in cytokine response in the probiotic treatment group was independent of the development of allergy.

CONCLUSIONS. Infants given the probiotic supplement *L. reuteri* have decreased allergen responsiveness and possibly greater capacity for immunoregulation during infancy.

REVIEWER COMMENTS. There is growing interest in the use of probiotic supplementation to prevent or modulate atopic disease. The authors had previously shown that prenatal and postnatal probiotic supplementation with *L. reuteri* reduced both allergic sensitization and prevalence of IgE-associated atopic dermatitis at 2 years of age. This study further demonstrated a general reduction in production of both T helper cells 1 and 2 cytokines in the subjects treated with *Lactobacillus*, prompting the authors to suggest a possible mechanism for their previous findings. A weaknesses of this study is the failure to correlate allergen and mitogen cytokine responses with probiotic treatment and clinical outcomes in this patient group. In addition, the study cannot account for the variation in size or timing of exposures to eggs, birch, or cat that certainly affects the likelihood of sensitization and peripheral mononuclear cell responsiveness. Various effects on the immune system have been demonstrated after probiotic treatment; this study would seem to add support for the immunomodulating effect of *Lactobacillus* supplementation in pregnancy and early childhood, although more research is needed to elucidate the mechanisms involved.


James J. Tschudy, MD
Mountain Home, ID
Stephen E. Scranton, MD
Davis, CA

ALLERGENS AND ENVIRONMENTAL EXPOSURES

**Can f 1 Levels in Hair and Homes of Different Dog Breeds: Lack of Evidence to Describe Any Dog Breed as Hypoallergenic**


PURPOSE OF THE STUDY. To compare levels of, and determine the relationships between, the major dog allergen (Can f 1) from the hair and coat of various breeds of dogs and in the homes in which the dogs live.

STUDY POPULATION. A total of 356 dogs (Labradoodles, Labrador retrievers, poodles, Spanish waterdogs, airedales, and a heterogeneous control group) were recruited from breeders, breeder associations, and a veterinary hospital in the Netherlands. In addition, 168 homes with 1 dog had floor and airborne dust samples collected and a survey of their 502 owners was conducted.

METHODS. Dog hair was collected by clipping the coat. Coat samples were collected by vacuuming one side of the dog for 30 seconds. Floor samples were collected by vacuuming for 2 minutes and passive airborne dust was sampled by using an electrostatic dust collector. Can f 1 levels in each sample were measured. For some analyses, Labrador retrievers and the control dogs were grouped as “nonhypoallergenic” and the other breeds grouped as “hypoallergenic.”

RESULTS. Hair samples were obtained from 151 dogs. The vacuumed coat and the hair of so-called “hypoallergenic” dogs had significantly more Can f 1 as compared with the nonhypoallergenic dogs (geometric mean: coat: 27.04 vs 0.12.98 μg/g; hair: 2.26 vs 0.77 μg/g; P < .001 for both). Airedales had the highest level of Can f 1 from the coat without differences between other breeds. There were significant differences between breeds in the Can f 1 level of hair (lowest: Labrador retrievers, highest: poodles) and high variability among dogs of the same breed in levels of both the coat and hair. Sixty-two percent of the “hypoallergenic” dogs were selected for that marketed reputation. Can f 1 levels from rugs/ carpets were higher than from smooth floors. Can f 1 levels in settled floor dust and in sampled air did not differ between homes with hypoallergenic and nonhypoallergenic dogs, although floor dust levels were lowest in homes with Labradoodles; however, there were no breed-to-breed differences in sampled air.

CONCLUSIONS. So-called “hypoallergenic” dogs had higher Can f 1 levels in hair and coat samples than did control breeds. There was no difference in Can f 1 levels in homes between types of dogs. There is no evidence to classify certain dog breeds as hypoallergenic.

REVIEWER COMMENTS. To paraphrase Shakespeare, “A dog by any other name...is still a dog.” At this time, there is no evidence to recommend one breed over another to dog-allergic patients. Nonetheless, patients frequently claim they do worse with one breed than another. We are not aware that a definitive study has been done, for example by evaluating for immune responses to any genetic polymorphisms in Can f 1 between breeds or evaluating allergen extracts from the dander of various breeds.

**Allergens in Urban Schools and Homes of Children With Asthma**


PURPOSE OF THE STUDY. To compare school allergen exposure to home allergen exposure in a cohort of children with asthma.
STUDY POPULATION. Twelve public elementary schools from an urban metropolitan area in the northeastern United States were included. Children with asthma attending these schools were then recruited for participation in the study.

METHODS. Settled dust and airborne samples from 12 schools were analyzed for indoor allergens using multiplex array technology. School samples were linked to students with asthma enrolled in the School Inner-City Asthma Study, and settled dust samples from these students’ homes were analyzed similarly for indoor allergens.

RESULTS. Two hundred twenty-seven settled dust samples and 117 airborne dust samples were collected from schools. Settled dust samples (n = 118) were collected from homes. There were higher levels of dog, cat, and mouse allergens in settled dust samples from school compared with homes (545% higher for mouse, P = .001; 198% higher for cat, P = .0033; 144% higher for dog, P = .0008). However, on average, for both schools and homes, the levels of dog and cat allergens were much lower than those found in households with pets (geometric means: *Canis familiaris* allergen 1 0.08 vs 0.03 μg/g; *Felis domesticus* allergen 1 0.19 vs 0.06 μg/g). Airborne and settled dust mouse allergen levels in classrooms were moderately correlated (r = 0.48, P < .0001). In general, dust mite levels were low in both home and school samples but were higher in the home samples (geometric means: *Dermatophagooides farinae* allergen 1 allergen 0.08 vs 0.04 μg/g; *Dermatophagooides pteronyssinus* allergen 0.02 vs 0.01 μg/g). For cockroach allergen, there was no difference between school and home samples, and the levels were almost undetectable in both locations.

CONCLUSIONS. There were higher levels of mouse, cat, and dog settled dust allergen levels in schools versus homes of asthmatic students from an urban metropolitan area. Cockroach and dust mite allergens were present at undetectable to low levels across sites. Mouse allergen levels were highest overall, and aerosolization of mouse allergen in classrooms may be a significant exposure for students because levels of mouse allergen were correlated in settled dust and airborne samples from classrooms.

REVIEWER COMMENTS. This is the first study to compare indoor allergen levels in schools versus homes of children with asthma. Most studies of indoor allergen exposures focus on the home environment, particularly the bedroom because this is considered to be the main site of allergen exposure, especially during sleep. This study demonstrates that school may be another important site of exposure to indoor allergens, particularly mouse allergen. Mouse allergen has been implicated as a contributor to asthma morbidity in school-age children in other studies. Additional studies are needed to better understand the role of school allergen exposures on asthma morbidity among children with asthma.

Persisting Pollen Exposure During Infancy Is Associated With Increased Risk of Subsequent Childhood Asthma and Hayfever


PURPOSE OF THE STUDY. To determine if exposure to higher concentrations of pollen within the first 3 to 6 months of life increases the risk of eczema, sensitization to food or aeroallergens at 2 years old, and asthma or hayfever at 6 to 7 years old.

STUDY POPULATION. The study used the Melbourne Atopy Cohort Study, a longitudinal birth cohort study, comprising 620 participants who were enrolled before birth. Children were born between 1990 and 1994 and had a family history of allergic disease in at least 1 first-degree relative.

METHODS. Researchers identified those born “inside” or “outside” pollen season (defined as September to January in Melbourne) and used daily pollen counts to calculate cumulative pollen exposure in the first 6 months of each child’s life. Using logistical regression models, they examined the cohort at 2 years old for associations of pollen exposure with eczema or allergic sensitization (skin prick test >3 mm to at least 1 of the following: cow’s milk, egg white, peanut, house dust mite, rye grass, and cat dander) and again at 6 to 7 years for diagnoses of asthma or hayfever.

RESULTS. At age 2 years, birth during pollen season was not associated with eczema or sensitization to food or aeroallergens; however, cumulative exposure to pollen at 6 months was associated with aeroallergen sensitization with the highest risk being at 3 months (adjusted odds ratio [aOR] = 1.34, 95% confidence interval [CI] 1.06–1.72, P < .05). At 6 to 7 years old, cumulative pollen exposure at 3 months was associated with hayfever (aOR = 1.14, 95% CI 1.009–1.29, P < .05), and exposure at 4 to 6 months was associated with asthma only (aOR = 1.35, 95% CI 1.07–1.72, P < .05). Cumulative exposure at 6 months increased odds of hayfever, asthma, and both hayfever and asthma (P < .05).

CONCLUSIONS. Persistent exposure to pollen in infancy appears to increase risk of developing asthma and hayfever later in life.

REVIEWER COMMENTS. This study is the first to show an association between early continuous pollen exposure and subsequent development of asthma and hayfever later in childhood. Interestingly, children without family history of asthma were also noted to have an increased risk of allergic disease if born inside pollen season. Given
Allergens in Urban Schools and Homes of Children With Asthma
Sharon K. Ahluwalia and Elizabeth C. Matsui
Pediatrics 2013;132;S12
DOI: 10.1542/peds.2013-2294R
Allergens in Urban Schools and Homes of Children With Asthma
Sharon K. Ahluwalia and Elizabeth C. Matsui
Pediatrics 2013;132:S12
DOI: 10.1542/peds.2013-2294R

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/132/Supplement_1/S12.2