

Heart Dissection Lab

Protocol:

1. To examine the external anatomy of the heart, it may be necessary to first clean it. If the **pericardium** has not been removed, peel it off the heart and remove it by using the scissors to cut it away at the junction with the top of the heart. There may also be considerable adipose tissue (white, cakey material resembling chicken fat) on the top of the heart. This needs to be scraped away, using the blunt probe, so that the various blood vessels that connect to the heart can be observed.
2. Once the surface of the heart is cleaned, identify the superior and inferior (apical) ends. The **apex** of the heart is the tip at the very bottom of the heart. Also determine the left, right, dorsal (back), and ventral (front) sides of the heart.
3. Structures visible on the surface of the heart include:
 - a. The **epicardium** is the thin, membrane-like outer covering of the entire heart.
 - b. The **auricles** are the dark-colored, cauliflower-shaped structures associated with each atrium (the upper chambers of the heart).
 - c. The **ventricles** are the lower chambers of the heart.
 - d. There are various grooves in the epicardium; these are the **sulcuses**. The **anterior interventricular sulcus** is located on the ventral side of the heart and separates the right and left ventricles. The **posterior interventricular sulcus** runs straight down the dorsal side of the heart. Note that the main branches of the coronary arteries and veins are located in the sulcuses.
 - e. The **pulmonary artery** connects with the right ventricle on the ventral side of the heart.
 - f. The **aorta** is located immediately behind the pulmonary artery. The **brachiocephalic artery** is the first branch that comes off the aorta as it arches over the heart. The **ligamentum arteriosum** is a small strip of tissue that connects the pulmonary artery with the aorta (it is a remnant of the ductus arteriosus found in fetal circulation).
 - g. Immediately behind the aorta and adjacent to the right auricle is the **superior vena cava**, which brings blood back to the right atrium from areas above the heart.
 - h. The **inferior vena cava** connects with the superior vena cava, just as both enter into the right atrium. The inferior vena cava brings blood to the heart from all areas below the heart.

i. On the left side of the heart, the **pulmonary vein(s)** empty into the left atrium. Depending on how your specimen has been cut, you may find 1-4 pulmonary veins.

4. Once you have identified all the external structures of the heart, you will need to make 2 incisions to examine the internal anatomy of the right side of the heart.

a. Make an incision beginning at the pulmonary artery and cutting through the heart wall parallel to, but to the right of, the anterior longitudinal sulcus. Continue this cut around to the back right side of the heart, following parallel to the anterior interventricular sulcus all the way. (Note: Be sure not to cut too deeply. You only want to cut through the outer wall of the heart. If you are worried about cutting too deep, put your blunt probe inside the heart and just cut down until you hit the probe).

b. The second incision should begin in the superior vena cava and continue straight down through the heart wall to connect with your first cut.

5. Now examine the structures inside the right side of the heart.

a. Examine the layers of the heart wall you have just cut through. The **epicardium** is the thin outer layer, the **myocardium** is the thick, muscular middle layer, and the **endocardium** is the thin, shiny inner layer.

b. The **pectinate muscles** are the ridges of tissue located on the inside of the auricles.

c. Find the 3 flaps of the **tricuspid valve**, which separates the right atrium from the right ventricle.

d. The flaps of the tricuspid valve are attached to thin, thread- like structures called the **chordae tendineae**. The chordae tendineae are in turn attached to the large bulges of **papillary muscle**, that contract to close the valve. The rest of the lining of the ventricle is made up of irregular folds of tissue called the **trabeculae carneae**.

e. The **moderator band** is a thin strip of tissue that connects the outer wall of the right ventricle to the inner wall.

f. The **pulmonary semilunar valve** is composed of three half-moon-shaped membranous flaps at the junction of the pulmonary artery with the right ventricle.

g. The opening of the **coronary sinus** can be found by looking to the left of your incision through the right atrium. You should see two openings: the top opening is the **inferior vena cava**; the lower is the coronary sinus. Put your blunt probe in this opening to trace where the coronary sinus goes.

6. To examine the inside of the left chambers of the heart, make an incision beginning at the leftmost part of the pulmonary vein and continuing down the left edge of the heart to the apex. Note that the heart wall is much thicker on the left side, so you will need to cut deeper to get all the way through.

7. The internal anatomy of the left side of the heart is essentially the same as the right side with a few exceptions. For example, the left side has no moderator band. **View Digital Images** 

The other important features are:

a. The ***bicuspid valve*** (consisting of only 2 flaps) separates the left atrium from the left ventricle.

b. The ***aortic semilunar valve*** is located behind the flaps of the bicuspid valve and connects the left ventricle with the aorta. It has exactly the same appearance as the pulmonary semilunar valve.

c. The ***interatrial septum*** is the wall of tissue that separates the left and right atria; the ***interventricular septum*** does the same for the left and right ventricles.