Quantifying Epidermal Skin Changes after Topical Treatment with a Novel Hyaluronic Acid-Phosphatidylethanolamine (HA-PE) Cream

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Introduction: With aging, keratinocytes have diminished proliferative capacity resulting in atrophic skin with reduced barrier function. This investigation evaluates the effect of daily topical applications of a novel high-molecular weight hyaluronan (HA-PE) cream (CA Patent PCT/CIPO 2,703,532) on keratinocyte renewal and epidermal thickness.

Methods: Unmodified hyaluronan (HA) and HA-PE, both containing 500kDa hyaluronan, were mixed separately into a vehicle cream. Each topical formulation was applied once daily onto the shaved backs of wild-type female retired breeder mice. At days one, five, and ten following the initial cream application, full-thickness biopsies of treated skin were obtained. In addition, a cardiac puncture was performed for serum C-reactive protein (CRP) analysis. Skin samples were analyzed for immunohistochemistry markers of keratinocyte proliferation (Ki67), keratinocyte differentiation (K10), and local inflammation (F4/80, TNFα). Differences between groups were compared using a one-way ANOVA with Tukey’s post hoc analysis.

Results: The HA-PE treated mice had greater keratinocyte proliferation (Ki67) and epidermal thickness across all time points compared with controls. However, there was no difference in keratinocyte differentiation (K10) markers between groups.

There was also no difference in either local (F4/80, TNFα) or systemic (CRP) markers of inflammation between groups.

Conclusions: Topical HA-PE shows promise as a novel skin care technology to increase epidermal thickness through enhanced keratinocyte proliferation. In addition, topical HA-PE does not elicit either a local or systemic inflammatory response in a murine model.