

MEDIA BACKGROUNDER

The ‘Biotics Family’ – how bacteria begin to shape our gut health the day we’re born

The microbiome, biotics and their role in gut health

We have trillions of bacterial cells in our body. These bacteria form part of an ecosystem – called ‘the microbiome’ – and the largest share of these bacteria are located in our gut. It is understood that maintaining a healthy balance in the bacteria that make up our microbiome (i.e. through eating a balanced diet) can support health. This has spurred remarkable interest in the use of dietary biotics (i.e. prebiotics, probiotics etc.) to modulate the microbiome to help support health. The term ‘biotic’ is derived from the Greek word *biōtikós*, meaning ‘pertaining to life’, and essentially refers to the biological ecosystem made up of living organisms (i.e. bacteria) together with their physical environment. In nutrition, biotics is a group of nutritionally active components (such as bacteria, carbohydrates, fibre) that, when consumed, can confer a health benefit.

Biotics and breastmilk

The beneficial effects of biotics can also be found in breastmilk. Breastmilk is the best source of nutrition for babies – its complex composition provides everything a baby needs for healthy growth and development – including lactose, fats, proteins, vitamins and low levels of bacteria. When a newborn first breastfeeds, the beneficial bacteria provided by breastmilk may also help colonise an infant’s gastrointestinal tract, contributing to the composition of an infant’s own gut microbiome. Another key component of breastmilk is human milk oligosaccharides (HMOs) – a specific class of non-digestible carbohydrate molecules found in large quantities in breastmilk – which can support both the growth of beneficial bacteria in a baby’s gut and the development of a baby’s immune system throughout its gut. Over 200 types of HMOs have been identified in breastmilk.

For over 40 years, Nutricia has been studying the composition and function of breastmilk. For multifactorial reasons, as not all mothers are able to or want to (exclusively) breastfeed, we believe that they should be fully empowered and have the right to make the best choices for themselves and their family. Factual, science-based information about the appropriate preparation, use and nutritional composition of our products is therefore essential to support mothers in their feeding decisions - in a way that does not discourage mothers from breastfeeding. As we unravel the complexities of breastmilk, we are deepening our understanding of the nutritional role biotics play in breastmilk, and how the biotics family can support the health and development of infants and children.

The role of the gut microbiome in supporting health and early life

To this end, Nutricia has partnered with leading experts in the field of paediatrics and gut microbiology and with the academic & educational publisher, Wiley, to publish, *‘The Biotics Family in Early Life’* – the fourth in a series of ‘Essential Knowledge Briefings’ (short, practical guides, in a mobile-enabled format) for healthcare professionals covering various aspects of health in early life. This fourth book explains the role the gut microbiome plays in supporting health in early life, and the role dietary biotics can play in modulating the gut microbiome in infants to help improve health outcomes. Specifically, the book explores the role pre- & probiotics, as well as new members of the biotics family – such as syn- and postbiotics – play in gut health, and the potential for harnessing the benefits of biotics in our research and in the development of breastmilk substitutes. Below is an overview and explanation of each member of the biotics family:

What are Prebiotics?

In a nutshell, prebiotics are *food for beneficial bacteria*. A key source of prebiotics is fibre from fruits, vegetables, nuts and milk. Once in the gut, such fibre helps stimulate the growth and diversity of such beneficial bacterial as *bifidobacteria* and *lactobacilli*. Breastmilk can have the same prebiotic effect,

promoting the growth of these beneficial bacteria in the infant's gut, which in turn supports immune system development. This prebiotic effect of breastmilk can be traced to HMOs – the non-digestible carbohydrate molecules that provide the food for these beneficial bacteria. Nutricia recognized these beneficial prebiotic effects on an infant's gut and immune system, and was the first to introduce prebiotics into breastmilk substitutes. Specifically, Nutricia introduced a patented mix of prebiotic short-chain galacto oligosaccharides and long-chain fructo oligosaccharides (scGOS/lcFOS) in a 9:1 ratio – a composition that closely mimics the complexity, diversity and functionality of HMOs in breastmilk and has demonstrated clinical benefits.¹⁻³

What are Probiotics ?

These are beneficial bacteria that can play an important role in digestive, immunological, and respiratory health. Adults obtain probiotics through certain probiotic-rich foods, such as yoghurt. In breastmilk, there are also beneficial bacteria that can have this probiotic effect. For example, the probiotic *Bifidobacterium breve* species is a commonly isolated bifidobacterial species in breastmilk and is found in significant quantities in the gut microbiota of breastfed infants. It has been proven in various studies to confer a beneficial health effect on breastfed infants⁴⁻⁷, and Nutricia has recently launched breastmilk substitutes that contain this probiotic strain.

What are Synbiotics?

In the scientific literature, synbiotics is the term increasingly being used to describe when probiotics are combined with prebiotics. In some cases, synbiotics can have a greater, or additive, effect, over and above that which can be achieved when pre- and probiotics are consumed separately. Such an effect can be due to the way prebiotics support the growth and survival of probiotics – especially the beneficial probiotic family of *Bifidobacteria* bacteria. For example, adding prebiotic oligosaccharides and probiotic bacteria is an effective way to increase the numbers of *Bifidobacteria* and other beneficial bacteria in the intestine of infants fed with breastmilk substitutes.⁸⁻⁹

What are the benefits of Synbiotics?

Boosting the amount of such beneficial bacteria is important when there is an imbalance in the number and diversity of bacteria in an infant's gut – referred to in the scientific literature as 'dysbiosis'. Research has identified a link between dysbiosis and both cow's milk protein allergy (CMPA) in infants¹⁰⁻¹³ as well as an elevated risk of developing other allergies later in life¹⁴. Since pre- and probiotics have been shown to support digestive¹⁵ and immunological health¹⁵⁻¹⁶, Nutricia now adds a synbiotic mixture to its breastmilk substitutes, such as its prebiotic scGOS/lcFOS plus a specific probiotic strain of the *Bifidobacterium breve*, a species of bacteria commonly found in breastmilk.

What are Postbiotics?

Postbiotics are bioactive compounds – such as proteins, lipids, carbohydrates, vitamins, organic acids, cell wall components, or other complex molecules – produced during a fermentation process. During fermentation, bacteria metabolize food or food ingredients to produce these compounds. Researchers are beginning to recognize that such postbiotics can have health boosting benefits, and research is ongoing in the field to fully understand the impact postbiotics can have on gut health.

What are the key benefits of postbiotics?

It is already understood that each bacterial strain used during a specific fermentation process produces a unique set of postbiotics, each with their own unique benefits. Some confer antimicrobial and immunomodulatory effects in the gut. Breastmilk substitutes with postbiotics are known to have beneficial effects on immune and gut characteristics¹⁷⁻¹⁹. Nutricia uses unique proprietary bacterial

strains in our *Lactofidus*[™] fermentation process to produce specific postbiotics that make their way into our breastmilk substitutes.

References

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