

Promoter: A DNA segment that allows a gene to be transcribed; helps RNA polymerase find where a gene starts

Operon: A region of DNA that has a promoter, and operator, and one or more genes that code for all the proteins needed to do a specific task; typically found in prokaryotes

***lac* operon:** One of the earliest operons discovered; includes 3 genes involved in the breakdown of the sugar lactose that are all under the control of a single promoter and operator

Without lactose: A repressor protein is bound to the operator and blocks RNA polymerase from transcribing the genes (off)

With lactose: The repressor protein is bound to lactose, which keeps it off of the operator, so RNA polymerase transcribes genes that, in turn, break down lactose (on).

Controlling transcription in eukaryotic cells:

Transcription is regulated at many points in eukaryotic cells; Control of the start of transcription is still and important point of regulation; Have unique combinations of regulatory DNA sequences that are recognized by transcription factors; Some genes control the expression of other genes and play an important role in development

mRNA processing:

- Occurs after transcription but before mRNA leaves the nucleus;
- Introns are removed and the exons are spliced together; Introns are intervening sequences of DNA; Exons are sequences of DNA that are expressed in the protein;
- A cap is added that helps mRNA to bind to a ribosome and prevents the strand from being broken down too quickly;
- A tail is added that helps mRNA exit the nucleus