

July 2001, part 1 • Volume 108 • Number 1

Differences in *Bifidobacterium* flora composition in allergic and healthy infants

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To the Editor:

The presence of bifidobacteria in the human intestine is thought to contribute to human health and well-being.¹ During the period when the microflora of the gut becomes established, breast feeding can promote the intestinal colonization of bifidobacteria. This represents a major mode whereby breast feeding protects the infant against infections and the development of atopic disease in comparison with formula-feeding.

Modification of the intestinal microflora to increase the predominance of beneficial bacteria with the ability to modulate the immune system seems a reasonable alternative by which to obtain a prophylactic or therapeutic effect against allergy. Reduced levels of bifidobacteria have been demonstrated in allergic infants in comparison with healthy infants.² This reduction has been shown to precede the development of atopic disease.³

The genus *Bifidobacterium* consists of many different species; which of these species might play a role in the treatment and etiology of allergic disease remains unknown. Therefore, the current study investigated the differences in the composition of the *Bifidobacterium* flora in

allergic and healthy infants.

Bifidobacteria were isolated from the feces of 7 breast-fed allergic infants and 6 breast-fed, healthy, age-matched controls (2 to 7 months of age). The collected fecal samples were kept at 4°C and analyzed within 6 hours. Each allergic infant manifested atopic eczema, according to the Hanifin⁴ criteria, and tested positive for at least 1 skin prick test. The isolated bacteria were identified to species level on the basis of cell morphology, growth requirements, and the ability to ferment 27 different carbohydrates.⁵

A distinct pattern of the *Bifidobacterium* flora was detected. Allergic infants harbored an adultlike *Bifidobacterium* flora; of the 7 allergic infants, 6 were colonized by *B adolescentis* ($P = .005$ in comparison with healthy infants). Three of the 7 allergic infants were found to be colonized exclusively by *B adolescentis*; this species represented 50% of the total bifidobacteria isolates from the allergic infants. The allergic infants were colonized to a lesser extend by *B infantis*, *B breve*, and *B longum* (Table I).

Each of the healthy infants had a typical infant *Bifidobacterium* flora,⁵ consisting mainly of *B bifidum* (58% of all *Bifidobacterium* isolates; $P = .029$ in comparison with allergic infants) and to a lesser extent of *B infantis* and *B breve* (Table I).

From the finding that the composition of the fecal bifidobacteria microflora differs, it can be hypothesized that individual *Bifidobacterium* species, rather than the entire genus, can affect the manifestation of allergy. It is not known whether any causal relation exists between the differences in *Bifidobacterium* species' composition and allergic disease. However, selected probiotics have been observed to relieve the symptoms of allergic disease.⁶ It can therefore be suggested that an aberrant intestinal microflora, and also *Bifidobacterium* flora, might deprive the host of maturational signals for the development of humoral immune defence mechanisms against allergy—in particular, circulating IgA- and IgM-secreting cells.⁷ Consequently, merely trying to increase the level of bifidobacteria in allergic infants might not “normalize” the intestinal microflora. Instead, it could be hypothesised that *Bifidobacterium* species typical for healthy infants should be administered.

Table I. *Bifidobacterium* composition in allergic and healthy age-matched infants

<i>Bifidobacterium</i> species	Percentage of isolates (frequency of isolation)		<i>P</i> value*: healthy vs allergic
	Allergic	Healthy	
<i>B adolescentis</i>	50 (6/7)	0 (0/6)	.005
<i>B bifidum</i>	2 (1/7)	58 (5/6)	.029

<i>B breve</i>	15 (1/7)	27 (2/6)	>.05
<i>B infantis</i>	21 (4/7)	15 (1/6)	>.05
<i>B longum</i>	12 (1/7)	0 (0/6)	>.05

*Fisher exact test.

Funded by the Academy of Finland and by the National Technology Agency of Finland.

Tuija Poussa is gratefully acknowledged for performing the statistical analysis.

1/8/115754

doi:10.1067/mai.2001.115754

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