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SEX: What if You Can't Circle M or F?

Alexandra Ganim

During my first week of work at a local restaurant, I was introduced to my coworker "Marie." Marie was 21 years old, and clearly different from the other employees in that I needed to look at her name tag to distinguish her sex. Though I had some prior knowledge and exposure to intersex conditions, my experience was limited to research, textbooks and the popular media. Having no previous personal exposure that I was aware of, I was caught slightly off-guard. This initial impression, however, dissolved almost as quickly as it had arisen once I observed my co-workers interacting with her in a friendly and comfortable manner. Unfortunately, I also soon became increasingly aware of the cruel discrimination that Marie faced, and constant belittlement every time she turned her back. This treatment came not only from restaurant guests, but fellow employees and other adults, some of whom went so far as to disrespect her blatantly and in public.

Though Marie attended and graduated from technical school with a degree in Hotel Hospitality, she is not allowed to answer the phone or become a server. Management does not want her interacting with guests, and therefore does not know what to do with her; they keep her in the kitchen area to run food out to tables or appoint her to other tasks away from the public eye. Unfortunately, this treatment was not only held by the managerial staff. I was approached one afternoon by a

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server who pulled me aside to say, “I know you aren’t a server assistant today, but whatever you do—Do not let Marie near any of my tables! Intercept any food she brings out and deliver it yourself.” I walked away from his request shocked and infuriated, but also haunted by the outrageous degree of discrimination challenging her on a daily basis.

As this semester began, I got into the habit of bringing textbooks with me to work to review class material if business was slow. On a particularly slow day, Marie and I were chatting while I glanced over my notes from a course called Endocrinology of Behavior, and she commented that I was learning a topic she knew much about. She continued to tell me about how she was born with male-typical external genitalia, and diagnosed with congenital adrenal hyperplasia (CAH) at birth. Babies with this syndrome have a problem with hormone production in the adrenal glands, which leads to exposure to higher than normal levels of steroid hormones that masculinize the genitalia and perhaps even the brain and behavior. Even if the child is a girl with two X chromosomes, the high levels of steroids during fetal development cause the expression of male-typical characteristics. Marie was born heavily masculinized; sex change surgery was performed soon after birth; and puberty brought her serious amounts of hormone therapy, which contributed to unhealthy weight gain in a male-typical distribution, “apple-shape” (as opposed to a female-typical “pear-shape”). A few years ago, her hormone treatment dosages were administered incorrectly, shooting her testosterone level to twice that of a normally healthy male – high enough to, as she explained, put her at severe risk of death. She continues to suffer from its lasting effects today, manifested in a lowered voice and facial hair.

Modern Dilemmas of Intersexuality

Disorders of sexual development have been kept secret throughout history, due to feelings of shame and embarrassment. Many times these emotions are projected by the family, who generally feel the need to “correct” the atypical genitalia as quickly and seamlessly as possible. The public’s exposure to this realm of disorders has been predominantly limited to comedic cruelty and traveling circuses featuring shows on birth defects and “freaks of nature.” The result of the secrecy, denial, and shame surrounding this topic has prevented true advocacy and awareness of this group to enter a public arena. Legislation to advocate for newborns with atypical sex development has become common, but perhaps the designated authority on the subject needs to be examined with a closer degree of scrutiny. Legislators, judges, and governmental authority may not have the scientific or psychological acumen to make a fair decision on atypical sex development issues at birth, or issues arising later in life, such as marriage. The growing trends in legislation of marriage typically state that a union can only be legally acknowledged between a man and a woman. Determination of sexual identity should be a personal decision, but if brought into the public sphere one must wonder how the situation is to be approached if the personal decision were to conflict with that of a judge.

There are numerous intersex conditions in which a male sex chromosome is accompanied by female gonads, female external genitalia or both. In some cases, female chromosomes are accompanied by a phallus and male or mixed gender identity. Legislation on “what determines sex,” would be impossible to discern, since no agreed upon definition or qualification exists. A popular press article from *The Philadelphia Inquirer* raised the question, “Can men

marry if they have ovaries?”, which exposed some of the complexities of sex determination on the basis of sex organs, chromosomal composition, and hormonal organization and activation (Flam). This article explains that there are at least seven accepted definitions of sex; therefore, a chosen definition carries with it some degree of personal opinion and arbitrariness. In a recent interview, an individual with complete androgen insensitivity syndrome (CAIS) has helped enlighten the general public on the topic: “I have testicles (internal) and a vagina. I have an F on my birth certificate but my bloodwork says my cells are all XY” (Flam).

The Texas Appellate Court decided that sex is determined by chromosome composition in the court case of Christie Lee Littleton (Mariner). In 1995 Christie sued medical doctors for malpractice upon the unexpected death of her husband. She lost the suit, because her marriage was declared invalid when the doctors proved her chromosomes to be XY. The extension of this type of ruling would prevent chromosomally male CAIS individuals, who are typically “female” by any practical accounts, from marrying a male. This invariably begs the question: would an individual with such distinctly feminine traits (CAIS male) be allowed to marry a woman? The judge may then use external genitalia and personal sex identity to invalidate that marriage. Non-consensual sex changes at birth and forced sex identity creates further gender uncertainty, which becomes another layered issue surrounding marriage (Mariner).

The judge in the above case has presumably not been trained in genetics or molecular biology, so one must wonder about his decision that chromosomes were the sole determination of sex. Perhaps fault can be attributed to the authorities on the matter, who also happened to be the defendants.

A New Consensus

Once brought to the public's attention, the matter can be openly discussed and more lives could be protected by a wide-scale consensus. There is hope that advocacy and exposure will encourage legislation to protect children born with disorders of sexual development, by avoiding arbitrary sex determinations and unnecessary surgeries. Such a statement, the "Consensus Statement on Management of Intersex Disorders," was published in November 2006, and has helped clarify the types of disorders and provide advice on treatment of infants with disorders of sexual development. Small support groups around the world have formed over the past couple decades to discuss and advocate against the shame, secrecy and unnecessary surgery performed without consent--although, ultimately (at least in the United States) parents have sole authority to give consent for their children's medical treatment. If this surgery were to be primarily cosmetic, surrogate consent might be less appropriate, which tends to be the opinion of many victims who regretfully deal with these issues through their adult lives. The consensus is largely based on psychological research of self-identified intersex adults, their life experiences, and the hope they have for future individuals born with disorders of sexual development.

The consensus postulates:

- ⊙ Nomenclature is important in helping with advocacy for the rights and psychological well-being of individuals. The preferential terminology is "disorders of sex development" to refer to any atypical congenital form of chromosomal, gonadal or anatomic sex.
- ⊙ Gender identity cannot be reliably established at the birth of an individual with a disorder of sex development. Gender is a complex issue that no phenotype, hormone level or chromosomal composition can absolutely indicate.

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- ⊙ Assign an infant a sex at birth, but avoid the surgery. It would be more psychologically traumatizing to be brought up as “neither” in a world of two choices: “male” or “female.”
- ⊙ Allow the child to develop in an extremely supportive environment, until a point when the individual clearly identifies as one sex or the other. This is said to be around three years of age, but remains undefined and based on the individual.
- ⊙ Parents of these individuals deal with their own trauma and shame, and should have some legislative guidance in dealing with their child’s condition before they irrevocably decide on sex surgery for their child. The long-term effects of such surgeries are far more traumatic and marginalizing for the individuals affected with disorders of sex development. Such legislation has been instated in the UK and Columbia, to emphasize parental rights to parental responsibilities, and “qualified and persistent informed consent” over a period of time in decisions of sex change surgeries (Lee).

Behavioral Neuronendocrine Research on Intersexuality

Research using both animal and human subjects in the field of behavioral neuroendocrinology has provided the critical data to support the consensus statement. If assignment of sex is determined by the individual’s personal identity as either male or female, it might seem logical to examine the development of the brain and early-wired circuitry as a basis for sex identity. Recent biological research on sexual differentiation of the brain reveals hypothesized controls on the masculinization or feminization of brain tissue. The terms “masculinized” or “feminized” are used to indicate differential development of certain brain areas, neuronal wiring, concentrations of chemicals and hormones that vary between the typical developing male and female in the embryo.

Depending on the species, brain masculinization achieved through the development of male-typical neuronal wiring, and defeminization through the suppression of the female-typical wiring, is largely controlled by androgen receptor (AR) or estrogen receptors (ER) in the brain during an early critical period, usually prenatal or neonatal (Sato).

Brain masculinization was originally thought to be controlled by circulating testicular testosterone, but rodent experiments of the “remove and replace” genre have demonstrated that chromosomal females will demonstrate male-typical behavior (mounting) if treated neonatally with testosterone, and later in life with testosterone, as first discovered in the laboratory of W. C. Young (Young). The female-typical sex behavior of rodents, the arched-back lordosis posture, occurs around the time of ovulation when circulating levels of the ovarian hormones, estradiol (E) and progesterone (P) are high. In ovariectomized females, treatment with E and P will predispose the female to show lordosis when she comes in contact with an adult male. Chromosomal females (XX) were treated with testosterone during fetal development and then, as adults, they were ovariectomized and treated with E and P to test their female sex behavior (lordosis) in the presence of a male. The females treated with testosterone prenatally failed to perform lordosis behavior as adults when treated with E and P (Young). This work did not examine human sexuality, but it did show for the first time that the brain and behavior could be permanently masculinized or feminized during early fetal development. Since the time of Young, many aspects of sexually dimorphic behavior have been linked to the masculinization or feminization by early steroid treatment.

A later advance in understanding sexual differentiation of behavior came when it was discovered that testosterone is

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converted to estrogen, and through this conversion testosterone becomes an effective biochemical in the body. The aromatization hypothesis states: "actions of testosterone appear to be exerted not through its androgenic activity, but rather its conversion by brain aromatase into estrogen, with the consequent activation of ER mediated signaling" (Sato). An experiment by the Institute of Molecular and Cellular Bioscience found evidence to support that masculinization is dependant on both estrogen receptors and aromatase (to convert testosterone to estradiol) in the brain. There is evidence that estradiol (which activates the ERs) is sufficient to organize the brain. Evidence for this is based on reduced male-typical behavior when there were defects in ERs or aromatase. AR-null mutation in males completely lost the ability to perform male-typical behaviors, and treatments with nonaromatizable androgens (DHT, 5 α -dihydrotestosterone) were unable to restore male-type behavior in chromosomal male mice (Sato).

If masculinization of the brain is achieved by estrogens acting on ER, it is a scientific puzzle to determine why the female fetuses are not masculinized by their ovarian estrogen and the estrogen of their mother. In normal fetuses, the estrogen is bound by alpha-fetoprotein (AFP). Enough AFP must be secreted from the endodermal cells of visceral yolk sac, the hepatocytes, and gastrointestinal tract to bind to circulating estrogens of the embryonic female. A study by Julie Bakker has gathered evidence to support that AFP helps protect the female brain from defeminization by binding to estrogens in circulation, and preventing them from being taken up by ER in the brain. This protein gradually decreases in concentration after birth, and within 24 hours has decreased by 50% (Bakker). Only residual amounts of AFP are circulating after three weeks of birth. Bakker asserts that estrogens serve

to defeminize the developing brain, a conclusion she reached observing *Afp*^{-/-}, which is the notation for the experimental group that could not produce AFP. She found that *Afp*^{-/-} males were masculinized and defeminized, and the *Afp*^{-/-} females did not show any signs of ovulation or a female phenotype, but their behavior could be restored with a treatment of estrogen blocker (aromatase inhibitor 1,4,6-androstatriene-3, 17-dione) (Bakker). This data supports the conclusion that AFP helps protect the female brain from defeminization, and show that masculinization and defeminization of the brain involves a complex array of hormonal events.

The above data show that behavior is masculinized by the presence of androgens and estrogens, but it would be an oversimplification to suggest that the male brain develops in the presence of steroids, whereas the female brain develops "by default." There is a delicate balance in the secretion of hormones on the organization and activation, which could play a role in sex identity. For example, other data by Bakker show that even though a high level of estrogenic stimulation masculinizes the brain, a low level of estrogenic stimulation is necessary for full female development. Thus, it seems while some aspects of sexual differentiation of the male and female brain are predictable, many are very individual and undefined in the reality of sex assignment.

Although the process of becoming male and female is biologically complex, it is clear that there is a distinct and vital role for hormones during early development. Support groups actively work to raise awareness that ambiguity is not "wrong" or unacceptable to society; differences should be embraced with understanding, not placed on a medical examination table to be dissected and scrutinized.

It is difficult to imagine the trauma and psychological

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damage one must endure as an individual with a disorder of sex development, not only dealing with confrontations on sex identity but also with sexual orientation. The issues are complex and nearly impossible to resolve when dueling with authorities with a black-and-white mentality who are obsessed with semantics and the determination of sharp parameters for sex, gender and legal marriage. A vast number of processes are involved in complete sexual development, incorporating the internal reproductive system, the external genitalia, the wiring of the brain, and relative hormone concentrations. The intricacies each of these processes brings can create a chaotic and confusing situation that is best left to the individual to decipher, in a safe and comfortable environment in which they can readily receive positive support. Developing a friendship with Marie has really helped me begin to understand the complexities that arise from a disorder of sex development . Intersex conditions need to be accepted and understood, not stigmatized. With increased conservative influence in the creation of gender-relation legislation, it is particularly important that equal treatment and opportunity are advocated for this needlessly marginalized group, including countless others like Marie.

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