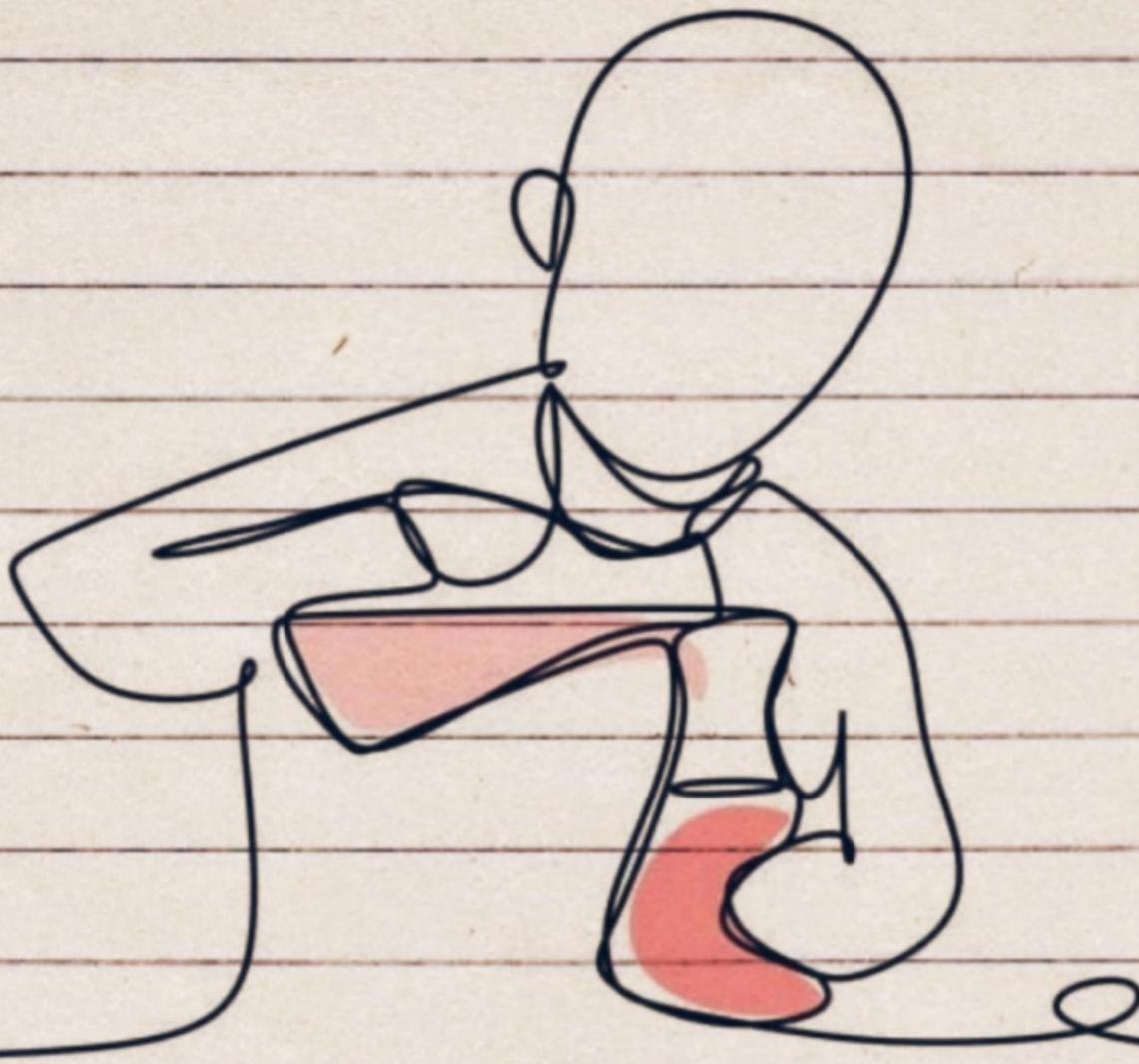
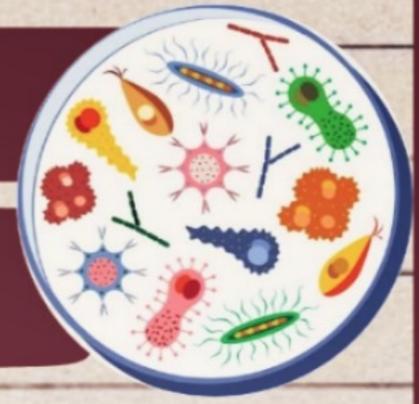


Hope academic team

genitourinary system



**Microbiology**

**Lecture :**

**Done by :** Qusai Ibraheem



# Schistosomiasis – Schistosoma hematobium

Schistosoma is part of parasite infection which is helminthes

Helminths are invertebrates characterized by elongated, flat or round bodies.

Helminth has two part:

1-Platyhelminthes (flat)

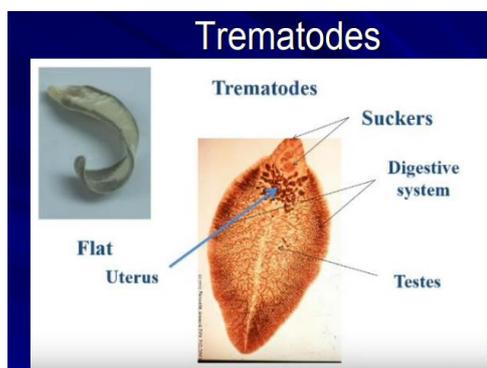
- Trematodes (flukes)
- Cestodes (tapeworms )

2-Nemathelminthes (circular)

- Nematodes (Roundworms)

And the schistosoma related to trematode

## Flukes, or trematodes



trematodes have a suckers to attachment, digestive system and have sexual organ called hermaphroditic which mean have male and female sexual organ in the same species for expetion is schistsoma withich have bisexual

ntermediate host : snail

\*Leaf-shaped, and vary in length from a few millimetres to 8cm. Excluding blood flukes, trematodes are hermaphroditic

–having both male and female reproductive organs.

–Both **self-fertilisation** and **cross-fertilisation** occur.

\*Blood flukes (schistosomes) are the only **bisexual** flukes that infect humans

–Within the definitive (human) host, male and female worms inhabit the **lumen of blood vessels** and are found in close physical association which is close contact with each other and inhabit in lumen of vessels

Common flukes (trematodes)	
Organ inhabited	Fluke
Lung	<i>Paragonimus westermani</i>
Intestine	<i>Fasciolopsis buski</i> , <i>Heterophyes heterophyes</i> , <i>Mettgonimus yokagawi</i>
Liver	<i>Clonorchis sinensis</i> , <i>Opisthorchis species</i> , <i>Fasciola hepatica</i>
Blood	<i>Schistosoma mansoni</i> , <i>Shistosoma haematobium</i> , <i>Schistosoma japonicum</i>

## SCHISTOSOMIASIS(BLOOD FLUKE INFECTION)

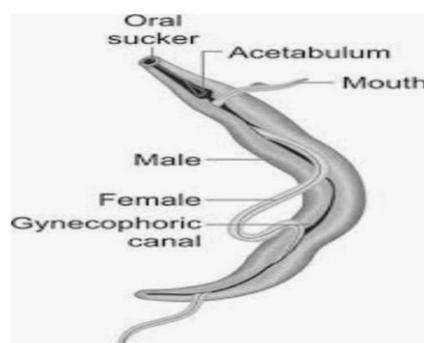
### Parasitology

The schistosomes are a group of closely related flukes that inhabit the portal vascular system of a number of animals.

Of the five species known to infect humans, three, *S. mansoni*(mainly in Africa , middle east and south America), *S. haematobium*(middle east and Africa), and *S. Japonicum*(china and Philippine), are of primary importance

The 1 to 2 cm male possesses a deep ventral groove, or "schist".

Within this gynecophoral canal it carries the longer, more slender female in lifelong copulatory embrace



Each pair deposits 300 (*S mansoni*, *S haematobium*) to 3000 (*S japonicum* is more species release egg) eggs daily for the remainder of its 4- to 35-year life span clinical picture is related to immunological response to egg

After mating of the adult worms in the portal vein, the conjoined couple use their suckers to ascend the mesenteric vessels against the flow of blood.

\*\*S. japonicum enters the superior mesenteric vein

—the venous radicals of the small intestine and ascending colon

\*\*S. mansoni and S. haematobium are directed to the inferior mesenteric system.

\*\*S. haematobium passes through the hemorrhoidal plexus to the systemic venous system, ultimately coming to rest in the venous plexus of the bladder and other pelvic organs.

Schistosoma japonicum—veins of small intestines

Schistosoma mansoni—portal veins of colon and rectum

Schistosoma haematobium—veins of bladder and pelvic organs

لما يوصل للportal system اما بروح للsuperior mesenteric vein زي s.japonicum وهون  
بوصل للsmall intestine and ascending colon فالegg بتطلع بالstool او للinferior  
mesenteric vein ومنها بتروح للcecum and rectum , distal colon وكم ان بتروح  
للbladder الي هم S. mansoni and S. haematobium

S. haematobium

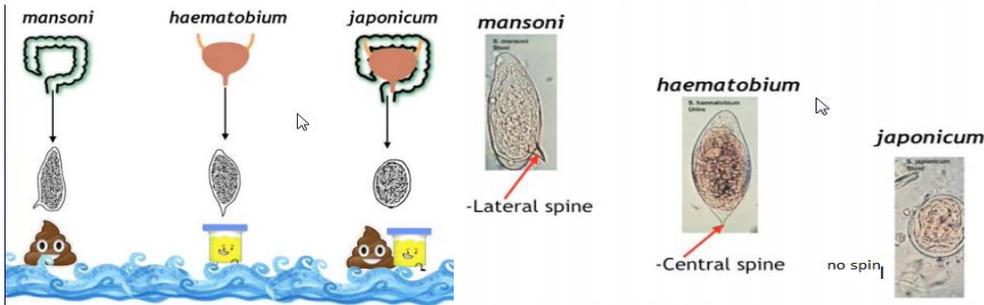
On reaching the submucosal venules in urinary bladder, the worms initiate oviposition.

-Each pair deposits 300 eggs daily for the remainder of its 4- to 35-year life span. Ova lying immediately adjacent to the mucosal which reponce to this type of infection

surface rupture into the lumen of the bladder and are passed to the outside in the urine so those how tranmitted

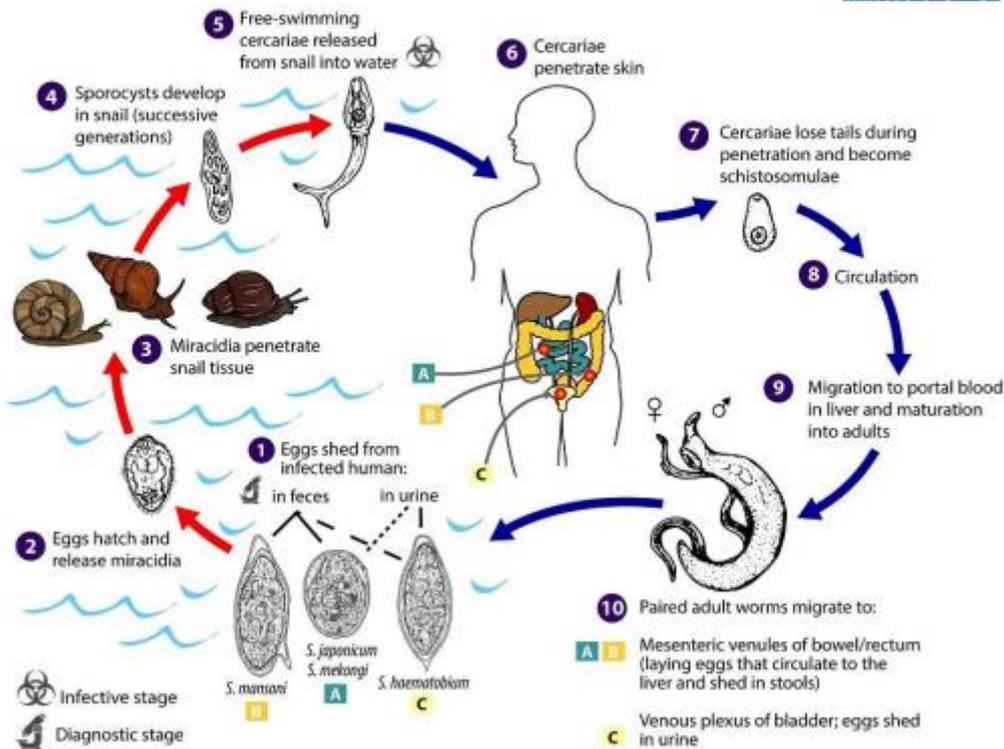
The eggs measure 60 by 140  $\mu\text{m}$  and possess a terminal spine.

### Diagnostic Stage by Morphology



4DPDx

*Schistosoma* spp.



Egg which is diagnostic stage carry in feces or urine and release in water the hatch into miracidia then penetrate snail which is intermediate host and inside snail develop into sporocyst then convert into free swimming cercariae which consider infective stage and these penetrate skin which loss tail while penetrate and become schistosoma and enter the circulation the migrate to portal blood and maturation into adult then adult migrate either to mesenteric vacuoles or to venous plexuses of bladder

-Approximately 200 million people—almost 1 in 30 of all humans—are infected worldwide

-Of these, roughly 200 000 will die annually

-Most infected patients carry fewer than 10 pairs of worms in the vascular system and, accordingly, lack clinical manifestations of disease. The symptom is appear due to complication of this type of infection

## PATHOGENESIS

There are three major clinicopathologic stages in schistosomiasis.

- The first stage is initiated by the penetration and migration of the schistosomula from cercariae
- The second or intermediate stage begins with oviposition and is associated with a complex of clinical manifestations.
- The third or chronic stage is characterized by granuloma formation and scarring around retained egg immune response to egg and form granuloma that destruction the tissue and scarring around retained egg

### 1-Early Stage (within 24 hours)

- Penetrating the skin,
- immediate and delayed hypersensitivity to parasitic antigens
- results in an intensely pruritic papular skin rash that increases in severity with repeated exposures to cercariae.

As the viable schistosomula begin their migration to the liver, the rash disappears and the patient experiences fever, headache, and abdominal pain for 1 to 2 weeks these manifestation result from present schistosoma in circulation

-S japonicum infection: characterize by Katayama syndrome : encephalitis. Typically, leukocytosis, marked peripheral eosinophilia, and elevated levels of IgM, IgG, and IgE immunoglobulins are present..

### 2-Intermediate Stage (One to two months)

- an acute febrile illness that bears a striking resemblance to serum sickness.
- fever and chills,

–patients experience cough(result from present shistosoma in lung), urticaria, arthralgia, lymphadenopathy, splenomegaly, abdominal pain, and diarrhea.

–The onset of oviposition leads to a state of relative antigen excess, the formation of **soluble immune complexes**, and the deposition of these in the tissues of the host

### 3–Chronic Stage

Approximately one half of all deposited eggs reach the lumen of the bowel or bladder and are shed from the body.

Those retained induce inflammation and scarring, initiating **the final and most morbid phase of schistosomiasis**

البي ال egg الي بضل بال urinary bladder وال wall of rectum هاي ال retaining egg بتعمل granuloma and scaring

Soluble antigens excreted by the eggs stimulate the formation of T lymphocyte–mediated eosinophilic granulomas.

Early in the infection, the inflammatory response is vigorous, producing lesions more than **100-fold larger than the inciting egg itself**

Inflammatory and fibrotic reactions to retained eggs cause chronic disease, the severity of tissue damage **is directly related to the total number of eggs retained** so if no egg retained ,no long term complication

### In *S. haematobium* infection

–the bladder mucosa becomes thickened, papillated, and ulcerated **result from granuloma**

–**ulceration lead to Hematuria** and dysuria result; repeated hemorrhages produce anemia.

–In severe infections the muscular layers of the bladder are involved, with loss of bladder capacity and contractibility.

–**Progressive obstruction** leads to renal failure and uremia.

–Bladder carcinoma is frequently seen.

Other urogenital organs may also be involved, including the spermatic cord, testes, fallopian tubes, ovaries, and vagina.

In *S. mansoni* and *S. japonicum* infections, the bowel mucosa is congested, thickened, and ulcerated. Patients experience abdominal pain, diarrhea, and blood in the stool.

Eggs deposited in the larger intestinal veins may be carried by the portal blood flow back to the liver, where they lodge in the presinusoidal capillaries .

The resulting inflammatory reaction leads to the development of periportal fibrosis and hepatic enlargement.

Presinusoidal obstruction of blood flow result in portal hypertension and serious manifestation of portal obstruction

Eggs that are carried around the liver in the portosystemic collateral vessels may lodge in the small pulmonary arterioles, where they produce interstitial scarring, pulmonary hypertension, and right ventricular failure.

Immune complexes shunted to the systemic circulation may induce glomerulonephritis.

Occasionally, eggs may be deposited in the central nervous system, where they may cause epilepsy or paraplegia

## DIAGNOSIS

❑ Definitive diagnosis requires the recovery of the characteristic eggs in urine, or biopsy specimens from bladder wall.

–filtering the urine through a membrane filter . To increase possibility to see egg to collect large amount of egg

Cystoscopy with biopsy of the bladder mucosa may be required for the diagnosis of mild infection.

Conventional serologic tests detect circulating antibodies with sensitivities exceeding 90% but cannot distinguish active from inactive infection .

## TREATMENT

- ❑ No specific therapy is available for treatment of schistosomal dermatitis.
- ❑ in first stage from penetrate skin which cause urticaria and pruritic popular skin treated by Antihistamines and corticosteroids may be helpful in ameliorating their more severe manifestations.
- ❑ Several antihelmintic agents may be used.
- ❑ Praziquantel, which is active against all three species of schistosomes, is the agent of choice, although there is increased resistance to this single-dose oral agent in mass therapy programs. (C/I pregnancy)

-and difficult treatment chronic stage

**Prevention:** prevent urine and stool to reach water, by kill snail and prevent swimming on contaminated water..

نهاية التلخيص سامحونا على اي اخطاء