Allergen Levels in Airborne and Surface Dust

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Key Words
House dust mite
Der p I
Der p II
Aero-allergen sampling

Introduction
The house dust mite Dermatophagoidespteronyssinus is widely present in the home. It has been implicated in the provocation of asthma attacks in atopic subjects. The faecal pellets produced by the mite contain one of the major mite allergens Derp I. These faecal particles may be inhaled by the patient, and environmental sampling should indicate the quantity.

Although sampling of surfaces within the home gives results related to the presence of allergen in the air, no study has established the nature of the relationship between surface and air mite allergen.

Material and Methods
Air samples were collected from the bedrooms of 62 asthmatic children. Dust was collected from the mattress, duvet and carpet using a Hoover dustette vacuum cleaner for 2 min within a 0.25-m2 template and from pillows for 30 s within a 0.06-m2 template [1]. A Casella air sampler was clipped to the pillow 12 in from the sleeping child’s head. It was switched on before the child went to bed and switched off after rising, each night for a 2-week period, to produce a cumulative sample. Forty-five air samples were collected and the results were expressed as nanograms per cubic metre of air.

Petri dishes (8.5 cm diameter) were pretreated with 2% teleostean gelatine; one was exposed at floor level and one at about pillow height for 2 weeks [2]. Sixty-one data sets were collected. Data are presented as nanograms per day. Dust specimens were extracted with PBS/Tween/BSA. Derp I, Derp II and Feldl were measured using a two-site monoclonal antibody ELISA assay [3]. Spearman’s correlation coefficient and other non-parametric tests were used for statistical analysis.

Results
Forty percent of air samplers collected Derp I, 5% collected Derp II. In contrast 85% of the Petri dishes collected Derp I and 76% Derp II. The median allergen measurements are presented in
Table 1 and correlations between airborne and surface sampling are presented in Table 2. Plots of Derp I carpet surface content versus air sampling is presented in Figure 1. As there was no significant difference between upper and lower Petri dishes for any of the three allergens, their scores have been added to give a total Petri dish score. Almost all homes without cats had no Fel d I aero-allergen. Therefore only Fel d I results for houses with cats are presented (5 air samplers and 7 Petri dish sets).

Fig. 1. Correlation of surface carpet Derp I versus Petri dish Derp I.

Table 1. Allergen in air samplers and petri dishes

<table>
<thead>
<tr>
<th>Allergen n</th>
<th>Correlation coefficient</th>
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<tr>
<td>!p &lt; 0.0001</td>
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<tr>
<td>*p &lt; 0.05; **p &lt; 0.01; ***p &lt; 0.001</td>
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Acknowledgement

We gratefully acknowledge the support of the Wellcome Trust

References