TDC I Paper I.
Grp C Unit 10
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Introduction to Unio(Lamellidens) and its Digestive System

Habit and Habitat of Unio:

Unio is an aquatic animal of phylum Mollusca, class Bivalvia/Pelecypoda, order Eulamellibranchia, family Unionidae commonly called as fresh water mussels.

They are found in freshwater lakes, ponds and rivers usually burrowed in the mud at the bottom by their large ventral muscular foot. They do not go deep in the burrow, because the posterior extremities of the valves are to be kept exposed for the ingress and egress of respiratory water current as well for filter feeding. They usually stay in shallow water during night, but migrate to deeper water during daytime. The food of Unio comprises of microscopical plants and animals.

External Structures of Unio:

Unio is bilaterally symmetrical and the body size varies from about 5 to 10 cm in length enclosed within a calcareous shell which represents its exoskeleton. The body is laterally flattened. The anterior side of the body is roughly oval in outline and the posterior end is slightly narrower. The hard calcareous shell which consists of two equal convex valves hinged at one edge by hinge ligament.Dorsally and somewhat anteriorly, each shell valve has a slightly raised part called the Umbo. Beneath the shell, a delicate layer called mantle or pallium envelopes the whole visceral mass. The mantle has two epithelial layers with an intermediate connective tissue layer . The epithelium just beneath the shell is composed of secretory cells and the inner epithelium is ciliated. The mantle consists of two lateral halves called the mantle lobes.

The mantle lobes at the aboral side produce two short tubes—the inhalant and exhalant siphons. The edge of the exhalant siphon is smooth and that of the inhalant siphon is produced into delicate processes. Sometimes the triangular tongue-shaped foot protrudes between the two valves towards the oral end.

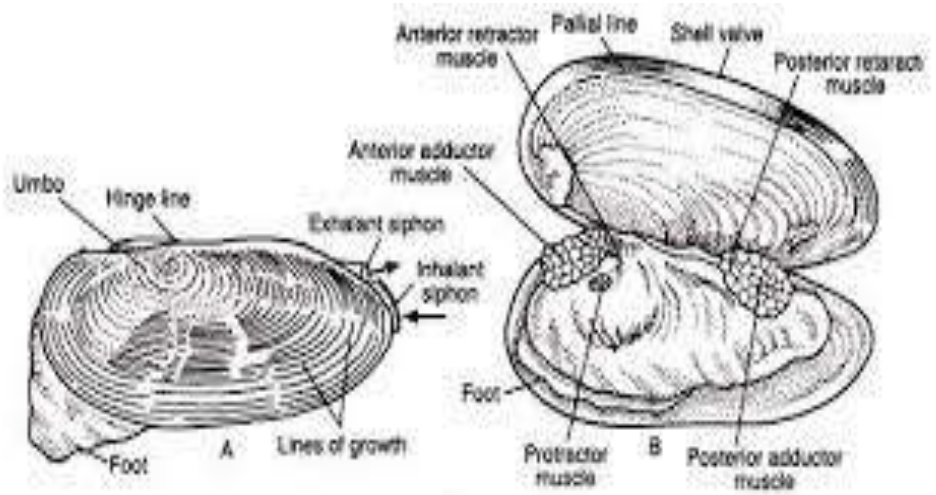

Fig. 18.28: External features of *Unio* A. Side view of an entire animal. The head of the arrow indicates the direction of water current. B. Internal structures of *Unio* after partial removal of the left shell valve.

Locomotion of Unio:

The muscular foot is the primary locomotor organ. The foot protrudes between the antero-ventral sides of shell valves and burrows like ploughshare through the mud. During progression, due to the flow of blood into the foot, the latter swells up and becomes turgid. When the animal intends to move, the foot is extended forward as far as possible by influx of blood and its contraction draws the body forward. So by such alternate extension and contraction of the foot, the animal moves very slowly.

Macroscopic Structure of Shell:

The two valves are united dorsally along a hinge-line by an elastic band, called hinge- ligament which helps the opening and closing of the valves. The hinge-teeth are present in Unio. The teeth are so arranged that the teeth of one fit into the sockets of the other valve. Series of concentric lines of growth are present on the external surface of the shell.

The lines of growth start from an elevation— the umbo which is the thickest and the oldest part of the shell. Some characteristic markings are also observed on the inner side of the shell. Two large oval impressions of the anterior and posterior adductor muscles are present near the anterior and posterior ends of the shell respectively .

The scar mark of the anterior adductor muscle is slightly smaller than that of the posterior one. Impressions of the anterior retractor and protractor muscles of the foot are present near that of the anterior adductor muscle. Another small impression of the posterior retractor muscle lies near that of the posterior adductor muscle.

The protractor muscle that serves to extend the foot, and retractor muscle withdraws the extended foot of the bivalves. A streak known as the pallial line, produced by the insertion of muscular fibres of the mantle into the shell is present.

Microscopic Structure of Shell:

The shell has three distinct layers . The outermost layer, known as periostracum, is composed of a substance, related to chitin, called conchiolin.

Beneath the periostracum is the prismatic layer formed of alternate layers of conchiolin and prisms of calcium carbonate. The innermost layer, called the nacreous layer, is formed of alternate linings of conchiolin and calcium carbonate. Such linings are arranged parallel to the surface.

Coelom of Unio:

The original coelomic cavity, in an adult, is replaced by connective tissue and is represented by three small cavities—the pericardium, the cavities in the gonads and the cavities in the excretory organs. The general body cavity is a haemocoel.

Digestive System of Unio:

The digestive system includes an alimentary canal and a paired digestive gland .

I. **The Alimentary Canal:**

1. The Mouth : The mouth is a transverse slit and situated below the anterior adductor muscles as a slit. It is bounded by two pairs of conical/oval and flattened fleshy flaps, called the labial palps. One pair of labial palps are external and the other are internal. The external labial palps in front of the mouth unite to form the upper lip and the internal labial palps similarly unite behind the mouth to form the lower lip. The radula is absent in Unio.

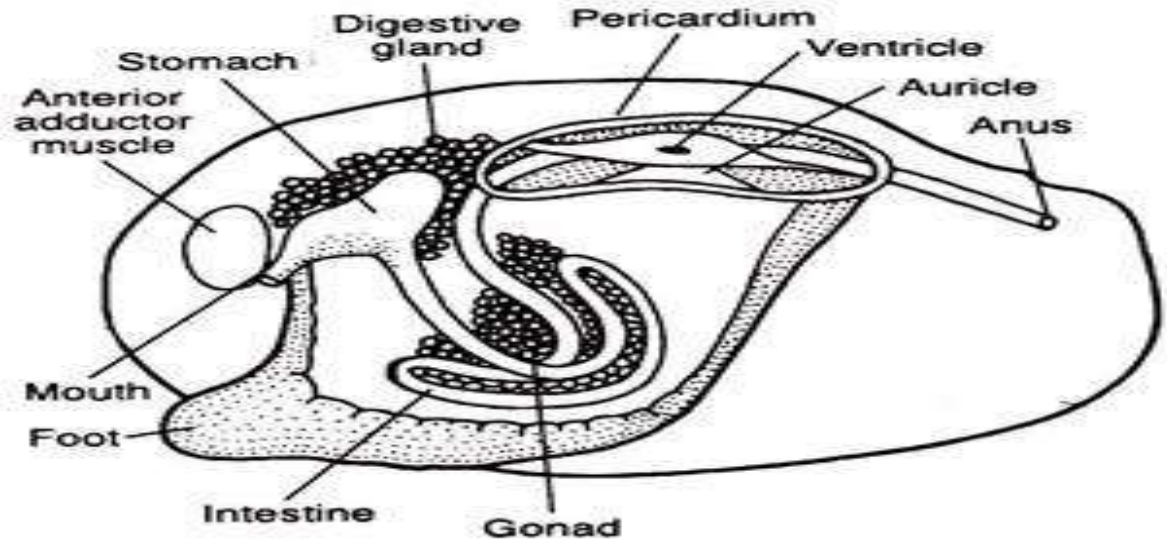

Fig. 16.30: Digestive system of *Unio*. Labial palps are removed.

2. Oesophagus: The mouth leads dorsally into a short and narrow tube, the oesophagus. Its inner wall is ciliated.

3. Stomach: The oesophagus widens to form a spacious saclike stomach. A pair of irregular digestive glands (liver) surround the stomach and the secretion of the gland is poured into the stomach by small ducts. The stomach is divisible into two portions dorsal portion where oesophagus and ducts of liver opens and ventral tubular style sac, containing gelatinous rod, the crystalline style.

4. The Intestine: From the posterior end of the stomach starts the intestine which enters into the visceral mass and forms coiled loop. The intestine then goes up and takes the level of the stomach. It then proceeds towards the posterior end through the pericardium and ventricle of heart as the rectum. It finally opens into exhalant siphon as anus.

5. Rectum: It is from the post terminal part of the intenstineThe rectal portion of the intestine is provided with a longitudinal ridge, known as the typhlosole, which forms two longitudinal grooves, one on each side. The typhlosole increases the absorptive area of the intestine. From one of such grooves of the intestine, a gelatinous rod-like structure, known as crystalline style, projects into the stomach which probably helps in the digestion of cellulose and starch. It has been seen that in starving Unio the crystalline style disappears.

II. Digestive Gland: It is called as digestive diverticulum or liver also. It is large, paired structure of dark brown or green colour surrounding the stomach. This gland does not only secrete the digestive juices but also assist in ingestion of fine food particles and intracellular digestion.

YOUTUBE LINKS.

https://www.youtube.com/watch?v=QlqrGUcdgpE

https://www.youtube.com/watch?v=0-IxHCPif9c

https://www.youtube.com/watch?v=P1VI6JaXsms