BOOK REVIEW

Applied Pharmacometrics (AAPS Advances in the Pharmaceutical Sciences Series)



Edited by Stephan Schmidt and Hartmut Derendorf

aapspress/Springer, 2014 565 pg, handcover \$239:00 isses 9781-99913039 eBook \$189isses 9781-90913046

Reviewed by Bernd Melhohm

Over the last decade, pharmacometrics has been an evolving discipline. Groups and scientific specialists in pharmacometrics have been established in industry, government agencies such as the US Food and Drug Administration, as well as multiple academic institutions around the globe. Concumently, there has been a growing demand for pharmacometric analyses and guidance in drug development projects by development teams, project leaders, and management. This journal is a clear manifestation of the growing role and demand for pharmacometrics.

In this highly dynamic environment of an evolving discipline. Schmidt and Derendorf have edited a textbook devoted to the application of pharmacometrics in drug development and applied pharmacotherapy. As a multicontributor textbook. this collection of texts captures a current snapshot of state-of-the-art pharmacometric analyses and applications by utilizing the collective expertise of experienced scientists. investigators, and thought leaders in the field.

After introductory chapters on quantitative pharmacology, physiologically based pharmacokinetic modeling.

and the role of pharmacometrics in precision medicine, the textbook provides a crosssection of applications in different subpopulations. drug development sections. and therapeutic areas. For the patient subgroups, this includes pediatric patients, renal impairment patients. and obese patients. This is supplemented by a chapter on pharmacometries in toxicology, with a focus on cardiovascular safety. The final two-thirds of the textbook are focused on applications of pharmacometric principles in therapeutic areas such as pulmonary diseases. psychiatric diseases, metabolic diseases, and dermatology. In addition. infectious diseases have received specific emphasis. with separate chapters on

pharmacometric applications in bacterial, viral, and fungal infections as well as tuberculosis.

Overall, Applied Pharmacometrics is a wellcrafted collection of up-todate applications in modeling and simulation that exemplifies the vast applicability of pharmacometric analyses in: drug development and applied pharmacotherapy. It. continues in the tradition of high scientific quality of the AAPS Advances in the Pharmaceutical Sciences book series and is highly recommended reading for individuals who are interested in learning and exploring the scope of pharmacometric applications in contemporary drug development and therapeutics in the 21st. century.

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Applied Pharmacometrics Aaps Advances In The Pharmaceutical Sciences Series

Stephan Schmidt, Hartmut Derendorf

Applied Pharmacometrics Aaps Advances In The Pharmaceutical Sciences Series:

Applied Pharmacometrics Stephan Schmidt, Hartmut Derendorf, 2014-12-01 This comprehensive volume provides an update on the current state of pharmacometrics in drug development It consists of nineteen chapters all written by leading scientists from the pharmaceutical industry regulatory agencies and academia After an introduction of the basic pharmacokinetic and pharmacodynamic concepts of pharmacometrics in drug development the book presents numerous examples of specific applications that utilize pharmacometrics with modeling and simulations over a variety of therapeutic areas including pediatrics diabetes obesity infections psychiatrics Alzheimer's disease and dermatology among others The examples illustrate how results from all phases of drug development can be integrated in a more timely and cost effective process Applying pharmacometric decision tools during drug development can allow objective data based decision making At the same time the process can identify redundant or unnecessary experiments as well as some costly clinical trials that can be avoided In addition to cost saving by expedited development of successful drug candidates pharmacometrics has an important economic impact in drug product selection Unsuccessful drug candidates can be identified early and discontinued without expending efforts required for additional studies and allocating limited resources Hence pharmacometric modeling and simulation has become a powerful tool to bring new and better medications to the patient at a faster pace and with greater probability of success Pharmaceutical Inhalation Aerosol Technology, Third Edition Anthony J. Hickey, Sandro R. da Rocha, 2019-03-26 This fully revised and updated third edition of Pharmaceutical Inhalation Aerosol Technology encompasses the scientific and technical foundation for the rationale design componentry assembly and quality performance metrics of therapeutic inhalers in their delivery of pharmaceutical aerosols to treat symptoms or the underlying causes of disease It focuses on the importance of pharmaceutical engineering as a foundational element of all inhaler products and their application to pulmonary drug delivery. The expanded scope considers previously unaddressed aspects of pharmaceutical inhalation aerosol technology and the patient interface by including aerosol delivery lung deposition and clearance that are used as measures of effective dose delivery Key Features Provides a thoroughly revised and expanded reference with authoritative discussions on the physiologic pharmacologic metabolic molecular cellular and physicochemical factors influencing the efficacy and utilization of pharmaceutical aerosols Emphasizes the importance of pharmaceutical engineering as a foundational element of all inhaler products and their application to pulmonary drug delivery Addresses the physics chemistry and engineering principles while establishing disease relevance Expands the technology focus of the original volumes to address the title more directly Offers an impressive breadth of coverage as well as an international flavour from outstanding editors and contributors *Drug Discovery and Evaluation: Safety and Pharmacokinetic Assays* Franz J. Hock, Michael K. Pugsley, 2024-10-21 Many aspects of drug safety have become an outstanding and even persistent issue and may occur during the process of both drug discovery and development Until 15 years ago drug discovery and

evaluation was primarily a sequential process starting with the selection of the most pharmacologically active compound from a series of newly synthesized small molecule chemical series by means of distinctive pharmacological assays Safety aspects were addressed by evaluation of the selected compound at high doses in a series of specific studies directed at indications other than the intended indication of the new compound These tests are then followed by pharmacokinetic studies which are primarily conducted to confirm whether the selected compound possesses a suitable half life for sufficient exposure and efficacy and whether it has the desired properties specificity to the intended route of administration Safety aspects relied predominantly on the conduct of single and repeat toxicologydose studies which inform changes in organ structure rather than organ function Both toxicological and pharmacokinetic studies are adapted to the progress of studies in clinical pharmacology and clinical trials The new edition of this well and broadly accepted reference work contains several innovative and distinguished chapters This sequential strategy has been abandoned with this new version of the book for several reasons Of the possible multitude of negative effects that novel drugs may impart on organ function e q ventricular tachy arrhythmia many are detected too late in non clinical studies to inform clinicians On the other hand negative findings in chronic toxicity studies in animals may turn out to be irrelevant for human beings New scientific approaches e g high throughput screening human pluripotent stem cells transgenic animals knock out animals in silico models pharmaco genomics and pharmaco proteomics as well as Artificial Intelligence AI methods offered new possibilities There are several examples that show that the druggability of compounds was considerably underestimated when the probability of success of a new project was assessed The success rate in the pharmaceutical industry and the introduction of new chemical entities to the market per year dropped dramatically whereas the development time for a new compound increased sometimes exceeding the patent protection Research and development scientists involving the following changes therefore adopted a change of strategy Parallel instead of sequential involvement of the various disciplines multidimensional compound optimization The term Safety Pharmacology was coined The International Conference on Harmonization ICH founded a Safety Pharmacology Working Group and the Safety Pharmacology Society SPS was launched The discipline provided for evaluation development and validation of a multitude of safety tests outlined in the Core Battery of Studies Characterizing the exposure profile of a drug by conducting pharmacokinetic studies that evaluates the absorption distribution metabolism and excretion should to be investigated at an early stage of development as results contribute to the selection of a compound for further development Advancements in Toxicology were achieved by the introduction of new methods e g in silico methods genetic toxicology computational toxicology and AI The book is a landmark in the continuously changing world of drug research and developments As such it is essential reading for many groups not only for all students of pharmacology and toxicology but also for industry scientists and physicians especially those involved in clinical trials of drugs and for pharmacists who must know the safety requirements of drugs The book is essential for scientists and managers in the

pharmaceutical industry who are involved in drug discovery drug development and decision making in the development process In particular the book will be of use to government institutions and committees working on official guidelines for drug evaluation worldwide Systems Pharmacology and Pharmacodynamics Donald E. Mager, Holly H.C. Kimko, 2016-11-29 While systems biology and pharmacodynamics have evolved in parallel there are significant interrelationships that can enhance drug discovery and enable optimized therapy for each patient Systems pharmacology is the relatively new discipline that is the interface between these two methods This book is the first to cover the expertise from systems biology and pharmacodynamics researchers describing how systems pharmacology may be developed and refined further to show practical applications in drug development There is a growing awareness that pharmaceutical companies should reduce the high attrition in the pipeline due to insufficient efficacy or toxicity found in proof of concept and or Phase II studies Systems Pharmacology and Pharmacodynamics discusses the framework for integrating information obtained from understanding physiological pathological pathways normal body function system vs perturbed system due to disease and pharmacological targets in order to predict clinical efficacy and adverse events through iterations between mathematical modeling and experimentation Pediatric Drug Development Andrew E. Mulberg, Dianne Murphy, Julia Dunne, Lisa L. Mathis, 2013-05-20 Most medicines have never been adequately tested for safety and efficacy in pediatric populations and preterm infants and children are particularly vulnerable to adverse drug reactions Pediatric Drug Development Concepts and Applications Second Edition addresses the unique challenges in conducting effective drug research and development in pediatric populations. This new edition covers the legal and ethical issues of consent and assent the additional legal and safety protections for children and the appropriate methods of surveillance and assessment for children of varying ages and maturity particularly for patient reported outcomes It includes new developments in biomarkers and surrogate endpoints developmental pharmacology and other novel aspects of global pediatric drug development It also encompasses the new regulatory initiatives across EU US and ROW designed to encourage improved access to safe and effective medicines for children globally From an international team of expert contributors Pediatric Drug Development Concepts and Applications is the practical guide to all aspects of the research and development of safe and effective medicines for children **Advances** in Pharmacokinetics and Pharmacodynamics Panos Macheras, 2023-05-26 This book provides a concise overview of recent advances in Pharmacokinetics PK and Pharmacodynamics PD The pharmacokinetics section covers the state of the art in Physiologically Based Pharmacokinetic PBPK modeling Chapter 1 as well as the assessment of food effect on drug absorption using PBPK modeling Chapter 2 Chapters 3 and 4 describe the recent development of Physiologically Based Finite Time Pharmacokinetic PBFTPK models and their applications to pharmacokinetic data The pharmacodynamics section focuses on PK PD modeling Chapter 5 provides an overview of PK PD modeling and simulation in clinical practice and studies Chapter 6 deals with the subject physiology variability issue encountered in PK PD studies while Chapter 7 reviews the

influence of clinical pharmacology in the modernization of drug development and regulation This book is an essential reference for pharmaceutical scientists Pharmacometrics Ene I. Ette, Paul J. Williams, 2007-04-06 Pharmacometrics is the science of interpreting and describing pharmacology in a quantitative fashion The pharmaceutical industry is integrating pharmacometrics into its drug development program but there is a lack of and need for experienced pharmacometricians since fewer and fewer academic programs exist to train them Pharmacometrics The Science of Quantitative Pharmacology lays out the science of pharmacometrics and its application to drug development evaluation and patient pharmacotherapy providing a comprehensive set of tools for the training and development of pharmacometricians Edited and written by key leaders in the field this flagship text on pharmacometrics Integrates theory and practice to let the reader apply principles and concepts Provides a comprehensive set of tools for training and developing expertise in the pharmacometric field Is unique in including computer code information with the examples This volume is an invaluable resource for all pharmacometricians statisticians teachers graduate and undergraduate students in academia industry and regulatory ADME Processes in Pharmaceutical Sciences Alan Talevi, Pablo A. Quiroga, 2024-03-27 Absorption Distribution agencies Metabolism and Excretion ADME processes and their relationship with the design of dosage forms and the success of pharmacotherapy form the basis of this upper level undergraduate graduate textbook Whereas primarily oriented to Pharmacy students and graduates it can also be useful for scientist from different fields elated to pharmaceutics and pharmacology e g material scientists material engineers medicinal chemists physicians who might be working in a positions in pharmaceutical companies or whose work might benefit from basic training in the ADME concepts and related biological background Pedagogical features such as objectives keywords discussion guestions summaries and case studies are included as teaching tools This book will provide not only general knowledge on ADME processes but also an updated insight on some hot topics such as drug transporters multi drug resistance related to pharmacokinetic phenomena last generation pharmaceutical carriers nanopharmaceuticals in vitro and in vivo bioequivalence studies biopharmaceuticals pharmacogenomics drug drug and food drug interactions in silico and in vitro prediction of ADME properties or chronopharmacokinetic In comparison with other similar textbooks around half of the volume would be focused on the relationship between expanding scientific fields and ADME processes Each of these burgeoning fields has a separate chapter in the second part of the volume and is written with experts on the correspondent topic including industrial scientists and academics from USA and UK Additionally each of the initial chapters dealing with the generalities of drug absorption distribution metabolism and excretion would include relevant classic examples related to each topic with appropriate illustrations ADME Processes and Pharmaceutical Sciences is written as a core textbook for courses on pharmaceutical sciences pharmacology pharmacokinetics drug delivery biopharmaceutics drug design and medicinal chemistry courses

Applications of Artificial Intelligence in Pharmaceuticals Muniasamy, Anandhavalli, Karunakaran,

Gauthaman, 2025-07-11 Artificial intelligence AI is transforming the pharmaceutical industry by accelerating drug discovery improving clinical trial design and optimizing manufacturing processes Its integration into areas such as polymers science omics and hospital administration enhances precision efficiency and patient outcomes The use of advanced technologies is not only streamlining operations but also opening new frontiers for innovation As AI reshapes the healthcare landscape it raises important questions about ethics data integrity and equitable access prompting the need for thoughtful implementation and governance Applications of Artificial Intelligence in Pharmaceuticals offers a comprehensive exploration of how AI is revolutionizing every facet of the pharmaceutical industry from drug discovery to hospital administration With a focus on practical implementation ethical considerations and future innovations this book serves as a roadmap to navigating the challenges and opportunities of AI in pharmaceuticals Covering topics such as data driven modelling patient feedback and smart manufacturing this book is an excellent resource for pharmaceutical industry professionals AI and data science practitioners academicians researchers healthcare professionals regulators policymakers entrepreneurs innovators and more

Information Resources in Toxicology, Volume 1: Background, Resources, and Tools, 2020-05-16 This new fifth edition of Information Resources in Toxicology offers a consolidated entry portal for the study research and practice of toxicology Both volumes represents a unique wide ranging curated international annotated bibliography and directory of major resources in toxicology and allied fields such as environmental and occupational health chemical safety and risk assessment The editors and authors are among the leaders of the profession sharing their cumulative wisdom in toxicology s subdisciplines This edition keeps pace with the digital world in directing and linking readers to relevant websites and other online tools Due to the increasing size of the hardcopy publication the current edition has been divided into two volumes to make it easier to handle and consult Volume 1 Background Resources and Tools arranged in 5 parts begins with chapters on the science of toxicology its history and informatics framework in Part 1 Part 2 continues with chapters organized by more specific subject such as cancer clinical toxicology genetic toxicology etc The categorization of chapters by resource format for example journals and newsletters technical reports organizations constitutes Part 3 Part 4 further considers toxicology s presence via the Internet databases and software tools Among the miscellaneous topics in the concluding Part 5 are laws and regulations professional education grants and funding and patents Volume 2 The Global Arena offers contributed chapters focusing on the toxicology contributions of over 40 countries followed by a glossary of toxicological terms and an appendix of popular quotations related to the field The book offered in both print and electronic formats is carefully structured indexed and cross referenced to enable users to easily find answers to their questions or serendipitously locate useful knowledge they were not originally aware they needed Among the many timely topics receiving increased emphasis are disaster preparedness nanotechnology omics risk assessment societal implications such as ethics and the precautionary principle climate change and children's environmental health Introductory chapters provide a backdrop to the science of toxicology its history the

origin and status of toxicoinformatics and starting points for identifying resources Offers an extensive array of chapters organized by subject each highlighting resources such as journals databases organizations and review articles Includes chapters with an emphasis on format such as government reports general interest publications blogs and audiovisuals Explores recent internet trends web based databases and software tools in a section on the online environment Concludes with a miscellany of special topics such as laws and regulations chemical hazard communication resources careers and professional education K 12 resources funding poison control centers and patents Paired with Volume Two which focuses on global resources this set offers the most comprehensive compendium of print digital and organizational resources in the toxicological sciences with over 120 chapters contributions by experts and leaders in the field

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