

Research team discovers two biomarkers that contribute to spine osteoarthritis

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A research team at the Krembil Research Institute has discovered a pair of tissue biomarkers that directly contribute to the harmful joint degeneration associated with spine osteoarthritis.

The study, published today in the *Journal of Clinical Investigation Insight*, is the first to show that elevated levels of both of these biomarkers cause inflammation, cartilage destruction and collagen depletion.

"These biomarkers are actively involved in increasing inflammation and destructive activities in spine cartilage and assist in its destruction," says principal investigator Dr. Mohit Kapoor, Senior Scientist at the Krembil Research Institute and Associate Professor in the Department of Surgery and the Department of Laboratory Medicine and Pathobiology at the University of Toronto. Dr. Kapoor specializes in arthritis research.

Osteoarthritis affects about three million Canadians and is characterized by a breakdown of the protective cartilage found in the body's spine, hand, knee and hip joints. There is no known cure.

The study involved tissue biopsies from 55 patients undergoing decompression or discectomy at the Krembil Neuroscience Centre at Toronto Western Hospital. As part of the study, the research team - led by Dr. Kapoor and comprising Dr. Akihiro Nakamura, a post-doctoral fellow, and Dr. Y. Raja Rampersaud, a clinical expert and spine surgeon - explored the role, function and signaling mechanisms of two tissue biomarkers: microRNA-181a-5p and microRNA-4454.

The study screened 2,100 microRNAs and found that measuring the levels of these two specific biomarkers can help clinicians determine the stage to which the disease has progressed, and provide a tool for determining the degree of cartilage destruction.

"These are biologically active molecules. By detecting them in the tissue biopsies, we have a tool for determining the stage of spine osteoarthritis," says Dr. Kapoor. "What is really significant, however, is we have discovered that these biomarkers are actively involved in destroying cartilage and increasing inflammation. Furthermore, they promote cartilage cells to die and deplete the most important component of your [cartilage](#), which is your collagen."

The discovery represents the end of the first stage of research. The team is now investigating whether these biomarkers can be detected in the blood - which would help clinicians more simply determine the stage of spine osteoarthritis - and whether further studying the [biomarkers](#) will allow researchers to halt and reverse spine degeneration.

"The most critical aspect of this discovery is that we have found that they are active. Now that we know what they are, we are currently looking at blocking them and restoring the joint," says Dr. Kapoor.

Provided by University Health Network

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