

Testosterone helps to bind antidepressants in the brain

January 26 2015, by Johannes Angerer

Female sex hormones have a strong effect on the psyche. This has been confirmed by numerous scientific studies and by phenomena such as the "baby blues", a bout of low mood following childbirth, or recurrent mood swings that occur prior to menstruation. However the male sex hormone testosterone also affects our mood and emotions, as well as our libido - and in a positive way.

In a study published in the highly respected journal *Biological Psychiatry*, researchers from the MedUni Vienna have now discovered a potential biological mechanism behind this relationship.

As they grow older and as their sex hormone output falls, men suffer more commonly from depression and some studies have already demonstrated a positive effect of testosterone supplementation on the moods of the test subjects. Now, the study led by Rupert Lanzenberger from the University Department of Psychiatry and Psychotherapy has demonstrated for the first time worldwide that testosterone increases the number of serotonin transporters (proteins) in the human brain. These proteins regulate the concentration of serotonin and are also the target for antidepressants.

Serotonin transporters increased after just four weeks of hormone therapy

As a model for investigating the effect of testosterone, the researchers from the MedUni Vienna chose hormone therapy given to transsexuals.

Says primary author Georg Kranz: "Transsexuals are people who feel that they are living in the wrong body and who therefore want high doses of opposite gender hormone therapy to adapt their appearance to that of the other gender. Genetic women are given testosterone, while genetic men are given oestradiol and medications to suppress testosterone production."

Using the imaging method of positron emission tomography (PET), the scientists together with Wolfgang Wadsak and Markus Mitterhauser from the Clinical Department of Nuclear Medicine and Ulrike Kaufmann from the University Department of Gynaecology have demonstrated that serotonin transporter levels in the brain are significantly higher after just four weeks of [hormone therapy](#) with testosterone and that they rise further if therapy continues. Moreover, a close relationship has also been demonstrated between [testosterone levels](#) in the blood and the concentration of serotonin transporters.

"The study has shown that [testosterone](#) increases the potential binding sites for commonly prescribed antidepressants such as SSRIs in the brain and therefore provides major insights into how sex hormones affect the human brain and gender differences in psychiatric illnesses," says Siegfried Kasper, Head of the University Department of Psychiatry and Psychotherapy at the MedUni Vienna.

More information: "High-Dose Testosterone Treatment Increases Serotonin Transporter Binding in Transgender People." *Biol Psychiatry*. 2014 Sep 23. pii: S0006-3223(14)00709-4. [DOI: 10.1016/j.biopsych.2014.09.010](#). [Epub ahead of print]

Provided by Medical University of Vienna

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