

30 REVIEW SHEET

EXERCISE

NAME _____

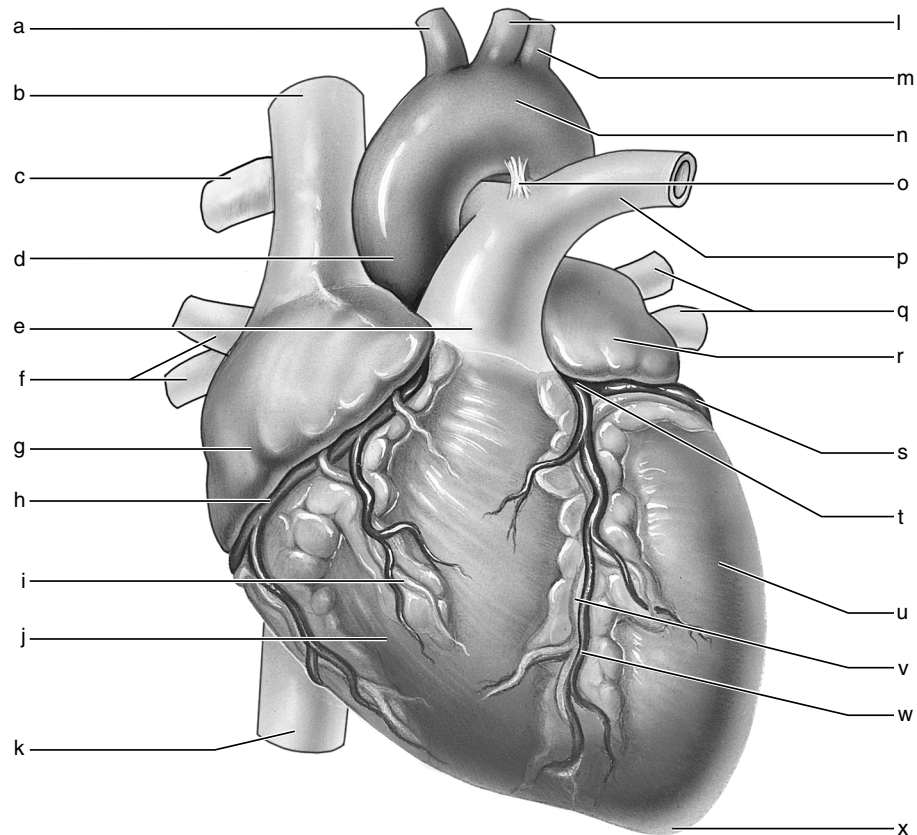
LAB TIME/DATE _____

Anatomy of the Heart

Gross Anatomy of the Human Heart

1. An anterior view of the heart is shown here. Match each structure listed on the left with the correct letter in the figure.

- g 1. right atrium
j 2. right ventricle
r 3. left atrium
u 4. left ventricle
b 5. superior vena cava
k 6. inferior vena cava
d 7. ascending aorta
n 8. aortic arch
a 9. brachiocephalic artery
l 10. left common carotid artery
m 11. left subclavian artery
e 12. pulmonary trunk
c 13. right pulmonary artery
p 14. left pulmonary artery
o 15. ligamentum arteriosum
f 16. right pulmonary veins
q 17. left pulmonary veins
h 18. right coronary artery
i 19. anterior cardiac vein



- t 20. left coronary artery
s 21. circumflex artery
w 22. anterior interventricular artery
x 23. apex of heart
v 24. great cardiac vein

2. What is the function of the fluid that fills the pericardial sac? To reduce friction during heart activity

3. Match the terms in the key to the descriptions provided below.

f 1. location of the heart in the thorax

a 2. superior heart chambers

h 3. inferior heart chambers

e 4. visceral pericardium

a 5. “anterooms” of the heart

g 6. equals cardiac muscle

b 7. provide nutrient blood to the heart muscle

d 8. lining of the heart chambers

h 9. actual “pumps” of the heart

c 10. drains blood into the right atrium

Key:

a. atria

b. coronary arteries

c. coronary sinus

d. endocardium

e. epicardium

f. mediastinum

g. myocardium

h. ventricles

4. What is the function of the valves found in the heart? They enforce a one-way flow of blood through the heart.

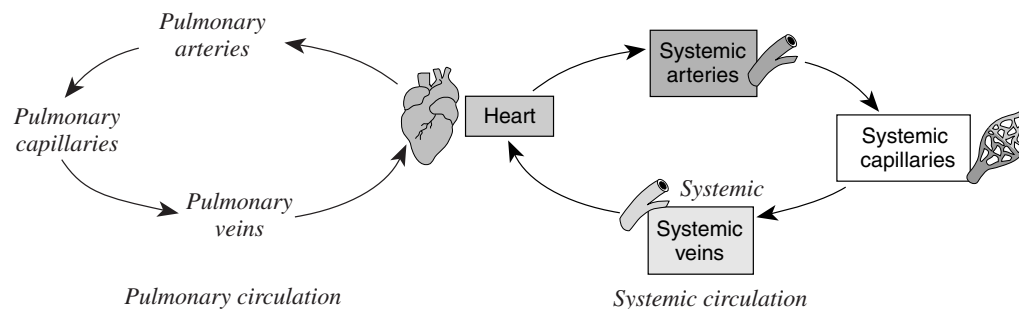
5. What is the role of the chordae tendineae? They anchor the AV valve flaps during ventricular systole, thus preventing backflow of blood into the atria.

Pulmonary, Systemic, and Cardiac Circulations

6. A simple schematic of a so-called general circulation is shown below. What part of the circulation is missing from this diagram?

Pulmonary circulation is not distinct from systemic circulation. Add to the diagram as best you can to make it depict a complete

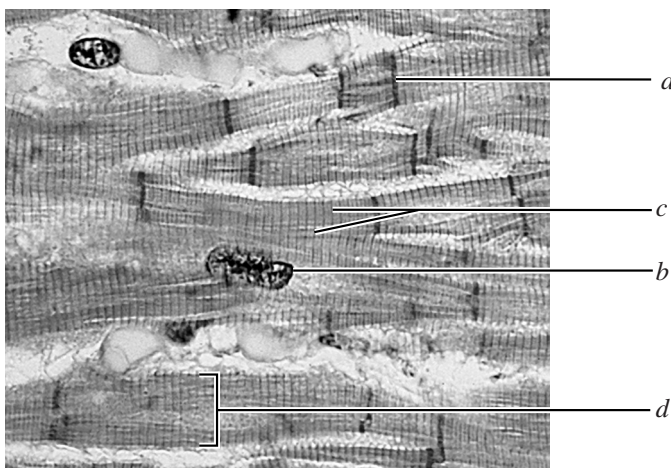
systemic/pulmonary circulation. Label the systemic and pulmonary circulations.



7. Differentiate clearly between the roles of the pulmonary and systemic circulations. The pulmonary circuit provides for gas exchange only; the systemic circuit provides the functional supply of the body tissues.
8. Complete the following scheme of circulation of a red blood cell in the human body.
 Right atrium through the tricuspid valve to the right ventricle, through the pulmonary semilunar valve to the pulmonary trunk, to the right and left pulmonary arteries, to the capillary beds of the lungs, to the pulmonary veins, to the left atrium of the heart, through the mitral/bicuspid valve to the left ventricle, through the aortic semilunar valve to the aorta, to the systemic arteries, to the capillary beds of the tissues, to the systemic veins, to the inferior vena cava, superior vena cava, and coronary sinus entering the right atrium of the heart.
9. If the mitral valve does not close properly, which circulation is affected? Systemic
10. Why might a thrombus (blood clot) in the anterior descending branch of the left coronary artery cause sudden death?
This artery supplies blood to the interventricular septum and the anterior walls of both ventricles. Ventricular damage, particularly to the left ventricle, is very serious.

Microscopic Anatomy of Cardiac Muscle

11. How would you distinguish the structure of cardiac muscle from that of skeletal muscle? Both tissue types are striated; thus, this is not a distinguishing feature. Skeletal muscle cells are long cylindrical cells with many peripherally located nuclei per cell. Cardiac cells have one (or two) centrally located nuclei per cell; their branched ends fit together at tight junctions called intercalated discs, which are not seen in skeletal muscle.
12. Add the following terms to the photograph of cardiac muscle below.
- a. intercalated disc b. nucleus of cardiac fiber c. striations d. cardiac muscle fiber



Describe the unique anatomical features of cardiac muscle. What role does the unique structure of cardiac muscle play in its function?

Cardiac muscle cells form a functional syncytium by virtue of their intercalated discs. This structural feature plus the special arrangement of cardiac muscle in the heart allows the pumping action of the heart to be carefully coordinated for maximal efficiency.

Dissection of the Sheep Heart

13. During the sheep heart dissection, you were asked initially to identify the right and left ventricles without cutting into the heart. During this procedure, what differences did you observe between the two chambers?

The left ventricle was firmer, thicker, and less compressible; the right ventricle felt "flabby."

When you measured thickness of ventricular walls, was the right or left ventricle thicker? *The left ventricle*

Knowing that structure and function are related, how would you say this structural difference reflects the relative functions of these two heart chambers? *The left ventricle pumps blood through the high-resistance systemic circulation; therefore, it has to be stronger than the right ventricle, which pumps blood through the short low-resistance pulmonary circuit.*

14. Semilunar valves prevent backflow into the ventricles; mitral and tricuspid (AV) valves prevent backflow into the atria. Using your own observations, explain how the operation of the semilunar valves differs from that of the AV valves. *When the ventricle was compressed (as in systole), the AV valve flaps moved superiorly into the closed position. When water was poured (as when blood backflows) into the semilunar valves, the cusps filled and closed the valve.*

15. Compare and contrast the structure of the mitral and tricuspid valves. *Both have thin flaps secured to papillary muscles by chordae tendineae. The right valve has three cusps, the left valve has two.*

16. Two remnants of fetal structures are observable in the heart—the ligamentum arteriosum and the fossa ovalis. What were they called in the fetal heart, where was each located, and what common purpose did they serve as functioning fetal structures?

Ligamentum arteriosum—ductus arteriosus between the pulmonary trunk and the aorta. Fossa ovalis—foramen ovale, in the atrial septum. When they were open (and functional), they allowed blood to bypass the nonfunctional fetal lungs.