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**St. Louis**  
Pediatric Specialty Care

## **NEWS RELEASE**

### **FOR IMMEDIATE RELEASE**

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### **Shriners Hospital study reveals new link to arthritis**

Signals from fat, not excess loading, lead to painful joint disease

(St. Louis) - A new study by investigators at Shriners Hospital for Children® — St. Louis suggests the damaging effects of obesity are not due to body weight but rather come from something much smaller – biochemical signals released by fat cells.

The study focuses on the link between overweight or obesity and the development of osteoarthritis, a painful disease of the joints. The investigation was led by Dr. Farshid Guilak, director of the St. Louis Shriners Hospital Research Center.

“We’ve shown here that it’s not overloading of the joints that is responsible for osteoarthritis, but, more likely, a factor given off by fat cells that makes cartilage susceptible to degeneration,” said Guilak, who also serves as the Mildred B. Simon Professor of Orthopaedic Surgery at Washington University, a partner of the St. Louis Shriners Hospital.

While historically regarded as an unavoidable part of aging, osteoarthritis is now appearing more commonly in children. This is due in part to widespread increases in childhood obesity, coupled with injuries that commonly occur in adolescents, such as knee ligament tears. Little scientific research had been done in the past on the connection between obesity and osteoarthritis because, Guilak said, it was simply dismissed as byproduct of overloading the joints with increased body weight. But the new study by investigators at the St. Louis Shriners Hospital and the Washington University School of Medicine shows that weight gain alone is not the cause.

## INSIDE THE RESEARCH

The researchers used a unique type of mouse that has no fat cells anywhere in their bodies. Even when they were fed an unhealthy, extremely high-fat diet, these mice did not develop osteoarthritis in any of their joints. The researchers were surprised to find that even with a knee injury that normally causes rapid degeneration of the cartilage, fat-free mice were protected from getting osteoarthritis.

Then, the researchers implanted a tiny piece of fat under the skin of these mice, so small it had no effect on their body weight. The mice became susceptible to osteoarthritis, even though there was no weight gain. This showed researchers that fat outside the knee joint plays a critical role in cartilage health.

The study was published in the journal *Proceedings of the National Academy of Sciences*. It was designed and executed by the lead author Dr. Kelsey Collins, a postdoctoral fellow in Guilak's laboratory.

"This study demonstrates that factors outside of the knee joint can affect cartilage health, which opens the door for a wide range of new osteoarthritis treatment targets we can investigate," Collins said. "Once we identify the factors given off by fat cells that are responsible for these effects on the joint, we hope to develop new drugs to target them."

In the meantime, Guilak, who also co-directs the Washington University Center for Regenerative Medicine and is a professor of biomedical engineering and of developmental biology, said that a healthy diet and weight loss are the first lines of prevention for osteoarthritis.

"Something like this could take years to develop, but we're excited about its prospects for reducing joint damage, as well as many of the other unhealthy effects of obesity," Collins said.

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Collins, K.H., Lenz, K.L., Pollitt, E.N., Ferguson, D., Hutson, I., Springer, L.E., Oestreich, A.K., Tang, R., Choi, Y.R., Meyer, G.A., Teitelbaum, S.L., Pham, C.T.N., Harris, C.A., and Guilak, F. Adipose tissue is a critical regulator of osteoarthritis, *Proceedings of the National Academy of Sciences USA*, published online December xxx, 2020.

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