

Name: \_\_\_\_\_

Period: \_\_\_\_\_

## Unit 8: Blood / Lymph / Cardiovascular System

### Test Review

1. Identify the general formed elements of the blood and their general functions.
  - a. Erythrocytes:
  - b. Leukocytes:
  - c. Thrombocytes:
  - d. Plasma:
2. Describe the structure of erythrocytes including hemoglobin.
3. Define “leukocyte” and list the two major groups with examples of each.
  - a. Definition:
  - b. Granulocytes:
  - c. Agranulocytes:
4. Define hemostasis and list and describe the three stages.
  - a. hemostasis:
  - b. First stage: Vascular Spasm:
  - c. Second stage: Platelet Plug Formation:
  - d. Third stage: Coagulation:
5. Contrast a thrombus and an embolus:
  - a. Thrombus:
  - b. Embolus:

6. Given any of the four blood groups in the ABO system, identify the antigens found in the erythrocytes and the antibodies found in the plasma of that blood group.
  - a. Type A:
  - b. Type B:
  - c. Type AB:
  - d. Type O:
7. Describe the Rh Factor.
8. Describe the diseases or disorders of the blood:
  - a. Anemia:
  - b. Hemolytic Disease of the Newborn:
  - c. Hemophilia:
  - d. Leukemia:
  - e. Mononucleosis:
  - f. Polycythemia:
9. Briefly describe each of the components of the lymphatic system.
  - a. tonsils:
  - b. spleen:
  - c. thymus:
  - d. lymph nodes:
  - e. bone marrow:
  - f. lymph vessels:

10. List the three ways lymph is moved throughout the body.

- a.
- b.
- c.

Where does lymph rejoin the blood?

11. Define and characterize antigens and antibodies.

- a. antigens:
- b. antibodies:

12. Describe the general role of the different types of T cells in cellular immunity.

- a. T-helper cells (CD4 cells):
- b. T-killer cells (cytotoxic cells):
- c. T-suppressor cells:
- d. T-memory cells:

13. Describe the roles of the B cells in humoral immunity.

- a. Plasma cells:
- b. Memory cells:

14. Describe the following types of immunity.

- a. Active immunity:
- b. Passive immunity:
- c. Natural acquisition of immunity:
- d. Artificial acquisition of immunity:

15. Describe the diseases or disorders of the lymphatic system.

- a. AIDS:
  
- b. Measles:
  
- c. Mumps:
  
- d. Rubella:
  
- e. Tetanus:

16. List several functions of the cardiovascular system.

17. Describe the layers of the heart.

- a. Epicardium:
  
- b. Myocardium
  
- c. Endocardium:

18. Describe the chambers of the heart in terms of from where they receive and where they send blood.

- a. Right atrium:
  
- b. Right ventricle:
  
- c. Left atrium:
  
- d. Left ventricle:

19. Describe the great vessels of the heart in terms of from where they receive and where they send blood.
- a. Superior Vena Cava:
  - b. Inferior Vena Cava:
  - c. Pulmonary Trunk:
  - d. Pulmonary Arteries:
  - e. Pulmonary Veins:
  - f. Aorta:
  - g. Branches of the Aorta:
    - 1.
    - 2.
    - 3.
20. Describe the locations of the valves of the heart. What is their function.
- a. Tricuspid valve:
  - b. Pulmonary semi-lunar valve:
  - c. Bicuspid (mitral) valve:
  - d. Aortic semilunar valve:
21. Trace blood flow through the heart listing all structures that it is in contact with along the way.

22. Identify the components of the conduction system of the heart.
- SA node:
  - AV Node:
  - AV Bundle:
  - Bundle Branches:
  - Purkinje Fibers:
23. Define systole and diastole as the two main principle events of the cardiac cycle, and then identify the position of the heart valves during each phase of the cycle.
- systole:
  - diastole:
24. Define cardiac output and identify those factors that determine it.
- definition of cardiac output:
  - definition of stroke volume:
  - definition of heart rate:
  - the formula for cardiac output:
25. Define and contrast the structures and functions of arteries, capillaries, and veins.
- arteries:
  - veins:
  - capillaries:
26. Define blood pressure and describe how a sphygmomanometer is used to measure it's two components.
- blood pressure:
  - systolic:
  - diastolic:

27. Define pulse and identify the general location of arteries where pulse may be felt.

- a. definition of pulse:
- b. carotid:
- c. radial:
- d. femoral:
- e. popliteal:
- f. dorsalis pedis:

28. Describe the diseases or disorders of the cardiovascular system.

- a. Aneurysm:
- b. Arteriosclerosis:
- c. Atherosclerosis:
- d. CAD (Coronary Artery Disease):
- e. CVA (Cerebrovascular accident):
- f. Murmur:
- g. Hypertension:
- h. Myocardial Infarction:

## Unit 8: Blood / Lymph / Cardiovascular System

### Test Review - KEY

1. Identify the general formed elements of the blood and their general functions.
  - a. Erythrocytes: responsible for transporting both oxygen and carbon dioxide
  - b. Leukocytes: responsible for protecting the body against infection
  - c. Thrombocytes: assist in hemostasis and blood clotting
  - d. Plasma: consists mostly of water and also carries dissolved substances such as electrolytes, hormones, gases, and organic compounds.
2. Describe the structure of erythrocytes including hemoglobin.

The mature erythrocyte is an anucleated biconcave disc approximately 7 mm in diameter. Hemoglobin is composed of four protein chains called the globin each containing a red pigment called heme. The heme is composed of an iron atom.
3. Define “leukocyte” and list the two major groups with examples of each.
  - a. Definition: white blood cell
  - b. Granulocytes: neutrophils, basophils, eosinophils
  - c. Agranulocytes: monocytes and leukocytes
4. Define hemostasis and list and describe the three stages.
  - a. hemostasis: stoppage of bleeding
  - b. First stage: Vascular Spasm: Vascular Spasm occurs when an arteriole or venule is broken or has been cut. The smooth muscles in the blood vessel wall are stimulated to contract and the blood loss is decreased almost immediately.
  - c. Second stage: Platelet Plug Formation: Platelets tend to stick to the exposed ends (collagen) of injured blood vessels.
  - d. Third stage: Coagulation: Coagulation is the actual formation of a blood clot.
5. Contrast a thrombus and an embolus:
  - a. Thrombus: a blood clot that has formed abnormally in a blood vessel
  - b. Embolus: a thrombus has become dislodged or fragmented and is carried away from the original site by the flow of the blood

6. Given any of the four blood groups in the ABO system, identify the antigens (agglutinogens) found in the erythrocytes and the antibodies (agglutinins) found in the plasma of that blood group.

	Antigens	Antibodies
a. Type A:	A	anti-B
b. Type B:	B	anti-A
c. Type AB:	A & B	none
d. Type O:	none	anti-A and anti-B

7. Describe the Rh Factor.

The Rh factor refers to the presence or absence protein D on the surface of the erythrocyte membranes. Rh + refers to the presence of protein D on the surface of the erythrocyte membrane. Rh- refers to the absence of protein D on the surface of the erythrocyte membrane.

8. Describe the diseases or disorders of the blood:

- a. Anemia: The anemias result from inadequate numbers of erythrocytes or a deficiency in the production of normal hemoglobin.
- b. Hemolytic Disease of the Newborn: Hemolytic disease of the newborn is also known as erythroblastosis fetalis. This disease occurs in the fetus if the fetus is Rh+ while the mother is Rh-.
- c. Hemophilia: Hemophilia is caused by a sex-linked genetic trait resulting in the inability to clot blood.
- d. Leukemia: Leukemia is a cancer of the blood characterized by the overproduction of immature white blood cells, which are released prematurely into the circulation.
- e. Mononucleosis: Mononucleosis, or infectious mononucleosis, is a noncancerous leukocyte disorder caused by a virus.
- f. Polycythemia: Polycythemia is an excessive number of erythrocytes. This disease is caused by an overproduction of blood cells within the body. The result is viscous (thick) blood which flows slowly through the blood vessels.

9. Briefly describe each of the components of the lymphatic system.
- a. tonsils: large lymphoid nodules located in the wall of the pharynx. The mouth is a port of entry into the body for harmful organisms we breathe, as well as those found in the food we eat, the tonsils help to destroy them.
  - b. spleen: The spleen is the largest collection of lymphatic tissue in the body. It is located in the LUQ, lateral to the stomach. The spleen is able to filter the blood and remove damaged or infected cells. It also helps to initiate the immune response when antigens are detected in the blood. In addition, the spleen functions as a large blood reservoir.
  - c. thymus: The thymus is posterior to the sternum and superior to the heart. It is a two lobed structure consisting of two layers -- a cortex and a medulla. The thymus gland produces a hormone called thymosin which helps to mature lymphocytes into T lymphocytes (T cells).
  - d. lymph nodes: The lymph nodes are small, oval, lymphatic organs which are surrounded by a fibrous capsule and located in clusters along the lymphatic vessels. They contain large numbers of lymphocytes. They are clustered in the cervical, axillary, inguinal regions and in the abdominal cavity. The lymph nodes filter and purifies the lymph before it is returned to the blood.
  - e. bone marrow: site of blood cell production; located within bone tissue
  - f. lymph vessels: lymph is transported along a network of vessels beginning with the lymphatic capillaries and ending with collecting ducts.
10. List the three ways lymph is moved throughout the body.
- a. Pressure gradients caused by the physical movement of breathing.
  - b. Skeletal muscle contractions which help to move lymph along the lymphatic vessels.
  - c. Valves in the lymphatic vessels which help to assist the one-way movement of lymph.

Where does lymph rejoin the blood? Subclavian veins

11. Define and characterize antigens and antibodies.
- a. antigens: foreign proteins capable of initiating the immune response and the production of antibodies
  - b. antibodies: globular proteins produced by the B-plasma cells which will bind to specific antigens and promote their destruction or removal from the body

12. Describe the general role of the different types of T cells in cellular immunity.
- a. T-helper cells (CD4 cells) release a variety of chemicals which helps to coordinate specific and nonspecific defenses, help to stimulate cell-mediated immunity and antibody-mediated immunity by helping stimulate the production of T cells and B cells
  - b. T-killer cells (cytotoxic cells): help to track down bacteria, fungi, protozoa, or foreign tissues that contain antigens
  - c. T-suppressor cells: stop the responses of the T cells and the B cells when the level of the antigen has decreased
  - d. T-memory cells: store a code of the antigen which may be used if the antigen appears a second time
13. Describe the roles of the B cells in humoral immunity.
- a. Plasma cells: make and secrete large numbers of antibodies that will fight against antigens
  - b. Memory cells: help to deal with a second exposure to the same antigens. At that time, they respond and differentiate into antibody-secreting plasma cells providing a rapid response to the antigen.
14. Describe the following types of immunity.
- a. Active immunity: Active immunity occurs when the person has been exposed to an antigen and the body produces antibodies in the immune response.
  - b. Passive immunity: Passive Immunity occurs when the person has been given the antibodies to fight a specific antigen.
  - c. Natural acquisition of immunity: Natural immunity begins at birth and is enhanced as the individual is exposed to new antigens which the person makes antibodies to fight against them. Natural may also refer to the passing of antibodies from the mother to the fetus and the mother to baby as she breastfeeds the infant.
  - d. Artificial acquisition of immunity: Artificial immunity stimulates the production of antibodies under controlled conditions so the individual will be able to overcome any natural exposure to the same type of antigen in the future. This includes the use of vaccinations to help the body stimulate the immune response. It may also refer to the injection of ready-made antibodies such as gamma globulins to help fight infections.

15. Describe the diseases or disorders of the lymphatic system.

- a. AIDS: The major cause of AIDS is infection by the human immunodeficiency virus (HIV) which infects the T-helper cells resulting in the progressive destruction of cell mediated immunity by the T cells and eventually humoral (antibody) immunity.
- b. Measles: Measles, also known as rubeola, is a highly contagious viral infection that may be one of the most dangerous of all childhood infections. Measles is spread by direct contact or by contact with infected respiratory droplets.
- c. Mumps: Mumps is a viral infection affecting the parotid salivary glands. It is common in children.
- d. Rubella: Rubella, or German measles, is a mildly contagious viral infection which produces a three day rash and swelling of the lymph nodes. The rubella virus is transmitted contact with contaminated body fluids or articles of clothing.
- e. Tetanus: Tetanus, also known as lockjaw, is a bacterial infection. It is generally systemic and is fatal in over 50% of unimmunized people. Transmission of the bacteria generally begins when a person is walking through contaminated dirt and receives a puncture wound. The exotoxins produced by tetanus enter the body and cause local infection and tissue death.

16. List several functions of the cardiovascular system.

The primary function is circulation. Critical transportation needs include movement of oxygen and carbon dioxide, heat, nutrients, hormones, waste products, enzymes, electrolytes, and other substances on a continuing basis.

17. Describe the layers of the heart.

- a. Epicardium: The epicardium is the outermost layer. It is a serous membrane which is composed of epithelial tissue and some connective tissue. It provides a small amount of protection to the heart.
- b. Myocardium: The myocardium is the middle, muscular wall of the heart. It is composed of cardiac muscle, blood vessels, and nerves. The muscular layer is responsible for pumping the blood through the heart and into the great vessels.
- c. Endocardium: The endocardium is the most inner layer. It is composed of epithelial tissue and is a very smooth lining. The blood passing through the heart is in contact with this layer.

18. Describe the chambers of the heart in terms of from where they receive and where they send blood.

- a. Right atrium: receives blood from superior and inferior vena cava and sends blood to the right ventricle

- b. Right ventricle: receives blood from right atrium and sends blood through the pulmonary semi-lunar valve to the pulmonary trunk
  - c. Left atrium: receives blood from the right and left pulmonary veins and sends blood to the left ventricle
  - d. Left ventricle: receives blood from the left atrium and sends blood through the aortic semi-lunar valve to the aorta
19. Describe the great vessels of the heart in terms of from where they receive and where they send blood.
- a. Superior Vena Cava: receives venous blood from the head, neck, and arm regions and sends blood into the right atrium
    - b. Inferior Vena Cava: receives venous blood from the abdomen and legs and sends blood into the right atrium
  - c. Pulmonary Trunk: receives blood from the right ventricle and sends blood to the right and left pulmonary arteries
  - d. Pulmonary Arteries: receives blood from the pulmonary trunk and sends blood to the lungs
  - e. Pulmonary Veins: receives blood from the lungs and sends blood to the left atrium
  - f. Aorta: receives blood from the left ventricle and sends blood to the body tissues
  - g. Branches of the Aorta:
    - 1. brachiocephalic artery
    - 2. left common carotid artery
    - 3. left subclavian artery
20. Describe the locations of the valves of the heart. What is their function.
- a. Tricuspid valve: The tricuspid valve is located between the right atrium and the right ventricle. It prevents backflow from the right ventricle back into the right atrium.
  - b. Pulmonary semi-lunar valve: The pulmonary semilunar valve is located between the right ventricle and the pulmonary trunk. It prevents backflow into the right ventricle from the pulmonary trunk.
  - c. Bicuspid (mitral) valve: The bicuspid valve is located between the left atrium and the left ventricle. It prevents backflow into the left atrium from the left ventricle.

- d. Aortic semi-lunar valve: The aortic semilunar valve is located between the left ventricle and the aorta. It prevents backflow into the left ventricle from the aorta.
21. Trace blood flow through the heart listing all structures that it is in contact with along the way.
- A. The superior vena cava drains deoxygenated blood from the head, neck, and arms while the inferior vena cava drains deoxygenated blood from the abdomen and the legs into the right atrium. The coronary sinus drains deoxygenated blood from the myocardium into the right atrium.
  - B. From the right atrium, deoxygenated blood flows through the tricuspid valve into the right ventricle.
  - C. From the right ventricle, deoxygenated blood flows through the pulmonary semilunar valve into the pulmonary trunk
  - D. The pulmonary trunk branches to form the right and left pulmonary arteries, which take deoxygenated blood to the lungs for gas exchange. Carbon dioxide is released from the blood while oxygen is picked up by the blood.
  - E. Oxygenated blood returns through the right and left pulmonary veins into the left atrium.
  - F. From the left atrium, oxygenated blood flows through the bicuspid (mitral) valve into the left ventricle.
  - G. From the left ventricle, oxygenated blood flows through the aortic semilunar valve into the aorta.
  - H. From the aorta, oxygenated blood flows into arteries, arterioles, capillaries, venules, and veins, eventually reaching the superior and inferior vena cava once again.
22. Identify the components of the conduction system of the heart.
- a. SA node: The normal cardiac impulse that initiates myocardial contraction begins in the SA (sinoatrial) node located in the upper right atrium. The SA node is known as the pacemaker.
  - b. AV Node: The nerve impulse will enter the AV (atrioventricular) node located at the inferior part of the right atrium which will slow down the nerve impulse allowing for the complete contraction of both atrial chambers
  - c. AV Bundle: The impulse is relayed through the AV bundle (Bundle of His) into the right and left bundle branches.
  - d. Bundle Branches: These bundle branches will take impulses to the right and left ventricles.
  - e. Purkinje Fibers: The impulse will continue into the conduction (Purkinje) fibers which stimulates the myocardium of both ventricles to contract simultaneously.

23. Define systole and diastole as the two main principle events of the cardiac cycle, and then identify the position of the heart valves during each phase of the cycle.

- a. systole: ventricular contraction
- b. diastole: ventricular relaxation

Atrial systole/ ventricular diastole: cuspid valves are open and semi-lunar valves are closed.

Atrial diastole/ ventricular systole: semi-lunar valves are open and cuspid valves are closed.

24. Define cardiac output and identify those factors that determine it.

- a. definition of cardiac output: Cardiac Output (CO) is determined by the volume of blood pumped out of the ventricles by each beat (stroke volume or SV) and by heart rate (HR).
- b. definition of stroke volume: Stroke volume (SV) is the volume of blood pumped with each heartbeat.
- c. definition of heart rate: Heart rate (HR) is the number of heart beats in one minute.
- d. the formula for cardiac output:  $SV \times HR = CO$

25. Define and contrast the structures and functions of arteries, capillaries, and veins.

- a. arteries: An artery is a blood vessel which transports blood away from the heart. Arteries are composed of three layers:
  - a. Tunica externa (adventitia). The tunica externa (the outer layer) is composed of fibrous connective tissue and provides flexible support that resists collapse or injury.
  - b. Tunica media. The tunica media (the middle layer) is composed of smooth muscle and elastic connective tissue. It allows for constriction and dilation of the blood vessels. It is innervated by the autonomic nervous system (the sympathetic and parasympathetic divisions).
  - c. Tunica intima (endothelium). The tunica intima (the inner layer) is composed of epithelial tissue and provides a smooth inner lining.
- b. veins: A vein is a blood vessel which transport blood toward the heart. Veins are composed of same three layers found in arteries. The major difference between veins and arteries is that the layers of the veins are thinner and the tunica intima forms valves.

- c. capillaries: A capillary is a small vessel which carries blood from the arterioles to the venules. It is the site nutrients and wastes exchange between the blood and the body cells. The capillary is composed only of a single layer of endothelium (tunica intima). The thinness permits ease of nutrient and waste transport across the blood vessel wall with the body cells.

26. Define pulse and identify the general location of arteries where pulse may be felt.

- a. definition of pulse: the alternate expansion and recoil of an artery
- b. carotid: felt along the sides of the trachea
- c. radial: felt at the wrist on the thumb side
- d. femoral: located in the groin
- e. popliteal: felt in the area behind the knee
- f. dorsalis pedis: felt on the upper surface of the foot

27. Define blood pressure and describe how a sphygmomanometer is used to measure it's two components.

- a. blood pressure: Blood pressure is measured with the aid of an apparatus known as a sphygmomanometer, which makes it possible to measure the amount of air pressure equal to the blood pressure in an artery. The measurement is made in terms of how many millimeters high the air pressure raises a column of mercury in a glass tube, although we do not use mercury blood pressure cuffs. The sphygmomanometer usually consists of a cuff which is wrapped around the arm over the brachial artery. Air is pumped into the cuff by means of the bulb. In this way, air pressure is exerted against the outside of the artery. Air is added until the air pressure exceeds the pressure within the artery which means the artery is compressed.
- b. systolic: The first sound is read which indicates the systolic blood pressure. Systolic blood pressure is the force with which the blood is pushing against the artery walls when the ventricles are contracting.
- c. diastolic: The lowest point at which the sounds can be heard, just before they disappear, is approximately equal to the diastolic blood pressure or the force of the blood when the ventricles are relaxed.

28. Describe the diseases or disorders of the cardiovascular system.

- a. Aneurysm: An aneurysm is an abnormal dilation found in an arterial wall. An aneurysm can be caused by atherosclerosis, arteriosclerosis, a history of trauma or infection. They can be located in any artery.
- b. Arteriosclerosis: Arteriosclerosis is the hardening of an artery which impairs its ability to regulate blood pressure.
- c. Atherosclerosis: Atherosclerosis is a form of arteriosclerosis which is characterized by the formation of fatty plaques in the arteries.
- d. CAD (Coronary Artery Disease): Coronary Artery Disease is a form of atherosclerosis which occurs in the coronary arteries.
- e. CVA (Cerebrovascular accident): This is a sudden impairment of the cerebral circulation in one or more of the blood vessels that supply the brain. The blood vessels may rupture or be blocked by fat or a blood clot. This disrupts the supply of oxygen to the brain and causes necrosis in the brain tissue.
- f. Murmur: A murmur occurs when there is a defect in the cusp of a heart valve resulting in the leakage of blood through the closed valve.
- g. Hypertension: High blood pressure is a blood pressure reading of 140/90 mmHg or higher.
- h. Myocardial Infarction: A heart attack occurs when the supply of blood and oxygen to an area of the myocardium is blocked causing the death of the myocardium.