

5.3.2 Control of blood glucose concentration

AQA GCSE Biology (Higher) Question and answer notes

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How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

What is blood glucose concentration? Why is it important that it is monitored and controlled?

Blood glucose concentration is the concentration of the sugar glucose in the bloodstream. If it gets too low or too high it causes problems in the body. Therefore it must be monitored and controlled to keep it within certain limits.

Which endocrine gland monitors and controls blood glucose concentration?

The pancreas monitors and controls blood glucose concentration.

How does the pancreas respond when it detects that the blood glucose concentration is too high?

When the pancreas detects that the blood glucose concentration is too high, it responds by secreting the hormone insulin into the bloodstream.

What are the target organs of insulin?

The target organs of insulin are the liver and the muscles.

What are the effects of insulin?

Insulin stimulates cells in the liver and muscles to take up glucose from the bloodstream and convert it glycogen for storage. This lowers the blood glucose concentration.

How does the pancreas respond when it detects that the blood glucose concentration is too low?

When the pancreas detects that the blood glucose concentration is too low, it responds by secreting the hormone glucagon.

What are the target organs of glucagon?

The target organs of glucagon are the liver and the muscles.

What are the effects of glucagon?

Glucagon stimulates cells in the liver and muscles to break glycogen down into glucose and release it into the bloodstream. This increases the blood glucose concentration.

What is negative feedback?

Negative feedback is when a system responds to a change by carrying out changes which reverse that change. In the body, negative feedback is used to maintain conditions within narrow limits.

How is negative feedback used to control blood glucose concentration in the human body?

Insulin and glucagon work together to form a negative feedback cycle that controls blood glucose concentration. If the blood glucose concentration rises too high, the pancreas releases insulin, which stimulates responses that reverse this change. If the blood glucose concentration falls too low, the pancreas releases glucagon, which stimulates responses to reverse that change.

What is diabetes?

Diabetes is a non-communicable disease in which the body loses its ability to control blood glucose concentration. There are two types of diabetes called Type 1 diabetes and Type 2 diabetes.

What happens in Type 1 diabetes?

In Type 1 diabetes, the pancreas fails to produce enough insulin. This leads to an uncontrolled high blood glucose concentration.

How is Type 1 diabetes usually treated?

Type 1 diabetes is usually treated with insulin injections.

What happens in Type 2 diabetes?

In Type 2 diabetes, the body cells no longer respond to insulin.

What is one risk factor for Type 2 diabetes?

Obesity is a risk factor for Type 2 diabetes.

How is Type 2 diabetes usually treated?

Type 2 diabetes is usually treated with a carbohydrate controlled diet and an exercise regime.