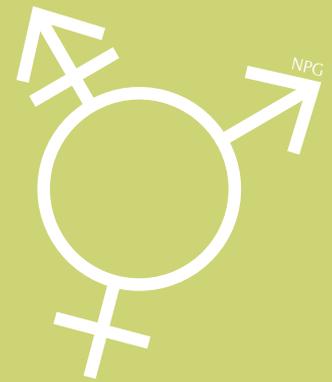


BRAIN IMAGING

Cross-sex hormones alter grey matter structures



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...high doses
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The extent to which, and indeed how, exogenous hormone treatment affects brain structure and function is still a matter of debate; however, evidence is emerging that high doses of hormones induce structural alterations in the brains of adult humans. In a new study published in *Psychoneuroendocrinology*, treatment of transgender individuals with cross-sex hormones is shown to result in changes in subcortical brain areas related to memory and emotion.

Rupert Lanzenberger and his team studied 14 male-to-female (MtF) and 25 female-to-male (FtM) transgender individuals. Participants were naive to sex hormone treatment at the start of the study and reported gender dysphoria before or at puberty. Cross-sex hormones were administered in high doses: FtM individuals received testosterone whereas MtF individuals were treated with oestradiol and an anti-androgen. MRI examinations and

plasma measurements of testosterone, oestradiol and progesterone were performed at baseline and after 4 months of continuous treatment.

After the treatment period, oestradiol levels were increased in MtF individuals, whereas levels of testosterone and progesterone were decreased. Conversely, in FtM individuals, levels of oestradiol and progesterone were decreased, whereas testosterone levels increased markedly. Analysis of brain structures revealed volume changes predominantly in MtF individuals, particularly in the hippocampus — a region involved in neurogenesis and neuronal plasticity. Specifically, oestradiol plus anti-androgen treatment reduced hippocampal volume in MtF individuals, which was accompanied by a global increase in ventricular structures. Moreover, reduced plasma levels of progesterone in MtF individuals correlated with

reductions in grey matter structures in the right hippocampus and right caudate. Overall, the findings suggest that high doses of cross-sex hormones alter structures in the adult human brain.

“Our findings are also relevant for women undergoing hormone-replacement therapy and those receiving oral contraceptive treatment,” comments Lanzenberger on the wider significance of their study. “As oestrogen plus progestin therapy increases the risk of dementia in postmenopausal women aged ≥ 65 years, our findings of pronounced decreases in the hippocampal region in response to oestradiol and anti-androgen treatment support a neurobiological underpinning of this phenomenon.”

David Holmes

ORIGINAL ARTICLE Seiger, R. et al. Subcortical gray matter changes in transgender subjects after long-term cross-sex hormone administration. *Psychoneuroendocrinology*; <http://dx.doi.org/10.1016/j.psychoneu.2016.09.028> (2016)