eCM XIV

Stem & Progenitor Cells for Musculoskeletal Regeneration

June 23 - 25, 2013
Congress Center, Davos Platz, Switzerland
Dear colleagues

Although bone has a remarkable propensity to repair, there are a number of situations where the repair process fails. This leads to many complications both social and economic. To meet these challenges, a complete understanding of bone biology, at the molecular, cellular and mechanical level is required. Furthermore the knowledge gained must be implemented into clinically relevant applications. This conference aims to address precisely these topics while exploring issues such as biomaterials and clinical approaches. The outcome should be an increased understanding of the topic and a fostering of the interaction between scientists and clinicians. Since the inaugural meeting in 1999 eCM meetings have been the place where scientists and clinicians meet to move clinical problems to the scientists and to initiate projects to translate the scientific solutions back to the clinics. The afternoons are free for excursions into the mountains or networking opportunities.

This international forum continues the eCM congress series held in Davos. The limited number of participants (150) ensures clinicians, biologists, engineers and material scientists will have ample opportunities for knowledge sharing in basic, translational and clinical research in addition to developments in the field of bone fixation, repair and regeneration. As the conference does not have parallel sessions it permits in-depth multidisciplinary discussions about how to advance this research area.

Yours sincerely

Local Conference Organizers

Dr Martin J Stoddart
Principal Investigator
Musculoskeletal Regeneration
AO Research Institute Davos

Dr Sybille Grad
Principal Investigator
Musculoskeletal Regeneration
AO Research Institute Davos

Dr Sophie Verrier
Principal Investigator
Musculoskeletal Regeneration
AO Research Institute Davos

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Martin Stoddart (AO Research Institute Davos, CH)
We thank the following Sponsors for financing this conference
Registration & Conference dinner tickets eCM XIV

Sunday, June 23rd  
Registration and pick up of conference bags at the Convention Center from 7 am on

Conference Secretaries

Carla Escher  
Sonia Wahl

AO Research Institute, Clavadelerstrasse 8, 7270 Davos Platz, Switzerland

Please contact Ms. Carla Escher for any information on eCM congresses
Tel: +41 81 414 2441  Fax: +41 81 414 2299
Email: carla.escher@aofoundation.org

IT Presentation Helper

Romeo Accola

All invited talks are 20 minutes (Max) (20-30 slides)  
to allow 10 minutes discussion per talk
All submitted talks are 10 minutes (10-15 slides)  
to allow 5 minutes discussion per talk
Chairpersons will cut people off who try to use this time for their talks!!
eCM is a True Open Access Journal, published by AO Research Institute Davos. AO Research Institute Davos is part of the AO Foundation, a medically guided nonprofit organization specialized in the treatment of trauma and disorders of the musculoskeletal system.

**eCM** provides a forum for publication of preclinical research in the musculoskeletal field (Trauma, Maxillofacial (including dental), Spine and Orthopaedics) and the cells & materials used in the replacement, repair or regeneration of these tissues.

**Detailed Scope**

- **Assessment of materials for biomedical use in the musculoskeletal field & interaction with tissues/prokaryotic / eukaryotic cells.**

  Manuscripts must have an important biological dimension reporting effects at the cellular, tissue or organismic levels. Papers focussing purely on material properties will not be entertained. In vitro cytocompatibility studies should use primary cells or more than one cell line and provide more than just simple descriptions of cell viability, spreading, proliferation, mineralisation etc. Major improvements in in vitro or in vivo models are considered.

- **Tissue Engineering and Regenerative Medicine.**

  Manuscripts concerning aspects of the repair or regeneration of connective and mineralized tissues within the musculoskeletal field will be considered.

- **Structure, function, biology of connective tissues.**

  Manuscripts concerning the structure of bone, teeth, cartilage, intervertebral discs, skeletal muscle, tendons and ligaments within the musculoskeletal field will be considered.

- **Stem and Progenitor Cells.**

  All manuscripts concerning stem cell characterization and mechanisms of differentiation as they relate to the connective and mineralized tissues of the musculoskeletal field will be considered. Note: The use of pooled donor cells should be avoided. When unavoidable, their use needs to be justified convincingly within the manuscript (and within the cover letter).

**Ten good reasons for publishing a paper in eCM**

1. World-wide open access.
2. Authors retain copyright to their articles.
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Scientific Program eCM XIV

Sunday, June 23rd

Welcome

08:30 – 08:40  Martin J. Stoddart (Switzerland)
               AO Research Institute
08:40 – 08:50  Sophie Verrier (Switzerland)
               Welcome to Davos

Session 1  Introduction to stem cells
Chair: Chris Evans

09:00 – 09:30  Stanimir Vuk-Pavlović (USA)
               Stemness as emergence
09:30 – 10:00  Richard Oreffo (UK)
               Skeletal stem cell based strategies for bone regeneration
10:00 – 10:15  Wnt3a enhances self renewal and chondrogenic potential of adult human mesenchymal stem cells
               R Narcisi, M Cleary, PA Brama, MJ Hoogduijn, D ten Berge, GJVM van Osch

10:15 – 11:00  Coffee Break

Session 2  Stem Cell Niche
Chair: Mauro Alini

11:00 – 11:30  Bruno Péault (USA)
               Perivascular cells
11:30 – 12:00  Cosimo De Bari (UK)
               Mesenchymal stem cell niches in joint health and disease
12:00 – 12:15  Engineering a functional hematopoietic microenvironment with human MSCs through endochondral ossification
               C Scotti, E Piccinini, H Takizawa, A Papadimitropoulos, P Bourgine, A Todorov, A Barbero, MG Manz, I Martin
12:15 – 12:30  Mesenchymal Stem Cells (MSC) induce the homing of endogenous stem/progenitor cells through the activation of alternatively activated macrophages in an ectopic bone formation model
               R Tasso, D Reverberi, C Rosillo, C Lo Sicco, R Cancedda

Free afternoon
Conference Social Walk (optional)
Session 3  Stem cells and regeneration  
Chair: Martin J. Stoddart

17:00 – 17:30  Diego Correa (USA)  
Regulation of MSCs ultimate phenotype: repercussions for cartilage tissue engineering

17:30 – 18:00  Magdalena Kucia, (USA)  
Novel therapeutic approaches in regenerative medicine – potential application of very small embryonic like stem cells and harnessing adult stem cells paracrine signals

18:00 – 18:15  Hypertrophic chondrogenic differentiated MSC pellets stimulate bone regeneration in segmental bone defects  
J van der Stok, M K E Koolen, N Kops, H Jahr, H Weinans, O P van der Jagt

18:15 – 18:30  Priming 3D cultures of human mesenchymal stromal cells towards cartilage formation via developmental pathways  
M Centola, B Tonnarelli, A Barbero, I Martin

18:30 – 20:00  Poster session (Drinks & Snacks)

Monday, June 24th

Session 4  Tissue specific stem cells  
Chair: Charles Archer

08:30 – 09:00  Ilyas Khan (UK)  
Articular cartilage-specific progenitor cells: a frank assessment of progress

09:00 – 09:30  Wiltrud Richter (Germany)  
Adipose-derived stroma cells for orthopaedic repair

09:30 – 09:45  Human progenitor tenocytes to improve healing in tendinopathies  
A Grognuz, A Farron, W Raffoul, LA Applegate

09:45 – 10:00  Reaming material: a vital source for human mesenchymal stem cells with high osteogenic potential  
P Kühlflick, E Lessl, A Moghaddam, T Jefferson-Keil, G Schmidmaier

10:00 – 10:45  Coffee Break
Session 5  
**Stem cells in disease and injury**

*Chairs: Sibylle Grad*

10:45 – 11:15  
**Steven Ghivizzani (USA)**  
Intra-tumoral heterogeneity in osteosarcoma and the cancer stem cell model

11:15 – 11:45  
**Peter Giannoudis (UK)**  
Obtaining and using MSCs during trauma repair

11:45 – 12:00  
Improvement of biologically impaired bone fracture healing by potent progenitor cells in the aged  
*A Sass, B Preininger, K Schmidt-Bleek, G Duda, and A Dienelt*

12:00 – 12:15  
Effects of inflammatory factors and synovial fluid on the expression of adhesion and migration factors in mesenchymal stem cells  
*MJC Leijs, PK Bos, J Verhaar, MJ Hoogduijin, GJVM Van Osch*

Free afternoon

18:00 Conference Dinner

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**Tuesday, June 25th**

Session 6  
**Interactions with Biomaterials**

*Chair: David Eglin*

08:15 – 08:45  
**Kevin Shakesheff (UK)**  
Cell and protein delivery systems to maximise efficacy and safety in regenerative medicine products

08:45 – 09:15  
**Matthias Lutolf (Switzerland)**  
Mimicking the stem cell niche with biomaterials

09:15 – 09:30  
Injectable polyurethane/alginate composite scaffolds for cell delivery  
*R Guo, CL Ward, CL Duvall, JM Davidson, JC Wenke, SA Guelcher*

09:30 – 09:45  
HMSC proliferation and differentiation are dependent on chemistry and surface roughness of calcium phosphate bone substitutes  
*V Castagna, R Olivares-Navarrete, Z Schwartz, BD Boyan, KA Hing*

09:45 – 10:00  
Autologous serum in combination with a nanostructured bone graft material improves matrix remodeling and bone formation in the sheep model for tissue engineering of bone grafts in clinically relevant size  
*AM Boos, Á Weigand, A Arkudas, A Hess, RE Horch, JP Beier*

10:00 – 10:15  
Loaded osteoprogenitor cells enhance the osteoconductivity of a load-transducing elastomer in the absence of periostea  
*C Sfeir, SH Zaky, KW Lee, J Gao, A Almarza, Y Wang*

10:15 – 10:45  
Coffee Break
Session 7  **Immunological aspects**  
Chair: Gerjo van Osch  

10:45 – 11:15  **Karen English (Ireland)**  
Immunomodulation by adult stem cells  

11:15 – 11:30  **M1 polarised macrophages are potential mediators of the anti-chondrogenic effects of osteoarthritic synovium**  
N Fahy, J Lehmann, M de Vries-van Melle, N Grotenhuis, E Farrell, JM Murphy, Y Bastiaanssen-Jenniskens, GJVM van Osch  

11:30 – 11:45  **Mesenchymal stroma cells implanted in fibrin hydrogel trigger attraction of M1 macrophages, endothelial cells and early immune modulation stimulating long bone healing without long-term engraftment**  
E Seebach, H Freischmidt, W Richter  

11:45 – 13:45 Lunch  

Session 8  **Clinical Perspectives (Sponsored by AOTrauma)**  
Chair: Geoff Richards  

13:45 – 14:15  **George Muschler (USA)**  
Some Practical Aspects of Cell Therapy  

14:15 – 14:45  **Luc Sensebé (USA)**  
Processing MSCs for clinical uses  

14:45 – 15:00  **Characterisation of a novel, clinically compliant, serum-free culture system for bone marrow derived mesenchymal stem cells**  
S Gaynard, E Mooney, G Shaw, V Barron, JS Hayes, F Barry, JM Murphy  

15:00 – 15:15  **Safety of mesenchymal stem cell application for regenerative therapy: Expression and functional role of c-Myc for expansion and cell differentiation**  
N Werth, S Boeuf, J Brocher, EM Maurer, M Anton, W Richter  

15:15 – 15:45  Robert Mathys Student prize announcements & Conference closing  

Conference End
1. Modelling the mesenchymal stem cell niche in bone marrow
   JJ Bara, U Menzel, P Leuzo, M Alini, M Stoddart

2. Testosterone enhances extracellular matrix synthesis by male intervertebral disc cells
   in vitro
   A Bertolo, M Baur, N Abli, SJ Ferguson, J Stoyanov

3. Determining the viscoelastic properties of trachea cartilage for scaffold design in tissue
   engineering
   S Biechler, B Kornis, J Lusk, S Williams

4. Inferior ectopic bone formation of Mesenchymal Stroma Cells from adipose tissue
   compared to bone-marrow: rescue by chondrogenic pre-induction
   J Brocher, P Janicki, P Voltz, E Seebach, W Richter

5. Enhancing therapeutic potential of MSC cells for bone regeneration
   EM Czekanska, MA Fuessinger, F Duttenhoffer, JR Ralphs, RG Richards, M Alini, MJ
   Stoddart

6. Study of the cell/polyelectrolytes interaction: the role of the hyaluronan-based
   pericellular matrix
   C Fotia, G Ciapetti, G Messina, G Marletta, N Baldini

7. Transfection of primary human mesenchymal stromal cells with growth and differentiation
   factor 5 (GDF-5) – A non-viral gene transfer therapy for the disc?
   B Gantenbein-Ritter, C Bucher, A Gazdhar, LM Benneker, SCW Chan

8. Mesenchymal stromal cell (MSC)-seeded dense collagen scaffold and VEGF promote
   healing of large bone defect
   C Gao, EJ Harvey, M Chua, F Jiang, A Li, H Wang, JE Henderson

9. High-voltage electro-spraying: a fascinating technique for living cells encapsulation for
   immunoisolation and regenerative medicine
   O Gryshkov, D Pogozhykh, N Hofmann, T Mueller, B Glasmacher

10. Low intensity pulsed ultrasound (LIPU) enhances ectopic bone formation by intrinsic
    mesenchymal stem cells in rabbit spine
    X Guo, XY Wang

11. Innervation of ectopic bone formed by intrinsic mesenchymal stem cells in rabbit spine
    X Guo, XY Wang

12. Towards an autologous culture of human endothelial progenitor cells
    M Herrmann, A Binder, U Menzel, M Alini, S Verrier

13. Serum albumin markedly increases bone formation in vivo
    DB Horvathy, B Vamos, I Toro, G Vacz, Z Lacza

    DB Horvathy, B Sandor, K Vajda, G Vacz, Z Lacza

15. Substrate-dependent properties of biomaterials-derived MSC spheroids
    GH Huang, SH Hsu

16. A novel magnesium composed PLGA/TCP porous scaffold for bone regeneration
    Y Lai, M Zhang, S Chen, X Wang, P Zhang, Q Ling

17. Effects of hypoxia on osteogenic differentiation of mesenchymal stem cells
    A Massa, C Fotia, F Boriani, D Granchi, N Baldini
18. The properties of equine chondroprogenitor cells from articular cartilage after extended in vitro expansion
   HE McCarthy, CW Archer

19. Stem cells derived from human osteoarthritic cartilage elicit in vitro regenerative properties
   L Nelson, HE McCarthy, J Fairclough, CW Archer

20. The use of specific PEEK nanotopographies to modulate osteogenic behaviour in primary osteoprogenitor cells
   DSS Morrison, N Gadegaard, MJ Dalby, AHC Poulsøn

21. BonyPid™: Osteoconductive and antimicrobial outcome in patients with Gustilo III open fractures: Six months follow up results
   N Emanuel, RO Estrada, MU Pasion, RC Ramos, D Segal, RB Gustilo, S Yafit

22. Bioreactor-based engineered models for basic research and clinical translation
   A Papadimitropoulos, E Piccinini, D Wendt, I Martin

23. Mesenchymal stem cell homing into the intervertebral disc: A chemotactic induced response
   G Pattappa, M Peroglio, D Sakai, J Mochida, LM Benneker, M Alini, S Grad

24. Importance of collagen-binding integrins for the matrix remodelling by tendon stem/progenitor cells
   C Popov, M Schieker, D Docheva

25. Combination of a new injectable multiphasic bone substitutes based on gel-coated Osprolife HA/TTCP granules with bone marrow concentrate: an in vitro and in vivo study in sheep
   E Preve, M Pierini, E Lucarelli, A Parrilli, G Giavaresi, S Prosperi, M Piccinini, F Bucciotti, D Donati, M Fini, S Giannini

26. Mesenchymal Stem Cell transplantation on rabbit tuberculous spondylitis lesion: Analysis on osteoblast activity via CBFA-1, ALP and OPN biomarker
   Rahyussalim, T Kurniawati, N Chairani, A Syahrurachman, Sutjahyo

27. Mesenchymal stem cell effects on microbiological and histopathological alterations in spondylitis tuberculosis rabbit's healing process
   Rahyussalim, T Kurniawati, A Syahrurachman, N Chairani

28. Mesenchymal stem cell transplantation on rabbit spondylitis tuberculosis lesion: analysis on ossification process through osteoblast cell count, osteocyte count and calcium level on lesion
   Rahyussalim, AR Gatam, T Kurniawati, N Chairani, EU Hutagalung, A Syahrurachman, Ismail, D Iskandriati, AD Fitr

29. Influences of mycobacterium tuberculosis exposures in the bony bridge formation of mesenchymal stem cell transplantation to rabbit with spondylitis tuberculosis
   Rahyussalim, T Kurniawati, Ismail, N Chairani, A Syahrurachman, W Chandra

30. Expression of cartilage stem cell markers is dependent on time in culture
   K Richardson, HE McCarthy, CW Archer

31. Is NOV/CCN3 a potential new regulator of joint homeostasis?
   KA Roddy, CA Boulter

32. Osteogenic-like behaviour of adipose derived stem cells in selected scaffolds obtained by 3D-printing
   S Ruminski, M Noga, B Ostrowska, A Pawlak, B Dybala, B Dabrowski, W Swieszkowski, M Lewandowska-Szumiel

33. Influence of thrombocytes concentrates on osteoblast differentiation. An in vitro study
   E Schiegnitz, PW Kämmerer, M Klein, B Al-Nawas, FP Koch
34. The addition of osteoclastic cells activates devitalized engineered hypertrophic cartilage to form bone  
   T Atanas, C Scotti, A Barbero, I Martin, A Papadimitropoulos

35. Isolation and characterization of exosomes derived from human platelet lysate  
   E Torreggiani, F Perut, L Roncuzzi, N Baldini

36. Radiographic assessment of Bio-Oss® for ulna defect healing in pigeon model  
   A Tunio, A Jalila, AR Intan-Shameha, YM Goh

37. The transpedicular approach for the study of intervertebral disc regeneration strategies:  
   in vivo characterization  
   G Vadalà, F Russo, F De Strobel, M Bernardini, D Eglin, S Grad, M Alini, V Denaro

38. Effects of bone marrow derived cells on pain and structural changes in a mono-iodoacetate rat model of osteoarthritis  
   GM van Buul, M Siebelt, MJC Leijis, PK Bos, JH Waarsing, N Kops, H Weinans,  
   J Verhaar, MR Bernsen GJVM van Osch

39. FK506 effects on osmolarity-induced differentiation of chondroprogenitors  
   AE van der Windt, H Weinans, H Jahr

40. The collagen component of biological bone replacement materials promotes bone formation by human mesenchymal stem cells  
   M Wagner-Ecker, P Voltz, W Richter

41. In vitro degradation, biocompatibility, and physical structure of composite scaffold  
   incorporating bioactive phytomolecule icariin for bone regeneration  
   M Zhang, Y Lai, S Chen, N Wang, P Zhang, X Wang, L Qin

42. Effect of a novel bioactive porous PLGA/TCP/Icariin composite scaffold for bone defect repair in a rabbit femur segmental defect model  
   S Chen, Y Lai, M Zhang, P Zhang, X Wang, L Qin

43. Increased differentiation of osteoblasts by endothelial progenitor cells (EPC) on titanium surface  
   T Ziebart, A Boddin, A Pabst, B Al-Nawas
Future Meeting

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2014
eCM XV:
Cartilage & Disc: Repair and Regeneration
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