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Food allergy to spinach and mushroom

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Key words: cross-reactivity; mold hypersensitivity; mushroom; spinach.

● A 31-YEAR-OLD woman was referred for two systemic reactions after spinach intake; the second was anaphylactic shock with respiratory failure. She also had had four episodes of Oral Allergy Syndrome a few minutes after mushroom intake. For the previous eight years she had suffered from persistent allergic asthma.

Skin prick tests (SPT) were positive to mites and airborne molds, and were negative to pollens, latex and commercial spinach extract. Prick-by-prick tests with raw and boiled spinach, raw beet and chard were positive. Specific bronchial challenge with *Alternaria alternata* was positive.

Total serum IgE was 786 kU/l and specific IgE was detected to *Aspergillus fumigatus*, *Cladosporium herbarum*, *A. alternata*, *Acarus siro*, *Glycyphagus domesticus*, and cat dander.

Extracts of spinach (raw and boiled leaves, and boiling water), mushroom, chard and beet were obtained by grinding 10 g of each in 100 ml PBS. After centrifugation, supernatants were precipitated in 90% ethanol for 30 min and centrifuged for 15 min at 4500 g. Precipitates were re-dissolved in 1 ml PBS and re-centrifuged under the same conditions.

SDS-PAGE and immunoblotting of the different extracts showed the strongest recognition of spinach allergens in the 10×concentrated boiling water. Therefore, the entire *in vitro* study was performed using this spinach extract.

The spinach extract showed two main bands of 20 and 25 kDa, and several minor bands (14–18 kDa). Several bands between 14 and 35 kDa were detected in mushroom and chard extracts

Immunoblotting (1) of the spinach extract showed four bands from about 18–35 kDa. In the mushroom extract, the patient's serum recognized a 22 kDa band, a broad zone without defined bands of lower molecular weight (16–18 kDa), and a faint band of about 15 kDa. In the chard extract we detected four very faint bands from about 23–30 kDa.

Spinach immunoblotting inhibition is shown in Fig. 1A. Mushroom and chard extracts were able to inhibit recognition of spinach allergens, with complete inhibition

of three allergens between 23 and 35 kDa. Regarding mushroom immunoblotting inhibition (Fig. 1B), *C. herbarum*, spinach and chard extracts were able to cause complete inhibition of the faint 15 kDa band, which was also partially inhibited using *A. alternata* as inhibitor. The 16–18 kDa zone was partially inhibited by *C. herbarum* and spinach, and totally inhibited by chard. The upper 22 kDa band was inhibited in part by spinach and chard.

IgE-mediated allergy to vegetables has been associated with sensitization to pollens and latex by the existence of common allergens, the pathogenesis-related proteins (2). Allergic reactions after eating spinach relatively unknown, with only four cases described so far (3–6); in three of these studies, the allergy was related to latex sensitization. In our case, both *in vivo* and *in vitro* aspects of the study discarded association with sensitization to latex or pollens, including *Chenopodium album*. Furthermore, we have not found previous reports of food allergy to mushroom *Agaricus bisporus* or of cross-reactivity between edible mushrooms and airborne molds belonging to the fungi *Imperfecti*.

In conclusion, spinach and mushroom, two foods with no taxonomical relationship, must have some common epitopes responsible for this newly found cross-reactivity. Although this is a single case report, due to the fact that mold sensitization is relatively common, more in-depth study of the possible cross-

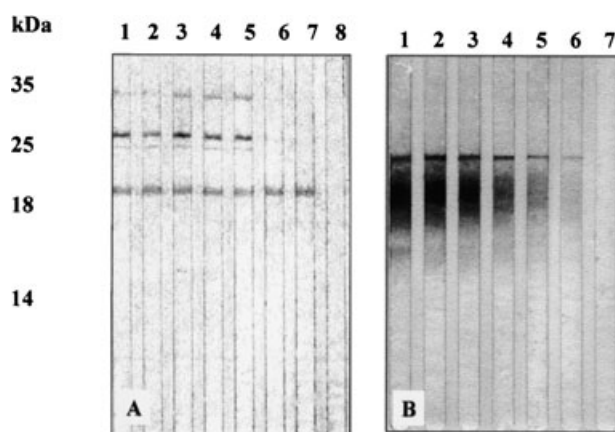


Figure 1. A: Immunoblot inhibition to spinach proteins with beet (lane 1), latex (lane 2), *Cladosporium herbarum* (lane 3), *Alternaria alternata* (lane 4), *Aspergillus fumigatus* (lane 5), chard (lane 6), mushroom (lane 7) and spinach (positive control, lane 8). B: Immunoblot inhibition to mushroom proteins with dog dander [negative control, lane 1], *Aspergillus fumigatus* (lane 2), *Alternaria alternata* (lane 3), *Cladosporium herbarum* (lane 4), spinach (lane 5), chard (lane 6), and mushroom (positive control, lane 7).

reactivity between edible mushrooms and airborne molds should be performed in order to estimate clinical relevance.

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Roxithromycin induced acute urticaria

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Key words: angioedema; roxithromycin; urticaria.

● A 22-YEAR-OLD FEMALE presented with a generalized eruption of few hours' duration, which was severely pruritic. There were multiple small and large areas of wheal formation, along with swelling of eyelids and lips, facial puffiness and flush. The patient had been advised to

take roxithromycin 150 mg twice daily for a sore throat and the skin eruption was observed a few hours after the second dose.

A case specifically sensitized to roxithromycin.

General physical examination was normal except for mild tachycardia; respiratory rate was normal and there was no difficulty in breathing. A diagnosis of acute urticaria with angioedema induced by roxithromycin was made and chlorpheniramine maleate 8 mg thrice daily was started. Lesions subsided within 12 h of stopping the drug and no relapse was observed in three months of follow-up. A skin prick test (SPT) was positive for roxithromycin (1 mg/ml), and negative for erythromycin and clarithromycin in the same concentration.

Acute urticaria has rapid onset and disappearance and is usually regarded as an allergic reaction, compared to chronic urticaria (1). Drugs and acute infections are the commonest causes of acute urticaria. Macrolide antibiotics have relatively low potential to induce various drug-induced hypersensitivity reactions. Erythromycin is regarded as the most innocuous of the antibiotics in current use. It is generally well tolerated with only a few serious adverse effects (2). Gastrointestinal disturbances are most frequent; less common are hepatotoxicity, reversible sensorineural deafness, agranulocytosis, and pancreatitis. Hypersensitivity reactions due to erythromycin are uncommon, reported in only 0.5% of patients (2). Cutaneous hypersensitivity reactions from macrolides are limited to a few case reports, with fixed drug eruptions and urticaria from erythromycin, fixed drug eruption from clarithromycin, and immediate hypersensitivity reaction and nail pigmentation from roxithromycin (3–8).

Increasingly roxithromycin is being used in place of erythromycin because of better efficacy and less frequent administration. Although they have similar adverse effects, roxithromycin's are less severe and less common (2). An immediate type allergic hypersensitivity reaction has been described in a patient, with generalized acute urticaria and tachycardia, shortly after administration of roxithromycin, with cross-reactivity to erythromycin and clarithromycin (7). Occurrence of lesions

within 24 h of roxithromycin administration favoured an immunological mechanism for urticaria in this patient, and a positive SPT suggested an immediate-type allergic hypersensitivity reaction, which was probably less severe because the drug was stopped immediately. Being aware of the immediate-type hypersensitivity to roxithromycin reported previously (7), it was considered unsafe to re-challenge orally. For this reason oral challenge for cross-sensitivity with erythromycin and clarithromycin was avoided and the patient was advised to avoid all macrolide antibiotics, particularly roxithromycin, in the future.

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