Proteomics For Biological Discovery

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New Frontiers in Chemical Biology   Sep 20 2021 This book highlights the new frontiers in chemical biology and describes their impact and future potential in drug discovery.

The Logic of Discovery   Nov 10 2020 Scientific research is viewed as a deliberate activity and the logic of discovery consists of strategies and arguments whereby the best objectives (questions) and optimal means for achieving these objectives (heuristics) are chosen. This book includes a discussion and some proposals regarding the way the logic of questions can be applied to understanding scientific research and draws upon work in artificial intelligence in a discussion of heuristics and methods for appraising heuristics (metaheuristics). It also includes a discussion of a third source for scientific objectives and heuristics; episodes and examplars from the history of science and the history of philosophy. This book is written to be accessible to advanced students in philosophy and to the scientific community. It is of interest to philosophers of science, philosophers of biology, historians of physics, and historians of biology.

Discovery and Explanation in Biology and Medicine   Nov 03 2022 Kenneth F. Schaffner compares the practice of biological and medical research and shows how traditional topics in philosophy of science—such as the nature of theories and of explanation—can illuminate the life sciences. While Schaffner pays some attention to the conceptual questions of evolutionary biology, his chief focus is on the examples that immunology, human genetics, neuroscience, and internal medicine provide for examinations of the way scientists develop, examine, test, and apply theories. Although traditional philosophy of science has regarded scientific discovery—the questions of creativity in science—as a subject for psychological rather than philosophical study, Schaffner argues that recent work in cognitive science and artificial intelligence enables researchers to rationally analyze the nature of discovery. As a philosopher of science who holds an M.D., he has examined biomedical work from the inside and uses detailed examples from the entire range of the life sciences to support the semantic approach to scientific theories, addressing whether there are "laws" in the life sciences as there are in the physical sciences. Schaffner's novel use of philosophical tools to deal with scientific research in all of its complexity provides a distinctive angle on basic questions of scientific evaluation and explanation.

Nature Remade Sep 08 2020 "In this fourth volume in our Convening Science series with the Marine Biological Laboratory, contributors, including historians, biologists, and philosophers, explore the development of bioengineering. The essays show how engineering is both a means to a functional end and a method of learning about the world. The book is organized around three themes--controlling and reproducing, knowing and making, and envisioning--to chart the increasing sophistication of our engineering of biological systems and to change our sense of the scales at which engineering occurs, to include not just genetics but also ecosystem-level intervention. The volume will attempt to make the case for "the centrality of engineering for understanding and imagining modern life.""--

Bioinformatics and Computational Biology in Drug Discovery and Development   Jun 17 2021 A comprehensive overview of the use of computational biology approaches in the drug discovery and development process.

Biological Pattern Discovery With R: Machine Learning Approaches   Jul 31 2022 This book provides the research directions for new or junior researchers who are going to use machine learning approaches for biological pattern discovery. The book was written based on the research experience of the author's several research projects in collaboration with biologists worldwide. The chapters are organised to address individual biological pattern discovery problems. For each subject, the research methodologies and the machine learning algorithms which can be employed are introduced and compared. Importantly, each chapter was written with the aim to help the readers to transfer their knowledge in theory to practical implementation smoothly. Therefore, the R programming environment was used for each subject in the chapters. The author hopes that this book can inspire new or junior researchers' interest in biological pattern discovery using machine learning algorithms.

Structural Biology in Drug Discovery   Jan 25 2022 With the most comprehensive and up-to-date overview of structure-based drug discovery covering both experimental and computational approaches, Structural Biology in Drug Discovery: Methods, Techniques, and Practices describes principles, methods, applications, and emerging paradigms of structural biology as a tool for more efficient drug development. Coverage includes successful examples, academic and industry insights, novel concepts, and advances in a rapidly evolving field. The combined chapters, by authors writing from the frontlines of structural biology and drug discovery, give readers a valuable reference and resource that: Presents the benefits, limitations, and potentiality of major techniques in the field such as X-ray crystallography, NMR, neutron crystallography, cryo-EM, mass spectrometry and other biophysical techniques, and computational structural biology Includes detailed chapters on druggability, allostery, complementary use of thermodynamic and kinetic information, and powerful approaches such as structural chemogenomics and fragment-based drug design Emphasizes the need for the in-depth biophysical characterization of protein targets as well as of therapeutic proteins, and for a thorough quality assessment of experimental structures Illustrates advances in the field of established therapeutic targets like kinases, serine proteinases, GPCRs, and epigenetic proteins, and of more challenging ones like protein-protein interactions and intrinsically disordered proteins

Discoveries in Plant Biology   Feb 23 2022 As scientific progress hinges on the continual discovery and extension of previous discoveries, this series, Discoveries in Plant Biology, is specially compiled to provide an atlas of the landmark discoveries in the broad span of plant biology. The collection of chapters, written by renowned plant biologists, describe how classic discoveries were made and how they have served as the foundation for subsequent discoveries. We hope that this will facilitate our readers' quest to advance their knowledge based on the advancements made previously by others. The 21 discoveries described in this First Volume all form the foundations of modern plant biology. The contributors, many of whom are themselves the researchers who made the discoveries, bring readers back in time to retrace the steps of the discoveries. Following the creative thoughts of the scientists in deciphering the natural laws, readers may appreciate how each field was developed from a simple subject to an advanced multidisciplinary field. Contents:Abscisic Acid: Discoveries and Exploration of Properties (F T Addicott)History of the Discovery of Ethylene as a Plant Growth Substance (M E Saltveit et al.)The Discovery of Transposable Elements (N Fedoroff)Discovery of T-DNA Agrobacterium Tumefaciens (M P Gordon)The Discovery of Fraction 1 Protein (Rubisco) (S G Wildman)C4 Photosynthesis: Discovery, Resolution Recognition, and Significance (M D Hatch & C R Slack)The Path of Carbon in Photosynthesis: 1942 – 1955 (A A Benson)Discoveries in Biological Nitrogen Fixation (R H Burris)The Discovery of Biological Clocks (F B Salisbury)and other papers Readership: Students and researchers in botany, biochemistry, genetics and plant physiology. keywords:Botany:Plant Biology "This excellent book should be present in all central libraries and in those of plant biology institutions. The book is recommended to advanced students and researchers." Journal of Plant Physiology

Proteomics for Biological Discovery   Sep 01 2022 An update to the popular guide to proteomics technology applications in biomedical research Building on the strength of the original edition, this book presents the state of the art in the field of proteomics and offers students and scientists new tools and techniques to advance their own research. Written by leading experts in the field, it provides readers with an

understanding of new and emerging directions for proteomics research and applications. Proteomics for Biological Discovery begins by discussing the emergence of proteomics technologies and summarizing the potential insights to be gained from proteome-level research. The tools of proteomics, from conventional to novel techniques, are thoroughly covered, from underlying concepts to limitations and future directions. Later chapters provide an overview of the current developments in post-translational modification studies, structural proteomics, biochemical proteomics, applied proteomics, and bioinformatics relevant to proteomics. Chapters cover: Quantitative Proteomics for Differential Protein Expression Profiling; Protein Microarrays; Protein Biomarker Discovery; Biomarker Discovery using Mass Spectrometry Imaging; Protein-Protein Interactions; Mass Spectrometry Of Intact Protein Complexes; Crosslinking Applications in Structural Proteomics; Functional Proteomics; High Resolution Interrogation of Biological Systems via Mass Cytometry; Characterization of Drug-Protein Interactions by Chemoproteomics; Phosphorylation; Large-Scale Phosphoproteomics; and Probing Glycoforms of Individual Proteins Using Antibody-Lectin Sandwich Arrays. Presents a comprehensive and coherent review of the major issues in proteomic technology development, bioinformatics, strategic approaches, and applications Chapters offer a rigorous overview with summary of limitations, emerging approaches, questions, and realistic future industry and basic science applications Features new coverage of mass spectrometry for high throughput proteomic measurements, and novel quantitation strategies such as spectral counting and stable isotope labeling Discusses higher level integrative aspects, including technical challenges and applications for drug discovery Offers new chapters on biomarker discovery, global phosphorylation analysis, proteomic profiling using antibodies, and single cell mass spectrometry Proteomics for Biological Discovery is an excellent advanced resource for graduate students, postdoctoral fellows, and scientists across all the major fields of biomedical science.

Moments of Discovery Aug 20 2021 A delightful compilation of adventure and catastrophe as well as triumph and tragedy experienced by those who struggled valiantly to study the rich biodiversity of Middle America and anguished over its senseless destruction.--Floyd E. Hayes, Pacific Union College Each chapter is a mix of ingredients, a mortar, which contributes to the foundation of Middle American scientific inquiry of species, and their research little known to the wider audience, upon which future inquiry must stand. It's also great and fascinating reading!--Robert L. Norton, coeditor of An Inventory of Breeding Seabirds of the Caribbean Throughout the twentieth century, pioneering biological field work was conducted from Mexico through Panama by such giants in the field as Miguel Alvarez del Toro, Charles Sibley, John T. Emlen Jr., and many others. But the written reports and scientific papers detailing their discoveries leave out the adventure, sense of discovery, and unexpected humor of their time in the field. Moments of Discovery collects twenty autobiographical descriptions of the incongruous situations, captivating people and places, and the inevitable trials and tribulations that surround some of the greatest biological discoveries in Mexico and Central America from the 1930s through the 1990s. The anthology allows the entertaining and illuminating events that have mostly lived in oral history to be read and enjoyed by a broad audience. A significant contribution to the history of biological exploration, this book is a must-read for anyone considering biological field work in the region--or the amateur, armchair fieldworker who wonders what those trips were really like. Kevin Winker is curator of birds and professor of biology and wildlife at the University of Alaska Museum and the Institute of Arctic Biology at the University of Alaska, Fairbanks.

Plasmids Nov 22 2021 Explore the remarkable discoveries in the rapidly expanding field of plasmid biology Plasmids are integral to biological research as models for innumerable mechanisms of living cells, as tools for creating the most diverse therapies, and as crucial helpers for understanding the dissemination of microbial populations. Their role in virulence and antibiotic resistance, together with the generalization of "omics" disciplines, has recently ignited a new wave of interest in plasmids. This comprehensive book contains a series of expertly written chapters focused on plasmid biology, mechanistic details of plasmid function, and the increased utilization of plasmids in biotechnology and pharmacology that has occurred in the past decade. Plasmids: Biology and Impact in Biotechnology and Discovery serves as an invaluable reference for researchers in the wide range of fields and disciplines that utilize plasmids and can also be used as a textbook for upper-level undergraduate and graduate courses in biotechnology and molecular biology.

Protein Degradation with New Chemical Modalities   Jun 05 2020 Targeting protein degradation using small molecules is one of the most exciting small-molecule therapeutic strategies in decades and a rapidly growing area of research. In particular, the development of proteolysis targeting chimera (PROTACs) as potential drugs capable of recruiting target proteins to the cellular quality control machinery for elimination has opened new avenues to address traditionally 'difficult to target' proteins. This book provides a comprehensive overview from the leading academic and industrial experts on recent developments, scope and limitations in this dynamically growing research area; an ideal reference work for researchers in drug discovery and chemical biology as well as advanced students.

From X-rays to DNA Feb 11 2021

Computational Approaches in Cheminformatics and Bioinformatics   Jan 01 2020 A breakthrough guide employing knowledge that unites cheminformatics and bioinformatics as innovation for the future Bridging the gap between cheminformatics and bioinformatics for the first time, Computational Approaches in Cheminformatics and Bioinformatics provides insight on how to blend these two sciences for progressive research benefits. It describes the development and evolution of these fields, how chemical information may be used for biological relations and vice versa, the implications of these new connections, and foreseeable developments in the future. Using algorithms and domains as workflow tools, this revolutionary text drives bioinformaticians to consider chemical structure, and similarly, encourages cheminformaticians to consider large biological systems such as protein targets and networks. Computational Approaches in Cheminformatics and Bioinformatics covers: Data sources available for modelling and prediction purposes Developments of conventional Quantitative Structure-Activity Relationships (QSAR) Computational tools for manipulating chemical and biological data Novel ways of probing the interactions between small molecules and proteins Also including insight from public (NIH), academic, and industrial sources (Novartis, Pfizer), this book offers expert knowledge to aid scientists through industry and academic study. The invaluable applications for drug discovery, cellular and molecular biology, enzymology, and metabolism make Computational Approaches in Cheminformatics and Bioinformatics the essential guidebook for evolving drug discovery research and alleviating the issue of chemical control and manipulation of various systems.

A Practical Guide to Drug Development in Academia   Aug 27 2019 "A lot of hard-won knowledge is laid out here in a brief but informative way. Every topic is well referenced, with citations from both the primary literature and relevant resources from the internet." Review from Nature Chemical Biology Written by the founders of the SPARK program at Stanford University, this book is a practical guide designed for professors, students and clinicians at academic research institutions who are interested in learning more about the drug development process and how to help their discoveries become the novel drugs of the future. Often many potentially transformative basic science discoveries are not pursued because they are deemed 'too early' to attract industry interest. There are simple, relatively cost-effective things that academic researchers can do to advance their findings to the point that they can be tested in the clinic or attract more industry interest. Each chapter broadly discusses an important topic in drug development, from preclinical work in assay design through clinical trial design, regulatory issues and marketing assessments. After the practical overview provided here, the reader is encouraged to consult more detailed texts on specific topics of interest. "I would actually welcome it if this book's intended audience were broadened even more. Younger scientists starting out in the drug industry would benefit from reading it and getting some early exposure to parts of the process that they'll eventually have to understand. Journalists covering the industry (especially the small startup companies) will find this book a good reality check for many an over-hopeful press release. Even advanced investors who might want to know what really happens in the labs will find information here that might otherwise be difficult to track down in such a concentrated form."

50 Years of Ocean Discovery   Mar 15 2021 This book describes the development of ocean sciences over the past 50 years, highlighting the contributions of the National Science Foundation (NSF) to the field's progress. Many of the individuals who participated in the exciting discoveries in biological oceanography, chemical oceanography, physical oceanography, and marine geology and geophysics describe in the book how the discoveries were made possible by combinations of insightful individuals, new technology, and in some cases, serendipity. In addition to describing the advance of ocean science, the book examines the institutional structures and technology that made the advances possible and presents visions of the field's future. This book is the first-ever documentation of the history of NSFâ€™s Division of Ocean Sciences, how the structure of the division evolved to its present form, and the individuals who have been responsible for ocean sciences at NSF as â€œrotatorsâ€ and career staff over the past 50 years.

Molecular Evolutionary Models in Drug Discovery   Mar 03 2020 Molecular Evolutionary Models in Drug Discovery explores the application of evolutionary molecular models in drug discovery in which secondary metabolites play a fundamental role. Secondary metabolites are not produced in isolation, they are the result of the interaction of genes, metabolism and the environment. The book examines the role of secondary metabolites as leads in drug discovery and on the development of a rational bioprospecting model for new medicines based on the evolution of secondary metabolism. These evolutionary models are part of biological systems and are the most reliable expression of the functioning of living beings. Examines the integration and application of evolutionary models in the pharmaceutical industry to create new drug development platforms Investigates the biotechnological prospecting of secondary metabolites and their potential use in the discovery of new drugs Evaluates the ecosystem of living beings and how its molecular adaptation might improve the success of therapies

Discoveries in Plant Biology   Dec 24 2021 "This excellent book should be present in all central libraries and in those of plant biology institutions. The book is recommended to advanced students and researchers".Journal of Plant Physiology, 1999

Aminoglycoside Antibiotics   Aug 08 2020 Advances that open new avenues in developing aminoglycoside antibiotics During the last twenty years, there have been numerous advances in the understanding of the chemistry, biochemistry, and recognition of aminoglycosides. This has

led to the development of novel antibiotics and opened up new therapeutic targets for intervention. This is the first book to provide a complete overview of recent advances in the field and explore their tremendous potential for drug discovery and rational drug design. With chapters written by one or more leading experts in their specialty areas, the book addresses the chemistry, biology, and toxicology of aminoglycosides. Aminoglycoside Antibiotics: From Chemical Biology to Drug Discovery is a great resource for academic and industrial researchers in drug design and mechanism studies and for researchers studying antibiotic resistance, antibiotic design and synthesis, and the discovery of novel pharmaceuticals. It is also a valuable reference for graduate students in pharmacy, pharmaceutical science, biophysics, medicinal chemistry, and chemical biology.

Biological Sciences, Revised Edition   Jan 13 2021 Biological Sciences, Revised Edition covers a wide range of topics under the vast umbrella of biology, the study of life. Students will learn about the methods and applications of the field through an exploration of disciplines, such as neurology, genetics, and virology. This newly revised edition uses scientific journal articles, reports, and press releases to offer the latest from key scientists and researchers in the field. Chapters include: Brain Imaging: Searching for Sites of Perception and Consciousness The Human Genome in Health and Disease Protein Structure and Function Biodiversity—The Complexity of Life The Biology and Evolution of Viruses Regeneration—Healing by Regrowing.

Madness and Memory Jan 31 2020 A first-person account of a revolutionary scientific discovery that is now helping to unravel the mysteries of brain diseases In 1997, Stanley B. Prusiner received a Nobel Prize, the world's most prestigious award forachievement in physiology or medicine. That he was the sole recipient of the award for the year was entirely appropriate. His struggle to identify the agent responsible for ravaging the brains of animals suffering from scrapie and mad cow disease, and of humans with Creutzfeldt-Jakob disease, had been waged largely alone and in some cases in the face of strenuous disagreement. In this book, Prusiner tells the remarkable story of his discovery of prions infectious proteins that replicate and cause disease but surprisingly contain no genetic material and reveals how superb and meticulous science is actually practiced with talented teams of researchers who persevere. He recounts the frustrations and rewards of years of research and offers fascinating portraits of his peers as they raced to discover the causes of fatal brain diseases. Prusiner s hypothesis, once considered heresy, now stands as accepted science and the basis for developing diagnoses and eventual cures. He closes with a meditation on the legacy of his discovery: What will it take to cure Alzheimer s, Parkinson s, Lou Gehrig s and other devastating diseases of the brain?"

Quantum Mechanics in Drug Discovery   Jul 27 2019 This volume looks at applications of quantum mechanical (QM) methods in drug discovery. The chapters in this book describe how QM approaches can be applied to address key drug discovery issues, such as characterizing protein-water-ligand and protein-protein interactions, providing estimates of binding affinities, determining ligand energies and bioactive conformations, refinement of molecular geometries, scoring docked protein–ligand poses, describing molecular similarity, structure–activity-relationship (SAR) analysis, and ADMET prediction. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary software and tools, step-by-step, readily reproducible modeling protocols, and tips on troubleshooting and avoiding known pitfalls. Cutting-edge and unique, Quantum Mechanics in Drug Discovery is a valuable resource for structural and molecular biologists, computational and medicinal chemists, pharmacologists, and drug designers.

The Least Likely Man   Oct 29 2019 How unassuming government researcher Marshall Nirenberg beat James Watson, Francis Crick, and other world-famous scientists in the race to discover the genetic code. The genetic code is the Rosetta Stone by which we interpret the 3.3 billion letters of human DNA, the alphabet of life, and the discovery of the code has had an immeasurable impact on science and society. In 1968, Marshall Nirenberg, an unassuming government scientist working at the National Institutes of Health, shared the Nobel Prize for cracking the genetic code. He was the least likely man to make such an earth-shaking discovery, and yet he had gotten there before such members of the scientific elite as James Watson and Francis Crick. How did Nirenberg do it, and why is he so little known? In The Least Likely Man, Franklin Portugal tells the fascinating life story of a famous scientist that most of us have never heard of. Nirenberg did not have a particularly brilliant undergraduate or graduate career. After being hired as a researcher at the NIH, he quietly explored how cells make proteins. Meanwhile, Watson, Crick, and eighteen other leading scientists had formed the "RNA Tie Club" (named after the distinctive ties they wore, each decorated with one of twenty amino acid designs), intending to claim credit for the discovery of the genetic code before they had even worked out the details. They were surprised, and displeased, when Nirenberg announced his preliminary findings of a genetic code at an international meeting in Moscow in 1961. Drawing on Nirenberg's "lab diaries," Portugal offers an engaging and accessible account of Nirenberg's experimental approach, describes counterclaims by Crick, Watson, and Sidney Brenner, and traces Nirenberg's later switch to an entirely new, even more challenging field. Having won the Nobel for his work on the genetic code, Nirenberg moved on to the next frontier of biological research: how the brain works.

Systems Biology in Drug Discovery and Development   Oct 10 2020 The first book to focus on comprehensive systems biology as applied to drug discovery and development Drawing on real-life examples, Systems Biology in Drug Discovery and Development presents practical applications of systems biology to the multiple phases of drug discovery and development. This book explains how the integration of knowledge from multiple sources, and the models that best represent that integration, inform the drug research processes that are most relevant to the pharmaceutical and biotechnology industries. The first book to focus on comprehensive systems biology and its applications in drug discovery and development, it offers comprehensive and multidisciplinary coverage of all phases of discovery and design, including target identification and validation, lead identification and optimization, and clinical trial design and execution, as well as the complementary systems approaches that make these processes more efficient. It also provides models for applying systems biology to pharmacokinetics, pharmacodynamics, and candidate biomarker identification. Introducing and explaining key methods and technical approaches to the use of comprehensive systems biology on drug development, the book addresses the challenges currently facing the pharmaceutical industry. As a result, it is essential reading for pharmaceutical and biotech scientists, pharmacologists, computational modelers, bioinformaticians, and graduate students in systems biology, pharmaceutical science, and other related fields.

The Story of Life: Great Discoveries in Biology (First Edition)   Dec 12 2020

The Science and Business of Drug Discovery   Jun 25 2019 The Science and Business of Drug Discovery is written for those who want to learn about the biopharmaceutical industry and its products whatever their level of technical knowledge. Its aim is to demystify the jargon used in drug development, but in a way that avoids over simplification and the resulting loss of key information. Each of the nineteen chapters is illustrated with figures and tables which clarify some of the more technical points being made. Also included is a drug discovery case history which draws the relevant material together into a single chapter. In recognizing that it is difficult to navigate through the many external resources dealing with drug development, the book has been written to guide the reader towards the most appropriate information sources, including those listed in the two appendices. The following topics are covered: Different types of drugs: from small molecules to stem cells Background to chemistry of small and large molecules Historical background to drug discovery, pharmacology and biotechnology The drug discovery pipeline: from target discovery to marketed medicine Commercial aspects of drug discovery Challenges to the biopharmaceutical industry and its responses Material of specific interest to technology transfer executives, recruiters and pharmaceutical translators.

Proteomics for Biological Discovery   Oct 02 2022 Written by recognized experts in the study of proteins, Proteomics for Biological Discovery begins by discussing the emergence of proteomics from genome sequencing projects and a summary of potential answers to be gained from proteome-level research. The tools of proteomics, from conventional to novel techniques, are then dealt with in terms of underlying concepts, limitations and future directions. An invaluable source of information, this title also provides a thorough overview of the current developments in post-translational modification studies, structural proteomics, biochemical proteomics, microfabrication, applied proteomics, and bioinformatics relevant to proteomics. Presents a comprehensive and coherent review of the major issues faced in terms of technology development, bioinformatics, strategic approaches, and applications Chapters offer a rigorous overview with summary of limitations, emerging approaches, questions, and realistic future industry and basic science applications Discusses higher level integrative aspects, including technical challenges and applications for drug discovery Accessible to the novice while providing experienced investigators essential information Proteomics for Biological Discovery is an essential resource for students, postdoctoral fellows, and researchers across all fields of biomedical research, including biochemistry, protein chemistry, molecular genetics, cell/developmental biology, and bioinformatics.

Discovery-Based Learning in the Life Sciences   Apr 03 2020 For nearly a decade, scientists, educators and policy makers have issued a call to college biology professors to transform undergraduate life sciences education. As a gateway science for many undergraduate students, biology courses are crucial to addressing many of the challenges we face, such as climate change, sustainable food supply and fresh water and emerging public health issues. While canned laboratories and cook-book approaches to college science education do teach students to operate equipment, make accurate measurements and work well with numbers, they do not teach students how to take a scientific approach to an area of interest about the natural world. Science is more than just techniques, measurements and facts; science is critical thinking and interpretation, which are essential to scientific research. Discovery-Based Learning in the Life Sciences presents a different way of organizing and developing biology teaching laboratories, to promote both deep learning and understanding of core concepts, while still teaching the creative process of science. In eight chapters, the text guides undergraduate instructors in creating their own discovery-based experiments. The first chapter introduces the text, delving into the necessity of science education reform. The chapters that follow address

pedagogical goals and desired outcomes, incorporating discovery-based laboratory experiences, realistic constraints on such lab experiments, model scenarios, and alternate ways to enhance student understanding. The book concludes with a reflection on four imperatives in life science research-- climate, food, energy and health-- and how we can use these laboratory experiments to address them. Discovery-Based Learning in the Life Sciences is an invaluable guide for undergraduate instructors in the life sciences aiming to revamp their curriculum, inspire their students and prepare them for careers as educated global citizens.

The Discovery and Utility of Chemical Probes in Target Discovery   May 17 2021 Numerous genetic methods can be utilised to link a phenotype to a single molecular target but annotated small molecule chemical probes and even entire chemogenomic libraries are increasingly being used as a complementary approach. This book will comprehensively cover the state of the art in chemical probes and best practice for use in target discovery, illustrated throughout with examples. Ideal for students and established biochemists, the book will also cover new technologies for probe discovery, new probe modalities, the new field of probes for RNA targets and the mature field of kinase chemical probes.

Biological Knowledge Discovery Handbook   Oct 22 2021 The first comprehensive overview of preprocessing, mining, and postprocessing of biological data Molecular biology is undergoing exponential growth in both the volume and complexity of biological data—and knowledge discovery offers the capacity to automate complex search and data analysis tasks. This book presents a vast overview of the most recent developments on techniques and approaches in the field of biological knowledge discovery and data mining (KDD)—providing in-depth fundamental and technical field information on the most important topics encountered. Written by top experts, Biological Knowledge Discovery Handbook: Preprocessing, Mining, and Postprocessing of Biological Data covers the three main phases of knowledge discovery (data preprocessing, data processing—also known as data mining—and data postprocessing) and analyzes both verification systems and discovery systems. BIOLOGICAL DATA PREPROCESSING Part A: Biological Data Management Part B: Biological Data Modeling Part C: Biological Feature Extraction Part D Biological Feature Selection BIOLOGICAL DATA MINING Part E: Regression Analysis of Biological Data Part F Biological Data Clustering Part G: Biological Data Classification Part H: Association Rules Learning from Biological Data Part I: Text Mining and Application to Biological Data Part J: High-Performance Computing for Biological Data Mining Combining sound theory with practical applications in molecular biology, Biological Knowledge Discovery Handbook is ideal for courses in bioinformatics and biological KDD as well as for practitioners and professional researchers in computer science, life science, and mathematics.

Pattern Discovery in Bioinformatics   Apr 27 2022 The computational methods of bioinformatics are being used more and more to process the large volume of current biological data. Promoting an understanding of the underlying biology that produces this data, Pattern Discovery in Bioinformatics: Theory and Algorithms provides the tools to study regularities in biological data. Taking a systema

Discovery Engineering in Biology   Nov 30 2019 "Who knew that small, plant-eating mammals called pikas helped scientists find new ways to survive extreme weather events, or that algae could be used as airplane fuel? Your students will learn about amazing scientific advancements like these when you use the lessons in Discovery Engineering in Biology: Case Studies for Grades 6-12. The book is a lively way to blend history, real-world perspectives, 21st-century skills, and engineering into your biology or STEM curriculum. Like Discovery Engineering in Physical Science (see p. XX), this book features case studies about observations and accidental discoveries that led to the invention of new products and problem-solving applications. The 20 lessons are both flexible and easy to use. After reading a historical account of an actual innovation, students explore related activities that connect to such topics as molecules and organisms, ecosystems, heredity, and biological evolution. Then they're prompted to think creatively about science from serendipity. They conduct research, analyze data, and use the engineering design process to develop products or applications of their own. Students are sure to be intrigued by investigations with titles such as "Vindicating Venom: Using Biological Mechanisms to Treat Diseases and Disorders" and "Revealing Repeats: The Accidental Discovery of DNA Fingerprinting." Discovery Engineering in Biology is an engaging way to help students discover that when accidents happen, the outcome can be an incredible innovation"--

The Path to the Double Helix   Mar 27 2022 Written by a noted historian of science, this in-depth account traces how Watson and Crick achieved one of science's most dramatic feats: their 1953 discovery of the molecular structure of DNA.

Fundamentals of Microfluidics and Lab on a Chip for Biological Analysis and Discovery   Jul 19 2021 Lab-on-a-chip technology permits us to make many important discoveries that can only be observed at the microscale or the nanoscale. Using this technology, biological and biochemical analyses translate into greater sensitivity, more accurate results, and more valuable findings. Authored by one of the field's pioneering researchers, Fundamentals of Microfluidics and Lab on a Chip for Biological Analysis and Discovery focuses on all key aspects of microfluidic lab-on-a-chip technologies to offer an exceptionally cohesive overview of the science, its limitations, breakthroughs made over the years, and currently emerging advances. The book emphasizes analytical applications of microfluidic technology and offers in-depth coverage of micromachining methods, microfluidic operations, chemical separations, sample preparation and injection methods, detection technology, and various chemical and biological analyses. Other topics of interest include the use of polymeric chips, fluid flow valve and control, single-cell analysis, DNA and RNA amplification techniques, DNA hybridization, immunoassays, and enzymatic assays. The book includes more than 300 figures that depict novel chip functions and breakthroughs and 16 tables summarize materials and refer readers to additional resources. An appendix compiles extensive analytical applications from emerging and established research groups. Beginners in the field will find the book useful for navigating the vast literature related to the technology, while experienced researchers will rely on the compiled information for easy comparison and references for further study. Derived from the highly popular Microfluidic Lab-on-a-Chip for Chemical and Biological Analysis and Discovery (2006), this volume is also readily adaptable for classroom use. Problem sets in each chapter help students test their assimilation of the material and clarify challenging concepts. The book contains a comprehensive glossary, a complete index, and extensive references. A solutions manual is available with qualifying course adoption.

First in Fly   Sep 28 2019 A single species of fly, Drosophila melanogaster, has been the subject of scientific research for more than one hundred years. Why does this tiny insect merit such intense scrutiny? Drosophila's importance as a research organism began with its short life cycle, ability to reproduce in large numbers, and easy-to-see mutant phenotypes. Over time, laboratory investigation revealed surprising similarities between flies and other animals at the level of genes, gene networks, cell interactions, physiology, immunity, and behavior. Like humans, flies learn and remember, fight microbial infection, and slow down as they age. Scientists use Drosophila to investigate complex biological activities in a simple but intact living system. Fly research provides answers to some of the most challenging questions in biology and biomedicine, including how cells transmit signals and form ordered structures, how we can interpret the wealth of human genome data now available, and how we can develop effective treatments for cancer, diabetes, and neurodegenerative diseases. Written by a leader in the Drosophila research community, First in Fly celebrates key insights uncovered by investigators using this model organism. Stephanie Elizabeth Mohr draws on these "first in fly" findings to introduce fundamental biological concepts gained over the last century and explore how research in the common fruit fly has expanded our understanding of human health and disease.--

Drug Design and Discovery   Apr 15 2021 Research in the pharmaceutical sciences and medicinal chemistry has taken an important new direction in the past two decades with a focus on large molecules, especially peptides and proteins, as well as DNA therapeutics. In Drug Design and Discovery: Methods and Protocols, leading experts provide an in-depth view of key protocols that are commonly used in drug discovery laboratories. Covering both classic and cutting-edge techniques, this volume explores computational docking, quantitative structure-activity relationship (QSAR), peptide synthesis, labeling of peptides and proteins with fluorescent labels, DNA-microarray, zebrafish model for drug screening, and other analytical screening and biological assays that are routinely used during the drug discovery process. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Thorough and accessible, Drug Design and Discovery: Methods and Protocols serve as a vital laboratory reference for pharmaceutical chemists, medicinal chemists, and pharmacologists as well as for molecular biologists.

The Double Helix   May 05 2020 The classic personal account of Watson and Crick's groundbreaking discovery of the structure of DNA, now with an introduction by Sylvia Nasar, author of A Beautiful Mind. By identifying the structure of DNA, the molecule of life, Francis Crick and James Watson revolutionized biochemistry and won themselves a Nobel Prize. At the time, Watson was only twenty-four, a young scientist hungry to make his mark. His uncompromisingly honest account of the heady days of their thrilling sprint against other world-class researchers to solve one of science's greatest mysteries gives a dazzlingly clear picture of a world of brilliant scientists with great gifts, very human ambitions, and bitter rivalries. With humility unspoiled by false modesty, Watson relates his and Crick's desperate efforts to beat Linus Pauling to the Holy Grail of life sciences, the identification of the basic building block of life. Never has a scientist been so truthful in capturing in words the flavor of his work.

Bioinformation Discovery   May 29 2022 This new edition continues to illustrate the power of biological data in knowledge discovery. It describes biological data types and representations with examples for creating a workflow in bioinformation discovery. The concepts in knowledge discovery from data are illustrated using line diagrams. The principles and concepts in knowledge discovery are used for the development of prediction models for simulations of biological reactions and events. Advanced topics in molecular evolution and cellular & molecular biology are addressed using bioinformation gleaned through discovery. Each chapter contains approximately 10 exercises for practice. This will help students to expand their problem solving skills in Bioinformation Discovery. In this new edition, there are three

new chapters covering single nucleotide polymorphism, genes, proteins and disease, and protein functions driven by surface electrostatics.
  First in Fly   Jun 29 2022 A single species of fly, Drosophila melanogaster, has been the subject of scientific research for more than one hundred years. Why does this tiny insect merit such intense scrutiny? Drosophila's importance as a research organism began with its short life cycle, ability to reproduce in large numbers, and easy-to-see mutant phenotypes. Over time, laboratory investigation revealed surprising similarities between flies and other animals at the level of genes, gene networks, cell interactions, physiology, immunity, and behavior. Like humans, flies learn and remember, fight microbial infection, and slow down as they age. Scientists use Drosophila to investigate complex biological activities in a simple but intact living system. Fly research provides answers to some of the most challenging questions in biology and biomedicine, including how cells transmit signals and form ordered structures, how we can interpret the wealth of human genome data now available, and how we can develop effective treatments for cancer, diabetes, and neurodegenerative diseases. Written by a leader in the Drosophila research community, First in Fly celebrates key insights uncovered by investigators using this model organism. Stephanie Elizabeth Mohr draws on these "first in fly" findings to introduce fundamental biological concepts gained over the last century and explore how research in the common fruit fly has expanded our understanding of human health and disease.
  Why Study Biology by the Sea?   Jul 07 2020 "Since the middle of the 19th century, biologists have migrated to the seashore to study marine organisms as a way of understanding life. By the turn of the 20th century, such work was being done inside permanent seaside field stations. The Stazione Zoologica, in Naples, Italy (from 1874), and the Marine Biological Laboratory, in Woods Hole, Massachusetts (from 1888), attracted leaders in many biological fields, and helped establish biology as a modern science. Why Study Biology by the Sea? tells the story of these unique scientific institutions while attempting to answer the contemporary question, "Why study biology by the sea?" The volume examines the origins and value of these places via perspectives that range from cell biology to philosophy of science"--