

Grandpa's obesity affects the health of his grandchildren

July 18 2016



This is an image of a weight scale. Credit: CDC/Debora Cartagena

With more than 14 million Australians now overweight or obese, researchers are warning of the harmful legacy that parental obesity can have on future generations. It follows a vital breakthrough in obesity research, which shows a father's metabolic health can be passed from generation to generation, affecting not only his children but importantly his grandchildren.

Scientists at Sydney's Victor Chang Institute and Garvan Institute of Medical Research have discovered that male mice who are obese when they conceive are putting their children and grandchildren at significant risk of developing metabolic disease - long before they are even born.

The lead author on the study, Associate Professor Catherine Suter from the Victor Chang Institute, believes that the discovery could have immediate ramifications for the public's health.

"A baby's health has long been considered the mother's responsibility as soon as she falls pregnant. But little attention has been paid to how a father's health might impact his unborn child. Now, we've found powerful evidence, in a mouse model, that dad's nutrition and [metabolic health](#) can influence his sons, and even his grandsons."

"We looked at the effect of dad's obesity across three generations. At first his offspring appeared to be in good metabolic health. But when they consumed a high-fat, high sugar, [junk food](#) diet, all the sons reacted dramatically and within just a few weeks they developed [fatty liver disease](#) and pre-diabetic symptoms, such as elevated glucose and insulin in the bloodstream," A/Professor Suter explained.

The researchers were amazed to find that the grandsons of the [obese mice](#) were also predisposed to [metabolic disorders](#), just as their fathers were. Importantly, this predisposition was transmitted to the grandsons even if their fathers ate well and were metabolically well at the time of conception.

"We were shocked when we saw the results, which were absolutely black and white. The grandchildren are at significant risk of getting very sick if they eat a 'junk [food diet](#)' - even when their father eats well and is healthy. The effects of the diet on offspring are dramatic, even when they eat poorly for just for a short time, all because their grandfather

was obese," A/Professor Suter confirmed.

Professor Mark Febbraio from Garvan is urging Australians to consider the lasting legacy of a poor diet on [future generations](#).

"It's important that we inform people of the implications of this study and possible risks so they can start making lifestyle changes now. If your father or grandfather was overweight or obese, you might need to be particularly careful about what you choose to eat. You can't treat your body like a rental car - otherwise you run the risk of propagating this for generations. And, as a father-to-be, it's worth considering whether your own health could impact on your children, and their children in turn," Professor Febbraio said.

But there is good news. The researchers also observed that in the great-grandsons, the metabolic health was improving significantly.

"By the third generation, the exaggerated response to a junk food diet was all but absent. What this shows is that it's possible to break that cycle of [metabolic disease](#). It's crucial to note that this predisposition isn't genetic. Instead, it's acquired. That means the damage can be undone and is ultimately reversible," explained Professor Suter.

The scientists say it's still not entirely clear how this multigenerational programming is happening, but there appear to be clues within the sperm of the mice.

"We are now working to understand how changes in RNA molecules in the sperm could transmit the metabolic effects from generation to generation," Professor Febbraio added.

The research has recently been accepted for publication in the journal *Molecular Metabolism*.

More information: Jennifer E. Cropley et al, Male-lineage transmission of an acquired metabolic phenotype induced by grand-paternal obesity, *Molecular Metabolism* (2016). [DOI: 10.1016/j.molmet.2016.06.008](https://doi.org/10.1016/j.molmet.2016.06.008)

Provided by Garvan Institute of Medical Research

Citation: Grandpa's obesity affects the health of his grandchildren (2016, July 18) retrieved 20 March 2024 from <https://medicalxpress.com/news/2016-07-grandpa-obesity-affects-health-grandchildren.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--