Drug Design Strategies Quantitative Approaches Drug Discovery

Drug DesignA Practical Guide to Rational Drug DesignComputational Methods for GPCR Drug DiscoveryA Comprehensive Guide to Toxicology in Nonclinical Drug DevelopmentGreen Chemistry Strategies for Drug DiscoveryRational Approaches to Structure, Activity, and Ecotoxicology of AgrochemicalsAn Introduction to Medicinal ChemistryGreen Approaches in Medicinal Chemistry for Sustainable Drug DesignScientific Modeling and SimulationsTheoretical Drug Design MethodsQSAR : Hansch Analysis and Related ApproachesCommunicated AbstractsMedicinal ChemistryQuantitative Drug DesignUnderstanding the Basics of QSAR for Applications in Pharmaceutical Sciences and Risk AssessmentThe Practice of Medicinal ChemistryBurger's Medicinal Chemistry and Drug Discovery, Principles and PracticeEmergent Methods in Social ResearchChemoinformatics Approaches to Structure- and Ligand-Based Drug DesignQSAR and Strategies in the Design of Bioactive CompoundsPharmacokineticsUX StrategyComputer Applications in Drug Discovery and DevelopmentPhenotypic screening in the 21st centuryTrial Designs and Outcomes in Dementia Therapeutic ResearchIntroduction to Educational ResearchBenefit-Risk Assessment in Pharmaceutical Research and DevelopmentStatistical Methods for Drug SafetyIntroduction to the Principles of Drug DesignQuantitative Structure-Activity Relationships in Drug Design, Predictive Toxicology, and Risk AssessmentComprehensive Medicinal Chemistry IISmith and Williams' Introduction to the Principles of Drug Design and ActionDrug Discovery and Development - E-BookEssentials of Medicinal ChemistryDrug Design StrategiesDrug Design StrategiesQualitative Research DesignStructure-activity Relationship Studies in Drug Development by NMR SpectroscopyStrategies for Reducing Drug and Chemical Residues in Food AnimalsIn Silico Drug Design

Drug Design

Extensive experimentation and high failure rates are a well-recognised downside to the drug discovery process, with the resultant high levels of inefficiency and waste producing a negative environmental impact. Sustainable and Green Approaches in Medicinal Chemistry reveals how medicinal and green chemistry can work together to directly address this issue. After providing essential context to the growth of green chemistry in relation to drug discovery in Part 1, the book goes on to identify a broad range of practical methods and synthesis techniques in Part 2. Part 3 reveals how medicinal chemistry techniques can be used to improve efficiency, mitigate failure and increase the environmental benignity of the entire drug discovery process, whilst Parts 4 and 5 discuss natural products and microwave-induced chemistry. Finally, the role of computers in drug discovery is explored in Part 6. Identifies novel and cost effective green medicinal chemistry approaches for improved efficiency and sustainability Reflects on techniques for a broad range of compounds and materials Highlights sustainable and green chemistry pathways for molecular synthesis

A Practical Guide to Rational Drug Design

Introduction to the Principles of Drug Design provides a framework of fundamental drug design and principles into which drugs following on developments may be fitted. This book presents the rationales behind the design of drugs. Organized into nine chapters, this book begins with an overview of how the body handles a drug in terms of absorption, metabolism, distribution, and excretion. This text then examines the critical drug activity at the receptor site, which is usually related to blood and other distribution fluid levels. Other chapters consider the factors involved in binding a drug, metabolite, or substrate to a receptor. The final chapter deals with the design of chemotherapeutic agent for clinical use in the treatment of human infections. This book is intended for use in undergraduate pharmacy courses in medicinal chemistry and as an aid in similar courses in biochemistry and pharmacology. Graduates in chemistry just entering the pharmaceutical industry will also find this book useful.

Computational Methods for GPCR Drug Discovery

This book provides a complete snapshot of various experimental approaches to structure-based and ligand-based drug design and is illustrated with more than 200 images.

A Comprehensive Guide to Toxicology in Nonclinical Drug Development

Green Chemistry Strategies for Drug Discovery

A Comprehensive Guide to Toxicology in Nonclinical Drug Development, Second Edition, is a valuable reference designed to provide a complete understanding of all aspects of nonclinical toxicology in the development of small molecules and biologics. This updated edition has been reorganized and expanded to include important topics such as stem cells in nonclinical toxicology, inhalation and dermal toxicology, pitfalls in drug development, biomarkers in toxicology, and more. Thoroughly updated to reflect the latest scientific advances and with increased coverage of international regulatory guidelines, this second edition is an essential and practical resource for all toxicologists involved in nonclinical testing in industry, academic, and regulatory settings. Provides unique content that is not always covered together in one comprehensive resource, including chapters on stem cells, abuse liability, biomarkers, inhalation toxicology, biostatistics, and more Updated with the latest international guidelines for nonclinical toxicology in both small and large molecules Incorporates practical examples in order to illustrate day-to-day activities and the expectations associated with working in nonclinical toxicology

Rational Approaches to Structure, Activity, and Ecotoxicology of Agrochemicals

The modern pharmacopeia has enormous power to alleviate disease, and owes its existence almost entirely to the work of the pharmaceutical industry. This book provides an introduction to the way the industry goes about the discovery and development of new drugs. The first part gives a brief historical account from its origins in the mediaeval apothecaries' trade, and discusses the changing understanding of what we mean by disease, and what therapy aims to achieve, as well as summarising case histories of the discovery and development of some important drugs. The second part focuses on the science and technology involved in the discovery process: the stages by which a promising new chemical entity is identified, from the starting point of a medical need and an idea for addressing it. A chapter on biopharmaceuticals, whose discovery and development tend to follow routes somewhat different from synthetic compounds, is included here, as well as accounts of patent issues that arise in the discovery phase, and a chapter on research management in this environment. The third section of the book deals with drug development: the work that has to be undertaken to turn the drug candidate that emerges from the discovery process into a product on the market. The definitive introduction to how a pharmaceutical company goes about its business of discovering and developing drugs. The second edition has a new editor: Professor Raymond Hill ● non-executive director of Addex Pharmaceuticals, Covagen and of Orexo AB ● Visiting Industrial Professor of Pharmacology in the University of Bristol ● Visiting Professor in the School of Medical and Health Sciences at the University of Surrey ● Visiting Professor in Physiology and Pharmacology at the University of Strathclyde ● President and Chair of the Council of the British Pharmacological Society ● member of the Nuffield Council on Bioethics and the Advisory Council on Misuse of Drugs. New to this edition: Completely rewritten chapter on The Role of Medicinal Chemistry in the Drug Discovery Process. New topic - DMPK Optimization Strategy in drug discovery. New chapter on Scaffolds: Small globular proteins as antibody substitutes. Totally updated chapters on Intellectual Property and Marketing 50 new illustrations in full colour Features Accessible, general guide to pharmaceutical research and development. Examines the interfaces between cost and social benefit, quality control and mass production, regulatory bodies, patent management, and all interdisciplinary intersections essential to effective drug development. Written by a strong team of scientists with long experience in the pharmaceutical industry. Solid overview of all the steps from lab bench to market in an easy-to-understand way which will be accessible to non-specialists. From customer reviews of the previous edition: ' it will have everything you need to know on this module. Deeply referenced and, thus, deeply reliable. Highly Commended in the medicine category of the BMA 2006 medical book competition Winner of the Royal Society of Medicine Library Prize for Medical Book of the Year

An Introduction to Medicinal Chemistry

The first edition of Comprehensive Medicinal Chemistry was published in 1990 and very well received. Comprehensive

Medicinal Chemistry II is much more than a simple updating of the contents of the first edition. Completely revised and expanded, this new edition has been refocused to reflect the significant developments and changes over the past decade in genomics, proteomics, bioinformatics, combinatorial chemistry, high-throughput screening and pharmacology, and more. The content comprises the most up-to-date, authoritative and comprehensive reference text on contemporary medicinal chemistry and drug research, covering major therapeutic classes and targets, research strategy and organisation, high-throughput technologies, computer-assisted design, ADME and selected case histories. It is this coverage of the strategy, technologies, principles and applications of medicinal chemistry in a single work that will make Comprehensive Medicinal Chemistry II a unique work of reference and a single point of entry to the literature for pharmaceutical and biotechnology scientists of all disciplines and for many industry executives as well.Comprehensive Medicinal Chemistry II will be available online in 2007 via the proven platform ScienceDirect providing the user with enhanced features such as cross-referencing and dynamic linking. * Comprehensively reviews - for the first time in one single work - the strategies, technologies, principles and applications of modern medicinal chemistry * Provides a global and current perspective of today's drug discovery process and discusses the major therapeutic classes and targets * Includes a unique collection of case studies and personal assays reviewing the discovery and development of key drugs

Green Approaches in Medicinal Chemistry for Sustainable Drug Design

The incorporation of Green Chemistry is a relatively new phenomenon in the drug discovery discipline, since the scale that chemists operate on in drug discovery is smaller than those of process and manufacturing chemistry. The necessary metrics are more difficult to obtain in drug discovery due to the diversity of reactions conducted. However, pharmaceutical companies are realizing that incorporation of green chemistry techniques at earlier stages of drug development can speed the development of a drug candidate. Written by experts who have pioneered green chemistry efforts within their own institutions, this book provides a practical guide for both academic and industrial labs wanting to know where to start with introducing greener approaches for greatest return on investment. The Editors have taken a comprehensive approach to the topic, covering the entire drug discovery process from molecule conception, through synthesis, formulation and toxicology with specific examples and case studies where green chemistry strategies have been implemented. Emerging techniques for performing greener drug discovery chemistry are addressed as well as cutting-edge topics like biologics discovery and continuous processing. Moreover, important surrounding issues such as intellectual property are included. This book serves as a practical guide for both academic and industrial chemists who work across the breadth of the drug discovery discipline. Ultimately, readers will learn how to incorporate green chemistry strategies into their everyday workflow without slowing down their science.

Scientific Modeling and Simulations

With more restrictions upon animal experimentations, pharmaceutical industries are currently focusing on a new generation of experiments and technologies that are considerably more efficient and less controversial. The integration of computational and experimental strategies has led to the identification and development of promising compounds. Computer Applications in Drug Discovery and Development is a pivotal reference source that provides innovative research on the application of computers for discovering and designing new drugs in modern molecular biology and medicinal chemistry. While highlighting topics such as chemical structure databases and dataset utilization, this publication delves into the current panorama of drug discovery, where high drug failure rates are a major concern and properly designed virtual screening strategies can be a time-saving, cost-effective, and productive alternative. This book is ideally designed for chemical engineers, pharmacists, molecular biologists, students, researchers, and academicians seeking current research on the unexplored avenues and future perspectives of drug design.

Theoretical Drug Design Methods

Fully updated, this textbook takes a receptor-based, target-centred approach, presenting concepts central to the study of drug action in a logical, mechanistic way, grounded on molecular & biochemical principles.

QSAR : Hansch Analysis and Related Approaches

Shows how different parts of the drug discovery process have developed, with particular emphasis on quantitative aspects and possible future progress.

Communicated Abstracts

"NMR (Nuclear Magnetic Resonance) Spectroscopy has found significant applications in drug discovery based on its capacity to map molecular interactions at the atomic level. Chemical shifts, cross relaxation, and exchange of protons are among the NMR parame"

Medicinal Chemistry

Quantitative Drug Design

Qualitative Research Design: An Interactive Approach, Second Edition provides researchers and students with a user-friendly, step-by-step guide to planning qualitative research. A bestseller in its First Edition, this invaluable book presents an innovative approach to the components of design and how they interact with each other. The text presents a clear strategy for creating coherent and workable relationships among these design components and highlights key design issues. Based on a course the author taught for seven years at the Harvard Graduate School of Education, the work is written in an informal, jargon-free style and incorporates many examples and hands-on exercises.

Understanding the Basics of QSAR for Applications in Pharmaceutical Sciences and Risk Assessment

Finding the new remedy for a certain disease: an inspired goal. QSAR, an invaluable tool in drug design, aids scientists to attain this aim. This book is a long-awaited comprehensive text to QSAR and related approaches. It provides a practice-oriented introduction to the theory, methods and analyses for QSAR relationships, including modelling-based and 3D approaches. Hugo Kubinyi is a leading expert in QSAR. Readers will benefit from the author's 20 years of practical experience, from his careful calculations and recalculations of thousands of QSAR equations. Among the topics covered are: - physiocochemical parameters - quantitative models - statistical methods - Hansch analysis - Free Wilson analysis - 3D-QSAR approaches The book can readily be used as a textbook due to its high didactic value and numerous examples (over 200 equations and 1100 references).

The Practice of Medicinal Chemistry

Many practitioners in the pharmaceutical industry are still largely unfamiliar with benefit-risk assessment, despite its growing prominence in drug development and commercialization. Helping to alleviate this knowledge gap, Benefit-Risk Assessment in Pharmaceutical Research and Development provides a succinct overview of the key considerations relevant to benefit-risk assessment across the pharmaceutical R&D spectrum, from early clinical development to late-stage development to regulatory review to post-launch assessment. The book first presents interpretations of benefit and risk in the context of a molecule moving from preclinical evaluation into its early testing in humans. It next considers benefit and risk characterization and assessment during a molecule’s journey from its clinical evaluation in humans through its submission to regulators for marketing approval. Throughout these sections, the book offers insight into the role of benefit-risk assessment in heightening understanding among key stakeholders by shaping questions and guiding discussions among scientists, physicians, developers, and regulatory agencies. The book also focuses on a molecule’s entry into the marketplace as a drug available for consumption by people. It explores the role of benefit-risk assessment as the relevance of carefully collected clinical efficacy and safety metrics fades in the wake of real-world use and evidence of effectiveness

and safety. Bringing together the expertise of 15 contributors from academia and the industry, this book offers an easy-to-read guide to the various facets of benefit-risk assessment in the major stages of pharmaceutical R&D. Suitable for those in both technical and managerial roles, it enables readers to communicate more effectively across their development chain as well as rationally and thoughtfully embed benefit-risk assessment into their R&D processes.

Burger's Medicinal Chemistry and Drug Discovery, Principles and Practice

BURGER'S MEDICINAL CHEMISTRY AND DRUG DISCOVERY, FIFTH EDITION, Volume 1: Principles and Practice This new edition of Dr. Alfred Burger's internationally celebrated classic helps researchers acquaint themselves with both traditional and state-of-the-art principles and practices governing new drug research and development. Completely updated and revised to reflect the many monumental changes that have occurred over the past decade and a half in medicinal chemistry and new drug development, this latest edition of Volume 1: Principles and Practice now: * Covers the latest methods of drug discovery, including such "hot" topics as computational chemistry and peptidomimetrics * Has added emphasis on preclinical development issues * Offers the most timely information on a broad range of important regulatory, management, legal, and financial issues * Features in-depth coverage of important factors in the discovery process, including ADME, toxicity and drug allergy, and clinical trials * Updates readers on recent advances in the understanding of the structural biology of drug action * Explores the cutting-edge technologies for drug discovery now in use around the world * Is more than twice the size of its predecessor * Brings together contributions by experts in a wide range of related fields from North America and Europe

Emergent Methods in Social Research

Chemoinformatics is paramount to current drug discovery. Structure- and ligand-based drug design strategies have been used to uncover hidden patterns in large amounts of data, and to disclose the molecular aspects underlying ligand-receptor interactions. This Research Topic aims to share with a broad audience the most recent trends in the use of chemoinformatics in drug design. To that end, experts in all areas of drug discovery have made their knowledge available through a series of articles that report state-of-the-art approaches. Readers are provided with outstanding contributions focusing on a wide variety of topics which will be of great value to those interested in the many different and exciting facets of drug design.

Chemoinformatics Approaches to Structure- and Ligand-Based Drug Design

This text/reference presents fundamental aspects of medicinal chemistry and contains comprehensive information on

approximately 5,000 drugs currently in use, describing their therapeutic uses, their mechanisms of action, and their main side and harmful effects. Employs the latest World Health Organization (WHO) pharmacological classification and provides extensive information for drugs on WHO's latest list of basic or essential pharmaceuticals, including history: chemical, trade and generic names; chemical structure; obtention; physical and chemical properties; mechanisms of action; therapeutic uses; adverse reactions; biotransformation; chemical and pharmacological incompatibilities; bioavailability; dosage; storage; and assay.

QSAR and Strategies in the Design of Bioactive Compounds

Advances in knowledge and technology have revolutionized the process of drug development, making it possible to design drugs for a given target or disease. Building on the foundation laid by the previous three editions, Smith and Williams Introduction to the Principles of Drug Design and Action, Fourth Edition includes the latest informatio

Pharmacokinetics

Explore Important Tools for High-Quality Work in Pharmaceutical Safety Statistical Methods for Drug Safety presents a wide variety of statistical approaches for analyzing pharmacoepidemiologic data. It covers both commonly used techniques, such as proportional reporting ratios for the analysis of spontaneous adverse event reports, and newer approaches, such as the use of marginal structural models for controlling dynamic selection bias in the analysis of large-scale longitudinal observational data. Choose the Right Statistical Approach for Analyzing Your Drug Safety Data The book describes linear and non-linear mixed-effects models, discrete-time survival models, and new approaches to the meta-analysis of rare binary adverse events. It explores research involving the re-analysis of complete longitudinal patient records from randomized clinical trials. The book discusses causal inference models, including propensity score matching, marginal structural models, and differential effects, as well as mixed-effects Poisson regression models for analyzing ecological data, such as county-level adverse event rates. The authors also cover numerous other methods useful for the analysis of within-subject and between-subject variation in adverse events abstracted from large-scale medical claims databases, electronic health records, and additional observational data streams. Advance Statistical Practice in Pharmacoepidemiology Authored by two professors at the forefront of developing new statistical methodologies to address pharmacoepidemiologic problems, this book provides a cohesive compendium of statistical methods that pharmacoepidemiologists can readily use in their work. It also encourages statistical scientists to develop new methods that go beyond the foundation covered in the text.

UX Strategy

User experience (UX) strategy requires a careful blend of business strategy and UX design, but until now, there hasn't been an easy-to-apply framework for executing it. This hands-on guide introduces lightweight strategy tools and techniques to help you and your team craft innovative multi-device products that people want to use. Whether you're an entrepreneur, UX/UI designer, product manager, or part of an intrapreneurial team, this book teaches simple-to-advanced strategies that you can use in your work right away. Along with business cases, historical context, and real-world examples throughout, you'll also gain different perspectives on the subject through interviews with top strategists. Define and validate your target users through provisional personas and customer discovery techniques Conduct competitive research and analysis to explore a crowded marketplace or an opportunity to create unique value Focus your team on the primary utility and business model of your product by running structured experiments using prototypes Devise UX funnels that increase customer engagement by mapping desired user actions to meaningful metrics

Computer Applications in Drug Discovery and Development

Since the publication of the first edition, the field has changed dramatically. Scientists can now explicitly consider 3D features in quantitative structure-activity relationship (QSAR) studies and often have the 3D structure of the macromolecular target to guide the 3D QSAR. Improvements in computer hardware and software have also made the methods

Phenotypic screening in the 21st century

"Introduction to Educational Research: A Critical Thinking Approach 2e is an engaging and informative core text that enables students to think clearly and critically about the scientific process of research. In acheiving its goal to make research accessible to all educators and equip them with the skills to understand and evaluate published research, the text examines how educational research is conducted across the major traditions of quantitative, qualitative, mixed methods, and action research. The text is oriented toward consumers of educational research and uses a thinking-skills approach to its coverage of major ideas"--

Trial Designs and Outcomes in Dementia Therapeutic Research

Given the increased attention by clinicians, researchers and the pharmaceutical industry to the management and treatment of dementia not only in the elderly but also in increasingly younger populations, the demands for effective evidence-based pharmaceutical control of dementia and quantitative assessment of outcomes have increased. Since some firs

Introduction to Educational Research

This volume provides an introduction to medicinal chemistry. It covers basic principles and background, and describes the general tactics and strategies involved in developing an effective drug.

Benefit-Risk Assessment in Pharmaceutical Research and Development

This book presents discussions of the most important aspects in the development of agrochemicals. The book covers such broad areas as structure activity and ecotoxicological analyses in comprehensive reviews for general methods and chronicles for individual examples. Topics in structure-activity relationships include how to combine submolecular structures of pharmacological interests and modify them according to chemorational models with computer-aided procedures such as the traditional Hansch-type QSAR, the sequential, simplex optimization, and molecular modeling. Topics in the ecotoxicology of organo phosphorus compounds are discussed in terms of the quantitative structure-toxicity relationship (QSTR). Chronicles of molecular orbital methodology in predicting environmental fates of agrochemicals are also provided. This volume will be invaluable for researchers in the agrochemical and pharmaceutical industries.

Statistical Methods for Drug Safety

The Practice of Medicinal Chemistry, Fourth Edition provides a practical and comprehensive overview of the daily issues facing pharmaceutical researchers and chemists. In addition to its thorough treatment of basic medicinal chemistry principles, this updated edition has been revised to provide new and expanded coverage of the latest technologies and approaches in drug discovery. With topics like high content screening, scoring, docking, binding free energy calculations, polypharmacology, QSAR, chemical collections and databases, and much more, this book is the go-to reference for all academic and pharmaceutical researchers who need a complete understanding of medicinal chemistry and its application to drug discovery and development. Includes updated and expanded material on systems biology, chemogenomics, computer-aided drug design, and other important recent advances in the field Incorporates extensive color figures, case studies, and practical examples to help users gain a further understanding of key concepts Provides high-quality content in a comprehensive manner, including contributions from international chapter authors to illustrate the global nature of medicinal chemistry and drug development research An image bank is available for instructors at www.textbooks.elsevier.com

Introduction to the Principles of Drug Design

This book is not going to be an exhaustive survey covering all aspects of rational drug design. Instead, it is going to provide critical know-how through real-world examples. Relevant case studies will be presented and analyzed to illustrate the following: how to optimize a lead compound whether one has high or low levels of structural information; how to derive hits from competitors' active compounds or from natural ligands of the targets; how to springboard from competitors' SAR knowledge in lead optimization; how to design a ligand to interfere with protein-protein interactions by correctly examining the PPI interface; how to circumvent IP blockage using data mining; how to construct and fully utilize a knowledge-based molecular descriptor system; how to build a reliable QSAR model by focusing on data quality and proper selection of molecular descriptors and statistical approaches. A Practical Guide to Rational Drug Design focuses on computational drug design, with only basic coverage of biology and chemistry issues, such as assay design, target validation and synthetic routes. Discusses various tactics applicable to daily drug design Readers can download the materials used in the book, including structures, scripts, raw data, protocols, and codes, making this book suitable resource for short courses or workshops Offers a unique viewpoint on drug discovery research due to the author's cross-discipline education background Explores the author's rich experiences in both pharmaceutical and academic settings

Quantitative Structure-Activity Relationships in Drug Design, Predictive Toxicology, and Risk Assessment

Emergent Methods in Social Research introduces state-of-the-art social research methods that address the growing methods-theory gap within and across the disciplines. In this text, editors Sharlene Nagy Hesse-Biber and Patricia Leavy combine original, in-depth introductions, previously published articles, and original works to provide readers with a comprehensive view of new and cutting-edge research methods and methodologies.

Comprehensive Medicinal Chemistry II

This book, aimed at academics, industrialists and post-graduates, documents the latest research into computer aided drug design.

Smith and Williams' Introduction to the Principles of Drug Design and Action

Highlighting international approaches; the book details strategies to minimize contamination, residue monitoring programs, and classes of drugs and chemicals that pose contaminant risk in livestock. Focuses attention on drug and chemical residues in edible animal products Covers novel computational, statistical, and mathematical strategies for dealing with chemical exposures in food animals Details major drug classes used in food animal production and their residue risks

Highlights efforts at harmonizing and the differences among areas like US, EU, Canada, Australia, South America, China, and Asia, where the issue of chemical exposures has significant impact on livestock products Ties veterinary clinical practice and the use of these drugs in food animals with regulatory standards and mitigation practices

Drug Discovery and Development - E-Book

In Silico Drug Design: Repurposing Techniques and Methodologies explores the application of computational tools that can be utilized for this approach. The book covers theoretical background and methodologies of chem-bioinformatic techniques and network modeling and discusses the various applied strategies to systematically retrieve, integrate and analyze datasets from diverse sources. Other topics include in silico drug design methods, computational workflows for drug repurposing, and network-based in silico screening for drug efficacy. With contributions from experts in the field and the inclusion of practical case studies, this book gives scientists, researchers and R&D professionals in the pharmaceutical industry valuable insights into drug design. Discusses the theoretical background and methodologies of useful techniques of cheminformatics and bioinformatics that can be applied for drug repurposing Offers case studies relating to the in silico modeling of FDA-approved drugs for the discovery of antifungal, anticancer, antiplatelet agents, and for drug therapies against diseases Covers tools and databases that can be utilized to facilitate in silico methods for drug repurposing

Essentials of Medicinal Chemistry

In the genomic era of 1990s-2000s, pharmaceutical research moved to target-based drug discovery which enabled development of a number of small molecule drugs against a wide range of diseases. In many cases however, drugs that arose from genomics failed, questioning the validity of the targets and the suitability of target-based drug discovery as an optimal strategy for all disease states. For monogenic diseases, target-based approaches may be well-suited to the identification of novel therapies. Most diseases, however, are caused by a combination of several genetic and environmental factors and are likely to require simultaneous modulation of multiple molecular targets/pathways for successful treatment. For such diseases, reductionist approaches focusing on individual targets rather than biological networks are unlikely to succeed and new drug development strategies are required. In search of more successful approaches, the pharmaceutical industry is moving towards phenotypic screening beyond individual genes/targets. However, this requires rethinking of diseases and drug discovery approaches from a network and systems biology perspective. Since returning to the pre-genomics era of screening drug candidates in laborious animal models is not a feasible solution, the industry needs to evolve a new paradigm of phenotypic drug discovery within the context of systems biology. Such a paradigm must combine physiologically and disease relevant biological substrates with sufficient throughput, operational simplicity and statistical vigour. Biomarker strategies for translational medicine, as well as

preclinical safety and selectivity assessments, would also need to be revised to adapt to the target agnostic style. This focused issue aims to discuss strategies, key concepts and technologies related to systems-based approaches in drug development. Design and implementation of innovative biological assays, featuring multiple target strategies, and rational drug design in the absence of target knowledge during the early drug discovery are illustrated with examples. Specific topics include: • The need for systems-based approaches in drug development • Phenotypic screening strategies • Compound libraries (natural product inspired compound collections) • Target deconvolution and identification • Target agnostic lead discovery and optimization • Multi-target approaches and decoding the phenotype (understanding biological interactions and multiscale systems modelling) • Translational aspects • Early evaluation of selectivity and safety in a target agnostic manner

Drug Design Strategies

Quantitative structure-activity relationships (QSARs) represent predictive models derived from the application of statistical tools correlating biological activity or other properties of chemicals with descriptors representative of molecular structure and/or property. Quantitative Structure-Activity Relationships in Drug Design, Predictive Toxicology, and Risk Assessment discusses recent advancements in the field of QSARs with special reference to their application in drug development, predictive toxicology, and chemical risk analysis. Focusing on emerging research in the field, this book is an ideal reference source for industry professionals, students, and academicians in the fields of medicinal chemistry and toxicology.

Drug Design Strategies

Qualitative Research Design

Although computational modeling and simulation of material deformation was initiated with the study of structurally simple materials and inert environments, there is an increasing demand for predictive simulation of more realistic material structure and physical conditions. In particular, it is recognized that applied mechanical force can plausibly alter chemical reactions inside materials or at material interfaces, though the fundamental reasons for this chemomechanical coupling are studied in a material-speci c manner. Atomistic-level s- ulations can provide insight into the unit processes that facilitate kinetic reactions within complex materials, but the typical nanosecond timescales of such simulations are in contrast to the second-scale to hour-scale timescales of experimentally accessible or technologically relevant timescales. Further, in complex materials these key unit processes are “rare events” due to the high energy barriers associated with those processes. Examples of such rare events include unbinding between two proteins that tether biological cells to extracellular

materials [1], unfolding of complex polymers, stiffness and bond breaking in amorphous glass bers and gels [2], and diffusive hops of point defects within crystalline alloys [3].

Structure-activity Relationship Studies in Drug Development by NMR Spectroscopy

This volume looks at modern computational strategies and techniques used in GPCR drug discovery including structure and ligand-based approaches and cheminformatics. The chapters in this book describe how these approaches can be applied to address key drug discovery issues, such as receptor structure modelling, function and dynamics, prediction of protein-water-ligand interactions and binding kinetics, free energy of binding, interconversion between agonists and antagonists, deorphanization of GPCRs, and the discovery of biased and allosteric modulators. 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 modelling protocols, and tips on troubleshooting and avoiding known pitfalls. Cutting-edge and unique,Computational Methods for GPCR Drug Discovery is a valuable resource for structural and molecular biologists, computational and medicinal chemists, pharmacologists, and drug designers.

Strategies for Reducing Drug and Chemical Residues in Food Animals

In Silico Drug Design

Understanding the Basics of QSAR for Applications in Pharmaceutical Sciences and Risk Assessment describes the historical evolution of quantitative structure-activity relationship (QSAR) approaches and their fundamental principles. This book includes clear, introductory coverage of the statistical methods applied in QSAR and new QSAR techniques, such as HQSAR and G-QSAR. Containing real-world examples that illustrate important methodologies, this book identifies QSAR as a valuable tool for many different applications, including drug discovery, predictive toxicology and risk assessment. Written in a straightforward and engaging manner, this is the ideal resource for all those looking for general and practical knowledge of QSAR methods. Includes numerous practical examples related to QSAR methods and applications Follows the Organization for Economic Co-operation and Development principles for QSAR model development Discusses related techniques such as structure-based design and the combination of structure- and ligand-based design tools