

REGULATION OF GENE EXPRESSION

Strategies for controlling gene expression

- In multicellular organisms, environmental changes induce changes in gene expression.
- two key features of transcription control first discovered in bacteria also apply to eukaryotic cells.
 - **First**, protein-binding regulatory DNA sequences, or control elements, are associated with genes.
 - **Second**, specific proteins that bind to a gene's regulatory sequences determine where transcription will start, and either **activate** or **repress its transcription**.

Transcription initiation control

- Activators and Repressors of Transcription
- Transcription Initiation by RNA Polymerase II
- Molecular Mechanisms of Transcription Activation and Repression
- Regulation of Transcription-Factor Activity
- Regulated Elongation and Termination of Transcription

Post transcriptional control

- Regulation of Pre-mRNA Processing
- Macromolecular Transport Across the Nuclear Envelope
- Cytoplasmic Mechanisms of Posttranscriptional Control
- Processing of rRNA and tRNA
- Signaling pathway that control gene activity

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- control of transcription initiation the first step is the most important mechanism for determining whether most genes are expressed and how much of the encoded mRNAs and, consequently, proteins are produced.