

Biopolymers For Medical And Pharmaceutical Applications Humic Substances Polyisoprenoids Polyester

Biopolymers from Renewable Resources is a compilation of information on the diverse and useful polymers derived from agricultural, animal, and microbial sources. The volume provides insight into the diversity of polymers obtained directly from, or derived from, renewable resources. The beneficial aspects of utilizing polymers from renewable resources, when considering synthesis, processing, disposal, biodegradability, and overall material life-cycle issues, suggests that this will continue to be an important and growing area of interest. The individual chapters provide information on synthesis, processing and properties for a variety of polyamides, polysaccharides, polyesters and polyphenols. The reader will have a single volume that provides a resource from which to gain initial insights into this diverse field and from which key references and contacts can be drawn. Aspects of biology, biotechnology, polymer synthesis, polymer processing and engineering, mechanical properties and biophysics are addressed to varying degrees for the specific biopolymers. The volume can be used as a reference book or as a teaching text. At the more practical level, the range of important materials derived from renewable resources is both extensive and impressive. Gels, additives, fibers, coatings and films are generated from a variety of the biopolymers reviewed in this volume. These polymers are used in commodity materials in our everyday lives, as well as in specialty products.

This new volume explores the latest research on the use of alginate as a biopolymer in various biomedical applications and therapeutics. The uses of alginates and modified alginates discussed in this book include tissue regeneration, encapsulation and delivery of drugs, nucleic acid materials, proteins and peptides, genes, herbal therapeutic agents, nutraceuticals, and more. This book also describes the synthesis and characterizations of various alginate and modified alginate systems, such as hydrogels, gels, composites, nanoparticles, scaffolds, etc., used for the biomedical applications and therapeutics. Alginate, a biopolymer of natural origin, is of immense interest for its variety of applications in pharmaceuticals (as medical diagnostic aids) and in materials science. It is the one of the most abundant natural biopolymers and is considered an excellent excipient because of its non-toxic, stable, and biodegradable properties. Several research innovations have been made on applications of alginate in drug delivery and biomedicines. There needs to be a thorough understanding of the synthesis, purification, and characterization of alginates and its derivatives for their utility in healthcare fields, and this volume offers an abundance of information toward that end.

Tailor-Made and Functionalized Biopolymer Systems: For Drug Delivery and Biomedical Applications covers the design and application of these functionalized and tailor-made biopolymers and biopolymer systems intended for drug delivery and biomedical applications. Various concepts, design protocols and biomedical applications of tailor-made biopolymer systems are covered, guiding the reader from theoretical knowledge to practical application. Authored by an array of experts from global institutions, this book offers an interdisciplinary approach to how tailor-made biopolymers lead to novel drug delivery and treatment solutions. This will be a useful reference to a broad audience, including biomedical engineers, materials scientists, pharmacologists and chemists. Provides a concise overview of tailor-made and functionalized biopolymer systems for biomedical applications Covers a range of modified biopolymers, biopolymeric composites and biopolymer-based systems in drug delivery, development of artificial organs, diagnostic applications, and more Describes characterization, synthesis and functionalization of biopolymers and biopolymers systems

Biopolymer-Based Nanomaterials in Drug Delivery and Biomedical Applications presents a clear and detailed body of information on biopolymer chemistry and polymer sciences in drug delivery. The book covers the recently reported nanomaterials consisting of biopolymers such as polysaccharides (i.e., plant, animal, bacteria, algae and fungi-derived) and proteins in terms of their structures, synthetic protocols and characterizations. In addition, their applications as therapeutic drug and gene delivery carriers and in other biomedical fields are reviewed. This book compiles chapters contributed by internationally renowned scholars working in biopolymer-based nanomaterials, offering a wide vision on the new and ongoing potential of different biopolymeric nanomaterials. The information related to concepts, design protocols and applications of biopolymer-based nanoplateforms is presented here, with detailed chapters on Pectin based nanomaterials, Konjac glucomannan based nanomaterials, Guar gum-based nanomaterials, tailor-made gum Arabic based nanomaterials, among others. Such systems are widely being used as functional materials for drug delivery and other therapeutic applications. Provides a critical and detailed examination in the recent development of biopolymer-based nanomaterials Focuses on modified biopolymer-based, diverse cutting-edge techniques in drug delivery and biomedical applications Assesses the opportunities and challenges of biopolymer-based nano-carriers in pharmaceutical and biomedical fields

Biopolymers Online provides a comprehensive overview of the occurrence, metabolism, and applications of all important biopolymer classes. This reference work treats processes for biotechnological production, isolation from organisms and modification, material properties and technical uses in areas such as chemical and food industries, medicine, pharmacy, and materials science.

Natural Polysaccharides in Drug Delivery and Biomedical Applications provides a fundamental overview of natural polysaccharides, their sources, extraction methodologies, and characterizations. It covers specific natural polysaccharides and their effective application in drug delivery and biomedical use. Additionally, chapters in the book discuss key topics including the sources and extraction methodologies of natural polysaccharides, their role in tissue engineering applications, polysaccharide-based nanoparticles in biomedical applications, and their role in the delivery of anticancer drugs. Written by industry leaders and edited by experts, this book emphasizes recent advances made in the field. Natural Polysaccharides in Drug Delivery and Biomedical Applications provides academics, researchers, and pharmaceutical health care professionals with a comprehensive book on polysaccharides in pharmaceutical delivery

process. Provides fundamental concepts of natural polysaccharides as it applies to the pharmaceutical, biomedical, and biotechnology industries Includes contributions from global leaders and experts from academia, industry, and regulatory agencies in the application of natural polysaccharides in pharmaceutical products and biomedical utilization Offers practical examples, illustrations, chemical structures, and research case studies to help explain natural polysaccharides concepts in drug delivery and biomedical applications

Handbook of Polymers, Third Edition, presents normalized, up-to-date polymer data in a consistent and easily referenceable layout. This new edition represents an update of the available data, including new values for many commercially available products, verification of existing data, and removal of older data where it is no longer useful. Polymers selected for this edition include all primary polymeric materials used by the plastics and chemical industries as well as specialty polymers used in the electronics, pharmaceutical, medical, and aerospace fields, with extensive information also provided on biopolymers. The book includes data on all major polymeric materials used by the plastics industry and all branches of the chemical industry, as well as specialty polymers used in the electronics, pharmaceutical, medical, and space fields. The entire scope of the data is divided into sections to make data comparison and search easy, including synthesis, physical, mechanical, and rheological properties, chemical resistance, toxicity, environmental impact, and more. The data enables engineers and materials scientists to solve practical problems, be that in applications, research and development, or legislation. The most current grades of materials have been selected to provide readers with information that is characteristic of currently available products. Provides key data on all primary polymeric materials used in a wide range of industries and applications Easy-to-access with data divided into sections making comparisons and search simple and intuitive Includes data on general properties, history, synthesis, structure, physical properties, mechanical properties, chemical resistance, flammability, weather stability, toxicity, and more The concept of focal controlled drug delivery has been applied for treating illnesses that are localized to a certain tissue or organ. These delivery systems are applied directly to the diseased site and deliver a desired dose for an extended time period while minimizing systemic distribution of toxic drug. Controlled drug delivery systems have been focused on oral extended release formulations and on systemic delivery of small drugs and peptides. Despite the upsurge of interest in focal targeted drug delivery, there is currently no single reference text on the subject. By comparison, there are numerous authored and edited books on oral, systemic and transdermal drug delivery or books on biodegradable polymers as drug carriers. Thus, the aim of Focal Drug Delivery is to bring together leading experts and researchers in the field to provide an authoritative account of the essential pharmaceutical, technological, physiological and biological sciences underpinning the topic. In addition, the book will review advances in treatment options for diseases localized at a certain tissue or organ.

Protein-Based Biopolymers: From Source to Biomedical Applications provides an overview on the development and application of protein biopolymers in biomedicine. Protein polymers have garnered increasing focus in the development of biomedical materials, devices and therapeutics due to their intrinsic bioactivity, biocompatibility and biodegradability. This book comprehensively reviews the latest advances on the synthesis, characterization, properties and applications of protein-based biopolymers. Each chapter is dedicated to a single protein class, covering a broad range of proteins including silk, collagen, keratin, fibrin, and more. In addition, the book explores the biomedical potential of these polymers, from tissue engineering, to drug delivery and wound healing. This book offers a valuable resource for academics and researchers in the fields of materials science, biomedical engineering and R&D groups working in pharmaceutical and biomedical industries. Covers a range of protein-based biopolymers, including elastin, collagen, keratin, soy and more Guides the reader through the fabrication, characterization and properties of protein biopolymers Explores the biomedical potential of protein biopolymers, covering applications such as cancer therapy, tissue engineering and drug delivery

Offers a comprehensive guide to the isolation, properties and applications of chitin and chitosan Chitin and Chitosan: Properties and Applications presents a comprehensive review of the isolation, properties and applications of chitin and chitosan. These promising biomaterials have the potential to be broadly applied and there is a growing market for these biopolymers in areas such as medical and pharmaceutical, packaging, agricultural, textile, cosmetics, nanoparticles and more. The authors – noted experts in the field – explore the isolation, characterization and the physical and chemical properties of chitin and chitosan. They also examine their properties such as hydrogels, immunomodulation and biotechnology, antimicrobial activity and chemical enzymatic modifications. The book offers an analysis of the myriad medical and pharmaceutical applications as well as a review of applications in other areas. In addition, the authors discuss regulations, markets and perspectives for the use of chitin and chitosan. This important book: Offers a thorough review of the isolation, properties and applications of chitin and chitosan. Contains information on the wide-ranging applications and growing market demand for chitin and chitosan Includes a discussion of current regulations and the outlook for the future Written for Researchers in academia and industry who are working in the fields of chitin and chitosan, Chitin and Chitosan: Properties and Applications offers a review of these promising biomaterials that have great potential due to their material properties and biological functionalities.

Polymeric Site-Specific Pharmacotherapy Edited by A. J. Domb The Hebrew University of Jerusalem, Israel This unique edited volume provides a comprehensive overview of site-specific drug delivery using polymeric implant devices. From the basic concept of localized drug delivery to major applications under active research, the subject is treated from a theoretical and practical viewpoint. Coverage includes the design, development and applications of polymeric devices, including suitable polymers, delivery systems and mechanisms of drug release. Recent advances and ongoing research are included and many subjects are reviewed here for the first time. Contributed to by an international team of acknowledged experts, this volume will have broad appeal amongst researchers, both in academia and industry, with an

interest in polymer chemistry, biopolymers, pharmaceutical analysis, pharmacology, bioengineering, and medical and organic chemistry. Contents include: Implantable Biodegradable Polymers for Site-specific Drug Delivery A. J. Domb; Drug Release and Tissue Distribution from a Polymer Implant M. L. Radomsky; Modelling of Drug Delivery to Brain Tissue G. D. Lapin; Polymer Conjugated Macromolecular Drugs for Tumor Specific Targeting H. Maeda; Drug Delivery to the Brain H. Brem, K. A. Walter, R. J. Tamargo, A. Olivi and R. Langer; Microparticulate Systems for Site-specific Therapy — Bone Marrow Targeting C. J. Porter, M. C. Davies, S. S. Davies and L. Illum; Drug Delivery to the Lung K. C. Meyer, W. Auerbach and R. Auerbach; Polymers for the Prevention of Surgical Adhesions A. J. Domb and D. Wiseman This new Handbook provides engineers and scientists with the information and practical guidance needed to successfully design and manufacture products using biopolymers and biodegradable plastics. Biopolymers and biodegradable plastics are a hot issue across the plastics industry, and for many of the industry sectors that use plastic: from packaging to medical devices and from the construction industry to the automotive sector. This book brings together in one place a number of key biopolymer and biodegradable plastics topics-in chapters previously published as well as updated and new chapters-for a broad audience of engineers of and scientists, especially those designing with biopolymers and biodegradable plastics or evaluating the options for switching from traditional plastics to biopolymers. Topics covered include preparation, fabrication, applications and recycling (including biodegradability and compostability). Applications in key areas such as films, coatings, controlled release, and tissue engineering are discussed.

Biopolymers: Applications and Trends provides an up-to-date summary of the varying market applications of biopolymers characterized by biodegradability and sustainability. It includes tables with the commercial names and properties of each biopolymer family, along with biopolymers for each marketing segment, not only presenting all the major market players, but also highlighting trends and new developments in products. The book includes a thorough breakdown of the vast range of application areas, including medical and pharmaceutical, packaging, construction, automotive, and many more, giving engineers critical materials information in an area which has traditionally been more limited than conventional polymers. In addition, the book uses recent patent information to convey the latest applications and techniques in the area, thus further illustrating the rapid pace of development and need for intellectual property for companies working on new and innovative products. Provides an up-to-date summary of the varying market applications of biopolymers characterized by biodegradability and sustainability Includes tables with the commercial names and properties of each biopolymer family, along with biopolymers for each marketing segment Presents a thorough breakdown of the vast range of application areas, including medical and pharmaceutical, packaging, construction, automotive, and many more Uses recent patent information to convey the latest applications and techniques in the area, thus further illustrating the rapid pace of development and need for intellectual property

This handbook focuses on biopolymers for both environmental and biomedical applications. It shows recent advances in technology in all areas from chemical synthesis or biosynthesis to end use applications. These areas have not been covered in a single book before and they include biopolymers for chemical and biotechnological modifications, material structures, characterization, processing, properties, and applications. After the introduction which summarizes the importance of biopolymer in the market, the book covers almost all the topics related to polysaccharides, biofibers, bioplastics, biocomposites, natural rubber, gums, bacterial and blood compatible polymers, and applications of biopolymers in various fields.

In recent years, the increasing public concern about the environmental pollution caused by persistent plastic wastes has stimulated the interest in replacing synthetic polymers by biopolymers. The term biopolymer refers to polymers that are renewable or biodegradable or both. Biopolymers are capable of bio-assimilation at accelerated rates so they are biocompatible with the environment. Furthermore, their sustainability is of exceptional interest; the renewable origin of biopolymers makes them inexhaustible in contrast with the uncertain accessibility at medium-term of synthetic polymers produced from fossil sources. Nevertheless, biopolymers often have inferior properties compared to commodity polymers. Modification is a way to improve properties and achieve property combinations required for specific applications. Therefore the synthesis, characterization and property evaluation of new biopolymer derivatives are essential tasks that have to be done for the development of new materials able to replace the traditional plastics in areas such as industrial, medical, food, consumer products, and pharmaceutical applications. In the present Thesis, the chemical modification of two kinds of carboxylic biopolymers has been studied to respond to the necessity of creating new biopolymer derivatives with advanced properties at reasonable cost. Poly (γ -glutamic acid) (PGGA) and hyaluronic acid (HyA) were the biopolymers selected in this Thesis for their capacity to form stable ionic complexes with cationic surfactants to generate stable materials with new properties. These complexes are currently object of intensive research in our group due to their outstanding features. They are easily prepared and they tend to be self-assembled in well-ordered amphiphilic structures able to respond reversibly to thermal effects. This behaviour is of high scientific interest and also of practical relevance in the design of medical devices for thermally and chemically controlled store and delivery of drugs. The main goal of this Thesis is the preparation of ionic complexes of the two mentioned polyacids using different cationic surfactants depending on the desired final properties. The first part of the work is devoted to provide physicochemical knowledge of the structure and properties of alkyltrimethylphosphonium surfactants which have potential interest for novel applications. Then these surfactants were coupled to both PGGA and HyA to obtain the respective ionic complexes with biocide activity and thermal stability higher than those made by their ammonium analogs. PGGA complexes, abbreviated as nATMP-PGGA, have high interest as food preserving and packaging applications displaying as main advantage the edibility of the polymer and the possibility of improving their basic properties through blending with nanoclays. On the other hand, HyA complexes, nATMP-HyA, are useful to obtain HyA derivatives with antimicrobial activity. In addition, the preparation of nanoparticles of nATMP-HyA with antimicrobial properties was feasible using the ionotropic gelation method. The second part of the Thesis was devoted to the preparation of "greener" complexes of hyaluronic acid. For this regard, alkanoylcholine surfactants were used to prepare the ionic complexes nACh-HyA. These complexes constitute a highly promising biocompatible/biodegradable platform for the design of systems suitable for drug transport and targeting delivery in anticancer chemotherapy because it was demonstrated that non-cytotoxic nanoparticles can be

prepared from these systems. The third part of the Thesis is dedicated to the preparation of biocompatible antimicrobial complexes using as cationic surfactant one of the most potent food preservative agents that is known today, that is the ethyl alpha-N-lauroyl L-arginate chloride surfactant (also known as LAE). These complexes (LAE-PGGA and LAE-HyA) are shown to be potential candidates to develop antimicrobial materials.

This informative and state-of-the-art book on Infrared Spectroscopy is addressed to Researchers in Medicine as well as to Pharmaceutical Industry and Agriculture. It features 7 specialized chapters of MIRS and NIRS covering applications in proteins and biopolymers; food quality research and food safety applications; and medical applications, such as Down syndrome disorders of tooth, probing of brain oxygen, the role of CO₂ in blood pressure and diagnosis of metastatic cancer. This book highlights the span of modern Infrared applications.

Chitosan in Biomedical Applications provides a thorough insight into the complete chitosan chemistry, collection, chemical modifications, characterization and applications of chitosan in biomedical applications and healthcare fields. Chitosan, a biopolymer of natural origin, has been explored for its variety of applications in biomedical research, medical diagnostic aids and material science. It is the second most abundant natural biopolymer after cellulose, and considered as an excellent excipient because of its non-toxic, stable, biodegradable properties. Several research innovations have been made on applications of chitosan in biomedical applications. The book explores key topics, such as molecular weight, degree of deacetylation, and molecular geometry, along with an emphasis on recent advances in the field written by academic, industry, and clinical researchers. Chitosan in Biomedical Applications will be of interest to those in biomedical fields including the biomaterials and tissue engineering community investigating and developing biomaterials for biomedical applications, particularly graduate students, young faculty and others exploring chitosan-based materials. Provides methodology for the design, development and selection of chitosan in biomedical applications 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 Plant and Algal Hydrogels for Drug Delivery and Regenerative Medicine offers a materials-focused and systematic overview of biopolymeric hydrogels utilized for biomedical applications. The book details the synthesis and characterization of plant and algal-based hydrogels, with each chapter addressing a separate polysaccharide hydrogel type. Specific applications in drug delivery and regenerative medicine are also discussed, highlighting the efficacy, biocompatibility, benefits and challenges for each polysaccharide hydrogel subtype. There is increasing demand for biomaterials which reduce/prevent the host response, inflammation and rejection, hence this book provides a timely resource. Biopolymeric hydrogels have skyrocketed because of their necessity in in vivo applications. They create an environment similar to living tissue, which is both biocompatible and biodegradable. Plant and algal polysaccharides in particular are well-equipped with functional groups that are easily modified for beneficial results. Systematically covers each plant and algal polysaccharide hydrogel subtype, from starch-based hydrogels to pectin and alginate-based hydrogels Provides an end-to-end description of the synthesis, characterization and application of biopolymeric hydrogels for drug delivery and regenerative medicine Appeals to a diverse readership, including those in biomedicine, pharmacy, polymer chemistry, biochemistry, materials science, biomedical engineering, and other biotechnology related disciplines

This book cover all types of microbe based polymers and their application in diverse sectors with special emphasis on agriculture. It collates latest research, methods, opinion, perspectives, and reviews dissecting the microbial origins of polymers, their production, design, and processing at industrial level, as well as improvements for specific industrial applications. Book also discusses recent advances in biopolymer production and their modification for amplifying the value. In addition, understanding of the microbial physiology and optimal conditions for polymer production are also explained. This compilation of scientific chapters on principles and practices of microbial polymers fosters the knowledge transfer among scientific communities, industries, and microbiologist and serves students, academicians, researchers for a better understanding of the nature of microbial polymers and application procedure for sustainable ecosystem.

Nanoparticles for Gene Delivery into Stem Cells and Embryos, by Pallavi Pushp, Rajdeep Kaur, Hoon Taek Lee, Mukesh Kumar Gupta. Engineering of Polysaccharides via Nanotechnology, by Joydeep Dutta. Hydroxyapatite-Packed Chitosan-PMMA Nanocomposite: A Promising Material for Construction of Synthetic Bone, by Arundhati Bhowmick, Subhash Banerjee, Ratnesh Kumar, Patit Paban Kundu. Biodegradable Polymers for Potential Delivery Systems for Therapeutics, by Sanjeev K. Pandey, Chandana Haldar, Dinesh K. Patel, Pralay Maiti. Phytomedicine-Loaded Polymeric Nanomedicines: Potential Cancer Therapeutics, by S. Maya, M. Sabitha, Shantikumar V. Nair, R. Jayakumar. Proteins and Carbohydrates as Polymeric Nanodrug Delivery Systems: Formulation, Properties and Toxicological Evaluation, by Dhanya Narayanan, J. Gopikrishna, Shantikumar V. Nair, Deepthy Menon. Biopolymeric Micro and Nanoparticles: Preparation, Characterization and Industrial Applications, by Anil Kumar Anal, Alisha Tuladhar. Applications of Glyconanoparticles as "Sweet" Glycobiological Therapeutics and Diagnostics, by Naresh Kottari, Yoann M. Chabre, Rishi Sharma, René Roy.

This book is focused on marine based biomedical carriers for delivery of therapeutics. Marine biomaterials and bio-based carriers show wide applications in pharmaceutical as well as biomedical fields for delivery of small and large molecules. Biomaterial-based composites, scaffolds or matrix systems are promising systems for controlled and prolonged release of drug in target site and control the premature release of drugs or bioactive compounds. This book discusses the targeted delivery of drugs and therapeutic applications. It also describes the use of marine biopolymers in cancer therapy. Different chapters describe the tissue engineering techniques to develop these carriers. The marine biomaterial-based systems are widely used for tissue engineering, and biomedical imaging. This book is meant for industry experts, students and researchers in the area of pharmaceutical sciences, biomedical engineering and material science and pharmacology.

This book summarizes the recent advances in applications of starch in state-of-the-art drug carriers (hydrogel, micro- and nano-particulate carriers) with stimulus-responsive and target-specific properties. It also highlights the role of starch and its derivatives in transmucosal administration to improve the bioavailability of drugs. Further, it outlines the principles of effective, advanced, starch-based drug delivery systems and illustrates how these principles are key to the development of future drug delivery strategies. This interesting reference resource is useful for students, researchers and engineers in the fields of carbohydrate chemistry, polymer sciences and drug delivery.

The text focuses on the basic issues and also the literature of the past decade. The book provides a broad overview of

functional synthetic polymers. Special issues in the text are: Surface functionalization supramolecular polymers, shape memory polymers, foldable polymers, functionalized biopolymers, supercapacitors, photovoltaic issues, lithography, cleaning methods, such as recovery of gold ions olefin/paraffin, separation by polymeric membranes, ultrafiltration membranes, and other related topics.

This book presents the latest technological advances in Raman spectroscopy that are presently redrawing the landscape of many fields of biomedical and pharmaceutical R&D. Numerous examples are given to illustrate the application of the new methods.

Biopolymers including natural (e.g., polysaccharides, proteins, gums, natural rubbers, bacterial polymers), synthetic (e.g., aliphatic polyesters and polyphosphoester), and biocomposites are of paramount interest in regenerative medicine, due to their availability, processability, and low toxicity. Moreover, the structuration of biopolymer-based materials at the nano- and microscale along with their chemical properties are crucial in the engineering of advanced carriers for drug products. Finally, combination products including or based on biopolymers for controlled drug release offer a powerful solution to improve the tissue integration and biological response of these materials. Understanding the drug delivery mechanisms, efficiency, and toxicity of such systems may be useful for regenerative medicine and pharmaceutical technology.

This book explores in depth a wide range of functional biomaterials-based systems for drug, gene delivery, and biomedical aspects. The chapters cover newer technologies such as polymeric micelle, pH-responsive biomaterials, stimuli-responsive hydrogels, silk fibroin, inorganic biomaterials, synthetic biomaterials, 3D printed biomaterials, metallic biomaterials, ceramic and hybrid biomaterials. It also describes the theranostic approaches for cancer therapy, the biomaterials-based nanofibers scaffolds in tissue engineering, as well as the strategies applications of metallic biomaterials for the medical and dental prosthetic field. This newer and updated approach will be attractive for biomedical engineering students working on materials science in the development of novel drug delivery strategies. The book will be an important reference for researchers and professionals working on biomaterial research in the pharmaceutical and medical fields.

This volume collected from papers presented at the International conference and exhibition on Pharmaceutical Sciences and Technology (PST 2019) which was held during 18-19th June 2019, Bangkok, Thailand. The theme of the conference is "Pharmaceutical Engineering and Pharmaceutical Science for Human Health". This research collection brings together multidisciplinary research results covering the researches in the field of pharmaceutical biopolymers, materials for biomedical application, cosmetic science, materials for nanomedicine as well as technologies of their modification and processing. We hope this collection will be useful for many specialists from pharmacology and biomedicine.

During the past few decades, much research has been reported on the formation of insoluble monomolecular films of lipids and biopolymers (synthetic polymers and proteins) on the surface of water or at the oil-water interface. This interest arises from the fact that monomolecular film studies have been found to provide much useful information on a molecular scale, information that is useful for understanding many industrial and biological phenomena in chemical, agricultural, pharmaceutical, medical, and food science applications. For instance, information obtained from lipid monolayer studies has been useful in determining the forces that are known to stabilize emulsions and biological cell membranes. The current texts on surface chemistry generally devote a single chapter to the characteristics of spread monolayers of lipids and biopolymers on liquids, and a researcher may have to review several hundred references to determine the procedures needed to investigate or analyze a particular phenomenon. Furthermore, there is an urgent need at this stage for a text that discusses the state of the art regarding the surface phenomena exhibited by lipids and biopolymers, as they are relevant to a wide variety of surface and interfacial processes.

Polymeric Biomaterials for Healthcare Applications details a broad range of polymeric biomaterials, methods of synthesis and preparation, and their various applications in healthcare and biomedicine. Natural and organic polymeric biomaterials play an essential role in preventing and treating a variety of health issues. There is a need to thoroughly cover processing of polymers used in medicine; this book covers a very broad range of different polymers, from polymer nanoparticles and conjugates, to natural biopolymers and temperature-sensitive polymers. This book provides a fundamental overview of polymers and processing technologies to allow clinical scientists to explore the use of these polymers in alternative applications. A particular challenge right now is the development of polymers and processing methods that can be sterilized using methods that are acceptable to the regulator - each chapter of the book covers this challenge in relation to a specific polymer class. A wide variety of healthcare applications are depicted, including treatment for autoimmune diseases and bacterial infections; tissue engineering, gene delivery, wound dressing and more. Polymeric Biomaterials for Healthcare Applications provides a core introductory text for clinical and materials scientists new to the area of polymeric biomaterials, as well as a detailed insight of how to use these materials in healthcare applications. This book will prove useful to academics and researchers in materials science, biomedical engineering, clinical science and pharmaceutical science. Covers a broad range of polymeric biomaterials, including chitosan, alginate, cellulose, collagen, synthetic conjugates and more Details a wide variety of healthcare applications for polymeric biomaterials, such as orthopaedic engineering, antibiotics, targeted drug delivery and so on Provides a detailed overview of polymer processing technologies, and sterilization considerations

Biopolymers remain a hot topic, with major medical and pharmaceutical industries turning to natural materials and their unique properties with regard to biodegradability and resorbability. This two-volume handbook compiles a selection of important substances successfully being used in medicine and pharmacy with articles taken directly from the Biopolymers series.

"Biopolymers" are polymeric materials of biological origin, including globular, membrane, and fibrous proteins, polypeptides, nucleic acids, polysaccharides, lipids, etc. and their assembly, although preference to respective subjects may be different among readers who are more interested in their biological significance or industrial and/or medical applications. Nevertheless, characterizing or revealing their secondary structure and dynamics may be an equally very important and useful issue for both

kinds of readers. Special interest in revealing the 3D structure of globular proteins, nucleic acids, and peptides was aroused in relation to the currently active Structural Biology. X-ray crystallography and multidimensional solution NMR spectroscopy have proved to be the standard and indispensable means for this purpose. There remain, however, several limitations to this end, if one intends to expand its scope further. This is because these approaches are not always straightforward to characterize fibrous or membrane proteins owing to extreme difficulty in crystallization in the former, and insufficient spectral resolution due to sparing solubility or increased effective molecular mass in the presence of surrounding lipid bilayers in the latter.

Provides insight into biopolymers, their physicochemical properties, and their biomedical and biotechnological applications This comprehensive book is a one-stop reference for the production, modifications, and assessment of biopolymers. It highlights the technical and methodological advancements in introducing biopolymers, their study, and promoted applications. "Biopolymers for Biomedical and Biotechnological Applications" begins with a general overview of biopolymers, properties, and biocompatibility. It then provides in-depth information in three dedicated sections: Biopolymers through Bioengineering and Biotechnology Venues; Polymeric Biomaterials with Wide Applications; and Biopolymers for Specific Applications. Chapters cover: advances in biocompatibility; advanced microbial polysaccharides; microbial cell factories for biomanufacturing of polysaccharides; exploitation of exopolysaccharides from lactic acid bacteria; and the new biopolymer for biomedical application called nanocellulose. Advances in mucin biopolymer research are presented, along with those in the synthesis of fibrous proteins and their applications. The book looks at microbial polyhydroxyalkanoates (PHAs), as well as natural and synthetic biopolymers in drug delivery and tissue engineering. It finishes with a chapter on the current state and applications of, and future trends in, biopolymers in regenerative medicine. * Offers a complete and thorough treatment of biopolymers from synthesis strategies and physicochemical properties to applications in industrial and medical biotechnology * Discusses the most attracted biopolymers with wide and specific applications * Takes a systematic approach to the field which allows readers to grasp and implement strategies for biomedical and biotechnological applications "Biopolymers for Biomedical and Biotechnological Applications" appeals to biotechnologists, bioengineers, and polymer chemists, as well as to those working in the biotechnological industry and institutes.

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