PRESS RELEASE

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Estrogen Effects on Brain Function May Contribute to Anxiety Problems

Anxiety disorders are among the most common psychiatric problems and they occur twice as frequently in women. Much research has been performed to understand the brain's response to fear and the elimination of fear, but many have focused solely on males. Thus, continuing to further understanding of the neurobiology underlying this sex difference could have important implications for the quality of life of many women.

A new study in *Biological Psychiatry* has used a multimodal, translational approach to study both female rats and healthy women during their natural hormonal cycles. Researchers exposed women to fear conditions using mild shocks. They found that estradiol aids the consolidation of extinction memory and increases the activation of brain regions involved in reducing fear.

"These data suggest that a woman's ability to inhibit her fear may be influenced by her estrogen levels at the time of exposure to the threatening cue: the higher the estrogen, the better her ability to control fear," explained senior author Dr. Mohammed Milad.

The authors do caution that these preliminary findings are based on experimental conditions in the laboratory and further studies are needed to test if women's ability to control fear in a natural setting may also be influenced by estrogen.

What seems to be clear for now is that estrogen is influencing the activation of critical networks in the brain that are involved in the response to fear. It is interesting to note that these particular brain regions have high levels of estrogen receptors compared to other brain regions.

Dr. John Krystal, Editor of *Biological Psychiatry*, commented: "Estrogen appears to have powerful effects on brain circuits involved in the learning of fears and the abatement of these fears. Its complex effects on these brain circuits may hold important clues to the distinctive pattern of anxiety disorders in women and perhaps to unique approaches to treatment."

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Notes to Editors:
The article is “Estradiol Modulates Medial Prefrontal Cortex and Amygdala Activity During Fear Extinction in Women and Female Rats” by Mohamed A. Zeidan, Sarah A. Igoe, Clas Linnman, Antonia Vitalo, John B. Levine, Anne Klibanski, Jill M. Goldstein, Mohammed R. Milad. The authors are affiliated with Massachusetts General Hospital, Boston, Massachusetts and Harvard Medical School, Charlestown, Massachusetts. Levine is also affiliated with Shriners Burns Hospital for Children, Boston, Massachusetts. Goldstein is also affiliated with Brigham and Women's Hospital, Boston, Massachusetts. The article appears in *Biological Psychiatry*, Volume 70, Number 10 (November 15, 2011), published by Elsevier.

The authors’ disclosures of financial and conflicts of interests are available in the article.

John H. Krystal, M.D., is Chairman of the Department of Psychiatry at the Yale University School of Medicine and a research psychiatrist at the VA Connecticut Healthcare System. His disclosures of financial and conflicts of interests are available here.

Full text of the article mentioned above is available upon request. Contact Donna Santaromita at d.santaromita@elsevier.com to obtain a copy or to schedule an interview.

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Biological Psychiatry is the official journal of the Society of Biological Psychiatry, whose purpose is to promote excellence in scientific research and education in fields that investigate the nature, causes, mechanisms and treatments of disorders of thought, emotion, or behavior. In accord with this mission, this peer-reviewed, rapid-publication, international journal publishes both basic and clinical contributions from all disciplines and research areas relevant to the pathophysiology and treatment of major psychiatric disorders.

The journal publishes novel results of original research which represent an important new lead or significant impact on the field, particularly those addressing genetic and environmental risk factors, neural circuitry and neurochemistry, and important new therapeutic approaches. Reviews and commentaries that focus on topics of current research and interest are also encouraged.

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