offered. Parents were contacted every 2 weeks until the infants turned 1 year old, and clinical visits were conducted at 2, 4, 6, and 12 months of life.

RESULTS. Of 1187 infants screened, 1130 infants (95%) were recruited. The cumulative incidence of atopic dermatitis in the PG (5.7% [SE: 1.2%]) was significantly less than that in the CG (9.7% [SE: SE 1.5%]; $P = .04$) and similar to the lower range in the BG (7.3% [SE: SE 1.6%]). Median time to the development of atopic dermatitis was similar in the PG (15.1 weeks [range: 5.1–49 weeks]) and the CG (16.8 weeks [range: 4.4–50.3 weeks]) but longer in the BG (22.5 weeks [range: 4.4–50.3 weeks). In a Cox regression model, the rate of atopic dermatitis was 44% lower in the PG versus CG ($P = .04$). The disease-free survival period was greater in the PG versus that in the CG ($P = .0377$). The number needed to treat with prebiotic supplementation to prevent 1 case of atopic dermatitis was 25 infants. Atopic dermatitis in the PG at the age of 12 months tended to be less severe than in the CG (median SCORAD score: 8 vs 12; $P = .08$). T-helper 2–specific thymus and activation-regulated chemokine levels, total immunoglobulin E levels, and percentage sensitized to hen's egg or cow's milk were not significantly different in all 3 groups.

CONCLUSIONS. Prebiotic supplementation in low-risk infants reduced the risk of atopic dermatitis by 44% in the first year of life and might be an effective preventive measure in formula-fed infants. Severity of atopic dermatitis was not significantly affected.

REVIEWER COMMENTS. These results might have far-reaching public health implications, because the study focused on preventing food allergy in infants who might not otherwise be identified by personal or family history of atopy. Prebiotics are generally considered safe and might be an alternative to hydrolysate formula or probiotics, which have shown variable results in infants at low risk. It is interesting to note that prebiotics might be less effective once disease has started and does not seem to have an effect on sensitization or other allergic diseases. The next step would be to investigate whether the benefit is transient or persistent and what mechanism might be responsible for the observed effects.

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Stephanie A. Leonard, MD
Anna Nowak-Wêgrzyn, MD
New York, NY

Efficacy of Probiotic *Lactobacillus* GG on Allergic Sensitization and Asthma in Infants at Risk

Rose MA, Stieglitz F, Köksal A, Schubert R, Schulze J, Zielen S. *Clin Exp Allergy.* 2010;40(9):1398–1405

PURPOSE OF THE STUDY. Previous studies have yielded conflicting data regarding the effects of probiotics on the prevention and treatment of allergic diseases. This prospective study examined the impact of dietary supplementation with *Lactobacillus rhamnosus* strain GG (ATCC 53103) on allergic sensitization, asthma, and atopic eczema.

STUDY POPULATION. Children ($N = 131$) between the ages of 6 and 24 months with a history of at least 2 physician-diagnosed episodes of wheezing within the previous year and a first-degree relative with atopic disease were recruited from a clinic of the Children's Hospital at Goethe University (Frankfurt, Germany) and were randomly assigned to double-blind supplementation with *L rhamnosus* or placebo twice daily for 6 months.

METHODS. Clinical monitoring was performed before intervention and at 3, 6, 9, and 12 months. Outcome measures included the Severity Scoring of Atopic Dermatitis (SCORAD) index, asthma symptom scores defined by cough, wheeze, and need for intervention, and allergic sensitization. Serum samples were taken at 0, 6, and 12 months. Serum levels of egg, milk protein, lactalbumin, cat, horse, dust mite, birch, timothy, and *Alternaria*-specific immunoglobulin E were used as markers of allergic sensitization. Serum eosinophils, eosinophil cationic protein, and transforming growth factor β were also measured.

RESULTS. There were no significant differences in SCORAD indices or asthma-related events between the intervention and placebo groups. In a subgroup of patients with previous aeroallergen sensitization, asthma symptom scores were significantly lower in the placebo group. In a subgroup of patients with previous food-allergen sensitization, patients who received probiotics had fewer rescue-free days and required more inhaled β agonists. Cumulative levels of aeroallergen-specific immunoglobulin E were lower in patients assigned to probiotic supplementation. In the subgroup sensitized to aeroallergens, median eosinophil cationic protein values were lower in the probiotic group. Transforming growth factor β was significantly reduced in the probiotic group.

CONCLUSIONS. In young children with a history of recurrent wheeze and a family history of atopic disease, oral supplementation with *L rhamnosus* had mild negative effects on clinical respiratory status in children with antecedent allergic sensitization. Probiotic supplementation had no beneficial effects on atopic eczema. Probiotic supplementation was associated with mild changes in laboratory assessments of allergic sensitization.

REVIEWER COMMENTS. In the current study, probiotic supplementation did not alleviate clinical symptoms of asthma or atopic eczema. In contrast, probiotic supplementation was associated with increased respiratory symptoms in patients with food and aeroallergen sensitivity. Potential

confounders include increased exposure to tobacco smoke and increased respiratory symptoms before the study in the children randomly assigned to the probiotic group. Additional studies are required to assess probiotic use in children with a personal or family history of atopic disease.

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Karla L. Davis, MD
Fort Leavenworth, KS

The Efficacy and Safety of a Chinese Herbal Product (Xiao-Feng-San) for the Treatment of Refractory Atopic Dermatitis: A Randomized, Double-Blind, Placebo-Controlled Trial

Cheng HM, Chiang LC, Jan YM, Chen GW, Li TC. *Int Arch Allergy Immunol.* 2011;155(2):141–148

PURPOSE OF THE STUDY. To determine if the Chinese herbal product Xiao-Feng-San (XFS) taken orally could significantly improve symptoms of severe intractable atopic dermatitis.

STUDY POPULATION. A total of 71 Taiwanese subjects (age range: 8.4–22.6 years [median: 13.1 years]) with history of severe, refractory atopic dermatitis and poor response to eczema medications (topical steroids, oral antihistamines) were enrolled.

METHODS. This was a prospective, double-blind, placebo-controlled trial in which patients were randomly assigned at a ratio of 2:1 to receive XFS or placebo over 8 weeks. There were 47 (median age: 12.2 years) given XFS and 24 (median age: 13.6 years) given placebo. Participants were matched according to gender, height, weight, BMI, age, duration of illness, and symptom scores. Patients were given varying doses depending on age. Laboratory studies were performed and total lesion score, erythema score, surface damage score, pruritis score, and sleep scores were calculated at 4-week intervals up to 12 weeks.

RESULTS. A total of 56 subjects completed the entire study. There was a statistically significant improvement in total lesion scores among those in the treatment group compared to those of the placebo group (79.7 ± 5.8% vs 13.5± 7.64%; $P < .001$). There was also statistically significant improvement in all symptom scores for those on treatment compared to those on placebo. Four weeks after the treatment was discontinued, the mean improvement in the clinical lesion score for the XFS group was still significantly better than that of the placebo group. Patients reported no adverse effects except unpalatability for some. Treatment did not affect total serum immunoglobulin E level, eosinophil counts, or interleukin 5, interleukin 13, or eosinophil cationic protein levels.

CONCLUSIONS. The traditional Chinese herbal medication XFS might be an alternative choice of therapy for severe, refractory, extensive, nonexudative atopic dermatitis.

REVIEWER COMMENTS. Severe and widespread atopic dermatitis can be frustrating to treat for patients, parents, and physicians. Patients often ask their physicians if there are alternative approaches to controlling atopic diseases. XFS is a common Chinese herbal preparation of 12 herbs, some with known anti-inflammatory effects, that might provide a complementary option for adults and children who require systemic steroids to control their eczema flares. However, more scientific evaluation of XFS to determine its mechanism of action, safety profile, applicability, and palatability need to be considered before widespread use is accepted.

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Joann H. Lin, MD
McKinney, TX

PRIMARY IMMUNODEFICIENCY, HIV, AND INFECTIOUS DISEASES

Chronic Mucocutaneous Candidiasis in Humans With Inborn Errors of Interleukin-17 Immunity

Puel A, Cypowyj S, Bustamante J, et al. *Science.* 2011; 332(6025):65–68

PURPOSE OF THE STUDY. Chronic mucocutaneous candidiasis disease (CMCD) is characterized by recurrent or persistent infections of the skin, nails, and oral and genital mucosa caused by *Candida albicans* and sometimes *Staphylococcus*. Previous studies have shown that interleukin 17 (IL-17) receptor-deficient mice were more susceptible to oropharyngeal candidiasis and staphylococcal infections of the skin. The purpose of this study was to assess if findings in the mouse model also applied to humans.

METHODS. Candidate gene sequencing was performed on a child with *C albicans* in the neonatal period and *Staphylococcus aureus* dermatitis at 5 months of age and a family from Argentina with autosomal dominant pattern of CMCD inheritance. Sequences of IL-17–related genes and receptors from affected people were compared with those of family members and controls. Additional experiments were performed by incubating fibroblasts from an affected child with recombinant IL-17A and IL-17F homodimers and heterodimers.

RESULTS. The initial child was found to be homozygous for a mutation in the *IL17RA* gene that was not found in any of the controls. The IL-17RA protein was not detected on the surface of fibroblasts, $CD4^+$ T cells, $CD8^+$ T cells, or monocytes from the patient. The patient's fibroblasts did not respond to any of the 3 IL-17 cytokines. In the family

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