

# Exotic Food Allergy: Anaphylactic Reaction to Lychee

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## ■ Abstract

There are very few reports on allergic reactions to lychee fruit in the literature. We describe the case of a 26-year-old man who developed pruritus, generalized urticaria, and severe angioedema of his lips and tongue with dyspnea within 15 minutes after lychee fruit intake. Although we found no lychee-specific immunoglobulin E antibodies, a basophil activation test (BAT) and a cellular antigen stimulation test (CAST) to lychee were both positive, as was a prick-to-prick test with fresh lychee fruit. The patient also suffered from an oral food allergy syndrome to parsley and was sensitized to mugwort but not to latex or profilin. BAT and CAST are helpful tools in the diagnostic workup for exotic food allergy. Mugwort is suggested as the allergen responsible for the cross-reactivity presented by this patient, as he had no sensitization to latex or profilin.

Key words: Anaphylactic reaction. Basophil activation test (BAT). Cellular antigen stimulation test (CAST). Lychee fruit.

## ■ Resumen

Hay muy pocas referencias en la literatura médica sobre reacciones alérgicas al lichi. Describimos el caso de un varón de 26 años de edad que presentó prurito, urticaria generalizada y angioedema grave de labios y lengua, acompañado de disnea a los 15 minutos de haber comido lichi. Aunque no detectamos anticuerpos IgE específicos frente a lichi, el test de activación de basófilos (BAT) y el test de producción de sulfidoleucotrienos (CAST) fueron ambos positivos. También fue positiva la prueba cutánea con lichi fresco. El paciente también padecía un síndrome de alergia oral al perejil y presentaba sensibilización a la artemisa, pero no al látex o a la profilina. Las pruebas BAT y CAST son útiles como herramientas para diagnosticar las alergias alimentarias exóticas. Se sugiere que la artemisa es el alérgeno responsable de la reactividad cruzada que presentaba el paciente, ya que no tenía sensibilizaciones al látex ni a la profilina.

Palabras clave: Reacción anafiláctica. Test de activación de basófilos (BAT). Test de producción de sulfidoleucotrienos (CAST). Lichi.

## Introduction

Allergologists are increasingly confronted with allergic reactions to exotic fruits, which are gaining ground in the Western diet. The present report describes an anaphylactic reaction after consumption of lychee fruit (*Litchi sinensis*). Lychee fruit belongs to the Sapindaceae family, is a seed, and contains a significant amount of profilin. Consumption can cause severe anaphylactic reactions in patients sensitized to the plant pan-allergen profilin [1] or latex [2].

## Case Description

A 26-year-old man developed pruritus, generalized urticaria, and severe angioedema of the lips and tongue with

dyspnea within 15 minutes of lychee fruit intake. He was treated with intravenous corticosteroids and antihistamines, monitored in a hospital for 24 hours and attended our clinic the next week for assessment of possible fruit allergy. The patient had an oral food allergy syndrome to parsley but no personal or family history of atopic diseases and no sensitization to latex.

To assess total and specific immunoglobulin (Ig) E levels, serum was analyzed by fluorescent enzyme immunoassay (Phadia CAP System, Phadia Diagnostics, Freiburg, Germany). Before prick-to-prick testing with fresh lychee fruit, a basophil activation test (BAT, Orpegen Pharma, Heidelberg, Germany) and a cellular antigen stimulation test (CAST, Bühlmann Laboratories, Allschwil, Switzerland) were performed with fresh lychee fruit extract. This extract was made by squeezing fresh fruit through a 100 µm cell strainer (FALCON, Becton

Dickinson Labware, Franklin Lakes, New Jersey, USA). Afterwards, the squeezed fruit was diluted 1:10, 1:100, and 1:1000 with phosphate buffered saline. The positive control was formyl-methionyl-leucyl-phenylalanine (fMLP) to assess CD63 upregulation and release of sulfidoleukotrienes (sLT). BAT was performed as described previously by us [3]. Briefly, 100  $\mu$ L of whole blood was preincubated with 20  $\mu$ L of wash buffer at 37°C for 30 minutes and then cells were stimulated with 100  $\mu$ L of each lychee dilution (1:10, 1:100, 1:1000) for 20 minutes at 37°C. Stimulation was stopped by chilling the cells on ice for 5 minutes. Then, phycoerythrin-conjugated anti-IgE and fluorescein-isothiocyanate-conjugated anti-CD63 monoclonal antibodies were added and the mixture was incubated for 20 minutes on ice. Finally, whole blood probes were lysed, fixed, washed, and analyzed within 2 hours in a flow cytometer (FACScan, Becton Dickinson, San Jose, California, USA). While the threshold was set in fluorescence 2 (red fluorescence) only basophils with very bright IgE expression were "live gated." At least 1000 high IgE-expressing basophils per sample were acquired and the percentage of CD63-expressing cells was determined by measuring fluorescence 1 (green fluorescence) compared with the wash buffer serving as negative control.

To assess sLT production, leukocyte suspensions enriched by dextran sedimentation were resuspended in stimulation buffer containing 20 ng/mL of interleukin 3, which also served as the negative control. After 10 minutes of priming, lychee extract dilutions were added and incubated for 40 minutes at 37°C. Subsequently, sLT de novo production was measured by enzyme-linked immunosorbent assay as recommended by the manufacturers' instructions and previously described [3].

Total serum IgE levels were normal (78.4 kU/L). Specific IgE antibodies to lychee fruit were not detectable (<0.35 kU/L, Uni-CAP class 0). There were no specific IgE antibodies detected with a panel of 7 common aeroallergens; to rBet v1, rBetv2, profilin, parsley, or celery; to a panel of

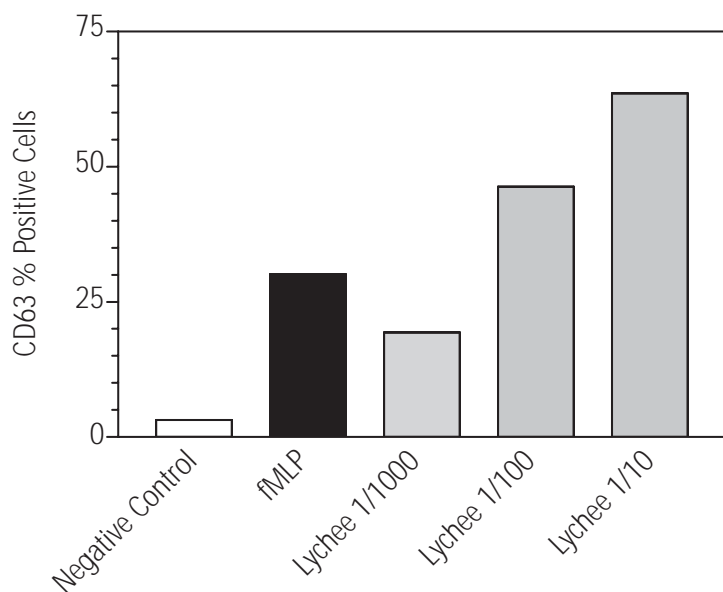
6 frequent food allergens; to walnut, pistachio, cashew, or latex; or to latex associated food antigens such as avocado. We only detected increased levels of specific IgE antibodies to mugwort 50.5 kU/L (Uni-CAP class 4).

We found a dose-dependent upregulation of CD63 surface expression on patient basophil granulocytes after stimulation with lychee extract (figure) whereas there was no reaction in a control subject (not shown). With CAST we found an increased release of sLT after stimulation with lychee extract dilution 1:10 (734 pg/mL sLT), dilution 1:100 (940 pg/mL sLT), dilution 1:1000 (383 pg/mL sLT), fMLP (978 pg/mL sLT) but not with negative control (116 pg/mL sLT).

Prick-to-prick testing with fresh fruit was positive in the patient (++++) but not in 4 healthy controls. Skin prick tests with celery, parsley, and mugwort were positive in the patient, and tests with fresh banana, pineapple, kiwi, melon, avocado, latex antigens, and 13 frequent aeroallergens (all ALK Scherax, Hamburg, Germany) were negative.

## Discussion

There are only a few case reports of allergic reaction to lychee in the literature [1,2,4,5]. In the patient presented, we found an increased production of sLT, basophil CD63 upregulation, and a positive skin prick test in response to lychee, but we found no lychee-specific IgE-antibodies. In 2 cases of an anaphylactic reaction to lychee, cross-reactivity to mugwort and antigens of the Umbelliferae family were reported [4]. Our patient also had an oral allergy syndrome to parsley confirmed by a sensitization with skin prick test as well as sensitization to mugwort. In contrast to patients in other case reports, he was not sensitized to latex or latex-associated fruits [2,5]. In addition, we found no evidence for a sensitization to profilin. Therefore, as mugwort sensitivity has been described in many forms of food allergy [6] and also by the patient, we



CD63 surface expression of basophil granulocytes from the patient with an allergic reaction to lychee fruit. Stimulation with formyl-methionyl-leucyl-phenylalanine (fMLP, positive control) and different dilutions of fresh lychee fruit.

propose it as the allergen responsible for the cross-reactivity presented in this case report. Accordingly, we instructed the patient to avoid lychee fruit as well as parsley and informed him about possible mugwort-associated food allergies. He received rescue medications, specifically a liquid glucocorticosteroid, an antihistamine, and an epinephrine inhaler for self-treatment in case of an emergency.

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## ERRATUM:

In: Vidal C, Bartolomé B, González-Quintela A, Rodríguez V, Armisen M. Prawns, Barnacles, and Nonsteroidal Anti-Inflammatory Drugs: Effect Modifiers or Interaction? 2007; 17(2); 113-118.

The title of the case report to which this Erratum refers should be "Prawns, Barnacles, and Nonstoeroidal Anti-Inflammatory Drugs: Effect Modifiers or Diagnostic Confounders?"