

OCR (A) Biology A-level

6.1.1 - Cellular control

Flashcards

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What is a mutation?



What is a mutation?

An alteration to the DNA base sequence.
Often arise spontaneously during DNA replication.



What are addition and deletion mutations?



What are addition and deletion mutations?

- Where one or more nucleotides (bases) are either inserted or deleted from the DNA sequence.
- More likely to be either harmful or beneficial, due to frame shift which means the entire amino acid sequence will be different.



What is a substitution mutation?



What is a substitution mutation?

- When a nucleotide in the DNA sequence is replaced by another.
- More likely to be a neutral mutation, meaning no change occurs in the amino acid sequence.



How is gene expression regulated at the transcriptional level?



How is gene expression regulated at the transcriptional level?

Transcription factors. These are proteins that can either initiate or inhibit the transcription of genes, so that only certain parts of the DNA are expressed.



Describe the function of the lac operon in low lactose concentrations.



Describe the function of the lac operon in low lactose concentrations.

- E.coli can use lactose as a respiratory substrate, via use of an enzyme.
- When lactose concentration is low, the lac operon binds to the gene that makes this enzyme and inhibits its expression.



Describe the function of the lac operon in high lactose concentrations.



Describe the function of the lac operon in high lactose concentrations.

Lactose binds to the operon, causing it to change shape and unattach from the gene. Allows RNA polymerase to bind and the gene to be expressed.



How is gene expression regulated at the post-transcriptional level?



How is gene expression regulated at the post-transcriptional level?

Splicing. Primary mRNA contains both coding regions (exons) and non-coding regions (introns). The introns are removed to produce mature mRNA ready for translation.



How is gene expression regulated at the post-translational level?



How is gene expression regulated at the post-translational level?

Activation of proteins, such as adrenaline. When adrenaline binds to a receptor, an enzyme is activated which converts ATP to cyclic AMP. Prompts further enzyme reactions, which activates the protein.



How is development controlled by homeobox genes?



How is development controlled by homeobox genes?

Code for transcription factors that activate genes when they're needed during development of a zygote. Their sequences are similar in plants, animals, and fungi.



How is development controlled by mitosis?



How is development controlled by mitosis?

Mitosis (cell replication) is the primary mechanism of growth. Genes regulating mitosis respond to various stimuli, both internal and external, in order to control rate of growth.



How is development controlled by apoptosis?



How is development controlled by apoptosis?

Programmes the death of cells. It is highly controlled and keeps cell division at a constant rate so as to prevent cancer.

