IgE reactivity patterns revealed six IgE epitopes of Der p 2 as potential hypoallergen for dust mite allergic individuals

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ABSTRACT

Background: Studies on dust mites have been confined to very few species in terms of crude extract or purified allergen reactivity, therefore, the relative allergenicity of common indoor dust mite species in the same cohort is unknown. **Objective:** To evaluate the presence of different IgE binding profiles to dust mite crude extracts, purified recombinant group 2 allergens and Der p 2 alanine mutants in the same population. **Methods:** Serum of 458 Singaporeans with allergies were evaluated using purified crude extract and group 2 allergens from 8 dust mite species and 21 alanine mutants of putative IgE epitopes of Der p 2 using immuno dot-blot assay. Reaction signatures were identified based on Ward's minimum-variance using R software and GraphPad Prism. Categorical data were compared using ANOVA test or Fisher-exact testing. Significance was defined as $p \leq 0.05$. **Results:** IgE reactions were observed in 67.9% and 57.1% of the individuals to crude extracts and recombinant group 2 allergens respectively. Individuals were classified into three reactivity-profiles (high mean IgE-reactivity to all dust mites, moderate mean IgE-reactivity to Dermatophagoides spp. and high mean IgE-reactivity to Dermatophagoides spp. but moderate mean IgE-reactivity to storage mites). Similar IgE-reactivity profiles were observed when recombinant group 2 allergens were used. Clinical outcomes did not significantly differ between reactivity profiles. Recognition of Der p 2 IgE epitopes varied among the IgE-reactivity profiles where six IgE epitopes (N10A, H11A, E62A, H74A, K77A and K96A) were common among different reactivity profiles. **Conclusion:** Dermatophagoides spp. and its group 2 allergens were the most important allergens in the indoor environment. Dust-mite allergic individuals displayed three unique IgE-reactivity profiles. Six of 21 IgE epitopes of Der p 2 were recognized by individuals from all three reactivity profiles, suitable to be used in hypoallergen preparations of Der p 2.