

Qualia

Does the science support a ban on female athletes with high testosterone levels?

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Caster Semenya, left, during the 2011 World championships Athletics in Daegu, South Korea. (Photo: Erik van Leeuwen (bron: Wikipedia))

In time for the London 2012 Olympic games, the International Olympic Committee (IOC) released new [guidelines](#) for determining whether female athletes with high testosterone levels are allowed to compete in the games. A female athlete may be ineligible due to a testosterone level within the normal male range because this “confers a competitive advantage” to her. A recent [paper](#) in the *American Journal of Bioethics* lambasts these new guidelines (as well as those by the International Association of Athletic Federations, IAAF) and highlights how they are not based on scientific evidence.

The new IOC and IAAF guidelines were probably initiated because of Caster Semenya, a South African runner who won the 800-meter race by 2.45 seconds at the Berlin World Championships in 2009. This win, along with her perceived masculine appearance, started a humiliating media blitz about whether Semenya was actually a woman, even though Semenya’s winning time ranked her only 26th overall and 7th for Juniors (and would not have ranked her in the male lists). After undergoing invasive medical testing and an almost yearlong investigation and suspension, Semenya was allowed to return to competition and will compete in the London Olympics. Probably due to heavy criticism garnered over the treatment of Semenya, the IOC developed their new policy that requires the testing of testosterone levels in female athletes with characteristics of hyperandrogenism. Female athletes with testosterone levels in the male range will only be able to compete if they agree to treatment or are found to be insensitive to androgens. This is despite the fact that, as the authors of the paper linked to above state, “*there is no evidence showing that successful athletes have higher testosterone levels than less successful athletes.*”

In fact the authors point out that there is a surprising dearth of placebo-controlled studies looking at how testosterone levels impact the female body. There are studies showing that testosterone increases endurance, muscle mass, and strength in men, although there is large variability in how individual men respond to the same amount of testosterone. It seems likely that there may be even more variability between how men and women respond to testosterone — especially considering the average man has 10 times the amount of testosterone of the average woman but not 10 times the strength. Further supporting this possibility is the fact that women with a condition

called Complete Androgen Insensitivity Syndrome (CAIS) have tissues that do not respond at all to testosterone and are overrepresented in elite athletics.

The lack of scientific studies in this arena have convinced me that a female athlete who has endogenous testosterone levels in the male range should not be barred from competition, especially when one considers the other naturally occurring mutations that give some athletes advantages over their non-mutated competitors. For example, some runners and cyclists have a mutation in their [mitochondrial DNA](#) that gives them increased aerobic capacity, and other athletes have mutations that increase muscle growth or blood flow to their muscles. Biological variability is part of the reason we have the Olympics to begin with; it should be celebrated, not derided. I fear, as do the authors of the paper disagreeing with the new rulings, that females with high levels of testosterone (who are often intersex) have been singled out for this type of testing because of the complicated feelings society has about gender and femininity -- in fact the paper has a good discussion of how difficult it can be to define a person's sex and the different ways that sex has been defined in athletic competitions historically. And I hope that the IOC revisits its guidelines before the next Olympics. In the meantime, I will be cheering on Caster Semenya in these games!