

Correspondence

Vitamin D and food allergy in patients with severe atopic dermatitis

To the Editor:

Recently, we read with great interest an article in the *Journal* by Allen et al¹ that provided the first direct evidence that vitamin D sufficiency might be an important protective factor for food allergy (FA) in the first year of life. The authors showed that infants with vitamin D insufficiency and born to Australian-born parents were most likely to have FA confirmed by food challenge. Infants born to vitamin D-insufficient parents were 3 times more likely to have egg allergy and 11 times more likely to have peanut allergy. Furthermore, food-sensitive infants with vitamin D insufficiency were 6 times more likely to have FA than tolerant infants with and without eczema.

As a result of this report, we reviewed 39 patients referred to our institution from throughout the United States for evaluation of severe atopic dermatitis (AD) and FA. Patients with AD and FA had their serum 25-OH vitamin D levels compared with those of patients with AD and no FA by using an approximate 2-sample permutation method.² The study was approved by the National Jewish Health Institutional Review Board.

Thirty-nine subjects had documented FA based on clinical history with supporting skin tests and specific IgE or positive food challenge results. Serum food-specific IgE antibody levels were 15 kU/L or greater for milk, 7 kU/L or greater for egg, and 14 kU/L or greater for peanut, which were previously shown to correlate with positive food challenge results.³ Median serum 25-OH vitamin D levels were 27 ng/dL (25th–75th percentiles, 23–36 ng/dL) for patients with AD and FA and 45 ng/dL (25th–75th percentiles, 31–70 ng/dL) for patients with AD and no FA ($P = .002$). For every 1-unit increase in serum 25-OH vitamin D levels, the chances that someone had FA decreased by 6% (95% CI, decrease of 11% to decrease of 2%; $P = .01$).

Our observations confirm those of Allen et al¹ and raise questions about the potential mechanisms by which vitamin D could reduce FA. Vitamin D has been shown to induce allergen-specific IL-10-secreting regulatory T lymphocytes, which inhibit cytokine production of T_H2 cells.⁴ Mutations in forkhead box protein 3 (*FOXP3*; the master switch gene for CD4⁺CD25⁺ cells) cause immune dysregulation, polyendocrinopathy, enteropathy,

X-linked syndrome, in which FA is a prominent feature, and indicate a role for regulatory T cells in food tolerance.⁵ Inhibition of 25-OH-vitamin D1- α -hydroxylase (CYP27B1) blocks epidermal lipid synthesis and antimicrobial peptide expression and alters skin permeability barrier homeostasis.⁶ The altered skin barrier is of importance because epicutaneous application of food antigen predisposes to IgE-mediated anaphylaxis.⁷ Epicutaneous sensitization also causes expansion of intestinal mast cells, which might lead to the increased intestinal permeability seen in patients with food-induced anaphylaxis.⁷ More work is warranted to study vitamin D and FA, including early introduction of vitamin D in infants.

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