Herdamania

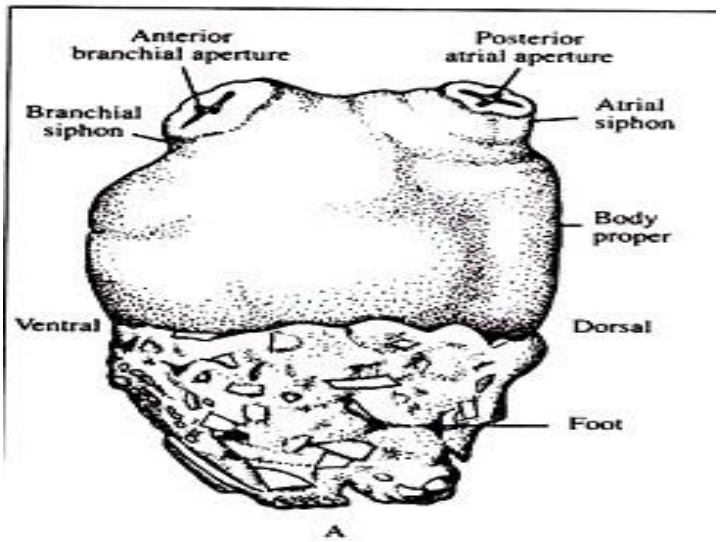
Phylum: **Chordata**
Sub-phylum: **Urochordata**
Class: **Ascidiacea**
Order: **Pleurogona**

Herdmania is a marine and sedentary animal. It is fixed to rocky substratum by a flat base. When it is disturbed, it suddenly contracts its body, and emits inner contents with force through its apertures. Hence it is called Sea squirt.

1. Habit and Habitat of Herdamania:

- Herdmania is a solitary Aascidian.
- It is exclusively marine.
- The genus is recorded to go to the depth of 9 m – 21.6 m of the sea.
- The adult is a sessile form which remains attached to the substratum by its base or foot.
- It is a microphagous animal which feeds on microscopic animals and plants.
- The tunic of Herdmania provides shelter for many organisms. A very common occurrence is the growth of a green alga on the tunic which sometimes hides the whole animal. The other organisms inhabiting the tunic are the hydroids, anemones, minutes lamellibranches, gastropods and many other animals.

  External Structures of Herdamania:



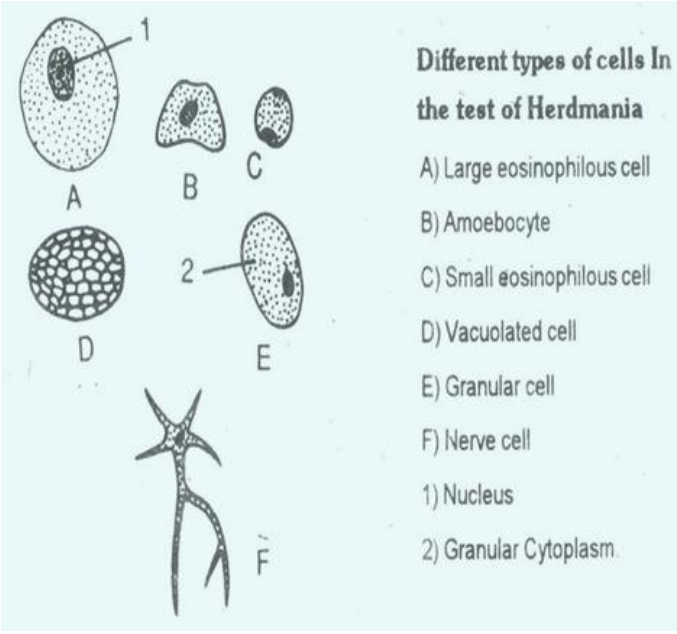
A

- Herdmania has an oblong bag like body (potato like in shape). It is pink in colour.
- The species inhabiting the sandy bed is provided with a narrow foot, but when the animals are attached to rocks or any molluscan shell, the ‘foot’ is found to be lacking.
- The attachment is done by a flat base. The animals with the ‘foot’ have their bodies divided into two parts—the body proper and the ‘foot’.
- The size and shape of the animals vary greatly. The average size of the adult is recorded to be 9.5 cm in length.
- The foot, when present, measures about 3-4 cm in length.
- The free end of the body bears the oral and atrial funnels containing the oral aperture and atriopore, respectively. Both these funnels are produced into four distinct lobes.
- The oral funnel is smaller than the atrial funnel.
- The whole of the body is enclosed by the test or tunic. The tunic is soft and leathery.
- The test is transparent in young stage which becomes opaque in the adult. In the young stage, a network of blood capillaries is clearly visible through the transparent test.
- One of the important characteristic features of Herdmania is the presence of reddish patches on the body, produced by the ampullae at the terminal ends of the blood vessels in the test.
- The test acts as the accessory respiratory structure in Herdmania.
- The mouth is situated at the base of oral funnel and the atriopore is contained in atrial funnel.
- The mouth indicates the anterior end of the body and its opposite end is the posterior.
- The dorsal side is marked by the atrial funnel, the opposite end is designated as the ventral side of the body.
- The bases of both the oral and atrial funnels are provided with a tentacular ring.
- The tentacles that surround the mouth are called the oral or branchial tentacles and that surround the atriopore are called the atrial tentacles. The oral tentacles are comparatively longer than the small and vestigial atrial tentacles.

- The oral tentacles form a sort of sieving apparatus which prevents the entry of larger particles into the pharyngeal cavity.
- The internal cavities of both the funnels are lined by a thin layer of test which is folded.
- On these folds, red pigmented patches are present which are separated by white streaks.
- There are eight red patches arranged alternately with eight white streaks. Both the patches and streaks extend from the tip of the funnels down to the basal end.
- In living condition, a strong water current is found entering the oral funnel and going out through the atrial funnel.

Body Wall of Herdamania:

- The test is the protective covering of the body. . It is a thick, leathery. It is secreted by the epidermis of the body wall.
- It is 4-8 mm thick and is composed of tunicin.
- In the ground substance of the test many structural elements embedded. These are the meshwork of blood vessels, spicules, interlacing fibres and a few cell-types.
- Several cell-types are encountered in Herdmania.



These are:

i. Amoeboid cells:

- These cells are abundant in the test.

ii. Eosinophilous cells:

- These are spherical cells, and the homogeneous cytoplasm contains fine granules. The granules take bright red stain with eosin.

The Eosinophilous cells are of two varieties:

(a) Larger variety with a big vesicular nucleus and

(b) Smaller type with an eccentric nucleus.

iii. Granular cells:

These cells are oblong in shape and the nucleus is large. These cell-types are surrounded by nerve fibres and are regarded as receptor cells.

iv. Spherical vacuolated cells:

These cells contain numerous small vacuoles, and the nucleus is not visible.

v. Nerve cells:

These are small cells with conspicuous nucleus and 2 to 6 dendrites. Besides, there are interlocking fibres running in the test. These fibres resemble the muscle fibres of the mantle. The test is traversed by blood vessels with their terminal ends dilated to form the terminal knobs or vascular ampullae.

These ampullae impart red-coloured patches on the outer side of the body. Another peculiar structure present in the test is the spicules. microscleres are minute bodies, each having a spherical head and a long body. The body is beset with 5 to 25 equidistant rings of small spines. But the head is smooth in most cases. The average size is about 50 micra.

The megascleres are larger than the microscleres and are grouped under two categories—depending on the shape. The first category of spicules has spindle-shaped bodies, so these are called spindle-shaped spicules and the second category of spicules are called pipette-shaped spicules.

The spindle-shaped spicules, like microscleres, are provided with 20-60 equally spaced rings of spines. The size is variable, but the average size is 1.5 mm. These spicules usually occur in bundles. The pipette-shaped spicules, as the name suggests, have a large round median swelling. These spicules are

also provided with numerous rings of spines. The length of the spicules extends up to 3.5 mm.

Beneath the test lies the mantle. The mantle is the true cellular wall which surrounds the body. It is not uniformly developed at all regions of the body. The mantle is highly developed in the anterodorsal side of the body.

The mantle is composed of:
(a) An outer epidermis
(b) A median layer of muscles and fibres
(c) An inner ectodermal layer lining the atrium.
The epidermis is formed of hexagonal cells. The median layer is composed of muscles and connective tissue elements.

There are two sets of muscles—longitudinal and annular. The longitudinal sets of muscles are more numerous than the annular sets. The muscles are non-striated. Each muscle is made up of many non-striated muscle fibres which are en-sheathed by a common connective tissue sheath.

Each muscle fibre is a flat ribbon-like cell with a conspicuous nucleus. The connective-tissue cells present in the middle layer are mostly the amoeboid and vacuolated cells. The ectodermal layer lining the atrium is composed of flat cells.

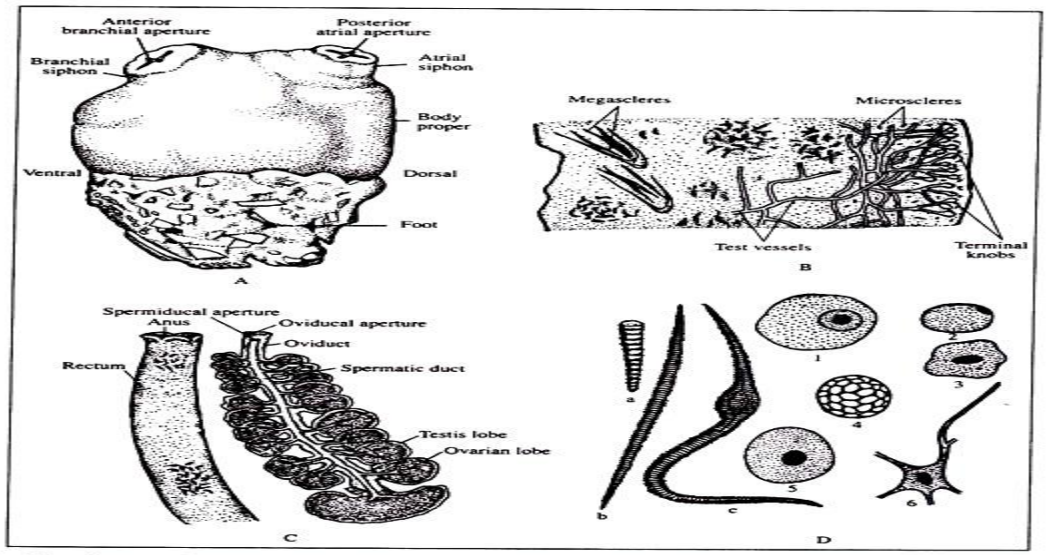


Fig. 3.5 : Anatomy of *Herdmania* (after Das). A. An adult animal. B. Section of the test. C. Sectional views of the gonads and gonoducts. Note the relationship with the rectum. D. Spicules and cell-types are : a = microscleres. b = spindle-shaped spicule. c = pipette-shaped spicule. 1 = large eosinophilous cell. 2 = small eosinophilous cell. 3 = amoeboid cell. 4 = vacuolated cell. 5 = granular cell. 6 = nerve cell.