

Study Guide – Chapter 14

Answers can be found in slide numbers presented in parentheses

1. What is the primary function of the cardiovascular system? (slide 3)
 - a. transport
2. Name the components of the cardiovascular system. (slide 4)
 - a. Heart
 - b. Blood vessels
 - c. Blood
3. List in order the vessels and heart chambers a red cell flows through during a complete circuit through the cardiovascular system. (slide 5, slide 19)
 - a. Pulmonary vein
 - b. Left atrium
 - c. Left ventricle
 - d. Aorta
 - e. Systematic arteries
 - f. Arterioles
 - g. Capillaries
 - h. Small veins
 - i. Large veins
 - j. Venous return to heart
 - k. Venae cavae
 - l. Right atrium
 - m. Right ventricles
 - n. Lungs via pulmonary artery
4. Describe how pressure changes as blood flows through the circulation. Is a pressure gradient (differential) needed to drive blood flow? (slides 6-11)
 - a. If blood vessels dilate, blood pressure decreases
 - b. If blood vessels constrict, blood pressure increases
 - c. Needs pressure gradient –higher the pressure, the greater the fluid flow
5. How does vascular resistance influence blood flow? (slides 12-15)
 - a. Vasoconstriction is a decrease in blood vessel diameter/radius and decreases blood flow
 - b. Vasodilation is an increase in blood vessel diameter/radius and increases blood flow
 - c. Flow of blood in the cardiovascular system is
 - i. Directly proportional to the pressure gradient
 - ii. Inversely proportional to the resistance to flow
6. What factors influence vascular resistance and which of these is most important for controlling vascular resistance? (slides 13 and 14)
 - a. Resistance increases as length increases
 - b. Resistance increases as viscosity increases
 - c. Resistance decreases as radius increases
 - d. Radius is the most important

7. Define vasoconstriction and vasodilation (slide 15)
 - a. Vasoconstriction is a decrease in blood vessel diameter/radius and decreases blood flow
 - b. Vasodilation is an increase in blood vessel diameter/radius and increases blood flow
8. If a pressure gradient increases or decreases, how do these changes influence blood flow? (slide 15)
 - a. Directly proportional to the pressure gradient
9. If vascular resistance increases or decreases, how do these changes influence blood flow? (slide 15)
 - a. Inversely proportional to the resistance to flow
10. How does cross-sectional area influence the velocity of blood flow? (slide 16)
 - a. Faster through the more narrow
 - b. Slower through the wider
11. What is the primary function of the heart? (slide 17)
 - a. The heart generates pressure when it contracts (systole) and pumps blood into the arterial circulation
12. How do increases or decreases in cardiac output or vascular resistance influence mean arterial pressure? (slide 17)
 - a. Depending on the amount of each, they effect the mean arterial pressure, increase the output or decrease the resistance
13. What structures assure one-way flow through the heart? (slides 20-23)
 - a. Semilunar valves
 - b. Atrioventricular
14. What cell types are present in the heart? How do they differ? (slide 24)
 - a. Contractile cells
 - i. Striated fibers
 - ii. Organized into sarcomeres
 - b. Autorhythmic cells
 - i. Not organized
 - ii. Smaller and fewer than contractile
 - iii. Signal for contraction
15. Describe the functions of intercalated disks. (slides 25,26,33)
 - a. Transfer force from cell to cell
 - b. Has gap junctions that allow electrical signals to pass rapidly from cell to cell
 - c. Depolarization of the autorhythmic cells then spread rapidly to adjacent contractile cells through gap junctions
16. Describe excitation-contraction coupling in the heart. (slide 27)
 - a. See quizlet

17. Describe the ion movements that are responsible for the phases of the action potential in a cardiac contractile cell and in an autorhythmic cardiac cell. (slides 29 and 32)
- Contractile cell
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18. Why is the long duration of phase 2 in a cardiac contractile cell important? (slides 30 and 31)
- Prevents tetanus
19. List the structures that make up the conducting system of the heart and indicate in order how signals arising in the SA node are transmitted throughout the heart through these structures. (slides 33-35)
- AV node
 - Routes the direction of electrical signals so the heart contracts from apex to base
 - Delay is accomplished by slower conductional signals through nodal cells
 - SA node
 - Sets the pace of the heartbeat at 70 bpm
 - AV node (50 bpm) and Purkinje fibers (25-40 bpm) can act as pacemakers under some conditions
20. Describe what the P wave, P-R segment, QRS complex and T wave represent in terms of electrical activity occurring in the heart. (slide 37 and 38)
- P wave- atrial depolarization
 - P-R segment- conduction through AV node and AV bundle
 - QRS complex- ventricular depolarization
 - T wave- ventricular repolarization
21. Know the events that occur in the cardiac cycle of systole and diastole. (slide 40)
- Late diastole- both sets of chambers are relaxed and ventricles fill passively
 - Atrial systole- atrial contraction forces a small amount of additional blood into ventricles
 - Isovolumic ventricular contraction- first phase of ventricular contraction pushes AV valves closed but does not create enough pressure to open semilunar valves
 - Ventricular ejection- as ventricular pressure rises and exceeds pressure in the arteries, the semilunar valves open and blood is ejected
 - Isovolumic ventricular relaxation- as ventricles relax; pressure in ventricles falls, blood flows back into cusps of semilunar valves and snaps them closed
22. What events cause the first heart sound? The second heart sound? (slide 41)
- First heart sound: vibrations following closure of the AV valves
 - Second heart sound: vibrations created by closing of semilunar valve