

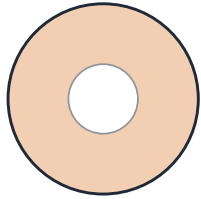
Exercise walk-through

9.4

Blood

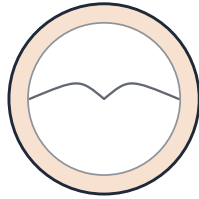
IGCSE Biology

Blood vessels



artery

thick muscular,
elastic wall;
narrow lumen;
high pressure



vein

thin wall;
wide lumen;
has **valves**;
low pressure



capillary

wall one cell
thick; lets
substances be
exchanged

■ **arteries** – thick, away
at high pressure

■ **veins** – thin, wide,
valves , back

■ **capillaries** – one
cell thick; exchange

Main: **aorta** / **vena**
cava , pulmonary, renal.

What the blood is carrying, and what defends it

Red blood cells

Red blood cells
haemoglobin

carry oxygen using the red pigment
. No nucleus, and a biconcave shape –
both give more room and more surface for oxygen.

Phagocytes

Phagocytes

carry out **phagocytosis** : they
surround and digest pathogens.

Lymphocytes

Make **antibodies**
cells behind.

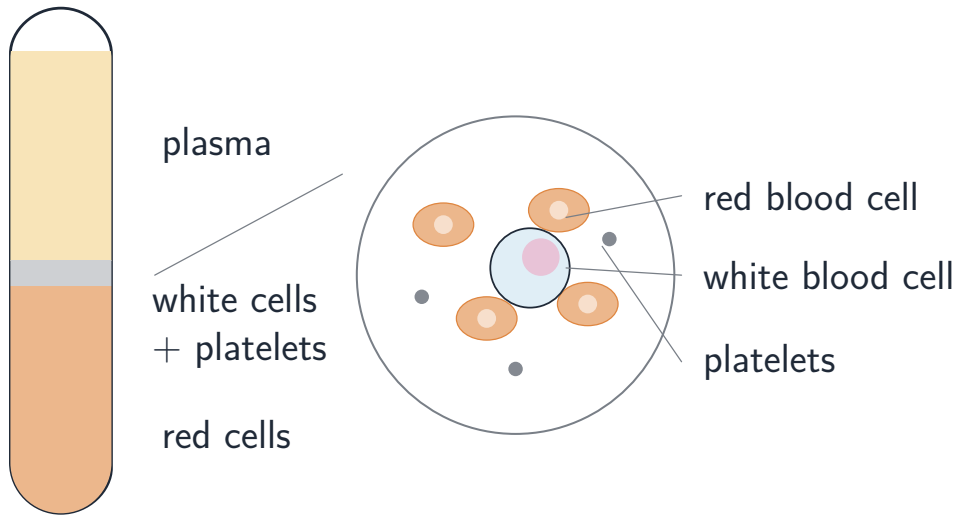
shaped to one antigen, and leave memory

Capillaries

One cell thick and very narrow, giving a large **surface**
area and a short diffusion distance – the whole point of
the circulation.

Every structure here is a shape that fits a job. Say the feature *and* the job it serves.

Blood



- **red cells** – carry O_2 via **haemoglobin**
- **white cells** –
defence
- **platelets** –
clotting
- **plasma** – carries
everything else

Defence and clotting

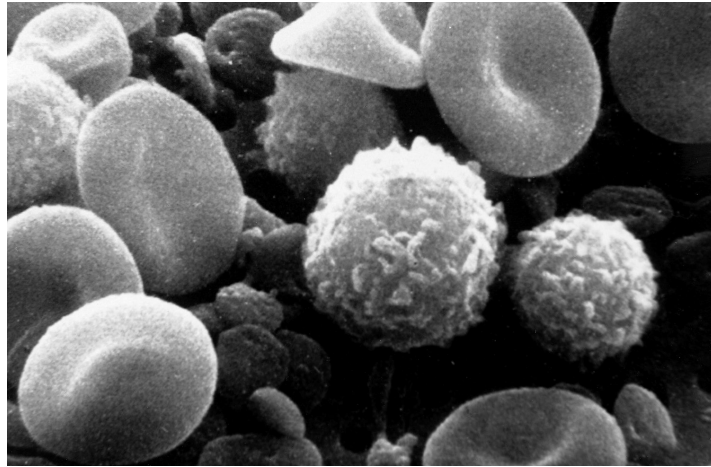
white blood cells

phagocytes engulf
pathogens ; lympho-
cytes make antibodies

clotting

fibrinogen →
fibrin threads
trap cells & seal the wound

Blood, continued



Real blood cells under an electron microscope: red cells (discs), white cells and platelets

Exercises 2.1-2.3

2.1 State the function of red blood cells.

[1]

2.2 Name the part of the blood that helps it clot.

[1]

2.3 Name the four components of blood.

[2]

Exercises 2.1-2.3

2.1 State the function of red blood cells. [1]

2.1

- red blood cells **carry oxygen** (using haemoglobin)
-

2.2 Name the part of the blood that helps it clot. [1]

2.2

- clotting uses **platelets**
-

2.3 Name the four components of blood. [2]

2.3

- red blood cells, white blood cells, platelets and plasma

Exercises 2.4·2.5

2.4 State the two roles of a blood clot.

[2]

2.5 Explain why red blood cells have no nucleus.

[2]

Exercises 2.4-2.5

2.4 State the two roles of a blood clot.

[2]

2.4

- a clot **stops further blood loss**
 - it **prevents pathogens** entering the wound
-

2.5 Explain why red blood cells have no nucleus.

[2]

2.5

- no nucleus leaves **more space**
- for **haemoglobin**, so each cell can carry more oxygen

Exercise 3.1

3.1 The liquid part of blood that carries dissolved substances is the:

[1]

☐

A plasma

B platelets

C red blood cells

D haemoglobin

Exercise 3.1

3.1 The liquid part of blood that carries dissolved substances is the:

[1]

☐

A plasma

B platelets

C red blood cells

D haemoglobin

3.1 A

- the liquid that carries dissolved substances is **plasma**
- B, C and D are cells or a protein

Exercise 3.2 (a)

3.2 White blood cells defend the body.

(a) Describe how a phagocyte deals with a pathogen.

[1]

Exercise 3.2 (a)

3.2 White blood cells defend the body.

(a) Describe how a phagocyte deals with a pathogen.

[1]

(a)

- a phagocyte **engulfs and digests** the pathogen

Exercise 3.2 (b)

3.2 White blood cells defend the body.

(b) Describe how a lymphocyte deals with a pathogen.

[1]

Exercise 3.2 (b)

3.2 White blood cells defend the body.

(b) Describe how a lymphocyte deals with a pathogen.

[1]

(b)

- a lymphocyte **makes antibodies** that stick to the pathogen

Exercise 3.3

3.3 Explain why clotting of blood at a cut is important.

[2]

Exercise 3.3

3.3 Explain why clotting of blood at a cut is important.

[2]

3.3

- the clot **seals the wound** to stop blood loss
- and **stops pathogens getting in**

Exercise 3.4 (a)

3.4 A blood sample is examined under a microscope.

(a) Complete the table by naming the component that carries out each function.

[4]

Function	Component
transports oxygen	
engulfs and digests pathogens	
produces antibodies	
transports carbon dioxide, urea and hormones	

Exercise 3.4 (a)

3.4 A blood sample is examined under a microscope.

(a) Complete the table by naming the component that carries out each function.

[4]

Function	Component
transports oxygen	
engulfs and digests pathogens	
produces antibodies	
transports carbon dioxide, urea and hormones	

(a)

- red blood cells; phagocytes; lymphocytes; plasma

Exercise 3.4 (b)

3.4 A blood sample is examined under a microscope.

(b) Describe how oxygen is carried from the lungs to a respiring muscle, using the correct terms for the two changes. [3]

Exercise 3.4 (b)

3.4 A blood sample is examined under a microscope.

(b) Describe how oxygen is carried from the lungs to a respiring muscle, using the correct terms for the two changes. [3]

(b)

- in the lungs, haemoglobin + oxygen → **oxyhaemoglobin**
- blood carries it to the muscle
- in the muscle it **dissociates** and releases oxygen

Exercise 3.4 (c)

3.4 A blood sample is examined under a microscope.

(c) Describe two ways in which a red blood cell is adapted to its function, explaining each. [4]

Exercise 3.4 (c)

3.4 A blood sample is examined under a microscope.

(c) Describe two ways in which a red blood cell is adapted to its function, explaining each. [4]

(c)

- any **two** of: **biconcave** shape → large SA:V / **no nucleus** → more haemoglobin / **small and flexible** → through capillaries

Exercise 3.4 (d)

3.4 A blood sample is examined under a microscope.

(d) Describe how a clot forms at a cut, naming the two proteins involved.

[3]

Exercise 3.4 (d)

3.4 A blood sample is examined under a microscope.

(d) Describe how a clot forms at a cut, naming the two proteins involved.

[3]

(d)

- platelets and damaged tissue release chemicals
- **fibrinogen** → insoluble **fibrin**
- fibrin mesh **traps red cells** and seals the wound

Exercise 3.4 (e)

3.4 A blood sample is examined under a microscope.

(e) A person moves to live at high altitude and their red blood cell count rises. Explain why. [2]

Exercise 3.4 (e)

3.4 A blood sample is examined under a microscope.

(e) A person moves to live at high altitude and their red blood cell count rises. Explain why. [2]

(e)

- at high altitude, **less oxygen** diffuses into the blood
- more red cells mean more haemoglobin, so **enough oxygen** still reaches tissues