Editorial
Allergy Asthma Immunol Res. 2014 March;6(2):103-104.
http://dx.doi.org/10.4168/aair.2014.6.2.103
pISSN 2092-7355 • eISSN 2092-7363

AAIR
Allergy, Asthma & Immunology Research

The Usefulness of Component-Resolved Diagnostics in Food Allergy

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The gold standard for the diagnosis of IgE-mediated food allergy is an oral food challenge (OFC) that directly verifies the causal relationship between clinical symptoms and offending foods.[1] However, OFC carries a risk of developing fatal reactions (such as anaphylaxis) in some patients. A thorough history taking and supportive tests such as a skin prick test (SPT) or serum food-specific IgE (sIgE) levels have been used in clinical practices for the diagnosis of IgE-mediated food allergy. A SPT or serum test can be performed easily and safely in an outpatient clinic setting. However, clinicians must be cautious in interpretation due to the possibility of a false positive or false negative test results. SPT or serum tests also have limitations and cannot replace OFC for the diagnosis of food allergy.[2]

Component-resolved diagnostics (CRD) is a diagnostic test to detect specific IgE against individual allergen molecules or components using purified native or recombinant allergens.[3] It is expected that CRD could provide further diagnostic information in patients with an IgE-mediated food allergy in terms of predicting clinical relevance or prognosis.

The level of specific IgE toward Ara h 2 was correlated with a clinical threshold in patients with a peanut allergy.[4] In a study that compared patients with a peanut allergy from 3 countries (Spain, the United States, and Sweden), American patients frequently had IgE against Ara h 1 to 3 that often manifested with severe symptoms, while sensitization to Ara h 9 and Ara h 8 were primarily found in Spanish and Swedish patients, respectively.[5] One study that included 37 adults presented the accuracy of a specific IgE antibody toward rPen a 1 for shrimp allergy.[6] Yang *et al* reported that sIgE antibodies to shrimp tropomyosin is more useful than a skin prick test to predict clinically relevant reactions in patients with shrimp allergy.[7] An Italian study of egg allergy showed that 94% of Gal d 1 negative patients tolerated boiled egg; however, 95% of Gal d 1 positive patients reacted to raw egg. This study suggests that sIgE against Gal d 1 appears to be a good predictor of egg allergy.[8] There have been more studies to report the higher diagnostic value of food allergies such as wheat, soybean, and hazelnut allergies.[9-11] Taken together, CRD could be used to predict clinical reactivity in subjects with a sensitization to foods and to establish sensitization patterns with prognostic outcomes.

Cow's milk allergy (CMA) is an adverse reaction to cow's milk protein that is either IgE-mediated or by non-IgE-mediated. Cow's milk proteins acting as allergens consist of casein and whey proteins. The casein fraction (Bos d 8) accounts for 80% of total protein, while 20% is contained in whey proteins such as β-lactalbumin (Bos d 4), β-lactoglobulin (Bos d 5), bovine serum albumin (Bos d 6), immunoglobulin (Bos d 7), and lactoferrin.[12] The prevalence of CMA in Western countries ranges from 0.12% to 3.8%, and frequently occurs during infancy.[13] CMA is the second most common food allergy in young Asian children[13] and is also common in Korean infants with a prevalence of 1.7%.[14] Consequently, the accuracy of diagnostic tests and prediction of prognosis in CMA is important.

In the present issue, Cingolani *et al.* presented the usefulness of CRD to determine the severity of cow's milk allergy.[15] The authors compared the level of specific IgE against nBos d 4, nBos d 5, and nBos d 8 between the anaphylaxis group and non-anaphylaxis group in patients with CMA. They found the level of IgE to nBos d 8 can differentiate the "high anaphylaxis-risk" from "milder-risk" group. The results support the usefulness of CRD in food allergy; however, not all studies consistently show the predictive value of CRD. Ott *et al*, evaluated the commercially available allergen microarray assay using Bos d 4, 5, 6, and 8 in patients with CMA.[16] They found that no single allergen was detected to discriminate between asymptomatic sensitization and clinically relevant allergy. With regard to peanut allergy, Ameri-

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Received: February, 8, 2014; Accepted: February, 8, 2014
• There are no financial or other issues that might lead to conflict of interest.

can patients frequently had sIgE against Ara h 1 to 3 and some tended to present with more severe symptoms.[5] Ara h 2 seems to be a good predictor for peanut allergy; however, the outcome of the food challenge could be predicted with sIgE to Ara h 2 only in 50% of the patients.[17] Tolerance to baked egg was not predicted by sIgE against ovomucoid.[18] CRD is promising as a diagnostic tool in food allergy, but its diagnostic value is limited at this point.

CRD is currently available for the diagnosis and management of food allergy; in addition, it is more important in the clinical investigation of IgE-mediated food allergy compared to conventional methods such as SPT or serum sIgE against whole proteins from allergenic foods. Recently, a number of studies have demonstrated the utility of CRD to predict the presence or severity of food allergy. CRD may be helpful to improve the specificity of current allergy testing; however, it is evident that more clinical studies to validate IgE reactivity are required.

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