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# A Christian Look at the Biology of Gender Dysphoria

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# A Christian Look at the Biology of Gender Dysphoria

## **Abstract**

"We should treat people suffering from gender dysphoria with the dignity, respect, and support that are due anyone created in the image of God, recognizing that their condition may not be resolved in this life."

Posting about the church's response to sexual identity issues from *In All Things* - an online journal for critical reflection on faith, culture, art, and every ordinary-yet-graced square inch of God's creation.

<https://inallthings.org/a-christian-look-at-the-biology-of-gender-dysphoria/>

## **Keywords**

In All Things, gender identity disorders, anatomy, sex hormones

## **Disciplines**

Biology | Christianity

## **Comments**

*In All Things* is a publication of the [Andreas Center for Reformed Scholarship and Service at Dordt College](#).

# A Christian Look at the Biology of Gender Dysphoria

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 [inallthings.org/a-christian-look-at-the-biology-of-gender-dysphoria/](http://inallthings.org/a-christian-look-at-the-biology-of-gender-dysphoria/)

Tony Jelsma

March 8, 2018



There is no denying that the LGBT agenda has advanced tremendously over the past few decades. Not only have laws been enacted to protect those who identify as LGBT, but public acceptance has also increased dramatically. Churches likewise have been forced to address the question of sexual identity and practice, and this has strained relationships within the church.

However, in the LGBT camp, transgendered individuals stand out as different from the others. Transgender refers to people whose biological sex conflicts with their gender identity, a concept known as gender dysphoria (GD). Thus, their situation is not one of sexual *attraction* but sexual *identity*.<sup>1</sup>

In a [recent series of In All Things posts](#) on gender dysphoria, Julia Sadusky and Mark Yarhouse provided a helpful approach and advice both for Christians with this condition and for the church as it deals with gender dysphoria. The final installment of this series acknowledged that we really do not know the cause(s) of this condition, but that some clues were emerging to help us understand. In this article, I will look at this question further, in the hope of a better understanding and empathy for those who suffer from the condition. Although there is much to learn about gender dysphoria, we must recognize that it is real, one cannot simply “snap out of it” by force of will, and it generally causes significant distress to those who suffer from it. Gender dysphoria is the conflict between one’s natal, or biological, sex and one’s gender identity. Although the term technically refers to those who experience distress about the incongruity between their biological sex and their perceived gender, I will use it to describe simply the condition of a conflict between sex and gender.<sup>2</sup> The definition may seem straightforward, but gender dysphoria is not a uniform condition. Gender dysphoric individuals genuinely feel they belong to the opposite gender and that they do not have a choice about their gender identity. However, others argue that gender identity is fluid and there is a gender spectrum, with gender

dysphoria at one end.

The situation is complicated still further by the fact that gender dysphoria is not necessarily a permanent condition. In fact, only about one-sixth of children with gender dysphoria remain that way into adulthood, and the likelihood of persistence correlates with the intensity of their dysphoria as children.<sup>3</sup> Still others do not experience gender dysphoria until they reach adolescence.

### **Sex vs. gender**

How can we take all this information and come to a better understanding of the cause of gender dysphoria? First, we must realize that gender identity (and thus the possibility of gender dysphoria) develops in two stages, both under the influence of sex hormones. Biological sex (genital and gonad development) and gender identity develop at different times. Biological sex develops early, in the first trimester of pregnancy. As the testes develop and begin to secrete testosterone, the internal and external reproductive organs follow the male developmental pattern. In the absence of testosterone, the female reproductive structures develop. On the other hand, the brain is masculinized by the presence of testosterone around the time of birth, with the absence of testosterone allowing the female default pattern. This is the *organizational* stage of sexual behavior, which results in generally distinguishable behaviors between boys and girls. The *activation* stage of sexual behavior begins later, at puberty, when levels of sex hormones again increase.

Gender dysphoria may arise from abnormalities in either stage. It can exist in childhood or it can arise in adolescence, leading people to suggest that hormone imbalances or disorders at either of these two stages may lead to a transgender identity. Some studies have compared the ratios of the second and fourth finger lengths (which differs between men and women and is thought to be due to prenatal testosterone exposure) between transgender and cisgender<sup>4</sup> individuals. Results are inconsistent, but in some cases correlate better with perceived gender than biological sex.

### **Causes of gender dysphoria**

Given the complexity of the presentation of gender dysphoria, it's not surprising to recognize that the possible causes are likewise varied and not well understood. We will look at both genetic and anatomical studies. Recent advances in genetics research allow us to sequence the entire genomes of individuals, thus making it possible to find individual gene mutations that may be the cause of a particular condition. This technology has found many different applications, including gender dysphoria. In one recent study, Yang et al. (2017) found mutations in the RYR3 gene in two of nine male-to-female transsexuals and one of four female-to-male transsexuals.<sup>5</sup> Although its role (and that of these mutations) in gender identity is unknown, this gene is expressed in several regions of the brain and may contribute in some way to gender dysphoria. Another study showed a correlation between a variant form of an estrogen (a female sex hormone) receptor gene and gender dysphoria in female-to-male

individuals, suggesting a link between the response to estrogen and gender identity.<sup>6</sup> Although these studies provide only a hint at biological causes of gender dysphoria, further analyses may reveal more genes that play a role.

Can we detect anatomical correlates with gender dysphoria? Numerous studies have examined brain anatomy to get at this question, but there are challenges to interpreting the data. In particular, it is difficult to distinguish cause from effect. Do the anatomical differences cause a person to experience gender dysphoria or, conversely, do the altered thought patterns cause the changes in brain structure? Moreover, many people with gender dysphoria undergo hormone treatments, which in themselves could change brain anatomy. Still, there is evidence for anatomical differences associated with gender dysphoria.

Burke et al.<sup>7</sup> examined the brains of people who had not undergone hormone treatments and found differences in a white matter tract that relates to, "...areas processing the perception of self and body ownership." Guillamon et al.<sup>8</sup> also described anatomical differences between the brains of transgender people and controls. The findings were not straightforward to interpret, but many brain structures were intermediate in size between the natal sex and the sex after transition. Finally, one study examined the response to inhaling the steroid androstadienone in people with gender dysphoria. Men produce higher levels of this steroid than women do, and it normally elicits stronger responses in the brains of women than in men. In this study, the responses of children with gender dysphoria were intermediate between control males and females but adolescents' responses were similar to their perceived gender.<sup>9</sup> While this finding suggests a developmental difference in individuals with gender dysphoria, it is not clear how the two are causally related.

We also do not know to what extent gender dysphoria is irreversible. As mentioned earlier, it does not persist in most children with gender dysphoria. Why does it persist in others? The brain exhibits considerable plasticity, which one can harness to bring about physiological and psychological changes.<sup>10</sup> Thus, it may be that persistent thought patterns, triggered by hormonal or genetic variants or even environmental influences, are the cause of the anatomical and physiological differences and that intense psychological counseling may likewise resolve or minimize the dysphoria. We also know that our experiences can change the expression of genes in the brain, a phenomenon known as epigenetic regulation, which in turn can affect our behavior.<sup>11</sup>

How do we as Christians respond to this issue? First, we should acknowledge that this is a broken world that is marred by sin, and that brokenness manifests itself in many ways, including gender dysphoria. Second, people with gender dysphoria do not choose to feel this way and generally suffer significant psychological trauma and social isolation as a result. Third, it should be evident that gender dysphoria is a disorder; otherwise, people with this condition would not try to resolve it through counseling, hormone treatments, or even surgery. Finally, while still acknowledging the biblical view of sex and gender, we should treat people suffering from gender dysphoria with the dignity, respect, and support that are due anyone created in the image of God, recognizing that their condition may not be resolved in this life.

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## Footnotes

1. Most but not all transsexuals are sexually attracted to those of their own natal sex, e.g. biological males who have a female gender identity are generally attracted to males. This is particularly the case for early onset GD. ↵
2. The literature varies in the naming of these individuals, sometimes referring to them as transgender or as transsexuals. ↵
3. Steensma, TD., McGuire, JK., Kreukels, BPC., Beekman, AJ, Cohen-Kettenis, PT. (2013) "Factors Associated With Desistence and Persistence of Childhood Gender Dysphoria: A Quantitative Follow-Up Study" *Journal of the American Academy of Child & Adolescent Psychiatry* 52: 582-590. ↵
4. Cisgender refers to those in which biological sex and perceived gender are the same. ↵
5. Fu Yang, Xiao-hai Zhu, Qing Zhang, Ning-xia Sun, Yi-xuan Ji, Jin-zhao Ma, Bang Xiao, Hai-xia Ding, Shu-han Sun & Wen Li, Genomic Characteristics of Gender Dysphoria Patients and Identification of Rare Mutations in RYR3 Gene. *Scientific Reports* 7:8331, DOI:10.1038/s41598-017-08655-x. ↵
6. Joselyn Cortés-Cortés, Rosa Fernández, PhD, Nerea Teijeiro, Esther Gómez-Gil, MD, Isabel Esteva, MD, Mari Cruz Almaraz, MD, Antonio Guillamón, MD, and Eduardo Pásaro (2017) "Genotypes and Haplotypes of the Estrogen Receptor  $\alpha$  Gene (ESR1) Are Associated With Female-to-Male Gender Dysphoria" *The Journal of Sexual Medicine* 14:464-472. ↵
7. Sarah M. Burke, Amir H. Manzouri & Ivanka Savic (2017) Structural connections in the brain in relation to gender identity and sexual orientation. *Scientific Reports* 7:17954. ↵
8. Antonio Guillamon, Carme Junque, Esther Go´mez-Gil, (2016) "A Review of the Status of Brain Structure Research in Transsexualism" *Arch Sex Behav* (2016) 45:1615–1648. ↵
9. Sarah M. Burke, Peggy T. Cohen-Kettenis, Dick J.Veltman, Daniel T. Klink, and Julie Bakker (2014) "Hypothalamic response to the chemo-signal androstadienone in gender dysphoric children and adolescents." *Frontiers in Endocrinology* 5: 60. ↵
10. Norman Doidge M.D. describes many amazing examples of neuroplasticity in *The Brain the Changes Itself* (Penguin Books) 2007. ↵
11. For example, childhood abuse causes epigenetic regulation of a gene regulating the stress response, thus shutting down their response to stressful situations. ↵