

Scientific breakthrough unlocks potential novel tendon therapy

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Scientists are investigating a new therapy for the treatment of tendon injuries such as tennis elbow and Achilles tendinitis after gaining new insight into the condition.

Tendon injuries (tendinopathies) are common, accounting for 30-50% of all sporting injuries, and are usually caused by repetitive strain or major trauma.

While many people recover after a period of rest, a significant number of people do not because the structure of the tendon itself has permanently weakened.

Healthy tendons, connecting muscles to bones, are primarily composed of type-1 collagen, a very strong material. When injured the body responds by producing the inferior type-3 collagen to quickly repair the damage. This type of collagen is not as strong as type-1 and is more prone to damage. Normally, over time, type 3 is replaced by the stronger type-1.

However, in some people, repetitive damage means the body never replaces the weaker type-3 collagen, leaving them with inherently weaker tendons and long-term symptoms, such as pain and reduced mobility.

Scientists at the University of Glasgow are trialling a [new therapy](#) (TenoMiR) for treating tendinopathy after being awarded a High Growth

Spinout grant from Scottish Enterprise.

The trial will use injections of microRNA – small molecules that help regulate gene expression – into the tendon to 'dial-down' the production of type 3 collagen and switch to type-1.

The Glasgow team have already been successful in making the switch in cultured cells in the lab and in mice. They will now work with international collaborators to trial the [treatment](#) on horses, which also frequently suffer tendon injuries, particularly in racing.

Following this trial, the team intends to commercialise the treatments through a spin-out company called Causeway Therapeutics focussing on bringing safe and effective medicines to human and veterinary markets.

Neal Millar, an academic consultant orthopaedic surgeon and clinical senior research fellow at the University of Glasgow, said: "Tendinopathy is essentially the result of an imbalance between collagen type-1 and type-3 and we have discovered the molecular cause. This breakthrough has allowed us to find a way to alter the levels of collagen type-3 in tendons, with the ultimate aim to get patients with [tendon injuries](#) better quicker."

Co-investigator and senior molecular biologist Dr Derek Gilchrist commented that: "Our studies have revealed the previously unrecognised ability of a single microRNA to cross-regulate important functions in the early biological processes that lead to tissue repair."

Results of the previous studies by the team, which also includes Professor Iain McInnes, Director of the Institute of Infection, Immunity and Inflammation within the University are published in *Nature Communications* and reveal the role of the microRNA 29a in tendon tissue repair.

More information: "MicroRNA29a regulates IL-33-mediated tissue remodelling in tendon disease." *Nature Communications* 6, article no. 6774 (2015). [DOI: 10.1038/ncomms7774](https://doi.org/10.1038/ncomms7774)

Provided by University of Glasgow

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