

Book reviews

“Dermatological and Transdermal Formulations”

Kenneth A. Walters (Editor), Marcel Dekker, New York, Basel; 2002, 567 pages, US\$ 195; ISBN 0-8247-9889-9

‘Dermatological and Transdermal Formulations’ is volume 119 of the series ‘Drug and the Pharmaceutical Sciences’ by Marcel Dekker. This book is an update and an expansion of the well-known book by Brian Barry ‘Dermatological Formulations – Percutaneous Absorption’ published 20 years ago, and focuses on the fundamentals in the field of dermatological research. The following subjects are addressed over 11 chapters: Chapter 1 describes the structure and function of the skin in a clearly arranged summary. It also encloses the most up-to-date on the subject, especially with regard to biochemistry. The next chapter deals with various skin diseases. Here, some brief information on diagnostics and pathogenesis as well as their topical treatment are given. However, in my opinion this chapter would be better positioned in a book concerning disease treatment. Chapter 3 is related to the basic mathematical principles in skin permeation. Starting with Fick’s laws, solutions for these are shown for different boundary conditions. The chapter includes the most important aspects of diffusion and is illustrated with numerous examples. Related references are well selected. Skin transport theories as well as their practical examples are described in Chapter 4. This chapter is not easy to read; however, many important pieces of information are provided. The complex nature of this chapter depends on the very complex nature of the skin and the involved transport processes. A very interesting short introduction on how to adapt the chemical potential theory to skin transport is given. Chapter 5 addresses methods for studying percutaneous absorption. This chapter is clearly arranged, very well organized and the pros and cons of the different methods are adequately discussed. In many cases, practical advice is quoted. The basics of formulation strategies for modulating skin permeation are given in Chapter 6. For chemical penetration enhancement, the most common examples are discussed and the interaction of vesicular systems with skin is described. Advantages and problems, as well as the rationale to use supersaturated solutions for dermal drug delivery, are mentioned and extended with examples. Chapter 7 is named ‘Drug formulation and transdermal systems’. In this chapter all dermal applied formulations are shortly reviewed. More information is provided in the

clinical use of transdermal systems. Well-determined cross-references to other chapters are given. However, it may be questionable as to whether the clinical aspects fit to the readers’ expectations. One of the hottest topics in the field of dermatological research is covered in detail in Chapter 8, ‘Bioavailability and bioequivalence of dermatological formulations’. In this chapter all relevant aspects concerning dermal bioavailability and bioequivalence are addressed on an up-to-date level. Often references to other chapters are provided. Chapter 9, entitled ‘Scale-up of dermatological dosage forms: a case for multivariate optimization and product homogeneity’, informs us about exemplar applications of factorial design to dermal formulations. Process variables influencing product homogeneity are discussed in detail. Safety aspects are outlined in the Chapters 10 and 11. In these two chapters many overlapping topics are noticeable. In addition, some new aspects concerning phototoxicity and corrosivity, like the OECD guidelines, are missing.

In summary, most of the chapters are well written and represent basic knowledge in the field of dermatopharmaceutics. For deeper information, well-selected references are provided. It is recommendable to anyone who wants to start in this field of research and also to those who want a brief overview of skin research. Undergraduates, as well as graduate students and researchers in industry and academia, will benefit from this book. It is a useful supplement to the dermatopharmaceutics field.

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“Topical Absorption of Dermatological Products”

Robert L. Bronaugh and Howard I. Maibach (Editors), Marcel Dekker, New York, Basel; 2001, 544 pages, US\$ 175; ISBN 0-8247-0626-9

The book ‘Topical Absorption of Dermatological Products’, edited by Robert L. Bronaugh and Howard I.

Maibach, is published as volume 21 in the series 'Basic and Clinical Dermatology' by Marcel Dekker. Based on R.L. Bronaugh and H.I. Maibach's well-known books "Percutaneous Absorption" and "In Vitro Percutaneous Absorption", new topics are added; however, some other topics are omitted. This means the new book is not a complete substitute for the above-mentioned volumes.

The book's chapters are divided into the following main parts: 'Mechanisms of Absorption' (Chapters 1–8), 'Methodology' (Chapters 9–21) and 'Drug and Cosmetic Absorption' (Chapters 22–35). Most of the single chapters are well chosen and cover actual knowledge in the dermal field. From the index many questions are easily accessible, and the subdivisions in the shorter chapters make it very easy for the reader to get directly to the desired information.

In the part 'Mechanism of Absorption' the following themes are addressed: Cutaneous metabolism (Chapters 1 and 5), influences of the way of application, like occlusion or not (Chapter 2), regional variation in percutaneous absorption (Chapter 3), skin barrier function in the neonate (Chapter 4), drug delivery to the hair follicles (Chapter 6), the relationship between percutaneous absorption and transepidermal water loss (Chapter 7), and dermal decontamination and absorption (Chapter 8). The following are some examples: In the occlusion chapter detailed information is provided that occlusion results in a higher absorption but not in all cases. Here, vehicle influences are demonstrated. The relevance of cutaneous metabolism in the application of any topical agent is intensively discussed. Due to safety aspects, different washing procedures are critically reviewed in the chapter on dermal decontamination and absorption.

In the 'Methodology' section not only methods to measure drug absorption are discussed, *in vitro* as well as *in-vivo*, but also special aspects are addressed, e.g. influence of dosing regimes, a biochemical approach of penetration enhancement and calculation of body exposure from percutaneous absorption data. Chapter 9 is a summary of *in vivo* methods for percutaneous absorption measurement, whereas in Chapters 10 and 11, the *in vitro* techniques using skin samples are summarized. Herein information concerning diffusion cells, source of skin and receptor fluids is provided. Factors involved in the dose–response interrelationships of percutaneous absorption are described in Chapters 12 and 13. Chapter 13 points especially to the effects of single and multiple dosing. Special techniques like Laser Doppler flowmetry (Chapter 14) and real-time breath analysis (Chapter 20) are discussed, with reference to their usefulness in determining percutaneous absorption. All relevant techniques to access drug concentration in different skin layers are addressed in Chapter 15. Chapter 16, entitled 'Stripping method for measuring percutaneous absorption *in vivo*', provides the interrelation of drug amount in the stratum corneum after an incubation period of 30 min and the amount of excreted drug in the following

period of 96 h. In addition, up-to-date unpublished data are used to show the influence of the applied dose. Methods for the assessment of topical corticosteroid-induced skin blanching are reviewed in Chapter 18. Pros and cons for the classical visual grading method and the chromameter system, and as well as first applications of digital image analysis to assess skin blanching, are given. Chapter 19 is related to *in vitro* release measurement in topical dermatological dosage forms. Also, the FDA guidance document "SUPACC-SS. Nonsterile Semisolid Dosage Forms – Scale Up and Postapproval Changes: Chemistry, Manufacturing, and Controls; *In Vitro* Testing and *In Vivo* Bioequivalence Documentation" is addressed. Chapter 17 gives an overview of the stratum corneum biogenesis and shows possibilities in using a biochemical approach, modulation of enzymes in the skin, for percutaneous absorption enhancement. The 'Methodology' part ends with Chapter 21, entitled 'Calculations of body exposure from percutaneous absorption data'. Herein, problems using absorption data from different anatomic sites for safety aspects are discussed.

The last part, 'Drug and Cosmetic Absorption', presents various methods of drug delivery to different skin layers and skin appendages, safety aspects, special drug delivery systems as well as common topical dermal formulations and a very special issue dealing with alternative therapies (Chapter 34). In Chapter 22 the delivery to deeper skin layers and underlying tissues are addressed. Phonophoresis, drug delivery using ultrasound, and iontophoresis are discussed in detail in Chapters 23 and 24. Safety and risk aspects are addressed in Chapter 25 'Percutaneous penetration as it relates to the safety evaluation of cosmetic ingredients', in Chapter 26 'Percutaneous absorption of fragrances', in Chapter 27 'Hair day absorption' (this chapter is identical to Chapter 32 in the book "Percutaneous Absorption"), in Chapter 28 'Percutaneous absorption of alpha-hydroxy acids', in Chapter 29 'Optimizing patch test delivery' and in Chapter 32 'Percutaneous absorption of sunscreens'. The different barrier conditions of the nails in comparison to the stratum corneum are intensively discussed in Chapter 30. In this chapter special focus is directed to topical delivery of antifungal drugs for onychomycosis treatment. Chapter 31 'Topical dermatological vehicles', Chapter 33 'Colloidal drug carrier systems' and Chapter 35 'Ointments, creams, and lotions used as topical drug delivery vehicles' inform us about different formulations which can be applied in the dermal field. For the sake of clarity, it would be desirable to integrate these chapters into one single chapter.

Altogether, this book covers a broad spectrum of pharmaceutical, cosmetic and toxicological aspects in the field of dermal research. It is easy to read, also for a newcomer in this field, and provides a lot of information. Undergraduates as well as graduate students, and researchers in industry and academia working in the dermal field will benefit from this new volume.