Probiotic Supplementation in the First 6 Months of Life in at Risk Asian Infants: Effects on Eczema and Atopic Sensitization at the Age of 1 Year


PURPOSE OF THE STUDY. To determine the effect of probiotic supplementation from birth to 6 months of age on eczema and allergic sensitization at 1 year of age in Asian infants at risk of allergic disease.

STUDY POPULATION. A total of 253 infants with a family history of allergic disease, defined as having a first-degree relative with doctor-diagnosed asthma, allergic rhinitis, or eczema, and positive skin-prick test result to dust mite, were voluntarily recruited prenatally at the clinics or eczema, and positive skin-prick test result to dust mite, were voluntarily recruited prenatally at the clinics between May 2004 and June 2006.

METHODS. The subjects were randomly assigned to receive 60 mL/day of commercially available cow’s milk-based formula either with or without probiotic supplementation from birth to the age of 6 months. The probiotics used were *Bifidobacterium longum* (10^7 colony-forming units per g) and *Lactobacillus rhamnosus* (2 x 10^8 colony-forming units per g). The primary outcome was eczema (pruritic rash with chronic relapsing course), and the secondary outcome was allergen sensitization. Questionnaires and pediatrician evaluations were performed at 1, 3, 6, and 12 months. The scoring atopic dermatitis index was used to objectively define the severity of atopic dermatitis. Skin-prick tests (to soy, milk, egg yolk, egg white, and 2 locally prevalent dust mites) were performed at the 12-month visit. The 2 outcomes were compared by using χ^2 tests, and logistic regression was used to calculate the odds ratio and to adjust for potential confounders (gender, birth order, prenatal smoking exposure, and feeding history).

RESULTS. The incidence of eczema in the probiotic group (22%) was similar to that in the placebo group (25%) (odds ratio: 0.8 [95% confidence interval: 0.4–1.5]). Severity among those with eczema according to the scoring atopic dermatitis index was not significantly different (P = .17). The rate of sensitization at 1 year showed no difference between the 2 groups (24% [probiotic group] vs 19% [placebo]).

CONCLUSIONS. The results of this study do not support the role of early-life probiotic supplementation as a modality for primary eczema prevention.

Impact of Maternal Atopy and Probiotic Supplementation During Pregnancy on Infant Sensitization: A Double-Blind Placebo-Controlled Study


PURPOSE OF THE STUDY. To explore factors in infant sensitization and the effect of probiotics.

STUDY POPULATION. The researchers evaluated 171 mother-infant pairs from an ongoing, placebo-controlled, double-blind study with nutrition modulation through dietary counseling and probiotic supplementation.
METHODS. Mothers with no chronic or metabolic disease before or during early pregnancy had dietary counseling and were randomly assigned to receive either probiotics (*Lactobacillus rhamnosus* strain GG and *Bifidobacterium lactis* Bb12) or placebo from the first trimester of pregnancy to the end of exclusive breastfeeding. Atopic sensitization of the infants was assessed by skin-prick test to cow’s milk, egg white, wheat, rice, gliadin, cod, soya bean, birch, 6 grasses, cat, dog, *Dermatophagoides pteronyssinus* (dust mite), latex, potato, carrot, and banana at the ages of 6 and 12 months. The mothers were skin tested for these antigens as well as peanut, hazelnut, alder, and mugwort in their third trimester of pregnancy. Infants were examined at 1, 6, and 12 months of age. Breast milk samples were collected immediately after birth and 1 month after delivery. Concentrations of transforming growth factor β2 (TGF-β2) and soluble CD14 were measured in breast milk by using commercial sandwich enzyme-linked immunosorbent assays. The concentrations of interferon γ, tumor necrosis factor α, interleukin (IL)-10, IL-6, IL-4, and IL-2 were measured via flow cytometry. Infant sensitization assessed by skin-prick test at the age of 12 months was the primary variable. The effects of probiotic intervention, allergy status of the mother, and duration of total and exclusive breastfeeding on infant sensitization were analyzed by using the χ² test. The t test for independent samples was used to compare the probiotic and placebo groups.

RESULTS. At the age of 12 months, 30% of the infants showed ≥1 positive reactions on the skin-prick test. Allergic disease and positive skin-prick test results in the mother were likely to be associated with increased risk of sensitization in the child. The total duration of breastfeeding affected the risk of sensitization in the infant according to the allergy status of the mother: the risk of sensitization increased for infants with allergic mothers breastfeeding for >6 months or exclusively breastfeeding for >2.5 months (odds ratio: 4.8; *P* = .005). Probiotic supplementation had a protective effect against sensitization in infants with mothers with sensitization. The concentration of TGF-β2 tended to be higher in thecolostrum of the mothers in the probiotic group, compared with those in the placebo group (probiotic/placebo ratio: 1.5; *P* = .02). A low level of TGF-β2 in thecolostrum seemed to be associated with a positive skin-prick test result in the infant. Probiotic supplementation had a protective effect against sensitization in a subgroup of infants with maternal sensitization: 26% of the infants in the probiotic group versus 50% in the placebo group had positive skin-prick test results. Atopic eczema was diagnosed at the age of 12 months in 9.7% of the infants in the probiotic group and in 17.6% of the infants in the placebo group.

CONCLUSIONS. Maternal skin-prick test reactivity accompanied by allergic disease may increase infant vulnerability to sensitization. Breastfeeding by atopic mothers increases the likelihood of sensitization in infants. Probiotics provide protection from sensitization in infants at high risk.

REVIEWERS COMMENTS. The authors of this article raise interesting questions about the impact of breast milk in the prevention of atopic disease. They noted a protective benefit of probiotic supplementation in their study population and theorized that the possible mechanism for this protective effect is through an increase in anti-inflammatory TGF-β2 in breast milk. The authors noted possible limitations of probiotics, including appropriate selections of anti-inflammatory probiotic strains and risk of disease in the infant. This is a fascinating area for future study.
Impact of Maternal Atopy and Probiotic Supplementation During Pregnancy on Infant Sensitization: A Double-Blind Placebo-Controlled Study

Stephen E. Scranton and Karla L. Davis

*Pediatrics* 2009;124;S112

DOI: 10.1542/peds.2009-1870M

Updated Information & Services

including high resolution figures, can be found at:
/content/124/Supplement_2/S112.2.full.html

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Allergy/Immunology
/cgi/collection/allergy:immunology_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
/site/misc/Permissions.xhtml

Reprints

Information about ordering reprints can be found online:
/site/misc/reprints.xhtml

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2009 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.
Impact of Maternal Atopy and Probiotic Supplementation During Pregnancy on Infant Sensitization: A Double-Blind Placebo-Controlled Study
Stephen E. Scranton and Karla L. Davis

*Pediatrics* 2009;124;S112
DOI: 10.1542/peds.2009-1870M

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/124/Supplement_2/S112.2.full.html