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PII: S1053-8119(17)30129-5
DOI: http://dx.doi.org/10.1016/j.neuroimage.2017.02.027
Reference: YNIMG13812
To appear in: NeuroImage

Received date: 13 September 2016
Revised date: 2 December 2016
Accepted date: 10 February 2017

Cite this article as: Georg S. Kranz, Rene Seiger, Ulrike Kaufmann, Allan Hummer, Andreas Hahn, Sebastian Ganger, Martin Tik, Christian Windischberger, Siegfried Kasper and Rupert Lanzenberger, Effects of sex hormone treatment on white matter microstructure in individuals with gender dysphoria, NeuroImage, http://dx.doi.org/10.1016/j.neuroimage.2017.02.027

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Effects of sex hormone treatment on white matter microstructure in individuals with gender dysphoria

Georg S. Kranz¹, Rene Seiger¹, Ulrike Kaufmann², Allan Hummer³, Andreas Hahn¹, Sebastian Ganger¹, Martin Tik³, Christian Windischberger³, Siegfried Kasper¹, Rupert Lanzenberger¹*

¹Department of Psychiatry and Psychotherapy
²Department of Obstetrics and Gynecology
³MR Centre of Excellence, Center for Medical Physics and Biomedical Engineering
Medical University of Vienna, Austria

*Correspondence to: Rupert Lanzenberger, A/Prof. PD MD NEUROIMAGING LABs – PET, MRI, EEG & Chemical Lab Department of Psychiatry and Psychotherapy Medical University of Vienna WaehringerGuertel 18-20 1090 Vienna, Austria rupert.lanzenberger@meduniwien.ac.at
http://www.meduniwien.ac.at/neuroimaging/

ABSTRACT

Sex steroid hormones such as estradiol and testosterone are known to have organizing, as well as activating effects on neural tissue in animals and humans. This study investigated the effects of transgender hormone replacement therapy on white matter microstructure using diffusion tensor imaging. Female-to-male and male-to-female transgender participants were measured at baseline, four weeks and four months past treatment start and compared to female and male controls. We observed androgenization-related reductions in mean diffusivity and increases in fractional anisotropy. We also observed feminization-related increases in mean diffusivity and reductions in fractional anisotropy. In both transgender participants and controls, hormonal fluctuations were correlated with changes in white matter microstructure. Although the present study does not preclude regression to the mean as a potential contributing factor, the results indicate that sex hormones are – at least in part – responsible for white matter variability in the human brain. Studies investigating the effects of sex hormones on adult human brain structure may be an important route for greater understanding of the psychological differences between females and males.

Keywords:

gender dysphoria, transgender, diffusion tensor imaging, hormone replacement therapy
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