Gene Expression

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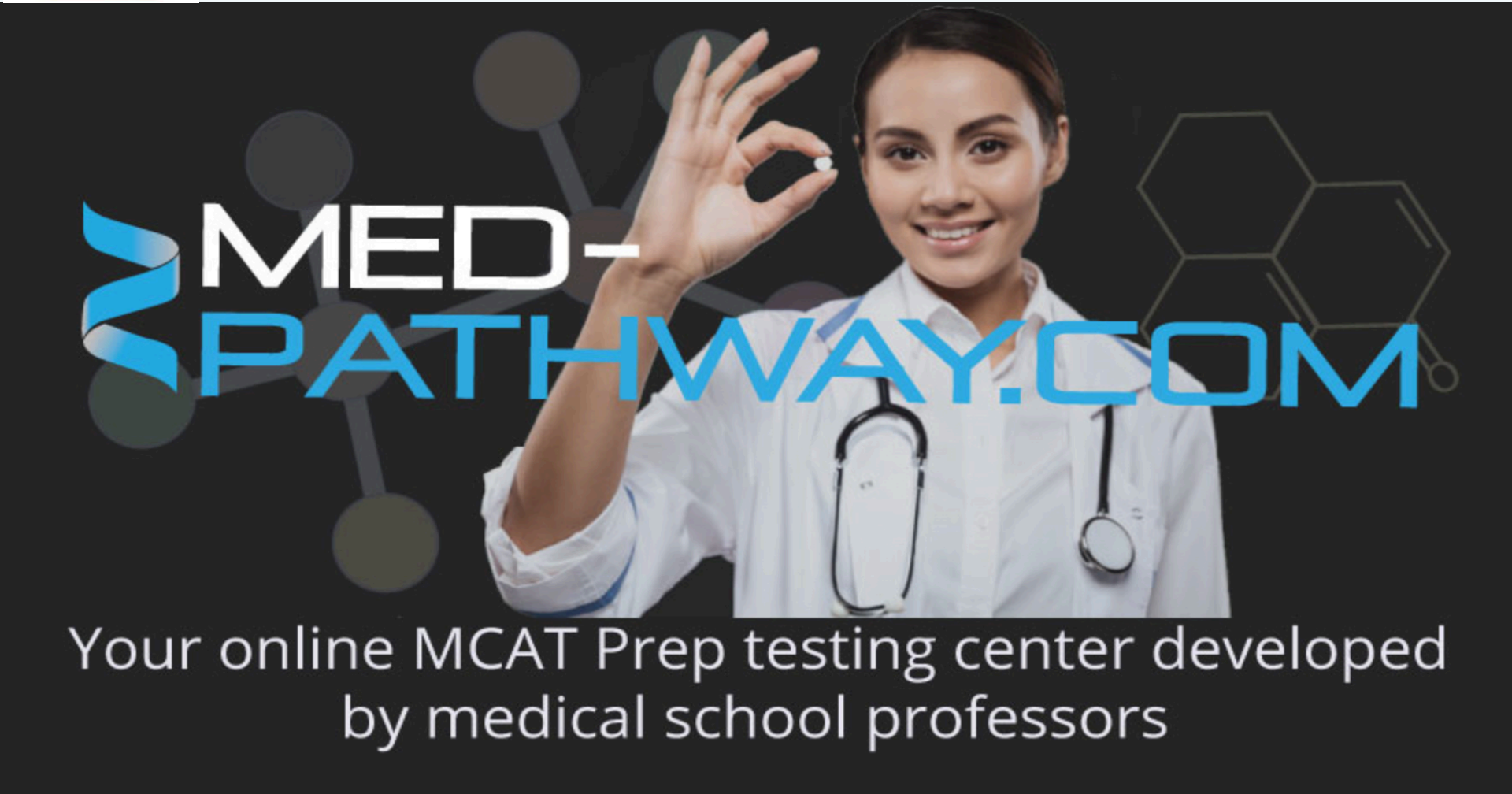
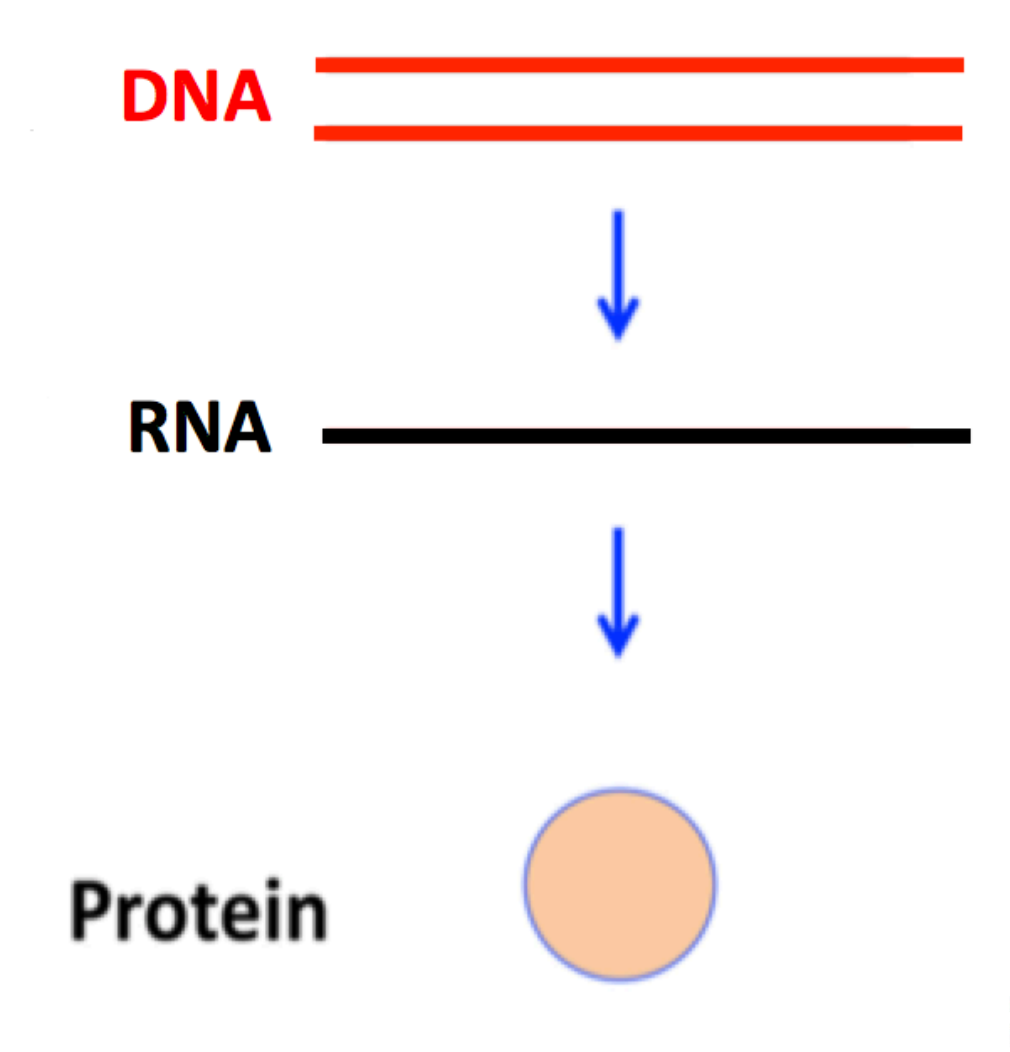
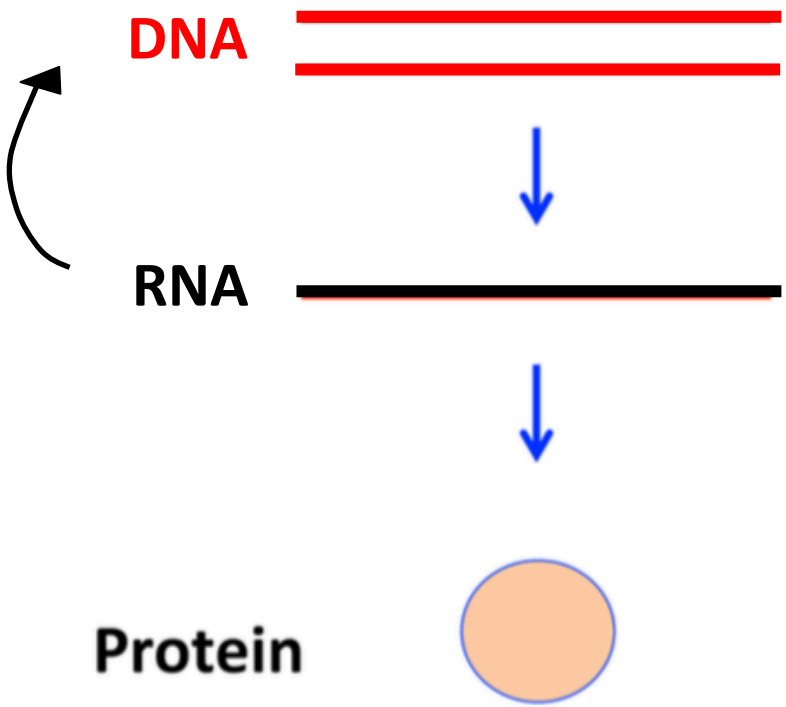


Crick's Central Dogma



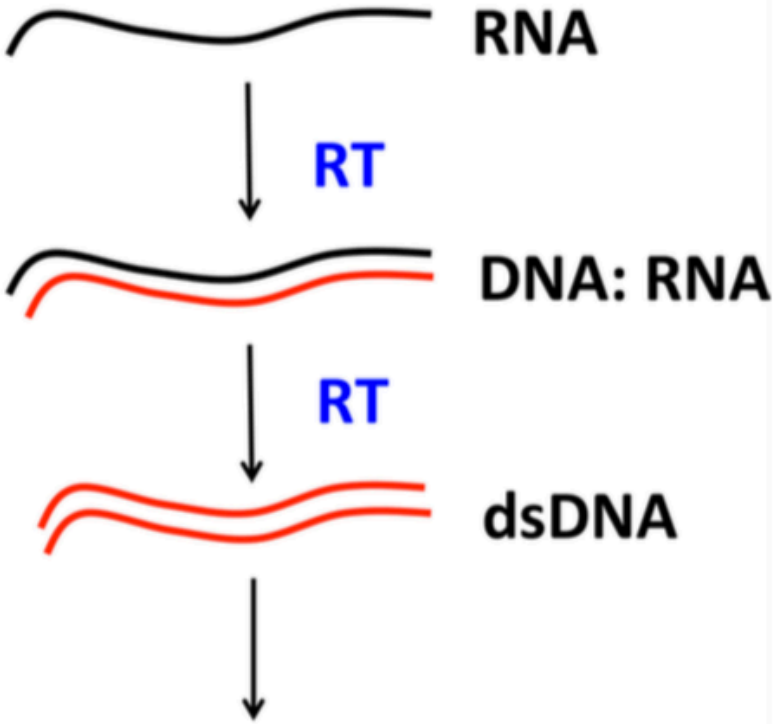
Retroviruses & Crick's Central Dogma

Crick's Central Dogma



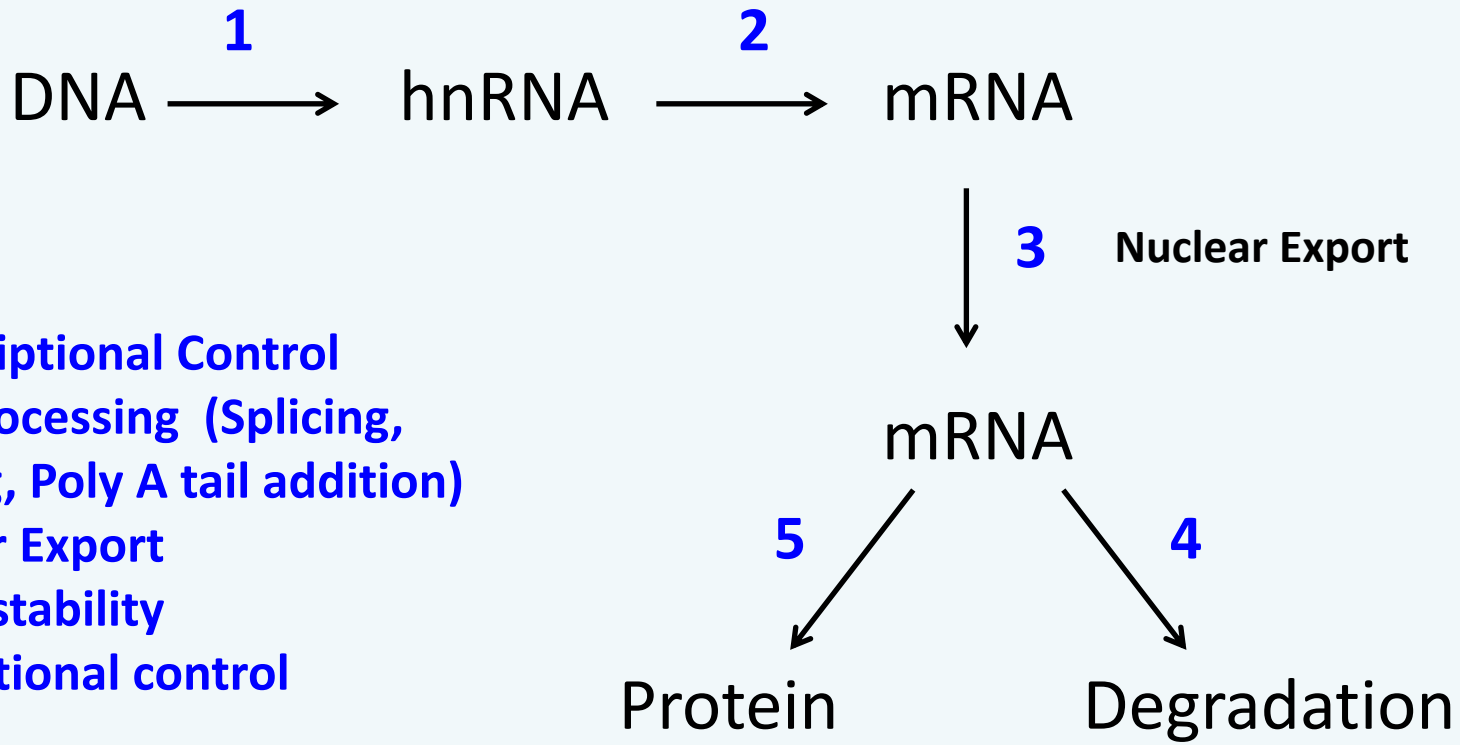
Retroviruses

RT = reverse transcriptase



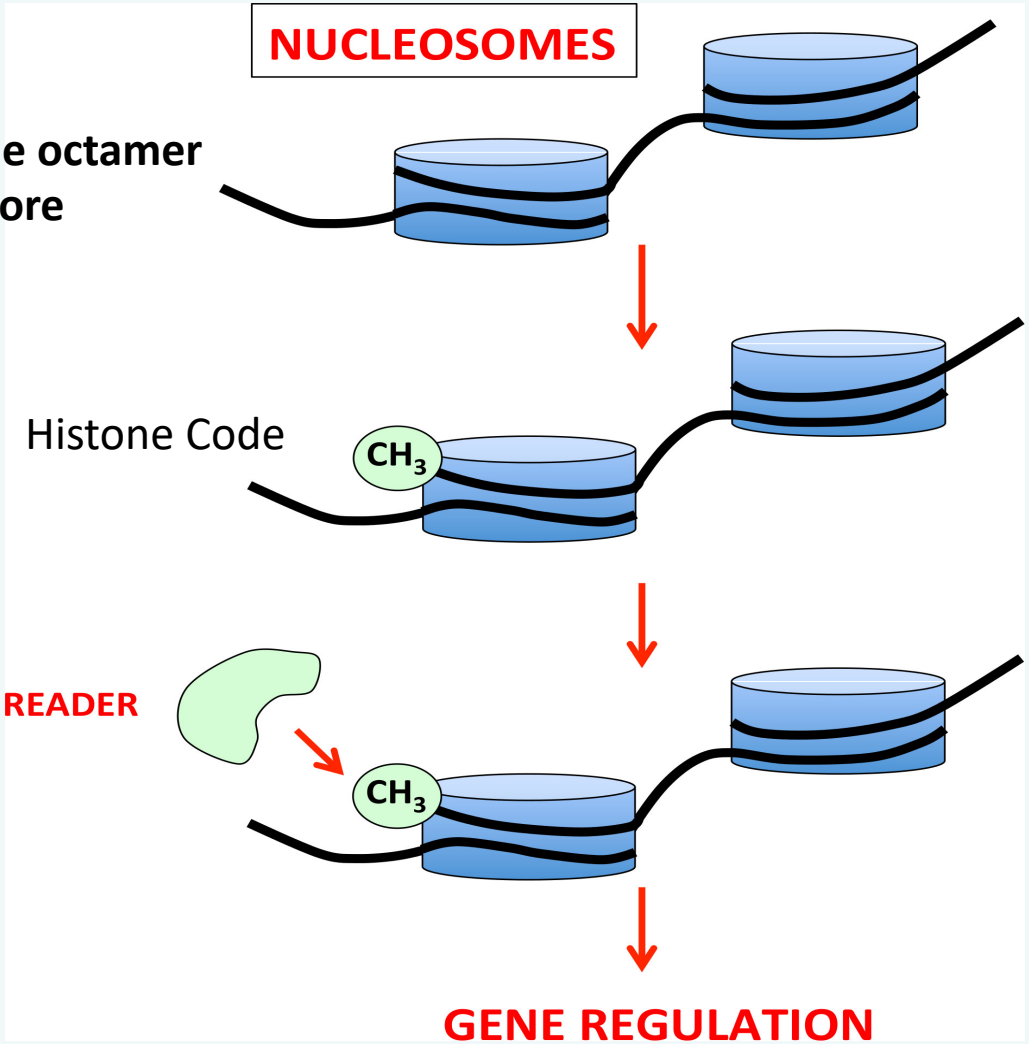
Integration into Genome

Multiple Points in Regulating Gene Expression



1. Transcriptional Control
2. RNA Processing (Splicing, Capping, Poly A tail addition)
3. Nuclear Export
4. mRNA stability
5. Translational control

Organization of Eukaryotic DNA



Heterochromatin

Euchromatin

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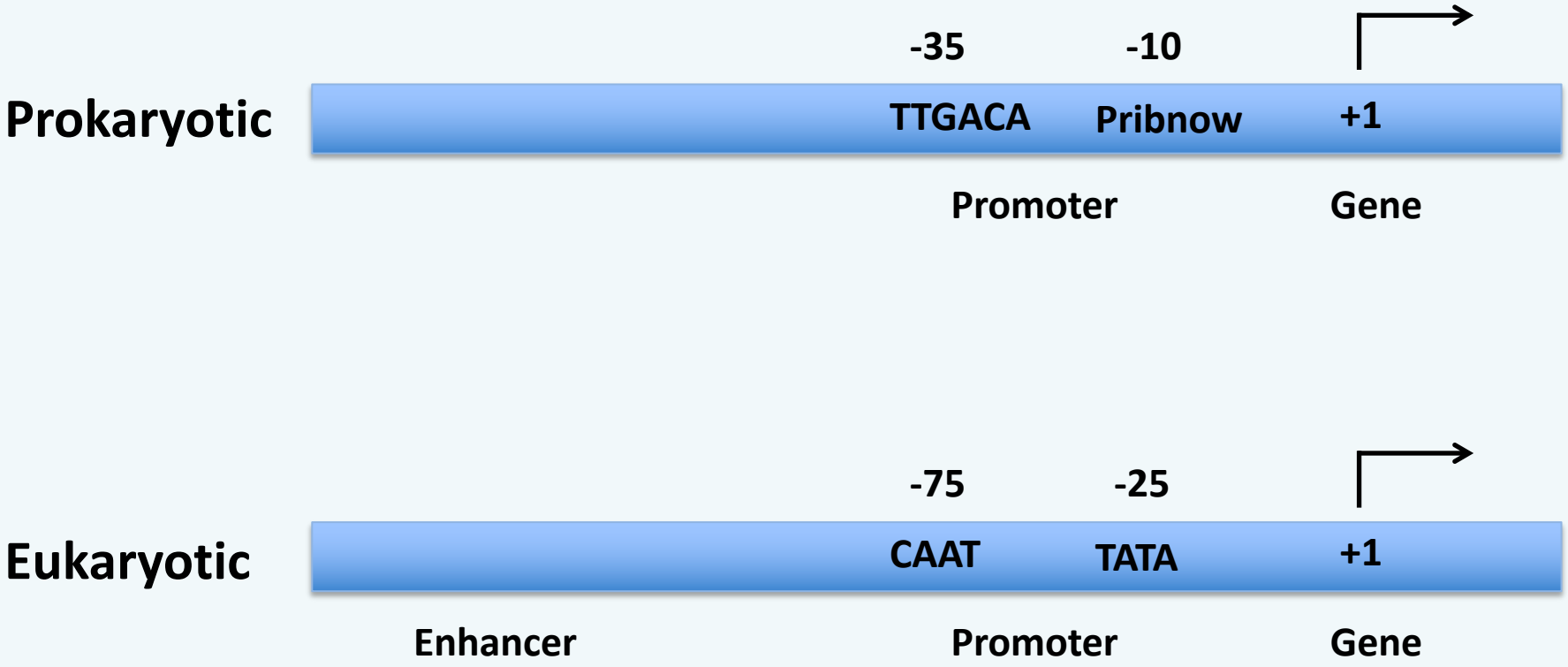
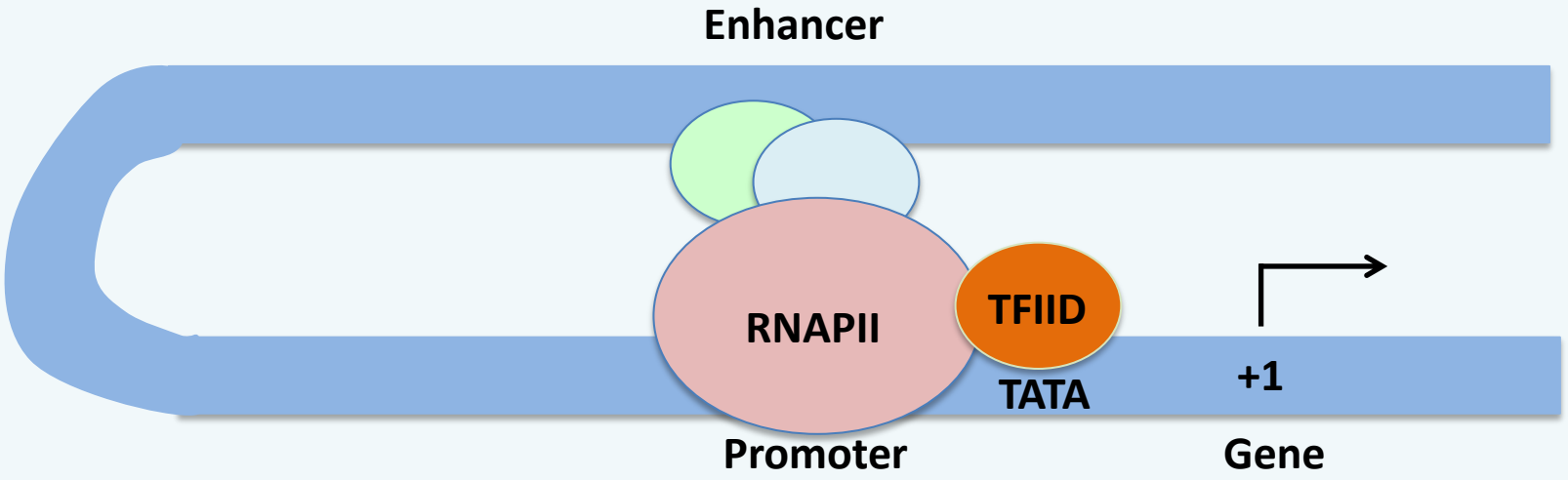
Cis Acting Elements in Gene Expression



DNA Looping & Gene Expression

Can Promote or Inhibit Gene Expression



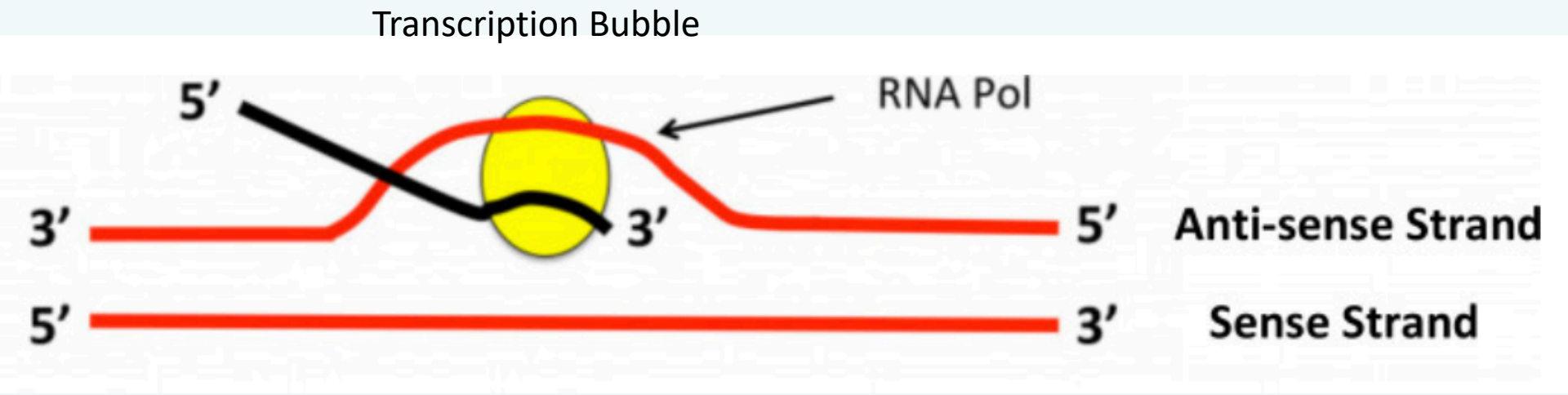
Occurs in Prokaryotes & Eukaryotes

Arabinose Operon

Eukaryotic vs Prokaryotic RNA Polymerase

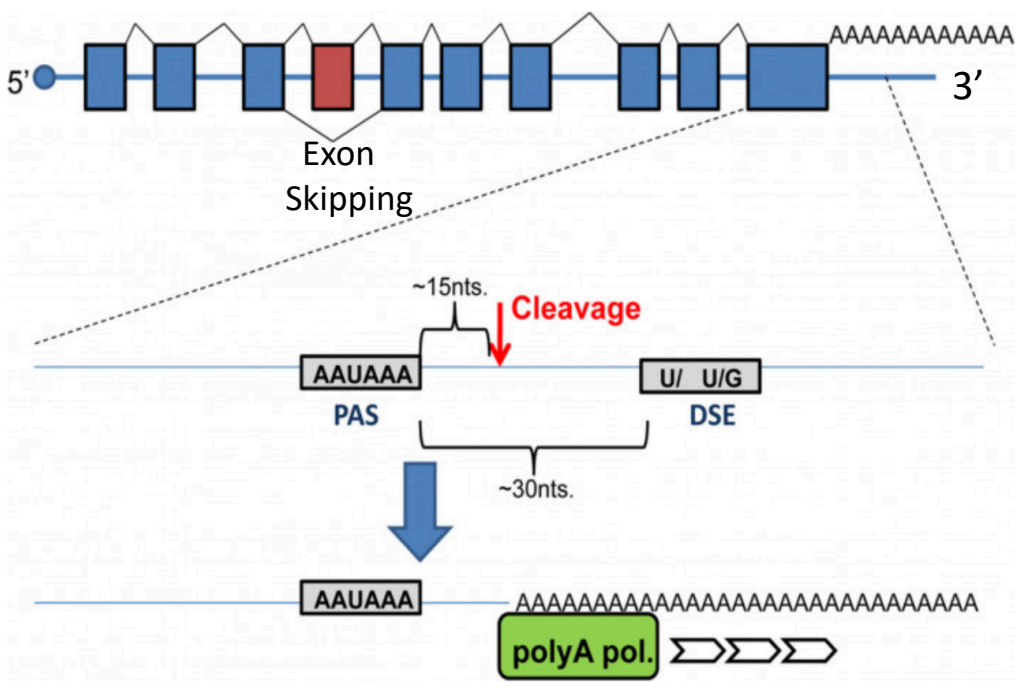
Prokaryotes	Eukaryotes
1. One RNA Polymerase $\alpha_2\beta\beta'$ (apo)	**1. Three RNA Polymerases:**
	RNAPI: ribosomal RNA **RNAPII: mRNA** **RNAPIII: tRNA**
2. Uses σ Factor for Promoter Specificity	**2. Recruited to Promoters by Factors such as TFIID**
3. Inhibited by Rifampin Actinomycin D	**3. RNAPII inhibited by α-amanatin**

Sense & Anti-Sense Strands

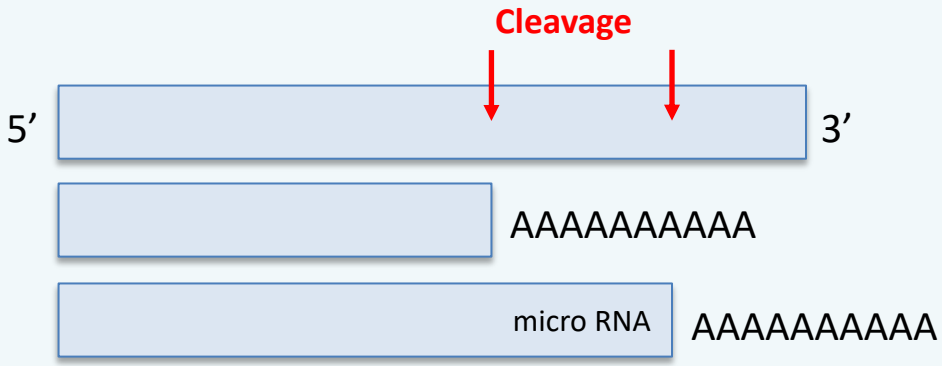


Anti-sense = Template

RNA Processing



Alternative Cleavage



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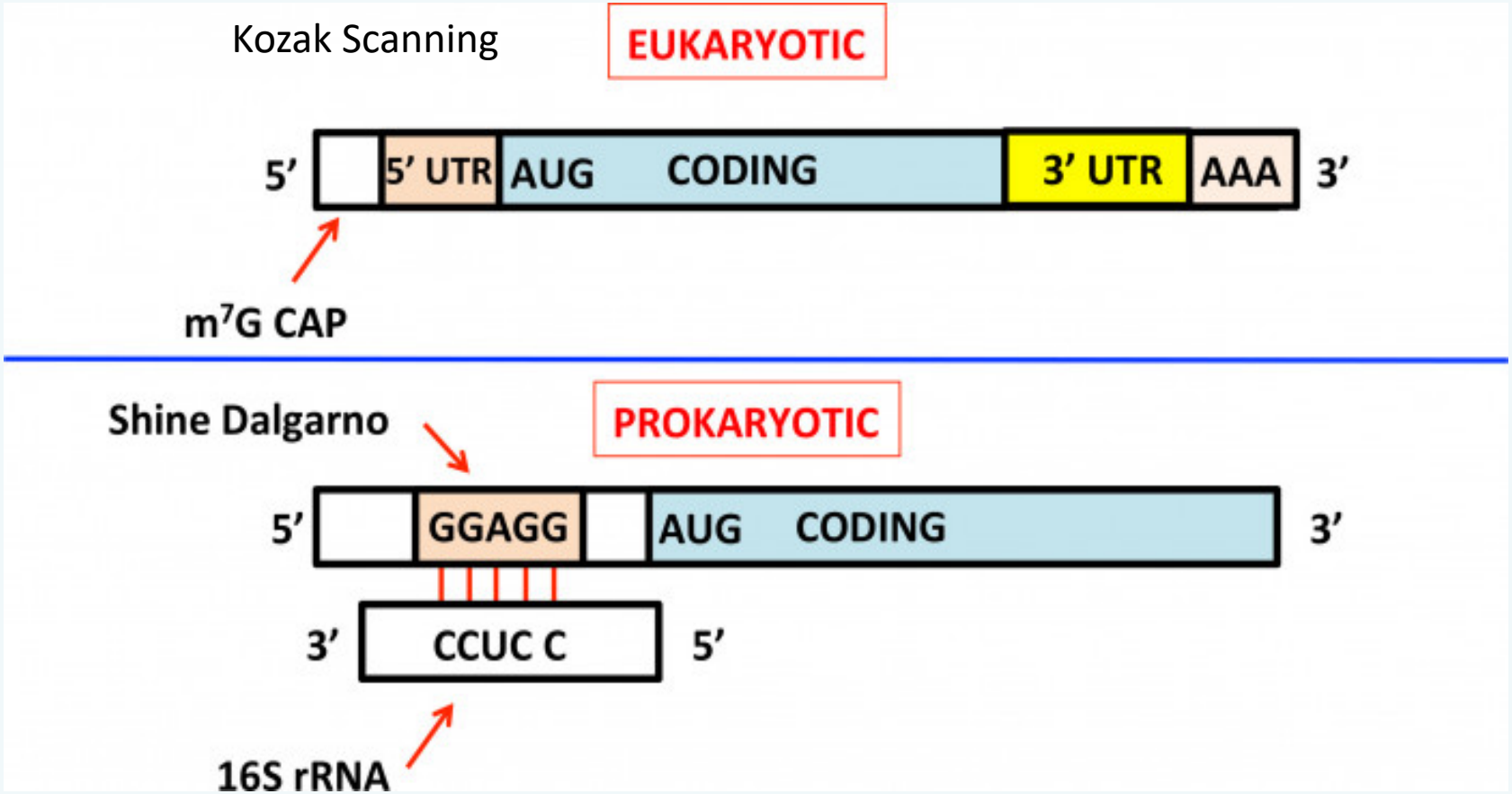
Bio #1: mRNA Processing and Mantle Cell Lymphoma

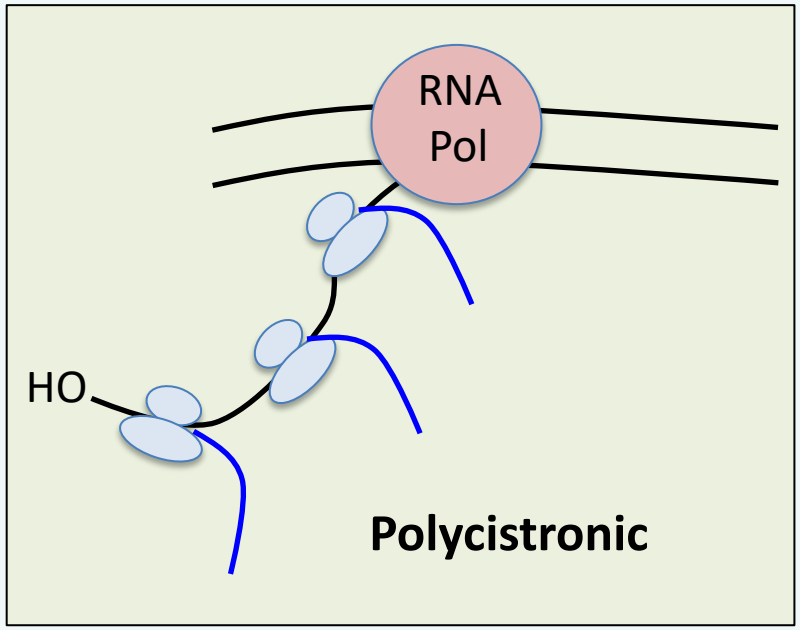
Full Length: Chromosomal Abnormalities in Muscular Dystrophy

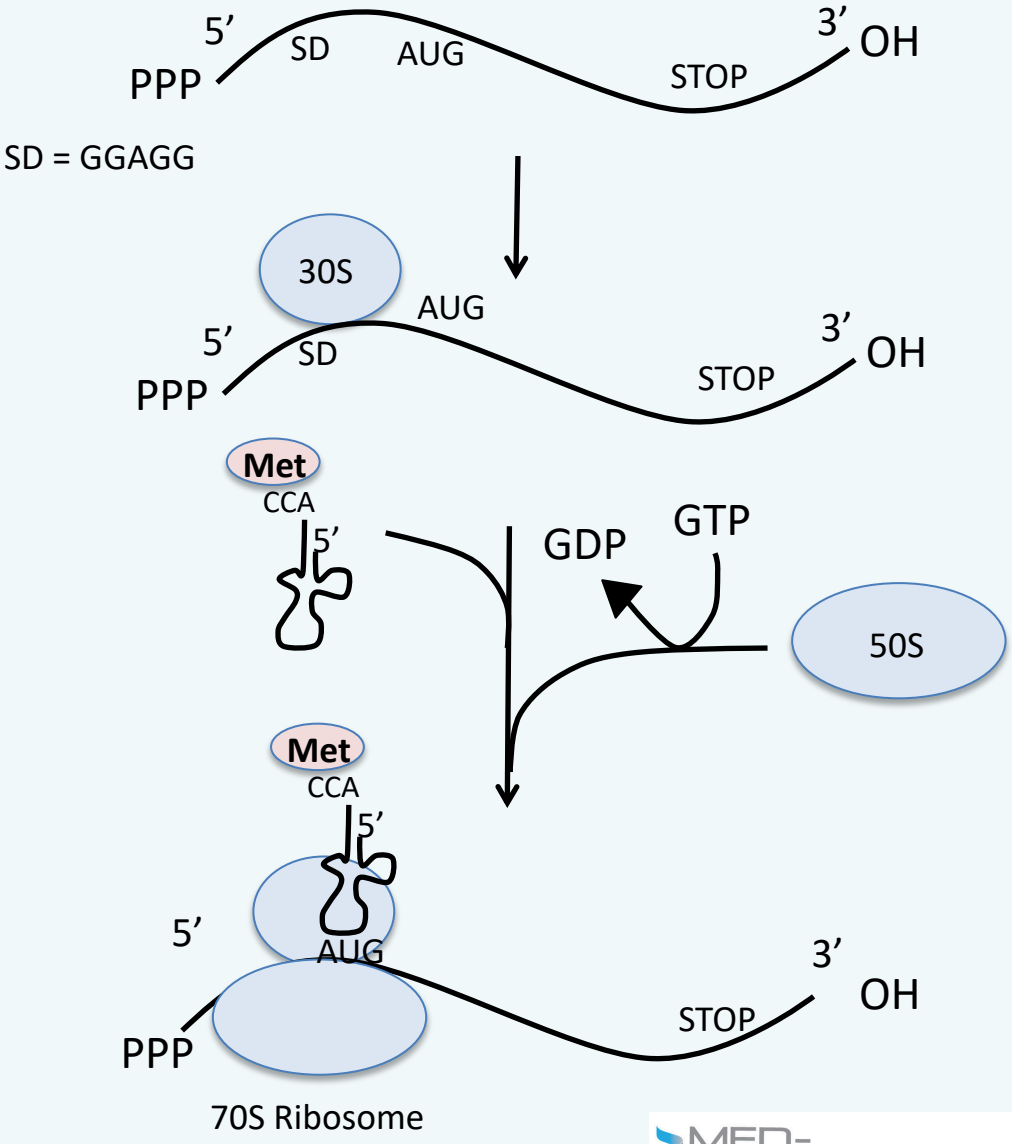
Eukaryotic & Prokaryotic mRNA



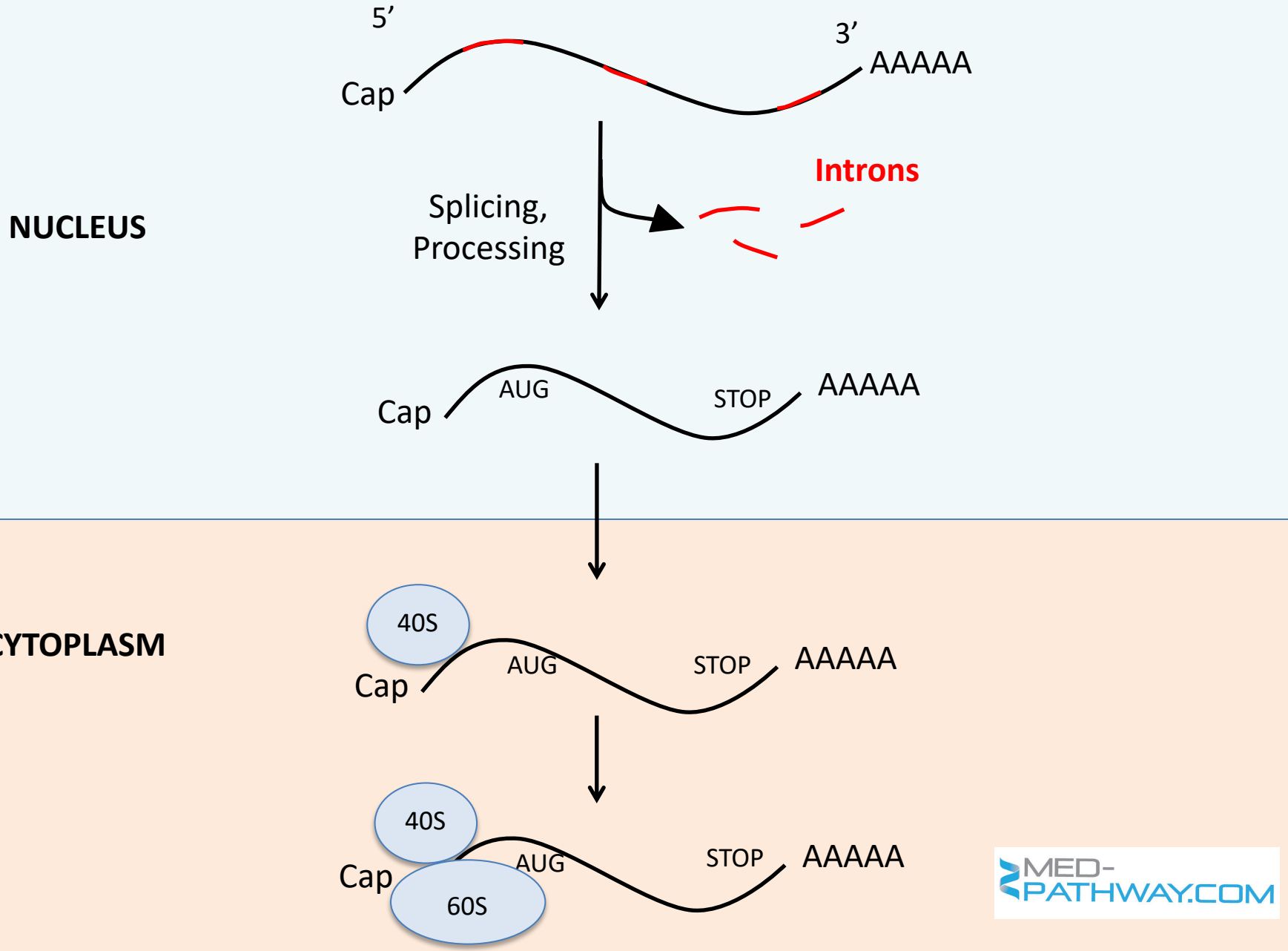
Prokaryotic Translation

Transcription & Translation
Are Coupled



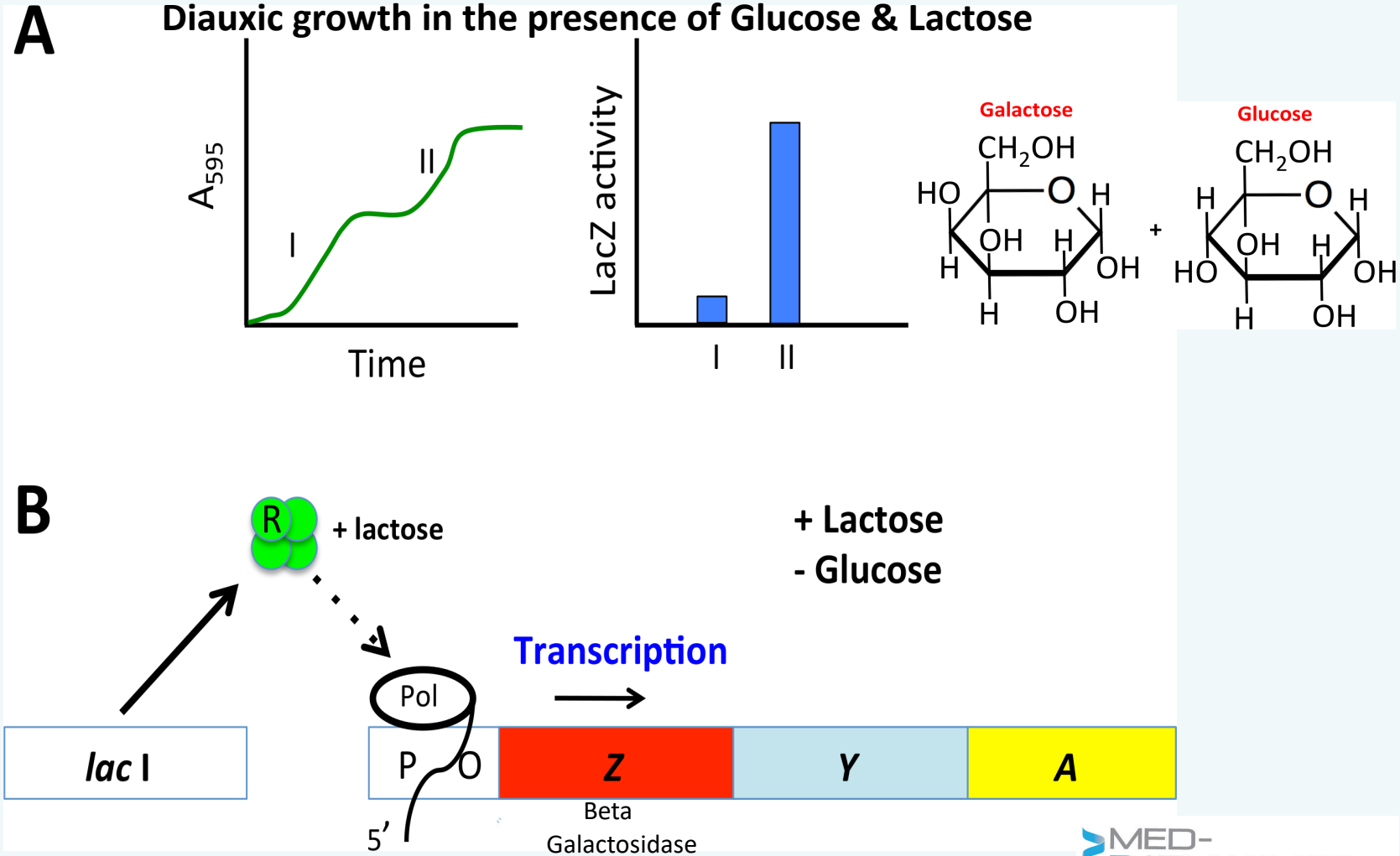


Eukaryotic Translation



Regulation of Lactose Metabolism

Jacob Monod Model



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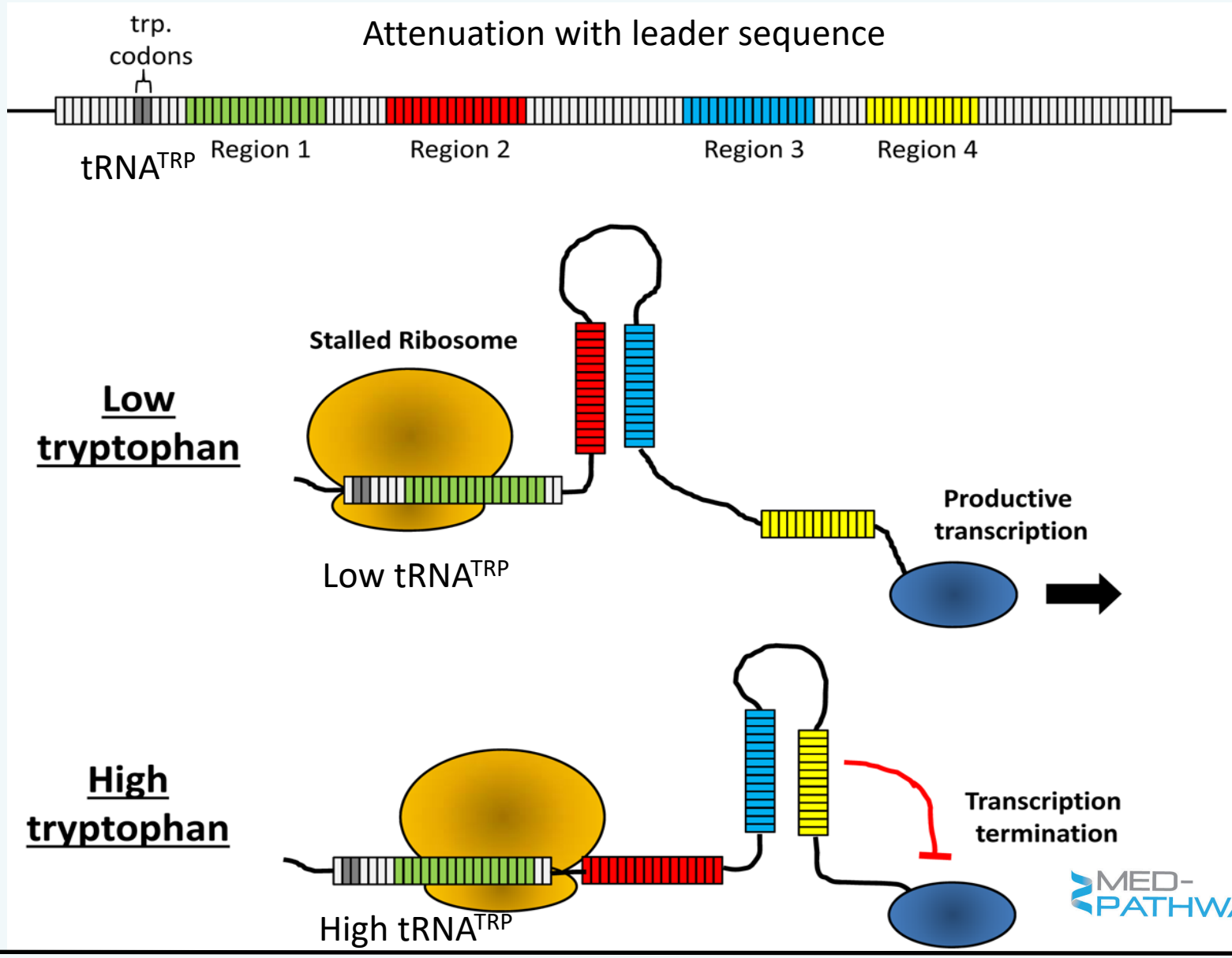
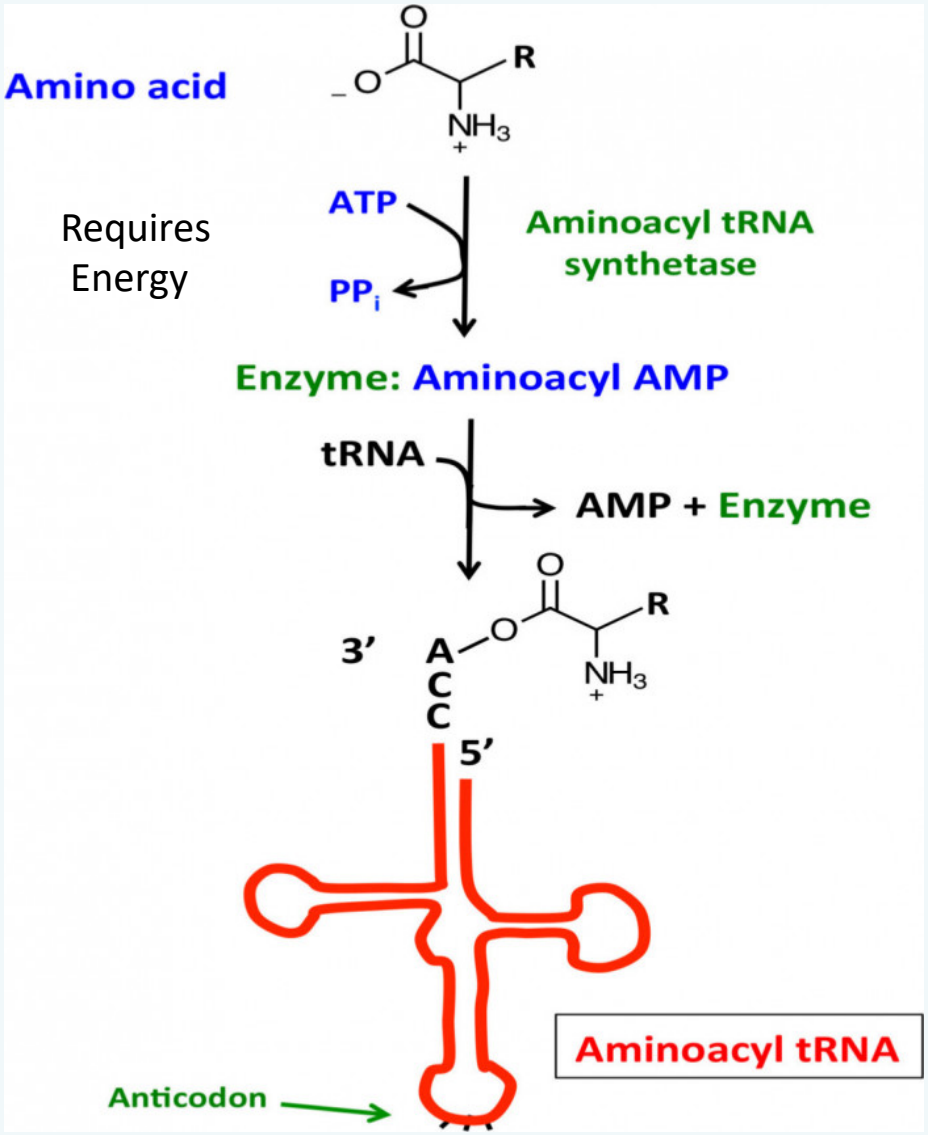
Bio Test #1 Passage: Genetics of Lactose Metabolism in *E. coli*

Regulation of Tryptophan Synthesis



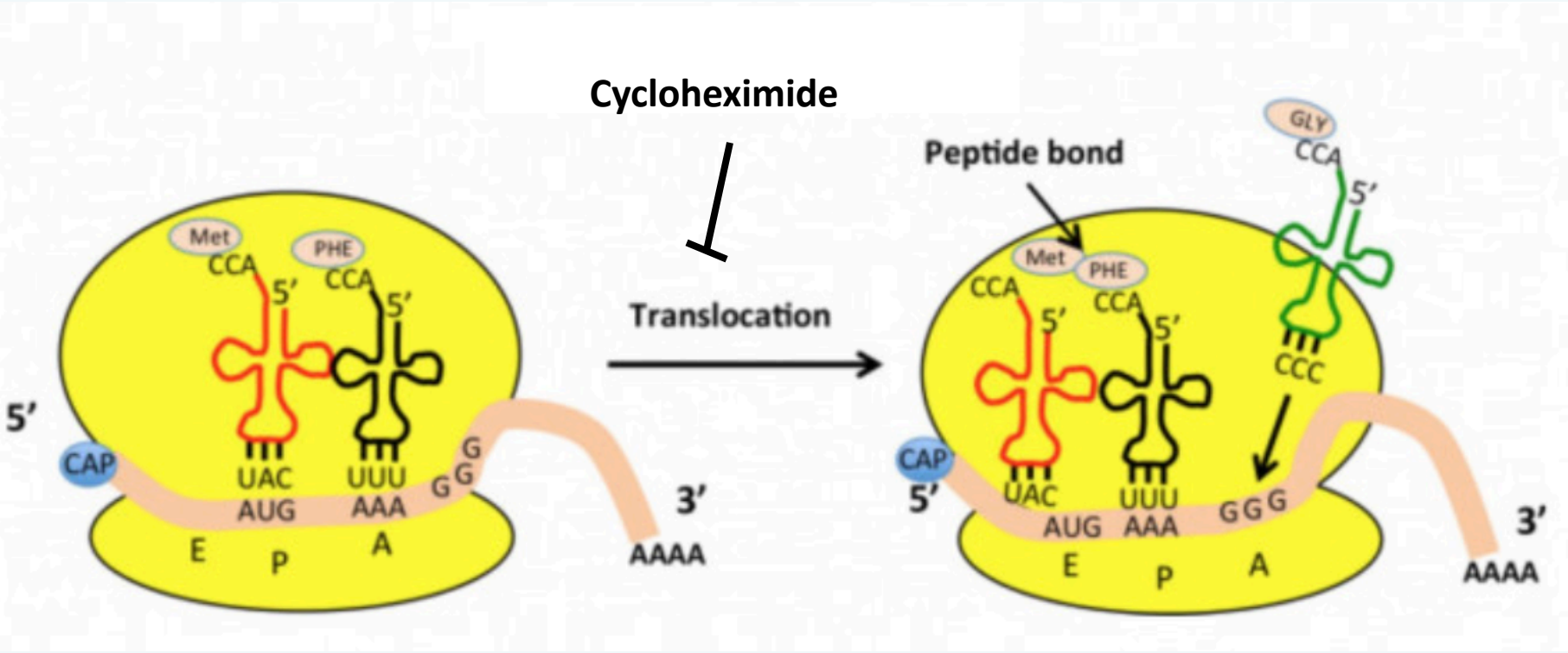
Bio #1: Regulation of Tryptophan Biosynthetic Genes in *E. coli*

tRNA charging



Met is first AA in Proteins

Ribosomal Translation



Sedimentation Velocity &
Ribosomal Footprinting
Chemical & Physical Test #1

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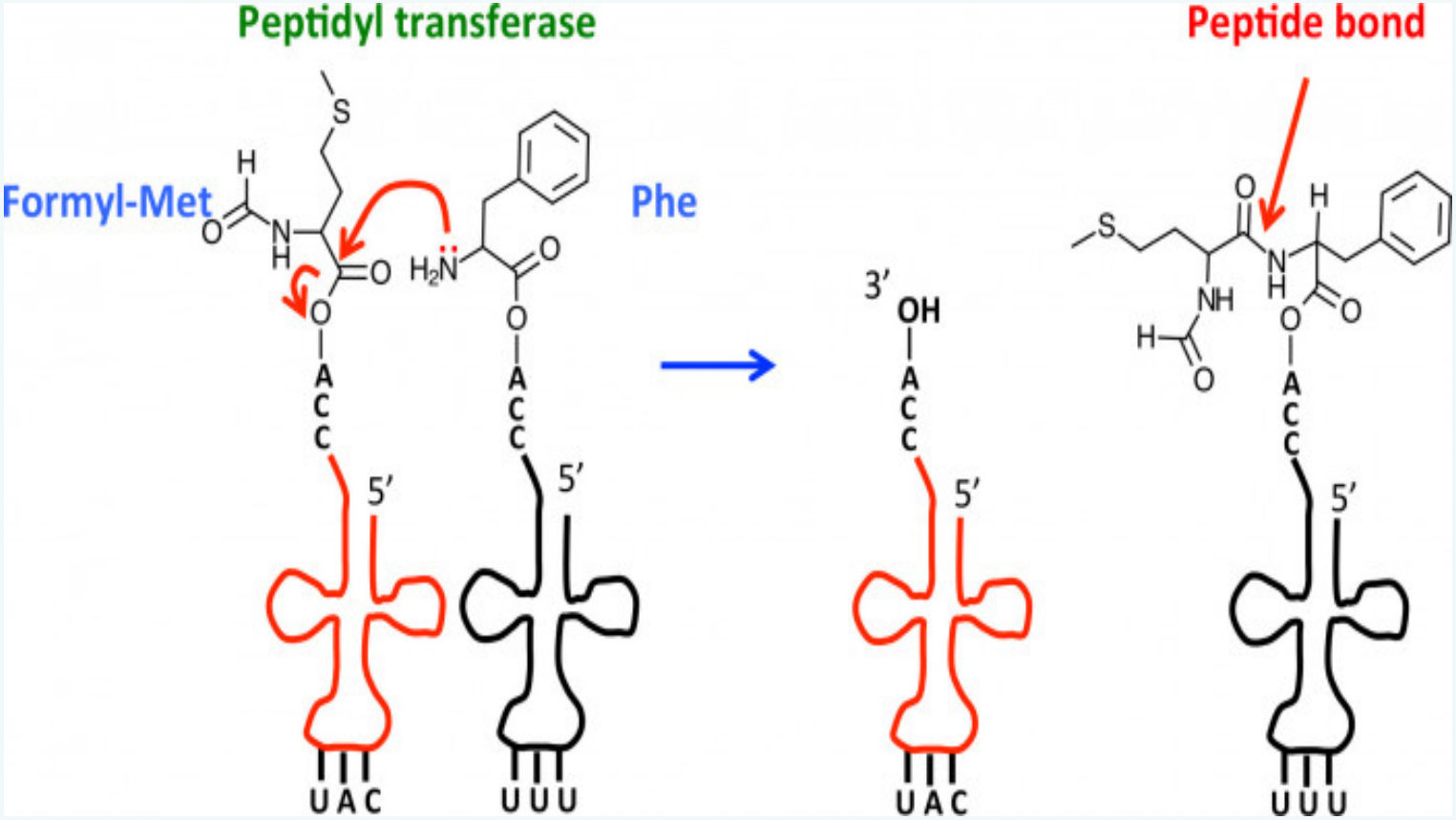
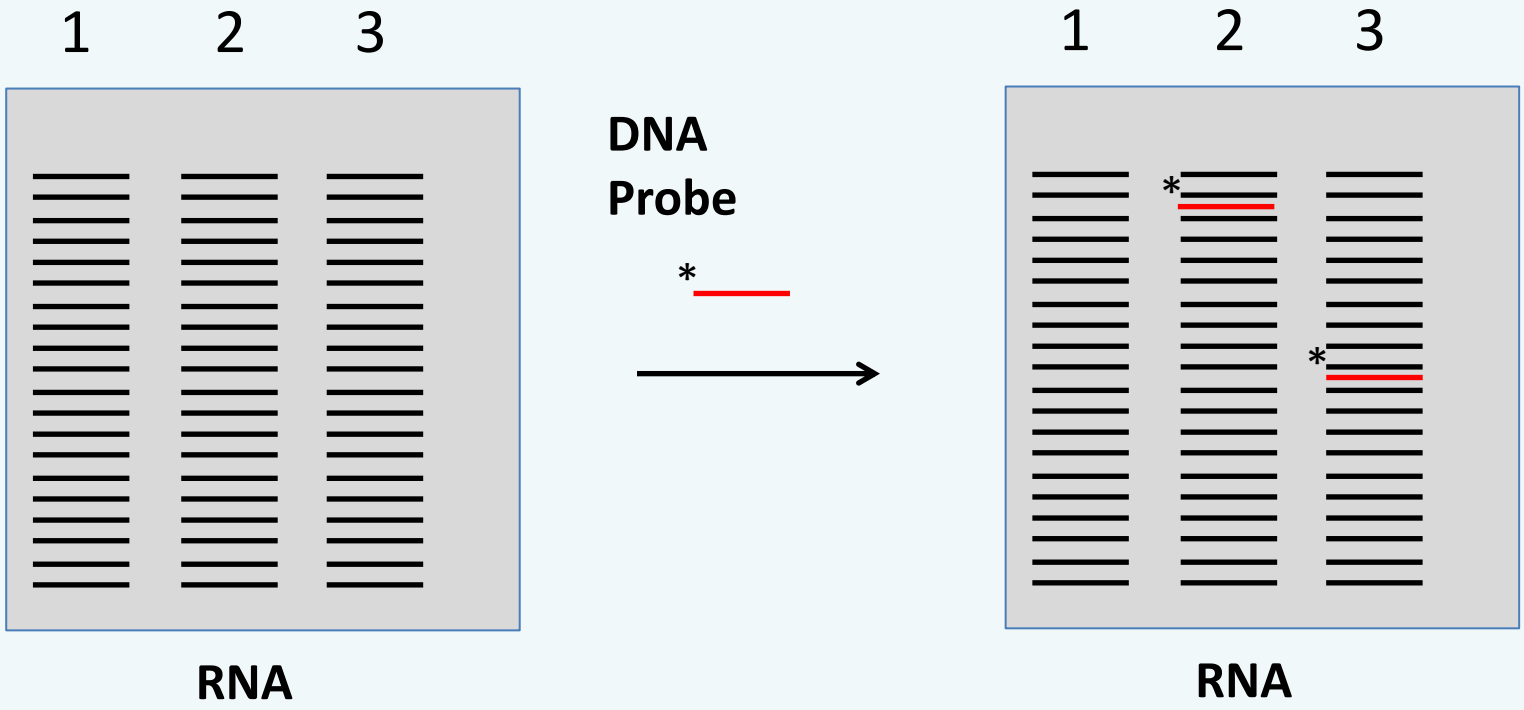
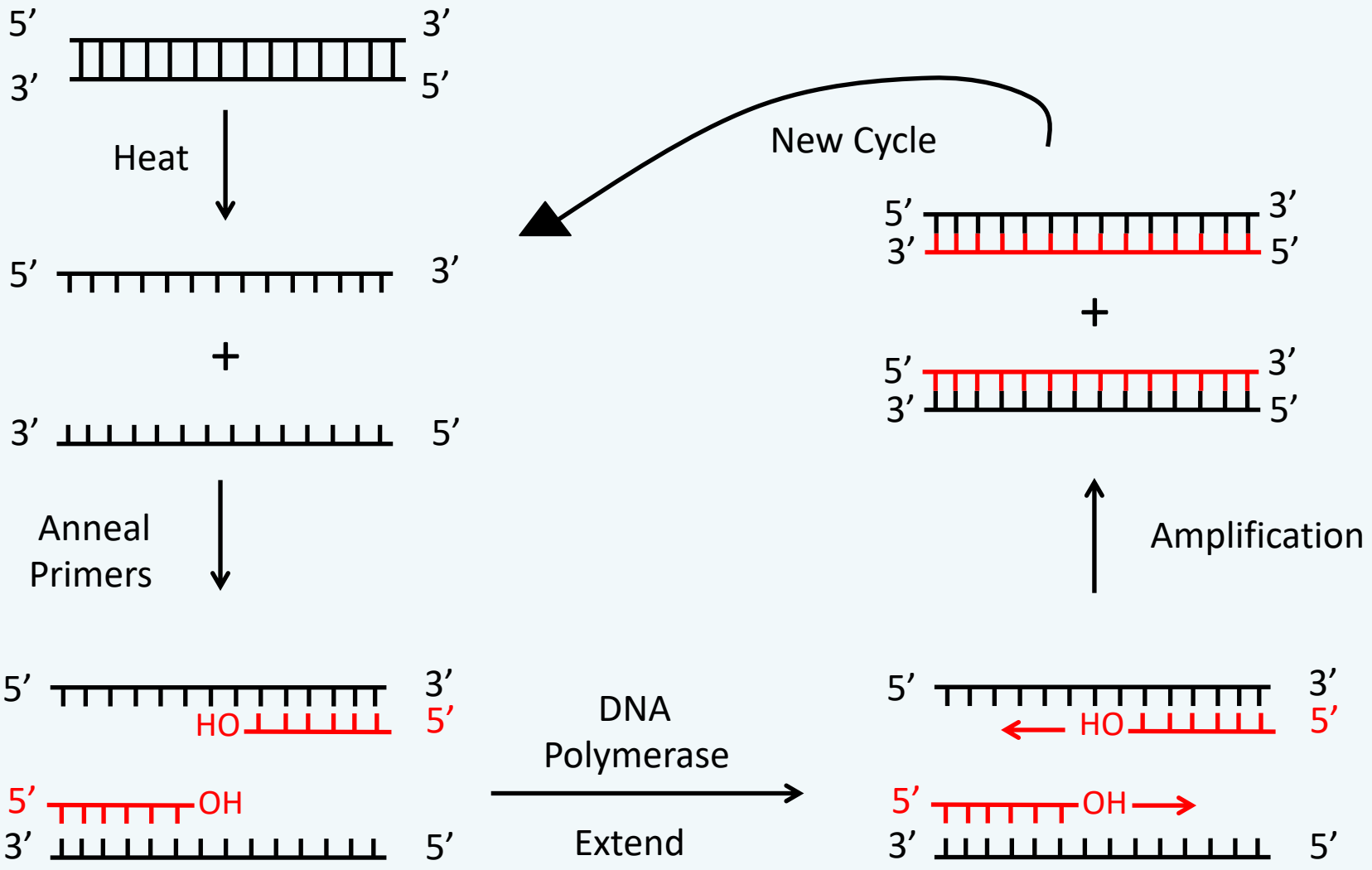
Peptidyl transferase



Analyzing Gene Expression: Northern Blot

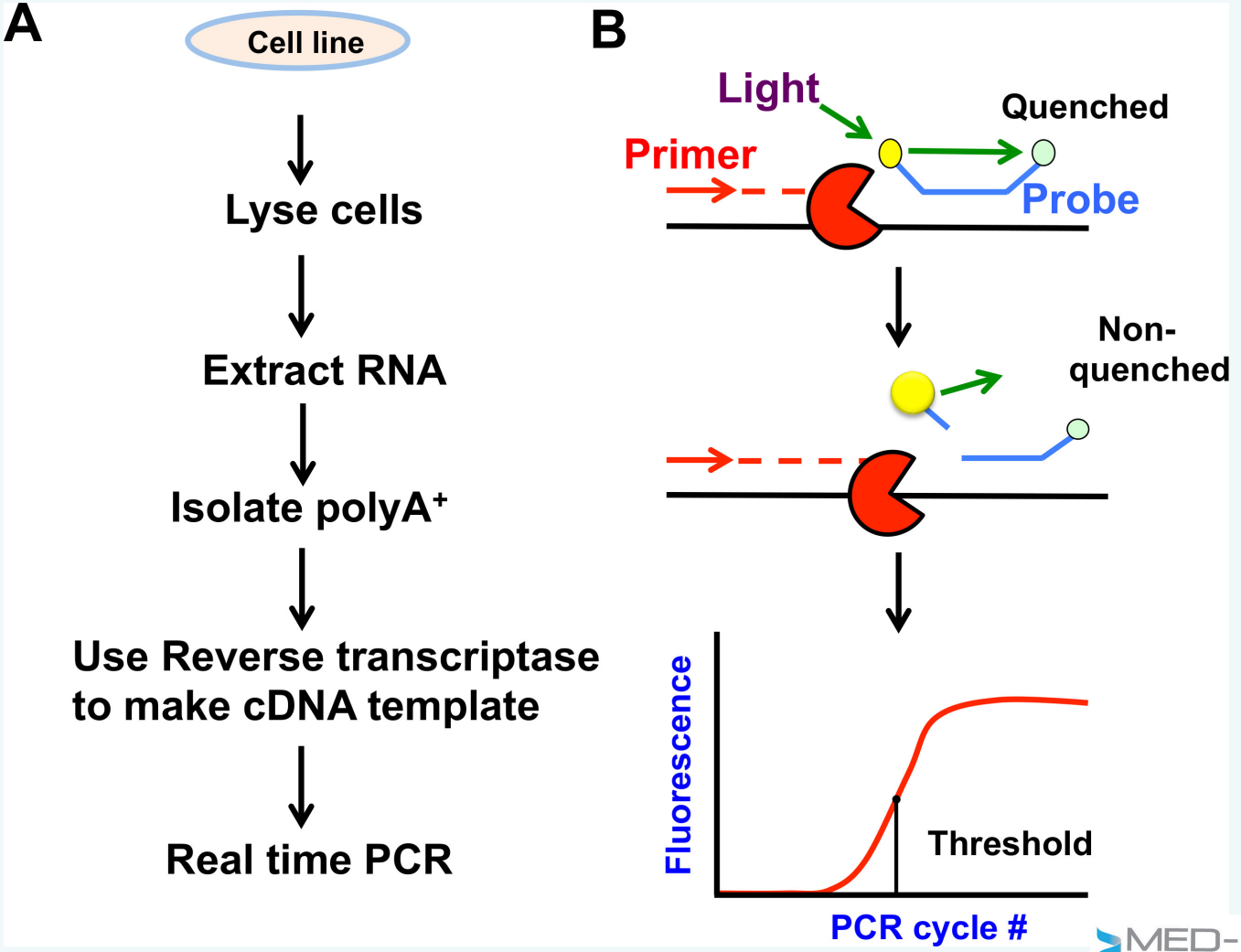


Analyzing Gene Expression: PCR

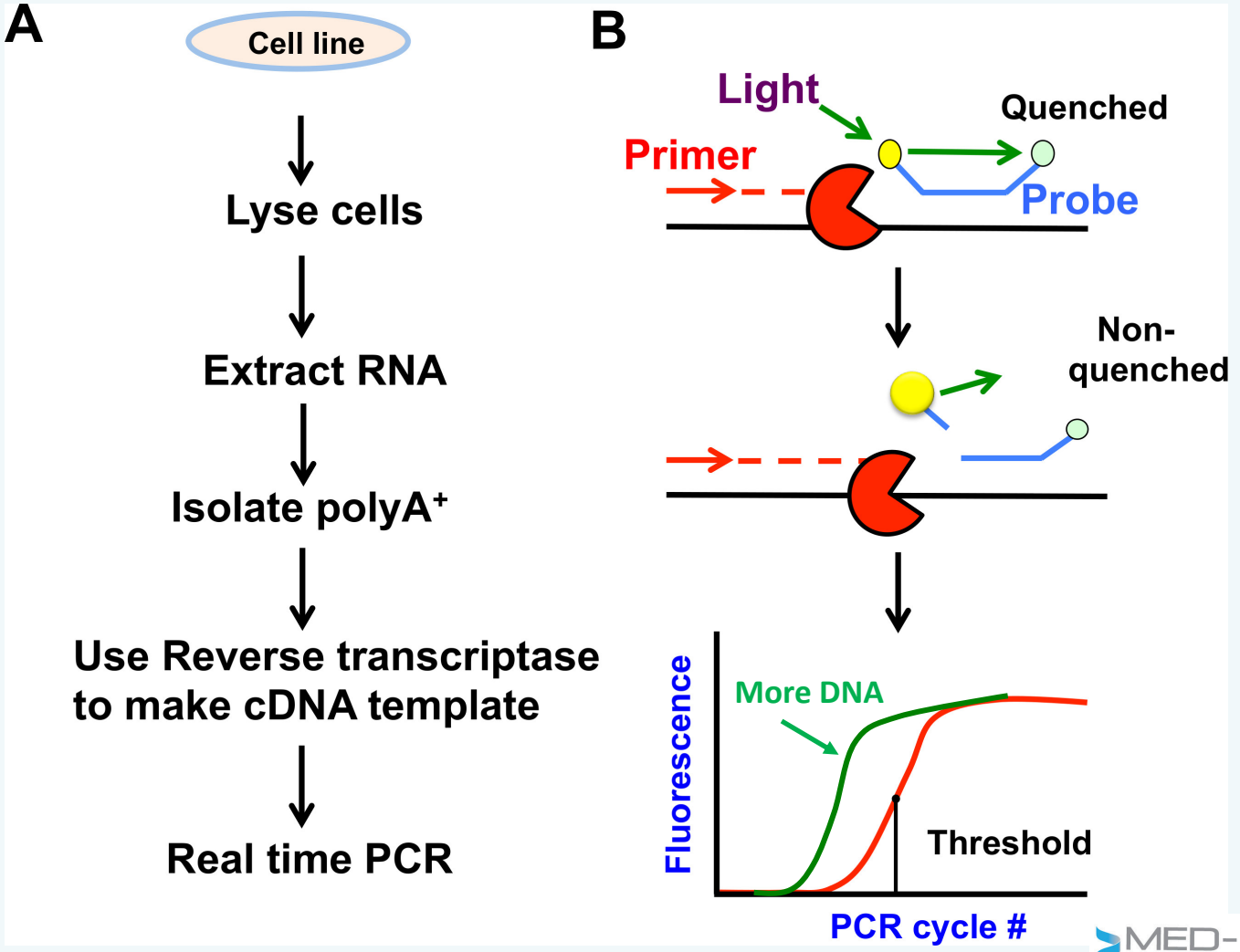


How to design primers?

Analyzing Gene Expression- RT-PCR



Analyzing Gene Expression- RT-PCR



Workshop Passages

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