

Perspective

Molecular biology and its laboratory methods

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Accepted 05 January, 2022

DESCRIPTION

The branch of biology that explores the molecular foundation of biological activity is known as molecular biology.

Molecular Biology is a branch of biology that investigates the content, structure, and interactions of cellular components such as nucleic acids and proteins, which carry out biological processes critical to a cell's function and survival.

The study of macromolecules and micromolecular systems found in living things, such as the molecular nature of the gene and its methods of gene replication, mutation and expression, is known as molecular biology. Given the essential importance of these macromolecular processes throughout molecular biology's history, philosophers of science use a philosophical focus on the idea of a mechanism to provide the clearest picture of molecular biology's history, concepts, and case studies.

Evolution is the most basic biological process, because it is necessary for living in a changing world. MBE presents new research on the patterns and processes that influence life's evolution at the molecular level, covering a wide range of taxonomy, genomic organisation, functions, morphologies, and phenotypes. The Methods, Resources, and Protocol portions of MBE give cutting-edge evolutionary research tools that facilitate discovery, while the Reviews and Perspectives sections present syntheses that encourage new evolutionary ideas.

Although every living organism contains a variety of molecules, most molecular biologists concentrate on genes and proteins. Proteins have a wide range of roles in living cells, and genes carry the instructions for making additional proteins.

Biochemistry and genetics, two closely linked sciences, have a lot in common with molecular biology. The three sciences are all interested in the molecular minutiae of how

organisms function. Each, however, concentrates on a different aspect of the subject and has various applications.

Laboratory Methods in Molecular Biology

The unique set of laboratory methods used in molecular biology is likely its most well-known feature. The following terms are frequently used in laboratories

Molecular cloning: Molecular cloning is a set of molecular biology experimental methods for assembling recombinant DNA molecules and directing their replication in host organisms. Cloning refers to a technique that involves the reproduction of a single molecule to produce a population of cells with identical DNA molecules. In most cases, DNA sequences from two separate organisms are used in molecular cloning: the source of the cloned DNA and the species that will serve as the living host for recombinant DNA replication. Many contemporary areas of modern biology and medicine rely on molecular cloning procedures.

Polymerase: A polymerase is an enzyme that produces lengthy polymer or nucleic acid chains. DNA polymerase and RNA polymerase copy a DNA template strand utilising base-pairing interactions or half ladder replication to construct DNA and RNA molecules, respectively.

DNA polymerase (DNAP) is an enzyme that creates new copies of DNA in the form of nucleic acid molecules. Polymers are huge molecules made up of smaller, repeating units that are chemically bonded to one another. Nucleic acids are polymers. Nucleotides, or nucleotide bases, are repeating units that make up DNA. DNA polymerase is in charge of the replication process, which involves copying a double-stranded DNA molecule into two identical DNA molecules. PCR stands for polymerase chain reaction.

Reaction in a chain: The polymerase chain reaction, often known as the chain reaction, is a chemical reaction used by

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molecular biologists to amplify DNA fragments. A single or a few copies of DNA can be reproduced into millions or billions of copies using this reaction.

Gel electrophoresis: The technique of gel electrophoresis is used to separate DNA fragments based on their size. DNA samples are placed into wells (indentations) at one end of a gel and pulled through using an electric current. Negatively charged DNA pieces gravitate toward the positive electrode.

Blotting: Blotting is a technique for isolating certain molecules from a mixture. It consists of three basic steps.

Gel electrophoresis is used to separate the molecules in the mixture first. The mixture might be DNA, RNA, or protein (Western Blot), and the gel could be agarose or polyacrylamide. In a molecular biology lab, blotting techniques are one of the most used approaches. Southern, northern, and immunoblotting are procedures that may be used to analyse a range of macromolecules, including DNA, RNA, and protein, respectively. Each technique relies on the capacity to size-dependently resolve individual macromolecules, transfers the molecules to a solid support, and then detect the specific molecule of interest using pre-determine.