GENERAL CHARACTERISTICS OF UROCHORDATA

The urochordates, sometimes known as the tunicates, are commonly known as "sea squirts. The body of an adult tunicate is quite simple, being essentially a sack with two siphons through which water enters and exits. Water is filtered inside the sack-shaped body. Urochordates are small marine animals with larvae that swim freely and adults that attach themselves to the ocean floor. The 1,300 species of urochordates, like all members of the phylum Chordata, possess four characteristic anatomical structures as embryos: a flexible body-length rod **notochord** that provides resistance against muscular contractions and allows for more efficient movement; a **dorsal** hollow **nerve cord** that forms the central nervous system; slits in the beginning of the digestive tract (the pharynx) that allow filter feeding and gas exchange; and a **postanal tail**.

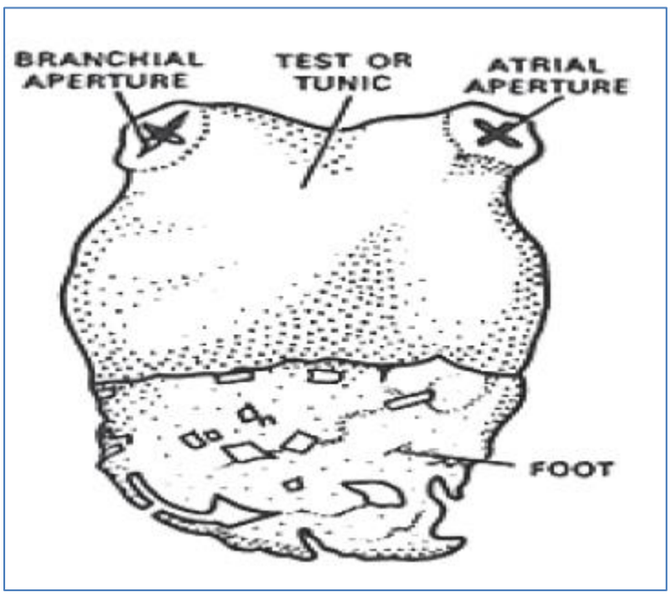

Fig: Herdmania in test

GENERAL CHARACTERS OF UROCHORDATA

- Body shows variation in size and form.
- The body is unsegmented and has no tail
- The body is covered by a test. It is formed by tunicine which is rallied to cellulose. Hence the name Tunicata

- Body wall shows one-layered epidermis, dermis is made by connective tissue and muscles, and atrial epithehum.
- Celome is absent.
- Atrial cavity surrounds the pharynx, into this cavity the gill slits, anus and genital ducts will open. It opens through atrial aperture.
- Larva has notochord in the tail. It disappears during metamorphosis.
- Respiratory system contains gills in the pharyngeal wall.
- Ciliary mode of feeding is common.
- Open type of Circulatory system is seen.
- The heart is ventral and it periodically reverses its function.
- Nervous system is represented by a single dorsal ganglion in the adult.
- Excretion is carried on by nephrocytes.
- Asexual reproduction is by budding.
- Bisexual animal and cross fertilisation is favoured.
- Fertilization is external.

CLASSIFICATION OF UROCHORDATA

Subphylum Urochordata is divided into three classes.

Class 1: Ascidiacea

Class 2: Thaliacea

Class 3: Larvacea (Appendicularia)

Class 1: ASCIDIACEA

- These are sedentary tunicates.
- The body is covered by a test.
- Pharynx is large and contains gill-slits.
- Notochord, nerve-cord and tail are absent in adults.

- These are bisexual animals.
- Life-history includes a typical tadpole larva.
- Examples: *Ascidia, Ciona, Herdmania, Botryllus* etc.

Class 2: THALIACEA

These urochordates are free-swimming and pelagic forms.

- They are covered by transparent test.
- The brachial and atrial apertures are placed at anterior and posterior ends.
- Pharynx is small.
- Notochord, nerve-cord and tail are absent in the adult.
- Asexual reproduction is by budding.
- These are bisexual animals.
- Tailed larva may be present or absent.
- Alternation of generations can be seen in the life history.
- Examples: *Doliolum*, *Salpa* etc.

Class 3: LARVACEA

- These are free-swimming pelagic tunicates.
- True test covering is lacking.
- They show loose gelatinous house.
- This house is useful for filter feeding.
- Two gill slits are present.
- Atrium is absent.
- Notochord and nerve cord are persistent.
- They show tail throughout their life.
- Neotenic forms are included.
- Examples: *Oikopleura.*

The typical tunicate looks like a non-chordate animal. If the life history of such animal is studied, the larval form reveals the chordate characters of that animal.

Urochordate's-resemblance with Chordate:

Urochordates resemble the chorates owing to the following features-

- Presence of dorsal tubular nerve cord.
- Presence of notochord.
- Well-developed pharynx with gill-slits.
- Presence of endostyle on the ventral side of the pharynx.
- Presence of atrium around the pharynx.
- Presence of post - anal tail with tail fin.

Because of these chordate features tunicates are included in chordate's group.

Urochordate's-resemblance with Amphioxus (Cephalochordata):

- Presence of notochord.
- Presence of dorsal tubular nerve cord.
- Presence of large pharynx with gill slits.
- Presence of atrium and atriopore.
- Presence of muscle band.

Thus, the urochordates show close relation with Cephalochordates.

Urochordates differ from other chordates owing to the following characters:

- Presence of retrogressive metamorphosis.
- Absence of segmentation.

- Because of these characters zoologists included these animals in a separate sub-phylum Urochordata.
- During recent years many zoologists regarded the tunicates as primitive and ancestral forms of chordates as a whole.

The urochordates are exclucively marine animals living on the substratum. The most familiar member of the group is *Herdmania;* it possesses two siphons for the entry and exit of water. Characteristically they have a larval stage which undergoes retrogressive metamorphosis giving rise to the adult animal. Urochordates show all the basic characters of chordata at one or the other stage of life, they are supposed to be lower than Cephalochordata but higher than hemichorates from evolutionary point of view.