Hydrocortisone diffusion through synthetic membrane, mouse skin, and epiderm™ cultured skin

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Abstract

Objectives. The penetration of hydrocortisone (HC) from six topical over-the-counter products along with one prescription cream through cultured normal human-derived epidermal keratinocytes (Epiderm™), mouse skin and synthetic nylon membrane was performed as well as the effect hydrating the skin by pre-washing was explored using the Upright Franz Cell.

Method and Results. Permeation of HC through Epiderm™, mouse skin and synthetic membrane was highest with the topical HC gel formulation with prewash treatment of the membranes among seven products evaluated, 198 ± 32 µg/cm², 746.32 ± 12.43 µg/cm², and 1882 ± 395.18 µg/cm², respectively. Pre-washing to hydrate the skin enhanced HC penetration through Epiderm™ and mouse skin. The 24-hour HC released from topical gel with prewash treatment was 198.495 ± 32 µg/cm² and 746.32 ± 12.43 µg/cm² while without prewash, the 24-h HC released from topical gel was 67.2 ± 7.41 µg/cm² and 653.43 ± 85.62 µg/cm² though Epiderm™ and mouse skin, respectively. HC penetration through synthetic membrane was ten times greater than through mouse skin and Epiderm™. Generally, the shape, pattern, and rank order of HC diffusion from each commercial product was similar through each membrane.

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