OPEN ACCESS Freely available online

ISSN: 2168-9431
Single Cell Biology

Commentary

Significance of Transcription and its Role in Oncology

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DESCRIPTION

Studies pertaining to the transcription process in genetics are referred to as transcription genetics. Information is transferred from DNA to RNA during transcription. As a result, the definition of gene transcription can be described as the process of making copies of the RNA from the genetic material stored in the DNA. The messenger RNA, or mRNA, is the name for this copy of the RNA [1].

The fundamental tenet of molecular biology holds that information is transferred from DNA to RNA through the process of transcription and from RNA to proteins through translation. The initial step in this procedure is transcription. The transcription process is regulated by a number of transcription factors, which are specialised proteins. The end-product of the myc gene, which generates a transcription factor in charge of controlling numerous pro-proliferative genes, serves as an illustration.

Biological significance of transcription

According to the fundamental tenet of molecular biology, information contained in genetic material is transferred from DNA (Deoxyribonucleic Acid) to RNA (Ribonucleic Acid) through transcription and from RNA to protein through translation. This suggests that the study of transcription genetics is concerned with how information is transferred from DNA to RNA. Given that it contains all the molecular knowledge of the functioning and functional mechanisms, genetic information is essential for the life of a cell or an organism made up of an organised structure of cells. Also, the gene, which is a particular arrangement of nucleic acids (often DNA), contains the information [2].

The main enzyme involved in transcription is RNA polymerase, which builds a complementary strand of RNA from a single-stranded DNA template. Every new molecule is added to the 3' end of the strand as RNA polymerase constructs a Stranded DNA in the 5' to 3' direction.

Factors involved in transcription are crucial for cellular activity, the body's response to illness, and the growth of an organism. Proteins that play a role in transcription comprise a wide variety and are typically found in multisubunit protein complexes. The complexes attach to "promotor" sections of DNA, which are found before a gene's coding sequence. They might also directly bind to RNA polymerase. They do this by activating or inhibiting the transcription of genes, which affects whether or not the gene is functional [3-5].

For RNA to function at a transcription site in eukaryotes, basal transcription factors are necessary. Examples of the most fundamental category of proteins necessary for the activation of transcription are Transcription Factor II A. (TFIIA) and Transcription Factor II B. (TFIIB). Determining the precise tasks carried out by the complexes that these basic transcription factors assemble has advanced science significantly.

Homeotic transcription factors

Transcription factors control the fate of individual cells during the development of a multicellular organism. For instance, homeotic genes, which encode transcription factors that direct cells to create various body parts, regulate how body creation happens. These proteins possess the dual gene-activation and gene-inhibition properties necessary for an organism to evolve in an orderly manner.

Role in oncogenesis

Transcriptional factors may significantly contribute to the development of cancer if they change the activity of genes involved in the cell division cycle. They may also be the tumour suppressor gene products or the oncogene (cancer-causing gene) products.

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Received: 27-Feb-2023, Manuscript No. SCPM-23-20279; **Editor assigned:** 02-Mar-2023, Pre QC No. SCPM-23-20279 (PQ); **Reviewed:** 17-Mar-2023, QC No. SCPM-23-20279; **Revised:** 22-Mar-2023, Manuscript No. SCPM-23-20279 (R); **Published:** 29-Mar-2023, DOI: 10.35248/2168-9431.23.12.044

Citation: Essiaf S (2023) Significance of Transcription and its role in Oncology. Single Cell Biol. 12:044.

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