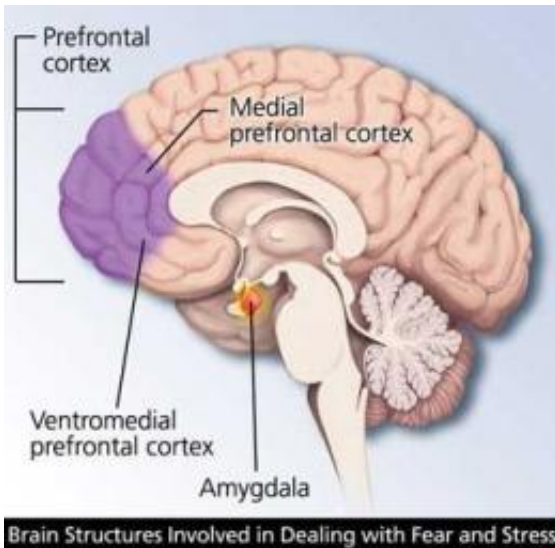


Researchers find key to gender differences in processing stress

3 December 2010



This is a stressful season in a stressful time, and there is plenty of evidence to suggest that women are more prone to emotional stress and depression than their cool male counterparts. Tracey Shors, a professor of psychology in Rutgers School of Arts and Sciences, has uncovered a clue to why men and women handle stress so differently in the brains of male and female rats.

The research, published Dec. 1 in the [Journal of Neuroscience](#), has implications for the way stress-related disorders are treated in men and women.

Shors and her co-authors, graduate student Lisa Maeng and post-doctoral scholar Jaylyn Waddell, examined two [brain regions](#) important in learning and stress, the amygdala and the prefrontal cortex. The amygdala, a small almond-shaped structure located deep within the brain, senses stressful situations. The prefrontal cortex, in the front of the brain, is necessary for higher cognitive functions.

"These two structures are intimately connected to one another," Shors said. "Therefore, we examined whether they communicate with one another to influence learning after stress."

The researchers exposed male and female rats to stress, and then presented them with an associative learning task. During training, the rats learned to associate one event with another that occurred later in time. They played a tone and later stimulated the rats' eyelids to elicit a blink. After the stimulus was taken away, most of the male rats responded to the tone by blinking on their own. Most of the females, however, did not blink in response to the tone, indicating that they had failed to learn that association. But the research also contained a neurological surprise for Shors, Maeng and Waddell.

When Shors and her colleagues disrupted the connections between the prefrontal cortex and the amygdala in some of the females, those females were able to learn the association.

"This wasn't true for males," Shors said. "So, males and females are using different brain structures to learn after stress. In other words, females can learn after stress if the [prefrontal cortex](#) can't 'talk' to the amygdala. From this, we conclude that males and females can use different brain circuits to learn after stressful life events."

Shors says sex differences in the brain may explain why women are so sensitive to stress, and why they are more likely to suffer from stress-related diseases such as [depression](#) and post-traumatic [stress](#) disorder (PTSD).

"Given these data, maybe we should consider these gender differences when we design treatments for such disorders," Shors said.

Provided by Rutgers University

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