Expression of the Recombinant Major Allergen of Salsola kali Pollen (Sal k 1) and Comparison with Its Low-Immunoglobulin E-Binding Mutant

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Background: The inhalation of Salsola kali pollen is an important cause of pollinosis during summer and early fall throughout desert and semi-desert areas. Sal k 1 has been previously reported as a major allergen of S. kali pollen. In this study, we produced the recombinant Sal k 1 and also its low IgE-binding mutant form. We further compared the IgE binding ability of these two recombinant molecules.

Methods: The recombinant Sal k 1 and its low IgE-binding variant, obtained by three amino acid exchanges (R142→S, P143→A, D144→V), were cloned and expressed in E. coli, as proteins fused with thioredoxin and His-tags, and then purified by Ni2+ affinity chromatography. The IgE-binding capacity of the wild-type and mutated rSal k 1 was compared using immunoblotting, ELISA and inhibition assays by ten sera from S. kali allergic patients. Moreover, in vivo IgE-reactivity was investigated by the skin prick test.

Results: Both the recombinant and the mutated form of Sal k 1 were expressed in E. coli at a relatively high amount and soluble form. All sera recognized rSal k 1 via immunoassay analysis. In addition, inhibition assays demonstrated that the purified rSal k 1 was similar to its counterpart in the crude extract. The mutated rSal k 1 exhibited a reduced IgE-binding capacity against wild-type rSal k 1.

Conclusions: This study demonstrates that purified rSal k 1 is comprised of IgE-epitopes similar to that of its natural counterpart and that the mutated variant showed a reduced IgE-binding capacity based on in vitro assays and in vivo provocation testing.

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