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J. Pharm. Pharmacol. 1995, 47: 91

Book Review

The Shape of Powder-Particle Outlines
(Materials Science and Technology Series/1)
Arthur E. Hawkins
Published 1993 Research Studies Press Ltd, Taunton, Somerset
150 pages
ISBN 0 86380 142 0 (Research Studies Press Ltd) £39.95
ISBN 0 471 93878 5 (John Wiley & Sons Inc.)

As the title clearly indicates, this book concentrates mainly on the numerical description of the two-dimensional outline of small particles, when investigated by microscopy. It also gives a brief introduction into the qualitative description of the projection of particles, and compares techniques of particle shape separation.

Widely used descriptors such as particle shape or roundness, which were often confused in earlier literature, are clearly defined as independent variables, and the chapter 'Single-number classification' also tries to tidy up the variety of shape descriptors, which are often similar in their numerical composition but presented with different nomenclature. Especially detailed and informative are chapters 5 and 6, which compare different ideas of multivariate shape representation by a series and the problems of fractal geometry to analyse the nature of a particle outline. It is extremely pleasing to see that the author clearly identifies the originator of ideas and uses original source material.

Comparatively short and less comprehensive are the comments on image analysis. The technique of appropriate image acquisition is too important to be buried in the chapter 'Single-number classification'. It also seems necessary to give some more details about available image analysis equipment, including comments on advantages, disadvantages and difficulties involved. This aspect reflects the absence of more recent references with only a few post 1990.

The intention of Dr Hawkins has been to write a book which should be read from cover to cover to obtain most benefit. In this he succeeds. It can be recommended for anybody who initially needs a deeper basic understanding of the subject. They can then use the large list of references for studying particular problems.

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J. Pharm. Pharmacol. 1995, 47: 91

Book Review

Glycopeptide Antibiotics
(Drugs and the Pharmaceutical Sciences Series/63)
Edited by Ramakrishnan Nagarajan
Published 1994 Marcel Dekker, Inc., New York
432 pages
ISBN 0 8247 9193 2 $165.00

This is a well written and produced book which succeeds in its aim of producing an authorative one volume coverage of the current knowledge on the glycopeptide antibiotics. It consists of a generously referenced nine chapters written by experts, mainly from the sectors of the pharmaceutical industry which have been responsible for the production of vancomycin and teicoplanin. This is particularly relevant for the chapters on the discovery; separation; structure-activity relationships; and the analytical quantitation of these drugs. It is less appropriate on chapters giving or containing clinical overviews and possibly for the chapter on resistance and mode of action. For these chapters it might have been more appropriate to have authors not directly associated with the industry. An academic input was used for the chapters discussing the relevant chemistry of the carbohydrate components and for the chapter describing the advances made towards the synthesis of vancomycin, vancomycin aglycones and other similar chemical structures. Insights are given on attempts to obtain more potent and hopefully less toxic semisynthetic glycopeptides.

The authorative nature and wide literature coverage of this book ensures that it will be of great interest to researchers and provide an important reference source for all involved with aspects of the use and development of glycopeptide antibiotics. Academic libraries should certainly be encouraged to stock a copy of this book.

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J. Pharm. Pharmacol. 1995, 47: 92

Book Review

Advances in Neutron Capture Therapy
Edited by Albert H. Soloway, Rolf F. Barth and David E. Carpenter
Published 1993 Plenum Press, New York
XXX + 829 pages
ISBN 0 306 44567 0 $169.50 (US and Canada)

The growing interest in neutron capture therapy, especially, boron neutron capture therapy (BNCT), as a treatment modality for several tumour types is reflected in the number and breadth of contributions to this timely book. The volume comprises the Proceedings of the Fifth International Symposium on Neutron Capture Therapy, which was held at Ohio State University, Columbus, in late 1992. The editors are three of the leading scientists and clinicians in the field of BNCT and have chosen to dedicate these Proceedings to the late Professor Hiroshi Hatanaka. This is entirely appropriate, since it was Professor Hatanaka who kept the idea of BNCT alive during the years of deep scepticism following the failures of early clinical trials in the 1960s, and hence allowed the rebirth of BNCT with new medicinal chemistry and new therapeutic design in the late 1980s.

Within such a large volume of proceedings, one would expect to find coverage of all aspects of current work on neutron capture therapy and this is indeed the case. The question of supply of thermal and epithermal neutrons needed for this binary therapy is addressed in eighteen papers on reactor sources and ten on the development of new sources not involving nuclear reactors. The importance and difficulties of accurate measurement of neutron fluence and dose are reflected in sixteen contributions. Since the failures in the early clinical trials of BNCT have been attributed to inadequate concentrations of boron in tumours or to lack of selectivity of biodistribution of boron, the efforts of medicinal chemists have been focused on targeting boron efficiently to tumour tissue through small molecule drugs (reported in twenty-two papers) and macromolecular systems, including monoclonal antibodies (eleven papers). Interest in delivery of gadolinium as a neutron capture agent is also noted. Biological, preclinical and clinical studies, including pharmacokinetic investigations, account for the remaining fifty-seven contributions. The book concludes with two of its most important features, a verbatim record of a round table discussion and a series of four brief overviews of the present position of BNCT.

The size, cost and comprehensive coverage make this definitely a book for the committed neutron capture scientist or clinician, rather than the lay person or the pharmaceutical scientist with a passing interest in the subject. This narrowness of the likely readership is exacerbated by the absence of an introductory section explaining, in simplified terms, the principles underlying BNCT and the potentially great advantages of binary therapies such as this. Such background information on this relatively complicated concept can be obtained much more readily by reading one of the several excellent recent reviews on neutron capture therapy in the journal literature. The book itself has been assembled from camera-ready copy. Nevertheless, the editors are to be congratulated for laying down strict standards for contributions. The frequent pitfalls of this method of production have been avoided and the result is an excellent presentation of the text with clear diagrams, good indices and a useful list of symposium participants. A few errors are evident in individual contributions but these do not detract significantly from the whole.

Overall, this book provides a comprehensive picture of a small but growing field of endeavour where the collaborative efforts of scientists of widely differing disciplines must be and are focused to one aim.

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J. Pharm. Pharmacol. 1995, 47: 92–93

Book Review

Protocols for Oligonucleotide Conjugates. Synthesis and Analytical Techniques
(Methods in Molecular Biology/26)
Edited by Sudhir Agrawal
Published 1994 Humana Press Inc., Totowa, NJ
xiv + 377 pages
ISBN 0 89603 252 3 $59.50 (paperback)
Published in the UK by Chapman & Hall £45.00

It is probable that the most intense interest in conjugating different molecules to oligonucleotides, at present, is in the area of antisense research, where the conjugated moiety might be expected to expedite delivery to the appropriate biological site, to interact with the target nucleic acid at that site, or merely to act as a reporter group capable of signalling the arrival of the oligonucleotide. However, even if the development of antisense oligonucleotides, as routine tools of genetic research and as novel, pathological gene-targeted therapeutic agents, should founder on the rocks of wishful thinking, there are still many areas of biological endeavour where oligonucleotide conjugates might prove invaluable. A book which brings together, in a single volume, experimental details of the disparate approaches taken to the synthesis of these derivatives, and their analysis, is, therefore, both timely and a valuable contribution to those, not directly involved in this field of research, who would have a potential application for the technology.

"Protocols for oligonucleotide conjugates. Synthesis and analytical techniques", is the sequel to the excellent volume, "Protocols for oligonucleotides and analogs. Synthesis and properties", also edited by Sudhir Agrawal, which was reviewed in the *Journal of Pharmacy and Pharmacology* 46: 400 (1994). With 14 separately authored chapters, the book covers a wide range of aspects and levels of complexity, from the simple to the migraine inducing, and is neither completely a laboratory manual nor a theoretical treatise, but more a hybrid of both.

By way of introduction to the subject, the problems of oligonucleotide synthesis overall are discussed by Sonveaux in Chapter 1, within the framework of an exhaustive survey of protecting groups which are or have been used. Although no experimental details are presented, the chapter cites 422 original source references. The next five chapters provide straightforward and detailed experimental protocols for synthesis of oligonucleotide conjugates, and may represent the major value

of this publication. The basic strategy described in each is to introduce, either during oligonucleotide synthesis or post-synthesis, amino- or thiol-linker molecules, or sites, usually protected, to which the functional structure of interest may subsequently be attached by standard active ester- or thiol-specific chemistry. The wide variety of approaches available results from the fact that such linkers may be introduced on the nucleobases, on internucleoside phosphate groups, or at the terminal hydroxyl residues, with the necessary requirement that the hybridization properties of the oligonucleotide with complementary nucleic acids should be minimally affected. Meyer describes the synthesis of fully protected phosphoramidite derivatives of deoxyuridine and deoxyguanosine carrying linkers on the 5 and N^2 positions of the base, respectively, which may be incorporated during automatic oligonucleotide synthesis, and he goes on to give an example of their use in producing a reactive, alkylating oligonucleotide conjugate. Likewise, Ruth, in an excellent, experimenter-friendly chapter, details the application of commercially available, thymidine analogue, C-5 aminolinker synthons of this type for preparing enzyme-oligonucleotide conjugates. Surprisingly, it would appear that the tail does not wag the dog, since he reports that attachment of even relatively large enzymes has very little impact on the hybridization characteristics of short oligonucleotides carrying a single such modification. Moreover, use of alkaline phosphatase–oligonucleotide conjugates as hybridization probes for membrane immobilized nucleic acids, with pro-luminescent adenosine monophosphate phosphodiesterase as substrate, gave in hours, sensitivities equivalent to the use of high molecular weight, ^{32}P-labelled, cloned probes, followed by days of autoradiography.

Aminolinks may also be introduced at phosphorus during oligonucleotide synthesis, (1) at the 3′-end, singly or in multiple arrays, through use of non-nucleoside H-phosphonate synthons and oxidation with mono-protected diamines, (2) at an internucleoside linkage within the oligonucleotide by the same amine oxidation technique following a single coupling with a normal deoxynucleoside H-phosphonate synthon in an otherwise phosphoramidite based synthesis, and (3) at the 5′-end through use of a non-nucleoside, linker phosphoramidite. Agrawal provides experimental details for these strategies and subsequent reporter group attachment. Functionalization of oligonucleotides with thio-specific reporter groups at a single phosphorothioate internucleoside linkage or through a simple thiol residue tethered to the DNA backbone is described in some depth by Fidanza et al. Interestingly, the chirality of the phosphorothioate linkage, which is normally seen as a drawback of this analogue structure, is claimed as an asset for preparing conjugates in which, depending on the stereoisomer chosen for the particular application, the attached molecule may be directed towards either the major or minor groove of the heteroduplex formed with the target nucleic acid. The synthesis of stereochemically pure dinucleoside phosphorothioate synthons for incorporation during phosphoramidite oligonucleotide synthesis is described.

It would appear that conjugation to the phosphate backbone has little effect on the hybridization potential of oligonucleotides, as does linking reporter groups to their 5′- or 3′-termini. Chu & Orgel deal with the experimental details of postsynthesis 3′- and 5′-terminal modification of oligonucleotides with amino- and thio-linkers, and their subsequent derivatization with functional molecules. These procedures also permit simultaneous terminal radiolabelling with ^{32}P or ^{35}S, which by virtue of the presence of the conjugate is protected against facile removal by phosphatase.

There are two chapters describing quite sophisticated synthetic organic chemistry, which I would think should only be repeated by the stout-hearted. Lin & Brown present detailed protocols for the synthesis of two degenerate base analogues, capable of forming Watson-Crick type base pairs with both adenine and guanine on the one hand, and with both cytosine and thymine on the other. These may be incorporated into oligonucleotide probes and primers for detection and polymerase chain reaction amplification, respectively, of cognate nucleic acids, when only the amino acid sequence of a protein is known. The authors demonstrate how they may be used to reduce the multiplicity of sequences required to overcome the problem of the degeneracy of the genetic code. Equally impressive, Jones provides comprehensive protocols for incorporation of ^{15}N into purine bases at various positions, and describes chemical synthesis of isotypically-labelled DNA fragments with these species, for studies of base pairing, hydration, drug/nucleic acid and protein/nucleic acid interactions.

Other chapters deal with the basic practical details of high performance liquid chromatographic analysis and purification of oligonucleotides, gel-capillary electrophoretic analysis, and base sequence determination by a novel nested-fragment strategy. The book ends with brief introductions to the concepts of nuclear magnetic resonance and mass spectrometry of oligonucleotides, and a mathematical approach to extracting thermodynamic data from equilibrium melting curves of duplexes and complexes of higher molecular order.

Overall, the standard is high and the book is to be recommended to those who would prepare their own oligonucleotide conjugates given guidance on experimental details of synthetic and analytical procedures.

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J. Pharm. Pharmacol. 1995, 47: 93–94

Book Review

New Pharmacological Approaches to the Therapy of Depressive Disorders
(International Academy for Biomedical and Drug Research Volume 5)
Edited by J. Mendlewicz, N. Brunello, S. Z. Langer and G. Racagni
Published 1993 S. Karger AG, Basel
VI + 195 pages
ISBN 3 8055 5746 9, SFr. 223.00, DM 267.00, US $ 178.50

Depressive illness is a common mental disorder from which 5–10% of the general population suffer during their lifetime. The direct cost of total health care for mood disorders is undoubtedly high whilst indirect or personal costs include absence from work, social dysfunctioning and even premature death from suicide. The preparation of an in depth text on new pharmacological approaches to the therapy of depressive illness is therefore timely and this book covers areas of both clinical and experimental biomedical research on this important topic.

The volume reports the proceedings of the inaugural workshop and the inaugural session of the European Decade of Brain Research. It is comprised of two parts grouped into 14 and 8 chapters, respectively. Part I initially discusses current issues in the classification and epidemiology of mood disorders.

This is followed by a revision of therapeutic approaches using classical antidepressant drugs such as tricyclic agents like imipramine, monoamine oxidase inhibitors (MAOI) and selective serotonin (5-hydroxytryptamine) reuptake inhibitors (SSRI). Evidence is also presented that somatodendritic and postsynaptic 5-HT_{1A} receptors possess distinct pharmacological properties. Hence, a novel therapeutic approach would be the development of postsynaptic 5-HT_{1A} agonists and selective terminal autoreceptor antagonists and this may produce a new generation of drugs exerting rapid antidepressant effects. The concept of reversible inhibitors of monoamine oxidase (RIMA) such as moclobemide are considered as a further advance in the treatment of depression since this group has no tyramine reaction like older MAOIs; they are effective in endogenous and non-endogenous depression and are better tolerated than standard antidepressants. Another more novel idea for pharmacotherapy embraces the possibility that presynaptic α_2-adrenergic receptors may be antagonized and positively modulate 5-hydroxytryptamine neurotransmission. This might be exploited as a treatment alone or in combination with other antidepressants. Further issues in this section include psychotherapeutics and evaluation of long-term prophylactic treatments for affective disorders as well as antidepressant medication in non-affective disorders.

Part II of the book has a much wider scope than the first part since it delineates proposals for international co-operation leading to a more integrative, multidisciplinary approach to research in the neurosciences. It does, however, cover more specific areas, with excellent chapters concerning the impact of molecular biology on neuropharmacological research, hormones and brain function, and brain imaging and treatment of mental disorders. It concludes with a round table discussion on the impact of regulatory issues on drug development for the central nervous system.

In this book there are contributions from a range of experts on the pharmacology of depressive illness which makes it useful for specialists in this research area. It is also valuable to those with a more generalized interest in the CNS to whom it should prove highly stimulating.

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J. Pharm. Pharmacol. 1995, 47: 94

Book Review

Achieving Sterility in Medical and Pharmaceutical Products
(Drugs and the Pharmaceutical Sciences/64)
Nigel A. Halls
Published 1994 Marcel Dekker, Inc., New York
296 pages
ISBN 0 8247 9014 6 $110.00

This book consists of a main body of text of 274 pages and a comprehensive index of five pages. There are ten chapters covering the need for sterility, sterility and sterility assurance, sterilization by gamma radiation, saturated steam, ethylene oxide and filtration, dry heat sterilization and depyrogenation, aseptic manufacture, maintenance of sterility and, finally, parametric release and other regulatory issues.

The purposes of the book are introduced in the preface as: 'to help practitioners in the field who manufacture sterile products...'
'to understand what needs to be done to achieve sterility'
'it is not intended for experts in specific sterilization technologies....'
'to bridge the knowledge gap for students and recently qualified graduates who may be moving....into the sterile products manufacturing industries'.

The text more than justifies these claims, although I believe it can and should be also recommended as an undergraduate reference book since there is a lack of suitable alternatives in this area. I found the chapters on sterility and sterility assurance, the maintenance of sterility and parametric release particularly relevant. The criticisms of 'the test for sterility' are a must as reading material for those advocating its continuation.

The author has taken care to include annexes at the end of several chapters giving examples of calculations, e.g. filter pore diameters from bubble point pressures, internal pressures for a filled syringe to be sterilized at 155°C and equivalent lethality. These will prove very useful to the novice.

I have some reservations regarding the book. I find circa 200 so-called up-to-date citations to be on the paltry side, especially when less than 20 date from 1990 to 1994. This is a particular problem with the publication in 1993 of the latest British Pharmacopoeia and of the Rules and Guidance for Pharmaceutical Manufacturers, neither of which appear to be cited. The legends and labels of the figures are generally too brief: this is a particular problem because it renders several figures unnecessarily difficult to understand, even with reference to the text.

However, these are only minor criticisms of a book which should be a worthy addition to any library based in pharmaceutical academia or industry. Dr Halls should be very proud of this excellent text.

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J. Pharm. Pharmacol. 1995, 47: 94–95

Book Review

Principles of Clinical Toxicology. Third Edition
Edited by Thomas A. Gossel and J. Douglas Bricker
Published 1994 Raven Press, New York
461 pages
ISBN 0 7817 0125 2 $79.50 US

This text covers the clinical aspects of acute human toxicology. It is written by and for workers in the United States such as pharmacists working in poisons centres and health care workers who generally advise members of the public to keep a bottle of syrup of ipecacuanha in the home, to phone poisons centres and manage poisonings at home. While we want to encourage high street pharmacists to learn more clinical toxicology and be able to advise the public appropriately, this book may be less than helpful in addressing the second, more practical aim.

From the view point of those with a general interest in the problems posed by human poisoning this book has plenty to

offer, covering the topic with a wide perspective. The epidemiology and circumstances of the commoner poisonings are well covered, toxicokinetics and mechanisms of toxicity are dealth with at a basic level, and clinical features and management are covered in just enough detail for one to be conversant with what should be done for the poisoned patient. Of the 19 chapters, the first three deal with general principles, the following eight deal with chemicals, metals, corrosives and plants, and the final eight chapters cover poisoning by drugs. The third edition is an update of the (1990) second edition, with similar format and layout. Succimer (DMSA) is now included as an antidote for lead poisoning, and the place of flumazenil is covered in benzodiazepine poisoning. There are some omissions: there is nothing on snakes or venomous animals. The coverage of herbal remedies is limited and the references old. In view of the recent literature, the topic deserves a little more consideration.

As with many American texts it ignores some important work from the UK and other European countries. Many of the references are also ageing, but the sections included are fairly comprehensive, with liberal use of flow-sheets, tables and diagrams. One interesting feature of the book is the inclusion of case histories and review questions.

In conclusion, this is a useful teaching, revision or reference text with an understandable American bias.

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J. Pharm. Pharmacol. 1995, 47: 95

Book Review

Nonselective Cation Channels. Pharmacology, Physiology and Biophysics
Edited by D. Siemen and J. Hescheler
Published 1993 Birkhäuser Verlag, Basel
xiii + 316 pages
ISBN 3 7643 2888 6 (Basel) ISBN 0 8176 2888 6 (Boston)
£50.00, sFr. 118.00, DM 134.00

This volume consists of a series of specialized reviews covering many aspects of nonselective cation channel physiology, pharmacology and biophysics. In the introduction, the editor reminds us of the prescient suggestion by Fatt and Katz (1951), published a year before Hodgkin and Huxley reported their work on the ionic basis of the action potential, that "Acetylcholine produces a large nonselective increase in ion permeability, i.e. a short circuit". Over 40 years later it has been shown that acetylcholine-sensitive ion channels are nonselective for monovalent cations and many other nonselective channels have been identified in the plasma membrane and in the membranes of intracellular organelles.

Work on cation channels which allow many different monovalent, and sometimes divalent ions to pass through has been somewhat overshadowed in recent years by the growing interest in the therapeutic possibilities of agents affecting specific Na^+, K^+ and Ca^{2+} channels in the plasma membrane. This book comes as a timely reminder of the widespread distribution of nonselective cation channels and their potential importance in excitation.

An impressive list of authors, mainly from Europe and the USA, has been assembled to provide 25 state-of-the-art reviews arranged in six sections, describing research on a very wide range of cation channels. Following an introduction to the field, the papers presented describe work on receptor activated and stretch or mechanically sensitive channels, gap junction channels, channels activated by intracellular calcium and cyclic nucleotides, including those associated with visual, taste and odour perception, together with consideration of nonselective channels as a regulatory component of a wide variety of cells from mammalian epithelia to plant tissues. In fact the range of nonselective cation channels is vast and in some cases their structures and functions are unknown. Notable exceptions to this lack of structural and functional information, however, are the well described ligand-gated channels associated with the nicotinic receptor on the muscle end-plate at the neuromuscular junction and the neuronal glutamate receptor, which has attracted a great deal of attention due to the importance of glutamate as an excitatory transmitter in the central nervous system.

The reviews in this volume are too highly specialized to have general appeal to pharmacologists and physiologists working outside the field of ion channel research. To electrophysiologists and those with special interests in the pharmacology of ion channels, it provides a valuable source of reference with much relevant quantitative data and a clear, up to date account of progress in the diverse field of cation channel research. A rather minor criticism is that in some chapters abbreviations have been used without adequate definition. Indeed, the volume would have benefited from the inclusion of a glossary of terms at the editing stage. A final summary chapter drawing some of the main themes together and outlining the functional relevance of the channels, where this is understood, would have been of value.

This book is very well presented and excellently referenced. With its wealth of tabulated data on the characteristics of nonselective cation channels, it will be an invaluable work of reference for those actively researching in the field.

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J. Pharm. Pharmacol. 1995, 47: 95–96

Book Review

Pharmaceutical Particulate Carriers. Therapeutic Applications
(Drugs and the Pharmaceutical Sciences Series/61)
Edited by Alain Rolland
Published 1993 Marcel Dekker, Inc., New York
448 pages
ISBN 0 8247 9016 2 $155.00

Administration of pharmaceutical particulate carriers is a promising approach to achieve controlled release and site-specific delivery of drugs. This publication covers many relevant topics relating to recent clinical developments and future therapeutic applications of pharmaceutical particulate carriers together with their various routes of administration.

This book is well presented, lucid and accurate, and provides a good coverage of its subject areas with a good balance throughout, with very thorough editing by Alain Rolland.

In a total of thirteen chapters, thirty-one international contributors provide their views on pharmaceutical particulate

carriers. The aim of this book which is to give a comprehensive overview of the various clinical applications of pharmaceutical particulate carriers, is largely achieved.

Highlighted are the different routes of administration of particulate carriers with respect to anatomical and (patho)-physiological considerations, and to carrier and disease related effects.

The general approach in each of the chapters is to overview the use of carriers used in each route under consideration. Generally, there is a good balance of the emphasis placed on each aspect but there are cases where it varies from author to author, as does the number of references. For example, for nasal delivery, there are 30 references but in other cases it was as high as 177 (chapter 7) or 118 (chapter 13). Generally, examples from recent publications are well chosen and in many instances references to 1991–1992 literature are included.

The book starts with an overview on opthalmic delivery of drugs using liposomal ophthalmic preparations. This chapter is a good, up-to-date review on the subject, quite detailed, and contains realistic predictions for the liposomal therapy in the text. The second chapter, concerning nasal delivery is surprisingly brief considering that nasal delivery has been a favourite topic of pharmaceutical researchers around the world within the last decade (for example coverage would be enhanced by inclusion of nasal vaccination).

Chapter 3 on the pulmonary delivery of liposomes provides a well-covered section where special problems and constrains of controlled drug delivery to the respiratory system are reviewed comprehensively. Here, there is a large portion of text centred on the respiratory distress syndrome (RDS) therapy. The chapter is quite useful and informative and would provide a good starting point for any one contemplating research on drug development in this area.

As the most frequently used mode of drug administration is still the oral route, it is not surprising that a total of 70 pages (chapters 4 and 5) is devoted to oral particulate delivery. These sections are clearly written and illustrated with diagrams, especially in chapter 4; the histological micrographs are of startling clarity. Both chapters are full of useful information and provide a wide range of references. In chapter 4, the text relies for its examples on the recent literature, much of it from the laboratories of the authors or their associates. The next chapter moves on to intra-tumoral delivery. This, and several other chapters later in the book, provide interesting information on the large body of knowledge on more specialized chapters, which reflects for example, the current state of knowledge in the field of intravenous liposomal therapy for retroviral infections, especially AIDS. Chapter 9 is almost as large as the transdermal delivery chapter. It reviews clinical evaluation of bromocriptive (BC) microspheres in pituitary adenomas where intramuscular administration of BC-loaded microspheres induced an inhibition of prolactine secretion for several weeks and produced a significant and rapid tumour-size reduction in parents with macroprolactinomas. Other specialized chapters, look closely at discussing the subcutaneous administration liposomal tumour antigen vaccines (chapter 8), and embolization (chapter 12).

The subject of the seventh chapter also includes nanospheres and microspheres along with extensive information on liposomes describing their subcutaneous and intramuscular use.

In chapter 10 an overview of potential medical applications of particulate carriers for the intravenous administration of drugs, especially for treatment of infectious diseases, is given.

The final chapter, also the largest and most elaborate chapter in the book, is a competent review on the use of particulate carriers in transdermal drug delivery and as new site-specific drug delivery systems. Here is contained meticulously gathered information enriched with clear illustrations and high quality electron and fluorescence micrographs, a large portion of data coming from authors own laboratories.

This book provides a valuable source of information and will interest those who work in the pharmaceutical sciences, biotechnology and delivery as well as to clinical pharmacologists and others interested in modern trends in therapy. Overall, I recommend this book to anyone interested in the diverse subject of particulate carriers, and their present and future therapeutic usage.

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