PRESS RELEASE

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Sex Change Hormonal Treatments Alter Brain Chemistry

Reports new study in Biological Psychiatry

Philadelphia, PA, October 8, 2015 – Hormonal treatments administered as part of the procedures for sex reassignment have well-known and well-documented effects on the secondary sexual characteristics of the adult body, shifting a recipient's physical appearance to that of the opposite sex.

New research published in the current issue of *Biological Psychiatry* indicates that these hormonal treatments also alter brain chemistry.

Researchers at the Medical University of Vienna, led by senior authors Dr. Siegfried Kasper and Dr. Rupert Lanzenberger, show that administration of the male hormone testosterone in female-to-male transsexuals raises brain levels of SERT, the protein that transports the chemical messenger serotonin into nerve cells.

In contrast, male-to-female transsexuals who received a testosterone blocker and the female hormone estrogen showed decreased levels of this protein in the brain.

SERT plays an important role in the treatment of mood and anxiety disorders, as many common antidepressants, such as Prozac, block its activity by inhibiting serotonin reuptake. In addition, some genetics studies have suggested that higher levels of serotonin transporter may increase resilience to stress and reduce risk for stress and mood disorders.

Because women are twice as likely to be diagnosed with depression as men, these changes in the levels of SERT are consistent with the increased risk for mood and anxiety disorders in females relative to males.

Lanzenberger added, "These results may explain why testosterone improves symptoms in some forms of depression. Our study also increases our knowledge on the role of sex hormones in sex differences of mood disorders."

Overall, these findings suggest that when people switch from female to male, their biology changes in a way that is consistent with a reduced risk for mood and anxiety disorders, whereas the reverse happens when males switch to females.

"This study is the first to show changes in brain chemistry associated with the hormonal treatments administered in the sex change process," said Dr. John Krystal, Editor of *Biological Psychiatry*. "It provides new insight into the ways that the hormonal differences between men and women influence mood and the risk for mood disorders."

The article is "High-Dose Testosterone Treatment Increases Serotonin Transporter Binding in Transgender People" by Georg S. Kranz, Wolfgang Wadsak, Ulrike Kaufmann, Markus Savli, Pia Baldinger, Gregor Gryglewski, Daniela Haeusler, Marie Spies, Markus Mitterhauser, Siegfried Kasper, and Rupert Lanzenberger (doi: 10.1016/j.biopsych.2014.09.010). The article appears in *Biological Psychiatry*, Volume 78, Issue 8 (October 15, 2015), published by Elsevier.

Notes for editors

Full text of the article is available to credentialed journalists upon request; contact Rhiannon Bugno at +1 214 648 0880 or Biol.Psych@utsouthwestern.edu. Journalists wishing to interview the authors may contact Dr. Rupert Lanzenberger at +43 (1) 40400 35760 or rupert.lanzenberger@meduniwien.ac.at.

The authors' affiliations, and disclosures of financial and conflicts of interests are available in the article.

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About *Biological Psychiatry*

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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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