

Obese dads pass on predisposition to obesity and metabolic disorders to their kids

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If you are obese and hope to be a father, here's another reason to lose weight: your children and grandchildren may inherit your waistline or metabolic disorders. That's because scientists have discovered in mice that obese fathers, even those who did not show any signs of diabetes, passed this negative trait on most frequently to their daughters. Sons don't entirely dodge this genetic bullet either—both sons and daughters of obese fathers have increased risks of developing metabolic diseases, such as diabetes.

"If these findings hold true in humans, then a father's diet and [body composition](#) at the time of conception is likely to affect his future child's health and risk of lifelong disease," said Tod Fullston, Ph.D., a researcher involved in the work from the Department of Obstetrics & Gynaecology at the Robinson Institute, Research Centre for Reproductive Health at the University of Adelaide in South Australia. "Fathers should aim to be as healthy as possible at the time of conception to give future generations the best possible chance of good health."

To make this discovery, Fullston and colleagues used two groups of male [mice](#). One was fed a high-fat diet that resembled a "fast food" diet and the other was fed a nutritious control diet. When compared to the control group, the group fed the "fast food" diet gained weight and had an increase in fat (obesity) without any indications of [diabetes](#). The two groups of male mice were then mated to normal weight control diet-fed females to produce first generation mice, which were also mated to normal weight control diet-fed mice to produce the second generation. Both generations of mouse offspring had [metabolic disorders](#) and obesity, with the only difference being their father's/grandfather's diet, although male/female offspring had different health problems. By

comparing small RNA molecules (microRNAs) in sperm from the obese mice as compared to the control mice, researchers deduced that changes in these molecules might be partly responsible for the transmission of these conditions from father to offspring. This suggests that diet changes the molecular makeup of sperm, which in turn, program embryos and their risk of metabolic and reproductive health problems. The research also suggests that these adverse health outcomes may be transmitted into the second generation as well.

"We've known for quite some time that obesity is a serious problem for children of expectant mothers," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*, "and now we see that obesity is likely a serious problem for children of obese fathers as well. Hopefully as more research emerges to support these findings, future fathers will find ways to slim down, if not for themselves, then for their children and [grandchildren](#)."

More information: Tod Fullston, E. Maria C. Ohlsson Teague, Nicole O. Palmer, Miles J. DeBlasio, Megan Mitchell, Mark Corbett, Cristin G. Print, Julie A. Owens, and Michelle Lane. Paternal obesity initiates metabolic disturbances in two generations of mice with incomplete penetrance to the F2 generation and alters the transcriptional profile of testis and sperm microRNA content. *FASEB J*, [doi:10.1096/fj.12-224048](https://doi.org/10.1096/fj.12-224048)

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