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# **Protein synthesis**

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# Introduction

**Proteins make up all living materials**

**Proteins are composed of amino acids - there are 20 different amino acids**

**Different proteins are made by combining these 20 amino acids in different combinations**

**Both prokaryotes and eukaryotes produce various proteins for multifarious processes and functions**

# Importance of protein

## Hair and Nails

A protein called alpha-keratin forms your hair and fingernails, and also is the major component of feathers, wool, claws, scales, horns, and hooves.

## Blood

The hemoglobin protein carries oxygen in your blood to every part of your body.

## Muscles

Muscle proteins called actin and myosin enable all muscular movement—from blinking to breathing to rollerblading.

## Brain and Nerves

Ion channel proteins control brain signaling by allowing small molecules into and out of nerve cells.

## Cellular Messengers

Receptor proteins stud the outside of your cells and transmit signals to partner proteins on the inside of the cells.

## Enzymes

Enzymes in your saliva, stomach, and small intestine are proteins that help you digest food.

## Antibodies

Antibodies are proteins that help defend your body against foreign invaders, such as bacteria and viruses.

## Cellular Construction Workers

Huge clusters of proteins form molecular machines that do your cells' heavy work, such as copying genes during cell division and making new proteins.



## ➤ **What is protein synthesis?**

- **Protein synthesis is a process of creating protein molecules. it involves amino acid synthesis, transcription, translation.**
- **Protein synthesis occurs in the cytoplasm of prokaryotes, and starts in the nucleus to proceed in the cytoplasm in eukaryotes.**

# Protein synthesis has two major parts

## ➤ Transcription

transfer of genetic instructions in DNA to mRNA in the nucleus. three steps: initiation, elongation, and termination.

After the mRNA is processed, it carries the instructions to a ribosome in the cytoplasm.

## ➤ Translation

RNA template or mRNA is used in conjunction with ribosomes, tRNA with attached amino acids to produce a polypeptide chain

## What Happens Next?

After a polypeptide chain is synthesized, it may undergo additional processes.

- a folded tertiary shape due to interactions among its amino acids.
- bind with other polypeptides or with different molecules.
- travel to the Golgi apparatus within the cytoplasm to be modified for the specific job they will do.



(c) Tertiary structure





## Summary

**Protein synthesis is the process in which cells make proteins. It occurs in two stages: transcription and translation.**

**After a polypeptide chain is synthesized, it may undergo additional processing to form the finished protein.**



# THANKS



**Do you have any questions?**

# References

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