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Book Review

Liposomes in Biomedical Applications
(Drug Targeting and Delivery, Volume 6)
Edited by Pang N. Shek
Published 1995 Harwood Academic Publishers, London
xiv + 286 pages ISBN 3 7186 5701 5 £72 $120

This book, volume six in the series Drug Targeting & Delivery, is a multi-authored collection of chapters edited by Pang N. Shek. The book aims to provide a comprehensive update of the applications of liposome delivery in biomedical sciences. It will serve as a useful guide to senior undergraduates, graduates and established biomedical and liposome scientists.

The book provides a good and balanced coverage between the different application areas, although drug delivery, especially antiviral therapy, takes up the largest portion. The individual chapters are well written and the material is broadly well presented with many illustrations of high quality reinforced by comprehensive referencing; typographical errors are few.

This volume evolved from the Defence Research Liposome Workshop in Toronto in 1993. Although it is yet another volume on liposomes, its publication can be justified considering the rapid progress in the use of liposome technology in biomedical application of which the book is a substantial update. The book is divided into three sections, namely: the use of liposomes in immunological applications; drug targeting and delivery; and red blood cell substitute (i.e. blood surrogate) development. Some of the key concepts and developments in the immunological applications of liposomal systems are summarized in section I (chapters 1–5). Chapter 1 reviews the use of liposomes as new peptide and protein vaccine carriers. Chapter 2 on the liposome-based immunologic properties in relation to cellular requirement and liposome design is a useful overview for this section. A new application of giant liposomes in the encapsulation of live or attenuated microbial vaccine is very interesting and is covered in chapter 3. The fifth chapter is an elaborate chapter and highlights extensively the potential of liposomes as mucosal immunoadjuvants. Of note, is the many references which are quoted from 1990 or later.

Section II (chapters 6–13) includes descriptions of various studies and concepts of liposome-mediated drug delivery and is the largest section. Considering the most advanced development in liposome applications is centred in the area of drug delivery, especially in the microbial and antiviral application, this is quite expected. The work described here encompasses preclinical studies and clinical trials of an anti-cancer drug (doxorubicin); animal models used for testing the efficacy of anti-microbial agents. An industrial perspective on liposome formulation; the application of liposomes for pulmonary delivery of antioxidants, and the generation and characterization of liposome aerosols. The use of liposomes in the antiviral therapy are compared together with their counterparts PLG microspheres in chapter 10, The fate and local persistence of intramuscularly injected drug or vaccine carrying liposomes as discussed in chapter 11, provides a further insight for understanding their route of distribution following intramuscular delivery. This chapter is enriched by a large number of fluorescent micrographs from in-depth histological analyses of the injection sites, lymph nodes and spleen.

The final section (chapters 14–18) includes a review of the current state of the development of blood substitutes using liposome-encapsulated haemoglobin, where the special problems associated with the use of native haemoglobin and its delivery with liposomes are presented. The fate of liposome-encapsulated haemoglobin and its interaction with mononuclear phagocytic systems are also detailed together with related safety and efficacy issues.

Overall, I recommend this book to all researchers interested or working in the area. It would provide a worthwhile addition to the liposome series.

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Book Review

Microbial Quality Assurance in Cosmetics, Toiletries and Non-Sterile Pharmaceuticals (Second Edition)
Edited by R. M. Baird and S. F. Bloomfield
Published 1996 Taylor & Francis, Basingstoke
vii + 258 pages ISBN 0 7484 0437 6 £65.00

This is the second edition of this book. The first edition arose from a meeting of researchers in the field of microbial quality assurance in relation to the manufacture of cosmetics, toiletries and non-sterile pharmaceutical products. The second edition has arisen out of the need to update some of the information and the opportunity has been taken to reorganize the material and to provide an overview of the subject. Particular emphasis has been placed on issues affecting toiletries and cosmetics.

The editors have been successful in achieving their aim and the book provides a readily accessible source of authoritative information on the microbiological issues involved. The updating does not represent a major portion of the work because comparatively little progress of major impact has been made in recent years. Even the chapter on New Methodology by and large refers to technology that is now fairly dated.

A wide range of approaches are currently employed in seeking to achieve products of an acceptable quality from a microbiological point of view. These are considered under sections considering Control in Manufacture and Control Through Preservation. It is interesting to note that only a limited range of about thirteen preservatives is currently used for the preservation of pharmaceutical products and that seven compounds account for 97% of the preservation undertaken with cosmetic and toiletry products. Thus the use of existing products has to be exploited to the full and this includes a full consideration of their use in combinations. The chapter on Development of Preservative Systems is thus an important chapter and the subject is dealt with very competently. Microbial Resistance to Preservative Systems also covers an important subject but it has not been written in the style of other chapters but more in the style of a microbiological review 37 literature citings in one reference-packed paragraph. The unfortunate typographical error, hydrophobic for hydrophilic, on page 154 could cause confusion in the discussion of the effects of hydrophilicity and hydrophobicity.

The updating is concerned very largely with the developments of the recommendations contained in the major compendiathe British Pharmacopoeia, European Pharmacopoeia and the United States Pharmacopoeia for Pharmaceuticals, and the developments of the in-house standards of the cosmetic and toiletry manufacturers. This is covered in the section of the book Microbiological Control: Methods and Standards. The book can be recommended as an essential reference for those working in the field and as an essential textbook for those wishing to become familiar with the subject.

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Book Review

Dielectric Analysis of Pharmaceutical Systems
Duncan Q. M. Craig
Published 1995 Taylor & Francis, London
iv + 232 pages ISBN 0 13 210279 X £65.00

Dielectric analysis is the study of the response of a material to an applied electric field. By measuring the rate and extent of the polarizability of the material it is possible to obtain information on both the microscopic and macroscopic processes within the sample. It is by no means a modern technique but it is only over the past two decades, with the increased availability of computer-controlled instruments, that the technique has gained prominence. With few exceptions, dielectric analysis has been largely neglected by pharmaceutical scientists, despite its potential as a versatile, rapid, non-invasive method for the physical characterization of complex systems. This book attempts to redress the balance and is particularly timely in the light of the publication of a comprehensive review on the subject in the September 1995 issue of the *Journal of Pharmaceutical Sciences* and a well attended session devoted to the pharmaceutical sciences at the 1994 annual meeting of the Dielectrics Society at Canterbury. In the field of dielectric analysis, as in the analogous field of rheology (in the latter the sample is stressed mechanically rather than electrically), experts are generally divided into the experimentalists, involved in optimizing the methodology and evaluating artefacts, and the theoreticians, involved in the mathematical interpretation and modeling of the data generated. This book is not intended for either group but aimed specifically at pharmaceutical and other applied scientists who have not had an extensive training in mathematics and physics but wish to find out what can be done with the technique. Of course, in order to interpret the data generated, both the principles and methodology of the technique need to be covered. The author is to be commended on the way he deals with these aspects, using a logical but understandable approach and all the time referring to more detailed texts for the more experienced.

In the remainder of the book (five chapters, approximately 75% of the content) the author deals with applications of the technique under the heading of solutions, colloids and suspensions, solids, polymer systems and biological systems. Each chapter is structured along similar lines, beginning with a broad overview of the pharmaceutical aspects of the field, followed by some specific applications (the majority are non- pharmaceutical in origin but easily assimilated by pharmaceutical scientists) chosen to illustrate the type of data that can be obtained and its analysis and interpretation. Each chapter ends with a short conclusion highlighting the potential of the technique in analogous systems of pharmaceutical interest. These ideas are then expanded upon in a specific concluding chapter in which the author gives a somewhat upbeat overview of the future of the technique in pharmaceutical science.

The book is well referenced throughout with a good index and clear diagrams. This is not a book for undergraduate teaching but essential reading for those working in the physical characterization of materials and formulations both in academia and industry. I wish it had been around when I first started looking at the technique some ten years ago.

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Book Review

Guidebook on Molecular Modeling in Drug Design
Edited by N. Claude Cohen
Published 1996 Academic Press, San Diego
xiv + 361 pages ISBN 0 12 178245 X $59.95

Rational drug design is based on the principle that the biological properties of molecules are related to their actual structural features. Whereas quantitative structureûactivity relationships (QSAR), based on mathematical equations expressing biological activity in terms of molecular parameters (hydrophobicity, electronic distribution, steric parameters etc.), are based on a two-dimensional frame of the structures considered and restricted to optimization of activity within a structurally related series, computer-assisted molecular modeling provides more detailed information on the interaction of a ligand with a protein (receptor) and in three-dimensions allows the subtle stereochemical features to be appreciated.

This book is intended as a guide to the capabilities of computer-assisted modeling in the design of drugs and is aimed at advanced students and professionals in the field, and as general background reading for other members of a drug research team (synthetic chemists, pharmacologists, biochemists).

The introductory chapter on The Molecular Modeling Perspective in Drug Design sets the scene for the subsequent chapters. A chapter on Molecular Graphics and Modeling: Tools of the Trade describes the hardware and software components used in modeling. This is followed by a description of the Molecular Modeling of Small Molecules which is a detailed, readily readable and fully explained account of the approaches to be taken or available forconformer generation and visualization, pharmacophoric pattern determination and overlay of bioactive molecules. Computer-Assisted New Lead Design takes the reader further into the realm of optimization of a lead structure in situations where three-dimensional receptor structure may be known or unknown, together with the approach of searching three-dimensional databases for new compounds based on a pharmacophore hypothesis. Another chapter describes the experimental techniques used in determining the three-dimensional structures of biological macromolecules, i.e. X-ray crystallography and nuclear magnetic resonance, and provides examples of proteinûprotein, proteinûnucleic acid and proteinùsmall molecule interactions as well as detailed accounts of data banks and their searching.

Modeling Drug-Receptor Interactions builds on the principles outlined in detail in the earlier chapters with some well-worked examples. A stumbling block to modeling in recent years, namely, the role of solvent in determining conformational preferences of drug and receptor as well as modulating the forces experienced between binding partners, is dealt with in detail. Well-worked examples permeate these chapters and detailed accounts of the development of useful drugs from a lead structure is exemplified by inhibitors of renin, HIV-1 protease, elastase and antithrombotic agents acting through the blocking of platelet aggregation. This book provides an excellent introductory text to molecular modeling which is well referenced and presented in an interesting and informative manner. It is to be recommended to all members of a drug designing team for background reading an emphasises the necessity for a dedicated molecular modeler as a team member.

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