

Instructor's Guide

ANATOMY

SERIES 101

THE CIRCULATORY SYSTEM (101.1)

This Instructor's Guide contains:

Brief Description, Objectives, Discussion Questions, Pretest, Post-test, Answer Keys, and Glossary for this program, Anatomy: The Circulatory System. The questions included in this guide follow the NCLEX model. Institutions that have purchased this program from Concept Media have permission to duplicate any of the contents of this Instructor's Guide for teaching purposes.

Anatomy: The Circulatory System

Program Description

This program provides an overview of the three main parts of the circulatory system – the heart, blood vessels, and blood. It describes the structures and functioning of the heart, including the conduction system. Then it discusses the three types of blood vessels and their role in circulation. Finally, it examines the blood components and the lymphatic system. Anatomy and physiology are illustrated with up-to-date graphics and animation.

Objectives:

Upon completion of this program, the learner will be able to:

- Describe the circulatory path of the blood.
- List the parts of a heart.
- Trace the path of electrical conduction through the heart.
- List the four components of blood, and explain the function of each.
- Compare and contrast veins with arteries.
- Describe the parts of the lymphatic system.

Anatomy: The Circulatory System

Previewing Questions

True or False

1. In an adult, the heart is approximately the size of a fist.
2. The heart consists of four chambers.
3. Deoxygenated blood flows into the left ventricle.
4. The heart valves push the blood forward through the circulation.
5. The dominant pacemaker of the heart is the AV node.
6. The largest blood vessel in the body is the aorta.
7. The aorta is a vein.
8. The aorta returns deoxygenated blood to the heart.
9. The largest component of blood consists of oxygen-carrying red cells.
10. Plasma is about ninety percent water.
11. Red blood cells are concave in shape.
12. Platelets are the body's defense against infection.
13. Another name for white blood cells is *leukocytes*.
14. Lymphatic fluid is mostly interstitial fluid.
15. Lymphatic fluid returns to the circulation by way of the left atrium.

Anatomy: The Circulatory System

Previewing Questions: Answer Key

Correct Answer Blacked Out

1. False
2. False
3. True
4. True
5. True
6. False
7. True
8. True
9. True
10. False
11. False
12. True
13. False
14. False
15. True

Anatomy: The Circulatory System

Discussion Questions:

1. Describe the circulatory path of the blood, beginning with the right atrium.
2. List the components of the electrical conduction path through the heart.
3. Explain the function of the four components of blood.
4. Compare and contrast veins with arteries.
5. Explain the difference between erythrocytes and leukocytes.

Anatomy: The Circulatory System

Post-Test Questions:

1. Which is *not* a component of the circulatory system?
 - a. blood vessels
 - b. lymph vessels
 - c. bone marrow
 - d. the aorta
2. The blood circulates through the heart in this order:
 - a. right atrium, left atrium, the lungs, right ventricle, left ventricle, the body.
 - b. right atrium, right ventricle, the lungs, left atrium, left ventricle, the body.
 - c. left atrium, left ventricle, the lungs, right atrium, right ventricle, the body.
 - d. left atrium, right atrium, the body, right ventricle, left ventricle, the lungs.
3. Average adult cardiac output is:
 - a. five liters per minute.
 - b. five cubic centimeters per minute.
 - c. ten liters per minute.
 - d. five liters per hour.
4. While the blood is circulating through the lungs, it:
 - a. releases oxygen and collects carbon dioxide.
 - b. releases carbon monoxide and collects nitrous oxide.
 - c. releases carbon dioxide and collects oxygen.
 - d. releases carbon monoxide and collects oxygen.
5. Another name for the SA node is:
 - a. the sinoaortic node.
 - b. the schizoaffective node.
 - c. the synchroatrial node.
 - d. the sinoatrial node.
6. The *V* in the AV node refers to:
 - a. vessel.
 - b. ventricle.
 - c. valve.
 - d. Valsalva.

Anatomy: The Circulatory System

Post-Test Questions, continued:

7. The natural pacemaker of the heart is the:
 - a. SA node.
 - b. AV node.
 - c. lymph node.
 - d. brain stem.

8. The electrical impulse is transmitted into the ventricular muscles from the:
 - a. SA node.
 - b. Purkinje fibers.
 - c. Bundle of His.
 - d. AV node.

9. The AV node:
 - a. can generate electrical impulses at a rate of 40 – 60 beats per minute.
 - b. slows the passage of the electrical impulse coming through the atria.
 - c. blocks conduction of rapid atrial impulses.
 - d. All of the above

10. Blood from the heart flows in this direction:
 - a. aorta, arteries, arterioles, capillaries, veins, inferior vena cava.
 - b. capillaries, venules, veins, inferior vena cava, aorta, arteries.
 - c. superior vena cava, inferior vena cava, veins, capillaries, arterioles, arteries.
 - d. aorta, inferior vena cava, arteries, superior vena cava, venules, capillaries.

11. Blood plasma:
 - a. is straw-colored.
 - b. is mostly water.
 - c. carries other blood components.
 - d. All of the above

12. Erythrocytes:
 - a. carry hormones.
 - b. fight infection.
 - c. transport carbon dioxide.
 - d. are convex in shape.

Anatomy: The Circulatory System

Post-Test Questions, continued:

13. Leukocytes:

- a. help blood clot.
- b. transport oxygen.
- c. are also called platelets.
- d. are less numerous than erythrocytes.

14. Thrombocytes:

- a. help blood clot.
- b. transport oxygen.
- c. are also called platelets.
- d. a and c

15. Lymphocytes:

- a. are a type of white blood cell.
- b. help fight infection.
- c. travel through the lymphatic system.
- d. All of the above

16. The lymphatic ducts:

- a. drain into the subclavian veins.
- b. drain into the coruna.
- c. remove lymphatic fluid from the general circulation.
- d. release lymphatic fluid in response to inflammation.

Anatomy: The Circulatory System

Post-Test Questions: Answer Key

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
8. a b c d
9. a b c d
10. a b c d
11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
16. a b c d

Anatomy: The Circulatory System

Glossary

artery: a vessel through which the blood passes away from the heart to the various parts of the body. The wall of an artery consists typically of a tough outer layer (tunica externa), a muscular middle layer (tunica media), and an endothelial inner layer (tunica intima).

atria:

- **left atrium:** the atrium of the left side of the heart; it receives blood from the pulmonary veins, and delivers it to the left ventricle
- **right atrium:** the atrium of the right side of the heart; it receives blood from the superior and the inferior venae cavae, and delivers it to the right ventricle.

AV node (*atrioventricular node*): a small area of specialized cardiac muscle cells and fibers located in the right atrium. It receives the cardiac impulses from the sinoatrial node and passes them on toward the ventricles, introducing a delay in impulse conduction.

bundle of His: a small band of atypical cardiac muscle fibers that originates in the AV node. It divides at the upper end of the muscular part of the interventricular septum into right and left bundle branches which descend in the septal wall to be distributed to the ventricles. This bundle propagates the atrial contraction rhythm to the ventricles.

capillaries: minute vessels that connect the arterioles and venules, forming a network in nearly all parts of the body. Their walls act as semipermeable membranes for the interchange of substances and fluids between the blood and tissues.

electrocardiogram (*ECG* or *EKG*): A graphic tracing of the variations in electrical potential caused by the cardiac impulse exciting and passing through the heart muscle.

electrodes: skin patches with conductive gel that are connected to wire leads and a cardiac monitor, used to record the electrical activity of the heart.

erythrocyte (*red blood cell*): one of the elements found in blood. In humans the normal mature form is a non-nucleated, biconcave disk, used to transport oxygen and carbon dioxide in the blood stream.

leukocyte (*white blood cell*): a blood component. Leukocytes are classified into two groups: *granular* (basophils, eosinophils, neutrophils) and *nongranular* (lymphocytes, monocytes).

lymphocyte: a mononuclear, nonphagocytic leukocyte found in the blood, lymph, and lymphoid tissues. Lymphocytes are the body's immune cells and their precursors. They are divided into two classes, providing B cell (humoral) and T cell (cellular) immunity.

Anatomy: The Circulatory System

Glossary, continued

plasma: the fluid portion of the blood in which the particulate components are suspended.

platelet (*thrombocyte*): a disk-shaped blood component, chiefly known for its role in coagulation.

Purkinje fibers: modified cardiac fibers occurring as an interlaced network in the subendocardial tissue. The Purkinje fibers receive the electrical impulse from the bundle branches and transmit the impulse to the ventricular muscle cells.

right lymphatic duct: a vessel draining the lymph from the upper right side of the body.

SA node (*sinoatrial node, sinus node*): a microscopic collection of atypical cardiac muscle fibers at the junction of the superior vena cava and the right atrium. The cardiac rhythm normally originates in this node.

thoracic duct: the largest lymph channel in the body, which collects lymph from the portions of the body below the diaphragm and from the left side of the body above the diaphragm.

vein : a vessel through which blood passes from the body and internal organs back to the heart; all veins except the pulmonary veins carry oxygen-depleted blood. Many veins have *valves* which prevent the backward flow of blood away from the heart.

venae cavae

- **inferior:** the venous trunk for the lower extremities pelvis and abdominal organs; it passes upward on the right of the aorta, and empties into the right atrium of the heart.
- **superior:** the venous trunk draining blood from the head, neck, upper extremities, and chest; it passes directly downward, and empties into the right atrium of the heart.

ventricles

- **right ventricle:** lower right chamber of the heart that pumps the blood through the pulmonary arteries into the lungs.
- **left ventricle:** the lower left chamber of the heart that pumps the blood out through the aorta into the systemic arteries.

Definitions adapted from [Dorland's Illustrated Medical Dictionary](http://www.Mercksource.com) as found online at www.Mercksource.com