A Novel Atopic Dermatitis Model Induced by Topical Application with Dermatophagoides Farinae Extract in NC/Nga Mice

http://www.firstlight.cn 2007-06-18

Background: Atopic dermatitis is a chronically relapsing inflammatory skin disease. Animal models induced by relevant allergens play a very important role in the elucidation of the disease. The patients with atopic dermatitis are highly sensitized with mite allergens such as Dermatophagoides farinae (Df). Therefore, in the present study, we tried to develop a novel model for atopic dermatitis by repeated application with Df extract ointment.

Methods: Df extract ointment was repeatedly applied to the back of NC/Nga mice together with barrier disruption. Atopic dermatitis-like skin lesions were evaluated by dermatitis scores, skin histology and immunological parameters. The effect of corticosteroid and calcineurin inhibitor was also examined.

Results: Repeated application of Df extract ointment caused rapid increase in dermatitis scores. Clinical (skin dryness, erythema, edema and erosion) and histological symptoms (dermal and epidermal thickening, hyperkeratosis, parakeratosis and inflammatory cell infiltration) in this model were very similar to those in human atopic dermatitis. Serum total and Df-specific IgE levels were elevated in this model compared with normal mice, and draining lymph node cells isolated from the mice that exhibited dermatitis produced significant amounts of interleukin-5, interleukin-13 and interferon-γ after re-stimulation with Df. Furthermore, current first-line drugs for the treatment of human atopic dermatitis, corticosteroid and tacrolimus ointments, were effective against the clinical and histological symptoms in this model.

Conclusions: These results suggest that the model we have established is useful for not only elucidating the pathogenesis of atopic dermatitis but also for evaluating therapeutic agents.

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