

EDITORIAL

Dermatophagoides siboney and *Blomia tropicalis* — dust mites of subtropical and tropical areas

The interest in mites as possible causes of allergic disorders has been confined to the past three decades. It was not until 1964 that mites belonging to the genus *Dermatophagoides* were shown by Voorhorst *et al.* [1] to be the major source of allergen in house dust. Dust mites are found worldwide, so millions of individuals are exposed. Members of the Pyroglyphidae family *Dermatophagoides pteronyssinus*, *Dermatophagoides farinae* and *Euroglyphus maynei* dominate the mite fauna of house dust. However, non-pyroglyphid mites (*Blomia tropicalis*, *Lepidoglyphus destructor*, *Acarus siro*, *Tyrophagus putrescentiae*), most of which are common in farming environments [2] may also be a part of the house dust fauna. *D. pteronyssinus* was earlier believed to be the predominant mite species in Europe, but a comprehensive survey of the prevalence of dust mites in the United States showed that the most common species there were *D. pteronyssinus* along with *D. farinae*, *E. maynei* and *B. tropicalis* [3]. *E. maynei* is common in homes in Europe where it can be the most abundant species [4,5]. *Blomia tropicalis*, which belongs to the Glycyphagidae family, is a common component of house dust in subtropical and tropical climates [6,7]. In South America *B. tropicalis* was found in 96% of dust samples and contributed 40% of the total mite population [8].

In this issue of the journal, Ferrándiz *et al.* discuss a less known mite species of the genus *Dermatophagoides*, namely *Dermatophagoides siboney* [9]. This species has been found in the Caribbean [10] and in Cuba [11] where it may constitute up to 40% of the total dust mite fauna. *D. siboney* is closely related to *D. farinae* and *D. microceras*, but is smaller [11].

Epidemiological studies have demonstrated that IgE antibodies to dust mites constitute a major risk factor for asthma [12,13]. However, the clinical importance of *D. siboney* has yet to be established. Ferrándiz *et al.* used 35 sera from adult Cuban asthmatic patients who showed symptoms of possible house dust mite allergy. The fact that all subjects were skin-prick test positive to *D. siboney* indicates that *D. siboney* could be a common cause of IgE-mediated sensitization [9]. In addition, these patients were also sensitized to *D. pteronyssinus*, *D. farinae*, *B. tropicalis*, *A. siro* and *L. destructor*. Whether the multiple sensitization depends on the presence of the various mite species in house dust remains uncertain.

B. tropicalis is a common allergen in subtropical and

tropical areas. Among 20 asthmatic children from Sao Paulo, Brazil, 65% had IgE antibodies against *B. tropicalis* [14], and 85.5% of atopic patients from Colombia were RAST positive to *B. tropicalis* [15]. However, they were all sensitized to *D. pteronyssinus* and/or *D. farinae*. Recently, Stanaland *et al.* reported a high prevalence (38%) of skin-test reactivity to *B. tropicalis* in 167 subjects from Tampa, Florida [16]. As in the former studies the majority of individuals were in addition sensitized to *Dermatophagoides* spp.

The major allergens of *Dermatophagoides* spp. have been studied in detail with both physicochemical and recombinant technology. The group VII allergens are a catalogue of enzymes [reviewed in 17 & 18]. A new major allergen of *Dermatophagoides* shows strong homology with glutathione S-transferase [19]. Ferrándiz *et al.* have characterized *D. siboney* with western blotting and autoradiography, and they report 13 IgE binding components with molecular weights between 14 and 95 kDa [9]. Two of these components, 25 and 14 kDa, are major allergens, as they were identified by 80 and 91% of the patients, respectively. Ferrándiz *et al.* also observed that more than 30% of the tested sera reacted with a 30 kDa protein which they speculate might belong to the group III allergens. Furthermore, five of the sera showed IgE-binding to the 14 kDa protein and not to the 25 kDa component. For the purification of the two components they employed affinity chromatography using cross-reacting monoclonal antibodies to group I and group II allergens and obtained purified preparations of the 25 and 14 kDa proteins with which the majority of the human sera react. The allergens were named Der s 1 and Der s 2. Based on these results it is likely that the number of crossreacting allergens and the levels of homology between the group I of *D. siboney* and those of *D. pteronyssinus*, *D. farinae* and of *E. maynei*, and between the group II allergens of the three *Dermatophagoides* species will be high. Earlier studies have demonstrated a high level of homology among the group I and group II allergens of *Dermatophagoides* spp. [13]. The group I allergens of *Euroglyphus*, *Eur m I*, show high amino-acid-sequence homology with both *Der p I* and *Der f I* [20]. Molecular studies of the *D. siboney* allergens will provide information on the degree of homology.

Regarding the allergenic characterization of *B. tropicalis*, Arlian *et al.* recently reported 21 different

IgE-binding antigens, using crossed radioimmuno-electrophoresis [21]. With sodium dodecyl-polyacrylamide gel electrophoresis (SDS-PAGE) and immuno-blotting, about 25 IgE-binding components between 11 and 85 kDa have been shown [22]. The most frequently detected allergens were the 11–13 kDa, 33 kDa, 36 kDa and 64 kDa, of which the 11–13 kDa was identified by more than 50% of the patient sera. The *B. tropicalis* allergen, *Blot 5*, has been cloned [23] and shows about 40% homology to *Der p V*, a 14 kDa allergen of *D. pteronyssinus* [18]. A new *B. tropicalis* allergen has been cloned which shows no homology to known proteins [24].

An important clinical issue is whether the dual immune response to pyroglyphid and non-pyroglyphid mites depends on multiple sensitization to unique species or to crossreacting allergens. The fact that all subjects, in the study by Ferrándiz *et al.* [9], were skin-prick-test positive to *D. siboney* as well as to *D. pteronyssinus*, *D. farinae*, *B. tropicalis*, *A. siro* and *L. destructor* could be explained by a varying degree of crossreactivity between the different mite species. As regards *Blomia* we have used radioallergosorbent test (RAST) inhibition technique, in a study regarding the immune response to *B. kulagini* and to *D. pteronyssinus* in Sweden and Brazil, to demonstrate that both *B. kulagini* and *D. pteronyssinus* possess their own unique allergens as well as allergens in common [25]. *Blomia kulagini*, which belongs to the genus *Blomia*, is a common cause of sensitization among urban people in Sao Paulo, Brazil [25]. A limited-to-moderate degree of crossreactivity has been found between *B. tropicalis* and *D. pteronyssinus* and *D. farinae* [15,16,21]. Immunoabsorption studies show that the majority of IgE antibodies to *B. tropicalis* (64%) are to species-specific allergens, while 36% are crossreactive with *D. pteronyssinus* [14]. Stanaland *et al.* found in their study of sensitization to *B. tropicalis* that some individuals were skin-prick-test positive to *B. tropicalis* (2%), *D. pteronyssinus* (3%) and *D. farinae* (2%) only [16], which underlines that *B. tropicalis* as well as *Dermatophagoides* contain unique allergens. Furthermore, undetectable or very low levels of the group I and group II allergens of the *Dermatophagoides* spp. have been found in two different *B. tropicalis* extracts, indicating that the crossreactivity is associated with other allergens [14]. Thus, it seems likely that *D. siboney* crossreacts with *B. tropicalis*, but to a lesser extent than with *D. farinae* and *D. pteronyssinus*.

The importance of IgE-mediated sensitization to *D. siboney* as a risk factor for allergic disease remains to be ascertained. Studies regarding mite fauna and the prevalence of IgE-mediated sensitization should also focus on *D. siboney* in addition to other mite species. If *D. pteronyssinus* or *D. farinae* is the most prevalent

sensitizer in the population studied it could be difficult to detect IgE to *D. siboney*-unique allergen(s). The article by Ferrándiz *et al.* shows that *D. siboney* should not be overlooked as the causative allergen when investigating subjects, from subtropical climates, with suspected allergy to house dust. Future studies need to establish whether this also applies in other regions. The relatedness of crossreacting allergens of *D. siboney* and other mites, both pyroglyphid and non-pyroglyphid, will not be known until molecular studies have been completed.

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