

Letter

COMPARISON OF THE MOSQUITO SALIVA-CAPTURE ENZYME-LINKED IMMUNOSORBENT ASSAY AND THE UNICAP TEST IN THE DIAGNOSIS OF MOSQUITO ALLERGY

Specific, sensitive, quantitative methods for measuring allergen specific IgE serve an important function in identifying sensitization to allergens and, when interpreted in conjunction with the clinical history, in diagnosing allergic diseases. Advances in technology have provided new laboratory tools for the quantitation of allergen specific IgE antibodies.¹ Among commercially available assays, the UniCAP test (Pharmacia and Upjohn Diagnostics AB, Uppsala, Sweden) uses new reagents, automatic instrumentation, and software to deliver fast and accurate results.²

Reactions to mosquito bites are immunological in nature and usually involve IgE antibodies.³ The commercially available UniCAP test for mosquito specific IgE uses mosquito whole-body extract that contains multiple antigens not present in mosquito saliva but few actual salivary allergens.⁴ Here, we compared this test with our in-house mosquito saliva-capture enzyme-linked immunosorbent assay (ELISA) in the diagnosis of mosquito allergy.

Thirty-two serum samples were collected from individuals in Canada, the United States, Japan, Swaziland, and Germany with either systemic ($n = 7$)⁵ or large local ($n = 25$)^{6,7} reactions to mosquito bites. Twenty-nine serum samples from individuals with no clinical history of mosquito allergy, confirmed with a negative *Aedes vexans* bite test result,⁷ served as negative controls. Mosquito saliva specific IgE levels were measured using the indirect ELISA previously developed in our laboratory,⁷ in which mosquito saliva extract collected from *A. vexans* was used as the capture antigen, and a pooled reference serum from mosquito-allergic individuals was used to standardize the results between plates. The results were expressed as optical absorbance at 405 nm. Serum mosquito specific IgE levels were also measured using the UniCAP test, in which *Aedes communis* whole-body extract was bound to a solid-phase carrier, performed in the Health Sciences Center Clinical Chemistry Laboratory.

The results from the 2 assays correlated significantly ($r = .559$, $P < .001$). Using both assays, the mean levels of mosquito specific IgE were significantly higher in individuals who were clinically allergic to mosquito bites than in controls (0.440 vs 0.366, $P < .048$ in the UniCAP test; 0.976 vs 0.387, $P < .001$ in ELISA). The positivity rate was calculated using the control mean + 2 SDs or 1.5 SDs as a cutoff level. Using both cutoff levels, the positivity rate with the ELISA in mosquito-allergic individuals was significantly and consistently higher (44% using mean + 2 SDs and 56% using mean

+ 1.5 SDs) than that with the UniCAP test (25% using mean + 2 SDs), with a similar positivity rate in the control group (Fig 1).

The results indicate that the mosquito saliva-capture ELISA is much more sensitive (high positivity in mosquito-allergic individuals) and specific (low positivity in controls) than the whole-body extract-based UniCAP test in the diagnosis of mosquito allergy. They confirm that the purity of the allergen used in an assay is extremely important to its accuracy and alert us to the fact that commercial whole-body extract IgE assays may not be sufficiently sensitive and specific to support the clinical diagnosis of mosquito allergy.

Because of the lack of availability of mosquito salivary preparations for use in skin tests and in vitro tests, local and systemic allergic reactions to mosquito bites are underdiagnosed.^{5,6} Recombinant mosquito salivary allergens with biological activity are being developed to improve the diagnosis and, eventually, the treatment of mosquito allergy.^{3,8}

ACKNOWLEDGMENTS

This work was supported by the Canadian Institutes of Health Research and the Children's Hospital Foundation of Winnipeg Inc. We thank Dr Tom Dembinski for performing the UniCAP tests and Ms Mary Cheang, MMath, for statistical analyses.

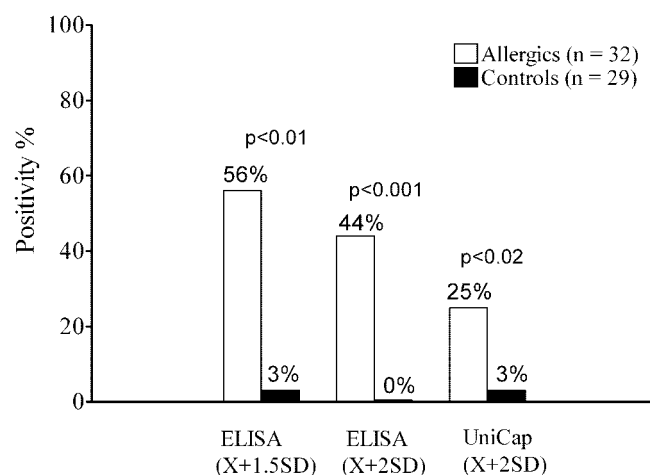


Figure 1. Positivity rates of mosquito specific IgE in mosquito-allergic individuals and negative controls measured by enzyme-linked immunosorbent assay (ELISA) and the UniCAP test. A cutoff level of positivity was made by using the mean of controls + 2 SDs in both assays (middle and right) or by using the mean of controls + 1.5 SDs in the ELISA (left).

Authors have nothing to disclose.

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Errata

In the March 2007 issue of *Annals of Allergy, Asthma & Immunology*, the dog dander scanning electron micrograph for On The Cover was incorrectly attributed. The correct acknowledgement is courtesy of Larry Garner, Hollister-Stier Laboratories LLC.

In the May 2007 issue of *Annals of Allergy, Asthma & Immunology*, the photographs for dawn sequoia and the pollen photomicrograph for On The Cover were incorrectly attributed. The correct acknowledgement is courtesy of Kraig W. Jacobson, MD.