Wissenschaftliche Posterausstellung 2017: Poster 6

Film-Forming Formulations with Sustained Penetration of an Antipruritic Drug into the Skin

Rouven Heck (1), Milica Ž. Lukić (2), Snežana D. Savić (2), Rolf Daniels (1) and Dominique J. Lunter (1)

(1) Department of Pharmaceutical Technology, Eberhard Karls University, Tuebingen, Germany
(2) Department of Pharmaceutical Technology and Cosmetology, Faculty of Pharmacy, University of Belgrade, Serbia

Chronic pruritus is a common symptom accompanying various chronic skin diseases. Conventionally, it is treated with antihistamines and local anesthetics. However, these drugs often cannot provide sufficient relief. As an alternative, capsaicinoids can be used. Their long-lasting antipruritic effect is caused by continuous stimulation of TRPV1 at the epidermal pain conducting fibers. To achieve this, currently available formulations need to be applied 4-6 times a day. This is inconvenient and results in poor patient compliance.

The aim of our study was to develop a film-forming formulation (FFF) with sustained release for dermal use making it easy to treat large areas of affected skin over a long period. Nonivamide (synthetic capsaicin) was used as active.

FFFs were prepared by loading a solution of nonivamide in refined castor oil into mesoporous silica. This was subsequently incorporated into a plasiticized film-forming polymer dispersion. Film forming capacity of the FFFs was investigated by confocal Raman microscopy. Color coded images show that the oil is bound to the silica and immobilized in a polymeric matrix. The inclusion of the nonivamide containing oil was regarded as a prerequisite to achieve sustained penetration into the skin.

Ex vivo permeation experiments were carried out to parametrically compare permeation of nonivamide from FFFs to a standard formulation (Hydrophilic Nonivamide Cream; HNC; prepared according to “Hydrophile Capsaicinoid Creme” in: Neues Rezeptur Formularium; monograph #11.125). It was found that permeation rate from a FFF with 0.9 % nonivamide was comparable to that from HNC containing 0.05 % nonivamide. The permeation rate from the FFF falls thus into a therapeutically suitable range.

As the site of action of capsaicinoids is located within the viable epidermis, ex vivo penetration experiments were performed to compare nonivamide penetration from FFF and HNC into excised skin. It was found that the FFF was capable of delivering a similar amount of nonivamide to the skin as the HNC. Nonivamide levels in the viable epidermis decreased rapidly if it was applied in HNC but were kept constant over a period of 24 hours if it penetrated from FFF. The capability of FFF to sustain penetration was thus shown.

Furthermore, skin irritation potential of FFF was tested against the vehicle and the control formulation HNC in an in vivo experiment in human volunteers (signed written consent obtained, approved by local ethics commitee and in accordance with the declaration of Helsinki). Transepidermal water loss, skin hydration and erythema index were assessed. It was found that FFF did not alter any of the measured parameters within the application time. This shows the excellent skin tolerability of the FFF.

Our investigation clearly shows that FFFs exhibit the desired sustained penetration profile while being well tolerated. As a result, dosing intervals can be prolonged and patient compliance to the treatment can be improved.