

Blood Vessels and Circulation

Objectives

This chapter describes the structure and functions of the blood vessels. Additional subjects contained in Chapter 13 include cardiovascular physiology, regulation, response, and effects of aging.

Review of Chapter Objectives

1. Distinguish among the types of blood vessels on the basis of their structure and function.
2. Explain the mechanisms that regulate blood flow through arteries, capillaries, and veins.
3. Discuss the mechanisms and various pressures involved in the movement of fluids between capillaries and interstitial spaces.
4. Describe the factors that influence blood pressure and how blood pressure is regulated.
5. Explain how the activities of the cardiac, vasomotor, and respiratory centers are coordinated to control blood flow through the tissues.
6. Explain how the circulatory system responds to the demands of exercise and hemorrhaging.
7. Identify the major arteries and veins and the areas they serve.
8. Describe the age-related changes that occur in the cardiovascular system.
9. Discuss the structural and functional interactions among the cardiovascular system and other body systems.

Blood Vessels and Circulation

Multiple Choice

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- 1 . An increase in cardiac output normally occurs during:
- stimulation of the vasomotor center
 - the process of vasomotion
 - widespread parasympathetic stimulation
 - all of the above

none of the above

2 . The central regulation of cardiac output primarily involves the activities of the:

- somatic nervous system
 - central nervous system
 - autonomic nervous system
 - all of the above
 - none of the above
-

3 . Atrial natriuretic peptide (ANP) reduces blood volume and pressure by:

- stimulating peripheral vasodilation
 - increased water loss by kidneys
 - blocking release of ADH
 - all the above
 - none of the above
-

4 . From the following selections, choose the answer that correctly identifies all the factors which would increase blood pressure. (Note: CO = cardiac output; SV = stroke volume; VR = venous return; PR peripheral resistance; BV = blood volume.)

- increasing CO, increasing SV, decreasing VR, decreasing PR, increasing BV
 - increasing CO, decreasing SV, increasing VR, decreasing PR, increasing BV
 - increasing CO, increasing SV, increasing VR, increasing PR, increasing BV
 - increasing CO, increasing SV, decreasing VR, increasing PR, decreasing BV
 - none of the above
-

5 . The most important determinant of peripheral resistance is:

- differences in the length of the blood vessels
- a combination of neural and hormonal mechanisms
- the diameter of the arterioles
- friction between the blood and the vessel walls

none of the above

6 . The two major factors affecting blood flow rates are:

- pressure and resistance
 - neural and hormonal control mechanisms
 - diameter and length of blood vessels
 - all of the above
 - none of the above
-

7 . The distinctive sounds of Korotkoff heard when taking the blood pressure are produced by:

- the opening and closing of the atrioventricular valves
 - the contraction and relaxation of the ventricles
 - turbulences as blood flows past the constricted portion of the artery
 - all of the above
 - none of the above
-

8 . Of the following blood vessels, the greatest resistance to blood flow occurs in the:

- veins
 - capillaries
 - venules
 - arterioles
 - none of the above
-

9 . The "specialized" arteries that are able to tolerate the pressure shock produced each time ventricular systole occurs and blood leaves the heart are:

- elastic arteries
 - muscular arteries
 - arterioles
 - fenestrated arteries
 - none of the above
-

10 The unidirectional flow of blood in venules and medium-sized veins is

maintained by:

- arterial pressure
 - pressure from the left ventricle
 - the presence of valves
 - the muscular walls of the veins
 - none of the above
-

11 The only blood vessels whose walls permit exchange between the blood and the surrounding interstitial fluids are:

- arterioles
 - venules
 - all of the above
 - none of the above
-

12 One of the major characteristics of the arteries supplying peripheral tissues is that they are:

- rigid
 - elastic
 - muscular
 - all of the above
 - none of the above
-

13 Smooth muscle fibers in arteries and veins are found in the:

- tunica externa
 - tunica media
 - tunica interna
 - endothelial lining
 - none of the above
-

14 The layer of vascular tissue that consists of an endothelial lining and an underlying layer of connective tissue dominated by elastic fibers is the:

- tunica interna
- tunica media

- tunica adventitia
 - tunica externa
 - none of the above
-

15 Stimulation of the vasomotor center in the medulla causes _____ and inhibition of:

- increasing diameter of arteriole; decreasing diameter of arteriole
 - vasodilation; vasoconstriction
 - vasoconstriction; vasodilation
 - hyperemia; ischemia
 - none of the above
-

16 The three primary interrelated changes that occur as exercise begins are:

- increasing vasodilation, decreasing venous return, increasing cardiac output
 - decreasing vasodilation, increasing venous return, increasing cardiac output
 - decreasing vasodilation, decreasing venous return, decreasing cardiac output
 - increasing vasodilation, increasing venous return, increasing cardiac output
 - none of the above
-

17 The only area of the body where the blood supply is unaffected while exercising at maximum levels is the:

- hepatic portal circulation
 - peripheral circulation
 - brain
 - pulmonary circulation
 - none of the above
-

18 The three elastic arteries that originate along the aortic arch and deliver blood to the head, neck, shoulders, and arms are the:

- axillary, R. common carotid, right subclavian
- R. axillary, R. brachial, L. internal carotid

- brachiocephalic, L. common carotid, left subclavian
 - R. dorsal, R. thoracic, R. vertebral
 - none of the above
-

- 19 The large blood vessel that collects most of the venous blood from organs below the diaphragm is the:
- inferior vena cava
 - hepatic portal vein
 - superior mesenteric vein
 - superior vena cava
 - none of the above
-

- 20 The three blood vessels that provide blood to all of the digestive organs in the abdominopelvic cavity are the:
- celiac artery and the superior and inferior mesenteric arteries
 - thoracic aorta, abdominal aorta, superior phrenic artery
 - intercostal, esophageal, and bronchial arteries
 - suprarenal, renal, and lumbar arteries
 - none of the above
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- 21 Blood homeostasis is maintained by:
- hormonal regulation
 - negative feedback
 - neural regulation
 - all of the above
 - none of the above
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- 22 When small amounts of blood are lost, blood pressure is restored by:
- interstitial reabsorption of fluids
 - vasoconstriction
 - increased red blood cell production
 - all of the above

none of the above

- 23 . At birth, the foramen ovale closes due to:
- increased pressure in the left atrium
 - increased pressure in the right atrium
 - expansion of the lungs
 - all of the above
 - none of the above