ORS Spine Section
Orthopaedic Research Society
Monthly Newsletter

Spinal Column

April 2025

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Message from the Chair

A Milestone and a Mission:
The Next Chapter for the ORS Spine Section

Dear ORS Spine Section,

It is an honor to serve as your new Chair, especially as we celebrate a significant milestone – our 10th year anniversary. Over the past decade, our Section has grown into a thriving community of more than 430 members, united by a shared commitment to advancing spine research and improving our understanding of spinal disorders, patient care and outcomes. As we commemorate this anniversary, it is not only a moment for reflection but also a call to action – to strengthen our community, deepen collaborations and ensure that our research continues to make a meaningful and lasting impact.

This progress would not have been possible without the exceptional leadership of our past Chairs and officers, who have dedicated their time, vision and expertise to shaping this Section into what it is today. I

extend my deepest gratitude to them for their outstanding contributions. I also want to recognize and thank our current officers, whose insights, dedication and generosity continue to drive our mission forward. Their willingness to give their time freely in service to this community is truly commendable and inspiring. Last but not least, a heartfelt appreciation for all the support and insight throughout the years bestowed to us by ORS staff and all our respective families.

We live in challenging times as we face research funding constraints, political discourse, institutional pressures and a rapidly evolving scientific landscape. Yet, these challenges also create opportunities – opportunities to unite, innovate and reaffirm the vital role of spine research in transforming lives. Now more than ever, we must build bridges, not silos, fostering connections that transcend disciplines, institutions and borders.

Regardless of our country of origin, institution, specialty or society affiliation, we are “One Spine Community” that is united by a shared purpose: advancing spine research and health to ultimately contribute to a more productive society. Our impact must be global, our approach collaborative and our mindset open. To drive meaningful change, we must rise to the moment, work together, and support one another in the pursuit of transformative discoveries.

This year, the ORS Spine Section is committed to:

· Strengthening partnerships with other societies and increasing international collaboration to expand our reach and amplify our impact.
· Enhancing clinician-researcher collaboration to bridge-the-gap between basic science and clinical applications, ensuring meaningful advancements in understanding spinal disorders and improving patient care.
· Fostering multidisciplinary research, bringing together engineers, biologists, data analysts, clinicians and other experts to push the boundaries of discovery.
· Expanding community outreach and education, recognizing that the future of spine research and clinical excellence depends on the foundation we build today.
· Elevating our Section and its members, ensuring that your voices are heard, your contributions recognized, and positioning the Spine Section as a key global stakeholder in shaping policy and guidelines.
· Promoting mentorship and career development, with a strong focus on empowering the next generation of spine researchers – paving the way for transformative progress by giant leaps rather than baby steps towards change.

At the core of all of this is the philosophy of being "men/women/individuals for others" – where we uplift one another, mentor the next generation, and remain forward-thinking in our pursuit of knowledge and inclusivity. Now is the time to embrace this mindset fully – to collaborate beyond boundaries, to challenge ourselves and each other and to work toward the common goal of improving spine health worldwide.

I invite each of you to engage with our Section, share your expertise and help shape the future of spine research. "Together," let's make this next decade even more impactful than the last.

Sincerely,

Dino Samartzis, DSc, Professor, Department of Orthopedic Surgery at Rush University

Chair, ORS Spine Section

Spine Section Roster 2025-2026

Chair- **Dino Samartzis, DSc**, Rush University

Past Chair- **Simon Tang, PhD, MSCI,** Washington University of St Louis

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Membership Co-Chair- **Derek Rosenzweigh, PhD**, McGill University

Research Chair- **Gabriela Graziani, PhD,** Polytechnic University of Milan

Clinical Society Liaison- **Ashish Diwan, MD, PhD**, University of Adelaide

Member at Large- **Chitra Dahia, PhD,** Weill Cornell Medical College

Spine Membership Committee

Dmitriy Sheyn, PhD, Cedars Sinai Medical Center

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Andres Bonilla, DVM. PhD, Colorado State University

Jordy Schol, **MSc**, Tokai University School of Medicine

Luca Ambrosio, MD, Campus Bio-Medico University of Rome

Welcome to our Spine Community.

Annual Meeting Recap

Congratulations to the 2025 ORS Spine Symposium Winners!

2025 Symposium Winners

Research Section Member Spotlight

Pranay L. Ramteke, PhD
Post-Doctoral Researcher
Thomas Jefferson University

"My current focus is to decipher the molecular and epigenetic basis of musculoskeletal disorders and apply this knowledge to enhance regeneration, healing, immune modulation, and improve therapeutic outcome in injury and non-injury models."

Meet Pranay

Xiaoyi Lan, PhD

Post-Doctoral Fellow

Department of Surgery, McGill University

Meet Xiaoyi

"I'm passionate about bioengineering and its application in developing functional biomaterials to address clinical challenges in musculoskeletal tissue. My research focuses on creating innovative solutions for tissue regeneration, with a primary emphasis on intervertebral disc repair. I'm particularly interested in cross-disciplinary projects that combine biomechanics, cell biology, and biomaterial science. This approach allows for the development of materials that not only replicate the mechanical and structural properties of native tissues but also promote healing and regeneration. By working at the intersection of these fields, I aim to contribute to advancements in regenerative medicine that can address unmet clinical needs."

Paper Review

Engineered Extracellular Vesicle-based Gene Therapy for the Treatment of Discogenic Back Pain

Biomaterials 308 (2024) 122562
https://doi.org/10.1016/j.biomaterials.2024.122562

Shirley N. Tang, Ana I. Salazar-Puerta, Mary K. Heimann, Kyle Kuchynsky, María A. Rincon-Benavides, Mia Kordowski, Gilian Gunsch, Lucy Bodine, Khady Diop, Connor Gantt, Safdar Khan, Anna Bratasz, Olga Kokiko-Cochran, Julie Fitzgerald, Damien M. Laudier, Judith A. Hoyland, **Benjamin A. Walter**, Natalia Higuita-Castro, **Devina Purmessur** (*authors in bold represent Spine Section Members)

Treatment of discogenic back pain (DBP) caused by the degeneration of intervertebral disc (IVD) still remains as an unmet challenge to the scientific community. Recently, cell-based therapy, growth factor delivery and viral gene delivery have been shown to exhibit significant advancements in restricting disc degeneration *in vivo*. However, the translational potential of these strategies has been limited by their transient effects, limited cell survival upon transplantation and undesired immunogenicity. Extracellular vesicles (EVs) can be a potential alternative to viral vectors for gene therapy as EVs offer reduced immune response and lower risk of insertional mutagenesis, making them suitable for repeated administration. In this regard, Tang *et al.* have engineered extracellular vesicles (eEVs) for delivery of forkhead-box F1 (FOXF1), a developmental transcription factor capable of inducing pro-anabolic features in diseased NP cells.

eEVs (with an average particle size of 290 nm) were derived from primary mouse fibroblasts after non-viral transfection with FOXF1. The authors confirmed the plasmid DNA content and full-length FOXF1 mRNA in the eEVs using qRT-PCR and PCR analysis. The presence of FOXF1 protein content, EV markers (CD63 and TSG101) and cytoskeletal marker (tubulin) were confirmed via western blot analysis. The effect of FOXF1 eEV treatment was studied in a mouse lumbar disc puncture model. The pain behavior of the mouse model was evaluated using hanging wire test, tail suspension, cold plate and open field assessment which demonstrated increased grip time, lesser mobile time, decreased cold hypersensitivity and elevated number of rears of the FOXF1 eEV treated groups as compared to the control groups. The effects of FOXF1 eEV treatment was further established by MRI and μCT imaging post euthanasia which showed maintenance of tissue hydration and disc-height of the FOXF1 eEV treated mice after 12 weeks. Moreover, the authors found that the GAG loss and the associated mechanical imbalance of the injured model could be eliminated through FOXF1 eEV treatment, as

determined by axial compression/tension loading, histological staining and immunohistochemistry analysis.

The findings of the authors are quite encouraging and indicate the potential of FOXF1 eEVs for restoring the structure and function of degenerated IVD in a mouse model. Additionally, the pain behaviors associated with IVD degeneration were substantially mitigated after FOXF1 eEV treatment, further demonstrating the translational benefits of the proposed therapeutic approach.

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