Reducing inflammation in atopic dermatitis and allergic contact dermatitis via cannabinoid-receptor-1 agonists

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Abstract

Statement of the Problem: Cannabis has been implicated with both therapeutic and harmful effects over the years. Studies have shown the harmful effect of cannabis on various body organs including the respiratory tract, nervous system and cardiovascular system. On the other hand, there is evidence to suggest the potential therapeutic effect of cannabis for various conditions including nausea and vomiting, wasting syndrome, chronic pain and inflammatory disorders. Cannabinoid receptors are categorized as cannabinoid-receptor-1 (CB1R) or cannabinoid-receptor-2 (CB2R), which are expressed in various tissues including the skin, Specifically, these receptors are distributed in skin sites like cutaneous nerve fiber bundles, mast cells, macrophages, and epidermal keratinocytes. While much emphasis has been given to the effects of cannabis on neuromodulation, there is less focus on its effect on the immune system and inflammatory conditions. The purpose of this study is to review the therapeutic potential and mechanism of action for cannabinoid-receptor-1 agonists in treatment of inflammatory skin conditions such as atopic dermatitis and allergic contact dermatitis. Methodology & Theoretical Orientation: To obtain these results, various search terms such as atopic dermatitis and allergic contact dermatitis were utilized. Furthermore, the articles were selected based on recency of publication as well as depth of detail regarding the specific immunologic mechanisms by which CB1R exerts its therapeutic effects. Findings: The results show that cannabinoid-receptor-1 agonists exert their anti-inflammatory effect in the skin by modulating mast cell proliferation and degranulation, as well as downregulating pro-inflammatory cytokines like interleukin-4, CC motif chemokine ligand-8 and CXC motif chemokine ligand-10 implicated in T-cell-dependent inflammation. Conclusion & Significance: Therefore, the anti-inflammatory effects of cannabinoid-receptor-1 agonists can be employed for therapeutics against various inflammatory skin conditions including atopic dermatitis and contact dermatitis.

Recent Publications

1. Dhadwal G. The risks and benefits of cannabis in dermatology clinic. Journal of Cutaneous Medicine and Surgery. 2017;22(2):194-199.

2. Gaffal E, Cron M, Glodde N, et al. Cannabinoid 1 receptors in keratinocytes modulate pro-inflammatory chemokine secretion and attenuate contact allergic inflammation. J Immunol 2013; 190: 4929–4936.

3. Information for health care professionals: cannabis (marijuana) and the cannabinoids. Health Canada. 2018.

4. Kim H, Kim B, Park B, et al. Topical cannabinoid receptor 1 agonist attenuates the cutaneous inflammatory responses in oxazolone-induced atopic dermatitis model. International Journal of Dermatology 2015;54(10):e401-e408.

5. Nam G, Jeong S, Park B, et al. Selective cannabinoid receptor-1 agonists regulate mast cell activation in an oxazolone-induced atopic dermatitis model. Ann Dermatol 2016; 28(1): 22-29.



Biography

Sheida Naderi-Azad has an expertise in immunodermatology, with a deep interest in melanoma immunotherapeutics, primary immunodeficiency diseases such as atopic dermatitis, and autoimmune conditions such as psoriasis. She has developed this interest upon completing her Bachelor of Science in Microbial and Environmental Pathophysiology at the University of British Columbia, and further completing a summer studentship at the Melanoma Clinic, Massachusetts General Hospital. She has had numerous published articles and presentations on melanoma therapeutics, anti-inflammatory conditions and dermatologic comorbidities such as mood disorders.

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