WJEC (Eduqas) Biology A-level

Topic 1.1 - Importance of ATP

Flashcards

What is ATP?

What is ATP?

- Adenosine triphosphate
- The universal energy carrier found in all living cells

Where is ATP produced?

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ATP is synthesised in the internal membranes of mitochondria and chloroplasts.

Describe how ATP is synthesised.

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- Involves **ATP synthase**, an enzyme found embedded in cellular membranes
- ATP synthase phosphorylates ADP to form ATP as protons flow through it, down an electrochemical gradient.

Compare the flow of protons across the mitochondrial and chloroplast membranes.

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Mitochondrial membrane: H^+ flow across the inner membrane, from the intermembrane space into the matrix.

Chloroplast membrane: H^+ flow across the thylakoid membrane, from the thylakoid space into the stroma.

Define chemiosmosis

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The synthesis of ATP through the movement of protons down their **electrochemical gradient** across a partially permeable membrane, catalysed by ATP synthase. As the protons move down, energy is released for the attachment of an inorganic phosphate to ADP forming ATP.

How is the proton gradient maintained during chemiosmosis?

How is the proton gradient maintained during chemiosmosis?

Potential energy associated with excited electrons is coupled to the active transport of H^+ across the membrane by **proton pumps**.

What is the electron transport chain?

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A series of electron carrier proteins each with progressively lower energy levels that transfer electrons in a chain of oxidation-reduction reactions, forming a gradient of protons that enables ATP synthesis.

How can dehydrogenase activity be investigated?

How can dehydrogenase activity in chloroplasts be investigated?

Investigated using artificial hydrogen acceptors such as DCPIP, methylene blue and tetrazolium compounds.

What colour change is observed when DCPIP is reduced?

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Blue to colourless

What colour change is observed when methylene blue is reduced?

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Blue to colourless