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Anaphylaxis caused by tomato lipid transfer protein

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KEY WORDS

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SUMMARY

This study reports an unusual case of anaphylaxis induced by tomato. Inhibition studies carried out in-vitro showed the complete cross-reactivity between the relevant tomato allergen and purified peach lipid transfer protein (LTP). Tomato LTP may sometimes cause severe allergic reactions.

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Tomato is probably the most commonly consumed vegetable worldwide. Although several tomato allergens have been detected so far, the major tomato allergen is unquestionably profilin, a pepsin-sensitive plant-panallergen that may cause oral allergy syndrome in subjects primarily sensitised to pollen (1-3). Very recently, the presence of lipid transfer protein (LTP), another plant pan-allergen that is heat- and pepsin-resistant, has been detected both in tomato peel and pulp (4). In effect, SPT with commercial tomato extracts score rather frequently positive on SPT in patients mono-sensitised to LTP (5). Most patients sensitised to tomato LTP seem to tolerate this food or report only local symptoms (4, 5); however, systemic symptoms upon ingestion of tomato have been reported as well (4). The cross-reactivity between tomato and peach LTPs has not been investigated in detail so far. In the present study we report a case of anaphylaxis following the ingestion of tomato, show that tomato LTP was the offending allergen, and demonstrate the cross-reactivity between tomato and peach LTPs.

A 37-year-old man was recently seen at this allergy outpatient clinic. He reported an episode of urticaria/angioedema, tachycardia, diarrhoea, hypotension and loss of consciousness immediately after eating pasta seasoned with little raw branch tomatoes and olive oil 15 days before. The patient was immediately brought to the emergency room where he recovered in a couple of hours after the administration of systemic steroids and antihistamines. The man recalled some occasional episodes of urticaria with slight dyspnoea at the end of meals during the previous two years, but in those cases he had never been able to detect a possible specific culprit food.

SPT with commercial extracts of both seasonal and perennial airborne allergens (Allergopharma, Reinbeck, Germany) showed strong skin reactivity to Parietaria pollen and moderate reactivity to grass pollen. SPT with a large spectrum of commercial food allergen extracts (ALK-Abello, Madrid, Spain 1:20 w/v) scored strongly positive for tomato, peanut, walnut, hazelnut, sunflower

seed, poppy seed, and peach, whereas no reactivity to wheat, soybean, carrot, orange, garlic, celery, and animal-derived foods was found. No reactivity to natural rubber latex was observed. The peach extract used to carry out SPT contains lipid transfer protein (30 µg/ml) and virtually lack all other described peach allergens, including Pru p 1, the Bet v 1 homologue, and profilin.

The patient gave an informed consent to blood sampling for further in-vitro investigations.

Fresh tomatoes were extracted as previously described (6). The final protein concentration of the obtained extract was 860 µg/ml. In a direct ELISA assay carried out using 1 µg of tomato protein/well, patient's serum showed a moderate IgE reactivity to the extract (743 OD) whereas a serum from a normal subject did not show any IgE reactivity (OD 245). In inhibition studies, pre adsorption of patient's serum with both 0.2 µg or 2 µg of purified peach LTP caused the total loss of tomato reactivity (OD 230) already using the lowest dose of peach LTP, whereas pre absorption with 8 µg of BSA did not cause any change in tomato reactivity (OD 830), thus showing both that tomato-induced anaphylaxis had been caused by lipid transfer protein and the complete cross reactivity between peach and tomato LTP.

Although this patient experienced anaphylaxis following the ingestion of fresh tomatoes it is very likely that peach was the primary sensitizer to LTP. In fact, as in all previ-

ously described cases of allergy to LTP contained in different plant-derived foods, pre-adsorption of serum with peach LTP caused the complete loss of IgE reactivity confirming that peach LTP contains all allergenic determinants of this allergen.

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