



Letter

In vivo tests with “Tahini” sauce: new allergenic source to evaluate IgE-mediated hypersensitivity to sesame

Sesame seed represents an “emerging” food allergen that can be consumed accidentally or used in certain perfumes, cosmetics, and lubricants.^{1,2} Clinical presentation of sesame allergy includes non-immunoglobulin E (IgE) and IgE-mediated allergic reactions, ranging from contact dermatitis to severe cases of anaphylaxis. From a molecular point of view, 7 glycoproteins have been recognized as sesame allergens: Ses i 1 and Ses i 2 (two 2S albumins), Ses i 3 (a 7S globulin—vicilinlike protein), Ses i 4 and Ses i 5 (2 oleosins), Ses i 6 and Ses i 7 (two 11S globulins—leguminlike proteins), and Ses i 8 (profilin).³ Skin prick tests (SPTs) and specific IgE antibodies are the most common tools used for confirming sesame allergy. However, in some cases, skin and serum tests do not produce any evidence of IgE reactivity to sesame allergens, thus complicating the diagnostic approach.⁴

We report a case of a 55-year-old man who was referred for a severe anaphylactic reaction with generalized urticaria/angioedema and hypotension occurring after ingestion of breadsticks containing sesame. Physical examination was unremarkable. His history was characterized by a 5-year history of contact dermatitis to lubricant oils. Forty days after the anaphylactic reaction, SPTs with a panel of 2 commercial sesame extracts (Stallergènes, Paris, France; ALK-Abellø, Madrid, Spain) were negative. Prick-by-prick tests with natural sesame seed crushed in saline overnight as previously described⁴ and lubricant oil were negative. Serum tryptase was 4.5 ng/mL (normal, <12 ng/mL); total serum IgE levels were within normal limits (<100 IU/mL) as well as specific IgE to a panel of legumes, nuts, and seeds (<0.10 kU/L, ImmunoCAP; Phadia, Uppsala, Sweden); specific IgE for sesame seed extract were 0.12 kU/L. Component resolved diagnosis with ImmunoCAP—Immuno Solid-phase Allergy Chip (ISAC) microarray technology was negative. Interestingly, positive results were obtained on prick-by-prick and epicutaneous tests with undiluted “Tahini” (a paste of 100% ground sesame seeds—“Luxor,” produced in India and commercialized in Italy by Alimenta Srl). This sensitization profile was further confirmed by a positive basophil activation test (BAT) after stimulation with 2 different commercial sesame extracts (Stallergènes; ALK-Abellø); in particular, CD63 expression (% of positive basophils) and stimulation index were 33.8% and 16, 21% and 10, respectively (normal, <5% and <2). Thus, a final diagnosis of anaphylaxis to sesame was made.

“Tahini” is a commercially available 100% sesame creamy sauce and, to our knowledge, this is the first time it has been used for prick-by-prick and epicutaneous tests. To find a rationale for the obtained results, we looked for allergenic proteins by immunoblot experiments with “Tahini” (0.5% in deionized water). Interestingly,

sodium dodecyl sulphate polyacrylamide gel electrophoresis showed no detectable proteins in commercial sesame extracts (data not shown) and 1 protein (molecular weight approximately 50 kDa in nonreducing conditions) composed by 2 subunits (molecular weights approximately 20 and 30 kDa in reducing conditions) in “Tahini” sauce; moreover, the patient’s serum (diluted 1:6) showed IgE reactivity to these proteins, thus confirming the presence of allergenic peptides in the aqueous solution of sesame paste (Fig 1). Indeed, as reported for other allergens,⁵ roasting probably increased the allergenicity of sesame proteins contained in “Tahini” as well; conversely, the overnight incubation of natural crushed sesame seed in saline may have reduced lipophilic protein extraction because of an unsuitable hydrophobic milieu. These data strongly support the potential utility of in vivo tests with “Tahini” sauce as additional diagnostic tools when hypersensitivity to sesame is suspected even though not supported by positive SPT with commercial extracts.

The present case raises 2 additional considerations with respect to ISAC and BAT analysis.

Namely, low levels of specific IgE for sesame extract could be clinically significant, and thus, a concentration between 0.10 and 0.35 kU/L could be associated with an IgE-mediated major allergic reaction; in this sense, efforts are urged to amplify the sesame allergen panel of the actually available ISAC test, in which Ses i 1 represents the only major allergen included. Conversely, BAT with commercial extracts demonstrated a higher sensitivity than SPTs in the evaluation of sesame hypersensitivity; these results are in line with those recently obtained by Raap et al,⁶ although BAT reliability for food allergies has to be completely established.

Finally, an interesting aspect emerges from the patient’s history of contact dermatitis to lubricant oils: because contact dermatitis to sesame oil is caused by lignin-like allergen compounds,² one might speculate that primary sensitization to sesame seeds might have occurred through a cutaneous route.

In conclusion, given the multiple allergic mechanisms involved in sesame hypersensitivity, we suggest a combined diagnostic approach including epicutaneous tests and BAT in those cases of immediate reactions to sesame-containing products with negative skin or serum tests. Moreover, we support prick-by-prick and epicutaneous tests with “Tahini” as new potential options for evaluating IgE-mediated hypersensitivity reactions to sesame.

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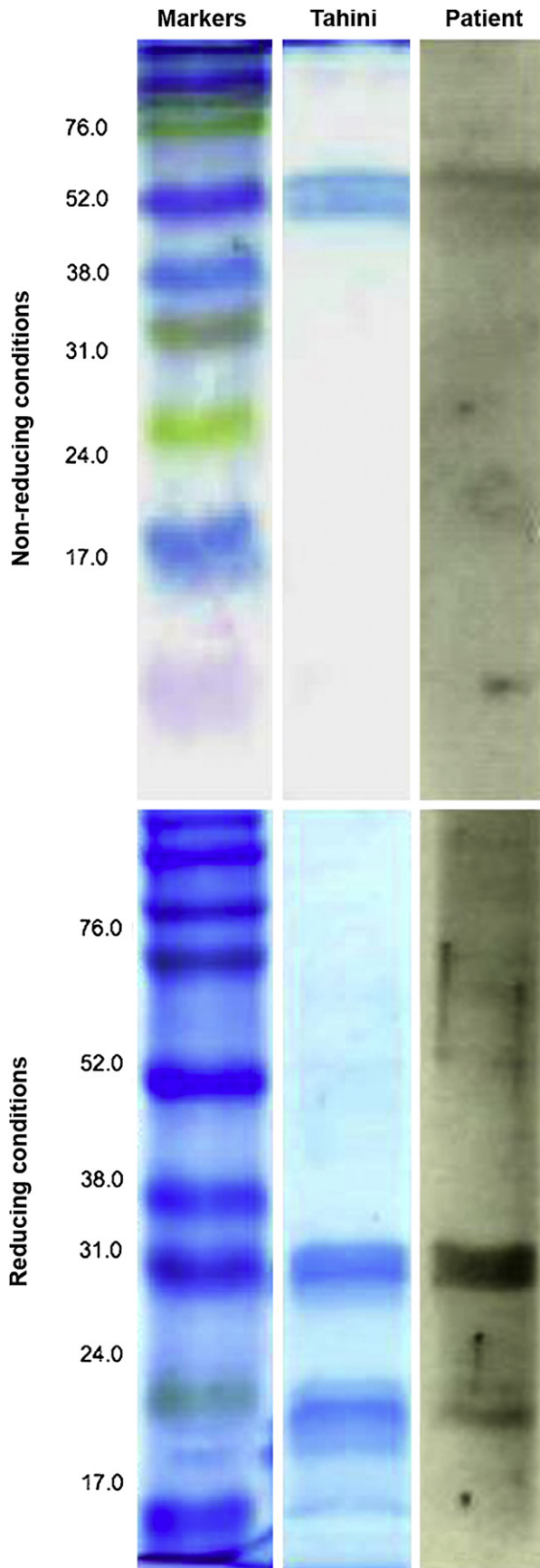


Figure 1. Sodium dodecyl sulphate polyacrylamide gel electrophoresis in colloidal-blue (Tahini) and IgE reactivity of the patient's serum in Western blot (patient) with "Tahini" under nonreducing and reducing conditions (with dithiothreitol).

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References

- [1] Kanny G, De Hauteclouque C, Moneret-Vautrin DA. Sesame seed and sesame seed oil contain masked allergens of growing importance. *Allergy*. 1996;51:952–957.
- [2] Gangur V, Kelly C, Navuluri L. Sesame allergy: a growing food allergy of global proportions? *Ann Allergy Asthma Immunol*. 2005;95:4–11.
- [3] Magni C, Ballabio C, Restani P, et al. Molecular insight into IgE-mediated reactions to sesame (*Sesamum indicum* L.) seed proteins. *Ann Allergy Asthma Immunol*. 2010;105:458–464.
- [4] Leduc V, Moneret-Vautrin DA, Tzen JT, Morisset M, Guerin L, Kanny G. Identification of oleosins as major allergens in sesame seed allergic patients. *Allergy*. 2006;61:349–356.
- [5] Vissers YM, Iwan M, Adel-Patient K, et al. Effect of roasting on the allergenicity of major peanut allergens Ara h 1 and Ara h 2/6: the necessity of degranulation assays. *Clin Exp Allergy*. 2011;41:1631–1642.
- [6] Raap U, Wiczorek D, Schenck F, Kapp A, Wedi B. The basophil activation test is a helpful diagnostic tool in anaphylaxis to sesame with false-negative specific IgE and negative skin test. *Allergy*. 2011;66:1497–1499.