

1

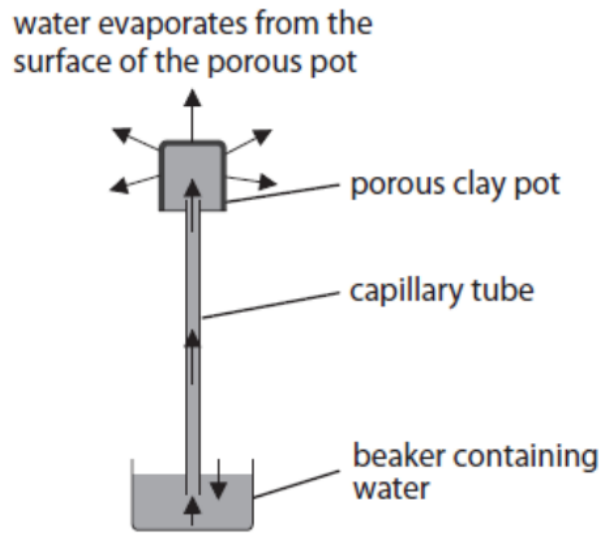
A student investigates the rate of evaporation from a clay pot and the rate of transpiration by a plant. The clay pot is porous and has small holes that allow water to evaporate.

The student keeps the clay pot and the plant in the same conditions next to a closed window. He measures the rates at different times of the day.

The table shows the student's results.

Time of day	Rate of evaporation from clay pot in cm³ per hour	Rate of transpiration from a plant in cm³ per hour
02 00 to 03 00	0.8	14
06 00 to 07 00	3.9	93
14 00 to 15 00	9.5	198
22 00 to 23 00	3.4	19

- (a) The student uses this apparatus to measure the rate of evaporation from the clay pot.



- (i) Explain the changes in the rate of evaporation from the clay pot.

(2)

- (ii) Suggest how the student could measure the rate of evaporation from the clay pot.

(3)

(b) (i) Explain one factor that affects transpiration from the plant that does not affect evaporation from the clay pot.

(2)

(ii) Draw a labelled diagram of the apparatus the student could use to determine the rate of transpiration by a plant.

(4)

2. The blood system is used for transport and protection against disease.

The table shows some components of blood and their functions.

(a) Complete the table by giving the missing information.

(5)

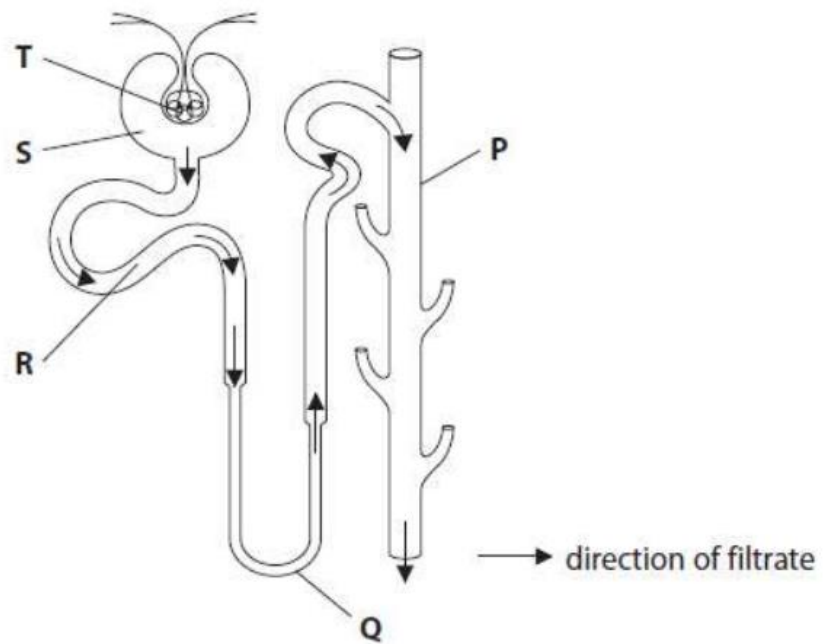
Component	Function
lymphocytes	
phagocytes	
	transports urea
	help in clotting
red blood cells	

(b) Describe the structural differences between red blood cells and white blood cells that help them carry out their functions.

(4)

3

The diagram shows part of a human nephron, with parts labelled P, Q, R, S and T.



(a) (i) What is the name of part P?

(1)

- A collecting duct
- B glomerulus
- C proximal convoluted tubule
- D renal artery

(ii) Where does ultrafiltration occur?

(1)

- A P
- B Q
- C R
- D T

(iii) Where is permeability affected by ADH?

(1)

- A P
- B Q
- C R
- D S

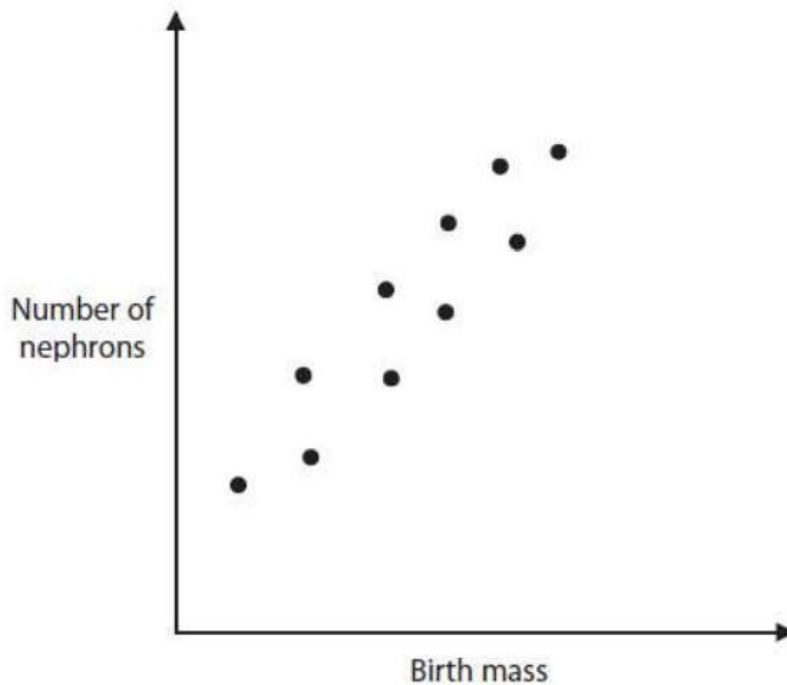
(iv) Where is glucose selectively reabsorbed into the blood?

(1)

- A Q
- B R
- C S
- D T

(b) Scientists investigate the relationship between birth mass and the number of nephrons in the kidney.

The scatter diagram shows their results.



(i) Describe the relationship shown by the scatter diagram.

(2)

(ii) Babies born with low birth mass are more likely to develop high blood pressure when they become adults.

Explain why protein in the urine of these adults may be an indication of kidney damage caused by high blood pressure.

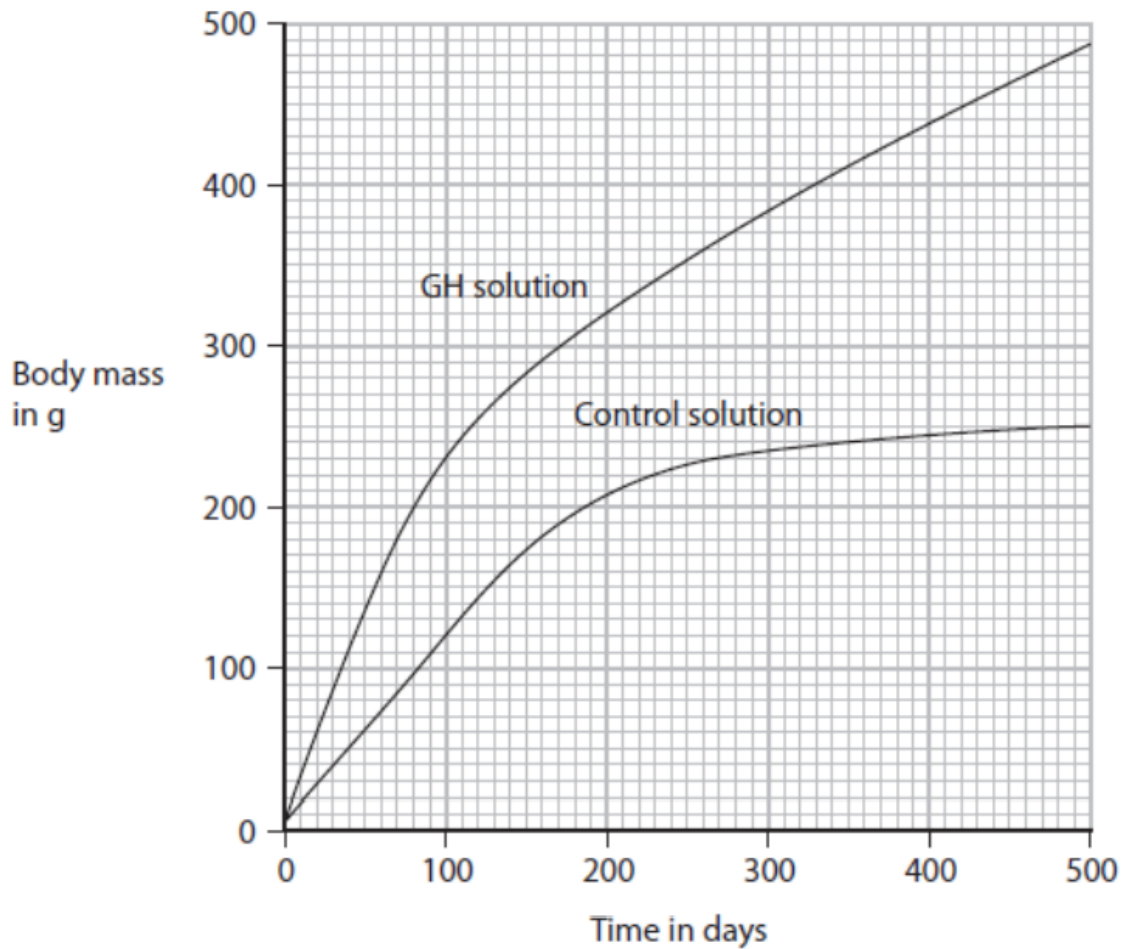
(4)

4 A scientist investigates the effect of growth hormone (GH) on the body mass of rats.

This is his method.

- give one rat a GH solution every day for 500 days
- give another rat a control solution every day for 500 days
- measure the mass of each rat each week for 500 days

The graph shows his results.



(a) Suggest how the control solution differs from the GH solution.

(1)

(b) Calculate the average rate of growth of the rat given GH solution from 100 days to 500 days.

Give your answer in g per day.

(2)

rate of growth = g per day

(c) The scientist controlled all the variables in his investigation.

Suggest two abiotic variables he controls.

(2)

1

2

(d) The scientist repeats his investigation using more rats.

Explain why using more rats improves his investigation.

(2)

5 The passage describes how plants respond to stimuli.

Complete the passage by writing a suitable word in each blank space.

(6)

Plant responses to directional stimuli are known as

Plant shoots respond to light coming from one direction by growing

..... the light. This is known as a positive

..... response. It is caused when a plant growth substance

called diffuses away from the light. This increases the

rate of growth on the side of the shoot furthest away from the light.

Shoots also respond to This is known as

a geotropic response.