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Deficiency of Wnt5a in keratinocyte does not ameliorate the imiquimod-induced psoriasis-like dermatitis

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Objective: Wnt5a acts as a natural anti-inflammatory cytokine, suggesting a protective role in human skin disorders. Hence, we aimed to evaluate the protective effects of Wnt5a in imiquimod-induced psoriasis-like skin disorder, a keratinocyte-driven inflammatory disease.

Methods: Eight-week old mice, in keratinocyte-specific knockout of Wnt5a (Wnt5a-CKO) and wildtype littermates, were randomly assigned to receive topical application of imiquimod (5% cream, 50mg/IKM) or control vehicle (VEH) on their shaved back for 7 days. Phenotypical presentation and severity index (PI) were modified from the human PASI guidelines. The expression levels of claudin-1 and claudin-7 were detected by western blot and immunofluorescence staining. The results demonstrated that Wnt5a depletion increased the expression of claudin-1 and claudin-7, indicating a protective effect of Wnt5a in imiquimod-induced psoriasis-like skin disorder.

Conclusions: The present study provides evidence for the protective role of Wnt5a in keratinocyte-driven inflammatory diseases, highlighting its potential as a therapeutic target.

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Novel chia seed extract (HyVa®) inhibits demethylation of PP2A and increases barrier repair markers, resulting in increased hydration of human skin

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Objective: Chia seeds have been widely studied as a functional food and reported to have several clinical benefits including cardio-protection, weight loss and metabolic disorder, very little has been published on its benefits to skin when applied topically. Here, we demonstrate for the first time the identification and characterization of a novel chia seed extract called HyVa®.

Methods: In addition to HyVa®, enhanced levels of (ω-6 LA) and (ω-3 ALA), it inhibits demethylation of PP2A and increases the expression of important hydration factors, Aquaporin-3 (AQP3) and Hyaluronic Acid Synthase 2 (HAS2) in cultured NHEKs. Lastly, human clinical testing demonstrated that, topical application of HyVa® is well tolerated and significantly increases skin barrier and hydration properties over vehicle-only.

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The association of interleukin-36γ, claudin-1 and claudin-7 in psoriasis

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Background: Interleukin-36 (IL-36) is a pro-inflammatory cytokine, involved in the development of psoriasis. Interactions between lymphocytes, DCs and keratinocytes (KCs) are important for psoriasis development and maintenance. Claudin proteins are transmembrane proteins that form tight junctions between epithelial cells. The aim of this study was to investigate the association of IL-36γ, claudin-1 and claudin-7 in psoriasis.

Methods: This study included 42 patients as psoriasis group with psoriasis vulgaris, 17 healthy volunteers as control group. Skin biopsies were used to detect the expression levels of IL-36γ, claudin-1 and claudin-7 by qPCR. The expression levels of IL-36γ, claudin-1 and claudin-7 in psoriasis group were significantly higher than that in the control group (P<0.001). The expression levels of IL-36γ, claudin-1 and claudin-7 in psoriasis group were negatively correlated with clinical severity index (P<0.01). The expression levels of IL-36γ, claudin-1 and claudin-7 in psoriasis group were positively correlated with CD11+, CD68+ and CD4+ (P<0.01).

Conclusions: The expression of IL-36γ is associated with the association of claudin-1 and claudin-7 in psoriasis.

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The importance of sirtuins in skin and new findings about sirt2 and its link to mechanobiology

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Objective: Sirtuins (SIRTs) are a family of NAD+-dependent histone deacetylases that play a critical role in many diverse cellular processes including transcriptional signaling, gene silencing, metabolism, stress response, inflammatory signaling, energy response and aging. The objectives of this study were to define the temporal role of SIRTs in skin by kinetically quantifying SIRT expression and to assess environmental impact by examining the response to environmental stressors. We show that SIRTs are beneficial for both cellular integrity and skin function, thereby contributing to skin cell activity.

Methods: We identified SIRTs as targets for the development of new topical agents based on their potential for skin protection. The importance of sirtuins in skin and new findings about sirt2 and its link to mechanobiology.

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Celastrol enriched extract modulates Th17 key disease mediators by interrupting feed-forward inflammation and by restoring homeostasis in psoriatic epidermal skin


Background: Psoriasis is an autoimmune skin disorder due to complex interaction between lymphocytes, DCs and keratinocytes (KCs). High IL-17 level produced by T cells, in response to Th17 cytokines, induces inflammation in the skin. Celastrol has been reported to modulate inflammation in vitro and in vivo. The aim of this study was to evaluate the modulatory effects of Celastrol enriched extract in Th17 mediated epidermal skin inflammation.

Methods: Celastrol enriched extract was incubated with mixed lymphocyte enriched keratinocyte culture, in two Th17 psoriasis induced models (ELISA) and Filaggrin (Flg) or S100A7 expression levels were detected by qPCR. Anti-microbial peptides (AMPs), Cytokines and Chemokines key biomarkers were assessed by RT-PCR. Multilayered micro-epidermis model (Cytoo M). Anti-microbial peptides (AMPs), Cytokines and Chemokines key biomarkers were assessed by RT-PCR. Multilayered micro-epidermis model (Cytoo M). Anti-microbial peptides (AMPs), Cytokines and Chemokines key biomarkers were assessed by RT-PCR.

Results: After application of our product, only 0.9% of acid and 0.4% of base were found in the receptor fluid in control membrane. The penetration of acids and bases was assessed by the monitoring of HCl and H2O2 barrier properties of a formulation towards acids and bases, and nickel and chromium oxides. Chemicals such as acids, bases and metals represent the major external agents from which such a skin must be isolated. Barrier creams are designed to protect or reduce the penetration of these hazardous substances into the skin, preventing skin lesions and other toxic effects from dermal exposure. The objective of our study was to evaluate the barrier properties of a formulation towards acids and bases, and nickel and chromium exposure. The penetration of acids and bases was assessed by the monitoring of HCl and H2O2 barrier properties of a formulation towards acids and bases, and nickel and chromium exposure.

Evaluation of barrier properties of topical barrier formulation to common allergenic agents

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Background: Barrier creams are designed to protect or reduce the penetration of these hazardous substances into the skin, preventing skin lesions and other toxic effects from dermal exposure. The objective of our study was to evaluate the barrier properties of a formulation towards acids and bases, and nickel and chromium exposure.

Methods: The importance of sirtuins in skin and new findings about sirt2 and its link to mechanobiology.

Results: After application of our product, only 0.9% of acid and 0.4% of base were found in the receptor fluid in control membrane. The penetration of acids and bases was assessed by the monitoring of HCl and H2O2 barrier properties of a formulation towards acids and bases, and nickel and chromium exposure. The penetration of acids and bases was assessed by the monitoring of HCl and H2O2 barrier properties of a formulation towards acids and bases, and nickel and chromium exposure.

Cellular energy (ATP) production as well as oxidative damage (H2O2) were measured. Finally, the effects of SIRTs on pro-collagen type I production in Normal Human Dermal Fibroblasts (NHDF) and cell spreading by aged NHDF were measured. Temporal differences in sirtuin expression levels were observed over time. Furthermore, SIRTs were impacted by environmental stressors such as UVB exposure and ozone, resulting in differences in ATP and H2O2 production. These data show that SIRTs benefit cell survival by modulating key disease mediators, by interrupting feed-forward inflammation and by restoring homeostasis in psoriatic epidermal skin.

References:

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