A13 · Blood sugar: insulin, glucagon and diabetes mellitus · Practice key

This is the worked key. Every practice question is worked step by step.

Worked examples

Read these first. There is one for each kind of question in this lesson.

Example 1 · Choose between insulin and glucagon

A person has just eaten a large meal. Which hormone does the pancreas release, and what does it do?

1. After a meal, blood sugar is too high.
2. The beta cells release insulin.
3. Cells take in glucose, and the liver stores it as glycogen.

Answer: Insulin. It lowers blood sugar.

Example 2 · Read a blood sugar graph

Blood sugar is 5 mmol/L before a snack and 9 mmol/L at its highest. Find the rise.

1. Read the starting value and the highest value.
2. 9 − 5 = 4.

Answer: It rises by 4 mmol/L.

Practice

Questions 1 to 4 are easy. Questions 5 to 8 are medium. Questions 9 and 10 are harder.

EASY

1. Name the organ that releases insulin and glucagon.

1. Its islet cells make both hormones.
2. It is the pancreas.

EASY

2. Name the cells that release glucagon.

1. Beta cells release insulin.
2. Alpha cells release glucagon.

EASY

3. Name the stored form of glucose in the liver.

1. Insulin makes the liver store glucose.
2. The stored form is glycogen.

EASY

4. State the word for high blood sugar.

1. Hyper means too much.
2. The word is hyperglycemia.

MEDIUM

5. State when glucagon is released and what it does.

1. It is released when blood sugar is too low.
2. It makes the liver change glycogen into glucose.

MEDIUM

6. Blood sugar is 5 mmol/L before a snack and 9 mmol/L at its highest. Calculate the rise. Name the hormone that brings it back down.

1. 9 − 5 = 4 mmol/L.
2. Insulin brings it back down.

MEDIUM

7. Explain why glucose appears in the urine of a person with untreated diabetes mellitus.

1. Blood sugar is very high.
2. The kidneys cannot return all the glucose to the blood.

MEDIUM

8. State one difference in cause and one difference in treatment between type 1 and type 2 diabetes.

1. Cause: in type 1 the beta cells are destroyed. In type 2 the body still makes insulin.
2. Treatment: type 1 needs insulin injections. Type 2 is treated with diet, exercise and medicine.

HARDER

9. A person with type 1 diabetes forgets an insulin injection and then eats a meal. Predict what happens to blood sugar. Explain.

1. Glucose from the meal enters the blood.
2. With no insulin, the cells cannot take the glucose in.
3. Blood sugar rises and stays high.

HARDER

10. The alpha cells of a person stop working. The beta cells are normal. Predict what happens to blood sugar many hours after a meal. Explain.

1. Many hours after a meal, blood sugar falls.
2. No glucagon is released to raise it.
3. Blood sugar falls too low.