

Endocrine system & hormones (e.g., blood glucose control)

Q1.a(2018)

Insulin is produced by an endocrine gland and is transported in the blood.

(a) (i) Which row shows the endocrine gland and the target organs for insulin?

(1)

	endocrine gland	target organs
☒ A	adrenal	liver and muscles
☒ B	adrenal	small and large intestines
☒ C	pancreas	liver and muscles
☒ D	pancreas	small and large intestines

Q1.b(2018)

(ii) Which part of the blood transports insulin to its target organs?

(1)

- ☒ A plasma
☒ B red blood cells
☒ C white blood cells
☒ D platelets

Q2.a(2018)

(b) Figure 1 shows the blood glucose and blood insulin concentration for a healthy person during one day.

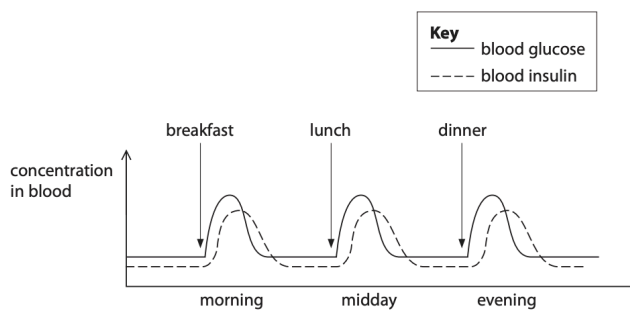


Figure 1

The blood glucose concentration increases after a meal.

Explain why the blood glucose concentration then decreases.

(2)

Q2.b(2018)

State **one** cause of type 1 diabetes.

(1)

Q2.c(2018)

Explain how controlling the diet can be used to treat type 2 diabetes.

(2)

Q2.d(2018)

A scientist is planning to test a new treatment for type 2 diabetes.

She selects 300 volunteers who have type 2 diabetes.

State **two** other factors that the scientist should consider when selecting the 300 volunteers.

(2)

Q3.a(2019,4)

Figure 3 shows the positions of the endocrine glands in a woman and a man.

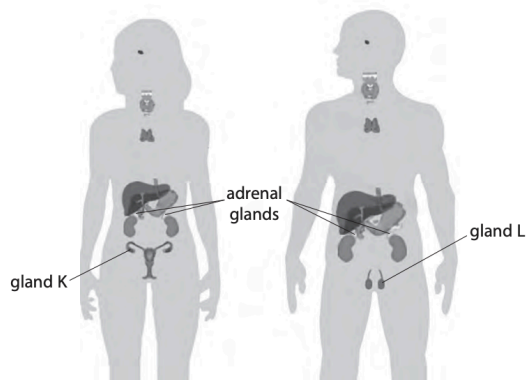


Figure 3

(a) Draw **one** straight line from each hormone to the effect of the hormone on the body.

(2)

hormone	effect of hormone
hormone from gland K in the woman	<ul style="list-style-type: none"> increases glucose levels prepares the uterus lining for a fertilised egg causes facial hair to grow controls the water content of the body decreases sweating
hormone from gland L in the man	

Q3.b(2019,4)

(b) How is adrenalin transported from the adrenal glands to its target organs?

(1)

- ☐ A by transpiration
- ☐ B by osmosis
- ☐ C dissolved in blood plasma
- ☐ D carried by red blood cells

Q3.c(2019,4)

(c) What name is given to the process of maintaining the internal body conditions?

(1)

- ☐ A respiration
- ☐ B diffusion
- ☐ C digestion
- ☐ D homeostasis

Q4.a(2019,4)

(d) Figure 4 shows the concentration of glucose in the blood of a person.

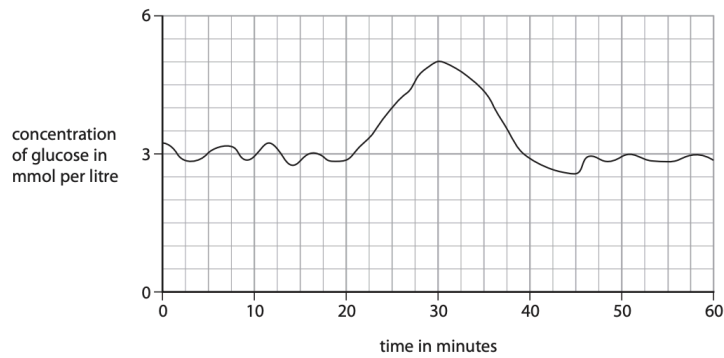


Figure 4

(i) Describe the trends shown in Figure 4 from 0 minutes to 30 minutes.

(2)

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.....

.....

.....

Q4.a(2019,4)

Explain why the concentration of glucose decreases from 30 minutes to 40 minutes.

(2)

.....

.....

.....

.....

Q5.a(2020,4)

- (i) Which row of the table shows the endocrine gland and hormone involved in the control of blood glucose concentration?

(1)

	endocrine gland	hormone
☐ A	ovary	oestrogen
☐ B	ovary	insulin
☐ C	pancreas	oestrogen
☐ D	pancreas	insulin

Q5.b(2020,4)

State a target organ for the hormone that controls blood glucose concentration.

(1)

Q6.a(2020,4)

People with a high BMI are more likely to develop type 2 diabetes.
Figure 8 shows the mass, height and BMI for two people.

person	mass in kilograms	height in metres	BMI
A	110	2.0	?
B	85	1.5	38

Figure 8

- (i) Use the formula to calculate the BMI for person A

$$\text{BMI} = \frac{\text{mass}}{\text{height}^2}$$

(2)

Q6.b(2020,4)

Person B develops type 2 diabetes.

Describe **two** lifestyle changes person B should make to help to control their blood glucose concentration.

(2)

Q7.(2021,4)

Endocrine glands make hormones.

Which endocrine gland is situated in the head and is attached to the brain?

(1)

- ☐ A adrenal
☐ B pancreas
☐ C pituitary
☐ D thyroid

Q8.(2021,4)

Diabetics cannot effectively control the concentration of glucose in their blood.

(b) Person A has type 1 diabetes.

Person B has type 2 diabetes.

Draw one straight line from each person to the cause of their type of diabetes.

(2)

person	cause
<div style="border: 1px solid black; padding: 5px; display: inline-block;">person A (type 1)</div>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">• does not have a pancreas</div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;">• cannot digest fatty foods</div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;">• does not produce insulin</div>
<div style="border: 1px solid black; padding: 5px; display: inline-block;">person B (type 2)</div>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">• has cells that have stopped responding to insulin</div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;">• cannot transport insulin in the blood</div>

Q9.a(2021,4)

(c) A scientist investigated how the waist to hip ratio affected the probability of developing type 2 diabetes.

The scientist chose 100 females in each of five waist to hip ratio groups and recorded if they developed type 2 diabetes.

Figure 6 shows the results.

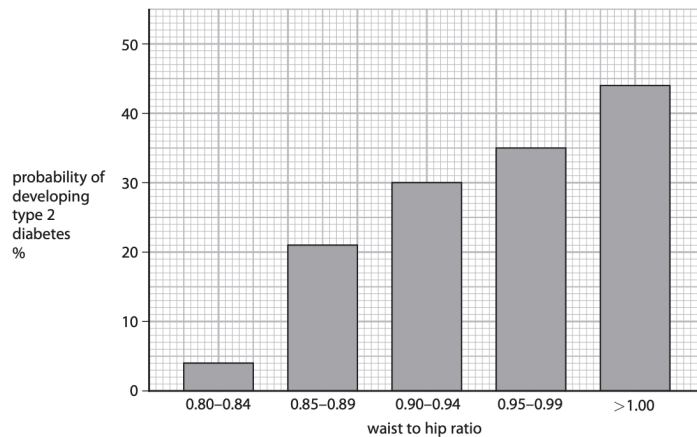


Figure 6

(i) Describe the trend shown in Figure 6.

Use data from Figure 6 in your answer.

(2)

Q9.b(2021,4)

A female has a waist measurement of 78.3 cm and a hip measurement of 90.0 cm.

Calculate the waist to hip ratio for this female and use Figure 6 to estimate the probability that she will develop type 2 diabetes.

(2)

probability %

Q9.c(2021,4)

The scientist also measured the BMI of the females.

BMI and waist to hip ratio are two factors that affect the probability of females developing type 2 diabetes.

State **two** other factors about the females in the study that would affect the probability of them developing type 2 diabetes.

(2)

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.....

.....

Q9.d(2021,4)

State why an athlete may have a high BMI but still have a low probability of developing type 2 diabetes.

(1)

.....

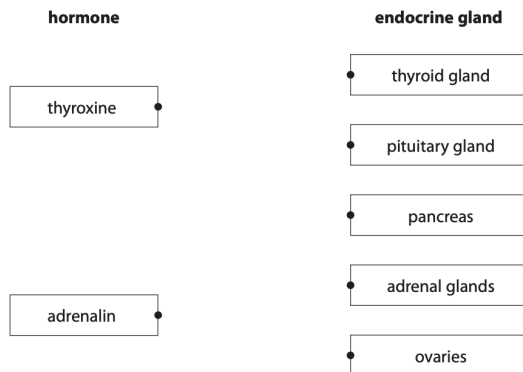
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Q10.(2023,4)

Hormones are chemicals produced in endocrine glands.

(a) Draw **one** straight line from each hormone to the endocrine gland that produces it.

(2)



Q11.a(2023,4)

People with diabetes cannot always control the concentration of glucose in their blood.

(a) Two people eat identical meals.

One person has diabetes, the other person does not have diabetes.

Figure 9 shows the concentration of glucose in the blood of these two people after eating the meals.

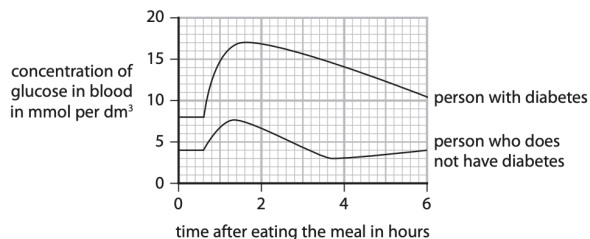


Figure 9

(i) Describe **two** differences in the concentration of glucose in the blood of the two people shown in Figure 9.

(2)

Q11.b(2023,4)

Calculate the maximum increase in the concentration of glucose in the blood of the person with diabetes.

(1)

..... mmol per dm³

Q11.c(2023,4)

Water moved out of the red blood cells of the person with diabetes when the concentration of glucose in the blood was above 15 mmol per dm³.

Explain why water moved out of the red blood cells of the person with diabetes.

(2)

Q11.d(2023,4)

The pancreas produces a hormone that causes the concentration of glucose in the blood to decrease.

(i) Name this hormone.

(1)

Q11.e(2023,4)

State how this hormone is transported from the pancreas to its target organs.

(1)

Q11.f(2023,4)

Which is the target organ for the hormone that controls the concentration of glucose in the blood?

(1)

- ☐ A kidney
- ☐ B pancreas
- ☐ C liver
- ☐ D lung

Q11.g(2023,4)

Explain how type 2 diabetes can be controlled.

(3)

Q12.a(2024,4)

Insulin is a hormone that controls blood glucose concentration.

(i) Which endocrine gland produces insulin?

(1)

- ☐ A thyroid
- ☐ B pancreas
- ☐ C adrenal
- ☐ D pituitary

Q12.b(2024,4)

State how insulin is transported from its endocrine gland to its target organs.

(1)

Q12.c(2024,4)

Name the main target organ for insulin.

(1)

Q13.a(2024,4)

(d) People with type 1 diabetes cannot produce insulin.

Figure 5 shows the blood glucose concentration for a person with type 1 diabetes.

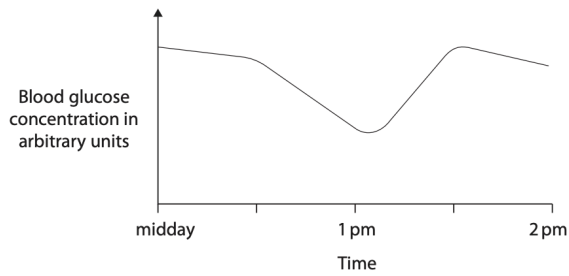


Figure 5

(i) Describe the trend from midday to 1 pm.

(2)

Q13.b(2024,4)

State what a person with type 1 diabetes could have done to cause the change in the blood glucose concentration from 1.05 pm to 1.30 pm.

(1)

Q13.c(2024,4)

People with type 2 diabetes have cells that do not respond to insulin.

State **two** ways that people with type 2 diabetes can control their blood glucose concentration.

(2)