Edexcel Biology GCSE

Topics 8.6 to 8.8, 8.12 - The circulatory system

Flashcards

What is the circulatory system?

What is the circulatory system?

- Network of organs and vessels
- Enables the flow of blood and transport of oxygen, carbon dioxide, nutrients and other molecules around the body

What are the main components of blood?

What are the main components of blood?

- Red blood cells
- White blood cells
- Platelets
- Plasma

What are red blood cells also known as?

What are red blood cells also known as?

Erythrocytes

What is the function of red blood cells?

What is the function of red blood cells?

- Transport O_2 from lungs to tissues
- Transport CO_2 from tissues to lungs

How do red blood cells transport oxygen to body cells?

How do red blood cells transport oxygen to body cells?

- Lungs, haemoglobin in RBCs binds reversibly with oxygen to form oxyhaemoglobin
- Tissues, oxyhaemoglobin breaks down to form haemoglobin and oxygen which diffuses into cells

How are red blood cells adapted to their function?

How are red blood cells adapted to their function?

- Biconcave disk gives large SA/V ratio, increasing diffusion rate
- Lack nucleus, allowing more space for haemoglobin molecules (increases oxygen carrying capacity of the cell)
- Small and flexible so they can squeeze through capillaries
- Thin giving a short diffusion distance

What is the function of white blood cells?

What is the function of white blood cells?

Provide immunological protection

Name two types of white blood cell

Name two types of white blood cell

- Phagocytes
- Lymphocytes

What are phagocytes?

What are phagocytes?

- Type of WBC
- Engulf pathogens and digest them in a process known as phagocytosis

What are lymphocytes?

What are lymphocytes?

- Type of WBC
- Produce antibodies specific to a pathogen
- Produce antitoxins to neutralise toxins

What is the function of platelets?

What is the function of platelets?

Role in blood clotting

What is plasma?

What is plasma?

- Pale-yellow liquid portion of the blood
- Contains proteins, nutrients, waste products, hormones, antibodies etc.

How is plasma adapted to its function?

How is plasma adapted to its function?

Plasma consists mainly of water. This acts as a solvent, enabling the transport of materials around the body.

What are the three main types of blood vessel?

What are the three main types of blood vessel?

- Arteries
- Capillaries
- Veins

What is the function of the arteries?

What is the function of the arteries?

Carry blood away from the heart under high pressure

Describe how the arteries are adapted to their function (6)

Describe how the arteries are adapted to their function (6)

- **Narrow lumen** maintains high pressure
- **Thick wall** to withstand high pressure
- **Thick layer of smooth muscle** provides strength
- **Thick layer of elastic fibres** allow stretch and recoil
- **Smooth inner lining** to reduce friction
- No valves

What is the function of the veins?

What is the function of the veins?

Return blood to the heart under low pressure

Describe how the veins are adapted to their function (4)

Describe how the veins are adapted to their function (4)

- **Large lumen** eases blood flow
- **Thin wall** as blood at low pressure
- **Thin layer of smooth muscle and elastic fibres**
- **Valves** prevent backflow of blood

What is the function of the capillaries?

What is the function of the capillaries?

Allow the exchange of materials at tissues

Describe how the capillaries are adapted to their function (4)

Describe how the capillaries are adapted to their function (4)

- Form **large network** ∴ greater surface area for diffusion
- Walls **one cell thick** giving a short diffusion distance
- Walls **permeable** allowing the exchange of substances
- **Narrow lumen** decreases diffusion distance

Describe the double circulatory system in humans

Describe the double circulatory system in humans

Blood flows through the heart twice in two circuits:

- Pulmonary circuit
- Systemic circuit

What is the pulmonary circuit?

What is the pulmonary circuit?

- Part of the circulatory system involving the right side of the heart
- Deoxygenated blood is transported to the lungs
- Gaseous exchange occurs between the alveoli and capillaries in the lungs
- Oxygenated blood is returned to the left side of the heart

What is the systemic circuit?

What is the systemic circuit?

- Part of the circulatory system involving the left side of the heart
- Oxygenated blood is pumped to tissues and organs around the body
- Exchange of materials occurs at tissues
- Deoxygenated blood returns to the right side of the heart

Name the four chambers of the heart

Name the four chambers of the heart

- Left atrium
- Left ventricle
- Right atrium
- Right ventricle

Describe the pathway of blood around the body, naming the structures of the heart

Describe the pathway of blood around the body, naming the structures of the heart

Pulmonary vein → Left atrium → Left ventricle → Aorta → Body → Vena cava → Right atrium → Right ventricle → Pulmonary artery → Lungs

Why is the left ventricle thicker than the right ventricle?

Why is the left ventricle thicker than the right ventricle?

- It pumps blood a further distance
- It must generate a greater force of contraction so blood can be pumped at a higher pressure

What is the function of valves in the heart?

What is the function of valves in the heart?

Prevent the backflow of blood

What is cardiac output?

What is cardiac output?

The volume of blood pumped out of a ventricle in one minute

What is stroke volume?

What is stroke volume?

The volume of blood pumped out of a ventricle in one contraction

What is heart rate?

What is heart rate?

The number of times the heart contracts in one minute

How is cardiac output calculated?

How is cardiac output calculated?

$$\text{cardiac output} = \text{heart rate} \times \text{stroke volume}$$

$$(\text{cm}^3\,\text{min}^{-1}) \qquad (\text{bpm}) \qquad (\text{cm}^3)$$