Synopsis of Original Research Paper

Basic studies on the onset and prevention of atopic dermatitis with simple chemicals

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The purpose of the present study is to investigate whether or not simple chemicals are able to introduce atopic dermatitis like symptoms in mice. An another purpose of the present study is to investigate the pharmacological and immunological prevention of such symptoms. For the first purpose, we tried to make a good model for atopic dermatitis in mice by using dinitrophenylbenzene (DNFB) on the ear skin. Consequently, we have established two different kinds of models for atopic dermatitis in mice.

In the first model, mice were passively sensitized by an intravenous injection of monoclonal anti-dinitrophenol (DNP) IgE, and their ears challenged epicutaneously with dinitrofluorobenzene (DNFB) 24 h later. The cutaneous reaction estimated by ear thickness reached a peak 1 and 24 h after the antigen challenge. Histopathological studies indicate that eczemous skin lesion (24 h) in mice is similar to that in human atopic dermatitis. Prednisolone at doses of 3 to 10 mg/kg clearly inhibited the IgE-mediated cutaneous reaction.

In the second model, DNFB was painted on the mice ear five times. The thickness due to dermatitis reached a maximum 24 hr after the second, third and fourth paintings. The strong expressions of INF-γ and IL-2 but not IL-4 and IL-5 mRNAs in reverse transcription-polymerase chain reaction (RT-PCR) in the skin lesions indicated the participation of Th1 cells in the ear delayed type hypersensitivity reaction. Simultaneously, hapten specific IgE (sIgE) was detected in serum from the immunized mice. These results indicate that five topical applications of DNFB to the mouse ear produces eczematous dermatitis in the ear and hapten sIgE in the serum. This model shows typical atopic dermatitis symptoms in the skin and IgE production. Regarding second project, the effect of anti-IL-4 monoclonal antibody on this hapten-induced contact dermatitis and IgE antibody production are studying now. The results will be reported in near feature.