Skin Irritation and Potential Efficacy of a Novel Compound for Localized Treatment of Psoriasis

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Purpose
Psoriasis is a chronic condition characterized by formation of white scaly patches on the skin. Current treatment options include topical glucocorticoids which have several side effects. Pentaerythritol tetrakis (3,5-di-tert-butyl-4-hydroxyhydrocinnamate) (PTTC) is a cinnamate tetraester which may be used as a novel topical treatment for psoriasis with less side effects. The purpose of this study was to determine the skin irritation and potential efficacy of PTTC using in vitro cell culture models.

Methods
MatTek ™ Corporation has developed a cell culture model derived from human keratinocytes that mimics skin both morphologically and metabolically. Briefly, each cell culture insert was exposed to neat PTTC as well as PTTC topical emulsion for one hour. After washing, cells were incubated overnight. An MTT assay was performed to determine cell viability; a positive and negative control were used as references to compare the test groups. Cell viability less than 50% was considered irritant. MatTek ™ Corporation also has a psoriatic skin model derived from psoriatic fibroblasts. The skin was dosed with a control untreated group, neat PTTC, and PTTC emulsion for 96 hours. Cell supernatant was collected and IL-6 levels were measured by ELISA as an endpoint to determine efficacy.

Results
The FDA requires that all new drugs be non-irritant to the skin, thus an irritation assay was performed in cell culture. PTTC alone as well as topical PTTC emulsion formulation were found to be nonirritant with cell viability of 69.0 ± 5.64% and 74.6 ± 5.03%, respectively. Psoriatic patients have elevated IL-6 levels, therefore IL-6 was chosen as an endpoint to determine efficacy in this study. The basal level for untreated psoriatic skin was found to be 141.69 ± 8.41 pg/mL. Treatment with neat PTTC slightly reduced IL-6 levels to 122.06 ± 17.59 pg/mL, whereas treatment with PTTC emulsion significantly reduced IL-6 levels to 92.53 ± 12.74 pg/mL.

Conclusion
PTTC was found to be non-irritant to human skin. PTTC emulsion reduced IL-6 levels, suggesting potential efficacy in the treatment of psoriasis.