WJEC Wales Biology GCSE

1.4 (a) to (j) - 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 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?

- At the lungs haemoglobin in RBCs binds reversibly with oxygen to form oxyhaemoglobin
- At the 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 a nucleus, allowing more space for haemoglobin molecules (increases oxygen carrying capacity of the cell)
- Small and flexible so they can squeeze through capillaries

What is the function of white blood cells?

What is the function of white blood cells?

Provide immunological protection:

- Phagocytes engulf and destroy pathogens
- Lymphocytes produce antibodies

How are phagocytes adapted to their function?

How are phagocytes adapted to their function?

- Can change shape to engulf foreign material
- Flexible membrane allows them to squeeze through pores in capillary walls and enter tissue fluid
- Contain enzymes that digest pathogens

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
- Transports proteins, nutrients, waste products, hormones, antibodies etc.

How is plasma adapted to its function?

How is plasma adapted to its function?

It consists mainly of water which acts as a solvent, enabling the transport of materials around the body

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?

- Involves **right** side of heart
- Deoxygenated blood transported to **lungs**
- Gaseous exchange occurs between alveoli and capillaries
- Oxygenated blood returns to left side of heart

What is the systemic circuit?

What is the systemic circuit?

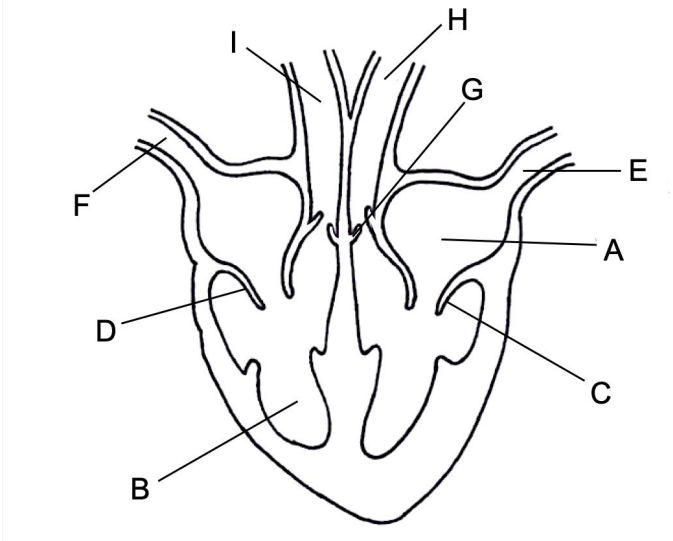
- Involves **left** side of heart
- Oxygenated blood pumped to **tissues** and **organs** around body
- Exchange of materials occurs at tissues
- Deoxygenated blood returns to right side of heart

Name the four chambers of the heart

Name the four chambers of the heart

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

Identify the structures of the heart labelled in the diagram below



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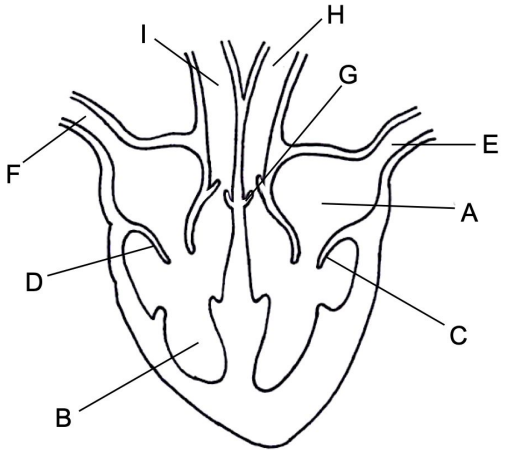


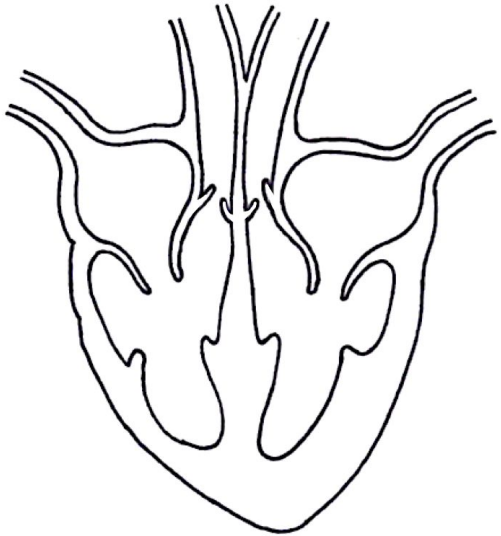
A	left atrium	**F**	vena cava
B	right ventricle	**G**	semi-lunar valve
C	bicuspid valve	**H**	aorta
D	tricuspid valve	**I**	pulmonary artery
E	pulmonary vein		

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

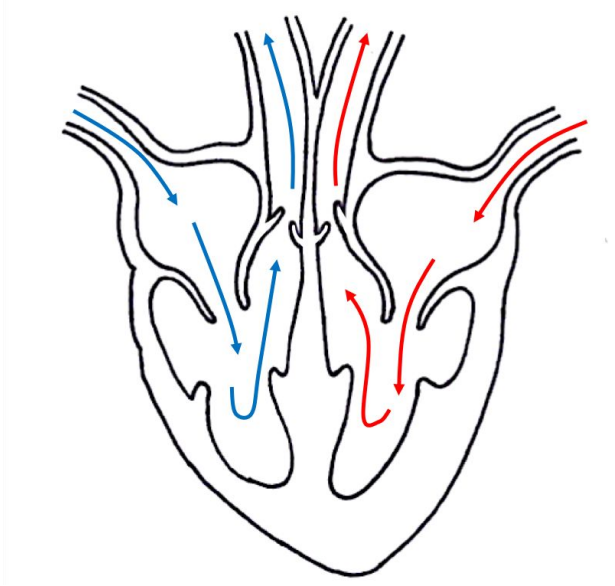
Describe the pathway of blood around the body, naming the structures of the heart

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

Show the direction of blood flow through the heart on the diagram below



Show the direction of blood flow through the heart on the diagram below



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 are the walls of the heart made of?

What are the walls of the heart made of?

Cardiac muscle

What is the function of cardiac muscle?

What is the function of cardiac muscle?

Contracts to pump blood around the body

What is the function of the coronary arteries?

What is the function of the coronary arteries?

Supply heart muscle with oxygen and nutrients

What is the function of valves in the heart?

What is the function of valves in the heart?

Prevent the backflow of blood

What are the two types of valves found in the heart?

What are the two types of valves found in the heart?

- Atrioventricular valves
- Semi-lunar valves

Where are the atrioventricular valves located?

Where are the atrioventricular valves located?

Between the atria and the ventricles

What are the two types of atrioventricular valve?

What are the two types of atrioventricular valve?

- **Bicuspid** valves
  (between left atrium and left ventricle)
- **Tricuspid** valves
  (between right atrium and right ventricle)

Where are the semi-lunar valves located?

Where are the semi-lunar valves located?

Between the ventricles and the arteries

What are the three main types of blood vessel?

What are the three main types of blood vessel?

- Arteries
- Capillaries
- Veins

Describe the pathway of blood through the blood vessels

Describe the pathway of blood through the blood vessels

heart → arteries → capillaries → veins → heart

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, allows muscles to easily compress the vein aiding blood flow
- **Relatively 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

Why is it important that blood flows slowly through the capillaries?

Why is it important that blood flows slowly through the capillaries?

Allows time for exchange of materials