

## **Phylum: Mollusca**

### **General attributes:**

1. In the Latin language, Mollusca meaning soft body.
2. Bilaterally symmetrical, live in most environments.
3. Body has more than two cell layers, tissues and organs.
4. Open Digestive system (have mouth and anus).
5. There is dorsal or lateral shells of protein or calcareous spicules.
6. Has a nervous system with a circum – oesophagal ring, ganglia and paired nerve chords.
7. Has an open Circulatory system with a heart and an aorta.
8. Has a gaseous exchange organs called ctenidial gilla.
9. Reproduction is sexual and asexual.
10. Feed a wide range of material.

## Classification of Mollusca

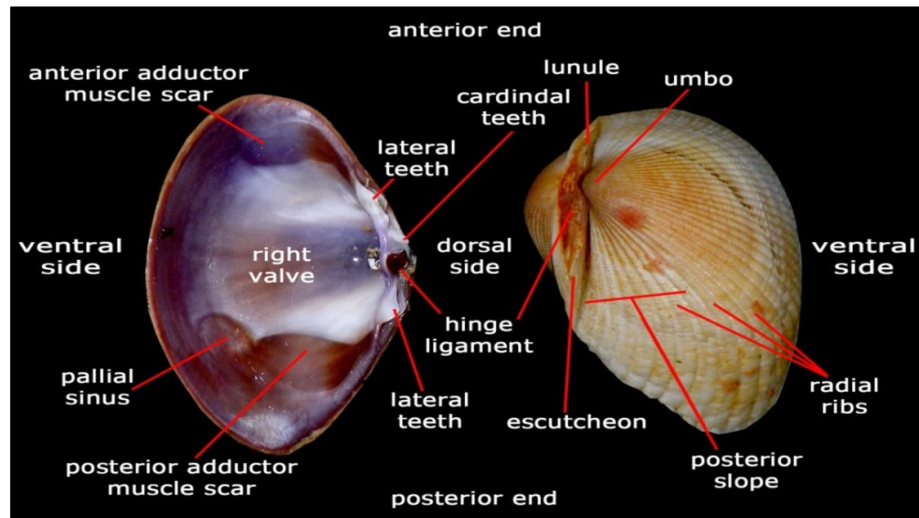
### Phylum: Mollusca

That phylum can be divided into the following classes:

1. Gastropoda (called stomach – footed Mollusca).....*Helix*.
2. Bivalve (Lamellibranchiata or Pelecypoda) (Bi= two that Mollusca possess two shells) ..... *Anodonta*.
3. Aplacophora (These benthic = deep water not have shell but have small calcareous spicules embedded in their mantle) ..... *Nomenia*
4. Monoplacophora (The name means with one plate a single shell) ..... *Neopilina*.
5. Polyplacophora (with 8 plates) ..... *Acanthochitem*.
6. 6-Scaphopoda (boat- footed)..... *Dentalium*.
7. Cephalopoda (Head – footed) have large head-eyes and tentacles..... *Octopus*.

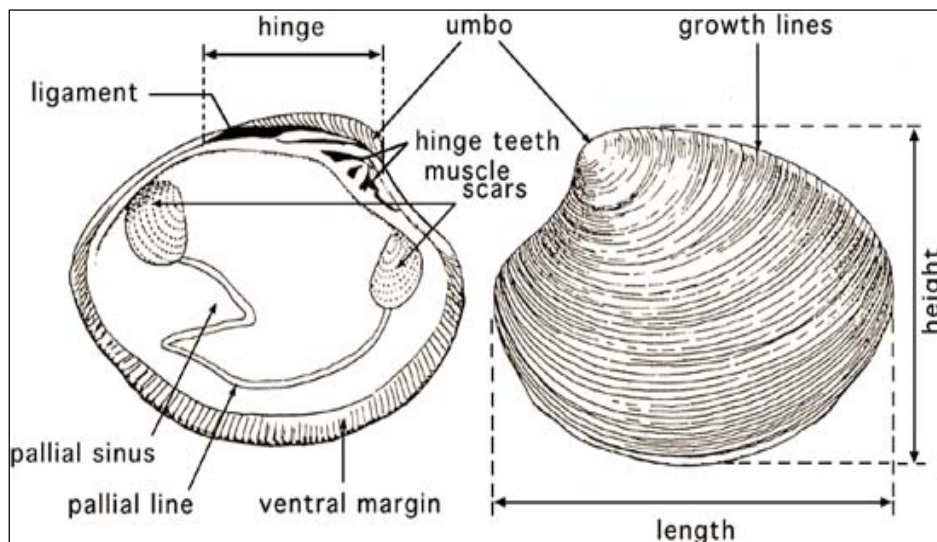
### Bivalva

1. Live in marine and freshwater, bury themselves in sediment other lie on the sea floor, attach themselves to rocks, bore into wood clay or stone and live inside their substances, to save themselves from predation.
2. The body enclosed by shell consisting of two hinged parts, the shell contains of calcium carbonate, and two similar parts called valves.
3. They have no head, but they also lack radula.
4. Growth happen by increased by length or increases in total or softbody weight or they vary and increase the growth, the growth can vary with season.
5. Important source of food for humans of least since Roman times
6. (Oyster – Clams – Scallops).
7. Shells are used decoration in many ways.



### External anatomy

1. There are two valves of the shell that may or may not be equal and may or may not completely enclose the inner soft parts, they vary in shape and color depending on species.
2. The valves are composed mostly of calcium carbonate ( $\text{CaCO}_3$ ) and have three layers:
  - a. Inner or nacreous layer.
  - b. Middle or prismatic layer (forms most of the shell).
  - c. Outer or periostracum layer (brown leathery layer which is often missing through abrasion or weathering in older animals)
3. Bivalves do not have obvious head or tail regions.

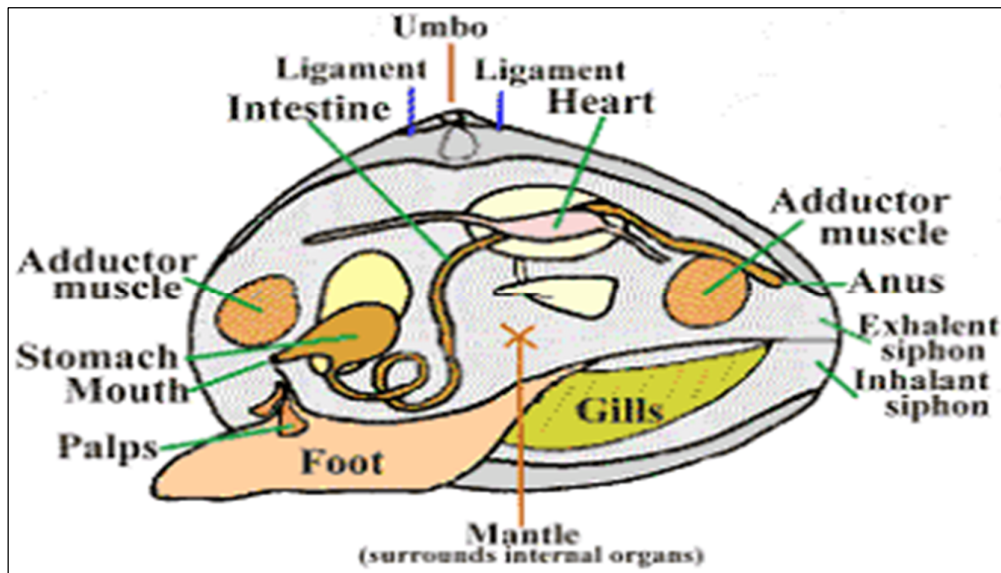


## Mantle

The soft part is covered by shell which composed of two thin sheath of tissue thickened at the edges, two halves of the mantle are attached to the shell from hinge ventral to the pallial line but are free at edge.

The main function of mantle:

1. Secrete the shell.
2. Sensory function and can initiate closure of the valves in response to unfavorable environmental conditions.
3. Respiratory function (control inflow of water into the body chamber.

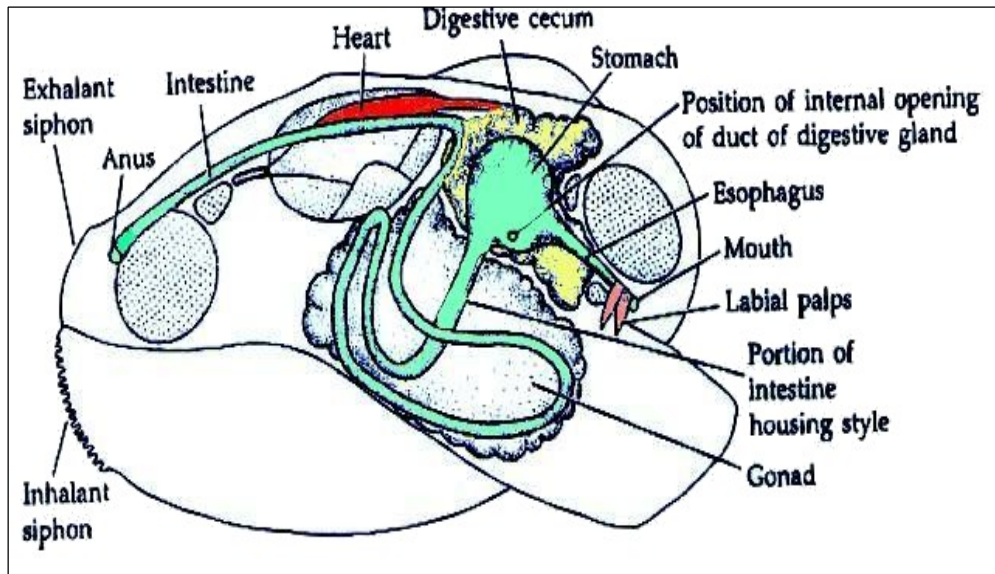


## Digestive system

Large gills - Labial palps (surrounded the mouth) – Mouth- Oesophagus - Stomach (surrounded by liver) - Intestine (contain crystalline style) - Rectum - Anus.

Crystalline style: Is round at one end and pointed at the other gelatinous rod can be up to 8 cm in length mixing food in the stomach and releases enzymes, assist in digestion is composed of layers of mucoproteins which release digestive enzymes to convert starch into digestible sugars.

Note: Bivalves are filter feeders, feed primarily on phytoplankton – microscopic plant life.

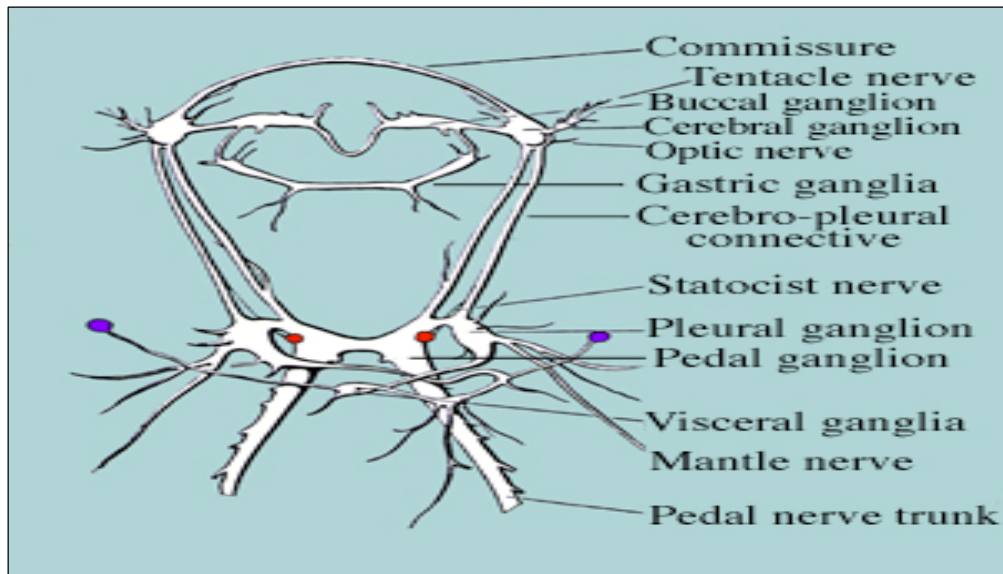


### **Circulation and Respiration**

1. Open circulatory system (heart, sinuses).
2. Heart has three chambers: two auricles receiving blood from the gills and single vertical, the vertical is muscular and pumps hem lymph into the aorta then to the rest of the body.
3. Hem lymph lack any respiratory pigment while in carnivorous species hem lymph has red amoebocytes (containing pigment).
4. Hem lymph in gills (hinge down into the mantle cavity) provide primary respiratory surface, capillaries provide secondary respiratory surface with  $O_2$ .

### **Nervous system**

1. Have no brain.
2. Consist of nerve network and series of paired ganglia (Cerebral ganglia- Pleural ganglia – Pedal ganglia- Visceral ganglia).
3. Cerebral ganglia (They two on either side of the Esophagus, all kindof ganglia connect to the Cerebriopleural ganglia by nerve fibers).
4. Control the sensory organs, while the pleural ganglia supply nerve to the mantle cavity, Pedal ganglia which control the foot, while visceral ganglia which can be quite large in swimming bivalves.



### Senses

1. Mechanoreceptors.
2. Chemoreceptors.
3. Many bivalves have no eyes, but some members have simple eyes and some consist of a pit of photo sensory cells and lens, some have complex eyes with lens.

### Urogenital system

1. The sex is separate (dioecious), hermaphroditic (monoecious).
2. The gonad is evident during the breeding season.
3. Male gonad is white in color and female is red even in hermaphrodite species.
4. The animal may spawn originally as male in season, refill the gonad with eggs and spawn second time, the season as female.
5. There are two Kidneys (are small, brown and sac like bodies that are flattened against the anterior part of the adductor muscle and that Kidney empty their material through large slits into the mantle chamber.

# Bivalve Anatomy (Sagittal)

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