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Endotoxin from synthetic and feather pillows

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To the Editor:

A number of studies have shown that the quantities of dog, cat, and house dust mite (HDM) allergens recovered from synthetic pillows are significantly greater than the quantities recovered from feather pillows.¹⁻³ This might be of relevance to atopic asthmatic patients because of the proximity of a pillow to the airway during sleep, inasmuch as asthma severity has been demonstrated to be associated with upper bedding HDM allergen levels.⁴ Exposure to endotoxin, a pro-inflammatory component of the cell wall of gram-negative bacteria, is a determinant of asthma severity in HDM-sensitized patients.⁵ We therefore measured endotoxin recovered from synthetic and feather pillows.

We asked staff members of our institution whether they had had both synthetic and feather pillows on the same bed for a period of more than 3 months. Eight pairs, each pair consisting of a synthetic and a feather pillow from the same bed, were studied. Dust samples were obtained by vacuuming each side of the pillow for 1 minute with a Hitachi 1100-W vacuum cleaner. Collected dust was stored at -20°C until analysis. The dust samples were extracted (0.2 g in 5.0 mL) with pyrogen-free water containing 0.05% Tween-20 and rocked for 1 hour before centrifugation for 15 minutes at 2000 *g*. The extracts were

stored at -20°C before analysis for endotoxin through use of the kinetic chromogenic BioWhittaker LAL kit in a single analytical batch.⁶ Because of the non- Gaussian distribution of the results, endotoxin units were log-transformed and expressed as geometric means with 95% CIs. Results from synthetic and feather pillows were compared through use of a paired t test, a P value of $<.05$ being deemed significant.

There was no significant difference in endotoxin levels, expressed either in terms of endotoxin units per gram of dust ($P = .31$) or per pillow ($P = .69$). Results are presented in Table I ■.

Table I. Geometric mean endotoxin levels (95% CI) in pillows

Pillow type	EU/g	EU/pillow
Synthetic	23,158 (14,976-35,809)	1,585 (846-2,970)
Feather	35,269 (17,057-74,442)	1,403 (671-2,934)
Synthetic:feather ratio	0.78 (0.54-1.15)	1.05 (0.93-1.20)

EU, Endotoxin units.

Mean dust weights were not significantly different between synthetic pillows (71.9 mg; 95% CI, 54.1-89.2) and feather pillows (60.6 mg; 95% CI, 8.2-113.0). There was a modest though statistically nonsignificant—most likely because of the small sample size ($n = 8$)—correlation for log-transformed endotoxin units per pillow between synthetic and feather pillows ($r = 0.48$; $P = .23$), suggesting that endotoxin levels are consistent within beds, irrespective of the sampled source.

This study has shown that in contrast to what is seen with environmental indoor allergens, there do not appear to be large differences in endotoxin levels between synthetic and feather pillows. Many cross-sectional studies and 1 longitudinal study have consistently shown that the type of upper bedding material plays a significant role in atopic disease.⁷

Reasons for this could relate to the reported differences in allergen levels¹⁻³ or to differences in endotoxin levels. However, the results of our study do not suggest large differences in endotoxin exposure related to pillow type. Although endotoxin levels, expressed in EU/g, were higher in feather pillows, they were less than 2- fold higher; in contrast, Der p 1, Fel d 1 and Can f 1 concentrations were 7- to 8- fold higher in synthetic pillows.¹⁻³

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Journal of Allergy and Clinical Immunology, The
December 2004 • Volume 114 • Number 6

Anna Sidorchuk, Magnus Wickman, Göran Pershagen, Frédéric Lagarde, Annika Linde

ABSTRACT

FULL TEXT

Clothing—Potentially a Significant Source of Endotoxin Exposure

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Hae-Seon Nam, MD, PhD^{a,b}, Julian Crane, FRACP^a, Robert Siebers, FNZIMLS, FNZICA^a

FULL TEXT

No difference in type 1 T-cell immune responses to human cytomegalovirus antigens between atopic children and nonatopic children

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