



Infant Nutrition Council

Industry supporting both Breastfeeding & Infant Formula

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Do we need to rethink the protein level of infant formula?

The protein level of ready to feed infant formula is significantly higher than that of human milk. This was a deliberate choice because firstly cow milk protein was considered not to be as well digested as human milk protein, and also the amino acid composition which can be achieved with a mix of cow milk proteins [currently 60% whey and 40% casein] does not accurately match that of human milk proteins in terms of the blood levels of individual amino acids produced in the infant. Indeed small amounts of some single amino acids may be added to formula to try to correct this.

The utilisation of formula protein may however be better than we thought, as revealed by a study from Europe.

It is well established that early nutrition in fetal life and infancy can affect later adult health [commonly called the Barker hypothesis]. This is a result of changes in hormone and metabolite levels during sensitive periods of development at a time when growth and development are proceeding at a very rapid pace.

It has also been shown in a combination of three relevant studies, the risk of a child being obese by school age was reduced by 15-25% with early breastfeeding as distinct from formula feeding. It was hypothesised that this resulted from excessive weight gain in infancy seen in feeding studies with formula compared to human milk.

Data on 4235 German children aged 5-6 years were assessed using existing records at birth, 6, 12 and 24 months. Children who had never been breastfed had a prevalence of obesity of 4.5% compared to 2.8% for those who had been breastfed, and a prevalence of overweight of 12.6% compared to 9.2% in those breastfed. Obesity prevalence was 3.8% if breastfeeding lasted for 2 months, 2.3% for 3-5 months, 1.7% for 6-12 months and 0.8% for over 12 months. (One assumes these older infants also received solids). Similar differences were found for being overweight. One hypothesis is that excessive protein intake is particularly

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responsible, reported to result in 55-80% greater protein intake per kilogram of body weight in formula fed babies. Energy intake is also higher but only 10-18% higher per kilo body weight.

The protein hypothesis suggests that an increased protein supply leads to higher body levels of those aminoacids which stimulate insulin release. That in turn increases blood insulin and thence Insulin-like Growth Factor 1 [IGF-1] which stimulates weight gain and especially increase in adipose tissue.

To test this, the European Childhood Obesity Trial Study Group undertook a randomised double-blind study of over a thousand infants who were to be formula fed, and compared the use of infant and followon formulas with higher or lower levels of protein than standard. This is part of a much larger and longer term study in 5 countries.

Measurement at age 2y showed that those fed a formula of lower than usual protein content produced a growth pattern similar to breastfed infants measured as a reference group, and also the pattern described in the new WHO growth standard.

It was hypothesised that this would reduce the risk of obesity in later childhood, and that as a consequence we should review policies for infant formula composition. The study is ongoing, among a much larger cohort of children, and these results are preliminary, but the authors suggest that on the basis of data to date an appropriate level of protein in formula would be nearer 1.8g/100kcal (0.43g/100kJ).

Comment: *This is a dramatic proposal and will undoubtedly lead to considerable debate and further studies not only in the current ongoing trial but also with more detailed metabolic/hormonal measurements. However it should not lead to precipitate action to change the composition of current formulas. The implication that such a change might reduce the risk of obesity is still only hypothetical, much longer-term studies would be needed to ensure that the difference is maintained into adult life, and also that such a change in protein content would not have some subtle deleterious effect on the longerterm growth and development of the child. The current formulation has been in use for several decades, and should not be changed without incontrovertible evidence that such change would be advantageous.*

Koletzko B, von Kries R, Monasterolo RC, Subías JE, Scaglioni S, Giovannini M, Beyer J, Demmelmair H, Anton B, Gruszfeld D, Dobrzanska A, Sengier A, Langhendries JP, Rolland Cachera MF, Grote V; for the European Childhood Obesity Trial Study Group: Can infant feeding choices modulate later obesity risk? *Am J Clin Nutr* 2009;89S: 1S-7S.