

# Schistosoma haematobium

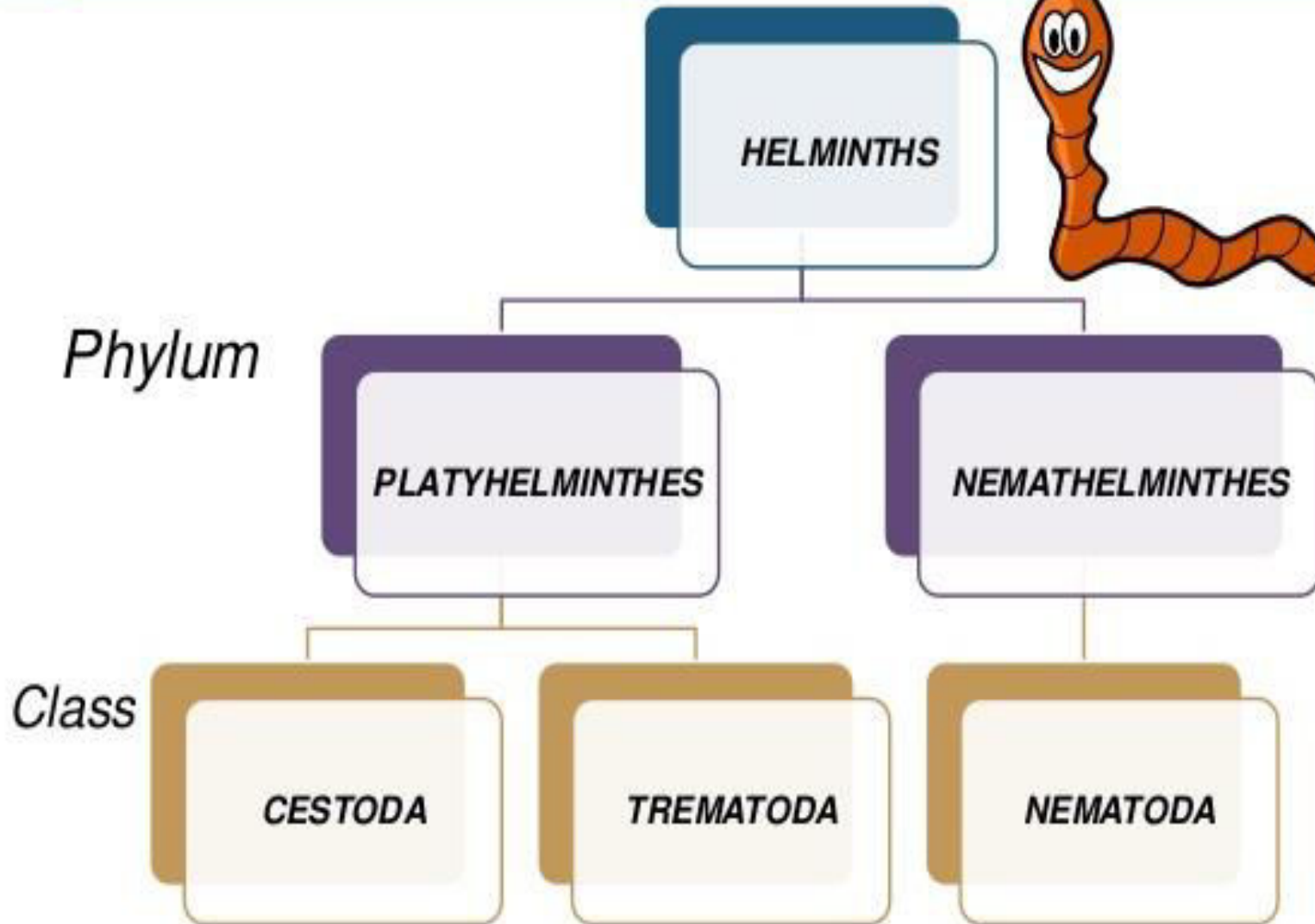
**SEM- VI, DSE- 3**

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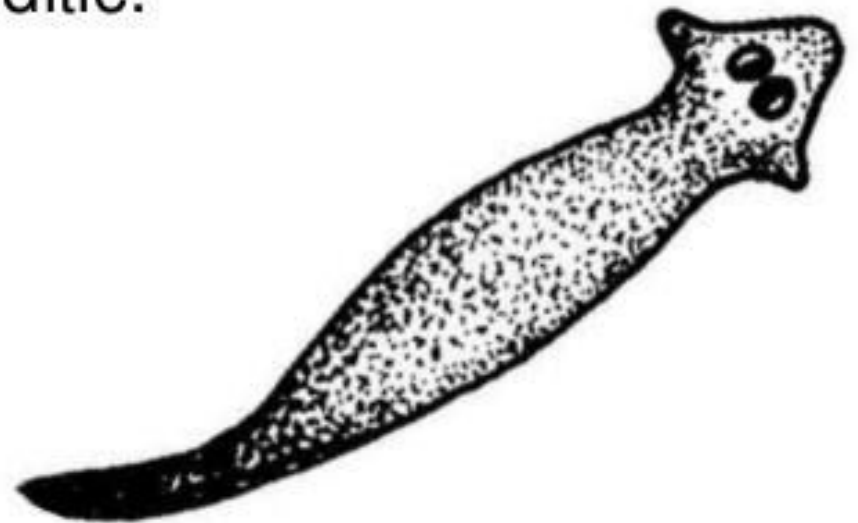


# Introduction



# TREMATODES

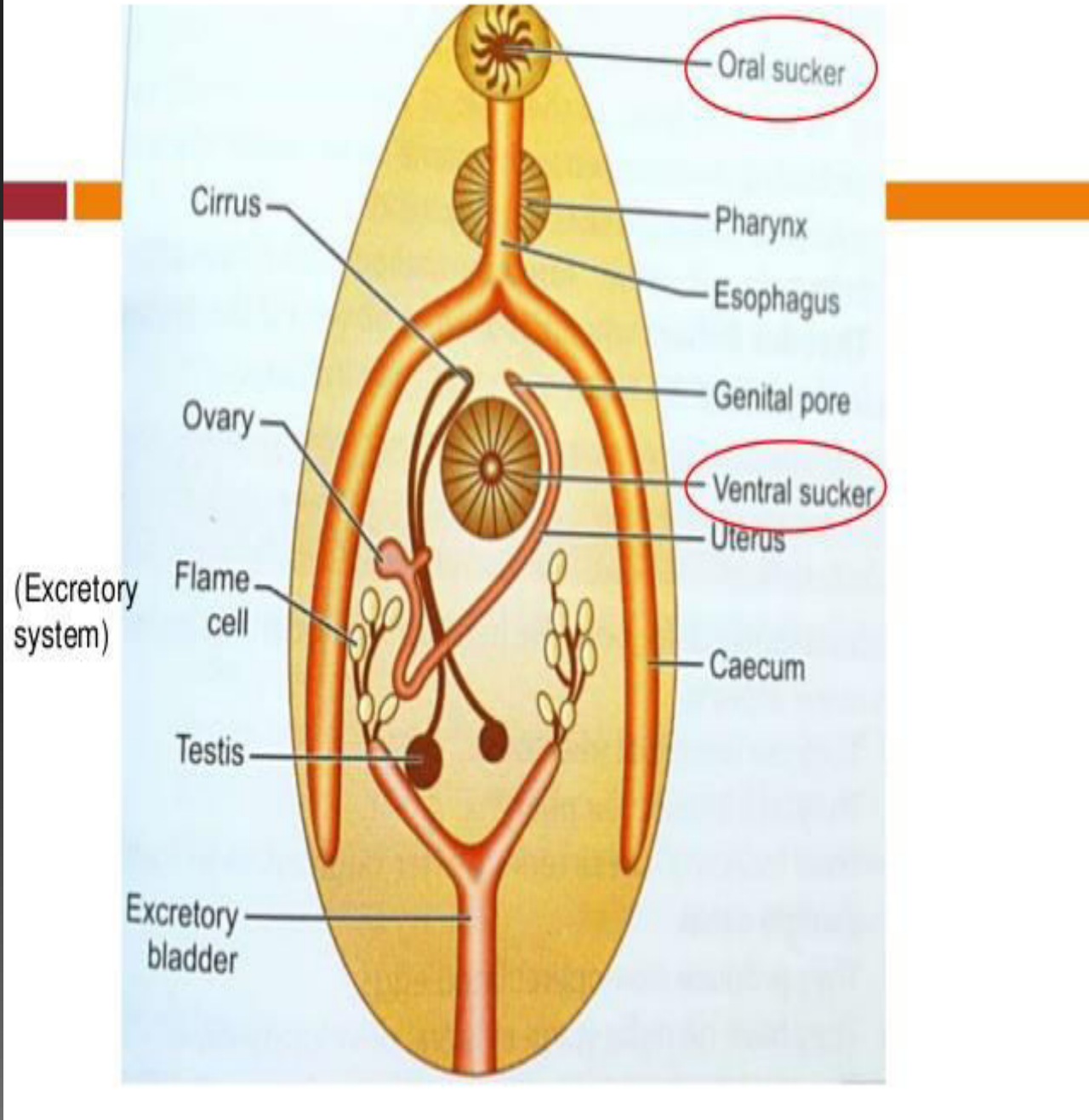
- ❑ Flat or fleshy, leaf-like unsegmented body.
- ❑ Incomplete alimentary canal.
- ❑ Possess suckers with no hooks.
- ❑ Sexes are separate in Schistosomes, while the others are hermaphroditic.
- ❑ Oviparous



# General Characteristics

- Presence of **two suckers**.
- Has no body cavity, circulatory and respiratory organs.
- Alimentary system- mouth surrounded by an oral sucker, muscular pharynx, oesophagus which bifurcates into 2 blind caeca.(inverted Y shaped)
- Rudimentary nervous system – paired ganglion cells.

# ALIMENTARY, EXCRETORY AND REPRODUCTIVE SYSTEMS



# Classification

## Based on Habitat:

- Blood flukes
- Liver flukes
- Intestinal flukes
- Lung flukes

# BLOOD FLUKES

- Family : *Schistosomatidae*
- Genus : *Schistosoma*
- Species:
  1. *S. haematobium*
  2. *S. mansoni*
  3. *S. japonicum*
  4. *S. mekongi*
  5. *S. intercalatum*



# Schistosomes

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- ❑ Schistosomiasis (bilharziasis)
- ❑ Water-borne disease (Africa, Asia & Latin America).
- ❑ Male worm is broader & lateral border is rolled ventrally into a cylindrical shape, producing a long groove – **GYNECOPHORIC CANAL**, in which females are held.
- ❑ Live in venous plexus in body of definitive host



## Features distinguishing Schistosomes from other trematodes:

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- ▣ Unisexual.
- ▣ Lack muscular pharynx
- ▣ Intestinal caeca reunite after bifurcation to form a single canal.
- ▣ Produce non-operculated eggs.
- ▣ Cercariae have forked tails and infects by penetrating unbroken skin of definitive host.

# History and Distribution

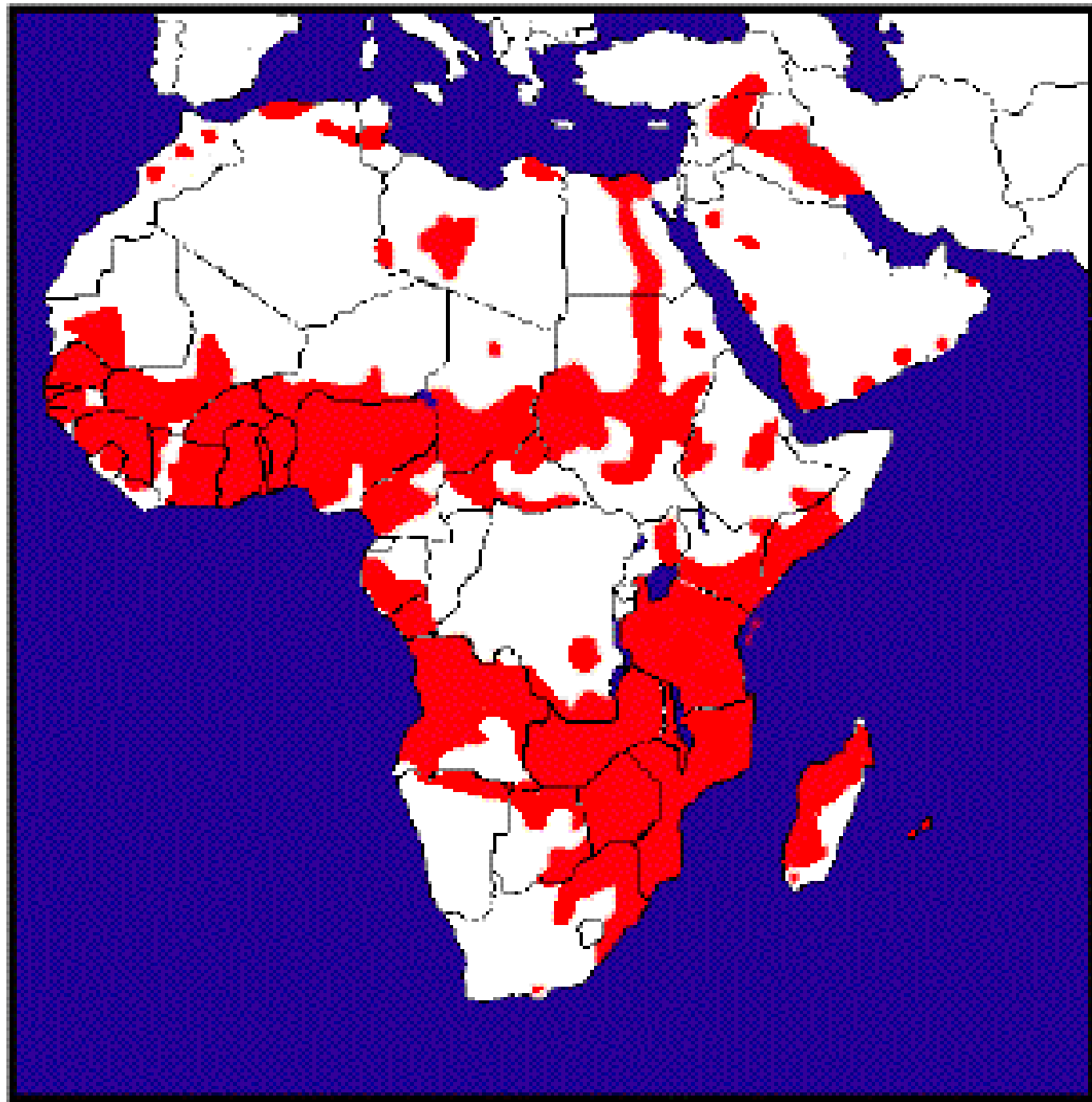
- *Bilharzia haematobium*.
- Bilharz described about the adult worm.
- Endemic in most parts of Africa, West Asia some parts of India.

**EGGS OF SCHISTOSOMES  
WAS FOUND IN RENAL  
PELVIS OF EGYPTIAN  
MUMMY FROM 1,200-1,000  
BC.**



**SCHISTOSOME  
ANTIGEN IDENTIFIED  
BY ELISA IN EGYPTIAN  
MUMMIES OF  
PREDYNASTIC PERIOD  
(3,100 BC)**

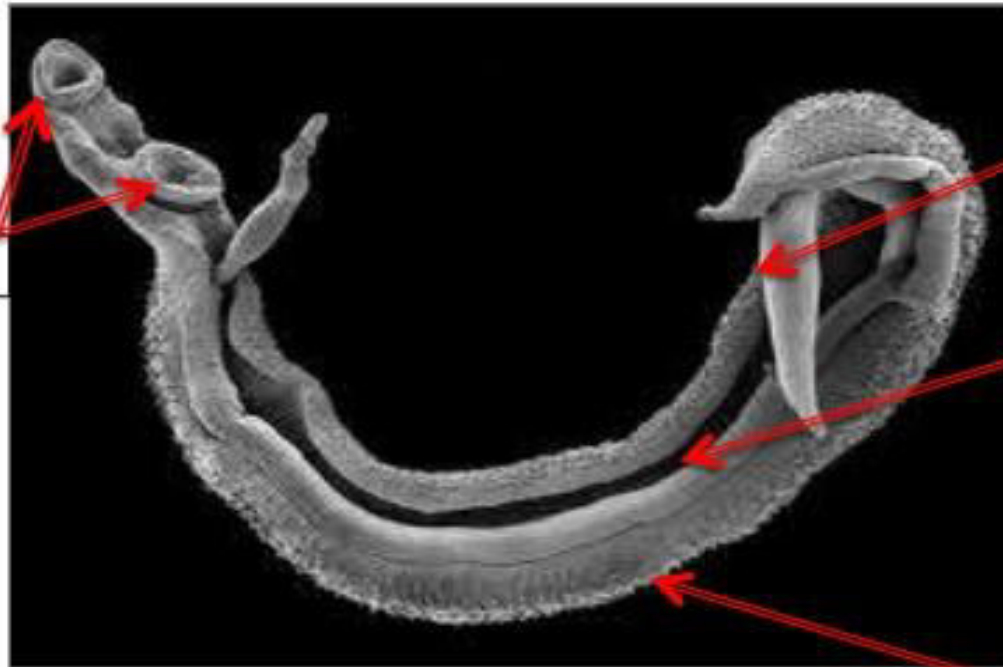
# PREVALENCE



# Morphology

## ADULT WORM

SUCKERS



**FEMALE**  
20mm long,  
0.25mm thick with  
cuticular tubercles  
confined to ends.

**GYNECOPHORIC  
CANAL**

**MALE**  
10-15mm long, 1mm  
thick & covered by  
finely tuberculated  
cuticle.

# EGG

Ovoid non-operculated



Gravid worm has  
20-30 eggs in  
uterus at a time &  
realises **300**  
Eggs/day

With a brownish yellow  
transparent shell  
carrying **terminal**  
**spine** at one pole

# Life cycle

- Definitive host : Humans
- Intermediate host : freshwater snails
- Infective form : Cercaria larva



Eggs hatch in water



first stage larva



Motile ciliated **MIRACIDIUM**



Infects snail



Cilia shed to become sporocyst



Cell proliferation to form **germ balls**



second generation sporocyst



Cercariae formed by sexual reproduction



reaches vesical and pelvic venous plexus

mature, mate, and lay eggs



grow & is sexually differentiated

in 20 days in **intrahepatic portal veins**



enters peripheral venules



sheds tail - **schistosomulae**



**infection by direct skin penetration**



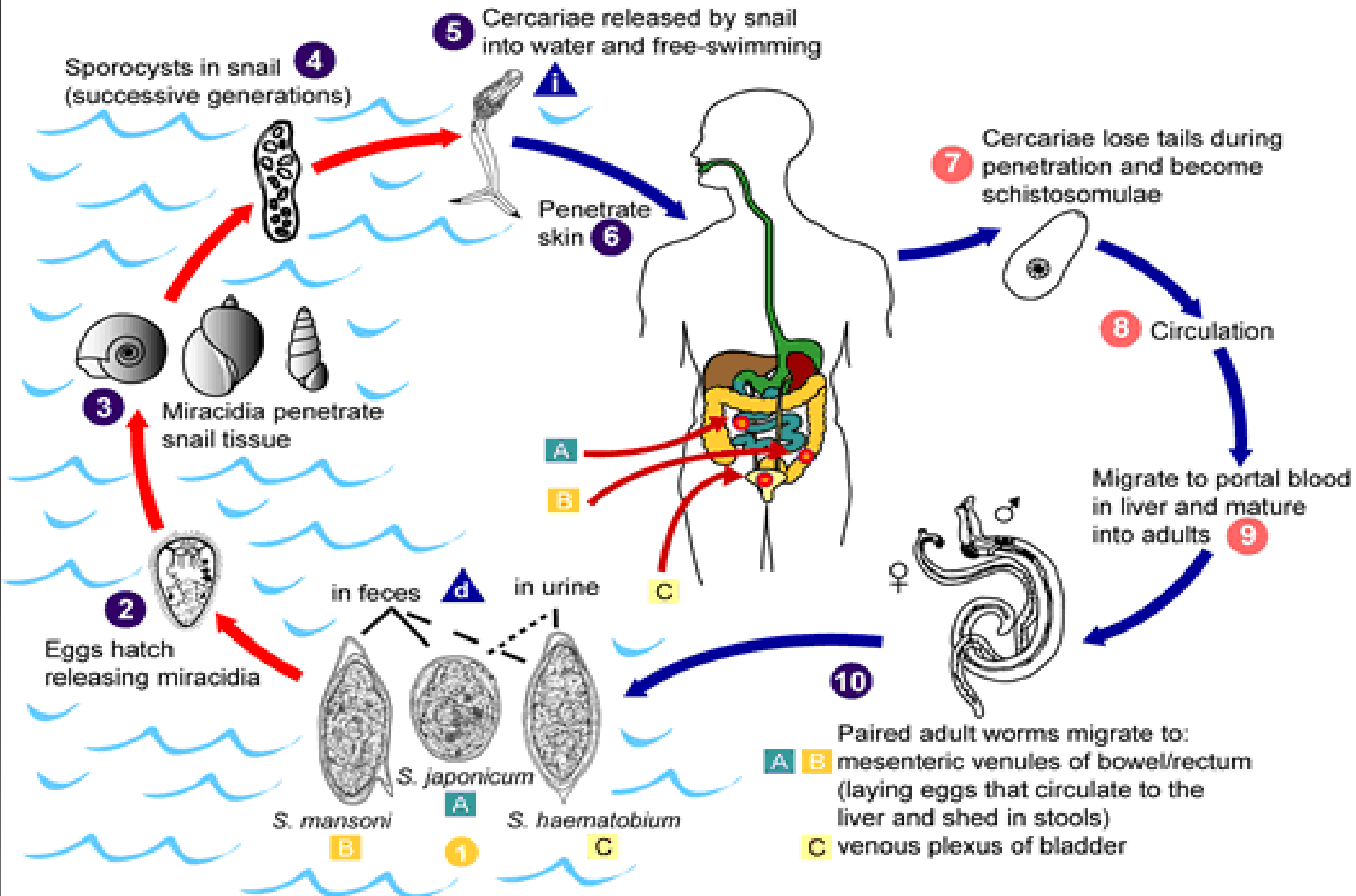
free living in water



on maturity, escape from parent



**i** = Infective Stage  
**d** = Diagnostic Stage



- Pierces vesical wall → Enter lumen of urinary bladder → Discharged in urine (end of micturition during midday)
- Cercaria – elongated ovoid body with forked tail
- Swarms of cercaria swim in water for about 3 days.
- Once infected, eggs appear in urine – 10 to 12 weeks.
- Adult worm could live upto 20–30 years.

# Clinical Features

- Classified depending on stages in evolution of infection:
  - ▣ During incubation period
  - ▣ During oviposition
  - ▣ During tissue proliferation & repair

# 1. Skin penetration & Incubation period

- Local cercarial dermatitis / **Swimmer's itch** – transient itching and petechial lesions at site of entry of cercariae.
  - ▣ Often in visitors to endemic areas than locals
- Anaphylactic or toxic symptoms – fever, malaise and urticaria.
- Accompanied by leucocytosis, eosinophilia, enlarged tender liver and



## 2.Oviposition

- Painless terminal hematuria – initially microscopic later becomes gross.
- Develops frequency of micturition and burning.
- Cystoscopy – hyperplasia and inflammation of bladder mucosa.

# Laboratory Diagnosis

## Detection of egg

- Urine microscopy
- Bladder mucosal biopsy



## Detection of antigen

- Circulating anodic antigen & Circulating cathodic antigen by ELISA



## Detection of antibody

- Complement Fixation Test (CFT)
- Immunofluorescence
- Indirect Hemagglutination
- Bentonite flocculation test
- Enzyme linked immunoelectrotransfer blot
- FAST/ELISA



## Intradermal skin test (Fairley's test)

- Group specific test gives positive to all Schistosomiasis



## Imaging

- X-Ray- bladder and ureteral calcification.
- USG- hydroureter & hydronephrosis
- Indirect diagnosis: IVP & Cystoscopy



INTRAVENOUS  
UROGRAM showing  
scalloping of bladder &  
right lower ureter by  
schistosomal polypoid  
lesions



# Treatment and Prophylaxis

- DOC – Praziquantel (40mg/kg for 1 day)
- Alternative DOC – Metrifonate
- Prophylaxis:
  - ▣ Eradication of intermediate molluscan hosts.
  - ▣ Prevention of environmental pollution with urine and faeces.
  - ▣ Effective treated of infected.
  - ▣ Avoid swimming, bathing and washing in infected water.

# DDx

- Acute nephritis
  - Renal TB
  - UGT cancer
  - Salmonella infection
  - Drug reactions
  - Helminthic Parasitic infections
- } hematuria

- CBC:
  - ▣ Eosinophilia, Anaemia
- Blood culture
- Urine microscopy:
  - ▣ eggs of *Schistosoma haematobium*

**Thank You**