



Fasciola hepatica (Liver fluke)

Common name: Sheep liver fluke

History and Distribution:

F. hepatica was the first trematode that was discovered more than 600 years ago in 1379 by Jehan de Brie. It was named by Linneus in 1758.

- It is the largest and most common liver fluke found in humans, but its primary host is the sheep and to a less extent, cattle.
- It is worldwide in distribution, being found mainly in sheep-rearing areas.
- It causes the economically-important disease, 'liver rot' **تعفن الكبد**, in sheep.

Habitat:

The parasite resides in the liver and biliary passages of the definitive host.

Morphology:

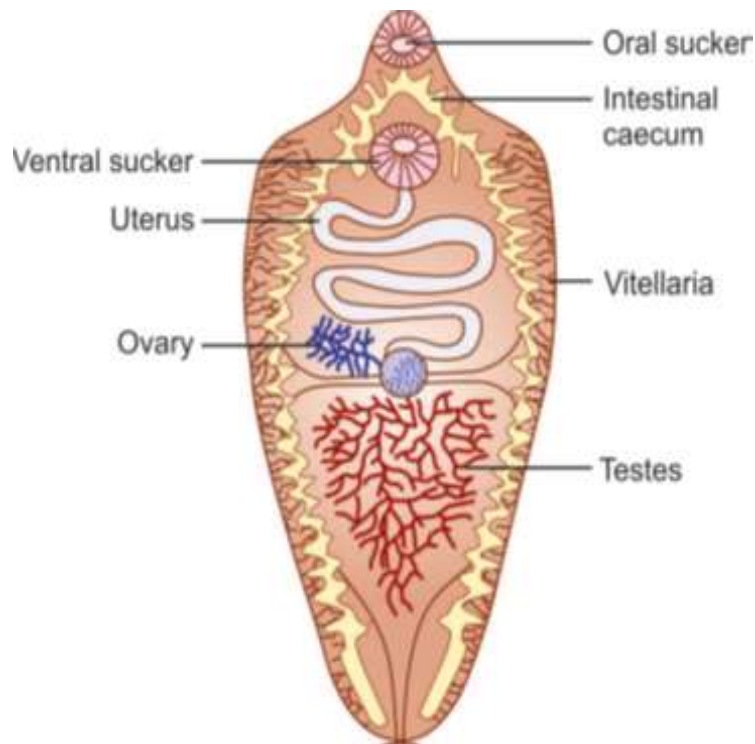
Adult Worm:

- It is a large leaf-shaped fleshy fluke **سميكة ورقية**, 30 mm long and 15 mm broad, grey or brown in color.
- It has a conical projection anteriorly containing an oral sucker and is rounded posteriorly.
- The adult worm lives in the biliary tract of the definitive host for many years- about 5 years in sheep and 10 years in humans.
- Like all other trematodes, it is hermaphrodite.

Egg:

The eggs are large, ovoid, operculated, bile-stained, and about 140 μm by 80 μm in size.

- Eggs contain an immature larva, the miracidium
- Eggs do not float in saturated solution of common salt
- Eggs of *F. hepatica* and *Fasciolopsis buski* cannot be differentiated
- Eggs are unembryonated when freshly passed.



Adult worm of Fasciola hepatica

Life Cycle:

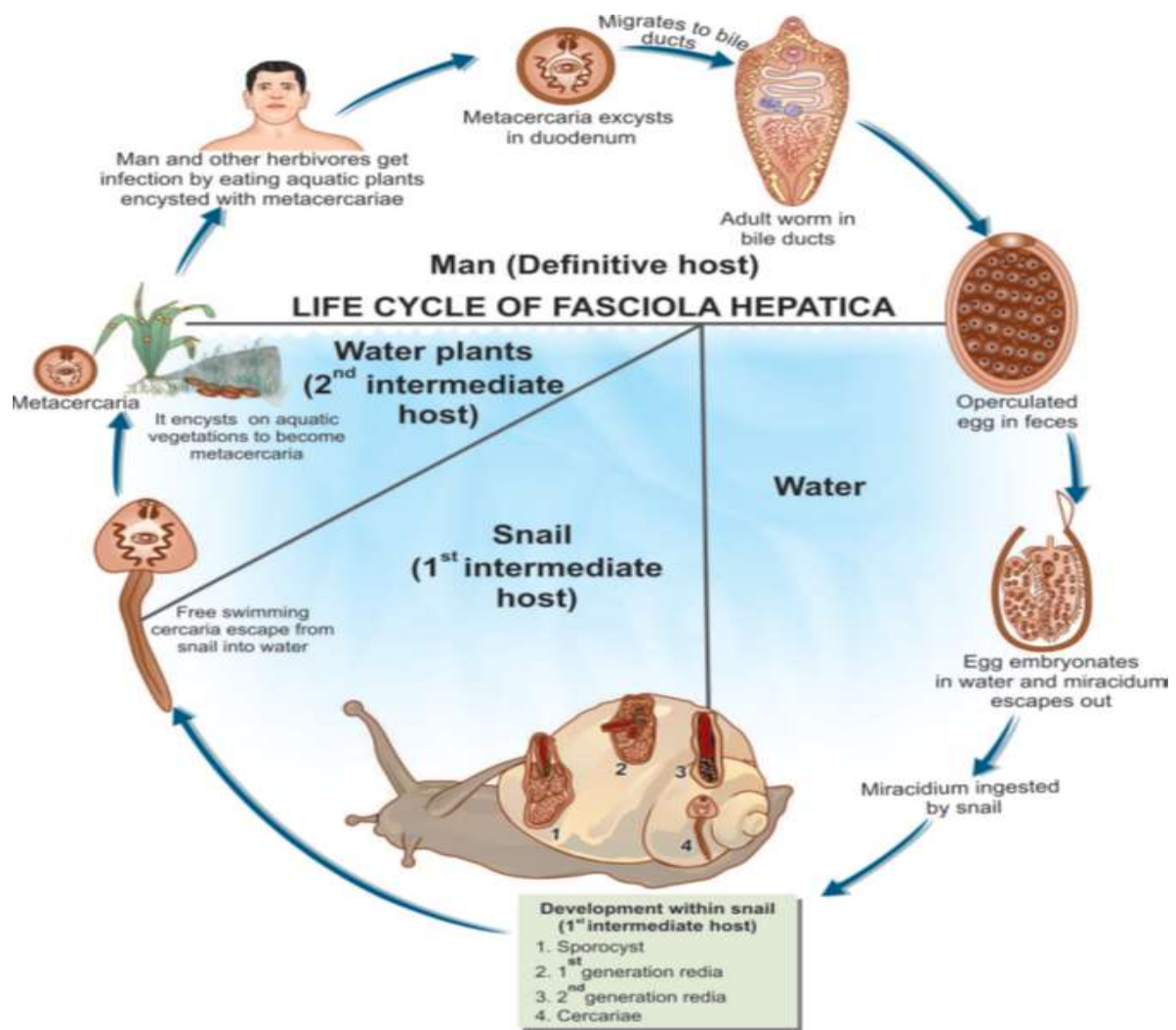
F. hepatica passes its life cycle in 1 definitive host and 2 intermediate hosts.

Definitive host: Sheep, goat, cattle, and man.

Intermediate host: Snails of the genus *Lymnaea* and *Succinea*. Encystment occurs on aquatic plants, which act as **second intermediate host**.

Mode of infection: The definitive host, sheep and man, get infection by ingestion of **metacercariae** encysted on aquatic vegetation.

- Adult worm lives in the **biliary passage** of sheep or man. Eggs are laid in the biliary passages and are shed in feces.
- The embryo matures in water in about 10 days and the **miracidium** escapes. It penetrates the tissues of first intermediate host, snails of the genus *Lymnaea*.
- In snail, the miracidium progresses through the **sporocyst** and the first and second generation **redia** stages to become the cercariae in about 1–2 months.
- The cercariae escape into the water and encyst on aquatic vegetation or blades of grass to become metacercariae, which can survive for long periods.
- Sheep, cattle, or humans eating watercress or other water vegetation containing the metacercaria become infected.
- The metacercariae excyst in the duodenum of the definitive host and pierce the gut wall to enter the peritoneal cavity.



- They penetrate the Glisson's capsule, traverse the liver parenchyma, and reach the biliary passages, where they mature into the adult worms in about 3–4 months.

Pathogenicity:

- Fascioliasis causes parenchymal injury **اصابة**. As humans are not its primary host, it causes more severe inflammatory response. Some larvae penetrate right through the liver and diaphragm ending up in the lung.
- In acute phase during the migration of the larva, patients present with fever, right upper quadrant pain, eosinophilia, and tender hepatomegaly. The symptoms subside **تهدأ** as parasites reach their final destination **مكانها المقصود النهائي**.
- In chronic phase, patients may develop biliary obstruction **انسداد القناة الصفراوية**, biliary cirrhosis **التليف الصفراوي**, obstructive jaundice **اليرقان الانسدادي**, cholelithiasis **التحصي الصفراوي**, and anemia.

- Occasionally, ingestion of raw liver of infected sheep results in a condition called halzoun (meaning suffocation الاختناق). The adult worms in the liver attach to the pharyngeal mucosa الغشاء المخاطي البلعومي, causing edematous congestion احتقان متورم of the pharynx and surrounding areas, leading to dyspnea ضيق التنفس, acute dysphagia عسر البلع الحاد, deafness الصمم, and rarely, asphyxiation الاختناق.

Diagnosis

- Stool Microscopy**

Demonstration of eggs in feces or aspirated bile from duodenum is the best method of diagnosis. Eggs of *F. hepatica* and *F. buski* are indistinguishable.

- Blood Picture**

It reveals eosinophilia.

- Serodiagnosis**

Serological tests such as immunofluorescence, ELISA, immunoelectrophoresis, and complement fixation are helpful in lightly-infected individuals for detection of specific antibody. ELISA becomes positive within 2 weeks of infection and is negative after treatment. In chronic fascioliasis, *Fasciola* copro-antigen may be detected in stool.

- Imaging**

USG, CT scan, Endoscopic Retrograde Choangiopancreatography (ERCP) and percutaneous cholangiography may be helpful in diagnosis.

Key points of *Fasciola hepatica*

- Largest and commonest liver fluke.
- Large leaf-shaped with a dorsoventrally flattened body.
- Hermaphroditic parasite.
- Eggs are ovoid, operculated, and bile-stained.
- Definitive host:** Primary definitive host is sheep, but it is also found in biliary tract of man.
- First Intermediate host:** Fresh water snails (*Lymnaea*).
- Second Intermediate host:** Aquatic vegetations.
- Infective form:** Metacercariae encysted on raw aquatic vegetations.
- Clinical features:** Acute phase—fever, right upper quadrant pain, hepatomegaly. Chronic phase—biliary obstruction, obstructive jaundice, cholelithiasis, and anemia.
- Diagnosis:** Detection of eggs in stool and aspirated bile, USG, ERCP and ELISA
- Treatment:** Oral triclabendazole or bithional.
- Prophylaxis:** Preventing pollution of water with feces and proper disinfection.