New Approaches to Musculoskeletal Tissue Regeneration, Quality, and Targeting

Scientific Agenda

**Wednesday, July 24**

3:00 PM – 5:30 PM

Registration

**Thursday, July 25**

7:00 AM-8:00 AM

Breakfast

8:00 AM–8:10 AM

Welcome

8:10 AM–9:15 AM

**Plenary Session: The Remodeling in Bone (RIB) Award and Presentation**

Rib Awardee: David Burr, PhD, Indiana University School of Medicine

*How Basic Science Can Result in Clinical Insights*

9:30 AM-10:00 AM

**Blue Ribbon Sun Valley Posters**

Chair: Teresita Bellido, PhD, Indiana University

*Disruption of LINC Complex in Stem Cells Results in Decreased Osteogenesis and Trabecular Architecture*
Scott Birks, University of Boise

*Regulation of Tendon Formation by Ca2+ Signaling Through CaV1.2 L-type Voltage-gated Calcium Channel*  
Chike Cao, PhD, Weill Cornell Medicine

*Disruption of Notch Signaling Targeted to the Myeloma Bone Marrow Microenvironment Simultaneously Inhibits Tumor Growth and Prevents Bone Loss Without Inducing Gut Toxicity*  
Adam Ferrari, BS, MS, Indiana University School of Medicine

*The Fibrodysplasia Ossificans Progressiva-causing ACVR1[R206H] and ACVR1[R258G] Mutations Exhibit Distinct Skeletal Phenotypes In Neonatal Mice*  
Lily Huang, Regeneron Pharmaceuticals, Inc.

*Isolation of Differentially Activated Tendon Cell Populations*  
Anne Nichols, PhD, University of Rochester

10:15 AM–12:00 PM  
**Session: Tendon Biology and Disease**  
Chair: Alayna Loiselle, PhD, University of Rochester Medical Center

*Mechanisms of Tendon Regeneration*  
Alice Huang, PhD, Icahn School of Medicine at Mount Sinai

*Cellular Basis of Tendon Regeneration*  
Alayna Loiselle, PhD, University of Rochester Medical Center

*Engineering Tissue Integration*  
Helen H. Lu, PhD, Columbia University
7:30 PM-8:00 PM

**Blue Ribbon Sun Valley Posters**

Chair: Alexander Robling, PhD, Indiana University

*Effects of Diet Alterations, With or Without Gut Microbial Transplants, on Bone Strength and Density*

Sarah Little, MS, Texas A&M University

*Sclerostin Antibody Rescues Hypophosphatemia and Increases Bone Mass in Hyp Mouse Model*

Ryan Ross, PhD, Rush University Medical Center

*The Role of AGEs Accumulation and RAGEs Signaling in Intervertebral Disc Degeneration*

Simon Tang, PhD, Washington University in St Louis

*IL-4 is Protective Against Murine Post-Traumatic Osteoarthritis*

Ericka von Kaeppeler, BS, Stanford School of Medicine

*The Primary Cilium and Osteoclastogenesis*

Michael Sutton, BSE, MS, Columbia University

8:00 PM–10:00 PM

**Poster Session**

(See poster list in the Agenda Book)

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**Friday, July 26**

7:00 AM – 8:00 AM

**Breakfast**

7:30 AM – 8:00 AM

**Regeneron Breakfast Session**

*Cracking the Code of Rare Diseases: Understanding Mechanisms and Developing Therapies*
Presenter: Aris Economides, PhD

8:00 AM–9:00 AM

**ASBMR/Harold M. Frost Young Investigator Awards Presentations**

Chair: Teresita Bellido, PhD, Indiana University

*Identification of a Novel Periosteal Stem Cell Population that Mediates Intramembranous Bone Formation*

Shawnon Debnath, PhD, Weill Cornell Medicine, Cornell University

*Single and Combinatorial Gene Therapy Strategies for Treatment of Post-Traumatic and Genetic Forms of Osteoarthritis*

Matthew Grol, PhD, Baylor College of Medicine

*Deletion of the Mitochondrial Deacetylase Sirt3 Suppresses Osteoclast Fusion and Increases Bone Mass in Old Mice*

Ha-Neui Kim, PhD, University of Arkansas for Medical Sciences

9:15 AM–12:00 PM

**Session: Major Methodologies: Material Properties and Tissue Quality - State of the Art**

Chair: David Burr, PhD, Indiana University

*Introduction – What are the Physical Attributes of Bone Tissue Properties?*

David Burr, PhD, Indiana University

*Measuring Bone’s Structure and Mechanical Behavior at Multiple Length Scales*

Elizabeth Zimmerman, PhD, Shriner’s Hospital for Children

*Measuring Multi-Scale Relationships between Bone Structure, Chemistry and Function and Their Importance to Skeletal Fragility*

Virginia Ferguson, PhD, University of Colorado
**Does Loss and Modification of Collagenous and Non-Collagenous Proteins Affect Fracture Risk? Tools, Assays and Disease Models**
Deepak Vashisht, PhD, Rensselaer Polytechnic Institute

**Reducing Fracture Risk by Acellular Manipulation of Bone Tissue Properties**
David Burr, PhD, Indiana University

1:00 PM – 2:30 PM

**Career Development Workshop**

*Career Transitions: Planning and Negotiating for Career Advancement*
Marjolein van der Meulen, PhD, Cornell University, Chair

Career Transitions: Planning and Negotiating for Career Advancement
- Mentoring: including transition from mentee to mentor
- Resources: start up and facilities, budgets, personnel
- Personnel: staffing a lab including recruiting graduate students, technicians & staff, postdocs
- PI vs team science: maintaining your own projects and collaborating successfully
- Transition considerations and concerns: intangibles and other considerations.
- Transitions within industry

6:00 PM – 8:00 PM

**Awards and Recognition Banquet**

**Saturday, July 27**

7:00 AM – 8:00 AM

**Breakfast**

7:30 AM – 8:00 AM

**Ultragenyx Breakfast Session**

*Understanding Bone Remodeling in XLH: Insight into Restoring Phosphate Homeostasis*
Presenter: Javier San Martin, MD
8:00 AM–9:00 AM

ASBMR/Harold M. Frost Young Investigator Awards Presentations
Chair: Alexander Robling, PhD, Indiana University

Serum Bone-Derived Extracellular Vesicles are Associated with Bone Loss with Antiretroviral Therapy in Adults with HIV
Erika Marques de Menezes, PhD, University of California - San Francisco

Innervation Controls Epiphyseal Stem Cell Niche Performance
Phillip Newton, PhD, Karolinska Institute

Intra-articular Ablation of Periostin Attenuates Post-traumatic Osteoarthritis in Mice via Canonical Wnt and NFkB Pathways
Muhammad Farooq Rai, PhD, Washington University in St. Louis School of Medicine

9:15 AM–12:00 PM

Session: Epigenetics and Musculoskeletal Disease
Chair: Regis J. O'Keefe, MD, PhD, Washington University

Brief Overview of Epigenetics
Regis J. O'Keefe, MD, PhD, Washington University

Histone Deacetylase 3 in Cartilage Development and Osteoarthritis
Jennifer J. Westendorf, PhD, Mayo Clinic

Defining DNMT3b and Downstream Targets in the Pathogenesis of Osteoarthritis
Regis J. O'Keefe, MD, PhD, Washington University

Genome-wide DNA Methylation Changes in Mice under Simulated Microgravity Conditions
Mario Fraga, University of Oviedo

1:00 PM – 2:30 PM
Career Development Workshop: Bringing Discoveries to Market: Navigating the FDA

Chair: Jose Moreno, PhD, FDA

The workshop will provide the audience with an overview of the various mechanisms available to obtain FDA feedback regarding the potential regulatory pathway ahead for any products resulting from their research efforts. This information is of special interest for researches applying to the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding programs, where such regulatory information can have a larger impact in the funding process. Attendees will gain key knowledge regarding the current regulatory pathways for device, drug, biological and combination products, and the mechanisms available to present the results of their research efforts to FDA.

7:30 PM–9:30 PM

Session: Rare Diseases of Phosphate Handling and Tissue Mineralization: Too Much or Too Little

Chair: Javier San Martin, MD, Ultragenyx, Inc.

Introduction to Phosphate Metabolism
Javier San Martin, MD, Ultragenyx, Inc.

From Therapeutics Target Identification to Drug Development, with an Anti-FGF23 Antibody, Burosumab
Javier San Martin, MD, Ultragenyx, Inc.

Targeting a Unique Pathophysiology for Improved Outcomes in X-linked Hypophosphatemia
Thomas Carpenter, MD, Yale University

Multiple Osteochondroma and Fibrodysplasia Ossificans Progressiva: Two Distinct Pediatric Disorders, One Common Therapeutic Target
Maurizio Pacifici, PhD, Children’s Hospital of Philadelphia

Sunday, July 28

7:00 AM-8:00 AM

Breakfast

7:50 AM – 8:00 AM

ORS Membership Presentation
Presenter: Chris Hernandez

8:00 AM–9:00 AM

ASBMR/Harold M. Frost Young Investigator Awards Presentations
Chair: Teresita Bellido, PhD, Indiana University

Vitamin D Receptor Signaling Prevents the Adverse Actions of Glucocorticoid Excess in Bone, Skeletal Muscle, and the Heart, by Interfering with the Atrogene Pathway
Amy Sato, PhD, Indiana University School of Medicine

Could Many Non-Contact Anterior Cruciate Ligament Injuries be a Result of Fatigue-Damage Accumulation?
Stephan Schlecht, PhD, University of Michigan

Osteocalcin Deficiency Rescues Glucose Metabolism in a Model of Severe Osteogenesis Imperfecta
Josephine Tauer, PhD, McGill University

Stimulation of Piezo1 by Mechanical Signals Promotes Bone Anabolism
Jinhu Xiong, PhD, University of Arkansas for Medical Sciences

9:15 AM-12:00 PM

Session: Musculoskeletal Regenerative Medicine Meets the Clinic
Chair: Lisa Larkin, PhD, University of Michigan

Bridge Enhanced ACL Repair: from Concept to Clinical Trial
Braden Fleming, PhD, Rhode Island Hospital/Warren Alpert Medical School of Brown University

Rotator Cuff Healing: Gaps in Knowledge, Progress and Opportunities
Kathleen Derwin, PhD, Cleveland Clinic

A Tissue Engineering Approach to Repair Volumetric Muscle Loss
Lisa Larkin, PhD, University of Michigan

7:30 PM – 9:30 PM

Session: Targeting Musculoskeletal Tissues

Chair: Brendan Boyce, MD, University of Rochester Medical Center

Introduction to Targeting Strategies
Brendan Boyce, MD, University of Rochester Medical Center

Targeting Chloroquine and Hydroxychloroquine to Bone to Increase Bone Mass
Brendan Boyce, MD, University of Rochester Medical Center

Genome Engineering of New Stem Cell Therapies for Arthritis
Farshid Guilak, PhD, Washington University

Bone-targeting Bortezomib in Pre-clinical Myeloma Studies
Lianping Xing, PhD, University of Rochester Medical Center

General contributions provided to the workshop by:

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