

## A case of onion allergy

---

### *To the Editor:*

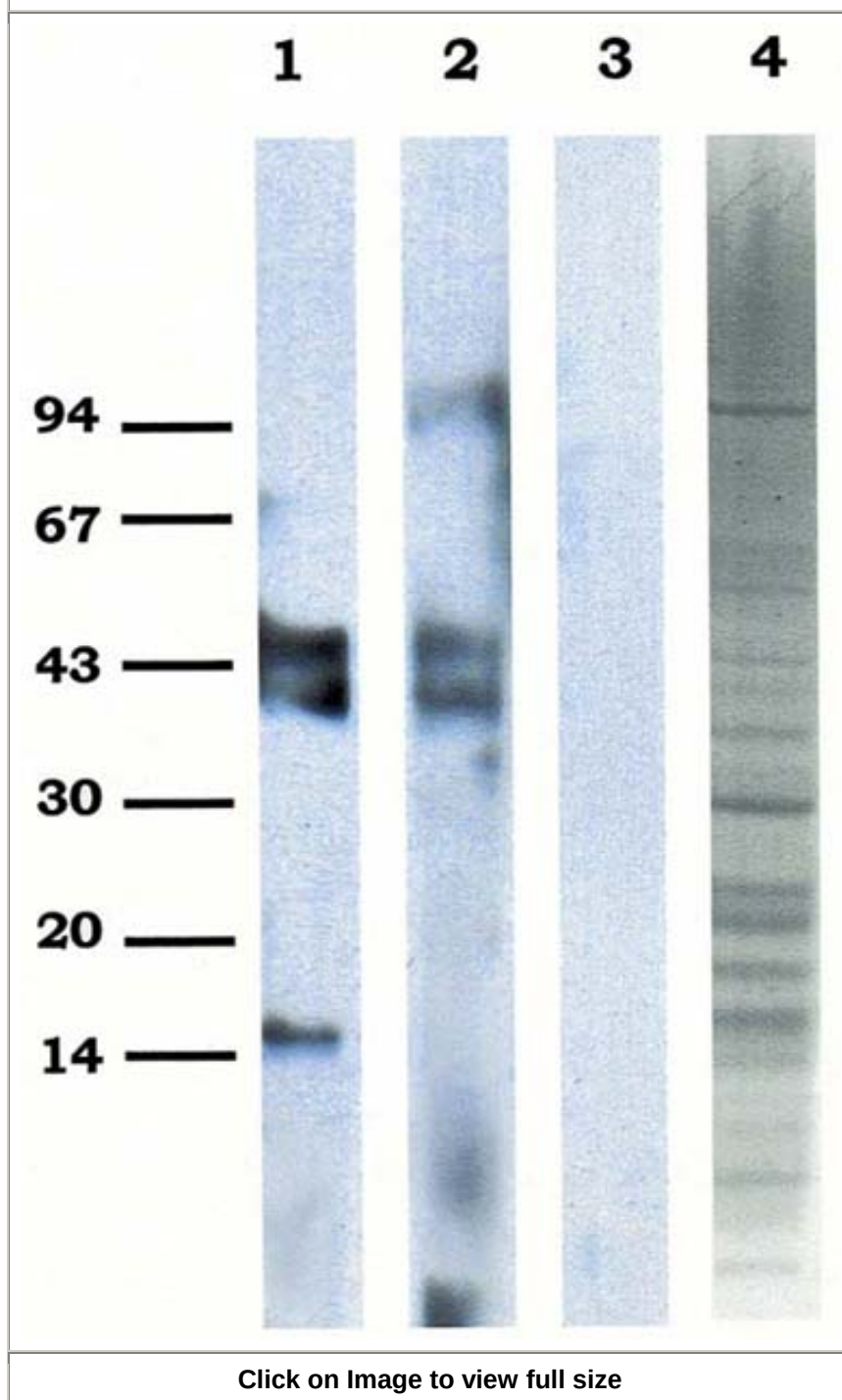
Although descriptions of a few cases of immediate hypersensitivity to garlic can be found in the medical literature,<sup>1,2</sup> true IgE-mediated food allergy to onion, the other important member of the Amaryllidaceae family, seems extremely rare despite its wide use. We describe a case of IgE-mediated onion allergy; relevant allergens have been characterized.

A 45-year-old man reported at least 5 episodes of severe, systemic urticaria/angioedema some minutes after eating raw onions during the previous few years. He tolerated cooked onions as well as other fruits and vegetables but had not been eating peaches since he was young because of oral allergy syndrome (oral itching and angioedema of the lip) and gastric pain. The man did not have respiratory allergy, and he showed negative skin prick test results with both seasonal and perennial airborne allergens. In contrast, he showed a moderate to strong reactivity (3+ to 4+ in comparison with wheal induced by histamine<sup>3</sup> 10 mg/mL) on skin prick testing with commercial extracts of plum, almond, pea, soybean, bean, peanut, hazelnut, walnut, tomato, orange, garlic, onion, celery, maize, and rice (Dome/Hollister-Stier, Spokane, Wash; 1:10 wt/vol) and with a specifically prepared peach peel extract (Lofarma, Milan, Italy). We previously showed that both plum and peach peel extracts contain neither Bet v 1–like allergens nor profilin and that in patients with positive results there is a very high probability of reaction against lipid-transfer proteins (LTPs).<sup>4,5</sup>

Onion proteins were extracted as previously described.<sup>1</sup> On a running gel (gradient 10% to 20%), 20 µg of onion extract was applied, and electrophoresis was carried out at 40 mA for 2 hours. Proteins were stained with 0.1% Coomassie Brilliant Blue or electrophoretically transferred onto a nylon-cellulose membrane (Fluorotrans 0.45 µm; Pall, Milan, Italy). The membrane was saturated with 0.1 mol/L tris-buffered saline and 5% fat-free milk powder; after being washed, it was incubated with the patient's serum. Bound specific IgEs were detected by peroxidase-conjugated anti-human IgE antibodies from goat (1:1000 in saturation buffer) through use of an ECL Western blotting kit (Amersham, Milan, Italy).

The patient's reactivity to both onion extract and LTP purified from peach peel by chromatographic means was further investigated by ELISA.<sup>5</sup> IgE reactivity was measured in terms of optical density (OD); a value greater than 300 was considered positive. Possible cross-reactivity between the onion and peach allergens recognized by the patient's serum was investigated by means of cross-inhibition experiments.<sup>5</sup> In all of these experiments, pooled sera from strong LTP-reactors and from normal subjects were used as positive and negative controls, respectively.

**Fig. 1.** IgE reactivity to onion of the patient's serum before (*lane 1*) and after inhibition by peach LTP (*lane 2*); reactivity of a normal serum is also shown (*lane 3*). *Lane 4* shows the SDS profile of onion extract.



[Click on Image to view full size](#)

The patient strongly reacted against both peach LTP and onion extract (1913 OD and 1745 OD, respectively). Corresponding peach- and onion-specific IgE levels in positive and negative control sera were 2402/735 OD and 168/254 OD, respectively. In inhibition studies, peach LTP caused a marked (but incomplete) inhibition of the patient's onion reactivity (which dropped to 347 OD), and onion extract partially inhibited serum reactivity to peach LTP (which fell to 1208 OD). Immunoblot analysis showed the patient's IgE reactivity both to a single band at approximately 15 kDa and to a double band at approximately 43 kDa in onion extract (Fig 1). Preabsorption of serum with peach peel

LTP caused the total loss of the 15-kDa reactivity but did not significantly change the reactivity at 43 kDa (Fig 1).

This LTP-hypersensitive patient also showed IgE reactivity to onion proteins at different molecular weights. Although it is not possible to demonstrate beyond any doubt which of these allergenic proteins (or even whether all or only one of them) was responsible for the clinical allergy, the fact that none of our more than 50 patients who were hypersensitive to LTP reported onion allergy suggests that proteins at approximately 43 kDa might be the relevant allergens.

**1/8/116983**

doi:10.1067/mai.2001.116983

*Riccardo Asero, MD<sup>a</sup>*

*Gianni Mistrello, BSc<sup>b</sup>*

*Daniela Roncarolo, BSc<sup>b</sup>*

*Stefano Amato, BSc<sup>b</sup>*

*<sup>a</sup>Ambulatorio di Allergologia, Ospedale Caduti Bollatesi Via Piave 20*

*20021 Bollate (MI), Italy*

*<sup>b</sup>Lofarma, Milan, Italy*

## References

TOP

1. Asero R, Mistrello G, Roncarolo D, Antoniotti PL, Falagiani P. A case of garlic allergy. *J Allergy Clin Immunol* 1998;101:427-8.
2. Perez-Pimiento AJ, Moneo I, Santaolalla M, de Paz S, Fernandez-Parra B, Dominguez-Lazaro AR. Anaphylactic reaction to young garlic. *Allergy* 1999;54:626-9.
3. Bousquet J, Michel FB. In vivo methods for the study of allergy: skin tests, techniques and interpretation. In Middleton E, Reed CE, Ellis EF, Adkinson NF, Yunginger JW, Busse WW, editors. *Allergy: principles and practice*. 4th ed. St. Louis: Mosby; 1993. p. 573-94.
4. Asero R. Detection and clinical characterization of patients with oral allergy syndrome caused by stable allergens in Rosaceae and nuts. *Ann Allergy Asthma Immunol* 1999;83:377-83.
5. Asero R, Mistrello G, Roncarolo D, de Vries SC, Gautier MF, Ciurana CLF, et al. Lipid transfer protein: a panallergen in plant-derived foods that is highly resistant to pepsin digestion. *Int Arch Allergy Immunol* 2000;122:20-32.