

The effect of immunological intervention on allergic inflammation in skin and nasal mucosa.

Halina Plewako

Department of Respiratory Medicine and Allergology,
The Sahlgrenska Academy at Göteborg University, Göteborg, Sweden

Immunocytochemical methods have been applied to investigate the inflammatory cell profile and expression pattern of several proteins with important roles, during allergic inflammation in nasal and skin biopsies. The anti-inflammatory effects of specific allergen immunotherapy (SIT) and anti-IgE treatment (omalizumab) were examined in the skin using the late phase reaction (LPR) model and in the nose through biopsies taken during the natural birch pollen season. The specific aims of these studies were: to evaluate the expression of enzymes of the eicosanoid pathway before and during the pollen season in patients with seasonal allergic rhinitis (SAR) (Study I); to investigate the anti-inflammatory effect of treatment with omalizumab (Xolair®) in nasal biopsies obtained from SAR patients (Study II); to examine the effect of SIT on the expression of costimulatory molecules in the skin LPR (Study III); and to follow-up patients from a SIT trial, several years after the termination of the treatment, including examination of the effect on expression of chemokines (eotaxin, RANTES, TARC) in the nasal mucosa before and during the pollen season (Study IV).

In SAR patients, examined in Study I, seasonal exposure to pollen resulted in increased expression of enzymes metabolizing arachidonic acid (AA) to leukotrienes, which confirmed the role of AA products in clinical allergic disease. In study II, treatment with Omalizumab was found to reduce serum free IgE levels and also eosinophil numbers in both blood and the nasal mucosa. In skin LPR biopsies examined in study III, treatment with SIT reduced the numbers of cells expressing costimulatory molecules. Study IV demonstrated that clinical improvement in the symptoms of SAR following SIT persists long after the termination of the treatment. In addition, SIT reduced the numbers of cells in the nasal mucosa expressing the pro-inflammatory chemokines eotaxin, RANTES and TARC, compared with controls.

Conclusion: The increased expression of enzymes catalyzing leukotriene biosynthesis observed during the pollen season confirms the important role of these inflammatory mediators in the symptomatology of SAR. The decreased numbers of eosinophils in blood and nasal mucosa biopsies demonstrate that Omalizumab has anti-inflammatory properties.

Specific immunotherapy has a long-lasting clinical effect that is mirrored in the nasal mucosa by the reduced influx of eosinophils following contact with allergen. This is probably related to the decreased expression of the chemokines eotaxin and RANTES, which have chemoattractive properties for eosinophils. The decreased expression of costimulatory molecules observed in SIT-treated patients suggests diminished antigen recognition, which may result in amelioration of the inflammatory response following allergen exposure.

ISBN 91-628-6583-8