

# Researchers shed new light on predicting spinal disc degeneration

August 4 2011

---

About 80% of the active population suffers from low back pain at some point in their lives. In a paper published on August 4th 2011 in *PLoS Computational Biology*, researchers at the Institute for Bioengineering of Catalonia (IBEC) show that overloading on already degenerated discs is less damaging than on discs which are still healthy – and that changes in cell density in discs are fundamental to the process of disc degeneration.

Back pain is closely related to ageing of the discs in the spine, a process characterized by a series of changes in their structure and function, but until now the chain of events that converts normal disc ageing into degenerative disease has not been properly understood. Using a computational model of the lumbar spine that takes into account nutritional and mechanical effects, the scientists looked at the effect of external "loading" on two important cell solutes related to disc metabolism: oxygen and lactate. Degenerative changes are believed to be linked to a failure in the transport of nutrients from the peripheral blood vessels to the discs, which affects solute concentration within the disc and depends on tissue composition and the disc's response to mechanical loads. Overloading can be damaging; however, normal loading allows healthy transportation of nutrients and solutes. They found that the effect of loading was greater when compressing a healthy disc than a degenerated one, and promoted fluctuations of the concentration of the solutes.

"It's essential for the healthy function of the spine that disc cells are provided with the nutrients necessary for tissue maintenance," explains

Damien Lacroix, head of the Biomechanics and Mechanobiology group which carried out the research. "In a healthy disc, we see that sustained mechanical stress – which alters solute concentration – affects the transport of nutrients more drastically than in already degenerated ones, suggesting that loading in the healthy disc is important for maintaining proper metabolic balance. It's safe to say that an alteration of cell number caused by this disturbance to the metabolic transport could result in the possible onset of disc degeneration."

These findings open up new avenues of research and development in the field of disc regenerative medicine.

Provided by Public Library of Science

Citation: Researchers shed new light on predicting spinal disc degeneration (2011, August 4) retrieved 24 April 2024 from

<https://medicalxpress.com/news/2011-08-spinal-disc-degeneration.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.