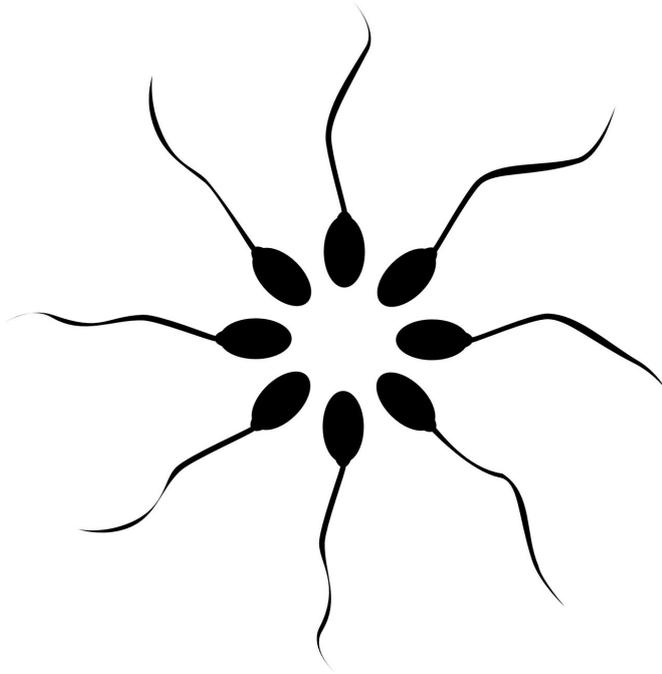


High-fat diet in childhood may affect sperm later in life

22 October 2020



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New research in mice suggests that a high-fat diet early in life may impair male fertility in adulthood. The first-of-its-kind study is published ahead of print in the *American Journal of Physiology-Endocrinology and Metabolism*.

As obesity increases around the world—particularly in children—experts have raised the question of how excessive weight and obesity-associated type 2 diabetes may affect [sperm quality](#) and male fertility. Testicular lipid dynamics—fat levels and [fat metabolism](#) in the testes—play an important role in maintaining normal structure of developing sperm cells. Mitochondrial function—the mitochondria are the energy centers of the cells—and antioxidant defenses provide energy for the production of sperm with normal movement patterns (motility). A new study explores whether a high-fat diet in

childhood can irreversibly damage sperm quality later in life even after a [healthy diet](#) is adopted.

The researchers studied young male mice; one group was given a high-fat diet after weaning, and another group was fed a high-fat diet for two months before switching to a standard diet. Both high-fat groups were compared with a control group on a standard diet. After four months on the diets, all mice were randomly placed in mating pairs with age-matched females. The research team observed reproductive success rate and the size of each litter. After an additional 10 weeks, researchers measured the males' blood sugar, insulin and reproductive hormone levels. They also analyzed sperm for factors that included overall concentration in the testes, [fat levels](#), mitochondrial activity, viability, motility and morphology (shape).

The research team found that diet did not affect hormone levels and that reducing fat in the diet helped to reverse elevated blood sugar levels. However, a high-fat diet negatively affected fat metabolism, caused an accumulation of fatty acids and reduced function of the antioxidant defense system in the testes that did not correct itself upon switching to a standard diet. These changes can lead to inflammation and metabolic changes that correspond with long-term sperm defects. The [high-fat diet](#) groups also had higher rates of pinhead sperm, a serious defect that alters the shape of [sperm cells](#).

The group that shifted from a high-fat to normal diet showed signs of lipolysis—the process of breaking down fats in the body—which is a positive change, but "this process is apparently too slow to recover normal sperm parameters," the researchers wrote.

"Our findings highlight the importance of preventing [childhood obesity](#), to avoid irreversible damage for the reproductive health of the fathers of tomorrow, with unpredicted effects to their progeny," the research team wrote.

"Diet during [early life](#) defines testicular lipid content and sperm quality in adulthood" is published ahead of print in the *American Journal of Physiology-Endocrinology and Metabolism*.

More information: Luis Crisóstomo et al. Diet during early life defines testicular lipid content and sperm quality in adulthood, *American Journal of Physiology-Endocrinology and Metabolism* (2020).
[DOI: 10.1152/ajpendo.00235.2020](https://doi.org/10.1152/ajpendo.00235.2020)

Provided by American Physiological Society

APA citation: High-fat diet in childhood may affect sperm later in life (2020, October 22) retrieved 17 January 2021 from <https://medicalxpress.com/news/2020-10-high-fat-diet-childhood-affect-sperm.html>

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