University of Lethbridge News Release

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Research reveals importance of social experience, especially for females

New research from the Canadian Centre for Behavioural Neuroscience at the University of Lethbridge has shown that strong and consistent social relationships are linked to a reduced anxiety response and more exploratory behaviour among female rats — a finding that could have implications for humans because of the growing use of electronic communications.

“It is a very important finding,” says Dr. Jamshid Faraji, a research associate in Dr. Gerlinde Metz’s lab. “We, as humans, are becoming increasingly socially isolated and many of us are deprived of face-to-face visual and interactional inputs.”

He, along with researchers from Golestan University of Medical Sciences and Avicenna Institute of Neuroscience in Iran, collaborated on a study using a rat model that has shown the benefits of social experience on the brain and behaviour, and a direct transmission of those benefits from mothers to their daughters. The results were recently published in *Scientific Reports - Nature* in an article entitled *Intergenerational Sex-Specific Transmission of Maternal Social Experience.*

“From a scientific perspective, we needed to find the neurohormonal correlates of social life and how that could impact our lives and, particularly, women’s lives,” says Faraji.

The researchers studied four groups of rats —males and females that lived in standard housing conditions and males and females that lived in social housing conditions. In the standard housing, two or three animals lived together while, in the social housing condition, about a dozen animals lived in a larger space.

“We found that, after three months, males and females raised in social conditions were showing unique changes in their brain structure and function, but females were showing more changes in their behaviour and brain structure compared to social males,” says Faraji. “In terms of changes in brain structure, social females were showing thicker cortexes and more density in neuronal populations.”

The researchers also wanted to know if the brain and behaviour changes they observed would also be seen in offspring, even if they weren't raised in social housing conditions. So, all animals in the second generation were raised in standard conditions. Half of the animals had mothers that had lived in social conditions and the other half had mothers that had lived in standard conditions.

"There's a very clear track of female lineage or mother-to-daughter pathway," says Faraji. "Although the female offspring were not exposed to social life, they were getting all those characteristics from their social mothers."

While there were some effects on male offspring, effects on females were more salient. They exhibited greater neural complexity, were more curious about the environment and showed reduced stress responses.

Previous research has shown females are more at risk when it comes to social isolation because of the oxytocin system, a key system that, to some extent, differentiates male and female responses to social interactions. Oxytocin, a brain chemical, has also been called the love hormone. Also, persistent social experience reduced stress hormones in social animals and their unexposed descendants. Faraji says online social interactions don't have the same effect on the brain as face-to-face contact, which releases oxytocin, and increasing social isolation can often be linked to anxiety and depression.

"Based on my results, I would suggest that we need to encourage people to establish strong social relationships that involve face-to-face communication in consistent and constant ways," says Faraji.

This news release can be found online at Maternal Social Experience.

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Contact
Caroline Zentner, public affairs advisor
403-394-3975 or 403-795-5403 (cell)
caroline.zentner@uleth.ca