

payment. As a last issue he addresses the project evaluation and its implications on the process of decision making.

In the last chapter the authors Breitenbach and Fischer ask the question 'Quo vadis pharmaceutical industry'? They try to outline the consequences of modern technologies such as bio- and gene technology, as information technology as well as nanotechnology on therapeutic methods. If the expectations generated by all these technologies would become reality the treatment of patients would become very individual. In many cases therapeutic progress would no longer result in drug products manufactured on a large scale. It is by mergers that in the transition time the pharmaceutical companies try to handle the problems resulting from high costs of development, of production and of marketing on one hand and of limited sales on the other hand. The number of pharmaceutical companies has decreased significantly during the last 10 years. In addition a critical assessment of products under economic aspects will become vital for pharmaceutical companies.

The scope of the book presented by Breitenbach and Fischer and their co-authors is very large. It is a good introduction for people interested in a better understanding of how pharmaceutical products are developed and manufactured. There are a large number of excellent diagrams explaining complex processes. The specific terminology which evolved under the influence of the regulations on one hand and the modern technologies on the other hand is well explained and will be of great help for all those being new in this business.

Ingfried Zimmermann*

*Lehrstuhl für Pharmazeutische Technologie,
Universität Würzburg, Würzburg, Germany*

E-mail address: i.zimmermann@pzl.uni-wuerzburg.de

* Lehrstuhl für Pharmazeutische Technologie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany. Fax: +49-931-888-4608.

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Cosmetic Lipids and the Skin Barrier (Cosmetic Science and Technology Series/24)

Thomas Förster (Ed.), Marcel Dekker, New York, Basel, 2001, 376 pages, ISBN 0-8247-0664-1 (US\$ 165)

The skin acts as a fascinating interface between us and the outside world. The outer layer, the stratum corneum, is a very thin but extremely effective barrier membrane. In part this is due to the unique lipid composition which resides both on and within its complex heterogeneous structure. The nature and significance of the lipids is therefore of interest to pharmaceutical and cosmetic scientists and also toxicologists interested in the permeation of xenobiotics. It is unfortunate that the opening word in the title of this book is

'cosmetic' as this may deter readers from outside the cosmetics field. In reality the book is of interest to any one concerned with the barrier properties of the skin and the significant role that lipids play.

The book has been edited well and is a multi-authored text covering most, but not all, aspects of skin lipids. It is a well-balanced and structured volume containing 11 chapters. These are divided into four roughly equal parts with the first of these dealing with the chemistry and structure of the lipids. The second considers their biological function and the third analysis of the lipids and their effects on the skin. The final part deals with specific lipids in cosmetic products.

The opening chapter examines the chemistry of the lipids and, as may be anticipated, shows their complexity and variability. This gives rise to the inherent variations that are seen in skin permeability, between sites, between individuals and as a result of disease states. The chapter also deals with the synthesis and structure of synthetic lipids that can be used to mimic the natural materials. The lipids in the intercellular spaces of the stratum corneum are organised into bilayer arrays. This again is important in the nature of the barrier properties of the stratum corneum and alterations in the lipid packing gives rise to changes in skin permeability. The structure of the lipids can be interrogated using small and wide angle X-ray diffraction. This is described and referenced well in the second chapter which also considers the structure of model membranes and the influence of hydration levels on lipid organization. Both in drug delivery and in cosmetic products there is an interest in the role of vesicles; these are reviewed from the standpoint of their effect on permeation and their visualisation. The final chapter of part one considers molecular modelling and how the lipids pack together. Conformational effects and polar head group interactions are clearly important and advances have been made in modelling these. The structures are complex and the interactions require significant computing power for the modelling. In the future it should be possible to use these approaches to predict diffusion through the bilayers and interactions of permeation modulators with the endogenous lipids.

The role of skin lipids in the barrier function is considered in the next chapter and is complementary to the first chapter on their chemistry. Biochemical aspects of lipid synthesis are described and biological effects such as the influence of ageing on lipid composition discussed. In this, the shortest of parts, the final chapter deals with skin equivalent models. This is an important subject given the complexities of obtaining skin samples for experiments. Various aspects are considered such as the different types of cultured skin, their histology and lipid composition.

The third part deals with analysis of the lipids and their effects on the skin. The first chapter in the section deals specifically with direct analysis. It considers the various sources of skin such as biopsy, skin stripping and blister formation. Extraction and separation procedures depend on

the way in which the skin has been obtained and the analysis can be achieved qualitatively and quantitatively using techniques such as TLC and GC-MS. Major advances have been made both in the identification of the lipids and consideration of their properties. Biophysical techniques have advanced and it is possible to examine the properties of skin from numerous perspectives. The second chapter deals with biophysical methods and concentrates on issues such as moisture assessment and transepidermal water loss (TEWL). Hydration of the skin is a very important determinant of its properties (both cosmetic and permeability), TEWL can be used to identify permeability defects in the barrier function. Pharmaceutical aspects of skin properties tend to regard a biophysical analysis in terms of spectroscopic techniques, however this chapter takes more account of properties such as the surface topography at a microscopic level (microrelief), bio-mechanical properties, desquamation and assessment of surface lipids. The final chapter in this part of the book does consider spectroscopic techniques and concentrates on infrared and Raman which can be used to look at enhancers, skin types

and the effects of formulations. There is a good basic introduction to the subject.

The final elements of the book are more focussed on the cosmetic scientist and consider important areas such as the sensory perception of the skin and products on the skin. These are difficult to assess and a rational approach is provided. The section also considers surfactant products and the interactions between surfactants and the skin.

Overall this is an interesting book that will be of considerable value to those scientists having a general interest in skin lipids and how these influence the biological and physicochemical properties of the stratum corneum.

Jonathan Hadgraft*

Medway Sciences, University of Greenwich, Kent, UK

E-mail address: jonathan.hadgraft@btinternet.com

* Medway Sciences, University of Greenwich, Central Avenue, Chatham Maritime, Kent ME4 4TB, UK. Tel./fax: +44-1634-883042.