

30 Which statement correctly compares blood plasma and tissue fluid in a healthy person?

- A** Blood plasma contains more protein than tissue fluid.  
**B** Both blood plasma and tissue fluid contain red blood cells.  
**C** Tissue fluid contains white blood cells whereas blood plasma does **not** contain lymphocytes.  
**D** Tissue fluid is formed from blood plasma and is **not** returned to blood plasma.

33 How many times must a carbon dioxide molecule pass through a cell surface membrane to travel from the tissue fluid into the blood plasma?

(Assume there are no pores between the cells the carbon dioxide molecule must pass through.)

- A** 1                      **B** 2                      **C** 3                      **D** 4

32 Which blood vessel carries blood with the lowest pressure?

- A** aorta  
**B** pulmonary artery  
**C** pulmonary vein  
**D** vena cava

31 The table shows the comparison of blood pressure in three main blood vessels during diastole.

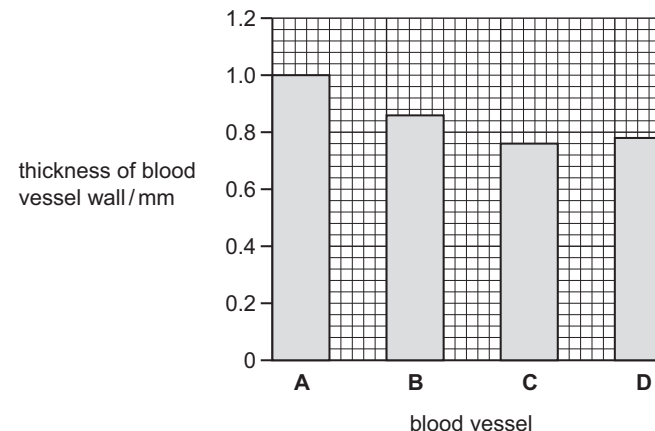
|                                              | vessel 1 | vessel 2  | vessel 3 |
|----------------------------------------------|----------|-----------|----------|
| blood pressure in the vessel during diastole | low      | very high | high     |

Which row identifies the three blood vessels?

|          | vessel 1         | vessel 2         | vessel 3         |
|----------|------------------|------------------|------------------|
| <b>A</b> | pulmonary vein   | pulmonary artery | aorta            |
| <b>B</b> | vena cava        | aorta            | pulmonary vein   |
| <b>C</b> | pulmonary vein   | aorta            | pulmonary artery |
| <b>D</b> | pulmonary artery | pulmonary vein   | vena cava        |

31 The graph shows the thickness of the walls of the main blood vessels to and from a mammalian heart.

Which blood vessel is the pulmonary artery?



- 6 (a) A student studied the structure of a mammalian heart.

The student took a photograph of the left side of a dissected heart as shown in Fig. 6.1.

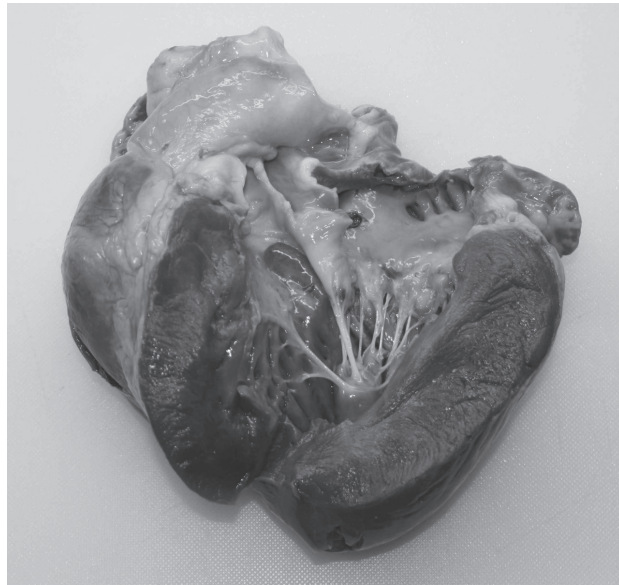


Fig. 6.1

Identify **two** features of the left side of the heart visible in Fig. 6.1 **and** explain how each feature is adapted to the function of the heart.

feature .....

explanation .....

.....

.....

.....

feature .....

explanation .....

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.....

[4]

- (b) Cardiac muscle is described as myogenic. This means the electrical activity controlling the rhythm of a regular heartbeat begins within the muscle tissue of the heart.

Describe how electrical activity within the heart controls each heartbeat.

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..... [4]

- (c) Tissue fluid is formed from blood plasma as it flows through capillaries.

Fig. 6.2 is a diagram of a capillary and some adjacent tissue cells in a capillary network.

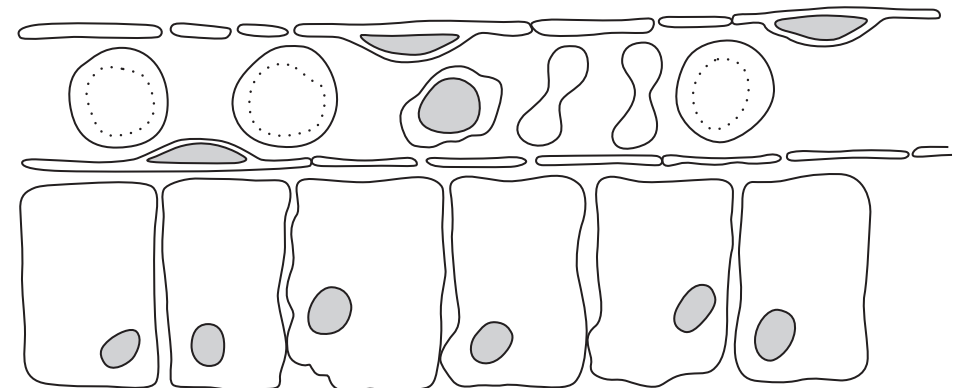


Fig. 6.2

- (i) Describe **two** functions of tissue fluid.

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(ii) With reference to Fig. 6.2, describe how tissue fluid is formed.

[3]

[3]

(d) Measles is a common disease caused by a virus. Vaccination to prevent the disease has been very successful.

(i) A child receives a vaccine for measles.

Explain why only some of the T-lymphocytes in the child respond to the measles vaccine.

..... [2]

[2]

(ii) Describe the events that occur in an immune response to a vaccine that result in lymphocytes that provide long-term immunity to measles.

..... [5]

[5]

**5** Veins transport blood towards the heart. The structure of a vein is adapted to its function.

(a) The inner layer of a vein is the tunica intima, composed of a single layer of endothelial cells that form a protective barrier.

When the tunica intima of a blood vessel is damaged, endothelial cells can carry out mitosis to allow tissue repair to occur.

(i) The spindle that is formed during mitosis is composed of spindle fibres.

Name the cell structures that are organised to form spindle fibres during mitosis.

..... [1]

[1]

(ii) Describe the **telophase** stage of mitosis.

[2]

[2]

**(b)** Explain how the structure of a vein is related to its function.

You **do not** need to include details of the structure of the tunica intima and its function.

[3]

[3]

[Total: 6]