

Giuliano Ciarimboli · Sophie Gautron
Eberhard Schlatter *Editors*

Organic Cation Transporters

Integration of Physiology, Pathology,
and Pharmacology

 Springer

Organic Cation Transporters Integration Pharmacology

Ming Hu, Xiaoling Li



Organic Cation Transporters Integration Pharmacology:

Organic Cation Transporters Giuliano Ciarimboli, Sophie Gautron, Eberhard Schlatter, 2015-12-17 This innovative text explores the cellular transport of organic cations from functional and structural properties to pharmacological implications and psychiatric developments The authoritative chapters introduce organic cation transporters and then proceed to discuss their mechanisms such as binding of substrates and inhibitors their drug dispositions and toxicity their relationships to genetic and pathophysiological variability and their roles in endocrine metabolic and neurological systems The final chapters delve into the use of animal models for the study of organic cation transporter function and their possible use in environmental cycling of pharmaceutical residues This comprehensive volume unites integrative transporter physiology with structural and molecular biology genetics pharmacology and pathophysiology offering a holistic approach to utilizing this novel technique in physiological contexts It will prove invaluable reading for researchers and students in various areas of integrative organ cell and molecular physiology as well as pharmacologists and neurologists Physiology, Biochemistry, and Pharmacology of Transporters for Organic Cations Giuliano Ciarimboli, 2021-06-24 Membrane transporters are of vital importance for cells They mediate the flux of many substances through the plasma membrane In this book the transporters for organic cations a special class of membrane transporters are presented Transporters belonging to this class are important because they allow many neurotransmitters e g histamine and serotonin and many drugs e g trospium and tofacitinib to permeate the plasma membrane Therefore transporters for organic cations can modulate the action of neurotransmitters and drugs having in this way important physiological and pharmacological implications These aspects are illustrated in original works and reviews presented in this book Using a system biology approach the global significance of different transporters working together has been illustrated Regulation mechanisms determining their expression in specific organs and modulating their function are also described in this book also concerning their role for special drug toxicities Such an aspect is also discussed in relationship to mutations single nucleotide polymorphisms of transporters for organic cations Finally the translational value of studies performed in flies mice and rats is discussed Therefore this book offers integrative information on transporters for organic cations which may be of interest to beginners and specialized scientists in this field **An Integrated Guide to Human Drug Metabolism** Mark Ashton, Paul W. Groundwater, Sophie Stocker, Adam Todd, 2024-05-13 *An Integrated Guide to Human Drug Metabolism* From Basic Chemical Transformations to Drug Drug Interactions uses the chemistry of each of the metabolic transformations to underpin the discussion of drug interactions with foods herbal medicines and other drugs Each of the human metabolic processes will be covered employing examples drawn from known metabolic transformations of drugs used clinically The clinical relevance of metabolism is discussed focusing on appropriate prescribing age related dosage adjustments routes of administration and personalized medicines Appropriate for use in the classroom or for self study *An Integrated Guide to Human Drug Metabolism* is useful for students and researchers

needing a reference for interdisciplinary research in drug interactions Metabolism is at the center of personalized medicine as it is a governing factor in the response of the patient to a drug For example does the patient express the genes and so enzymes which are responsible for the metabolism of a drug Do they express the genes responsible for the bioactivation of a prodrug into its active form Examples of clinically used agents for which metabolic phenotyping is essential will be used to highlight the increasing necessity for understanding the genetic profile of individual patients This book includes questions and answers to gauge learning of each chapter real life case studies and the basic science as a basis for the discussion of clinical aspects Covers each of the human metabolic processes employing examples drawn from known metabolic transformations of drugs used clinically Provides an integrated approach linking together the science and practice strands of human drug metabolism Contains questions and answers to assess learning of material and real life case studies

Organic Cation Transporter 1 (OCT1): Not Vital for Life, but of Substantial Biomedical Relevance Jurgen Brockmoller, Mladen Vassilev Tzvetkov, Shuiying Hu, 2022-01-12 Around one third of all biologically relevant small molecules are organic cations These include endogenous substances like catecholamines and other neurotransmitters toxins and drugs designed to affect signaling processes The organic cation transporter 1 OCT1 is among the strongest expressed membrane transporters at the sinusoidal blood facing side of liver cells and contributes substantially to the clearance of the blood from numerous organic cations A most striking feature of OCT1 is its pronounced genetic diversity Between 1 and 10% of all human populations have little to no OCT1 activity With several of the OCT1 substrates up to 10% of Europeans are functionally OCT1 deficient Apparently the lack of OCT1 do not lead to apparent substantial pathological changes in these individuals It thus appears that this transporter is not essential to human life but does it means that OCT1 is irrelevant In the last 25 years since the first cloning of this transporter data on its pharmacological and physiological relevance is steadily accumulating Numerous clinically relevant drugs e g metformin morphine fenoterol sumatriptan tramadol and tropisetron have been shown to be substrates of OCT1 and OCT1 deficiency has been shown to affect the pharmacokinetics efficacy or toxicity of these drugs Also vitamin B1 has been shown to be a substrate of OCT1 and in genetically modified mice OCT1 substantially modulated hepatic lipid metabolism total body fat and systemic glucose and lipid concentrations Still numerous important questions remain unsolved For which drugs toxins or other endogenous or exogenous substances is OCT1 relevant How can we predict the relevance of OCT1 from in vitro studies What determines the substrate selectivity of OCT1 in comparison to other transporters or transport processes for organic cations What regulates the expression of OCT1 in the liver and possibly in other tissues What is the impact of OCT1 variation in different areas of medicine including the therapies for cancer as well as for pulmonary cardiovascular or neurological diseases How can evolutionary biology contribute to a better understanding of the roles of OCT1 And importantly what types of research are likely to significantly further the knowledge on OCT1 in the next decades

Drug Transporters Guofeng You, Marilyn E. Morris, 2007-08-13 A comprehensive guide to drug transporters

that influence the absorption distribution and elimination of drugs in the body The development of powerful expression cloning and genome analysis techniques has facilitated the molecular identification and characterization of numerous transporters that play a crucial role in drug disposition Explaining the principles of drug transport and the associated techniques Drug Transporters Molecular Characterization and Role in Drug Disposition Provides a comprehensive overview of drug transporters Includes specific descriptions of transporter families including substrate and inhibitor specificity subcellular and tissue localization mechanisms governing transport species differences the clinical implications of these transporters in human physiology and disease and their role in drug distribution elimination and interactions in drug therapy Describes transporter mediated drug disposition a newly emerging field in drug therapy Gives a comprehensive summary of drug transport across biological membranes in the liver brain kidney and intestine Provides balanced coverage of mechanistic aspects and functional outcomes Features chapters contributed by distinguished scientists in their specialty areas Provides sufficient detail to enable non specialists to understand the principles and techniques This authoritative guide is a practical hands on desk reference for researchers in academia and the pharmaceutical industry and scientists in government agencies It is also an excellent text for graduate level courses in the pharmaceutical and pharmacology fields

Oral Bioavailability and Drug Delivery Ming Hu,Xiaoling Li,2024-02-13 ORAL BIOAVAILABILITY AND DRUG DELIVERY Improve the performance and viability of newly developed and approved drugs with this crucial guide Bioavailability is the parameter which measures the rate and extent to which a drug reaches a user s circulatory system depending on the method of administration For example intravenous administration produces a bioavailability of 100% since the drugs are injected directly into the circulatory system in the case of oral administration however bioavailability can vary widely based on factors which if not properly understood can result in a failure in drug development adverse effects and other complications The mechanics of oral bioavailability are therefore critical aspects of drug development Oral Bioavailability and Drug Delivery provides a comprehensive coverage of this subject as well as its drug development applications Beginning with basic terminology and fundamental concepts it provides a thorough understanding of the challenges and barriers to oral bioavailability as well as the possibilities for improving this parameter The resulting book is an indispensable tool for drug development research Oral Bioavailability and Drug Delivery readers will also find Discussion questions in many chapters to facilitate comprehension Detailed discussion of topics including dissolution absorption metabolism and more Real world examples of methods in actions throughout Oral Bioavailability and Drug Delivery is ideal for pharmaceutical and biotechnology scientists working in drug discovery and development researchers in chemistry biology pharmacology immunology neuroscience and other related fields and graduate courses in drug development and delivery

Integrated Pharmacy Case Studies Sally-Anne Francis,Felicity Smith,John Malkinson,2015-06-05 Over 90 case studies based on real life patient care scenarios Each case includes learning outcomes and references Handbook of Drug

Metabolism, Third Edition Paul G. Pearson, Larry C. Wienkers, 2019-05-20 This book continues to be the definitive reference on drug metabolism with an emphasis on new scientific and regulatory developments It has been updated based on developments that have occurred in the last 5 years with new chapters on large molecules disposition stereo selectivity in drug metabolism drug transporters and metabolic activation of drugs Some chapters have been prepared by new authors who have emerged as subject area experts in the decade that has passed since publication of the first edition **Membrane Transporters as Drug Targets** Gordon L. Amidon, Wolfgang Sadée, 2006-04-11 Because progress in the field of transporters has been extraordinary this volume will focus on recent advances in our understanding of the structure function physiology and molecular biology of membrane transporters There will be an emphasis on transporters as molecular targets for drug delivery and disposition in the body Basic Pharmacokinetics and Pharmacodynamics Sara E. Rosenbaum, 2016-11-28 Updated with new chapters and topics this book provides a comprehensive description of all essential topics in contemporary pharmacokinetics and pharmacodynamics It also features interactive computer simulations for students to experiment and observe PK PD models in action Presents the essentials of pharmacokinetics and pharmacodynamics in a clear and progressive manner Helps students better appreciate important concepts and gain a greater understanding of the mechanism of action of drugs by reinforcing practical applications in both the book and the computer modules Features interactive computer simulations available online through a companion website at <https://web.uri.edu/pharmacy/research/rosenbaum/sims> Adds new chapters on physiologically based pharmacokinetic models predicting drug drug interactions and pharmacogenetics while also strengthening original chapters to better prepare students for more advanced applications Reviews of the 1st edition This is an ideal textbook for those starting out and also for use as a reference book International Society for the Study of Xenobiotics and I could recommend Rosenbaum's book for pharmacology students because it is written from a perspective of drug action Overall this is a well written introduction to PK PD British Toxicology Society Newsletter *Drug Transporters* Glynis Nicholls, Kuresh Youdim, 2016-08-16 Understanding and quantifying the effects of membrane transporters within the human body is essential for modulating drug safety and drug efficacy In this first volume on Drug Transporters the current knowledge and techniques in the transporter sciences and their relations to drug metabolism and pharmacokinetics are comprehensively reviewed The second volume of the book is specifically dedicated to emerging science and technologies highlighting potential areas for future advances within the drug transporter field The topics covered in both volumes ensure that all relevant aspects of transporters are described across the drug development process from in silico models and preclinical tools through to the potential impact of transporters in the clinic Contributions are included from expert leaders in the field at the bench industrial scientists renowned academics and international regulators Case studies and emerging developments are highlighted together with the merits and limitations of the available methods and tools and extensive references to reviews on specific in depth topics are also included for those wishing to

pursue their knowledge further As such this text serves as an essential handbook of information for postgraduate students academics industrial scientists and regulators who wish to understand the role of transporters in absorption distribution metabolism and excretion processes In addition it is also a useful reference tool on the models and calculations necessary to predict their effect on human pharmacokinetics and pharmacodynamics *Reviews of Physiology, Biochemistry and Pharmacology* ,2007-05-02 H Wegele L M ller and J Buchner Hsp70 and Hsp90 A Relay Team for Protein Folding R Sch lein The Early Stages of the Intracellular Transport of Membrane Proteins Clinical and Pharmacological Implications L Schild The Epithelial Sodium Channel From Molecule to Disease *Applications of Pharmacokinetic Principles in Drug Development* Rajesh Krishna,2012-12-06 This volume is an important advancement in the application of pharmacokinetic PK and pharmacodynamic PO principles to drug development The series of topics presented deal with the application of these tools to everyday decisions that a pharmaceutical scientist encounters The ability to integrate these topics using PK and PO methods has optimized drug development pathways in the clinic New technologies in the areas of in vitro assays that are more predictive of human absorption and metabolism and advancement in bioanalytical assays are leading the way to minimize drug failures in later more expensive clinical development programs of Pharmacokinetics and pharmacodynamics have become an important component understanding the drug action on the body and is becoming increasingly important in drug labeling due to its potential for predicting drug behavior in populations that may be difficult to study in adequate numbers during drug development The ability to correlate drug exposure to effect and model it during the drug development value chain provides valuable insight into optimizing the next steps to derive maximum information from each study These principles and modeling techniques have resulted in an expanded and integrated view of PK and PO and have led to the expectations that we may be able to optimally design clinical trials and eventually lead us to identifying the optimal therapy for the patient while minimizing cost and speeding up drug development There is wide utility for the book both as a text and as a reference Drug Delivery Yitzhak Rosen,Pablo Gurman,Noel Elman,2017-09-19 Integrating the clinical and engineering aspects of drug delivery this book offers a much needed comprehensive overview and patient oriented approach for enhanced drug delivery optimization and advancement Starting with an introduction to the subject and pharmacokinetics it explores advances for such topics as oral gastroretentive intravitreal and intrathecal drug delivery as well as insulin delivery gene delivery and biomaterials based delivery systems It also describes drug delivery in cancer cardiac infectious diseases airway diseases and obstetrics and gynecology applications Examining special clinical states requiring innovative drug delivery modifications such as hypercoagulability often seen in pregnancy cancer and autoimmune diseases the book also discusses methods for improved drug delivery in clinical settings using clinical end points clinical trials simulations and other venues It also describes the latest drug delivery advances involving nanomaterials NEMS and MEMS devices hydrogels microencapsulation lipids stem cells patches and ultrasound The book is rounded out by a chapter on the FDA regulatory and

bioethical challenges involved in advancing drug delivery

Enzyme- and Transporter-Based Drug-Drug Interactions

K. Sandy Pang, A. David Rodrigues, Raimund M. Peter, 2009-12-17 Germination of the thought of Enzymatic and Transporter Based Drug Drug Interactions Progress and Future Challenges Proceedings came about as part of the annual meeting of The American Association of Pharmaceutical Scientists AAPS that was held in San Diego in November of 2007 The attendance of workshop by more than 250 pharmaceutical scientists reflected the increased interest in the area of drug drug interactions DDIs the greater focus of PhRMA academia and regulatory agencies and the rapid pace of growth in knowledge One of the aims of the workshop was to address the progress made in quantitatively predicting enzyme and transporter based DDIs as well as highlighted areas where such predictions are poor or areas that remain challenging for the future Because of the serious clinical implications initiatives have arisen from the FDA <http://www.fda.gov/cber/gdlns/interactstud.htm> to highlight the importance of enzyme and transporter based DDIs During the past ten to fifteen years we have come to realize that transporters in addition to enzymes play a vital role in drug elimination Such insight has been possible because of the continued growth in PK ADME pharmacokinetics absorption distribution metabolism excretion knowledge fueled by further advances in molecular biology greater availability of human tissues and the development of additional and sophisticated model systems and sensitive assay methods for studying drug metabolism and transport in vitro and in vivo This has sparked an in depth probing into mechanisms surrounding DDIs resulting from ligand induced changes in nuclear receptors as well as alterations in transporter and enzyme expression and function Despite such advances the in vitro and in vivo study of drug interactions and the integration of various data sets remain challenging Therefore it has become apparent that a proceeding that serves to encapsulate current strategies approaches methods and applications is necessary As Editors we have assembled a number of opinion leaders and asked them to contribute chapters surrounding these issues Many of these are the original Workshop speakers whereas others had been selected specially to contribute on topics related to basic and applied information that had not been covered in other reference texts on DDI The resulting tome entitled Enzyme and Transporter Based Drug Interactions Progress and Future Challenges comprises of four sections Twenty eight chapters covering various topics and perspectives related to the subject of metabolic and transporter based drug drug interactions are presented

Veterinary Pharmacology and Therapeutics Jim E. Riviere, Mark G. Papich, 2017-11-29 *Veterinary Pharmacology and Therapeutics* Tenth Edition is a fully updated and revised version of the gold standard reference on the use of drug therapy in all major veterinary species Provides current detailed information on using drug therapies in all major domestic animal species Organized logically by drug class and treatment indication with exhaustive information on the rational use of drugs in veterinary medicine Includes extensive tables of pharmacokinetic data products available and dosage regimens Adds new chapters on pharmaceuticals ophthalmic pharmacology food animal pharmacology and aquatic animal pharmacology Includes access to a companion website with the figures from the book in PowerPoint

Martin's Physical

Pharmacy and Pharmaceutical Sciences Patrick J. Sinko, 2023-02-08 Consistently revised and updated for more than 60 years to reflect the most current research and practice Martin's Physical Pharmacy and Pharmaceutical Sciences 8th Edition is the original and most comprehensive text available on the physical chemical and biological principles that underlie pharmacology and the pharmaceutical sciences An ideal resource for PharmD and pharmacy students worldwide teachers researchers or industrial pharmaceutical scientists this 8th Edition has been thoroughly revised enhanced and reorganized to provide readers with a clear consistent learning experience that puts essential principles and concepts in a practical approachable context Updated content reflects the latest developments and perspectives across the full spectrum of physical pharmacy and a new full color design makes it easier than ever to discover distinguish and understand information providing users the most robust support available for applying the elements of biology physics and chemistry in work or study *Medical*

Pharmacology and Therapeutics E-Book Derek G. Waller, Tony Sampson, 2013-08-07 This book covers all the pharmacology you need from basic science pharmacology and pathophysiology through to clinical pharmacology to therapeutics in line with the integrated approach of new medical curricula The first section covers the basic principles and the rest is organised by body systems The book ends with sections on toxicity and prescribing practice Integrates basic science pharmacology clinical pharmacology and therapeutics Brief review of pathophysiology of major diseases Case histories and multiple choice questions and answers Tabular presentation of all common drugs within each class Section on further reading Kinetics chapter simplified with more practical examples Includes more on genetic issues Drug tables made more concise to make information more accessible Fully updated to reflect current clinical practice Pharmacogenomics Yui-Wing Francis Lam, Stuart R. Scott, 2018-11-27 Pharmacogenomics Challenges and Opportunities in Therapeutic Implementation Second Edition provides comprehensive coverage of the challenges and opportunities facing the therapeutic implications of pharmacogenomics from academic regulatory pharmaceutical socio ethical and economic perspectives While emphasis is on the limitations in moving the science into drug development and direct therapeutic applications this book also focuses on clinical areas with successful applications and important initiatives that have the ability to further advance the discipline New chapters cover important topics such as pharmacogenomic data technologies clinical testing strategies cost effectiveness and pharmacogenomic education and practice guidelines The importance of ethnicity is also discussed which highlights pharmacogenomic diversity across Latin American populations With chapters written by interdisciplinary experts and insights into the future direction of the field this book is an indispensable resource for academic and industry scientists graduate students and clinicians engaged in pharmacogenomics research and therapeutic implementation Provides viewpoints that focus on the scientific and translational challenges and opportunities associated with advancing the field of pharmacogenomics Highlights progress in both the research and clinical areas of pharmacogenomics as well as relevant implementation experience challenges and perspectives on direct to consumer genetic testing Includes where applicable

discussion points review questions and cases for self assessment purposes and to facilitate in depth discussion Principles of Pharmacology David E. Golan, Joseph Loscalzo, Mark N. Namchuk, 2025-08-07 Highly regarded by both students and instructors Principles of Pharmacology The Pathophysiologic Basis of Drug Therapy 5th Edition provides a unique integrated mechanism based and systems based approach to contemporary pharmacology and drug development An easy to follow format helps both undergraduate and graduate students grasp challenging concepts quickly and efficiently Each chapter presents a clinical vignette illustrating a therapeutic problem within a physiologic or biochemical system followed by a discussion of the biochemistry physiology and pathophysiology of the system and concluding with a presentation of the pharmacology of the drugs and drug classes that activate or inhibit the system by interacting with specific molecular and cellular targets

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