Binding And Kinetics For Molecular Biologists

Handbook of Biochemical Kinetics
Handbook of Surface Plasmon Resonance
Thermodynamics and Kinetics of Drug Binding
Protein-Ligand Interactions
Fragment Based Drug Design
Kinetics for the Life Sciences
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Fundamentals of Protein Structure and Function
Antitargets and Drug Safety
Principles and Problems in Physical Chemistry for Biochemists
In-cell NMR Spectroscopy

ANTWAN FITZPATRICK

Handbook of Biochemical Kinetics Springer Science & Business Media
This handbook offers a practical guide to the principles of quantitative analysis in biological experiments. The material is primarily aimed at working molecular biologists, but the scope and clarity of presentation make it equally suitable as an introduction for students. Topics covered range from the basics â€” such as measuring the concentrations of macromolecules â€” through considerations of binding constants and the kinetics of molecular interactions. The book ends with a thorough consideration of data analysis.
Handbook of Surface Plasmon Resonance Royal Society of Chemistry
Receptors: Models for Binding, Trafficking, and Signaling bridges the gap between chemical engineering and cell biology by lucidly and practically demonstrating how a mathematical modeling approach combined with quantitative experiments can provide enhanced understanding of cell phenomena involving receptor/ligand interactions. In stressing the need for a quantitative understanding of how receptor-mediated cell functions depend on receptor and ligand properties, the book offers comprehensive treatments of both basic and state-of-the-art model frameworks that span the entire spectrum of receptor processes--from fundamental cell surface binding, intracellular trafficking, and signal transduction events to the cell behavioral functions they govern, including proliferation, adhesion, and migration. The book emphasizes mechanistic models that are accessible to experimental testing and includes detailed examples of important contemporary issues. This much-needed book introduces chemical engineers and bioengineers to important problems in receptor biology and familiarizes cell biologists with the insights that can be gained from engineering analysis and synthesis. As such, chemical engineers, researchers, and advanced students in the fields of biotechnology, biomedical sciences, bioengineering, and molecular cell biology will find this book to be conceptually rich, timely, and useful.
Thermodynamics and Kinetics of Drug Binding World Scientific
There are numerous excellent reviews on fragment-based drug discovery (FBDD), but there are to date no hand-holding

guides or protocols with which one can embark on this orthogonal approach to complement traditional high throughput screening methodologies. This Methods in Enzymology volume offers the tools, practical approaches, and hit-to-lead examples on how to conduct FBDD screens. The chapters in this volume cover methods that have proven to be successful in generating leads from fragments, including chapters on how to apply computational techniques, nuclear magnetic resonance, surface plasma resonance, thermal shift and binding assays, protein crystallography, and medicinal chemistry in FBDD. Also elaborated by experienced researchers in FBDD are sample preparations of fragments, proteins, and GPCR as well as examples of how to generate leads from hits. Offers the tools, practical approaches, and hit-to-lead examples on how to conduct FBDD screens The chapters in this volume cover methods that have proven to be successful in generating leads from fragments, including chapters on how to apply computational techniques, nuclear magnetic resonance, surface plasma resonance, thermal shift and binding assays, protein crystallography, and medicinal chemistry in FBDD

Protein-Ligand Interactions Royal Society of Chemistry

This unique book presents a systematic review of the methods for the determination of binding constants of complex formation in solution. Collects material that has been scattered throughout the literature of several separate fields. Offered here are methods from the areas of acid-base chemistry, metal-ion coordination compounds, hydrogen-bonding, charge-transfer complexation, hydrophobic interaction, and protein-binding. Discusses the relevant thermodynamics, modelling, statistics and regression analysis, and interpretation of data. Includes fresh discussions of random association (contact complexes), selection of standard states, and comparison of results. Treats all of the experimental methods useful for measuring these equilibrium constants, including those based on spectrophotometry, nuclear magnetic resonance, reaction kinetics, potentiometry, solubility, liquid-liquid partitioning, dialysis, chromatography, flourimetry, and many others.

Fragment Based Drug Design Academic Press

An accessible overview of the most popular and cutting-edge methods for studying the properties of molecules and their interactions.

Kinetics for the Life Sciences Humana

Chemical Kinetics and Reaction Dynamics brings together the major facts and theories relating to the rates with which chemical reactions occur from both the macroscopic and microscopic point of view. This book helps the reader achieve a thorough understanding of the principles of chemical kinetics and includes: Detailed stereochemical discussions of reaction steps Classical theory based calculations of state-to-state rate constants A collection of matters on kinetics of various special reactions such as micellar catalysis, phase transfer catalysis, inhibition processes, oscillatory reactions, solid-state reactions, and polymerization reactions at a single source. The growth of the chemical industry greatly depends on the application of chemical kinetics, catalysts and catalytic processes. This volume is therefore an invaluable resource for all academics, industrial researchers and students interested in kinetics, molecular reaction dynamics, and the mechanisms of chemical reactions.

Protein-nucleic Acid Interaction John Wiley & Sons

This book serves as an introduction to protein structure and function. Starting with their makeup from simple building blocks, called amino acids, the 3-dimensional structure of proteins is explained. This leads to a discussion how misfolding of proteins causes diseases like cancer, various encephalopathies, or diabetes. Enzymology and modern concepts of enzyme kinetics are then introduced, taking into account the physiological, pharmacological and medical significance of this often neglected topic. This is followed by thorough coverage of hæmoglobin and myoglobin, immunoproteins, motor proteins and movement, cell-cell interactions, molecular chaperones and chaperonins, transport of proteins to various cell compartments and solute transport across biological membranes. Proteins in the laboratory are also covered, including a detailed description of the purification and determination of proteins, as well as their characterisation for size and shape, structure and molecular interactions. The book emphasises the link between protein structure, physiological function and medical significance. This book can be used for graduate and advanced undergraduate classes covering protein structure and function and as an introductory text for researchers in protein biochemistry, molecular and cell biology, chemistry, biophysics, biomedicine and related courses. About the author: Dr. Buxbaum is a biochemist with interest in enzymology and protein science. He has been working on the biochemistry of membrane transport proteins for nearly thirty years and has taught courses in biochemistry and biomedicine at several universities.

Physical Chemistry of Macromolecules Wiley-Interscience

With its focus on emerging concerns of kinase and GPCR-mediated antitarget effects, this vital reference for drug developers addresses one of the hot topics in drug safety now and in future. Divided into three major parts, the first section deals with novel technologies and includes the utility of adverse event reports to drug discovery, the translational aspects of preclinical safety findings, broader computational prediction of drug side-effects, and a description of the serotonergic system. The main part of the book looks at some of the most common antitarget-mediated side effects, focusing on hepatotoxicity in drug safety, cardiovascular toxicity and signaling effects via kinase and GPCR anti-targets. In the final section, several case studies of recently developed drugs illustrate how to prevent anti-target effects and how big pharma deals with them if they occur. The more recent field of systems pharmacology has gained prominence and this is reflected in chapters dedicated to the utility in deciphering and modeling anti-targets. The final chapter is concerned with those compounds that inadvertently elicit CNS mediated adverse events, including a pragmatic description of ways to mitigate these types of safety risks. Written as a companion to the successful book on antitargets by Vaz and Klabunde, this new volume focuses on recent progress and new classes, methods and case studies that were not previously covered.

Protein-Ligand Interactions John Wiley & Sons

This readily comprehensible book explains the identification of molecular targets via cellular assays, reporter genes or transgenic models, as well as surveying recent advances in the synthesis, separation and analysis of drugs. A special section is devoted to molecular genetics methods. With its examination of these novel methods and generous practical advice, this is essential reading for all pharmaceutical chemists, molecular biologists and medical researchers using molecular methods to study drugs and their action.

Initial Rate Enzyme Kinetics John Wiley & Sons

Integrating coverage of polymers and

biological macromolecules into a single text, Physical Chemistry of Macromolecules is carefully structured to provide a clear and consistent resource for beginners and professionals alike. The basic knowledge of both biophysical and physical polymer chemistry is covered, along with important terms, basic structural properties and relationships. This book includes end of chapter problems and references, and also: Enables users to improve basic knowledge of biophysical chemistry and physical polymer chemistry. Explores fully the principles of macromolecular chemistry, methods for determining molecular weight and configuration of molecules, the structure of macromolecules, and their separations.

Molecular Driving Forces Garland Science
What use is physical chemistry to the student of biochemistry and biology? This central question is answered in this book mainly through the use of worked examples and problems. The book starts by introducing the laws of thermodynamics, and then uses these laws to derive the equations relevant to the student in dealing with chemical equilibria (including the binding of small molecules to proteins), properties of solutions, acids and bases, and oxidation-reduction processes. The student is thus shown how a knowledge of thermodynamic qualities makes it possible to predict whether, and how, a reaction will proceed. Thermodynamics, however, gives no information about how fast a reaction will happen. The study of the rates at which processes occur (kinetics) forms the second main theme of the book. This section poses and answers questions such as `how is the rate of a reaction affected by temperature, pH, ionic strength, and the nature of the reactants? These same ideas are then shown to be useful in the study of enzyme-catalysed reactions.

Structural Biology in Drug Discovery John Wiley & Sons
Enzyme kinetics has undergone very rapid growth and development during the past fifteen years and has been well received by the biochemical community. A cursory glance at the current biochem ical literature reveals the increasing popularity of enzyme ki netics1 yet, there are very few books available to guide the enzymologist who wishes to conduct kinetic experiments. This monograph was undertaken to provide the fledgling kineticist with an outline of contemporary initial rate enzyme kinetics. A large portion of the material contained in this book is presented in a second-year, graduate-level course in biochemistry at Iowa State University. I have found that the presentation in this course has enabled students without a strong background in math ematics to undertake initial rate studies at the research bench. The monograph obviously is more comprehensive than any course could be, and should permit similar accomplishment. As the title implies, the major emphasis of this monograph is on initial rate enzyme kinetics. I considered at length the advis ability of including chapters on integrated rate equations and on the theory and application of rapid reaction kinetics, such as rapid-mixing stopped-flow, and temperature-jump kinetics. These, however, are topics that would require a good deal of space to develop if they were to be helpful to the beginner.

Protein-Ligand Interactions Courier Corporation
This title brings to the attention of researchers in the industry, and in academia, the application of fractals to help in modeling the analyte/receptor binding and dissociation kinetics on biosensor surfaces.The work builds on that done in Engineering Biosensors: Kinetics and Design Applications, published by Academic Press in 2002. In particular, more examples are provided of where biosensors may be effectively used. This sequel is extremely timely, given the anticipation that the applications and reliance on biosensors will increase due to the advances in miniaturization, (wireless) communications, and the development of new materials (especially biological and chemical). Other applications of biosensors on the increase can be found in: the protection of civilian structures and infrastructures; protection from possible biological and chemical threats; health care; energy; food safety; and the environment to name a few. - Covers all areas of applications of biosensors - No other book on biosensors describes the kinetics of binding - Provides numerous examples of where biosensors may be used

Computational Methods for Estimating the Kinetic Parameters of Biological Systems John Wiley & Sons
Molecular Driving Forces, Second Edition E-book is an introductory statistical thermodynamics text that describes the principles and forces that drive chemical and biological processes. It demonstrates how the complex behaviors of molecules can result from a few simple physical processes, and how simple models provide surprisingly accurate insights into the workings of the molecular world. Widely adopted in its First Edition, Molecular Driving Forces is regarded by teachers and students as an accessible textbook that illuminates underlying principles and concepts. The Second Edition includes two brand new chapters: (1) "Microscopic Dynamics" introduces single molecule experiments; and (2) "Molecular Machines" considers how nanoscale machines and engines work. "The Logic of Thermodynamics" has been expanded to its own chapter and now covers heat, work, processes, pathways, and cycles. New practical applications, examples, and end-of-chapter questions are integrated throughout the revised and updated text, exploring topics in biology, environmental and energy science, and nanotechnology. Written in a clear and reader-friendly style, the book provides an excellent introduction to the subject for novices while remaining a valuable resource for experts.

Molecular Biology in Medicinal Chemistry Humana
Welcome to your study of enzyme kinetics, the subject that underlies all enzymology, which in turn underlies all aspects of biochemistry. This text will give you an introduction to a wide range of topics that constitute the modern enzyme kinetics. This textbook is directed at graduate students in biochemistry, chemistry, and life sciences, for advanced courses in enzyme kinetics, enzymology, and enzyme chemistry. For this reason, the whole book is organized in a systematic and scholarly fashion. It is unlikely that the student will be expected to cover everything in the text, but in a later career she or he may find it an invaluable reference for topics that are needed in practice. The concepts, definitions and detailed algebra of enzyme kinetics are laid out in accurate detail. For that reason, this textbook can also serve as a handbook for enzyme kinetics for research workers in the field. The research worker will find it a useful source, which can be used for solving the daily experimental problems in the laboratory. The preparation of the manuscript for this book was under the constant surveillance of W. Wallace Cleland, Professor of Chemical Science at the University of Wisconsin in Madison, and one of the founders of modern enzyme kinetics. Without his help and advice, this bookwould not be possible. Several versions of the manuscript were constantly corrected and improved by Svetlana Professor of Biochemistry at the University of Novi Sad.

Receptors Springer
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

Biomolecular Kinetics Oxford University Press on Demand

A comprehensive presentation of essential topics for biological engineers, focusing on the development and application of dynamic models of biomolecular and cellular phenomena. This book describes the fundamental molecular and cellular events responsible for biological function, develops models to study biomolecular and cellular phenomena, and shows, with examples, how models are applied in the design and interpretation of experiments on biological systems. Integrating molecular cell biology with quantitative engineering analysis and design, it is the first textbook to offer a comprehensive presentation of these essential topics for chemical and biological engineering. The book systematically develops the concepts necessary to understand and study complex biological phenomena, moving from the simplest elements at the smallest scale and progressively adding complexity at the cellular organizational level, focusing on experimental testing of mechanistic hypotheses. After introducing the motivations for formulation of mathematical rate process models in biology, the text goes on to cover such topics as noncovalent binding interactions; quantitative descriptions of the transient, steady state, and equilibrium interactions of proteins and their ligands; enzyme kinetics; gene expression and protein trafficking; network dynamics; quantitative descriptions of growth dynamics; coupled transport and reaction; and discrete stochastic processes. The textbook is intended for advanced undergraduate and graduate courses in chemical engineering and bioengineering, and has been developed by the authors for classes they teach at MIT and the University of Minnesota.

Chemical Kinetics: Beyond The Textbook Cambridge University Press

The binding of small ligands to biological molecules is central to most aspects of biological function. The past twenty years has seen the development of an increasing armoury of biophysical methods that not only detect such binding, but also provide varying degrees of information about the kinetics, thermodynamics and structural aspects of the process. These methods have received increasing attention with the growth in more rational approaches to drug discovery and design. This book reviews the latest advances in the application of biophysics to the study of ligand binding. It provides a complete overview of current techniques to identify ligands, characterise their binding sites and understand their binding mechanisms. Particular emphasis is given to the combined use of different techniques and their relative strengths and weaknesses. Consistency in the way each technique is described makes it easy for readers to select the most suitable protocol for their research. The introduction explains why some techniques are more suitable than others and emphasizes the possible synergies between them. The following chapters, all written by a specialist in the particular technique, focus on each method individually. The book finishes by describing how several complimentary techniques can be used together for maximum effectiveness. This book is suitable for biomolecular scientists at graduate or post-doctoral level in academia and industry. Biologists and chemists will also find it a useful introduction to the techniques available.

Biosensors: Kinetics of Binding and Dissociation Using Fractals Lulu.com

This volume contains a series of essays which describe a range of problems in the field of nucleic-acid interactions, investigated by a variety of techniques. An introductory chapter on DNA-protein interactions in the regulation of gene expression is followed by papers on selected model systems.

Methods of Molecular Analysis in the Life Sciences CRC Press

Surface plasmon resonance (SPR) plays a dominant role in real-time interaction sensing of biomolecular binding events, this book provides a total system description including optics, fluidics and sensor surfaces for a wide researcher audience.

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