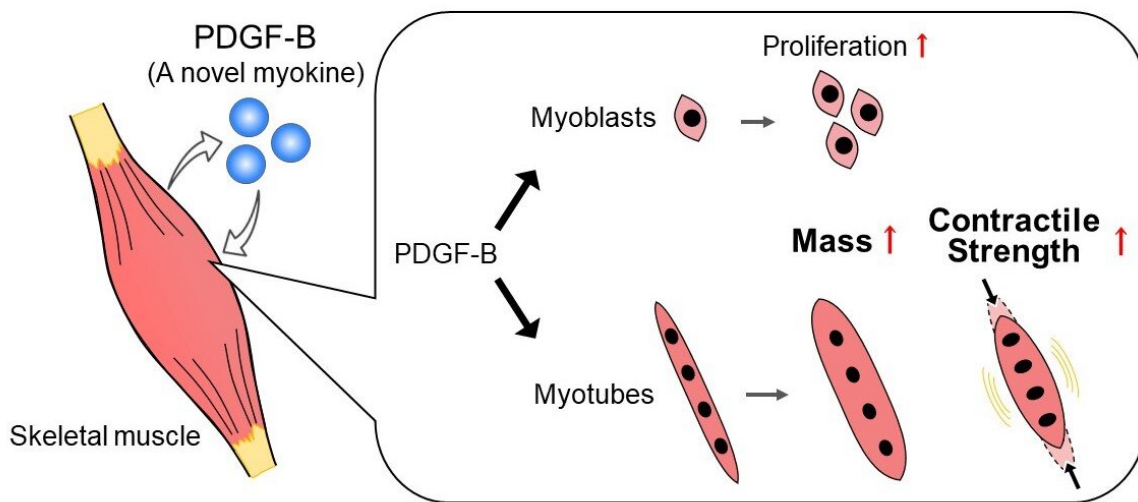


Scientists discover secreted protein helps repair and grow muscles

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PDGF-B secreted from skeletal muscle cells enhances not only cell proliferation but also muscle hypertrophy accompanied by contractile function. Credit: Tokyo Metropolitan University

Scientists from Tokyo Metropolitan University have discovered that a protein called platelet-derived growth factor subunit B (PDGF-B) is continuously secreted from skeletal muscle cells and helps to repair muscles by encouraging myoblasts (muscle stem cells) to proliferate. Unexpectedly, they found that PDGF-B also helps muscle fibers grow. They confirmed this corresponded to fibers contracting more strongly.

Their findings promise game-changing therapies for treating muscular atrophy and injury.

Myokines are small proteins secreted by [skeletal muscle cells](#). They have a wide range of functions and may act on cells both near and far to where they are made. A comprehensive picture of how myokines affect [cellular processes](#) is far from clear, but it is believed that they play an important role in exercise-related bodily functions, particularly the maintenance of muscle tissue.

A team led by Associate Professor Yasuko Manabe at Tokyo Metropolitan University has been studying how myokines affect the behavior of muscle cells. Through extensive experiments, they found that a myokine known as platelet-derived growth factor subunit B, or PDGF-B, is secreted by skeletal muscles in a constitutive way (i.e., without any stimulus). To understand what role it plays, they took myoblasts, precursor cells which go on to differentiate into muscle fibers, and exposed them to PDGF-B. They were able to clearly show that PDGF-B induced greater proliferation of myoblasts.

Curiously, they also found that PDGF-B impacted cells which had already differentiated. They took myotubes, a developmental stage of [muscle fibers](#), and exposed them to the same myokine. Myotubes treated in this way exhibited significantly more maturation, visibly increasing in diameter under microscope observation. They also expressed more Myosin Heavy Chain, a key part of the protein structure of myosin, the molecular motor responsible for [muscle contraction](#).

Using a recently developed technique based on observing how myotubes react to an electric pulse, this was shown to directly correspond to increased contractile strength. Thus, PDGF-B not only helps make more muscle, but makes them stronger. But this doesn't mean both processes are accelerated in a haphazard manner. They noticed subtle differences

in PDGF-B signaling pathways between myotubes and myoblasts; the team believe these differences may be involved in cells switching from a proliferating phase to one where they are maturing.

The paper is published in the journal *Biochemical and Biophysical Research Communications*.

The team's work shows clearly that PDGF-B is involved in muscle regeneration and constitutes a big leap forward for developing effective treatments for muscle injury and atrophy as well as regimens for improving muscle performance.

More information: Hiroki Hamaguchi et al, PDGF-B secreted from skeletal muscle enhances myoblast proliferation and myotube maturation via activation of the PDGFR signaling cascade, *Biochemical and Biophysical Research Communications* (2022). [DOI: 10.1016/j.bbrc.2022.11.085](https://doi.org/10.1016/j.bbrc.2022.11.085)

Provided by Tokyo Metropolitan University

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