What is the Arterial System?

Worksheet

The arterial system is the network of arteries - elastic (conducting), muscular (distributing), and arterioles - that carries oxygenated blood away from the heart and controls blood pressure and flow distribution to organs.

Questions

1. Which vessels are the main site of vascular resistance in the arterial system?

A) Elastic arteries
B) Muscular arteries
C) Arterioles
D) Capillaries

2. Which artery type includes the aorta?

A) Muscular artery
B) Elastic artery
C) Arteriole
D) Venule

3. What happens to blood pressure as blood moves from the aorta to the arterioles?

A) It increases
B) It stays constant
C) It decreases
D) It becomes negative

4. What is the main function of the arterial system?

A) Return blood to the heart
B) Carry blood away from the heart under pressure
C) Exchange gases with tissue
D) Store the largest blood volume

5. The aorta has an internal diameter of about 2.5-3 cm, while a capillary has a diameter of roughly 8 micrometers (0.008 mm). About how many times wider is the aorta than a capillary?

6. Mean arterial pressure is about 90 mmHg in the aorta but drops to about 35 mmHg by the end of the arterioles. What percentage of pressure is lost across the arterial tree before capillaries?

7. A nurse counts a patient's radial artery pulse for 15 seconds and counts 18 beats. What is the patient's heart rate in beats per minute?

8. Define: What is the arterial system?

9. Define: What's the difference between elastic and muscular arteries?

10. Define: What are arterioles?

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Answer Key

1. C) Arterioles - Arterioles have thick smooth muscle relative to their small diameter, making them the main resistance vessels.

2. B) Elastic artery - The aorta is an elastic (conducting) artery, rich in elastin to buffer pulsatile pressure.

3. C) It decreases - Pressure progressively falls due to resistance, dropping most sharply across the arterioles.

4. B) Carry blood away from the heart under pressure - Arteries carry blood away from the heart; that direction of flow is their defining feature, regardless of oxygen content.

5. Convert aorta diameter to mm: 2.75 cm 27.5 mm (using midpoint) Ratio = 27.5 mm / 0.008 mm 3,438 The aorta is roughly 3,000-3,500 times wider than a single capillary.

6. Pressure drop = 90 35 = 55 mmHg Percentage drop = 55 / 90 100 61% Arterioles are the site of the greatest resistance and pressure drop, which is why they're called 'resistance vessels'.

7. Heart rate = beats counted (60 s / 15 s) Heart rate = 18 4 = 72 beats per minute This falls within the normal resting range of 60-100 bpm.

8. The network of vessels carrying oxygenated blood away from the heart under high, pulsatile pressure.

9. Elastic arteries (like the aorta) cushion pulsatile flow; muscular arteries actively regulate flow via vasoconstriction/dilation.

10. The smallest arteries; they control blood flow into capillary beds and are the main site of vascular resistance.

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