

1 (a) Fig. 2.1 shows a reflex action that involves the eye.

A shows an eye in dim light. **B** shows the same eye when a bright blue light is shone into it.

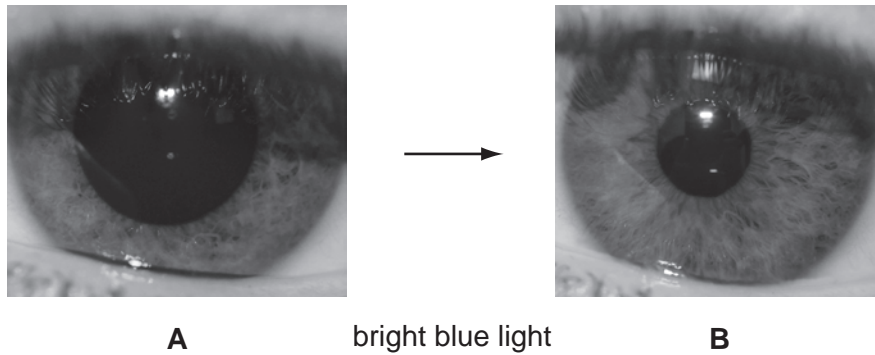


Fig. 2.1

(i) Identify the:

- stimulus to which the eye responds;
- receptor cells that detect the stimulus;
- effector;
- response that the eye makes.

Write your answers in Table 2.1.

Table 2.1

stimulus	
receptor cells	
effector	
response	

[4]

(ii) Describe how the nervous system coordinates the response shown in Fig. 2.1.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Adrenaline is secreted by the adrenal glands to prepare the body for dangerous situations.

Extreme sports, such as bungee jumping shown in Fig. 2.2, are an example of such a dangerous situation.



Fig. 2.2

2 The light sensitive cells in the eye are known as rods and cones.

Fig. 2.1 shows drawings of a rod cell and a cone cell.

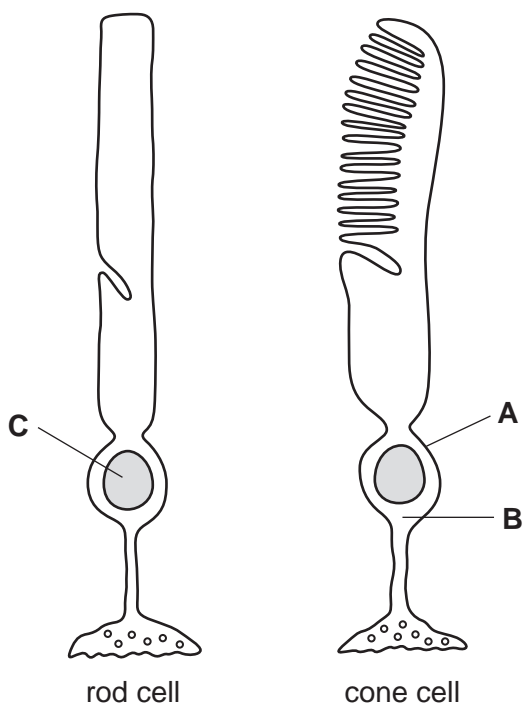


Fig. 2.1

(a) Name the structures labelled A to C.

- A
- B
- C [3]

(b) (i) Name the tissue in the eye where rods and cones are found.

..... [1]

(ii) Name the parts of this tissue where there are

cones but no rods

no cones or rods [2]

(c) Describe how rods and cones function.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

[Total: 10]

- 3 The glucose concentration of the blood is maintained within the range 80–90 mg per 100 cm³ blood.

Fig. 2.1 is a flow chart showing how the body responds to changes in the glucose concentration of the blood after the absorption of a carbohydrate-rich meal and during strenuous exercise.

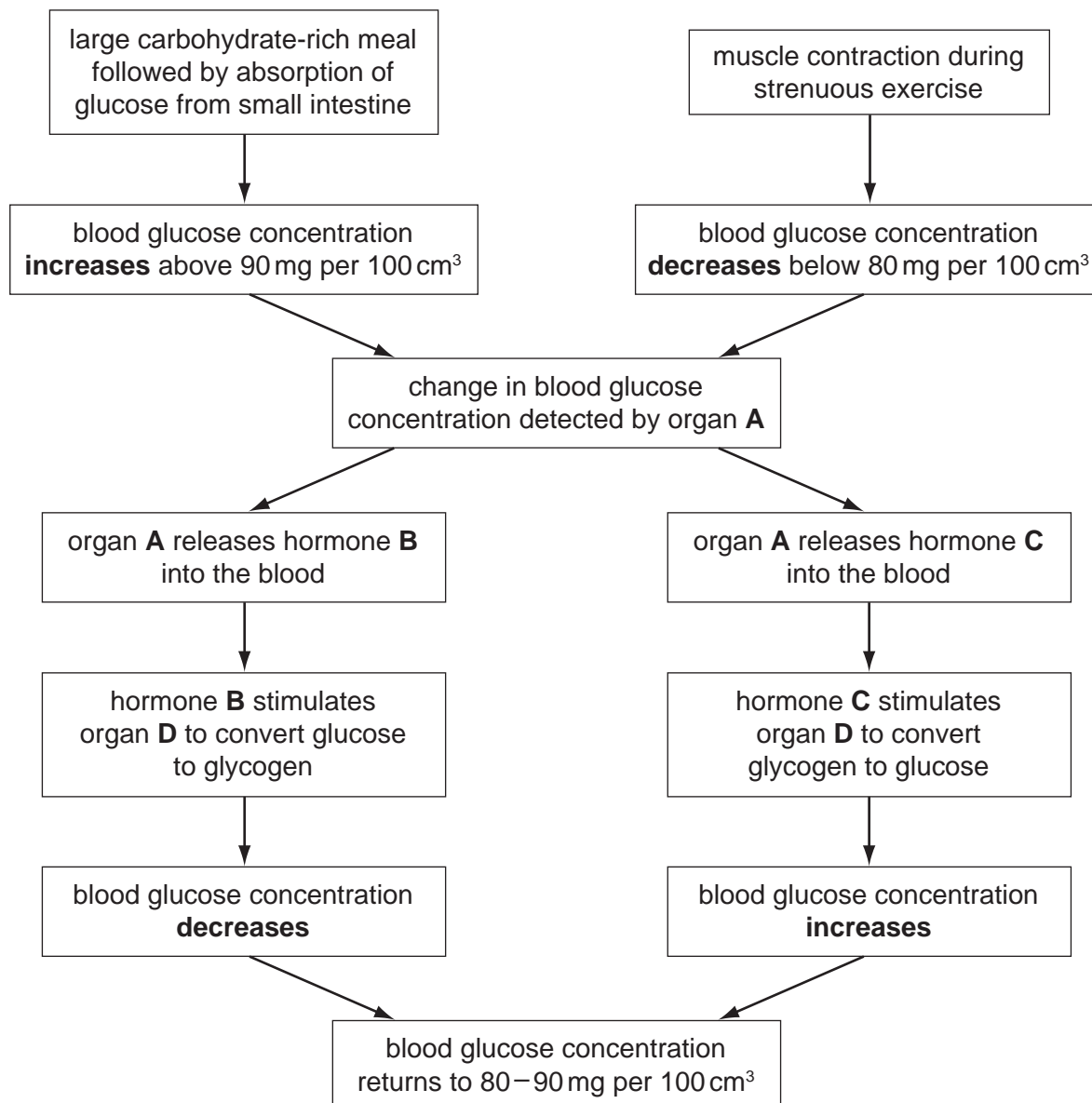


Fig. 2.1

(a) Name organ **A** and hormones **B** and **C**.

A

B

C [3]

(b) (i) Name organ **D** that stores glucose as glycogen.

..... [1]

(ii) Suggest why glucose is converted to glycogen rather than kept as glucose inside the cells.

.....

.....

.....

..... [2]

(c) Name the type of control system used in homeostasis that returns the blood glucose concentration to 80–90 mg per 100 cm³.

..... [1]

(d) Animal hormones are used in the production of milk and meat. Bovine somatotrophin (BST) is used to increase milk production by cows. The hormone is produced by genetically modified bacteria that contain the cattle gene for making BST. It is used in the United States but is banned for use in the European Union.

(i) Outline how genes, such as the one for BST, are transferred from the cells of cattle (cows) to bacteria.

.....

.....

.....

.....

.....

..... [3]

(ii) Suggest advantages **and** disadvantages of using hormones, such as BST, in the production of milk and meat.

advantages

.....

.....

.....

disadvantages

.....

.....

..... [3]

[Total: 13]

4 (a) Define the term *sensitivity*.

.....

.....

.....

..... [2]

Fig. 2.1 shows the reflex arc involved in a simple reflex action.

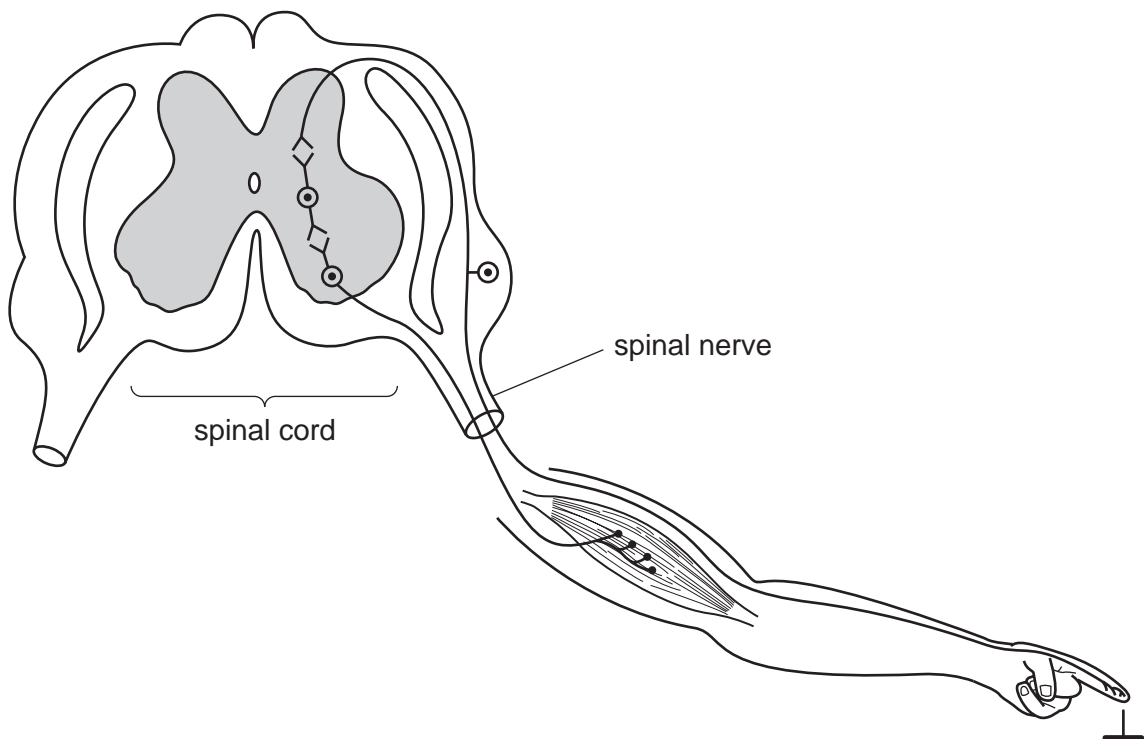


Fig. 2.1

(b) On Fig. 2.1 use label lines and the following letters to show

F a receptor in the skin

G the neurone that transmits impulses to the spinal cord

H the effector in this reflex arc.

[3]

(c) A reflex is an involuntary action.

Explain what is meant by the term *involuntary* action.

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

(d) Suggest the advantages of having reflexes.

You may refer to an example to illustrate your answer.

.....
.....
.....
.....
.....
..... [3]

(e) In dangerous situations there is an increase in the secretion of adrenaline from the adrenal glands.

Describe three ways in which this increase in adrenaline prepares the body for action.

1
.....
2
.....
3
..... [3]

[Total: 13]