

After an ACL tear: Research opens door to new treatments to improve recovery for athletes

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A U-M clinical research coordinator conducts functional knee strength testing at the U-M Health System's MedSport facility to measure muscle weakness after an ACL injury. Credit: University of Michigan Health System

Striking the likes of Chicago Bulls' Derrick Rose, L.A. Lakers' Kobe Bryant and Detroit Tigers' Victor Martinez, tears in the anterior cruciate ligament (ACL) are one of the most rampant and serious knee injuries

among athletes.

Now, researchers from the University of Michigan Health System have identified a new [drug target](#) that may prevent one of the most dreaded consequences of an ACL tear –the weakening or loss of muscle tissue (muscle atrophy) that can be a career-killer in sports and ultimately develop into osteoarthritis.

A hormone called myostatin that blocks muscle growth appears to play a key role in causing [muscle damage](#) after ACL tears, according to a study that appears in the *American Journal of Sports Medicine*. The findings pave the way for potential treatment preventing [muscle loss](#) after an ACL tear and consequent knee replacement, which affects more than 250,000 people a year in the U.S.

"We've had several advances in technology to improve the recovery process for an ACL tear, but most patients still experience 30-40 percent muscle weakness – and that weakness largely limits the ability to return to the same level of sports," says lead author and athletic trainer Christopher L. Mendias, Ph.D., A.T.C, assistant professor of Orthopaedic Surgery and Molecular & Integrative Physiology at the U-M Medical School.

"This is the first study in humans to open the door to a potential therapy to prevent [muscle atrophy](#). We see this as an important step in restoring athletic and functional abilities in the short term, and in preventing osteoarthritis in the long term."

Often dubbed an athlete's worst nightmare, [ACL tears](#) usually require surgical repairs and months of intense rehabilitation that force long breaks from playing any sports.

Myostatin has shown promise as a potential drug target for treating other

conditions such as muscular dystrophy and cancer, and blocking the protein has led to increased muscle mass and strength.

"In the sports world, there's great concern about the short-term and long-term affect of an ACL tear on not only an athlete's physical skills and ability to return to play, but also the longevity and health of the knee joint," says senior author Asheesh Bedi, M.D., assistant professor in orthopedic surgery.

"This is the first study to look into the biology of muscle tissue involved in an ACL tear and to show how Myostatin affects the muscle damage we see following surgery. We need further studies to examine how these findings may aid in better recoveries following a common and often detrimental type of knee injury for athletes."

More information: "Changes in Circulating Biomarkers of Muscle Atrophy, Inflammation and Cartilage Turnover in Patients Undergoing Anterior Cruciate Ligament Reconstruction and Rehabilitation," *American Journal of Sports Medicine*, [DOI:10.1177/0363546513490651](https://doi.org/10.1177/0363546513490651)

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