

Translation of RNA to Protein

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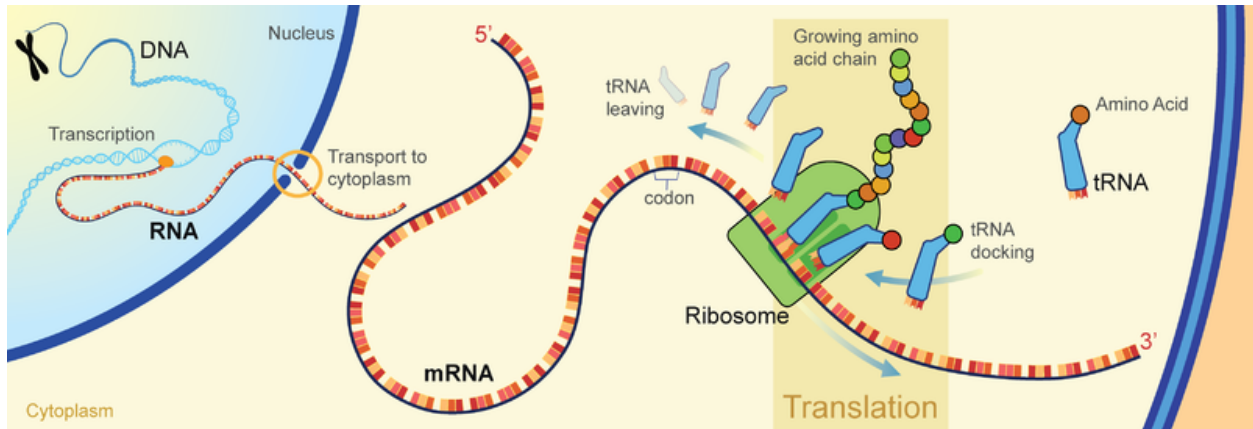


FIGURE 1.1

Translation of the codons in mRNA to a chain of amino acids occurs at a ribosome. Notice the growing amino acid chain attached to the tRNAs and ribosome. Find the different types of RNA in the diagram. What are their roles in translation?

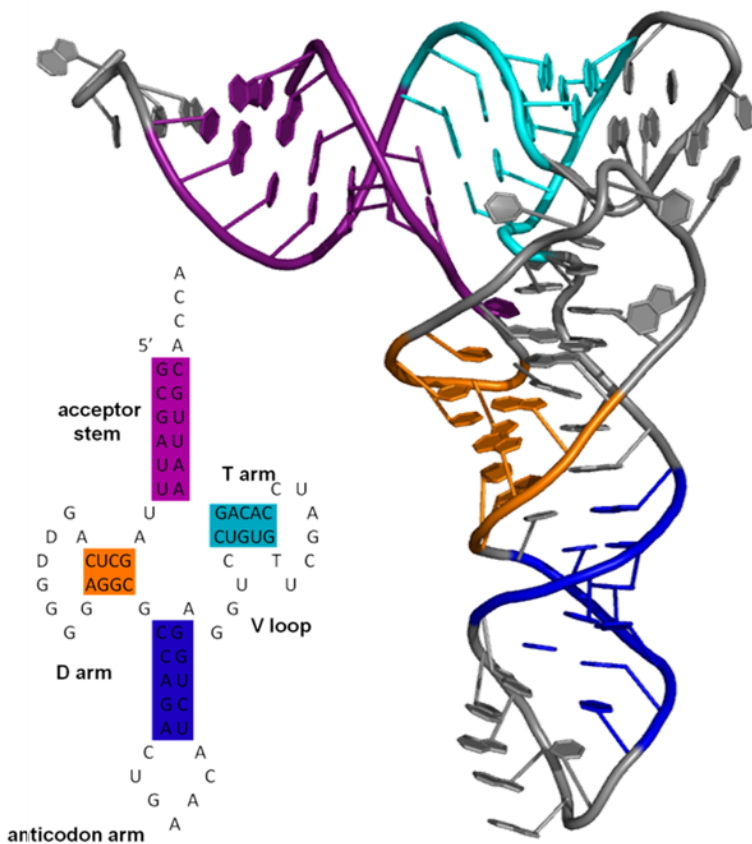


FIGURE 1.2

The tRNA structure is a very important aspect in its role. Though the molecule folds into a *3-leaf clover* structure, notice the anticodon arm in the lower segment of the molecule, with the amino acid attached at the opposite end of the molecule (acceptor stem). It is the anticodon that determines which codon in the mRNA the tRNA will bind to.

chain. The chain of amino acids keeps growing until a stop codon is reached. To see how this happens, go the link below. <http://www.youtube.com/watch?v=B6O6uRb1D38> (1:29)

After a polypeptide chain is synthesized, it may undergo additional processes. For example, it may assume a folded shape due to interactions among its amino acids. It may also bind with other polypeptides or with different types of molecules, such as lipids or carbohydrates. Many proteins travel to the Golgi apparatus to be modified for the specific job they will do. You can see how this occurs by watching the animation at this link: <http://vcell.ndsu.edu/animations/proteinmodification/movie-flash.htm> .

Summary

- Translation is the *RNA* → *Protein* part of the central dogma.
- Translation occurs at a ribosome.
- During translation, a protein is synthesized using the codons in mRNA as a guide.
- All three types of RNA play a role in translation.

Making Connections



MEDIA

Click image to the left or use the URL below.

URL: <http://www.ck12.org/flx/render/embeddedobject/115602>

Explore More

Explore More I

Use this resource to answer the questions that follow.

- <http://www.hippocampus.org/Biology> → Non-Majors Biology → Search: **Translation**

1. In addition to the mRNA, translation needs what three components?
2. Describe the structure of a ribosome.
3. Describe the structure and role of a tRNA molecule.
4. Define codon and anticodon.
5. How does termination occur?

Explore More II

- **Protein Synthesis** at <http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP1302> .
- **RNA Translation** at <http://johnkyrk.com/DNAtranslation.html> .
- **How Do Cells Make Proteins?** at <http://ca.pbslearningmedia.org/content/lps07.sci.life.stru.lpbiosystems/#content/4dd2fb6badd2c73bce006585> .
- **Transcribe and Translate a Gene** at <http://learn.genetics.utah.edu/content/begin/dna/transcribe/> .

Review

1. Outline the steps of translation.
2. Discuss the structure of a tRNA molecule, and its role in translation.
3. How are transcription and translation related to the central dogma of molecular biology?

References

1. Original image by the National Human Genome Research Institute, redrawn by Mariana Ruiz Villarreal (LadyofHats) for CK-12 Foundation. [DNA transcription to mRNA, which translates to a chain of amino acids at a ribosome](#) . CC BY-NC 3.0
2. Kyle Schneider. [Structure of tRNA](#) . Public Domain