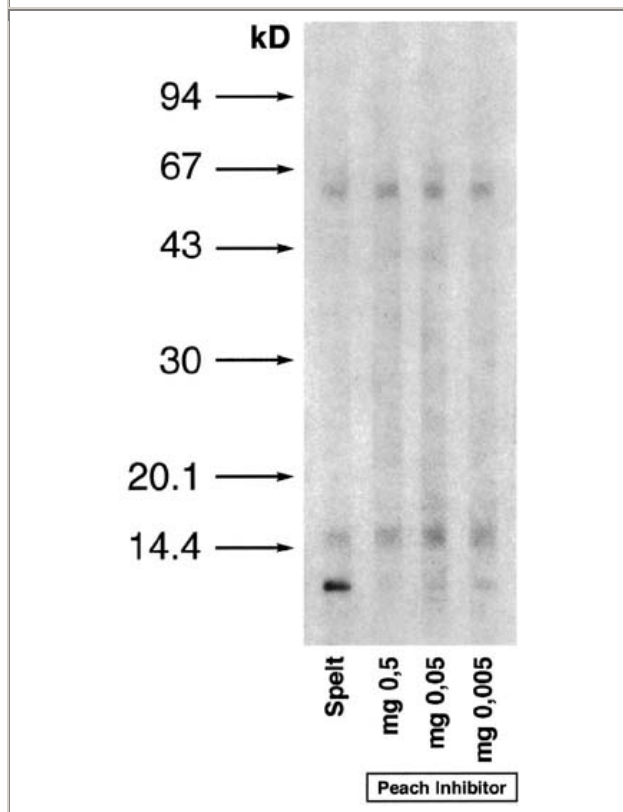


A lipid transfer protein involved in occupational sensitization to spelt

To the Editor:

We report the case of a biologist in whom occupational sensitization to spelt (*Triticum spelta*) developed after exposure to large amounts of spelt powder during a few months of research work. She suddenly noticed a quickly progressing dermatitis on her hands after contact with spelt. She was not atopic, and she had never had allergic rhinitis or asthma. During the same period she also had severe and generalized continuous urticaria/angioedema, which flared up after ingestion of different foods, especially bread, pasta, and Rosaceae fruits (apple, apricot, cherry, peach, and plum).

Fig. 1. Lane 1, IgE immunoblotting of spelt extract with the patient's serum. Lanes 2-4, Spelt immunoblotting inhibited by different concentrations (0.5, 0.05, and 0.005 mg) of peach extract.



At the time of presentation to our allergy center, the patient had already been evaluated by an allergist, and her CAP/RAST result was positive for egg, milk, rice, wheat, corn, barley, soybean, and peanut but negative for pollens. We repeated the serum-specific IgE measurement (CAP System, Pharmacia & Upjohn) and confirmed the positivity for egg (9.31 kUA/L), milk (2.86 kUA/L), peanut (8.45 kUA/L), and cereals such as wheat (3.21 kUA/L), barley (2.75 kUA/L), oat (0.93 kUA/L), corn (1.80 kUA/L), and brown rice (7.15 kUA/L); we also found positivity for tomato (0.89 kUA/L), orange (0.54 kUA/L), apple (0.81 kUA/L), peach (1.17 kUA/L), apricot (1.14 kUA/L), plum (0.93 kUA/L), and cherry (0.41 kUA/L). The total IgE measurement was 299 kUA/L.

Because we considered spelt contact to be the possible cause of the general clinical feature, we advised the patient to avoid it. Within a few months after changing her occupation, the patient found that her food symptoms had disappeared and she could reintroduce into her diet all of the foods that she previously had not been able to tolerate, except peach and apricot. Also, sensitization decreased, and 6 months later the CAP/RAST result was weakly positive only for corn (0.91 kUA/L), tomato (0.73 kUA/L), peach (0.63 kUA/L), and apricot (0.55 kUA/L) and totally negative (<0.35 kUA/L) for the other foods.

The serum IgE reactivity pattern to spelt proteins was determined by SDS-PAGE¹ immunoblotting (Fig 1, *lane 1*), which revealed a strong IgE binding to a 9-kd protein and a lower binding to 15-kd and 60-kd proteins. We performed an immunoblotting inhibition experiment to investigate cross-reactivity between spelt and peach; the IgE-binding to the 9-kd protein of spelt was completely inhibited by peach inhibitor (Fig 1, *lanes 2-4*).

N-terminal automated sequence analysis of the 9-kd spelt allergen showed that the first 15 amino acids were Ile-Asp-X-Gly-His-Val-Asp-Ser-Leu-Val-Arg-Pro-X-Leu-Ser. A database search showed high homology with proteins belonging to the lipid transfer protein (LTP) family, especially with those from wheat (100% identity, 100% similarity), barley (53% identity, 93% similarity), rice (66% identity, 86% similarity), maize (53.3% identity), and peach (46.6% identity).

We may conclude that in this patient the massive exposure to spelt caused sensitization to it, clinically expressed as cutaneous contact reaction; sensitization to spelt likely also conditioned allergy to several foods immunochemically related to spelt, clinically expressed as generalized urticaria and angioedema. A main point was that the avoidance of the contact with spelt led to a complete resolution not only, as expected, of the symptoms to spelt but also of the symptoms and sensitization to the other foods. A possible explanation may be based on the well-known IL-4-dependent modulation of the IgE synthesis through a T_H1/T_H2 shift, the " T_H2 hypothesis."¹ A continuous antigenic stimulation may give rise to a polyclonal rather than antigen-specific increase in the IgE synthesis; allergen avoidance in this patient, who was previously not atopic, might have caused a return to a low IL-4 content in the microenvironment, turning off the IgE synthesis.

Moreover, in this study we have identified a 9-kd allergen as a newly discovered relevant IgE binding protein of spelt, which is an LTP highly homologous to wheat LTP (never demonstrated to be allergenic) and to other LTPs of maize and peach, identified as major allergens.^{2,3} The structural similarity could thus explain the reactions of this patient to Rosaceae fruits and the IgE cross-reactivity between spelt and peach LTP, demonstrated by immunoblotting inhibition.

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