

Why People Are Trans

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Every human life begins in exactly the same way.

In the earliest weeks after conception, there is no male body and no female body: there is only a developing embryo, following the same fundamental plan. At around five weeks of gestation, every fetus possesses a pair of primitive structures called the genital ridge and two duct systems that are, at this stage, equally capable of becoming either male or female reproductive organs. Nipples form at this point too, before the hormones that create sexual difference have even begun their work. That is why all humans have nipples, regardless of the gender they will eventually live as (MLG Data, 2024).

This is not a minor biological footnote. It is the foundation of everything that follows, and it tells us something profound: sex is not a fixed essence that enters the body at the moment of conception. It is a process, something that unfolds over weeks and months, shaped by genes, hormones, timing, and a cascade of small biological decisions that interact in ways science is still mapping. That process can go in different directions, and it does not always arrive at the same destination for every cell in the same body.

From One Road, Many Destinations

Between roughly weeks six and twelve of pregnancy, the process of sexual differentiation begins in earnest. A gene on the Y chromosome called SRY can activate and trigger the production of testosterone in the developing testes. If it activates strongly and the foetal cells respond to the hormone signal, male anatomy begins to form. If SRY does not activate, or if the cells do not respond strongly enough to the testosterone, female anatomy develops by what biologists call default (Sax, 2002). This has long been presented as a simple switch: male or female. But the reality is far more complex.

The process is never all-or-nothing. Timing matters enormously. A hormone that arrives a few days early or late can produce different effects. Receptor sensitivity varies from individual to individual. Hormone concentrations fluctuate. Thousands of small genetic variations across the population influence how each step unfolds. The result is not a binary but a spectrum, with many possible intermediate states between the textbook descriptions of male and female development (Ainsworth, 2015). **This is ordinary biology, not a malfunction.**

One of the most important pieces of evidence for this comes from intersex people, who are born with sex characteristics that do not fit typical binary medical definitions of male or female bodies. This includes people who have XY chromosomes but do not respond to testosterone, people who have XX chromosomes but were exposed to high levels of androgens in utero, people born with genitalia that do not match their gonadal tissue, and people with chromosomal patterns such as XXY, XYY, or mosaic configurations (Blackless et al., 2000).

Research using broad definitional criteria suggests that approximately **1.7 percent of the human population is born with intersex traits** (Blackless et al., 2000), making the condition roughly as common as red hair. In the United Kingdom, this translates to well over a million people living with bodies that do not conform to the simple male/female binary. The Intersex Society of North America

notes that intersex traits are "*natural biological variations*," not abnormalities, and that the entire framework of a strict biological binary fails to describe the reality of human sex development (ISNA, 2024).

The binary model of sex does not describe human biology accurately. Intersex people are not marginal curiosities. They are living evidence that the categories we use to sort human bodies into two neat groups are inventions imposed onto a more complicated biological reality.

The Brain: Its Own Path

Sexual differentiation of the body is one process. Sexual differentiation of the brain is another, and the two do not always proceed in lockstep with each other.

During pregnancy, the brain develops under the influence of many of the same hormones that shape the body, but it follows its own developmental timetable and is influenced by additional factors that do not affect the body in the same way. Research over the past two decades has demonstrated that the human brain shows subtle but measurable differences between typical male and typical female patterns in structure, connectivity, and function. No single brain region is exclusively male or female, but statistical distributions of certain features do tend to differ between groups assigned male and female at birth (Joel et al., 2015).

The crucial question for understanding transgender people is whether the brains of transgender individuals follow the pattern of their birth-assigned sex or their gender identity. The evidence, gathered across multiple independent research groups and imaging modalities, suggests the latter.

In a 2018 review published in *Neuropsychopharmacology*, Nguyen and colleagues synthesised the existing neuroimaging literature on transgender people and concluded that transgender individuals show brain-structural and functional features that differ from their birth-assigned sex in the direction of their gender identity (Nguyen et al., 2018). The authors noted that these differences cannot be fully explained by hormone therapy, as some are observable in transgender people before they have undergone any hormonal treatment.

A more recent study by Kurth and colleagues (2022), published in the *Journal of Clinical Medicine*, used voxel-based morphometry to examine brain structure in transgender women and found that several brain regions in these individuals showed patterns more aligned with their gender identity than with their birth-assigned sex. The authors concluded that "*brain sex in transgender women is shifted towards gender identity*" (Kurth et al., 2022). This finding is consistent with a broader body of research demonstrating that transgender individuals exhibit brain features that align with their gender identity rather than their birth-assigned sex.

Taken together, decades of neuroscience research suggest that gender identity is not a choice and not a delusion. It is a feature of human neurobiology, as real and as deeply held as any other aspect of who a person is. When a transgender woman says she is a woman, she is reporting a biological fact about herself.

The Biology of Sex Is Not Simple

One of the most persistent misunderstandings in public debate about transgender people is the idea that sex is determined absolutely by chromosomes. This is false, and the evidence is overwhelming.

The assumption that everyone can be sorted into XX=female and XY=male is a simplification that does not survive contact with actual biology. Women with Complete Androgen Insensitivity Syndrome have XY chromosomes, external female anatomy, and are typically diagnosed at puberty when they fail to menstruate (National Center for Biotechnology Information, 2024). Men with XXY chromosomes (Klinefelter syndrome) have external male anatomy and are often diagnosed only in adulthood. People

with Swyer syndrome have XY chromosomes and female external genitalia and internal female reproductive structures (Dewhurst, 2004). Mosaic patterns, where different cells in the same body carry different chromosomal configurations, add further complexity. Chromosomal configurations do not determine strict, immutable categories in the way that popular culture assumes.

The World Health Organization has noted that sex is characterised by biological differences that exist on a spectrum, not a binary, and that the categorisation of sex is more complex than the simple XX/XY model allows (WHO, 2022). What matters for lived reality is not a single letter on a laboratory report but the whole of a person's embodied development, including how their brain and body both developed.

None of this is controversial in biology. It is taught in medical schools, described in clinical guidelines, and documented in peer-reviewed literature. What is controversial is drawing the obvious political implications from these facts: that a system which sorts all of humanity into two rigid categories, and then uses that sorting to determine rights, access, and recognition, is built on a biological claim that **does not hold**.

Gender Diversity Is Not New

Human societies have never been as rigidly binary in their gender arrangements as modern Western culture has sometimes pretended. Across history and across cultures, communities have recognised more than two genders.

In South Asia, the hijra community has existed for millennia, recognised as a distinct gender category with its own social roles, spiritual functions, and legal recognition in countries including India and Bangladesh (Nanda, 2014). Among many Indigenous nations of North America, Two-Spirit people held respected roles as a third gender that combined aspects of what Western cultures label masculine and feminine, with different nations recognising these individuals under different names and with different cultural functions (Driskill et al., 2011). In Samoa, the fa'afafine are recognised as a third gender, assigned male at birth but expressing a feminine gender role, fully accepted within Samoan society (Vasey and Bartlett, 2007). Similar traditions existed in Polynesia, among the Zapotec people of Oaxaca, in the Ottoman Empire, and in numerous other contexts (Herdt, 1994).

What modern science adds to this anthropological picture is an understanding of why gender diversity exists: it arises from the very ordinary variation in the processes by which human beings develop, including variation in the interaction between genes, hormones, brain development, and social context. This is not a modern invention or a social contagion. It is a feature of human biology that has been present throughout recorded history and across all known human cultures.

What Gender-Affirming Care Actually Does

The question of whether transition-related healthcare works is not a matter of ideology or belief. It is an empirical question, and the empirical evidence is clear.

Gender-affirming care encompasses a range of interventions, including social transition (using a person's chosen name, pronouns, and appearance), psychological support, puberty suppression for adolescents, hormone therapy, and, where appropriate, surgical interventions. These approaches are recommended by every major medical organisation with relevant expertise, including the Endocrine Society, the American Psychological Association, the American Academy of Pediatrics, and the World Health Organization (Endocrine Society, 2017; WHO, 2022).

The clinical outcomes data are equally clear. A landmark study by Russell and colleagues (2018), published in the *Journal of Adolescent Health*, examined the effect of using a transgender adolescent's chosen name on rates of depression, suicidal ideation, and suicidal behaviour. The results were striking: each additional context in which the young person's chosen name was used (at

home, at school, with friends, at work) was associated with a 29 percent decrease in suicidal ideation and a 56 percent decrease in suicidal behaviour. Using a person's chosen name is not a trivial act. It is a protective factor with measurable effects on mental health outcomes.

A study by Green and colleagues (2022), published in the *Journal of Clinical Endocrinology & Metabolism*, analysed data from The Trevor Project and found that transgender and nonbinary youth who received gender-affirming hormone therapy showed significantly lower rates of depression and suicidal thoughts than those who did not. The effect sizes were clinically meaningful. A systematic review by Doyle and colleagues (2023), published in *Nature Human Behaviour*, found consistent evidence across multiple studies that hormone therapy is associated with significant improvements in psychological well-being among transgender individuals.

Research from the Canadian Study of Identity Development showed that access to gender-affirming care is associated with dramatic reductions in mental health disparities between transgender and cisgender people (Bauer et al., 2015). Without such care, transgender people experience markedly higher rates of depression, anxiety, and suicidality, largely attributable to minority stress: **the chronic psychological burden of social marginalisation, discrimination, and stigma** (Hatzenbuehler, 2009). With affirming care and supportive social environments, those disparities narrow substantially.

The claim that gender-affirming care causes harm is not supported by the evidence. Every systematic review of the literature has found the opposite: that supportive, patient-centred care improves mental health outcomes and that denying such care is associated with significant harm, including dramatically elevated rates of suicide attempts (Bauer et al., 2015; Green et al., 2022).

Responding to the Misinformation

Against this body of evidence, a counter-movement has emerged, making claims that biology is simple, that sex can always be determined by chromosomes, that people can be "*made trans*" by social influence, and that gender diversity is a harmful ideology rather than a natural expression of human biology. None of these claims withstand scrutiny.

The argument that gender diversity is a modern social contagion, driven by peer influence or online content, is contradicted by the existence of gender-diverse people in every historical period and every culture for which records exist. It is also contradicted by the neurobiological evidence showing measurable differences in brain structure and function between transgender and cisgender individuals, differences that cannot be attributed to social influence or suggestion.

The argument that chromosomes are definitive is contradicted by the clinical reality of intersex conditions and by the fact that chromosomal testing is rarely even performed as part of routine medical care. Most people alive have never had their chromosomes tested. The assumption that one's chromosomes are XY or XX is just that: an assumption.

The argument that sex is biologically binary in a simple and absolute sense is contradicted by the full breadth of developmental biology. Sex determination in humans involves dozens of genes, multiple hormones, numerous tissue types, and developmental processes that unfold over months with countless opportunities for variation. The binary model is a useful approximation for many practical purposes. It is not a description of biological reality.

Transgender people are not against nature. **They are nature.** They exist because biology is more varied, more interesting, and more complex than the categories we have invented to sort it. Every embryo starts the same. Hormones and genes steer development in different directions. Sometimes the brain and the body develop along different paths. That is not a defect in the system. It is the system working as it always has: with diversity built into its foundations.

When transgender people are accepted, supported, and allowed to live as themselves, the

evidence shows that they thrive. When they are rejected, pathologised, or denied basic recognition, the evidence shows that they suffer. The science points clearly in one direction: gender diversity is part of the ordinary range of human experience, rooted in biology, expressed across cultures and throughout history, and deserving of the same respect and protection as any other aspect of human identity.

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