

# Anaphylaxis Caused by Imported Red Fire Ant Stings in Málaga, Spain

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## ■ Abstract

A 27-year-old woman suffered from anaphylaxis after being stung by *Solenopsis invicta* ants while she was handling wood from South America. The patient reported no previous adverse reactions to stings by other hymenopteran species. Intradermal skin tests with hymenoptera venom (*Vespula vulgaris*, *Polistes* species, *Apis mellifera*) were negative. Serum specific immunoglobulin (Ig) E yielded positive results for *S invicta* (5.28 kU/L) and negative results for *A mellifera*, Ves v 5 and Pol a 5. Immunodetection assays showed the presence of serum IgE against the Sol i 2 allergen. The patient had probably been stung previously although inadvertently by red fire ants while she handled infested wood from South America, and precautionary measures are thus advisable when this material is to be handled. To our knowledge this is the first case of anaphylaxis from red fire ant stings reported in Europe.

**Key words:** Red fire ant venom. Allergens. Anaphylaxis. *Solenopsis invicta*. Hymenoptera. Europe.

## ■ Resumen

Una mujer de 27 años padeció un episodio de anafilaxia después de haber sido picada por hormigas rojas (*Solenopsis invicta*) presentes en maderas procedentes de Sudamérica que estaba manipulando. La paciente no había sufrido anteriormente reacciones alérgicas por picadura de himenópteros. Las pruebas intradérmicas con veneno de *Vespula vulgaris*, *Polistes*, y *Apis mellifera* fueron negativas. La IgE específica a *S invicta* fue positiva (5,28 kU/L) y fue negativa para *Vespula*, *Polistes*, *A. mellifera*, Ves v 5 y Pol a 5. Ensayos de inmunodetección indicaron la presencia de IgE sérica contra el alérgeno Sol i 2. La paciente probablemente había sido picada con anterioridad y de modo inadvertido por hormigas rojas presentes en las maderas que estaba manipulando y, en consecuencia, es importante tomar precauciones en el manejo de estos materiales. Según nuestro conocimiento, este es el primer caso descrito en Europa de anafilaxia por picadura de hormiga roja americana.

**Palabras clave:** Veneno de hormiga roja. Alérgenos. Anafilaxia. *Solenopsis invicta*. Himenópteros

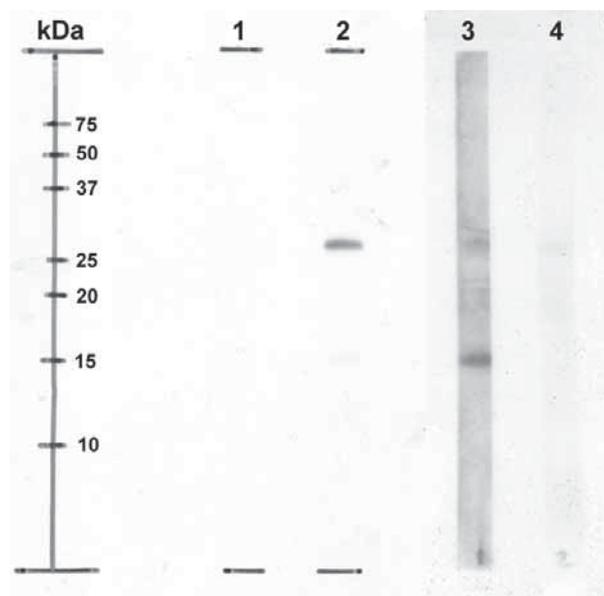
## Introduction

Fire ant allergy is the most frequent cause of hypersensitivity to hymenopterans in the southeastern United States of America (USA), accounting for up to 42% of all cases in endemic areas [1]. Several fire ant species have been described, the most important being *Solenopsis invicta* (red fire ant, predominant), and *Solenopsis richteri* (black fire ant). These ants originated in South America and were introduced into the USA in the early twentieth century. Red fire ant venom is an extremely potent allergy-inducing agent, with 4 allergens identified to date (Sol i 1, Sol i 2, Sol i 3 and

Sol i 4). Sol i 3 is closely related to wasp venom antigen 5 [2,3]. A high rate of sensitization (16%) in populations that have experienced brief exposures (3 weeks) has been observed [4]. Here we report a case of anaphylaxis in a woman who was stung by red fire ants in Málaga, southern Spain.

## Case Description

A 27-year-old woman with no allergic antecedents of note immediately developed symptoms of generalized urticaria and pruritus, dyspnea, general malaise and hypotension after



IgE immunodetection experiment with patient's serum after sodium dodecyl sulfate-polyacrylamide gel electrophoresis of *S invicta* whole body extract, under nonreducing (lanes 1 and 2) and reducing conditions (lanes 3 and 4). Lanes 1 and 4 correspond to serum from a patient with no IgE to *S invicta* extract. The molecular weight (in kDa) of pre-stained markers run in parallel are indicated on the left.

being stung by ants while she was handling wood from South America. She required urgent treatment with adrenaline and systemic corticosteroids and antihistamines, whereupon her symptoms remitted. The patient reported no previous adverse reactions to stings by other hymenopteran species. The ants were subsequently identified as *S invicta* by an expert from ALK-Abelló.

Intradermal skin tests with hymenoptera venom (*Vespula vulgaris*, *Polistes* species, *Apis mellifera*) were negative. No skin tests were performed with red fire ant extract because no extract was available at that time.

Specific immunoglobulin (Ig) E in patient's serum (ImmunoCAP, Phadia, Barcelona, Spain) yielded positive results for *S. invicta* (5.28 kU/L) and negative results for *Vespula* species, *Polistes* species and *A mellifera*. No specific IgE was detected to recombinant antigens 5s from *V vulgaris* and *P annularis* (Ves v 5 and Pol a 5) [5] tested with the ADVIA-Centaur immunoassay system (Bayer Corporation, Tarrytown, NY, USA) [6].

IgE-immunodetection assays (figure) with the patient's serum after sodium dodecyl sulfate-polyacrylamide gel electrophoresis of *S invicta* whole body extract detected an IgE-binding band of approximately 28 kDa under nonreducing conditions, and a band of approximately 14 kDa under reducing conditions. The 28/14 kDa band obtained in the IgE-immunodetection assays probably represented the Sol i 2 allergen, a homodimer consisting of two 119-amino acid subunits linked by a single disulfide bridge [3].

## Discussion

Many cases of systemic reaction from fire ant stings have been reported in the USA, some with fatal outcomes [7]. Our patient had an episode of severe anaphylaxis after being stung by *S invicta* ants while she was handling wood from South America. In vitro studies demonstrated that the patient was sensitized to the Sol i 2 allergen. No adverse reactions to other hymenopteran species were reported, and no specific IgE was found to other hymenopterans tested or to wasp venom antigen 5s from either *V vulgaris* or *P annularis*. The patient had probably been stung previously but inadvertently by red fire ants while she handled infested wood from South America, and precautionary measures are thus advisable when this material is to be handled. The woman is currently receiving immunotherapy with fire ant whole body extract. To our knowledge this is the first case of anaphylaxis from red fire ant stings reported in Europe.

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