Controlled And Novel Drug Delivery

The application of drug delivery is a valuable, cost-effective lifecycle management resource. By endowing drugs with new and innovative therapeutic benefits, drug delivery systems extend products’ profitable lifecycle, giving pharmaceutical companies competitive and financial advantages, and providing patients with improved medications. Formulation development is now being used to create new dosage forms for existing products, which not only reduces the time and expense involved in new drug development, but also helps with regard to patent protection and bypassing existing patents. Today’s culture demands convenience, a major factor determining adherence to drug therapy. Over the past few years, patient convenience-oriented research in the field of drug delivery has yielded a range of innovative drug-delivery options. As a result, various drug-delivery systems, including medicated chewing gums, oral dispersible tablets, medicated lozenges and lollipops, have now hit the market and are very popular. These dosage forms offer a highly convenient way to dose medications, not only for special population groups with swallowing difficulties, such as children and the elderly, but for the general populace as well. This book provides valuable insights into a number of formulation design approaches that are currently being used, or
could be used, to provide new benefits from existing drug molecules. This book gathers together the research work of leading Indian scientists actually engaged in pharmaceutical research. The contributors are all distinguished experts in their respective fields. All the contributors are scientists working in Indian laboratories, however their achievements in the field are full of valuable information supplemented with adequate references which help the intended readers in digging out the complete information on any aspect. The book has 17 chapters, 150 figures and over 2150 references and will be of immense use for all pharmaceutical industries, RD laboratories, research scientists in universities colleges, teachers as well as post-graduate and graduate students. The book provides a single volume covering detailed descriptions about various delivery systems, their principles and how these are put in use for the treatment of multiple diseases. It is divided into four sections where the first section deals with the introduction and importance of novel drug delivery system. The second section deals with the most advanced drug delivery systems like microbubbles, dendrimers, lipid-based nanoparticles, nanofibers, microemulsions etc., describing the major principles and techniques of the preparations of the drug delivery systems. The third section elaborates on the treatments of diverse diseases like cancer, topical diseases, tuberculosis etc. The fourth and final
section provides a brief informative description about the regulatory aspects of novel drug delivery system that is followed in various countries. 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. Provides both fundamentals and new and emerging applications. Advanced Drug Delivery brings readers fully up to date with the state of the science, presenting the basics, formulation strategies, and therapeutic applications of advanced drug delivery. The book demonstrates how core concepts of pharmaceutical sciences, chemistry, and molecular biology can be combined and applied in order to spark novel ideas to design and develop advanced drug delivery systems for the treatment of a broad range of human diseases. Advanced Drug Delivery
features contributions from an international team of pharmaceutical scientists. Chapters reflect a thorough review and analysis of the literature as well as the authors' firsthand experience developing drug delivery systems. The book is divided into four parts: Part I, Introduction and Basics of Advanced Drug Delivery, explores physiological barriers, stability, transporters, and biomaterials in drug delivery. Part II, Strategies for Advanced Drug Delivery, offers tested and proven strategies for advanced delivery of both small molecules and macromolecules. Part III, Translational Research of Advanced Drug Delivery, focuses on regulatory considerations and translational applications of advanced drug delivery systems for the treatment of cardiovascular diseases, cancer, sexually transmitted diseases, ophthalmic diseases, and brain diseases. Part IV, Future Applications of Advanced Drug Delivery in Emerging Research Areas, examines stem cell research, cell-based therapeutics, tissue engineering, and molecular imaging. Each chapter provides objectives and assessment questions to help readers grasp key concepts and assess their knowledge as they progress through the book. Advanced Drug Delivery is recommended for graduates and upper-level undergraduates in the pharmaceutical sciences who need a solid foundation in the basics. It is also recommended for pharmaceutical professionals who want to take advantage of new and emerging applications in advanced drug delivery.
This research book covers the major aspects relating to the use of novel delivery systems in enhancing both transdermal and intradermal drug delivery. It provides a review of transdermal and intradermal drug delivery, including the history of the field and the various methods employed to produce delivery systems from different materials such as device design, construction and evaluation, so as to provide a sound background to the use of novel systems in enhanced delivery applications. Furthermore, it presents in-depth analyses of recent developments in this exponentially growing field, with a focus on microneedle arrays, needle-free injections, nanoparticulate systems and peptide-carrier-type systems. It also covers conventional physical enhancement strategies, such as tape-stripping, sonophoresis, iontophoresis, electroporation and thermal/suction/laser ablation. Discussions about the penetration of the stratum corneum by the various novel strategies highlight the importance of the application method. Comprehensive and critical reviews of transdermal and intradermal delivery research using such systems focus on the outcomes of in vivo animal and human studies. The book includes laboratory, clinical and commercial case studies featuring safety and patient acceptability studies carried out to date, and depicts a growing area for use of these novel systems is in intradermal vaccine delivery. The final chapters
review recent patents in this field and describe the work ongoing in industry. This is a useful textbook and resource for undergraduate and postgraduate students and anyone in the working concepts of a drug delivery system and its performance. A novel drug delivery system refers to strategy, technology, formulation-based approaches and customized system(s) developed for safe administration and within body transportation of drugs as needed for optimum therapeutic benefits while ensuring minimum to nil toxic effects. Multidisciplinary approaches and cutting edge technology have been used to develop the carrier modules to deliver the contained drug to the target tissues in a preprogrammed manner. The process desirably modifies the drug distribution and accumulation, thereby producing optimum therapeutic effects. Carrier-mediated drug delivery has emerged as a powerful technology for the treatment of various difficult pathologies. The therapeutic index of conventional and novel drug is enhanced owing to specificity due to targeting of drug to the particular tissue. This book includes an introduction to novel drug delivery, oral osmotic pumps, bioadhesive and mucoadhesive systems, multiple emulsions, colon-specific drug delivery systems, transdermal drug delivery systems, spherical crystallization, microemulsion, implants and inserts, micellar systems, liposomes, microspheres and microcapsules, nanoparticles, resealed erythrocytes, transfersomes and
ethosomes, organogels, dendrimers, niosomes, solid lipid nanoparticles, drug conjugates, cyclodextrin complexes, multifunctional nanomedicines, and floating drug delivery system(s). Each chapter attempts to discuss introduction, concept, progress, status and future prospects of the concerned novel drug delivery system.

This book approaches the subject from a mechanistic perspective that pitches the language at a level that is understandable to those entering the field and who are not familiar with its common phrases or complex terms. It provides a simple encapsulation of concepts and expands on them. In each chapter the basic concept is explained as simply and clearly as possible without a great deal of detail, then in subsequent sections additional material, exceptions to the general rule, examples, etc., is introduced and built up. Such material was generously supplemented with diagrams; conceptually elegant line diagrams in two or three colors. The artwork was well thought out and able to condense the scientific principles into a novel and visually exciting form. The diagrams encourage browsing or draw the reader to salient points. In addition, the technique of highlighting key concepts in a separate box is used throughout each chapter. A comprehensive treatment of the science, technology, and regulation of rate-controlled administration of therapeutic agents, with coverage of the basic
concepts, fundamental principles, biomedical rationales, and potential applications. This revised and updated edition (first in 1982) incorporates 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
This volume, the first of the two-volume Drug Delivery Approaches and Nanosystems series, presents a full picture of the state-of-the-art research and development in drug delivery systems using nanotechnology and its applications. It addresses the ever-expanding application of nanotechnology or nano-sized materials in the medical field and the real-world challenges and complexities of current drug delivery methodologies and techniques. Many methods of drug delivery systems have been used, but very few of them have been validated for medical use. A major reason for the above situation, the editors believe, is the gap between academia and research, and the gap between academic research and real-time clinical applications and needs. This volume addresses that gap. This volume presents 12 chapters that provide information about the preparation and characterization of nanocomposite materials used in drug delivery systems; advanced research of carbon nanotubes, nanocomposite materials, and polymer-clay, ceramics, and silicate glass-based nanocomposites; and the functionality of graphene nanocomposites. The book also provides detailed information on the application of nanotechnology in drug delivery systems in health care systems and medicine. The book describes how nanostructures are synthesized and draws attention to wide variety of nanostructures available for biological research.
and treatment applications. This valuable volume provides a wealth of information that will be valuable to scientists and researchers, faculty, and students. Volume 2 of the two-volume series is subtitled Drug Targeting Aspects of Nanotechnology. The volumes are available separately or as a set. Nanotechnology-Based Approaches for Targeting and Delivery of Drugs and Genes provides an overview of the important aspects of nanomedicine in order to illustrate how to design and develop novel and effective drug delivery systems using nanotechnology. The book is organized into three sections, beginning with an introduction to nanomedicine and its associated issues. Section two discusses the latest technologies in nanomedicine, while the third section covers future developments and challenges in the field. By focusing on the design, synthesis, and application of a variety of nanocarriers in drug and gene delivery, this book provides pharmaceutical and materials science students, professors, clinical researchers, and industry scientists with a valuable resource aimed at tackling the challenges of delivering drugs and genes in a more targeted manner. Explores a wide range of promising approaches for the diagnosis and treatment of diseases using the latest advances in cutting-edge nanomedical technologies. Contains contributions from world-renowned experts and researchers working in the area of nanomedicine and drug delivery. Covers the associated challenges.
and potential solutions to working with nanotechnology in drug delivery Highlights crucial topics, such as biopharmaceutical and toxicity issues, quality by design, drug targeting, and more

Medical Nanotechnology and Nanomedicine introduces non-experts to the world of nanomedicine and its evolving organizational infrastructure. Considering the fluid nature of nano breakthroughs and the delicate balance between benefits and consequences as they apply to medicine, readers at all levels will gain a practical, understandable base of information on these developments so that they may take the greatest advantage of them. This practical reference investigates the impact of nanotechnology on applications in medicine and biomedical sciences, and the broader societal and economic effects. Eschewing technological details, it focuses on enhancing awareness of the business, regulatory, and administrative aspects of medical applications. It gives readers a critical, balanced, and realistic evaluation of existing nanomedicine developments and future prospects and provides an ideal foundation upon which to plan and make decisions.

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A report on progress in the development of materials used in or on the human body, ranging
from biopolymers used in controlled-release drug delivery systems and prosthetic devices to metals used in bone repair and plastics used in absorbable mechanisms such as sutures. 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 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

Nano Drug Delivery Strategies for the Treatment of Cancers discusses several current and promising approaches for the diagnosis and treatment of cancer by using the most recent developments in nanomedical technologies. The book presents introductory information about the biology of different types of cancer in order to provide the reader with knowledge on their specificities. In addition, it discusses various novel drug delivery systems, detailing their functionalities, expected outcomes and future developments in the field, focusing on brain, mouth and throat, breast, lung, liver, pancreas, stomach, colon, bowel, skin and prostate cancers. The book is a valuable source for cancer researchers, oncologists, pharmacologists and nanotechnologists who are interested in novel drug delivery systems and devices for treatment of various types of cancer that take advantage of recent advances in this exciting field. Discusses a wide range of promising approaches for the diagnosis and treatment of cancer using the latest advancement in cutting-edge nanomedical technologies Provides foundational information on different types of cancer and their biology to help the reader choose the best nano drug delivery system for patients Presents novel drug delivery systems based on nanoparticles, microparticles, liposomes, self-assembling Micelles and block copolymer micelles

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 technologies modify drug release profile, absorption, distribution and elimination for the benefit of improving product efficacy and safety, as well as patient convenience and compliance. Drug release is from: diffusion, degradation, swelling, and affinity-based mechanisms. Controlled Drug delivery highlights how the multifunctionality of several materials can be achieved and valorized for pharmaceutical and biopharmaceutical applications. Topics covered in this comprehensive book include: Controlled drug delivery systems-Introduction; Polymers; Microencapsulation; Mucosal Drug Delivery system; Implantable Drug Delivery Systems; Transdermal Drug Delivery Systems; and Gastro retentive drug delivery systems. This book gives guidance on how to approach modifications of biopolymers for drug delivery systems and materials for implants. It is also describes structure-properties relationships in proposed excipients, drug delivery systems and biomedical materials.

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

**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

In complex macromolecules, minor modifications can generate major changes, due to self-assembling capacities of macromolecular or supramolecular
networks. Controlled Drug Delivery highlights how the multifunctionality of several materials can be achieved and valorized for pharmaceutical and biopharmaceutical applications. Topics covered in this comprehensive book include: the concept of self-assembling; starch and derivatives as pharmaceutical excipients; and chitosan and derivatives as biomaterials and as pharmaceutical excipients. Later chapters discuss polyelectrolyte complexes as excipients for oral administration; and natural semi-synthetic and synthetic materials. Closing chapters cover protein-protein associative interactions and their involvement in bioformulations; self-assembling materials, implants and xenografts; and provide conclusions and perspectives. Offers novel perspectives of a new concept: how minor alterations can induce major self-stabilization by cumulative forces exerted at short and long distances Gives guidance on how to approach modifications of biopolymers for drug delivery systems and materials for implants Describes structure-properties relationships in proposed excipients, drug delivery systems and biomedical materials

Nanotechnology for Oral Drug Delivery: From Concept to Applications discusses the current challenges of oral drug delivery, broadly revising the different physicochemical barriers faced by nanotechnolgy-based oral drug delivery systems, and highlighting the challenges of improving intestinal permeability and
drug absorption. Oral delivery is the most widely used form of drug administration due to ease of ingestion, cost effectiveness, and versatility, by allowing for the accommodation of different types of drugs, having the highest patient compliance. In this book, a comprehensive overview of the most promising and up-to-date engineered and surface functionalized drug carrier systems, as well as opportunities for the development of novel and robust delivery platforms for oral drug administration are discussed. The relevance of controlling the physicochemical properties of the developed particle formulations, from size and shape to drug release profile are broadly reviewed. Advances in both in vitro and in vivo scenarios are discussed, focusing on the possibilities to study the biological-material interface. The industrial perspective on the production of nanotechnology-based oral drug delivery systems is also covered. Nanotechnology for Oral Drug Delivery: From Concept to Applications is essential reading for researchers, professors, advanced students and industry professionals working in the development, manufacturing and/or commercialization of nanotechnology-based systems for oral drug delivery, targeted drug delivery, controlled drug release, materials science and biomaterials, in vitro and in vivo testing of potential oral drug delivery technologies. Highlights the relevance of oral drug delivery in the clinical setting.
Covers the most recent advances in the field of nanotechnology for oral drug delivery. Provides the scientific community with data that can facilitate and guide their research.

This book will describe current research on drug delivery systems that encompass four broad categories, namely: routes of delivery, delivery vehicles, payload, and targeting strategies. Where appropriate delivery vehicles and relevant release of specific agents in any of these categories in clinical application will be discussed. All chapters will highlight the translational aspects of the various technologies discussed and will provide insights into the advantages of such delivery systems over current ones in clinical or research use. Each technology reviewed in this book will have significant potential to improve patients' lives by enhancing the therapeutic efficacy of drugs. This book:

- Discusses the various factors that mitigate effective oral insulin delivery and the current status of research efforts to overcome these barriers along with recent clinical projections.
- Examines the advantages and disadvantages of each drug delivery system.
- Examines the standard method of accomplishing controlled drug release through the incorporation of the drugs within polymeric biomaterials such as capsules and microcapsules as well as other vehicles such as liposomes.
- Discusses various controlled drug delivery systems, including sustained release.
delivery systems and pulse or delayed release, e.g. to target different regions of the gastrointestinal tract. In view of these wide-ranging technological areas, and the up-to-date discussions of opportunities and challenges associated with these applications, the book should provide readers from technology, materials science, pharmacology and clinical disciplines with very valuable information. Microparticles are one of the key novel drug delivery systems has been widely used to precisely modulate release rate. Microparticles based polymeric systems fabricated using suitable carrier has been extensively explored as an effective matrix for controlled and sustained release delivery of many drugs. With the controlled release systems, the rate of drug release matches the rate of drug elimination, and therefore the drug concentration is within the therapeutic window for the majority of the 24-hr period. The aim of this study was to prepare Eudragit microspheres containing Tramadol HCl by solvent evaporation method to achieve a controlled drug release profile. Investigation of the effect of various processing and formulation factors such as polymer type, drug: polymer ratio, stirring speed to obtain spherical particles. Then yield of production, shape, and mean particle size, particle size distribution, encapsulation efficiency, surface properties and release rate of drug from the microspheres were performed. International research specialists discuss their work with pharmaceuticals in this
text, focusing on the mechanisms and assessment of drug absorption and delivery. The book also explores the ways in which a drug should be administered to provide self-regulating and programmed delivery. Many controlled release veterinary drug delivery systems (CRVDDS) are presently in use, and recently there has been a host of new CRVDDS within veterinary medicine. The challenges of this area of drug delivery arise from the unique anatomy and physiology of the target animal, the cost constraints associated with the value of the animal being treated and the extended periods of time that delivery must be sustained for (often measured in months). The purpose of this book is to introduce the reader to the unique opportunities and challenges of the field of CRVDDS and to explain and discuss the basic controlled release principles underlying the development of CRVDDS. Its aim is to provide an overview of many of the areas where CRVVDS have application, and to highlight the opportunities and prospects for controlled release technology in the veterinary field. Controlled Release Veterinary Drug Delivery comprises chapters that provide workers in the field (and those interested in this area) with information on the design, development and assessment of a variety of CRVDDS. The book contains chapters that describe the relevant animal physiological and anatomical considerations alongside descriptions of current
and emerging controlled release delivery systems for a variety of routes for drug delivery, and present overviews on the physical and chemical assessment of veterinary controlled release delivery systems. The veterinary area is abound with opportunities for the development of controlled release drug delivery technologies. It is an area of medicine that is open to the acceptance of novel drug delivery devices, and which readily encompasses the use of novel routes of administration. It is an area of many unmet needs, most of which offer opportunities and unique challenges for the innovative formulation scientist to provide solutions. This book will provide an insight into the biological, clinical and pharmaceutical challenges that face the formulation scientist in this interesting and diverse area of research.

The design of a controlled drug delivery system should be primarily aimed at achieving more predictable and increased bioavailability of drugs. Over the years, novel dosage forms have become increasingly sophisticated with major role being played by controlled release drug delivery systems. Such systems release drug at predetermined rate, as determined by drug pharmacokinetics and desired therapeutic concentration. It is evident from the recent scientific and patent literature that an increased interest in novel dosage forms that are retained in the body for a prolonged and predictable period of time exists today in academic and
industrial research groups. One of the most feasible approaches for achieving a prolonged and predictable drug delivery profile in the GI tract is to control the gastric residence time (GRT). Dosage forms with a prolonged GRT, i.e. gastro-retentive dosage forms (GRDFs), provide new and important therapeutic options. Novel Drug Delivery Systems for Phytoconstituents discusses general principles of drug targeting, construction material and technological concerns of different phytoconstituent in delivery systems. It focuses on the development of novel herbal formulations and summarizes their method of preparation, type of active ingredients, route of administration, biological activity and their applications. It discusses therapeutic activities of plant derived chemicals, their limitations in clinical applications and novel drug delivery solutions to overcome them to provide better therapeutic effects with controlled and targeted drug delivery. Focus on drug delivery of phytomolecules Act as bridge between natural product scientist and clinical doctors Discusses mechanism of poor bioavailability of herbal molecules Increases awareness towards phytochemical efficacy Summarizes efficient novel delivery systems-based formulations. It extensively covers the applications of novel drug delivery systems including polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid capsules, liposomes, phytosomes, microsphere, transfersomes, and ethosomes. Some chapters are
especially focused on anticancer phytodrugs, silymarin, andrographolide, berberine, and curcumin delivery with special emphasis on their application. Enables readers to apply process dynamics and control theory to solve bioprocess and drug delivery problems. The control of biological and drug delivery systems is critical to the health of millions of people worldwide. As a result, researchers in systems biology and drug delivery rely on process dynamics and control theory to build our knowledge of cell behavior and to develop more effective therapeutics, controlled release devices, and drug administration protocols to manage disease. Written by a leading expert and educator in the field, this text helps readers develop a deep understanding of process dynamics and control theory in order to analyze and solve a broad range of problems in bioprocess and drug delivery systems. For example, readers will learn how stability criteria can be used to gain new insights into the regulation of biological pathways and lung mechanics. They'll also learn how the concept of a time constant is used to capture the dynamics of diffusive processes. Readers will also master such topics as external disturbances, transfer functions, and input/output models with the support of the author's clear explanations, as well as: Detailed examples from the biological sciences and novel drug delivery technologies 160 end-of-chapter problems with step-by-step solutions
Demonstrations of how computational software such as MATLAB and Mathematica solve complex drug delivery problems Control of Biological and Drug-Delivery Systems for Chemical, Biomedical, and Pharmaceutical Engineering is written primarily for undergraduate chemical and biomedical engineering students; however, it is also recommended for students and researchers in pharmaceutical engineering, process control, and systems biology. All readers will gain a new perspective on process dynamics and control theory that will enable them to develop new and better technologies and therapeutics to treat human disease.

The goal of any novel drug delivery system is to provide therapeutic benefits to the patients by increasing duration of drug action, reducing dosing frequency, and controlling drug release rate at the target site, thereby reducing unwanted side effects. Advanced Technology for Delivering Therapeutics is a reference book that covers recent developments in the field of drug delivery science and technology. The purpose of this book is to bring together descriptions of some selective technologies including new and promising nanotechnology currently being investigated for drug delivery applications. This book is a useful source of information for graduate and post-graduate students of pharmacy and biomedical science; pharmaceutical