TECHNICAL REPORT

XemaTop™

Evaluation of Different Formulations Applied to Psoriasis Tissue (Part 3/3)

Abstract: Psoriasis is a chronic immune-mediated inflammatory disease of the skin characterized by hyperproliferation of keratinocytes and expression of markers such as the interleukin (IL)-6 and the proteins Ki67, Psoriasin and Elafin. PCCA Formula #12054 – Zinc Pyrithione 0.2% and Cyanocobalamin 0.07% topical cream (XemaTop) – was applied to *in vitro* psoriasis tissue samples for assessment of anti-inflammatory and antiproliferative properties. The test formulation considerably inhibited the production of all psoriasis markers. The compounding base XemaTop may then be considered a valuable base for the incorporation of active substances when compounding topical formulations indicated in psoriasis.

Introduction:

Psoriasis is a chronic immune-mediated inflammatory disease of the skin characterized by red, scaly, and well-defined lesions that form as a result of epidermal hyperproliferation. Keratinocytes, cells within the epidermal layer of the skin, may be stained for the expression of psoriasis-specific markers. The purpose of this study is to evaluate the *in vitro* anti-inflammatory and antiproliferative properties of Zinc Pyrithione 0.2% and Cyanocobalamin 0.07% topical cream (XemaTop): PCCA Formula #12054, using reconstructed psoriasis tissue model and the ELISA assay for detecting the expression of the following markers: interleukin IL-6; proteins Ki67, Psoriasin and Elafin [1]. Zinc pyrithione and cyanocobalamin, a vitamin B12 substance, are commonly used in topical formulations for psoriasis [2-3].

Methodology:

An aliquot of 50 µL of the test formulation (PCCA Formula #12054) was applied to reconstructed psoriasis tissue samples (MatTek Corporation), on day 0 and on day 2 of the study. Four replicates were tested and 4 additional tissue samples were left untreated to serve as study control. Culture media were collected on day 5 using the Enzyme-Linked Immunosorbent Assay (ELISA) by Cayman Chemical for detection of the interleukin IL-6 [4]. ELISA by LifeSpan BioSciences was used for detection of the protein markers Ki67, Psoriasin and Elafin within untreated and treated psoriasis tissues extracts [5]. The levels of the markers produced by the psoriasis tissue following application of the test formulation were quantified based on the absorbance detected at 450 nm.

Results and Discussion:

The mean and relative concentration of the psoriasis markers (IL-6, Ki67, Psoriasin and Elafin) was calculated for both treated and untreated tissue samples, as displayed in Table 1 and Figures 1-2.

The concentration of the markers in the psoriasis tissue samples treated with the PCCA Formula #12054 was considerably lower than the concentration of the same markers in the untreated tissues. These results show that the test formulation inhibited the expression of all inflammation and proliferation markers tested in the psoriasis tissue.

Conclusions:

The inhibition of the markers IL-6, Ki67, Psoriasin and Elafin is likely to attenuate the inflammatory response and cellular proliferation associated with psoriasis and, as a result, XemaTop may be considered a valuable proprietary base for the incorporation of active substances when compounding topical formulations indicated in psoriasis.

References:

1. Jiang, S., Hinchliffe, T.E. and Wu, T. (2015). Biomarkers of an autoimmune skin disease - psoriasis. *Genomics Proteomics Bioinformatics*, 13, 224-233.

2. Sadeghian, G., Ziaei, H. and Nilforoushzadeh, M.A. (2011). Treatment of localized psoriasis with a topical formulation of zinc pyrithione. *Acta Dermatoven APA*, 2011, 20 (4), p.187-190.

3. Williams, L.A. and Humphreys, E. (2011). Treatment options for psoriasis. *International Journal of Pharmaceutical Compounding*, 15 (3), p.204-213.

4. Cayman Chemical (2015) Interleukin-6 (Human) EIA Kit. Retrieved from https://www.caymanchem.com/pdfs/501030.pdf. Accessed 23 October 2015.

5. LifeSpan BioSciences, Inc. (2016) Human MKI67 / Ki67 ELISA Kit. Retrieved from https://www.lsbio.com/elisakits/manualpdf/ls-f11875.pdf. Accessed 11 March 2016.

Table 1. Mean and relative concentration of markers in untreated tissues and following application of the test formulation.

Concentration of markers	Negative control (untreated tissues)	Zinc Pyrithione 0.2% and Cyanocobalamin 0.07% topical cream (XemaTop): PCCA Formula #12054
IL-6 (pg/mL) ± SD (%)	198.857 ± 27.236 (100%)	7.704 ± 1.698 (4%)
Ki67 (ηg/mL) ± SD (%)	6.139 ± 2.078 (100%)	0.288 ± 0.064(5%)
Psoriasin (ηg/mL) ± SD (%)	441.75 ± 79.88 (100%)	-0.50 ± 0.58 (-0.1%)
Elafin (ηg/mL) ± SD (%)	58.133 ± 2.875 (100%)	29.838 ± 1.708 (51%)

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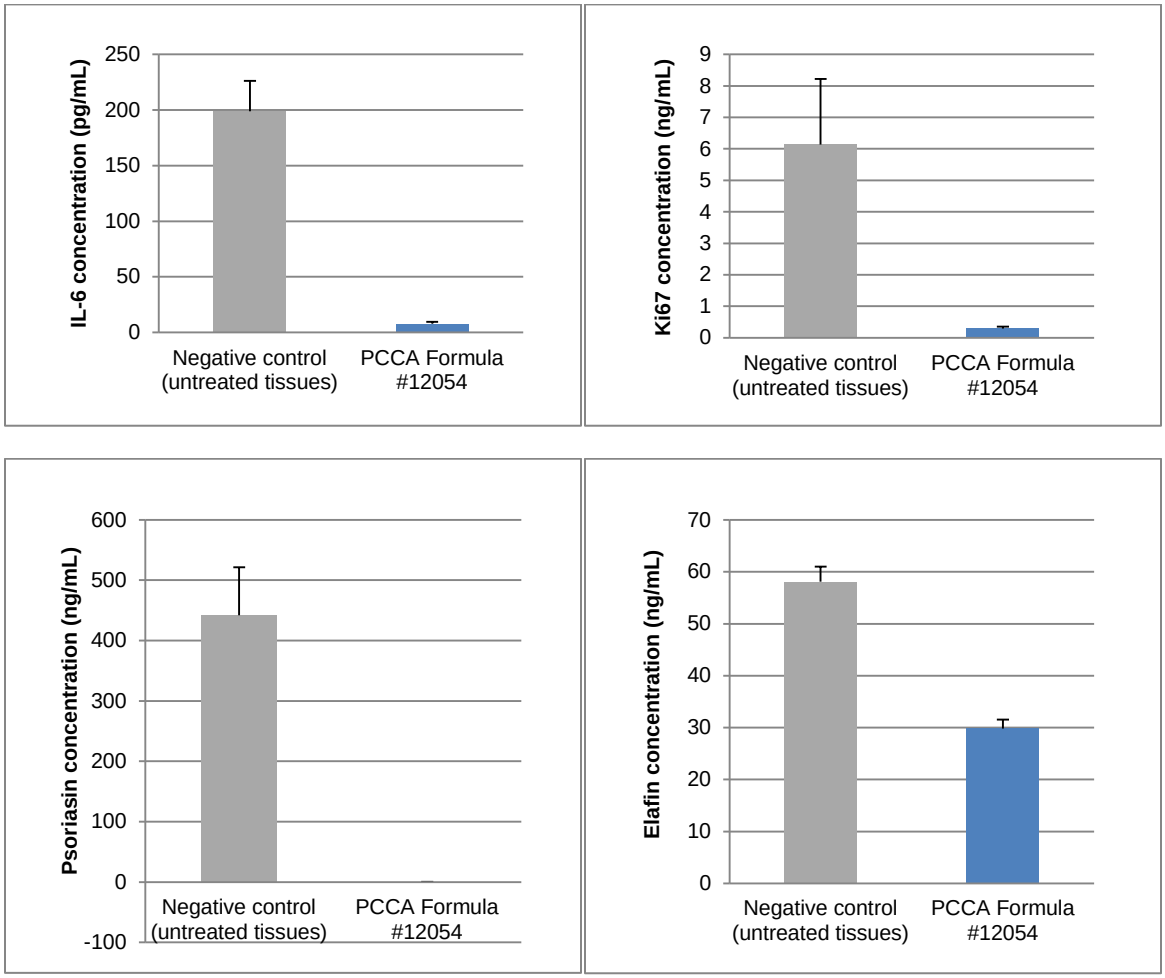

Figure 1. Mean concentration of markers in untreated tissues and following application of the test formulation.

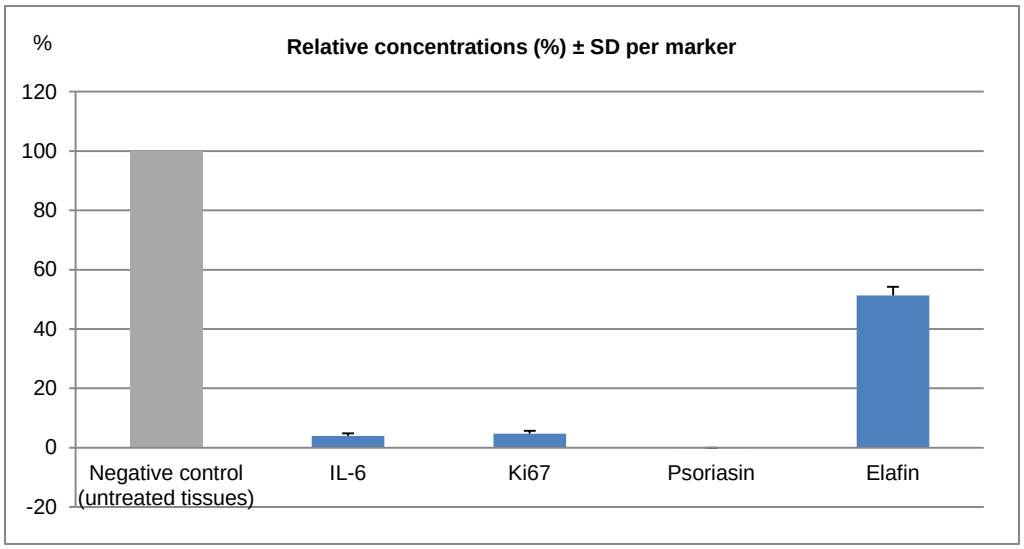

Figure 2. Relative concentration of markers in untreated tissues and following application of the test formulation.