

New research: Increased stress on fathers leads to brain development changes in offspring

16 February 2018, by David Kohn



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New research in mice has found that a father's stress affects the brain development of his offspring. This stress changes the father's sperm, which can then alter the brain development of the child. This new research provides a much better understanding of the key role that fathers play in the brain development of offspring.

Scientists have known that a mother's environment during pregnancy, including factors such as poor diet, [stress](#) or infection, can cause damage negatively impact her [offspring](#). This may be due in part to how this environment affects the expression of certain genes—known as epigenetics.

But the researchers, led by neuroscientist Tracy Bale at the University of Maryland School of Medicine, now show that a father's stress can also affect offspring [development](#), by altering important aspects of his sperm.

Bale will discuss this new, not-yet-published work

at a special session and press conference at the 2018 AAAS annual meeting in Austin, Texas on Friday, February 16.

Previously, Bale had found that adult male mice experiencing chronic periods of [mild stress](#) have offspring with a reduced response to stress; changes in stress reactivity have been linked to some neuropsychiatric disorders, including depression and PTSD. She and her colleagues isolated the mechanism of the reduced response; they found that the father's sperm showed changes in genetic material known as microRNA. MicroRNA are important because they play a key role in which genes become functional proteins.

Now, Bale and her colleagues have unraveled new details about these microRNA changes. In the male reproductive tract, the caput epididymis, the structure where sperm matures, releases tiny vesicles packed with microRNA that can fuse with [sperm](#) to change its cargo delivered to the egg. The caput epididymis responded to the father's stress by altering the content of these vesicles.

This suggests that even mild environmental challenges can have a significant impact on the development and potentially the health of future offspring. By learning more about links between a father's exposure to stress and the risks of disease for his offspring, we can better understand, detect, and prevent these disorders.

Bale has focused much of her research on the links between stress and subsequent risk for [neurodevelopmental disorders](#), including autism and schizophrenia, in offspring. Her previous studies on the placenta have revealed novel sex differences during pregnancy that may predict increased prenatal risk for neurodevelopmental disorders in males.

More information: The press conference will occur at 10 AM on Friday, February 16 in the AAAS pressroom in the Austin convention Center.

Provided by University of Maryland School of Medicine

APA citation: New research: Increased stress on fathers leads to brain development changes in offspring (2018, February 16) retrieved 8 March 2021 from <https://phys.org/news/2018-02-stress-fathers-brain-offspring.html>

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