

(G) Mammalian Transport

Sheep Heart Dissection

Dissection of the sheep heart offers students an excellent opportunity to learn about the anatomy of a mammalian heart. The human heart is similar in structure and function; the most obvious difference is that the sheep heart is much smaller.

A closer look at this crucial muscle

The ribs, sternum, and vertebral column protect the heart, and a tough, double-layered membrane called the pericardium covers it and the bases of the large blood vessels attached to it. The inner layer of the pericardium, called the visceral pericardium, or epicardium, contains blood vessels, lymph, nerves, and fat (especially around the larger blood vessels).

The heart has 4 pumping chambers. The 2 upper chambers, the atria, pump blood directly from the veins into the lower chambers, the ventricles. The right ventricle moves blood to the lungs for oxygenation and the left ventricle pumps blood into the body tissues.

Semilunar valves prevent the backflow of blood into the ventricles. Large valves between the atria and the ventricles prevent the backflow of blood into the atria when the ventricles contract. The chordae tendineae and papillary muscles prevent these valves from being forced back into the atria by ventricular contraction. The opening and closing of these valves produces the “lub-dub” sounds heard through a stethoscope.

Safety

Students should follow safe practices when performing any activity in the laboratory. Demonstrate the protocol for using the dissecting instruments and emphasize the importance of proper usage. Students should wear safety glasses or goggles, gloves, and lab aprons when dissecting. They should dissect on the dissection tray at all times to contain the specimen and any excess fluids. Promote proper hygiene practices before, during, and after the lab.

External anatomy

1. Put on safety glasses or goggles, gloves, and lab apron.
2. Obtain a dissecting tray and a set of dissecting instruments.
3. Place the preserved sheep heart on your dissecting tray.
4. Study Figures 1 and 2 and familiarize yourself with mammalian heart structures.
5. Notice the fat that covers the upper part of the heart and blood vessels. Remove as much of this fat as possible, using forceps to either pick or scrape it away. Work carefully and do not damage any of the heart structures as you remove the fat.
6. The fat is light colored, soft, and without structure. Heart muscle is dark and fibrous. The walls of blood vessels are thin, tough, and usually smooth on the inside. Make an effort to distinguish between these 3 tissue types.
7. Once you remove the fat, locate the structures shown in Figures 1 and 2. In some cases, the blood vessels may be cut so close to the heart that little more than holes remain to show where they once attached.

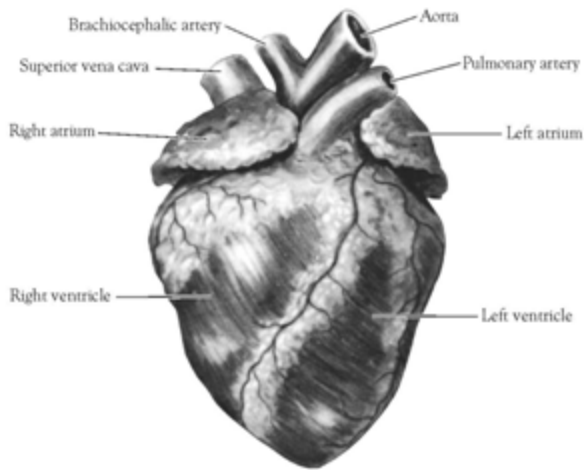


Figure 1. Heart (Anterior View)

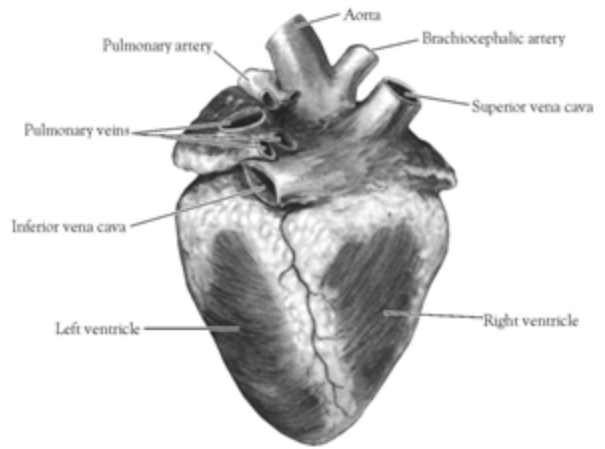


Figure 2. Heart (Posterior View)

Internal anatomy

1. Position the heart as shown in Figure 3 (anterior side up). Cut open the left atrium and locate the bicuspid valve between the left atrium and ventricle.

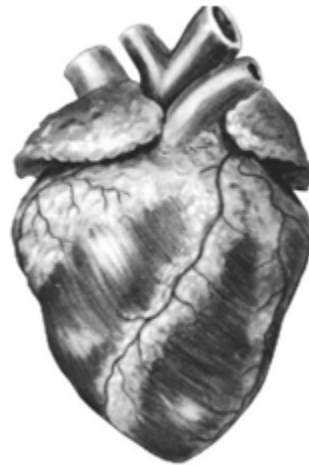


Figure 3

2. Beginning at a point below the middle of the left ventricle, make an incision through the left ventricle wall as shown in Figure 4. Remove the lower-front portion of the wall.

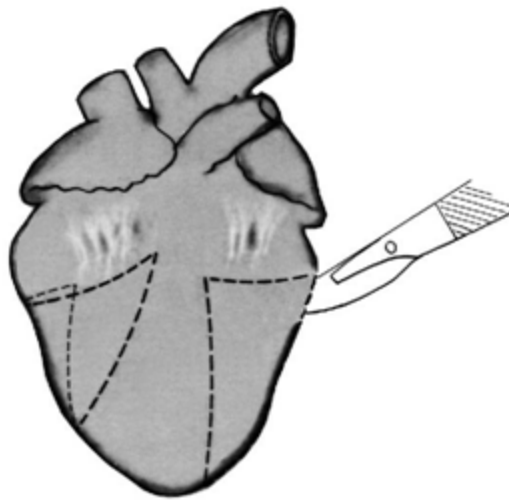


Figure 4

3. Look through the hole you have produced and locate the chordae tendineae and the papillary muscles as shown in Figure 5.
4. Trim away the front and side of the left ventricular wall, leaving part of the papillary muscles and all of the bicuspid valve in place. Make an incision to the side of the bicuspid valve as shown at A in Figure 5.
5. Spread the left side of the heart and identify the structures labeled in Figure 5.

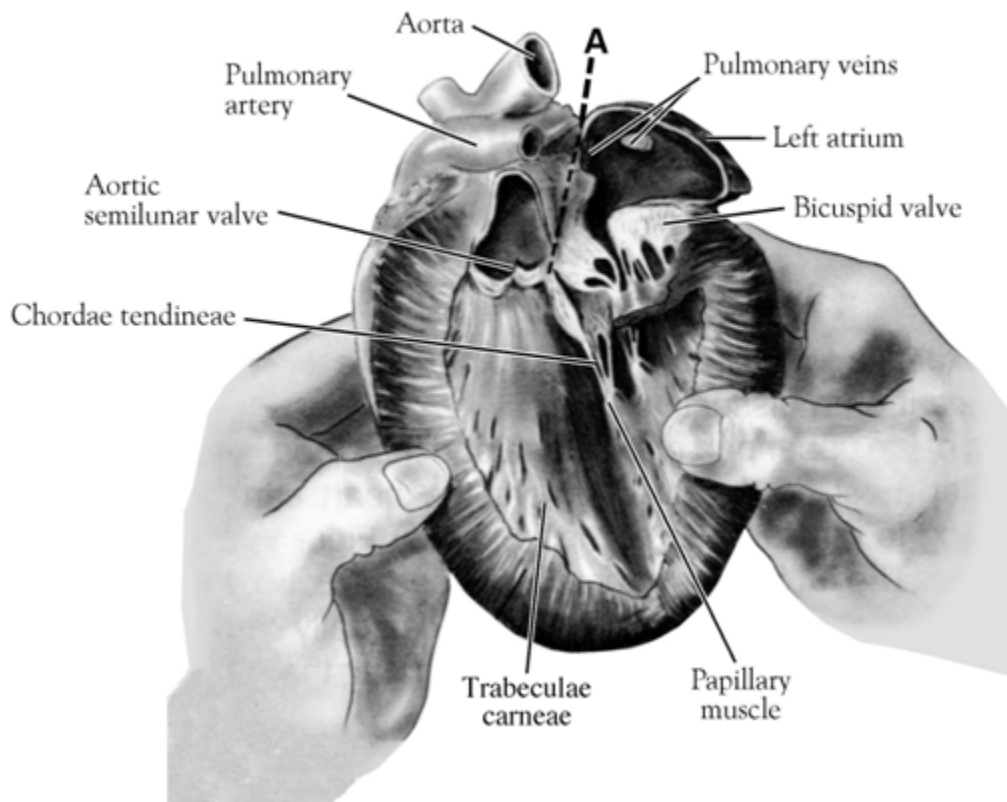


Figure 5

6. The right side is dissected similarly; begin by opening the top of the right atrium and locating the tricuspid valve between the right atrium and ventricle.
7. Remove the lower-front portion of the ventricular wall just as you removed that of the left ventricle.
8. Cut high across the front of the heart to locate the pulmonary semilunar valves.
9. Identify the structures labeled in Figure 6.
10. Refer to your textbook and trace the path of blood through the heart, beginning with the right atrium.

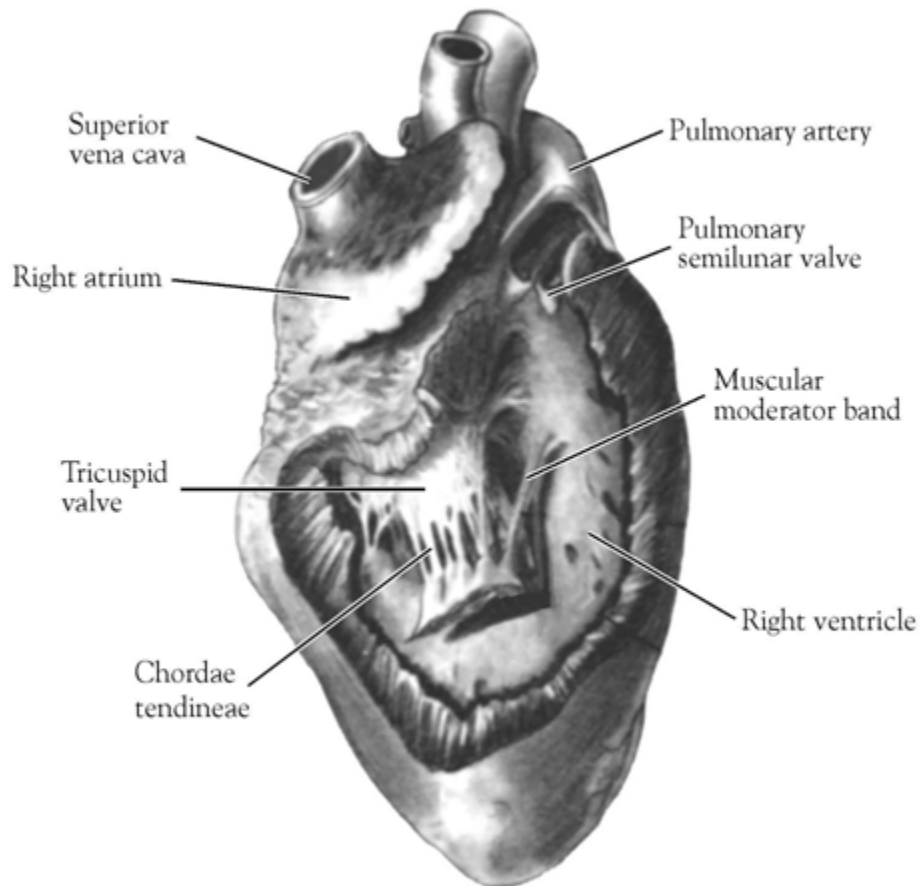


Figure 6