



Trilogy

Disassembling anti-rights narratives through biology
and science

The biomedical construction of sex: a critical perspective against essentialisms



Akāhatā

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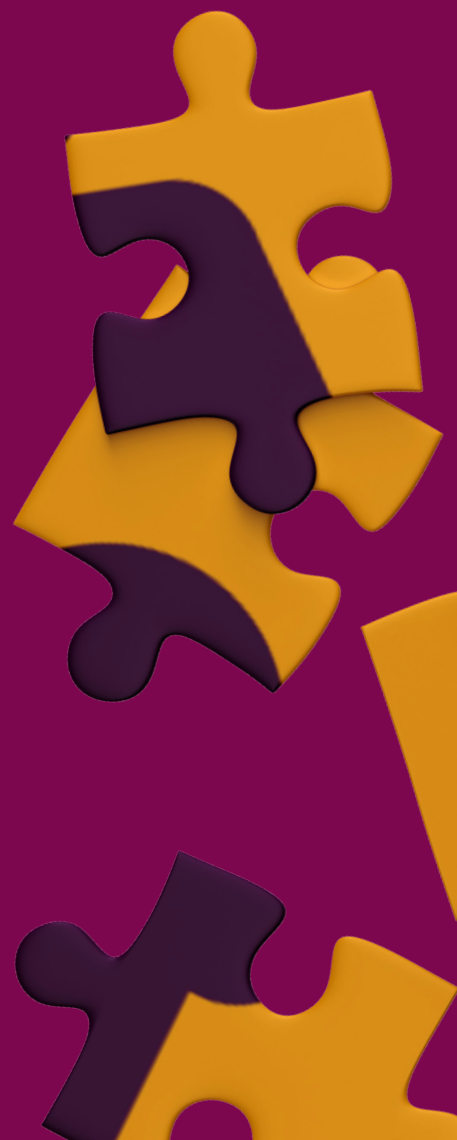
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PROLOGUE

"The sex of a body is too complex a matter.
There is no black or white, but degrees of difference."
Anne Fausto Sterling

A ghost haunts the world, the ghost of gender....

Some people suspect that gender is a way of talking about women's inequality and simply assume that gender is equivalent to women. Others suspect it is a veiled way of referring to homosexuality. For others it is a different way of talking about sex. There are feminisms that struggle with the distinction, associating sex with biology and legal birth registration and gender with assumed social and cultural norms based on sex. There are endless debates from LGBTIQ+ activist movements; feminisms and other political stakeholders that do not end up agreeing on a single approach to grasp and understanding gender. And neither does sex.

The issue that concerns us here is precisely the arguments that both from anti-rights discourses and from conservative and trans-exclusionary feminisms dispute over and over again the legitimacy of the ways of living, existing and being of many people. They do so from essentialist premises about sex. Postulates that interpret biology as an a priori truth; ahistorical and abstract and not as a science made by people who are part of a culture and who are included in certain paradigms.

From Akāhatā we share the trilogy "Disarming anti-rights narratives: a look from biology and science" Throughout each of the installments, the authors dismantle pseudo-scientific and essentialist arguments used by anti-rights sectors and exclusive trans feminisms. We consider that the task of political advocacy requires an approach to scientific knowledge;

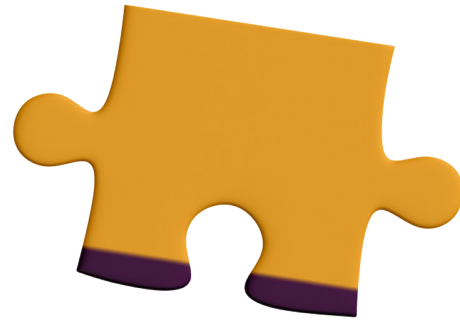
and to the process of construction of knowledge from different disciplines that endorse or repudiate certain policies. Especially because anti-rights, conservative and ultra-right actors appeal to a systematic attack against scientific knowledge and those who produce it, fertilized with fake news, misrepresentations and an alarming lack of rigor in their arguments and supposed "counterevidence". Our LGBT, feminist and allied movements have to improve their knowledge on these issues and be encouraged to give the biological discussion from an informed place, because it is the only way to counteract the proliferation of misrepresentations and pseudoscience propagated by conservative and anti-rights sectors.


Based on philosophical reflection, Siobhan Guerrero Mc Manus argues that the construction of scientific knowledge responds to the political and economic powers that hegemonize each historical context and that have nurtured biologicist essentialism. Appealing to the medical sciences, Marina Elichiry discusses the construction of common sense in the field of health that manages the sexual and social control of bodies and their subjects. Finally, Lu Ciccia points out three conflicts in the interpretation of the cerebral origin of the binary organization of sex.

One coordinate runs through this work: anti-rights discourses first install sexual panic over gender. A form of alarmist response to the destabilization of the colonial and racist regime that classifies, normalizes, pathologizes and criminalizes people, their bodies, families, sexuality and lives according to a dogma based on a deterministic, reductionist and essentialist idea of science, including biology.

Heir to racist colonialism, the use of an obsolete biology - which does not respond to the current development of that science - as a weapon of justification of a supposed natural aristocracy, appears veiled or explicitly in anti-scientific narratives that express concern. On the other hand, from the right in relation to the threat to masculinity, the disappearance of the family and the values of the West. Conservative feminisms contribute to this when they use the essentialist argument of the erasure of the sexes to warn about the loss of the category of woman as a subject of feminist struggle.

Behind hatred there is the threat of loss, says Sara Ahmed. And that phrase resonates in the offensives that time and again evoke and seek to institutionalize symbols, notions and regulations that justify mechanisms of power that reinforce policies of the colonial, neoliberal regime, which in its centrifugal force expels to the margins everything that does not adhere to its civilizing order.



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[...] labeling someone as male or female is a social decision. Scientific knowledge can assist us in this decision, but only our conception of gender, and not science, can define our sex. Furthermore, our conception of gender affects the knowledge about sex produced by scientists in the first place.

Sexed bodies, **Anne Fausto Sterling** (2000)

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1 Introduction

2 Sexual characteristics on its spectrum

3 The natural variability of sexual characteristics

4 The case of games or Olympics as a field of dispute over the boundaries of sex

5 Conclusion

1 INTRODUCTION

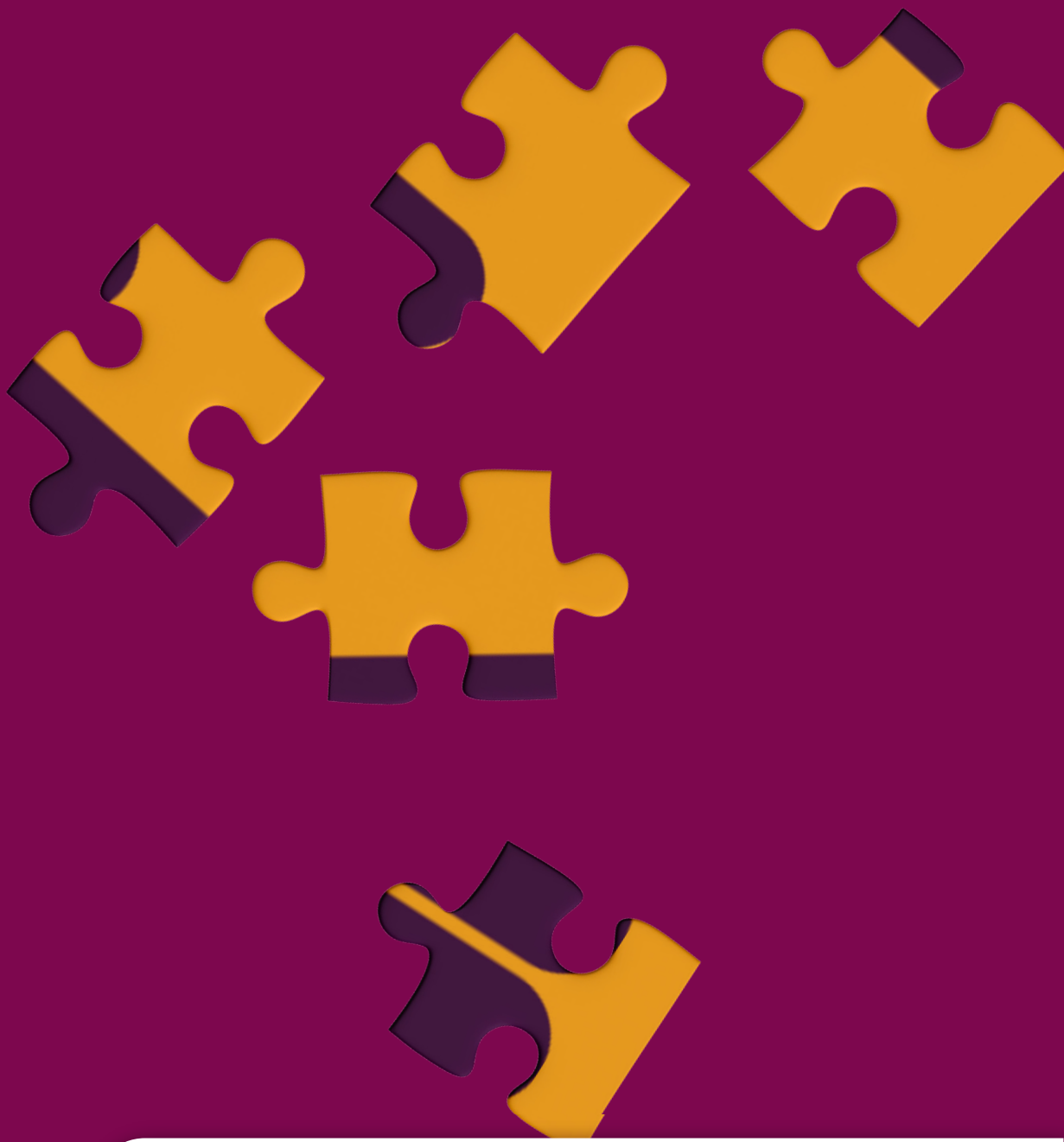
The anti-gender movement supports that gender is nothing more than an elucubration and that the only real thing is sex. On the other hand, feminist and LGBTBI+ movements have developed deep discussions on the sociocultural construction of gender, however, analyses on the effects of culture on science and medical research on sexual difference are not as advanced or widespread. In the current context, acquiring tools to discuss some pseudo-scientific arguments that support an alleged inexorable nature of sexual difference is fundamental.

In this short article I intend to investigate the essentialist assumptions on the basis of the sexual dichotomous system, defended from conservative positions with statements based more on fantasies and preconceptions than on scientific data. Then, I intend to dismantle certain approaches of biological determinism that support the idea of the sexual binary system, exposing opportunistic mechanisms that operate, where false or unprovable premises are used, inappropriate argumentative leaps are made, and hasty conclusions are reached in order to support a dichotomous ideology that is non-existent in nature as such.

The ultimate purpose of this article is to offer tools from the critical reading of scientific articles and evidence-based medicine, to analyze the circulating discourses on sexual characteristics, collaborating with a de-pathologizing and body diversity perspective, in order to de-medicalize and eliminate the stigma of body variations, promote dignity, autonomy, informed decisions and prevent systematic damage to the health of certain vulnerable populations.

In the first section of this work, I will expose what are the binary and sexist assumptions and biases from which we start to study, categorize and describe bodies. I will then describe how those assumptions, based on modern and Western cultural constructs, are intended to be reaffirmed through medicine and biology from a scientific approach that aims to materialize prejudices and stereotypes about sex, gender and associated behavior and images. Later on, I will offer a series of situations in which dichotomous essentialist assumptions are refuted, elucidating the existence of a spectrum of possible sexual characteristics. I recover and discuss, towards the end, the case of the Olympic Games and their sex control regulations as a current, systematic, legitimized and media example of the compulsive surveillance of the sexual characteristics of men and women, as a social and cultural good (especially Western) to be protected, by any means and at any cost.





2 **SEXUAL CHARACTERISTICS ON ITS SPECTRUM**

The sexual characteristics of people - often condensed into the vague term “sex”- are composed of the attributes of sex chromosomes, gonads (testicles, ovaries), hormones, secondary sexual characteristics (body hair, breast and muscle development, fat distribution, voice deepness), external genitalia and internal genitalia. This series of markers is not unequivocally due to a genetic or hormonal factor, but there is a medical and social agreement that these traits can be analyzed when characterizing sex. It is interesting to note that the markers do not have two unique and opposite values, nor necessarily exclusive. That is, people do not exclusively have testosterone or estrogen, mammary glands or penis, XX or XY chromosomes.

In addition, none of these characteristics can be considered "decisive" in defining a person's sex since, in reality, this is a cultural interpretation of a complex interaction of visible and hidden characteristics, which translate into a socially accepted norm. Not all people born with testicles look and are registered as male and not all those born with uterus look and are registered as female. Not all people with XY chromosomes develop penises, and not all XX people look “female.” Health teams usually do not know the chromosomes or gonads of someone who is born, and sometimes the sex that is legally assigned is defined based on an agreed criterion in a culture or in a health institution, even if it does not match the typically female and male markers.

It is often held that sexual characteristics are dimorphic, opposed (therefore never overlapping), polarized, and hierarchized. Certain approaches are based on this hypothesis to investigate and define parameters related to health, well-being, human rights, regulations and sport. The stereotypes that are defended as "natural" models of femininity and masculinity respond to the interest of reinforcing this sexual dimorphic model where there should be no shared characteristics and where

variations are indicated as abnormal, infrequent, pathological, dangerous, necessary to monitor and imperative to correct. The characteristics of women and men that are presented as monolithic and opposed respond to the ideals of a heterosexual, reproductive, cissexual and colonial life model.

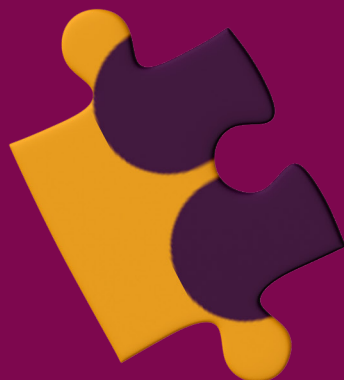
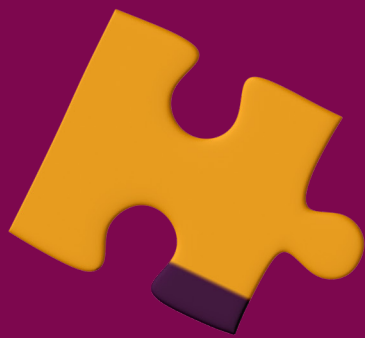
Throughout the article I will show how certain causal associations that are made between chromosomes, hormones, genitals, appearance, attitudes, strength, dexterity, respond to an essentialist desire that does not respond to the natural and social complexity of sexual characteristics.





3

THE NATURAL VARIABILITY OF SEXUAL CHARACTERISTICS



Sexual characteristics vary between different people and sometimes populations. Some may even vary in the same individual over time. For example, a person's hormone concentration can be modified naturally over time, by puberty, by the function of the adrenal glands, by the amount of body fat, among other factors. The amount of body hair can increase, breast size can be modified with hormonal changes, body fat and with exercise, the appearance of the genitals typically changes with puberty and hormone exposure. Other characteristics, such as sex chromosomes and gonadal composition, are fixed in a person and remain unchanged throughout life.

Regarding the differences between individuals, the sex chromosomes¹ are usually presented as pair XX or XY, considered the first typically female and the second male, due to the potential of each pair to develop uterus, vulva and ovaries or penis and testicles. However, it is common to find variations in sex chromosomes that in some cases are undetectable and irrelevant to people's lives. For example, the presence of XXY sex chromosomes is as prevalent as in 1 in every 500 male-assigned infants. Since in many cases this chromosomal variation has no impact on the physical characteristics or health of people, most do not receive a diagnosis (75%) or receive it late in life (López-Siguero, J.P, 2014). Other sex chromosome variations, such as the presence of a single X chromosome, occur in 1 in 2000 girls born, which shows that sex chromosome variations are not uncommon.

As for sex hormones, in the medical literature, testosterone or androgens are sometimes called the male sex hormone and estradiol or estrogens are called the female sex hormone. However, all people have varying concentrations of both hormones, which serve various functions in the body that are not limited to developing sexed physical characteristics. Although cis² men often have higher testosterone values on

average than cis women, when analyzing the hormonal concentration of people individually, it is not uncommon to find women who have testosterone within the range considered male, and men who have values below the male range or even in the female range. These findings in themselves do not imply a disease or health risk but are sometimes part of the biological variations that take place in human nature.

Polycystic ovary is a condition that occurs in up to 20% of cis women of reproductive age (Winnykamien, I., Dalibón, A., & Knoblovits, P. 2017) where testosterone is often above the normal female range. It is the main known cause for higher than usual testosterone values (called hyperandrogenism in medical literature) and does not produce any health or life risk per se. Concerns around this condition are linked to the physical appearance that high testosterone can give and the potential risk of infertility, that is, two fundamental aspects of femininity. The World Health Organization states that more than 70% of people with this condition have not been diagnosed (WHO, 2023), which suggests that it has not brought them enough problems to consult.

One study compared the sex hormones of Chinese and Caucasian men from the United States, observing that the former have little facial and body hair (Santner et al., 1998). The result did not show significant differences in androgens, which shows that the distribution and density of body hair is not a male characteristic or directly proportional to circulating testosterone, but that there are other genetic and environmental factors that condition them.

¹ People count 46 chromosomes organized into 23 pairs that harbor the genetic material. One of those pairs is that of the sex chromosomes.

² Cis means that the person's gender matches the sex assigned at birth.



4

THE CASE OF GAMES OR OLYMPICS AS A FIELD OF DISPUTE OVER THE BOUNDARIES OF SEX

I recover current discussions on sex that are revived in each Olympic championship, for the validity and legitimacy they have, the global dissemination, the copious exchange between experts available, and as a paradigm of the translation that sports organizations have made from sexist and racial prejudices to regulations allegedly based on scientific evidence.

According to the Olympic Charter, the goal of Olympism is to put sport at the service of human development and maintain dignity, recognizing the right of all people to practice sport without discrimination of any kind, including by sex and race. In addition, within its duties, it declares to take care of athletes' health. However, the constraints imposed on women with hormonal outliers, including intersex women and trans women, are incompatible with the principles being pursued.

For decades, the Olympic Games conducted "sex tests" theoretically aimed at preventing men from competing in the women's category. The first edition of the Games was held exclusively for men and, in the second, less than (5%) of the total were women. As López (2024) states, segregation was first de facto and then the biomedical foundations were sought to justify it. In the past, compulsive genital examinations were used to evaluate sex, then chromosome analysis assuming that a woman always had XX chromosomes and an XY man and, currently, the exclusion criterion is testosterone.

In 2003, the International Olympic Committee (IOC) launched the Stockholm Consensus where the existence of trans athletes is recognized, but in order to compete in the female category they were required to have their gonads removed, do 2 years of hormonalization and have legal recognition. Starting in 2012, the IOC published rules to ban women in the female category who had a testosterone value higher than the female range, unless they were insensitive to the effects of testosterone. The cut-off value was initially up to 5nmol/l, and in 2015 it was extended to 10nmol/l in coincidence with the

Hyperandrogenism Regulations of the International Association of Athletics Federations (IAAF). The arguments start from the premise that testosterone gives a sporting advantage such that, having higher concentrations than usual and due to the direct relationship that testosterone has with strength, it enhances power and speed in competitors. They further state that such women should be excluded in order to ensure equal competition and protect other (non-hyperandrogenic) women from unfair advantage. In 2014, the Indian athlete Dutee Chand denounces the Regulation that excludes her because of her natural testosterone values, and the highest arbitration court is issued in 2015 challenging the Regulation for lack of scientific evidence that proves that endogenous testosterone (produced by the body itself) granted sports advantage and, secondarily, that that advantage was significant enough to exclude athletes with that natural condition. In addition, they confirmed that the Regulation was discriminatory.

These rules, developed by medical panels of the agencies, are based on the ultimate purpose of protecting women from an unfair advantage that could be enjoyed by athletes with high androgens (including intersex and trans). However, they are based on assumptions about the effects of high testosterone in women, such as a marked increase in strength, speed, power, endurance, which turn out to have no scientific support. On the other hand, it is a rule that applies exclusively in the category of women, since there is no similar regulation or tests to control endogenous testosterone values in men. In addition, there is to date no other "unfair natural advantage" that is used to disqualify Olympic athletes, even when it is known that certain mitochondrial mutations confer more resistance for swimmers, that the great height and growth of hands due to excess of natural growth hormone grants sports advantage for basketball and rowing, among others. It is remarkable that there is no limitation to the natural advantages, hormonal or not, in the male categories. Obviously, international

sports bodies consider themselves responsible for guarding the limits of femininity, its appearance and its strength. Although these regulations try to differentiate themselves in their text from the old sex tests, in practice, the athletes declare that they are subjected to physical and genital examinations as part of the stages of evaluation of sensitivity to testosterone, as well as to public stigma and questioning, to the violation of confidentiality and dissemination of their health information and sensitive data and, finally, to coercion to perform unnecessary medical treatments that expose them to risks in order to decrease their natural hormones and be able to continue competing, sport being their work and economic source.

Numerous cases of women athletes at the highest level have transcended by questioning their sex, their gender, their status as women and their whole being. In the ruling in favor of Dutee Chand³, several findings can be reviewed that refute the dichotomous and hierarchical idea of the sexes. On the one hand, it is determined that there is no evidence worldwide that natural testosterone can provide a greater sporting advantage than any other physical advantage that an elite athlete may have. There is even a high representation of elite athletes with complete insensitivity to androgens, which indicates that in these cases testosterone does not have any effect in favoring their excellent performance. Beyond the data that is extracted on average, there are female athletes who have surpassed the marks of potential men, such as the tennis player Sabalenka whose forehand is stronger than that of her male peers, which has led her to declare that "she feels somewhat uncomfortable for being on top of men", and the runner Tara Dower who is the fastest person in history to complete the Appalachian Trail. Several hormonal studies carried out on elite athletes (Bermon et al., 2014; Healy et al., 2014)

observe that a significant number of women have testosterone values above the female range, and a proportional number of men below the male range, showing that the premise linked to being able to distinguish men and women from androgen concentrations is false since these values overlap. In addition, it confirms that male athletes with low testosterone can be elite athletes. Regarding the arbitrary testosterone limits drawn by each rule, the IAAF witness physicians accepted that it was possible for healthy women to present with more than 10nmol/l of testosterone, but that it was unlikely for them not to go to the doctor since the aesthetic effects on their bodies of testosterone (clitoral size, body hair) should lead them to make consultations. That is, they start from stereotypical interpretations of gender to make claims and elaborate supposedly scientific norms. On the other hand, they recognize that sensitivity to androgens - which is the other condition for the athlete to be excluded - is very difficult to evaluate and would be done through the subjective observation of the sexual characteristics of the athlete, which is a very unreliable, unscientific and degrading method.

With regard to the claim of justice and protection pursued by the norm, it is clear that the potential benefits are not well established but there is enough evidence of the damage that these rules have inflicted on athletes who have been excluded from world competitions, have been questioned, scrutinized, have been victims of mockery, racism, affecting their mental health, their work, their image and without a doubt their athletic performance. This shows that the main values to be protected by these norms are the ideals of femininity (weakness, softness, female gender expression, large breasts, absence of body hair, heterosexuality, need for protection), and that women who can be excluded, monitored, punished and corrected are those who look unwanted to men

³ Available on the website of the Court of Arbitration for Sport

(non-normative hair, flat chest, muscles, sexual orientation or gender identity). The fact that gender examinations are carried out only on women who are reported or a source of suspicion, subjects women with hormonal variations, racialized, intersex, trans women, and all those with a non-normative aspect to specific violations.

Dr. Ljungqvist, an expert witness on behalf of the IAAF, when asked why other genetic traits such as the size of a hand to play volleyball were not excluded, indicated that these characteristics do not qualify a person as male or female, which shows that these regulations seek to adjust and correct monolithic categories of women and men, and not to prevent unfair advantages. To illustrate the extent to which these rules function as a manual of colonial gender surveillance, I highlight an article published by Bermon (2013), a witness and former member of the IAAF, where he describes the detection of four female athletes with XY chromosomes through the rules of hyperandrogenism and states that although leaving the testicles in them did not carry any health risk, they were informed that gonadectomy would allow them to continue with elite sport in the female category, and they were also proposed a partial clitoridectomy with a feminizing vaginoplasty, both unnecessary cosmetic interventions, and estrogen replacement therapy, which were performed on the four athletes.

These cruel imposed outcomes shed light on the true implementation (Karkazis & Jordan-Young, 2018) of regulations that purport to be scientific and neutral. The practices of normalization and genital mutilation that were imposed in an extortive manner on these four athletes come from the surgical medical models that are applied to intersex babies, also based on the binary conviction of wanting to correct bodies that do not adapt to the typical idea of woman or man (Muschialli et al., 2024).

In the article, the authors mentioned that the athletes came from developing countries, from rural areas. The issue of race is an unavoidable topic in this discussion, given that most of the athletes investigated by these protocols and questioned in the media are racialized women from the Global South⁴. Even Bermon in an oral presentation of the regulation expressed concern that women in Africa and Asia are "reaching" the highest level due to an unfair advantage for not having been "treated" (Karkazis & Jordan-Young, 2018), implying that those who need protection are white, European athletes, with access to all resources. Racist and colonial stereotypes, not only sexist ones, also operate on the surveillance of bodies and femininity.

As Dutee Chand expressed, scrutiny, suspicion, and fear of certain body types and gender expressions can affect self-perception and identity, and pressure increases for female athletes to conform to stereotypical expectations of female behavior and appearances for fear of being investigated. That is, these regulations play a preventive role in monitoring sex and also gender expression, including sexual orientation. In addition, they discourage the participation of trans and intersex people, especially women.

⁴ ter Semenya (South Africa), Dutee Chand (India), Cristine Mboma (Namibia), Beatrice Masilingi (Namibia), Francine Niyonsaba (Burundian), Margaret Wambui (Kenya), Santhi Soundarajan (India), Imane Khelif (Algeria).



5 CONCLUSION

Attempts to establish sex and gender control norms hidden by biomedical foundations are common in different areas. In this article I exposed mechanisms through which these norms are based in the field of health and sport, and I exemplified how surveillance, stigmatization and attempts to exclude those people who are outside the realm of the binary norm are carried out. This compulsive surveillance with the aim of marginalizing, punishing, hiding and correcting those who have bodily characteristics other than the dichotomous ideal, collaborates with the production of sex and gender as presumably axiomatic truths to be protected, even when nature is presented as an unconstrained spectrum.

REFERENCES

- Fausto-Sterling, A. (2000). *Cuerpos sexuados: La construcción social de la diferencia sexual*. Editorial Melusina.
- López-Siguero, J. P. (2014). Manejo del paciente con síndrome de Klinefelter. *Rev Esp Endocrinol Pediatr*, 5, 85-90.
- Winnykamien, I., Dalibón, A., & Knoblovits, P. (2017). Síndrome de ovario poliquístico. *Revista del Hospital de Italiano Buenos Aires*, 37(1), 10-20.
- Organización Mundial de la Salud (OMS, 2023). Síndrome de ovario poliquístico. [Link](#).
- Santner, S. J., Albertson, B., Zhang, G. Y., Zhang, G. H., Santulli, M., Wang, C., ... & Santen, R. J. (1998). Comparative rates of androgen production and metabolism in Caucasian and Chinese subjects. *The Journal of Clinical Endocrinology & Metabolism*, 83(6), 2104–2109.
- López, L. F. (2024). Tres etapas de la vigilancia de género en el atletismo olímpico. *AVATARES de la comunicación y la cultura*, 27, 1853-5925.
- Bermon, S., Garnier, P. Y., Hirschberg, A. L., Robinson, N., Giraud, S., Nicoli, R., ... & Ritzen, M. (2014). Serum androgen levels in elite female athletes. *The Journal of Clinical Endocrinology & Metabolism*, 99(11), 4328–4335.
- Healy, M. L., Gibney, J., Pentecost, C., Wheeler, M. J., & Sonksen, P. H. (2014). Endocrine profiles in 693 elite athletes in the postcompetition setting. *Clinical Endocrinology*, 81(2), 294–305.
- Fénichel, P., Paris, F., Philibert, P., Hiéronimus, S., Gaspari, L., Kurzenne, J. Y., ... & Sultan, C. (2013). Molecular diagnosis of 5 α -reductase deficiency in 4 elite young female athletes through hormonal screening for hyperandrogenism. *The Journal of Clinical Endocrinology & Metabolism*, 98(6), E1055–E1059.
- Karkazis, K., & Jordan-Young, R. M. (2018). The powers of testosterone: Obscuring race and regional bias in the regulation of women athletes. *Feminist Formations*, 30(2), 1–39.
- Muschialli, L., Allen, C. L., Boy-Mena, E., Malik, A., Pallitto, C., Nihlén, Å., & Gonsalves, L. (2024). Perspectives on conducting “sex-normalising” intersex surgeries conducted in infancy: A systematic review. *PLOS Global Public Health*, 4(8), e0003568.
- Karkazis, K., & Jordan-Young, R. M. (2018). The powers of testosterone: Obscuring race and regional bias in the regulation of women athletes. *Feminist Formations*, 30(2), 1–39.