

Engineering Polymer Systems For Improved Drug Delivery

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Chitosan in Drug Delivery - Md Saquib Hasnain 2021-10-26

Chitosan in Drug Delivery provides thorough insights into chitosan chemistry, collection, chemical modifications, characterization and applications in the pharmaceutical industry and healthcare fields. The book explores molecular weight, degree of deacetylation and molecular geometry, emphasizing recent advances in the field as written by academic, industry and regulatory scientists. It will be a useful resource for pharmaceutical scientists, including industrial pharmacists, analytical scientists, postgraduate students, health care professionals and regulatory scientists actively involved in pharmaceutical product and process development in natural polymers containing drug delivery. Provides methodologies for the design, development and selection of chitosan in drug delivery for particular therapeutic applications Includes illustrations demonstrating the mechanism of biological interaction of chitosan Discusses the regulatory aspects and demonstrates the clinical efficacy of chitosan

Fundamentals and Applications of Controlled Release Drug Delivery - Juergen Siepmann 2011-12-14
Pitched at a level comprehensible to those new to the field, this authoritative text covers the scientific and technological fundamentals of drug delivery as well as clinical applications and the developmental potential in controlled release drug delivery.

Applications of Polymers in Drug Delivery - Ambikanandan Misra 2020-10-20

Applications of Polymers in Drug Delivery, Second Edition, provides a comprehensive resource for anyone looking to understand how polymeric materials can be applied to current, new, and emerging drug delivery applications. Polymers play a crucial role in modulating drug delivery and have been fundamental in the successful development of many novel drug delivery systems. This book describes the development of polymeric systems, ranging from conventional dosage forms to the most recent smart systems. Regulatory and intellectual property aspects as well as the clinical applicability of polymeric drug delivery systems are also discussed. The chapters are organized by specific delivery route, offering methodical and detailed coverage throughout. This second edition has been thoroughly revised to include the latest developments in the field. This is an essential book for researchers, scientists, and advanced students, in polymer science, drug delivery, pharmacology/pharmaceuticals, materials science, tissue engineering, nanomedicine, chemistry, and biology. In industry, this book supports scientists, R&D, and other professionals, working on polymers for drug delivery applications. Explains how polymers can be prepared and utilized for all major drug delivery routes Presents the latest advances, including drug targeting, polymeric micelles and polymersomes, and the delivery of biologicals and nucleic acid therapeutics Includes appendices with in-depth information on pharmaceutical properties of polymers and regulatory aspects

Smart Drug Delivery System - Ali Demir Sezer 2016-02-10

This contribution book collects reviews and original articles from eminent experts working in the interdisciplinary arena of novel drug delivery systems and their uses. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of different smart drug delivery systems. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in the design, optimization, and adaptation of gene delivery systems for the treatment of cancer, cardiovascular, diabetic, genetic, and infectious diseases, and considers assessment and review procedures involved in the development of gene-

based pharmaceuticals.

Drug Delivery Aspects - Ranjita Shegokar 2020-04-13

Drug Delivery Aspects reviews additional features of drug delivery systems, along with the standard formulation development, like preclinical testing, conversion into solid dosage forms, roles of excipients and polymers used on stability and sterile processing. There is a focus on formulation engineering and related large scale (GMP) manufacturing, regulatory, and functional aspects of drug delivery systems. A detailed discussion on biologics and vaccines gives insights to readers on new developments in this direction. The series Expectations and Realities of Multifunctional Drug Delivery Systems examines the fabrication, optimization, biological aspects, regulatory and clinical success of wide range of drug delivery carriers. This series reviews multifunctionality and applications of drug delivery systems, industrial trends, regulatory challenges and in vivo success stories. Throughout the volumes discussions on diverse aspects of drug delivery carriers, such as clinical, engineering, and regulatory, facilitate insight sharing across expertise area and form a link for collaborations between industry-academic scientists and clinical researchers. Expectations and Realities of Multifunctional Drug Delivery Systems connects formulation scientists, regulatory experts, engineers, clinical experts and regulatory stake holders. The wide scope of the book ensures it as a valuable reference resource for researchers in both academia and the pharmaceutical industry who want to learn more about drug delivery systems. Encompasses engineering and large-scale manufacturing of nanocarriers Considers preclinical, regulatory and ethical guidelines on nanoparticles Contains in-depth discussions on delivery of biologics, vaccines and sterilisation Industrial view on solid dispersions, milling techniques

Engineering Drug Delivery Systems - Ali Seyfoddin 2019-11-15

Engineering Drug Delivery Systems is an essential resource on a variety of biomaterials engineering approaches for creating drug delivery systems that have market and therapeutic potential. The book comprehensively discusses recent advances in the fields of biomaterials and biomedical sciences in relation to drug delivery. Chapters provide a detailed introduction to various engineering approaches in designing drug delivery systems, delve into the engineering of body functions, cover the selection, design and evaluation of biomaterials, and discuss the engineering of colloids as drug carriers. The book's final chapters address the engineering of implantable drug delivery systems and advances in drug delivery technology. This book is an invaluable resource for drug delivery, materials scientists and bioengineers within the pharmaceutical industry. Examines the properties and synthesis of biomaterials for successful drug delivery Discusses the important connection between drug delivery and tissue engineering Includes techniques and approaches applicable to a wide range of users Reviews innovative technologies in drug delivery systems such as 3-D printed devices for drug delivery

Application of Nanotechnology in Drug Delivery - Ali Demir Sezer 2014-07-25

This book collects reviews and original articles from eminent experts working in the interdisciplinary arena of nanotechnology use in drug delivery. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of nanotechnology application of drug delivery. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in design, optimization, and adaptation of gene delivery

systems for the treatment of cancer, cardiovascular, pulmonary, genetic, and infectious diseases, and considers assessment and review procedures involved in the development of gene-based pharmaceuticals.

Engineering Polymer Systems for Improved Drug Delivery - Rebecca A. Bader 2014-01-17

Polymers have played a critical role in the rational design and application of drug delivery systems that increase the efficacy and reduce the toxicity of new and conventional therapeutics. Beginning with an introduction to the fundamentals of drug delivery, *Engineering Polymer Systems for Improved Drug Delivery* explores traditional drug delivery techniques as well as emerging advanced drug delivery techniques. By reviewing many types of polymeric drug delivery systems, and including key points, worked examples and homework problems, this book will serve as a guide to for specialists and non-specialists as well as a graduate level text for drug delivery courses.

Drug Targeting and Stimuli Sensitive Drug Delivery Systems - Alexandru Mihai Grumezescu 2018-05-21

Drug Targeting and Stimuli Sensitive Drug Delivery Systems covers recent advances in the area of stimuli sensitive drug delivery systems, providing an up-to-date overview of the physical, chemical, biological and multistimuli-responsive nanosystems. In addition, the book presents an analysis of clinical status for different types of nanoplatforms. Written by an internationally diverse group of researchers, it is an important reference resource for both biomaterials scientists and those working in the pharmaceutical industry who are looking to help create more effective drug delivery systems. Shows how the use of nanomaterials can help target a drug to specific tissues and cells Explores the development of stimuli-responsive drug delivery systems Includes case studies to showcase how stimuli responsive nanosystems are used in a variety of therapies, including camptothecin delivery, diabetes and cancer therapy

Engineering of Biomaterials for Drug Delivery Systems - Anilkumar Parambath 2018-02-01

Engineering of Biomaterials for Drug Delivery Systems: Beyond Polyethylene Glycol examines the combined issues of PEGylation and viable biomaterials as alternatives. With a strong focus on polymeric biomaterials, the book first reviews the major issues associated with PEGylation and its use in vivo. Chapters then focus on alternative polymer systems for drug delivery systems. Finally, nanoparticles and future perspectives are examined. This book is a valuable resource for scientists and researchers in biomaterials, pharmaceuticals and nanotechnology, and all those who wish to broaden their knowledge in this field. Provides a self-contained work for the field of biomaterials for drug delivery Summarizes the current knowledge on PEGylation and strategies for bypassing it Presents research on an important, though under-represented issue in biomaterials Written by a world-class team of research scientists, engineers and clinicians

Advanced Biomaterials in Biomedical Engineering and Drug Delivery Systems - Naoya Ogata 2012-12-06

First of all, I would like to share the great pleasure of the successful five-day symposium with every participant in the 5th Iketani Conference which was held in Kagoshima from April 15 (Tuesday) to 22 (Saturday), 1995. Outstanding speakers enthusiastically presented their up-to-the-minute results. Relatively little time was allotted for each presentation to ensure as much time as possible for intensive discussions on the particular topics that had just been presented: I was delighted to see that the lectures were of high quality, and the discussions were lively, exciting, and productive in a congenial atmosphere. We also had 92 papers in the poster session, in which young (and relatively young) scientists made every effort to present the novel results of their research in advanced biomaterials and drug delivery systems (DDS). I believe some of the research is most promising and will become noteworthy in the twenty-first century. It was a privilege for me to deliver a lecture at the special session of the symposium. In my introductory remarks, I pointed out five key terms in multifaceted biomaterials research: materials design, concept or methodology, devices, properties demanded, and fundamentals. I am confident that innovative progress in device manufacturing for end-use, e.g., artificial organs, vascular grafts, and DDS, can be brought about only through properly designed advanced materials that exhibit the desired functionality at the interface with any living body.

Nanoparticles in Polymer Systems for Biomedical Applications - Jince Thomas 2018-12-12

The volume includes presentations of technological and research accomplishments along with novel approaches in nanomedicine and nanotechnology. It explores the different types of nanomedicinal drugs with their production and commercial significance. Other topics discussed are the use of natural and

synthetic nanoparticles for the production of drugs, different types of nanoparticles systems, drug carriers, wound-healing antimicrobial activity, effects of natural materials in nanomedicine, and toxicity of nanoparticles. The valuable information presented in this volume will help to keep those in this field up to date on the key findings, observations, and fabrication of drugs related to nanomedicine and nanotechnology. With chapters written by prominent researchers from academia, industry, and government and private research laboratories across the world, the book will prove to be a rich resource.

Pharmaceutical Applications of Polymers for Drug Delivery - David Jones 2004

Annotation The review focuses on the use of pharmaceutical polymer for controlled drug delivery applications. Examples of pharmaceutical polymers and the principles of controlled drug delivery are outlined and applications of polymers for controlled drug delivery are described. The field of controlled drug delivery is vast therefore this review aims to provide an overview of the applications of pharmaceutical polymers. The review is accompanied by approximately 250 abstracts taken from papers and books in the Rapra Polymer Library database, to facilitate further reading on this subject.

Nanopharmaceuticals - Ranjita Shegokar 2020-01-10

Nanopharmaceuticals reviews advances in the drug delivery field via nanovehicles or nanocarriers that offer benefits like targeted therapy and serves as a single dose magic bullet for multiple drug delivery with improved drug efficiency at a lower dose, transportation of the drug across physiological barriers as well as reduced drug-related toxicity. The chapters are written by a diverse group of international researchers from industry and academia. The series *Expectations and Realities of Multifunctional Drug Delivery Systems* examines the fabrication, optimization, biological aspects, regulatory and clinical success of wide range of drug delivery carriers. This series reviews multifunctionality and applications of drug delivery systems, industrial trends, regulatory challenges and in vivo success stories. Throughout the volumes discussions on diverse aspects of drug delivery carriers, such as clinical, engineering, and regulatory, facilitate insight sharing across expertise area and form a link for collaborations between industry-academic scientists and clinical researchers. *Expectations and Realities of Multifunctional Drug Delivery Systems* connects formulation scientists, regulatory experts, engineers, clinical experts and regulatory stake holders. The wide scope of the book ensures it as a valuable reference resource for researchers in both academia and the pharmaceutical industry who want to learn more about drug delivery systems. Other volumes in the *Expectations and Realities of Multifunctional Drug Delivery Systems* book series: *Delivery of Drugs, Volume 2, 9780128177761 Drug Delivery Trends, Volume 3, 9780128178706 Drug Delivery Aspects, Volume 4, 9780128212226* Encompasses functional aspects of nanocarriers Discusses Intellectual Property landscapes of micro-nano drug carriers Contains in-depth investigation of specific aspects of drug delivery systems

Reflexive Polymers and Hydrogels - Taylor & Francis Group 2020-06-30

The design of environment-sensitive systems with biomedical and pharmaceutical applications has improved significantly due to recent advances in smart polymer and hydro gel technology. *Reflexive Polymers and Hydrogels: Understanding and Designing Fast Responsive Polymeric Systems* examines several natural systems that respond rapidly to environmental stimuli, providing the reader with an understanding of mechanisms that govern these responses. It also considers limitations of reflexive systems, by investigating model systems where selected interactions of specific components are evaluated to determine theoretical limits of response rates and cycle time. The text characterizes the status of artificially prepared materials that could have both thermodynamic and kinetic response events, and explores potential future applications of such systems. It includes chapters on how to design synthetic reflexive systems based on an understanding of the naturally occurring systems and discusses potential applications of reflexive systems in biomedical and pharmaceutical areas. Designed for those working in controlled drug delivery, tissue engineering, and biomedical engineering, this groundbreaking text is one of the first to deal with kinetic and thermodynamic aspects of smart polymers and hydrogels, with a specific focus on extremely fast responsive systems. Features, Offers highly relevant information previously unavailable in a single text, Examines the feasibility of systems designed for biological use from both kinetic and thermodynamic points of view, Compares fast responsive polymeric systems to existing, natural systems, Explores methods for preparing flash systems for specific applications Book jacket.

Bioinspired and Biomimetic Polymer Systems for Drug and Gene Delivery - Zhongwei Gu

2015-03-09

Here, front-line researchers in the booming field of nanobiotechnology describe the most promising approaches for bioinspired drug delivery, encompassing small molecule delivery, delivery of therapeutic proteins and gene delivery. The carriers surveyed include polymeric, proteinaceous and lipid systems on the nanoscale, with a focus on their adaptability for different cargoes and target tissues. Thanks to the broad coverage of carriers as well as cargoes discussed, every researcher in the field will find valuable information here.

Strategies to Modify the Drug Release from Pharmaceutical Systems - Marcos Luciano Bruschi

2015-06-16

Since the earliest dosage forms to modern drug delivery systems, came a great development and growth of knowledge with respect to drug delivery. Strategies to Modify the Drug Release from Pharmaceutical Systems will address principles, systems, applications and advances in the field. It will be principally a textbook and a reference source of strategies to modify the drug release. Moreover, the characterization, mathematical and physicochemical models, applications and the systems will be discussed. Addresses the principles, systems, applications and advances in the field of drug delivery. Highlights the mathematical and physicochemical principles related to strategies. Discusses drug release and its possible modifications.

Biomaterials Science - William R Wagner 2020-05-23

The revised edition of the renowned and bestselling title is the most comprehensive single text on all aspects of biomaterials science from principles to applications. *Biomaterials Science*, fourth edition, provides a balanced, insightful approach to both the learning of the science and technology of biomaterials and acts as the key reference for practitioners who are involved in the applications of materials in medicine. This new edition incorporates key updates to reflect the latest relevant research in the field, particularly in the applications section, which includes the latest in topics such as nanotechnology, robotic implantation, and biomaterials utilized in cancer research detection and therapy. Other additions include regenerative engineering, 3D printing, personalized medicine and organs on a chip. Translation from the lab to commercial products is emphasized with new content dedicated to medical device development, global issues related to translation, and issues of quality assurance and reimbursement. In response to customer feedback, the new edition also features consolidation of redundant material to ensure clarity and focus. *Biomaterials Science*, 4th edition is an important update to the best-selling text, vital to the biomaterials' community. The most comprehensive coverage of principles and applications of all classes of biomaterials. Edited and contributed by the best-known figures in the biomaterials field today; fully endorsed and supported by the Society for Biomaterials. Fully revised and updated to address issues of translation, nanotechnology, additive manufacturing, organs on chip, precision medicine and much more. Online chapter exercises available for most chapters.

Engineering Polymeric Biomaterials to Treat Kidney Diseases and Leverage Boronic Acid

Chemistry for Drug Delivery - Alexander Prossnitz 2022

Polymer drug delivery vehicles are diverse and powerful tools to modulate biodistribution, cellular uptake, and dosing of therapeutics. As our understanding of the biological barriers improves, the challenges facing the field of precision nanomedicine have become more nuanced requiring specific engineering design. On the other hand, the therapeutic landscape is rapidly evolving to compass a wide range of biologic drugs, in addition to traditional small molecules. As the definition of a therapeutic continues to expand, drug delivery vehicles must be versatile using simple techniques to achieve a broad range of functionality. This work highlights achievements both in improving the understanding of biological barriers, and engineering conjugation techniques to load a variety of therapeutic cargo. First, a brief overview of polymeric nanomaterial drug delivery systems, therapeutic drug cargo, biological barriers, and synthesis techniques are reviewed (Chapter 1). With these design criteria in mind, a panel of anionic polymers was synthesized and screened to optimize passive targeting to kidneys (Chapter 2). We further investigated these anionic polymers by synthesizing novel boronic ester-based polymer-drug conjugates of polyphenolic drugs to specifically treat fibrotic tubular epithelial cells (Chapter 3). While these unimer systems are effective for drug delivery to the tubular epithelial cells of the kidney, we developed a more generalized boronic ester

drug delivery approach by encapsulating polyphenolic drugs into micellular nanoparticles and tuning drug release with neighboring tertiary amines (Chapter 4). Finally, we demonstrate the diverse utility of these boronic acid copolymers for enhanced intracellular delivery of peptides, proteins, and nucleic acids (Chapter 5). The work concludes with a summary of major findings and suggestions for future projects (Chapter 6).

Materials for Biomedical Engineering: Nanomaterials-based Drug Delivery - Alina-Maria Holban

2019-03-20

Materials for Biomedical Engineering: Nanomaterials-Based Drug Delivery highlights the progress made in the field of nanostructures bioactive materials and their impact on efficient drug delivery towards personalized medicine. Drug delivery is a well investigated and challenging bio-medical field, with promising perspectives in medicine and engineering. This book brings together the latest research findings regarding nanostructured materials and their potential in designing highly efficient and personalized drug delivery systems. Provides a valuable resource of recent scientific progress, highlighting the most well-known applications of nanostructures in drug delivery systems. Includes novel opportunities and ideas for developing or improving technologies in composites by companies, biomedical industries, and in related sectors. Features at least 50% of references from the last 2-3 years.

Smart Polymers - José Miguel García 2022-01-19

Smart polymers react sharply to small changes in physical or chemical conditions and present an intelligent response to chemical stimuli (i.e., chemical species -including biomolecules-, pH, solvents, redox, stimuli that trigger controlled depolymerization) and physical stimuli (i.e., temperature, light, mechanical stress and electrical stimuli). For these reasons, the interest in smart polymers has recently increased exponentially, especially in biological stimuli (i.e., application of polymer-based biosensors, drug delivery, tissue engineering, precision medicine and cell therapy). This book offers a unique opportunity to review the physical-chemical fundamentals of smart polymers, and their behaviour. It also provides an excellent review of the main applications of smart polymers.

Biodegradable and Biocompatible Polymer Composites - Navinchandra Gopal Shimpi 2017-09-18

Biodegradable and Biocompatible Polymer Composites: Processing, Properties and Applications begins by discussing the current state-of-the-art, new challenges and opportunities for various biodegradable and biocompatible polymer composite systems. Interfacial characterization of composites and the structure-property relationships in various composite systems are explained in detail via a theoretical model. Processing techniques for various macro and nanocomposite systems and the influence of processing parameters on properties of the composite are also reviewed in detail. The characterization of microstructure, elastic, visco-elastic, static and dynamic mechanical, thermal, rheological, optical, and electrical properties are highlighted, as are a broad range of applications. The book is a useful reference resource for both researchers and engineers working in composites materials science, biotechnology and nanotechnology, and is also useful for students attending chemistry, physics, and materials science and engineering courses. Presents recent outcomes and highlights the going importance of biodegradable and biocompatible polymer composites and their impact on the environment. Analyzes all the main processing techniques, characterization and applications of biodegradable composites. Written by leading international experts working in the field of biodegradable and biocompatible polymer composites. Covers a broad range of application fields, including medical and pharmaceutical, agricultural, packaging and transport.

Drug Delivery (book) - Ashim K. Mitra 2014-08-08

Drug Delivery is the latest and most up-to-date text on drug delivery and offers an excellent working foundation for students and clinicians in health professions and graduate students including nursing, pharmacy, medicine, dentistry, as well as researchers and scientists. Presenting this complex content in an organized and concise format, *Drug Delivery* allows students to gain a strong understanding of the key concepts of drug delivery. This text focuses on the basic concepts of drug delivery while thoroughly examining various topics such as: CNS delivery, Gene delivery, Ocular delivery, World-wide research on drug delivery, Recent advances in drug delivery. A significant advancement has been made in the field of drug delivery. This text provides a detailed overview of drug delivery systems, routes of drug administration and development of various formulations. The cutting edge research being carried out in this field will be

compiled and a focus on worldwide research on drug delivery and targeting at the molecular, cellular, and organ levels will also be summarized. Each new print copy includes access to the Navigate Companion Website including: Chapter Quizzes, Interactive Glossary, Crossword Puzzles, Interactive Flashcards, and Matching Exercises

Advanced Materials in Drug Release and Drug Delivery Systems - Katarzyna Winnicka 2021-09-03

Development of new drug molecules is costly and requires longitudinal, wide-ranging studies; therefore, designing advanced pharmaceutical formulations for existing and well-known drugs seems to be an attractive device for the pharmaceutical industry. Properly formulated drug delivery systems can improve pharmacological activity, efficacy and safety of the active substances. Advanced materials applied as pharmaceutical excipients in designing drug delivery systems can help solve problems concerning the required drug release—with the defined dissolution rate and at the determined site. Novel drug carriers enable more effective drug delivery, with improved safety and with fewer side effects. Investigations concerning advanced materials represent a rapidly growing research field in material/polymer science, chemical engineering and pharmaceutical technology. Exploring novel materials or modifying and combining existing ones is now a crucial trend in pharmaceutical technology. Eleven articles included in the Special Issue “Advanced Materials in Drug Release and Drug Delivery Systems” present the most recent insights into the utilization of different materials with promising potential in drug delivery and into different formulation approaches that can be used in the design of pharmaceutical formulations.

Alginates in Drug Delivery - Amit Kumar Nayak 2020-07-23

Alginates in Drug Delivery explores the vital precepts, basic and fundamental aspects of alginates in pharmaceutical sciences, biopharmacology, and in the biotechnology industry. The use of natural polymers in healthcare applications over synthetic polymers is becoming more prevalent due to natural polymers' biocompatibility, biodegradability, economic extraction and ready availability. To fully utilize and harness the potential of alginates, this book presents a thorough understanding of the synthesis, purification, and characterization of alginates and their derivative. This book collects, in a single volume, all relevant information on alginates in health care, including recent advances in the field. This is a highly useful resource for pharmaceutical scientists, health care professionals and regulatory scientists actively involved in the pharmaceutical product and process development of natural polymer containing drug delivery, as well as postgraduate students and postdoctoral research fellows in pharmaceutical sciences. Provides a single source on the complete alginate chemistry, collection, chemical modifications, characterization and applications in healthcare fields Includes high quality illustrations, along with practical examples and research case studies Contains contributions by global leaders and experts from academia, industry and regulatory agencies who are pioneers in the application of natural polysaccharides in diverse pharmaceutical fields

Polymeric Drug Delivery Systems - Glen S. Kwon 2005-04-12

Emphasizing four major classes of polymers for drug delivery—water-soluble polymers, hydrogels, biodegradable polymers, and polymer assemblies—this reference surveys efforts to adapt, modify, and tailor polymers for challenging molecules such as poorly water-soluble compounds, peptides/proteins, and plasmid DNA.

Design of Controlled Release Drug Delivery Systems - Xiaoling Li 2005-11-24

The goal of every drug delivery system is to deliver the precise amount of a drug at a pre-programmed rate to the desired location in order to achieve the drug level necessary for the treatment. An essential guide for biomedical engineers and pharmaceutical designers, this resource combines physicochemical principles with physiological processes to facilitate the design of systems that will deliver medication at the time and place it is most needed.

Intrinsically Biocompatible Polymer Systems - Marek Kowalczyk 2020-03-25

Biocompatibility refers to the ability of a biomaterial to perform its desired function with respect to a medical therapy, without eliciting any undesirable local or systemic effects in the recipient or beneficiary of that therapy, but generating the most appropriate beneficial cellular or tissue response in that specific situation, and optimizing the clinically relevant performance of that therapy, which reflects current developments in the area of intrinsically biocompatible polymer systems. Polymeric biomaterials are

presently used as, for example, long-term implantable medical devices, degradable implantable systems, transient invasive intravascular devices, and, recently, as tissue engineering scaffolds. This Special Issue welcomes full papers and short communications highlighting the aspects of the current trends in the area of intrinsically biocompatible polymer systems.

Fundamentals of Drug Delivery - Heather A. E. Benson 2021-10-12

A comprehensive guide to the current research, major challenges, and future prospects of controlled drug delivery systems Controlled drug delivery has the potential to significantly improve therapeutic outcomes, increase clinical benefits, and enhance the safety of drugs in a wide range of diseases and health conditions. Fundamentals of Drug Delivery provides comprehensive and up-to-date coverage of the essential principles and processes of modern controlled drug delivery systems. Featuring contributions by respected researchers, clinicians, and pharmaceutical industry professionals, this edited volume reviews the latest research in the field and addresses the many issues central to the development of effective, controlled drug delivery. Divided in three parts, the book begins by introducing the concept of drug delivery and discussing both challenges and opportunities within the rapidly evolving field. The second section presents an in-depth critique of the common administration routes for controlled drug delivery, including delivery through skin, the lungs, and via ocular, nasal, and otic routes. The concluding section summarizes the current state of the field and examines specific issues in drug delivery and advanced delivery technologies, such as the use of nanotechnology in dermal drug delivery and advanced drug delivery systems for biologics. This authoritative resource: Covers each main stage of the drug development process, including selecting pharmaceutical candidates and evaluating their physicochemical characteristics Describes the role and application of mathematical modelling and the influence of drug transporters in pharmacokinetics and drug disposition Details the physiology and barriers to drug delivery for each administration route Presents a historical perspective and a look into the possible future of advanced drug delivery systems Explores nanotechnology and cell-mediated drug delivery, including applications for targeted delivery and toxicological and safety issues Includes comprehensive references and links to the primary literature Edited by a team of internationally-recognized experts, Fundamentals of Drug Delivery is essential reading for researchers, industrial scientists, and advanced students in all areas of drug delivery including pharmaceuticals, pharmaceutical sciences, biomedical engineering, polymer and materials science, and chemical and biochemical engineering.

Polymeric Drugs and Drug Delivery Systems - Raphael M. Ottenbrite 2019-04-30

Polymeric materials are now playing an increasingly important role in pharmaceuticals, as well as in sensing devices, in situ prostheses and probes, and microparticle diagnostic agents. This new volume consists of twenty-two recent research-based reports on the developments in these areas of pharmaceutical and biomaterials technology. The reports w

Nanomaterials for Drug Delivery and Therapy - Alexandru Mihai Grumezescu 2019-03-14

Nanomaterials for Drug Delivery and Therapy presents recent advances in the field of nanobiomaterials and their important applications in drug delivery, therapy and engineering. The book offers pharmaceutical perspectives, exploring the development of nanobiomaterials and their interaction with the human body. Chapters show how nanomaterials are used in treatments, including neurology, dentistry and cancer therapy. Authored by a range of contributors from global institutions, this book offers a broad, international perspective on how nanotechnology-based advances are leading to novel drug delivery and treatment solutions. It is a valuable research resource that will help both practicing medics and researchers in pharmaceutical science and nanomedicine learn more on how nanotechnology is improving treatments. Assesses the opportunities and challenges of nanotechnology-based drug delivery systems Explores how nanotechnology is being used to create more efficient drug delivery systems Discusses which nanomaterials make the best drug carriers

Novel Approaches for the Delivery of Anti-HIV Drugs - José das Neves 2020-05-20

HIV/AIDS continues to be one of the most challenging individual and public health concerns of the present day. According to the UNAIDS, nearly 38 million individuals were living with the infection by the end of 2018, while 1.7 million new cases occurred during that same year. In spite of the numerous advances in the development and delivery of antiretroviral agents, both for treatment and prevention, several challenges

remain. This book includes original research and review articles on innovative strategies and approaches for the formulation and delivery of anti-HIV drugs, including genetic material and other biopharmaceuticals. Different local and systemic delivery strategies are addressed based on different technologies intended for oral, transdermal, subcutaneous, vaginal, or rectal administration. Authored by eminent scientists in academia and nonprofit organizations involved in the development of antiretroviral drug products, this collection provides useful information for all those involved in HIV/AIDS treatment and prevention.

Drug Delivery - Eric P. Holowka 2014-11-22

Current pharmaceutical and clinical approaches to the treatment of disease suffer from the inherent limitations in the specialization of drugs introduced to physiological systems. The interface of clinical and material sciences has allowed for a broad spectrum of creative approaches with the potential to alleviate these shortcomings. However, the synergy of these disciplines also presents problems in which nascent technology lacks the necessary evaluation within its intended clinical environment. Given the growing potential for materials science to address a number of unanswered therapeutic needs, it remains even more pressing to validate emerging drug delivery technologies in actual clinical environments. *Drug Delivery: Materials Design and Clinical Perspective* addresses the core fundamentals of drug delivery using material science and engineering principles, and then applies this knowledge using prominent examples from both the scientific literature and clinical practice. Each chapter focuses on a specific drug delivery technology, such as controlled-release materials, thin-film materials, or smart materials. Within each chapter, an initial section on "Engineering Concepts" reviews the relevant fundamental principles that guide rational design. The following section on "Materials Design" discusses how the design process applies engineering concepts for use in physiological systems. A third section on "Implementation" discusses current approaches in the literature which have demonstrated effective drug delivery in controlled environments. Finally, each chapter contains several sections on "Clinical Applications" which describe the validity of materials approaches from a clinical perspective; these sections review the safety and efficacy of drug delivery systems for specific, compelling medical applications. The book thereby bridges materials science with clinical medicine, and provides the reader with a bench-to-bedside view of novel drug delivery systems. · Provides a comprehensive description of drug delivery systems from a materials perspective · Includes a wide-ranging discussion of clinical applications of drug delivery systems · Presents separate chapters on controlled release materials, thin film materials, self-microemulsifying materials, smart materials, etc. · Covers fundamental engineering principles, rational materials design, implementation testing, and clinical applications for each material type

Polymer Nanoparticles for Nanomedicines - Christine Vauthier 2017-01-07

This volume serves as a valuable handbook for the development of nanomedicines made of polymer nanoparticles because it provides researchers, students, and entrepreneurs with all the material necessary to begin their own projects in this field. Readers will find protocols to prepare polymer nanoparticles using different methods, since these are based on the variety of experiences that experts encounter in the field. In addition, complex topics such as, the optimal characterization of polymer nanoparticles is discussed, as well as practical guidelines on how to formulate polymer nanoparticles into nanomedicines, and how to modify the properties of nanoparticles to give them the different functionalities required to become an efficient nanomedicine for different clinical applications. The book also discusses the translation of technology from research to practice, considering aspects related to industrialization of preparation and aspects of regulatory and clinical development.

Localized Micro/Nanocarriers for Programmed and On-Demand Controlled Drug Release - Seyed Morteza Naghib 2022-09-30

This book provides a comprehensive overview of the localized drug delivery system landscape. The 10 chapters provide a detailed introduction in polymers, nanostructures and nanocomposites for developing localized controlled drug delivery systems (LCDDSs) in the form of stimuli-responsive delivery systems, targeted drug delivery systems or the combination of both. A discussion on manufacturing techniques, optimization, challenges and adaptation of LCDDSs for the treatment of a wide range of diseases is also included. This simple and informative resource conveys an understanding about designing novel drug

delivery systems to students in advanced pharmacology, biotechnology, materials science and biochemistry study programs. Readers will be equipped with the knowledge of regulating drug release rates to get a desired pharmacological profile, that helps a researcher to ensure a high therapeutic effectiveness. The detailed information about various drug delivery systems and a compilation of recent literature sources also paves the way for research scholars to construct a drug targeting framework for their research plans.

Drug Delivery - W. Mark Saltzman 2001-03-15

Synthetic materials are a tremendous potential resource for treating human disease. For the rational design of many of these biomaterials it is necessary to have an understanding of polymer chemistry and polymer physics. Equally important to those two fields is a quantitative understanding of the principles that govern rates of drug transport, reaction, and disappearance in physiological and pathological situations. This book is a synthesis of these principles, providing a working foundation for those in the field of drug delivery. It covers advanced drug delivery and contemporary biomaterials.

Drug Delivery Systems - 2019-10-23

Drug Delivery Systems examines the current state of the field within pharmaceutical science and concisely explains the history of drug delivery systems, including key developments. The book translates the physicochemical properties of drugs into drug delivery systems administered via various routes, such as oral, parenteral, transdermal and inhalational. Regulatory and product development topics are also explored. Written by experts in the field, this volume in the *Advances in Pharmaceutical Product Development and Research* series deepens our understanding of drug delivery systems within the pharmaceutical sciences industry and research, as well as in chemical engineering. Each chapter delves into a particular aspect of this fundamental field to cover the principles, methodologies and technologies employed by pharmaceutical scientists. This book provides a comprehensive examination that is suitable for researchers and advanced students working in pharmaceuticals, cosmetics, biotechnologies, and related industries. Provides up-to-date information on how to translate the physicochemical properties of drugs into drug delivery systems Explores how drugs are administered via various routes, such as oral, parenteral, transdermal and inhalational Contains extensive references and further reading for course and self-study

Modeling and Control of Drug Delivery Systems - Ahmad Taher Azar 2021-02-06

Modeling and Control of Drug Delivery Systems provides comprehensive coverage of various drug delivery and targeting systems and their state-of-the-art related works, ranging from theory to real-world deployment and future perspectives. Various drug delivery and targeting systems have been developed to minimize drug degradation and adverse effect and increase drug bioavailability. Site-specific drug delivery may be either an active and/or passive process. Improving delivery techniques that minimize toxicity and increase efficacy offer significant potential benefits to patients and open up new markets for pharmaceutical companies. This book will attract many researchers working in DDS field as it provides an essential source of information for pharmaceutical scientists and pharmacologists working in academia as well as in the industry. In addition, it has useful information for pharmaceutical physicians and scientists in many disciplines involved in developing DDS, such as chemical engineering, biomedical engineering, protein engineering, gene therapy. Presents some of the latest innovations of approaches to DDS from dynamic controlled drug delivery, modeling, system analysis, optimization, control and monitoring Provides a unique, recent and comprehensive reference on DDS with the focus on cutting-edge technologies and the latest research trends in the area Covers the most recent works, in particular, the challenging areas related to modeling and control techniques applied to DDS

Smart Polymeric Nano-Constructs in Drug Delivery - Suresh P Vyas 2022-11-25

Smart Polymeric Nano-Constructs in Drug Delivery: Concept, Design and Therapeutic Applications provides a thorough discussion of the most state of the art material and polymer exploitations for the delivery of bioactive(s) as well as their current and clinical status. The book enables researchers to prepare a variety of smart drug delivery systems to investigate their properties as well as to discover their uses and applications. The novelty of this approach addresses an existing need of exhaustively understanding the potential of the materials including polymeric drug delivery systems that are smartly designed to deliver bioactive(s) into the body at targeted sites without showing side effects. The book is helpful for those in the health sector, specifically those developing nanomedicine using smart material-based nano-delivery

systems. Polymers have unique co-operative properties that are not found with low-molecular-weight compounds along with their appealing physical and chemical properties, constituting the root of their success in drug delivery. *Smart Polymeric Nano-Constructs in Drug Delivery: Concept, Design and Therapeutic Applications* discusses smart and stimuli responsive polymers applicable in drug delivery, followed detailed information about various concepts and designing of polymeric novel drug delivery systems for treatment of various type of diseases, also discussing patents related to the field. The book helps readers to design and develop novel drug delivery systems based on smart materials for the effective delivery of bioactive that take advantage of recent advances in smart polymer-based strategies. It is useful to those in pharmaceutical sciences and related fields in developing new drug delivery systems. Provides comprehensive overview of the potential role of polymeric systems in drug delivery Explores the design, synthesis, and application of different smart material-based delivery systems Includes fundamental and clinical applications

Organic Materials as Smart Nanocarriers for Drug Delivery - Alexandru Mihai Grumezescu 2018-03-26
Organic Materials as Smart Nanocarriers for Drug Delivery presents the latest developments in the area of organic frameworks used in pharmaceutical nanotechnology. An up-to-date overview of organic smart nanocarriers is explored, along with the different types of nanocarriers, including polymeric micelles, cyclodextrins, hydrogels, lipid nanoparticles and nanoemulsions. Written by a diverse range of international academics, this book is a valuable reference for researchers in biomaterials, the pharmaceutical industry, and those who want to learn more about the current applications of organic smart nanocarriers. Explores the most recent molecular- and structure-based applications of organic smart nanocarriers in drug delivery Highlights different smart nanocarriers and assesses their intricate organic structural properties for improving drug delivery Assesses how molecular organic frameworks lead to more effective drug delivery systems