April 2025

In this Issue:

News From the Preclinical Models Section

The Preclinical Models Section was launched eight years ago, bringing together veterinarians and researchers interested in using animal models. The recent Annual Meeting demonstrated a vibrant community and underscored the importance of engagement, discussion, and communication.

Our goal is to provide valuable insights on various preclinical models, particularly those involving animal research, while highlighting diverse perspectives on animal physiology and welfare to ensure best practices. We achieved this goal through a well-attended workshop and scientific meeting, and the excellent feedback we received reaffirms our mission. Maintaining this ongoing scientific and ethical discourse will allow us to address key challenges in animal care, model development, creation of standardized guidelines, data quality, public perception, reproducibility, and experimental design.

This work would not be possible without the dedicated and motivated volunteers who invest their time and effort to advance the Section's mission. We would like to extend our gratitude to all former volunteers from the PCM leadership for their outstanding contributions.
Thank You to **Aimee, Drew, and Martijn** for your dedication and service throughout the last years!

It is Our Pleasure to Introduce Our 2025 Preclinical Models Roster:

Section Chair: **Brad Nelson**, *DVM, PhD, DACVS, Colorado State University*

Section Past Chair: **Annette McCoy**, *DVM, MS, PhD, DACVS, University of Illinois*

Section Chair Elect: **Bruno Menarim**, *DVM, MS, PhD, University of Kentucky*

Section Research & Education Chair: **Lynn Pezzanite**, *DVM, PhD, DACVS, Colorado State University*

Section Secretary: **Adrienn Markovics**, *MD, PhD, Rush University*

Section Treasurer: **Maria Isabel Menendez Montes,** *DVM, PhD, Washington University in St. Louis*

Section Membership Chair: **John Elfar**, *MD, FACS, FAOA, FAAOS, University of Arizona*

Recap of 2025 Annual Meeting

Section Communications Chair: **Annemarie Lang**, *DVM, PhD, University of Michigan; supported by and* ***Claudia Siverino****, PhD, AO Research Institute Davos,* ***Anna Rapp****, PhD, University of Pennsylvania,* ***Kait Link****, DVM, University of Oregon*

Time flies! It has already been over a month since we gathered in sunny Phoenix, Arizona for a fantastic ORS Annual Meeting. We prepared an exciting program featuring a workshop, a scientific session, and the JOR-PCM lunch, which sparked engagement.
First and foremost, we extend our gratitude to everyone who participated, contributed to the lively podium discussions, and made the event a success. A special thank you to our speakers and panelists, your expertise was truly valuable!

Workshop

Elements of Successful Study Design when Working with Preclinical Animal Models
Our workshop focused on key elements of study design with both large and small animal models in musculoskeletal research. Topics included model selection, endpoint determination, pain management, and regulatory considerations.

- **Leah Steyn,** *PhD, University of Arizona* provided an informative overview of regulatory requirements related to animal model research, offering valuable tips for crafting successful IACUC protocols and emphasizing the importance of thorough planning and reporting.
- **Jeremiah Easley,** *DVM, Colorado State University* shared firsthand insights on study design in collaboration with industry, illustrating key differences in timelines and protocol approaches between academic and industry settings.
- **Tom Schaer,** *VMD, University of Pennsylvania* gave an in-depth presentation on optimizing functional outcomes in musculoskeletal research using large animal models. Did you know pigs can walk a "catwalk"?
- **Blaine Christiansen**, *PhD, University of California Davis* joined us last-minute for a compelling talk on maximizing outcomes from preclinical animal models, covering topics such as tissue sharing, data reuse, and best practices for reporting and planning.

The workshop concluded with a dynamic panel discussion, where audience engagement led to a thought-provoking exchange of ideas.

Scientific Session

Scientific Session: Ethical considerations when working with preclinical animal models

Our scientific session tackled ethical considerations beyond the 3Rs, providing a platform for speakers to share personal experiences in designing studies involving animal models.

- **Mark Suckow,** *DVM, DACLAM, University of Kentucky* delivered a talk on the ethical and humane use of small animal models in orthopedic research, highlighting environmental enrichment, tunnel handling, and anesthesia/analgesic protocols while emphasizing the importance of consulting institutional veterinarians.
- **Jeremiah Easley,** *DVM, Colorado State University* discussed regulatory and ethical challenges in developing large animal models, underscoring both the difficulties and translational advantages these models offer.

The final discussion panel encouraged open, respectful dialogue, fostering a diverse exchange of perspectives among attendees.

JOR Luncheon

The Preclinical Models Section is responsible for providing guidance on animal care, pain management, and experimental design in submissions to the *Journal of Orthopedic Research (JOR)* involving preclinical animal models.

At this luncheon, **Dr. Edward Schwartz, PhD,** *JOR* Editor-in-Chief, presented preliminary recommendations, sparking a well-attended and engaging group discussion. We greatly appreciate everyone's openness in sharing concerns, opinions, and ideas—together, we can work toward increased transparency and improved standards in preclinical testing to ensure the highest level of animal welfare.

Preclinical Awards ORS 2025

Congratulations to this year's awardees—your work is inspiring, and we look forward to seeing your continued contributions to the field!

PCM 2025 Winners

Update on Webinar Series "Preclinical Models 101"

Following the success of our first Webinar Series, we're excited to continue with engaging content in the "Preclinical Models 101" sessions! These sessions are designed for trainees, early-career investigators, and newcomers to the field.

Topics will include:

- Transgenic mouse models
- In vitro models
- Pain management

Join us for the First Webinar of the year:

Rodent Models 101: An Introduction to Genetic and Transgenic Mouse Models on Wednesday, April 9th, 2025, 12:00 PM- 1:00PM CST.

Register for Rodent Models 101

Recordings of Previous Webinars are Available:

I. Pathology 101: Look Before You Leap! Histopathology Tips and Tricks for Preclinical Orthopaedic Models
II. Pain 101: Comprehensive Approaches to Musculoskeletal Pain Assessment and Animal Welfare Monitoring in Preclinical Research
III. Intravital Imaging 101: Exploring the Dynamics of Musculoskeletal Health - Intravital Multiphoton Microscopy Innovations at Cornell University
IV. Multiomics Approaches 101

JOR Articles of Interest

Impact of sensory neuropeptide deficiency on behavioral patterns and gait in a murine surgical osteoarthritis model

This study investigated the role of Substance P (SP) and calcitonin gene-related peptide alpha (αCGRP) in pain perception, well-being, and gait during experimental osteoarthritis (OA) in mice. While cartilage degradation was significantly reduced in SP-deficient (Tac1−/−) mice compared to wild-type and αCGRP-deficient mice, behavioral and gait differences were minimal, with Tac1−/− mice showing the highest unloading of the operated limb. The findings suggest that reduced cartilage damage in the absence of SP may be linked to altered loading, though the underlying mechanism remains unclear.

Disease modifying osteoarthritis drug discovery using a temporal phenotypic reporter in 3D aggregates of primary human chondrocytes

This study developed a novel screening approach to identify disease-modifying drugs for osteoarthritis (OA) by focusing on stimulating type II collagen production in chondrocytes. Using a 3D cartilage culture system and a luciferase-based reporter assay, the researchers screened a natural product library and identified aromoline, a bisbenzylisoquinoline alkaloid, as a promising candidate that enhances type II collagen expression. In silico and biochemical analyses revealed dopamine receptor D4 (DRD4) as a potential target, providing a new platform for OA drug discovery and highlighting aromoline's potential for future therapeutic development.

Orthopaedic Research Society
9400 W. Higgins Road, Ste. 225
Rosemont, Illinois 60018
(847) 823-5770
ors@ors.org

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