"One Gene, One Polypeptide"

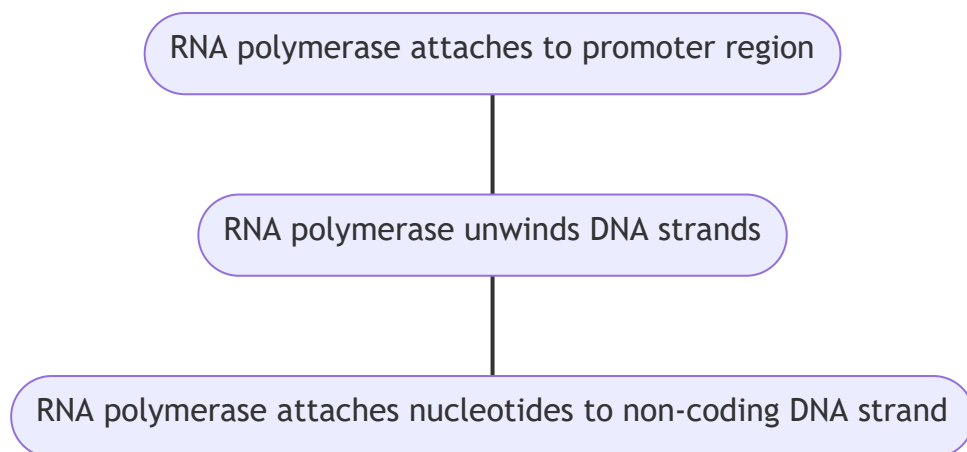**Christian Choe**

1. Purpose of Protein Synthesis

Protein synthesis is the process of creating proteins, molecules that are made up of amino acids, and are essential for doing tasks within cells. This process is divided up into two major parts, transcription and translation.

2. Steps

2.1. Transcription

Transcription: The process of producing a mRNA sequence from a DNA template.

In eukaryotes, transcription happens in the nucleus, where DNA, the genetic information for life, is contained.

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│  RNA polymerase attaches to promoter region  │
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      │  RNA polymerase unwinds DNA strands │
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│  RNA polymerase attaches nucleotides to non-coding DNA strand │
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1. The enzyme RNA polymerase attaches to a promoter region,

2. RNA polymerase unwinds and separates the DNA strands by breaking the weak hydrogen bonds between the nucleotides.

3. RNA polymerase attaches free RNA nucleotides to a DNA strand in a 3' to 5' direction, and forms phosphodiester bonds between the nucleotides.

4. As RNA polymerase moves along the DNA sequences, it rewinds the DNA behind it.

5. Once it reaches a terminator, the RNA polymerase detaches from the DNA, finishing the mRNA copy of the strand.

6. The mRNA leaves the nucleus through a nuclear pore

2.1.1. Processing

- On the 5' end of the pre-mRNA, a 5' is added on.

- On the 3' end of the pre-mRNA, a poly(A) tail is added on.

- Non-coding segments of RNA, called introns, are removed

2.2. Translation

7. In the cytoplasm, the mRNA seeks out a ribosome, a macromolecular machine

8. Once the ribosome has attached to the 5' cap on the mRNA, it begins to move along the mRNA in a 5' to 3' direction

9. Upon reading a start codon (AUG), the ribosome begins to bind tRNA anticodons to mRNA codons, and catalyses the formation of peptide bonds through condensation reactions.

10. This goes on until the ribosome reads a stop codon releasing the polypeptide chain which will fold into itself to become a protein.

3. Exceptions

4. Bibliography

3.5 Transcription and Translation | BioNinja. (2022). Retrieved 12 February 2022, from http://www.old-ib.bioninja.com.au/standard-level/topic-3-chemicals-of-life/35-transcription-and-transl.html