

Review Article

## Immunotherapy for domestic-mite allergy

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The treatment of domestic mite allergic disease combines immunologic and pharmacologic therapy. While drugs provide symptomatic treatment, allergen avoidance and immunotherapy (IT) can modify the natural course of the disease. The inhalation of allergens leads to nasal and bronchial inflammation and the continuous exposure to domestic mites may induce persistent inflammation and non-specific hyperreactivity of the nose and the lung. The major objectives of immunotherapy are, in the short term, to reduce responses to allergic triggers which precipitate symptoms, to decrease the inflammatory response and to prevent the development of persistent disease. IT is the only treatment that may affect the natural course of allergic diseases, either by preventing the development of asthma in patients with allergic rhinitis or by altering the disease progression.

In the 1998, a position paper from the WHO working group on allergen immunotherapy entitled "Allergen Immunotherapy: therapeutic vaccines for allergic diseases" has been published. This paper is the first consensus report of representative authorities from various countries of the world in which an international agreement on the specific treatment of allergic diseases has been reached.

Immunotherapy is the practice of administering gradually increasing quantities of an allergen vaccine to an allergic subject to improve the symptoms associated with the subsequent exposure to the causative allergen. Allergen immunotherapy is indicated for patients who have demonstrated evidence of specific IgE antibodies to clinically relevant allergens. At

present it cannot be predicted exactly who will respond to the IT, although a careful selection of patients is accompanied to a better outcome.

The optimal duration of immunotherapy is still unknown. Many clinicians advise 3–5 years of therapy for patients who have had a good therapeutic response to maintain a long-term effect. However, the decision to discontinue allergen immunotherapy should be individualized.

The quality of the allergen vaccines is critical for both diagnosis and treatment. Where possible, standardized vaccines of known potency and shelf life should be utilized for allergen immunotherapy. From a global perspective, the WHO recommendation encourages the adoption of standardization procedures that can be used and interpreted worldwide. Regulatory agencies should work toward common methods for production and standardization of allergen vaccines. It is recommended that all allergenic vaccines be standardized for total allergenic potency, biologic activity, and major allergen measurements in mass units. IT with mite vaccines (*D. pteronyssinus* and *D. farinae*) is more effective than crude house-dust vaccines.

Recombinant Der f 2 has recently been developed as a promising allergen for the diagnosis and immunotherapy of house-dust mite allergy and studies in immunology. Recombinant Der p 2, Der p 5 and Der p 7 can induce immediate hypersensitivity skin test reactions.

Many theories have been proposed to explain the mechanisms of allergen specific IT: the "blocking antibody" hypothesis which postulates that IgG competes

with IgE for allergen binding; the decrease in IgE antibody titres after prolonged therapy; the increase in anti-idiotypic antibodies, the increase in allergen-specific T-suppressor cells, the decrease in histamine-releasing factors, the change of CD4+ cells from Th2 to the Th1 phenotype.

Several double blind, placebo controlled trials have shown that IT with domestic-mite vaccines produced significant decreases in symptom-medication scores (perennial allergic rhinitis), decreased responses to both nasal challenge test and skin prick test with *D. Pteronyssinus* (Ewan PW, 1988; Lofkvist T, 1994; Pastorello EA, 1990; Mc Hugh SM, 1990). IT was shown to reduce asthma symptom scores and the medication requirement for asthma (Price JF, 1988; Olsen OT, 1997; Pichler CE, 1997). These studies suggest that IT is effective and may decrease inflammation since the late-phase reaction was decreased. (Bousquet J, 1988; Van Bever HP, 1990; Garcia-Ortega P, 1993).

House-dust mite immunotherapy is accompanied by the induction of IgE against foods, including tropomyosin-reactive IgE. Induction of IgE during mite immunotherapy might occasionally cause allergy to foods of invertebrate animal origin. Cosensitization to storage mites is a frequent finding in patients sensitized to *D. Pteronyssinus*. Although this is largely the result of cross-reactivity between different mite species, it nevertheless may be of clinical significance in patients exposed to storage mites.

Although subcutaneous allergen injection is the usual route for the administration of IT, new routes of administration of IT are currently being explored. Nasal, sublingual or oral immunotherapy using high doses of allergen vaccines, may prove to be effective, safe and easy routes of administration. Many studies indicate favourable effects of a sublingual immunotherapy to mites in asthmatic children with significant decrease in respiratory symptoms and rescue medication. Sublingual immunotherapy is effective in alleviating symptoms of mite rhinitis and in reducing responses to the nasal challenge and skin prick tests (Passalacqua G, 1988).

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