EA DV CONGRESS
BERLIN 11-14 OCTOBER 2023
EUROPEAN ACADEMY OF DERMATOLOGY AND VENEREOLOGY

Abstract N°: 2476

A comparison of cosmetic active´s efficacy used in acne adjunctive care in reducing TRPV1 activation in hypersensitive skin cells

Alexandra Vogelsang[1], Chiara Knoblich[1], Katja Warnke[1], Julia Gallinger[1], Julia Weise[1]

[1]Beiersdorf AG

Introduction & Objectives:

Acne affects an estimated 9.4 % of the global population, making it one of the most common skin diseases (Layton et al, 2021; Tan & Bhate, 2015). For a successful acne treatment with prescribed medication the compliance of the patient is a crucial factor. Often dermatologists face non-compliant patients due to pronounced side effects of acne medication such as itching, burning, and dryness of the skin (Snyder et al, 2014).

Skin pruritus is a condition characterized by a hyperresponsiveness of sensory neurons and stimulation of neuroreceptors such as calcium-permeable transient receptor potential (TRP) channels. The thermoreceptor TRPV1 (capsaicin receptor) is known to mediate skin sensitivity including sensation of pain, itch, warmth, and afferent functions to chemical stimuli (Kitakka et al, 2017, Sulzberger et al, 2016, Sun et al, 2016, Yun et al, 2011, Gibson et al, 2014). The Nobel Prize in Physiology or Medicine 2021 was awarded to David Julius and Ardem Patapoutian for their discovery of temperature receptors such as TRPV1 (Latorre & Díaz-Franulic, 2022).

This in vitro study aims to evaluate the effects of different anti-irritant and soothing active ingredients in TRPV1 overexpressing keratinocytes.

Materials & Methods:

We investigated the inhibition of capsaicin-induced TRPV1 activation in vitro.

Keratinocytes (HaCaTs) with stably transfected TRPV1 receptor were stained with a Ca2+-sensitive fluorescent dye. After baseline recording cells were treated with the TRPV1 agonist capsaicin (1 µM) alone or in combination with actives. 100 µM of the respective actives (4-t-butylcyclohexanol, allantoin, glycyrrhetinic acid, niacinamide, dextran sulfate) were analyzed. A solvent control as well as cells treated only with the respective actives served as unstimulated controls. The Ca2+ influx dependent fluorescent signal was measured in a kinetic mode over 40 cycles (approx. 90 s) in a spectrophotometer. The area under the curve (AUC) was determined for each treatment. For TRPV1 activation the differences between the AUC of the capsaicin-stimulated samples and the respective unstimulated controls were calculated.

Results:

The in vitro model confirmed significant efficacy of 4-t-butylcyclohexanol to reduce Ca2+ influx into cells, thus 4-t-butylcyclohexanol efficiently acts as a TRPV1 antagonist. No reduction of Ca2+ influx was observed for the other tested actives (allantoin, glycyrrhetinic acid, niacinamide, dextran sulfate).

Conclusion:

4-t-butylcyclohexanol proved to be superior in inhibiting TRPV1 stimulation in keratinocytes compared to other tested actives. Thus, cosmetic formulations containing 4-t-butylcyclohexanol are suitable as adjunctive care for prescribed acne medication to actively reduce symptoms of itching and burning and therefore increase patient adherence.