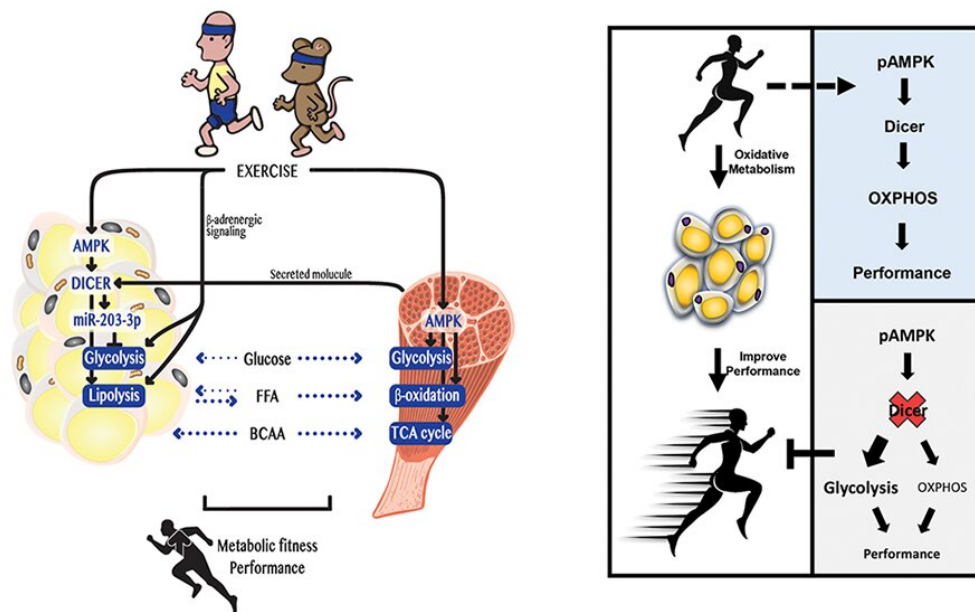


New insight into how muscles and fat cells work together to make you more fit

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Credit: University of Copenhagen

Why does exercise training make you more fit? It's well established that exercising enhances insulin sensitivity and improves our metabolism that, in turn, increases exercise performance. But the biological mechanisms underlying this adaptation are not fully understood.

New research published in the journal *PNAS* suggests that part of the

explanation rests on how skeletal [muscle](#) and [fat tissue](#) communicate with each other. The research was led by CBMR's Associate Professor Jonas Treebak from the Novo Nordisk Foundation Center for Basic Metabolic Research (CBMR) at the University of Copenhagen, together with Assistant Professor Marcelo A. Mori from the University of Campinas.

DICER primes fat to help muscles

In experiments in both mice and humans, they found that short-term [exercise training](#) increases levels of the enzyme DICER in fat cells. DICER in fat helps muscles adapt to exercise and increase performance because it primes fat cells to release [fatty acids](#) into the bloodstream that muscles need.

The scientists argue that DICER works by regulating a microRNA molecule that stops fat from utilizing glucose from the bloodstream. Their study shows that mice, which cannot produce DICER, do not get more fit from exercising, and even develop obesity.

However, if you transfer blood from previously exercised mice into non-exercised mice, it increased levels of DICER in the fat of non-exercised mice. This suggests that exercise training causes muscles to release a molecule that causes fat cells to produce more DICER.

An unknown circulating factor

Associate Professor Jonas Treebak says: "The idea that skeletal muscle signals to other tissues in response to exercise is not new, and although the specific signal from muscle remains elusive, we have identified a signaling axis between muscle and fat that is central for the adaptive response in muscle to exercise training."

He adds: "The next steps are obviously to identify the circulating factor from [skeletal muscle](#) as well as to identify the target(s) of the specific microRNA."

More information: Bruna B. Brandão et al, Dynamic changes in DICER levels in adipose tissue control metabolic adaptations to exercise, *Proceedings of the National Academy of Sciences* (2020). [DOI: 10.1073/pnas.2011243117](#)

Provided by University of Copenhagen

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