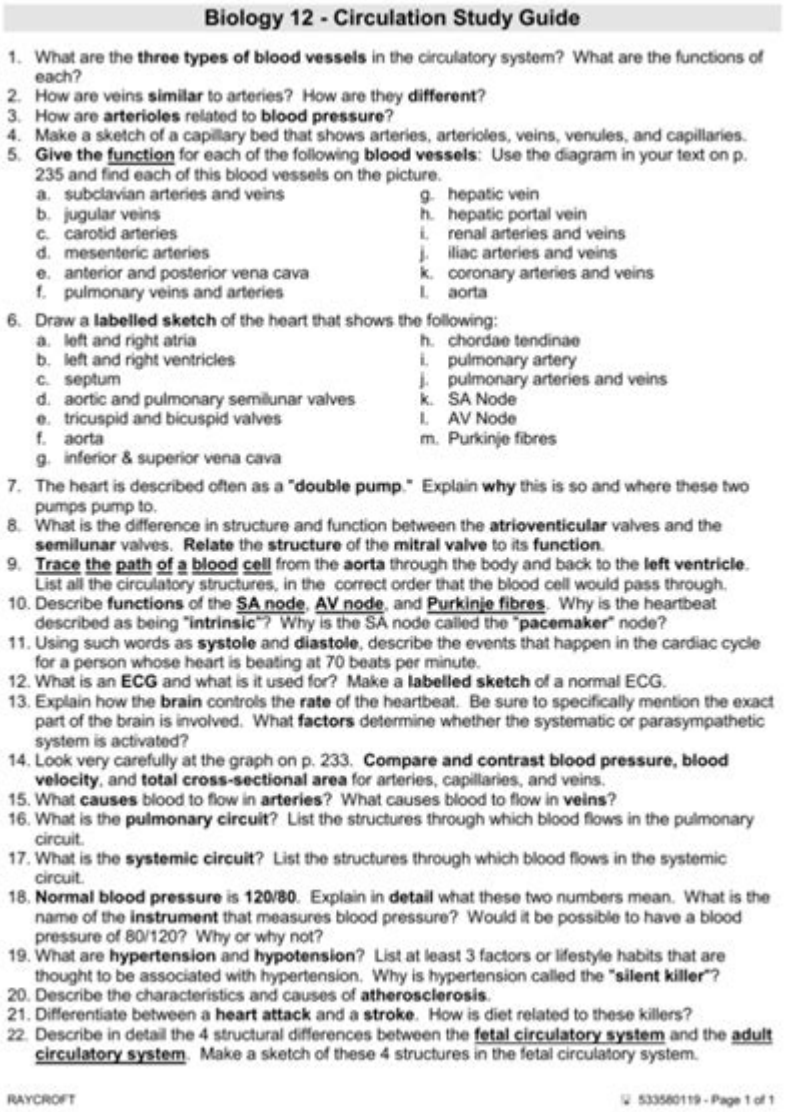
Biology 12 Circulation Study Guide Answers



Biology 12 - Circulation Study Guide

1. What are the **three types of blood vessels** in the circulatory system? What are the functions of each?
2. How are veins **similar** to arteries? How are they **different**?
3. How are **arterioles** related to **blood pressure**?
4. Make a sketch of a capillary bed that shows arteries, arterioles, veins, venules, and capillaries.
5. **Give the function** for each of the following **blood vessels**: Use the diagram in your text on p. 235 and find each of this blood vessels on the picture.
   a. subclavian arteries and veins
   b. jugular veins
   c. carotid arteries
   d. mesenteric arteries
   e. anterior and posterior vena cava
   f. pulmonary veins and arteries
   g. hepatic vein
   h. hepatic portal vein
   i. renal arteries and veins
   j. iliac arteries and veins
   k. coronary arteries and veins
   l. aorta
6. Draw a **labelled sketch** of the heart that shows the following:
   a. left and right atria
   b. left and right ventricles
   c. septum
   d. aortic and pulmonary semilunar valves
   e. tricuspid and bicuspid valves
   f. aorta
   g. inferior & superior vena cava
   h. chordae tendinae
   i. pulmonary artery
   j. pulmonary arteries and veins
   k. SA Node
   l. AV Node
   m. Purkinje fibres
7. The heart is described often as a "**double pump**." Explain **why** this is so and where these two pumps pump to.
8. What is the difference in structure and function between the **atrioventicular** valves and the **semilunar** valves. **Relate** the **structure** of the **mitral valve** to its **function**.
9. **Trace the path of a blood cell** from the **aorta** through the body and back to the **left ventricle**. List all the circulatory structures, in the correct order that the blood cell would pass through.
10. Describe **functions** of the **SA node**, **AV node**, and **Purkinje fibres**. Why is the heartbeat described as being "**intrinsic**"? Why is the SA node called the "**pacemaker**" node?
11. Using such words as **systole** and **diastole**, describe the events that happen in the cardiac cycle for a person whose heart is beating at 70 beats per minute.
12. What is an **ECG** and what is it used for? Make a **labelled sketch** of a normal ECG.
13. Explain how the **brain** controls the **rate** of the heartbeat. Be sure to specifically mention the exact part of the brain is involved. What **factors** determine whether the systematic or parasympathetic system is activated?
14. Look very carefully at the graph on p. 233. **Compare and contrast blood pressure, blood velocity**, and **total cross-sectional area** for arteries, capillaries, and veins.
15. What **causes** blood to flow in **arteries**? What causes blood to flow in **veins**?
16. What is the **pulmonary circuit**? List the structures through which blood flows in the pulmonary circuit.
17. What is the **systemic circuit**? List the structures through which blood flows in the systemic circuit.
18. **Normal blood pressure** is **120/80**. Explain in **detail** what these two numbers mean. What is the name of the **instrument** that measures blood pressure? Would it be possible to have a blood pressure of 80/120? Why or why not?
19. What are **hypertension** and **hypotension**? List at least 3 factors or lifestyle habits that are thought to be associated with hypertension. Why is hypertension called the "**silent killer**"?
20. Describe the characteristics and causes of **atherosclerosis**.
21. Differentiate between a **heart attack** and a **stroke**. How is diet related to these killers?
22. Describe in detail the 4 structural differences between the **fetal circulatory system** and the **adult circulatory system**. Make a sketch of these 4 structures in the fetal circulatory system.

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Biology 12 circulation study guide answers serve as essential tools for students looking to master the complex concepts surrounding the circulatory system. Understanding circulation is crucial not only for academic success in biology but also for grasping how various life forms maintain homeostasis. This guide will cover the fundamental principles related to circulation, detailing the components, functions, and mechanisms involved, as well as answering common questions that may arise during studies in this area.

Understanding the Circulatory System

The circulatory system, also known as the cardiovascular system, is a vital organ system responsible for the transportation of nutrients, gases, hormones, blood cells, and waste products throughout the body. This system plays a key role in maintaining homeostasis and supporting cellular metabolism.

Components of the Circulatory System

The circulatory system consists of three main components:

1. **Heart:** A muscular organ that pumps blood throughout the body.
2. **Blood Vessels:** A network of arteries, veins, and capillaries that transport blood.
3. **Blood:** The fluid that carries oxygen, nutrients, hormones, and waste products.

Functions of the Circulatory System

The circulatory system performs several key functions, including:

- **Transportation:** Distributing oxygen from the lungs and nutrients from the digestive system to all cells in the body.
- **Waste Removal:** Collecting waste products like carbon dioxide and urea from cells and transporting them to the lungs and kidneys for excretion.

- **Regulation:** Helping to regulate body temperature, pH levels, and fluid balance.

- **Protection:** Playing a role in the immune response by transporting white blood cells and antibodies.

The Heart: Structure and Function

The heart is a complex organ divided into four chambers: the right atrium, right ventricle, left atrium, and left ventricle. Each chamber has a specific function in the circulation of blood.

Chambers of the Heart

1. Right Atrium: Receives deoxygenated blood from the body through the superior and inferior vena cavae.
2. Right Ventricle: Pumps the deoxygenated blood to the lungs via the pulmonary artery for oxygenation.
3. Left Atrium: Receives oxygenated blood from the lungs through the pulmonary veins.
4. Left Ventricle: Pumps oxygenated blood to the rest of the body through the aorta.

Valves of the Heart

The heart contains four main valves that ensure unidirectional blood flow:

- **Tricuspid Valve:** Located between the right atrium and right ventricle.

- **Pulmonary Valve:** Located between the right ventricle and pulmonary artery.
- **Mitral Valve:** Located between the left atrium and left ventricle.
- **Aortic Valve:** Located between the left ventricle and aorta.

Types of Circulation

There are two primary types of circulation in the human body: systemic circulation and pulmonary circulation.

Systemic Circulation

Systemic circulation refers to the pathway in which oxygenated blood is distributed from the left side of the heart to all body tissues and returns deoxygenated blood back to the right side of the heart. Key points include:

- Oxygen-rich blood travels from the left ventricle into the aorta.
- Blood is distributed through systemic arteries to various tissues.
- After delivering oxygen and nutrients, blood returns to the heart via systemic veins.

Pulmonary Circulation

Pulmonary circulation is the pathway in which deoxygenated blood is transported from the right side of the heart to the lungs for oxygenation and returns to the left side of the heart. Key points include:

- Deoxygenated blood is pumped from the right ventricle into the pulmonary arteries.
- Blood travels to the lungs, where it releases carbon dioxide and absorbs oxygen.
- Oxygenated blood returns to the left atrium via the pulmonary veins.

Blood Pressure and Circulation

Blood pressure is a critical aspect of the circulatory system, indicating the force exerted by circulating blood on the walls of blood vessels. It is measured in millimeters of mercury (mmHg) and is expressed as two values: systolic and diastolic pressure.

Understanding Blood Pressure Readings

- Systolic Pressure: The pressure in the arteries when the heart beats (contracts).
- Diastolic Pressure: The pressure in the arteries when the heart is at rest (between beats).

A normal blood pressure reading is typically around 120/80 mmHg. High or low blood pressure can indicate underlying health issues.

Common Questions and Study Guide Answers

As students study the circulatory system, they often encounter questions that require clear, concise answers. Here are some commonly asked questions along with their answers:

1. What is the main function of red blood cells?

Red blood cells (RBCs) are primarily responsible for transporting oxygen from the lungs to tissues and carrying carbon dioxide back to the lungs for exhalation.

2. How does the heart maintain a constant rhythm?

The heart's rhythm is maintained by the sinoatrial (SA) node, which acts as a natural pacemaker, generating electrical impulses that trigger heartbeats.

3. What are the differences between arteries, veins, and capillaries?

- Arteries: Carry oxygenated blood away from the heart (except for pulmonary arteries) and have thick, muscular walls.
- Veins: Carry deoxygenated blood back to the heart (except for pulmonary veins) and have thinner walls with valves to prevent backflow.
- Capillaries: Microscopic vessels where exchange of gases, nutrients, and waste occurs between blood and tissues.

4. What role do platelets play in the circulatory system?

Platelets are cell fragments that play a crucial role in blood clotting. They aggregate at sites of injury to form clots, preventing excessive bleeding.

5. How do lifestyle choices impact the circulatory system?

Lifestyle choices such as diet, exercise, smoking, and alcohol consumption can significantly affect heart health and circulation. Poor choices can lead to conditions like hypertension, heart disease, and stroke.

Conclusion

Understanding the circulatory system is fundamental for any biology student. The **Biology 12 circulation study guide answers** provided in this article can serve as a comprehensive resource for

students preparing for exams or seeking to deepen their understanding of this critical system. By grasping the components, functions, and mechanisms of circulation, students will be well-equipped to tackle related topics in biology and apply this knowledge to real-world health scenarios.

Frequently Asked Questions

What are the main components of the human circulatory system?

The main components of the human circulatory system include the heart, blood vessels (arteries, veins, and capillaries), and blood.

How does the structure of arteries differ from veins?

Arteries have thicker, more muscular walls to withstand high pressure from the heart, while veins have thinner walls and often contain valves to prevent backflow of blood.

What is the role of the heart in the circulatory system?

The heart functions as a pump, circulating blood throughout the body to deliver oxygen and nutrients to tissues and remove waste products.

What is the significance of the pulmonary circulation pathway?

Pulmonary circulation is crucial as it carries deoxygenated blood from the heart to the lungs to receive oxygen and release carbon dioxide, and then returns oxygenated blood back to the heart.

How do capillaries facilitate the exchange of substances between blood and tissues?

Capillaries have thin walls that allow for the diffusion of oxygen, carbon dioxide, nutrients, and waste products between the blood and surrounding tissues.

What is the function of the lymphatic system in relation to circulation?

The lymphatic system helps maintain fluid balance, absorbs fats from the digestive system, and plays a role in immune response, working alongside the circulatory system.

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