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# **Liposomes**

## ***Methods and Protocols***

**Volume 1: Pharmaceutical Nanocarriers**

**Edited by**

**Volkmar Weissig**



**Humana Press**

# Liposomes Methods And Protocols Volume 1 Pharmaceutical Nanocarriers Methods In Molecular Biology

**Rumiana Dimova, Carlos Marques**



## **Liposomes Methods And Protocols Volume 1 Pharmaceutical Nanocarriers Methods In Molecular Biology:**

**Liposomes** Volkmar Weissig, 2010-04-29 Efforts to describe and model the molecular structure of biological membranes go back to the beginning of the last century. In 1917 Langmuir described membranes as a layer of lipids one molecule thick. Eight years later Gorter and Grendel concluded from their studies that the phospholipid molecules that formed the cell membrane were arranged in two layers to form a lipid bilayer. Danielli and Robertson proposed in 1935 a model in which the bilayer of lipids is sequestered between two monolayers of unfolded proteins, and the currently still accepted fluid mosaic model was proposed by Singer and Nicolson in 1972. Among those landmarks of biomembrane history a serendipitous observation made by Alex Bangham during the early 1960s deserves undoubtedly a special place. His finding that exposure of dry phospholipids to an excess of water gives rise to lamellar structures has opened versatile experimental access to studying the biophysics and biochemistry of biological phospholipid membranes. Although during the following four decades biological membrane models have grown in complexity and functionality, liposomes are besides supported bilayers, membrane nanodiscs and hybrid membranes still an indisputably important tool for membrane biophysicists and biochemists. In vol II of this book the reader will find detailed methods for the use of liposomes in studying a variety of biochemical and biophysical membrane phenomena concomitant with chapters describing a great palette of state of the art analytical technologies.

**Liposomes** Volkmar Weissig, 2010 With nearly one hundred years of intensive study lipids have proven to be a vital and ever more promising area of cell biological research. In *Liposomes Methods and Protocols* leading experts in the related fields explore cutting edge experimental methods involving all aspects of lipids as essential components of the cell membrane. Volume 1 *Pharmaceutical Nanocarriers* focuses on the state of the art aspects of developing liposome based nanoscale drug delivery techniques delving into the depths of the emerging field of pharmaceutical and biomedical nanotechnology. As a volume in the highly successful *Methods in Molecular Biology*™ series the chapters include introductions to their respective topics, lists of the necessary materials and reagents, step by step readily reproducible laboratory protocols and notes on troubleshooting and avoiding known pitfalls. Comprehensive and authoritative *Liposomes Methods and Protocols* promises to be an essential source of practical know how for every investigator young and seasoned alike whose research area involves in one way or another phospholipids, glycolipids or cholesterol.

*Advances in Novel Phytopharmaceuticals* Durgesh Nandini Chauhan, Madhu Gupta, Vikas Sharma, Nagendra Singh Chauhan, 2024-12-19 *Advances in Novel Phytopharmaceuticals* covers the current aspects of the development of novel herbal formulations and summarizes their type of active components, biological activity, applications and toxicity associated with novel herbal formulations. Such distinct types of novel herbal formulations are described to have remarkable advantages over conventional formulations of plant actives and extracts. The book also covers the various herbal phytoconstituents used for novel drug delivery applications. These novel herbal formulations can be used more uprightly and with enhanced efficacy by

incorporating them into modern dosage forms This can be accomplished by designing novel drug delivery systems for herbal ingredients This book provides key information for everyone interested in novel phytodrug delivery systems and drug discovery including medicinal chemists cosmetic experts nutritionists toxicologists drug formulators and healthcare professionals Students professors and researchers working in pharmaceutical sciences and beyond will also find the book useful We will also focus on patent filed technology transfer market potential and regulatory aspects of herbal nanomedicines if any Research in this area is still in the exploratory stage and in the market there are no books available that summarize all the contents of the research As such we will try to make our full contribution to this area This book is the continuation of a first volume and readers and the target audience will gain all the latest knowledge in the subject Aims and scope To understand the basic information and application of phytoconstituents To understand the various phytoconstituents based formulations for disease management To understand the herbal drugs used for cosmetic applications To understand the phytodrug delivery systems and their applications To provide detailed knowledge about the technical aspects of formulation To update readers with the latest research progress in this emerging research area To provide the details about the patents filed technology transfer market potential and regulatory aspects for the same Food Formulation Shivani

Pathania, Brijesh K. Tiwari, 2021-02-26 Reviews innovative processing techniques and recent developments in food formulation identification and utilization of functional ingredients Food Formulation Novel Ingredients and Processing Techniques is a comprehensive and up to date account of novel food ingredients and new processing techniques used in advanced commercial food formulations This unique volume will help students and industry professionals alike in understanding the current trends emerging technologies and their impact on the food formulation techniques Contributions from leading academic and industrial experts provide readers with informed and relevant insights on using the latest technologies and production processes for new product development and reformulations The text first describes the basis of a food formulation including smart protein and starch ingredients healthy ingredients such as salt and sugar replacers and interactions within the food components Emphasizing operational principles the book reviews state of the art 3D printing technology encapsulation and a range of emerging technologies including high pressure pulsed electric field ultrasound and supercritical fluid extraction The final chapters discuss recent developments and trends in food formulation from foods that target allergies and intolerance to prebiotic and probiotic food formulation designed to improve gut health A much needed reference on novel sourcing of food ingredients processing technologies and application this book Explores new food ingredients as well as impact of processing on ingredient interactions Describes new techniques that improve the flavor and acceptability of functional food ingredients Reviews mathematical tools used for recipe formulation process control and consumer studies Includes regulations and legislations around tailor made food products Food Formulation Novel Ingredients and Processing Techniques is an invaluable resource for students educators researchers food technologists and

professionals engineers and scientists across the food industry

**Liposomes** Volkmar Weissig, 2009-12-18 Efforts to describe and model the molecular structure of biological membranes go back to the beginning of the last century In 1917 Langmuir described membranes as a layer of lipids one molecule thick 1 Eight years later Gorter and Grendel concluded from their studies that the phospholipid molecules that formed the cell membrane were arranged in two layers to form a lipid bilayer 2 Danielli and Robertson proposed in 1935 a model in which the bilayer of lipids is sequestered between two monolayers of unfolded proteins 3 and the currently still accepted fluid mosaic model was proposed by Singer and Nicolson in 1972 4 Among those landmarks of biomembrane history a serendipitous observation made by Alex Bangham during the early 1960s deserves undoubtedly a special place His finding that exposure of dry phospholipids to an excess of water gives rise to lamellar structures 5 has opened versatile experimental access to studying the biophysics and biochemistry of biological phospholipid membranes Although during the following 4 decades biological membrane models have grown in complexity and functionality 6 liposomes are besides supported bilayers membrane nanodiscs and hybrid membranes still an indisputably important tool for membrane biophysicists and biochemists In vol II of this book the reader will find detailed methods for the use of liposomes in studying a variety of biochemical and biophysical membrane phenomena concomitant with chapters describing a great palette of state of the art analytical technologies

**Liposomes** Gerard G.M. D'Souza, Hongwei Zhang, 2023-02-13 This third edition provides new and updated chapters detailing preparation of liposomes physicochemical characterization of liposomes lipid analysis drug encapsulation surface modification stimuli response as well as cellular interaction and biodistribution Also included is an updated chapter on the history and evolution of the field of liposomology Written in the format of the highly successful Methods in Molecular Biology series each chapter includes an introduction to the topic lists necessary materials and reagents includes tips on troubleshooting and known pitfalls and step by step readily reproducible protocols Authoritative and cutting edge Liposomes Methods and Protocols Third Edition aims to serve as a reference for graduate students post doctoral researchers as well as established investigators utilizing lipid based systems

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Nanotechnology in Edible Food Packaging Vimal Katiyar, Tabli Ghosh, 2021-02-23 p This volume delivers a systematic

overview of nanotechnology in the development of edible food packaging with noteworthy characteristics for improved food quality. It covers current research trends, history, outlines, and state of the global market in combination with associated biomaterials and synthesis strategies. The contents detail the use of various emerging bionanostructured materials such as cellulose nanostructures, chitosan nanostructures, and more. It further deliberates an in-depth discussion on various synthesis strategies and routes for the development of edible food packaging in terms of utilizing various nanosystems such as polymeric nanocomposites, nanoencapsulation systems, nanoemulsion systems, and others. Further, it also discusses experimental practices for bionanostructured and edible packaging materials to check the effectivity in terms of offering enhanced shelf life of food products. It also touches upon the socio-techno challenges in line with developing edible packaging materials using nanotechnology for high performance packaging application. The book is an excellent guide for both the academia and industry, especially early career professionals in edible food packaging sectors for selecting proper biomaterial involving biofillers, modifiers, cross linkers, compatibilizers, and others to enhance the property of edible food packaging for targeted features.

**Nanocarriers for Drug-Targeting Brain Tumors** Lalit Kumar, Yashwant Pathak, 2022-06-21

Nanocarriers for Drug Targeting Brain Tumors covers different types of nanocarriers and their design and development for targeting drugs to the brain. The book also presents case studies and the mechanism of action of nanocarriers in drug targeting to a specific site. This helps researchers and clinicians understand the design, development, and mechanism of action of nanocarriers. As brain tumors continue to be a significant health problem globally and very complex for targeting drugs, conventional dosage forms are not very effective and side effects are a major concern. Functionalized nanocarriers can address these problems. Furthermore, the targeting of nanocarriers is preferred for reducing toxicity and improving the effectiveness of the drugs. However, there is a need for understanding the design and development of formulation with the mechanism of action of nanocarriers for brain targeting. Provides information on the design and development of nanocarriers for targeting brain tumors. Outlines the working principles of different nanocarriers for targeting brain tumors. Includes case studies of different nanocarriers for targeting brain tumors.

**The Giant Vesicle Book** Rumiana Dimova, Carlos

Marques, 2019-11-19. Giant vesicles are widely used as a model membrane system both for basic biological systems and for their promising applications in the development of smart materials and cell mimetics as well as in driving new technologies in synthetic biology and for the cosmetics and pharmaceutical industry. The reader is guided to use giant vesicles from the formation of simple membrane platforms to advanced membrane and cell system models. It also includes fundamentals for understanding lipid or polymer membrane structure, properties, and behavior. Every chapter includes ideas for further applications and discussions on the implications of the observed phenomena towards understanding membrane-related processes. The Giant Vesicle Book is meant to be a road companion, a trusted guide for those making their first steps in this field as well as a source of information required by experts.

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Radiopharmaceuticals in Oncology and Neurology Françoise Kraeber-Bodéré, Jacques Barbet, Michel Chérel, Denis Guilloteau, 2017-05-03 The aim of this Research Topic was to assemble a series of articles describing basic preclinical and clinical research studies on radiopharmaceuticals and nuclear medicine The articles were written by attendees of the third Nuclear Technologies for Health Symposium NTHS 10th 11th March 2015 Nantes France under the auspices of the IRON LabEx Innovative Radiopharmaceuticals for Oncology and Neurology Laboratory of Excellence This French network gathering approximately 160 scientists from 12 academic research teams Funded by investissements d'Avenir fosters transdisciplinary projects between teams with expertise in chemistry radiochemistry radiopharmacy formulation biology nuclear medicine and medical physics The 12 articles within this resulting eBook present a series of comprehensive reviews and original research papers on multimodality imaging and targeted radionuclide therapy illustrating the different facets of studies currently conducted in these domains **Liposome Methods and Protocols** Subhash C. Basu, Manju

Basu, 2002-05-15 In vitro utilization of liposomes is now recognized as a powerful tool in many bioscience investigations and their associated clinical studies e.g. liposomes in drug targeting liposomes in gene transport across plasma and nuclear membranes liposomes in enzyme therapy in patients with genetic disorders However before these areas can be effectively explored many basic areas in liposome research require elucidation including a) attachment of liposomes to cell surfaces b) permeation of liposomes through the plasma membranes and c) stability of liposomes in cell or nuclear matrices None of these areas have been exhaustively explored and liposome researchers have ample opportunities to contribute to our knowledge The aim of Liposome Methods and Protocols is to bring together a wide range of detailed laboratory protocols covering different aspects of liposome biology in order to assist researchers in those rapidly advancing medical fields mentioned earlier With this goal in mind in each protocol chapter we have detailed the materials to be used followed by a step by step protocol The Notes section of each protocol is also certain to prove particularly useful since the authors include troubleshooting tips straight from their benchtops valuable information that is seldom given in restricted methods sections of standard research journals For this reason we feel that the book will prove especially useful for all researchers in the liposome field **Pharmaceutical Nanotechnology** Volkmar Weissig, Tamer Elbayoumi, 2020-08-14 This volume details

protocols on formulation surface modification characterization and application of a variety of pharmaceutical nanocarriers such as micelles nanoparticles dendrimers carbon dots polymersomes and others Chapters are targeted toward investigators

working in academic and industrial laboratories conducting research in the broad field of pharmaceutical sciences with an emphasis on drug delivery Written in the highly successful Methods in Molecular Biology series format chapters include introductions to their respective topics lists of the necessary materials and reagents step by step readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Authoritative and cutting edge Pharmaceutical Nanotechnology Basic Protocols aims to be a source of inspiration to all investigators who are interested in the potential of the merger of nanotechnology with pharmaceutical sciences      **Liposome Methods and Protocols** Subhash C. Basu, Manju Basu, 2002-05-15 In vitro utilization of liposomes is now recognized as a powerful tool in many bioscience investigations and their associated clinical studies e g liposomes in drug targeting liposomes in gene transport across plasma and nuclear membranes liposomes in enzyme therapy in patients with genetic disorders However before these areas can be effectively explored many basic areas in liposome research require elucidation including a attachment of liposomes to cell surfaces b permeation of liposomes through the plasma membranes and c stability of liposomes in cell or nuclear matrices None of these areas have been exhaustively explored and liposome researchers have ample opportunities to contribute to our knowledge The aim of Liposome Methods and Protocols is to bring together a wide range of detailed laboratory protocols covering different aspects of liposome biology in order to assist researchers in those rapidly advancing medical fields mentioned earlier With this goal in mind in each protocol chapter we have detailed the materials to be used followed by a step by step protocol The Notes section of each protocol is also certain to prove particularly useful since the authors include troubleshooting tips straight from their benchtops valuable information that is seldom given in restricted methods sections of standard research journals For this reason we feel that the book will prove especially useful for all researchers in the liposome field      Supramolecules in Drug Discovery and Drug Delivery Thomas Mavromoustakos, Andreas G. Tzakos, Serdar Durdagi, 2020-10-29 This detailed book aims to provide readers with critical information to accomplish the synthesis of nanosystems for the purpose of supramolecular entities complexing with drugs targeted drug delivery system characterization as well as the study of the physical chemical interactions that govern the stability and properties of these systems Beginning with a collection of chapters on drug delivery platforms such as cyclodextrins micelles liposomes polymeric nanotubes and more the volume continues with coverage of the study of nanotechnology systems using different biophysical techniques such as DSC ITC solid and liquid NMR spectroscopy and electrochemistry Written for the highly successful Methods in Molecular Biology series chapters include introductions to their respective topics lists of the necessary materials and reagents step by step readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Authoritative and practical Supramolecules in Drug Discovery and Drug Delivery Methods and Protocols serves as an ideal guide for researchers working toward drug delivery mechanisms that can tailor their physical chemical properties and enhance their efficacy while retaining their structures intact      *Liposome Methods And Protocols* Subhash C.



Basu, Manju Basu, 2009-02-01 Topics I Physical Properties 1 Preparation Isolation And Characterisation Of Liposomes Containing Natural And Synthetic Lipids 2 Preparation And Use Of Liposomes For The Study Of Sphingolipid Segregation In Membrane Model Systems II Liposome Fusion Modulation 3 Peptide Induced Fusion Of Liposomes 4 Liposomes Applications In Protein Lipid Interaction Studies 5 Lipids In Viral Fusion III Application Of Liposomes 6 Liposome Mediated Fluorescence Based Studies Of Sphingolipid Metabolism In Intact Cells 7 Micelles And Liposomes In Metabolic Enzyme And Glycolipid Glycosyl Transferase Assays

**Liposomes, Part A** Nejat Duzgunes, 2003-11-11 Liposomes are cellular structures made up of lipid molecules Important as a cellular model in the study of basic biology liposomes are also used in clinical applications such as drug delivery and virus studies Methods in Liposome Preparation Physiochemical Characterization of Liposomes

**Liposome Technology** Gregory Gregoriadis, 2016-04-19 Liposome Technology Volume I Liposome Preparation and Related Techniques Third Edition is a thoroughly updated and expanded new edition of a classic text in the field Including step by step technical details Volume I illustrates numerous methods for liposome preparation and auxiliary techniques necessary for the stabilization and characteriza

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**Liposomes** Angel Catala, 2019-09-04 Liposomes have received increased attention in recent years Nevertheless liposomes due to their various forms and applications require further investigation These structures can deliver both hydrophilic and hydrophobic drugs The preparation of liposomes results in different properties for these systems In addition there are many factors and difficulties that affect the development of liposome drug delivery structures The purpose of this book is to concentrate on recent developments in liposomes The articles collected in this book are contributions by invited researchers with long standing experience in different research areas We hope that the material presented here is understandable to a broad audience not only scientists but also people with a general background in many different biological sciences This volume offers up to date expert reviews of the fast moving field of liposomes and is divided in two major sections 1 Introduction 2 Liposomes general properties

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