

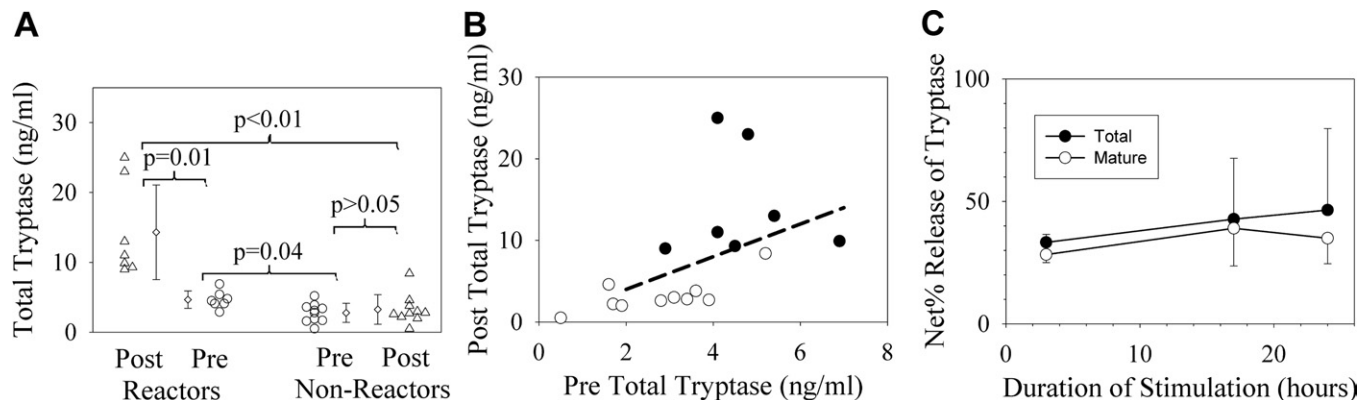


Figure 1. Total tryptase levels in vivo and in vitro. A, Total serum tryptase levels in reactors and nonreactors to RI, pre- and post-RI, or systemic reactions. A one-tailed unpaired *t* test with a Bonferroni correction was used. B, Post- versus pre-RI total tryptase levels in reactors (solid circles) and nonreactors (open circles). The dashed line shows a ratio of post to pre total tryptase of 2 for pre values ≥ 2 ng/mL. C, Tryptase release from skin mast cells over time. Skin-derived mast cells from three different individuals in culture with recombinant human stem cell factor (100 ng/mL; gift of Swedish Orphan Biovitrum [Stockholm, Sweden]) were stimulated with anti-Fc ϵ RI monoclonal antibody (22E7) and assessed for release of total and mature tryptase up to 24 hours later as described.³ Spontaneous release was $<5\%$ in each case.

RESULTS

Mature and total serum tryptase levels for each subject are shown in eTable 3.

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SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.anai.2010.12.015.

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SEVERE ALLERGIC REACTION TO GLUTEN HYDROLYSATE WITHOUT REACTION TO WHEAT

In September 2010, the Health and Consumers Directorate-General of the European Commission released a market notification through the Rapid Alert System for Food and Feed on severe allergic reactions from bakery products caused by a wheat protein hydrolysate. We describe 2 atopic children with anaphylaxis and urticaria-angioedema caused by acid gluten hydrolysate.

An 11-year-old boy had a history of 1 episode of anaphylaxis and 5 episodes of angioedema with generalized urticaria 30 minutes after ingestion of a jelly doughnut (twice), meat pie, pizza, or waffle. Earlier he consumed all foods without reactions. On skin prick testing (SPT), he had positive results for birch, timothy and mugwort pollens, cat, dog, and hazelnut (Soluprick SQ allergens; ALK-Abelló, Hørsholm, Denmark) without clinical symptoms. He had negative results on SPT for wheat (1/10 [wt/vol] 0.9% sodium chloride) and gliadin (1 mg/mL of ethanol; Sigma, St Louis, MO), and the results of a CAP-FEIA (Phadia, Uppsala, Sweden) test for serum wheat specific IgE were negative.

An in-house Immunospot method was used to evaluate serum IgE antibodies to a doughnut that had caused anaphylaxis.¹ A wide range of allergens were evaluated in the assay. Nonatopic

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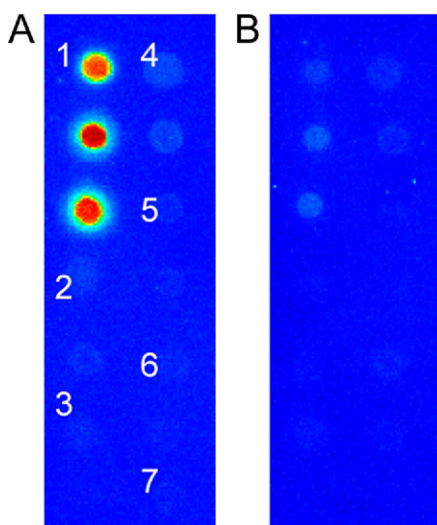


Figure 1. A, IgE to gluten hydrolysate (1) in the serum sample of a patient with anaphylactic reaction to doughnuts. There is no binding to gluten (2), gliadin (3), raw or cooked wheat (4-6), or timothy (7). B, Nonatopic serum was used as a control in the Immunospot assay.

serum was used as a control. A distinct IgE binding to 1 ingredient of doughnut (Berlinermix 20 SF), used as an enhancer, was seen in the Immunospot test. One of the components of Berlinermix 20 SF was palm oil, in which partially acid hydrolyzed gluten (Meripro 711; Syral, Aalst, Belgium) was used as an emulsifier. The SPT wheal size with hydrolyzed gluten was 10 mm, and a specific IgE binding in Immunospot was found to gluten hydrolysate but not to pure palm oil. There was no specific binding to other food allergens tested. In open food challenge, mild urticaria appeared after ingestion of 10 mg of hydrolyzed gluten and anaphylaxis after 100 mg. The result of the control test with wheat bread not containing hydrolyzed gluten was negative.

The other patient was a 14-year-old boy with a history of asthma and allergic rhinitis for many years. On the basis of SPT, he was sensitized to timothy, cat, and dog and had negative SPT reactions to wheat and gliadin. He had no food restrictions in his diet. During the last 2 years he had experienced 3 episodes of urticaria-angioedema after ingestion of doughnuts. The SPT wheal size for hydrolyzed gluten was 15 mm, and distinct, very strong IgE binding was detected in Immunospot to hydrolyzed gluten. In open food challenge, mild pharyngeal discomfort appeared after ingestion of 10 mg and 100 mg of hydrolyzed gluten and urticaria-angioedema after a dose of 150 mg.

Gluten-derived products are used in the food industry, especially in bakery products as emulsifiers.² The peptides produced by partial hydrolysis may contain highly IgE-reacting high-molecular-weight entities different from gluten-binding epitopes, likely resulting in a rearrangement of peptides issued from gluten processes.³ Hydrolyzed wheat proteins can induce unexpected immediate hypersensitivity through food ingestion.⁴ In our cases ingestion of hydrolyzed gluten was the source of severe allergic reactions in children without reaction to native wheat flour (Fig 1). The possibility of allergic reactions caused by “new” unexpected allergens, in our case allergy to jelly doughnut, needs to be kept in mind. It is important to perform a wide diagnostic setup with all individual ingredients. In addition, once confirmed as potential allergens, proper labeling of the products is warranted. In these cases

gluten hydrolysate-sensitive patients did not react to wheat or gluten, the labeling of which is mandatory in the European Union.

Our findings and results, together with preliminarily reported cases from several countries in Europe, suggest that acid gluten hydrolysate is a novel allergen that should be included in mandatory labeling of foods.

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ACCESSORY MUSCLE USE IN PEDIATRIC PATIENTS WITH ACUTE ASTHMA EXACERBATIONS

Physicians have few objective methods with which to assess the severity of acute asthma exacerbations in pediatric patients. Percent predicted forced expiratory volume in 1 second (%FEV₁) by spirometry is the accepted criterion standard but is frequently not available in acute care settings. Prior pediatric investigations have noted modest correlation of accessory muscle use with lower %FEV₁ but have not reported severity-dependent associations of accessory muscle use by muscle groups in use with %FEV₁ or hospitalization decisions.^{1,2} Because this is an easily identifiable physical finding, we sought to examine associations of individual accessory muscle groups with both %FEV₁ and hospitalization in pediatric patients with acute asthma exacerbations.

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