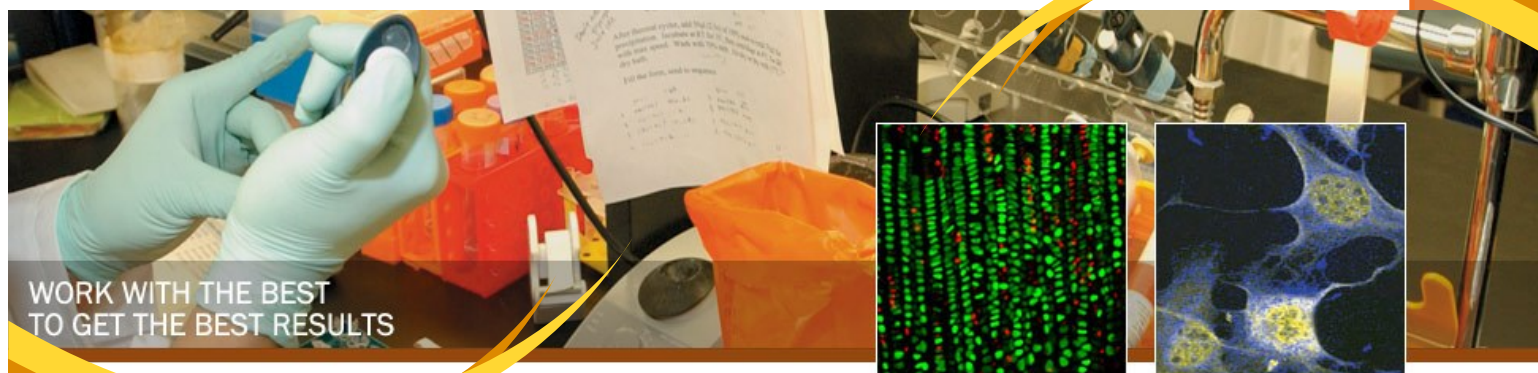




MUSCULOSKELETAL
RESEARCH CENTER
at Washington University

Musculoskeletal Research Center

Vol 7 | Issue 3 | June 2015



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Summer Educational Series

New Directions in Musculoskeletal Research

Date Speaker

6/05 **Dr. Bo Zhang, PhD (*Developmental Biology*)**
"Bioinformatics in High-Throughput Sequencing: Data Mining and Integration"

6/12 **Dr. Ting Wang, PhD (*Genetics*)**
"Epigenetic Analyses"

6/19 **Dr. Simon Tang, PhD and Dr. Stavros Thomopoulos, PhD (*Orthopaedic Surgery*)**
"Soft Tissue Imaging in the Structure and Function Core"

6/26 **Dr. Roberto Civitelli, MD (*Bone & Mineral Diseases*) and Dr. Fanxin Long, PhD (*Orthopaedic Surgery*)**
"Design of Complex Animal Experiments"

Fridays @ 9:00 am
BJCIH Bldg. 11th floor | A/B Conf. Rm.

in this issue

SES 2015 ... p. 1
Tang article... p. 2

UPDATED!

Core D:
Mouse Strain List
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Please remember to include reference to support from the Musculoskeletal Research Center in your abstracts and publications.

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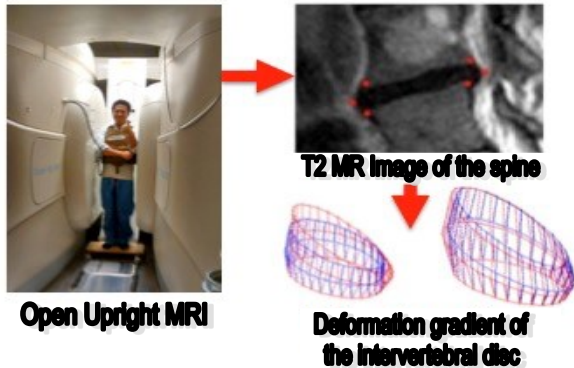
Investigating Low Back Pain and Intervertebral Disc Degeneration

Simon Tang, PhD

Over 80% of the US population will suffer at least one episode of low back pain (LBP) in their lifetime, and LBP incurs billions of dollars in health care and lost wages in the United State. Moreover, more than 75% of individuals who suffer a LBP episode fail to recover within a year. Thus, for many, LBP is a chronic and function-limiting condition.

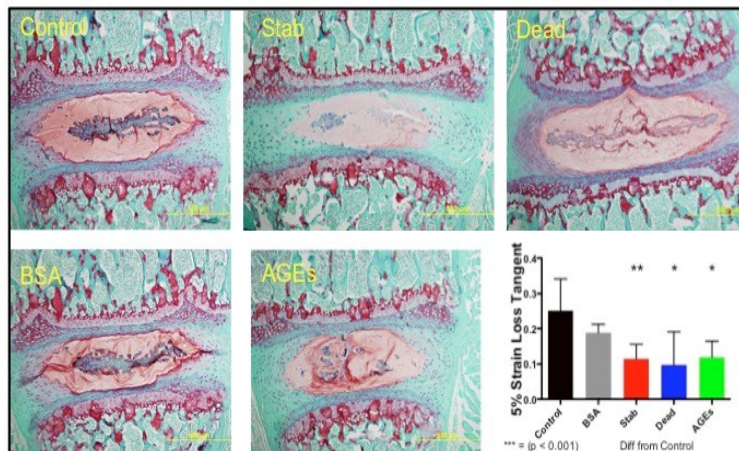
The research interests in my laboratory include the mechanisms of low back pain, and the molecular mechanisms governing intervertebral disc degeneration and inflammation. At the human scale, collaboratively with Dr. Linda Van Dillen in Physical Therapy, we investigate the deformational mechanisms of spine using a novel Open, Upright Magnetic Resonance Imaging (MRI) system (Center for Diagnostic Imaging – St Louis) that allows the imaging of the spine in a loaded state. By investigating these tissue-level changes in patients with nonspecific LBP, we hope to develop new translational diagnostic approaches and reveal tissue-level changes that could help guide the management and therapeutic strategies for LBP.

Figure 1: The Open, Upright MRI system allows us to image the spine in a loaded (standing) and non-loaded (supine) states of humans. We are subsequently able to register these states to determine the deformation gradients of intervertebral discs and identify how these tissue-level deformations are altered in individuals who suffer from LBP. Courtesy of JY Liu.



We are also investigating the molecular mechanisms influence the degeneration of the intervertebral disc (IVD). In the laboratory, we deploy organ culture models that allow us to precisely modulate the conditions that maintain the structural and cellular integrity of the IVD. Of interest, we have identified advanced glycation end-products (AGEs) and the cellular receptor (R-AGE) as potential mediators of degeneration and inflammatory processes. The accumulation of AGEs occur with aging and is particularly elevated in diabetics, and we are currently seeking to elucidate these mechanisms with the overall goal of identifying factors and strategies to prevent and reverse the AGEs-mediated effects of degeneration.

Figure 2: Our laboratory organ culture models shows that advanced glycation end-products degenerates the intervertebral disc and compromises the mechanical function of the disc. Courtesy of A. Abraham and J. Liu.



NEW Grant Competition! Translational Research Grant

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