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Replicative forms Acquired by Nucleic Acid

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Abstract

DNA is the prime source of biological molecule which is involved in forming the living beings. And this phenomenon occurs by the cell division in which one cell divides to produce two daughter cells that consists of the required genetic information. One of the well-recognized activity followed by the DNA is that the "DNA Replication" which is the process of the one DNA strand to form duplicate of the other DNA strand is necessary for the keeping the integrity of the DNA molecule.

Keywords: Conservative • Dispersive • Semi conservative

Introduction

The molecular biology deals with the topic of DNA replication which is described to be one of the biological processes that involves the formation of two identical replicas produced from one original molecule. It's the process which occurs in every living organism and is the standard level of a biological inheritance. The DNA molecule has the ability to perform the self-replication, and there are three theoretical concepts that had been considered for the study of the process a DNA replication occurs:

- Conservative
- Dispersive
- Semi conservative

Conservative

This replication refers to the process in which the double stranded molecule is conserved and the new replica is formed from the old molecule.

Dispersive

In dispersive replication the original molecule gets disintegrated and leads to the development of new two daughter molecules with getting integrated with the new nucleotides present in its surrounding.

Semi Conservative

In Semi conservative replication, the two parent strands initially gets separated leading to the single template DNA strand which will be involved as the template DNA strand for the synthesis of new complementary DNA strand. Thus, the new replica formed as the complementary of the template DNA strand would be responsible for carrying and conserving the initial integrity of the parent DNA molecule. This replication is majorly favored by the prokaryotic as well as the eukaryotic organism.

The DNA is proved to be helical twisted right handed molecule which during the replication process gets separated by the specific enzymes providing the way for the polymerases to act accordingly. The enzyme responsible for breaking the bonds among the nitrogenous bases is the helicase, thus, leading to the development of the two separate templates which acts as the template for the synthesis of the new DNA molecule.

The series of reaction to occurs on the template DNA requires the group of DNA polymerases. And to these enzymes to work they need other molecular proteins for its accomplishment that is the requirement of the primer is necessary as it is responsible for the short nucleotide sequences which gets attached to the template DNA molecule as to provide the initiation of binding of the new nucleotide present already from its surrounding. However, this primer gets disintegrated once 10-15 nucleotide chain is formed and is then replaced by the new DNA via one of the DNA polymerase.

At the 3' hydroxyl group of the primer is the precursor (nucleotides) of the DNA is added via the DNA polymerases. The bond formed between the 3' prime end of the primer and that of the 5' prime end of the nucleotides is known as the phosphordiester bonds.

Conclusion

The replication of the DNA can adapt to any one of its directionality that is the unidirectional and the bidirectional depending on the type organelle processing the DNA replication. The unidirectional replication only occurs in prokaryotes and in the mitochondrial DNA. The DNA replication follows the directionality from the 5' to 3' on the template/leading DNA strand and 3' to 5' on the lagging DNA strand. The leading strand has the 5'-3' replication consists of the exposed 3' prime end which provides the site for the attachment of the new nucleotides via the DNA polymerases whereas, in the 3'-5' replication process the 5' prime end is left exposed which is compensated through the development of the short 5'-3' DNA strands which are called as the okazaki fragments which makes use of the DNA ligase enzyme for connecting its fragments into the continues run of the nucleotide chain.

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Conflict of Interest

We have no conflict of interests to disclose and the manuscript has been read and approved by all named authors.

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