

Name: \_\_\_\_\_

## Crab Dissection

### **Part I**

By simply examining the external anatomy of a crab, it is difficult to see just how this group has modified each of their 19 appendages for reproduction, feeding, and locomotion. In today's lab you will dissect either a *Cancer* crab or a kelp crab. *Cancer* crabs are common benthic predators usually found in rocky areas or eelgrass beds. Their predatory habits often shape the distribution, behavior, and morphology of their prey species (recall the variation in shell morphology we saw in the snails-*Cancer* crabs were the guilty party). In contrast, kelp crabs are often found on kelp (imagine that), which is their primary food. In the wintertime, when kelp is scarce, they feed on barnacles and other organisms.

### I: External Anatomy

Before you begin the dissection, observe the external morphology of your crab and compare it to the other species.

1. Use the guides provided to identify your crab. Which *species* do you have? Please give **both** the common and scientific name. (0.5)
  
2. Is your crab a Brachyuran (true crab) or an Anomuran (false crab)? What is the way that you can tell? (0.5)

Now determine the sex of your critter. This is readily determined by the shape of the abdomen: in males the abdomen is acutely triangular; in females it is very broad. Furthermore the carapace of the female crab tends to be more dome-shaped than males, and males tend to have proportionately larger claws than females.

3. What sex is your animal? (0.5)
  
4. Fill in the blanks below with the number of appendages in each region: (1)  
Head =  
Thorax =  
Abdomen =

The head region of the brachyuran crab is very compressed and fused with the thoracic region, essentially forming one large body tagmata called the cephalothorax.

5. Examine the two pairs of antennae, how does their structure differ? What is the function of each pair? (1)

6. Look at the hair-like setae on the underside of the Cancer crab. What function might these setae have? (0.5)

7. Locate the excretory pore at the basal segment of the second antennae (this segment is fused into the 'face' of the crab; the pore has a small cap covering it). What is one advantage and one disadvantage to discharging urine from this location? (1)

8. Examine one of the walking legs of your crab. Note the direction that each of the joints bends, and describe it below. (0.5)

Gently pull the abdomen out and observe the abdominal segments and their associated appendages.

9. What abdominal appendages are missing, as compared to the 'basic' malacostracan body plan? (0.5)

10. Which segment or somite on the thorax bear the gonopores in the two sexes? (0.5)

Male =

Female =

## **II: Internal Anatomy**

Use scissors to make two cuts from the posterior margin of the carapace to the anterior margin, just behind each eye. Cut as close to the surface as possible. Cut the epidermis away from the carapace at the margin between the carapace and the abdomen. Lift the carapace up and separate it from the epidermis. You will need to cut the pair of anterior dorsal pyloric muscles away from the carapace, as well as any other muscle strands. Cut the epidermis away to expose the internal organs.

Identify as many of the organs as you can. The heart lies in the posterior part of the cephalothorax and is cream colored. The stomach, bladder, hepatopancreas, and ovaries or testes should also be visible. Note the hard chitinous structures of the interior skeleton. These internal structures are called apodemes.

*11. Draw the internal anatomy of your crab. Label heart, gills, cardiac stomach, hepatopancreas, ovaries/testes, and apodemes. (3)*

*12. What is the function of the apodemes?(0.5)*

Look at the shape of the ovaries and testes, and observe the difference between the sexes. If you have a female, examine a small piece of the ovary under a dissecting scope. If you have a male, make a slide with some of the material from the testes and observe it under a compound scope. The non-motile sperm are enclosed within larger packets, termed spermatophores.

*13. Draw what you see (0.5)*

*14. Examine a small piece of hepatopancreas under a dissecting scope. Name 2 functions of this organ? (1)*

The stomach is composed of two parts: the cardiac and the pyloric. Open up the cardiac stomach to locate the gastric mill.

15. *What is the advantage to having your grinding teeth in your stomach? (0.5)*

16. *Sketch one of the teeth of the gastric mill. How many teeth are there? (1)*

17. *Draw a flow chart depicting the passage of a piece of food eaten by a crab.  
Include the following terms: esophagus, cardiac stomach, filtering setae, pyloric stomach, gastric mill, hepatopancreas, hindgut, anus. (2)*

Examine the branchial portion of one side of the carapace where the gills are exposed. Gills attached to the leg are called podobranchs; those attached to the softer membranous cuticle between the leg and the body are arthrobranchs, while those attached to the body wall are pleurobranchs.

18. *What kind of gills does your crab have? (0.5)*

19. What is the function of the epipods? (0.5)

Observe the linkage between the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> maxillipeds and their epipods which serve as gill rakers. Move the 2<sup>nd</sup> and 3<sup>rd</sup> maxillipeds manually while watching the gill chamber.

function? (0.5)

20. Examine the 2<sup>nd</sup> maxilla and note the flattened scaphognathite. What is its

Make sure you note all parts of each, including the endopods and exopods. Examine the mouthparts, starting with the third maxilliped and working your way in.