

Transport in Humans

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TEAM

BIOCARDIA

Transport in Humans

2 (a) Fig. 2.1 shows the transfer of materials between blood and tissues.

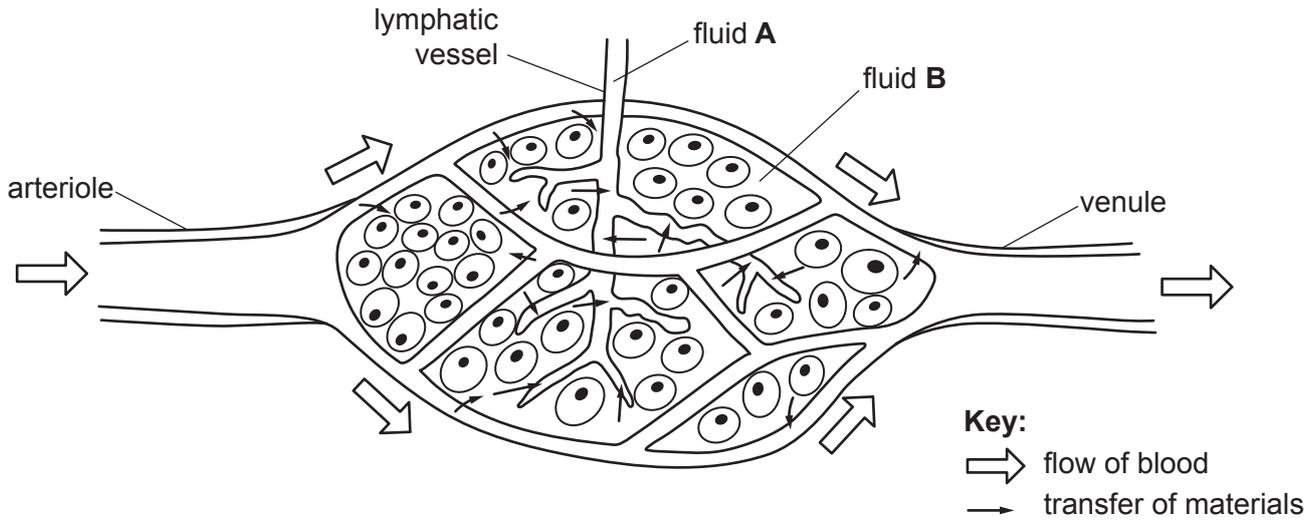


Fig. 2.1

(i) Complete Table 2.1 by:

- stating the names of the fluids
- writing **yes** if the fluid contains red blood cells or **no** if the fluid does **not** contain red blood cells.

Table 2.1

letter on Fig. 2.1	name of the fluid	contains red blood cells
A		
B		

[2]

(ii) State the name of the process by which oxygen is transferred from fluid **B** to the cells.

..... [1]

(iii) Explain why cells need oxygen.

.....

 [2]

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6

(b) Describe the functions of arterioles in the skin.

.....

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.....

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..... [3]

(c) Describe the functions of lymph nodes in the lymphatic system.

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..... [2]

(d) Lacteals are part of the lymphatic system.

(i) State where in the body lacteals are found.

..... [1]

(ii) Describe the role of lacteals.

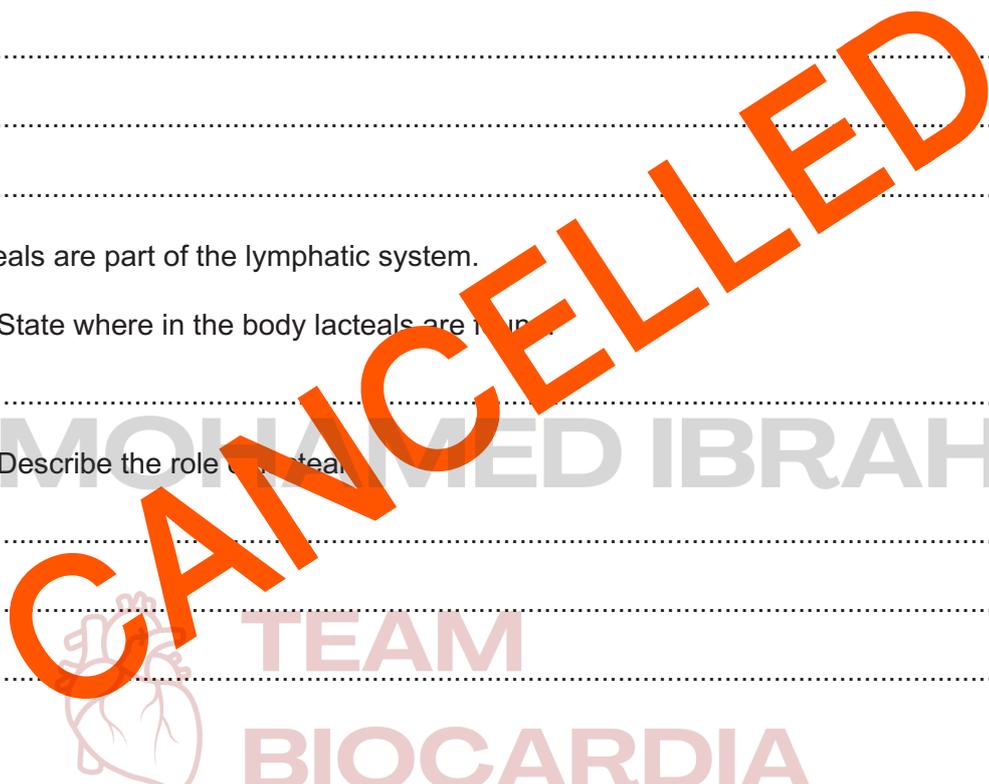
.....

.....

..... [1]

[Total: 12]

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- (c) Consuming too much of some mineral salts, such as sodium chloride, increases the risk of developing coronary heart disease (CHD).

Doctors studied the effect of diet on the risk of developing CHD.

The doctors first selected volunteers who had a high salt diet.

The doctors assessed the volunteers' overall risk of developing CHD and monitored their blood pressure.

- (i) List **two** factors, **other than diet and blood pressure**, that the doctors considered when assessing the overall risk of the volunteers developing CHD.

1

2

[2]

- (ii) The doctors used urine tests to identify volunteers who had a high salt diet.

Explain why urine tests are a good indicator of how much salt has been consumed.

.....
.....
.....
.....
..... [2]

- (d) The volunteers were divided into two groups.

The mass of salt consumed by **both** groups was changed every 4 weeks:

- low salt intake for 4 weeks
- medium salt intake for 4 weeks
- high salt intake for 4 weeks.

In addition, group 2 was given other changes to their diet but group 1 was not.

- (i) Suggest **one** component of the diet of group 2, **other than salt**, that the doctors changed to further reduce the risk of developing CHD.

..... [1]

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The systolic blood pressure of the volunteers was measured every 4 weeks. These results are shown in Fig. 3.2.

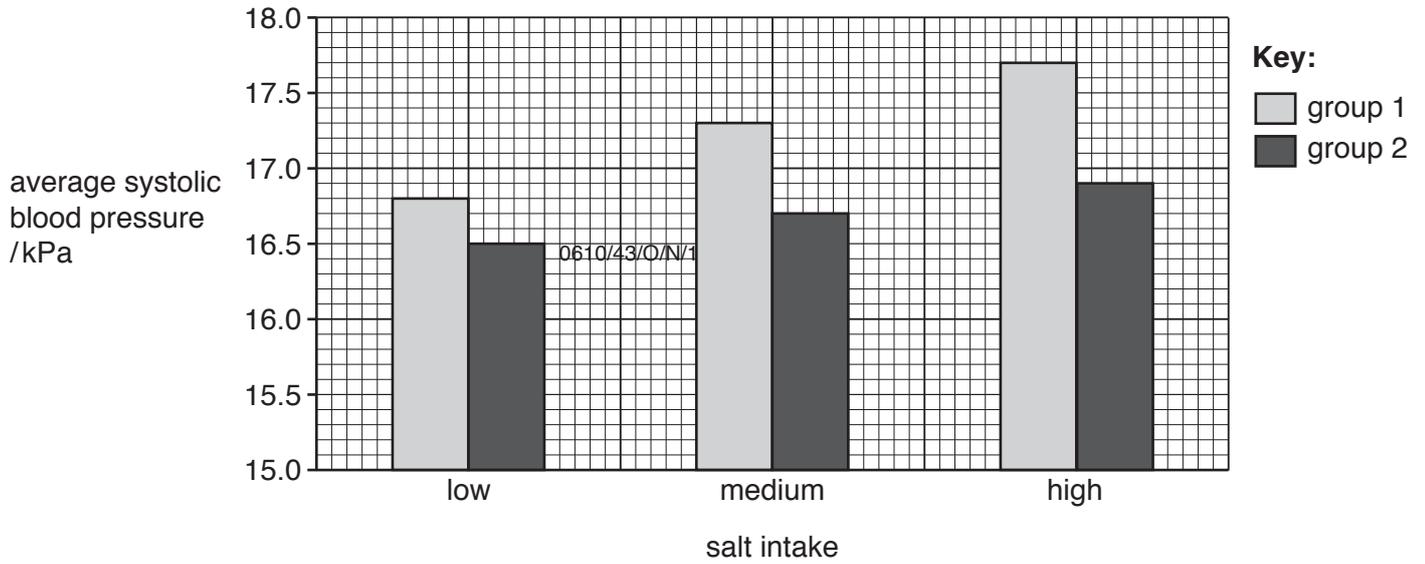


Fig. 3.2

- (ii) Calculate the percentage increase in the average systolic blood pressure of the group 1 volunteers when they increased their salt intake from low to high.

low salt intake kPa

high salt intake kPa

Give your answer to the nearest whole number.

Space for working.

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..... %
[3]

6 Fig. 6.1 is a photomicrograph of a blood clot.

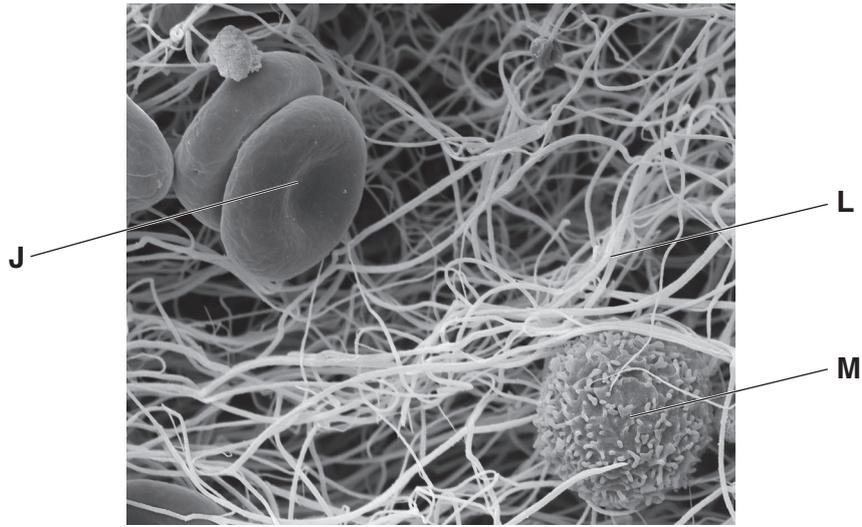


Fig. 6.1

(a) Describe how a blood clot forms.

Use the letters in Fig. 6.1 in your answer.

.....

.....

.....

.....

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[5]

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(b) State the importance of blood clotting.

.....

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.....

.....

..... [2]

0610/43/O/N/19

4 Mammals have a double circulation.

(a) State what is meant by the term *double circulation*.

.....

.....

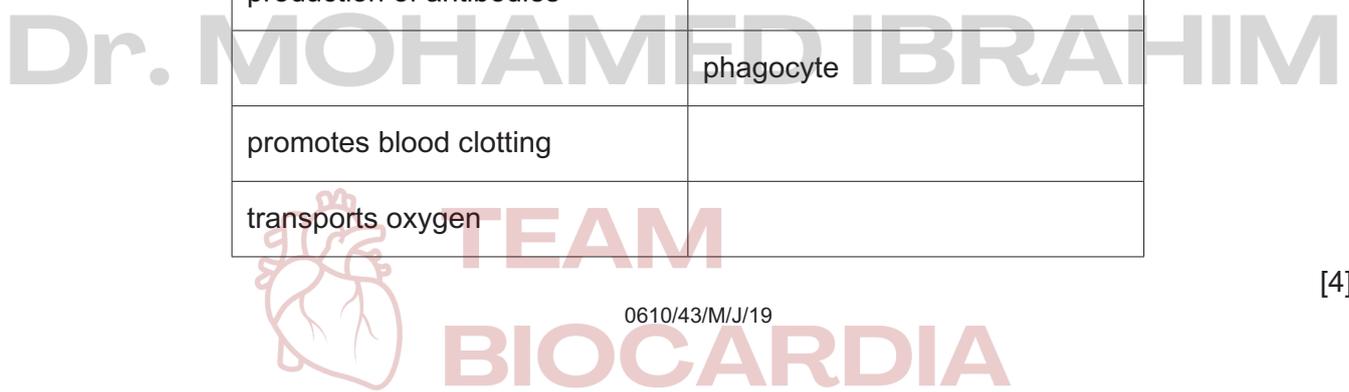
..... [1]

(b) Table 4.1 shows some information about the functions of the components of blood.

Complete Table 4.1.

Table 4.1

function	type of cell
production of antibodies	
	phagocyte
promotes blood clotting	
transports oxygen	



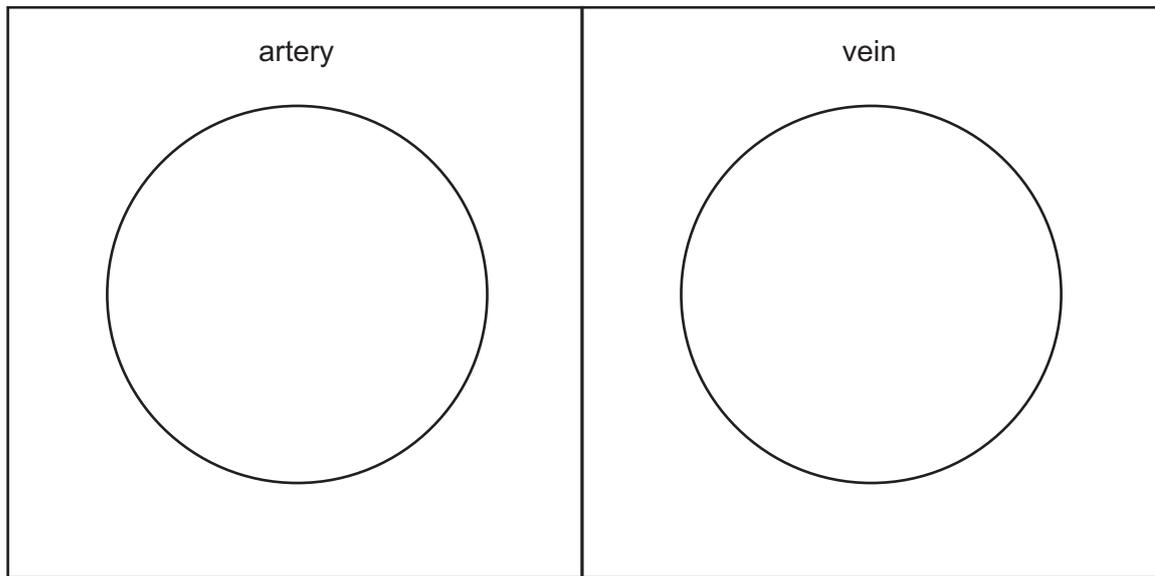
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[4]

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(c) Blood is transported in arteries and veins.

Complete the drawings of the cross-sections of an artery and a vein to show the differences between these two types of blood vessel. Label the lumen in each drawing.



[2]

(d) A diagram of a mammalian heart and associated blood vessels is shown in Fig. 4.1.

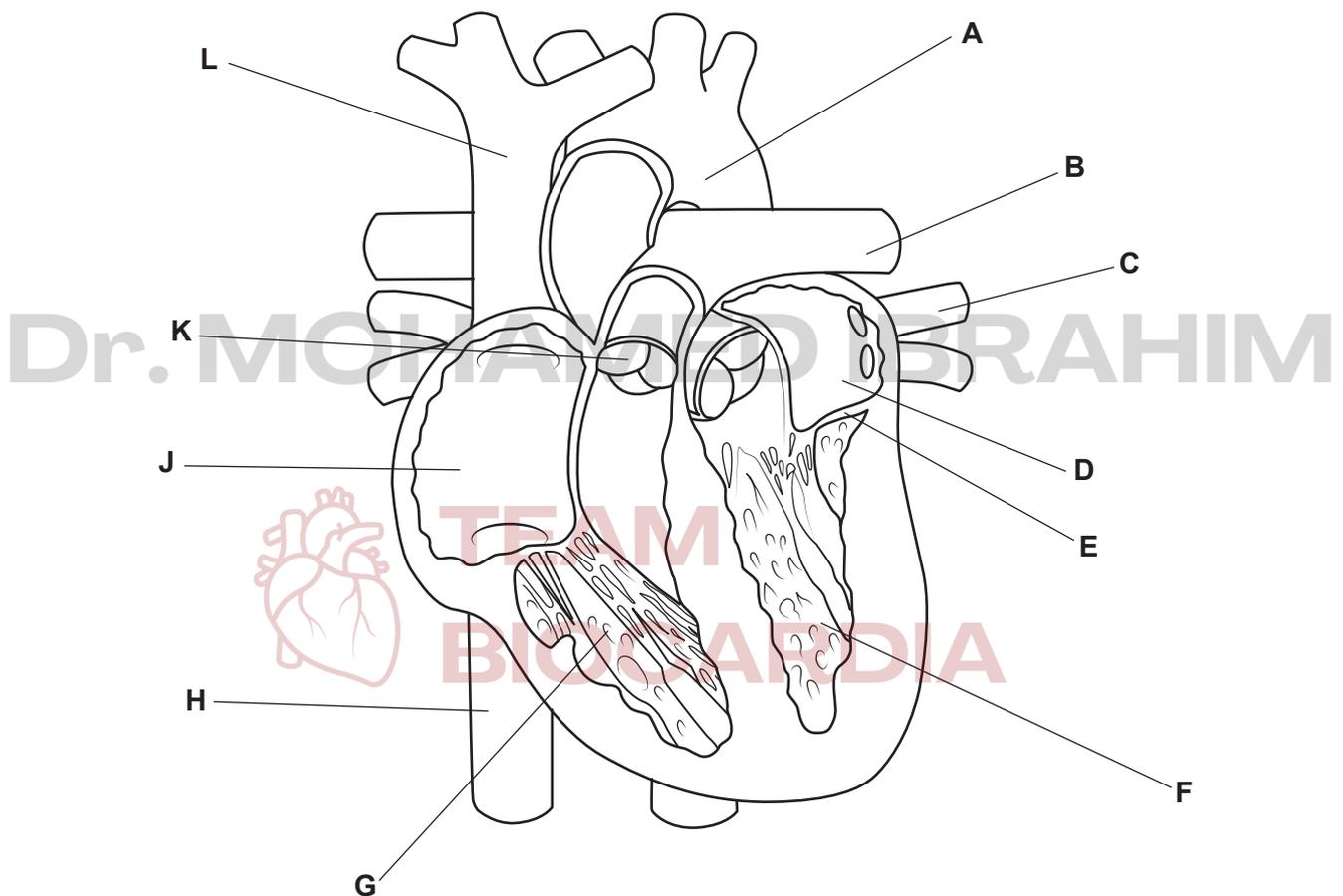


Fig. 4.1

(i) Sketch arrows on Fig. 4.1 to show the pathway taken by deoxygenated blood from the heart towards the lungs. [2]

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- 5 (a) Tissue plasminogen activators (TPAs) are human proteins that are used as drugs to break down blood clots.

TPAs break down blood clots by activating plasminogen. Plasminogen is a protein that is always present in the blood.

When activated, plasminogen forms a protease that breaks down fibrin molecules.

- (i) Plasminogen is found in the plasma.

State what is meant by the term *plasma*.

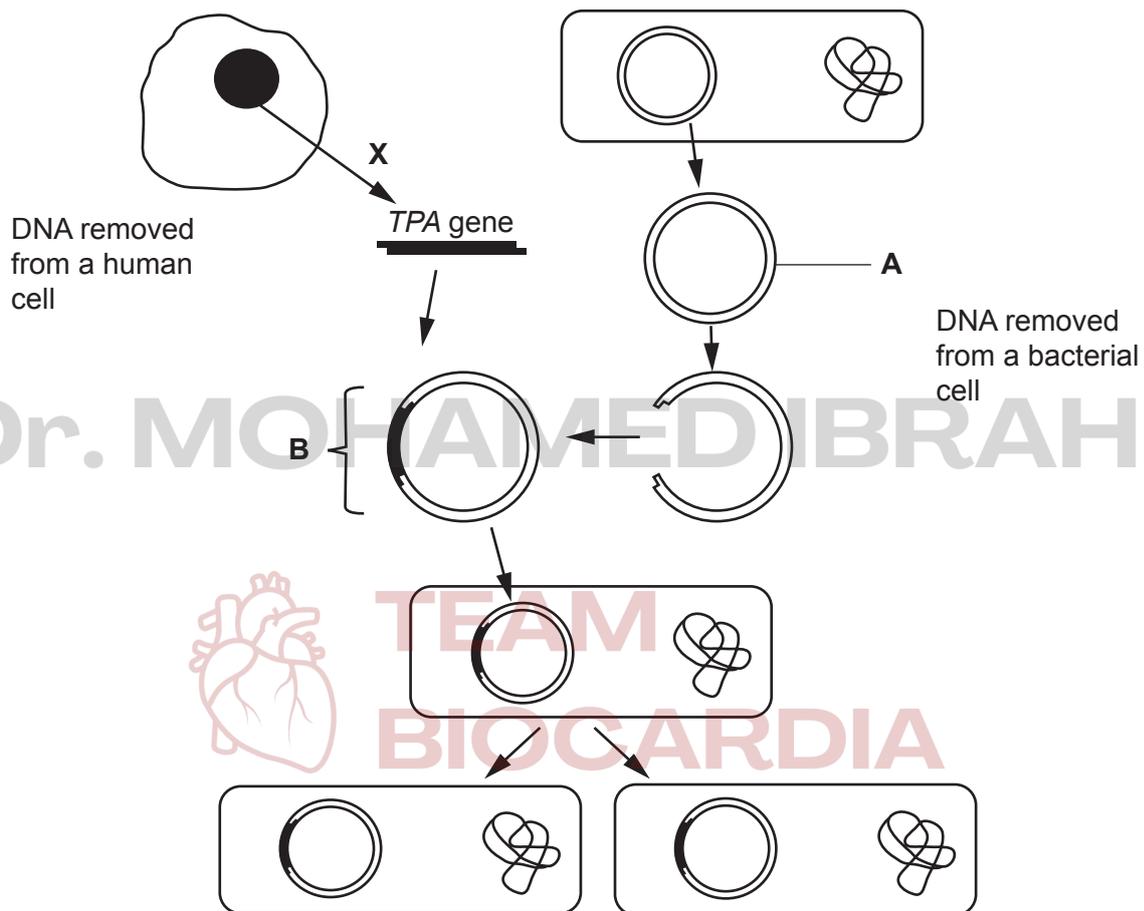
..... [1]

- (ii) State the products of the action of protease on the protein fibrin.

..... [1]

TPAs can be produced by genetically-engineered bacteria.

Fig. 5.1 shows some of the stages involved in genetically engineering a bacterium to make a TPA.

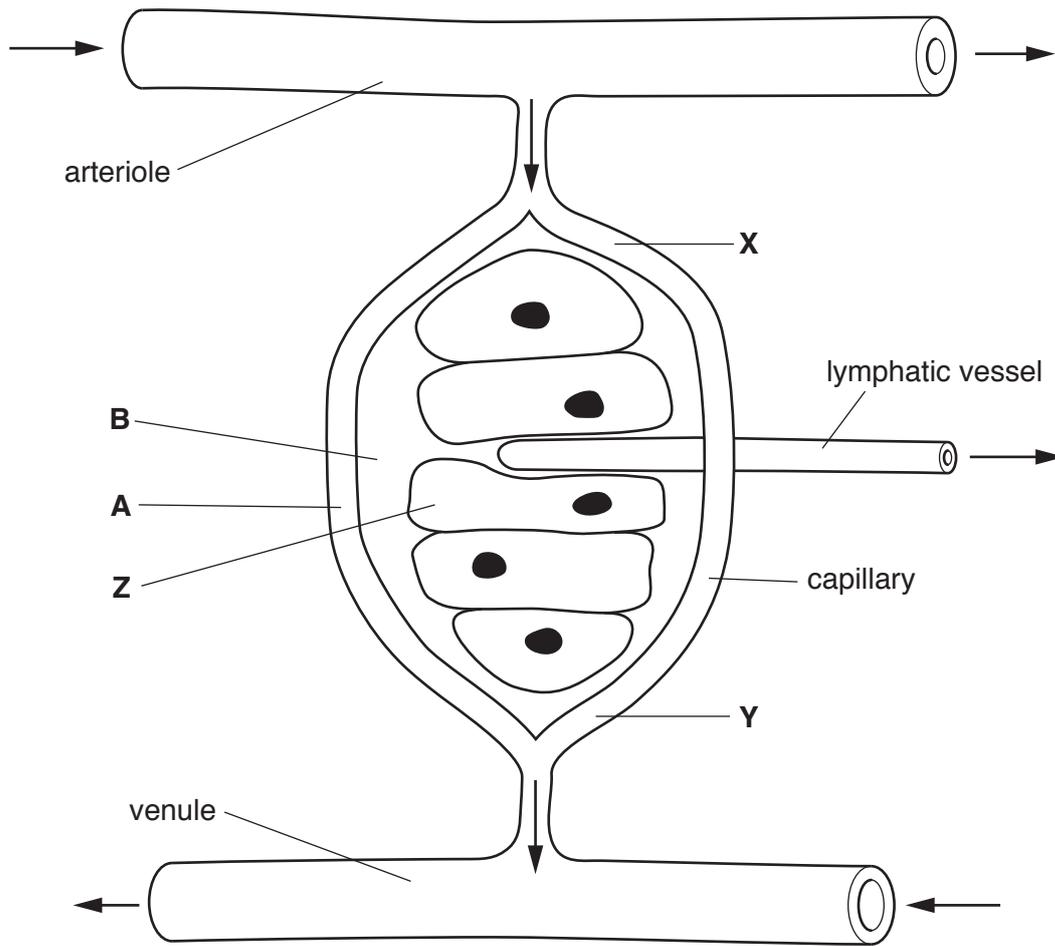


not to scale

Fig. 5.1

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- 6 Fig. 6.1 is a diagram showing some body cells and parts of the human lymphatic and circulatory systems.



not to scale

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Fig. 6.1

- (a) Capillaries allow blood to reach most cells in the body.
- (i) State the name of the process by which oxygen moves from **A** to **Z** as shown in Fig. 6.1.
[1]
- (ii) Describe how some of the liquid in **A** moves to **B** in Fig. 6.1.

[2]
- (iii) State **one** component of blood that remains inside the capillaries as the blood flows from **X** to **Y** in Fig. 6.1.
[1]

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(b) Lymphatic vessels are similar in structure to veins.

(i) Describe the structure of veins.

.....
.....
.....
.....
.....[2]

(ii) Describe the role of the lymphatic vessel shown in Fig. 6.1.

.....
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.....
.....
.....[2]

(c) Lacteals are another part of the lymphatic system.

State where in the body lacteals are found and state their function.

location in the body

function

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[2]

(d) In the lymphatic system, there are structures that contain large numbers of lymphocytes.

(i) State the name of these structures.

.....[1]

(ii) State the role of lymphocytes.

.....
.....
.....[2]

Immunity Chapter

[Total: 13]

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5 Fig. 5.1 shows a photomicrograph of human blood.

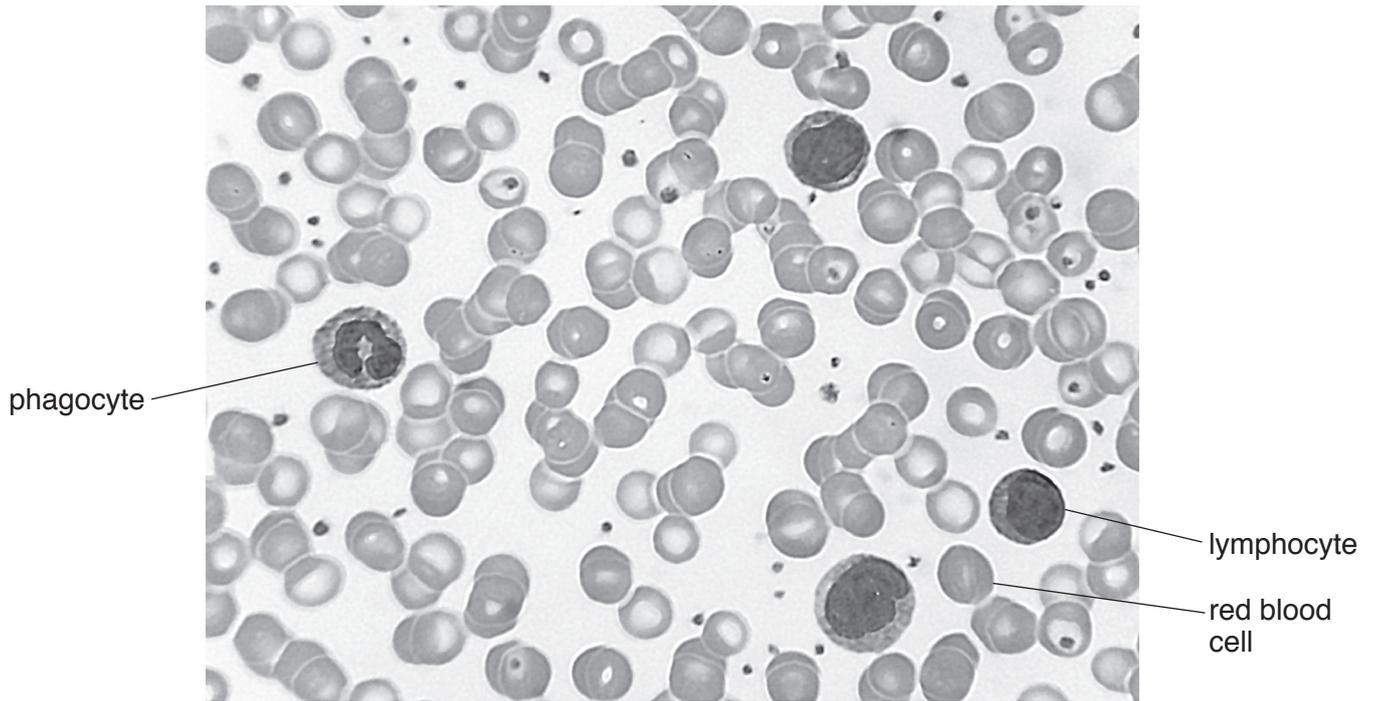


Fig. 5.1

(a) Describe the differences in appearance and the roles of the **three** cells labelled in Fig. 5.1.

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[6]

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(b) Fig. 5.2 shows some of the stages of blood clotting.

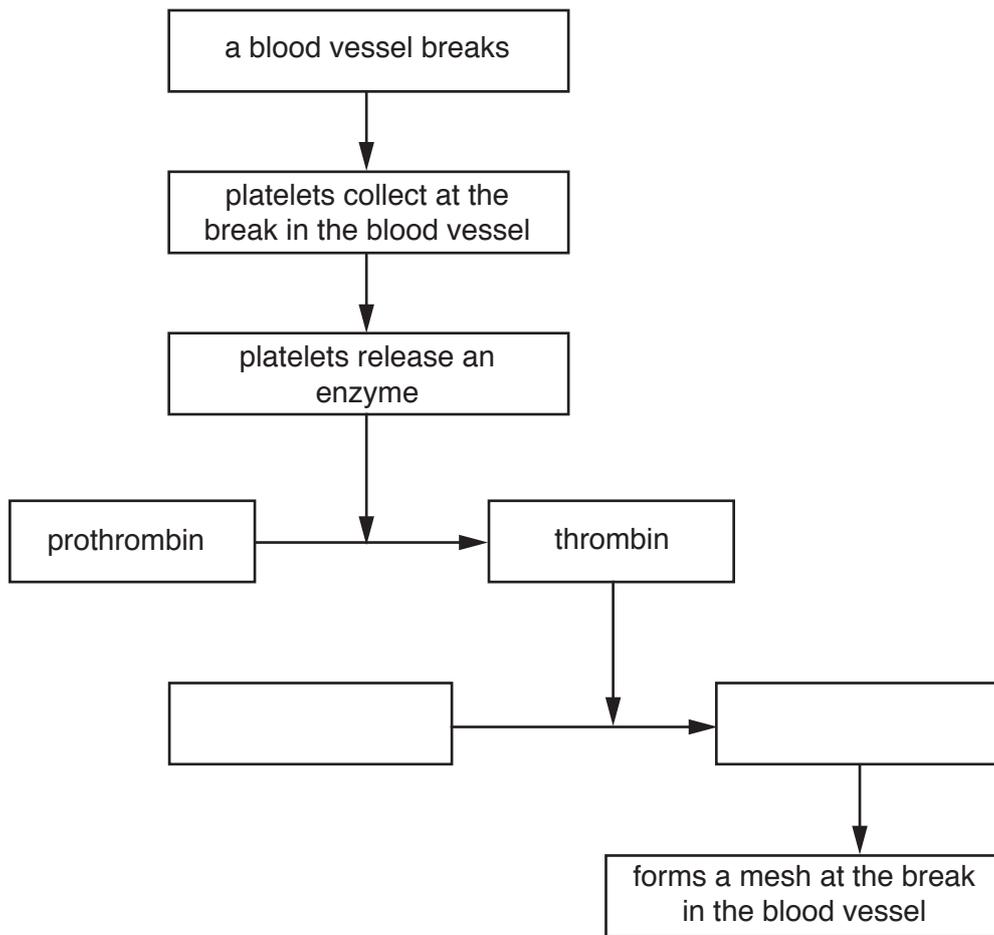
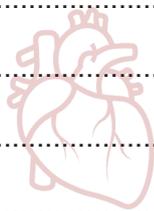


Fig. 5.2

(i) Complete Fig. 5.2 by filling in the **two** empty boxes. [1]

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(ii) State **two** roles of blood clotting.



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[2]