McKay Orthopaedic Research Laboratory Update

Robert L. Mauck, PhD and Louis J. Soslowsky, PhD

The McKay Orthopaedic Research Laboratory of the Department of Orthopaedic Surgery in the Perelman School of Medicine continues to explore important problems in musculoskeletal research. The research facility, including labs and offices, occupies just over 17,000 sq. ft. of newly renovated space on the Ground and 1st Floors of Stemmler Hall. There are over 120 full- and part-time staff and trainees now in the labs. McKay is an active, thriving research and educational environment.

The Mckay labs are in the midst of a transformation both in terms of physical space and faculty. Our home, Stemmler Hall, is undergoing a >$100 million dollar renovation, which will culminate in 2018 in a fully modernized and aesthetically pleasing facility in which to grow our laboratory space, faculty, and research and training endeavors. We will move from our current, temporary location to 3rd floor of the completed building in Fall/Winter 2018. In terms of recruitment, we were delighted to welcome Dr. Joel Boerckel, PhD, an expert in bone mechanobiology and Dr. Kyu Sang Joeng, an expert in disease models of bone and tendon, as our newest tenure track faculty members. We are also very excited that Dr. Sherry Liu was recently promoted to Associate Professor with tenure. We are also now actively recruiting for an endowed chair faculty position, and hope to grow our ranks further in the very near future.

Currently, the lab has an annual research budget from extramural grants, gifts, and endowments > $14,124,397 and continues to rank within the top 5 orthopaedic programs in the country in terms of funding from the National Institutes of Health (NIH) with a 2016 ranking of #3. This past year has seen a very impressive and continued rise in new grant activity amongst the faculty.

We have had several new grants (>$25,000) awarded this year, representing the breadth and diversity of research undertaken by our faculty. These include:

- Dr. **Joel Boerckel**—"Mechanical Control of Therapeutic Vasculogenesis for Peripheral Ischemia"
- Dr. **George Dodge** and Dr. **Robert Mauck**—"Tunable Mechano-Activated Microcapsules for Therapeutic Delivery"
- Dr. **Nat Dyment**—"Defining the tendon lineage to improve tissue engineering strategies"
- Dr. Xiaowei **Sherry Liu**—"Roles of modeling- and remodeling-based bone formation in determining trabecular bone mechanics at multiple length scales"
- Dr. **Harvey Smith** and Dr. **Robert Mauck**—"Tissue Engineered Total Disc Replacement in a Large Animal Model"
- Dr. **Foteini Mourkioti**—"Cardiomyocyte telomere dysfunction in the progression of dystrophic cardiomyopathy"
- Dr. **Eileen Shore**—"Mechanisms regulating normal and ectopic endochondral ossification"
- Dr. **Lachlan Smith**—"Pathogenesis and Treatment of Bone Disease in the Mucopolysaccharidoses"
- Dr. **Louis Soslowsky**—"Training in musculoskeletal research"
- Dr. **Sarah Gullbrand**—"The Role of the Endplate in Intervertebral Disc Degeneration and Regeneration"

In addition, we are delighted to report that the NIH T32 grant supporting our training program in Orthopaedic Bioengineering, led by Dr. Lou Soslowsky, scored a '13' on its first submission, and will be renewed for another five years (extending this longest running T32 supported program)! This is as a testament to the excellent educational resources in McKay and the widespread impact of our department faculty on training the next generation of musculoskeletal scientists.

In addition to the above-mentioned new grants this year, each of the McKay Laboratory faculty remains well-funded through existing research grants not identified in this new grants list. Further, there were several new industry grants and clinical trials (>$25,000) initiated by both basic science and surgeon faculty this year. These include:

- Dr. **John Kelly**—"Operative versus Non-operative Treatment for Atraumatic Rotator Cuff Tears: A Multicenter Randomized Controlled Pragmatic Trial"—in collaboration with Vanderbilt University
- Dr. **Mona Al Mukaddam**, Dr. **Eileen Shore**, Dr. **Fred Kaplan**—"A Phase 3, Efficacy and Safety Study of Oral Palovarotene for the Treatment of Fibrodysplasia Ossificans Progressiva (FOP)"—from Clementia Pharmaceuticals
- Dr. **Andrew Kuntz**—"A Post-Market Clinical Follow-up Study of the TITAN (TM) Reverse Shoulder System used in Primary or Revision Total Shoulder Arthroplasty" – from Integra Life Sciences
- Dr. **Louis Soslowsky** – "MPT2 - pGlcNAc rotator cuff model study"—with Marine Polymer Technologies, Inc.

Growing musculoskeletal research in the Department of Orthopaedic Surgery and across the Penn campus has been a primary objective for our program, and this effort has been particularly fruitful in the past year. We look forward to another exciting year of continued growth and success.