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BOOK REVIEWS

Antibody-Mediated Delivery Systems

JOHN D. RODWELL, ED.

Marcel Dekker, Inc., New York, 1988

Neither the notion that antibodies could be covalently coupled to molecules of medical relevance and then used as directed chemotherapeutics or diagnostics nor the technology to do so is new. The potential to produce such conjugated molecules in pure form and large quantities for effective, widespread treatment of diseases such as cancer, however, has only recently become available. New techniques for the production of monoclonal antibodies and their genetic modification have sparked a resurgence of interest and effort in the area of antibody-conjugated products. This book, a single volume in a series addressing the broader subject of "Targeted Diagnosis and Therapy" is a testimony to the effort that has been displayed in the last ten years in the development of such molecules.

Specific problems that have prevented antibody-mediated delivery systems from reaching the stage of clinical application include cross-reactivity of the complexes with normal tissue, in vivo degradation, nonspecific binding to plasma proteins, toxicity to nontargeted tissue, and vascular premeability barriers. *Antibody-Mediated Delivery Systems* presents the individual work of different research groups that are addressing these problems. Each chapter is written by a single author or group and contains their particular experience with a certain type of conjugate, the relevant conjugation chemistry, and a detailed description of methodology. Also accompanying each chapter is a complete reference list.

This book's greatest strength is the depth in which it covers specific subject matter. The 12 chapters include studies of antibodies conjugated with anthracyclines, alkaloids, antifolates (such as methotrexate), alkylating agents, cobra venom factor, and radioisotopes. In addition, topics such as the chemistry involved in the attachment of spacer arms, modification of toxins, enhancement of a conjugate's vascular permeability,

reduction of nonspecific binding, and modification of the antibody are well addressed.

Such a reference has an obvious value to people closely tied to the fields of cancer therapy or biotechnology. The wealth of practical experience and methodology which it contains tailors this book to those concerned with the use or production of such molecules and may render it impractical for those seeking a general background in antibody-targeted therapy and diagnosis.

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Membrane Systems: Analysis and Design

Applications in Biotechnology, Biomedicine and Polymer Science

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Hanser Publishers, Munich, Vienna, New York

The study of synthetic and biological membrane systems is rapidly intensifying as applications in the fields in biotechnology, biomedicine, and polymer science are pioneered. The science and engineering of membrane systems, which is based on chemical and physical phenomena and relationships derived from the fundamental principles of molecular kinetics, diffusion, and thermodynamics, forms a well-connected highly interdisciplinary body of study. Because of the interdisciplinary nature of the subject and the wide range of applications, disparate bits of knowledge are emerging in the diverse disciplines. The aim of this book is to unify these governing principles.

Emphasis is on development of fundamental relationships into a set of principles of molecular diffusion and chemical reaction that govern synthetic and biological membrane systems. Inclusion of these fundamentals not only makes the analysis tractable, but also helps make the book self-contained. Step by step formulation of governing equations from first principles is accompanied by numerous schematic diagrams of membrane systems, graphical representations of correlations, and tables of parameter values that give the reader a lucid understanding of the systems used and a good feel for the magnitude of system sizes and forces. Original works from which a theory is derived or experimental data is borrowed are referenced. Development of theories is followed by experimental strategies and often by experimental results, numerical solutions, and reference to topics not covered that serve to illustrate a concept, result, or limitation of what has been presented. Large scale applications of a theory as well as prospective applications are cited along with the respective corporation and publication reference.

The book begins with a discussion of diffusive transport of matter across a membrane in response to an activity gradient and transport char-

acter differences for ideal polymer membranes, synthetic polymer membranes, and biological membranes. Multifold transport character exhibited in the latter two membrane systems is described in terms of microheterogeneities in the membranes. Explanation of the diverse transport phenomena exhibited by these two systems is achieved by first investigating synthetic membrane systems in which the structure may be invariant under challenge by a penetrant. Next, the more complicated transport mechanism associated with a hybrid synthetic polymer-biopolymer membrane system, such as an enzyme biosensor, is examined. This discussion leads nicely into an examination of purely biological membrane systems. In this latter section, membrane enclosure of active biological entities such as an enzyme biosensor, is examined. This discussion leads nicely into an examination of purely biological membrane systems. In this latter section, membrane enclosure of active biological entities such as enzymes or whole cells is studied. Last, biocatalysts, bioreactors, and mammalian excitable membranes are examined.

Sorption of penetrant in a synthetic polymer membrane is described in terms of a dual mode sorption model (simultaneous Henry's law and Langmuir sorption). Transport phenomena in biosensors is modeled by adding the elementary reaction steps that consume the penetrant or produce it from a substrate to the elementary transport steps of penetrant sorption and diffusion. Enzyme membranes and microbial membranes employed in biosensors are discussed. The mechanisms of transport when a biosensor is placed into bioreactor-separator configuration are then addressed. Reactor balance equations and the previously derived diffusion-kinetic models are applied. Establishment of a collagen-based biocatalyst-bioreactor technology, developed in the author's laboratory, is detailed. Transport properties of naturally occurring control and sensing systems, such as the lac operon and neurotransmitters at the neuromuscular junction, are also presented. Previous work with collagen relates to a collagen-immobilized enzyme system as a support structure for a postsynaptic membrane. This leads to the formulation of a diffusion-kinetic model for events at the neuromuscular junction where penetrant duality reappears. Simulations of this diffusion-kinetic model are expected to be helpful in developing designs for microscopic, membrane-based chemical sensors. The book concludes with a description of mammalian excitable membranes of the myocardium.

A nomenclature section at the end of each chapter facilities the understanding of equations in a field where multidisciplinary symbols for the same variables often become confusing and irritating. An author and subject index are included at the end of the book enabling quick reference.

Much of the experimental work cited in this book is the author's own. His contributions to dual sorption theory for polymeric glasses, bioreactor analysis and design, and chemical messenger research in biotechnology more than qualify him as a competent author and expert resource on the subject of membrane systems. In spite of his knowledge and expertise,

the author acknowledges that this work is of limited scope, representing only the beginning of our understanding of such systems. It is, however, a very sufficient and worthwhile beginning. In addition to sharing his technical knowledge, the author reveals a part of his personality by introducing each chapter with entertaining folk song phrases from selections that hold special meaning to him.

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The Antimicrobial Drugs

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The constantly expanding field of pharmaceutical products, the accumulation of knowledge about their properties, mode of action, administration routes and, not of least importance—side effects and developing resistance, outlines the necessity of an up-to-date summary of the drugs in current use. This new book is an impressive effort to supply relevant and yet condensed information about large numbers of drugs used against infectious diseases in man. Let the reader, who would think that the scope of the book is only the therapy against microorganisms be not misled by the title; the content is broader and different antifungal and antiparasitic agents are considered in adequate depth.

The book is divided into five parts, mainly according to the type of infection. The first part presents the principles of antimicrobial therapy. The second and major part, is devoted to different drugs used for treatment of bacterial infections. Antibiotics in current use are presented in chapters, according to their mode of action. A separate chapter reviews synthetic agents as antibacterial drugs. Some less commonly used antibiotics, i.e., polymyxins), urinary tract antisceptics, as well as drugs used against Mycobacteria are discussed in three separate chapters. Parts three, four and five cover the drugs used for treatment of fungal, parasitic, and viral infections.

The remarkable and extremely hard to achieve organization of rather diverse and overwhelming data is one of the major merits of this book. The authors manage to present explicit information about the mechanism of action, cases of application, dosage schedules, side effects, and pharmacology of all the drugs discussed. A vast number of references is included, which is very helpful in finding any additional information.

The book will be useful to medical students as a textbook, and also as a reference book to clinicians and clinical pharmacists. It should be of use to organic chemists who are interested in the synthesis of new synthetic agents against infections.

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