LABORATORIO

Mollusca

EJERCICIO 11

Goals for today

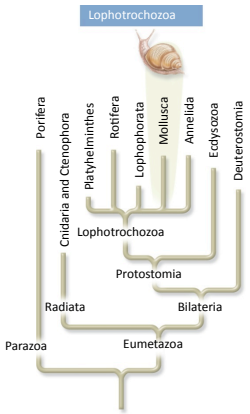
- Learn to recognized the Phylum **Mulluska and** from other animals
- Learn the main 'diagnostic' characteristics
- Learn about some species biology

Mollusca

Mollusca ranks next to arthropods in number of described species ~90,000 species. Mollusca includes chitons, snails, slugs, clams, oyster, squids, octuposes, cuttlefish, and others.

Key characteristics of the phylum:

- Body cavity: coelomates
- Triploblastic
- Bilateral symmetry
- Cephalization
- Protostomates
- Ancestral larva trochophore
- Belong to phylogenetic clade: Lophotrochozoa
- Muscular foot
- Protective mantle that houses the gills
- Typically a shell



Mollusks: Your Tasks

Exercise 11A:

- **Phylum: Mollusca**
  - **Clase Bivalvia**
    - ***Genus: Anodonta***

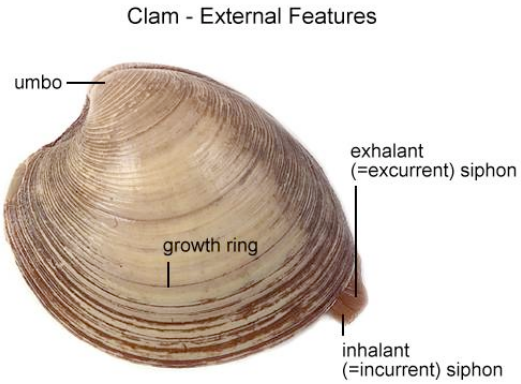
Anodonta is a freshwater clam. Like many of its freshwater relatives these animals live buried in the sand or mud. Found in rivers, lakes, and streams

For the dissection make sure to get a clam with a wooden stick separating the valves otherwise is very difficult to open them

Mollusk: *Anodonta*

1. Dissection: Take a clam from the container. Examine their external anatomy.

Where is the umbo?

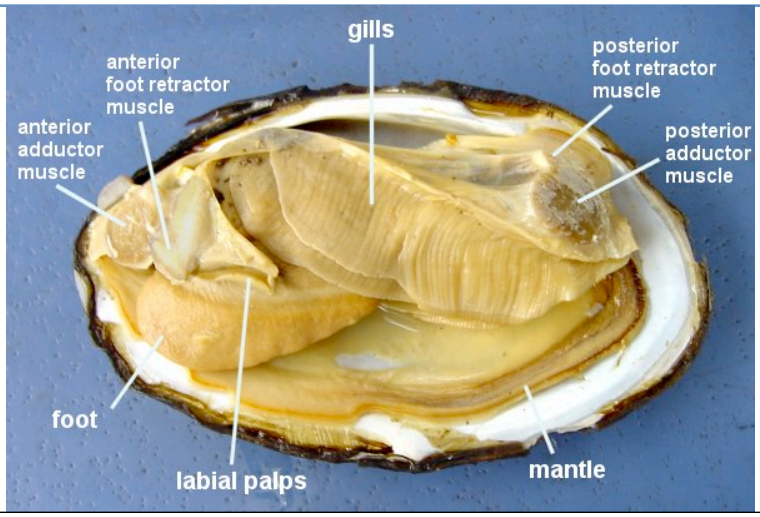


Freshwater clams are found buried in sand or mud of rivers, streams, and lakes.

When you start open it, you need to cut the hinge ligaments and the anterior and posterior adductor muscles, which pull the shell closed

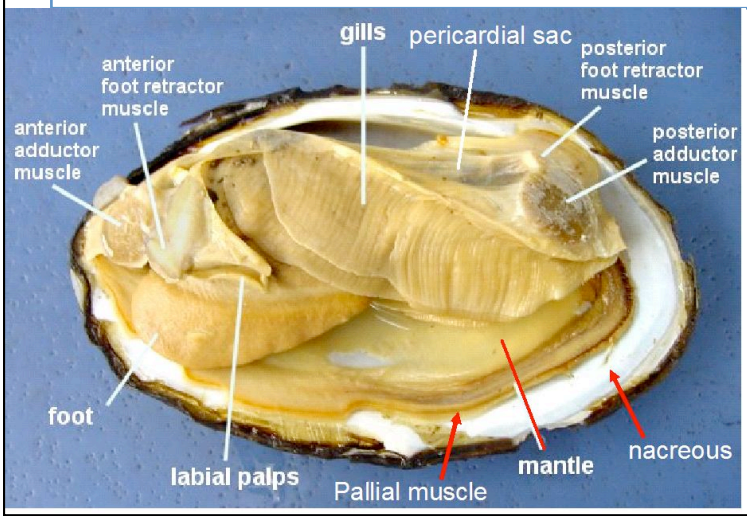
Mollusk: *Anodonta*

1. Dissection: Take a clam from the container. Examine their internal anatomy.



Mollusk: *Anodonta*

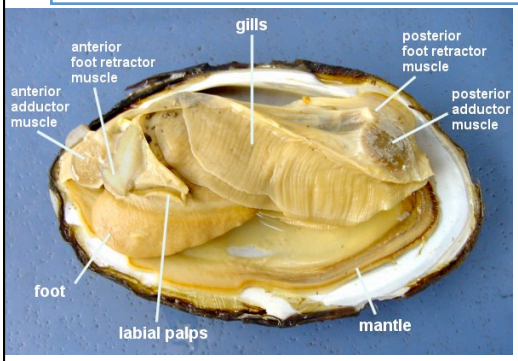
1. Dissection: Take a clam from the container. Examine their internal anatomy.



What is the pallial line?

Mollusk: *Anodonta*

1. Dissection: Take a clam from the container. Examine their internal anatomy.



If the outer gill is thicker than the inner gill you probably have female. The gill is serving as a **brood chamber** for developing of the embryos.

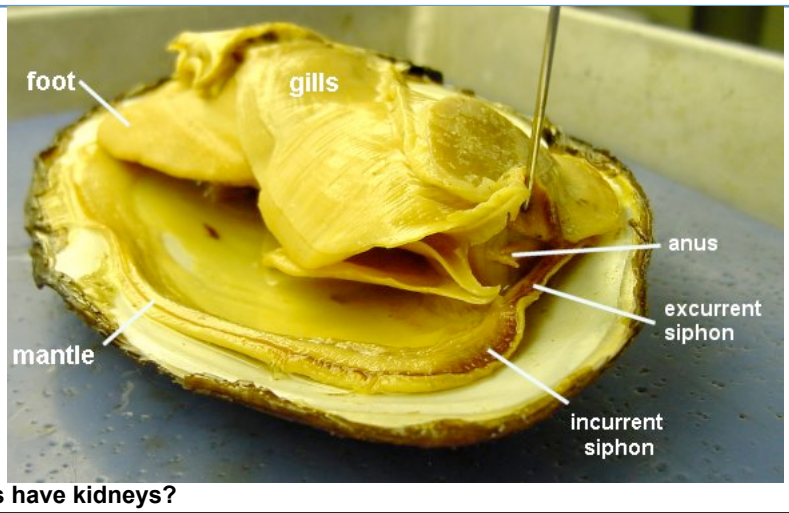
Are clams monoecious or dioeciuos?

Take a look at the labial palps: What do you think is their function?

Cut the left gill, can you see the digestive glands?

Mollusk: *Anodonta*

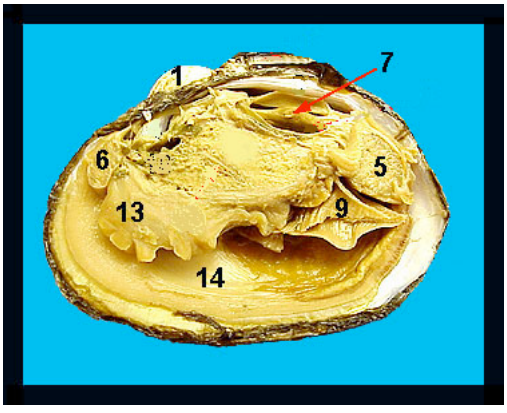
1. Dissection: Take a clam from the container. Examine their internal anatomy.



Do clams have kidneys?

Mollusk: *Anodonta*

1. Dissection: Take a clam from the container. Examine their internal anatomy.



Sometimes you can even see the heart (#7). **With the exception of most cephalopods**, mollusks have an open circulatory system.

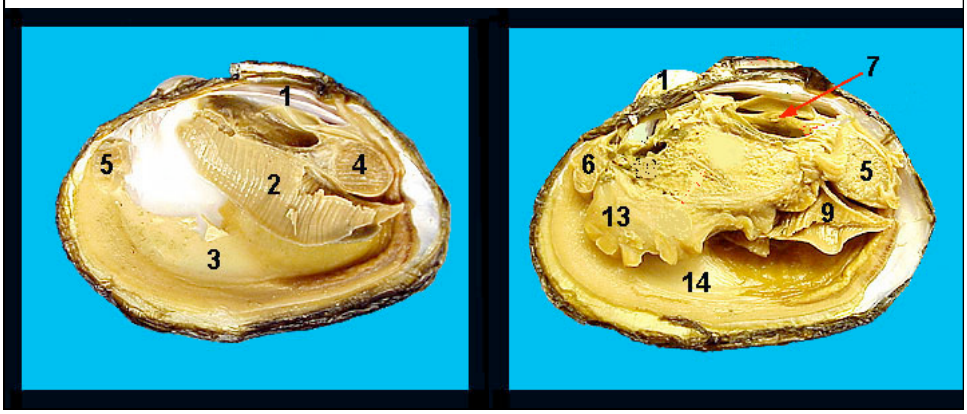
Where is the body cavity or coelom?

The coelom is actually very small and is located around the gonads

Mollusk: *Anodonta*

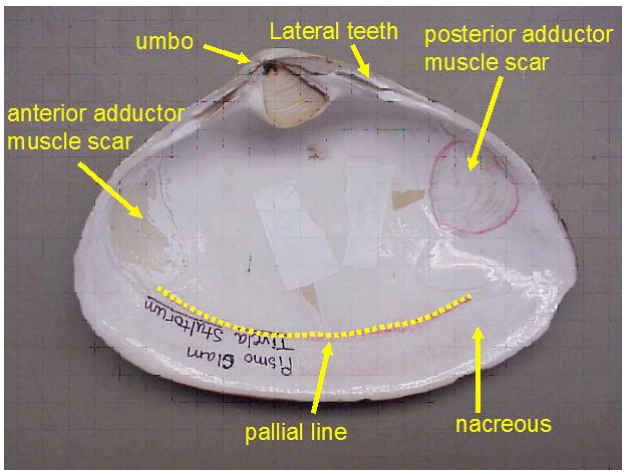
1. Dissection: Test yourself

Do clams have a brain?



Mollusk: *Anodonta*

1. Look a bivalve clean shells and identify the following scars



Mollusk: *Anodonta*

2. Look for the Glochidia slide in your box. This is the larvae of freshwater clams.

Glochidium larva has hooks to by which they fasten themselves to the gills, skin, or scales of passing fish. There they live as parasites for several weeks. They basically used the fish to disperse upstream. After a while the young clam breaks loose and sink to the bottom to develop as a free-living adult.

They leave the clam body through the excurrent siphon and are as small a dust particle.

Mollusks: Your Tasks

Exercise 11D:

- **Phylum: Mollusca**
  - **Clase Cephalopoda**
    - ***Genus: Loligo***

Squids are active swimmers. They range in size from a 2 cm up to 15 m! (Giant squid, Architeuthis).

Cephalopods have a reduced internal shell of have lost it completely. Take a look at the 'pluma' or internal shell of your squid and the one in the demonstration table.

Mollusks: Your Tasks

Exercise 11D:

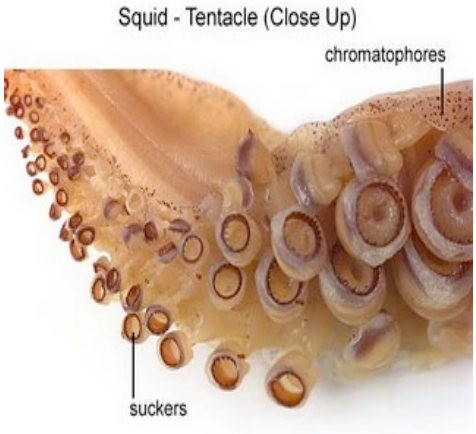
- **Phylum: Mollusca**
  - **Clase Cephalopoda**
    - ***Genus: Loligo***

Cephalopods have a reduced internal shell of have lost it completely. Take a look at the 'pluma' or internal shell of your squid and the one in the demonstration table.

The exception is *Nautilus*

Mollusks: *Loligo*

1. Dissection: Before start cutting take a look at the external anatomy of these animals. Look at there skin



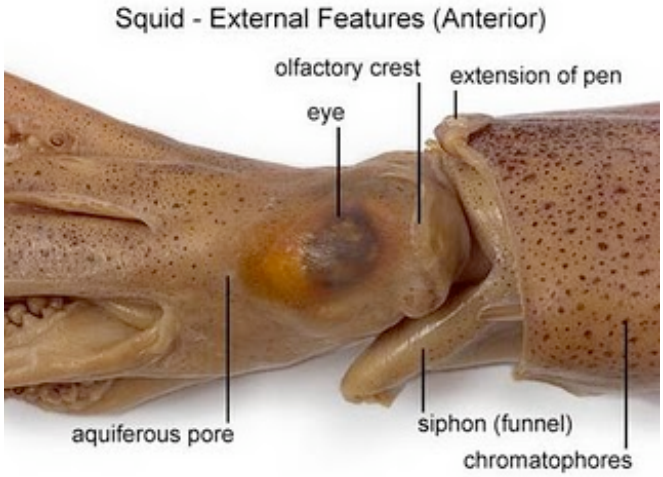
Squids and cephalopods in general have pigment cells called ***chromatophores*** *in the skin.*

What do you think is the function of these cells?

What are ommochromes?

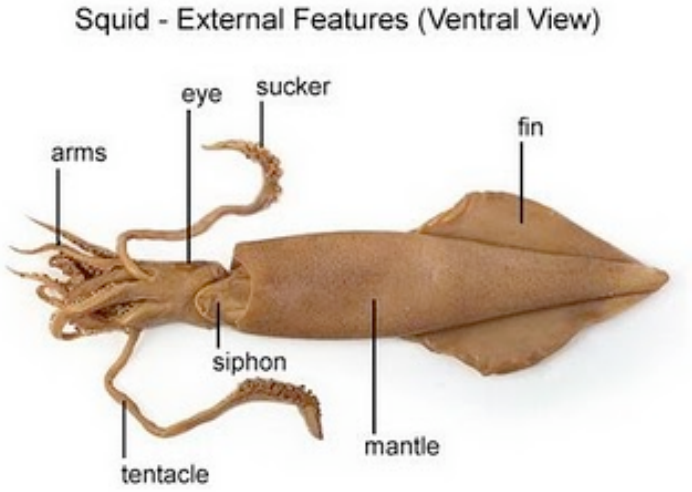
Mollusks: *Loligo*

1. Dissection: Look at the eyes, the olfactory crest, the pen, and siphon



Mollusks: *Loligo*

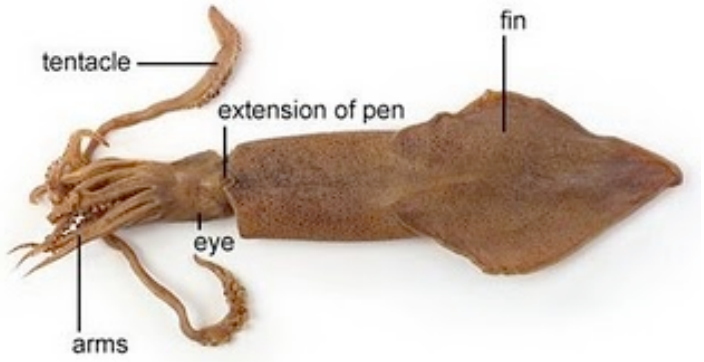
1. Dissection: Ventral view, check out the suckers, eyes, fin, arms, and tentacles, the siphon



Mollusks: *Loligo*

1. Dissection: Dorsal View, look at the extension of the pen, the fin, arms and tentacles

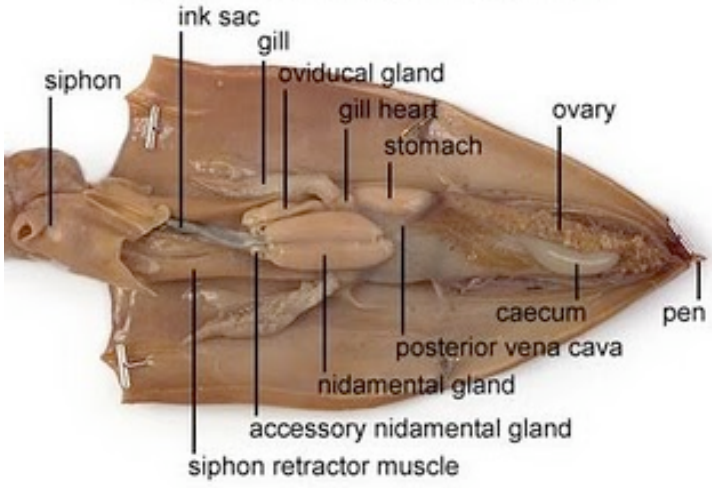
Squid - Dorsal View



Mollusks: *Loligo*

1. Dissection: If you have a female look for the following structures

Squid - Internal Features (Female)



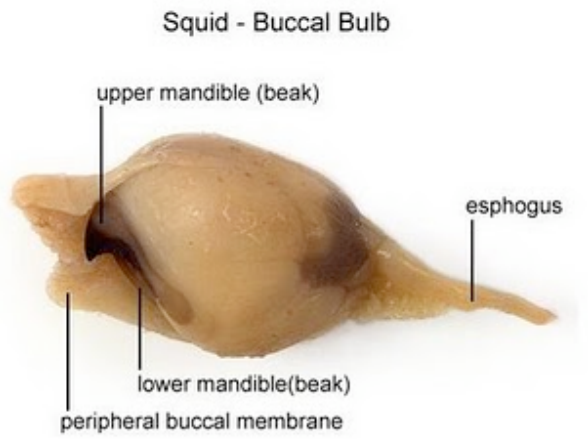
Mollusks: *Loligo*

Female Squid

- In females,
  - the ovaries containing the eggs are light yellow in color; they look and feel like Jell-O.
  - Females also have a pair of egg shell glands called **nidamental glands**; they are the large, oval, white organs located at about the midpoint of the mantle cavity.
  - Females also have **an accessory nidamental** gland located near the top of the main glands. They are close to the ink sac and pinkish in color, do not confuse them with the heart.

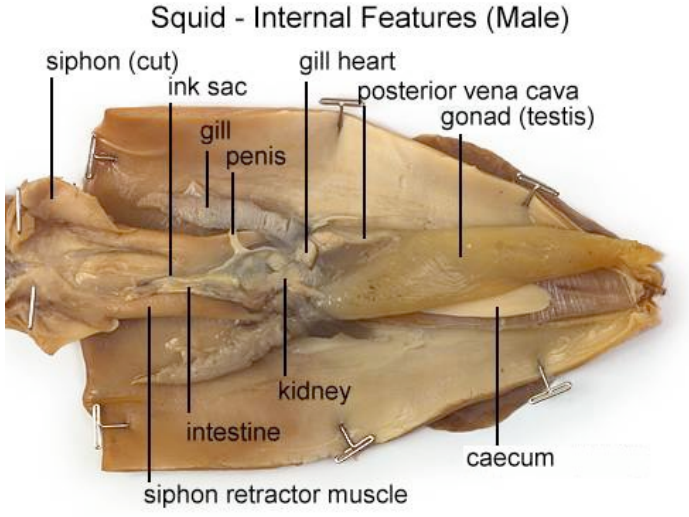
Mollusks: *Loligo*

1. Dissection: buccal bulb …can you find it?



Mollusks: *Loligo*

1. Dissection: If you have a male look for the following structures



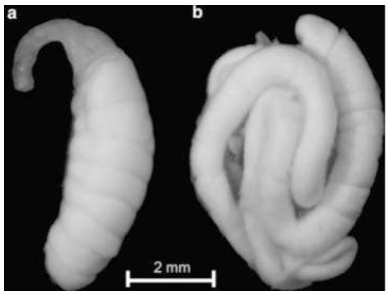
Mollusks: *Loligo*

Male Squid

- In males,
  - The sperm pass through the small coiled tube called the **vas deferens** and into the **spermatophoric gland which looks like a small sac with many intertwining circles within it**.
  - This gland adds substances to the sperm to make it into a sperm packet (**spermatophore**).

Mollusks: *Loligo*

2. Look at a slide of the spermatophores: your instructor will set the slide in the microscope for demonstrations

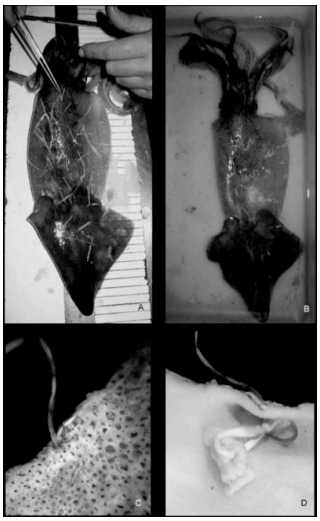


Squid don't just make sperm: they package it up into fairly elaborate little torpedoes called **spermatophores**, which are either handed to the female with a specially modified arm called the **hectocotyl arm, or squirted onto her with a penis**. Once on the female (or a male, it really doesn't matter), the spermatophore everts, forming a structure called the spermatangia, in which all the packed sperm uncoil, ready to do their job, and the whole mass is anchored to the target with a cement body. These structures do show species-specific differences, but here is one example from Heteroteuthis dispar.

http://scienceblogs.com/pharyngula/2008/12/machines_of_aggressively_lovin.php

Mollusks: *Loligo*

2. Look at a slide of the spermatophores: your instructor will set the slide in the microscope for demonstrations



Now the curious observation: squid are often captured festooned with spermatophores and spermatangia, and in many cases, the spermatangia may be imbedded deeply into the musculature of the animal — so it's not simply as if the spermatophores are lovingly placed in an appropriate orifice, they are *piercing* the female (or the male, again, they don't care that much), tearing deep into the interior. **The question is, how do they get in there.**

The answer is that spermatophores also release digestive enzymes and actively burrow into the target tissue. Squid sperm show an aggressive persistence and vigorously active assault on the female body

http://scienceblogs.com/pharyngula/2008/12/machines_of_aggressively_lovin.php

Mollusks: Your Tasks

Exercise 11B:

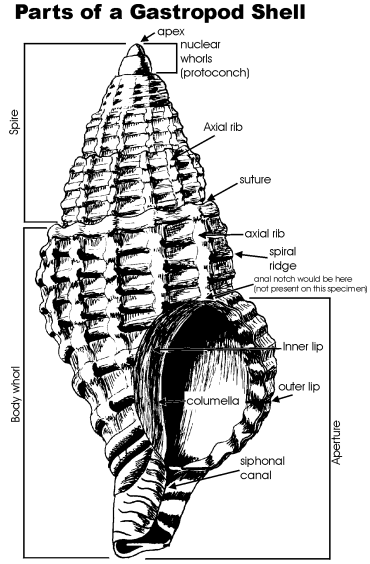
- **Phylum: Mollusca**
  - **Clase Gastropoda**

A couple of key characteristics of gastropods include the shell in most species and the phenomenon of torsion.

Look at the specimens in the demonstration table can you see the eyes at the top of the tentacles?

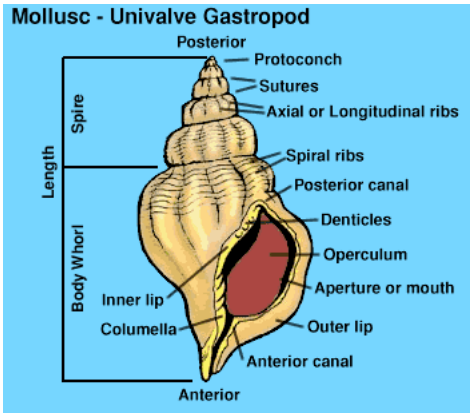
Mollusks: Your Tasks

Parts of a Gastropod Shell



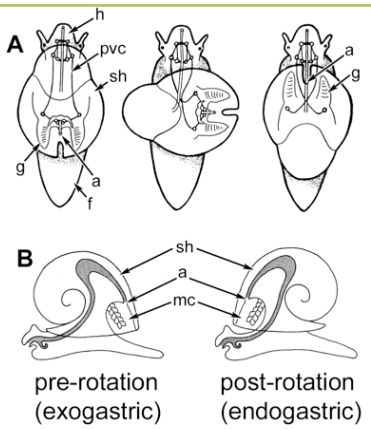
Drawing adapted from Schultz, Robert Lowell, 1953. A key to the common gastropods of Puget Sound and vicinity. MA thesis, Walla Walla College.

1. Look at all the specimens in the table. Take a couple of shells and identify the following parts



Mollusks: Your Tasks

1. One interesting aspect of gastropods is the 'phenomenon' of torsion

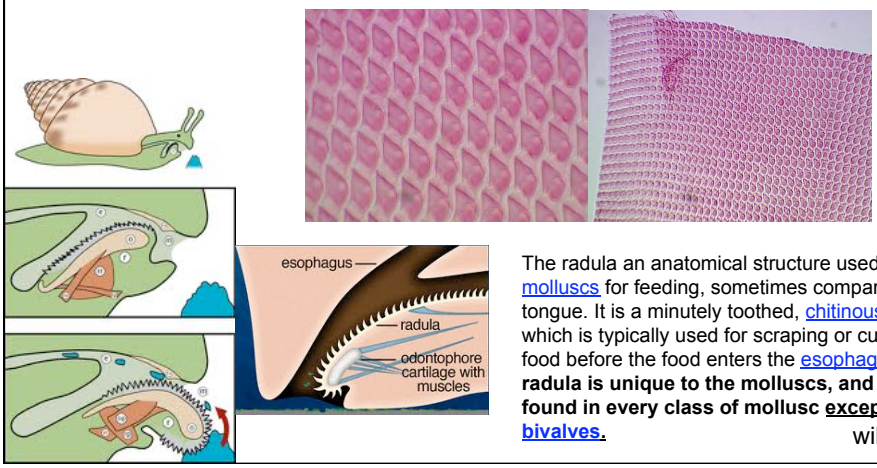


Torsion is an anatomical event which takes place during the very early part of the life of snails and slugs of all kinds. In other words, torsion is a gastropod synapomorphy which occurs in all gastropods during larval development. Torsion is the rotation of the visceral mass, mantle and shell **180˚ with respect to the head and foot of the gastropod. This brings the mantle cavity and anus to an anterior position above the head.**

wikipedia

Mollusks: Your Tasks

2. Look for a slide in your box labeled as radula



The radula an anatomical structure used by molluscs for feeding, sometimes compared to a tongue. It a minutely toothed, chitinous ribbon, which is typically used for scraping or cutting food before the food enters the esophagus. **The radula is unique to the molluscs, and is found in every class of mollusc except the bivalves.**

wikipedia

Mollusks: Your Tasks

Exercise 11C:

- **Phylum: Mollusca**
  - **Clase Polyplacophora (chitons)**

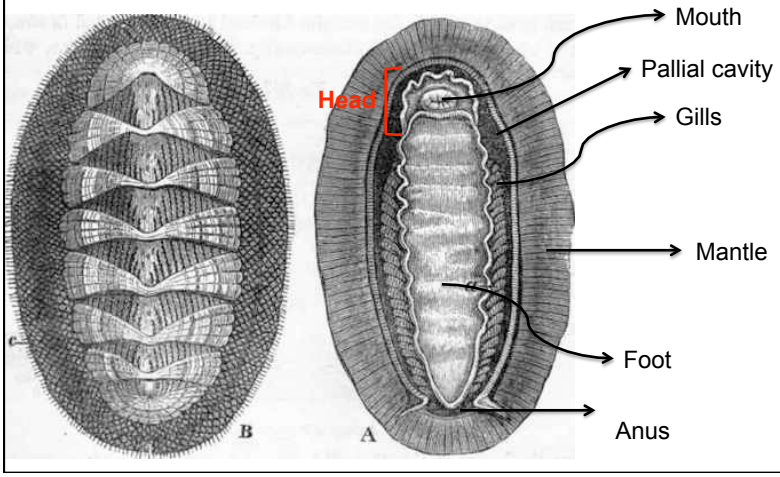
The mantle in this animals is called the girdle

Chitons have shell that is divided into 8 overlapping plates. They feed on algae and diatoms from rocks. Generally live in the intertidal zone. A few species are carnivorous.

Not all chitons have their plaques in the outside some them buried in their mantle

Mollusks: Your Tasks

1. Take a preserved specimen or look at the preserved dissection over the demonstration table and identify the following parts:



Mollusks: Your Tasks

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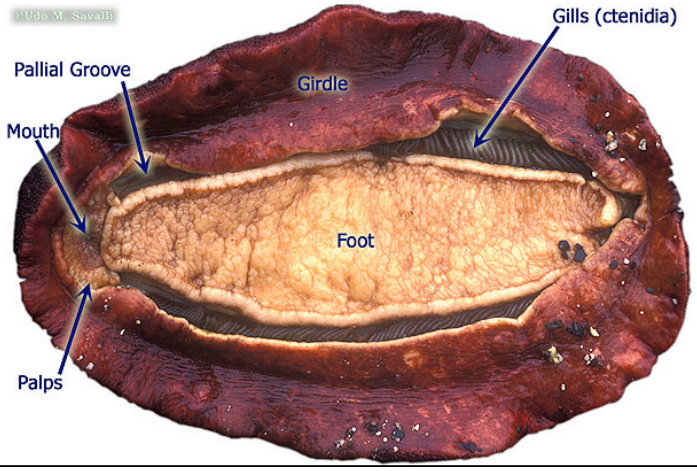

Links

- http://biog-1101-1104.bio.cornell.edu/BioG101_104/tutorials/animals/squid.html
- http://legacy.lclark.edu/~clifton/marbio/lectures/Lecture%2010.html
- http://homepage.uab.edu/acnnnghm/BY255L/BY255L-Mollusca.htm
- http://www.proprofs.com/quiz-school/search.php?search=zoology&tag=true