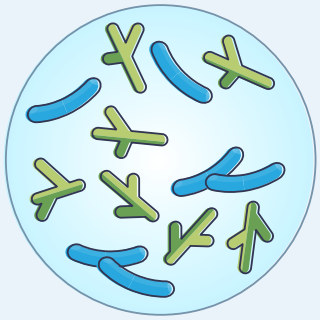
PRACTICE TOOL

# The Developing Gut Microbiota and Immune System in Children with Food Allergies

There is a link between the gut microbiota and health that begins to develop early in life. Proper nutrition plays a key role in the development of the gut microbiota and the immune system. This practice tool outlines the association between the gut microbiota, food allergy, and immune health, and the role that nutrition can play, specifically with the use of pre- and probiotics.

## Gut Microbiota



*The gut microbiota is a complex community of microorganisms, residing in the human digestive tract.*[1]

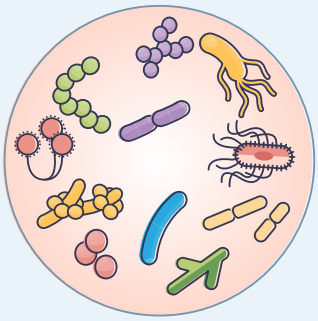
*The gut microbiota play a crucial role in digestion, absorption, and immunomodulation.*

### Gut Microbiota in the First 1,000 Days

The shaping and evolution of the gut microbiota starts at birth, and its composition is influenced by various genetic, nutritional, and environmental factors. The gut microbiota changes dramatically during the first 1,000 days of life and can be affected by several key factors:[2,3]

- **Maternal Factors:** maternal health (i.e., obesity, periodontitis), maternal diet, vaginal health, antibiotic use during pregnancy, smoking, type of delivery (vaginal or C-section)
- **Postnatal Factors:** gestational age, antibiotic use, breastfeeding, host genetics, environment

## Gut Dysbiosis



*Gut dysbiosis is an imbalance, or disruption, in the gut microbiota composition compared to healthy individuals.*[1]

*Gut dysbiosis may lead to the onset of many diseases, ranging from gastrointestinal and metabolic conditions to immunological and neuropsychiatric diseases.*

### Consequences of Gut Dysbiosis

Between Immune Health and the Gut Microbiota:

**The gut hosts 70-80% of the body's immune cells**[4]

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**The gut microbiota in early life plays a key role in the development of the immune system**[5]

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**Gut dysbiosis in early life has been linked to long-term health and immune system consequences**[3]

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**Long-term consequences may include conditions such as: allergic, inflammatory, metabolic, neurological**[3]



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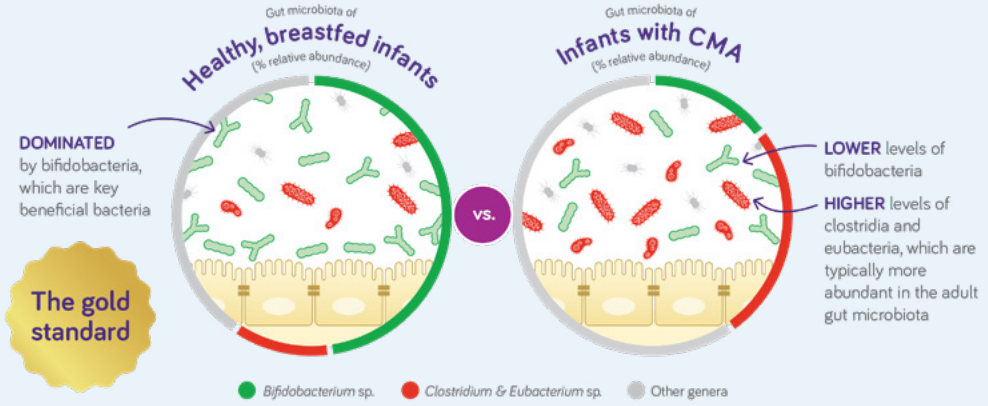
## Food Allergy and Gut Dysbiosis

The gut microbiota is associated with cow's milk allergy (CMA) in early life. Infants with CMA have been found to have gut dysbiosis,[6] which has been linked to immune system and long-term health consequences.[3]




**CMA presents a significant clinical burden to children including increased infections:**[7]

- Gastrointestinal
- Skin
- Respiratory
- Ear

Credit: Nutricia, reprinted with permission.

Gut microbiota-modulating ingredients like **prebiotics** and **probiotics**, have been added to hypoallergenic infant formulas to support infants with food allergies who are not exclusively breastfed.

### PREBIOTICS

- A substrate that is selectively utilized by host microorganisms, conferring a health benefit[8]
- Prebiotic oligosaccharides, such as galactooligosaccharides and fructooligosaccharides:[9]
  - » Support normal development of the infant's immune system
  - » Provide beneficial effects in infants with allergies or at risk for allergies

### PROBIOTICS

- Live organisms that, when administered in adequate amounts, confer a health benefit on the host[10]
- *Bifidobacterium breve* is one of the predominant bifidobacterial species in the gut microbiota of healthy breastfed infants

**Exploratory findings with the use of hypoallergenic formula with prebiotics (scFOS/lcFOS) and probiotics (*Bifidobacterium* breve M-16V) in infants with CMA.**

| Gut microbiota modulation | Less medication usage | Reduced infections & hospitalizations[13] |
|---|---|---|
| • Improved the gut microbiota to be closer to that of healthy breastfed infants (increased bifidobacteria and reduced *Eubacterium rectale* and *Clostridium coccoides*).[11,12] | • Fewer infants required antibiotics and dermatological medications[13] | • Fewer reported infections, including ear infections<br>• Fewer hospitalizations due to infections |

**References**

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