

Fathers' diet, bodyweight and health at conception may contribute to obesity in offspring

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Research involving rats suggests that there is a biological link between paternal diet, bodyweight and health at the time of conception and the health of his offspring. In a new research report published online in *The FASEB Journal*, scientists show that if male rats ate a high fat diet, had diabetes and were obese, their offspring had altered gene expression in two important metabolic tissues—pancreas and fat (even though they were not yet obese). This altered gene expression may increase the risk of future obesity and premature aging. Other genes that were affected include markers of premature aging, cancer, and chronic degenerative disease.

"While scientists have focused on how the maternal diet affects children's health, this study is part of exciting new research exploring the impact of paternal diet on offspring risk of obesity," said Margaret Morris, Ph.D., a researcher involved in the work from the Pharmacology School of Medical Sciences at the University of New South Wales in Sydney, Australia. "The fact that similar gene markers were affected in pancreas and fat tissue tells us that some of the same pathways are being influenced, possibly from the earliest stages of life. It will be important to follow up these findings, and to learn more about when and how to intervene to reduce the impact of poor paternal metabolic health on offspring."

To make this discovery, Morris and colleagues used two groups of male rats, one of which was obese and diabetic and fed a high-fat diet; and the other was lean and healthy and fed a normal diet. The two groups of males were mated with lean female rats, and researchers examined their female offspring. Those who were born from obese fathers on a [high-fat diet](#), showed a poor ability to respond to a glucose challenge, even while consuming a healthy diet. Specifically, the offspring

of the obese rats showed [gene expression](#) changes in pancreatic islets, which are responsible for producing insulin to control blood glucose and the [fat tissue](#) of their female offspring.

"For a long time, we've known that the nutrition and health status of women who are pregnant or who want to get pregnant is critical to the health of her offspring, and we've also suspected that the same is true for fathers to a lesser degree," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "This report is the first step in understanding exactly how the nutrition and [health](#) of fathers affects his children, for better or worse."

More information: Sheau-Fang Ng, Ruby C. Y. Lin, Christopher A. Maloney, Neil A. Youngson, Julie A. Owens, and Margaret J. Morris. Paternal high-fat diet consumption induces common changes in the transcriptomes of retroperitoneal adipose and pancreatic islet tissues in female rat offspring. *FASEB J.* DOI: [10.1096/fj.13-244046](https://doi.org/10.1096/fj.13-244046)

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