

Publication

A major allergen gene-fusion protein for potential usage in allergen-specific immunotherapy

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Background: Specific immunotherapy is a common treatment of allergic diseases and could potentially be applied to other immunologic disorders. Despite its use in clinical practice, more defined and safer allergy vaccine preparations are required. Differences between epitopes of IgE that recognize the 3-dimensional structure of allergens and T cells that recognize linear amino acid sequences provide a suitable tool for novel vaccine development for specific immunotherapy. Objective: The aim of the study was to delete B-cell epitopes and prevent IgE crosslinking, but to preserve T-cell epitopes by fusion of 2 major allergens of bee venom because of a change in the conformation. Methods: By genetic engineering, we produced a fusion protein composed of the 2 major bee venom allergens: phospholipase A(2) (Api m 1) and hyaluronidase (Api m 2). Results: The Api m [1/2] fusion protein induced T-cell proliferation and both T(H)1-type and T(H)2-type cytokine responses. In contrast, IgE reactivity was abolished, and profoundly reduced basophil degranulation and type 1 skin test reactivity was observed. Pretreatment of mice with Api m [1/2] fusion protein significantly suppressed the development of specific IgE as well as other antibody isotypes after immunization with the native allergen. Conclusion: The novel fusion protein of 2 major allergens bypasses IgE binding and mast cell/basophil IgE FcεRI crosslinking and protects from IgE development.

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