

Childhood exercise can reverse negative health effects caused by father's obesity

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Exercise in childhood has been shown to promote long-lasting health and can counteract the risk of developing diabetes that comes from having an obese father.

That's according to new research published in *The Journal of Physiology*. Insulin is a hormone that controls [blood sugar levels](#) and people with low insulin sensitivity do not respond to insulin as well as normal, which results in blood sugars levels increasing. This can lead to type 2 diabetes.

Children of fathers with a [high-fat diet](#) or who are obese are more likely to have low insulin sensitivity. This new research indicates that exercise early in life reverses the negative effect of this low insulin sensitivity in adulthood for children and therefore can counteract the risk of diabetes.

The study conducted by Victoria University, Melbourne, in collaboration with the University of Melbourne, involved breeding obese male rats with healthy female rats. Their [offspring](#) underwent exercise training for only 4 weeks after weaning and then were assessed as adults in terms of responsiveness to glucose and insulin, skeletal muscle function and pancreas structure.

The offspring of obese fathers had reduced whole body and skeletal muscle insulin sensitivity and reduced insulin secretion. Early exercise in these offspring prevented in adulthood the negative effects caused by a high-fat diet in their [fathers](#). It is important to note early exercise did not have any positive effects on their pancreas. This was very interesting as the group had previously shown that rats born small for gestational age, like humans, had pancreas problems as adults but in this case, early life exercise in the rats prevented the pancreatic problems.

The study is limited in that the researchers did not determine at which age the alterations in the health status of the individual begins and when these changes take place. This would help to determine optimal periods

during childhood when preventive interventions should be introduced.

The researchers plan to look at which genes are switched on and off to determine the relationship between paternal diet and offspring exercise, as well as how exercise and paternal diet can affect the offspring's physiology. They also plan to examine if similar effects occur in larger mammals that have developmental rates more similar to humans.

Dr. Filipe Falcão-Tebas, the first author, and Professor Glenn McConell, the senior author on the study, commented on the findings 'Obesity due to a high-fat [diet](#) in the father can have a negative effect on the metabolism of their offspring. Our study showed that [exercise](#) only in early life of the offspring can have long-lasting beneficial effects on their health by normalizing their muscle [insulin sensitivity](#) in adulthood. Further work needs to be carried out including understanding what genes are switched on and off to cause these changes'.

More information: Four weeks of exercise early in life reprograms adult skeletal muscle insulin resistance caused by paternal high fat diet, *Journal of Physiology* (2018). [DOI: 10.1113/JP276386](https://doi.org/10.1113/JP276386)

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