

Plenary Session / EC – US Workshop: Early life programming of obesity

Lecture 5: Long-term consequences of infant feeding on later obesity risk

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Abstract

Events during early life modulate later obesity risk, an example of metabolic programming (www.metabolic-programming.org) (1). In a large cross-sectional study, we found breast feeding to reduce the later risk of overweight and obesity in German children at school entry, adjusted for confounders, by about 20 and 25 %, respectively (2). Our findings were confirmed in several other cohort studies, including a large cross-sectional survey of 33,768 school children in the Czech Republic in 1991 where breastfeeding reduced the adjusted odds ratios for overweight and obesity by 20 % (3). In a meta-analysis including 69,000 children in studies adjusting for at least three relevant confounders, we found breastfeeding associated with a obesity risk reduction of 22 % (4), and similar effects were found in two subsequent meta-analyses by other authors.

Given the reported dose-response relationship between breast feeding duration and later risk reduction, compositional aspects of human milk may play a causal role. We hypothesized that breastfeeding protects by reducing high early weight gain through a lower protein content in breast milk as compared to infant formulae (5). This hypothesis is studied in the multicentre EU Childhood Obesity Project in 5 countries, with a one year randomized intervention trial feeding infant and follow-on formulae with different protein contents. We found that less protein in formula normalizes weight for length and BMI (body mass index) up to and at the age of 2 years, relative to breast fed infants (6). We predict that this may lead to a 13 % reduction of overweight at school age.

This data indicates that improved infant feeding strategies can contribute to long-term protection against later obesity. This should lead to enhanced efforts to support, promote and protect breastfeeding, as well as refinement of formula and perhaps complementary feeding strategies.

Further data analysis should explore at which age periods dietary intervention is effective, whether genetically defined subpopulations are particularly responsive, and which metabolomic and endocrine markers may distinguish and predict infants with different risk or susceptibility, which will allow more detailed insights into underlying mechanisms that are important for more sophisticated dietary prevention. Based on such results, future opportunities should arise with regards to the development and evaluation of refined infant feeding products based on modern food technology, that support optimal early growth and long-term obesity prevention

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