

Researcher finds link between back pain and genetics

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(Medical Xpress) -- A common complaint, back pain is one of the many side effects of aging. Over three quarters of the population experience it at some point, and until now, researchers have had little conclusive proof of the causes and mechanisms of the pain.

New research from Prof. Gregory Livshits of Tel Aviv University's Department of Anatomy and [Anthropology](#) at the Sackler Faculty of Medicine, however, shows that genetics are a major contributing factor to this [pain](#) — and common back pain complaints may have different [genetic](#) origins. The results of their study can help identify the different mechanisms involved in back pain and lead to more effective treatment

options.

The research, pursued in collaboration with a team of scientists at Kings College, London led by Prof. Tim Spector and Dr. Fran Williams, was recently published in the journal *Annals of the Rheumatic Diseases*.

Identical twins, identical pains

Our two-footed anatomy causes strain and subsequent deterioration of the muscular skeletal system, as do factors such as weight or physical exertion. The team's research shows genetics play a key role in lower back pain and the deterioration of intervertebral discs of the spine as well. More surprisingly, Prof. Livshits says, lower back pain and disk degeneration do not always overlap, and are caused by different genetic factors.

Preliminary testing done in Israel more than 10 years ago gave scientists their first clue to the connection between genetics and back pain. A study conducted on Arabic families revealed recurring patterns of lower back pain in family members — many relatives of the same family would develop the same symptoms, even at a young age.

To further test these observations, Prof. Livshits and his team looked at a sample twin population of 2,500 individuals, comprising both identical and non-identical female twins. They tested for several potential risk factors, such as smoking, weight, physical work, vertebral disc degeneration disease as well as genetic predisposition. Researchers relied on MRIs of the spine; radiographic assessment of the body lean, fat and bone mass; and blood samples for DNA extraction, genotyping and testing blood for potential biomarkers associated with joint disease.

In non-identical twins who share half of their genetic make-up, patients were almost three times more likely to suffer from back pain if their

twin did so as well. In identical twins, who share all of their genes, the patient was six times more likely to have joint disease if their twin experienced the same joint disease.

Refining genetic testing

Although the degeneration of intervertebral discs is often associated with lower back pain, researchers discovered that the two conditions could exist independently, and are also caused by different genetic factors.

"We have genetic factors that affect the rate and extent of the degeneration of our discs. In fact, the genetic factors are second only to age," explains Prof. Livshits. "On the other side, we have different [genetic factors](#) that independently cause lower back pain. These are mechanisms not involved in spine degeneration."

This discovery could revolutionize the study and treatment of back pain, says Prof. Livshits. More research on the genetic causes of [back pain](#) is still required, he notes, and a broader genome search of affected and non-affected individuals is necessary.

The next step for Prof. Livshits will be an international effort that spans university labs in a number of countries, creating a consortium of research groups. Together, they will be able to combine their efforts to analyze large sets of data in the quest to solve the mysteries associated with this common complaint.

Provided by Tel Aviv University

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