Introduction of Complementary Foods in Infancy and Atopic Sensitization at the Age of 5 Years: Timing and Food Diversity in a Finnish Birth Cohort

PURPOSE OF THE STUDY. To assess whether the timing and diversity of complementary foods introduced during infancy affects the development of allergic sensitization by the age of 5 years.

STUDY POPULATION. This analysis included 3675 children who were part of the Finnish Type 1 Diabetes Prediction and Prevention prospective cohort, which started in 1994. These children participated in a nutrition study during infancy and underwent an allergy evaluation at age 5.

METHODS. This was a prospective cohort study nested in the larger Diabetes Prediction and Prevention population-based cohort. The child’s diet was assessed during infancy (3, 6, and 12 months) by dietary questionnaires, which asked specifically about breastfeeding, use of formula and cow’s milk, dietary supplements, and complementary food introduction. When the child reached 5 years, he or she underwent testing for specific immunoglobulin E to select environmental and food allergens.

RESULTS. Early introduction of oats (<5.5 months), wheat (<6.5 months), rye (<7 months), barley (<7.5 months), fish (<9 months), and egg (<11 months) decreased the risk of subsequent sensitization to both food and inhalant allergens. The risk of sensitization was also decreased when children had 4 or more complementary foods introduced by 4 and 6 months. These associations were stronger when looking at children with eczema or a parental history of atopy.

CONCLUSIONS. The results of this study show that early introduction of cereals, fish, and egg, as well as a greater diversity of foods introduced between 3 and 6 months, was protective against subsequent allergic sensitization. This effect was most pronounced in those at high risk for developing atopy.

REVIEWER COMMENTS. This study supports the theory that early introduction of complementary foods is protective against the development of allergic disease, particularly in those at high risk for developing allergies. Nonetheless, this remains observational data and more conclusive evidence on this topic is expected to be generated soon from randomized controlled trials currently under way.

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Fish Consumption in Infancy and Asthma-Like Symptoms at Preschool Age

PURPOSE OF THE STUDY. This study evaluated whether the timing of introduction of fish and the amount of fish consumed were associated with asthma-like symptoms at age 48 months.

STUDY POPULATION. Patients were recruited from a population-based, multiethnic prospective birth cohort of 7210 children in Rotterdam, Netherlands, who were born between April 2002 and January 2006.

METHODS. Nutritional data were collected from children at age 14 months by using a semiquantitative food frequency questionnaire, which assesses timing of fish consumption, fat content of fish, and amount of fish consumed. Asthma-like symptoms were evaluated by using the International Study of Asthma and Allergies in Childhood questionnaire at age 36 and 48 months. Confounding variables were considered such as the infant’s gender, gestational age, and birth weight, and maternal factors such as age, body mass index, parity, educational level, ethnicity, marital status, household income, smoking history, fish intake, folic acid supplementation, and any family history of asthma, eczema, food allergy, or allergic rhinitis.

RESULTS. Children with introduction of fish between ages 6 and 12 months had a significantly lower prevalence of wheezing at 48 months compared with children who were not introduced to fish in the first year. In comparison, fish introduction between 0 and 6 months and no introduction in the first year were associated with an increased prevalence of wheezing and shortness of breath at age 48 months. There was no association found between the amount of fish servings and asthma-like symptoms at age 36 and 48 months or type of fish consumption, maternal fish consumption in pregnancy, breastfeeding duration, family history of allergic disease, or history of food allergy or eczema.

CONCLUSIONS. Introduction of fish between ages 6 and 12 months, but not type or amount of fish consumed, was associated with lower prevalence of asthma-like symptoms at age 48 months, which may represent a window of opportunity.

REVIEWER COMMENTS. This study adds to the growing amount of data which suggest that there may be a critical young age during which the introduction of classically allergenic foods reduces rather than increases the risk of food allergy and perhaps other atopic conditions. Regarding earlier introduction of fish being related to reduced risk of asthma, one theory suggests that the omega-3 fatty acids in fish inhibit the production of specific cellular mediators of atopic responses. It is interesting to see an evolution in our understanding of how specific
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
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