

Cat removal and *Fel d I* levels in mattresses

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Fel d I allergen has been detected in house dust vacuumed from carpets^{1,2} and mattresses.³ After cat removal, a slow decrease in *Fel d I* levels has been observed on carpets,¹ but this finding has never been monitored on mattresses, despite the fact that upper respiratory airways are in intimate contact with the mattress for 8 hours a day. Previous studies⁴ suggest that cats often remain long periods on beds, and that this can be a major triggering factor in families with asthma. In this study, our goal was first, to evaluate the presence of *Fel d I* allergen in a large number of house-dust samples from mattresses, and second, to compare *Fel d I* levels from mattresses in houses where cats were living, had been removed, or had never lived.

One hundred thirty-six dust samples were collected from mattresses (after removal of all bed clothes) with a vacuum cleaner (2 min/m²) and stored at 4° C until processing. Eighty-one samples were from the beds of subjects with asthma receiving treatment at the allergy clinic of our hospital, and 55 samples were from adults recruited in a health care center. All subjects answered a standardized questionnaire about the presence or absence of a cat at home, the duration of its presence or absence, and whether the cat stayed indoors or outdoors.

A two-site monoclonal antibody-based ELISA was adapted from the ELISA described for the assay of major mite allergens.⁵ *Fel d I*-specific monoclonal antibodies were provided by M. D. Chapman and T. A. E. Platts-Mills (Charlottesville, Va.). Two dilutions of each sample were assayed (usually 1/3 and 1/30), and each dilution was assayed twice. The final result was the mean of the two wells at the same

dilution and of the two dilutions. The lowest allergen concentration detected was about 0.5 mU/ml or 2.5 ng/ml, corresponding to 0.05 µg of *Fel d I* per gram of dust. ELISA results were transformed into decimal logarithms to obtain normalized (gaussian) distributions of the values in each group before comparing their means. Differences between group means were evaluated by analysis of variance. Two-by-two comparisons were performed with Scheffé's method. To present more meaningful results, geometric mean values were retransformed into arithmetic mean values.

Fel d I was detectable in 132 of 136 samples (97%). Houses without *Fel d I* were thus scarce. It has been hypothesized that allergenic particles could be brought into homes either by contact with animals outside the house or through the building ventilation system. *Fel d I* allergen could also be residual from the previous presence of cats.

The current or past presence of a cat in the home greatly influenced *Fel d I* levels in mattresses (Fig. 1). The geometric mean *Fel d I* levels were significantly ($p < 0.03$) higher (21.9 µg/gm of dust) in homes with a cat than in homes after cat removal (5.2 µg/gm of dust). Mean *Fel d I* levels were also significantly ($p < 0.002$) higher than in homes after cat removal than in homes in which a cat had never been kept (1.4 µg/gm of dust). In homes ($n = 9$) in which a cat had been removed for less than 5 years, mean *Fel d I* level was higher (14.0 µg/gm of dust) than in homes ($n = 12$) in which the cat had been removed for more than 5 years (3.1 µg/gm of dust; $p < 0.02$). Wood et al.¹ also monitored *Fel d I* levels in carpets after cat removal and concluded that 20 weeks after removal, only half the homes had antigenic levels comparable to levels found in control homes that had never kept cats. However, in two of these houses, aggressive environmental control measures, that is, removal of carpets and furniture, had been undertaken. In our study, *Fel d I* levels in mattresses remained high for a much longer period. This finding suggests that mattresses are long-lasting *Fel d I* reservoirs. Thus, the possible clinical benefit of cat re-

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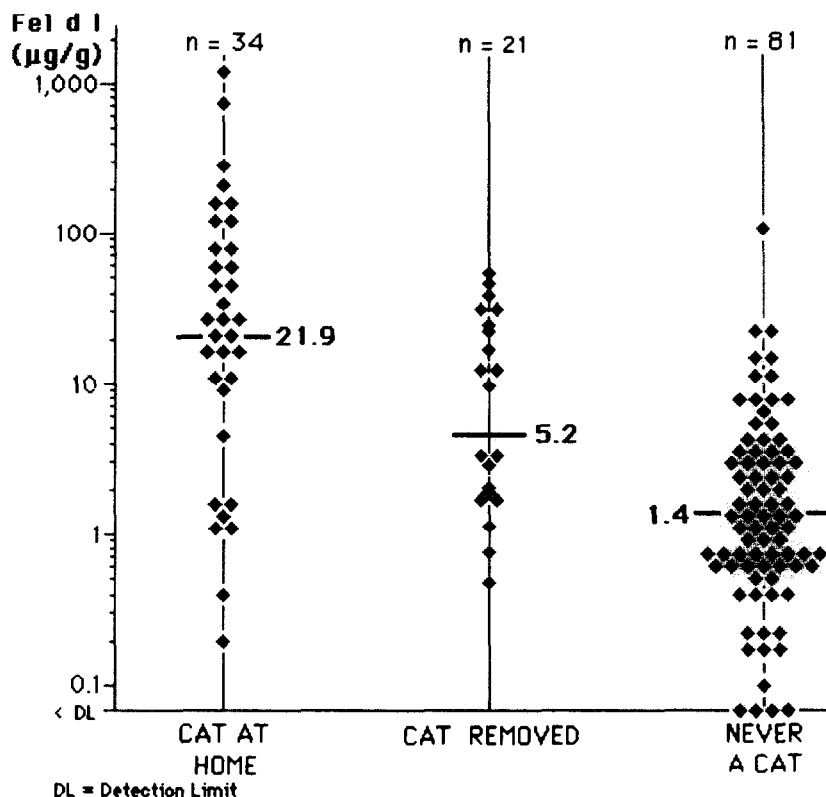


FIG. 1. Individual *Fel d I* level in mattresses from subjects currently, formerly, and never keeping a cat at home. Each measurement is represented as a single dot. The horizontal bars indicate the geometric *Fel d I* mean level expressed in arithmetic units in each group.

removal from a cat-sensitive subject's home might be delayed unless adequate environmental control measures are undertaken, including changing the mattress.

REFERENCES

1. Wood RA, Chapman MD, Adkinson NF Jr, Eggleston PA. The effect of cat removal on allergen content in household-dust samples. *J ALLERGY CLIN IMMUNOL* 1989;83:730-4.
2. Ohman JL Jr, Lorusso JR, Lewis S. Cat allergen content of commercial house dust extracts: comparison with dust extracts from cat-containing environment. *J ALLERGY CLIN IMMUNOL* 1987;79:955-9.
3. Swanson MC, Campbell AR, Klauck MJ, Reed CE. Correlation between levels of mite and cat allergens in settled and airborne dust. *J ALLERGY CLIN IMMUNOL* 1989;83:776-83.
4. Murray AB, Ferguson AC, Morrison BJ. The frequency and severity of cat allergy vs dog allergy in atopic children. *J ALLERGY CLIN IMMUNOL* 1983;72:145-9.
5. Chapman MD, Aalberse RC, Brown MJ, Platts-Mills JAE. Monoclonal antibodies to the major feline allergen, *Fel d I*. II. Single-step affinity purification of *Fel d I* N-terminal sequence analysis and development of a sensitive two-site immunoassay to assess *Fel d I* exposure. *J Immunol* 1988;140:812-8.

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