Edexcel (B) Biology A-level

4.4 - Circulation

Flashcards

Draw a diagram of the human heart, including names of chambers, vessels, and valves.

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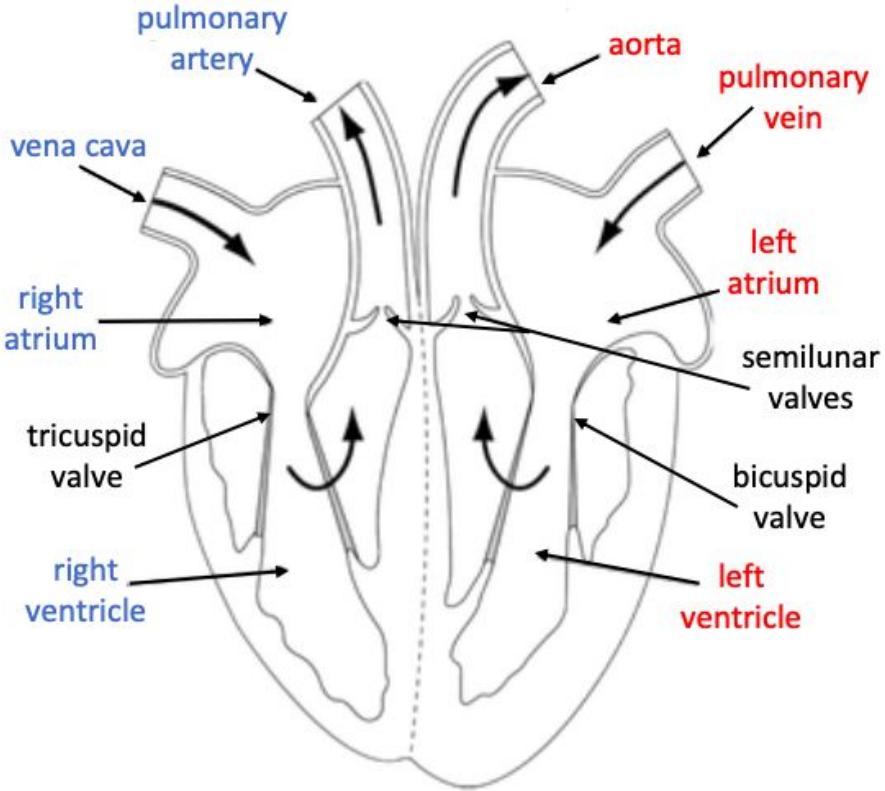

Relate the structure of the chambers to their function.

Relate the structure of the chambers to their function.

- Atria: thin-walled and elastic, so they can stretch when filled with blood.
- Ventricles: thick muscular walls pump blood under high pressure. The left ventricle is thicker than the right because it has to pump blood all the way around the body.

Relate the structure of arteries to their function.

Relate the structure of arteries to their function.

Thick, muscular walls to handle high pressure without tearing. Elastic tissue allows recoil. Narrow lumen to maintain pressure.

Relate the structure of veins to their function.

Relate the structure of veins to their function.

Thin walls due to lower pressure.

Require valves to ensure blood doesn't flow backwards. Have less muscular and elastic tissue as they don't have to control blood flow.

Relate the structure of capillaries to their function.

Relate the structure of capillaries to their function.

- Walls only one cell thick; short diffusion pathway.
- Very narrow, so can permeate tissues and red blood cells can lie flat against the wall, effectively delivering oxygen to tissues.
- Numerous and highly branched, providing a large surface area.

Why are two pumps (left and right) needed instead of one?

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To maintain blood pressure around the whole body. When blood passes through the narrow capillaries of the lungs, the pressure drops sharply and therefore would not be flowing strongly enough to continue around the whole body. Therefore it is returned to the heart to increase the pressure.

Describe what happens during cardiac diastole.

Describe what happens during cardiac diastole.

The heart is relaxed. Blood enters the atria, increasing the pressure and pushing open the atrioventricular valves. This allows blood to flow into the ventricles. Pressure in the heart is lower than in the arteries, so semilunar valves remain closed.

Describe what happens during atrial systole.

Describe what happens during atrial systole.

The atria contract, pushing any remaining blood into the ventricles.

Describe what happens during ventricular systole.

Describe what happens during ventricular systole.

The ventricles contract. The pressure increases, closing the atrioventricular valves to prevent backflow, and opening the semilunar valves. Blood flows into the arteries.

What does myogenic mean?

What does myogenic mean?

The heart's contraction is initiated from within the muscle itself, rather than by nerve impulses.

Name the nodes involved in heart contraction and where they are situated.

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- Sinoatrial node (SAN)= wall of right atrium.
- Atrioventricular node (AVN)= in between the two atria.

Explain how the heart contracts.

Explain how the heart contracts.

- SAN initiates and spreads impulse across the atria, so they contract.
- AVN receives, delays, and then conveys the impulse down the bundle of His.
- Impulse travels into the Purkinje fibres which branch across the ventricles, so they contract from the bottom up.

Why does the impulse need to be delayed?

Why does the impulse need to be delayed?

If the impulse spread straight from the atria into the ventricles, there would not be enough time for atrial systole to complete.

What is an ECG?

What is an ECG?

A graph showing the amount of electrical activity in the heart during the cardiac cycle.

What does each element of an ECG represent?

What does each element of an ECG represent?

- P-wave shows atrial systole caused by the SAN.
- QRS complex shows ventricular systole.
- T-wave shows systole as the ventricles repolarise.

Describe the function of blood.

Describe the function of blood.

- Transport of nutrients and waste
- Form tissue fluid
- Defend against foreign bodies

What are the main components of blood?

What are the main components of blood?

1. Erythrocytes (red blood cells)
2. Leucocytes (white blood cells)
3. Plasma

Describe the structure of erythrocytes and their function.

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Biconcave shape, no nucleus, contain lots of haemoglobin. Function is to carry oxygen.

Describe types of leucocyte and their functions.

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- Lymphocytes = release antibodies, engulf pathogens.
- Eosinophils = contain enzymes that detoxify foreign proteins.
- Neutrophils = engulf foreign material.
- Monocytes = respond to inflammation.

Describe the function of plasma.

Describe the function of plasma.

Contains water, proteins, ions, nutrients, gases, and hormones. Delivers them to cells. Makes up 55% of blood.

Why does blood need to clot?

Why does blood need to clot?

- Prevents blood loss
- Prevents entry of harmful bacteria.
- Provides a framework for repair.

Explain the process of blood clotting.

Explain the process of blood clotting.

1. Platelets release thromboplastin in response to damage.
2. Causes prothrombin to change to its active form, thrombin.
3. Turns soluble fibrinogen into insoluble fibrin, forming a mesh that traps blood cells.

What causes atherosclerosis?

What causes atherosclerosis?

Build-up of fibrous plaque. Endothelium becomes damaged which can cause a blood clot. Cells, salts, cholesterol, and other substances build up and harden, forming a plaque that narrows the artery.

How does atherosclerosis affect health?

How does atherosclerosis affect health?

Increases risk of cardiovascular diseases such as heart attack, stroke, and angina.

Give factors that increase risk of atherosclerosis.

Give factors that increase risk of atherosclerosis.

Age, genetics, smoking, alcohol, lack of exercise, obesity, cholesterol levels.