

Biomarker may signal whether common back pain treatment will work, doctor finds

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A new study from researchers at the Stanford University School of Medicine has identified a unique protein complex that can be used to predict whether an epidural steroid injection will help relieve pain caused by a herniated disc in the lower spine.

Roughly a quarter of all people with [back pain](#) have a herniated disc, and approximately 90 percent of herniated discs occur in the lower back. Steroid injections generally cost a few thousand dollars each, and patients often receive a series of three or more of them, said Gaetano Scuderi, MD, a clinical assistant professor of orthopaedic surgery who is the senior author of the study to be published in the Aug. 15 edition of *Spine*. The lead author, S. Raymond Golish, MD, PhD, was recently a fellow in spine surgery at Stanford.

"There's about a 50-50 chance that the epidural steroid will work, so most people figure, 'Hey, I have nothing to lose,'" Scuderi said.

"However, there is a significant expense, not to mention the procedural risks and lost productivity."

Scuderi cited a 2008 study showing that Americans spend \$90 billion every year on treatments for lower-back [pain](#), and said the findings in his new study provide the basis for a test that might someday lead to substantial savings for the health-care system.

A herniated disc is a problem with one of the small, spongy cushions that sit between the vertebrae of the spine. The hernia occurs when the inside

portion of the disc ruptures and bulges out from between the vertebrae. If it's in the lumbar, or lower spine, region, it may lead to pain, numbness and tingling in the legs and buttocks, not to mention a backache.

Most people with herniated discs get better within one to six months, but the symptoms can be hard to live with, so physicians often prescribe muscle relaxants, painkillers or a series of steroid injections, which have been shown to provide moderate, short-term relief. Many patients also undergo a physical-therapy regimen. In a small number of cases, surgery is needed.

But if patients with lower-back pain could be screened to determine whether they would respond to the injections, they could be spared the discomfort and cost of a futile procedure, Scuderi said, as well as its potential complications, such as bleeding, infection and thinning and even death of bone tissue.

The researchers found that when a molecular complex of fibronectin and aggrecan - protein fragments associated with degenerated or traumatized cartilage - are not present near the hernia, steroid injections almost never work. However, when the complex is present, the injections often provide significant relief. In such cases, the authors hypothesize that the [steroid injection](#) interrupts the inflammatory process initiated by the fibronectin-aggrecan complex.

The study enrolled 26 patients - 19 men and seven women - over the course of a year. Of the 14 whose test samples contained the fibronectin-aggrecan complex, 12 responded to an epidural steroid injection and two did not. Of the 12 whose samples did not contain the complex, only one responded to the injection.

"We believe that the [biomarker](#) complex identified represents a bona

find and independent indicator of [epidural steroid injection]-responsive patients," the authors write, noting that larger trials are warranted.

There are challenges to developing this finding for practical use. As it stands, testing for the [protein complex](#) is "a technically challenging clinical procedure" that is "as invasive as the injection itself," the authors write. It requires a tube to be inserted into the outermost part of the spinal canal. Scuderi noted that the procedure also costs about as much as a single steroid injection. However, he said there may be a way to develop a cheaper, simpler sampling method - possibly by creating a blood test or using molecular imaging.

Scuderi said he and his fellow researchers also are working to determine whether the [protein](#) complex itself could be exploited to reduce pain. "If it's bioactive, it may be a target for new therapies that could reduce or eliminate the pain more effectively and with fewer side effects than steroids," he said.

Provided by Stanford University Medical Center

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