



ORIGINAL ARTICLE

## Respiratory allergy to moth: the importance of sensitization to *Bombyx mori* in children with asthma and rhinitis<sup>☆,☆☆</sup>

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### KEYWORDS

Sensitization;  
Moth;  
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### Abstract

**Objective:** this study aimed to prepare a silkworm moth (*Bombyx mori*) antigenic extract and to perform skin prick tests with this extract in patients with allergic respiratory diseases; to evaluate serum specific immunoglobulin E (IgE) to *Bombyx mori* using ImmunoCAP® system and to report the frequency of positivity between the two methods and with clinical data.

**Methods:** this was a cross-sectional study with 99 children and adolescents diagnosed with asthma and/or allergic rhinitis, who had skin reactivity to at least one of the six aeroallergens tested. Clinical data were evaluated: skin prick tests with *Bombyx mori* in-house extract, and total and specific IgE analysis using ImmunoCAP® were performed.

**Results:** the frequency of *Bombyx mori* specific IgE was found to be 52.5% and 60% using the skin prick test and ImmunoCAP®, respectively. An association between a positive skin test for *Bombyx mori* and the presence of allergic rhinitis, atopic dermatitis, and urticaria was observed, but the same was not true for asthma or allergic conjunctivitis. There was no relation with the severity of asthma or rhinitis symptoms.

**Conclusions:** a high frequency of sensitization to *Bombyx mori* was observed in a selected population of patients with respiratory allergic diseases in the city of Curitiba, state of Paraná, Brazil. The extract prepared from the wings of this moth species is effective in demonstrating this sensitivity.

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<sup>☆☆</sup> Study conducted at Allergy and Pediatric Immunology Service, Hospital de Clínicas, Universidade Federal do Paraná.

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**PALAVRAS-CHAVE**

Sensibilização;  
Mariposa;  
Asma;  
Rinite

**Alergia respiratória à mariposa: importância da sensibilização à *Bombyx mori* em crianças com asma e rinite****Resumo**

**Objetivo:** Preparar extrato antigênico da mariposa do bicho-da-seda (*Bombyx mori*) e realizar testes cutâneos com esse extrato em pacientes com doenças respiratórias alérgicas, avaliar IgE sérica específica para *Bombyx mori* usando o sistema ImmunoCAP® e relatar a frequência de positividade entre os dois métodos e com dados clínicos.

**Métodos:** Estudo transversal com 99 crianças e adolescentes com diagnóstico de asma e/ou rinite alérgica, que apresentaram reação cutânea a pelo menos um dos seis aeroalérgenos testados. Os dados clínicos foram avaliados; testes cutâneos com extrato de *Bombyx mori* e análise de IgE total e específica por ImmunoCAP® foram realizados.

**Resultados:** A frequência de IgE específica para *Bombyx mori* foi de 52,5% e 60%, respectivamente, pelo teste cutâneo e ImmunoCAP®. Foi observada uma associação entre o teste cutâneo positivo para *Bombyx mori* e a presença de rinite alérgica, dermatite atópica e urticária, mas o mesmo não ocorreu para a asma ou conjuntivite alérgica. Não houve relação com a gravidade dos sintomas de asma ou rinite.

**Conclusões:** Alta frequência de sensibilização à *Bombyx mori* foi encontrada em uma população selecionada de pacientes com doenças alérgicas respiratórias na cidade de Curitiba, estado do Paraná, Brasil. O extrato preparado a partir das asas dessa espécie de mariposa é eficaz em demonstrar essa sensibilidade.

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**Introduction**

Sensitization to inhalant allergens is a risk factor for the development of allergic diseases such as asthma and rhinitis. Knowledge about sensitizing allergens and their degree of exposure in different environments is essential for the diagnosis and treatment of allergic respiratory diseases. *Dermatophagoides pteronyssinus* and *Blomia tropicalis* mites are the main sensitizers for patients diagnosed with asthma and allergic rhinitis.<sup>1,2</sup>

The participation of insects in allergic respiratory reactions has been discussed for decades.<sup>3</sup> The most extensively studied insect has been the cockroach, whose domestic infestation is a cause of asthma and is considered to be a public health issue.<sup>4</sup> There have been descriptions of asthma and rhinitis triggered by species of flies and mosquitoes such as the mayfly and the caddis fly.<sup>5,6</sup> A study conducted with asthmatic patients in the city of São Paulo, Brazil, evidenced positive skin prick test (SPT) with mosquito extract in 32.5% of cases, and positive SPT with moth extract in 65% of cases.<sup>7</sup>

There have been several reports of individuals who, during the process of silk production, developed respiratory allergic diseases. While caring for silkworm cocoons, workers are exposed directly to their inhalant antigens, present from the selection to the hatching of cocoons, when there is contact with dust from the moths' wings.<sup>8</sup> These allergens can trigger asthma,<sup>9</sup> rhinitis, and conjunctivitis symptoms.<sup>10</sup>

The silkworm moth has cross-reactivity with other species of moths and butterflies; it has been shown that patients with respiratory allergic diseases can develop symptoms from environmental exposure to their allergens.<sup>11,12</sup> Concentrations of moth antigens verified by radioimmunoassay in samples of dust in the external environment (not

home) for a period of three years were high and at levels comparable to those of pollen.

Skin tests with moth extract in allergic patients had 45% reactivity in this population.<sup>13</sup> In 1997, allergy skin tests in atopic children in the city of Curitiba, state of Paraná, Brazil, detected 38.4% of positivity to moth extract (1:20 *Heterocera* weight/volume), the second most frequent after the *Dermatophagoides pteronyssinus* mite (97.5%). It was suggested that the high rate of sensitization to moth required a better evaluation of its clinical relevance.<sup>14</sup>

The aim of this study was to determine the sensitivity to *Bombyx mori* by SPT using silkworm moth wing antigens and specific serum immunoglobulin E (IgE) in children diagnosed with asthma and/or allergic rhinitis.

**Methods**

This was a cross-sectional study with non-probabilistic sampling of 99 children and adolescents of both genders with a diagnosis of asthma and/or allergic rhinitis treated at the outpatient allergy clinic of Allergy and Pediatric Immunology Service, Hospital de Clínicas, Universidade Federal do Paraná, with positive SPT for at least one of the following antigens: *Dermatophagoides pteronyssinus*, *Blomia tropicalis*, *Blattella germanica*, *Lolium multiflorum*, dog epithelium, or cat epithelium.

The diagnosis and classification of respiratory allergic diseases (asthma and rhinitis) followed the recommendations of the Global Initiative for Asthma (GINA)<sup>15</sup> and Allergic Rhinitis and its Impact on Asthma (ARIA),<sup>16</sup> respectively.

The allergen extract of *Bombyx mori* was prepared from the wings of this species using the following method: the material from the insect was macerated with a pestle in a ceramic mortar and the content was degreased with ethyl

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