

## Book Reviews

# Transdermal and Topical Drug Delivery. From Theory to Clinical Practice

Adrian C Williams, ISBN: 0 85369 489 3. 242pp, 2003, price £65.00,  
Pharmaceutical Press, London

In recent years, interest in the skin as a portal of entry for drugs has risen dramatically and the field has become very “topical” as evidenced by the increasing number of research publications, topical products on the market for systemic drug delivery and debates such as the one entitled “The Inhaler versus The Patch” at the last annual meeting of the Controlled Release Society in Glasgow. Research into enhancing transdermal drug delivery using various physical, chemical and formulation strategies and on transcutaneous vaccination related to the development of non-invasive immunisation is on the rise. To the many new researchers in the field of topical and transdermal delivery of drugs and vaccines, the book provides a concise, informative and entertaining introduction to the discipline.

The book is clearly written and the large body of knowledge on drug delivery into and through the skin has been grouped logically, in seven chapters. The author starts with the basics about the structure and function of the skin, goes on to discuss aspects of the drug permeation process through the skin including drug properties and the mathematics of drug flux, chemical enhancers and retarders of drug permeation, physical techniques and formulation vehicles currently under investigation to increase drug permeation, formulations and patches applied onto the skin and finally concludes with some clinical principles of drug delivery into and through the skin. In the last chapter, issues such as formulation quantities, type of formulation, dilution of preparation, occlusion versus non-occlusion, formulation equivalence, etc. are addressed. Four case studies, on permethrin treatment of scabies, PUVA therapy, salicylic acid and errors

with patches, have been included to illustrate the clinical principles and their implications in transdermal drug delivery.

To help new (and other) researchers, there is a glossary of terms commonly used in topical and transdermal drug delivery at the end of the book, as well as a terminology section in Chapter 2 designed to alleviate confusion in the literature where certain terms, such as permeation and penetration, are often used interchangeably. Particularly helpful is the chapter on experimental design, where the author discusses the benefits and limitations of *in vitro* and *in vivo* studies, animal and artificial membranes used in *in vitro* studies, preparation of skin membranes, selection of diffusion cells, dose, vehicle and receptor media, integrity checks and expression of results, among others. This chapter is especially important to the field, given the very large variation in experiment methodologies used by different researchers.

In the preface of the book, the author, Professor Adrian C Williams, hopes that the book provides an introductory text to new researchers to the field, formulators and clinical practitioners. This, I believe, it will do. Other unintended (or forgotten?) beneficiaries of the book include pharmacy (and other) lecturers for whom this small volume provides a wealth of information in one place which can help lecturers contextualise and integrate the knowledge to enhance teaching and learning. The book certainly landed on my desk in time for this semester!

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## Chronotherapeutics

Peter Redfern (Ed.), ISBN 0 85369 488 5, 426 pp, 2003, Price £75.00,  
Pharmaceutical Press, London

*Chronotherapeutics* by Peter Redfern (Ed.) is an excellent and informative text on this fascinating, yet much overlooked, subject.

Certain consequences of disruption to the biological clock, such as jet lag and, possibly, seasonal affective disorder, are phenomena that are frequently discussed in the popular press and that the public, as well as health care professionals, will be familiar with. Indeed, anyone who has taken a long haul flight, or burned the midnight oil on one occasion too many, will certainly have experienced the effects that this can have on our every day functioning, such as sleep, wakefulness and appetite. However, the far reaching implications of circadian rhythms, not only in normal physiology but also in the treatment of a range of diseases, may come as a surprise to many.

Oral dosing of drugs, at different times of the day, results in marked differences in pharmacokinetic parameters which cannot be explained simply by factors such as whether or not the subject is fed or fasted at the time of dosing. The book describes in detail how rates of drug absorption, distribution, metabolism and excretion are affected by circadian rhythms and gives a table citing the results of published studies of the pharmacokinetics of some 50 commonly prescribed drugs and how these vary over the course of the day, in healthy individuals, as well as in those being treated for specific conditions. These important differences are presented in the context of physiological variations in enzyme systems, ion channel activity, receptor expression, hormone levels and mediator production over

the course of the day and how intrinsic and exogenous factors are involved in regulation of circadian rhythms. Clearly, a better understanding of factors that influence drug levels and activity could result in improvements in the safety profiles and therapeutic efficacies of many of our currently available drugs. This book discusses the potential optimisation of dosing regimes to take into account chronobiology and, also, the design of novel sustained release dosage forms that result in release of drug at times likely to result in the greatest benefit.

Whereas the above factors are of clear pertinence to all areas of drug treatment, subsequent, individual chapters in the book are dedicated to specific therapeutic areas. These chapters provide comprehensive discussion of the importance of chronobiology in fields such as the treatment of asthma, gastrointestinal and cardiovascular diseases, as well as more specialised areas, such as cancer chemotherapy and pain management. The final chapters are concerned with circadian rhythm disorders, the effects of ageing and the potential pharmacological modulation of circadian rhythms.

This book, in a single volume, manages to cover a wide range of topics in considerable detail, whilst remaining accessible to the general reader. I am certain that *Chronotherapeutics* will be a valuable resource to scientists and practitioners alike.

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