ADVANCED BIOLOGY: REGULATION OF GENE EXPRESSION

(USE CHAPTER 18 AS A RESOURCE)

BACTERIA OFTEN RESPOND TO ENVIRONMENTAL CHANGE BY REGULATING TRANSCRIPTION



1. Operons: The Basic Concept



1. Operator
2. Operon
3. Repressor
4. Regulatory gene
5. Corepressor
6. Repressible and Inducible Operons: Two Types of negative Gene Regulation
7. Repressible Operon
8. Inducible Operon

 

1. Inducer
2. Positive Gene Regulation



EUKARYOTIC GENE EXPRESSION IS REGULATED AT MANY STAGES

1. Differential Gene Expression



1. Regulation of Chromatin Structure
2. Histone Modifications and DNA Methylation
3. Epigenetic Inheritance
4. Regulation of Transcription Initiation
5. Organization of a Typical Eukaryotic Gene
6. The Roles of Transcription Factors



1. Enhancers and Specific Transcription Factors
2. Combinatorial Control of Gene Activity
3. Coordinately Controlled Genes In Eukaryotes
4. Mechanisms of Post-Transcriptional Regulation
5. RNA Processing



1. mRNA Degradation
2. Initiation of Translation
3. Protein Processing and Degradation

NONCODING RNAS PLAY MULTIPLE ROLES IN CONTROLLING GENE EXPRESSION

1. Effects on mRNAs by MicroRNAs and Small Interfering RNAs
2. miRNA
3. siRNA
4. RNAi
5. Chromatin Remodeling and Effects on Transcription by ncRNAs

RESEARCHERS CAN MONITOR EXPRESSION OF SPECIFIC GENES

1. Studying the Expression of Single Genes
2. Nucleic acid hybridization
3. Nucleic acid probe
4. In-situ hybridization
5. cDNA



1. Studying the Expression of Groups of Genes

DNA microarray assays