Transgender brains are more like their desired gender from an early age

EMBARGOED UNTIL 00.01 CEST TUESDAY 22 MAY 2018

Brain activity and structure in transgender adolescents more closely resembles the typical activation patterns of their desired gender, according to findings to be presented in Barcelona, at the European Society of Endocrinology annual meeting, ECE 2018. These findings suggest that differences in brain function may occur early in development and that brain imaging may be a useful tool for earlier identification of transgenderism in young people.

Transgenderism is the experience, or identification with, a gender different to the assigned biological sex, whilst gender dysphoria (GD) is the distress experienced by transgender people, and may be present from a very young age. Although GD incidence is rare, gender identity is an essential part of psychological health, and if unaddressed can lead to serious psychological issues. Current strategies for addressing GD in younger people involve psychotherapy, or delaying puberty with hormones, so that decisions on transgender therapy can be made at an older age. Genetics and hormones contribute to sex differences in brain development and function that lead to more male- or female-typical characteristics; however, these processes are not well established. Furthermore, little is known on how early in life, or to what extent, the gender-typical characteristics of transgender people become established. Earlier diagnosis or better understanding of transgenderism could help to improve quality of life for young transgender people, and help families to make more informed decisions on treatment.

In this study, Dr. Julie Bakker from the University of Liège, Belgium, and her colleagues from the Center of Expertise on Gender Dysphoria at the VU University Medical Center, the Netherlands, examined sex differences in the brain activation patterns of young transgender people. The study included both adolescent boys and girls with gender dysphoria and used magnetic resonance imaging (MRI) scans to assess brain activation patterns in response to a pheromone known to produce gender-specific activity. The pattern of brain activation in both transgender adolescent boys and girls more closely resembled that of non-transgender boys and girls of their desired gender. In addition, GD adolescent girls showed a male-typical brain activation pattern during a visual/spatial memory exercise. Finally, some brain structural changes were detected that were also more similar, but not identical, to those typical of the desired gender of GD boys and girls.

Dr Bakker says, “Although more research is needed, we now have evidence that sexual differentiation of the brain differs in young people with GD, as they show functional brain characteristics that are typical of their desired gender.”

Dr Bakker’s research will now investigate the role of hormones during puberty on brain development and transgender differences, to help guide and improve future diagnosis and therapy for GD adolescents.

Dr Bakker comments, “We will then be better equipped to support these young people, instead of just sending them to a psychiatrist and hoping that their distress will disappear spontaneously.”

Abstract

Symposium S30.3
Brain structure and function in gender dysphoria

The concept of gender identity is uniquely human. Hence we are left with the phenomenon of men and women suffering from Gender Dysphoria (GD) also known as transsexualism to study the origins of gender identity in humans. It has been hypothesized that atypical levels of sex steroids during a perinatal critical period of neuronal sexual differentiation may be involved in the development of GD. In order to test this hypothesis, we investigated brain structure and function in individuals diagnosed with GD using magnetic resonance imaging (MRI). Since GD is often diagnosed in childhood and puberty has been proposed to be an additional organizational period in brain differentiation, we included both prepubertal children and adolescents with GD in our studies. First, we measured brain activation upon exposure to androstadienone, a putative male chemo-signal which evokes sex differences in hypothalamic activation (women > men). We found that hypothalamic responses of both adolescent girls and boys diagnosed with GD were more similar to their experienced gender than their birth sex, which supports the hypothesis of a sex-atypical brain differentiation in these individuals. At the structural level, we analyzed both regional gray matter (GM) volumes and white matter (WM) microstructure using diffusion tensor imaging. In cis-gender girls, larger GM volumes were observed in the bilateral superior medial frontal and left pre/postcentral cortex, while cis-gender boys had more volume in the bilateral superior-posterior cerebellum and hypothalamus. Within these regions of interest representing sexually dimorphic brain structures, GM volumes of both GD groups deviated from the volumetric characteristics of their birth sex towards those of individuals sharing their gender identity. Furthermore, we found intermediate patterns in WM microstructure in adolescent boys with GD, but only sex-typical ones in adolescent girls with GD. These results on brain structure are thus partially in line with a sex-atypical differentiation of the brain during early development in individuals with GD, but might also suggest that other mechanisms are involved. Indeed, using resting state MRI, we observed GD-specific functional connectivity in the visual network in adolescent girls with GD. The latter is in support of a more recent hypothesis on alterations in brain networks important for own body perception and self-referential processing in individuals with GD.

Notes for Editors

1. The symposium “Brain structure and function in gender dysphoria” will take place on 22 May 2018, at the European Congress of Endocrinology at the Centre Convencions Internacional Barcelona, Spain.

2. For other press enquiries please contact the ECE 2018 press office:

Aida de Heras
Communications Executive
European Society of Endocrinology
Tel: (+44) (0)1454 642 206
Mob: (+44) (0)7876824027
Email: aida.heras@bioscientifica.com

3. The European Congress of Endocrinology is held at Centre Convencions Internacional Barcelona, Spain on the 19-22 May 2018. See the full scientific programme.

4. The European Society of Endocrinology was created to promote research, education and clinical practice in endocrinology by the organisation of conferences, training courses and publications, by raising public awareness, liaison with national and international legislators, and by any other appropriate means.