

Letter to the Editor about “Testosterone and muscle memory: A response window for the inclusion of transgender people in sport”

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Dear Editor:

We, from the National Autonomous University of Honduras (UNAH), present this document with the aim of calling upon researchers worldwide experienced in biochemistry, sports physiology, as well as specialists in physical activity and sports, to provide impetus and establish scientific positions regarding the competitive parity between transgender athletes and cisgender women in various sports disciplines.

Currently, the topic continues to generate systematic debates that controversially revolve around equal rights and biological conditions for fair competition. In this regard, the International Olympic Committee (IOC) governs regulations for the inclusion of transgender individuals in women's competitions. According to the IOC, two essential guidelines were established in 2015 to define competitive inclusion. For individuals transitioning from women to men, they are eligible to compete in the male category without restrictions. However, for those transitioning from men to women, they can compete under the following conditions:

The athlete has declared their gender identity as female, and this declaration cannot be changed, for sporting purposes, for a minimum of 4 years.

The athlete must demonstrate that their total serum testosterone level has remained below 10 nmol/L for at least 12 months before their first competition. Any further period required to minimize any advantage in female competition would be determined on a case-by-case basis.

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The athlete's total serum testosterone level must stay below 10 nmol/L throughout the desired eligibility period to compete in the female category.

It is important to note that compliance with these conditions is monitored through tests, and in case of non-compliance, eligibility for competition will be suspended.

However, despite many athletes meeting these requirements, questionable competitive advantages are observed. For example, the case of a transgender swimmer from the United States winning university competitions with world-class records raises concerns. Despite being legally within regulatory frameworks to compete, her 193 cm height and a history of high-performance swimming before transitioning provoke thoughts within the specialized community.

In this context, one must question whether testosterone levels are the sole biological indicator to measure. From our perspective, many unanswered questions remain, sparking a debate and the path toward new studies. Following the previous argument, it is worth asking whether muscle memory is the same between a transgender athlete and a cisgender woman, considering the reasons why athletes' muscles recover more quickly when they resume training after a long period of inactivity. This notion is rooted in genetics, where epigenetic muscle memory is determined by early growth, conditioning rapid recovery.

Seaborne argues that muscles tend to retain a memory of prior muscle growth. If an athlete used steroids in the past, even if they abstain during the current period, they may still have advantages over other competitors. Therefore, if a transgender competitor accumulated physical stressors during their high-performance training, enabling them to achieve a somatotype advantageous despite gender reassignment and hormonal feminization therapy to block testosterone action, their muscles might retain a memory based on their male background, providing advantages in physical performance and a somatotype in better conditions than other competitors.

This argument is grounded in the fact that high-performance physical training, such as strength and muscle mass gains, is accompanied by DNA hypomethylation, a type of epigenetic modification. This modification, influenced by our environment and activities throughout life, involves the removal of methyl groups from DNA, making it easier to read. If training ceases, muscle volume may decrease, but hypomethylation persists, as demonstrated in Seaborne's studies. Considering this approach, it could serve as a starting point for various studies aimed at resolving the issue at hand.

In conclusion, muscle memory could be a significant factor in determining the advantages in physical condition observed in transgender athletes over other competitors. Therefore, the analytical perspective should extend beyond the levels of testosterone before and during competition. From this standpoint, we urge the scientific community with professional interest and relevance to pave the way for possible answers that are imperative in the sports community.

Keywords: Physical loads, Somatotype, DNA hypomethylation.

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