

## Editorial on Molecular Biology

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### EDITORIAL

Molecular Biology is the branch of biology that studies the composition, structure and interactions of cellular molecules such as nucleic acids and proteins that carry out the biological processes essential for the cells functions and maintenance. This study emerged in the 1930s, having developed out of the related fields of biochemistry, genetics, and biophysics; today it remains closely associated with those fields.

Of particular importance to molecular biology are the nucleic acids (DNA and RNA) and the proteins which are constructed using the genetic instructions encoded in those molecules. Carbohydrates and lipids may also be studied for the interactions they have with nucleic acids and proteins.

### Molecular biology techniques

#### Electrophoresis

Electrophoresis is a common lab technique used to identify, quantify, and purify nucleic acid fragments or a process which separates molecules such as DNA or proteins out according to their size, electrophoresis is considered as a mainstay of molecular biology laboratories. During the process, samples are loaded into wells of an agarose or gel and subjected to an electric field, causing the negatively charged nucleic acids to move toward the positive electrode. Then, the shorter DNA fragments will travel more rapidly, whereas the longest fragments will remain closest to the origin of the gel, resulting in separation based on size.

#### Polymerase Chain Reaction (PCR)

The polymerase chain reaction (PCR) can be defined as a fast and inexpensive technique used to "amplify" - copy - small segments of DNA. PCR is used as a basic tool in molecular biology to ensure that we have sufficient DNA to carry out further techniques such as genetic modification, however it has wider practical uses such as in forensics (identification using DNA profiling) and disease diagnosis.

#### Restriction Digest

Restriction digestion or restriction endonuclease is a process in which DNA is cut at specific sites, dictated by the surrounding DNA sequence.

#### Ligation

The act of joining two pieces of DNA together. It occurs as part of normal cellular processes such as DNA replication, to repair single and double strand DNA breaks.

#### Blotting

Blotting is a technique used to specifically identify biomolecules following electrophoresis. The transfer of protein, rna or dna molecules from a relatively thick acrylamide or agarose gel or to a paper like membrane by capillarity or an electric field, preserving the spatial arrangement.

#### Cloning

The process of generating a genetically identical copy of a cell or an organism or the technique of introducing a new gene into a cell or organism. In biomedical research, this can be used to see what effect the expression of that gene has on the organism, to turn the organism into a factory which will produce large quantities of the gene or the protein it codes for, or (within the inclusion of a label) to indicate where the products of that gene are expressed in the organism.

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