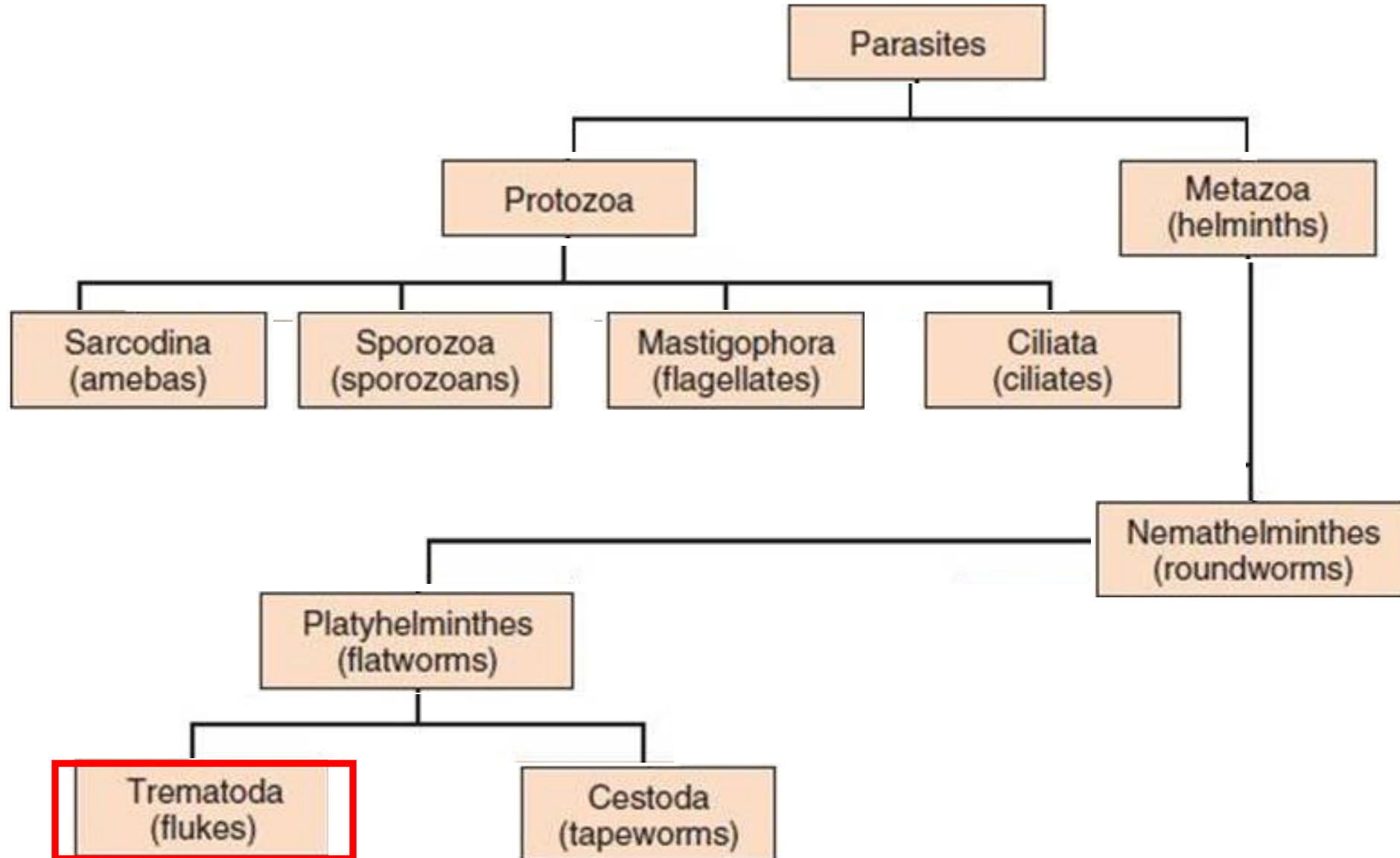


# GIT Module

## Parasitic Infections (Schistosomiasis & Gastrointestinal hydatidosis)

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# Classification of parasites



# Introduction

- Schistosomiasis is one of mankind's oldest and most pernicious parasitic infections, currently still affecting more than 200 million people worldwide.
- Disease was named after German Theodor Bilharz who identified adult parasite in the 1851.
- **Theodor Bilharz**, a German physician and pathologist, who worked in various hospitals, noticed the worm in white bumps on the mucous membranes of the bladder, ureters, seminal glands and intestine



**Theodor Bilharz**



## Definition

- Schistosomiasis is a chronic and potentially lethal tropical disease, mainly caused by the parasitic blood flukes.
- With untreated infections generally the infection can persist for 3–10 years and a minority of infected individuals developing life-threatening pathology .

***S. haematobium***

**Inhabits urogenital  
veins**

***Schistosoma species***

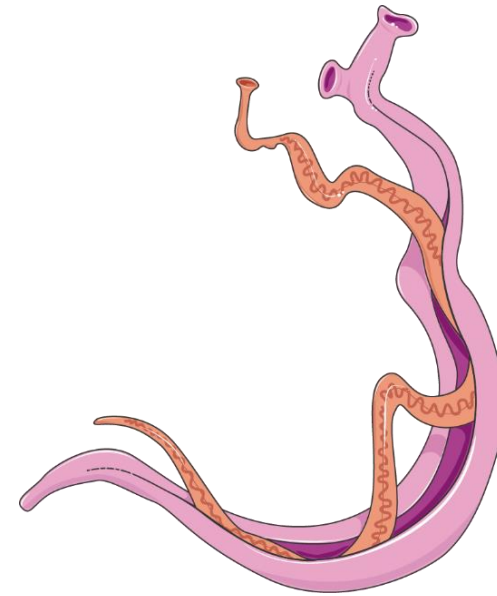
***S. mansoni***

**Inhabits inferior  
mesenteric vein  
(large intestine)**

***S. Japonicum***

**Inhabits superior &  
inferior mesenteric  
veins (small and  
large intestine)**

# Trematodes (Flukes)

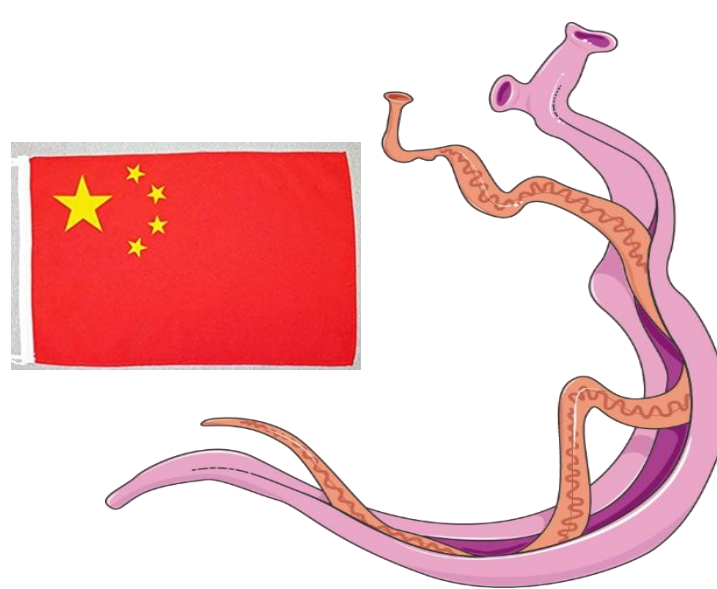


	<b>Flukes</b>	<b>Schistosomes</b>
<b>Shape</b>	Flat and leaf-shaped	Elongated and cylindrical
<b>Sexes</b>	hermaphroditic	Separate sexes
<b>Egg</b>	operculated	Nonoperculated
<b>Transmission</b>	ingestion	Skin penetration
<b>Infective stage</b>	metacercaria	Cercaria
<b>Intermediate host</b>	2	1

# Schistosomes (Blood flukes)



**Trematoda (flukes)**



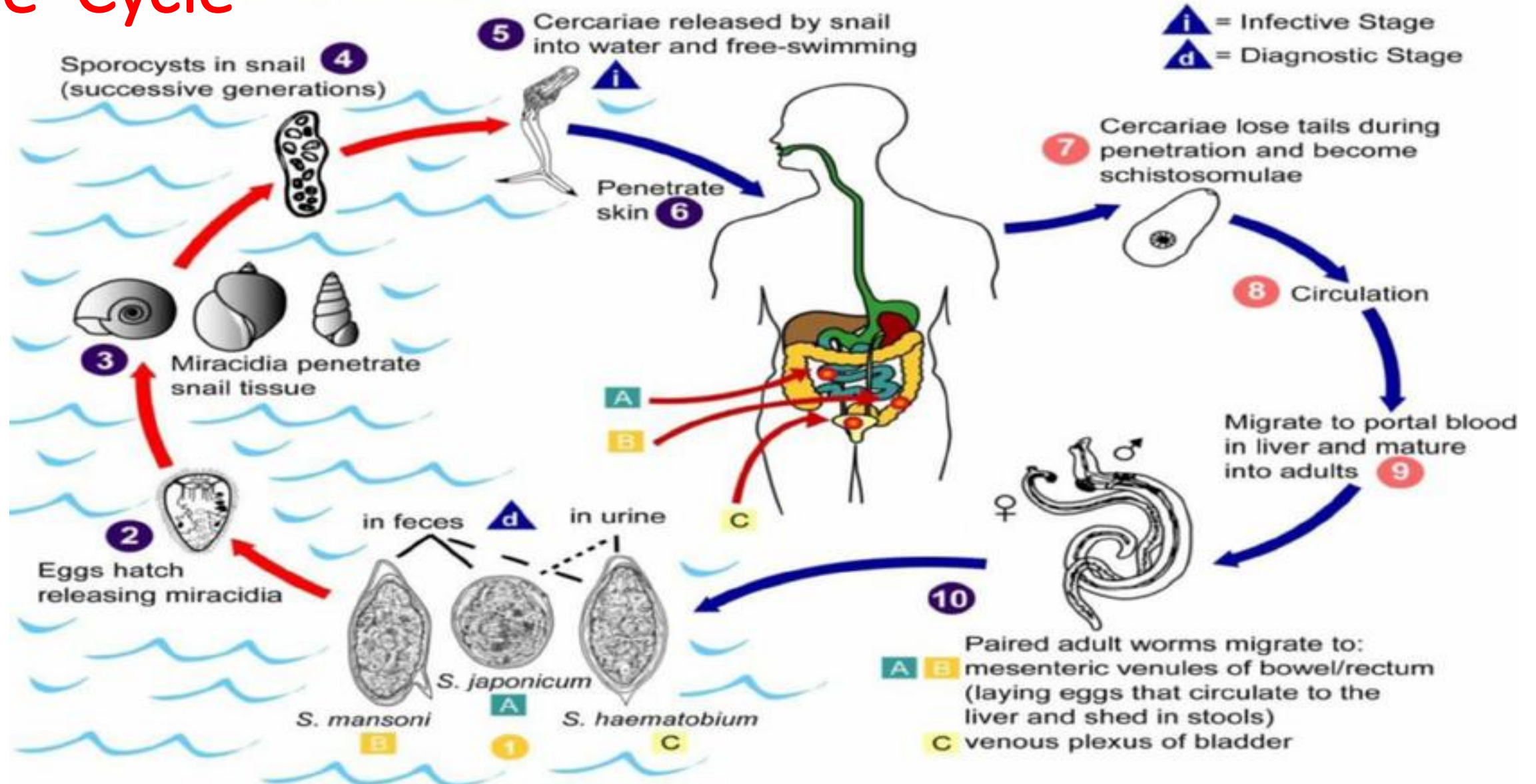
***S. Japonicum***



***S. mansoni***  
**(Nile delta)**

# Schistosomiasis (Bilharziasis)

## Life Cycle



# Schistosomiasis (Bilharziasis)

## Mode of infection



Man is infected by coming in contact with cercaria in polluted water of canals or drinking polluted canals water containing cercaria. The cercaria actively penetrates the skin or the mucous membrane through the action of spin

# Intestinal Schistosomiasis (Bilharziasis)

❖ Caused by *S. mansoni* and *S. japonicum*.

## *S. mansoni*

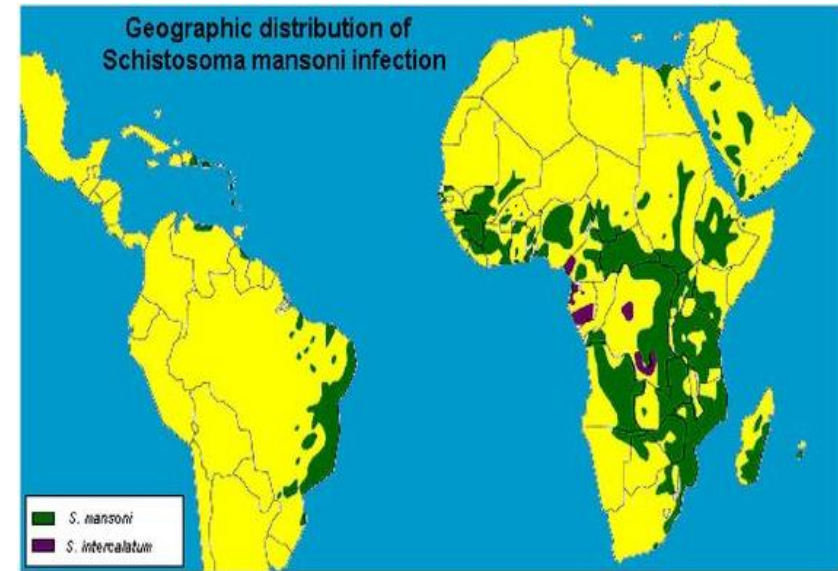
❖ **Geographical distribution:** Nile Delta, Africa, Middle East, South America.

❖ **D.H:** Man

❖ **Reservoir hosts (R.H) :** Monkeys & rodents.

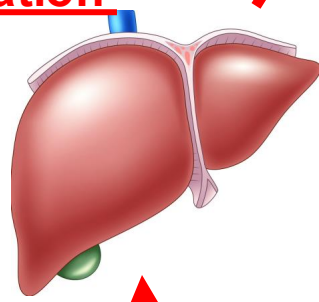
❖ **Habitat:** Small branches of inferior mesenteric vein of rectum & pelvic colon.

❖ **Maturation** of adult worm occurs in intrahepatic branches of portal vein.

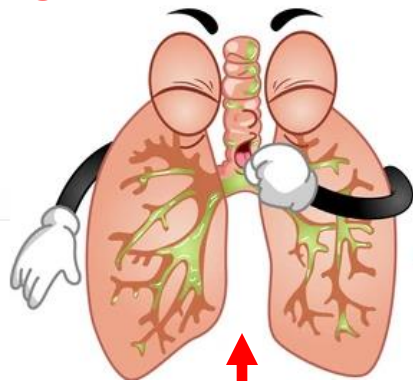


# Stages of disease

## 2- Stage of migration

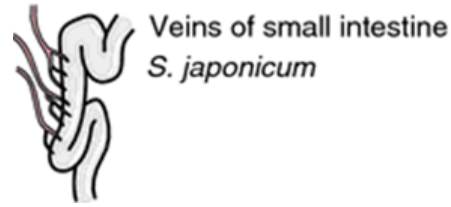


## 2- Stage of migration



**Blood**

## 3- Stage of egg deposition

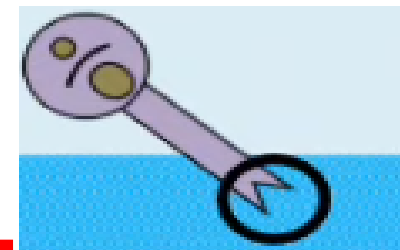


## 4- Stage of tissue reaction, repair and fibrosis

## 1- Stage of invasion



- Proteolytic enzymes
- Surface tension
- Tail



**Furcocercus  
Cercaria**

**Eggs in  
Stool**



**Miracidium**



**Biomphalaria  
alexandrina**

# Intestinal Schistosomiasis (Bilharziasis)

## Stages of disease

### 1- Stage of invasion

#### Manifestations

- ❖ Skin lesion due to cercarial penetration.
- ❖ Local dermatitis, irritation, itching and papular rash.



# Intestinal Schistosomiasis (Bilharziasis)

## Stages of disease

### 2- Stage of migration

- ❖ **Lung** : Irritation due to passage of schistosomulum causing minute haemorrhage, cough, sputum, dyspnea and eosinophilia, and pneumonitis.
- ❖ **Liver** : Enlarged tender liver and spleen.
- ❖ **Toxic symptoms**: Due to metabolic products of maturing parasites causing fever, anorexia, headache, malaise and muscle pain.

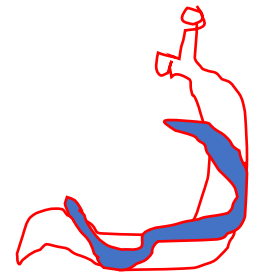
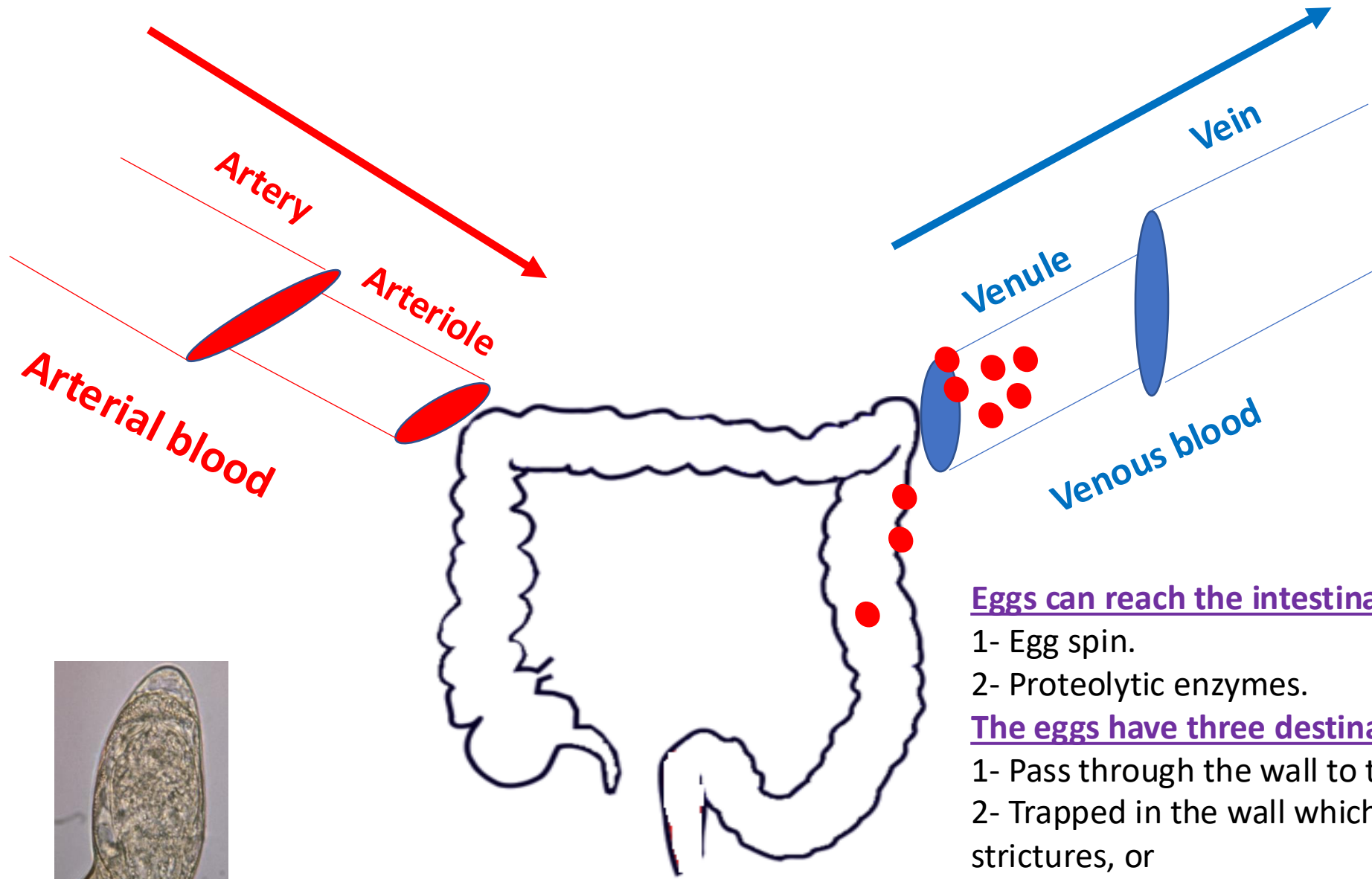
# Intestinal Schistosomiasis (Bilharziasis)

## Stages of disease

### 3- Stage of egg deposition (acute schistosomiasis)

- ~3–5 weeks post infection: The development of schistosomes into sexually mature, egg-producing adults occurs within the portal vein.
- Once sexual maturity is reached, worm pairs migrate toward the mesenteric vessels .
- Adult *S. mansoni* worms reside deep within the mesenteric veins of the intestine, where they feed on blood and acquire nutrients necessary for growth
- Each worm pair produces ~300 eggs daily.

### 3- Stage of egg deposition



Eggs can reach the intestinal wall by:

- 1- Egg spin.
- 2- Proteolytic enzymes.

The eggs have three destinations:

- 1- Pass through the wall to the lumen, or
- 2- Trapped in the wall which leads to granuloma, fibrosis, and strictures, or
- 3- Eggs moved with the venous circulation forming embolism. (Liver, lung, CNS, skin, ....)

# Intestinal Schistosomiasis (Bilharziasis)

## Stages of disease

### 3- Stage of egg deposition (acute schistosomiasis)

- Finally, egg aggregation supports extravasation by releasing proteases creating channels from the intravascular to intraluminal space .
- Eggs deposited in the **pelvic colon and rectum**. Expulsion of eggs in stool 20-55% → tissue damage and haemorrhage.

## Symtome

- ❖ Abdominal pain.
- ❖ Frequent motion, dysentery with blood and mucus in stools.

# Intestinal Schistosomiasis (Bilharziasis)

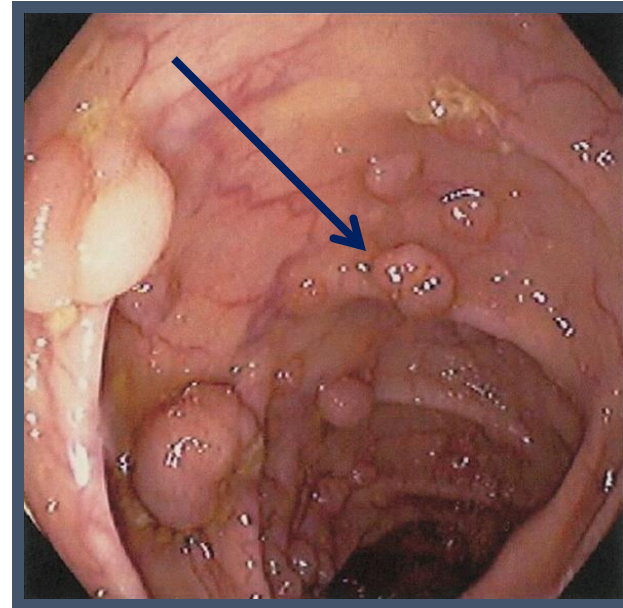
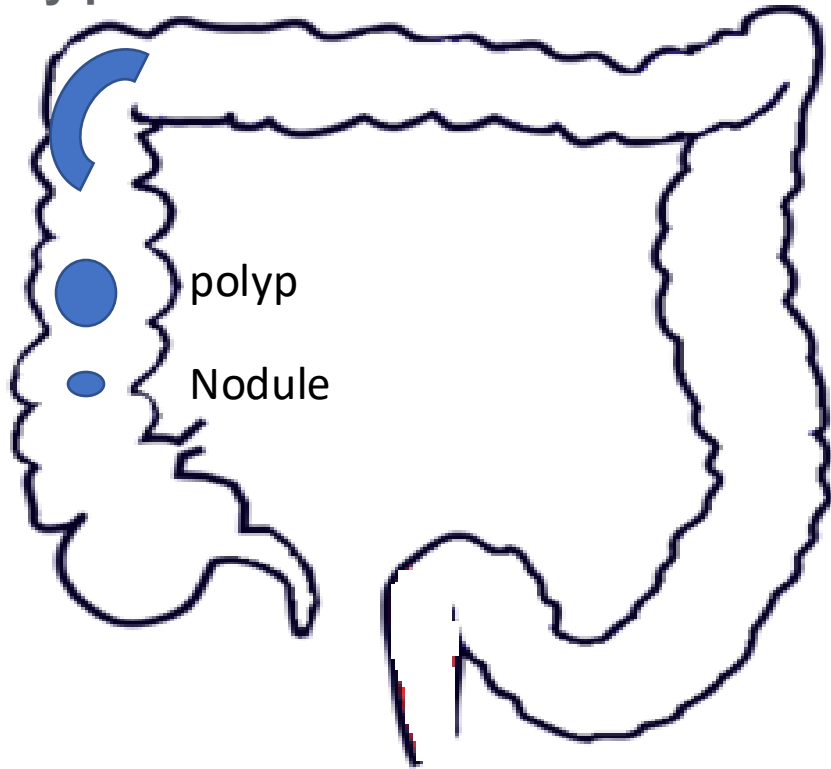
## Stages of disease

### 4- Stage of tissue reaction, repair and fibrosis (chronic or late stage)

- ❖ Trapped eggs in the intestinal wall → formation of **polyps, granuloma, papillomata and sandy patches.**
- ❖ Later on, the intestinal wall becomes **fibrosed** and thickened → **stricture of the wall.**
- ❖ Sinuses or fistula can occur.
- ❖ Rectal prolapse.
- ❖ The fibrotic complications that follows granuloma resolution is the main cause of pathology and lethality in schistosomiasis.

## 4- Stage of tissue reaction, repair and fibrosis (chronic or late stage)

Sandy patch



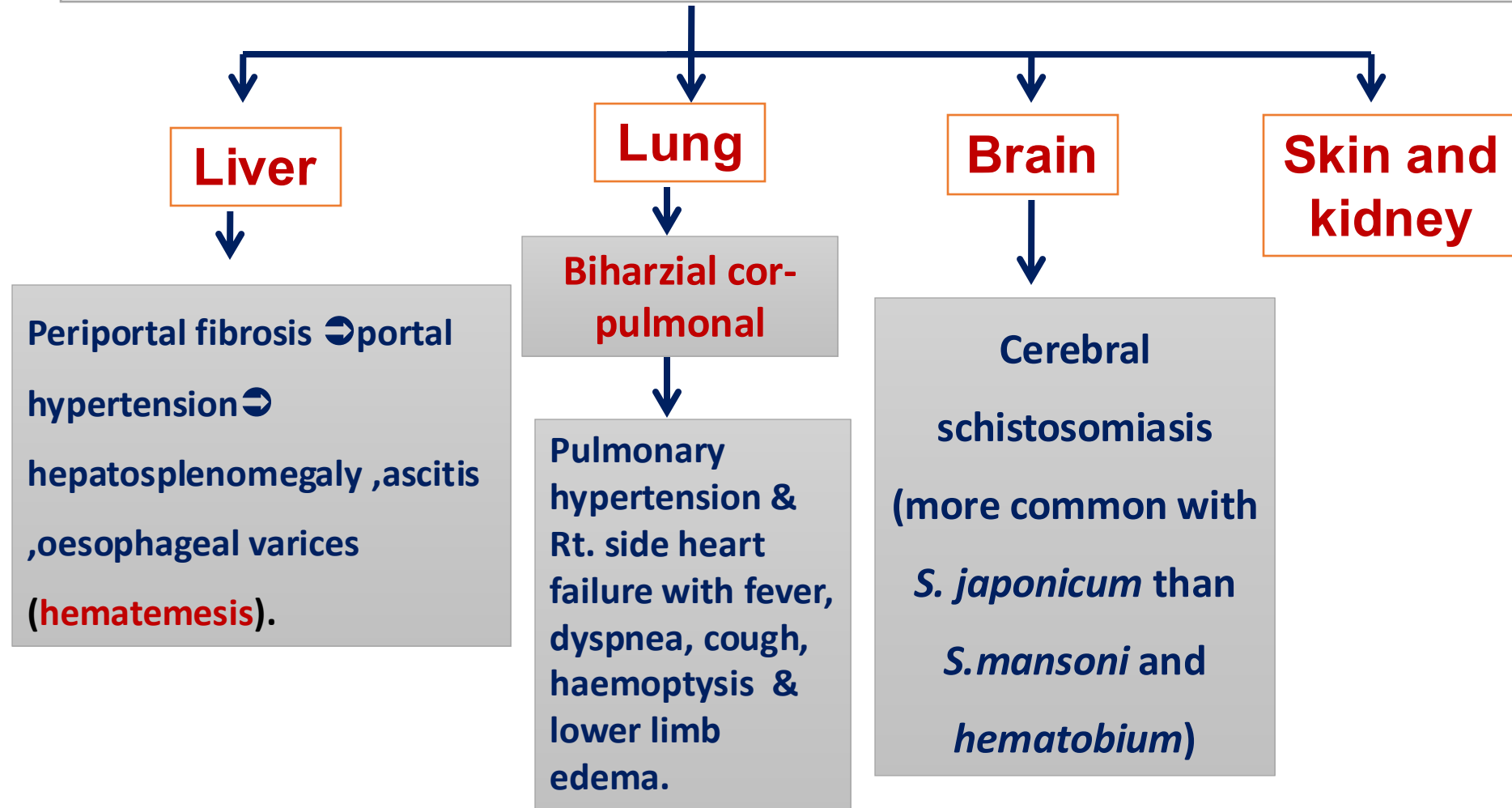
**Intestinal polyp**



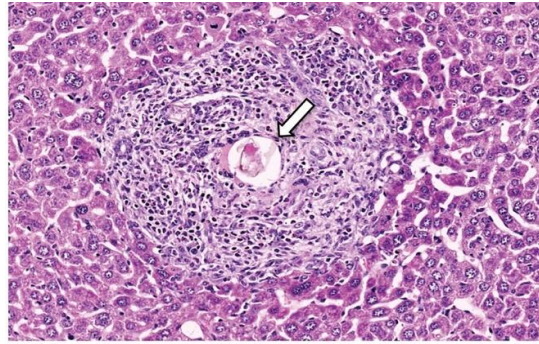
**Intestinal fibrosis**

# EGGS THAT FAIL

Some eggs are swept back into the blood stream to different organs:-



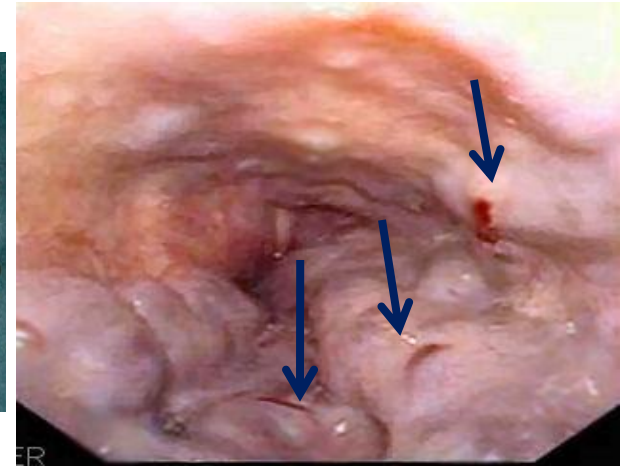
# EGGS THAT FAIL



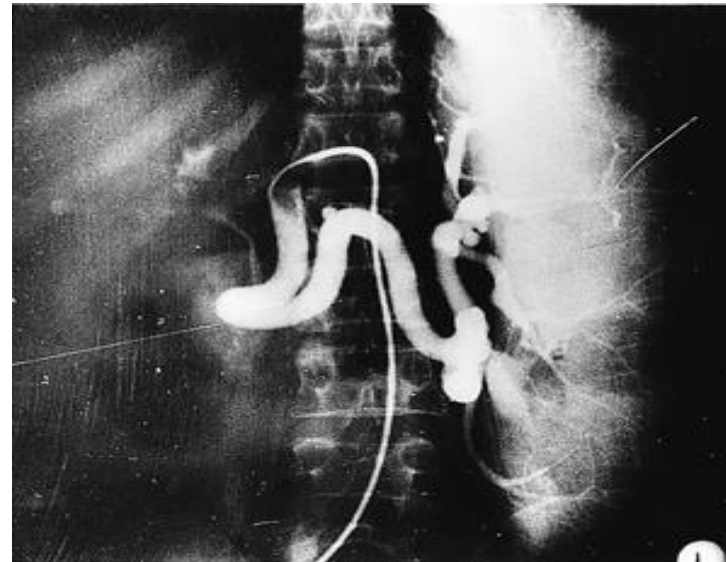
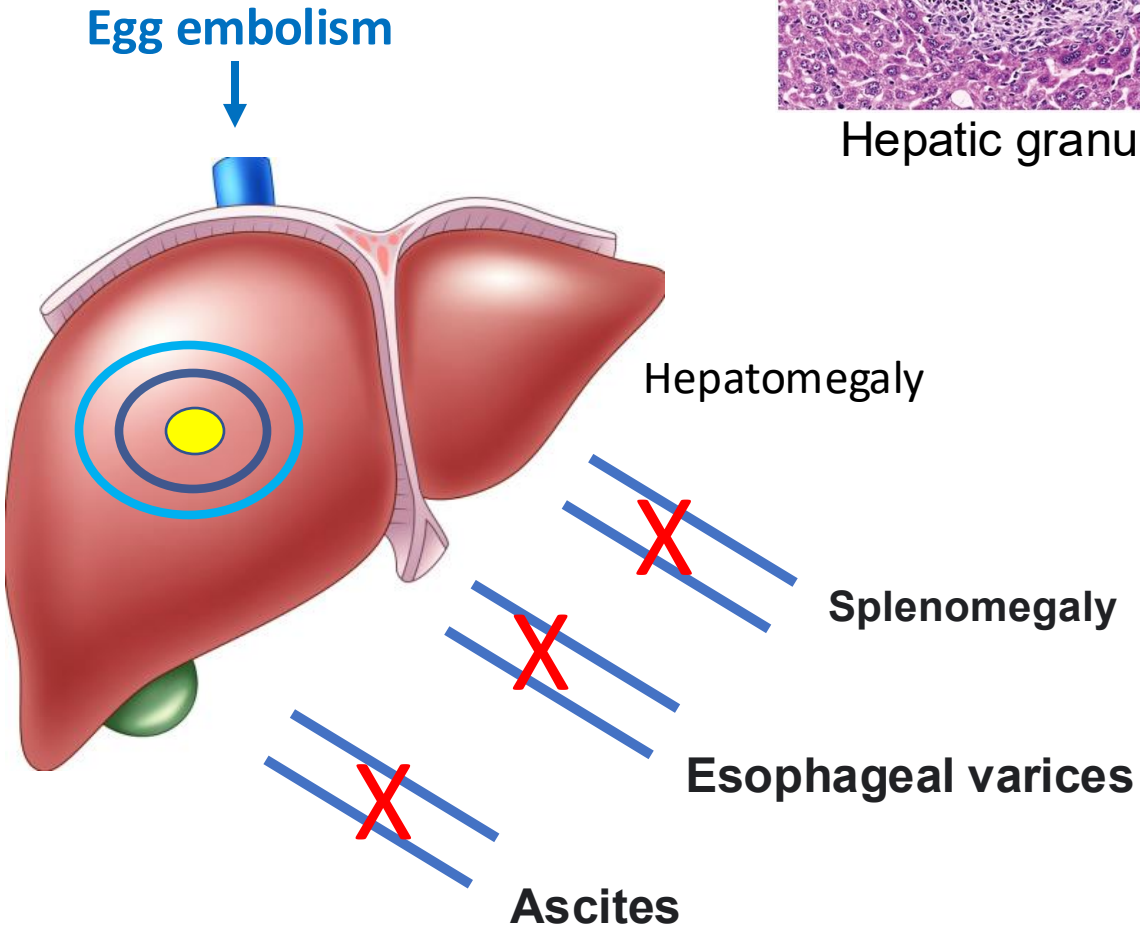
Hepatic granuloma



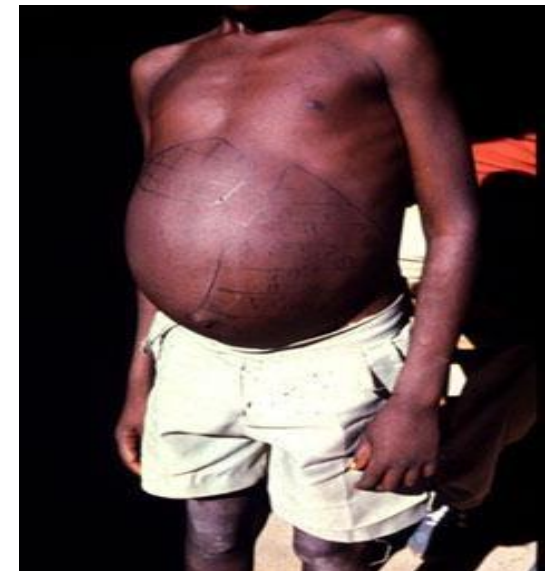
Fibrosed liver



Esophageal varices

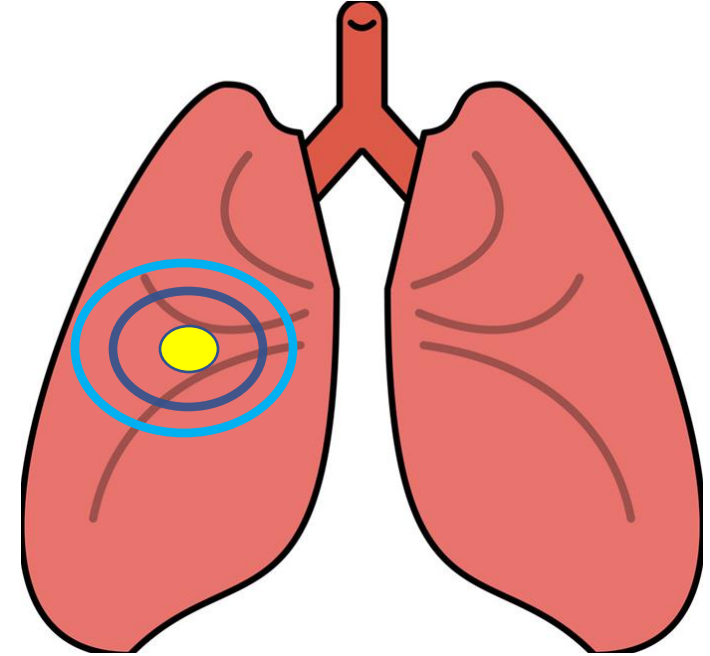


splenomegaly



Ascites

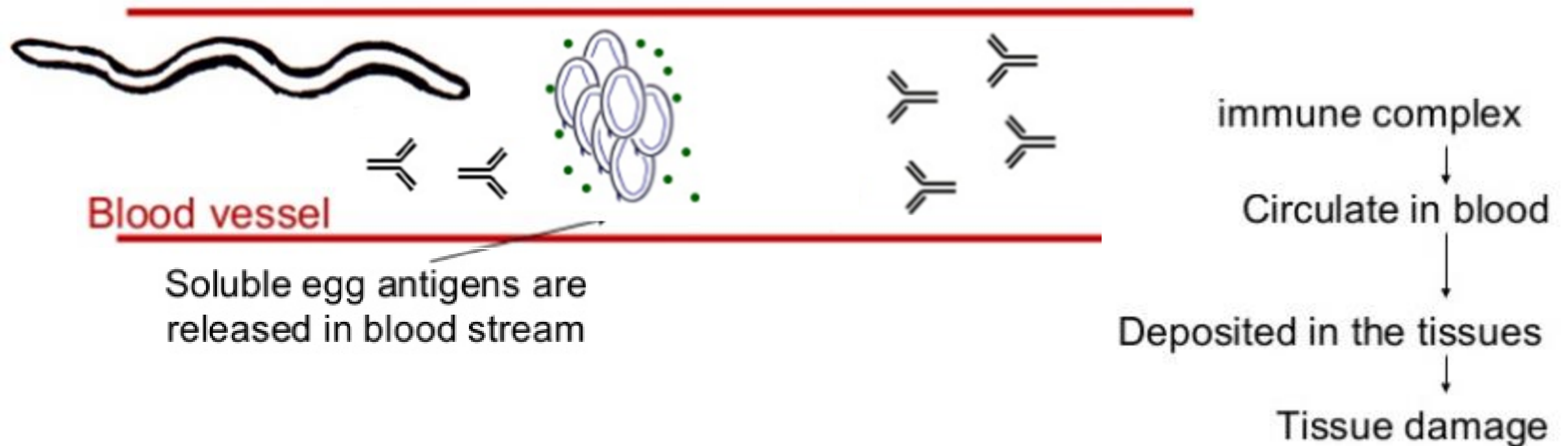
# EGGS THAT FAIL



- The embolism goes and blocks the lung arterioles
- This will cause granuloma and fibrosis
- This will cause back pressure in the heart leading to congestive right sided heart failure (called **Cor pulmonale**).
- This lead to body edema

# Katayama Syndrome

- Occurs mainly in *S. japonicum* infection
- Due to laying large number of eggs antigens.
- The patient suffers from: Fever, chills, diarrhoea, generalized lymphadenopathy, Eosinophilia.
- Thus also called acute toxemic schistosomiasis.



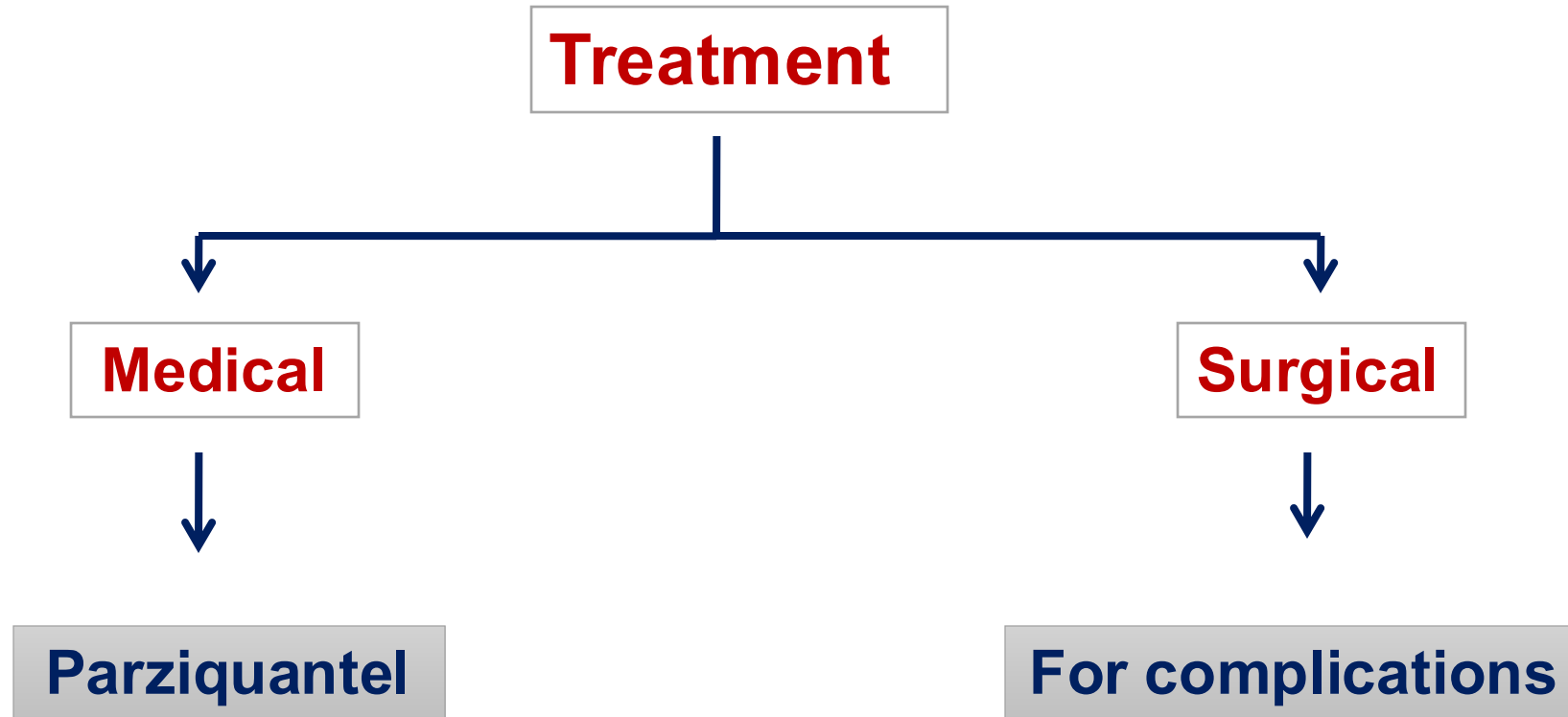
# Laboratory diagnosis

## Direct

- 1) Detection of eggs in the stool by direct smear or concentration .
- 2) Thick faecal smear .
- 3) Rectal swab.
- 4) Rectal biopsy or liver biopsy in chronic stage

## Indirect

- 1) Intradermal test.
- 2) Serological tests :  
IHAT, CFT, and ELISA.
- 3) Recently: Detection of circulating *Schistosoma* antigens by using of monoclonal antibodies
- 4) Anaemia:-
  - Iron deficiency anaemia due to blood loss.
  - Haemolytic anaemia due to hyper-splenism.
- 6) Eosinophilia



PZQ: The standard treatment for *S. mansoni* and *S. haematobium* is generally 40 mg/kg, often divided into two 20 mg/kg doses, or a single 60 mg/kg dose for *S. japonicum*. Efficacy is high against adults, with reported cure rates around 60–90% depending on the infection intensity.

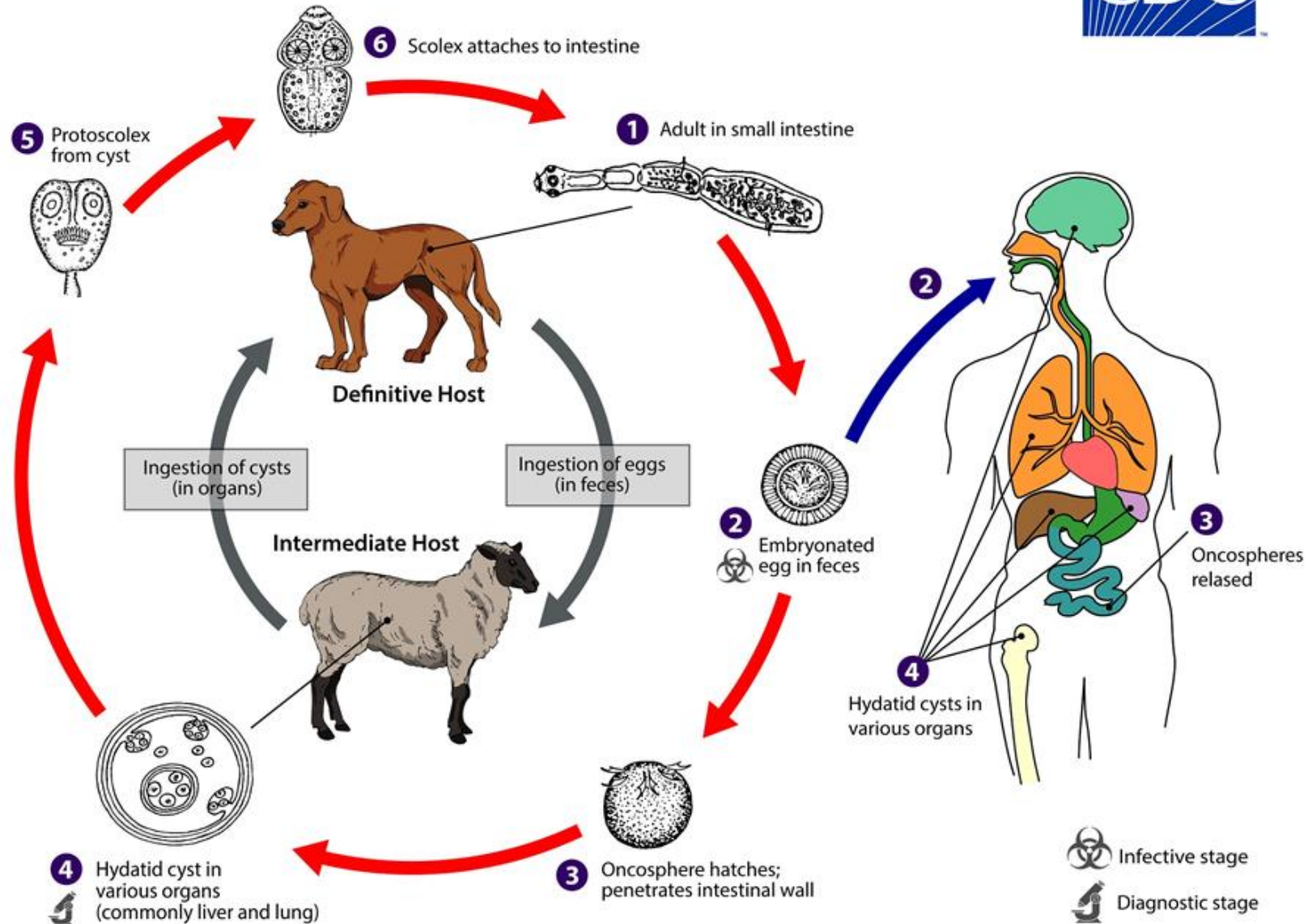
**Limitations:** PZQ has limited activity against immature (juvenile) schistosomes. Therefore, individuals, especially travelers, should be re-treated 6–8 weeks after their last exposure to contaminated water.

# Gastrointestinal hydatidosis

# Gastrointestinal hydatidosis

- Hydatid cysts can be found in almost any organ of the body but the most common sites are liver (50%-77%), lung (15%-47%), spleen (0.5%-8%), and kidney (2%-4%), bone (1-4%) and brain (1- 2%).
- The cycle of *E. granulosus* involves usually dogs as definitive host and sheeps as an intermediate one.
- Humans are accidental intermediate hosts infected through ingestion of water or food contaminated with dog faeces with the eggs or through direct contact with animal hair that retain eggs on their coat
- The eggs converted to oncospheres the penetrate the s.intestine distributed to various organs and invest tissue as cysts

# Echinococcosis



# Pathophysiology

- Gastrointestinal echinococcosis may result from a direct digestive localization of Hydatid Cyst, but most often results from the rupture or fistulization in the digestive tract of HC of other localizations; there have been reports of perforations and fistulizations of HC of the spleen in the colon, hepatic HC in the duodenum, mesenteric HC in the small intestine, adrenal HC in the proximal jejunum, retro-peritoneal HC in the rectum or appendix, and pancreatic HC in the duodenum.

# Gastrointestinal hydatidosis

- Extrahepatic hydatid cyst usually remains asymptomatic for years.
- Patients mostly present after the cyst becomes large enough to palpate or to cause non-specific symptoms as abdominal discomfort
- Hydatid involvement of the digestive tract is more unusual even in the endemic areas of this parasitosis.

- A liver hydatid cyst is a parasitic infection (cystic echinococcosis) caused by the larva of *Echinococcus granulosus* tapeworms, often forming slow-growing fluid-filled sacs in the liver. Transmitted by ingesting eggs from contaminated food or feces of infected animals (mostly dogs/sheep), it causes abdominal pain, jaundice, or nausea. Diagnosis involves ultrasound, CT, or MRI. Treatment often requires surgery (often laparoscopic), anti helminthic medication (albendazole), or specialized drainage (PAIR Method: Puncture, Aspiration, Injection (of scolicidal agent), and Re-aspiration).
- Complications: Risks include cyst rupture (causing severe allergic reactions), jaundice, or infection, and pressure on organs.
- Diagnosis: Primarily via ultrasound (showing daughter cysts/septations), CT scans (detecting calcified walls), and sometimes MRI for biliary involvement.

# The clinical presentation

- The hydatidosis of the digestive tract can range from simple digestive discomfort, abdominal pain, abdominal distension, intestinal pseudo-obstructions or abdominal mass may also be reported.
- More rarely complicated forms of HC are acute appendicitis, appendiceal gangrene with perforation, intestinal obstruction, single or multiple colonic perforation.
- Surgery is the treatment of choice.

# Gastrointestinal hydatidosis

## Diagnosis

- The combination of clinical, laboratory, radiological findings of cyst in upper and lower GI endoscopy help for a preliminary diagnosis.

