

Father's diet impacts on son's ability to reproduce, study finds

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Credit: Monash University

New research involving Monash University biologists has debunked the view that males just pass on genetic material and not much else to their offspring. Instead, it found a father's diet can affect their son's ability to out-compete a rival's sperm after mating.

The study sought to understand if the nutritional history of fathers had

an effect on their sons. Experiments were carried out in the fruit fly, which shares many similar pathways and characteristics with human genes.

One of the lead authors of the study, Dr Susanne Zajitschek from the School of Biological Sciences, said the study highlighted the importance of the paternal environment on future generations, even a long time before offspring were produced.

"Our study found that males that were raised on either high or low protein diets, but spent their adulthood on an intermediate diet, produced sons that had large differences in gene expression, which most likely contributed to the resulting differences in [sperm](#) competitiveness," Dr Zajitschek said.

"They differed in their ability to sire offspring, with the high-protein dads producing sons who were doing much better in [sperm competition](#), which means their sperm was more likely to win against a competitor's sperm within the female tract.

"We also found that the immune response genes were less active in sons of low-protein fathers, while metabolic and reproductive processes were increased in sons of fathers on a [high protein diet](#)," she said.

The research, published in *Biology Letters*, is one of only a few studies to have so far reported trans-generational effects in relation to diet quality, and one of the first to report on the post-copulatory advantages conferred by parental diet.

Researchers from Monash University, George Washington University, and the Spanish-based Donana Biological Station took part in the study which examined how high- and low-protein paternal larval [diet](#) influenced post-copulatory sexual selection and [gene expression](#) in the

sons of fruit flies (*Drosophila melanogaster*).

More information: Felix Zajitschek et al. High-protein paternal diet confers an advantage to sons in sperm competition, *Biology Letters* (2017). [DOI: 10.1098/rsbl.2016.0914](https://doi.org/10.1098/rsbl.2016.0914)

Provided by Monash University

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