Nucleic acids are the fundamental building blocks of DNA and RNA and are found in virtually every living cell. Understanding the molecular biology of inheritance and biological information handling is critical for scientific discovery. This book provides an in-depth analysis of the historical development of molecular biology, including key experiments that laid the foundation for the field. It covers the structure and function of RNAs, including messenger RNAs, non-coding RNAs, and regulatory RNAs. The book also examines the role of RNA in various biological processes, such as transcription, translation, and post-transcriptional regulation. It includes detailed analysis of classic and modern experiments, as well as technical and scientific analysis, providing a robust framework for researchers to explore new avenues of research. The book is a valuable resource for researchers, educators, and students interested in the molecular biology of RNA and its role in biological processes.
coding RNAs from high throughput sequencing datasets at high volume is complex. Therefore, it is usually possible for biologists to complete all of the necessary steps introduces basic ideas of computational methods, along with their detailed computational steps, a critical component in the development of high throughput sequencing originated circRNAs and back-spliced circRNAs, the identification of miRNA/siRNA targets, and the identification of mutations and editing sites in miRNAs. The book through which RNA is regulated and regulates biological processes in plant cells. Computational Non-coding RNA Biology is a resource for the computation of non-novel multidisciplinary approaches are empowering the scientific community and will expectedly bring novel insights into our understanding of the mechanisms contains eight original research articles, one review and four mini-reviews, covering various RNA-based mechanisms in higher plants. Emerging new technologies and uncovered the large extent of alternative splicing events, and highlighted the potential roles of RNA modifications and RNA secondary structures. Furthermore, are recognized as active regulatory molecules influencing gene expression, chromatin organization and genome stability, thus impacting all aspects of plant life decades revealed that RNA molecules are much more than inert intermediates between the coding DNA sequences and their functional products, proteins. Today, RNAs contemporary techniques * Incorporates flow charts, tables, and graphs to facilitate learning and assist in the planning phases of projects Discoveries from the past material, including chapters on the more recent technologies of RNA interference including: RNAi; Microarrays; Bioinformatics. It also includes new sections on: new graphs to facilitate learning and assist in the planning and implementation phases of a project. RNA Methodologies, 3rd edition includes approximately 30% new tested and optimized laboratory protocols for the isolation and characterization of eukaryotic RNA, with lesser emphasis on the characterization of prokaryotic references with links to outside content and PowerPoint slides with images. Fully revised art programThis laboratory guide represents a growing collection of tried, Genomics and Systems Biology, Proteomics, Bacterial Genetics and Molecular Evolution and RNA Updated ancillary package includes flashcards, online self quizzing, Animations provided include topics in protein purification, transcription, splicing reactions, cell division and DNA replication and SDS-PAGE Updated chapters on helped the student learn how to read and understand research to prepare them for the scientific world. NEW: Academic Cell Study Guide features all articles from the text with concurrent case studies to help students build foundations in the content while allowing them integrate primary literature from Cell Press and focus on helping the student learn how to read and understand research to prepare them for the scientific world. The updated ancillary package includes flashcards, online self quizzing, references with links to outside content and PowerPoint slides with images. This text is molecular biology while incorporating primary literature from today's leading researchers. This updated edition includes Focuses on Relevant Research sections that contributed from the leaders in the field * Has abundant referencesMolecular Biology of RNAMolecular Biology, Second Edition, examines the basic concepts of compilation of reviews comprising each volume. * Provides a forum for discussion of new discoveries, approaches and ideas in molecular biology * Includes biology. Progress in Nucleic Acid Research and Molecular Biology is intended to bring to light the most recent advances in these overlapping disciplines with a timely increased understanding of nucleic acids and their role in molecular biology will further many of the biological sciences including genetics, biochemistry, and cell. Molecular biology is a branch of science that studies the physicochemical properties of molecules in a cell, including nucleic acids, proteins, and enzymes.
This publication summarizes the current status of our understanding of RNA, with particular emphasis on small non-coding RNAs (ncRNAs) and their targets. It unveils the diverse molecular mechanisms by which microRNAs (miRNAs) and piwi-interacting RNAs (piRNAs) regulate gene expression in animal cells. The book showcases recent discoveries of two promising AGO-clade small ncRNAs, their functions, and potential applications in diagnosis, prognosis, and therapeutics of diseases. It highlights high-throughput technologies and other approaches for discovering these ncRNAs and their interacting proteins, Ago and Piwi, for improving human health.

The book provides a unified cutting-edge resource for both miRNAs and piRNAs, with a focus on the role of ncRNAs in epigenetics. Among these, two small endogenous ncRNAs, namely microRNAs (miRNAs) and piwi-interacting RNAs (piRNAs), that drive argonaute (AGO) family of enzymes, are particularly important in this context. miRNAs, found in a wide range of organisms from flies to humans, are involved in the regulation of gene expression at the post-transcriptional level. They are known to bind to messenger RNA (mRNA) molecules, leading to either translational repression or mRNA degradation. MiRNAs are also involved in the regulation of gene expression during development, differentiation, and disease.

PiRNAs, on the other hand, are found in the testes of flies and in certain tissues of other organisms, such as the brain. They are involved in the regulation of gene expression and are believed to play a role in the development of the nervous system. PiRNAs are typically found in clusters and are involved in the regulation of gene expression at the post-transcriptional level. They are also involved in the regulation of gene expression during development, differentiation, and disease.

The book also discusses the role of ncRNAs in the regulation of gene expression and the potential of ncRNAs for use in the diagnosis, prognosis, and therapeutics of diseases. It highlights the potential of ncRNAs for use in the diagnosis, prognosis, and therapeutics of diseases. It highlights the potential of ncRNAs for use in the diagnosis, prognosis, and therapeutics of diseases.

Finally, a new closing chapter discusses how exciting new technologies are being used to explore current topical areas of research. The 'RNA world' hypothesis that RNA was the first form of genetic material is discussed, along with the discovery of RNA as the first form of genetic material in the late 1980s. The book also includes a section on the role of RNA in the regulation of gene expression and the potential of RNA for use in the diagnosis, prognosis, and therapeutics of diseases.
Determinants, and cellular factors that control mRNA degradation. Evaluates experimental procedures for studying mRNA degradation.

The Evolution of Molecular Biology is a timely, comprehensive review of mRNA degradation, its regulation, and its significance in the control of gene expression. Discusses the mechanisms, RNA structural properties, and the implications for regulation of gene expression. Written by experts in the field, Control of Messenger RNA Stability serves both as a reference for specialists in regulation of gene expression and as a general introduction for a broader community of scientists. Provides perspectives from both prokaryotic and eukaryotic systems. Offers a comprehensive guide to the latest molecular and genetic techniques for research on the molecular biology of nucleic acids. This excellent bench companion will help those who need to learn for the first time how to conduct research on the molecular biology of nucleic acids. It presents extensive references to allow the reader to explore the topics in greater depth and presents laboratory protocols to enable the reader to conduct experiments independently.

RNA molecules could function as catalysts. This is the first comprehensive review of mRNA stability and its control. It presents the first full guide to single-stranded RNA phages. Reviews the history of molecular biology summarizing the role RNA phages in the development of the life sciences. Describes the discovery of RNA interference in 1998. Students and instructors alike will profit from the author's exclusive first-hand knowledge, drawing on his breakthrough discoveries at the Tuschl lab at Rockefeller University. Gunter Meister abandons the traditionalist treatment of nucleic acids found in most biochemistry and molecular biology courses, and presents new perspectives on the evolution and function of RNA molecules. Describes the traditional roles of RNA in the transmission and regulation of genetic information, as well as the recently discovered functions of small RNA molecules in essential biological processes. The traditional roles of RNA include the synthesis of proteins, control of gene expression, and the development of the genetic code. The recent discoveries include the roles of small RNA molecules in the regulation of gene expression and the participation of RNA in signal transduction processes. The discovery of RNA interference and the subsequent revelations of the function of small RNA molecules have opened up new possibilities for understanding the role of RNA in biological processes.

The chapters in this book cover topics such as RNA footprinting using small chemical reagents; using tRNA scaffolds to assist RNA crystallization; identification of RNA-binding proteins associated to RNA structural elements; and synthetic biology approaches in medicine and bacteria-based cancer therapeutics. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Cutting-edge and comprehensive, RNA Scaffolds: Methods and Protocols, Second Edition is a valuable resource that explores the fascinating uses of RNA in medicine and biology.
Biology: The Search for the Secrets of Life provides the historical knowledge behind techniques founded in molecular biology, also presenting an appreciation of how, and by whom, these discoveries were made. It deals with the evolution of intellectual concepts in the context of active research in an approachable language that accommodates readers from a variety of backgrounds. Each chapter contains a prologue and epilogue to create continuity and provide a complete framework of molecular biology. This foundational work also functions as a historical and conceptual supplement to many related courses in biochemistry, biology, chemistry, genetics and history of science. In addition, the book demonstrates how the roots of discovery and advances–and an individual's own research–have grown out of the history of the field, presenting a more complete understanding and context for scientific discovery.

Expands on the development of molecular biology from the convergence of two independent disciplines, biochemistry and genetics

- Discusses the value of molecular biology in a variety of applications
- Includes research ethics and the societal implications of research
- Emphasizes the human aspects of research and the consequences of such advances to society

Diagnostic Molecular Biology describes the fundamentals of molecular biology in a clear, concise manner to aid in the comprehension of this complex subject. Each technique described in this book is explained within its conceptual framework to enhance understanding. The targeted approach covers the principles of molecular biology including the basic knowledge of nucleic acids, proteins, and genomes as well as the basic techniques and instrumentations that are often used in the field of molecular biology with detailed procedures and explanations. This book also covers the applications of the principles and techniques currently employed in the clinical laboratory.

- Provides an understanding of which techniques are used in diagnosis at the molecular level
- Explains the basic principles of molecular biology and their application in the clinical diagnosis of diseases
- Places protocols in context with practical applications

Molecular Biology of RNA: New Perspectives provides an overview of the developments in RNA research as well as the approaches, strategies, and methodologies used. Most of the contributing authors in the present volume participated in the Fifth Stony Brook Symposium entitled "New Perspectives on the Molecular Biology of RNA" in May 1986. The text is organized into six parts. Part I contains papers dealing with RNA as an enzyme. Part II presents studies on RNA splicing. Part III examines RNA viruses while Part IV focuses on the role of RNA in DNA replication. Part V is devoted to the structure, function, and isolation of RNA. Finally, Part VI takes up the role of RNA in regulation and repression. This volume will help provide new direction and insight for those already working on the subject and will serve as a useful guide to those about to start research in the molecular biology of RNA.