

# Study finds intramuscular fat affects skeletal muscle mechanics with implications for the age and obesity

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Efforts to battle the bulge and stay youthful aren't futile, but they are certainly compromised by a physiological process that undermines our mobility, according to a Simon Fraser University scientist.

For the first time, James Wakeling, a comparative biomechanist in SFU's Department of Biomedical Physiology and Kinesiology, and his research team have isolated the mechanisms that link the reduction of [muscle performance](#) to intramuscular fat. They have used a novel modeling approach to understand the effect of different distributions of fatty tissue within a muscle on the mechanical output of that muscle.

In a *Journal of the Royal Society Interface* paper they document how our ability to perform everyday activities declines naturally with [fat accumulation](#) in human skeletal muscles. Ageing, obesity and many diseases worsen or advance this inevitable process.

Human skeletal muscles are attached to bones by bundles of collagen fibers known as tendons. There are approximately 640 of them in our bodies.

"Accumulation of intramuscular fat seems to be ubiquitous during ageing and for people with obesity," explains Wakeling. "Understanding how this fat alters the ability of our muscles to develop force will mark an important step to help maintain mobility and a healthy lifestyle in all

Canadians, even if we can't halt the process completely."

His team's findings reveal there is a general deterioration in the muscle quality with fat infiltration. The infiltration alters [muscle tissue](#) composition and consequently changes the way in which contractile forces are distributed through the [muscle](#). This, in turn, substantially reduces [muscle force](#) as a whole.

Interdisciplinary collaboration with SFU math professor Nilima Nigam made this work possible. She helped develop the conceptual mathematical and computational models used in this study.

"This study highlighted, for me, the power of genuine interdisciplinary collaboration to answer deep conceptual questions. We've used tools from physiology, mathematics, biomechanics and scientific computing to address questions which are of interest in public health."

**More information:** "The effect of intramuscular fat on skeletal muscle mechanics: implications for the elderly and obese." *J. R. Soc. Interface* 2015 12 20150365; [DOI: 10.1098/rsif.2015.0365](https://doi.org/10.1098/rsif.2015.0365)

Provided by Simon Fraser University

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