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Free fatty acids chain length distribution affects the permeability of skin lipid model membranes

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Abstract

The lipid matrix in the stratum corneum (SC) plays an important role in the barrier function of the skin. The main lipid classes in this lipid matrix are ceramides (CERs), cholesterol (CHOL) and free fatty acids (FFAs). The aim of this study was to determine whether a variation in CER subclass composition and chain length distribution of FFAs affect the permeability of this matrix. To examine this, we make use of lipid model membranes, referred to as stratum corneum substitute (SCS). We prepared SCS containing i) single CER subclass with either a single FFA or a mixture of FFAs and CHOL, or ii) a mixture of various CER subclasses with either a single FFA or a mixture of FFAs and CHOL. In vitro permeation studies were performed using ethyl-p-amino benzoic acid (E-PABA) as a model drug. The flux of E-PABA across the SCS containing the mixture of FFAs was higher than that across the SCS containing a single FA with a chain length of 24 C atoms (FA C24), while the E-PABA flux was not effected by the CER composition. To select the underlying factors for the changes in permeability, the SCSs were examined by Fourier transform infrared spectroscopy

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