



University of
Lethbridge

NEWS RELEASE

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Prenatal maternal stress has lasting effects on offspring

A University of Lethbridge research study has shown that the effects of prenatal maternal stress (PNMS) can last for generations.



Drs. Gerlinde Metz and Stephanie King and a team of researchers used a rat model to examine the consequences of PNMS across four generations.

“Prenatal maternal stress is a major driver of adverse pregnancy outcomes and a risk factor for chronic illness in adulthood,” says Metz. “The present study builds on our earlier finding that transgenerational and multigenerational PNMS causes adverse pregnancy outcomes and impaired development in offspring.”

The first- and second-generation mothers experienced shorter pregnancies and altered behaviours, and their pups had reduced weight and delayed sensorimotor development.

“In our new study, we found that the first generation of offspring revealed a moderate impact of PNMS, but we saw drastic changes in the second and third generations,” says Metz.

The disruption involved genes and biological pathways associated with neurological and psychiatric diseases, which may help explain why some non-genetic diseases carry a risk in some families. The placenta typically prevents fetal exposure to maternal stress hormones, but PNMS may affect the balance. If the stress occurs during a critical time of development, it can affect the eggs and sperm and potentially the health of future generations.

“Our study demonstrates the compounding consequences of PNMS across generations,” says Metz. “It also suggests the placenta could be a source of predictive biomarkers associated with neurodevelopmental health.”

Using the placenta to identify markers associated with prenatal stress could lead to therapeutic interventions in early life that could mitigate the impact of some psychological and neurological diseases.



King, the lead author of the study and now an assistant professor and research director at St. Matthews University School of Medicine in the Cayman Islands, states that one of the most exciting aspects of this study is the identification of the placenta as a potential noninvasive biomarker for predicting a child's neurodevelopmental health.

"We saw many of the same shifts in the placenta mirrored in the brain," says King. "By analyzing placental tissue, we can gain insights into how prenatal stress can predispose individuals to mental or physical health issues later in life."

"Our findings underscore the importance of considering environmental stressors, like maternal stress, as key contributors to the rising rates of neurodevelopmental and psychiatric disorders. This research opens new avenues for early intervention and prevention strategies, potentially helping to reduce the transgenerational transmission of these risks."

Note

Dr. Stephanie King, who is also an expert in the field of transgenerational programming linked to environmental toxicants such as DDT and glyphosate, is available for interviews via Zoom.

[Read the online version.](#)

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Our University's Blackfoot name is Iniskim, meaning Sacred Buffalo Stone. The University is located in traditional Blackfoot Confederacy territory. We honour the Blackfoot people and their traditional ways of knowing in caring for this land, as well as all Indigenous Peoples who have helped shape and continue to strengthen our University community.

