Clam Dissection

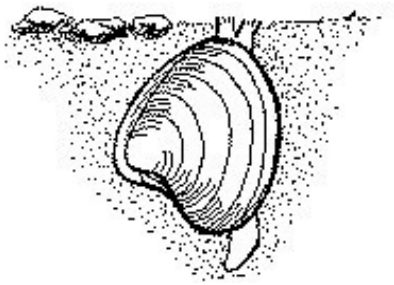
Roy E. Plotnick
Earth and Environmental Sciences
University of Illinois at Chicago
845 W. Taylor St.
Chicago, IL 60607

plotnick@uic.edu

Introduction to Paleontology Spring 2011

Lab Exercise I Clam Dissection

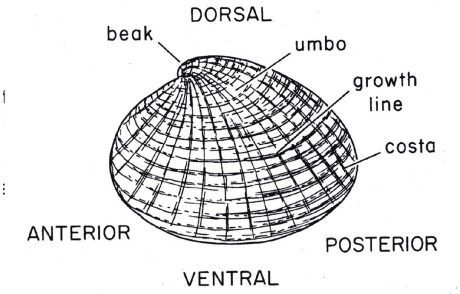
The goal of this exercise is to learn how both soft part anatomy and mode of life can be inferred from preserved hard parts. The tank contains living specimens of the hard-shell clam *Mercenaria mercenaria.*(Note: species and genus names are always written in italics). This is a very important species commercially, where it is known variously as a quahog, hardshell clam, or littleneck clam. It lives in shallow water, where it likes sandy bottoms. *Mercenaria* lives buried 1-2 cm. below the surface.



It is a moderately rapid burrower. It feeds by filtering phytoplankton from water that it pulls in over its gills with one siphon (inhalent) and then pumps back out through the other (exhalent). The siphons allow the clam to bring water into its body while remaining buried Before removing it from the tank, see if any of the individuals have their siphons out. Have any burrowed in?

1. Examine the external surface of the shell. Locate the *beaks*, which are at the front (anterior) of the animal. Holding the beaks away from you, the *right valve* is on your right and the *left valve* on your left. What is the symmetry of the shell?

Using the diagram below, locate *anterior, posterior, dorsal, ventral*. Does the shell show any *growth lines*? *Costae*? Distinguish between the *beak* and the *umbo*.

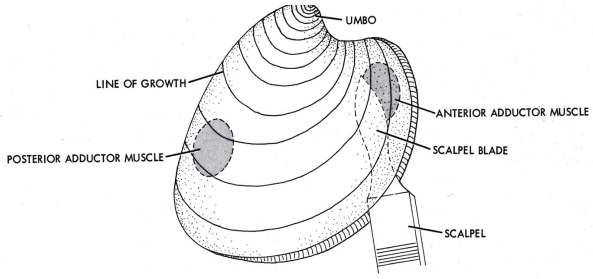


Left valve

2. Run your fingers along the shell perpendicular to the growth lines.
   a. Do you feel any difference if you move towards or away from the beak? In which direction (dorsal or ventral) would it be easier for the shell to move in sediments?

   b. What about the life history of the animal can you determine using the growth lines?

Your instructor will demonstrate how to open the shell. Generally this is done by cutting the *adductor muscles*. BE CAREFUL! Do not pull the shells wide apart; open it just enough to see the internal soft parts.



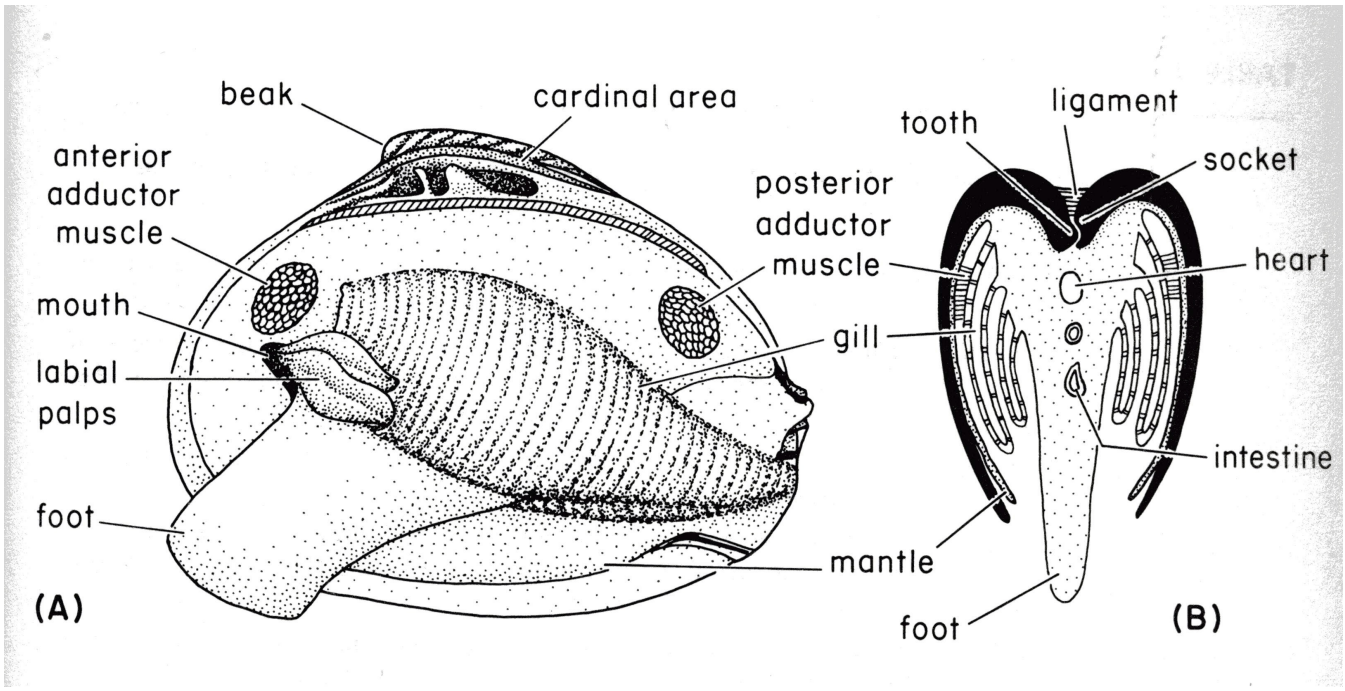
3. We will examine the hinge area first.
   a. Locate the ligament - what happens when you push it with a needle? How might the ligament be used to open the shell?

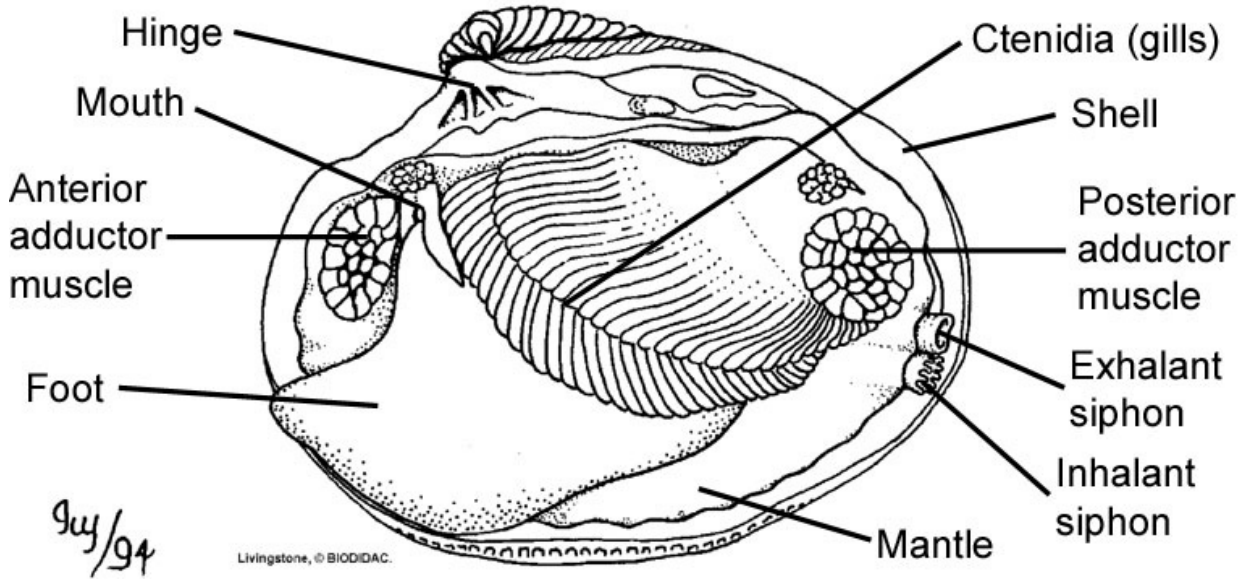
      i. What role do the adductor muscles play?

      ii. How could you tell if a clam is dead?

   b. Note the structure of the hinge *dentition.* This type of dentition is said to be heterodont. (See fig. 13-6 in text).

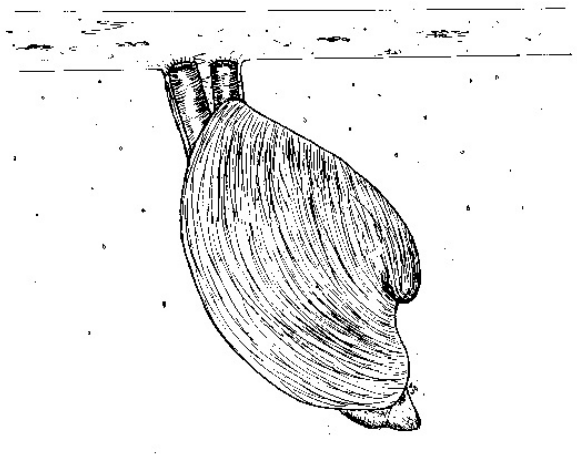
4. Using the diagrams, locate:
   a. *foot*
   b. ctenidia (gills);
   c. exhalent siphon;
   d. *inhalent siphon*,
   e. *palps*
   f. *anterior and posterior adductor muscles*.
   g. *mantle:*
      i. Note where the mantle margin attaches to the shell
      ii. Note how the siphons are formed by the musion of the mantles from the left and right valves



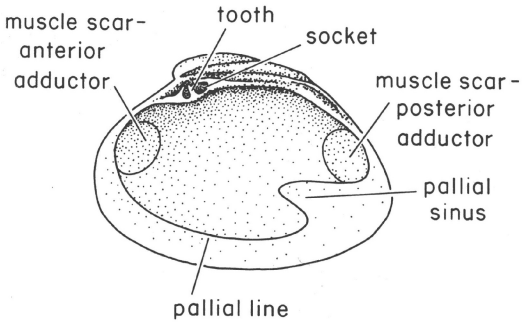


http://biodidac.bio.uottawa.ca

5. Which siphon is wider? Why might this be?



6. Carefully scrape away the adductor muscles from the shell. Observe the *muscle scars* that record their position.

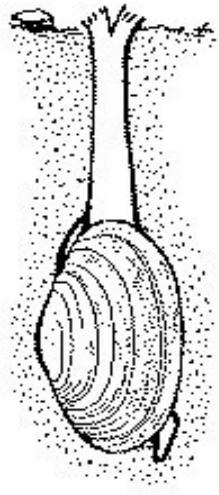


7. Now peel away the mantle from the shell. Observe the *pallial line* that records the position of the contact. Also notice the posterior *pallial sinus*. How does the position and size of the pallial sinus relate to that of the siphons?

8. Based on what you have seen, could you reconstruct the internal anatomy of a clam if you were given its shell? How?

9. Now examine the shell of the soft-shell clam *Mya arenaria*, also known as the longneck clam, or steamer. Based on the shell structure, what would predict about the soft-part anatomy and ecology of this animal? (The hinge is desmodont, bearing a chondrophore)

10. Look at the preserved specimen of *Mya*. Found in all seas, it buries itself in the mud to depths from 10 to 30 cm. Does this information match your prediction?



Figures from: Beerbower, 1968; Sherman and Sherman, 1970; Biodidac

Assignment: produce a glossary for you own use of the terms in italics. Include what the feature does in the life of the organism.