

# Early years of life: How crucial for long-term health?

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*Virtual Live Event - September 7, 2022*



## Introduction

*This episode is the second of three online programs that explore the remarkable ecosystem of gut flora. In this series, titled “The Power of Gut Microbiota”, we learn how the delicate balance of microbes in our digestive system can be disrupted by antibiotics and how probiotics can help the ecosystem return to balance. In the first program, we explored the different roles microbiota plays in our health, the impact of external factors (lifestyle, diet and medications) on this ecosystem, and the consequences of a loss of balance called “dysbiosis”.*

*In this episode we consider the importance of protecting the developing microbiota in the first years of life and look at the short- and long-term consequences of antibiotic use during these crucial early years.*



This virtual event focuses on providing key information on how microbiota settles itself in the gut of children and the possible harmful effects of antibiotics. In a dynamic and interactive way, **Sue Saville**, a scientific journalist, interviews **Professors Marie-Claire Arrieta** and **Ener Cagri Dinleyici**, experts on understanding how our early-life microbiome helps define important aspects in childhood development.



They begin by discussing how our early days set the tone for the quality of life later, and how our dynamic gut ecosystem gradually shapes itself. Afterwards, they talk about the factors that can alter children’s microbiota and why it is important to take care of it, especially when taking an antibiotic treatment. Probiotics such as *Saccharomyces boulardii* CNCM I-745 can play a key role in protecting children’s microbiome.

## Aim of the webinar

**To help us understand “How crucial for long-term health are the early years of life?”, Professors Marie-Claire Arrieta and Ener Cagri Dinleyici discuss on:**

- The development of microbiota during the early years of life and the factors that play a role in its composition.
- The importance of the equilibrium of gut microbiota on short- and long-term health.
- The impact of antibiotics on microbiome and how it can be restored when probiotics are taken at the same time.

## Key lessons

**Maintaining a well-balanced gut microbiota is crucial for short- and long-term health.**

- *The first 1,000 days of life have a great importance in the establishment of a healthy microbiota.*
- *Diet, maternal factors, and antibiotic treatments have an influence on the gut microbiota composition in the first years of life.*
- *All classes of antibiotics affect microbiota composition.*
- *It is important to preserve a healthy gut microbiota.*
- *Some probiotics may prevent antibiotics' side effects.*
- *The use of *S. boulardii* CNCM I-745 could be an important strategy for preventing antibiotic associated dysbiosis, restoring the intestinal microbiota composition and it is recommended during antibiotic treatment.*

## The importance of protecting the developing microbiota for lifelong gut health

At the time of birth, an infant's body undergoes a massive microbial colonization, especially in the gut, not only by a large volume of microbes but an active, dynamic substance-producing system. The substances produced during this colonization are necessary for the proper development of several systems, including the immune, metabolic, and neurological systems. Once colonized, the microbial ecosystem remains the same for life, therefore it is important to establish and protect healthy microbiota during child development.

"The first 1,000 days of life" is a critical period, covering pregnancy and the first years of an infant's life. Various factors can influence microbiota composition during this period, including maternal obesity, gestational age, infections, cesarean section, breastfeeding, and medications, such as antibiotics during the first years of life. These factors affect the pattern of bacterial colonization and the maintenance of a healthy gut microbiota, as well as the immune system in infancy.

Diet holds a special place in the composition of gut microbiota, and largely determines the type of microbes and substances produced. As Prof. Arrieta says: "If we are what we eat, we are also what our microbiota eats." For infants, their diet is milk. It has been shown that beneficial microbes in the infant's microbiota have a strong preference for breast milk over formula. Breastfeeding is the gold standard of nutrition for infants and helps to protect and restore infantile gut microbiota composition. Once the child moves on to more solid foods, it has been shown the importance of introducing a wide variety, especially fruits and vegetables, to foster a more diversified microbiota.

## Antibiotics may have short- and long-term consequences on the health

Antibiotics are very important and have been lifesaving medications for many years. On the other hand, they are not without side effects. Not only do they kill microbes responsible for diseases, but also cause collateral damage with consequences on short-term and long-term health. Antibiotic treatment can impact the entire microbiome, and because an infant's microbiota is less resilient, it is less likely to return to its previous state. In the short term, antibiotics can prevent the growth of beneficial microbes or foster the growth of detrimental ones leading to dysbiosis and contributing to diarrhea and fungal overgrowth, for example.

This dysbiosis, especially if occurring during the first years of life, can also impact long-term health. Numerous studies have shown important links between antibiotic use in early life and an increased risk of several chronic diseases, such as allergies, asthma, and immune, inflammatory bowel and metabolic diseases. All antibiotics alter the gut microbiota composition.

## ***S. boulardii* CNCM I-745 may protect and restore the gut microbiota during antibiotic treatment**

Clinical trials have shown that specific probiotics can prevent the negative side effects of antibiotics. Probiotics are defined as live microorganisms, bacterial or yeast, that when administered in adequate amounts confer a health benefit on the host. A multitude of probiotics exist; therefore, it is important to select specific probiotics that clinical trials have best evaluated.

Clinical trials have shown that *Saccharomyces boulardii* CNCM I-745 and *Lactobacillus* GG have beneficial effects in the prevention of antibiotic-associated diarrhea. The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) recently recommended these two probiotics for the prevention of antibiotic-associated diarrhea<sup>1</sup>. *Saccharomyces boulardii* CNCM I-745 is a good example of an effective probiotic in the prevention of antibiotic-associated dysbiosis. As a yeast, its fungal nature makes it resistant to antibiotics<sup>2</sup>. It has been shown that *S. boulardii* CNCM I-745 restores the intestinal microbiota in infants with acute intestinal infection due to rotavirus<sup>3,4</sup>. Besides, the administration of *S. boulardii* CNCM I-745 has been associated with an increase of short chains fatty acids<sup>5,6</sup>, an important part of the healthy gut ecosystem, and with a decrease in microbiota alteration during antibiotic treatment<sup>7</sup>.

Thus, when administered with antibiotics, *S. boulardii* CNCM I-745 could both prevent the antibiotic associated dysbiosis and restore the intestinal microbiota.

## **Conclusion**

Antibiotic associated dysbiosis during the first years of life may have short- and long-term consequences on health. Therefore, when antibiotic treatment is required, gut microbiota must be protected. When taken with antibiotics, probiotics such as *S. boulardii* CNCM I-745 may prevent dysbiosis and help to restore a healthy gut microbiota.

## References to learn more about the topic of the webinar

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Internal code: 22.41