Gene

Transcription

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OBJECTIVES WE'RE GOING TO PRESENT

Definition — Define Transcription.

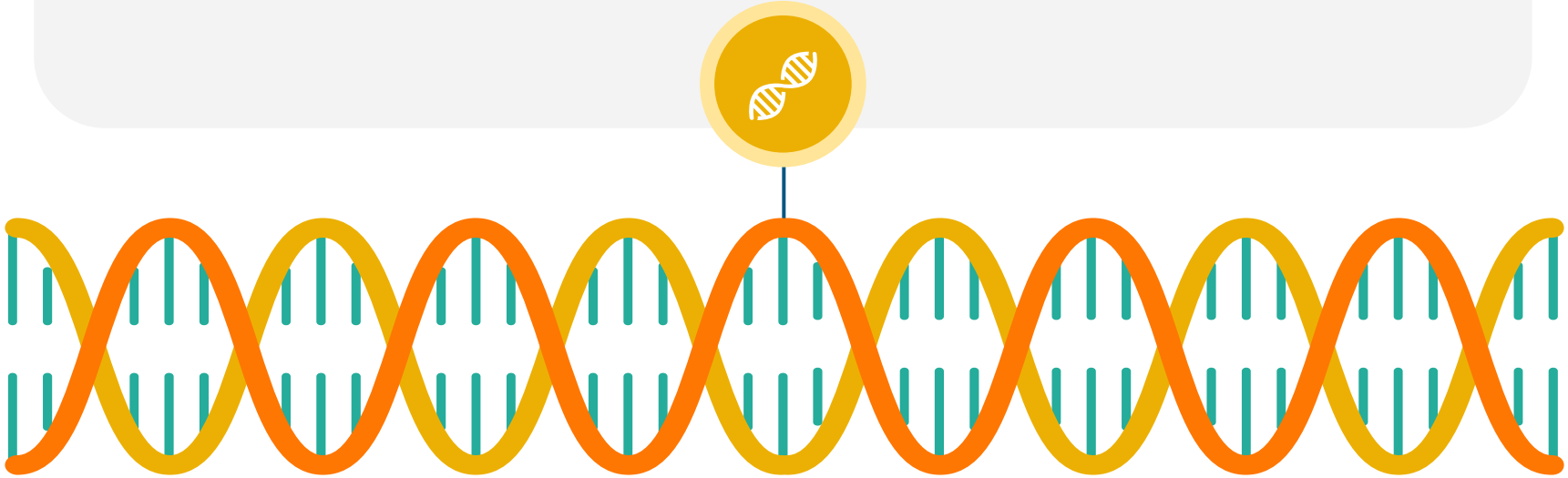
The Process — Describe the steps of transcription.

Comparison — Differentiate between prokaryotic and eukaryotic.

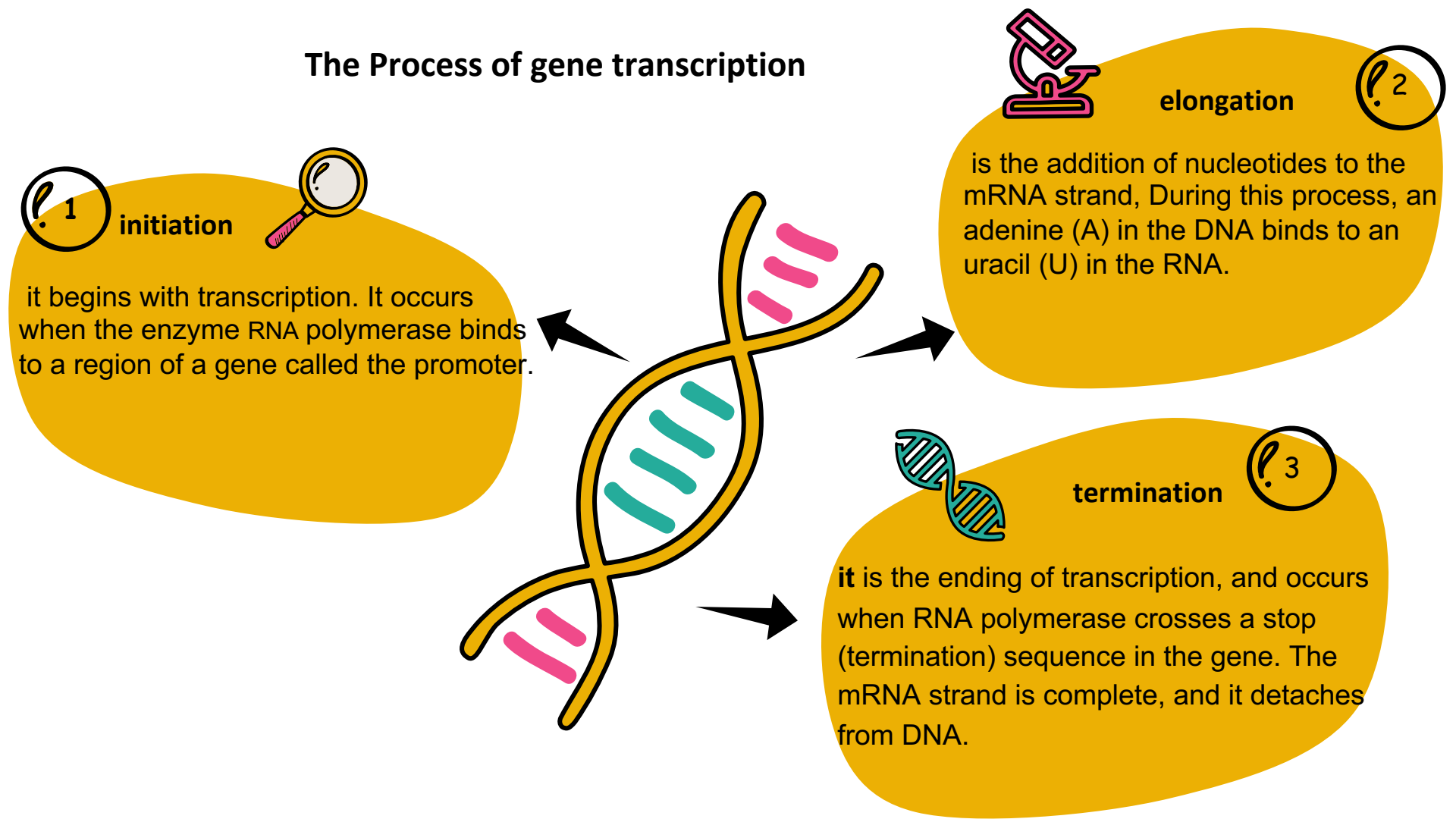
Summary — Recall what we learned about transcription.

What is Gene transcription?

Transcription is the process of transferring the genetic information in DNA into RNA base sequences, it is the first step in gene expression, In the case of protein synthesis, a protein-coding gene is transcribed to give a messenger RNA.



The Process of gene transcription



1 **initiation**

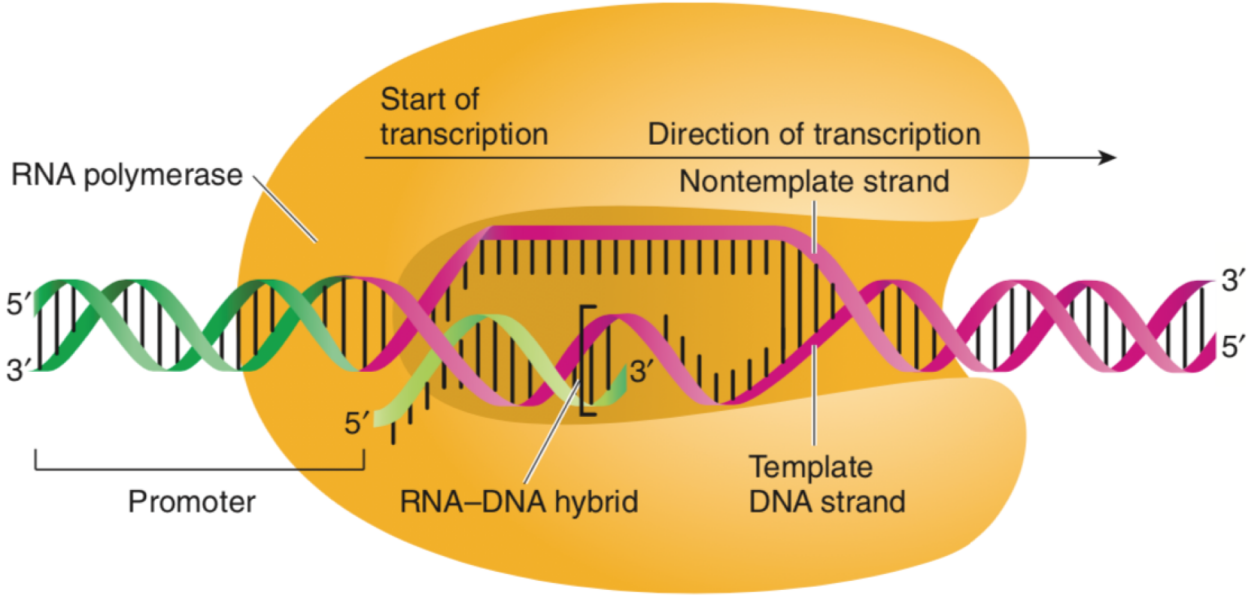
it begins with transcription. It occurs when the enzyme RNA polymerase binds to a region of a gene called the promoter.

2 **elongation**

is the addition of nucleotides to the mRNA strand, During this process, an adenine (A) in the DNA binds to an uracil (U) in the RNA.

3 **termination**

it is the ending of transcription, and occurs when RNA polymerase crosses a stop (termination) sequence in the gene. The mRNA strand is complete, and it detaches from DNA.



RNA polymerases are enzymes that transcribe DNA into RNA.

RNA polymerase always builds a new RNA strand in the 5’ to 3’ direction

RNA polymerase "walks" along one strand of DNA, known as the template strand, in the 3' to 5' direction.

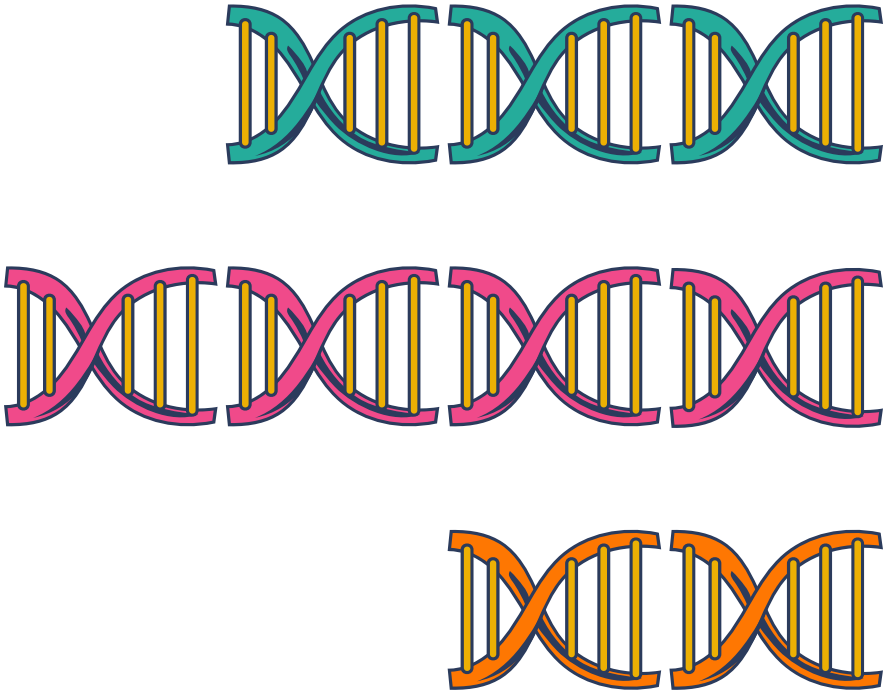
For each nucleotide in the template.

RNA polymerase binds to promoter DNA, then separates the two strands of DNA after that it adds nucleotides to produce the (mRNA) that carries the information to the ribosome.

PROKARYOTIC	EUKARYOTIC
Occurs in the cytoplasm.	Occurs in the cell nucleus
mRNA transcribed directly from template DNA molecule.	Initially a pre-mRNA molecule is formed and then processed to yield a mature mRNA
RNA polymerase consists of five subunits.	RNA polymerase consists of 10-17 subunits.
Transcription and translation happen simultaneously.	Transcription and translation differ in time and space.
Holoenzyme recognizes and binds directly to the promoter.	Promoter recognition cannot be carried out by RNA polymerase alone.

VS

Summary



- Transcription is the first step in gene expression. It involves copying a gene's DNA sequence to make an RNA molecule.
- Transcription is performed by enzymes called RNA polymerases, which link nucleotides to form an RNA strand (using a DNA strand as a template).
- Transcription has three stages: initiation, elongation, and termination.
- In eukaryotes, RNA molecules must be processed after transcription: they are spliced and have a 5' cap and poly-A tail put on their ends.
- Transcription is controlled separately for each gene in your genome.

References

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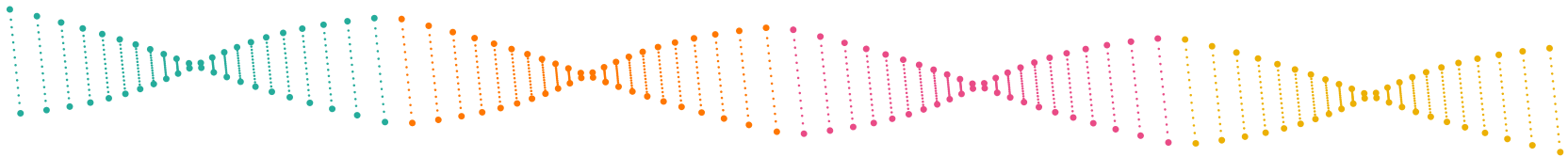


Thank you!