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Penetration Enhancer Incorporation in Bilayers

ANTHONY J. I. WARD* and REGINA TALLON *University College Dublin, Dublin, Ireland*

I. INTRODUCTION

The use of agents to enhance the penetration of drugs through the skin has been widely studied, although phenomena associated with the modification of the barrier function and the molecular nature of the incorporating molecules remain unclear. An understanding of these interactions, however, is fundamental to the design of topical delivery vehicles and their modes of interaction with the skin.

This chapter explores the use of a simple surfactant system to model some of the features of the lipophilic component of the stratum corneum (SC). For this, the choice of model is determined by the head group nature of those lipids that are predominately neutral (1,2) to about 75% to 80% in the SC compared with about 10% phospholipids. This type of lipid interacts with the aqueous environment through hydrogen-bonding interactions. A similar situation arises with simple surfactants of the alkyl polyoxyethylene glycol ether (CnEOm) type that form associated structures when mixed with water (3). Particular attention will be focused on the lyotropic mesophase formed when the amphiphilic molecules associate into bimolecular arrangements separated by aqueous layers (Fig. 1), known as the *lamellar phase*. Note that this phase comprises randomly dispersed lamellar domains and should not be confused with vesicles and liposomes, although these structures also maintain bimolecular arrangements of the amphiphiles. Indeed, many physicochemical properties are analogous between the two types of systems, but some differences exist in observed behavior (see Sect. II.A) because of differences in isotropy. Furthermore, the lamellar phase does

*Current affiliation: Clarkson University, Potsdam, New York