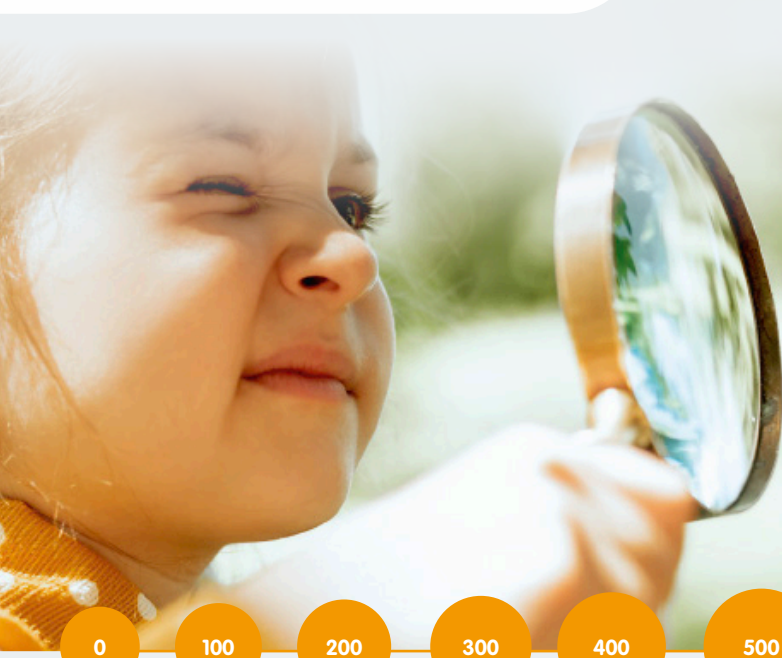


WHITEPAPER

THE FIRST 1000 DAYS OF AN INFANT'S LIFE

This refers to the period from conception until the child's second birthday and is an important time for the growth and development of infants (see figure 1).



FIRST 1000 DAYS

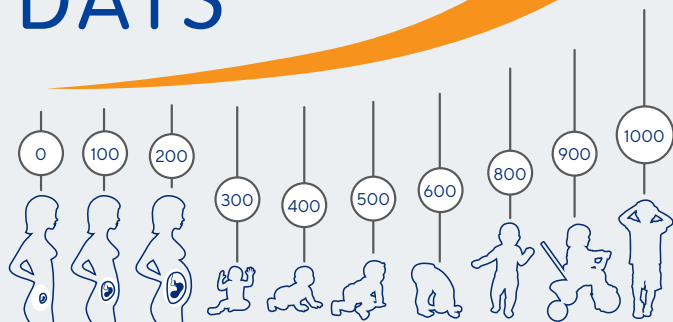


Figure 1 The first 1000 days of infant's life

This early phase of life consists of different developmental stages, in which the infant's body matures and develops. This phase is characterized by:

- exponential growth of the infant's body;
- strong brain development;
- important maturation of the digestive system and the immune system;
- the development of the gut microbiota, which plays a central role in the development of all these different body systems.

This phase lays the foundation for lifelong health. Alterations or a delay in the maturation can have a negative impact on the long-term health outcome (see figure 2). 1 2 3

GROWTH

The early phase of life is characterized by exponential physical growth. Body weight and length will significantly increase and the infant will triple its birth weight in the first year and double its length by two years of age. 4

BRAIN

The brain is developing both in physical mass and in complexity: 40,000 new synapses are added every second to a baby's brain just after birth. A baby's brain reaches 70% of its adult size by the first birthday and 80% by the second birthday. At the age of four years, a child's brain has reached its full size, but it won't stop developing until approximately 20 years of age. Even then, brain development never stops. 5



Figure 2 In the early phase of an infant's life, different body systems undergo tremendous development and maturation



“The development of the digestive system during the early phase of life is of major importance”

DIGESTIVE SYSTEM

The development of the digestive system during the early phase of life is of major importance. The digestive system ensures digestion and absorption of nutrients but also provides a gut barrier against infectious agents and leakage of allergens. ⁶

IMMUNE SYSTEM

The immune system is relatively immature at birth and needs to learn how to defend the infant against harmful invaders and tolerate harmless allergens during early life. ⁷ An effective immune system can remove pathogens and is trained to define appropriate immune responses to harmless environmental allergens.

GUT

The maturation of the digestive and immune system depends heavily on a well-balanced gut microbiota. From the moment of birth, the infant's gut microbiota will develop extensively. The diversity of the microbiota will gradually increase after birth due to microbes being obtained from the environment. ⁷

The gut microbiota promotes the immune system by regulating the gut barrier function and by establishing the cells responsible for immune responses. ⁸

The gut microbiota promotes the digestive system by providing nutrients needed for a proper development of the gut. ⁹ ¹⁰

There is even evidence that there is an association between the gut microbiota and the brain via the gut-brain axis, so the gut microbiota might influence wellbeing and behaviour. ¹¹

NUTRITION

The early phase of life is important for infants because environmental influences, such as nutrition, can have profound effects on the growth and development of the infant and thus on short term and long-term health outcomes. Adequate nutrition is crucial for the growth and development of the infant and can help to mature the gut microbiota.

CONCLUSION

The early phase of life is important for infants as they grow and develop rapidly and because the digestive and immune system still need to mature. The gut microbiota gradually increases in levels and diversity and plays an important role in the maturation of the digestive and immune system. Adequate nutrition in early life is crucial for proper growth and development.

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