

Chapter 12- Lab- Sheep Heart Dissection

The anatomy of the sheep heart closely resembles that of the human heart. Use your computer lab and models of the human heart as references.

First examine the **pericardium**, a fibroserous membrane that encloses the heart, which may have already been removed in preparing the sheep heart for preservation. The **myocardium** is the middle layer and constitutes the main muscle portion of the heart. The **endocardium** (third layer) is the inner lining of the heart. Use your computer lab diagrams to determine which is the ventral surface of the heart and then identify the **pulmonary trunk** emerging from the anterior ventral surface, near the midline, and medial to the **left auricle**. A longitudinal depression on the ventral surface, called the **anterior interventricular sulcus**, separates the right ventricle from the left ventricle. Locate the coronary blood vessels lying in this sulcus.

Procedure

- 1 Remove any fat or pulmonary tissue that is present.
- 2 In cutting the sheep heart open to examine the chambers, valves, and vessels, the anterior interventricular sulcus is used as a guide.
- 3 Carefully make a shallow incision through the ventral wall of the **pulmonary trunk** and the right ventricle, trying not to cut the dorsal surface of either structure.
- 4 The incision is best made less than an inch to the right of, and parallel to, the anterior interventricular sulcus.
- 5 If necessary, the incision can be continued to where the pulmonary trunk branches into a right pulmonary artery, which goes to the right lung, and a left pulmonary artery, which goes to the left lung. **Pulmonary semilunar valves** can be clearly seen upon opening the pulmonary trunk.
- 6 Keeping the cut still parallel to the anterior interventricular sulcus, extend the incision around and through the dorsal ventricular wall until you reach the **interventricular septum**. **Do not cut the interventricular septum.**
- 7 Now examine the dorsal surface of the heart and locate the thin-walled **superior vena cava** directly above the right auricle. This vein proceeds posteriorly straight into the **right atrium**.
- 8 Make a second longitudinal cut, this time through the superior vena cava (dorsal wall).
- 9 Extend the cut posteriorly through the right atrium on the left of the right auricle. Proceed posteriorly to the dorsal **right ventricle** wall and join your first incision.

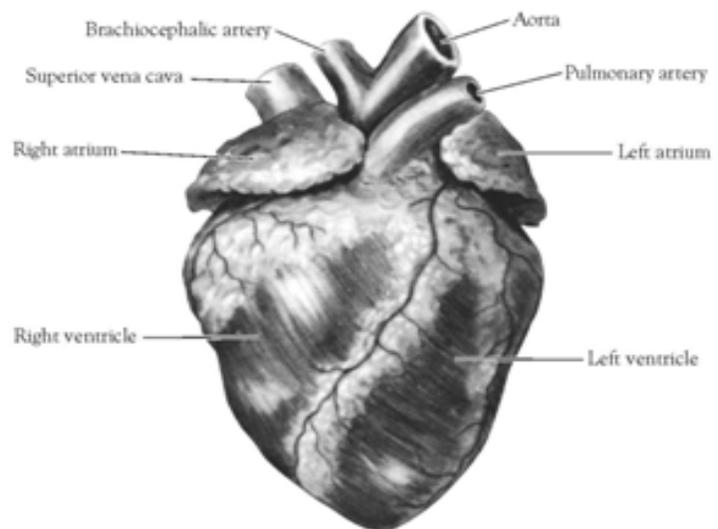


Figure 1. Heart (Anterior View)

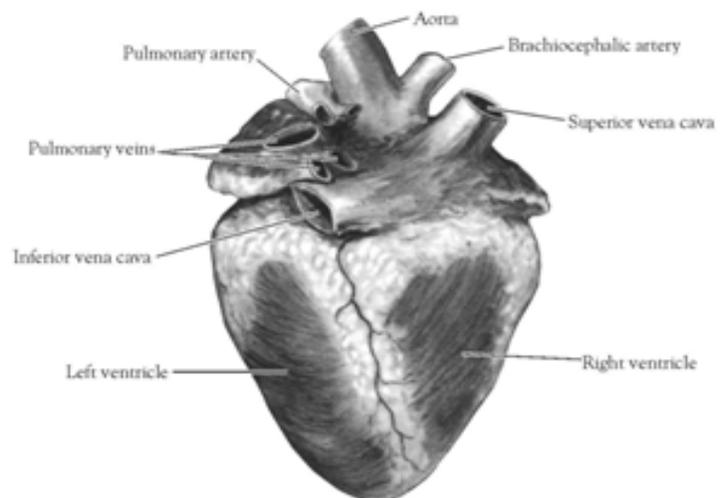


Figure 2. Heart (Posterior View)

- 10 Carefully spread apart the right side of the heart. The interior of the superior vena cava, right atrium, and right ventricle will now be examined. Start with the right auricle and locate the pectinate muscle, the large opening of the **inferior vena cava** on the left side of the right atrium, and the opening of the coronary sinus just below the opening of the inferior vena cava.
- 11 Now find the wall that separates the two atria, the **interatrial septum**. Also find the **fossa ovalis**, an oval-shaped depression ventral to the entrance of the inferior vena cava.
- 12 The **tricuspid valve** between the right atrium and the right ventricle should be examined to locate the three cusps. From the cusps of the valve itself, the **chordae tendinae**, which hold the valve in place, should be identified. From the chordae tendinae, you should be able to trace its origin to **papillary muscles** which are located on the wall of the right ventricle.
- 13 Look carefully again at the dorsal surface of the **left atrium** and locate as many **pulmonary veins** (normally 4) as possible.
- 14 Make your third longitudinal cut through the most lateral of the pulmonary veins that you have located.
- 15 Continue posteriorly through the left atrial wall and the **left ventricle** to the **apex** of the heart.
- 16 Compare the difference in thickness of the wall between the right and left ventricles.
- 17 Examine the **bicuspid (mitral) valve**.
- 18 Probe from the left ventricle to the aorta as it emerges from the heart, examining the **aortic semilunar valve**.
- 19 Locate now the **brachiocephalic artery**, which is one of the branches from the aortic arch. This artery continues branching and terminates by supplying the arms and head.
- 20 Connecting the aorta with the pulmonary artery is the remnant of the ductus arteriosus, called the ligamentum arteriosum. It may not be present in your sheep heart.

Be sure you are able to identify the following structures of the heart.

pericardium (if present)
 myocardium
 endocardium
 anterior interventricular sulcus
 coronary blood vessels (arteries and veins)
 superior vena cava
 inferior vena cava
 right atrium and right auricle
 tricuspid valve
 chordae tendinae (both sides)

papillary muscle (both sides)
 interatrial septum
 interventricular septum
 right ventricle
 pulmonary trunk
 pulmonary semilunar valve
 pulmonary arteries (if present)
 pulmonary veins (if present)
 left atrium and left auricle
 bicuspid (mitral valve)

left ventricle
 aorta
 aortic semilunar valve
 brachiocephalic artery (if present)
 left subclavian artery (if present)

Fill out Part A and B of the lab report.

PART A

Match the terms in column A with the descriptions in column B. Place the letter of your choice in the space provided.

Column A	Column B
a. Aorta	_____ 1. Upper chamber of heart
b. Atrium	_____ 2. Structure from which chordae tendineae originate
c. Cardiac vein	_____ 3. Prevents blood movement from right ventricle to right atrium
d. Coronary artery	_____ 4. Membranes around heart
e. Endocardium	_____ 5. Prevents blood movement from left ventricle to left atrium
f. Mitral (bicuspid) valve	_____ 6. Gives rise to left and right pulmonary arteries
g. Myocardium	_____ 7. Inner lining of heart chamber
h. Papillary muscle	_____ 8. Layer largely composed of cardiac muscle tissue
i. Pericardial cavity	_____ 9. Space containing serous fluid
j. Pericardial sac	_____ 10. Drains blood from myocardial capillaries
k. Pulmonary trunk	_____ 11. Supplies blood to heart muscle
l. Tricuspid valve	_____ 12. Distributes blood to body organs (systemic circuit) except lungs

Part B

Complete the following:

- 1 Compare and contrast the structure and function of the atrioventricular valves and the semilunar valves.
- 2 Describe the function of the chordae tendinae and the papillary muscles.
- 3 Explain why there is a significant difference in thickness between the wall of the aorta and the wall of the pulmonary trunk?
- 4 Explain why there is a significant difference between the myocardium of the left ventricle and the myocardium of the right ventricle.
- 5 List in order the major blood vessels, chambers, and valves through which blood must pass in traveling from a vena cava to the aorta.