BIOL 2402

Dissection of the Sheep Heart and Human Heart

Objectives

After completing this lab, you should be able to:

1. Locate and identify the major structures of the sheep heart.
2. Describe the function of the major structures of the sheep and human heart.
3. Identify the corresponding structures in the human heart model.
4. Compare the structures of the sheep heart with those of the human heart.
5. Know the path of blood through and out of the heart

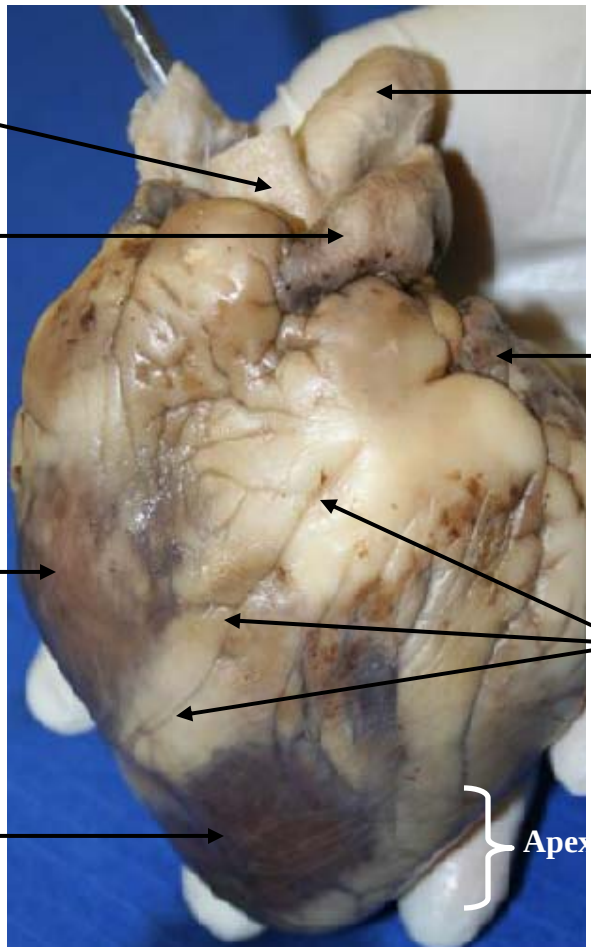
Materials

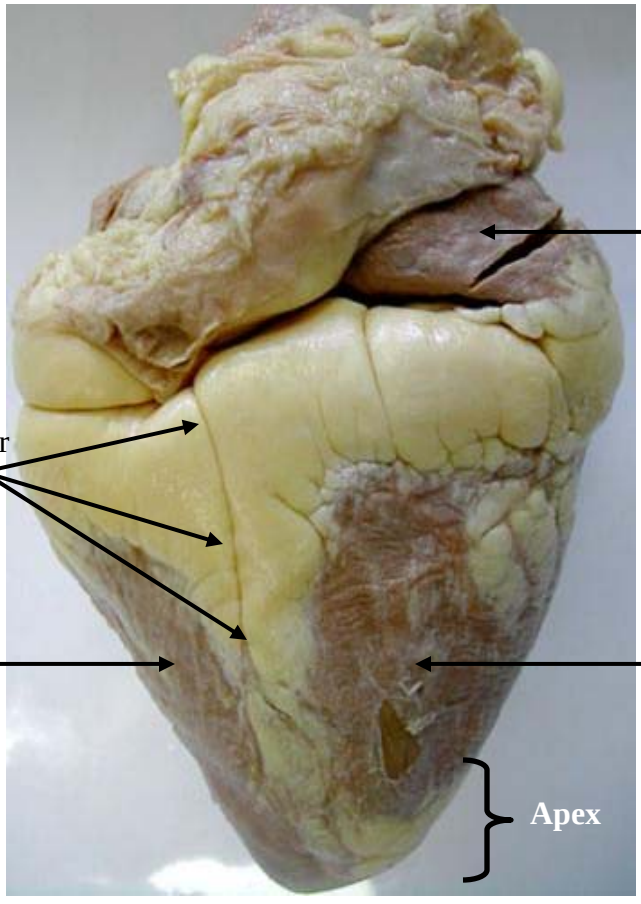
Preserved sheep heart
Dissecting tray and instruments
Vinyl dissecting aprons
Disposable gloves
Anatomy & Physiology / Revealed, Version 2.0 CD-ROM
Human heart model

INTRODUCTION

The heart is a cone-shaped muscular organ, about the size of your fist. It is located in the mediastinum region (central region of the thoracic cavity), between the lungs, and behind the sternum. The heart is a hollow organ, containing 4 chambers. At least one blood vessel attaches to each of the chambers. The heart valves keep the blood moving forward because backward flow closes the valves. Contraction of the heart pumps blood through the heart and out into arteries. The right ventricle pumps blood into the pulmonary trunk, which leads to the pulmonary arteries, and the left ventricle pumps blood into the aorta, which is the major artery in the body.

You will learn the major structures of the heart by dissecting the sheep heart. While you are examining the major structures of the sheep heart, compare them with the corresponding organs of the human heart model. Then you will dissect the human heart by using your *Anatomy & Physiology / Revealed*, Version 2.0 CD to identify the major structures of the human heart and learn functions of each.


Brachiocephalic Artery
Aorta
Pulmonary Trunk
Left Atrium
Sheep Heart, Anterior (Ventral) View
Right Ventricle
Anterior Interventricular Sulcus
Left Ventricle
Apex


Right Atrium
Posterior Intraventricular Sulcus
Sheep Heart, Posterior (Dorsal) View
Left Ventricle
Right Ventricle
Right Ventricle
Apex

Dissection of the Sheep Heart

KNOW the <u>location</u> and <u>function</u> of the following parts on the sheep heart (and human heart too):

Base and apex of the heart
Left and right atrium
Left and right ventricle
Anterior and posterior interventricular sulcus
Interventricular Septum
Aorta
Pulmonary trunk
Pulmonary arteries (right and left) – Know them in a diagram only
Pulmonary veins (2 right and 2 left) – Know them in a diagram only
Superior and Inferior vena cava
Tricuspid and Bicuspid (Mitral) valves
Aortic and Pulmonary valves – Know them in a diagram only
Chordae Tendineae
Papillary muscles
The three (3) layers of the heart wall: epicardium, myocardium, endocardium
Pericardium

Atrium = Singular
Atria = Plural

Vena Cava = Singular
Vena Cavae = Plural

SHEEP HEART DISSECTION PROCEDURE:

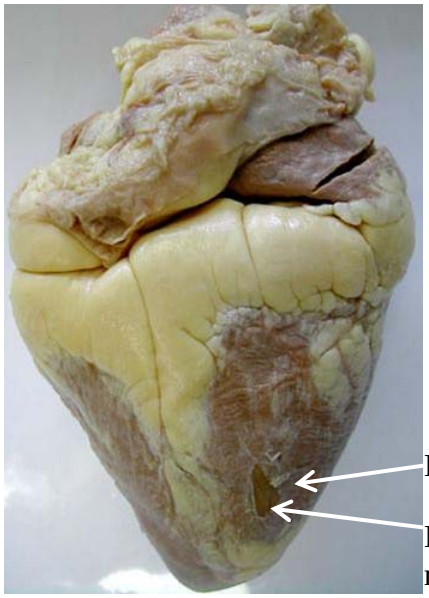
Identify all major structures of the heart highlighted below and follow the path of blood through the heart.

1. Obtain all dissecting instruments, dissecting apron, tray, gloves, and a sheep heart.

2. Remove the **pericardium**, the tough fibrous membrane surrounding the heart containing a lot of adipose tissue. Lift it up and notice that it attaches to the **base** of the heart. Using the dissecting scissors cut it as close to the major blood vessels at the superior aspect (base) of the heart.

3. With the tip of the dissecting needle, separate a small portion of the **epicardium** (visceral pericardium) from the **myocardium** and note how the epicardium covers the surface of the heart.

Sheep heart, posterior (dorsal) view.

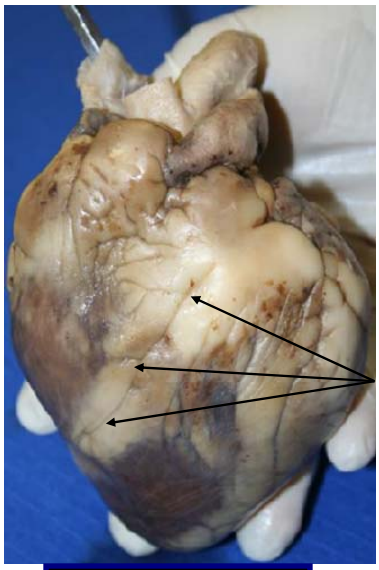


4. Identify the anterior and posterior view of the heart.

Anterior (Ventral) View: notice the **anterior interventricular sulcus**

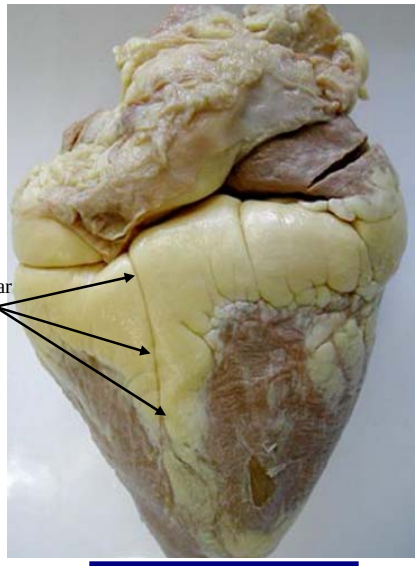
Posterior (Dorsal) View: notice the **posterior interventricular sulcus**

4.



Anterior Intraventricular Sulcus

Anterior View

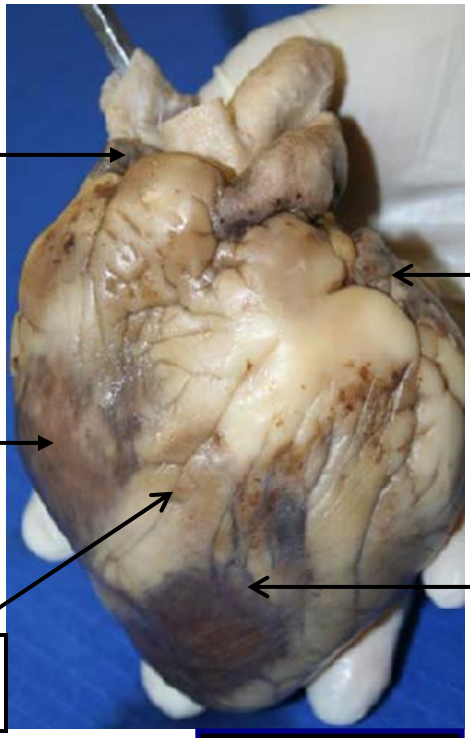


Posterior Intraventricular Sulcus

Posterior View

5. Distinguish the four chambers of the heart.
Lay the heart on the dissecting tray, anterior surface up. Locate the **right** and **left ventricle** and **righ**t and **left atrium**.

Atrium = singular
Atria = plural



Right Atrium

Left Atrium

Right Ventricle

Left Ventricle

Name this sulcus:

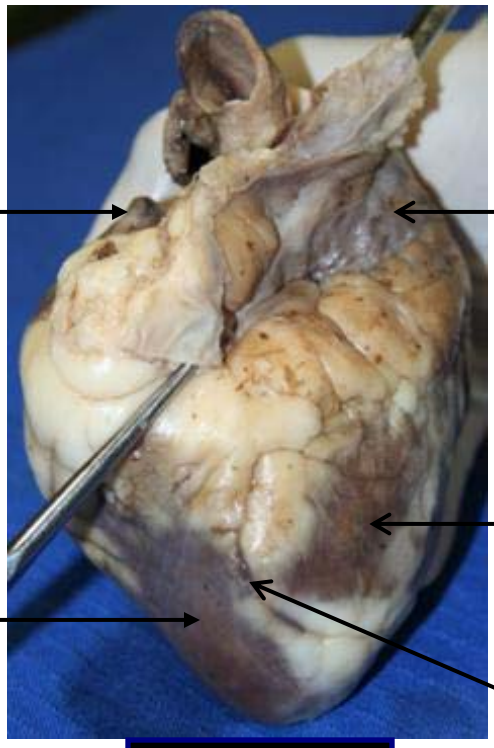
Note: the left coronary artery is located in this sulcus!

Anterior View

Compare the thickness of the wall of the right ventricle with that of the left ventricle by pressing the wall of each ventricle between your thumb and finger.

Which ventricle has a thicker wall? _____

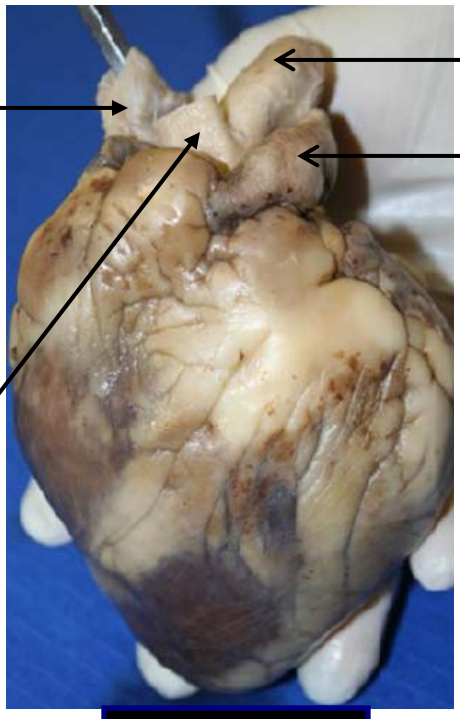
Lay the heart on the dissecting tray, posterior surface up. Locate the **right** and **left ventricle** and **right** and **left atrium**.



Posterior View

Name this sulcus:

6. Locate the major blood vessels of the heart.
Lay the heart on the dissecting tray, anterior surface up. Locate the **pulmonary trunk aorta**, and **superior vena cava**.



Anterior View

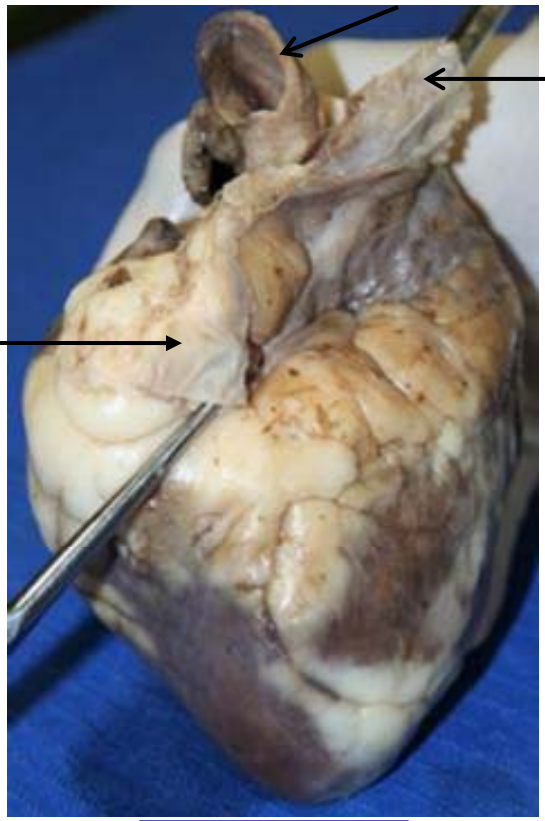
Insert the blunt prove in the pulmonary trunk. To which ventricle does the prove go to?

Insert the blunt prove in the aorta. To which ventricle does the prove go to?

Insert the blunt prove in the superior vena cava. To which atirum does the prove go to?

Lay the heart on the dissecting tray, posterior surface up. Locate the **inferior vena cava** and **superior vena cava**.

Vena Cava = Singular
Vena Cavae = Plural

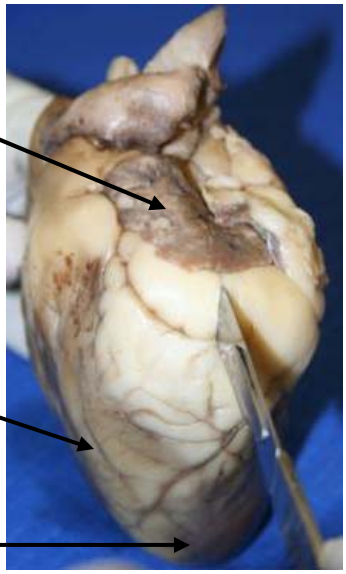


Posterior View

NOTICE the thickness of the vena cavae walls. Compare these venous walls to the thickness of the wall at the aorta.

Which blood vessel has a thicker wall? WHY?

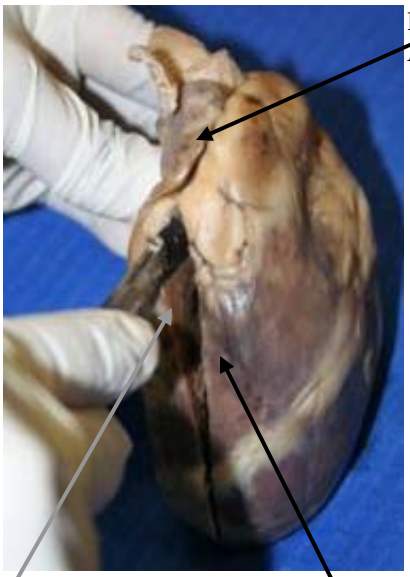
7. Use the scalpel to open the heart chambers: make an incision along the coronal plane, from the superior portion of the **left** ventricle to the superior portion of the **right** ventricle.



Step One

Step Two

Coronal cut through the left ventricle.



Step Three

Coronal cut through the right ventricle.

8. Open the heart ventricles and using the pointed needle separate a small portion of the **endocardium**. *Hint:* thin layer; it lines the heart chambers and heart valves.

9. Identify the right ventricle, left ventricle, and **interventricular septum** in the interior of the sheep heart.

Right Ventricle

Interventricular Septum

Left Ventricle

Which ventricle has thicker walls?

WHY? _____

_____

_____

_____

_____

FACT: 99% of the heart wall is made up of myocardium!

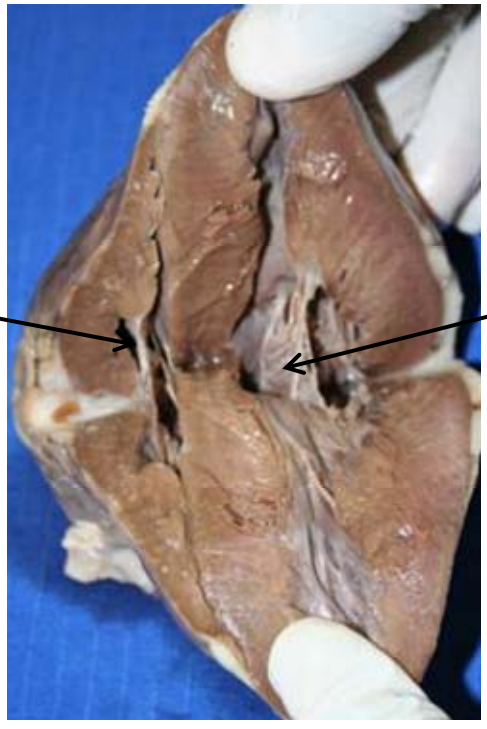
Review: using the pointed needle, identify the three layers of the heart wall.

10. Identify the **tricuspid valve** and **bicuspid (mitral)** valve.

Fill in the blank:

1. The tricuspid valve is between the _____ atrium and _____ ventricle.

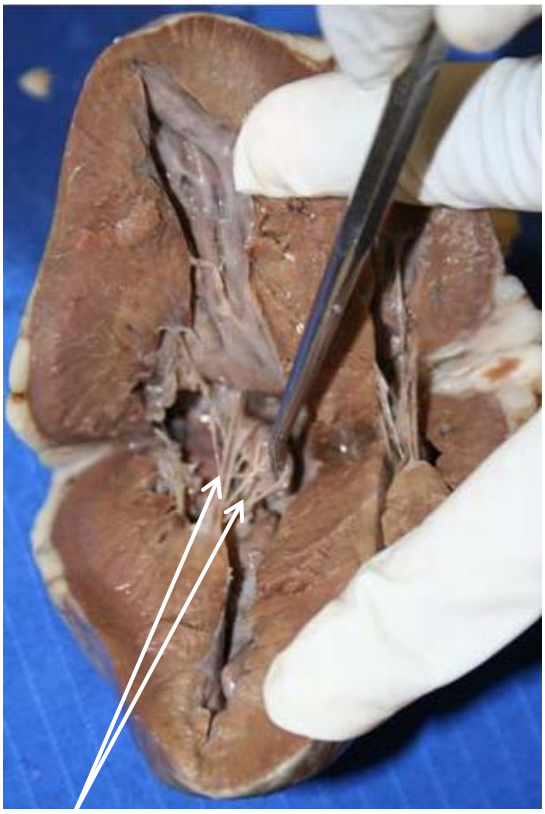
2. The bicuspid (mitral) valve is between the _____ atrium and _____ ventricle.



Tricuspid Valve

Bicuspid Valve

11. Locate and identify the **chordae tendineae** and **papillary muscles**.



Chordae Tendineae

Papillary Muscles

Describe the **function** of chordae tendineae:

_____
_____
_____

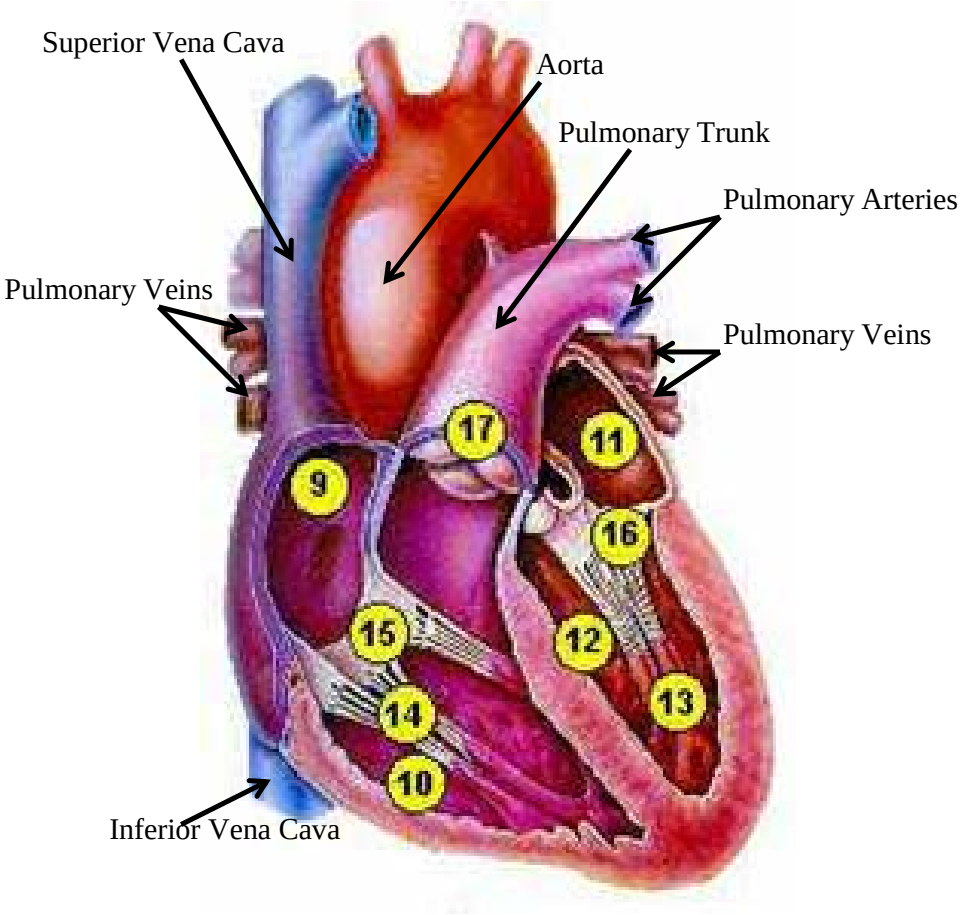
Describe the **function** of papillary muscles:

_____
_____
_____

Review Questions

Coronal Section of the Human Heart.

Label the structures, chambers, valves found in the human heart using the terms provided.



Terms:
Chordae Tendineae
Pulmonary Valve
Mitral (Bicuspid) Valve
Tricuspid valve
Papillary Muscle
Right Atrium
Left Atrium
Right Ventricle
Left Ventricle

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____