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Molecular Biology

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Does Molecular Biology Play Vital Role In New Era Of Molecular Science?

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Introduction

Molecular Biology is the field 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 cell's functions and maintenance [1,8]. The field of molecular biology is focused especially on nucleic acids (e.g., DNA and RNA) and proteins—macromolecules that are essential to life processes—and how these molecules interact and behave within cells.6 Molecular biology also plays important role in understanding formations, actions, and regulations of various parts of cells which can be used to efficiently target new drugs, diagnose disease, and understand the physiology of the cell. Some of the most powerful new technologies include polymerase chain reaction (PCR) advances, "difference analysis" (that is, the discovery of different gene expression patterns between different cells), transgenic/gene knockout technology, and gene delivery to tissues/gene therapy [2]

Molecular similarities provide evidence for the shared ancestry of life. DNA sequence comparisons can show how different species are related. ... Fossils provide evidence of long-term evolutionary changes, documenting the past existence of species that are now extinct.6 Disease prevention and treatment, generation of new protein products, and manipulation of plants and animals for desired phenotypic traits are all applications that are routinely addressed by the application of molecular biology methods [8].

Molecular biology is the study of biology at a molecular level. The field overlaps with other areas of biology and chemistry, particularly genetics and biochemistry [3]. As of the early 2000s, the study of gene structure and function, molecular genetics, has been amongst the most prominent sub-field of molecular biology [5]. In the area of bacteriology molecular methods have been applied to resistance testing, the detection of infection due to fastidious bacteria, the more rapid detection of serious bacterial infections compared to conventional methods and the detection of bacterial infection after antibiotics have been administered [4,7].

Genes are segments of information stored on gigantic nucleic acid molecules and proteins are molecules in their own right, making both of these substances (and the relationship between them), extraordinarily important to study. Molecular biologists work to identify and understand the parts of biological pathways. Molecular Biological Tools (MBTs) are analyses used to estimate biodegradation at contaminated sites. They can provide key evidence about contaminant-degrading microorganisms and biodegradation processes at many phases associated with site remediation projects. Biotechnologies may be used to study the genetic material of viruses and bacteria to determine whether a disease is caused by particular disease-producing agents. Its techniques are also used to understand how genetic factors contribute to human disease in new era of molecular science and technology.

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Basic Methods in Cellular and Molecular Biology [8]

- Using a Hemacytometer to Count Cells. ...
- Passaging Cells. ...
- PCR: The Polymerase Chain Reaction. ...
- DNA Gel Electrophoresis. ...
- Separating Protein with SDS-PAGE. ...
- Bacterial Transformation: The Heat Shock Method. ...
- Bacterial Transformation: Electroporation. ...
- The ELISA Method.

Sub disciplines of Molecular Biology [9]

- Comparative Genomics. This is the study of human genetics by comparisons with model organisms such as mice, the fruit fly and the bacterium E. ...
- DNA Forensics. ...
- Functional Genomics. ...
- Gene Therapy. ...
- Genomics. ...
- Molecular Genetics. ...
- Pharmacogenomics. ...
- Proteomics.

Molecular and cell biology have a great deal to offer tropical medicine in the future. As well as helping to understand the population genetics and dynamics of both infectious and non-infectious diseases, they promise to provide a new generation of diagnostic and therapeutic agents, and to play a major role in the development of new vaccines and other approaches to the control of disease in new era [10].

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