

Letter to the Editor

The role of wheat ω -5 gliadin IgE antibodies as a diagnostic tool for wheat allergy in childhood

To the Editor:

Wheat allergy is a common disorder in early childhood. Given the absence of reliable testing modalities, the diagnosis of immediate wheat allergy is currently based almost exclusively on the results of oral food challenges. No good correlation between the outcome of oral food challenges and the levels of wheat-specific serum IgE has been observed.¹⁻³ Wheat ω -5 gliadin has been identified as the major allergen in wheat-dependent, exercise-induced anaphylaxis (WDEIA).⁴ More recently, it has been reported that IgE to ω -5 gliadin is also highly predictive of immediate allergy to ingested wheat in children, with increased levels correlating with positive oral wheat challenge results.⁵ More than 80% of children with immediate symptoms to wheat reportedly had IgE antibodies to ω -5 gliadin, whereas none were detected in children with negative wheat challenge results. The aim of the present study was to confirm the role of ω -5 gliadin-specific IgE for the diagnosis of wheat hypersensitivity in 2 independent patient populations, one from Germany and the other from the United States.

The first population was comprised of 57 German children with suspected wheat allergy. Ages ranged from 6 months to 14 years (median age, 1 year), and 95% of the subjects had atopic dermatitis. Sera were obtained from all patients before oral food challenge. Thirty-eight of the 57 children were sensitized to wheat (defined as a wheat-specific IgE level >0.35 kUA/L), whereas 19 children had wheat-specific IgE antibodies less than the limit of detection. All children underwent a diagnostic double-blind, placebo controlled wheat challenge. Of 38 sensitized children, 18 had a positive wheat challenge result with immediate reactions, and 20 challenge results were negative. In the nonsensitized group 9 children had a positive wheat challenge result, and 10 were tolerant.

The second population included 29 American children with a clinical history or suspicion of wheat allergy. Ages ranged from 1 year to 12 years (median age, 5 years); 100% of the children had a history of atopic dermatitis, with 59% reporting clinical histories of a prior wheat reaction or failed oral challenge. Sera were obtained from patients before the oral food challenge, and all of the children showed sensitization, with wheat-specific IgE levels ranging from 0.84 kUA/L to greater than 100 kUA/L (upper detection limit). All children underwent oral wheat challenges; 12

had positive wheat challenge results with immediate reactions, and 17 challenge results were negative.

In both populations ω -5 gliadin- and wheat-specific IgE antibodies were measured in the sera by using the UniCAP system (Phadia, Uppsala, Sweden). The results for the German children are shown in Fig 1, and those for the American children are shown in Fig 2.

In both the German and American wheat-sensitized children, wheat-specific serum IgE levels did not show significant differences between the patients with wheat allergy with positive oral food challenge results and the tolerant children who passed the oral food challenge without symptoms (Figs 1 and 2). Contrary to our expectation, ω -5 gliadin-specific IgE antibody concentrations did not differ between the reactive or tolerant groups (Figs 1 and 2). Importantly, in the German study group 9 of the 20 tolerant patients with a negative oral food challenge result showed IgE antibodies to ω -5 gliadin (defined as >0.35 kUA/L), and 50% of the allergic children had no increased ω -5 gliadin-specific IgE levels. Similar results were observed in the American population, with 4 of the 17 tolerant patients exhibiting positive ω -5 gliadin-specific IgE antibodies, but only 1 of the 12 allergic patients having a positive ω -5 gliadin level. Interestingly, 2 of 9 German children who were not sensitized to wheat but had clinical reactions during the oral food challenge had increased ω -5 gliadin-specific IgE levels (Fig 1).

In summary, ω -5 gliadin-specific IgE antibodies did not correlate with the outcomes of oral food challenges in wheat-sensitized patients with suspected wheat allergy. These data support the findings of Lauriere et al,⁶ who showed that sera from patients allergic to hydrolyzed wheat proteins with immediate skin reactions and from patients with WDEIA exhibited distinct patterns of reactivity. Patients with wheat allergy with immediate skin symptoms reacted mainly with all ω -gliadin alleles and 1 γ -gliadin encoded, respectively, on chromosomes 1D and 1B but not with any ω -5 gliadin alleles, as for patients with WDEIA. Similarly, Constantin et al⁷ have shown that different profiles of wheat antigens are recognized by patients with IgE-mediated wheat allergy and celiac disease, suggesting that the nature of a food antigen might influence the quality of the pathologic immune response.

Our findings did not show a correlation between ω -5 gliadin levels and the outcomes of oral wheat challenges, and therefore additional determination of ω -5 gliadin-specific IgE levels in wheat-sensitized patients appears not to be helpful. However, our

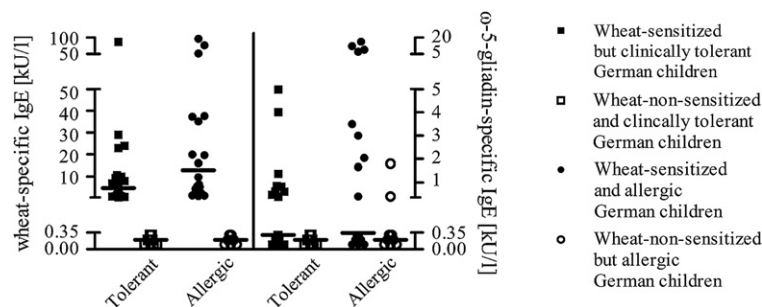


FIG 1. Wheat- and ω -5 gliadin-specific IgE levels in German patients with clinically relevant wheat allergy who had a positive oral food challenge result (*Allergic*) and in tolerant children who had passed the oral food challenge without symptoms (*Tolerant*).

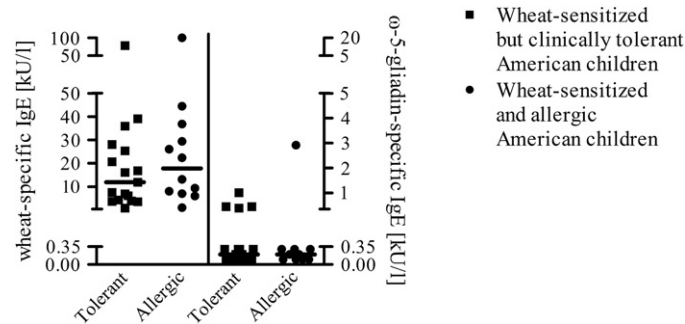


FIG 2. Wheat- and ω -5 gliadin-specific IgE levels in American patients with clinically relevant wheat allergy who had a positive oral food challenge result (*Allergic*) and in tolerant children who had passed the oral food challenge without symptoms (*Tolerant*).

study suggests that for some patients with suspected wheat allergy without increased wheat-specific IgE levels, the determination of ω -5 gliadin-specific IgE levels might be helpful in detecting sensitization to water-insoluble wheat proteins. Importantly, additional studies are necessary to identify the major allergens involved in food allergy to wheat proteins.

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