

Study of female weightlifters crushes stereotype

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In the first-ever study of its kind, San Francisco State University and California State University, Fullerton researchers found that elite women weightlifters have the same amount—and in some cases more—of the

muscle fibers needed for the sport compared to their male counterparts. These "fast twitch fibers" are especially suited to fast and powerful movements, such as those in "clean and jerk" lifts. By finding that males don't have more of the fibers, the study, published on March 27 in *PLOS ONE*, helps disprove a stereotype about women athletes that has persisted for years.

"Despite no high-level data, people thought that women had fewer fast twitch fibers and that was seen as a negative thing," said San Francisco State Assistant Professor of Kinesiology Jimmy Bagley, one of the study's co-authors. "We've shown that that is not true."

Humans have three main muscle cell (or fiber) types, and each has a different variety of a protein called myosin heavy chain ("MHC"). MHC is the "microscopic motor" that makes your muscles move, explains Bagley. Human fiber types include MHC I (slow twitch), IIa (fast twitch) and IIx (super-fast twitch). Bagley and his team analyzed muscle fibers from thigh muscle biopsies collected from six world/Olympic-class [female athletes](#), nine national-caliber female athletes and six national-caliber male athletes during the 2017 World Weightlifting Championships held in Anaheim, California. These weightlifters had the most fast twitch (MHC IIa) fibers ever reported in athletes (67 percent on average), and two of the World/Olympic-class women had over 85 percent fast twitch fibers, more than any of the men.

"These findings suggest [athlete](#) caliber, training experience and [body mass](#) determine the percentage of fast twitch fiber more than gender," said Bagley. "It used to be thought that fiber type was what you were born with, but we show that's not the case—training has a huge influence."

Alumna Kaylie Zapanta, who graduated with a master's in kinesiology in 2017 and competed in college-level weightlifting, helped perform the

muscle fiber analysis. She says that while women differ from men in terms of hormones and [body type](#), the study is pivotal in showing that from a muscle perspective, women are pretty much the same as men.

"When you look at [muscle](#) tissue, you can't really differentiate between a man's [muscle fibers](#) and a woman's," she said.

More information: *PLOS ONE* (2019). journals.plos.org/plosone/article?id=10.1371/journal.pone.0207975

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