09.00  Introduction

**BIOSPINE SESSION**  
**Disc Regeneration**  
Moderator: **Hans-Jörg Meisel** (Halle - Germany)

09.20  Three prong attack for regeneration of the intervertebral disc: consideration of the degenerate niche  
**Christine Le Maitre** (Sheffield - United Kingdom)

09.35  MSC homing into degenerated intervertebral disc: A novel approach  
**Mauro Alini** (Davos - Switzerland)

09.50  Role of exosomes in cell biology  
**Timothy Ganey** (Atlanta - USA)

10.05  Discussion

10.15  MSCs secretome decreases matrix degrading activity of anulus fibrosus cells under mechanical loading and an inflammatory environment  
Raquel Gonçalves¹, **Graciosa Teixeira**², Zhiyao Yong², Taryn Sagasse², Joana Ferreira¹, Anita Ignatius², Hans-Joachim Wilke² Cornelia Neidlinger-Wilke²  
(¹Porto - Portugal, ²Ulm - Germany)

10.25  Nose to back: compatibility of nasal chondrocytes with environmental conditions mimicking a degenerated intervertebral disc  
**Max Hans-Peter Gay**, Arne Mehrkens, Michael Rittmann, Andrea Barbero, Ivan Martin, Stefan Schaeren (Basel - Switzerland)

10.35  Discussion

10.45  Coffee break, Poster & Industrial Exhibition

**COMBINED ORS SPINE SECTION - BIOSPINE SESSION**  
**Disc Degeneration**  
Moderator: **Makarand V. Risbud** (Philadelphia - USA)

11.00  Mechanistic insights into spontaneous disc degeneration  
**Makarand V. Risbud** (Philadelphia - USA)

11.20  Organ culture models of disc degeneration  
**Sybille Grad** (Davos - Switzerland)

11.35  Mechano-Immunosensing and disc degeneration  
**Würtz-Kozak Karin** (Zurich - Switzerland)
11.50 Which factors contribute to anulus fibrosus weakening and failure? Insights from mechanobiology models
Neidlinger-Wilke Cornelia (Ulm - Germany)

12.05 Discussion

12.15 Veterinary spine diseases: relevant for humans?
Björn Meij (Utrecht - The Netherlands)

12.30 Pre-clinical testing of anti-inflammatory compounds in an intervertebral disc organ culture model
Gernot Lang¹, Yannik Gehlen¹, Fabian Heizmann¹, David Kubosch¹, Norbert Südkamp¹,
Mauro Alini², Sibylle Grad², Zhen Li² (¹Freiburg - Germany, ²Davos - Switzerland)

12.40 Intervertebral disc degeneration from a biomechanical point of view: what do we need to fix?
Pieter-Paul A. Vergroesen¹, Christine M.E. Rustenburg², Theodoor H. Smit², Kaj S. Emanuel²
(¹Utrecht - The Netherlands, ²Amsterdam - The Netherlands)

12.50 Discussion

13.00 Lunch break, Poster & Industrial Exhibition

14.00 QUICK FIRE SESSION
Endoscopic Spine Surgery and MISS

Early clinical efficacy of delta endoscope decompression of the spinal canal for the treatment of cervical spondylotic myelopathy
Kunfeng Song (Zhengzhou - China)

“U” route transforaminal percutaneous endoscopic thoracic discectomy as a new treatment for thoracic spinal stenosis
Xiaobing Zhao, Honggang Zhou, Xingchen Li, Haijun Ma (Zhengzhou - China)

Microdiscectomy annular repairment and autologous conditioned plasma intradiscal injection:
a new serial therapeutic model for the treatment of lumbar disc herniation
En Song (Kunming - China)

Comparison of foraminotomy and intervertebral distraction for nerve root decompression in degenerative spinal disease
Lucas Smolders¹, Sebastian Knell¹, Brian Park¹, Antonio Pozzi¹, Björn Meij², Frank Steffen¹
(¹Zurich - Switzerland, ²Utrecht - The Netherlands)

Discussion
BIOSPINE SESSION

Innovation in Spine Surgery

Moderators: Francesco Ciro Tamburrelli (Rome - Italy), Alberto Delitata (Rome - Italy)

14.30 Menagement of cervical spondylotic Myelopathy: laminectomy and instrumented fusion in lordosis
Vincenzo Denaro (Rome - Italy)

14.45 Inadequate decompression in cervical spine surgery: how to avoid and manage
James D. Kang (Boston - USA)

15.00 Discussion

15.10 Novel cage design and method to boost spinal fusion
Chris Arts (Maastricht - The Netherlands)

15.25 BMP 2 in spinal fusion - clinical and experimental results
Christian Hohaus (Dessau - Germany)

15.40 The mechanism of dural adhesion in the excessive fibrosis causing pain after spine surgery
Joo Han Kim (Seoul - South Korea)

15.55 Update on custom made 3D printed titanium implants for anterior column reconstruction following en bloc resection for spinal tumours
Marco Girolami, Giovanni Barbanti Brodano, Stefano Bandiera, Silvia Terzi, Riccardo Ghermandi, Gisberto Evangelisti, Giuseppe Tedesco, Valerio Pipola, Alessandro Gasbarrini (Bologna - Italy)

16.05 Discussion

16.15 Coffee break, Poster & Industrial Exhibition

DEBATE SESSION

Open vs Micro vs Endoscopic Surgery for Migrated Lumbar Disc Herniation

Moderators: James D. Kang (Boston - USA), Xifeng Zhang (Beijing - China)

16.30 Open solution - Why don’t you do an easy, fast and cost-effective solution!
Alberto Di Martino (Rome - Italy)

16.45 Microsurgery solution - MIS microsurgery is now a gold standard solution!
Zafer Orkun Toktas (Istanbul - Turkey)

17.00 Endoscopic solution - Let me talk about real MIS with the best value!
Jin-Sung Kim (Seoul - South Korea)

17.15 Discussion
BIOSPINE SESSION

Chronic Low Back Pain: New Mini-Interventional Approaches
Moderator: Massimiliano Carassiti (Rome - Italy)

17.30 Mechanism based mini-invasive treatment: what’s new? 
Massimo Allegri (Monza - Italy)

17.45 Comparative study of the crosstalk between microglia and degenerated versus non degenerated human intervertebral discs: implication of sphingosine-1-phosphate modulation in neuroinflammation
Stefania Navone1, Laura Guarnaccia1, Jean Ouellet2, Daniele Nicoli1, Roberta Gualtierotti1, Stefano Borsa1, Paolo Rampini1, Mauro Pluderi1, Lisbet Haglund2, Rolando Campanella1, Laura Riboni1, Mauro Alini3, Giovanni Marfia1
(1Milan - Italy, 2Montreal - Canada, 3Davos - Switzerland)

17.55 A novel treatment for lumbar facet joint pathology «the PRP CT-guided injection» 
Philippe Adam (Toulouse - France)

18.05 Ablation of the basivertebral nerve: pilot study results and long-term results of an innovative treatment of back pain
Stephan Becker1, Michael Heggeness2 (1Vienna - Austria, 2Wichita - USA)

18.15 Discussion

18.25 Closure

18.30 Welcome reception
08.30 QUICK FIRE SESSION

Disc Degeneration and Regeneration

Moderator: Sybille Grad (Davos - Switzerland)

Does the terminal complement complex play a role in disc degeneration?
Graciosa Q. Teixeira¹, Zhiyao Yong¹, Raquel M. Goncalves², Amelie Kuhn¹, Michael Ruf³, Andreas Nerlich³, Uwe M. Mauer¹, Anita Ignatius¹, Rolf Brenner¹, Cornelia Neidlinger-Wilke¹
(¹Ulm - Germany, ²Porto - Portugal, ³Karlsbad-Langensteinbach - Germany)

Investigation of inflammatory and pain-related pathways in canine degenerative spinal disease
Thomas Bitterli¹, David Schmid¹, Ladina Ettinger¹, Lisanne Thijssen¹, Olga Krupkova¹, Marianna Tryfonidou², Björn Meij², Antonio Pozzi¹, Frank Steffen¹, Karin Wuertz-Kozak¹, Lucas Smolders¹ (¹Zurich - Switzerland, ²Utrecht - The Netherlands)

The unfolded protein response mediated by perk is causally related to the pathogenesis of intervertebral disc degeneration
Takeshi Fujii¹, Nobuyuki Fujita¹, Satoshi Suzuki¹, Kota Watanabe¹, Takeshi Miyamoto¹, Keisuke Horiuchi², Morio Matsumoto¹, Masaya Nakamura¹ (¹Tokyo - Japan, ²Saitama - Japan)

The role of Type I Diabetes in intervertebral disc degeneration
Fabrizio Russo¹, Luca Ambrosio¹, Gianluca Vadala¹, Kevin Ngo², Yong Fan², Gwendolyn Sowa², Nam Vo², James D. Kang³, Vincenzo Denaro⁷ (¹Rome - Italy, ²Pittsburgh - USA, ³Boston - USA)

Preliminary safety, tolerability and efficacy of intradiscal STA363 in patients with chronic discogenic low back pain
Svante Berg¹, Andreas Gerward², Bengt Isberg³, Kjell Olmarker¹, Anders Lehmann²
(¹Upplands Väsby - Sweden, ²Gothenburg - Sweden, ³Stockholm - Sweden)

Discussion

Dissecting mesenchymal stem/stromal cells secretome to modulate the inflammatory response of degenerated intervertebral disc
Joana Rita Ferreira¹, Graciosa Quelhas Teixeira², Mário Adolfo Barbosa¹, Raquel Madeira Gonçalves¹ (¹Porto - Portugal, ²Ulm - Germany)

Lipid nanocapsules for the sustained released of therapeutic miRNA: new perspective in regenerative medicine of intervertebral disc
Brian Le Moal¹, Elise Lepeltier², Valérie Geoffroy¹, Angélique Angélique Galvani¹, Catherine Le Visage¹, Catherine Passirani², Jérôme Guicheux¹, Johann Clouet¹
(¹Nantes - France, ²Angers - France)

Fetal extracellular matrix of nucleus pulposus as a natural scaffold for intervertebral disc rejuvenation
Morena Francesca Fiordalisi, Ana João Silva, Marta Pinto, Cláudia Machado-Ribeiro, Mário Barbosa, Joana Caldeira, Raquel Madeira Gonçalves (Porto - Portugal)

Controlled release of biological factors for progenitor cell-mediated endogenous repair of intervertebral discs
Leslie Frapin, Johann Clouet, Nina Henry, Claire Chedeville, Jérôme Guicheux, Catherine Le Visage (Nantes - France)
Targeted proteomic analysis to explore the anti-inflammatory effects of porcine notochordal cell-derived matrix
F.C. Bach¹, F.M. Riemers¹, G. Erdmann², C. Sachse², M. Templin³, K. Ito⁴, M.A. Tryfonidou¹
(Utrecht - The Netherlands, ²Berlin - Germany, ³Reutlingen - Germany, ⁴Eindhoven - The Netherlands)

Regenerative medicine of intervertebral disc: comparison of the transpedicular and transannular approaches of ovine lumbar intervertebral disc in a longitudinal follow up
Cyrille Decante¹, Johann Clouet¹, Antoine Hamel¹, Luc Le Fournier², Olivier Gauthier¹, Dominique Rouleau¹, Julie Lesoeur¹, Boris Halgand¹, Catherine Le Visage¹, Jerôme Guicheux¹, Marion Fusellier¹ (¹Nantes - France, ²Angers - France)

Discussion

COMBINED AOSPINE - BIOSPINE SESSION
New MRI Analysis for Disc De/Regeneration
Moderator: Dino Samartzis (Chicago - USA)

09.45 Novel imaging for the assessment of spinal phenotypes?
Dino Samartzis (Chicago - USA)

10.05 In vivo spectroscopy to quantify biomarkers of painful disc degeneration
Jeffrey Lotz (San Francisco - USA)

10.20 A 20-year prospective longitudinal study on degeneration of the cervical spine using MRI in volunteers
Kota Watanabe (Tokyo - Japan)

10.35 MRI - Spectroscopy, biochemical evaluation of disc biology
Stephan Becker (Vienna - Austria)

10.45 Discussion

11.00 Coffee break, Poster & Industrial Exhibition
BIOSPINE SESSION
Cell Therapy

11.15 Stem cells and biomaterials for the regenerative medicine of intervertebral disc: from clinical data to innovative concepts
Jerome Guicheux (Nantes - France)

11.30 Exploring progenitor cell therapies for the intervertebral disc
Benjamin Gantenbein (Bern - Switzerland)

11.45 Mesenchymal stem cells from adipose tissue for the treatment intervertebral disc degeneration: in vivo study
Francesco Benazzo (Pavia - Italy)

12.00 Discussion

12.10 MSC homing facilitates IVD cell survival, proliferation and enhances the TIE2 positive IVD progenitor cell subpopulation
Sebastian Wangler¹, Marianna Peroglio¹, Ursula Menzel¹, Lorin Benneker¹, Lisbet Haglund², Daisuke Sakai³, Mauro Alini¹, Sibylle Grad¹ (¹Davos - Switzerland, ²Montreal - Canada, ³Tokyo - Japan)

12.20 Viable allograft as a supplemental therapeutic for disc regeneration
Douglas Beall¹, Gregory Wilson², Randolph Bishop³, William Tally⁴, H. Thomas Temple⁵, Timothy Ganey⁶ (¹Oklahoma City - USA, ²Tulsa - USA, ³Savannah - USA, ⁴Athens - USA, ⁵Ft Lauderdale - USA, ⁶Tampa - USA)

12.30 Implantation of bone-marrow derived mesenchymal stem cells for intervertebral disc regenerative therapies may reduce the risk of neurovascular growth and reduce discogenic pain
Abbie Binch¹, Stephen Richardson², Judith Hoyland², Frank Barry¹ (¹Galway - Ireland, ²Manchester - United Kingdom)

12.40 Intradiscal injection of autologous adipous tissue derived mesenchimal cells: a comparison with simultaneous nucleoplasty or alone
Daniele Genco¹, Davide Amata¹, Luca Iosca¹, Stefano Giarratana², Alessia Violini³, Paolo Grossi¹ (¹Milan - Italy, ²Siena - Italy, ³Trento - Italy)

12.50 Discussion

13.00 Lunch break, Poster & Industrial Exhibition
COMBINED ITALIAN SPINE SOCIETY (SICV&GIS) - BIOSPINE SESSION
Minimally Invasive Approaches for Adult Scoliosis
Moderators: Giuseppe Costanzo (Rome - Italy), Cesare Faldini (Bologna - Italy)

14.00  Certainties and indication of sagittal balance
       Cesare Faldini (Bologna - Italy)

14.10  Lateral approach: advantages and pearls
       Carlo Doria (Sassari - Italy)

14.20  Posterior approach: PLIF o TLIF?
       Francesco Tamburrelli (Rome - Italy)

14.30  Discussion

14.40  Minimally invasive management of complex patients with severe kyphosis and rotation
       Giuseppe Costanzo (Rome - Italy)

14.50  Use of bone marrow concentrated for posterolateral fusion
       Bernardo Misaggi (Milan - Italy)

15.00  Uncommon surgical cases
       Alessandro Gasbarrini, Giovanni Barbanti Brodano (Bologna - Italy)

15.10  Discussion

WORKING GROUP SESSION
Education and Dissemination in Spine Surgery
Moderator: Hans-Jörg Meisel (Halle - Germany)

15.30  BioSpine AP 2018: new collaboration and success
       Yong Eun Cho (Seoul - South Korea)

15.40  JOR Spine: Introduction from the Editor in Chief
       Mauro Alini (Davos - Switzerland)

15.50  NeuroSpine: Introduction from the Editor in Chief
       Yoon Ha (Seoul - South Korea)

16.00  Teaching spinal anatomy for spine surgery training
       Francisco Forriol (Madrid - Spain)

16.10  Discussion

16.20  Coffee break, Poster & Industrial Exhibition
BIOSPINE SESSION
Spinal Cord Repair and Regeneration
Moderators: Francesco Tommasello (Messina - Italy), Gaetano Gulino (Catania - Italy)

16.35 Injectable guiding materials for spinal cord repair
Laura De Laporte (Aachen - Germany)

16.50 Role of TRPV4 channel in spinal cord injury
Inbo Han (Seongnamsi - South Korea)

17.05 Clinical trial of spinal cord injury with neural lineage stem cells
Yoon Ha, Keung Nyun Kim (Seoul - South Korea)

17.20 Discussion

ROUND TABLE DISCUSSION
The Role of Mineralization in Disc Degeneration
Moderators: Marianna Tryfonidou (Utrecht - The Netherlands),
Makarand V. Risbud (Philadelphia – USA),

17.30 Disc calcification: an underestimated suspect in chronic back pain
Dino Samartzis (Chicago - USA)

17.45 The cellular implications and importance in disc calcification - Not just endplate anymore!
Christine Le Maitre (Sheffield - United Kingdom)

18.00 Round table discussion

BIOSPINE SESSION
Therapies of the Future

18.20 Biomaterial-based drug delivery for chronic low back pain; are we there yet?
Laura Creemers (Utrecht - The Netherlands)

18.35 iPS-based therapy: a preview of the iPSpine approach
Marianna Tryfonidou (Utrecht -The Netherlands)

18.50 Discussion
08.00  QUICK FIRE SESSION
Biomaterials & Spine Surgery

Why we use PEKK? Material’s characteristics and clinical results
**Max Nemoz-Gaillard**¹, Didier Perrin², Philippe Penot³, Jacques Boulot⁴
(¹Avignon - France, ²Alès - France, ³Brest - France, ⁴Toulouse - France)

Stiff rod is a substantial risk factor of proximal junctional kyphosis after adult spinal deformity surgery: comparative study between cobalt chrome- and titanium alloy-rod constructs
**Seung-Jae Hyun** (Seoul - South Korea)

Clinical effect of the nano-hydroxyapatite/polyamide66 cage in reconstruction of cervical stability: a midterm study
**Weiyang Zhong**, Ke Tang, Xiaoji Luo, Zhengxue Quan, Dianming Jiang (Chongqing - China)

Bioactive 3D composite scaffolds for bone tissue regeneration
Maria Elena Gino, Maria Letizia Focarete, Silvia Panzavolta, Chiara Gualandi, **Giovanni Barbanti Brodano**, Cristiano Griffoni, Paola Torricelli, Laura Sicuro, Milena Fini (Bologna - Italy)

The E. coli derived rhBMP-2 with hydroxyapatite in spinal fusion
**Yoenhoi Heo** (Seoul - South Korea)

**Discussion**

Electrospun collagen coupled with bone marrow-derived exosomes
**Javorina Milosevic**¹, Connie Chung², Claudia Heine¹, Shabnam Namin², Timothy Ganey³, Joerg Meisel¹ (¹Leipzig - Germany, ²Miami - USA, ³Tampa - USA)

Application of bio-ceramic (BGS-7) artificial zygoma based on additive manufacturing
**Jun Young Lim**, Jun Hyuk Seo, Hyun Seung Ryu, Yong Bok Kim, Sung Nam Park, Byoung Hun Choi (Seongnam - South Korea)

Injectable strontium-doped hydroxyapatite integrated with phosphoserine-tethered poly (epsilon-lysine) dendrons for bone defect repair
**Maria Grazia Raucci**, Luigi Ambrosio (Naples - Italy)

Instrument vertebral arthrodesis in scoliosis correction with locally harvested bone autograft without use of bone precursors
Marco Crostelli, **Osvaldo Mazza**, Carlo Iorio, Massimo Mariani, Dario Mascello (Rome - Italy)

**Discussion**

Effect of screw insertion trajectory on the mechanical response of L4 vertebrae: a computational finite element study
**Cristina Falcinelli**, Leonardo Molinari, Alessio Gizzi, Alberto Di Martino, Vincenzo Denaro (Rome - Italy)

The outcome of multilevel anterior cervical discectomy and fusion
**Chang Hwa Ham**, Yoon-Kwan Park, Joo Han Kim, Woo Keun Kwon, Woong Bae Park, Han Kim (Seoul - South Korea)
How To cure degenerative spondylolisthesis

**Pier Paolo Mura**, Maurizio Piredda, Silvia Casula, Francesca Maria Meloni
(Quartu Sant’Elena - Italy)

Combined anterior/posterior approach in degenerative adult scoliosis

Luca Proietti, **Caterina Fumo**, Andrea Perna, Marco Renzi, Francesco Ciro Tamburrelli
(Rome - Italy)

Capacitive coupling electric fields (CCEF) in the treatment of vertebral compression fractures (VCFS)

Biagio Moretti, Andrea Piazzolla, **Davide Bizzoca** (Bari - Italy)

Discussion

**COMBINED NSPINE - BIOSPINE SESSION**

**Robotics and Navigation in Spine Surgery**

Moderator: **Bronk Boszczyk** (Tutzing - Germany)

09.50 Neuronavigated robot-aided noninvasive stimulation of neurones

**Giovanni Di Pino** (Rome - Italy)

10.05 Robotics and 3D printing in spine surgery: where we are and where we go

**Paolo Domenico Parchi**, Rodolfo Capanna (Pisa - Italy)

10.20 Augmented reality supported cervical transpedicular fixation on 3D-printed vertebrae model; an experimental education study

Mehmet Gazi Boyaci, Ugur Fidan, Ahmet Fatih Yuran, Serhat Yildizhan, Furkan Kaya, **Ömer Kimsesiz**, Merve Özdıil, Akin Cengiz, Adem Aslan (Turkey)

10.30 Roadmap for development of brand new spine surgery robot in South Korea

**Seong Yi** (Seoul - South Korea)

10.40 Discussion

10.50 Coffee break, Poster & Industrial Exhibition
BIOSPINE SESSION
Biomaterials for Spine Surgery
Moderator: Biagio Moretti (Bari - Italy)

11.05  Bone graft substitutes in spine
Norbert Passuti (Nantes - France)

11.20  Antibacterial effect of cobalt-chromium alloy: in vitro and in vivo evaluation
Kota Watanabe (Tokyo - Japan)

11.35  The biomechanics of novel surface technologies at the bone interface
Lisa Ferrara (Southport - USA)

11.50  Discussion

12.00  Designing biomaterials and scaffolds with osteoinductive properties
Maria Chatzinikolaidou (Crete - Greece)

12.15  Customized multiphasic nucleus/annulus scaffolds for intervertebral disc repair regeneration
Luigi Ambrosio (Naples - Italy)

12.30  Design and evaluation of electrospun structured polycaprolactone biomaterials for annulus fibrosus repair
Maude Gluais¹, Johann Clouet¹, Marion Fusellier¹, Cyrille Decante¹, Constantin Moraru¹, Joëlle Veziers¹, Dominique Dumas², Jérôme Abadie¹, Sing Yian Chew², Jerome Guicheux¹, Catherine Le Visage¹ (¹Nantes - France, ²Nancy - France, ³Singapore - Singapore)

12.40  A novel bioactive glass-ceramic spacer for spinal fusion: NovoMax
Seung Jung Han, Jun-Hyuk Seo, Hyun-Seung Ryu (Seoul - South Korea)

12.50  Discussion

13.00  Lunch break, Poster & Industrial Exhibition
### SATELLITE SYMPOSIUM

**Respine Project**

**Moderator:** Christian Jorgensen (Montpellier - France)

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<th>Time</th>
<th>Session</th>
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<td>14.00</td>
<td>Opening and introduction</td>
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<td>14.15</td>
<td>Global burden of low back pain</td>
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<td><strong>Sergio Iavicoli</strong> (Rome - Italy)</td>
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<td>14.30</td>
<td>The ReSpine project: the RCT to test MSC efficacy to treat low back pain</td>
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<td><strong>Christian Jorgensen</strong> (Montpellier - France)</td>
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<td><strong>Discussion</strong></td>
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<td>Bone marrow mesenchymal stem cells biology</td>
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<td><strong>Louis Casteilla</strong> (Toulouse - France)</td>
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<td>15.10</td>
<td>Cell production: from donation to transplantation.</td>
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<td><strong>Javier García-Sancho</strong> (Valladolid - Spain)</td>
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<td>15.30</td>
<td><strong>Discussion</strong></td>
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<td>15.40</td>
<td>Preclinical evidences of MSC mediated disc regeneration</td>
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<td><strong>Gianluca Vadalà</strong> (Rome - Italy)</td>
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<td>16.00</td>
<td>Autologous and allogeneic mesenchymal stromal cells as a treatment for low back pain</td>
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<td><strong>Javier García-Sancho</strong> (Valladolid - Spain)</td>
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<td>16.20</td>
<td>Future of cell therapy for degenerative disc disease</td>
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<td><strong>Danièle Noël</strong> (Montpellier - France)</td>
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<td>16.40</td>
<td><strong>Discussion</strong></td>
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<td>17.00</td>
<td>Summary and farewell</td>
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**Friday - April 5**
Autograft, allograft, metal and polymeric cages for spinal fusion

P01 Carbon-fiber-reinforced peek fixation system in the treatment of spine tumours
Giuseppe Tedesco, Giovanni Barbanti Brodano, Marco Girolami, Valerio Pipola, Stefano Bandiera, Silvia Terzi, Riccardo Ghermandi, Gisberto Evangelisti, Alessandro Gasbarrini (Bologna - Italy)

P02 Moldable allograft bone gel infused with spine-derived exosomes triggers osteogenic induction
Connie Chung, Renaud Sicard, Shabnam Namin, Timothy Ganey (Tampa - USA)

Cell Therapies for Intervertebral disc Regeneration

P03 Coculture of nucleus pulposus micro-tissue with nasal chondrocytes as an in vitro model for intervertebral disc regeneration
Jesil Kasamkattil, Max Hans Peter Gay, Arne Mehrkens, Andrea Barbero, Ivan Martin, Stefan Schären (Basel - Switzerland)

P04 Investigation of the effect of nicotinamide riboside on the cellular senescence of primary human bone marrow-derived mesenchymal stromal cells in vitro
Emina Džafo¹, Rahel May¹, Eliane J Müller¹, Stefán Baertschi¹, Olaia Naveiras², Lorin M. Benneker¹, Benjamin Gantenbein¹ (¹Bern - Switzerland, ²Lausanne - Switzerland)

P05 Different isolation methods for nucleus pulposus progenitor cells
Daniela A. Frauchiger¹, Adel Tekari², Rahel May¹, Emina Džafo¹, Samantha C.W. Chan¹, Jivko Stoyanov¹, Alessandro Bertolo¹, Xingshuo Zhang¹, Daisuke Sakai², Jordy Schöl², Sibylle Grad³, Marianna Tryfonidou⁶, Lorin M. Benneker¹, Benjamin Gantenbein¹ (¹Bern - Switzerland, ²Sfax - Tunisia, ³Nottwil - Switzerland, ⁴Kanagawa - Japan, ⁵Davos - Switzerland, ⁶Utrecht - The Netherlands, ⁷Bern - Switzerland)

P06 Can PPARδ agonist increase cell yield of nucleus pulposus progenitor cells positive for angiopeoietin-1 receptor (= TIE2) after cell isolation?
Xingshuo Zhang¹, Daniela A. Frauchiger¹, Rahel D. May¹, Emina Džafo¹, Adel Tekari², Lorin M. Benneker¹, Daisuke Sakai², Marianna Tryfonidou⁶, Benjamin Gantenbein¹ (¹Bern - Switzerland, ²Sfax - Tunisia, ³Isehara - Japan, ⁴Utrecht - The Netherlands)
Cervical Decompression and Fusion

P07 Cervical intradural disc herniation after percutaneous endoscopic cervical discectomy
Young Joon Rho (Seoul - South Korea)

P08 Treatment of myelopathy due to cervicothoracic OPLL via posterior decompression and fusion
Young Joon Rho (Seoul - South Korea)

P09 Herniated discs at the cervicothoracic junction
Bang-Sang Hahn, Sung-Uk Kuh (Seoul - South Korea)

P10 The effect of uncinate process resection on subsidence following anterior cervical discectomy and fusion
Dongwuk Son, Suhun Lee, Junseok Lee, Geunsung Song (Yangsan-si - South Korea)

P11 A lower T1 slope as a predictor of subsidence in anterior cervical discectomy and fusion with stand-alone cages
Dongwuk Son, Suhun Lee, Junseok Lee, Geunsung Song (Yangsan-si - South Korea)

P12 Correlation analysis between C7 Slope and cervical sagittal parameters in short segment anterior cervical discectomy with fusion
Junfeng Ma (Tianjin - China)

P13 Is decompressive C1 laminectomy without fusion feasible for the treatment of craniovertebral junction stenosis with myelopathy
Unyong Choi, Kyung-Hyun Kim (Seoul - South Korea)

Disc Degeneration

P14 Changes in gene expression of intervertebral discs from diffuse idiopathic skeletal hyperostosis (DISH) patients compared to traumatic/degenerative intervertebral discs
Rahel D. May, Daniela A. Frauchiger, Christoph E. Albers, Lorin M. Benneker, Benjamin Gantenbein (Bern - Switzerland)

P15 The correlation between effusion of facet joint on magnetic resonance imaging and interspinous and degenerative lumbar spondylolisthesis
Junfeng Ma (Tianjin - China)

P16 A comparison of accessory rods constructs to two rods constructs after corrective fusion surgery including sacroiliac fixation for adult spinal deformity Does it prevent or aggravate complications
Unyong Choi, Kyung-Hyun Kim (Seoul - South Korea)

P17 Angular loss could happen during early period of follow up after corrective surgery for adult spinal deformity with spinal sagittal malalignment How much and where could be the location
Unyong Choi, Kyung-Hyun Kim (Seoul - South Korea)
Poster Session

Growth Factors in Spinal Fusion and Disc Regeneration

P18 Percutaneous endoscopic lumbar discectomy and platelet rich plasma biological therapy for the treatment of lumbar disc herniation
En Song (Kunming - China)

P19 Intradiscal and epidural platelet-rich plasma injection for the treatment of chronic discogenic low back pain
En Song (Kunming - China)

P20 Stimulation of intervertebral disc cells in alginate bead culture with bone morphogenetic protein 2 and/or L51P
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