Gene Polymorphisms, Breastfeeding, and Development of Food Sensitization in Early Childhood

PURPOSE OF THE STUDY. This study looked at the effect of breastfeeding on the development of food sensitivity (FS) and explored whether this relationship was modified by an array of functional single nucleotide polymorphisms (SNPs).

STUDY POPULATION. The study included children from the Boston Birth Cohort, consisting of multietnic, predominantly African American mother-infant pairs, participating in a postnatal children’s health study assessing growth, development, and health outcomes.

METHODS. Follow-up visits were scheduled at 6 to 12 months and 2, 4, and 6 years, with blood samples obtained at these times. Breastfeeding history was obtained with a standardized questionnaire. FS was defined as specific IgE of 0.35 kU/L or greater to any of 8 common food allergens (egg white, cow milk, peanut, soy, shrimp, walnut, wheat, and cod). Eighty-eight potentially functional SNPs were genotyped from 18 genes involved in innate immunity or TH1/TH2 imbalance. Logistic regression models were used to test the effects of breastfeeding and gene-breastfeeding interactions on FS.

RESULTS. The children (n = 970) were followed for an average of 2.5 ± 2.2 years. Overall, 37.2% had FS, 76.0% were ever breastfed, and 21.0% were exclusively breastfed for at least 4 months. The prevalence of FS was higher in breastfed children (39.6%) than in those never breastfed (29.4%). With adjustment for pertinent covariates, breastfed children were at 1.5 times higher risk for FS than never breastfed children. The percentages of ever and exclusive breastfeeding were similar in those with and without family histories of allergic disease. Of the 88 SNPs successfully genotyped, 5 revealed statistically significant gene-breastfeeding interaction. Children carrying the GT/TT genotype for an SNP in the IL-12 receptor beta gene had a decreased risk of FS (odds ratio 0.6), but those with the GG genotype for that SNP had an increased risk of FS (odds ratio 2.0). Similar interactions were observed for SNPs in Toll-like receptor 9 (TLR9) and thymic stromal lymphopoietin (TSLP). Most striking, in the group with exclusive breastfeeding, children carrying the TLR9 TT genotype had odds ratios of 3.3 and 13.2 for breastfeeding <4 months and >4 months respectively.

CONCLUSIONS. The effects of breastfeeding on FS are modified by SNPs in the IL-12 beta receptor, TLR9, and TSLP genes, both individually and jointly. These findings underscore the importance of considering individual genetic variations in assessing this relationship.

REVIEWER COMMENTS. How often have pediatricians and allergists confronted a distraught mother who feels she did everything to avoid allergic disease in her young child by adhering to breastfeeding and delaying the introduction of notoriously allergenic foods? We know now from other studies that the latter tactic is generally the wrong course, and this article might help us understand why prior studies regarding the allergy-prevention benefits of breastfeeding have yielded mixed results.

Parental Eczema Increases the Risk of Double-Blind, Placebo-Controlled Reactions to Milk but Not to Egg, Peanut, or Hazelnut

PURPOSE OF THE STUDY. The authors investigated whether history of parental atopic diseases are associated with a higher risk of reaction to common allergenic foods in children.

STUDY POPULATION. In this Dutch study, 396 children (251 male, 145 female) with suspected food allergy were recruited from a pediatric allergy outpatient clinic. Median age was 5.4 years (range, 6 months to 17.8 years).

METHODS. The parents and children were asked if they each had a previous diagnosis of asthma, allergic rhinitis, atopic dermatitis, or (in the parents) food allergy. Children were identified as having food sensitivity through an elevated ImmunoCap-specific IgE (>0.35 kU/L) to cow’s milk, hen’s egg, peanut, or hazelnut. The children also underwent double-blind, placebo-controlled food challenges (DBPCFC) to the allergenic food, with a period of at least 2 weeks between food and placebo challenges. Logistic regression analysis was used to compare risk of a reaction to each food tested between children whose parents were not atopic and children with 1 or 2 parents with atopic diseases.

RESULTS. More than 90% of the children had been previously diagnosed with atopic disease, most commonly eczema. A total of 553 DBPCFCs were performed with 274 children tested for 1 food, 92 for 2 foods, 25 for 3 foods, and 5 for all 4 foods. Foods tested included cow’s milk (n = 185), egg (n = 110), peanut (n = 198), and
Gene Polymorphisms, Breastfeeding, and Development of Food Sensitization in Early Childhood
James R. Banks and Timothy Andrews

Pediatrics 2012;130;S8
DOI: 10.1542/peds.2012-2183I

Updated Information & Services
including high resolution figures, can be found at:
/content/130/Supplement_1/S8.1.full.html

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
Gene Polymorphisms, Breastfeeding, and Development of Food Sensitization in Early Childhood
James R. Banks and Timothy Andrews

Pediatrics 2012;130;S8
DOI: 10.1542/peds.2012-2183I

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/130/Supplement_1/S8.1.full.html