

Effect of Ceramide Preparations on Barrier Repair

An ex-vivo barrier repair study

Introduction: In this study the ability of Ceramide III preparations to accelerate the Stratum Corneum barrier repair was investigated.

Study: The study was performed for Cosmoferm by TNO, Prince Maurits Laboratory (NL).

Methods: The study was performed using a porcine ear skin permeation model described by de Lange et al. (1992, JPM 27: 71-77). The skin was exposed to multiple acetone applications. Before application (baseline) and 2 hours post irritant exposure, transepidermal water loss (TEWL) was measured using an Evaporimeter to determine the degree of damage after Stratum Corneum disruption. The damaged areas were treated with the test formulations. The aqueous formulations used in this study were:

Vehicle: Sodium lauroyl lactylate (SLL) membrane system without Ceramides (control)

System 1: 0.5% Ceramide III in 4.5% SLL membrane system

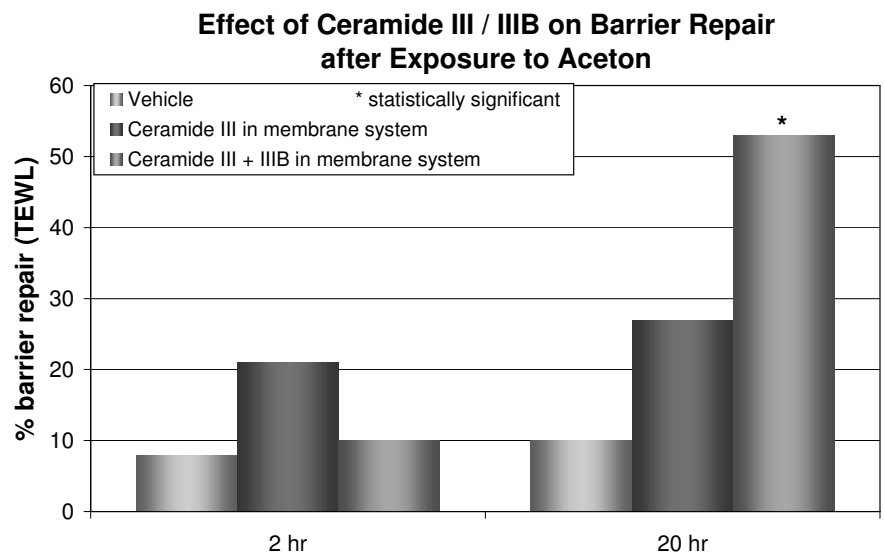
System 2: 0.5% Ceramide III / IIIB (60:40), 0.5% cholesterol, 0.5% free fatty acids, 2% SLL membrane system (SK-influx-like system)

At 2 and 20 hours post application, TEWL was measured to study the effects of repair. The control TEWL (baseline) was subtracted from all TEWL values. TEWL at 2 and 20 hours after treatment were expressed as a percentage of the value obtained directly after exposure to the irritant.

The Mann-Whitney U-test ($p < 0.05$) was performed to determine statistical differences between TEWL data obtained after exposure to acetone and the Ceramide treatment data (2 and 20 hours after application).

Results: The graph shows the percentage barrier repair after acetone exposure.

A statistically significant decrease in TEWL, implying improved Stratum Corneum barrier repair, was found 20 hours after application of the Ceramide III and IIIB membrane system.



Conclusion: It was demonstrated that Ceramide III and the combination of Ceramide III and IIIB in a membrane system are effective in Stratum Corneum barrier repair. This effect was statistically significant for Ceramide III and IIIB 20 hours after application. This study also indicates that combining Ceramides with cholesterol and fatty acids is beneficial for barrier repair.