



AESTHETIC AND COSMETIC DERMATOLOGY (LASERS SEPARATE CATEGORY)

## ENHANCEMENT OF SKIN BARRIER FUNCTION ON A CELLULAR AND PHENOTYPIC LEVEL: INTEGRATIVE EFFECTS OF A NOVEL MULTI- FUNCTIONAL MOISTURIZER

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**Introduction:** Urea has been used as a dermatological treatment for more than a century due to its hydrating, keratolytic, and antimicrobial effects. Recently genomic analyses revealed urea stimulated expression of epidermal antimicrobial and transport proteins, providing insights into its mode of action.

**Objective:** This study investigated the effects of a novel moisturizer with 10% urea, other NMF components, and stratum corneum (SC) lipids on gene and phenotypic expression in subjects with xerosis. Tests included (i) ex vivo penetration of urea, (ii) ex vivo expression of genes encoding proteins involved in skin barrier function, hydration, and lipid metabolism, and (iii) in vivo skin barrier and hydration parameters.

**Materials and Methods:** Two double-blind, vehicle-controlled clinical studies were conducted. Women with dry skin applied the moisturizer or its vehicle 2x daily to the forearms for 2 weeks. (i) 24h after 2 weeks of use, skin surface strips were taken and the content of urea was analyzed in the 3rd stripping by HPLC-MS. (ii) Expression of 48 genes were analysed in suction blister samples using a low density array. (iii) SC hydration was measured 24h after a single application and 24h after 2 weeks of use. Barrier function was assessed by transepidermal water loss measurement 24h and 48h after 2 weeks of use.

**Results:** Compared to vehicle and the untreated control area, application of the moisturizer revealed (i) an increase in SC urea content, (ii) an upregulation of IVL, KLK7, CLDN1, LOR (skin barrier), AQP9 (skin hydration), and ELOVL4, SMPD1, HMGCR (skin lipid metabolism), (iii) an improved skin hydration and barrier function.

**Conclusions:** These results shed new light on the cellular effects of the employed actives. Enhanced expression of analyzed genes suggest benefits for atopic xerosis, ichthyosis vulgaris, and psoriasis, and confirms profound physiological effects of the functional





moisturizer beyond its humectant properties.

