IgE serological tests based on natural house dust mite extracts underestimate allergen-specific IgE levels compared to recombinant allergen-based tests

Huey-Jy Huang, Yvonne Resch-Marat, Kuan-Wei Chen, Renata Kiss, Rudolf Valenta, Susanne Vrtala

Medical University of Vienna, Center for Pathophysiology, Insectology and Immunology, Department of Pathophysiology and Allergy Research, Vienna, Austria

Correspondence: Huey-Jy Huang, huey-jy.huang@meduniwien.ac.at

Background: House dust mites (HDM) are distributed almost worldwide and are the main elicitors of indoor allergies. Diagnosis of HDM allergy is mainly performed with natural allergen extracts which are often of insufficient quality.

Objective: To compare diagnostic tests based on specific IgE serology to natural HDM extracts (ImmunoCAP [d1] with tests based on recombinant HDM allergens (ImmunoCAP, ImmunoCAP ISAC, ELISA).

Methods: Sera from 27 well-characterized HDM allergic patients were tested for IgE reactivity to the most important HDM allergen molecules (Der p 1, 2, 5, 7, 21 and 23) by ELISA, dot blot and ImmunoCAP ISAC microarray technology (allergen-chip containing 13 house dust mites allergens). Additionally, IgE-reactivity was tested to a mixture of the six most important HDM allergens using Streptavidin ImmunoCAP, and to natural house dust mites extract by ImmunoCAP (d1).

Results: In each of the 27 house dust mites allergic patients IgE sensitization could be diagnosed with each of the serological tests. A strong positive correlation was found between IgE measurements performed with the extract-based ImmunoCAP and the ImmunoCAP containing a mix of the house dust mites allergen molecules (r = 0.9418, p < 0.0001). The correlation between the ImmunoCAP ISAC-based chip and allergen molecule-based ImmunoCAP (r = 0.86, p < 0.0001) or extract-based ImmunoCAP (r = 0.85, p < 0.0001) was also significant. However, higher specific IgE-levels were measured with diagnostic tests based on the recombinant allergens in patients with IgE-reactivity to Der p 5, 21 and/or Der p 23 indicating that these allergens are underrepresented in natural HDM extracts.