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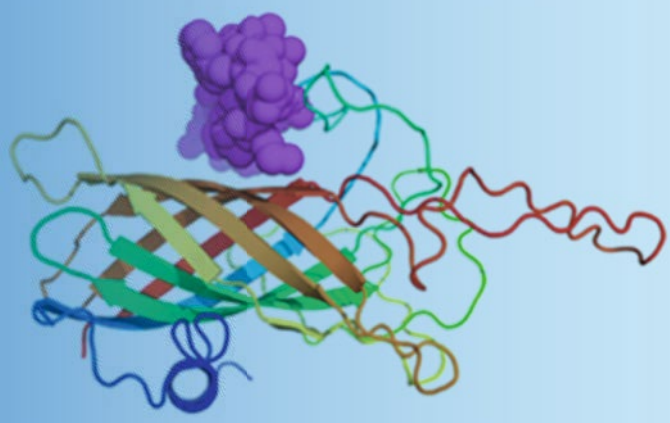

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Chapter 41

Allergy Vaccines Using a *Mycobacterium*-Secreted Antigen, Ag85B, and an IL-4 Antagonist

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Abstract

In recent decades, the prevalence of allergic diseases, including bronchial asthma, airway hypersensitivity, hay fever, and atopic dermatitis, has been increasing in the industrialized world, and effective treatments probably require manipulating the inflammatory response to pathogenic allergens. T helper (Th) 2 cells are thought to play a crucial role in the initiation, progression, and persistence of allergic responses in association with production of interleukin (IL)-4, IL-5, and IL-13. Therefore, a strategy of a shift from Th2- to Th1-type immune response may be valuable in the prophylaxis and management of allergic diseases. It is also necessary to develop prophylactic and therapeutic treatment that induces homeostatic functions in the multifaceted allergic environment, because various factors including innate and adaptive immunity, mucosal immune response, and functional and structural maintenance of local tissue might be involved in the pathogenesis of allergic disorders. We review herein recent findings related to the curative effect for mouse models of asthma and atopic dermatitis using DNA-, virus-, and protein-based vaccines of a *Mycobacterium* secretion antigen, Ag85B, and a plasmid encoding cDNA of antagonistic IL-4 mutant.

Key words Vaccine, Asthma, Atopic dermatitis, Ag85B, Mutant IL-4, DNA, HPIV2, Recombinant protein, Th1, Th2, IFN-γ, IL-4

1 Introduction

Interleukin (IL)-4 has numerous biological activities relevant to the mediation of allergic inflammation [1]. IL-4 is essential for the switching and secretion of IgE and IgG1 by B cells with promotion of the Th2 phenotype and mast cell proliferation. The action of IL-4 is not limited to the initiation of Th2 responses but may also stimulate other cellular responses that contribute to the manifestations of allergic disease [2, 3]. These findings suggest that inhibition of the action of IL-4 may be helpful for suppression of allergic reactions.

There are two possible strategies of immunotherapy for inhibiting the development of allergic inflammation. One strategy is inducing strong Th1-type immune responses in order to suppress

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