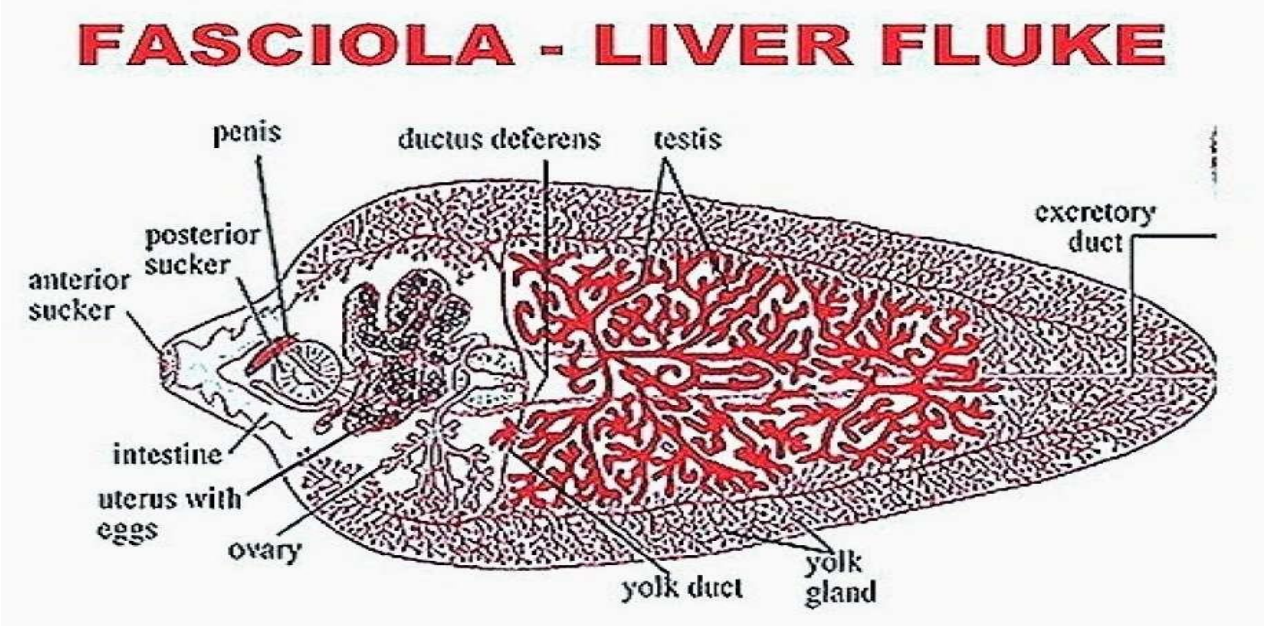
Lever Fluke: *Fasciola hepatica*

Introduction

Fascioliasis is transmittable disease caused by *Fasciola* parasite, which are flat worms called as liver flukes. The mature flukes are generally seen in the bile ducts of infected people and animals, such as cattle and sheep. In general, fascioliasis is additionally widespread in livestock and other animals than in humans.Two *Fasciola species* (types) infect people. The most important species is *Fasciola hepatica*, which is also recognized as "the common liver fluke". A linked species, Fasciola gigantica, can also contaminate people. Fascioliasis occurs in more then 70 countries, especially where cattle and sheeps are reared. *Fasciola hepatica* is found in all continents except for Antarctica. Fasciola gigantica has been seen in few tropical regions.

Epidemeology

Infection starts when Metacercariae infected amphibian vegetation is eaten or when water containing metacercariae is consumed. People are often infected by eating watercress. Human infections happen in parts of Europe, northern Africa, Cuba, South America, and different areas. It is one of the most significant infection specialists of household stock all through the world. *F. hepatica* is distributed around the world, and causes extraordinary monetary misfortunes in dairy cattle and sheep . It has been known as a significant parasite of steers and sheep for many years.



Morphology

1. **General morphology:**

   Its body is oval, dorsiventrally flattened and resembles a leaf. Body is soft. It is 1.5 to 5 cm long; 5 to 1.5 cm in width in the body. The body is pinkish in shading. The digestive system appears dark colored in shading due to the ingested bile.

2. **External openings:**

a. At the front end mouth opening is present.

b. On the ventral side over the ventral sucker a small genital openings is present.

c. In the reproducing season on the dorsal side a small opening of Laurer's canal persists.

3. **Suckers:** Two suckers are present.

a. At the anterior approximately near the mouth an oral sucker exists. It is 1 mm. in diameter and is useful for ingestion and attachment also.
b. On the ventral side a ventral sucker exists that is about 3 to 4 mm. away from anterior end. It is a larger sucker. It is used for attachment.

4. **T.S. of Body Wall:** The body wall of *Fasciola* shows the following parts-

a. Tegument: It is an external cytoplasmic layer. It depicts microvilli. It is syncytial layer. It is wide and thick. It contains endoplasmic reticulum, mitochondria etc. It contains sclero protein and is impervious to digestive juices and shows backwardly directed spines.
b. Basement membrane: Below the tegument, basement membrane exists.
c. Musculature: Below the basement membrane muscle layers arepresent. The muscles are longitudinal and circular and below the longitudinal muscles oblique muscles exist.

5. Reproductive system:

Fasciola is a bisexual animal. It shows both male and female reproductive organs-

a. **Male reproductive system**: The male reproductive system has a pair of testis preesnt one above the other inside the body. Each testis is very highly branched. From each testis Vas deferens originatess. The two spermducts go ahead and unite. The seminal vesicle is continuous as an ejactilatory duct and opens into the genital atrium that lies just above the ventral sucker. The terminal portion of the ejaculatory duct is highly muscular and called as the cirrus. Also when not in use the cirrus is present in a sac known as cirrus sac.
b. **Female reproductive system**: The female reproductive system has a single highly branched ovary present on the right side of the body. From the ovary oviduct originate which proceed towards the middle of the body of fluke. On each side of the body there

are two longitudinal vitelline ducts and a huge number of vitelline glands. They all unite with longitudinal vitelline ducts with the help of small ducts. The longitudinal ducts are linked by a transverse vitelline duct which is situated a bit over the middle line of the body. From this transverse vitelline duct which is positioned a bit above the middle line of the body. From this transverse vitelline duct a yolk reservoir originates. This gives a median vitelline duct which unites with oviduct. The joint duct now opens into ootype. At the junction of the oviduct-vitelline duct a uterus is present which is a long coiled tube. It opens into the genital atrium with the help of female genital opening. At the junction of uterus, oviduct and vitelline duct, mehlis glands exist. The junction of all these three ducts is called Ootype.

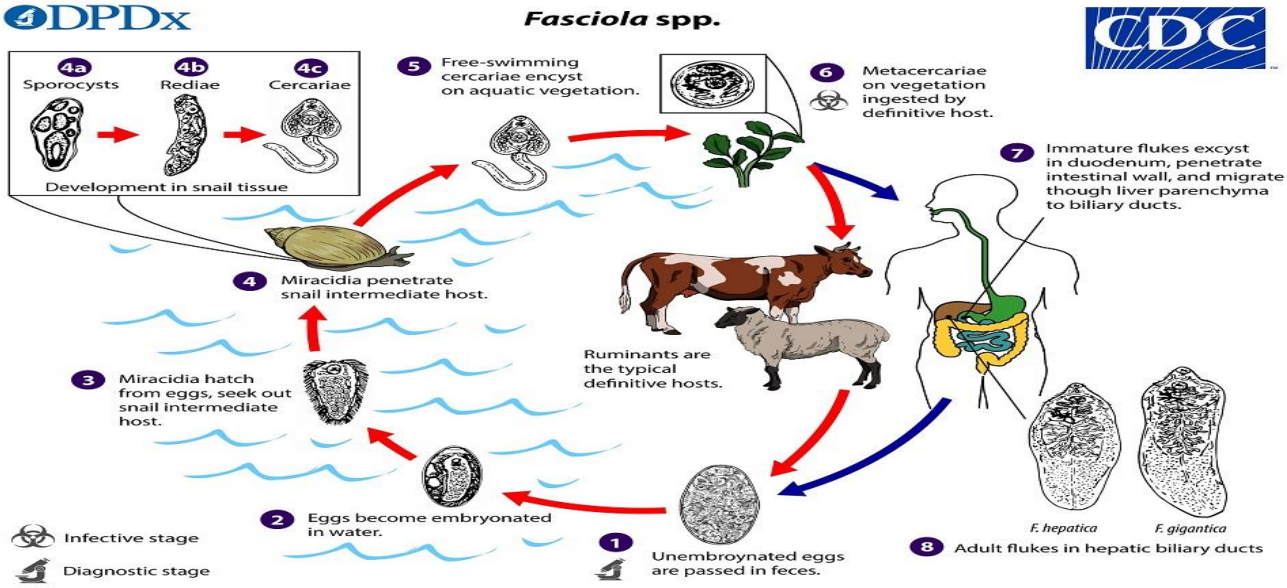
Host Range

1.Definitive host: Sheep, Cattle, Humans (Accidental) and Other Mammals.

2.Intermediate host: Fresh Water Snail

3.Geographic Range: Cosmopolitan; wherever sheep and cattle are raised.

Life Cycle



The existence pattern of *Fasciola hepatica* starts when a female lays eggs in the liver of a tainted human. Juvenile eggs are discharged in the biliary ducts and taken out in the feces. Whenever arrived in water, the eggs become embryonated and create larvae called miracidia. A miracidium invades an amphibian snail and develops into cercaria, a larva that is equipped for swimming

with its huge tail.The cercaria exits and finds sea-going vegetation where it forms a cyst called Metacercariae. A human eats the crude freshwater plant containing the cyst. The Metacercariae excysts in the first piece of the small intestine, duodenum. It at that point penetrates the intestinal divider and gets into the peritoneal pit. It finds the liver and starts eating liver cells. This happens just a couple of days after the underlying contact with the parasite. Usually the larva spends a couple of weeks just browsing and eating the liver. At that point it relocates to the bile duct where it begins its last stage and becomes an adult. It takes around a quarter of a year for the Metacercariae to form into a grown-up. Adults are around 3 cm long and 1 cm wide. Grown-up females can deliver up to 25000 eggs for each day.

Pathology and Lever Damage

Little harm occures by juveniles infiltrating the intestinal wall and the capsule surrounding the liver however much necrosis results from movement of flukes through the liver parenchyma. Worms in bile ducts cause irritation and edema, which thus stimulate creation of fibrous tissue in the walls of these ducts. Thus thickened, the ducts can deal with less bile and are less responsive to needs of the liver. Back pressure brins atrophy of liver parenchyma, with concomitant cirrhosis and lastly jaundice. In overwhelming infections the gall bladder is harmed, and walls of the bile ducts are disintegrated completely.

Symptoms-

• Hepatic Tenderness

• Anemia

• Hepatomegaly resulting from Edema

• Nausea

• Vomiting

• Secondary Infections

• Jaundice

• Lethargy

• Prolonged High Fever

People get infection by accidentally swallowing the fluke parasite. The most common was is by eating watercress or other contaminated freshwater plants. Another way humans get infected with the parasite is by ingesting contaminated water by drinking it or by consuming vegetables that were washed or irrigated with unhygienic water. A number of people sense illness near the

beginning of infectivity, while immature flukes pass (migrate) from the intestines through the abdominal cavity and liver. Symptoms from the sharp (migratory) phase can emerge as soon as a few days subsequent to the exposure (typically, <1–2 weeks) and can last plentiful weeks or months. However, some people feel ill only in the persistent phase of the infection (chronic), when mature (adult) flukes are in the bile ducts. For example, symptoms can be a consequence from inflammation and obstruction of bile ducts. During both phases of the contamination, clinical features can include fever, malaise, abdominal pain, eosinophilia, hepatomegaly (an enlarged liver), and abnormal liver tests.

Diagnosis-

• **Stool Samples**-Yellowish-brown Eggs. Eggs Don't get Shown for 4 Months.

• **Biliary or Duodenal Aspirate**

• **Antibody Test-** Can detect worm 2 weeks after infection

• **Ultrasound-** Shows adult worms in Bile Duct

• **CT Scan**-Reveals numerous burrows in Liver

Treatment-

1.Bithional

• Highly Effective

• Large Dose

• High Cost

• Long Treatment Period

2.Triclabendazole

• Easier to Use

• 1-2 Oral Doses in 24 hrs

• Virtually 100% Effective

3.Surgery

Prophylaxis-

• Education: Cheapest and Most Cost Effective Way

• Wash Aquatic Vegetables in 6% Vinegar for 5-10 minutes

• Better herding practices

• Keep herds away from aquatic areas

• Moluskicide: Controls Intermediate Snail Host