

Preface

Molecular biology is an area of biology concerned with the process of gene transcription to yield RNA, the translation of RNA into proteins and the role those proteins play in cellular function. Since around 1960, molecular biologists have developed methods to identify, isolate, and manipulate molecular components in cells including DNA, RNA, and proteins. Understanding the molecular basis of life had its beginnings with the advent of biochemistry. Early in the nineteenth century, it was discovered that preparations of fibrous material could be obtained from cell extracts of plants and animals. Mulder concluded in 1838 that this material was: Later, many wondered whether chemical processes in living systems obeyed the same laws as did chemistry elsewhere. Complex carbon-based compounds were readily synthesized in cells, but seemed impossible to construct in the laboratory. By the beginning of the twentieth century, chemists had been able to synthesize a few organic compounds, and, more importantly, to demonstrate that complex organic reactions could be accomplished in non-living cellular extracts. These reactions were found to be catalyzed by a class of proteins called enzymes. Early biochemistry, then, was characterized by efforts to understand the structure and chemistry of proteins themselves, and efforts to discover, catalog, and understand enzymatically catalyzed biochemical reactions.

Molecular Biology Techniques is intended to provide information on common methods used in molecular biology, biochemistry, genetics and biophysics which generally involve manipulation. It covers a wide range of topics related to molecular and cell biology including structural and functional genomics, transcriptomics, proteomics, bioinformatics, biomedicine, molecular enzymology, molecular virology and molecular immunology. *Molecular Biology* is a compilation of general interest reviews, mini-reviews, experimental and theoretical works and computational analyses in molecular and cell biology and analysis of DNA, RNA, protein, and lipid. This book is an obligatory tool for introducing advanced graduate students to the techniques of recombinant DNA technology, or gene cloning and expression.

Molecular biology looks at the molecular mechanisms behind processes such as replication, transcription, translation and cell function. One way to describe the basis of molecular biology is to say it concerns understanding how genes are transcribed into RNA and how RNA is then translated into protein. However, this simplified picture is currently being reconsidered and revised due to new discoveries concerning the roles of RNA.