Topical MEK inhibition as a new modality for inflammatory skin diseases and cancers

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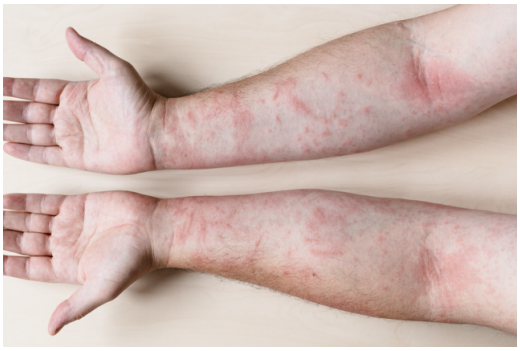
Unmet Need

Inflammatory skin conditions affect many people, with a wide range of severities. Common skin disorders, such as psoriasis and atopic dermatitis, affect close to 20% of the population. Skin lesions associated with bone marrow transplants and precancerous skin conditions affect fewer people but are still detrimental. There are many products on the market available to treat the symptoms of these conditions, such as itchiness or dryness. The most common treatments involve the use of topical steroids, which reduce the inflammatory response. However, use of steroids comes with steep side effects including skin damage (redness, bruising, and thinning) and can be absorbed and affect internal organs. Because of this, steroids may only be used for a limited time. Other treatments (such as salicylic acid, vitamin D, retinoids, calcineurin inhibitors and antihistamines) are less effective, and all come with side effects ranging from mild discomfort (skin irritation) to more serious conditions (risk of cancer and birth defects). There is a need for novel treatment for various inflammatory skin conditions which are complex to treat, and current products attempt to alleviate symptoms, but do not always address the underlying cause.

Technology

Duke inventors have developed a novel therapeutic for inflammatory skin conditions. The MEK signaling pathway is abnormally activated in inflammatory skin diseases and cancers, but currently MEK inhibitors have not yet been used to treat non-cancerous conditions. This invention uses a MEK inhibitor to treat a wide range of skin diseases. Specifically, Trametinib, an FDA-approved cancer therapeutic, is approved for use in skin cancers. Because of the detrimental side effects that occur when taken orally and in high doses, it is only approved for malignant cancers. Duke inventors assessed the *in vivo* effects of a topical application of Trametinib on 3 different animal skin disease models, including the oncogenic Braf-driven skin cancer and inflammation model, the 2,4-dinitrofluorobenzene (DNFB)-induced atopic dermatitis, and UV-induced skin carcinogenesis. The inventors demonstrated that trametinib in a topical form can reduce symptoms of the



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Links

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various skin diseases: a topical dose of less than 0.01% of the oral dose used for chemotherapy is effective in reducing skin inflammation in a DNFB-induced atopic dermatitis mouse model, which is a common model for human atopic dermatitis, or eczema.

Advantages

- Simple topical application of low dosage drug
- Drug treatment that treats underlying causes vs symptoms
- Home-based therapy safe for self-application

Publications

- U.S. Patent Application (US16/960,466)
- PCT Application (US2019/012,878)