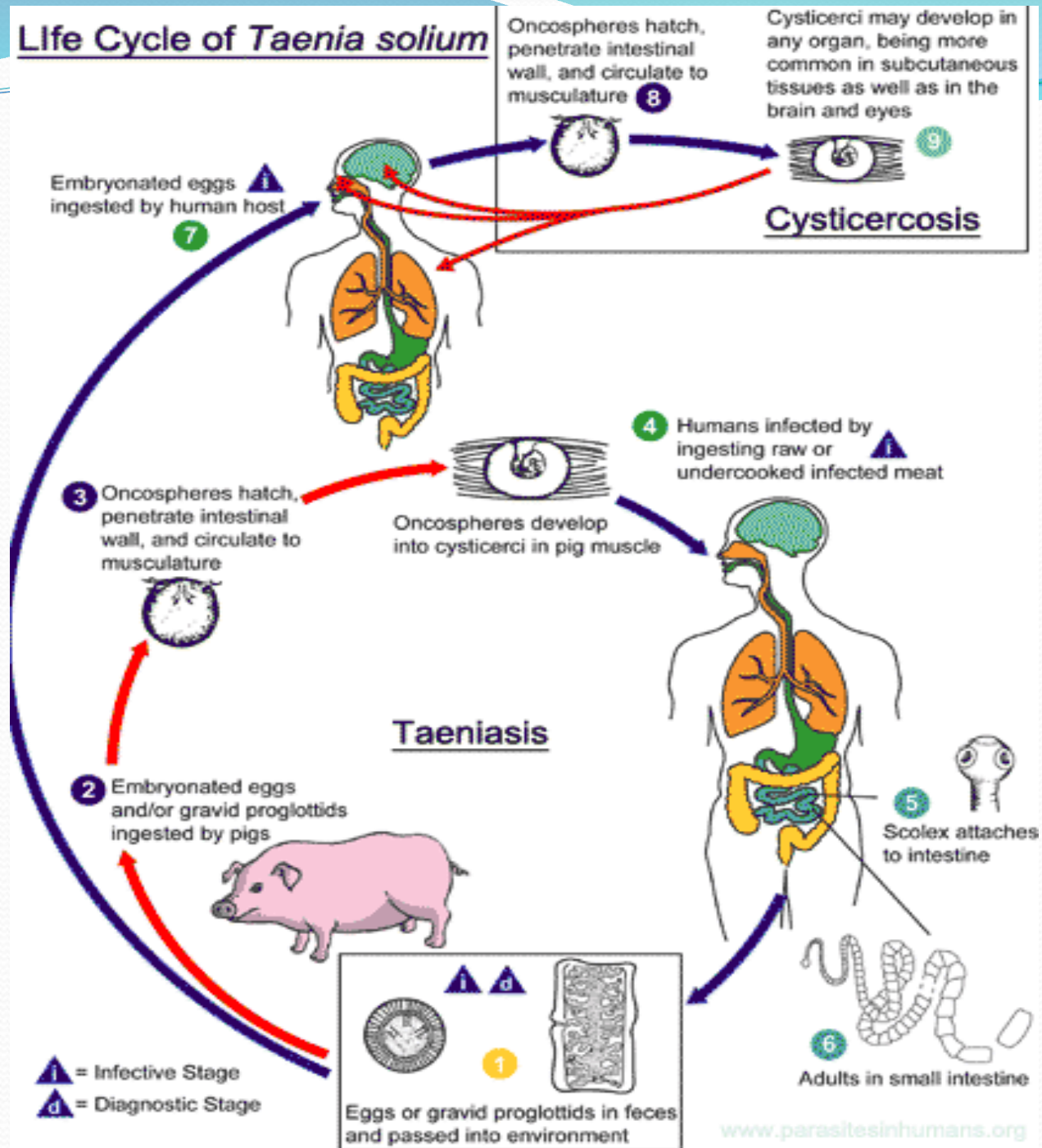
Tenia solium

- prezinta la extremitatea anterioara a scolexului (extremitatea anterioară a teniei, pe care se află organele de fixare) o coroana dubla de carlige



Tenia solium sau
tenia armata
(din cauza carligelor)

Life Cycle of *Taenia solium*



Clinical manifestation

- Incubation period - 2.5-3 months
- Often asymptomatic
- Segments are allocated only faeces (never go out alone from the intestine)
- Clinical manifestations of 2-3 times more often than in *T.Saginata*
- Deprivation of nutrition
- Dysfunction of the intestine: abdominal pain, epigastric or right upper quadrant, bloating, nausea, vomiting, diarrhea or constipation, increased appetite
- Allergic reactions
- Appendicitis
- Obstructions of the intestine
- Glossitis: tongue increased in size, mucosal ulceration of the oral cavity
- Neurological symptoms: headache, dizziness, insomnia, epileptic seizures
- Impaired vision: diplopia, decreased vision

Laboratory diagnosis

- Diagnosis of intestinal taeniasis can be made by recovery of the characteristic ova in the stool.
- The ova of *T. solium* and *T. saginata* are identical and diagnosis is made by the recovery of the segments or scolex.
- Immunodiagnostic test - detection of IgG antibodies in serum reactive with *T. solium* antigens present on a membrane.
- Genetically - *T. solium* - I genotype (Asia) - more aggressive in adults causes cysticercosis
II genotype - (America, Europe, Africa), less aggressive

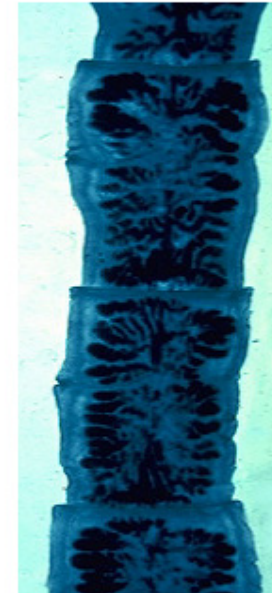
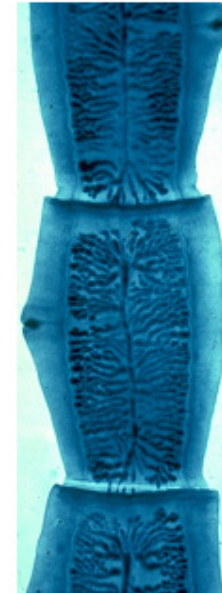
Taenia saginata

Taenia solium

Scolex



Proglottis

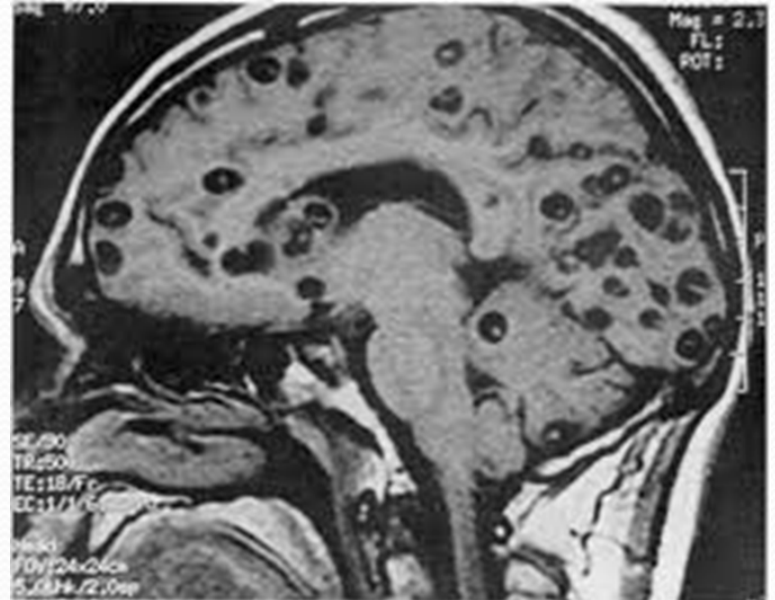
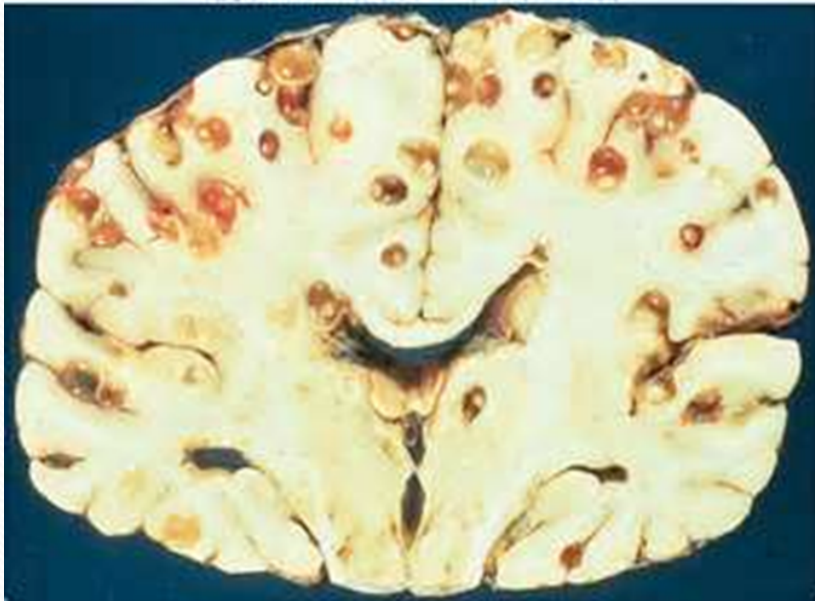


Embryophores



Clinical forms of cysticercosis

- Neurocysticercosis ventricular system - headaches and seizures - 95%, 99% lethal!
- Spinal neurocysticercosis - rare! Coccyx area.
- Cysticercosis of the heart muscle - myositis, arrhythmias, pericarditis, muscle pain, decreased performance



Ocular cysticercosis -

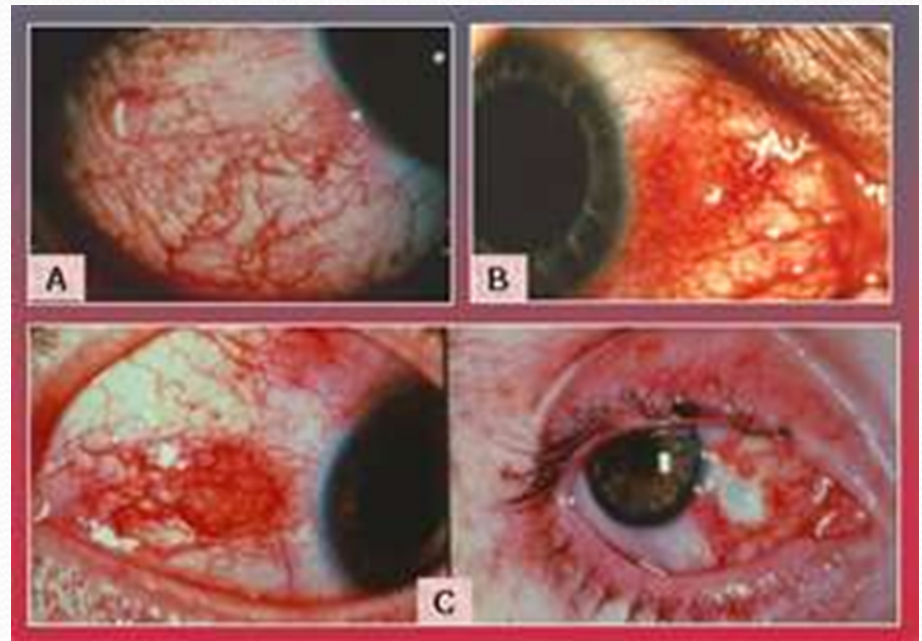
hemilesion!

Globe, conjunctivitis

sub conjunctivitis

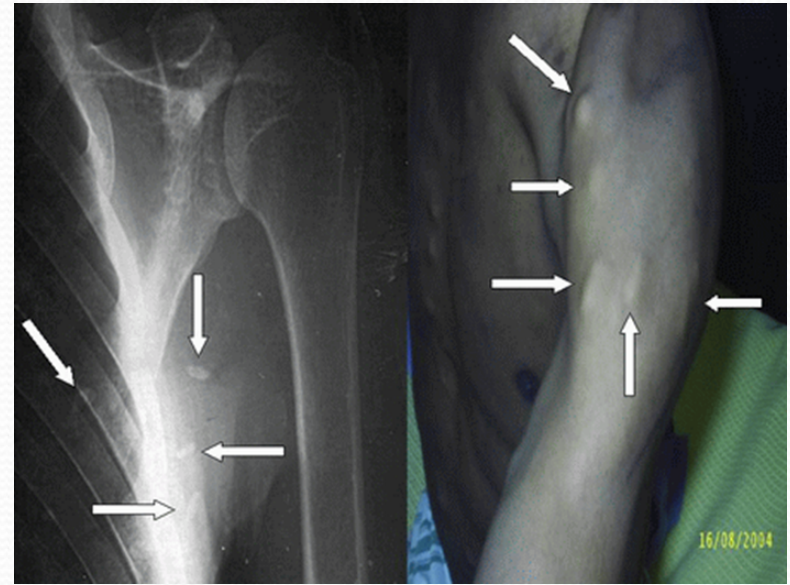
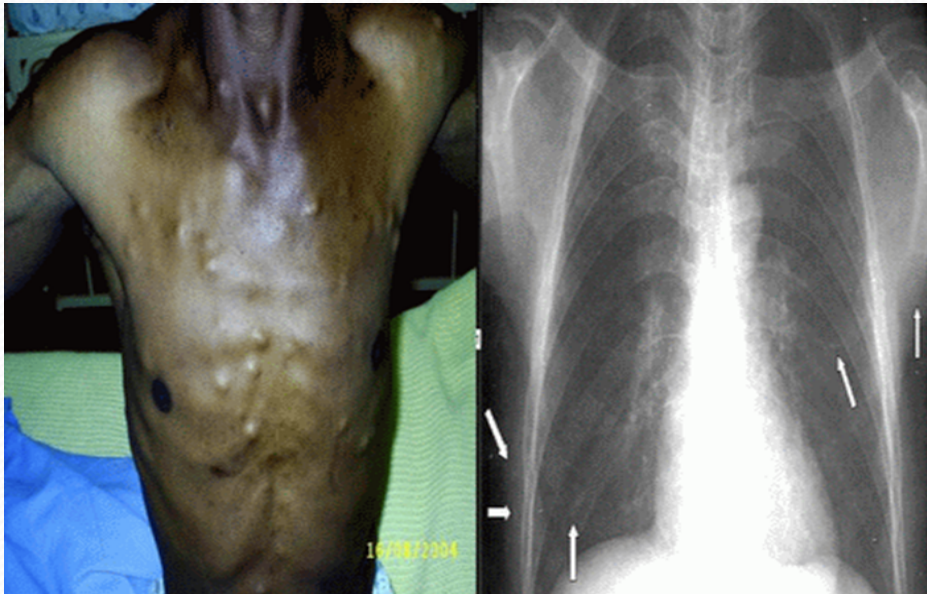
orbits

extra ocular muscles



Cysticercosis skin and muscles - intercostal muscles, extremities muscles, masticatory, tongue muscles, the aesthetic effect.

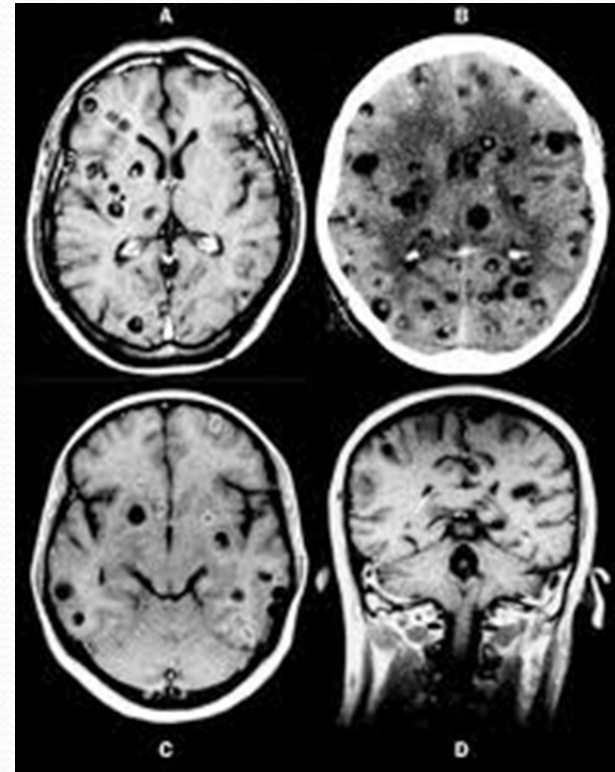
Invasion of muscle: asymptomatic or myositis, fever, eosinophilia, muscular pseudo hypertrophy, (*initiate with muscle swelling, later ⇒ atrophy and fibrosis*)





Laboratory Diagnosis in Cysticercosis

- Biopsy (subcutaneous nodule). Calcification in muscles usually appears three to five years after initial infection, and are most typically seen as spindle-shaped calcifications, most numerous in the thighs.
- X-ray/CT/MRI: cerebral cysticercosis. MRI scans may reveal the presence of lesions in the brain. Calcified cysticerci are less often seen in the brain: in about one-third of cases, 10 years or more after infection.
- Ophthalmoscopy: ophthalmic cysticercosis
- In cerebral cysticercosis:
- CSF: significant eosinophilia, lymphocytosis, raised protein albumin;
- ELISA can reveal antigens in the CSF and in serum, but false negatives can occur in



Treatment

Praziquantel 5-10 mg / kgc single dose

Niclosamidul 2 g - adult single dose

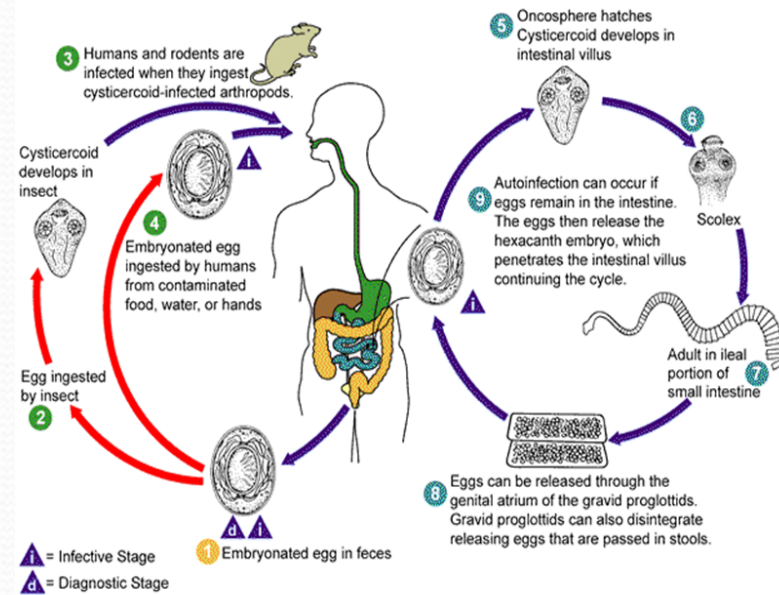
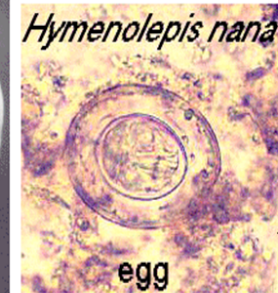
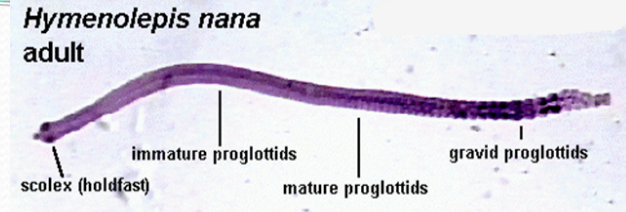
Albendazol 400mg/zi 3 days

Prophylaxis

**Heat treatment of meat - at 55 ° C
destroyed larva**

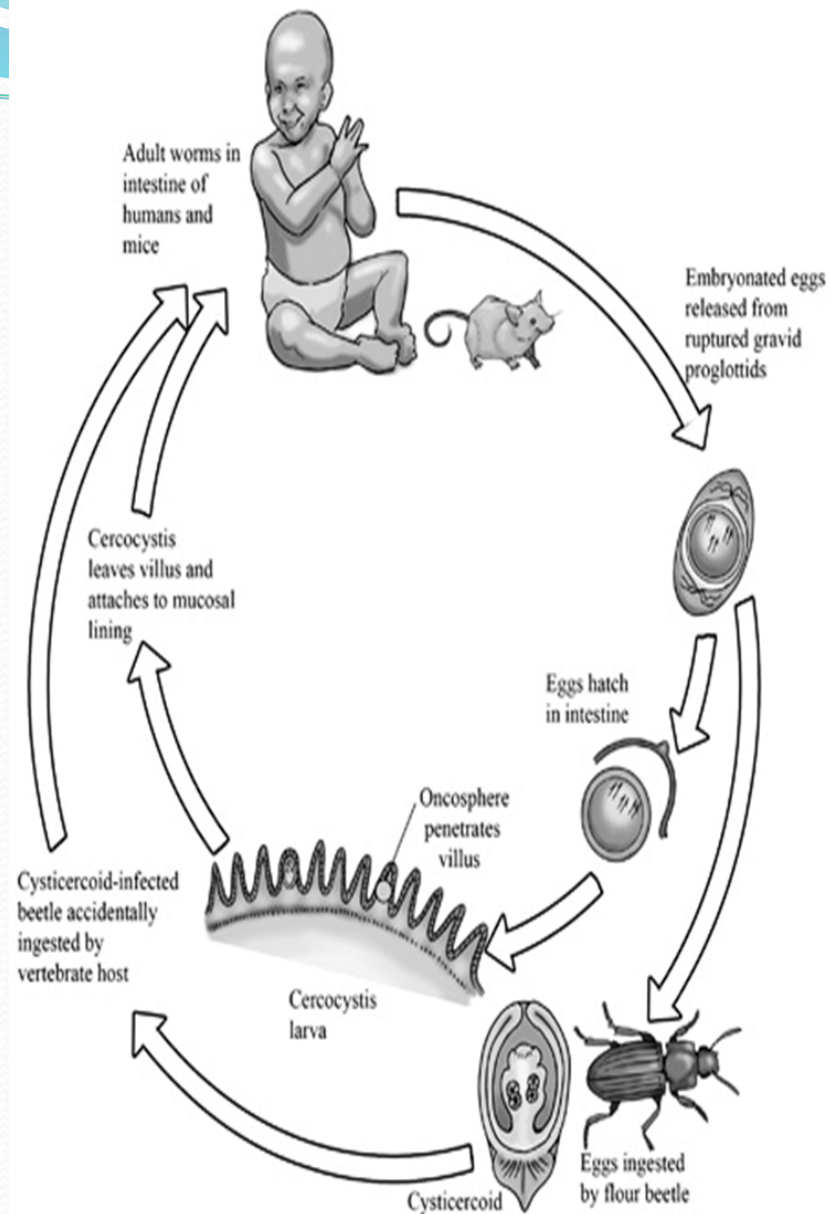
Hymenolepis nana

- The dwarf tapeworm, is the smallest tapeworm to infect humans.
- Has a cosmopolitan distribution and is thought to be the most common tapeworm throughout the world.
- The infection is more frequently seen in children although adults are also infected
- The adult tapeworm is normally 2.5-4cm long, scolex armed with one circlet of five hooks. The segments are wider than they are long
- Egg - contagious to humans - into the intestine - endogenous and exogenous autoinfection



Hymenolepis nana

- 3,5-4,5 cm length
- *Hymenolepis* live in rats, common in warm climates
- *Hymenolepis* ⇒ **rats feces** ⇒ consumed by secondary hosts: beetles (ex. **flour beetle**) ⇒ cysticeroid
- **infection in humans:**
 - » eating material contaminated by insects
 - » directly person to person
 - » **autoinfection:**
into the ileum: eggs ⇒ oncospheres ⇒ cysticeroid ⇒ mature adults ⇒ eggs ⇒ some penetrate intestinal villa
- asymptomatic or GI discomfort



Development cycle - 21-30 days.

Lifespan *Hymenolepis* in the body - no more than 30 days, but because of self-infection disease may continue for many years.

Clinical Disease

- The incubation period of 2-3 weeks
- Infections due to *H. nana* may cause no symptoms even with heavy worm burdens.
- Symptoms of restlessness, irritability, anorexia, abdominal pain and diarrhea have been reported.
- Neurological symptoms - headaches, irritability, lethargy, dizziness, decreased attention and memory
- Allergic symptoms - maculo-papular rash, itching, swelling Quincke, vasomotor rhinitis, kerato-conjunctivitis
- Heavy worm burdens may be caused by auto-infection which can be a problem in the immunocompromised.

Laboratory Diagnosis

- Diagnosis is based on recovery and identification of the characteristic ova in a formol-ether concentrate of feces.
- Adult worms and proglottids are rarely seen in stool samples.

Treatment

Niclosamid 60-80 mg / kgc / day.

1 day - 2 g, the next 6 days - 1 g / day

Recurrence rate after 10 days of treatment

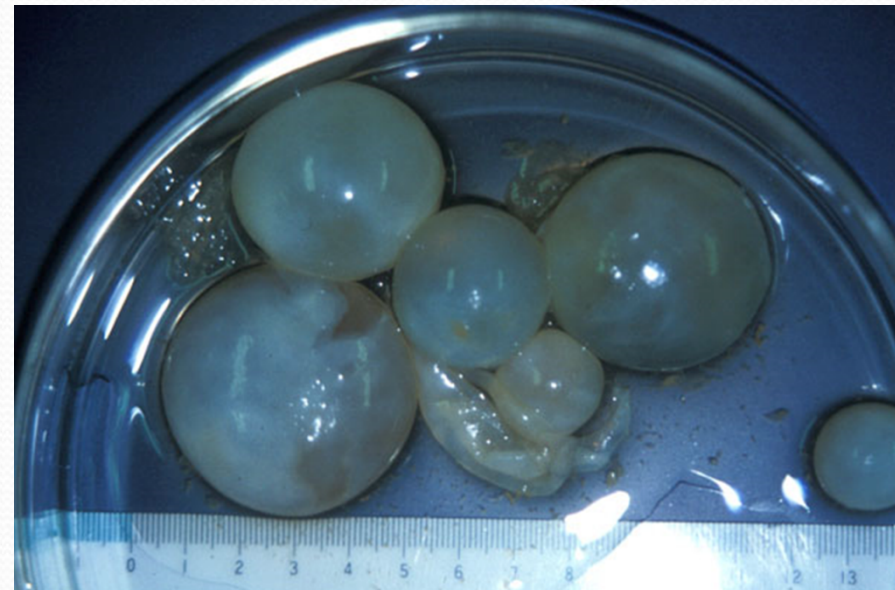
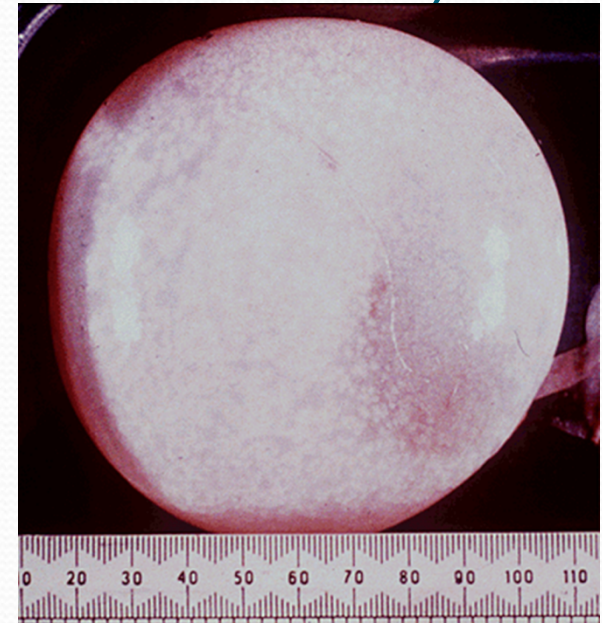
Praziquantel 20-25mg/kgc/day once

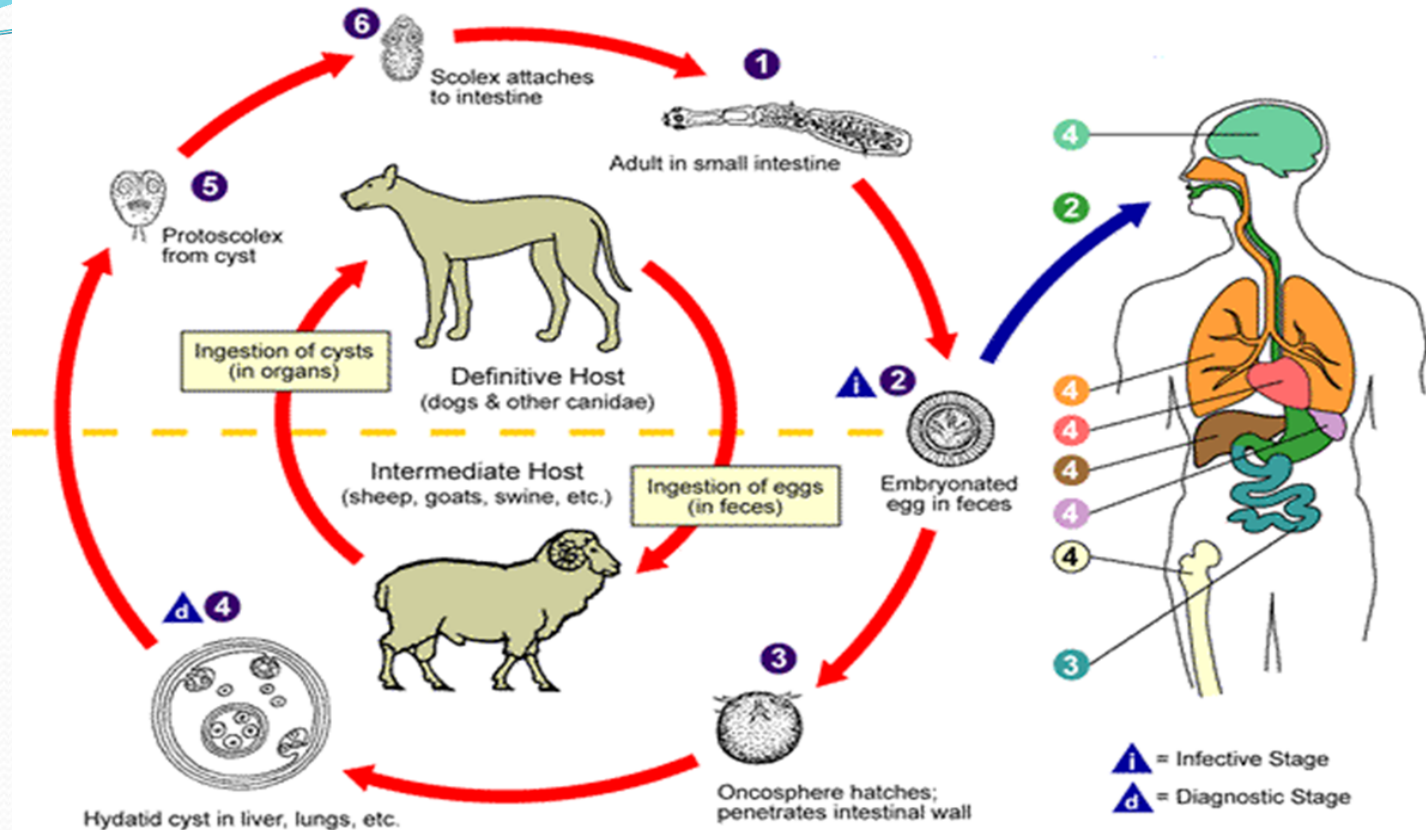
After treatment is recommended - copro-parasitological examination weekly for 4 months

Echinococcosis (hydatidosis, or hydatid disease)

Echinococcosis Hydatid Cyst

- Cystic echinococcosis (CE) is the larval cystic stage of a tapeworm (*Echinococcus granulosus*, 3-6 mm long)
- definitive hosts – carnivorous (dogs)
- intermediate host - herbivorous (sheep, cattle, and goats) and humans
- humans infected by ingesting tapeworm eggs from carnivore
- the central cavities of cysts are filled with fluid & protoscolices
- growth rate of cysts is highly variable (average $\approx 1-1.5$ cm/y)
- months - years may pass before symptoms appear
- spontaneous cure of cystic echinococcosis is possible





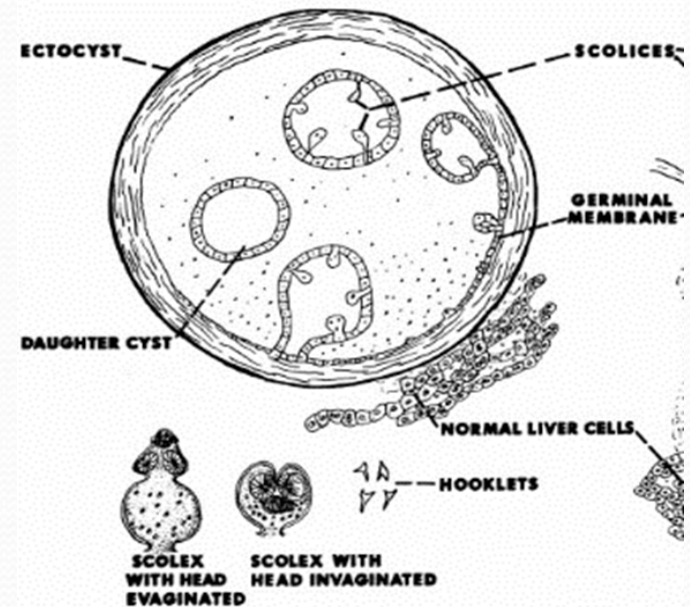
- The adult ***Echinococcus granulosus*** resides in the small bowel of the definitive hosts, dogs or other canids. Gravid proglottids release **eggs** that are passed in the feces. After ingestion by a suitable intermediate host (under natural conditions: sheep, goat, swine, cattle, horses, camel), the egg hatches in the small bowel and releases an **oncosphere** that penetrates the intestinal wall and migrates through the circulatory system into various organs, especially the liver and lungs. In these organs, the oncosphere develops into a cyst that enlarges gradually, producing **protoscolices** and daughter cysts that fill the cyst interior. The definitive host becomes infected by ingesting the cyst-containing organs of the infected intermediate host. After ingestion, the protoscolices evaginate, attach to the intestinal mucosa and develop into **adult stages in 32 to 80 days**.

Echinococcus granulosus

- primary echinococcosis - larval cysts may develop in every organ
 - most pts (80%) have single-organ involvement and a solitary cyst
 - 2/3 pts - liver echinococcosis
 - second organ involved – lung
- secondary echinococcosis - spontaneous trauma such as induced rupture or during medical interventions (anaphylaxis)



The adult stage of *Echinococcus granulosus*.



Larvae of *E. granulosus*

E. granulosus, is found in sheep-raising areas such as:
Australia, New Zealand, Tasmania, Iceland, England, Spain, Italy, Greece and other countries in Central, Eastern and southern Europe, Egypt, North, East and southern Africa, Israel, the Arab countries of the Middle East, Russia, North China, the Philippines, and Japan

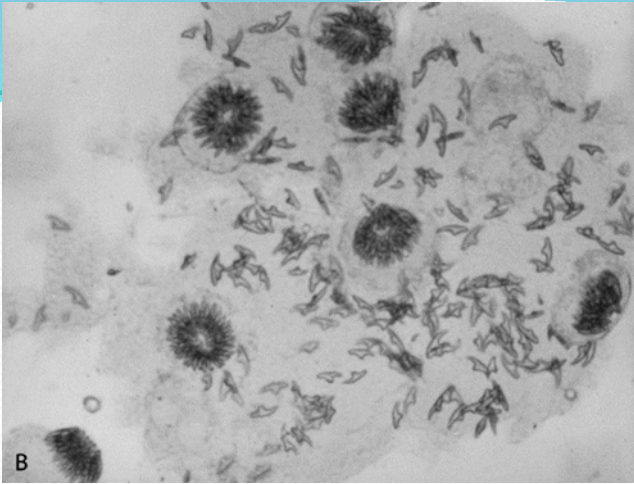


Echinococcosis. Clinical features

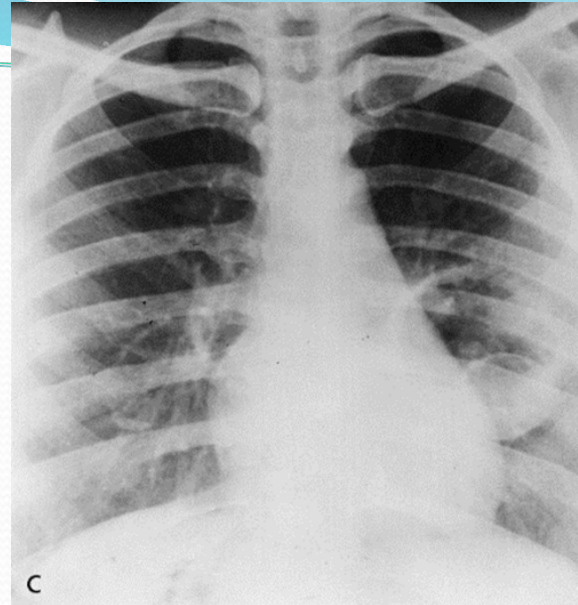
The spectrum of symptoms depends on the following:

- » involved organs
- » size of cysts & their sites within the affected organ
- » interaction between the cysts and adjacent organ structures (e.g. bile ducts; vascular system)
- » complications caused by rupture of cysts
- » bacterial infection of cysts and spread of protoscolices and larval material into bile ducts or blood vessels
- » immunologic reactions such as asthma, anaphylaxis, or membranous nephropathy secondary to release of antigenic material

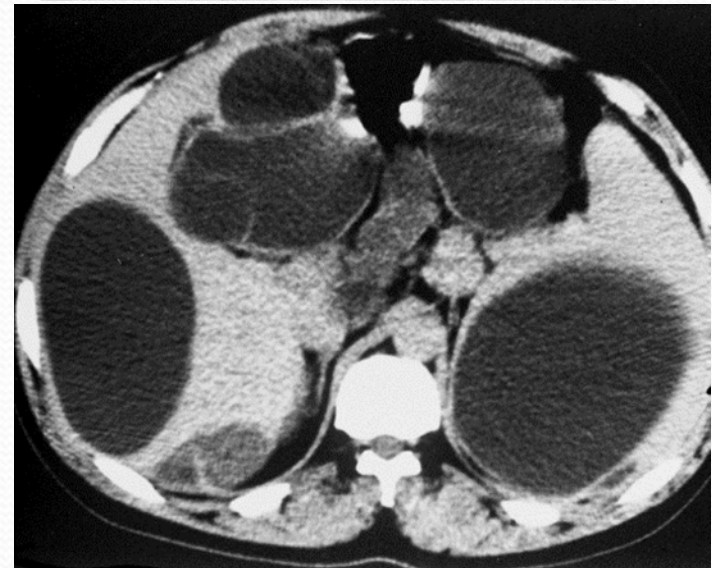
Usually, cysts do not induce clinical symptoms before they have reached a size sufficient to exert pressure on adjacent organs.



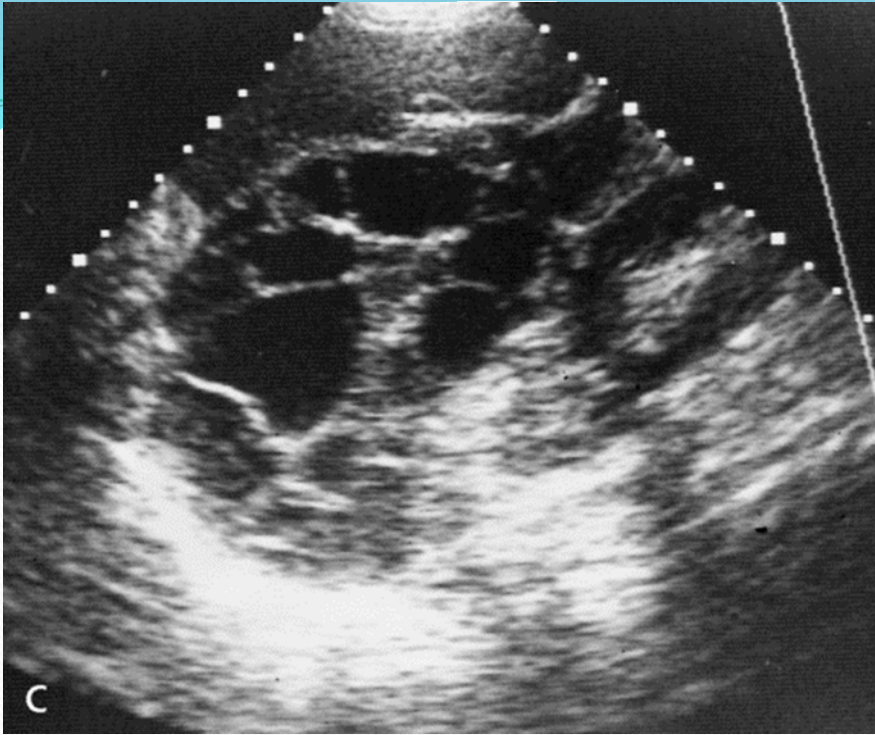
Hydatid cysts contain "sand" or sediment with multiple scolices and hooklets.



The "septa" are the walls of daughter cysts flattened by contact with other daughters

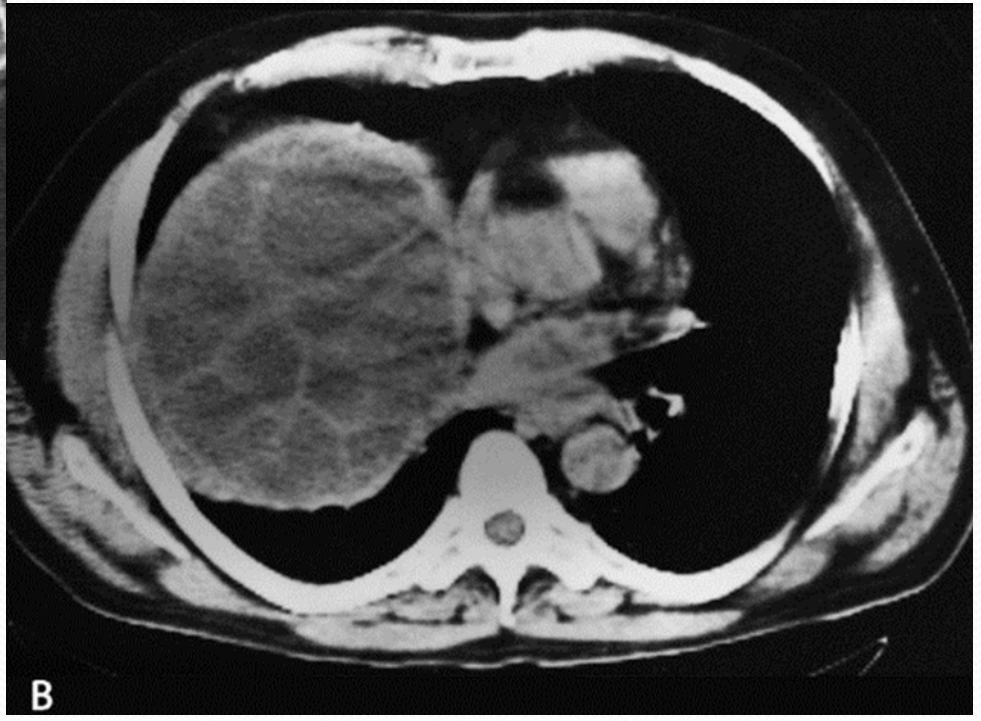


Multiple hydatid cysts are identified on nonenhanced CT scan in the right and left lobes of the liver and in the spleen,



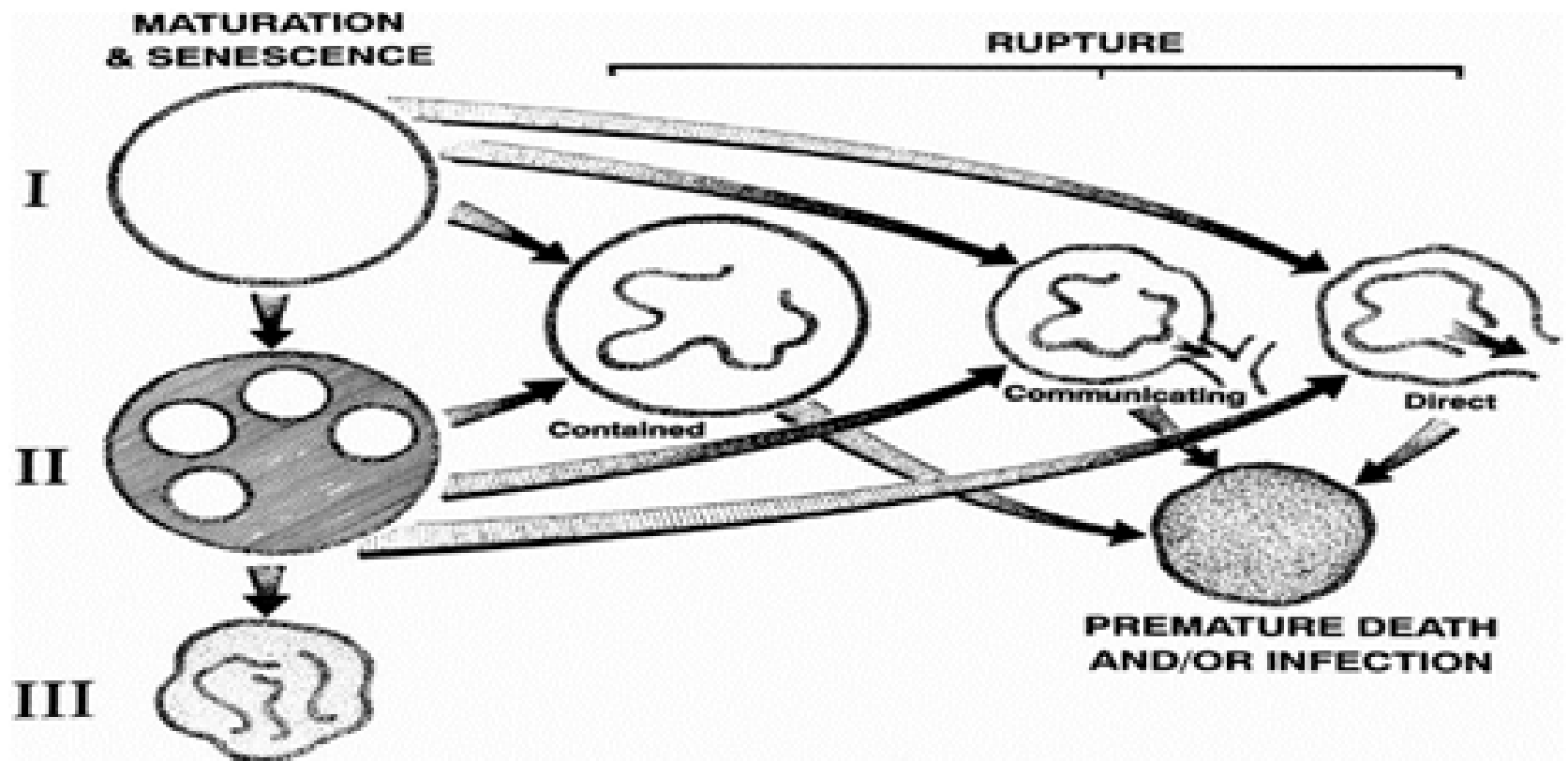
C

The ultrasound appearance



B

Nonenhanced CT scans of the liver



Schematic representation of the natural history and complications of hydatid cysts.

Cysts which have undergone contained rupture may die, but they do not become infected. The pericyst may calcify at any stage of maturation of the lesion and this does not imply that the lesion is dead. However, calcification of the endocyst and its contents is proof that the parasite has died. (Courtesy of Dr. Lewall and *Clinical Radiology*, 1998).

Echinococcosis. Laboratory

- **limited eosinophilia (<15%) or absent.**
- **ELISA: anti-*Echinococcus* antibodies IgG**
- **10% of pts with hepatic cysts and 40% with pulmonary do not produce detectable serum IgG Ab (false-negative results)**
- **cysts of the brain or eye and calcified cysts often induce no or low antibody titers**
- **children 3-15 years produce minimal serologic reactions**
- **radioallergosorbent (RAST) tests**
- **dot immunobinding assay DIA for the detection of hydatid antigen-specific antibodies (HA-DIA)**

Treatment:

- **Albendazole efficacy increases with courses of up to 3 months in the more common cyst sites.**



Treatment

- Surgical removal is preferred when liver cysts are large (>10 cm), secondarily infected, or located in certain organs (brain, lung, or kidney) without opening, to prevent the dissemination
- Mebendazol 50-150 mg / kg / day - 3 months
- Albendazol 800 mg / day in 2 divided doses 28 days 3-4 repeated course with a break of 15 days



- 2005 - Surgical removal primary solitary liver cyst
- 2007 - New formation in abdomen
- 2010 - Viral cirrhosis D with ascites, reoperation was impossible

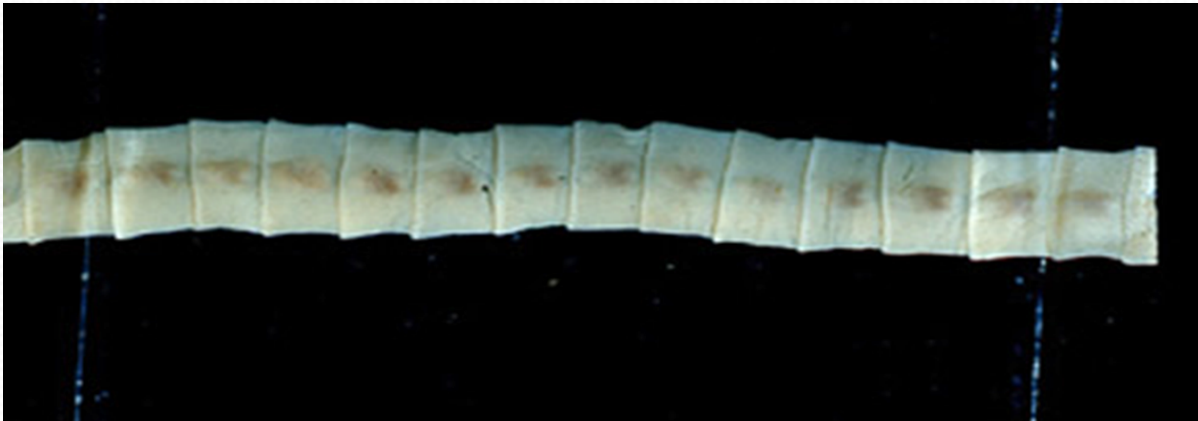
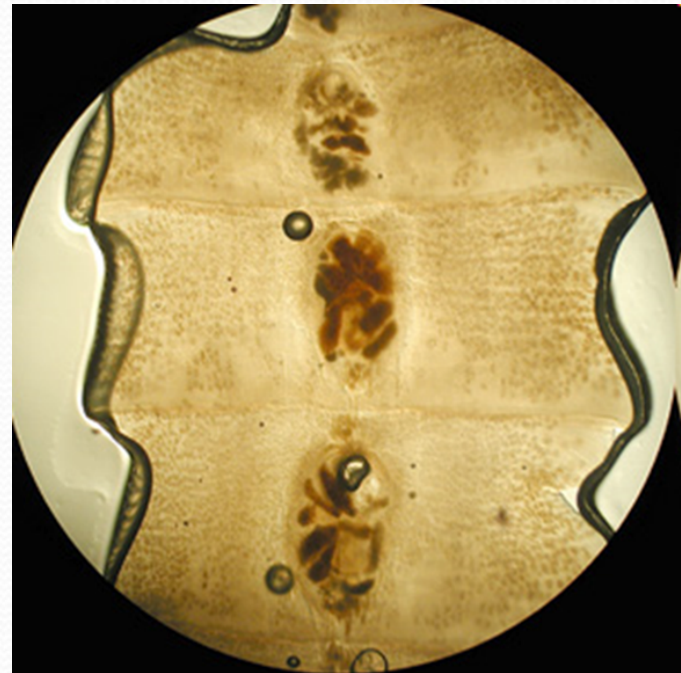
Diphyllobothriasis

- The fish tapeworm ***Diphyllobothrium latum***, is the largest parasite that infects humans.
- A full-grown worm can vary in size from 1-15 m and is the longest human tapeworm. It consists of up to 3000-4000 proglottids.
- The scolex has 2 sucking grooves, also called bothria. Proglottids are typically wider than they are long, which is why *D latum* is called the broad tapeworm.
- Humans become infected when they eat raw or undercooked freshwater fish that contain fish tapeworm cysts.
- The infection is seen in many areas where humans eat uncooked or undercooked fish from rivers or lakes, including:
 - African countries in which freshwater fish are eaten
 - Eastern Europe
 - North and South America
 - Scandinavia
 - Some Asian countries
- 10-30 years living in human

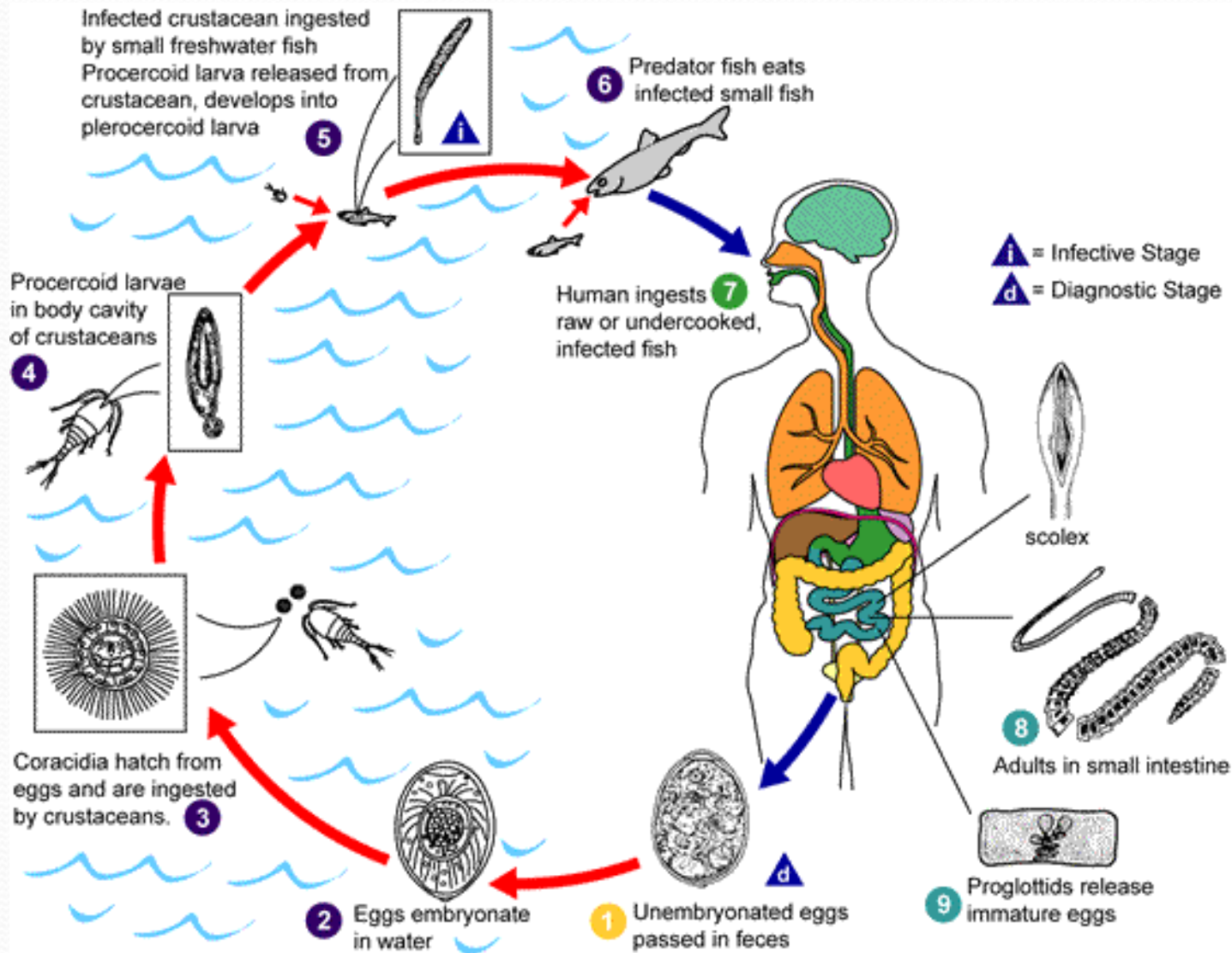


Diphyllobothrium Latum

- 1-15 m long
- proglottids are wider than they are long
- scolex has 2 sucking grooves (bothria)
- eggs ⇒ fresh water ⇒ transform into coracidia ⇒ eaten by crustaceans (proceroid) ⇒ eaten by freshwater fish (plerocercoid) e.g. salmon ⇒ humans, canids, felines, bears ⇒ live for up to 10 years

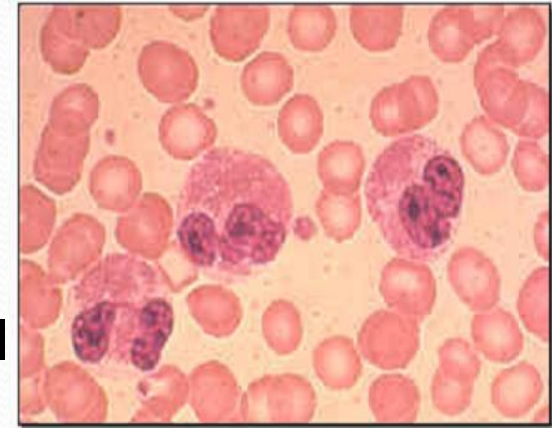


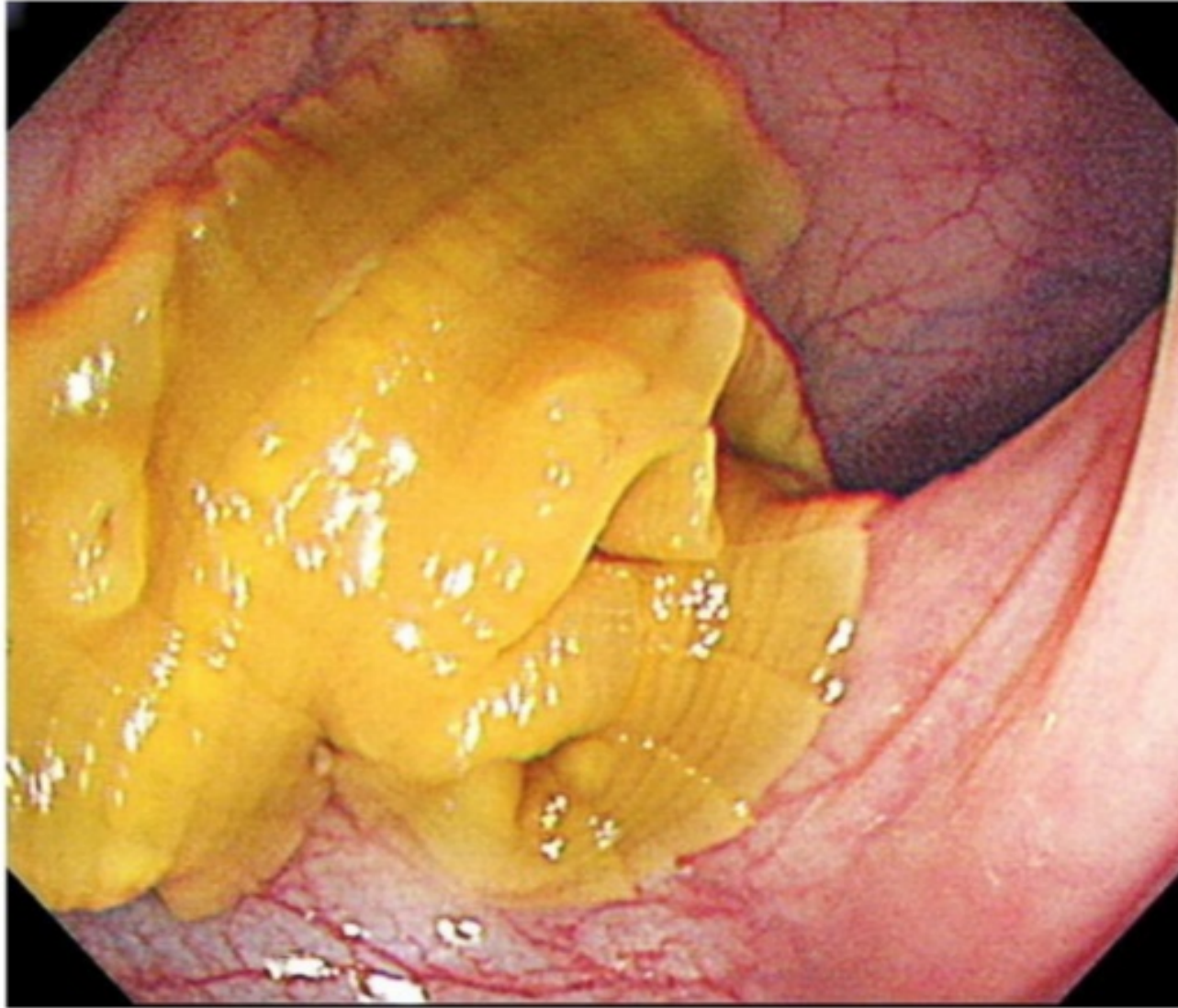
Life Cycle



Clinical Presentation

- Diphyllorhynchiasis can be a long-lasting infection (decades).
- Most infections are asymptomatic.
- Manifestations :
 - Abdominal discomfort
 - Diarrhea, vomiting
 - Weight loss
 - 40% pts have decreased serum vitamin B-12 I
 - 2% pts are anemic.
- Anemia produced by diphyllorhynchiasis is typically associated with increased free hydrochloric acid in gastric juice in contrast to the relative achlorhydria invariably observed in true pernicious anemia.
- Massive infections may result in intestinal obstruction.
- Migration of proglottids can cause cholecystitis or cholangitis.





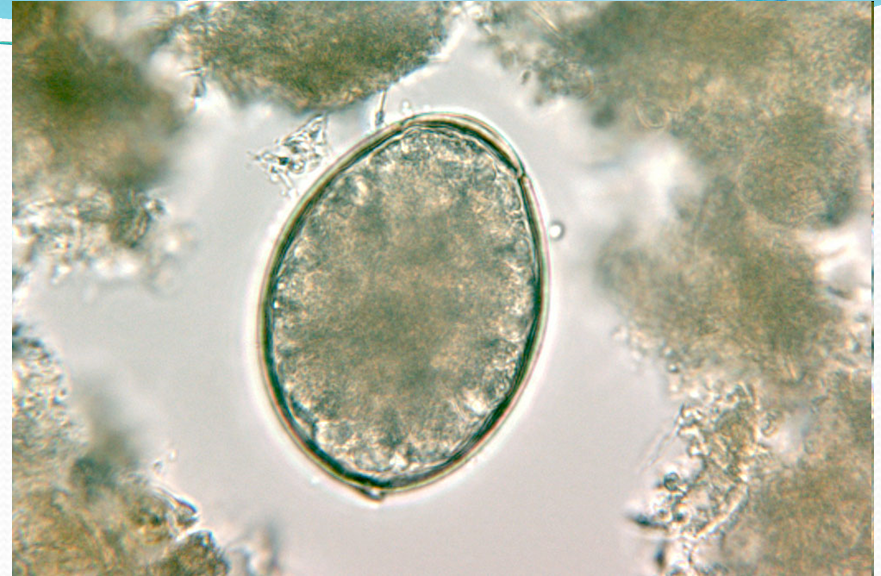
Botriocefalul in organismul uman. Localizare in Ilev si extindere in colonul sigmoid. (colonoscopie)

Laboratory tests

- Complete blood count, including differential
- Blood tests to determine the cause of anemia
- Vitamin B12 level
- Stool examination for eggs and parasites

Prevention

- Avoiding raw freshwater fish and cooking fish enough (to more than 140 degrees F for 5 minutes or (50°C, 10-15 min) will prevent infection with the fish tapeworm.
- Freezing fish to -4 degrees F for 24 hours also kills fish tapeworm eggs.
- Salting fish kills the larvae in 7-8 days

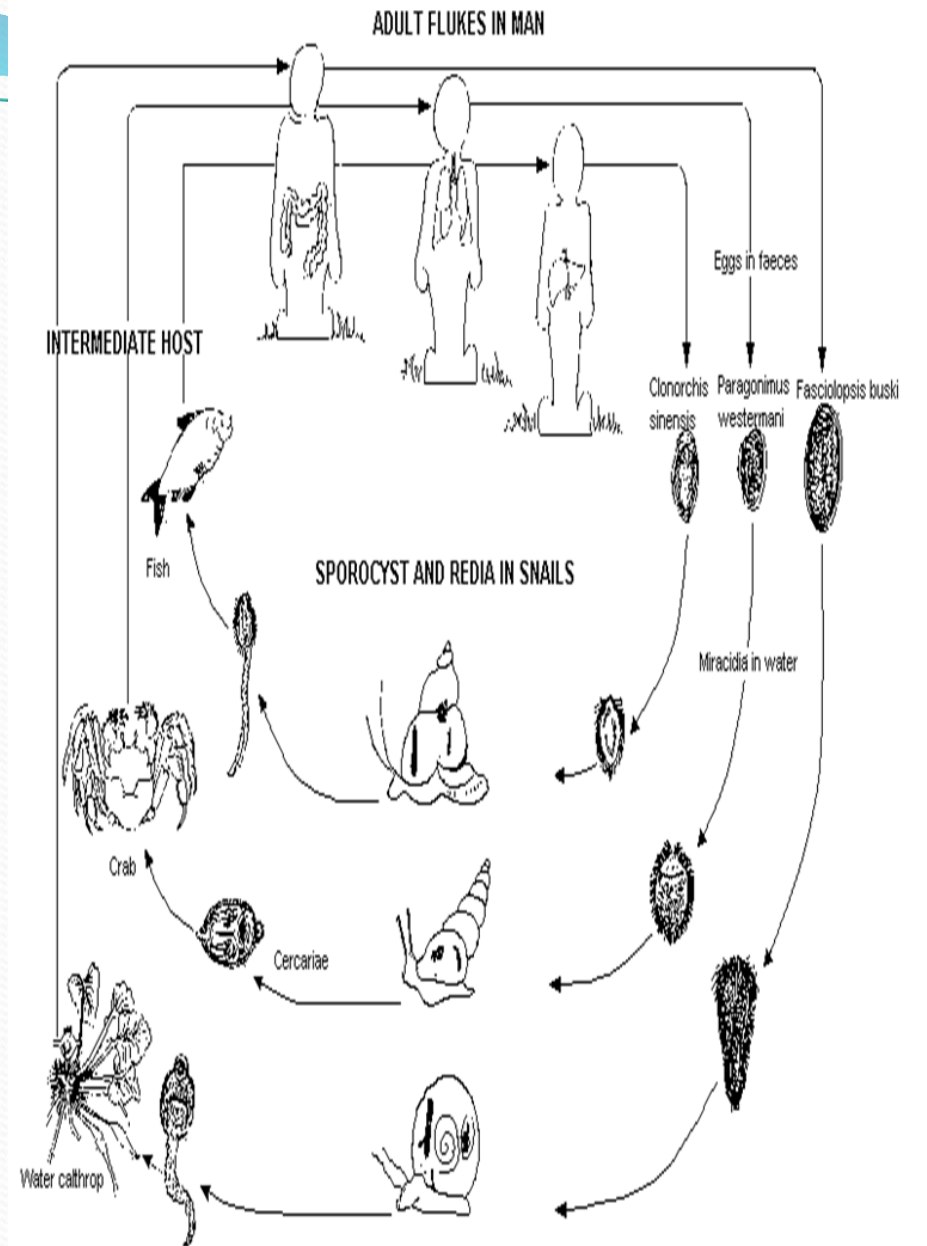


Trematodes of medical importance

- ⌘ Schistosoma, blood flukes
- ⌘ Clonorchis & Opistorchis, liver flukes with metacercaria in fish
- ⌘ Paragonimus, lung flukes with metacercaria in crabs
- ⌘ Fasciolopsis, Fasciola, Dicrocoelium, intestinal and liver flukes with metacercaria on plants

All flukes (trematodes):

- Have a cycle with an **obligatory intermediate host**.
- The first intermediate host of these flatworms is always a **freshwater snail**.
- The larvae which comes from the snail infects either :
 - a second intermediate host (fish, crab),
 - encysts on certain plants, or
 - penetrates the final host directly through the skin.
- **the presence of the intermediate host determines whether a particular fluke can be present or not in any given area.**
- Infestations by flukes are always via larval forms, never via eggs.
- Except for schistosomes all trematodes are hermaphrodite (no separate sexes).



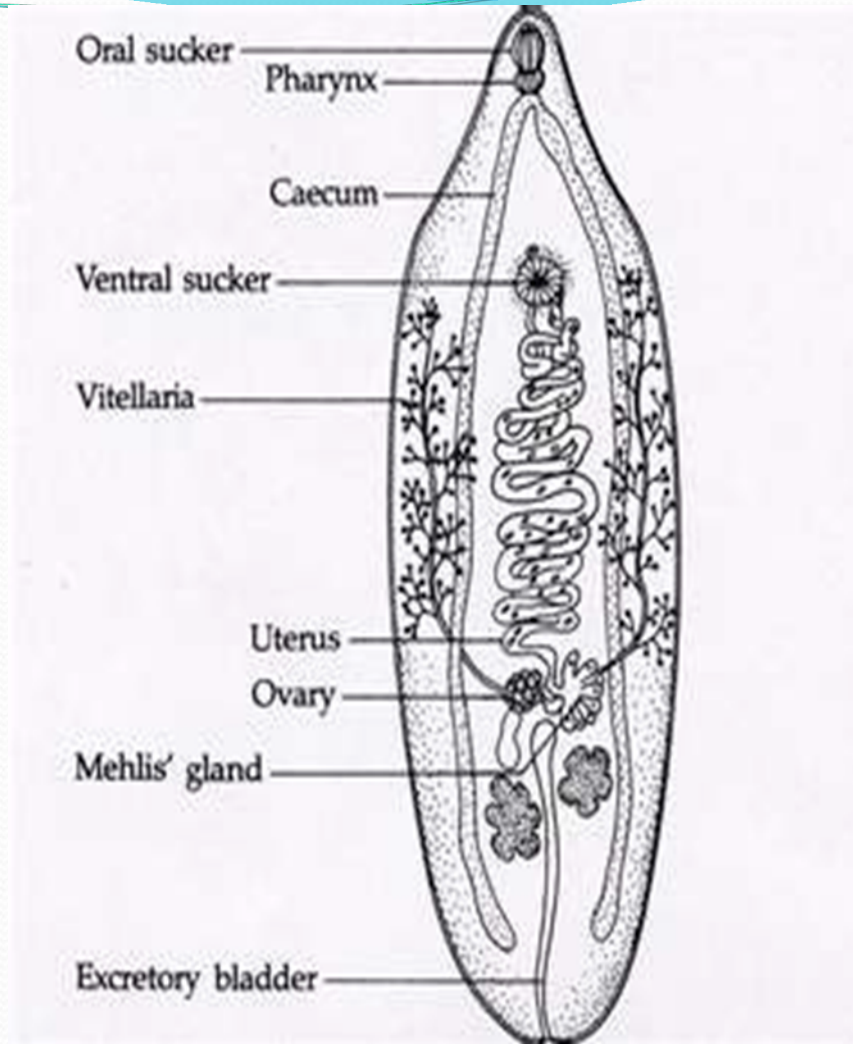
LIFE CYCLES of *FASCIOLOPSIS BUSKI*, *PARAGONIMUS WESTERMANI* and *CLONORCHIS SINENSIS*
Adapted and redrawn from NCDC

Opisthorchiasis

- ***Opisthorchis sinensis*** = *Clonorchis sinensis* or liver fluke endemic in Southeast Asia, Japan, Korea, Taiwan, China
- ***Opisthorchis felinus*** = cat liver fluke, Eastern Europe, Siberia, other parts of Asia
- ***Opisthorchis viverrini*** = liver fluke, Southeast Asian
- flat elongate worm
- 7-12 mm in length by 1.5-3 mm in width

***Opisthorchis* spp.:**

- have a complex life cycle involving a definitive mammalian host (cats, dogs, foxes, pigs) and two intermediate aquatic hosts.
- Humans: inadequately cooked/raw/pickled fish.

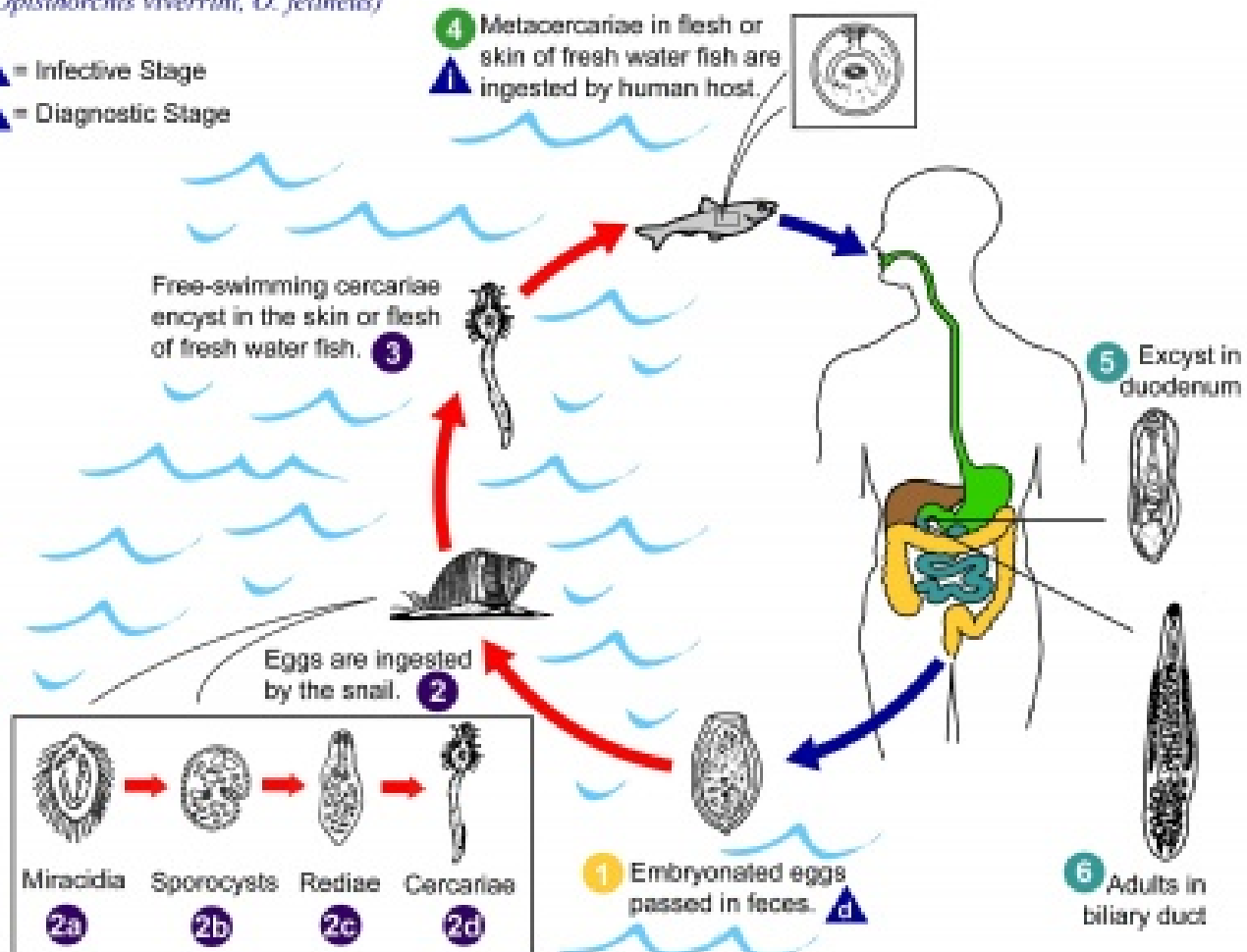


Opisthorchiasis

(*Opisthorchis viverrini*, *O. felinus*)

▲ = Infective Stage

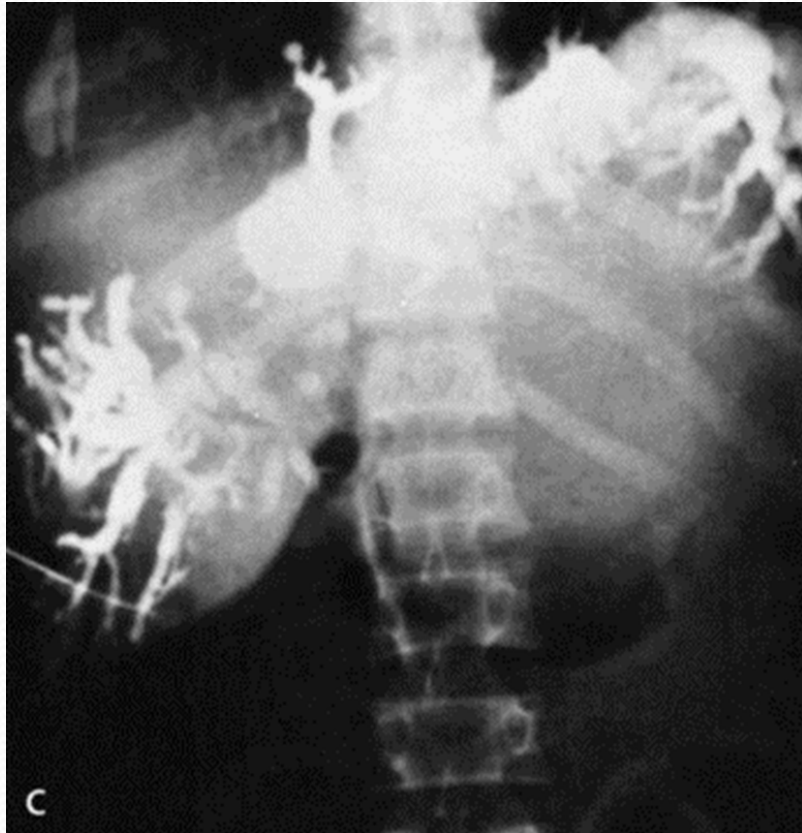
▲_d = Diagnostic Stage



Длительность цикла развития - минимум 4 месяца

Opisthorchiasis

- Adults live in the:
 - bile ducts, gallbladder, pancreatic duct of their animal or human host.
- **opisthorchiasis affect liver, pancreas, gall bladder**
Because of local mechanical and toxic irritation:
 - proliferation of the biliary epithelium
 - thickening of the duct walls with fibrous tissue,
 - dilatation of the intrahepatic bile ducts
 - large numbers of parasites may produce mechanical obstruction, biliary stasis
- **Acute infection 2–4 weeks after eating raw fish:**
 - high-grade fever, malaise,
 - arthralgia, lymphadenopathy, skin rash
 - right upper quadrant abdominal discomfort
 - Eosinophilia, increased liver enzymes
- **Chronic infection:**
 - suppurative cholangitis recurrent, liver abscess
 - intrahepatic duct stone,
 - cirrhosis, liver cancer
- In contrast to clonorchiasis, where cholelithiasis is a frequent and serious complication, there is no indication that opisthorchiasis predisposes to the formation of biliary calculi.



Combined appearance of large cystic dilations and small cystic or saccular ectasia of the bile ducts considered pathognomonic of *Opisthorchis* liver fluke infection.

Complications

Cirrhosis of the liver and biliary tract

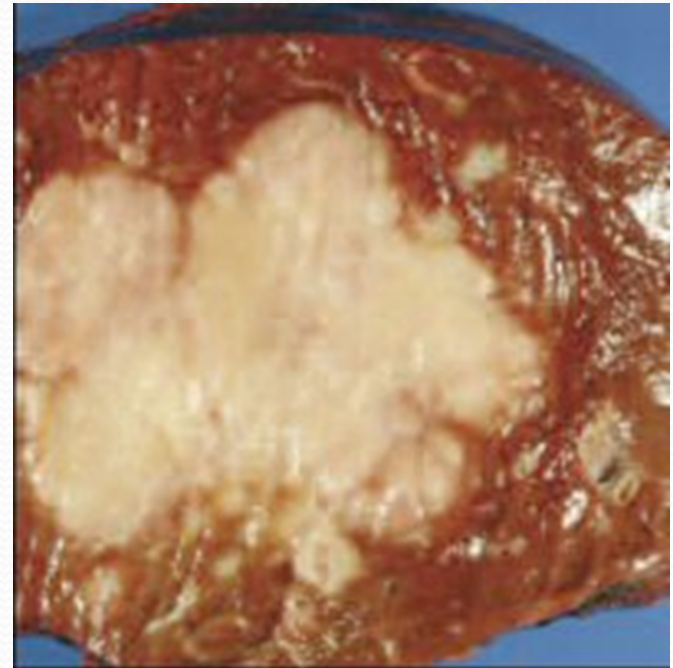
Suppurative diffuse cholangitis

Hepatophyma

Liver Cancer



Hepatophyma



Liver Cancer

Laboratory Diagnosis

Microscopic demonstrations of fluke eggs in the feces (~30x15 μm)

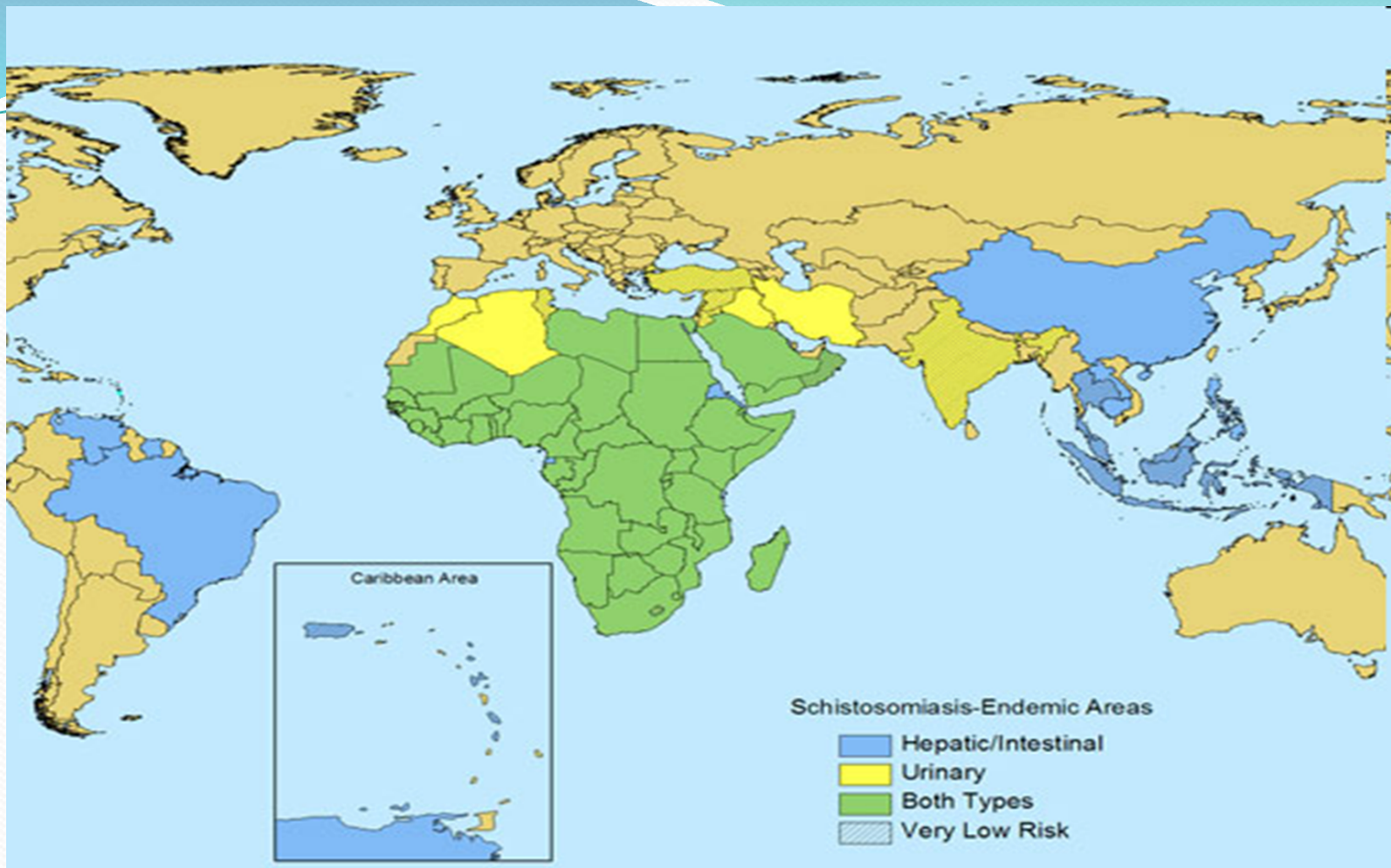
Treatment

- Praziquantel 25 mg/kg
3 times / day for 1-2 days
- Mebendazol 30mg/kg / day
for 3-4 weeks
- Albendazol 10 mg / kgc /
day - 7 days



Human schistosomiasis: epidemiology

- 200 million persons infected with schistosomes in 74 countries
- 120 million persons have symptoms, 20 million have severe disease, and 100,000 die each year
- Higher infection rate and infection burden in children
 - amount of water exposure, partial acquired immunity, age, and genetic susceptibility



5 species of Schistosomes infect humans:

***S. haematobium*:** Africa, foci in Middle East & India

***S. mansoni*:** Africa, endemic in Brazil, Surinam, Venezuela, some Caribbean

***S. japonicum*:** only Asia, mainly China, Indonesia, the Philippines and Thailand

***S. mekongi*:** Laos & Cambodia

***S. intercalatum*:** Rain forest areas of Central and West Africa

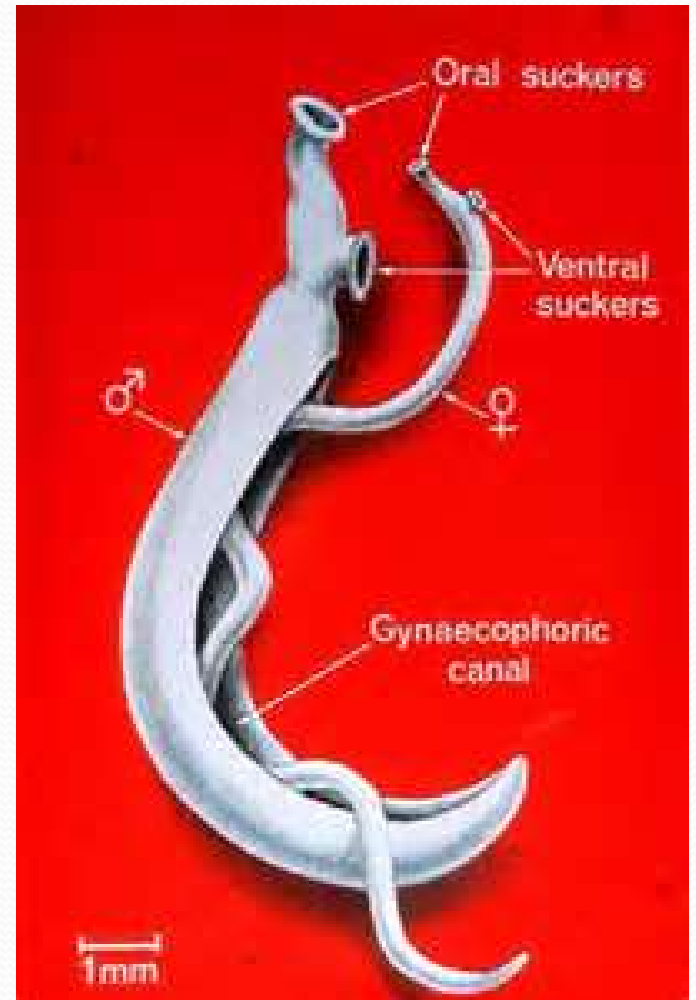
Schistosomes morphology

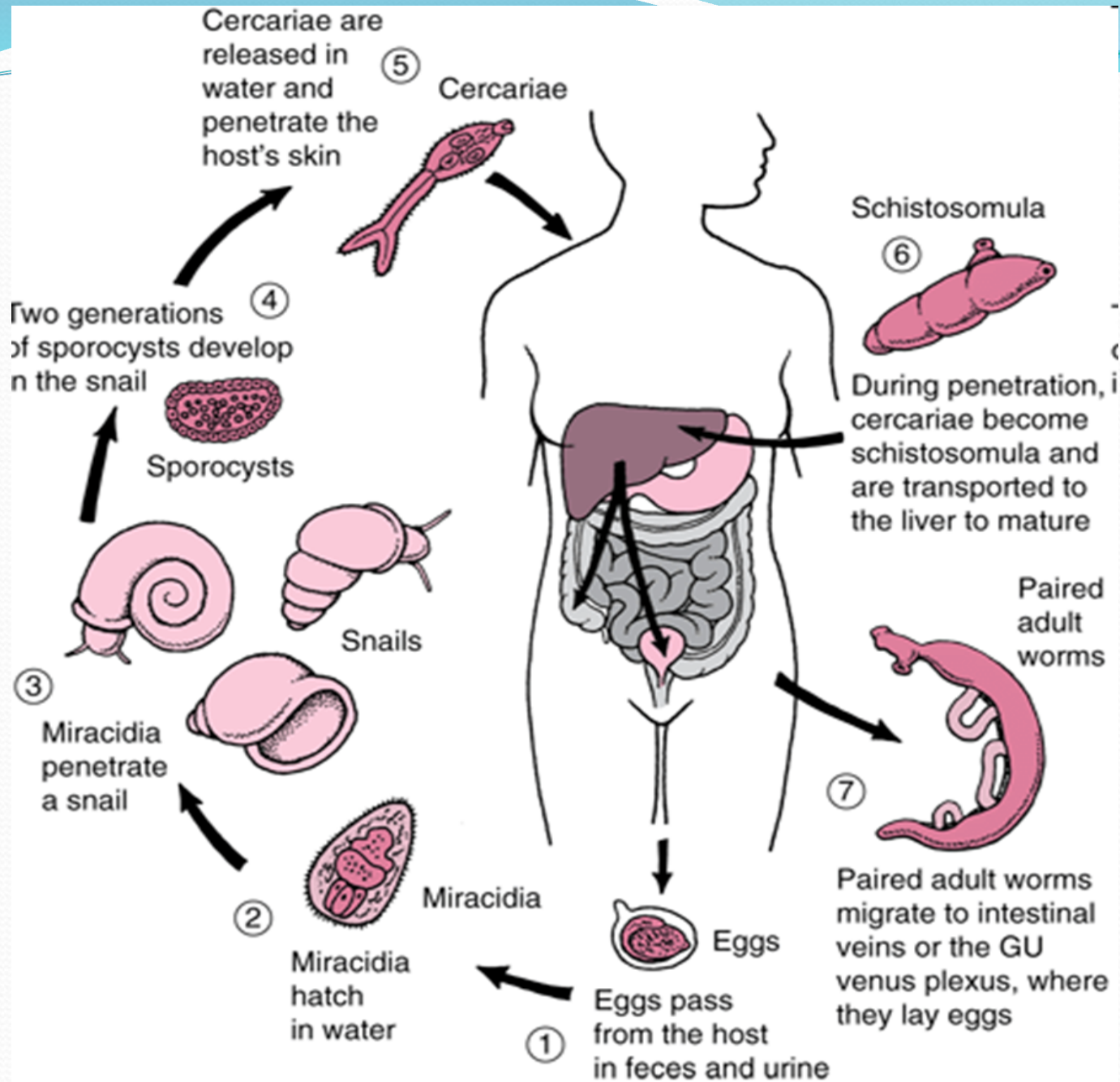
Male : 9,5 mm x 19,5 mm

Canalis gynecophorus

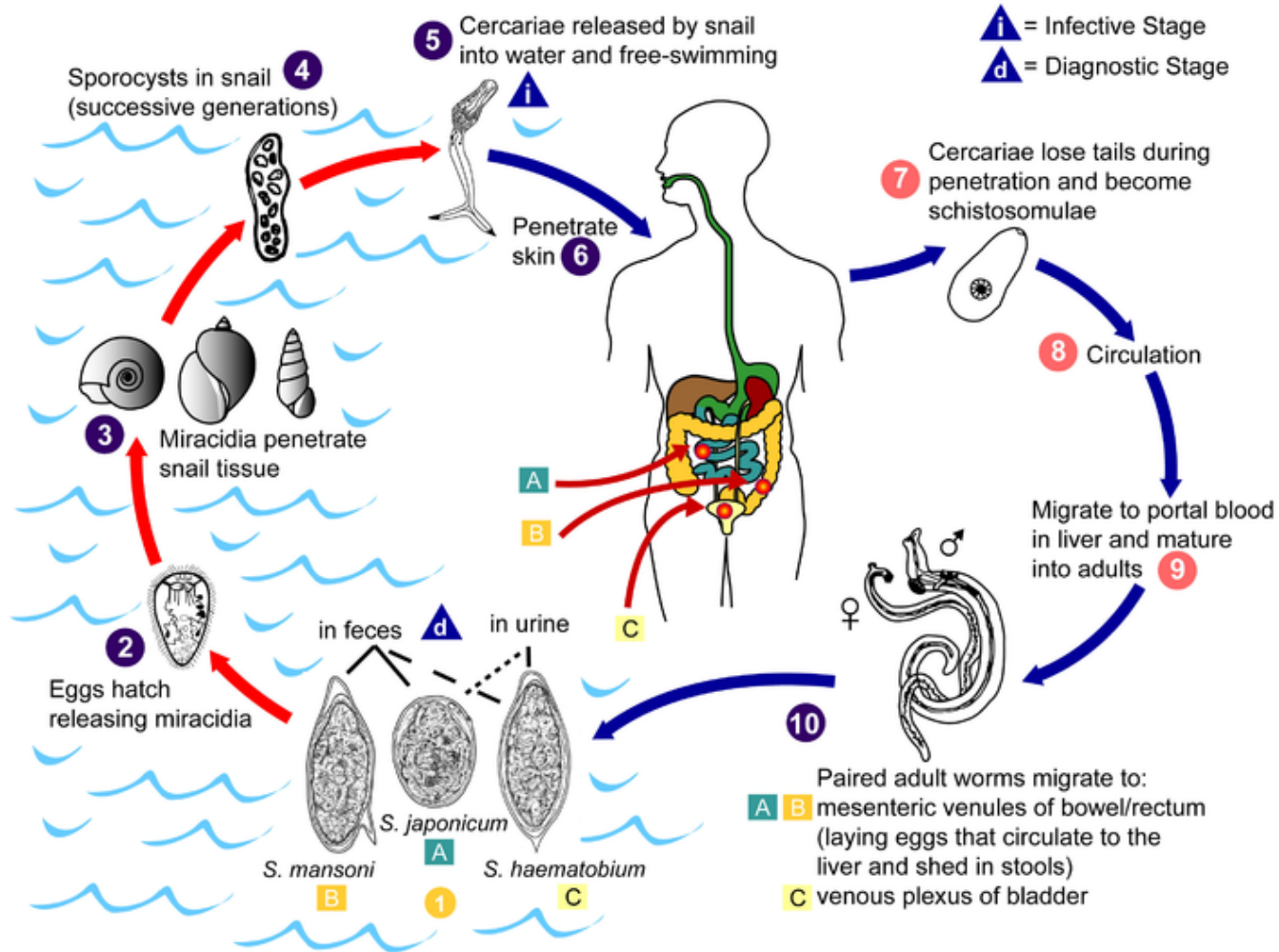
Female : 16 mm x 26 mm

Thin-shaped





Schistosomiasis



S. Mansoni : habitat Mesenteric and portal veins

V.mesenterica inferior

S. Japonicum : habitat Mesenteric and portal veins

V.mesenterica superior

S. Hematobium : habitat V.vesicalis

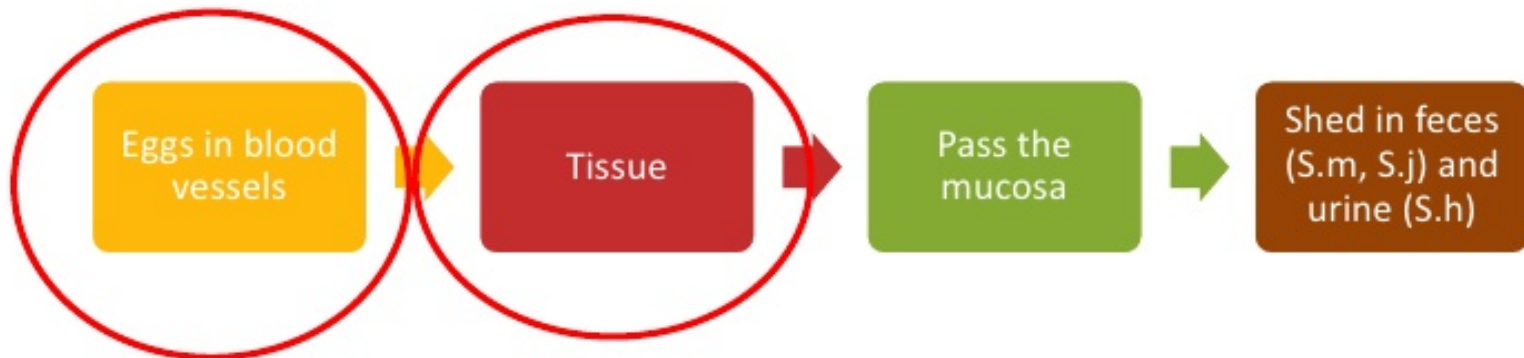
Clinical manifestation

Period	Affected organ	Manifestation
Immediate	Skin	Dermatitis: A maculopapular eruption at the site of penetration In migrants or tourists: skin reactions (hours), a rash (up to one week later)
Acute Schistosomiasis	Systemic Gastrointestinal Lungs	A history of contact with contaminated water 2-6 weeks before (in travellers) Mediated by the immune complex
Katayama fever	Liver, spleen	Majority of cases begin with the deposition of an egg into host tissues <u>Fever</u> , headache, generalized myalgias, right-upper-quadrant pain, and bloody diarrhea, respiratory symptoms Tender hepatomegaly, splenomegaly, aseptic meningitis. Not all patients shed eggs, but all have eosinophilia and most have positive serologic tests
Chronic schistosomiasis		Especially in people with longstanding infection in poor areas Gastrointestinal and Liver Disease Genitourinary Disease Neurologic and Other Manifestations



Pathogenesis

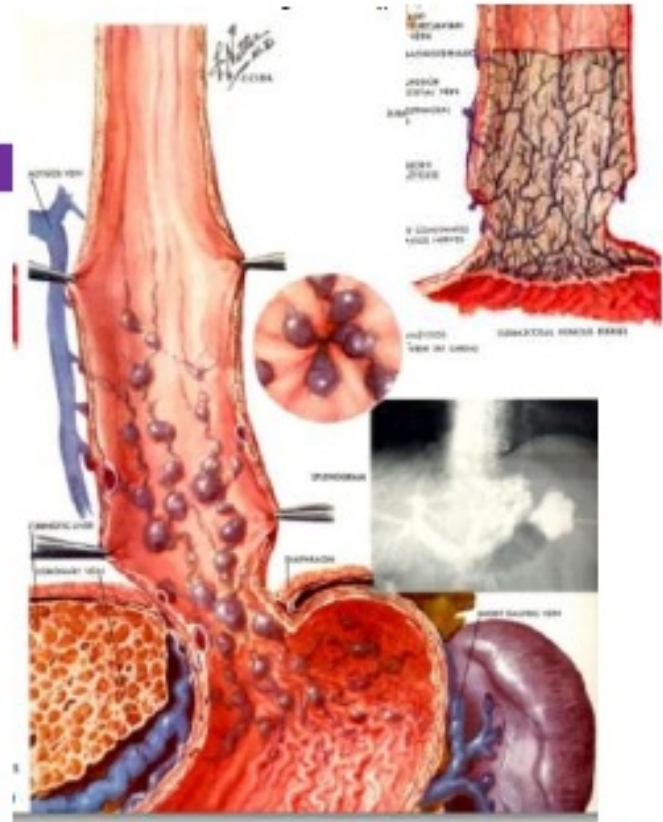
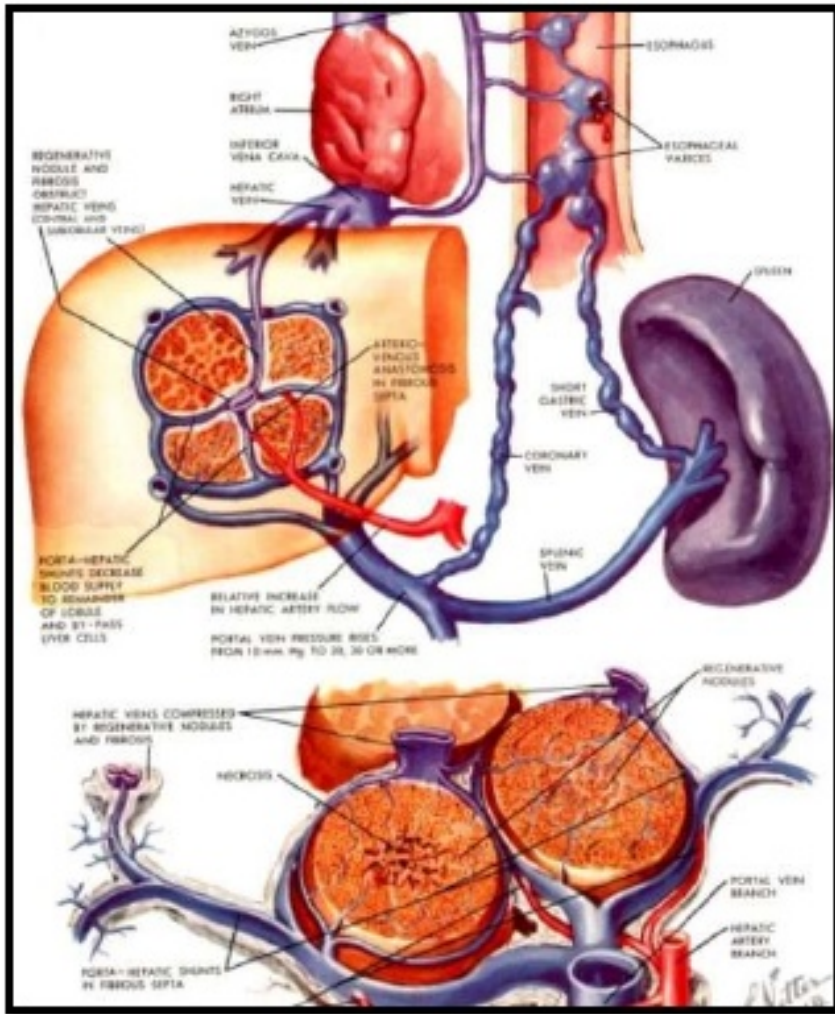
- Egg production commences four to six weeks after infection and continues for the life of the worm — usually three to five years.



Gastrointestinal and liver disease

- **Intestinal disease:** Eggs in the gut wall → inflammation, hyperplasia, ulceration, microabscess formation, and polyposis
 - ▣ Light infections: fatigue, intermittent abdominal pain, and diarrhea
 - ▣ Heavy infections: anemia, intestinal polyps
- **Liver disease**
 - ▣ presinusoidal inflammation, periportal fibrosis & collagen deposits, progressive obstruction of blood flow, portal hypertension, hepatomegaly
 - Early chronic: granuloma infiltration around eggs in small venules
 - In 5-10%: periportal fibrosis in years after infection

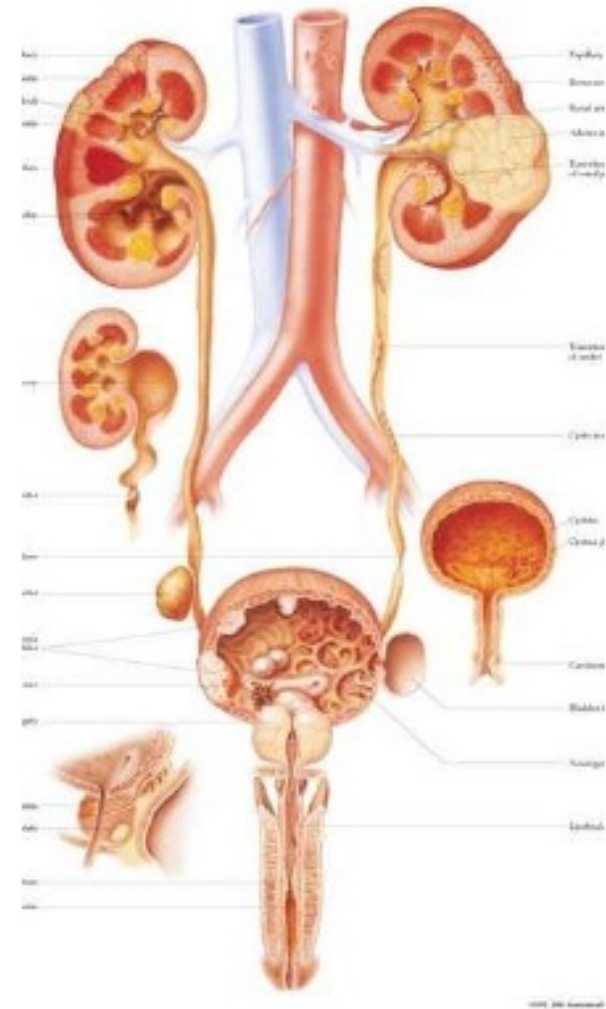
Portal hypertension, variceal bleeding



- Hepatomegaly
- Varices
- Variceal bleeding
- Splenomegaly

Genitourinary Disease

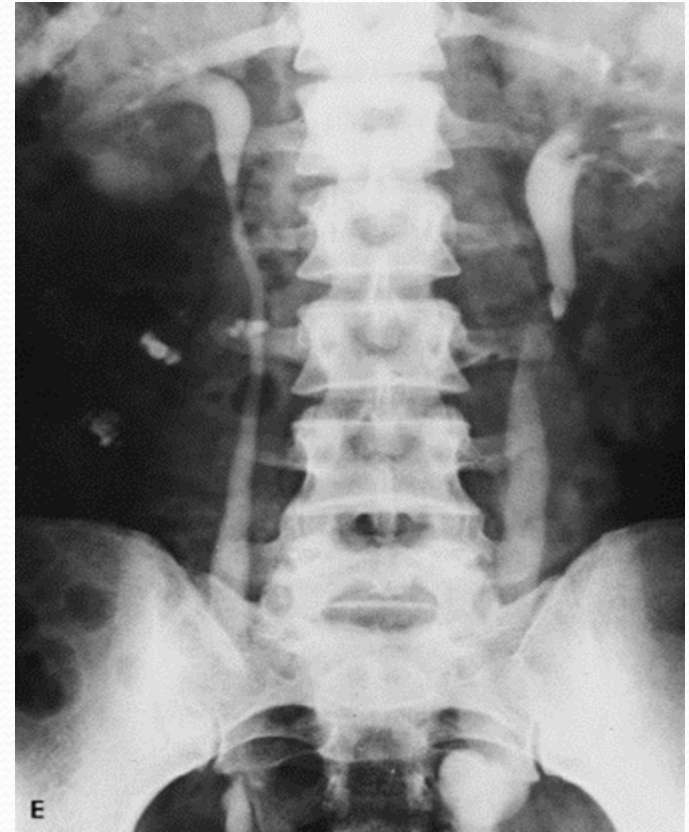
- Dysuria and hematuria (early and late disease)
- Late manifestations:
 - proteinuria (often in the nephrotic range)
 - calcifications in the bladder
 - obstruction of the ureter
 - renal colic
 - hydronephrosis
 - renal failure
 - associated risk of bladder cancer
- Secondary bacterial infection is frequent
- Genital disease in 1/3 women: vulval and perineal hypertrophic, ulcerative, fistulous, or wart-like



Schistosomia haematobium

immunological reactions to *Schistosoma*
eggs trapped in tissues ⇨ schistosomiasis:

- » initial inflammatory reaction is reversible ⇨ in latter stages - collagen deposition & fibrosis ⇨ organ damage
- » eggs penetrate the genito-urinary system:
 - granulomas in the uterus, fallopian tube, and ovaries
 - obstructive uropathy, pyelonephritis, glomerulonephritis, amyloidosis, renal failure, bladder carcinoma (in 10-20 y after initial infection)
- » *S. hematobium* rarely causes intestinal or liver disease
- » causes few changes in the lungs (there may eventually be diffuse fibrosis, with numerous ova, particularly in the peribronchial regions)



An intravenous urogram showing several stenotic areas in the lower third of both ureters, with local and general dilatation.

Findings with chronic schistosomiasis may include the following:

- Portal hypertension with abdominal distention, hepatosplenomegaly, pedal edema, pallor, distended abdominal veins, and ascites
- Intestinal polyposis with heme-positive stool, pallor, and signs of malnutrition
- CNS symptoms, including focal neurologic findings, seizures, and spinal cord lesions
- Renal failure with anemia and hypertension
- Cor pulmonale with signs of right heart failure
- Genital lesions, including ulceration, hypertrophic lesions, or nodular lesions of the cervix, vulva, or vagina or vesicovaginal fistula (external vulvar or perianal lesions develop in 30% of women; women develop uterine enlargement, menstrual disorders, cervicitis, and infertility)



Diagnosis: Schistosomiasis

Eggs in stool

Multiple samples

S. haematobium egg with a short terminal spine, seen in a urine specimen.



Others:

PCR

Serology - ELISA

Treatment

Emetina 1 mg/kg /day 10 days

Bithionol 30-50 mg/kgc/day (10-15 dose)

Chloxil 0,06g/kgc/day- 5 days