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J. Pharm. Pharmacol. 1992, 44: 536

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Book Review

Peptide and Protein Drug Delivery

Edited by Vincent H. L. Lee

Published 1991 Marcel Dekker Inc., New York

912 pages

ISBN 0 8247 7896 0 \$150.00 USA and Canada, \$180.00 all other countries

One sign of a good textbook is the number of colleagues who want to borrow it: an even greater endorsement is the length of time it takes to get it back. On the basis of both these criteria, this is a very good book and the major reason for the length of time that it took to write this review was the difficulty in keeping it on my desk long enough to read it.

The book is the fourth in a series on *Advances in Parenteral Sciences* and it has to be said that it is a volume which does not fall comfortably under the general series title. The fundamental topics that are covered include peptide and protein synthesis, physical chemistry and biochemistry, analysis, enzymatic and membrane constraints and pharmacokinetics. Comprehensive reviews of delivery by parenteral, oral, buccal, rectal, nasal, vaginal and transdermal routes are also included, together with background information on anatomy, biochemistry and physiology relevant to such sites of delivery. A final section includes details of mucoadhesion, formulation, controlled release, toxicity, immunogenicity and regulatory aspects. It is obvious that the series title would not naturally lead the enquirer to this excellent volume.

As with most volumes nowadays, this one is multi-authored which does of course mean that the editor must select his titles and authors in advance. With a subject like peptide and protein delivery, this approach could be dangerous since progress in science may well outpace the authors. I was very pleased to see that the editor had not only realized this fact but had also taken the responsibility himself to cover, in the first chapter of the book, those areas where major developments had occurred.

It would be impossible to review all 22 chapters of the book and I shall not attempt this task. In general, an excellent volume was slightly let down by the quality of some of the diagrams, the photographs were of little use and there were inconsistencies in some of the references. On a more positive note, each chapter contained an extensive bibliography which would provide any reader with an excellent introduction to each topic.

The editor has grouped the chapters under three headings covering (a) the fundamentals of peptide and protein delivery, (b) a review of the approaches taken to optimise absorption from the various routes and (c) the practical considerations relating to the formulation and registration of delivery systems. In the first section, the chapters are all well written and comprehensive, containing a wealth of practical information and details of techniques. However, none of the authors have been afraid to

interject some basic definitions to remind the reader of important points. A good example is the differentiation between a peptide and protein in the chapter on the physical biochemistry of protein drugs. Each of the authors has been very careful to ensure that overlap has not occurred and there is a refreshing lack of repetition, which is not always the case in volumes of this type.

A major barrier which must be overcome if a peptide or protein is to be delivered successfully is that presented by enzymatic activity which can occur at the site of administration and can be extensive. A consequence of this is that even relatively small peptides, such as thyrotrophin-releasing hormone, a tripeptide, produce bioavailabilities of 67.5 and 31.1% respectively when given by the subcutaneous and intramuscular routes. The excellent chapter which deals with this aspect covers the characteristics of the enzymes, their distribution in tissues and cells and structure/activity relationships. It is followed by a review of the nature of the degradation of specific examples and means of its prevention. However, one of the problems with the timescale that is involved in publication is that events can outstrip the text. The chapter in question ends with a mention of the work which attempted the oral delivery of insulin by a formulation imitating chylomicra. Although the authors were correct in posing a number of sceptical questions, the subsequent admission that the formulations were contaminated with an oral hypoglycaemic agent was not a possibility, quite reasonably, that the reviewers contemplated.

It is, of course, quite reasonable that the first section occupies almost half of the volume and the seven chapters on delivery about 50% of this space. Examples of successful delivery systems are limited and the authors in the section have had a smaller literature to deal with. The important common feature to delivery by any of the routes considered is, often, insufficient bioavailability which is subject to great fluctuation. As a consequence, some of the routes could only be included for their potential rather than their achievement. The conclusions to the chapter on transdermal delivery of peptides provide a succinct summary relating to this point.

The final section is the smallest and least coherent but again provides balanced and authoritative reviews. It will doubtless provide the type of information which it is easy to question and the authors are to be congratulated for their perception and courage.

I like this book. It is extensive (912 pages), it is weighty (1.74 kg) and it is relatively inexpensive (\$150 in the USA, £103 in the UK). At about 10p per page it is much better value than a telephone call, since to read a page takes longer and is much more rewarding: purchasers would not feel cheated if no change is given.

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