

Read for Clarity: Schraer & Stoltze Ch. 9/10 Pages 177-200

Part II Human Circulation and The Blood: Match the following with the correct letter:

- | | |
|------------------------------|--|
| (1) plasma _____ | (a) a blood vessels that carry blood away from the heart |
| (2) ICF _____ | (b) vein structures that that allow blood to flow only toward the heart |
| (3) systolic pressure _____ | (c) the upper chambers of the heart that receive blood |
| (4) pacemaker _____ | (d) the liquid component of the blood |
| (5) vaccine _____ | (e) prevent blood from flowing back into the heart after systole |
| (6) septum _____ | (f) the type of blood cells that protect the body against infection |
| (7) arterioles _____ | (g) the period of relaxation during the heartbeat cycle |
| (8) artery _____ | (h) the liquid cell environment of body cells |
| (9) lymph system _____ | (i) a disease caused by narrowing of the arteries by such things as fatty deposits |
| (10) hypertension _____ | (j) structures that filter out foreign matter and bacteria from lymph |
| (11) semilunar valves _____ | (k) the pathway between the heart and the lungs |
| (12) aorta _____ | (l) the high pressure of the heartbeat cycle |
| (13) valves _____ | (m) the vessels that return excess plasma from the intercellular spaces to the blood |
| (14) atria _____ | (n) the veins that return blood to the heart from the systemic pathway |
| (15) diastole _____ | (o) a blood cell that functions in the blood clotting process |
| (16) pulmonary pathway _____ | (p) this sends signals to the ventricles to contract, thus regulating the rate of the heart-beat |
| (17) anemia _____ | (q) the largest artery in the body |
| (18) leukemia _____ | (r) the lower chambers of the heart for pumping blood |
| (19) bone marrow _____ | (s) inability of blood to carry oxygen to cells |
| (20) vena cava _____ | (t) a weak sample of a disease given to strengthen immunity |
| (21) lymph nodes _____ | (u) small arteries |
| (22) platelets _____ | (v) the site of RBC and most WBC production |
| (23) WBC's _____ | (w) cancer of the bone marrow producing dysfunctional WBC's |
| (24) ventricles _____ | (x) the wall that separates left and right halves of the heart |

HUMAN CIRCULATION

1. The exchange of materials between the blood and the body cells occurs as the blood flows through the (1) heart (2) arteries (3) veins (4) capillaries
2. Within the heart, blood flows from the (1) ventricles to the atria (2) atria to the ventricles (3) right side to the left side (4) left side to the right side
3. Which of the following does *not* occur during systole? (1) blood flows from right ventricle into pulmonary arteries (2) contraction of atria (3) relaxation of ventricles (4) blood flows from left ventricle into aorta
4. A student's blood pressure measures 116/70. The number "116" or systolic number refers to the amount of blood pressure exerted on the walls of the student's (1) veins (2) lymph glands (3) capillaries (4) arteries
5. Impulses initiated by the pacemaker of the heart (1) are felt in the arteries as the pulse (2) cause contraction first of the atria then the ventricles (3) can be speeded up by the vagus nerves (4) can be measured with a sphygmomanometer
6. The blood in the arteries is under pressure due to the (1) force of contraction of the ventricles (2) squeezing action of skeletal muscles (3) expansion and contraction of the lungs (4) action of the heart valves
7. In the human body, the blood with the greatest concentration of oxygen is found in the (1) left atrium of the heart (2) cerebrum of the brain (3) nephrons of the kidney (4) lining of the intestine
8. The right ventricle is the chamber of the heart which contains (1) deoxygenated blood and pumps this blood to the lungs (2) deoxygenated blood and pumps this blood to the brain (3) oxygenated blood and pumps this blood to the lungs (4) oxygenated blood and pumps this blood to the brain
9. In the pulmonary circulation, oxygen-poor blood passes from the (1) right ventricle into the pulmonary veins (2) left ventricle into the pulmonary arteries (3) right ventricle into the pulmonary arteries (4) left ventricle into the pulmonary veins
10. In the systemic circulation, blood is pumped from the (1) right ventricle into the aorta (2) right ventricle into the superior vena cava (3) left ventricle into the superior vena cava (4) left ventricle into the aorta
11. Excess glucose is converted to glycogen and stored (1) in the liver, as a result of the hepatic-portal circulation (2) in the liver, as a result of the renal circulation (3) in smooth muscle, as a result of the coronary circulation (4) in the kidneys, as a result of the renal circulation
12. In humans, most of the worn out red blood cells are removed from the blood in the (1) kidneys (2) spleen (3) lungs (4) bone marrow
13. Fluid and proteins lost from the blood in the capillaries are returned to the circulation through the (1) hepatic-portal circulation (2) vessels of the lymphatic system (3) spleen (4) renal circulation
14. A person who consumes large amounts of saturated fats may increase his or her chances of developing (1) high blood pressure (2) stroke (3) pericarditis (4) arteriosclerosis
15. A type of "heart attack" in which a narrowing of the coronary artery causes an inadequate supply of oxygen to reach the heart muscle is known as (1) anemia (2) leukemia (3) angina pectoris (4) cerebral palsy
16. The part of the lymphatic system involved in the body's defense against disease is the (1) lacteals (2) lymph nodes (3) lymph capillaries (4) right lymph duct

QUESTIONS

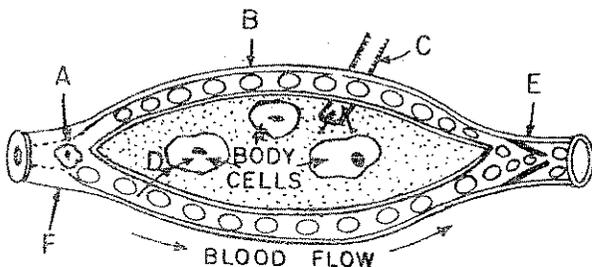
15.

Human Circulation

1. Which is characteristic of lymph nodes? (1) They carry blood under great pressure. (2) They move fluids by means of a muscular pump. (3) They produce new red blood cells. (4) They contain phagocytic cells.
- * 2. The accumulation of specific antibodies in the plasma, due to the introduction of an antigen, is characteristic of (1) an immune response (2) angina pectoris (3) a coronary thrombosis (4) cerebral palsy
- * 3. An organism develops active immunity as a result of (1) manufacturing its own antigens (2) producing antibodies in response to a vaccination (3) receiving an injection of antibodies produced by another organism (4) receiving an injection of a dilute glucose solution
4. In the human body, which blood components engulf foreign bacteria? (1) red blood cells (2) white blood cells (3) antibodies (4) platelets
5. In humans, the exchange of materials between blood and intercellular fluid directly involves blood vessels known as (1) capillaries (2) arterioles (3) venules (4) arteries

6. An injury to a blood vessel may result in the formation of a blood clot when (1) bone marrow cells decrease platelet production (2) kidney tubules synthesize clotting factors (3) ruptured platelets release enzyme molecules (4) white blood cells release antibodies
7. Oxygen carried by the blood in the capillaries normally enters body cells by (1) active transport (2) osmosis (3) diffusion (4) pinocytosis
8. Which type of vessel normally contains valves that prevent the backward flow of materials? (1) artery (2) arteriole (3) capillary (4) vein
9. The blood vessels that transport deoxygenated blood to the heart are known as (1) capillaries (2) lymph vessels (3) veins (4) arteries

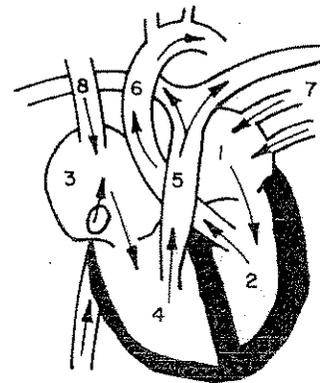
Base your answers to questions 10 through 14 on the diagram below, which represents the exchange of materials between capillaries and cells, and on your knowledge of biology.



10. Blood vessel B has walls that are very thin. This enables this type of vessel to (1) transport hemoglobin to body cells (2) transport red blood cells into the tissue spaces (3) withstand the pressure of the blood coming from veins (4) easily transport substances into and out of the blood

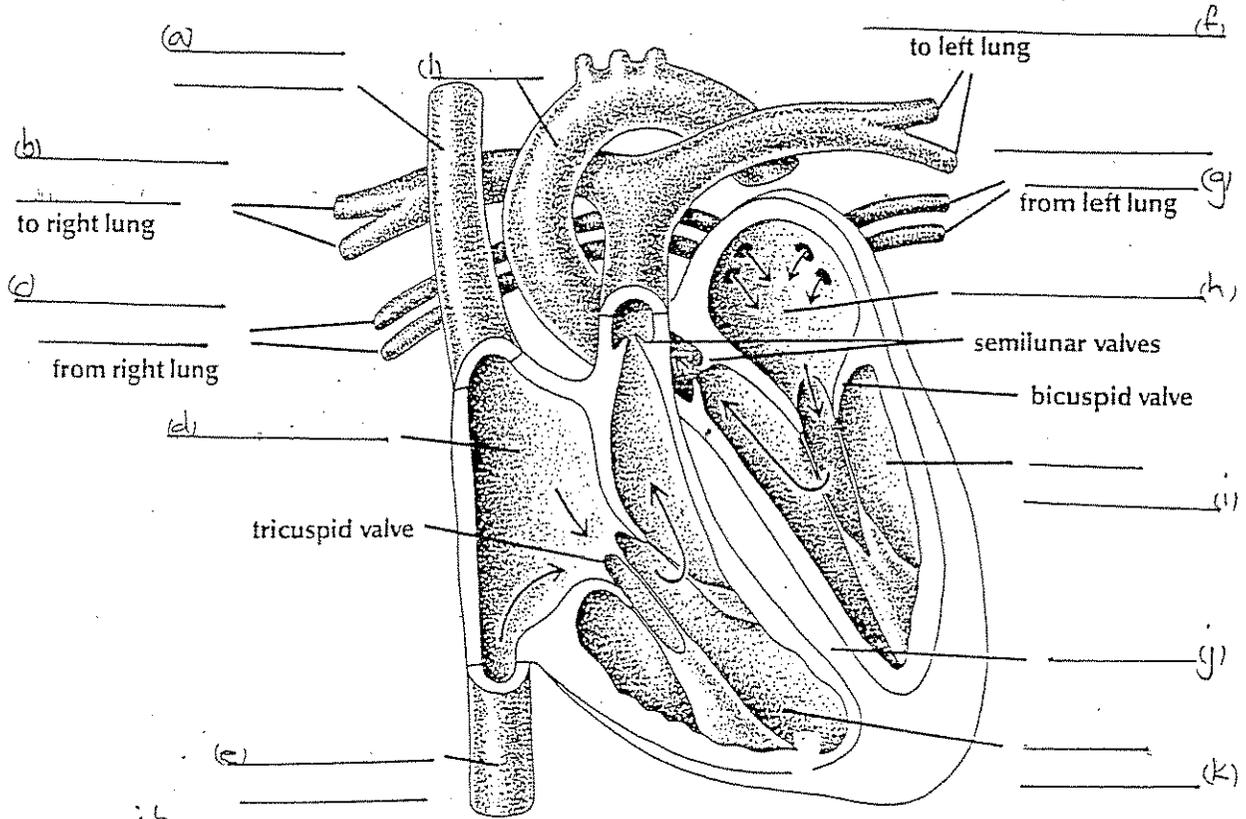
11. A function of cell A is to (1) carry oxygen (2) engulf disease-producing organisms (3) transport digested food (4) produce hemoglobin
12. A substance that diffuses in the direction indicated by D is most likely (1) fibrin (2) oxygen (3) urea (4) bile
13. Which vessel most likely contains the greatest amount of carbon dioxide? (1) F (2) B (3) C (4) E
14. Excess intercellular fluid (ICF) is constantly drained off by lymphatic vessels. Which letter represents such a vessel? (1) E (2) B (3) C (4) F
- * 15. The right ventricle is the chamber of the heart that contains (1) deoxygenated blood and pumps this blood to the lungs (2) deoxygenated blood and pumps this blood to the brain (3) oxygenated blood and pumps this blood to the lungs (4) oxygenated blood and pumps this blood to the brain

Base your answers to questions 16 through 19 on the diagram below and on your knowledge of biology. The diagram represents the human heart, and the direction of blood flow is indicated by arrows.



- * 16. The aorta is represented by number (1) 1 (2) 6 (3) 8 (4) 4
- * 17. Deoxygenated blood returns to the heart through the structure represented by number (1) 8 (2) 7 (3) 3 (4) 5
- * 18. The chamber that pumps blood to all parts of the body except the lungs is represented by number (1) 1 (2) 2 (3) 3 (4) 4
- * 19. Blood passes from the heart to the lungs through the structure represented by number (1) 5 (2) 6 (3) 7 (4) 8

The human heart is a muscular, four-chambered organ about the size of a fist. The two upper chambers—the *atria* (singular, *atrium*)—receive blood from the body, while the two lower chambers—the *ventricles*—pump blood out to the body by the force of their contractions.



Read only: 2, 3 & 6

- Label the parts indicated on the preceding diagram.
- In the human body, the heart is located in the chest (thoracic) cavity.
- The human heart is protected by a membrane called the pericardium.
- The structure that separates the right and left sides of the heart is the _____.
- What prevents the backflow of blood from the ventricles into the atria?

- The type of muscle found in the heart is cardiac muscle.
- Describe what occurs during diastole and systole in the heartbeat cycle.
During (a), the period of relaxation, blood flows from atria into ventricles. In (b), the period of contraction, blood flows from ventricles to arteries. / (a) = _____ (b) = _____
- What controls the rate of heartbeat?
Nerve impulses to the sinoatrial node, or (a), control the rate of heartbeat.
(a) = _____

BLOOD PRESSURE

Read only
1 & 2

The contraction of the muscular ventricles of the heart forces blood into the arteries, producing *blood pressure*. *Hypertension* is a condition in which blood pressure remains above the accepted norm. (especially diastolic pressure)

- Why is hypertension considered a potentially dangerous condition?
Hypertension is the result of excessive strain on the blood vessels and heart.
- The instrument used to measure blood pressure is called a _____.

TRANSPORT

3. Pathways of Circulation

PULMONARY CIRCULATION

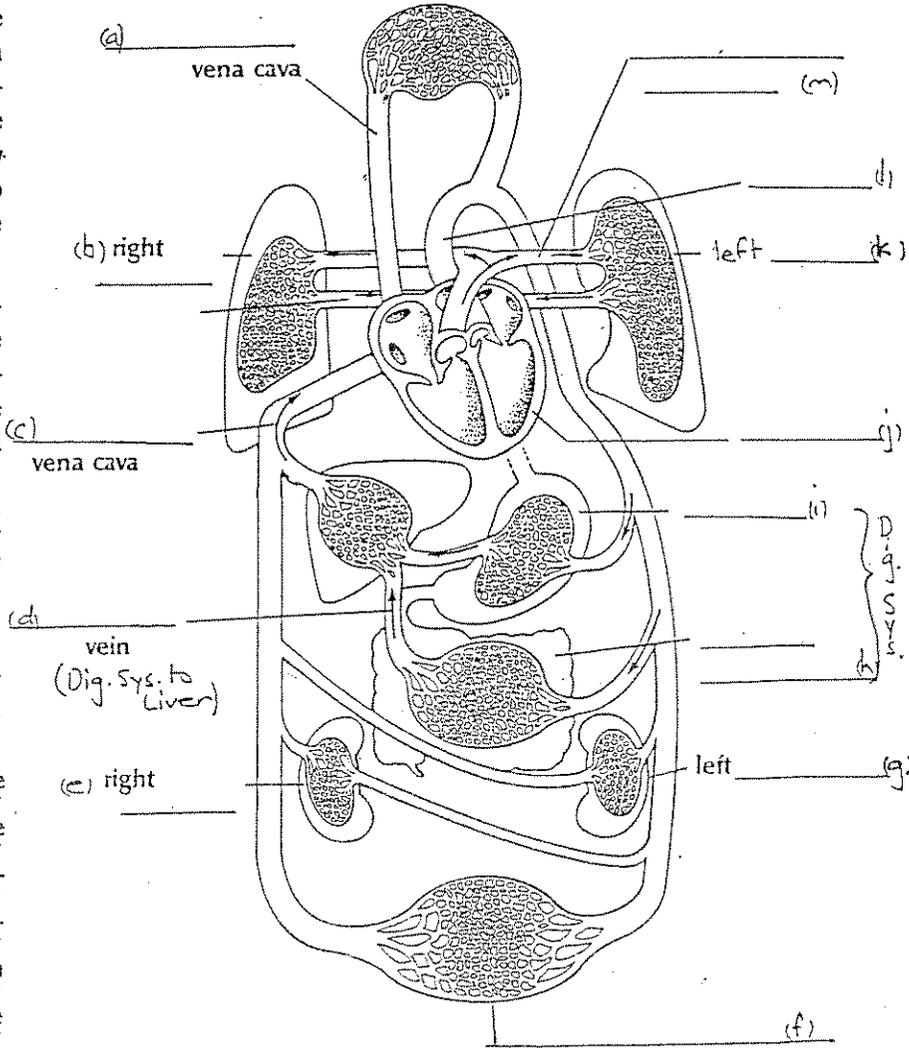
Blood leaving the right ventricle of the heart passes through the *pulmonary arteries* to the lungs. Within the capillaries of the lungs the blood gives up carbon dioxide and picks up oxygen, returning to the left atrium of the heart through the *pulmonary veins*. This path from the heart to the lungs and back again is the *pulmonary circulation*.

1. On the circulatory system diagram, trace the path of the blood during pulmonary circulation, beginning at the right atrium. Use a colored pen or pencil.
2. On the same diagram, label the pulmonary artery, the pulmonary vein, the left lung, and the right lung.
3. Describe the exchange of respiratory gases that occurs in the capillaries of the lungs.

Venous blood arriving in the lungs has given up oxygen to the body tissues and picked up carbon dioxide. Air in the lung capillaries has a relatively high oxygen content and a low carbon dioxide content. (a) diffuses out of the blood, and (b) diffuses into the blood.

(a) = _____
 (b) = _____

Circulatory System



SYSTEMIC CIRCULATION

Blood leaving the left ventricle enters the *aorta* and passes from there to all parts of the body (except the lungs), eventually returning to the heart. This is the *systemic circulation*.

1. The part of the body *not* served by the systemic circulation is the _____.