What is Systemic Circulation?

Worksheet

Systemic circulation carries oxygenated blood from the left ventricle through the aorta to the body's tissues, where oxygen and nutrients are exchanged, then returns deoxygenated blood via the venae cavae to the right atrium.

Questions

1. Systemic circulation begins in which heart chamber?

A) Right atrium
B) Right ventricle
C) Left atrium
D) Left ventricle

2. Where does gas and nutrient exchange occur in systemic circulation?

A) Aorta
B) Systemic capillaries
C) Vena cava
D) Left atrium

3. Systemic circulation ends when deoxygenated blood enters the:

A) Left atrium
B) Pulmonary vein
C) Right atrium
D) Aorta

4. Why is aortic pressure (about 120/80 mmHg) much higher than pulmonary artery pressure (about 25/8 mmHg)?

A) The aorta is shorter
B) Systemic circulation must supply the entire body against greater resistance
C) The left ventricle is weaker
D) Pulmonary circulation carries more blood

5. Aortic pressure is about 120/80 mmHg, while pulmonary artery pressure is only about 25/8 mmHg. Why must systemic pressure be so much higher?

6. Blood in the aorta has oxygen saturation of about 98%; blood returning in the vena cava has about 75%. What caused the drop?

7. During exercise, systemic blood flow to skeletal muscle can increase from about 1 L/min to about 20 L/min. What causes this increase?

8. Define: What is systemic circulation?

9. Define: Which chamber starts systemic circulation?

10. Define: Where does gas and nutrient exchange happen in systemic circulation?

Answer Key

1. D) Left ventricle - The left ventricle pumps oxygenated blood into the aorta to start systemic circulation.

2. B) Systemic capillaries - Exchange happens at the capillary level within body tissues.

3. C) Right atrium - Blood returns via the venae cavae into the right atrium, completing the systemic loop.

4. B) Systemic circulation must supply the entire body against greater resistance - Systemic circulation covers a much greater distance and resistance, requiring higher driving pressure.

5. Systemic circulation must push blood through the entire body, including distant tissues like the feet and hands This long distance and high resistance requires a much stronger driving pressure The left ventricle's thick myocardium generates this higher pressure

6. Oxygenated blood leaves the left ventricle at about 98% saturation As blood passes through systemic capillaries, tissues extract oxygen for metabolism Deoxygenated blood returns via the venae cavae at roughly 75% saturation

7. Arterioles supplying active muscle dilate (vasodilation) in response to metabolic demand This lowers resistance and increases local blood flow Cardiac output also rises via increased heart rate and stroke volume to support the shift

8. The loop carrying oxygenated blood from the left ventricle to body tissues and deoxygenated blood back to the right atrium.

9. The left ventricle, pumping blood into the aorta.

10. In the systemic capillaries within body tissues.