Long-term effects of early nutrition on later health

Results in Brief

Early nutrition determines later health

The increase in overweight children constitutes a major health concern for future diseases such as obesity and diabetes. Therefore, it is of paramount importance to translate scientific knowledge into dietary recommendations that are implemented early on in life.

Accumulating evidence indicates that early nutrition and lifestyle have long-term effects on later health. Food choices during pregnancy and eating patterns in infancy can affect a range of different bodily functions. These programmed changes in the body increase the likelihood of becoming overweight and developing consequent metabolic disorders which manifest later in life. Although metabolic programming for obesity is multifactorial, maternal obesity and excessive pregnancy weight gain emerge as independent risk factors of obesity in childhood.

The EU-funded EARLYNUTRITION (Long-term effects of early nutrition on later health) project was a large collaborative effort among researchers from 35 institutions in 12 European countries, the United States and Australia who joined forces to fill the gap between scientific advances and their practical implementation into recommendations for everyday life. “The key objective was to investigate how early nutrition programming and lifestyle factors impact the rates of obesity and related disorders,” explains project coordinator Prof. Berthold Koletzko. In particular, the
project focused on the mechanisms of metabolic programming and how their manipulation could lead to better health later in life.

Association of obesity with early life nutrition

EARLYNUTRITION explored different key hypotheses on likely causes and pathways of early life origins of obesity. These included the in utero hypothesis that suggests that intrauterine exposure to glucose causes permanent changes to the foetus. Maternal obesity was found to alter placental lipid metabolism while dietary intervention studies in obese pregnant rodents showed proof of principle that interventions can reduce obesity and related disorders. In addition, researchers obtained metabolome profiles of pregnant women that allowed them to identify specific obesity-related targets with therapeutic value.

The second hypothesis tested during EARLYNUTRITION – the accelerated postnatal weight gain hypothesis – proposed an association between rapid weight gain in infancy with a higher obesity rate later in life. Researchers performed prospective analyses of 39 mother-offspring cohorts for gestational weight gain, body composition and smoking in relation to offspring adiposity. They detected no correlation between the intake of beneficial omega-3 fatty acids during pregnancy and adolescent adiposity or early type-2 diabetes. Interestingly, following nutritional analysis of breast milk composition they observed an association between pre-pregnancy weight and milk insulin levels.

The effect of early life dietary interventions

In another part of the project, randomised trials in pregnant women and infants as well as follow-up studies in childhood were performed to test the mismatch hypothesis. According to this hypothesis, a sub-optimal perinatal and an obesogenic childhood environment increase the predisposition to obesity and corresponding co-morbidities.

Investigation of a number of pre- and post-natal interventions indicated that reduced protein intake during infancy leads to a significant reduction in obesity risk. “Along with promotion of breastfeeding, this is the most powerful strategy for prevention of childhood obesity known today, and it was promptly implemented in respective EU guidelines,” outlines Prof. Koletzko.

Considering that obesity forms the basis for the development of diabetes, high blood pressure and heart disease, prevention during the early stages of life has the potential to achieve far greater benefits than interventions at later stages. EARLYNUTRITION findings considerably improve our understanding of the impact of early nutritional programming on health during childhood, adolescence and adulthood. Collectively, project results expand existing dietary recommendation
guidelines and identify novel prevention strategies for tackling the childhood obesity epidemic.

**Keywords**

EARLYNUTRITION, nutrition, obesity, pregnancy, diabetes

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**RESULTS PACK**

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