

Gene Regulation Explored

Part 1: Gene Expression in Bacteria

Bacterial operons are sets of genes that share a common promoter and are expressed together. Expression includes transcription and translation.

- A Key to Life: Controlling Gene Expression
- Gene Expression Overview
- Transcription
- Translation
- Promoters and Operons
- Check Your Understanding
- Summary of Part 1

Part 2: Repression

Repressor proteins can turn off transcription of operons in response to cellular conditions.

- Switching Off
- Conditional vs. Constitutive Expression
- Repressors and Operators
- Repressor Binding
- Expression of the Repressor Gene
- Repressor and Operator Mutations
- Check Your Understanding
- Summary of Part 2

Part 3: Activation

Prokaryotic cells use activator proteins to increase transcription of genes.

- Dialing Up
- Cyclic AMP Reflects Extracellular Glucose Availability
- Strong vs. Weak Promoters
- Activators and Activator Sites
- How Activators Work
- Activation and Repression Work Together
- Mutations in the lac Operon
- Check Your Understanding
- Practice: Build the lac Operon
- Summary of Part 3

Part 4: Practicing with Gene Regulation

Explore gene regulation by designing a series of increasingly challenging expression patterns.

- Up and Down, On and Off

- Genetic Engineering and Human Growth Hormone
- Tryptophan
- Fluorescent Proteins
- Practice: GFP + lac Repressor
- Practice: GFP + lac Repressor + CAP

Part 5: Quiz Questions

Quiz Questions

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