

Make the protein through the genetic dogma process.

Coding

Strand 5' AGCAATCATGGATTGGGTACATTTGTA ACTGT 3'

Template

Strand

mRNA

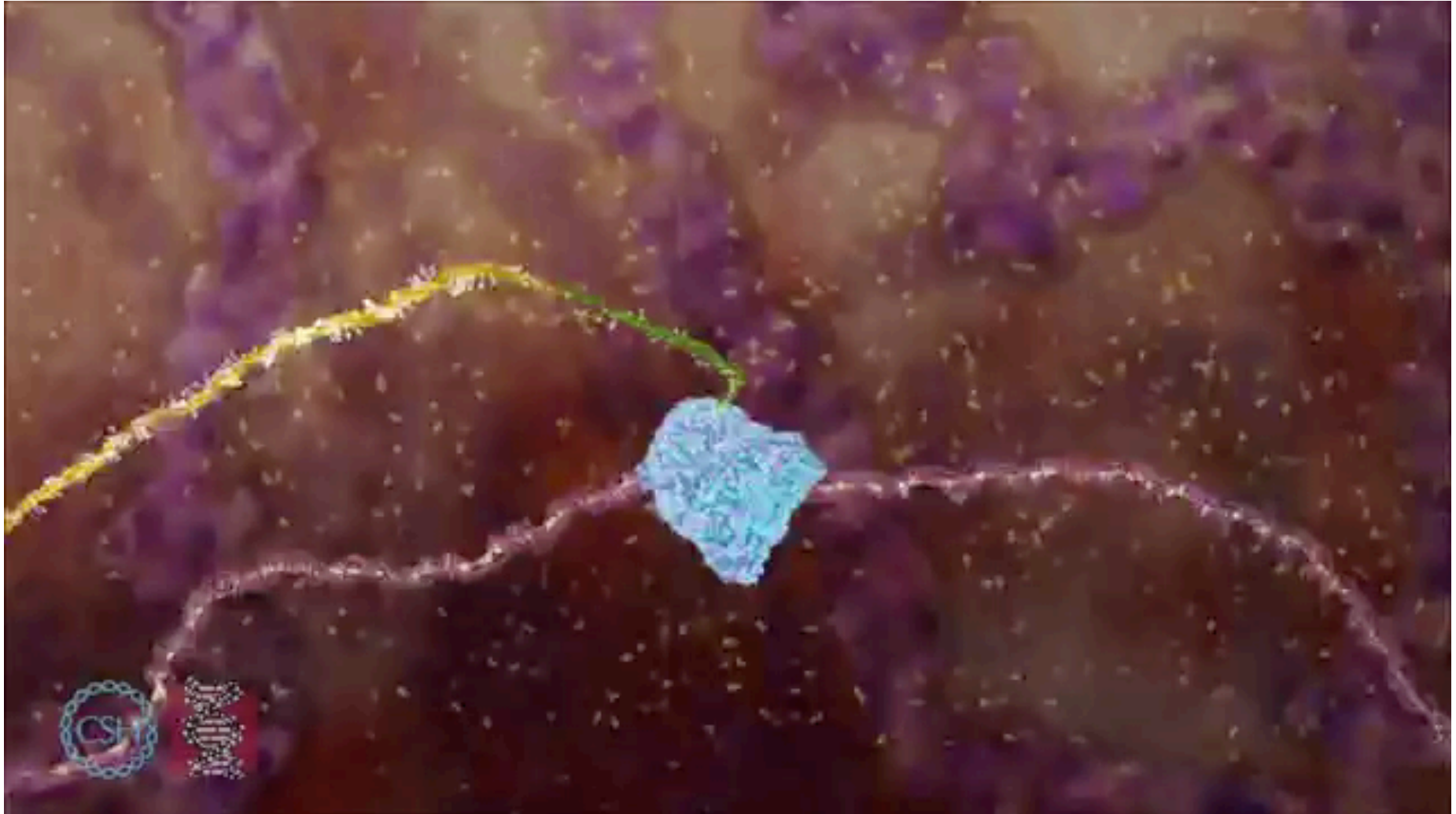
Protein



Complete the table.

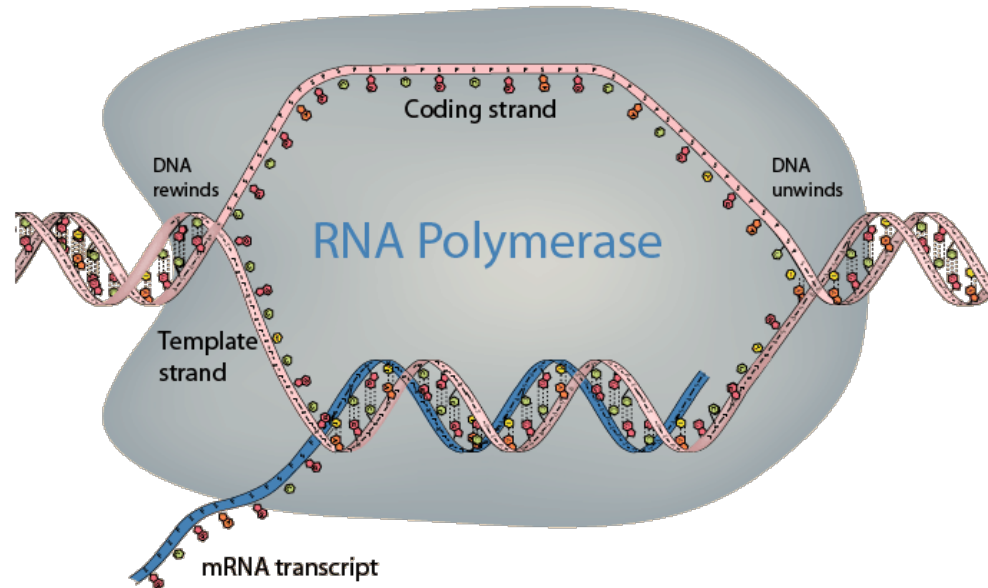
DNA _____ strand		G			G				
DNA's _____ strand			T			A			T
mRNA	A	C		U					
Amino acids							Ser		

Transcription



Transcription

- the process where the DNA code is used to make a complementary mRNA strand



Transcription

3 stages:

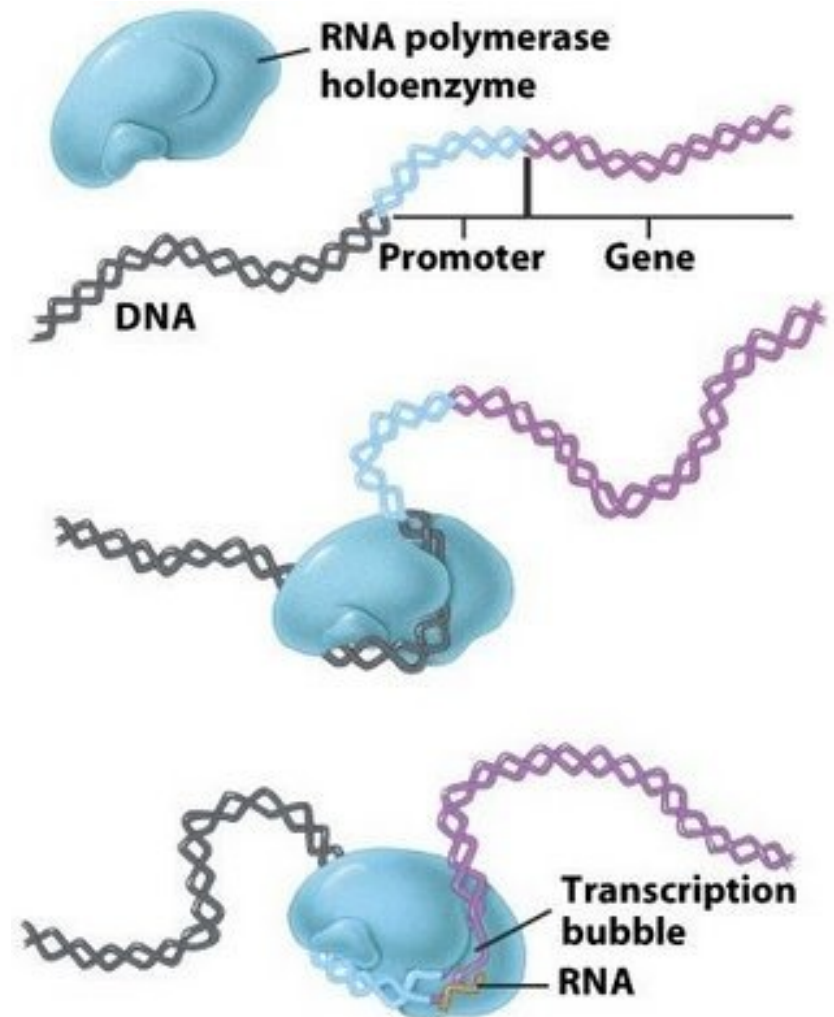
initiation

elongation

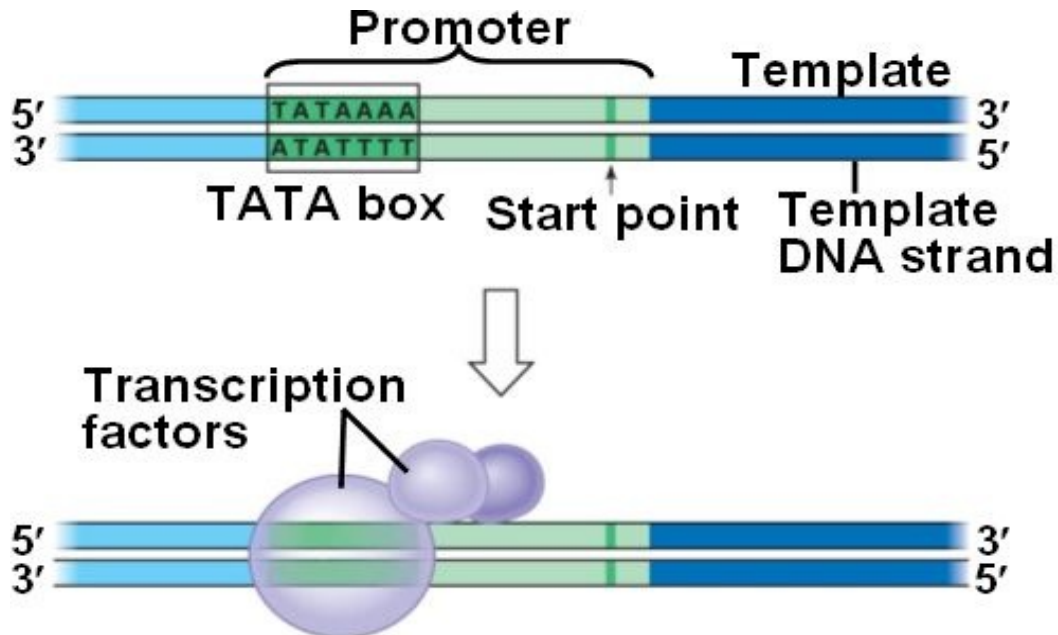
termination

Initiation

- RNA polymerase binds to the **promoter** (a sequence upstream of a coding sequence for protein)



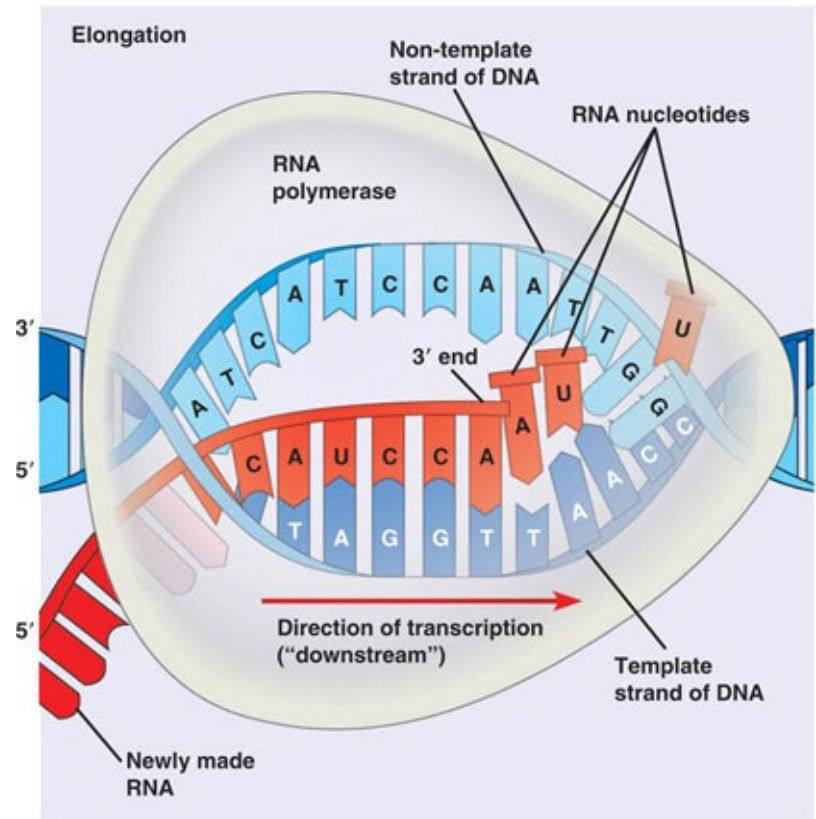
Promoter Sequence



- upstream of the gene
- recognition site for RNA polymerase to bind to the DNA (initiated by protein called Transcription factors)
- **TATA box** (in eukaryotes): high in adenine and thymine (easier to break H-bonds)

Elongation

- RNA polymerase opens the double helix
- synthesizes mRNA by adding ribonucleotides from 5' to 3'



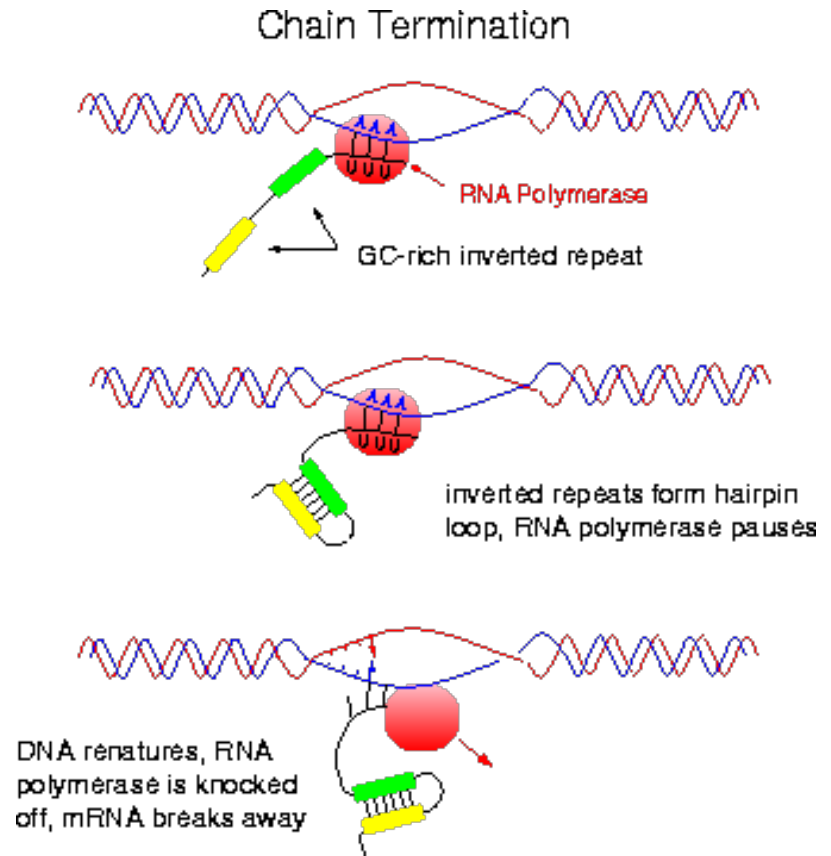
Elongation

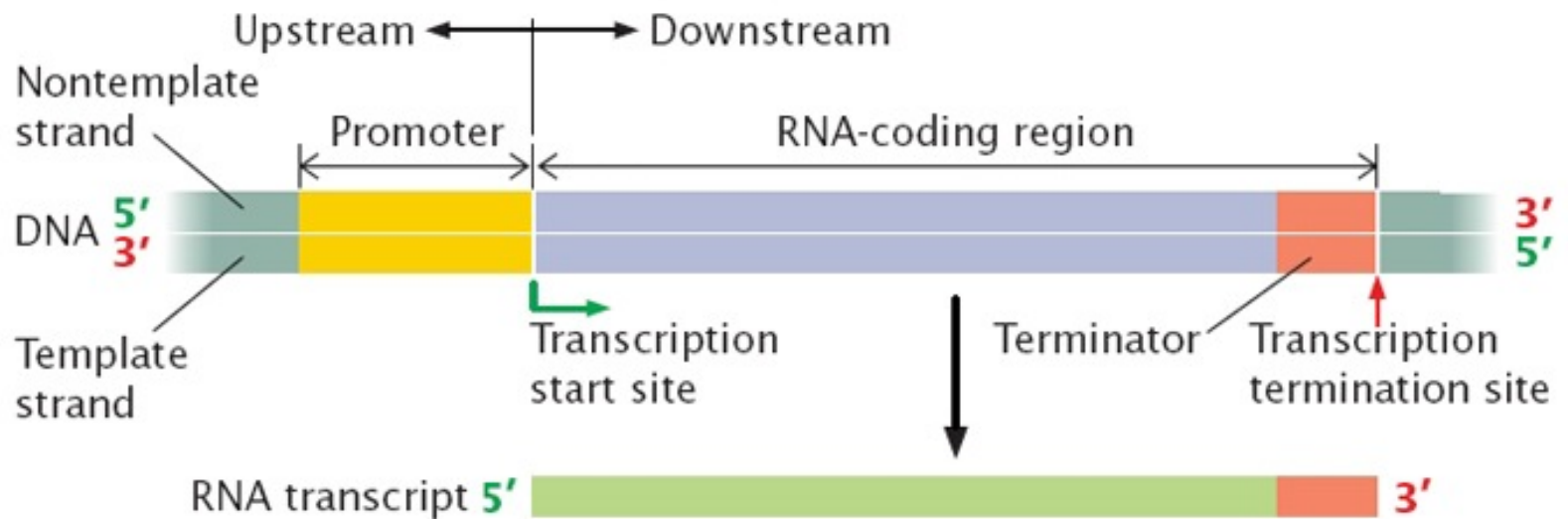
- the **template strand** of the DNA is used as a template for making the complementary mRNA strand
- the complementary DNA strand (called the **coding strand**) has the same sequence as mRNA -with exceptions of U and T)

Example 3' TTT AAA GGG CCC 5' **Template (message)**
 5' AAA TTT CCC GGG 3' **Coding strand**
 5' AAA UUU CCC GGG 3' **mRNA**

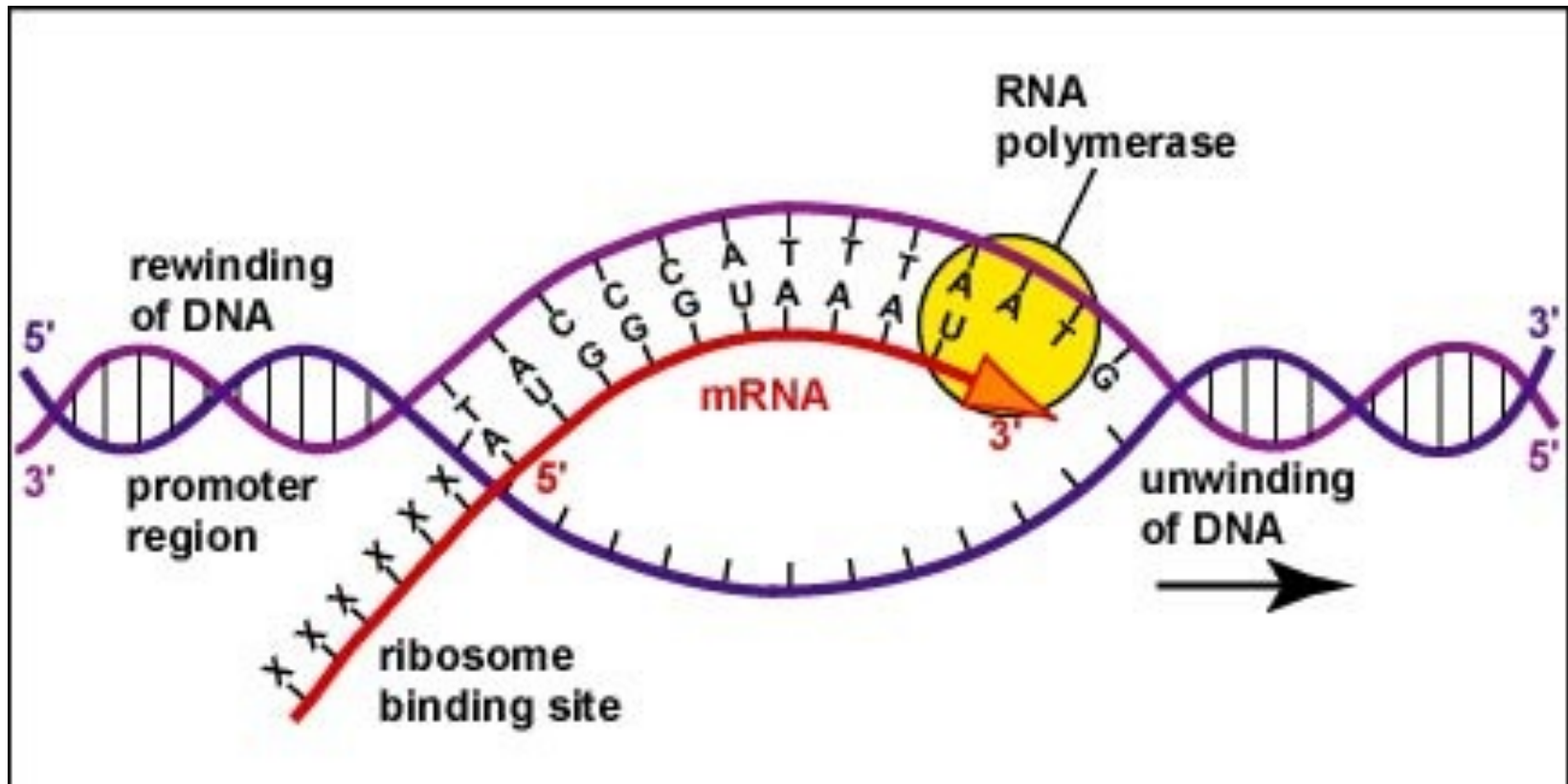
Termination

- transcription stops at the **termination sequence**, and mRNA is released





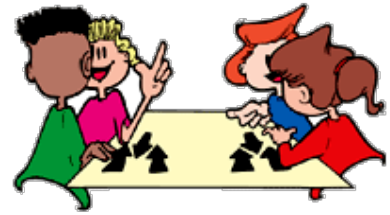
Transcription Summary



Transcription Animations

[http://www.pbslearningmedia.org/resource/
lsp07.sci.life.stru.celltrans/cell-
transcription-and-translation/](http://www.pbslearningmedia.org/resource/lsp07.sci.life.stru.celltrans/cell-transcription-and-translation/)

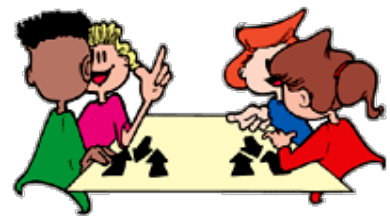
Post-transcriptional Modifications



Minimize this into 40 words or less by blackening out sections.

Transcriptional modification is a process in cell biology by which, in eukaryotic cells, primary transcript RNA is converted into mature RNA. A notable example is the conversion of precursor messenger RNA into mature messenger RNA (mRNA), which includes splicing and occurs prior to protein synthesis. This process is vital for the correct translation of the genomes of eukaryotes because the human primary RNA transcript that is produced, as a result of transcription, contains both exons, which are coding sections of the primary RNA transcript and introns, which are the non-coding sections of the primary RNA transcript.

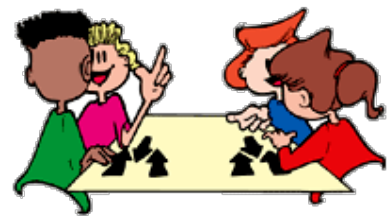
Post-transcriptional Modifications



Splice out introns to leave 40 words.

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Post-transcriptional Modifications

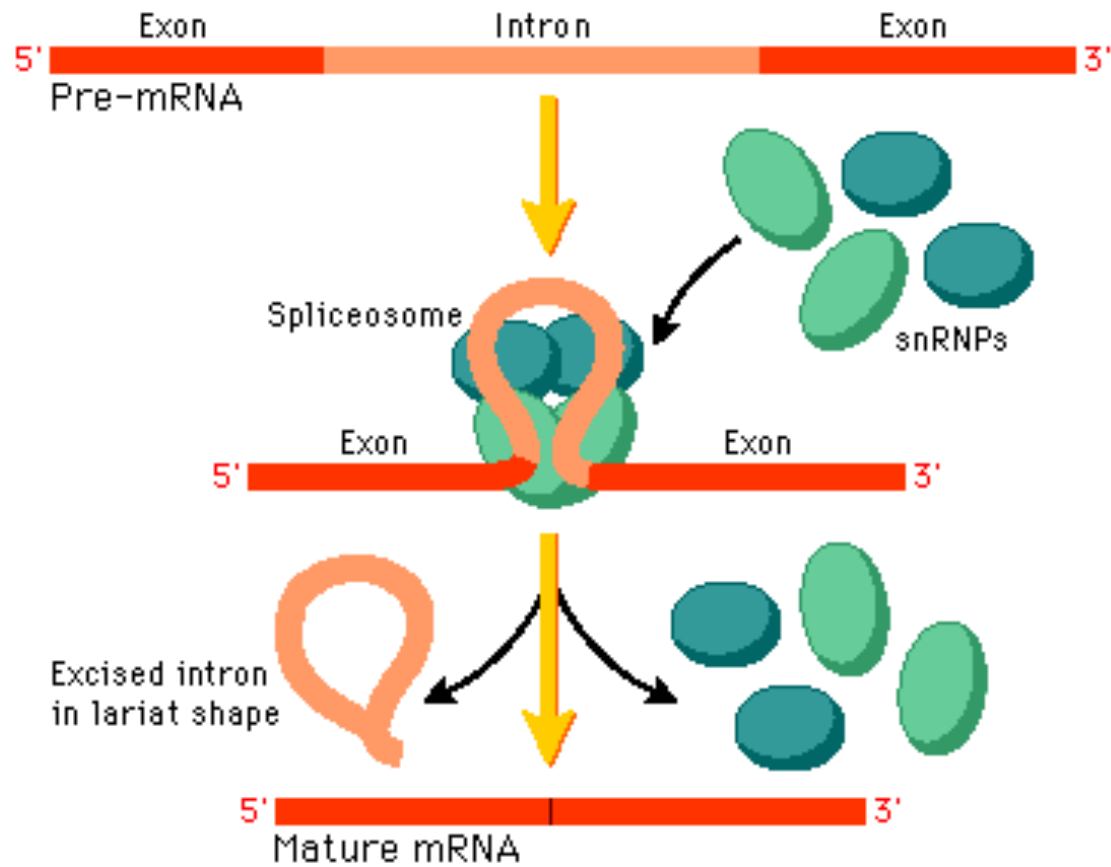


Transcriptional modification is a process in which eukaryotic RNA is converted to mature RNA. A conversion includes splicing. This process is for correct translation. RNA transcript contains both exons, coding sections, and introns, which are the non-coding sections.

Alternative Splicing

Transcriptional modification is a process in which eukaryotic RNA is converted to mature RNA. RNA transcript contains both exons, coding regions, and introns, which are the non-coding sections. A conversion includes splicing. This process is for correct translation.

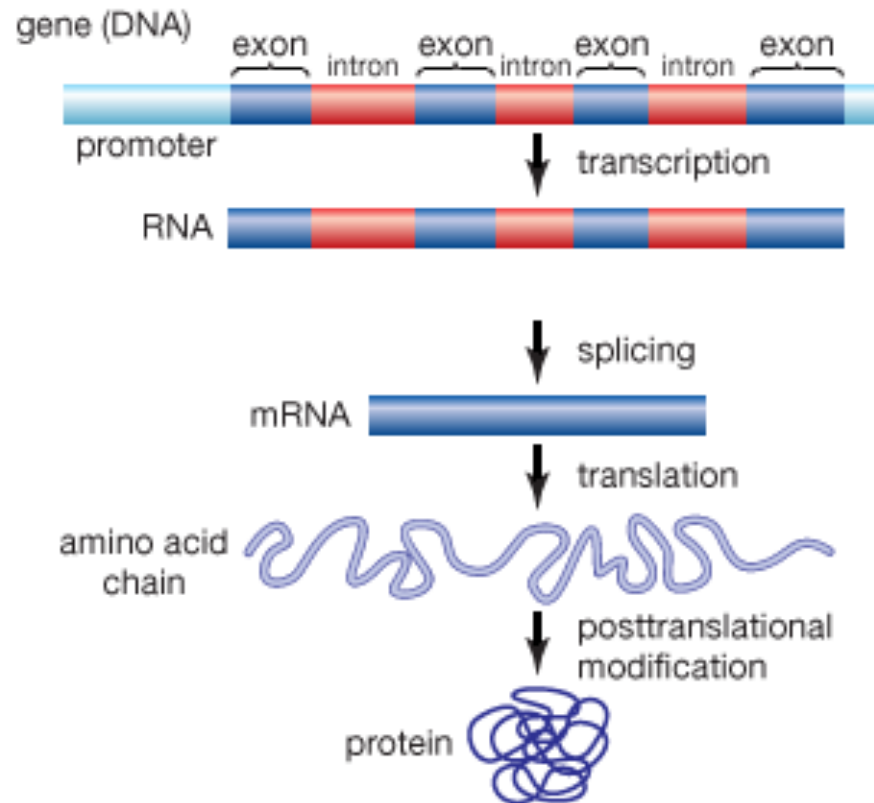
snRNPs



Removal of Introns

- the eukaryotic genome consists of coding regions (**exons**) and non-coding regions (**introns**)
- enzyme-protein complexes called **spliceosomes** cut the introns out of the primary transcript and rejoin the exons

Removal of Introns



Alternative Splicing

- research shows that exons may be joined in different combinations to produce different but related proteins
- explains how in humans about 100 000 proteins can be produced from only around 20 000 genes

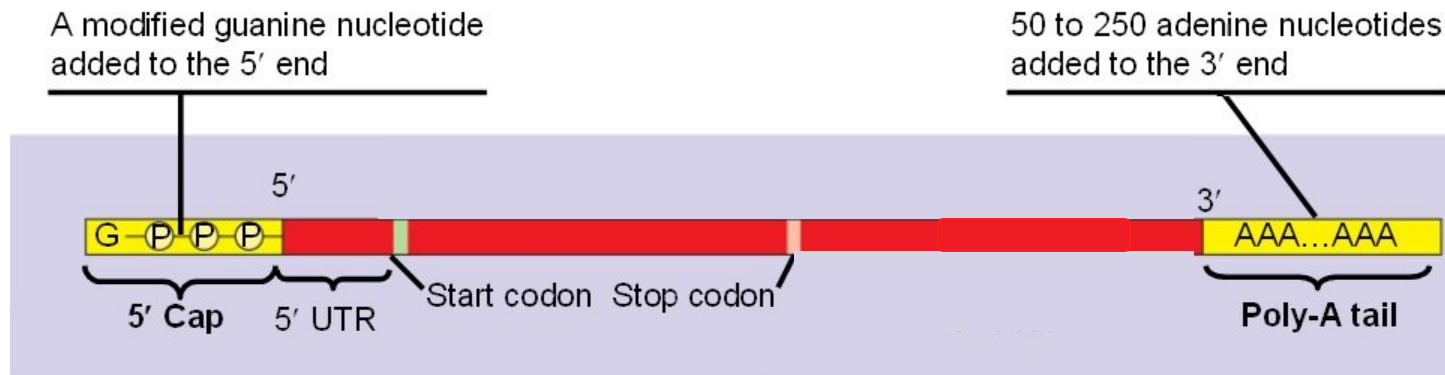
Post-transcriptional Modifications

- the **pre-mRNA** in eukaryotic cells needs to undergo additional modifications before leaving the nucleus

Addition of Poly(A) Tail

- approximately 200 adenine ribonucleotides are added to the 3' end by *poly-A polymerase*
- called a **poly(A) tail**.
- vital to protect it from RNA digestion by enzymes in the cytosol

Addition of 5' Cap



- a **5' cap** consisting of 7 G is added to the start of the primary transcript
- for a correct starting point for ribosomes later on in translation prior to protein synthesis

mRNA Transcript

- the mRNA is ready to leave the nucleus for translation and it is now called the **mRNA transcript**

