



ISSN 8756-3282  
Volume 44, Number 2, June 2009  
Supplement to Bone

# Bone

## 36th European Symposium on Calcified Tissues

In association with the awarding of the  
2009 International Research Prize  
of the Austrian Society for Bone and Mineral Research



**Programme and Abstracts**

**May 23-27, 2009  
Vienna, Austria**

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)



**EDITOR-IN-CHIEF: Roland Baron**

Professor Internal Medicine,  
Harvard Medical School and  
Professor and Chair,  
Oral Medicine, Infection and Immunity, Harvard School of Dental Medicine  
188 Longwood Avenue,  
Boston, MA 02115, USA  
Phone: (+1/617) 432-7320  
E-mail: Roland\_Baron@hms.harvard.edu

**EDITOR: Masaki Noda**

Dept. of Molecular Pharmacology  
Division of Functional Disorders Research  
Medical Research Institute  
Tokyo Medical & Dental University  
3-10 Kanda-Surugadai, 2-chome  
Chiyoda-ku, Tokyo 101, Japan  
Phone/Fax: (+81/3) 5280-8066  
E-mail: noda.mph@mri.tmd.ac.jp

**Rene Rizzoli**

Professor of Medicine  
University Hospital Cantonal  
Department of Rehabilitation and Geriatrics  
24 rue Micheli-du-Crest  
Geneva CH-1211, Switzerland  
Phone: (41-22) 372 99 50  
Fax: (41-22) 382- 9973  
E-mail: rene.rizzoli@medecine.unige.ch

**ASSOCIATE EDITORS****Jane E. Aubin**

*bone cell biology*  
Dept. of Medical Genetics &  
Microbiology  
Graduate Dept. of Molec. & Med.  
Genetics  
University of Toronto  
Medical Sciences Building, Room 6230  
1 King's College Circle  
Toronto, ON M5S 1A8, Canada  
Phone: (+1/416) 978-4220  
Fax: (+1/416) 978-3954  
E-mail: jane.aubin@utoronto.ca

**Thomas A. Einhorn**

*orthopaedics, biomechanics*  
Professor and Chairman  
Department of Orthopaedic Surgery  
DOB-8088  
Boston Medical Center  
One Boston Medical Center Place  
Boston, MA 02118-2393, USA  
Phone: (+1/617) 638-8435  
Fax: (+1/617) 638-8493  
E-mail: thomas.einhorn@bmc.org

**Toshio Matsumoto**

*endocrinology*  
First Dept. of Internal Medicine  
University of Tokushima School of  
Medicine  
3-18-15 Kuramoto-cho  
Tokushima 770, Japan  
Phone: (+81/88) 633-7119  
Fax: (+81/88) 633-7407  
E-mail: toshimat@clin.med.  
tokushima-u.ac.jp

**David B. Burr**

*biomechanics, histomorphometry*  
Professor and Chairman of Anatomy  
Dept. of Anatomy & Cell Biology,  
MS 259  
Indiana University School of  
Medicine  
635 Barnhill Drive  
Indianapolis, IN 46202, USA  
Phone: (+1/317) 274-7495  
Fax: (+1/317) 278-2040  
E-mail: dburr@iupui.edu

**David Fyhrie**

*bioengineering and biomechanics*  
Professor and Director,  
David Linn Chair  
University of California Davis  
Department of Orthopaedic Surgery  
Orthopaedic Research Laboratories  
2799 W. Grand Blvd  
4635 Second Avenue, Room 2000  
Sacramento, CA 95817  
Phone: (916) 734-5745  
Fax: (916) 734-5750  
E-mail: dpfyhrie@ucdavis.edu

**Bjorn R. Olsen**

*skeletal development, molecular genetics*  
Hersey Professor of Cell Biology  
Department of Cell Biology  
Harvard Medical School  
240 Longwood Avenue  
Boston, MA 02115, USA  
Phone: (+1/617) 432-1874  
Fax: (+1/617) 432-0638  
E-mail: bjorn\_olsen@hms.harvard.edu

**Felicia Cosman**

*metabolic bone diseases, osteoporosis, clinical studies*  
Medical Director of the Clinical  
Research Center  
Helen Hayes  
Hospital Route 9W  
West Haverstraw, NY 10993  
Phone: (845) 786 4919  
Fax: (845) 786-4878  
E-mail: cosmanf@helenhayeshosp.org

**Harry K. Genant**

*bone imaging*  
Skeletal Section, Radiology Dept.  
University of California  
505 Parnassus Avenue, Suite M392  
Box 0628  
San Francisco, CA 94143-0628, USA  
Phone: (+1/415) 476-4864  
Fax: (+1/415) 435-5924  
E-mail: harry.genant@ucsf.edu

**Stuart H. Ralston**

*clinical studies, human genetics*  
Professor of Rheumatology  
University of Edinburgh  
Western General Hospital  
Rheumatic Diseases Unit  
Edinburgh EH4 2XU  
United Kingdom  
Phone: (+44/131) 651-1035  
Fax: (+44/131) 651-1085  
E-mail: stuart.ralston@ed.ac.uk

**Richard Eastell**

*bone diseases, biomarkers and clinical studies*  
Professor of Bone Metabolism, Head  
of the Academic Unit of Bone  
Metabolism, Metabolic Bone Centre,  
Sorby Wing, Northern General Hospital,  
Herries Road, Sheffield,  
South Yorkshire, S5 7AU, England  
Phone: (+44/114) 271 4705  
(secretary, Gill)  
Fax: (+44/114) 261 8775  
E-mail: r.eastell@sheffield.ac.uk

**T. Jack Martin**

*endocrinology, bone cell biology*  
St. Vincent's Institute of Medical  
Research  
41 Victoria Parade  
Fitzroy, VIC 3065, Australia  
Phone: (+61/3) 9288-2480  
Fax: (+61/3) 9416-2676  
E-mail: jmartin@svi.edu.au  
\* Special Editor for Reviews

**Robert R. Recker**

*osteoporosis, clinical studies, histomorphometry*  
Osteoporosis Research Center  
Creighton University  
601 North 30th Street, Suite 5766  
Omaha, NE 68131, USA  
Phone: (+1/402) 280-4471  
Fax: (+1/402) 280-5034  
E-mail: rrecker@creighton.edu



8756-3282(200906)44:S2;1-0

# BONE

---

36th European Symposium on Calcified Tissues  
23–27 May, 2009 Vienna, Austria

**Volume 44**  
**Supplement 2**  
**2009**



ELSEVIER

Amsterdam • Boston • London • New York • Oxford • Paris •  
Philadelphia • San Diego • St. Louis



**P111****Influence of nmr therapy on metabolism of osteosarcoma- and chondrosarcoma cell lines**

B. Steinecker-Frohnwieser<sup>a,\*</sup>, L.G. Weigl<sup>b</sup>, C. Höller<sup>b</sup>, E. Sipos<sup>b</sup>,  
W. Kullich<sup>a</sup>, H.G. Kress<sup>b</sup>

<sup>a</sup>*LBI for Rehabilitation of Internal Diseases, Ludwig Boltzmann Cluster for Rheumatology, Balneology and Rehabilitation, Saalfelden*

<sup>b</sup>*Department of Special Anaesthesia and Pain Management, Medical University Vienna, Vienna, Austria*

Nuclear magnetic resonance therapy (NMRT) with weak magnetic fields has been shown to stimulate repair processes in cartilage and to influence pain signalling. On the contrary, a recent study with strong magnetic field intensity of a magnetic resonance imaging machine with 3T, 125.3 MHz demonstrates deleterious effects on chondrocytes and cartilage repair.

To assess the effect of NMRT with optimized field strength (up to 2.3 mT, 100 kHz) on cellular processes we used microarrays and quantitative PCR (qPCR) for expression profiling of NMRT treated chondrosarcoma and osteosarcoma cells. In addition the Ca<sup>2+</sup> imaging technique was used to study functional effects on Ca<sup>2+</sup> influx and Ca<sup>2+</sup> release.

For expression studies, RNA was isolated from cells treated with an NMR therapy device (MBST, MedTec, Wetzlar, Germany) for 20 h in 4 days. The RNA was labelled with biotin and hybridized to membranes carrying different gene markers. Bioluminescence of bound and labelled RNA was used to quantify gene expression. To corroborate results from gene arrays, the qPCR was used.

Results from microarrays indicate an upregulation of members of the NFAT transcription factors by NMRT. We checked the expression level of the NFAT members C1, C3, C4, 5 and C2IP by qPCR. However, in our first qPCR experiments, no clear tendency in the expression levels of those NFATs was detected.

For Ca<sup>2+</sup> release experiments, NMRT treated osteosarcoma and chondrosarcoma cells were rinsed with three different concentrations of histamine. Half maximum activation of Ca<sup>2+</sup> release was observed at concentrations between 1 μM and 10 μM histamine. NMRT treated osteosarcoma as well as chondrosarcoma cells showed the same Ca<sup>2+</sup> release properties when compared to non treated cells.

For investigation of the voltage activated Ca<sup>2+</sup> influx we used PC12 cells, a cell line of neuronal origin. Depolarization of the cells was achieved by a solution containing a high potassium concentration. PC12 cells were NMR treated for 1 h and the voltage activated Ca<sup>2+</sup> influx was measured after loading the cells for 60 min with fura2-AM. The Ca<sup>2+</sup> rise induced by depolarization was not different in treated or in control cells.

Up to now, inconsistent effects of NMRT on chondrosarcoma, osteosarcoma or PC12 cells were detected in respect to Ca<sup>2+</sup> signalling and gene expression.

**Conflict of interest:** Werner Kullich, MedTec, Wetzlar, Grant Research Support. Bibiane Steinecker-Frohnwieser, Grant Research Support.