

Fish oil during pregnancy does not protect against excessive adipose tissue development

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Is obesity in infants "programmed" in the womb? Previously, researchers assumed that consumption of "bad" fats during pregnancy contribute to excessive infant adipose tissue growth and that "good" omega-3 fatty acids prevent expansive adipose tissue development. An study run by the Technische Universität München showed no evidence to support this "perinatal programming" theory.

Obesity has become a global epidemic with more and more younger children affected by the overweight trend. According to the Robert Koch Institute, 15 percent of children aged between 3 and 17 are overweight. With serious consequences – childhood [obesity](#) is a risk factor for type 2 diabetes and also increases the chances of developing coronary heart disease or cancer in adult life. Nutritional experts are therefore keen to find effective prevention methods. "Efforts to control weight gain and obesity should target the earliest possible stages of development," says Professor Hauner, Head of the Else Kröner-Fresenius Centre for Nutritional Medicine at TUM.

To achieve that, Prof. Hauner decided to research early adipose [tissue growth](#). In their INFAT study, Hauner and his colleagues, explored how the composition of [fatty acids](#) in the mother's diet during pregnancy and lactation affected the offspring. The research focused in particular on the ratio between Omega 6 fatty acids – present in meats, cold cuts and sausages – and [Omega 3 fatty acids](#) – concentrated in oily saltwater fish in particular. The team hypothesized that decreasing this ratio in the mother's diet was a promising way of preventing infant obesity. Cell

culture and mouse studies had shown that arachidonic acid – an Omega 6 fatty acid – resulted in increased adipogenesis and growth of fat mass in offspring. Experiments with Omega 3 fatty acids, however, revealed a curbing effect on adipose tissue growth among mice offspring.

The results of the INFAT study challenge the validity of this "lean" perinatal programming theory. Hauner and his researchers closely observed and monitored 208 expectant mothers from the start of their pregnancies. One group increased its intake of Omega 3 fatty acids by taking [fish oil](#) capsules and reducing meat-based meals during pregnancy and breastfeeding. The control group maintained its usual diet and refrained from taking fish oil capsules. In both groups, skinfold thickness (SFT) measurements were used to estimate infant adipose tissue growth at regular intervals up until the age of 12 months. For the first time in infants of this age, ultrasound was also used to measure the fat layer at defined sites over the abdomen. The results show no difference in infant [adipose tissue](#) growth between the two groups. This study thus refutes the perinatal programming theory. The INFAT study thus revealed no evidence to support the effectiveness of fish oil capsules during [pregnancy](#) as a way to control excessive weight gain in infants.

So how seriously can we take claims that food supplements increase intelligence, protect against allergies and help avoid obesity? "Many of the claims associated with food supplements should be treated with caution," continues Hauner. "Prenatal development is a complex process that cannot be reduced to a simple correlation between nutrient intake and fat mass growth. There are a number of additional, environmental factors and mechanisms that influence body weight – for instance in daycare or at school." Hence the INFAT study will continue to monitor the children at regular intervals until they reach the age of five. The team now plans to explore other assumptions surrounding the beneficial properties of Omega 3 fatty acids – in relation, for example, to

protection against asthma or neurodermatitis. INFAT is the first prospective, dietary intervention study to provide a rich data set to explore these assumptions.

More information: Hauner H, Much D, Vollhardt C, Brunner S, Schmid D, Sedlmeier EM, Heimberg E, Schuster T, Zimmermann A, Schneider KTM, Bader BL, Amann-Gassner U. Effect of reducing the n-6/n-3 long-chain polyunsaturated fatty acid (LCPUFA) ratio during pregnancy and lactation on infant adipose tissue growth within the first year of life (INFAT study): an open-label, randomized, controlled trial. *The American Journal of Clinical Nutrition*, [DOI:10.3945/ajcn.111.022590](https://doi.org/10.3945/ajcn.111.022590) , published online on December 28, 2011.

INFAT study: Hauner H, Vollhardt C, Schneider KTM, Zimmermann A, Schuster T, Amann-Gassner U. The impact of nutritional fatty acids during pregnancy and lactation on early human adipose tissue development. Rationale and design of the INFAT study. *Annals of Nutrition and Metabolism*, 2009; 54(2):97-103, [DOI: 10.1159/000209267](https://doi.org/10.1159/000209267)

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