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## Non-Invasive Imaging Technique Developed to Guide Diagnosis of Common and Painful Degenerative Back Condition

**LOS ANGELES (Sept 10 , 2014)** –The Cedars-Sinai Regenerative Medicine Institute, Biomedical Imaging Research Institute and the Department of  Surgery received a $2.8 million grant from the National Institutes of Health (NIH) to aid in the development of the first-ever imaging technique used to diagnose patients suffering from a painful degenerative back condition. By actively identifying the location of pain, researchers hope to alleviate the need for painful diagnostic procedures and in the future, provide targeted, stem-cell based therapeutics to affected individuals.

"Degenerative back conditions are extremely challenging to diagnose and treat," said Hyun Bae, MD, clinical lead of the research study, medical director of orthopedic spine surgery and director of spine education. "By understanding where the source of pain comes from, physicians can better utilize treatments and pain management to help patients live a more normal lifestyle."

More than 85 percent of the United States population suffers from low back pain, much of which is caused by intervertebral disc degeneration. This disc degeneration is a progressive condition, resulting in chronic pain in the back and neck. For some patients, degeneration can occur for years before presenting symptoms, where other individuals are affected most immediately.

As described in the journal Magnetic Resonance in Medicine, identifying the exact disc that is causing the debilitating back pain through imaging techniques may save patients from painful and invasive diagnostic procedures, which require a contrast agent being injected into several spinal discs.

In the study, investigators developed various imaging techniques using MRI that can identify specific biomarkers and also provide a five-pronged diagnostic approach to better aid in diagnosing intervertebral disc degeneration. The approach, used on 12 volunteers and animal models, enabled investigators to precisely diagnose the origin of discogenic pain and monitor the progression of disc degeneration.

These methods involve the use of various imaging techniques to identify certain biomarkers, including water, pH, GAG, glucose, lactate and a cartilage-specific protein known as aggrecan.

"Our research team is interested in the role of stem cells in this disease and how we can utilize these cells to regenerate the disc and turn it back into a functional tissue," said Dan Gazit, PhD, collaborating project lead, director of the Skeletal Regeneration and Stem Cell Therapy Laboratory in the Department of Surgery, the Skeletal Program in the Regenerative Medicine Institute and the Molecular and Micro Imaging

Core Facility. "Using this novel imaging technique, we will be able to evaluate the effect of our future stem cell therapies on back pain."

Additional investigators working on the project include collaborating project lead author Debiao Li, PhD, director of the Biomedical Imagining Research Institute, Wafa Tawackoli, PhD, technical director of the Research Imaging Core and Micro/Molecular Imaging; Gadi Pelled, PhD, an assistant professor in the Gazit Laboratory and Zhaoyang Fan, PhD, 3T MRI technical director in the Biomedical Imaging Research Institute.

Siemens Healthcare researchers Ning Jin, Yutaka Natsuaki and Xiaoming Bi also contributed to the study.

IRB number: Pro00025881.

Citation: Magnetic Resonance in Medicine. 2014 April: "Diagnosis of Discogenic Low Back Pain Using pH Level-Dependent MRI."

COI Disclosure: Investigators have nothing to disclose.

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