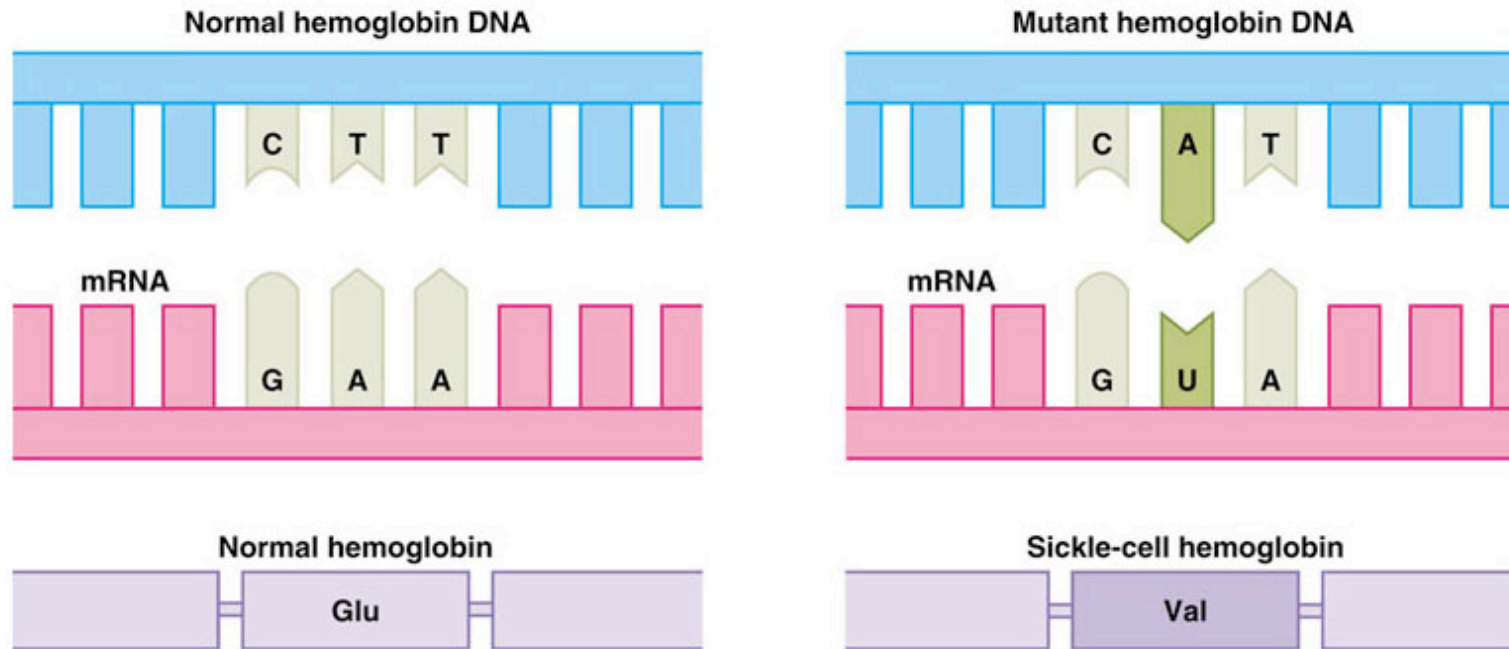
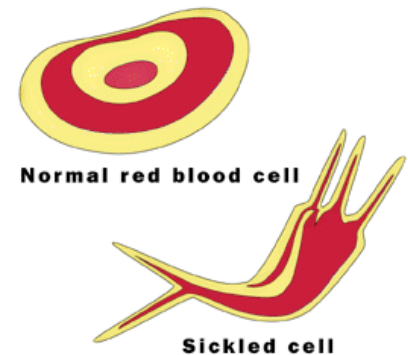


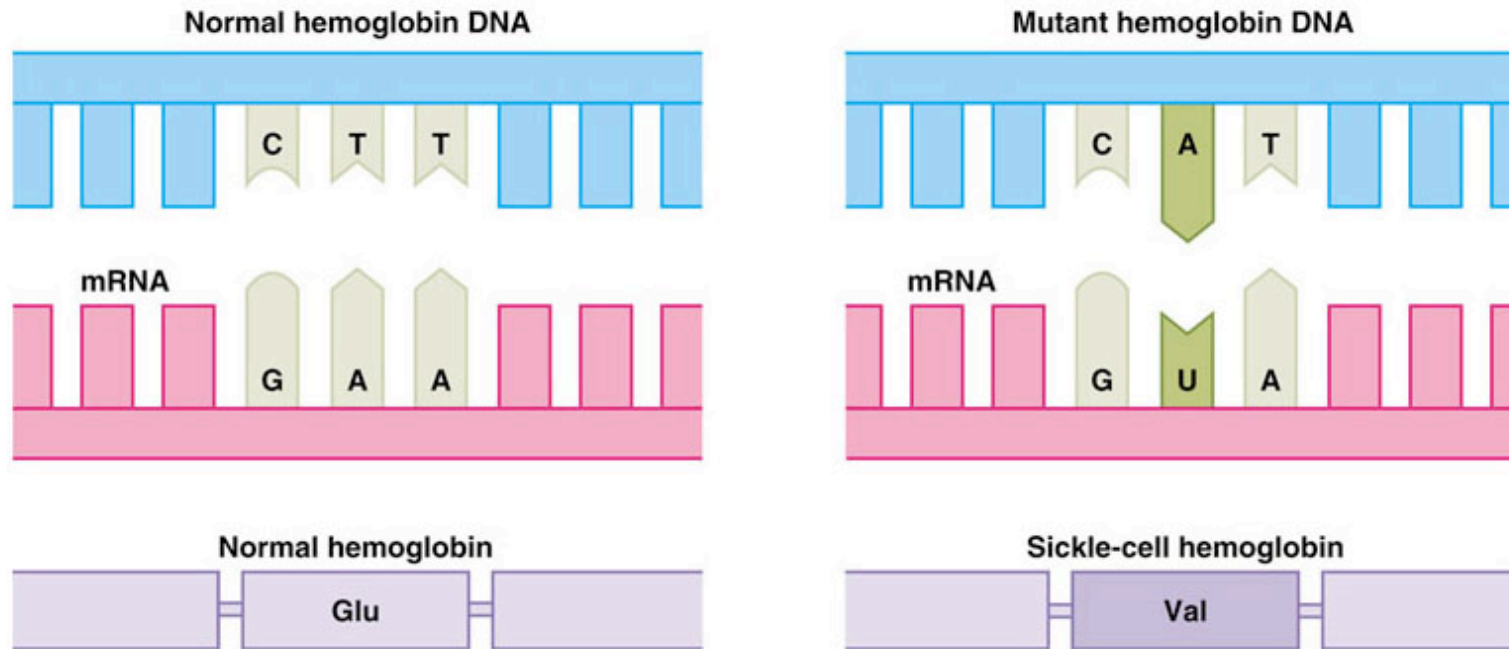
How can Gene Expression go wrong...



What can cause these mutations?

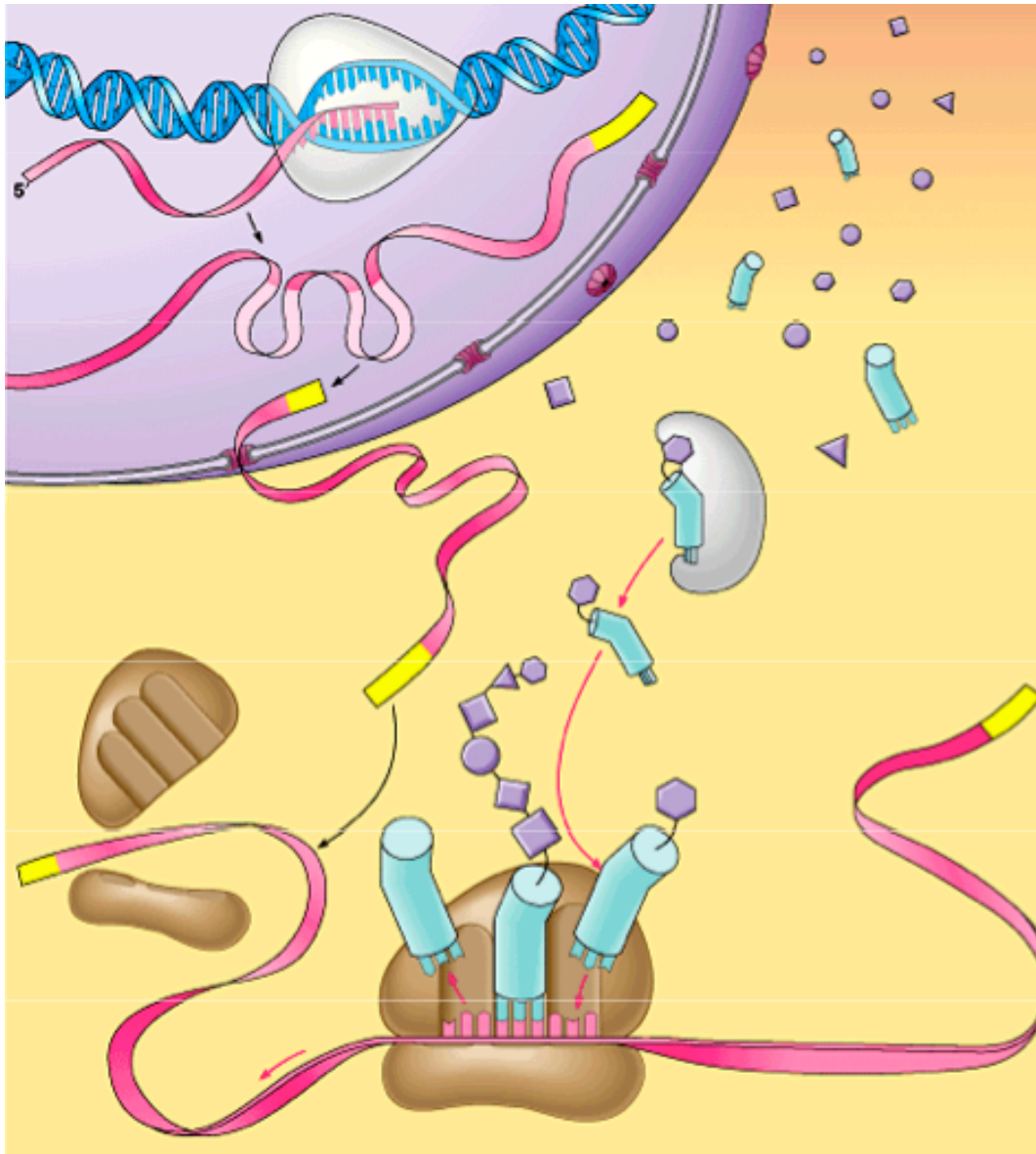


How can Gene Expression go wrong...



What can cause these mutations?

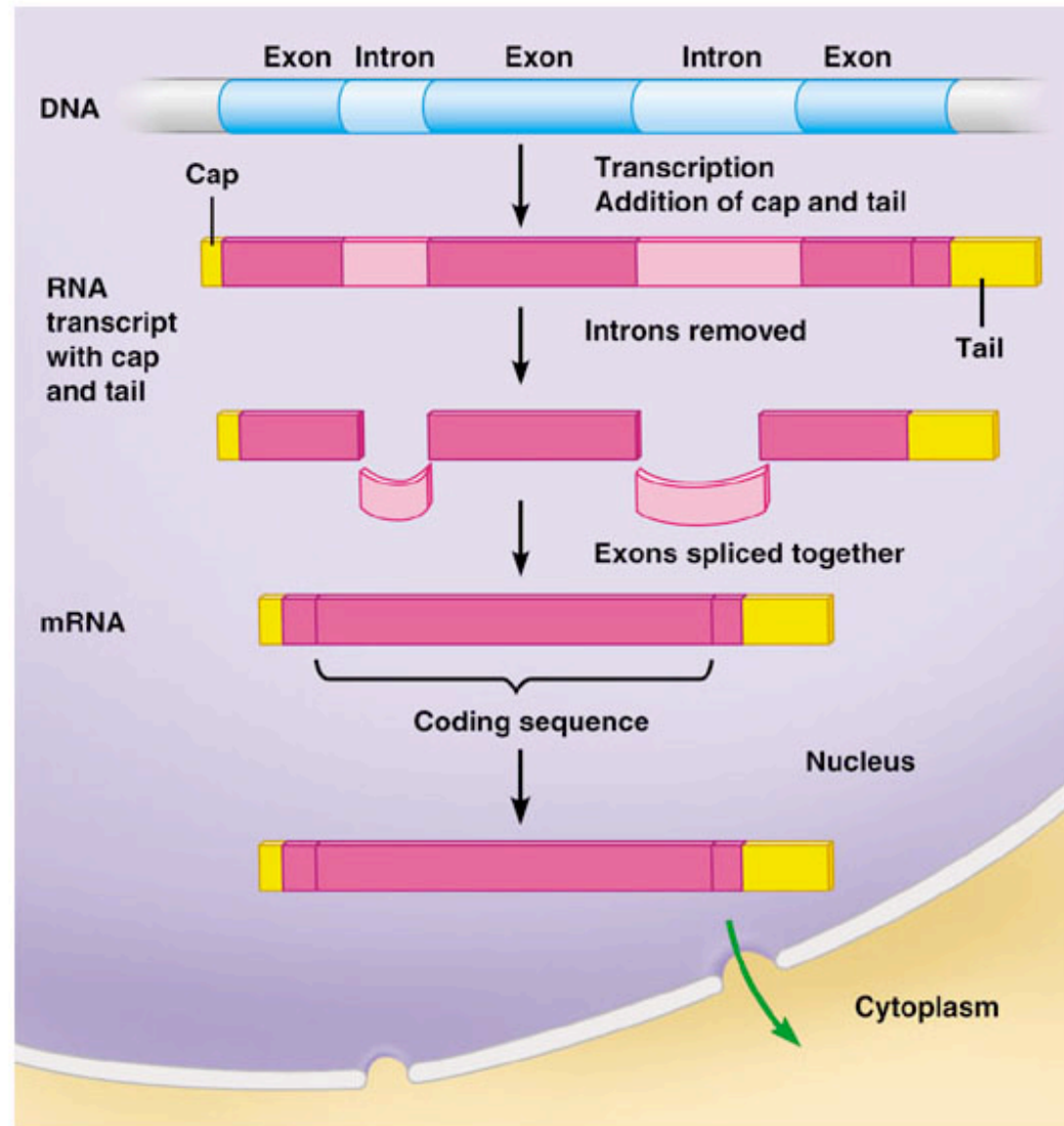
Overall Picture



What type of cell is this, prokaryotic or eukaryotic...how can you tell?

Eukaryotic Gene Regulation #1

Therefore, 1 Gene = Many Proteins



Eukaryotic Gene Regulation #2

Multiple Transcripts per Gene

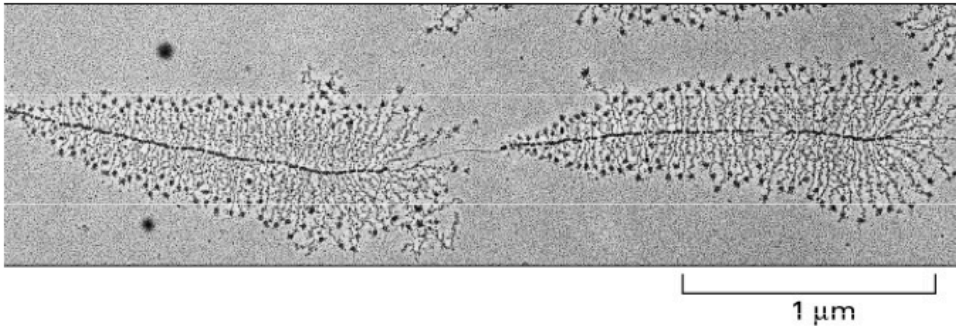


Figure 6-9. Molecular Biology of the Cell, 4th Edition.

Differential Gene Expression

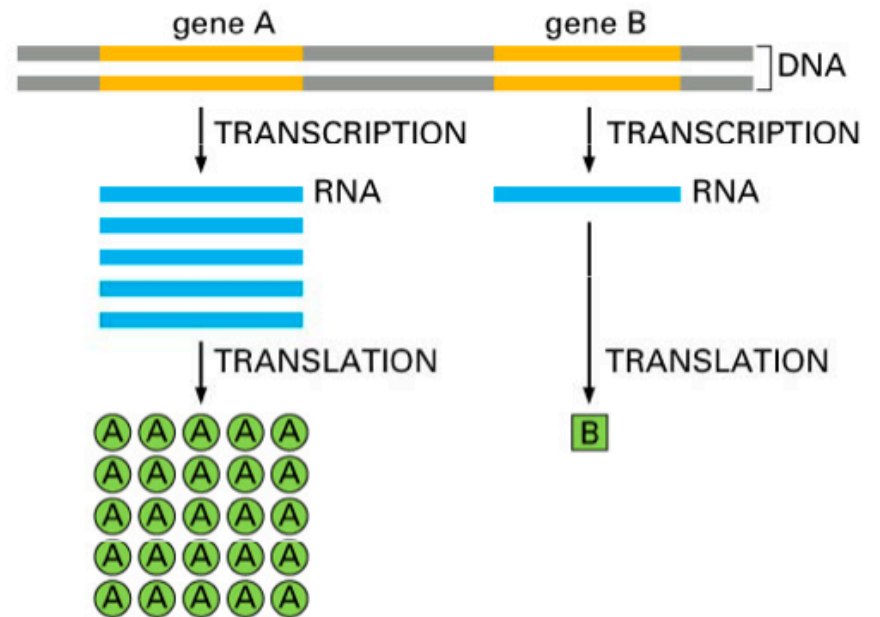
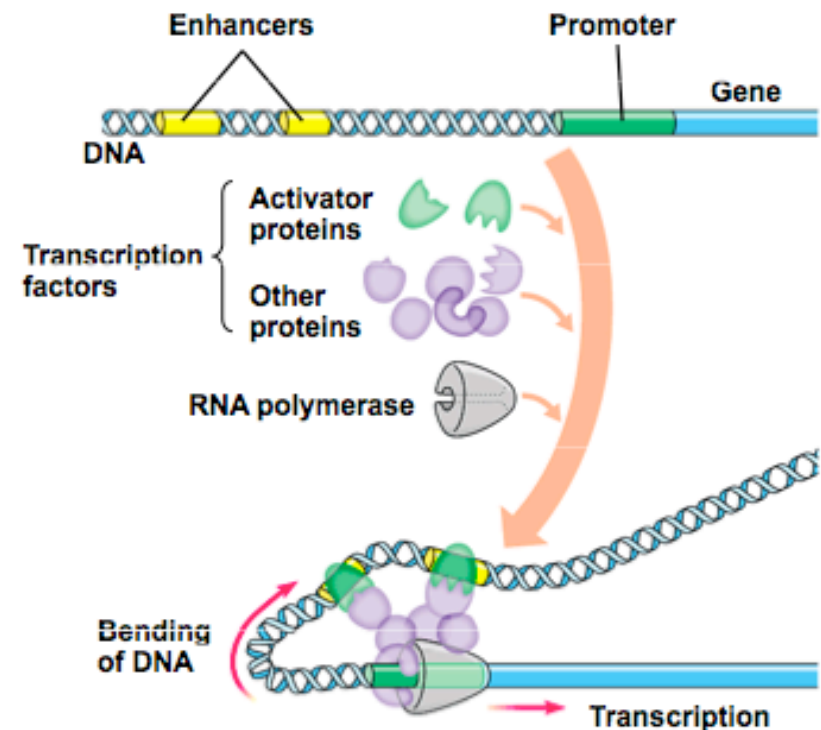


Figure 6-3. Molecular Biology of the Cell, 4th Edition.

Eukaryotic Gene Regulation #3

Control of eukaryotic transcription

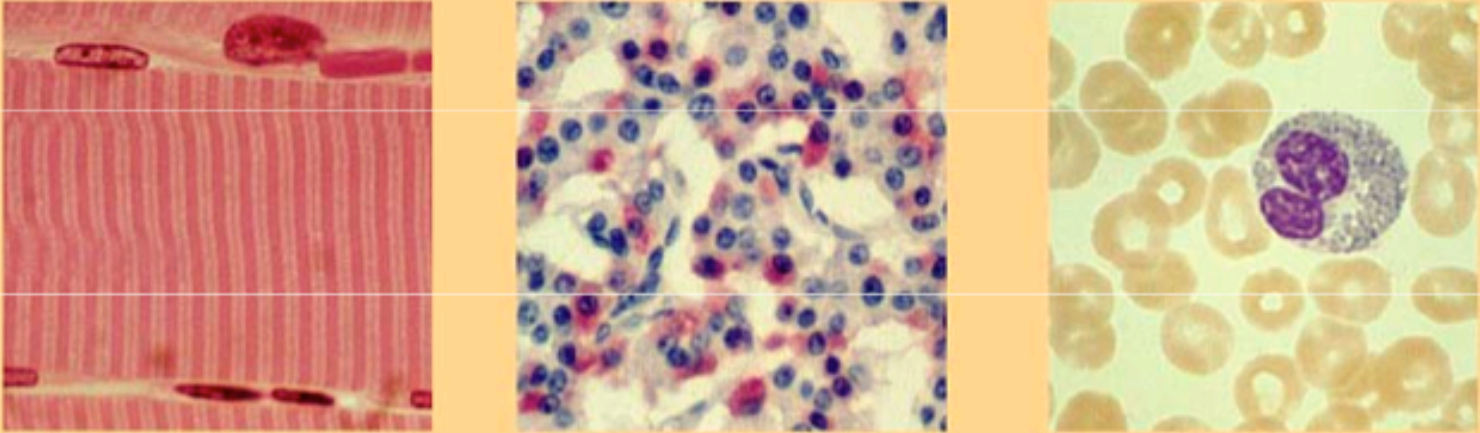
- A variety of regulatory proteins interact with DNA and each other
 - These interactions turn the transcription of eukaryotic genes on or off



Eukaryotic Gene Regulation #3

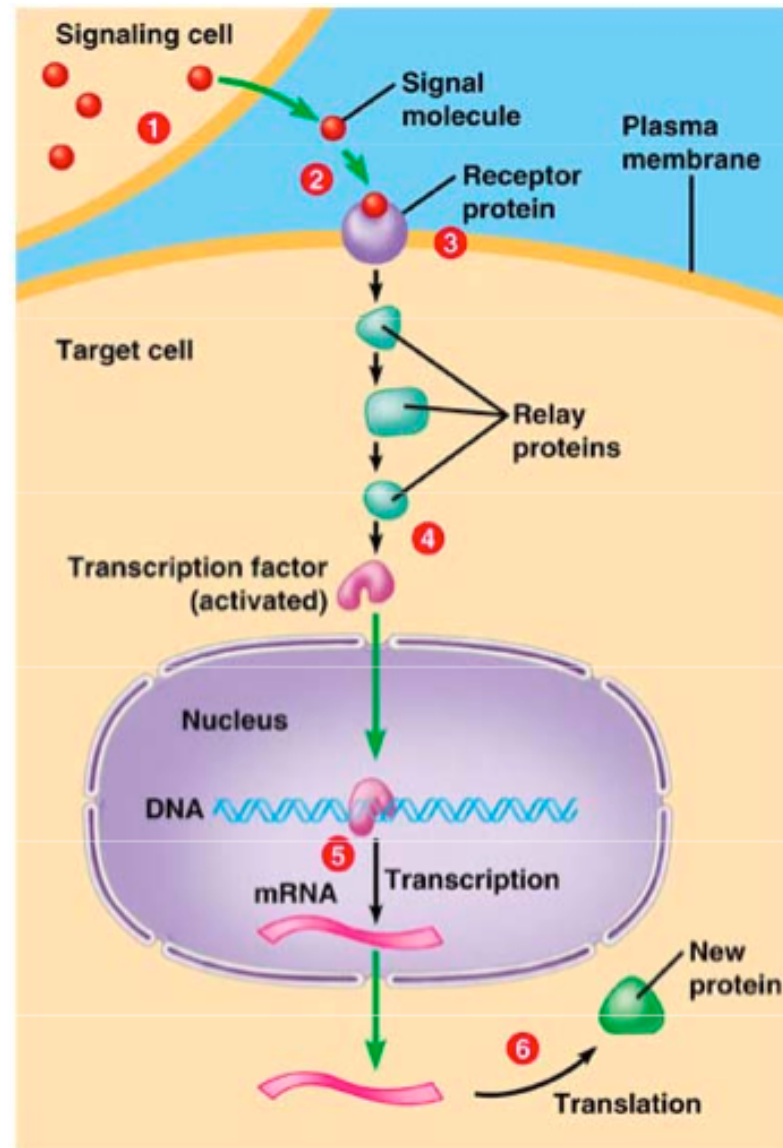
Gene regulation in eukaryotes

PATTERNS OF GENE EXPRESSION IN FIVE TYPES OF CELLS



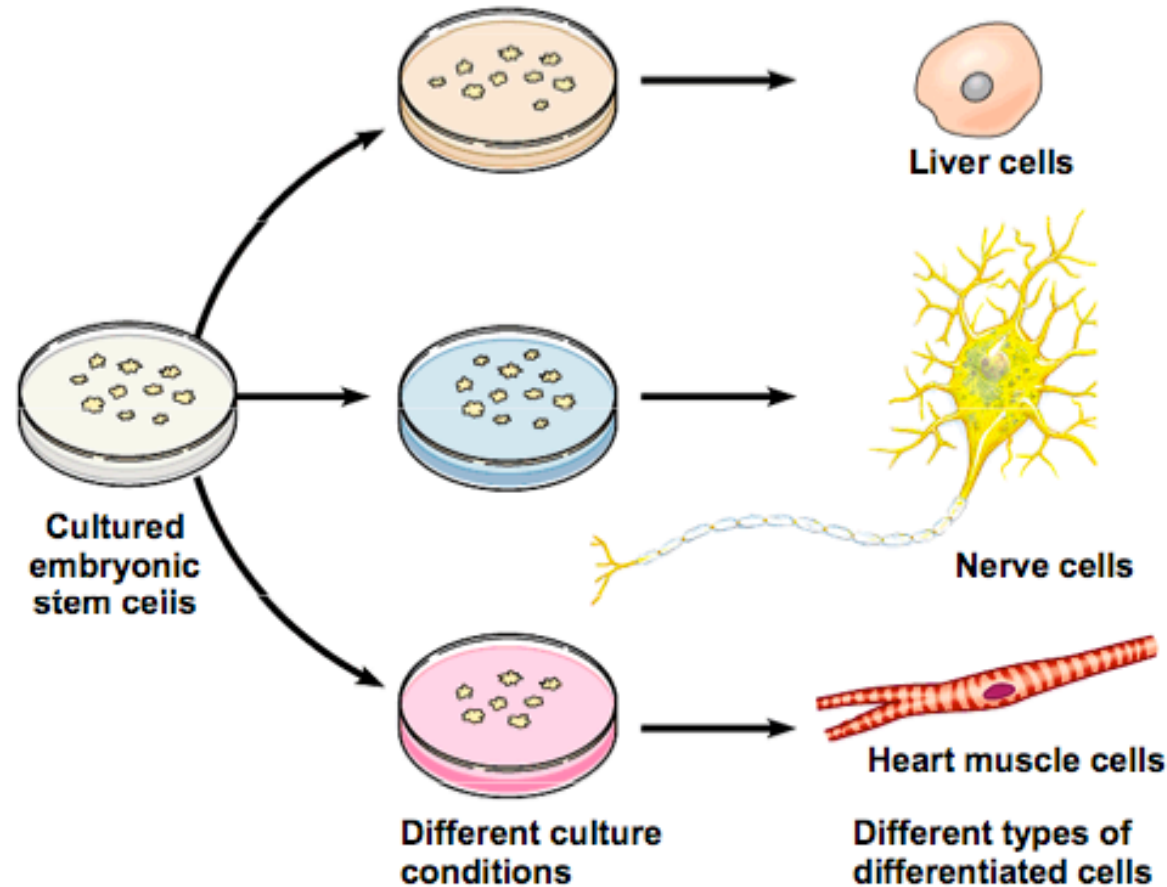
	Muscle Cell	Pancreas Cells		Blood Cells	
		Alpha Cells	Beta Cells	White Cells	Red Cells (Immature)
Genes for...					
Glycolysis enzymes	On	On	On	On	On
Muscle contraction proteins	On	Off	Off	Off	Off
Glucagon	Off	On	Off	Off	Off
insulin	Off	Off	On	Off	Off
Hemoglobin	Off	Off	Off	Off	On

Eukaryotic Gene Regulation #3



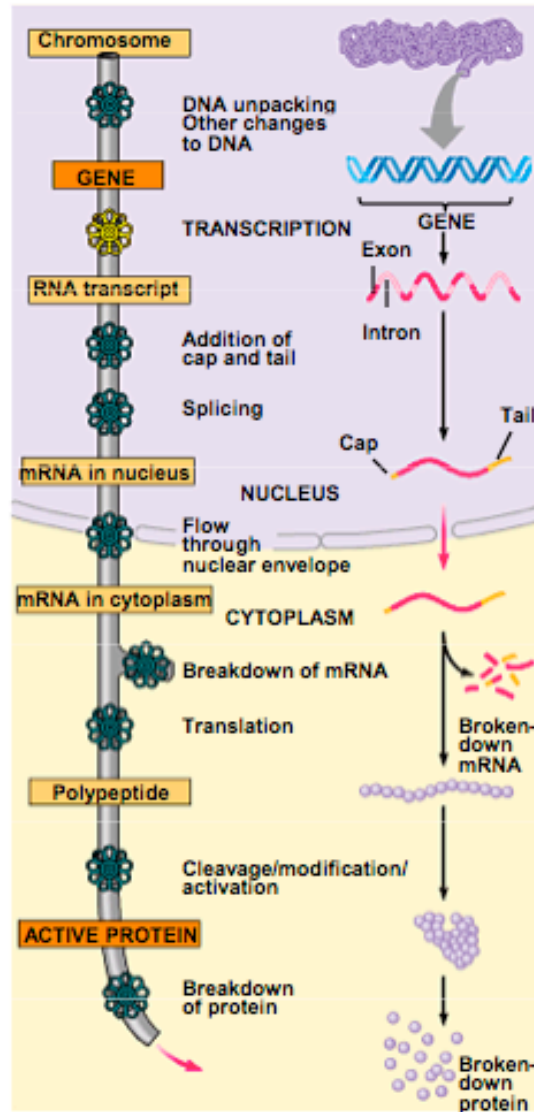
Eukaryotic Gene Regulation #3

- Differentiation of embryonic stem cells in culture
- Each culture will have a different set of transcription factors to turn on specific genes



Eukaryotic Gene Regulation #4

Stages of eukaryotic gene regulation

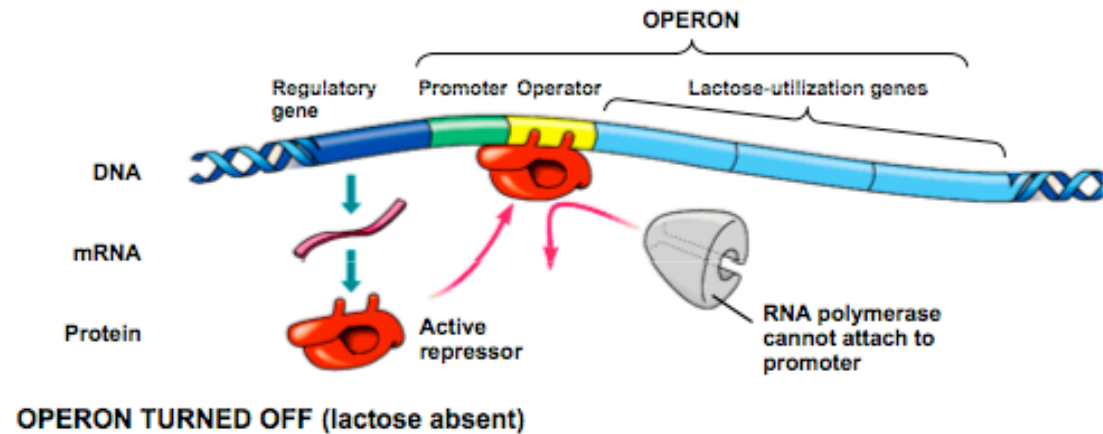


**Degradation
of mRNA or
functional
protein**

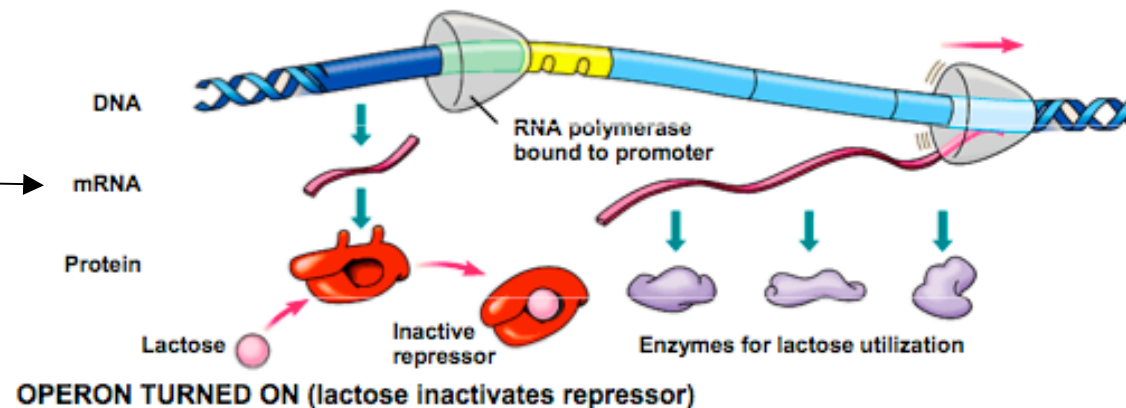
Prokaryotic Gene Regulation - Operon Activation

The regulation of gene expression: Gene Regulation in prokaryotes

- The *lac* operon produces enzymes that break down lactose only when lactose is present

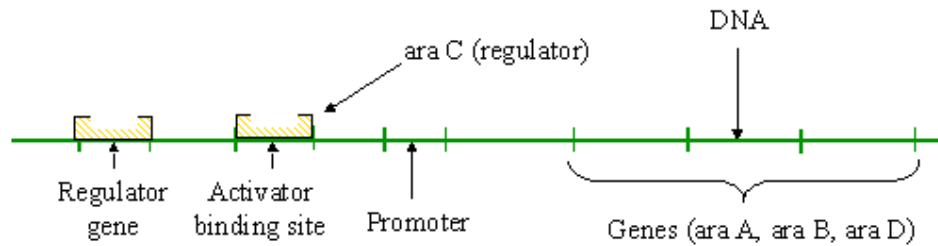


How is it possible to create 3 proteins from 1 mRNA molecule?



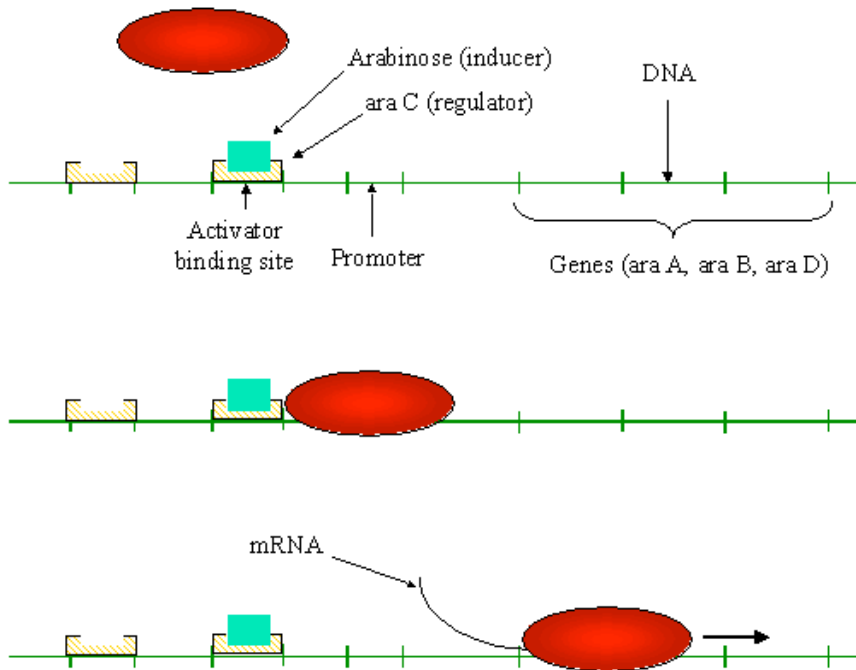
Prokaryotic Gene Regulation - Operon Activation

Prokaryotic Gene Regulation: Ara Operon



Arabinose Absent

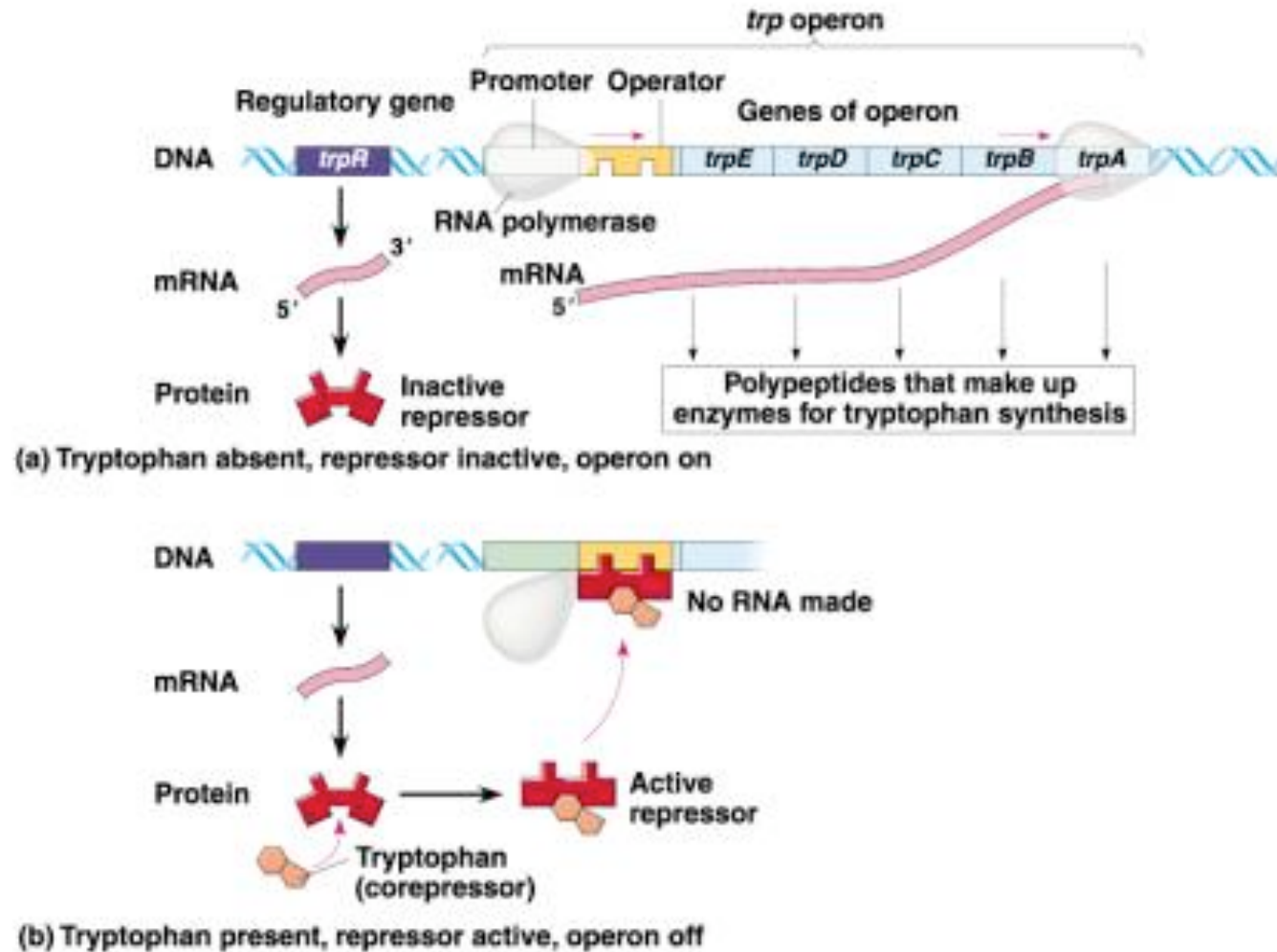
When arabinose is present, it binds to ara C causing it to change shape. The new shape promotes the attachment of RNA polymerase to the DNA, thus allowing transcription to occur.



Arabinose Present
- ara C/arabinose complex
attracts RNA Polymerase

Prokaryotic Gene Regulation - Operon Repression

Prokaryotic Gene Regulation: Trp Operon



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