



Musculoskeletal Research Center

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MUSCULOSKELETAL
RESEARCH CENTER
at Washington University



WORK WITH THE BEST
TO GET THE BEST RESULTS

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 **Washington**
University in St. Louis
SCHOOL OF MEDICINE

AVIOLI MUSCULOSKELETAL SEMINAR SERIES



FRIDAYS 9:00AM
BJC INSTITUTE OF HEALTH,
11TH FLOOR, ROOM AB

Date	Speaker
Oct 25th	Courtney Karner, PhD <i>Long Lab - Orthopaedic Surgery</i>
Oct 29th Tuesday	Georg Schett, MD <i>University of Erlangen-Nuremberg, Germany</i>
Nov 1st	Wei Zou, PhD <i>Teitelbaum Lab - Pathology and Immunology</i>
Nov 8th	Rick Wright, MD <i>Orthopaedic Surgery</i>
Nov 15th	Hua Shen, PhD <i>Thomopoulos Lab - Orthopaedic Surgery</i>
Nov 22nd	Gabriel Mbalaviele, PhD <i>Bone and Mineral Diseases</i>



4th Annual

Winter

Symposium

February 12, 2014

Guest Speaker:

Farshid Guilak, PhD

(Duke University Medical Center)

“Engineering New Therapies for Osteoarthritis”

For more information about the MRC and the Cores, please click here:
<http://musculoskeletalcore.wustl.edu>

Please remember to include reference to support from the Musculoskeletal Research Center in your abstracts and publications.
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Examining the Role of Diabetes in Skeletal Tissue Function

Simon Tang

Assistant Professor, Orthopedic Surgery, Biomedical Engineering, and Mechanical Engineering and Materials Science

Symptomatic disc degeneration is a significant problem around world and within the United States; up to 85% of the US population experience back pain over their life times. Intervertebral Disc (IVD) degeneration is strongly associated with lower back pain, and it underlies several painful low back disorders.

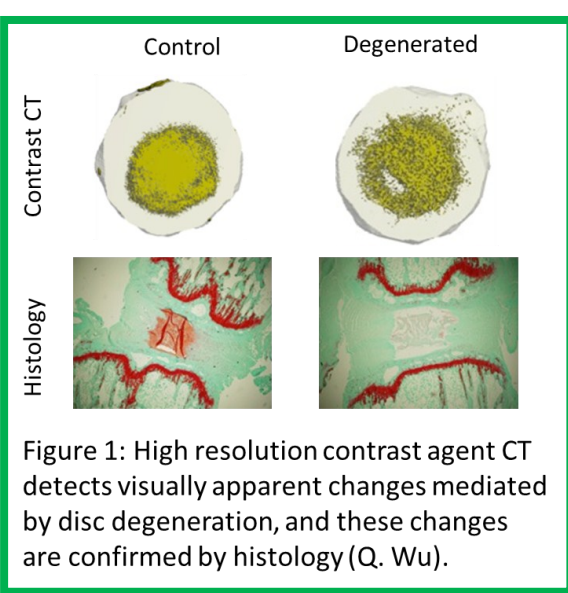
Although multiple risk factors have been identified for intervertebral disc degeneration including genetics and mechanical loading history, recent evidence have shown that diabetes mellitus is a prominent risk factor for DDD and back pain. Our laboratory thus is interested in defining the mechanisms in diabetes that may provoke intervertebral disc degeneration.

Compromised Mechanical Stability in Diabetic Intervertebral Discs

Collaboratively with investigators in Indiana University (Drs. Burr and Fuchs), we have found that the intervertebral discs in rats with Type II diabetes exhibit significantly impaired mechanical function and may be more susceptible mechanical damage leading to injury.

Novel ways to visualize and quantify structural changes in the disc

Currently, we have developed a new method to using contrast-agent enhanced CT that provides high-resolution imaging (10 μ m voxel resolution) of the rodent intervertebral disc.



The contrast agent allows the selective segmentation of the disc structure and provides quantitative functional assessment of the disc (Fig 1). Furthermore, it is possible to conduct longitudinal assessment of the discs as it changes with disease.

Novel Assays to Assess Altered proteome function

On a more mechanistic basis, we are trying to understand the changes on the protein level that occur in diseases

such as diabetes that may lead to the functional impairments that we observe in skeletal tissues. In our laboratory we have applied two novel assays that measures the ability of the proteins to unfold in order to dissipate energy and the amount of reactive carbonyls (indicative of the susceptibility to oxidation).



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