Infant Nutrition and Immunology in the 21st Century: Focus on Induction of Oral Tolerance and Allergy Prevention

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Every infant is at risk

Evidence shows that as many children at ‘low risk’ (ie, no familial history) will develop an allergy as so-called high-risk infants with atopic heredity. Thus, it is increasingly recognised that all infants should be included in allergy prevention measures, specifically to facilitate maturation of the immature, fetal immune system to a balanced TH1:TH2 system.

Developing oral tolerance and avoiding food allergies is key

Oral tolerance is an acquired, active immunological hyporesponsiveness to harmless food antigens. Without oral tolerance, the body’s immune system overreacts to food proteins or allergens. This leads to food allergy and other allergies later in life. Food allergies and early atopic eczema are well recognised as major risk factors for the subsequent development of atopic disease; thus, primary dietary prevention focuses on averting early development of food allergies.

NAN H.A. modulates immune responses and promotes oral tolerance

Breastfeeding is the best option for achieving a correctly balanced immune system and early oral tolerance. However, when an infant formula is needed, NAN H.A. with moderately hydrolysed proteins and a tailored nutrient blend helps balance infant immune responses toward tolerance via several mechanisms:

- Reduced protein allergenicity and active immunocompetent proteins to induce oral tolerance.
- Support of a bifidobacteria-dominant gut flora to promote a balanced TH1:TH2 immune system.
- An optimal ratio of docosahexaenoic acid (DHA) and arachidonic acid (ARA) comparable to that of breast milk.
- Optimised nutrition for less metabolic stress and a better immune status.

NAN H.A. is clinically proven to reduce the risk of allergic diseases

In at-risk infants, the use of NAN H.A. during the first few months of life has been shown to reduce the risk of allergies by up to 50% compared with traditional formulas. However, the rationale for including all newborns in allergy prevention programmes is being increasingly recognised. In view of this, the prospective ZUFF (Zug-Frauenfeld) study was conducted in an unselected population of normal infants. The intervention cohort (n=564) received 4 months of exclusive breastfeeding and/or NAN H.A., with no complementary food (reduced-allergen diet), while the control cohort (n=566) received breast milk and/or regular cow’s milk-based formula and was permitted complementary food after 3 months of age.

All measured growth parameters were identical in the two groups over 2 years of follow-up. Health status was improved in the intervention group relative to the control group, with the main difference between the two groups being a significantly reduced incidence of skin problems in the intervention group (figure), in particular seborrheic dermatitis, atopic dermatitis and other types of eczema.

Conclusion

Currently, the World Health Organisation and most European paediatric nutrition committees recommend partially (moderately) hydrolysed infant formulas for all non-breastfed or partially breastfed at-risk infants. The European Directive on Infant Formula recommends the use of infant formulas with reduced allergenic qualities, which include partially hydrolysed formulas.

In the United States, the American Academy of Pediatrics accepts that moderately hydrolysed formulas may have a role in allergy prevention. However, the data from the ZUFF study show that NAN H.A. is also associated with reduced risk of allergy in nonselected infants. Such mounting clinical evidence for the use of formulas with reduced allergenicity is likely to influence future international recommendations and legislation on infant formulas.

Based on current literature, hypoallergenic infant formulas, like NAN H.A., are the best substitute for mother’s milk for any infant who cannot be exclusively breastfed during the first 6 months of life. The wider use of such formulas may prove an important step toward reducing the future personal and societal burdens of allergic diseases.

References: