



## Altered early infant gut microbiota in children developing allergy up to 5 years of age.

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Abstract:

**BACKGROUND:** Early colonization with bifidobacteria and lactobacilli is postulated to protect children from allergy, while *Clostridium (C.) difficile* colonization might be associated with allergic disease. Previous studies of infant gut microbiota in relation to subsequent allergy development have mostly employed culture-dependent techniques, studied genera of bacteria and the follow-up period was limited to 2 years. **OBJECTIVE:** To relate gut microbiota in early infancy, notably bifidobacteria and lactobacilli at species level, to allergy development during the first 5 years of life and study if environmental factors influence the early infant gut microbiota. **METHODS:** Fecal samples were collected at 1 week, 1 month and 2 months after birth from 47 Swedish infants, followed prospectively to 5 years of age. Bacterial DNA was analysed with real-time PCR and related to allergy development, family size as well as endotoxin and Fel d 1 levels in house dust samples. Primers binding to *C. difficile*, four species of bifidobacteria, two lactobacilli groups and *Bacteroides fragilis* were used. Children regarded as allergic manifested allergic symptoms and were skin prick test positive during their first 5 years while non-allergic children were neither. **RESULTS:** Children who developed allergy were significantly less often colonized with lactobacilli group I (*Lactobacillus (L.) rhamnosus*, *L. casei*, *L. paracasei*), *Bifidobacterium adolescentis* and *C. difficile* during their first 2 months. Infants colonized with several *Bifidobacterium* species had been exposed to higher amounts of endotoxin and grew up in larger families than infants harbouring few species. **CONCLUSION:** A more diverse gut microbiota early in life might prevent allergy development and may be related to the previously suggested inverse relationship between allergy, family size and endotoxin exposure.

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