

Effects of social isolation traced to brain hormone

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The anxiety and aggression that result from social isolation have been traced to altered levels of an enzyme that controls production of a brain hormone.

The study, done in mice by researchers at the University of Illinois at Chicago College of Medicine, is reported in this week's online addition of the *Proceedings of the National Academy of Sciences*.

"We use this animal model for human stress because social isolation in both animals and humans can be responsible for a range of psychological effects, including anxiety, aggression and memory impairment," said Dr. Erminio Costa, director of the UIC Psychiatric Institute, professor of biochemistry and one of the authors of the study.

Previous studies had suggested that the neural pathways that underlie aggression, anxiety and fear include activation of specific types of neural circuitry that leads into the amygdala, the region of the brain responsible for emotion.

The researchers looked in these types of neurons for changes in the levels of two enzymes that are needed for the production of allopregnanolone, a brain hormone that acts to reduce stress through regulation of GABA, an important neurotransmitter. They found that the level of one of the enzymes, called 5-alpha-reductase type I, was reduced nearly 50 percent in the lonesome mice. Levels of the other enzyme did not change.

The researchers suggest that the decrease of 5-alpha-reductase type I and the consequent reduction in the hormone may impair the function of circuits leading to the amygdala and explain the aggressive behavior, perhaps related to anxiety, in socially isolated mice.

"Humans respond to similar stress in very similar ways," said Dr. Alessandro Guidotti, UIC scientific director and professor of biochemistry in psychiatry. "By identifying the mechanism we may be able to identify drugs that can treat these effects of stress."

UIC researchers Roberto Agis-Balboa, Dr. Graziano Pinna, Fabio Pibiri and Dr. Bashkim Kadriu also contributed to the study. The work was supported by grants from the National Institute of Mental Health. Pibiri was supported in part by a postdoctoral fellowship from the Regione Autonoma della Sardegna, Italy.

UIC ranks among the nation's top 50 universities in federal research funding and is Chicago's largest university with 25,000 students, 12,000 faculty and staff, 15 colleges and the state's major public medical center. A hallmark of the campus is the Great Cities Commitment, through which UIC faculty, students and staff engage with community, corporate, foundation and government partners in hundreds of programs to improve the quality of life in metropolitan areas around the world.

Source: University of Illinois at Chicago

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