

Evidence for a Birch Pollen-Specific Cutaneous T-Cell Response in Food-Responsive Atopic Dermatitis

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Key Words

Atopic dermatitis · Birch pollen · Eczema · Food allergy · T lymphocytes

Atopic dermatitis (AD) is a chronic eczematous skin disease which often begins early in infancy and runs a course of remissions and exacerbations. Skin lesions of AD might be provoked by food antigens in a subpopulation of AD patients. A series of studies has been performed including diet programmes and oral provocations with various food antigens in children with AD. Delayed eczematous reactions have been reported in studies in which the suspected allergen was administered daily for several days [reviewed in ref. 1]. Previously, we described a positive correlation of oral provocation tests with egg or milk with specific proliferative reactions of blood T lymphocytes to ovalbumin or casein in children with AD [2]. We also investigated the role of food antigens in adolescent and adult patients with AD [3] and showed that individuals who experienced worsening of AD following oral provocation with milk had a higher incidence of casein-specific T-cell reactions compared to controls. Birch pollen often raise an IgE response in adolescent and adult patients with AD. Cross-reactivities with food antigens have intensively been studied at a molecular level during the last decade. In most cases immediate types of hypersensitivity reactions have been described to birch pollen-

associated food antigens, i.e. symptoms of the oral allergy syndrome, urticaria/angioedema, rhinitis, conjunctivitis, asthma or even anaphylactic shock [4, 5]. Most patients eliminate this food as soon as they become aware of its allergenic character.

In this study we investigated 37 adolescents and adults with AD being highly sensitized to birch pollen antigens (CAP RAST class >4) who did not suffer from immediate symptoms to birch pollen-related foodstuff and therefore did not maintain a birch pollen-related elimination diet prior to this study. These patients underwent an elimination diet including all birch pollen-related food antigens. Seventeen of them reacted following a double-blind placebo-controlled oral food challenge with birch pollen-related food with a deterioration of their AD (i.e. increase of >15 SCORAD points). Neither specific IgE nor associated respiratory diseases (i.e. rhinitis, asthma) differentiated these patients from non-reactive patients. A proliferative response of peripheral blood lymphocytes to birch pollen antigens and a higher expression of ICAM-1⁺ birch pollen-stimulated lymphocytes were detectable both in reactive and in non-reactive patients. In contrast, a significantly higher increase in the proportion of blood lymphocytes expressing the cutaneous lymphocyte antigen upon incubation with birch pollen antigens was found with cells from reactive in comparison to non-reactive patients. T-cell clones and lines were generated from blood and lesional skin of both patient

groups in the presence of recombinant Bet v 1 and Bet v 2. The proliferative response of skin-derived T-cell lines from reactive patients to birch pollen extract or Bet v 1 was significantly higher than that of non-reactive patients. An enrichment of more than 25% of T-lymphocyte subpopulations defined by TCR V β -elements was detected in the majority (9/14) of such antigen-stimulated T-cell lines from responsive patients. A higher frequency of birch pollen-reactive T cells was calculated from limiting dilution assays and a higher rate of birch pollen-specific T-cell clones was generated from cultures with skin-derived T cells from reactive patients.

Our results show for the first time that a subpopulation of patients with a hypersensitivity to birch pollen and AD

reacts with worsening of eczema following oral challenge with birch pollen-related food and that a birch pollen-specific T-cell response can be found in lesional skin of these patients. A major conclusion from the present study is that a clinical relevance of food allergy should be suspected in adolescent and adult patients with AD who are sensitized to pollen antigens even if no history of immediate reactions to related food is presented.

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