AQA, OCR, Edexcel

A Level

A Level Biology

Control of Blood Glucose Answers

Name:

M M E

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Total Marks: /36

Control of Blood Glucose

Answer	Marks
1. a) i) – Pancreas - Beta cells secrete insulin - Alpha cells secrete glucagon	3 marks
ii) – binds to receptors on liver and muscle cells - Increases membrane permeability to glucose so more glucose is taken up by cells - Activates enzymes that convert glucose to glycogen in glycogenesis	3 marks
iii) <u>Glycogenesis:</u> - Glucose molecules form glycogen - liver cells/ muscle cells <u>Gluconeogenesis:</u> - Formation of glucose from non-carbohydrates (fatty acids and amino acids) - Liver <u>Glycogenolysis:</u> - Hydrolysis of glycogen into glucose - Liver	6 marks

b) i) – If the blood glucose level rises too high this is detected by the pancreas. - Causes the β cells to start secreting insulin and stops the α from secreting glucagon -Insulin increases the uptake of glucose into the cells and glycogenesis occurs -Blood glucose level decreases - If the blood glucose levels falls by too much, the pancreas detects this - The α cells start secreting glucagon and the β cells stop secreting insulin - Glucagon acts on liver cell receptors - Activates glycogenolysis and gluconeogenesis - Cells release glucose into the blood, increase the blood glucose level	9 marks
c) i) – Adrenaline secreted during 'fight or flight response' - Activates enzymes that hydrolyse glycogen stores to - promote glycogenolysis to increase glucose concentration in the blood - Inhibit insulin production - More glucose available for muscle activity	4 marks
ii) Binding of adrenaline and glucagon activates adenylate cyclase - This converts ATP into a 'second messenger' called cyclic AMP (cAMP) - cAMP activates a chain of reactions that cause glycogenolysis/ activate Kinase A.	3 marks

2. a) i) Hyperglycaemic – when the blood glucose level is too high Hypoglycaemic – when the blood glucose level is too low	2 marks
ii) <u>Type 1</u> - β cells destroyed - don't produce any insulin - glucose cannot be absorbed into the cells after eating - Carefully controlled by insulin injections - <u>Type 2:</u> - Caused by lifestyle and diet. - Body's cells don't respond to insulin because the receptors do not work - Controlled through diet changes and increased exercise.	6 marks