

Wissenschaftliches Hauptprogramm (Teil 2): Neues zur Dermopharmazie aus Laboratorien und Rechtsanwaltsbüros

Extrahieren Emulgatoren Lipide aus dem Stratum corneum? Aktueller Stand der Forschung

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Emulsifiers are frequently used in topical formulations like emulsions and creams to stabilize the dispersed phase in the coherent phase against coalescence during storage. After application to the skin, emulsifiers may interact with the stratum corneum (SC). The SC plays a major role in skin barrier function. It consists of keratinocytes surrounded by highly ordered lipids which are responsible for maintaining the excellent barrier function.

Interaction of emulsifiers with the SC lipids may lead to an impairment of this barrier function. Especially when formulations are applied to already impaired skin e. g., diseased skin, such impairment of the barrier function should be avoided in order not to aggravate the disease. It is thus of pivotal importance to characterize emulsifiers with regard to their effect on SC lipids and skin barrier function.

We analysed the impact of several pharmaceutically used emulsifiers ex vivo and in vivo regarding their impact on SC lipid content and conformation. Confocal Raman microspectroscopy (CRM) was used alongside liquid chromatography-mass spectrometry (LC-MS). CRM is a non-destructive method that requires no or only little sample pre-treatment and can give information on total lipid content as well as on lipid conformation. LC-MS was used to analyse the content of the different lipids species in the SC.

Ex vivo experiments were performed in porcine skin that serves as a good model for human skin. In vivo experiments were carried out in human volunteers. The study was performed according to the declaration of Helsinki, approved by the ethics committee of the University clinics of Tuebingen (221/2022B02), and informed written consent was obtained from the volunteers. Alongside tape stripping experiments to harvest the SC and subsequent lipids quantification, the following physiological parameters were measured to give an impression of the skin barrier function: transepidermal water loss (TEWL), skin hydration, erythema index and skin pH.



In ex vivo experiments, it was found that mostly, but not exclusively, hydrophilic emulsifiers show a tendency to extract lipids from the SC going along with a shift in lipids conformation [1-6]. In vivo experiments showed that lipid content could be correlated to physiological skin parameters.

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Literature

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