Key Terms

Deoxyribonucleic acid is the starting point of the processes of transcription and translation. This is the original piece of genetic material through which all biological processes within an organism are governed. DNA is always found in the form of a double-helix.

DNA polymerases are a group of enzymes that are used to make copies of DNA templates, essentially used in DNA replication mechanisms. These enzymes make new copies of DNA from existing templates and also function by repairing the synthesized DNA to prevent mutations.

mRNA stands for “messenger RNA,” and aptly so: mRNA is essentially the messenger molecule that goes between the DNA in the nucleus of the cell and the ribosomes where proteins are synthesized.

tRNA stands for “transfer RNA” and is the link between the mRNA and the amino acids that are formed into proteins. Essentially, the tRNA “reads” the mRNA and “translates” it into a sequence of amino acids.

Ribonucleic acid—RNA—is a vital molecule for the function of living things. RNA is a primary factor in the transfer of genetic information and the synthesis of proteins. Unlike DNA, however, RNA can take a variety of forms and shapes.

RNA polymerase is an enzyme that transcribes DNA and produces a strand of mRNA (essentially the transcribed copy of the DNA).

DNA

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DNA polymerase is responsible for the process of DNA replication, during which a double-stranded DNA molecule is copied into two identical DNA molecules. (PCR means polymerase chain reaction)

Transcription

Transcription, in the case of DNA, is much the same: a molecule known as RNA polymerase transcribes the nucleus-bound DNA exactly, producing a replica mRNA strand that can be transferred out of the nuclear membrane for use in the production of proteins.

The two strands of DNA are made up of one sense strand and one antisense strand. mRNA uses the antisense strand as a template when transcribing the information. Because the nucleotides of nucleic acids only bond in specific pairs, the resulting mRNA strand will be identical to the sense strand of the DNA molecule.

RNA

Types of RNA

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Translation

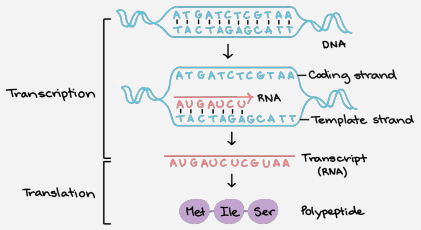
the process by which a cell makes proteins using the genetic information carried in messenger RNA (mRNA). The mRNA is made by copying DNA, and the information it carries tells the cell how to link amino acids together to form proteins.

Translation of an mRNA molecule by the ribosome occurs in three stages: initiation, elongation, and termination.

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Transcription/Translation



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Published 15th March, 2022.

Last updated 15th March, 2022.

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