**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.

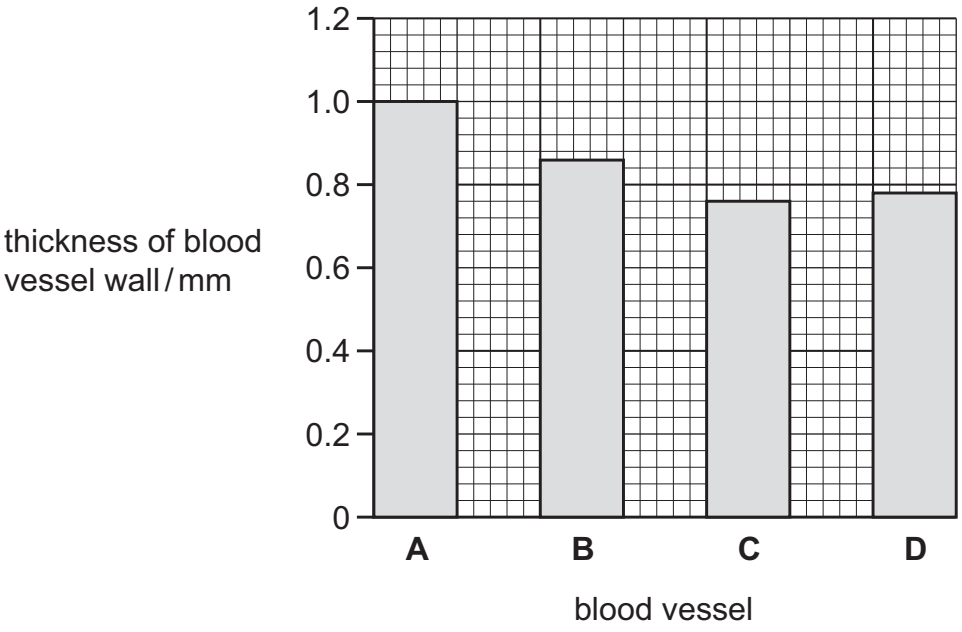
| | vessel 1 | vessel 2 | vessel 3 |
|---|---|---|---|
| blood pressure in the vessel during diastole | low | very high | high |

Which row identifies the three blood vessels?

| | vessel 1 | vessel 2 | vessel 3 |
|---|---|---|---|
| **A** | pulmonary vein | pulmonary artery | aorta |
| **B** | vena cava | aorta | pulmonary vein |
| **C** | pulmonary vein | aorta | pulmonary artery |
| **D** | 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.

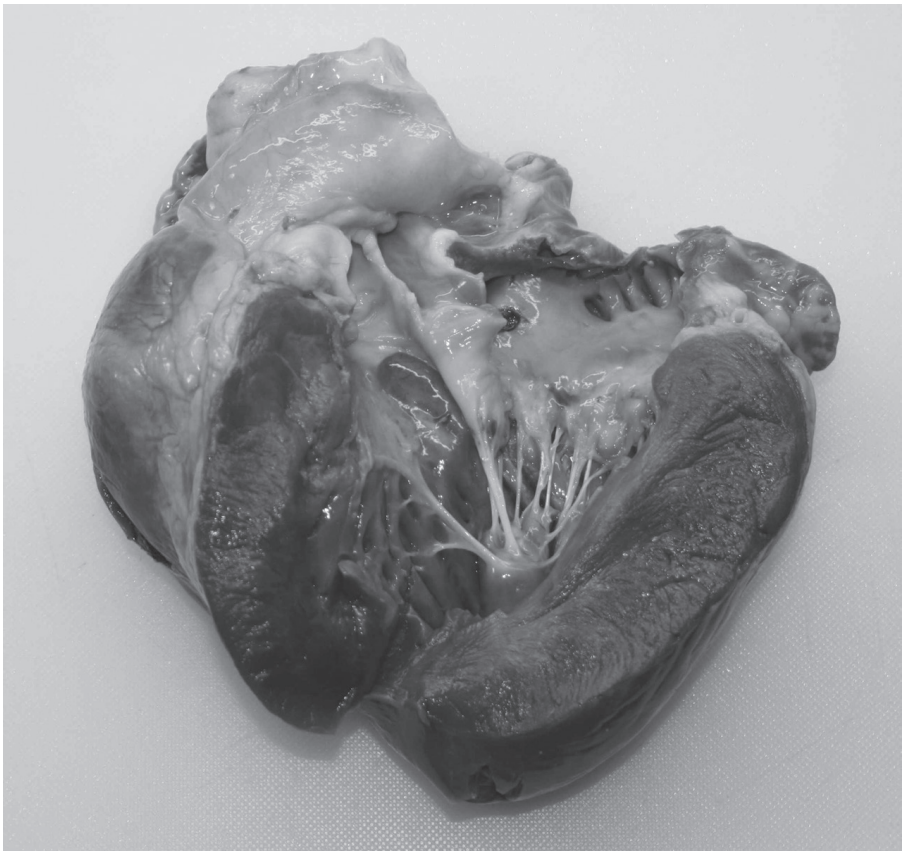


**Fig. 6.1**

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.

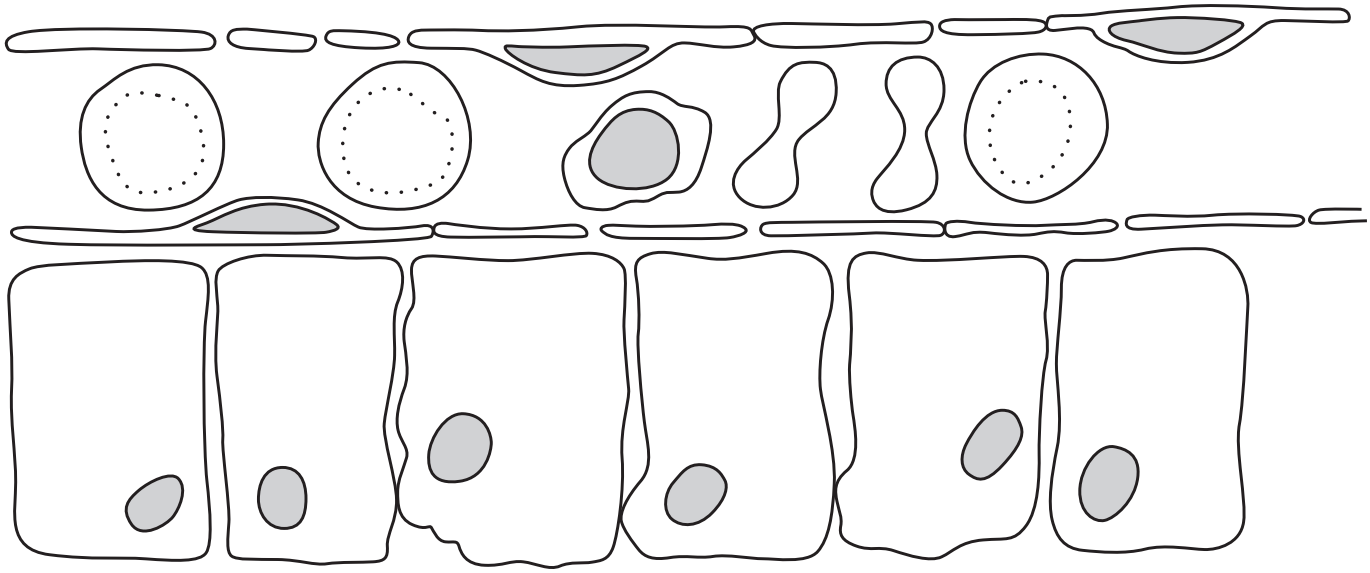

**Fig. 6.2**

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

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[2]

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

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..... [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.

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..... [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.

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..... [5]



[Total: 20]

**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]

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

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..... [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.

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..... [3]

[Total: 6]