Urticaria Induced by Ingestion of *Anemonia sulcata*

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The anemone *Anemonia sulcata* is a species of anthozoan cnidarian belonging to the Actiniidae family. It is found in the Mediterranean Sea and the Atlantic Ocean, mainly near the province of Cadiz in the south of Spain, where it is commonly called "ortiguilla" [1]. It lives on rocks in areas of intense sunlight, up to a depth of 20 meters, and is harvested for human consumption. *A sulcata* is commercially available. This nettle-like anemone has toxic organelles called cnidocysts, which can inject venom with their microscopic harpoon-like structures and cause toxic reactions [2,3]. It is generally prepared by marinating in vinegar (with the nettles remaining attached) and then fried. The ability to sting disappears after this process. Toxic reactions have been reported after contact with *A sulcata*, although, to date, none have been documented after ingestion when it is prepared in this manner [3]. *A sulcata* is commercially available as a labeled product in our area.

We report a case of a patient who experienced urticaria after ingestion of fried "ortiguillas". We detected IgE-reactive proteins of 69, 55, 40, 37, and 35 kDa, thus potentially explaining the symptoms observed.

The patient was a 47-year-old man, who was a cook by profession. He had a medical history of mild allergic rhinitis due to mite allergy. He was referred to our allergy department from the emergency room after presenting with hives on his torso, facial erythema, and pharyngeal pruritus. His urticaria occurred a few minutes after he had eaten an "ortiguilla" fried in olive oil. In the emergency room, the patient was treated with parenteral methylprednisolone and dexchlorpheniramine and recovered within 2 hours. No cofactors were identified in the episode. He has since tolerated fish and seafood. He reported having handled "ortiguillas" at work with gloves and never having experienced these symptoms. He had previously eaten "ortiguillas" with good tolerance.

We performed prick-by-prick tests with raw and fried "ortiguilla". The results were positive, with wheals measuring 14 mm and 10 mm, respectively. Skin tests with raw and fried "ortiguillas" were also carried out in 10 healthy controls, whose results were negative.

The patient underwent skin prick tests (SPTs) for the most common aeroallergens in our area (mites, pollens, fungi, latex, *Anisakis simplex*, and dander from cat, dog, and horse) and

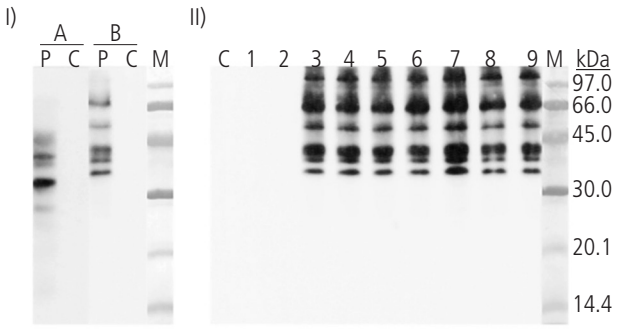

Figure. I) SDS-PAGE Immunoblotting. A) RAS extract B) FAS extract. Lane P, patient serum; Lane C, control serum (pool of sera from nonatopic patients); Lane M, molecular mass standard.
II) SDS-PAGE immunoblotting-inhibition with FAS extract in solid phase. Lanes 1-9, patient serum previously incubated with FAS extract (lane 1), with RAS extract (lane 2), with *Glycyphagus domesticus* extract (lane 3), with *Dermatophagoides pteronyssinus* extract (lane 4), with *Blattella germanica* extract (lane 5), with sunflower pollen extract, inhibition negative control of the assay (lane 6), Der p 10 (lane 7), Pen i 1 (lane 8), and BSA (lane 9). RAS indicates extract from raw *Anemonia sulcata*; FAS, extract from fried *A sulcata*.

also for common food allergen extracts (milk, egg, shellfish, fish, apple, nuts, tomato, and melon). His results were positive to *Dermatophagoides pteronyssinus* (8 mm) and *Glycyphagus domesticus* (4 mm).

Allergen microarray immunoassay performed with 112 allergens (ImmunoCAP ISAC, Thermo Fisher Scientific) yielded the following results (ISU-E) to house dust mite allergens: Der p 1, 5.2; Der f 2, 5.2; Der f 1, 1.9; Der f 2, 4.8.

Protein extracts from raw *A sulcata* (RAS) and fried *A sulcata* (FAS) were prepared by homogenization in phosphate-buffered saline, dialyzation, and lyophilization.

The IgE-reactive protein profile of these extracts was analyzed using SDS-PAGE immunoblotting as described by Laemmli [4,5].

Analysis of the RAS extract revealed IgE-binding bands of 45 kDa, 38 kDa, 32 kDa, and 28 kDa; analysis of the FAS extract revealed IgE-binding bands of 69 kDa, 55 kDa, 40 kDa, 37 kDa, and 35 kDa (Figure, I).

In order to study possible cross-reactivity between IgE-reactive proteins from RAS, FAS, *D pteronyssinus, G domesticus*, and *Blattella germanica*, SDS-PAGE immunoblotting-inhibition assay was carried out with FAS extract in the solid phase. Purified tropomyosin from *D pteronyssinus* (Der p 10) and *Penaeus indicus* (Pen i 1) were used in the inhibitory phases.

The RAS extract was able to inhibit binding of total IgE on the FAS extract. However, extracts from *D pteronyssinus, G domesticus, B germanica*, and purified tropomyosin (Der p 10 and Pen i 1) did not produce any kind of inhibition, thus illustrating the lack of serum IgEs that cross-react with proteins from FAS and proteins from these extracts (Figure, II). The difference between the molecular masses of the IgE-binding proteins from RAS and FAS might be due to the frying process, as observed with other seafoods [6].

We report a case of IgE-mediated allergy due to intake of fried *A sulcata*. The allergens most probably involved in the reaction are the IgE-reactive proteins detected in the immunoblotting assay.

The reactions described above were the result of skin contact. These toxic reactions can be local or systemic, involving several organs and causing kidney failure, liver failure, or anaphylactic shock [7-9]. No reactions have been described after *A sulcata* ingestion.

In conclusion, we report the first known case of hypersensitivity due to ingestion of fried *A sulcata*. We detected IgE-binding bands of 69 kDa, 55 kDa, 40 kDa, 37 kDa, and 35 kDa, which may be responsible for this reaction.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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