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Early nutrition and immune health: When it begins

DOHaD | Monday 21st October
19:45 | Rooms 212 and 213
Limited Seats - Registration Needed
Early nutrition and immune health: *When it begins*
Chaired by
Prof. Beverly Muhlhausler
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Breastfeeding: a personalized medicine for long-term immune health
Prof. Valerie Verhasselt, Australia

HMO story so far
Prof. Yvan Vandenplas, Belgium
Breastfeeding: a personalized medicine for long-term immune health

Prof. Valerie Verhasselt
School of Molecular Sciences, Perth, Australia

Key messages

The neonatal immune system has its specific *modus operandi*, which differs much from the adult one. It is also facing many challenges such as organ development and exposure to numerous novel antigens.

Understanding how breastfeeding fulfils the early life requirements and guides immune trajectories will provide the infant with preventive and curative approaches that are tailored to this very specific period of life and will ensure long-term immune health.

Abstract

As compared to adulthood, early post-natal life is a period that is characterized by rapid changes.

The neonates’ tissues are constantly changing due to the growth process and are exposed to multiple new antigens, which are found in the environment, are present in the diet or are associated with gut microbiota colonization. The neonatal immune system has its own reactivity, which profoundly differs from the adult. It is not a “small adult” nor an immature immune system nor a tolerant prone immune system. Neonatal immune system is a different one with specific requirements for activation and regulation. Breastmilk is most probably a key condition for physiological, and optimal, function and imprinting of immune system in early life. Alike the immune system and environment that are constantly changing in early life, breastmilk composition is constantly evolving. Volume, macronutrients, micronutrients, immunological factors, microbiota and microbiota shaping molecules are changing with lactation.
stages, which follow infant growth, and with environmental immune challenges. Breastmilk composition constantly adapt to microbial challenges and provides each infant with the most efficient, and personalized, way to prevent infectious disease. While there is no consistent evidence that breastfeeding is preventing allergy, there are data indicating that breastmilk has the potential to actively influence immune trajectory and promote tolerance to allergens. These discoveries will guide interventions among breastfeeding mothers to increase the levels of breastmilk factors associated with long-term allergy prevention.

We are starting to decipher the specific requirements for the neonatal immune system to function optimally and we are discovering how breastmilk fulfils these requirements and guides immune trajectories from early life. Answering these questions will provide the infant with preventive and curative approaches that are tailored to this very specific period of life and will ensure long-term immune health.

References:

HMOs story so far

Prof. Yvan Vandenplas
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Abstract

Breastmilk is the natural and ideal food for infants, providing the energy and nutrients that every infant needs during the first four to six months of life in the correct quality and amount. Stool bacterial composition differs between breastfed and formula-fed infants and both breastfeeding and the resulting gut microbiota are linked to the better health of the infants. Infants who are breastfed for shorter periods or are not breastfed suffer more infectious diseases, such as gastroenteritis and acute otitis media, more immune mediated diseases, have a lower intelligent quotient and are likely to have a higher risk of overweight and type 2 diabetes in later life. The amount of HMOs in mother’s milk is a dynamic process as it changes over time. Many factors such as duration of lactation, environmental and genetic factors influence the amount of HMOs. HMOs may support immune function development and provide protection against infectious diseases directly through the interaction of the gut epithelial cells or indirectly through the modulation

Key messages

HMOs are the 3rd most important component in mother’s milk and support a balanced immune function development and provide protection against infectious diseases by stimulating the development of bifidobacteria.

The addition of 2’-fucosyllactose (2’-FL) and Lacto-N-neotetraose (LnNT) to infant formula show a normal growth pattern and normal defecation, and suggest clinical benefit with reduced infections and antibiotic use. It can therefore be concluded that 2’-FL and LnNT are a safe and beneficial supplementation to infant formula.
of the gut microbiota, including the stimulation of the bifidobacteria.

It was only recently that scientists and industry were able to produce the first oligosaccharides structurally identical to those in human milk. It is important to note that HMOs resist cold and heat, and are not affected by pasteurization and freeze-drying. The limited clinical data suggest that the addition of HMOs to infant formula seems to be safe and well tolerated, inducing a normal growth and suggesting a trend towards health benefit.

HMOs act as soluble decoy receptors that block the attachment of specific viral, bacterial or protozoan parasite pathogens to epithelial cell surface sugars, which may in turn help prevent infectious diseases in the gut, respiratory and urinary tracts. In addition, HMOs alter host epithelial and immune cell responses with potential benefits for the neonate, beyond protection against infectious diseases.

The addition of one HMO, namely 2´-fucosyllactose (2´-FL), is a step forward to bring formula feeding closer to the gold standard: mother’s milk. No adverse effects have been reported for 2´-FL and in vitro and animal studies have shown benefits of supplementation of infant formula with 2´-FL. Lacto-N-neotetraose (LnNT) is added to infant formula as well. The first clinical data in infants show a normal growth pattern and normal defecation, and suggest clinical benefit with reduced infections and antibiotic use. More prospective randomized trials in infants comparing formula without and with HMOs are still needed to evaluate the clinical effects of this supplementation. It can therefore be concluded that 2´-FL and LnNT are a safe and beneficial supplementation to infant formula.

References:


3. NeHMO multicenter study Spain 2019. Real World Study to investigate the Growth and Feeding Tolerance of Infants Consuming a Formula Enriched with 2 HMOs