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The well-documented efficacy of allergen-specific immunotherapy is dose dependent. However, high allergen doses can often not be reached because of allergic side-effects. T-cell epitope peptides, short, linear amino-acid sequences derived from allergens and presented by antigen-presenting cells (APCs) in the context with MHC II, are recognized by specific T cells but do not bind to allergen-specific IgE antibodies. Therefore, they are unable to induce allergic reactions. However, they do retain the capacity of the full allergen to modulate T-cell reactivity during immunotherapy (1). In animal models, injections with major T-cell epitope peptides of either cat or mite allergens were able to suppress a primary or an ongoing IgE response to the respective allergens by induction of peripheral T-cell unresponsiveness (2, 3).

Immunotherapy with a mixture of two T-cell-reactive, 27-amino-acid sequences from chain I of the major cat allergen Fel d 1 was effective in a double-blind, placebo-controlled trial involving 95 cat-allergic patients: four weekly injections of 750 µg of the peptide mixture significantly reduced both nasal and lung symptoms during exposure in a cat-inhabited room. However, side-effects, including respiratory symptoms, developed in a number of peptide-treated patients up to 3 h or later after the injections (4).

Phospholipase A₂ (PLA) is the major allergen of honeybee venom. Three T-cell epitopes corresponding to the amino-acid sequences 45–62, 82–92, and 113–124 of PLA (5) were used for peptide immunotherapy in five bee venom-allergic individuals with a history of moderately severe reactions to bee stings. Increasing doses were given with weekly injections, resulting in a cumulative dose of 397.1 µg of the peptide mixture over 2 months. No side-effects to the peptide injections were observed. All patients tolerated a

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first challenge with 10 µg of natural PLA without any systemic allergic symptoms. During a live bee-sting challenge 1 week later, three patients were completely protected while two developed mild cutaneous systemic allergic reactions. After treatment, specific proliferative response to PLA and the peptides in peripheral blood mononuclear cells was strongly reduced in successfully treated patients. The production of TH2 and TH1 cytokines

was inhibited, while B cells were not affected in their capacity to produce specific IgE and IgG4 antibodies (6, 7).

Clinical trials of peptide immunotherapy in both inhalatory and venom allergy have shown efficacy and safety. The mechanism of protection induced is allergen-specific T-cell anergy. However, treatment with T-cell epitopes of one major allergen alone may not protect all patients sufficiently.

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