foods may affect allergic outcomes for a variety of reasons.

Prenatal and Postnatal Probiotics Reduces Maternal but Not Childhood Allergic Diseases: A Randomized, Double-Blind, Placebo-Controlled Trial

PURPOSE OF THE STUDY. To evaluate the prevalence of allergen sensitization and development of allergic diseases in high-risk infants following prenatal and postnatal probiotic supplementation.

STUDY POPULATION. The study population included 191 pregnant women with atopic diseases determined by history, total immunoglobulin E (IgE) concentration >100 kU/L, and/or positive specific IgE concentration >0.7 kU/L for at least 1 of the following: *Dermatophagoides pteronyssinus,* cockroach, egg white, milk protein, shrimp, or peanut.

METHODS. Pregnant mothers were assigned to receive *Lactobacillus* GG (LGG) or placebo, daily, from 24 weeks’ gestation until delivery. After delivery, breastfeeding mothers and non-breastfeeding infants received LGG for 6 months. Questionnaires regarding allergic symptoms, total IgE levels, and allergen-specific IgE levels were obtained in mothers at enrollment and delivery. Clinical assessments, total IgE levels, and allergen-specific IgE levels were obtained in children at 0 (cord blood), 6, 18, and 36 months of age. Primary outcome measures assessed point and cumulative prevalence for allergic symptoms and diseases in children with allergen sensitization and IgE-associated diseases at 6, 18, and 36 months. Paired studies of cytokine profiles before and after LGG administration were assessed for interleukin (IL)-10, IL-13, IL-12p70, interferon-γ, inducible protein-10, and transforming growth factor-β.

RESULTS. No significant effects of probiotic supplementation on allergic sensitization in children, development of allergic diseases in children, or maternal IgE levels were found. Maternal symptoms of allergic rhinitis improved in 60% of the LGG group and 34% of the placebo group. No symptomatic improvement of gastrointestinal allergy or eczema was demonstrated. Maternal allergic symptom improvement was most prominent in women with initial total IgE >100 kU/L. Symptom improvement was associated with increased IL-12p70 levels, irrespective of LGG or placebo administration.

CONCLUSIONS. Administration of LGG from 24 weeks’ gestation reduced severity of maternal atopy but did not prevent childhood sensitization or allergic disease. Increases in IL-12p70 levels in mothers with clinical improvement suggest that LGG improved maternal atopy by enhancing T helper 1 cell expression rather than decreasing IgE production.

Pre- and Postnatal *Lactobacillus reuteri* Supplementation Decreases Allergy Responsiveness in Infancy

PURPOSE OF THE STUDY. Probiotic supplementation has been shown in some studies to decrease the development and incidence of atopic dermatitis and allergic sensitization. This study sought to identify the immunomodulatory effect of prenatal and postnatal *Lactobacillus reuteri* supplementation.

STUDY POPULATION. Sixty-one children from a double-blind, randomized, placebo-controlled probiotic trial with available blood cell samples from at least 3 time-points, including birth and 6, 12, or 24 months. Twenty-nine children received probiotic supplementation from 36 weeks through 12 months of age and 32 received placebo.

METHODS. Peripheral blood mononuclear cells were isolated from blood samples and challenged with ovalbumin, birch, cat, or phytohaemagglutinin. Interleukin (IL)-5, IL-10, IL-13, interferon-γ, CCL17, CCL18, CCL22, and CXCL10 were measured. The effect of probiotics on T helper cell differentiation was indirectly explored.

RESULTS. Probiotic supplementation decreased mean allergen-induced production of several cytokines at several time periods, particularly IL-5 and IL-10. Differences were most significant for cat. Children with IgE-associated disease had predictably higher levels of birch-induced CCL17 at 12 and 24 months of age, as well as higher ovalbumin-induced CXCL10 at birth and CCL17 at age 24 months. Analysis showed that the observed difference
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 of 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.


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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/carpet 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.

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**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.
Pre- and Postnatal *Lactobacillus reuteri* Supplementation Decreases Allergy Responsiveness in Infancy

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