

High levels of maternal care has life-long impact on vulnerability to stress

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A new study shows that high levels of maternal care during the early post-natal period in rodents can reduce the sensitivity of the offspring to stressful events during adulthood. Maternal care is shown to chemically modify and thereby re-program genes that control stress responses making them less likely to be activated. The findings have important implications for understanding early environment influences on stress-related disorders.

Early life experience, particularly quality of [maternal care](#) and sensory input from the mother, can influence vulnerability or resilience to mental and [cognitive problems](#) later in life, but little is known about how this occurs.

In a new study, led by Tallie Z. Baram from the University of California at Irvine, the effects maternal care on stress systems in the brain, which are thought to influence vulnerability to depression, were investigated in laboratory rats. The authors separated rat pups from their mothers for a short time every day for a week. This led to intense maternal care every day when pups and mother-rats were reunited. The activity of neurons that produce the stress chemical corticotropin-releasing hormone (CRH) were then examined in the brains of these offspring and compared with those from control offspring.

It was found that enhanced quality of maternal care experienced by the pups reduced the excitability of CRH-producing stress neurons in their brains. This effect was also associated with reduced activity of stress-

associated genes in these neurons. The reduced activity of stress-related genes resulted from altered activity of a protein called NRSF, an important regulator of gene expression in the brain. This rewiring of brain stress circuits in rats pups that receive enhanced quality of maternal care was associated with activation of stress-related genes later in life in response to a stressful event.

This study provides a mechanism that may explain the beneficial effects of maternal care on resilience to stress-related disorders. According to Dr. Baram. "The findings show a direct causal effect of [sensory input](#) from the mother on the function of stress handling throughout life, and pinpoint the molecular changes involved. They also show plasticity of the wiring of the infant brain."

There are important future implications of the study for those who may be vulnerable to depression. "If we figure out exactly how cells regulate their stress molecules, we can modify and improve the function of the stress system in individuals who have not benefited from optimal early life environment, and perhaps prevent vulnerability to [stress](#)-related mental and cognitive problems", said Dr. Baram.

Provided by American College of Neuropsychopharmacology

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