

LIFE HISTORY OF FASCIOLA HEPATICA

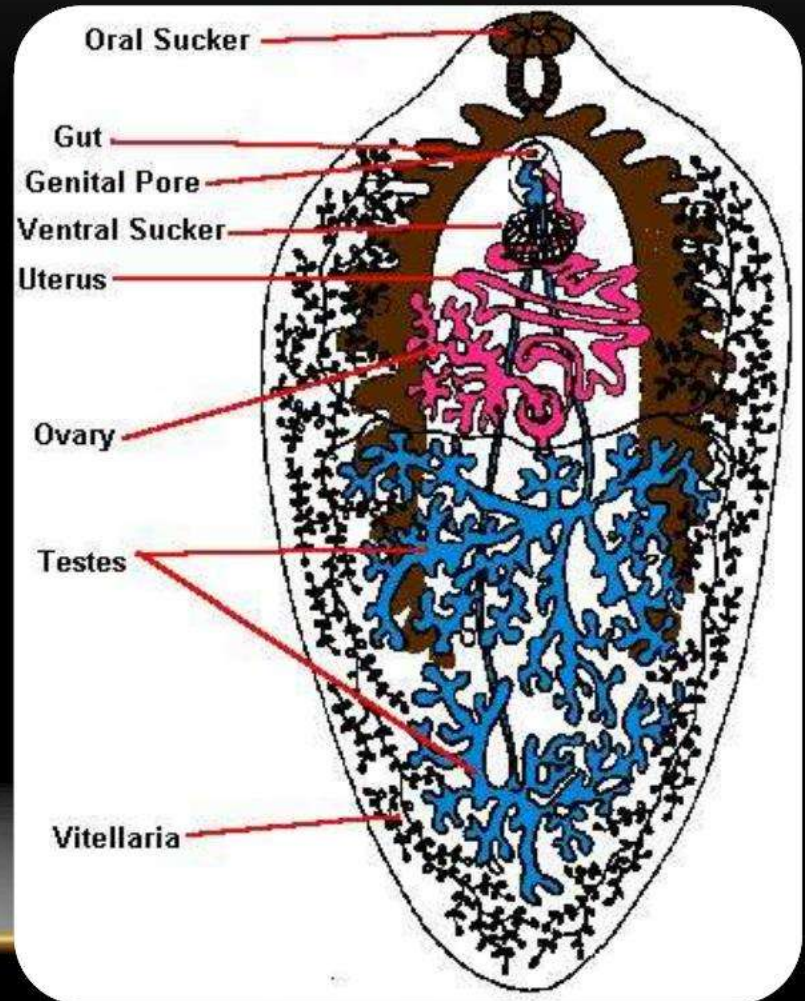
Dr. P. John Kiran

FASCIOLA HEPATICA

- Fasciola hepatica, also known as the common liver fluke or sheep liver fluke, is a parasitic flatworm of the class Trematoda, phylum Platyhelminthes that infects the livers of various mammals, including humans. The disease caused by the fluke is called fascioliasis (also known as fasciolosis). *F. hepatica* is distributed worldwide, and causes great economic losses in sheep and cattle. It has been known as an important parasite of sheep and cattle for hundreds of years.

INTRODUCTION

- Phylum:
Platyhelminthes
- Flat worm
- Liver fluke
- Effects sheep,
cattle, and
sometimes
humans

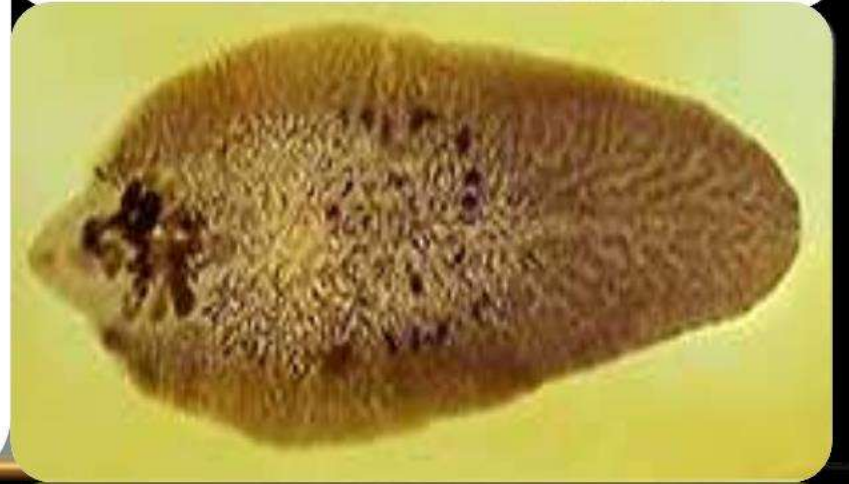
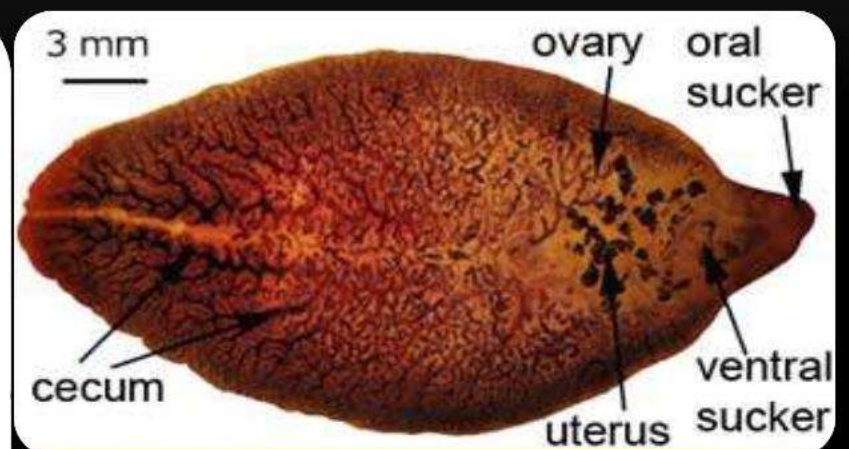
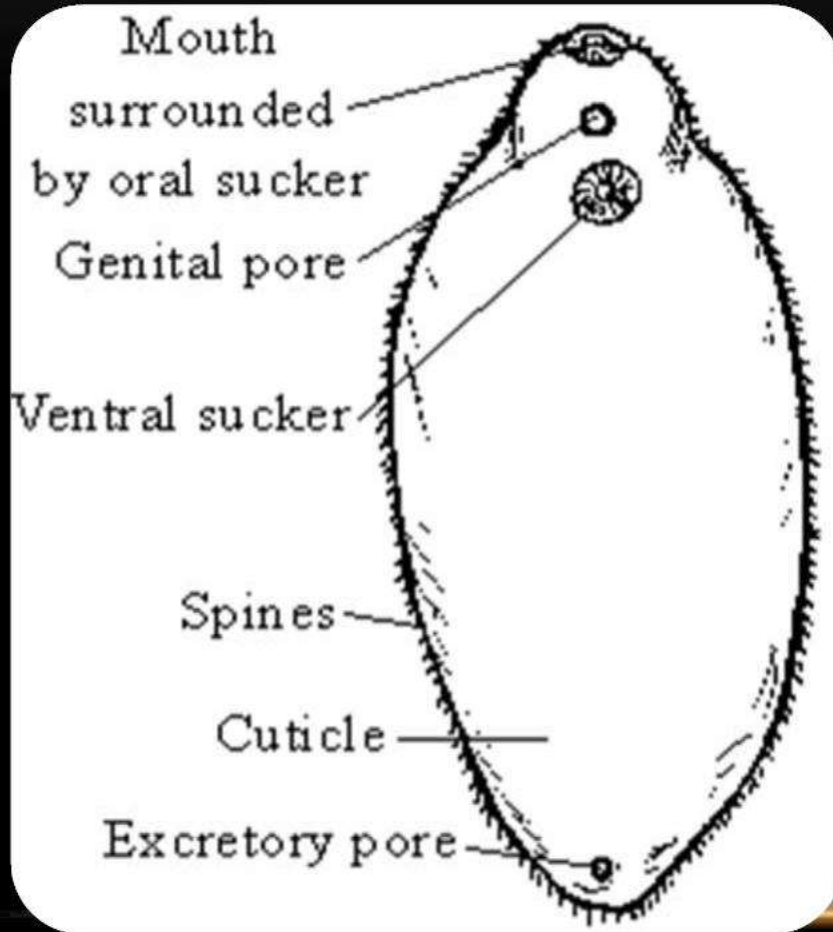


FASCIOLA HEPATICA



- Fasciola hepatica is a liver fluke common in humans and livestock that can cause major economic losses **(Diwilde et al, 2008)**. Infected animals become anaemic and lose significant amounts of weight.

MORPHOLOGY OF F. HEPATICA



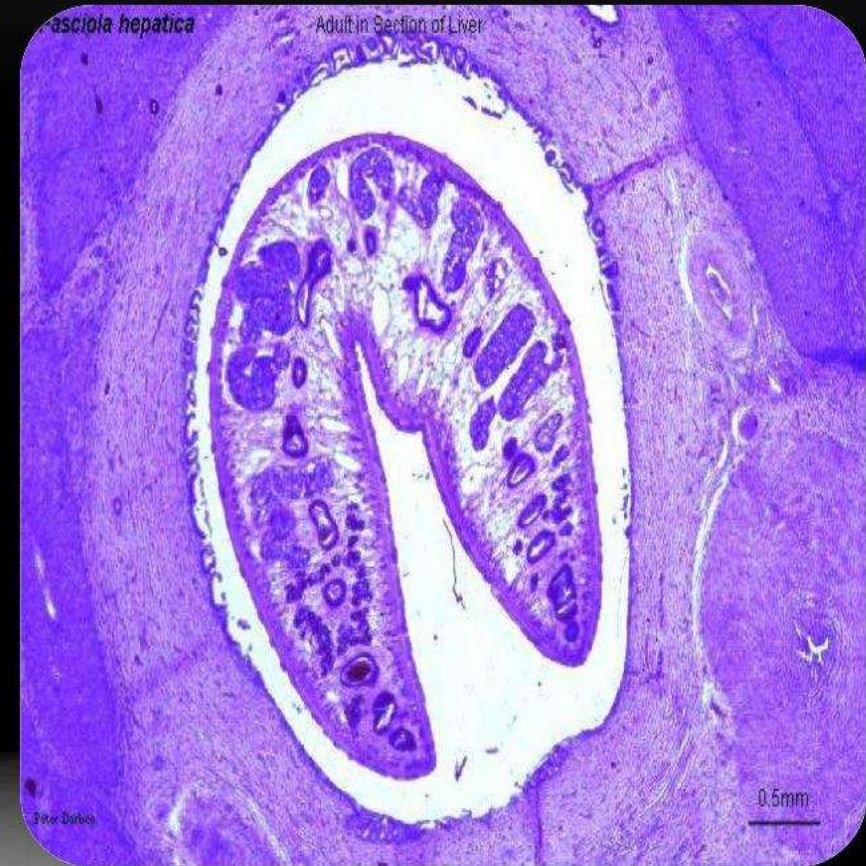
F. HEPATICA

- Definitive host:
 - Sheep
 - Cattle
 - Humans (Accidental)
 - Other Mammals
- Intermediate host
 - **Fresh Water Snail**
- Geographic Range
 - Cosmopolitan; anywhere sheep and cattle are raised

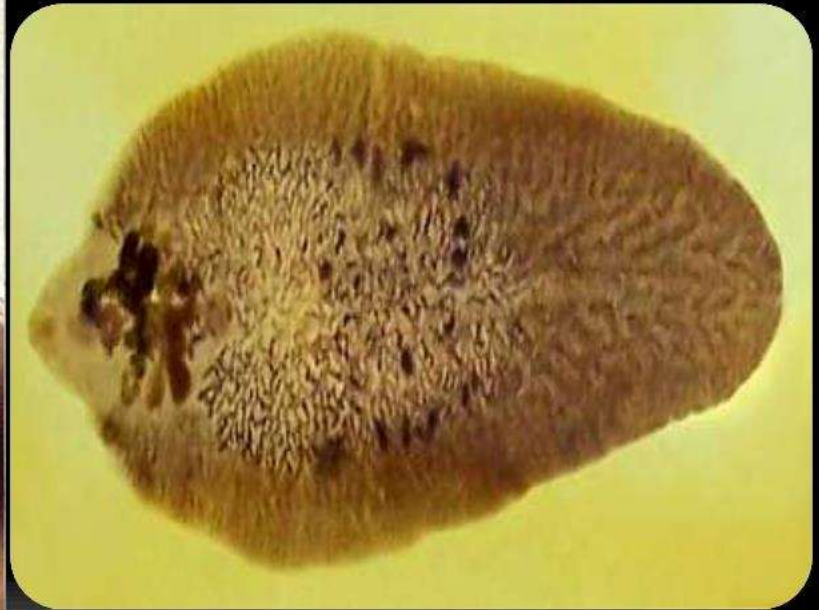


MORPHOLOGY

- **Adult fluke**
 - Flat leaf like body
 - 20-30mm long
 - 8-15mm wide



F. HEAPATICA

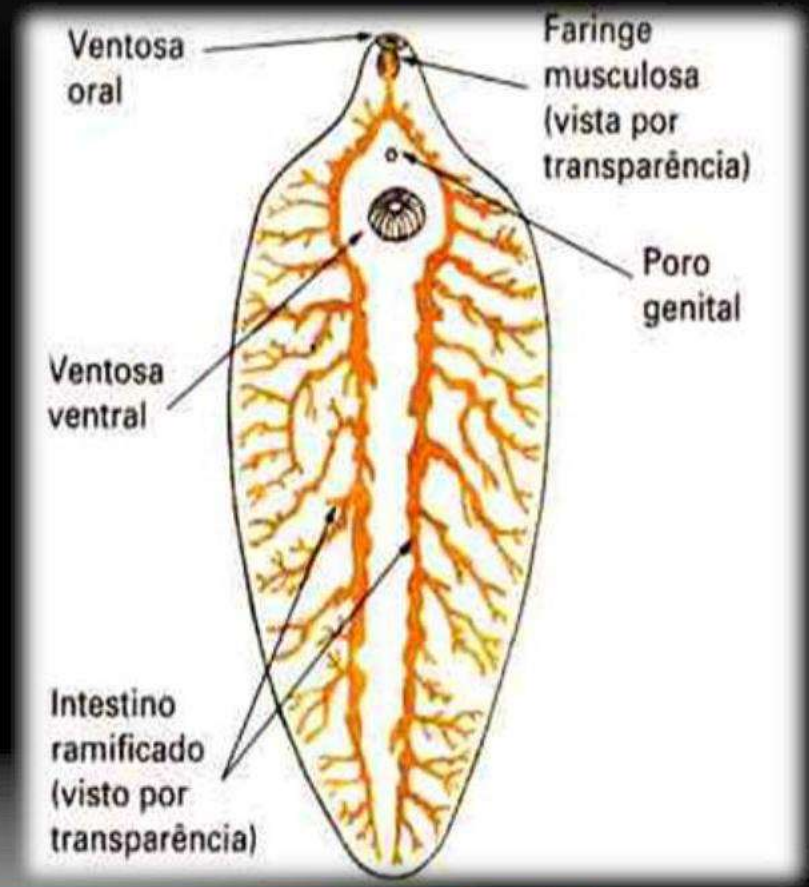


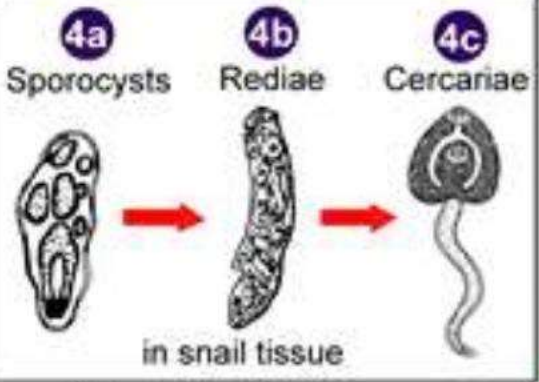
CYCLE OF EVENTS IN FASCIOLA HEPATICA

- The life cycle of *Fasciola hepatica* starts when a female lays eggs in the liver of an infected human. Immature eggs are discharged in the biliary ducts and taken out in the feces. If landed in water, the eggs become embryonated and develop larvae called miracidia. A miracidium invades an aquatic snail and develops into cercaria, a larva that is capable of swimming with its large tail.

CYCLE OF EVENTS IN INFECTION

- The **cercaria** exits and finds aquatic vegetation where it forms a cyst called Metacercariae. A human eats the raw freshwater plant containing the cyst. The Metacercariae excysts in the first part of the small intestine, duodenum. It then penetrates the intestinal wall and gets into the peritoneal cavity.



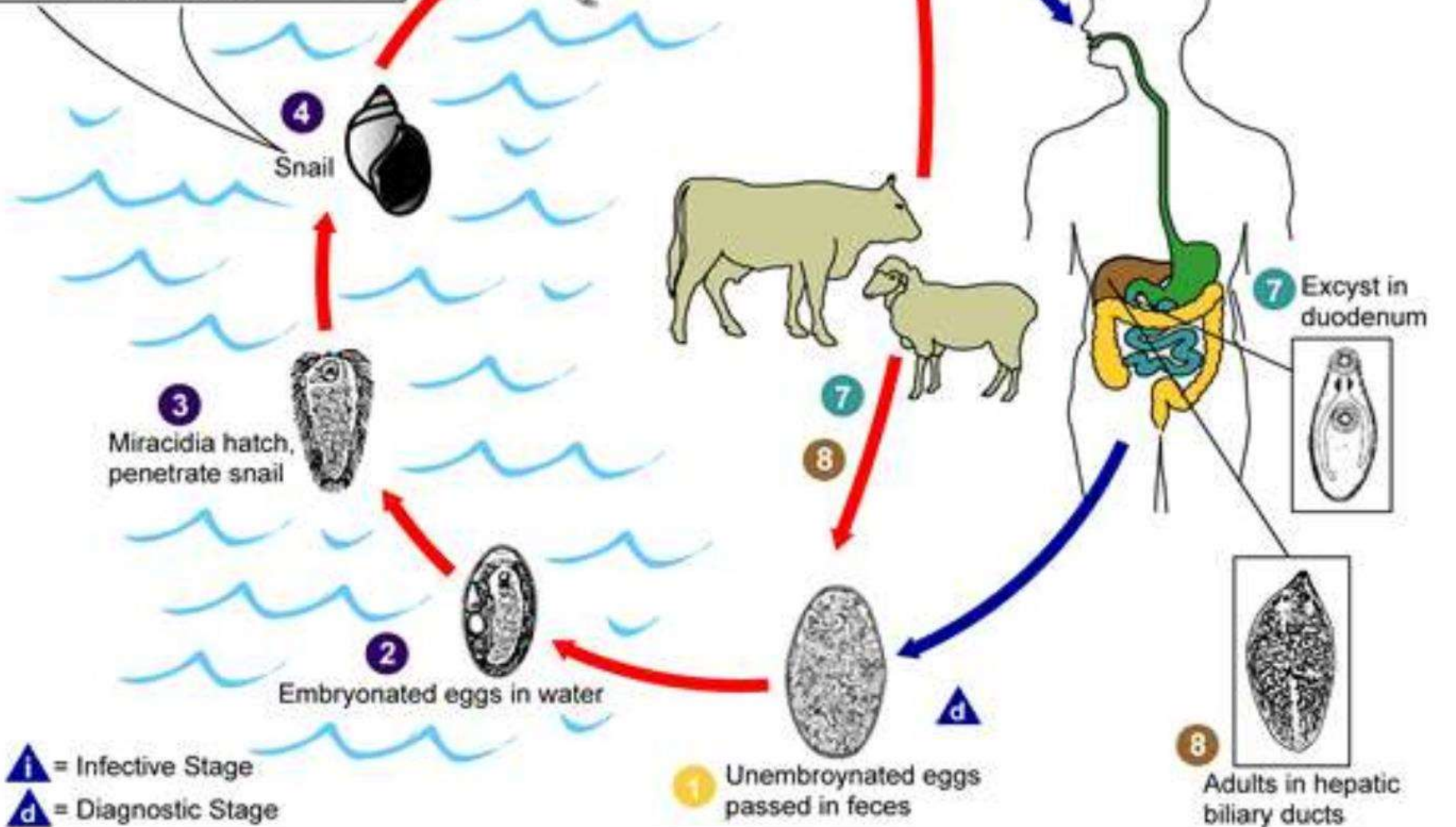


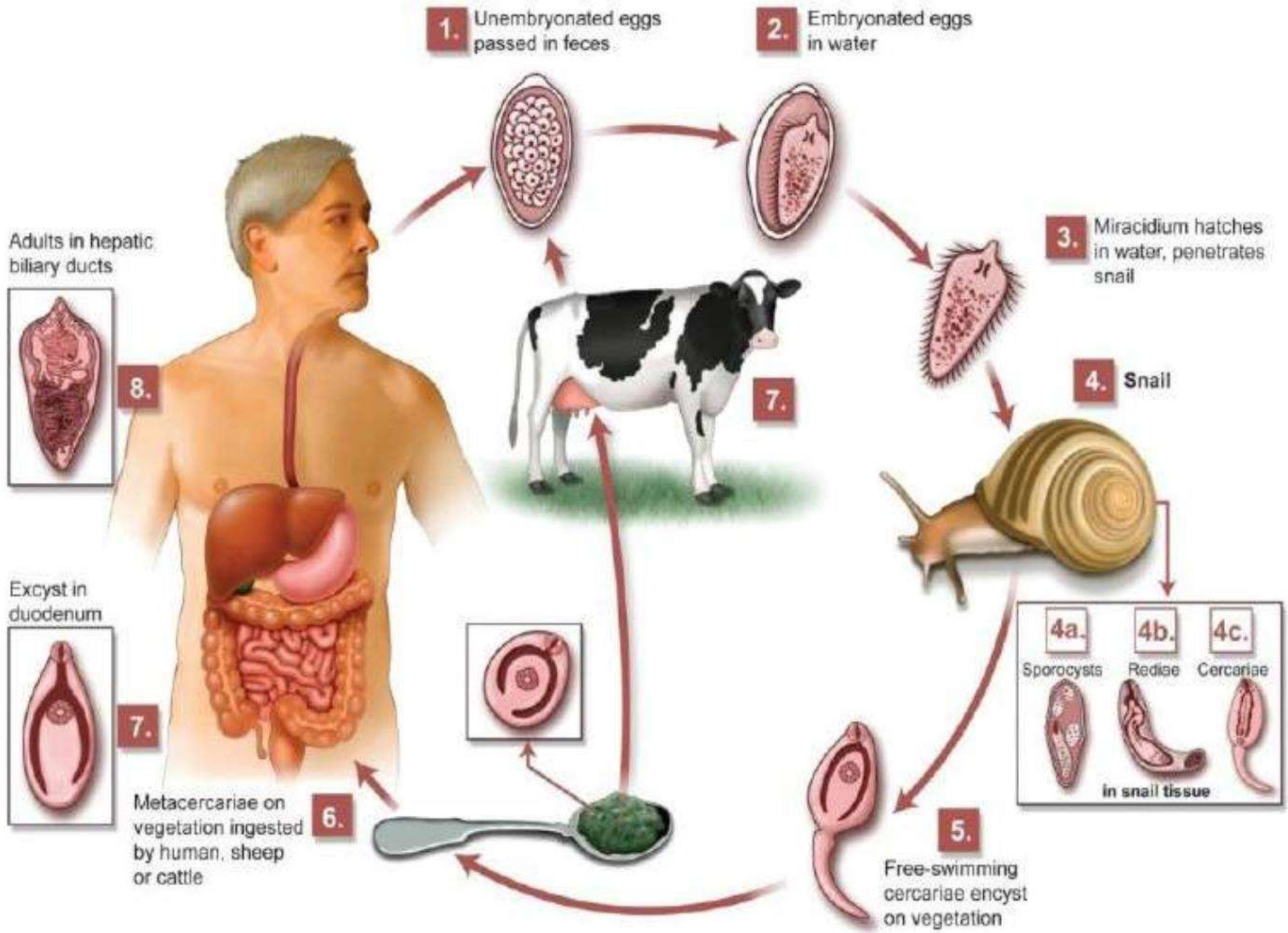
5 Free-swimming cercariae encyst on water plants



Metacercariae on water plant ingested by human, sheep, or cattle

6





1. Unembryonated eggs passed in feces

2. Embryonated eggs in water

3. Miracidium hatches in water, penetrates snail

4. Snail

4a.	4b.	4c.
Sporocysts	Rediae	Cercariae
in snail tissue		

5. Free-swimming cercariae encyst on vegetation

Adults in hepatic biliary ducts

8.



Excyst in duodenum

7.

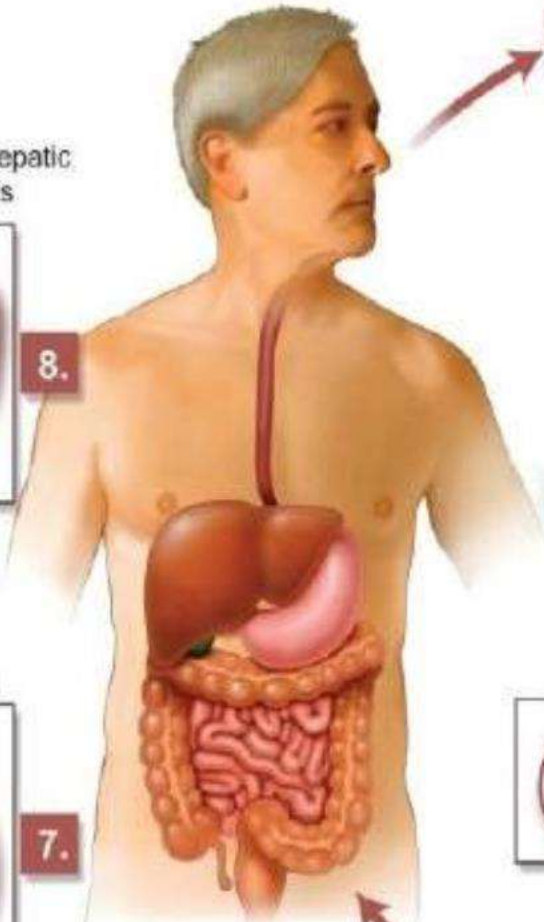


6. Metacercariae on vegetation ingested by human, sheep or cattle

6.



7.



CYCLE OF EVENTS IN INFECTION

- It finds the liver and starts eating liver cells. This happens only a few days after the initial contact with the parasite. Usually the larva spends a few weeks just browsing and eating the liver. Then it relocates to the bile duct where it begins its final stage and becomes an adult. It takes about three months for the Metacercariae to develop into an adult. Adults are about 3 cm long and 1 cm wide. Adult females can produce up to 25000 eggs per day.

PROGRESS OF INFECTION

- **Ingestion Metacercariae**
- **Ex-cyst in Duodenum**
- **Burrows through Intestinal Wall**
- **Enters Peritoneal Cavity**
- **Migrates to Liver**

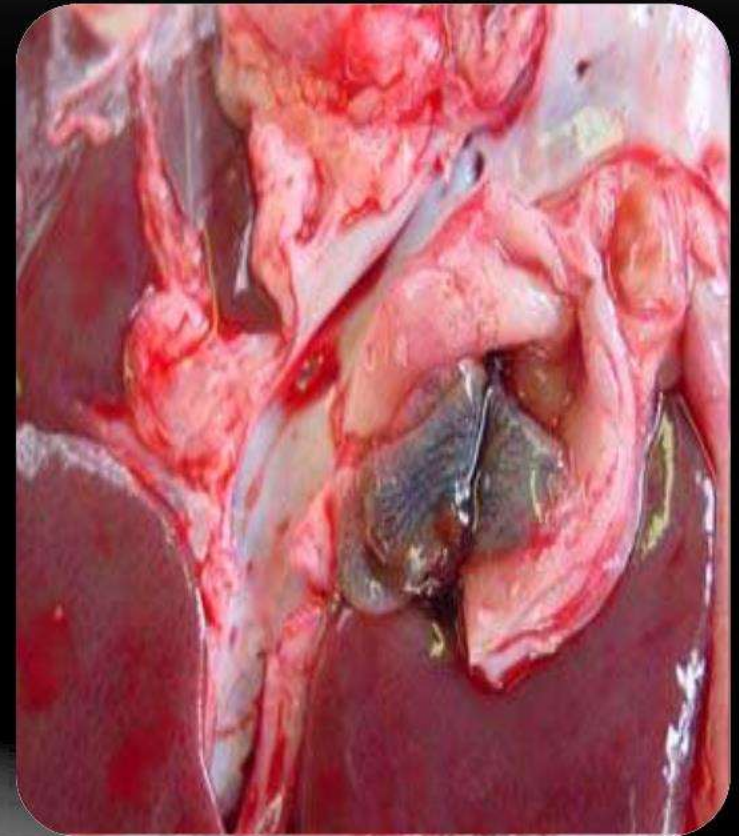


PATHOLOGY AND LIVER DAMAGE

- Little damage is done by juveniles penetrating the intestinal wall and the capsule surrounding the liver but much necrosis results from migration of flukes through the liver parenchyma. Worms in bile ducts cause inflammation and edema, which in turn stimulate production of fibrous tissue in the walls of these ducts. Thus thickened, the ducts can handle less bile and are less responsive to needs of the liver. Back pressure causes atrophy of liver parenchyma, with concomitant cirrhosis and possibly jaundice. In heavy infections the gall bladder is damaged, and walls of the bile ducts are eroded completely.

SYMPTOMS

- Abdominal Pain
- Anemia
- Hepatic Tenderness
- Hepatomegaly resulting from Edema
- Intermittent Fever
- Jaundice
- Lethargy
- Nausea
- Prolonged High Fever
- Secondary Infections
- Vomiting



SYMPTOMS

- **Acute**
 - More common in sheep
 - 10,000+ Metacercariae consumed at one time
 - Dramatic Liver Inflammation, Frequently Resulting in
- **Chronic**
 - More Common and Rarely Fatal
 - Nonspecific Symptoms
- **Halzoun**
 - Eating raw, infected liver
 - Infects pharynx
 - Causes swelling and obstructs breathing



DIAGNOSIS

- **Stool Samples**
 - **Yellow-Brown Eggs**
 - **Eggs Don't Show for 4 Months**
- Duodenal or Biliary Aspirate
- Antibody Test
 - Can detect 2 Weeks After Infection
- Ultrasound
 - Visualize Adults in Bile Duct
- CT Scan
 - Reveals Burrows in Liver



TREATMENT

- **Bithional**
 - Highly Effective
 - Large Dose
 - High Cost
 - Long Treatment Period
- **Triclabendazole**
 - Easier to Use
 - 1-2 Oral Doses in 24 hrs
 - Virtually 100% Effective
- **Surgery**

EPIDEMIOLOGY

- Infection begins when Metacercariae infected aquatic vegetation is eaten or when water containing Metacercariae is drunk. Humans are often infected by eating watercress. Human infections occur in parts of Europe, northern Africa, Cuba, South America, and other locales. It is one of the most important disease agents of domestic stock throughout the world and shows promise of remaining so for years to come.

THANK YOU