Studies highlight lasting effects of early life stress on the genome, gut, and brain

November 5 2018

Excessive stress during fetal development or early childhood can have long-term consequences for the brain, from increasing the likelihood of brain disorders and affecting an individual's response to stress as an adult to changing the nutrients a mother may pass on to her babies in the womb. The new research suggests novel approaches to combat the effects of such stress, such as inhibiting stress hormone production or "resetting" populations of immune cells in the brain. The findings were presented at Neuroscience 2018, the annual meeting of the Society for Neuroscience.

Childhood stress increases the chance of developing anxiety, depression, or drug addiction later in life by two to four times, while stress during pregnancy may increase the child's risk of developing autism spectrum disorder, as well as several other psychiatric illnesses. Scientists are discovering more about the mechanisms through which childhood or fetal stress disrupts brain development and leads to these disorders, which may help reveal new therapeutic strategies.

Today's new findings show that:

- In a mouse model of autism spectrum disorder caused by maternal infection during pregnancy, renewing fetal brain immune cells alleviates symptoms of the disorder (Tsuneya Ikezu, abstract 030.09)
- Stress before or during pregnancy can alter gut bacteria in women and mice, which in the mice reduces critical nutrients

reaching fetuses' brains (Eldin Jašarevic, abstract 500.14)
- Early life stress changes chromatin structure in a brain reward region in mice, making them more vulnerable to stress as adults (Catherine Pena, abstract 500.01)
- In rat pups, stress-induced deficits in social behavior and amygdala development occur only when the mother is present (Regina Sullivan, abstract 783.14)
- Early life stress accelerates the development of the fear response in young mice, but the effect can be prevented by blocking stress hormone production (Kevin Bath, abstract 499.01)

"The research presented today demonstrates the long-lasting and far reaching effects of stress during early development, from the populations of bacteria in the gut to the way DNA is folded in the nucleus," said press conference moderator Heather Brenhouse, Ph.D., of Northeastern University and an expert in the effects of early life trauma. "Understanding how stress impacts developing biological systems may lead to new, patient-specific approaches to treatment and better outcomes."

Provided by Society for Neuroscience