Zine Project

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What does a cell do with its DNA?

The Central Dogma

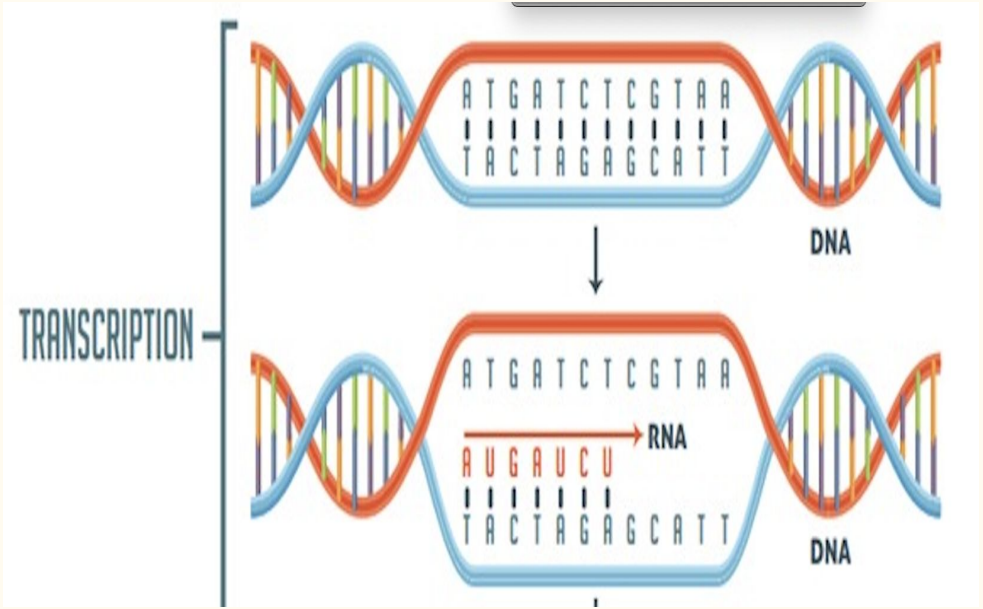
Steps in the Central Dogma

Simple on the Outside
Complex on the Inside

- DNA to RNA
  - Transcription
- Eukaryotes (Polyadenylation)
- RNA to Protein
  - Translation

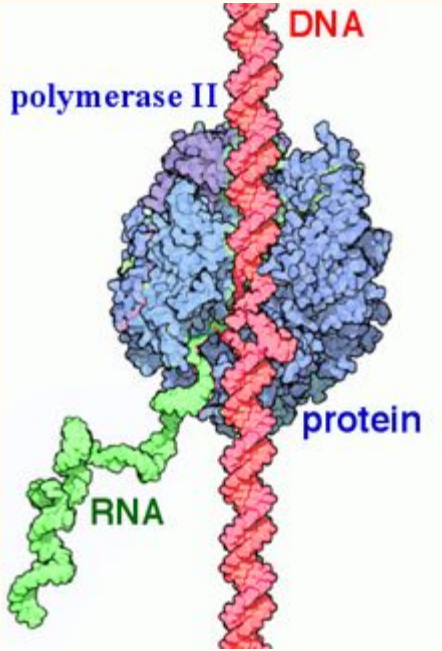
Steps of Transcription

1. Pre-Initiation
2. Initiation
3. Promoter Clearance
4. Elongation
5. Termination



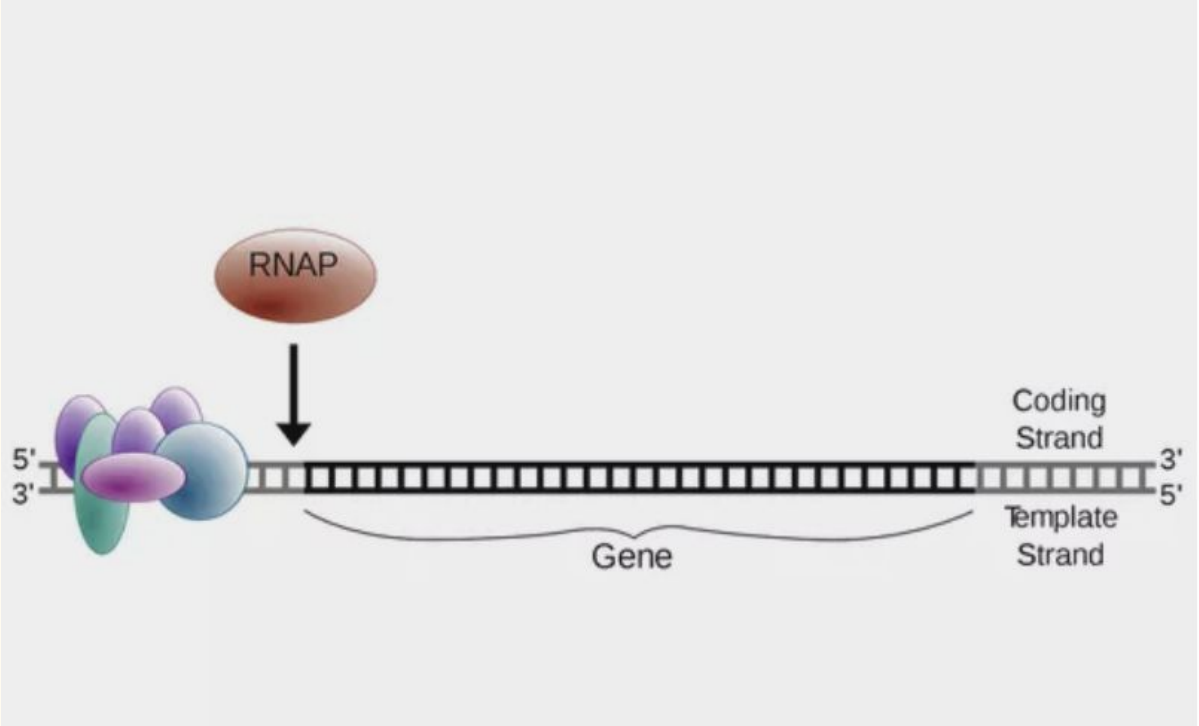
Pre-Initiation

Certain molecules come and attach on the DNA molecule. Some of these molecules are RNA polymerase and other cofactors that help unwind the DNA and create a bubble.



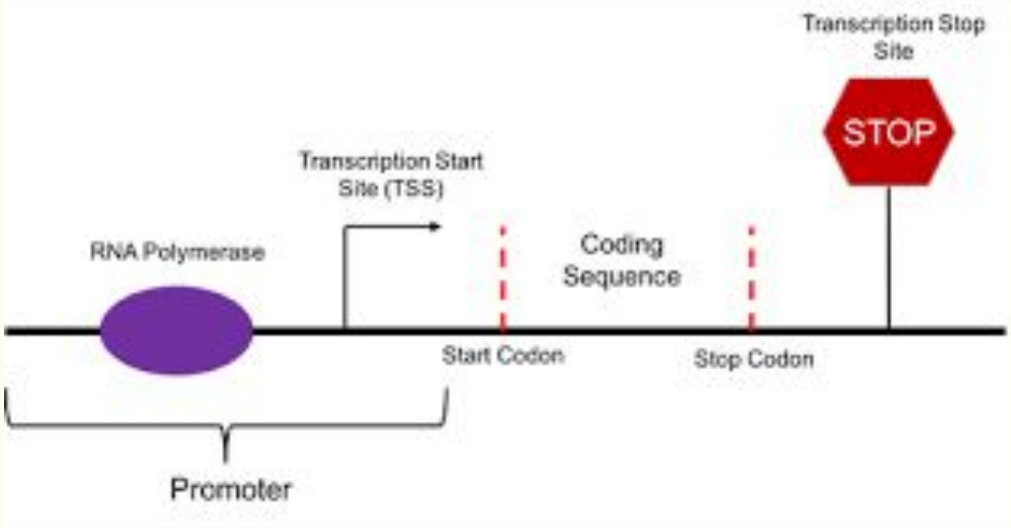
Initiation

RNA polymerase binds at the promoter location of the DNA. In more complex organisms such as eukaryotes there are transcription factors that attach to the RNA polymerase and helps start transcription.



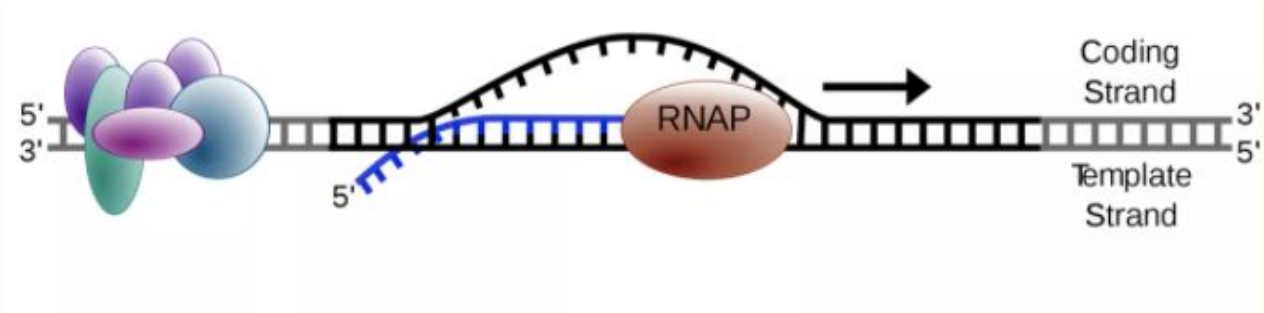
Promoter Clearance

RNA polymerase leaves the promoter once the first bond has been synthesized. The promoter is where the RNA polymerase first attached to and it also signals where transcription starts.



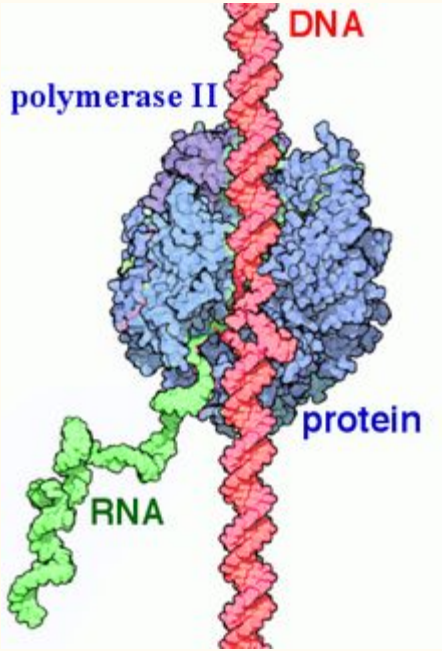
Elongation

One strand of the DNA molecule is a template or blueprint for the new RNA strand that will be created. Although there will be many RNA copies being made of the same DNA starant only one type of gene is being produced.



Termination

This is the final step of transcription. This step happens when the new mRNA strand has been synthesized and now the RNA polymerase has reached the termination site and detaches from the DNA strand.



What Happens During Polyadenylation?

In Eukaryotes there is something special that happens. The Introns are removed from the mRNA and then the exons that remain and connected. There is also a poly-A tail that is added. This is bunch of adenine nucleotides are that added at the end. Also at the front of the mRNA there is a 5’ guanine nucleotide. This will be important during translation.

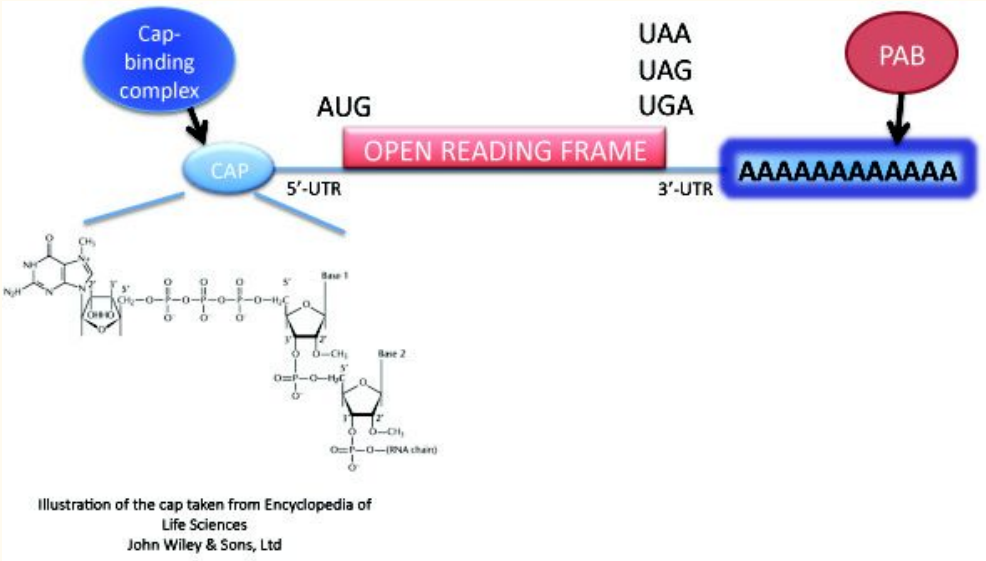
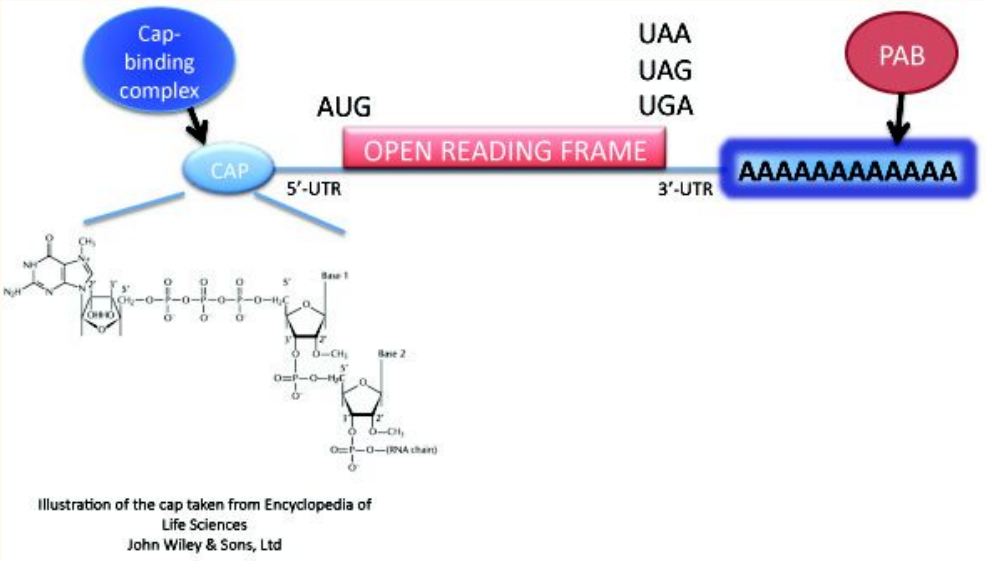


Illustration of the cap taken from Encyclopedia of Life Sciences
John Wiley & Sons, Ltd

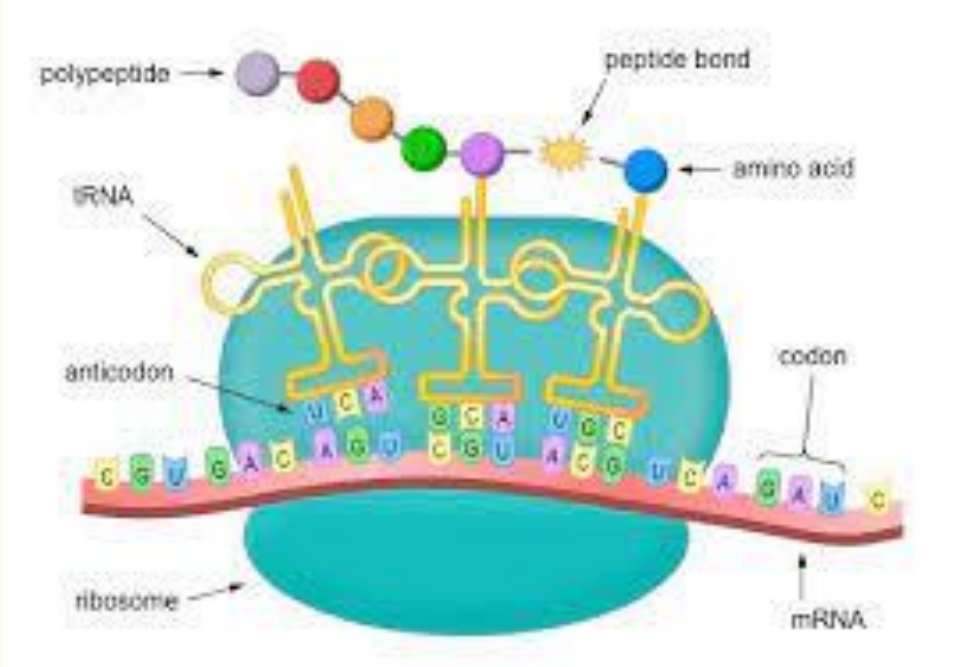
Steps of Translation

1. Initiation
2. Elongation
3. Termination



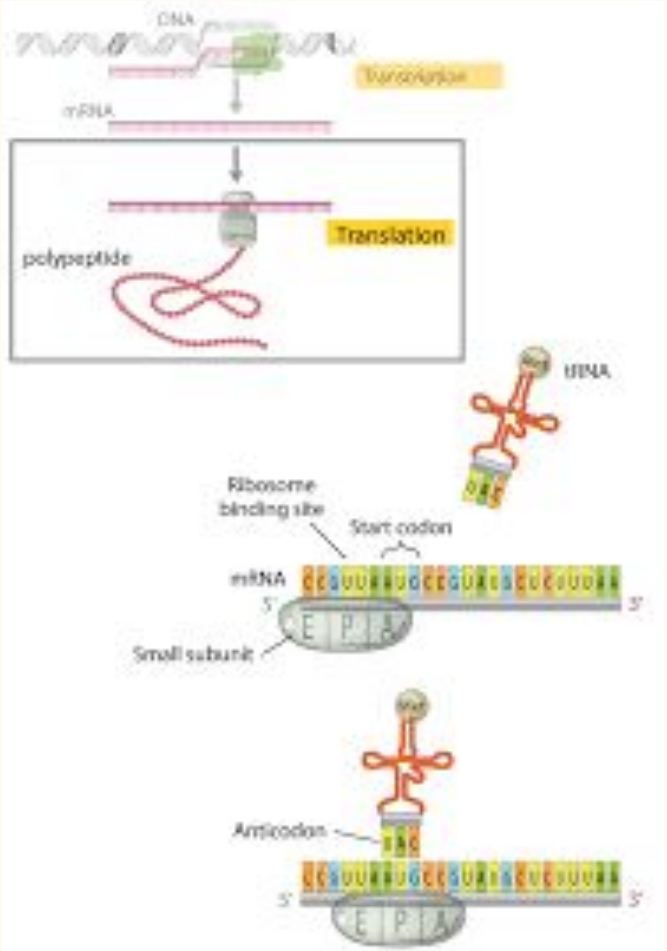
Initiation

The ribosomal subunit attached to the start of the mRNA sequence. Next step is a transfer RNA molecule carrying the amino acid methionine binds to what is called the start codon of the mRNA sequence.



Termination

Termination happens when the ribosome reaches one of 3 stop codons, UAA, UAG, UGA. The tRNA molecules know that this molecule can recognize these codons to stop. WHen the ribosome recognizes it then translation is complete.



The Central Dogma is very unique.

Conclusion

This Zine Project was very fun for me to do. When I was learning about the central dogma a couple of weeks ago I was a little confused about the topic so I utilized this project as opportunity to learn more about the central dogma of molecular biology.