Summer 2012

Musculoskeletal Messenger

University of Pennsylvania Penn Center for Musculoskeletal Disorders

Inside this issue:

Penn Center for Musculoskeletal Disorders
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If you have any news or information that you would like included in the next issue of this newsletter, please email us at:

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Remember to include reference to support from the Center in your abstracts and publications. Cite Grant NIH/NIAMS P30AR050950 from the National Institute Of Arthritis And Musculoskeletal And Skin Diseases of the NIH.

Looking Forward to the 2012 PCMD Annual Scientific Symposium — November 14, 2012

Preparations are underway for the 9th Annual Penn Center for Musculoskeletal Disorders Scientific Symposium in the BRB Auditorium/ Lobby to be held on November 14, 2012.

The keynote speaker will be Constance R. Chu, M.D., Albert B. Ferguson, Jr. MD Endowed Chair in Orthopaedic Surgery Professor; Vice Chairman for Translational Research; and Director, Cartilage Restoration Center at The University of Pittsburgh. Her lecture is titled "Osteoarthritis: From Palliation to Prevention."

The day will begin at 10:45 am with registration and poster set-up followed by scientific presentations from new Center members and PCMD Pilot Grant recipients.

The symposium will also include lunch and a judged poster session with prizes awarded in four categories.

The day will conclude with a reception from 4:00-5:30pm in the BRB lobby.

Please register (no charge, but registration is required) by going to: http://www.med.upenn.edu/pcmd/PCMD-scientific-symposium-registration-form.shtml.

Please check the PCMD website in the upcoming months for more information.

PCMD Pilot and Feasibility Grant Recipients Announced

The Penn Center for Musculoskeletal Disorders Pilot and Feasibility Grant Program has awarded four investigators with one year of funding each for their pilot grant projects with a start date of July 1, 2012.

The first recipient in our newest round, Jason A. Burdick, Ph.D., will receive funding for his grant titled "Acelluar Fibrous Scaffolds for Stem Cell Recruitment and Cartilage Repair." Dr. Burdick's project will test the use of microfracture in animals combined with a scaffold for endogenous repair.

The second new recipient, James L. Carey, M.D., M.P.H., will receive funding for his pilot grant titled "Development of a Large Animal Model of Osteochondritis Dissecans." Dr. Carey's study will develop a large animal model of OCD. His team will utilize the medial femoral condyle of porcine stifle joints, a model system.

The third new recipient is Andrew Kuntz, M.D., whose pilot grant is titled "Effects of Intra-Articular Glenohumeral Injection of a Non-steroidal Anti-Inflammatory Drug on Shoulder Joint Mechanics in a Rat Model." Dr. Kuntz's aim is to investigate the effects, and therefore safety, of intra-articular NSAID injection on articular cartilage, rotator cuff tendons, and joint function in the native rat shoulder.

The fourth new recipient is Arjun Raj, Ph.D., whose pilot grant is titled " Single Cell Analysis of Molecular and Micromechanical Heterogeneity in Mesenchymal Stem Cells and Engineered Tissues ." Dr. Raj's study will evaluate the functional heterogeneity of mesenchymal stem cells (MSCs).

Congratulations to all pilot grant recipients!

Introducing New Molecular Profiling Core Director -- Vivianna Van Deerlin, M.D., Ph.D.

Vivianna Van Deerlin, M.D., Ph.D. has been appointed Interim Faculty Director of the Penn Molecular Core Facility. Dr. Van Deerlin is Associate Professor of Pathology and Laboratory Medicine and Director of the Clinical Molecular Pathology Laboratory at the Hospital of the University of Pennsylvania (HUP) and Director of the ACGME-accredited Molecular Genetic Pathology fellowship program. She received her M.D./Ph.D from Washington University School of Medicine in St. Louis and completed her residency training in Clinical Pathology and fellowship training in Molecular Pathology at HUP, after which she did a post-doctoral fellowship with Dr. Virginia Lee. She has been on the faculty at Penn Medicine since 2001. Dr. Van Deerlin is board certified in Clinical Pathology and in Molecular Genetic Pathology jointly by the American Board of Pathology and the American Board of Medical Genetics.

Dr. Van Deerlin brings significant experience and expertise to the Molecular Profiling Facility. Her own research is focused on identifying and studying the underlying genetic mechanisms of neurodegenerative disorders. She has also identified novel mutations in several genes for ALS and FTLD. Among her accomplishments, Dr. Van Deerlin coordinated a genome-wide association study on a pathologically-defined subset of FTLD which identified a novel risk genetic risk factor for this subtype of FTLD involving 45 centers and 11 countries and published in Nature Genetics. In addition, she has a special interest in the translation of research tests into the (CLIA-certified) clinical laboratory from her research studies as well as in conjunction with users of the Molecular Profiling/Genomics Facility. She is an active participant of numerous professional organizations, currently serving as a Committee Member in the Solid Tumors Subdivision of the Association for Molecular Pathology and the Molecular Genetic Pathology Committee of the American Board of Pathology.

Dr. Van Deerlin is deeply committed to the services provided to investigators and the projects currently underway. She is enthusiastic about the opportunity to develop new services and facilitate new scientific investigations. Dr. Van Deerlin welcomes inquiries regarding genomic technology and its application to current and future projects. She may be contacted at vivianna@upenn.edu or 215-662-6550.

Technical Staff Added for Histology Core

The Histology Core of the Penn Center for Musculoskeletal Disorders (PCMD) now has additional technical staffing to accommodate the growing number of its service requests. As part of this effort to facilitate Core user projects, a schedule has been adopted to formalize the turn-around times for the most commonly requested services. The Core will complete projects for paraffin embedding, sectioning and basic staining of up to ten samples within three weeks of the initial request (i.e., receipt of samples). For plastic embedding, sectioning and basic staining of up to ten samples, the Core will complete projects within six weeks of the receipt of samples. These changes will allow the Histology Core to better serve PCMD members in a time-efficient manner. Questions in regard to these and other Core services should be directed to the Core Director at pignolo@mail.med.upenn.edu.

Musculoskeletal Tenure Track Open Faculty Position

The Penn Center for Musculoskeletal Disorders at the University of Pennsylvania is currently seeking applicants for a tenure/tenure track faculty position at the rank of Assistant, Associate, or full Professor. Responsibilities include developing an independent, extramurally-funded research program, as well as collaborating with other research and clinical faculty in the Penn Center for Musculoskeletal Disorders and elsewhere in the Penn community.

The successful applicant will have experience in an identified area of musculoskeletal research such as imaging, tissue engineering, cell and developmental biology, stem cells or matrix biochemistry/biology. The candidate will be involved in teaching students, residents and research assistants. Applicants must have an M.D. or Ph.D. or M.D./Ph.D. degree and have demonstrated excellent qualifications in education and research.

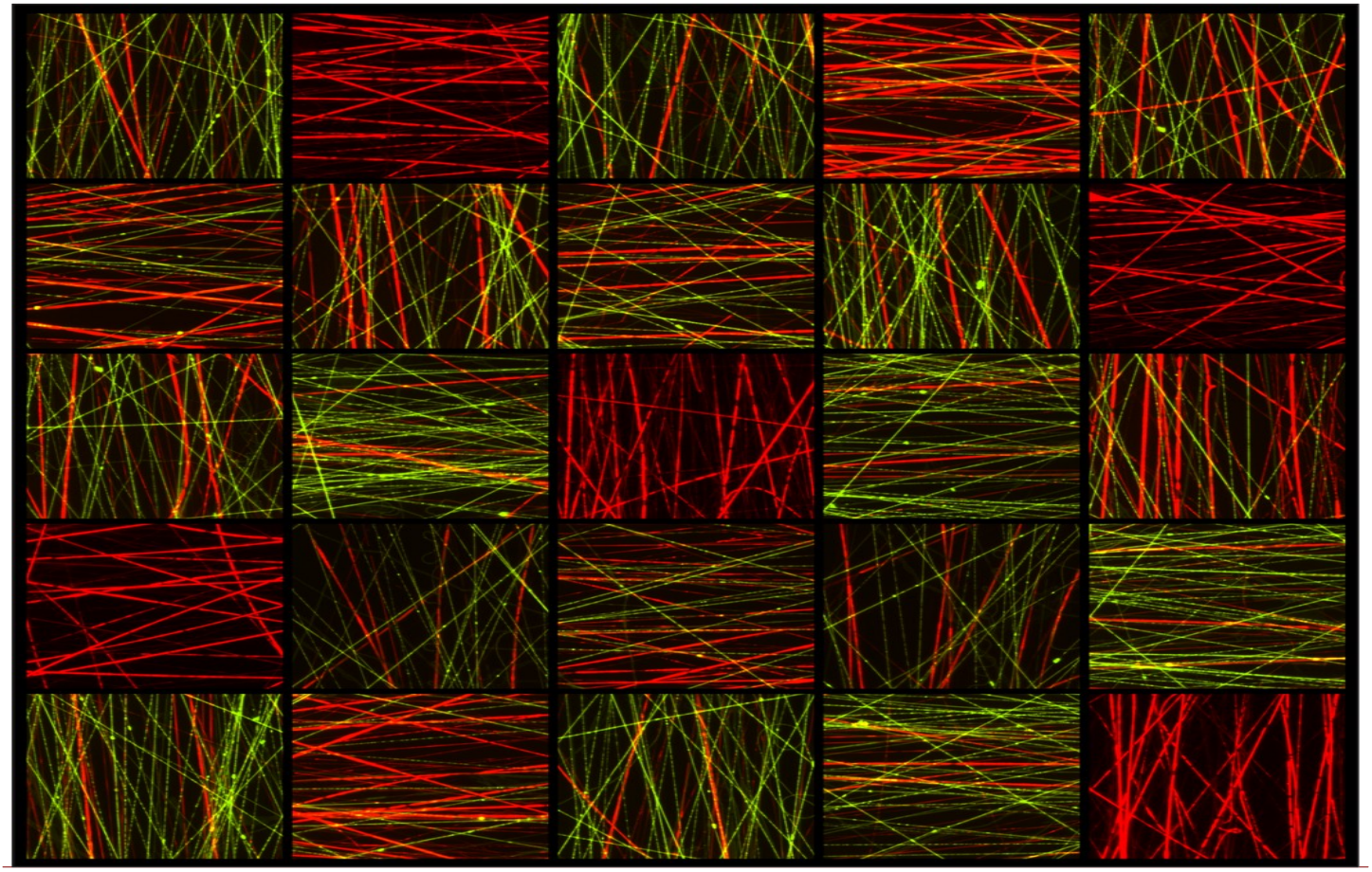
Please bring this opportunity to the attention of any potential candidates you may think may be interested in this position.

Apply for this position online at: http://www.med.upenn.edu/apps/faculty_ad/index.php/g/d2704

Proceedings of the National Academy of Sciences Article by Rob Mauck, Ph.D.

In an article recently published in the *Proceedings of the National Academy of Sciences (PNAS)* (http://www.pnas.org/site/misc/highlights.shtml#nanofiber), Brendon Baker, Roshan Shah, Amy Silverstein, John Esterhai, Jason Burdick, and Rob Mauck reported on the development and validation of an enabling technology in which tunable composite nanofibrous scaffolds are produced to provide instruction without impediment. Fibrous tissues prevalent throughout the body possess an ordered structure that underlies their refined and robust mechanical properties. Engineered replacements will require recapitulation of this exquisite architecture in three dimensions. Investigators have long used aligned nanofibrous scaffolds to dictate cell and matrix organization; however, their widespread application in tissue repair has been hindered by poor cell infiltration due to tight packing of fibers during fabrication. Composites were formed containing two distinct fiber fractions: slow-degrading poly(ε-caprolactone) and water-soluble, sacrificial poly(ethylene oxide) (PEO) (which can be selectively removed to increase pore size). Increasing the initial fraction of sacrificial PEO fibers enhanced cell infiltration and improved matrix distribution. Importantly, the team showed that despite the removal of >50% of the initial fibers, the remaining scaffold provided sufficient instruction to align cells and direct the formation of a highly organized ECM across multiple length scales, which in turn increased the mechanical properties of the engineered constructs (nearly matching native tissue). This approach transforms what is an interesting surface phenomenon (cells on top of nanofibrous mats) into a method by which functional, three-dimensional tissues (>1mm thick) can be formed. The team is hopeful that this new technology will find widespread applications in regenerative medicine and advance the repair of dense connective tissues throughout the musculoskeletal system.

Pictured below is a montage of anisotropic fibrous biomaterials, each composed of tunable fractions of structural (red) and sacrificial (green) electrospun nanofibers. Brendon Baker and his co-workers examined how the balance of these two elements within a three dimensional tissue construct can alter cell infiltration, matrix synthesis, and tissue function.



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U.S. Department of Health and Human Services

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NIAMS National Institute of Arthritis and Musculoskeletal and Skin Diseases

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Upcoming Events

PCMD Visiting Professorship Series 2012-2013

Tuesday, September 11, 2012, 1:30-2:30pm/BRB 251
Joint Injury and Osteoarthritis - Bone Crosstalk
Joseph A Buckwalter, MS, MD
Professor, Head & Arthur Steindler Chair
University of Iowa

Tuesday, October 23, 2012, 1:00-2:00pm/ Austrian Auditorium CRB
Orthopedic Biomaterials that Mimic and Harness Biological Signals
William L. Murphy, PhD
Associate Professor, Biomedical Engineering, Orthopedics & Rehabilitation
University of Wisconsin

Wednesday, November 14, 2012, 10:45-5:30pm / BRB II/III Auditorium
Osteoarthritis: From Palliation to Prevention
Constance R. Chu, MD
Albert B. Ferguson, Jr. MD Endowed Chair in Orthopaedic Surgery Professor
The University of Pittsburgh

Tuesday, December 18, 2012, 1:00-2:00pm/ BRB 252
A Novel Biomarker of Early Post-Traumatic Osteoarthritis Using the Horse as an Animal Model
Lisa A. Fortier, DVM, PhD, DACVS
Associate Professor of Surgery
Cornell University

Tuesday, January 15, 2013, 1:00-2:00pm/ TBA
Sensorimotor and Serum Biomarkers Indicative of Underlying Pathologies in a Rat Model of Upper Extremity Overuse
Mary Barbe, PhD
Professor of Anatomy & Cell Biology
Temple University

Tuesday, February 12, 2013, 1:00-2:00pm/ TBA
Coupling Bone Resorption and Formation
Xu Cao, PhD
Lee Riley Professor and Co-Director
John Hopkins University

Tuesday, March 12, 2013, 1:00-2:00pm/ TBA
Aging, Redox Signaling, and the Development of Osteoarthritis
Richard F. Loeser Jr, MD
Professor, Internal Medicine-Rheumatology & Immunology
Wake Forest School of Medicine

Tuesday, April 09, 2013, 1:00-2:00pm/ TBA
Tendon Stem Cells, Tendinopathy, and Tendon Repair
James H-C. Wang, PhD
Associate Professor of Orthopaedic Surgery, Mechanical Engineering & Materials Science
University of Pittsburgh School of Medicine

Tuesday, May 07, 2013, 1:00-2:00pm/TBA
Preclinical Models and Imaging of Musculoskeletal Degeneration and Regeneration
Robert E. Guldberg, PhD.
Director, Institute for Bioengineering & Bioscience; Professor of Mechanical Engineering Georgia Institute of Technology