



ORS PSRS 6th International Spine Research Symposium

Sunday, November 6 – Thursday, November 10, 2022

Skytop Lodge, Skytop, Pennsylvania, USA

Poster Presentations

Topic: Development and Homeostasis

- 1. Effect of Microenvironmental Conditions on the Glycosaminoglycan Synthesis Rates of Nucleus Pulposus Cells**
Presenting Author: Niamh Wilson, *Trinity College Dublin, Ireland*
- 2. Investigating the role of steroid hormones in the intervertebral disc**
Presenting Author: Jeffrey Hutchinson, *University of Western Ontario, Canada*
- 3. Does increasing sulfation boost primary intervertebral disc cell cultures**
Presenting Author: Paola Bermudez-Lekerika, *University of Bern, Switzerland*
- 4. Enhanced Phenotyping of Bovine Intervertebral Disc Cells with Integrated Single-Cell RNA-Sequencing Datasets**
Presenting Author: Levon Rodriguez, *Icahn School of Medicine at Mount Sinai, USA*
- 5. CD-9 as a Novel Marker of Healthy Late-Stage Nucleus Pulposus Cells**
Presenting Author: Lachlan Smith, *University of Pennsylvania, USA*
- 6. Effects of Organ Culture and Mesenchymal Stem Cell Delivery on Nucleus Pulposus Cell Extracellular Matrix Gene Expression and Cell Cycle Progression**
Presenting Author: Lachlan Smith, *University of Pennsylvania, USA*
- 7. Mitochondrial fusion protein OPA1 is necessary for maintaining integrity of NP cell organelles and tissue homeostasis**
Presenting Author: Vedavathi Madhu, *Thomas Jefferson University, USA*
- 8. Understanding the physiological behaviour of disc cells in an in vitro imitation of the healthy and degenerated niche**
Presenting Author: Christine Le Maitre, *Sheffield Hallam University, UK*
- 9. Investigating the Role of TRPV4 as a Mechanoreceptor in the Intervertebral Disc**
Presenting Author: Taylor Shelton, *The University of Western Ontario, Canada*
- 10. Effects of Lactate and Histone Lactylation on Aggrecan Expression in Rat Nucleus Pulposus Cells**
Presenting Author: Trudy Zou, *University of Pittsburgh, USA*
- 11. Understanding the Role of the Notochord in Spinal Development**
Presenting Author: Vaneka Hoskie, *Harvard Medical School, USA*

12. **The Role of Ellis-Van Creveld Syndrome Proteins during Intervertebral Disc Development and Degeneration**
Presenting Author: Stephen Richardson, *University of Manchester, UK*
13. **Regulation of CREB provides a feedback loop for the homeostasis and mechanics of connective tissues vital for spine alignment**
Presenting Author: Ryan Gray, *University of Texas at Austin, USA*
14. **Spatial and temporal N-glycome characterisation of the human healthy and diseased intervertebral disc**
Presenting Author: Aert Scheper, *CURAM SFI Research Centre for Medical Devices, Ireland*
15. **Bioprinting Whole Intervertebral Discs to Understand Development and Inform Regenerative Therapies**
Presenting Author: Matthew Kibble, *University of Manchester, UK*
16. **Native Tie2+ Progenitor Cells - The ultimate Rejuvenation Source for the Degenerated Intervertebral Disc?**
Presenting Author: Benjamin Gantenbein, *University of Bern, Switzerland*
17. **From pluripotent stem cells to intervertebral disc progenitor cells: a transcriptomic study at the single-cell resolution**
Presenting Author: Anne Camus, *Nantes University, France*
18. **High Osmolality with Supplemented Chondroitin Sulfate not only Stimulates Anabolism but also Suppresses Catabolism in Bovine Nucleus Pulposus Explants**
Presenting Author: Yutaro Kanda, *The Brigham and Women's Hospital, USA*
19. **Effects of High Osmotic Pressure with Supplemented Chondroitin Sulfate under Cyclic Hydrostatic Pressure on Metabolism in Bovine Nucleus Pulposus Explants**
Presenting Author: Yutaro Kanda, *The Brigham and Women's Hospital, USA*
20. **Regenerative Healing in neonatal mouse intervertebral discs only occurs before postnatal day 28**
Presenting Author: Danielle D'Erminio, *Icahn School of Medicine at Mt Sinai, USA*
21. **Sirtuin 6 is critical for maintaining intervertebral disc homeostasis during spine aging**
Presenting Author: Pranay Ramteke, *Thomas Jefferson University, USA*

Topic: Pain, Pathobiology and Crosstalk

22. **Evidence of Histone Lactylation and its Role in MMP-13 Epigenetic Regulation in Intervertebral Discs**
Presenting Author: Dong Wang, *University of Pittsburgh, USA*
23. **Network medicine-based gene prioritization in Intervertebral Disc Degeneration**
Presenting Author: Francesco Gualdi, *Universitat Pompeu Fabra, Spain*
24. **Smoking and tetramer tryptase+ Mast Cells accelerate intervertebral disc degeneration by inducing METTL14-mediated DIXDC1 m6 modification**
Presenting Author: Ji Tu, *University of New South Wales, Australia*
25. **HMGB1 mediates macrophage recruitment and regional intervertebral disc properties following injury**
Presenting Author: Kevin Burt, *Columbia University, USA*

- 26. Characterization and Modulation of the Pro-Inflammatory Effects of Immune Cells in the Canine Intervertebral Disc**
Presenting Author: Mary Heimann, *The Ohio State University, USA*
- 27. Free calcium and the Extracellular Calcium-Sensing Receptor Regulate Intervertebral Disc Degeneration and Calcification**
Presenting Author: Michael Grant, *McGill University, Canada*
- 28. Revisiting the catabolic response of intervertebral disc cells in 3D to TNF- α and IL-1 β**
Presenting Author: Paola Bermudez-Lekerika, *University of Bern, Switzerland*
- 29. TLR-2 Activation Dysregulates miR-100-5p and miR-155-5p Leading to the Downregulation of c-Fos**
Presenting Author: Petra Cazzanelli, *Rochester Institute of Technology, USA*
- 30. Females Activate More Inflammatory Pathways than Males and Wnt Signaling-Deficiency in Aging Attenuates Inflammatory Pathways in Response to Disc Injury**
Presenting Author: Tori Kroon, *Icahn School of Medicine at Mount Sinai, USA*
- 31. Slow twitch paraspinal muscle dysregulation in adolescent idiopathic scoliosis exhibiting HIF-2 α misexpression**
Presenting Author: Victor Leung, *The University of Hong Kong, Hong Kong*
- 32. Environmentally Stressed Nucleus Pulposus Cells Trigger the Onset of Discogenic Low Back Pain**
Presenting Author: Wensen Jiang, *Cedars-Sinai Medical Center, USA*
- 33. Novel dissection method for isolating the dorsal root ganglion, dorsal horn of the spinal cord, along with the nucleus pulposus, and annulus fibrosus from the intervertebral discs of the same mouse**
Presenting Author: Alison Shur, *Hospital for Special Surgery, USA*
- 34. Chronic Type 2 Diabetes Impairs Tissue Remodeling and Stimulates Pro-inflammatory and Immune-Cell Recruiting Chemokines in the Murine Intervertebral Disc**
Presenting Author: Christian Gonzalez, *Washington University in St. Louis, USA*
- 35. Effects of Vertebral Endplate Injury on Spinal Cord Using an in Vivo Rat Model**
Presenting Author: Denise Iliff, *Icahn School of Medicine at Mount Sinai, USA*
- 36. ADAM8 Inactivation Retards Intervertebral Disc Degeneration in Mice**
Presenting Author: Yejia Zhang, *University of Pennsylvania, USA*
- 37. Roles of TNFAIP8 family in intervertebral disc degeneration**
Presenting Author: Yejia Zhang, *University of Pennsylvania, USA*
- 38. Characterization of the Temporal Regulation of Acute Immune Cell Infiltration in a Mouse Model of Intervertebral Disc Injury**
Presenting Author: Sade Clayton, *Washington University in St Louis, USA*
- 39. Circulating microRNAs May be Predictive of Degenerative Cervical Myelopathy**
Presenting Author: Nicholas D'Antonio, *Rothman Institute, USA*
- 40. Differential expression of TNFR1 and TNFR2 receptors with TNF-alpha challenge in a rat IVDs cells in vitro**
Presenting Author: Olga Yiantsos, *Icahn School of Medicine at Mt Sinai, USA*

- 41. Identification of sub-populations of Chronic Low Back Pain patients by cluster analysis of gut microbiota: a preliminary analysis**
Presenting Author: Valerio Tonelli Enrico, *University of Pittsburgh, USA*
- 42. Link N Regulates DRG Hypersensitivity through Regulation of IL-1beta**
Presenting Author: Muskan Alad, *McGill University, Canada*
- 43. Lumbar intervertebral disc injury in mice increases neuronal and vascular annulus fibrosis infiltration**
Presenting Author: Ryan Potter, *Washington University in St Louis, USA*
- 44. Are current machine learning applications analogous to radiologist classification of degenerate discs? A systematic review and meta-analysis**
Presenting Author: Roger Compte, *King's College London, UK*
- 45. Investigating autoimmune contribution to Modic change in TwinsUK**
Presenting Author: Francesco Gualdi, *Universitat Pompeu Fabra, Spain*
- 46. Sdc4 plays an important role in the homeostasis of lumbar spine**
Presenting Author: Kimheak Sao, *Thomas Jefferson University, USA*
- 47. Intradiscal Inflammatory Stimulation Induces Spinal Pain Behavior and Intervertebral Disc Degeneration In Vivo**
Presenting Author: Lauren Lisiewski, *Columbia University, USA*
- 48. Intervertebral Disc Activation of NFKB leads to Systemic Inflammation and Disc Macrophage Infiltration**
Presenting Author: Mark Kim, *Columbia University, USA*
- 49. A Novel Mouse Model for the Study of Spinal Cord Injury-Associated Neurogenic Heterotopic Ossification**
Presenting Author: Rachad Aita, *McGill University, Canada*
- 50. A Prospective Evaluation of the Clinical Outcomes of Culture Positive Patients who Underwent Primary Lumbar Fusion**
Presenting Author: Philip Paschal, *Hospital for Special Surgery, USA*
- 51. Bilateral needle puncture of caudal intervertebral discs in mice results in compromised structure, elevated IL-6, and de novo intradiscal innervation and vascularization**
Presenting Author: Remy Walk, *Washington University in St. Louis, USA*
- 52. Diffuse idiopathic skeletal hyperostosis (DISH) in humans: Prevalence and the continuum of imaging features in a Northern US population**
Presenting Author: Dale Fournier, *University of Western Ontario, Canada*
- 53. Physiological Measurement of Nucleus Pulposus Oxygen and Glucose in a Large Animal Model of Disc Degeneration: Preliminary Findings**
Presenting Author: Karthikeyan Rajagopal, *University of Pennsylvania, USA*
- 54. Mechanical compression in an ovine model of Degenerative disc disease**
Presenting Author: Andres Bonilla, *Colorado State University, USA*
- 55. Synergy of the Autoimmune response in a model of Degenerative Disc Disease**
Presenting Author: Andres Bonilla, *Colorado State University, USA*

56. **In Vivo Differences in Disc Mechanical Function Between Young and Elderly Populations During Diurnal Loading and Postural Changes Evaluated with MRI**
Presenting Author: Dawn Elliott, *University of Delaware, USA*
57. **Inhibition of TRPV4 Blunts IL-6 Production and Protects Against Degeneration in the Nucleus Pulposus Due to Dynamic Loading of the Intervertebral Disc**
Presenting Author: Garrett Easson, *Washington University in St. Louis, USA*
58. **Intervertebral Disc and Facet Crosstalk in a Rabbit Puncture Model of Disc Degeneration**
Presenting Author: Brianna Orozco, *University of Pennsylvania, USA*
59. **Molecular Augmentation of the Microniche of Human Osteoarthritic Chondrocytes by Biomimetic Proteoglycans**
Presenting Author: Elizabeth Kahle, *Drexel University, USA*
60. **A finite element comparison between Total Disc Replacement and Anterior Cervical Discectomy & Fusion in lordotic, kyphotic, and straight cervical spine**
Presenting Author: Deepanshu Singh, *University of Toledo, USA*
61. **A Method to Characterize Crack Initiation in Intervertebral Discs Using a Multiaxial Anisotropic Approach**
Presenting Author: Jill Middendorf, *University of Minnesota, USA*
62. **An Evaluation of the Comparators Used to Establish Credibility and Validation of Spine Computational Models**
Presenting Author: Brittany Stott, *McGill University, Canada*
63. **Automated Vertebral Segmentation using a Convolutional Neural Network**
Presenting Author: Girish Viraraghavan, *Drexel University, USA*
64. **Delamination Strength and Stiffness in the Annulus Fibrosus from Adult Spinal Deformity Patients**
Presenting Author: Manmeet Dhiman, *University of Calgary, Canada*
65. **Determination of Stress-Growth Relationship in Immature Porcine Vertebrae using Finite Element Modeling**
Presenting Author: Girish Viraraghavan, *Drexel University, USA*
66. **Development and Validation of DNA Origami Sensors to Assess the Microenvironment of the Intervertebral Disc**
Presenting Author: Jordin Marshall, *The Ohio State University, USA*
67. **Does Intervertebral Disc Stiffness Differ in Adolescent Idiopathic Scoliosis (AIS) and Degenerative Scoliosis?**
Presenting Author: Taylor Bader, *University of Calgary, Canada*
68. **Does Spinal Deformity Result from Loss of Mechanical Integrity of the Annulus Fibrosus in Degenerated Intervertebral Discs?**
Presenting Author: Taylor Bader, *University of Calgary, Canada*
69. **Effect of Anterior Vertebral Body Tether Breakage on Curve Correction in Adolescent Idiopathic Scoliosis Patients**
Presenting Author: Girish Viraraghavan, *Drexel University, USA*

- 70. Multi-modal Evaluation of Vertebral Strength in Individuals with Impaired Bone Density**
Presenting Author: Rachana Vaidya, *Washington University in St. Louis, USA*
- 71. Patient-Specific Finite Element Modeling of Scoliotic Curve Progression using Region-Specific Stress-Modulated Vertebral Growth**
Presenting Author: Girish Viraraghavan, *Drexel University, USA*
- 72. Prediction of Curve Correction in Adolescent Idiopathic Scoliosis Patients After Anterior Vertebral Body Tethering Surgery Using Machine Learning**
Presenting Author: Girish Viraraghavan, *Drexel University, USA*
- 73. Step time and trunk acceleration magnitude asymmetries do not contribute to overall gait asymmetry in chronic low back pain**
Presenting Author: Anna Bailes, *University of Pittsburgh, USA*
- 74. Use of Finite Element Modeling to Design 3D-Printed Bioabsorbable Cage to Support Tissue-Engineered Intervertebral Disc Implants**
Presenting Author: Byumsu Kim, *Cornell University, USA*
- 75. In Vitro and In Silico Investigation of Dynamic Compression on Cartilage Endplate Cells in Agarose**
Presenting Author: Katherine Crump, *University of Bern, Switzerland*
- 76. Cellular Responses to Physiologically Relevant Hydrostatic Pressure in Isolated Bovine Annulus Fibrosus Cells in vitro**
Presenting Author: Ryo Taiji, *Brigham and Women's Hospital, USA*
- 77. Effects of Hydrostatic Pressure on Metabolic Turnover in Inner and Outer Annulus Fibrosus Explants**
Presenting Author: Ryo Taiji, *Brigham and Women's Hospital, USA*
- 78. Effects of collagen cross-linking on solute transport in the human cartilage endplate**
Presenting Author: Jae-Young Jung, *University of California San Francisco, USA*
- 79. Restoration of Physiologic Loading Improves Outcomes in Engineered Disc Implanted-Spinal Motion Segments**
Presenting Author: Sarah Gullbrand, *University of Pennsylvania, USA*
- 80. A 3D Bioprinted Model of the Intervertebral Disc for Disease Modelling Applications**
Presenting Author: Stephen Richardson, *University of Manchester, UK*
- 81. Characterization of Quantitative MRI Measures to Assess Spontaneous Canine Intervertebral Disc Degeneration**
Presenting Author: Casey Johnson, *University of Minnesota, USA*
- 82. Effects of Hydration of Nucleus Pulposus Tissue on T1rho and T2 Relaxation Times and Mechanical Properties**
Presenting Author: Megan Co, *The Ohio State University, USA*
- 83. Validating a Novel VR/AR Spinal Surgical Training Device with Focus on Physics-Based Force Feedback**
Presenting Author: Sami Alkadri, *McGill University, Canada*
- 84. Cyclic traction loading facilitates water uptake in a healthy bovine disc culture: preliminary study**
Presenting Author: Astrid Soubrier, *AO Research Institute, Switzerland*

85. **3D Printed Scaffolds for Stabilization and Local Delivery in Bone Metastases**
Presenting Author: Ateeque Siddique, *McGill University, Canada*
86. **Nanoparticle-functionalized Bone Cement for the Local Therapeutic Delivery to Spine Metastases**
Presenting Author: Ateeque Siddique, *McGill University, Canada*
87. **Dasatinib and Quercetin treatment reduces the incidence and severity of disc degeneration with evidence of Junb and Zfp3611 as regulators of cell fate**
Presenting Author: Olivia Ottone, *Thomas Jefferson University, USA*
88. **Targeting Senescent Cancer Cells Using Senolytic Drugs to Prevent Breast-To-Bone Metastasis**
Presenting Author: Eleane Hamburger, *McGill University, Canada*
89. **A cell-free therapeutic strategy: the role of Wharton's Jelly MSCs derived extracellular vesicles in intervertebral disc regeneration**
Presenting Author: Gianluca Vadala, *Campus Bio-Medico University Hospital Foundation of Rome, Italy*
90. **EV-enriched secretome fraction of interleukin-1 β -primed mesenchymal stem/stromal cells modulates the phenotype of human annulus fibrosus cells**
Presenting Author: Graciosa Teixeira, *Ulm University, Germany*
91. **3D Printed Titanium Surface Optimization for Mesenchymal Stem Cell Growth and Attachment**
Presenting Author: Gregory Paschal, *Hospital for Special Surgery, USA*
92. **Regenerative potential of an injectable hydrogel system in human degenerate discs**
Presenting Author: Hosni Cherif, *McGill University, Canada*
93. **Novel-Unidentified Targets for Driving Osteogenesis in ASCs Using a Genome-Wide CRISPRa Screen**
Presenting Author: Hunter Levis, *University of Utah, USA*
94. **Increased Extracellular Matrix Deposition using Synergistic Multiplex CRISPR-activation of a Novel Gene in ACAN/Col2 Upregulated Adipose-Derived Stem Cells**
Presenting Author: Hunter Levis, *University of Utah, USA*
95. **Synergistic Multiplex CRISPR-activation of RNF14 Improves Extracellular Matrix Deposition in Low-pH Media in dCas9-VPR-ACAN/Col2 Upregulated Adipose-Derived Stem Cells**
Presenting Author: Hunter Levis, *University of Utah, USA*
96. **PCR-201, a novel gene therapy treatment approach for intervertebral disc degeneration**
Presenting Author: Joseph Snuggs, *Sheffield Hallam University, UK*
97. **Phenotypic maturation of hiPS-derived notochord-like cells using covalent hydrogel and micromasses culture**
Presenting Author: Julie Warin, *Nantes University, France*
98. **o-Vanillin Enhanced Extracellular Vesicle Modulation of Human Mesenchymal Stem Cell Differentiation and Disc Cell Phenotype**
Presenting Author: Li Li, *McGill University, Canada*

- 99. Non-viral Cell Penetrating Peptides for microRNA Delivery and Regulation of NP Cell Phenotype**
Presenting Author: Marcos Barcellona, *Trinity College Dublin, Ireland*
- 100. Notochordal cells as a potential cell source for disc degeneration-associated low back pain**
Presenting Author: Shaghayegh Basatvat, *Sheffield Hallam University, UK*
- 101. Treatment of intervertebral disc cells with CRISPR modified MSC derived EVs**
Presenting Author: Iker Martinez Zalbidea, *Rochester Institute of Technology, USA*
- 102. Dual Peptide Functionalized Alginate Hydrogels to Control MSC Therapeutic Potency for Cell-mediated Intervertebral Disc Repair**
Presenting Author: Xiaohong Tan, *Washington University in St. Louis, USA*
- 103. TNFR1 blocking improves degenerative human annulus fibrosus cell genotype**
Presenting Author: Jennifer Gansau, *Icahn School of Medicine at Mount Sinai, USA*
- 104. A Novel, Shelf-Stable Complete Autograft Substitute Based on Innovative Allograft Preservation Technology**
Presenting Author: Subha Bhattacharyya, *MTF Biologics, USA*
- 105. Fetal-inspired scaffolds for Intervertebral Disc Regeneration**
Presenting Author: Joana Caldeira, *Universidade do Porto, Portugal*
- 106. Mechanical Characterization of Flexible and Resorbable Support Materials for Tissue Engineered Intervertebral Discs**
Presenting Author: Alikhan Fidai, *Cornell University, USA*
- 107. Nanofiber-Reinforced Sulfated Alginate for 3D Bioprinting of Intervertebral Discs**
Presenting Author: Gabriella Wagner, *Rochester Institute of Technology, USA*
- 108. Notochordal cell matrix-based hydrogel serves as a delivery vehicle and protective niche of notochordal phenotype for IVD regeneration**
Presenting Author: Georgina Targa Fabra, *CURAM SFI Research Centre for Medical Devices, Ireland*
- 109. Repairing Annulus Fibrosus Fissures to Prevent Intervertebral Disc Herniation using Methacrylated Gellan Gum in combination with Novel Silk**
Presenting Author: Andreas Croft, *University of Bern, Switzerland*
- 110. Using Mesendoderm Progenitor Cells Seeded in Hydrogel Biomaterial to Regenerate the Intervertebral disc**
Presenting Author: Rebecca Williams, *Sheffield Hallam University, UK*
- 111. Adhesive and Non-Adhesive Hydrogels for Intervertebral Disc Repair in an Ovine Discectomy Model**
Presenting Author: Christopher Panebianco, *Icahn School of Medicine at Mount Sinai, USA*
- 112. Driving Osteogenesis in Composite Biomaterials Using Tunable Hydroxyapatite Surface Modifications**
Presenting Author: Matthew Fainor, *University of Pennsylvania, USA*
- 113. From Preclinical to Clinical Translation of Intervertebral Disc Cell-based Regeneration - Effects of Species-Specific Scale, Metabolism and Matrix Synthesis Rates**
Presenting Author: Emily McDonnell, *Trinity College Dublin, Ireland*

- 114. Repair of Intervertebral Disc Herniations with Surgical-Fiberlock Technology**
Presenting Author: Brianna Orozco, *University of Pennsylvania, USA*
- 115. Injectable Radiopaque Hyaluronic Acid Granular Hydrogels for Intervertebral Disc Repair**
Presenting Author: Sarah Gullbrand, *University of Pennsylvania, USA*
- 116. Interlaminar Fusion Stabilization versus Pedicle Screw Instrumentation, a Retrospective Study of Lumbar Circumferential Fusion**
Presenting Author: Philip Paschal, *Hospital for Special Surgery, USA*
- 117. Withdrawn**
- 118. Are All Cervical Cages Created Equal? An Analysis of a Decade of Adverse Event Reports in the United States**
Presenting Author: Oluwatodimu Raji, *The Taylor Collaboration, USA*
- 119. Intravenous vs Oral Acetaminophen Perioperative to Instrumented Lumbar Fusion: A Comparative Effectiveness Study**
Presenting Author: Gregory Paschal, *Hospital for Special Surgery, USA*
- 120. Poly-Ether-Ketone-Ketone versus Titanium Interbody Cages in Patients Undergoing ACDF Procedures, a Prospective Evaluation**
Presenting Author: Philip Paschal, *Hospital for Special Surgery, USA*
- 121. Rapamycin Ameliorates Age-Associated Intervertebral Disc Degeneration in Marmosets with Gender Specific Effects**
Presenting Author: Yunting Tang, *University of Pittsburgh, USA*
- 122. FOXF1 Delivery via Engineered Extracellular Vesicles in a Mouse Lumbar Intervertebral Disc Puncture Model**
Presenting Author: Shirley Tang, *The Ohio State University, USA*
- 123. Synergistic Effect of RG-7112 & o-Vanillin Combination Treatment for Intervertebral Disc Degeneration**
Presenting Author: Olivia Wu-Martinez, *McGill University, Canada*
- 124. Activation of the Integrated Stress Response (ISR) Pathway in the Intervertebral Discs of a Mouse Model of Chondrodysplasia Results in Early Onset Disc Degeneration**
Presenting Author: Kathryn Cheah, *University of Hong Kong, Hong Kong*