

Abstracts of the ECTS 2023 Congress featuring BRS Annual Meeting

ECTS 2023 Congress

50th European Calcified Tissue Society Congress

15 – 18 April 2023

Scientific Programme Committee

Chair:

Bo Abrahamsen (Holbæk, Denmark)

Co-Chairs:

Peter Pietschmann (Vienna, Austria)

Clinical Co-Chair:

Polyzois Makras (Athens, Greece)

Basic Co-Chair:

Martina Rauner (Dresden, Germany)

Local Organizing Committee (LOC)-Chair:

Jim Gallagher (Liverpool, UK)

Members:

Natasha Appelman-Dijkstra (Leiden, The Netherlands)

Serge Ferrari (Geneva, Switzerland)

Melissa Formosa (Malta, Malta)

Celia Gregson (Bristol, UK)

Petar Milovanovic (Belgrade, Serbia)

International Associate Members:

Michelle McDonald (Darlinghurst, Australia)

Ken Saag (Birmingham, USA)

Local Organising Committee:

Jim Gallagher (Liverpool, UK)

Kate Ward (Southampton, UK)

Kassim Javaid (Headington, UK)

Alison Gartland (Sheffield, UK)

Alex Ireland (Manchester, UK)

Juliette Hughes (Ormskirk, UK)

Scott Dillon (Cambridge, UK)

Abstract Review Panel

Each abstract was scored blind.

Bo Abrahamsen (Denmark)
Nerea Alonso (Austria)
Athanasios Anastasilakis (Greece)
Christina Andreasen (Denmark)
Natasha Appelman-Dijkstra (Netherlands)
Tim Arnett (United Kingdom)
Korhan Baklaci (Turkey)
Felicia Baleanu (Belgium)
Giuseppe Banfi (Italy)
Ulrike Baschant (Germany)
Duncan Bassett (United Kingdom)
Douglas Bauer (United States)
Zhanna Belaya (Russia C.I.S.)
Francis Berenbaum (France)
Clemens Bergwitz (United States)
Claudine Blin (France)
Jens Bollerslev (Norway)
Nicolas Bonnet (Switzerland)
Annemieke Boot (Netherlands)
Roger Bouillon (Belgium)
Karine Briot (France)
Ludmila Brunerova (Czech Republic)
Andrea Burden (Switzerland)
Bjoern Busse (Germany)
Natalie C Butterfield (United Kingdom)
M Leonor Cancela (Portugal)
Geert Carmeliet (Belgium)
Mara Carsote (Romania)
Antonino Catalano (Italy)
Roland Chapurlat (France)
Chantal Chenu (United Kingdom)
Cristiana Cipriani (Italy)
Roberto Civitelli (United States)
Emma Clark (United Kingdom)
Martine Cohen-Solal (France)
Graziana Colaiani (Italy)
Luciano Colangelo (Italy)
Juliet Compston (United Kingdom)
Valerie Cormier-Daire (France)
Bess Dawson-Hughes (United States)
Teun De Vries (Netherlands)
Adolfo Diez-Perez (Spain)
Judit Donáth (Hungary)
Stella D'oronzio (Italy)
Eleni Douni (Greece)
Claire Edwards (United Kingdom)
Grahame Elder (Australia)
Florent Elefteriou (United States)

Ari Elson (Israel)
Karol Estrada (United States)
Vincent Everts (Netherlands)
Astrid Fahrleitner-Pammer (Austria)
Colin Farquharson (United Kingdom)
Serge Ferrari (Switzerland)
Lars Folkestad (Denmark)
Melissa M Formosa (Malta)
Morten Frost (Denmark)
Seiji Fukumoto (Japan)
Thomas Funck-Brentano (France)
Yankel Gabet (Israel)
James Gallagher (United Kingdom)
Sonja Gamsjaeger (Austria)
Kaare Gautvik (Norway)
Luigi Gennari (Italy)
Valerie Geoffroy (France)
Jeroen Geurts (Switzerland)
Fernando Gianfrancesco (Italy)
Claus-Christian Glüer (Germany)
Mary Goldring (United States)
Jenny Gregory (United Kingdom)
Celia Gregson (United Kingdom)
Daniel Grinberg (Spain)
Bettina Groetsch (Germany)
Núria Guañabens (Spain)
Matthias Hackl (Austria)
Peyman Hadji (Germany)
Melanie Haffner-Luntzer (Germany)
Nicholas Harvey (United Kingdom)
Barbara Hauser (United Kingdom)
Eric Hay (France)
Marietta Herrmann (Germany)
Eric Hesse (Germany)
Lorenz Hofbauer (Germany)
Ingunn Holen (United Kingdom)
Carmen Huesa (United Kingdom)
Anita Ignatius (Germany)
Yuuki Imai (Japan)
Alex Ireland (United Kingdom)
Abbas Jafari (Denmark)
Katharina Jähn-Rickert (Germany)
Suzanne Jan De Beur (United States)
Hervé Kempf (France)
Klaus Klaushofer (Austria)
Marie-Helene Lafage-Proust (France)
Craig Langman (United Kingdom)
Laurence Legeai-Mallet (France)
Willem Lems (Netherlands)
Ulf Lerner (Sweden)
Thomas Levin Andersen (Denmark)
Paul Lips (Netherlands)
Irma Machuca-Gayet (France)

Maria-Bernadette Madel (United States)
Outi Mäkitie (Finland)
Polyzois Makras (Greece)
Radmila Matijevic (Serbia)
Pawel Matusik (Poland)
Antonio Maurizi (Italy)
Sandro Mazzaferro (Italy)
Laura McCabe (United States)
Michelle McDonald (Australia)
Carolina Medina-Gomez (Netherlands)
Ciro Menale (Italy)
Daniela Merlotti (Italy)
Petar Milovanovic (Serbia)
Salvatore Minisola (Italy)
Barbara Misof (Austria)
Ralph Müller (Switzerland)
Anda Mihaela Naciu (Italy)
Riko Nishimura (Japan)
Barbara Obermayer-Pietsch (Austria)
Claes Ohlsson (Sweden)
Julien Paccou (France)
Andrea Palermo (Italy)
Eleftherios Paschalis (Austria)
Janina Patsch (Austria)
Pilar Peris (Spain)
Olivier Peyruchaud (France)
Peter Pietschmann (Austria)
Richard Pikner (Czech Republic)
Sylvain Provot (France)
Adalbert Raimann (Austria)
Saravana Ramasamy (United Kingdom)
Martina Rauner (Germany)
Lars Rejnmark (Denmark)
Mara Riminucci (Italy)
Fernando Rivadeneira (Netherlands)
Ilaria Roato (Italy)
Pamela Gehron Robey (United States)
Tim Rolvien (Germany)
Antonio Rossi (Italy)
Kenneth Saag (United States)
Syazrah Salam (United Kingdom)
Arne Schaefer (Germany)
Camilla Schalin-Jantti (Finland)
Martin Schepelmann (Austria)
Felix Nikolai Schmidt (Germany)
Dirk Schnabel (Germany)
Peter Schwarz (Denmark)
Federica Scotto di Carlo (Italy)
Heide Siggelkow (Germany)
Cristina Sobacchi (Italy)
Anne Sophie Sølling (Denmark)
Nicole Sommer (Austria)
Katherine Staines (United Kingdom)

Steve Stegen (Belgium)
Gudrun Stenbeck (United Kingdom)
Pawel Szulc (France)
Gaia Tabacco (Italy)
Hanna Taipaleenmaki (Germany)
Michaela Tencerova (Czech Republic)
Anna Maria Teti (Italy)
Jonathan Tobias (United Kingdom)
Elena Tsourdi (Germany)
Jan Tuckermann (Germany)
Mustafa Unal (Turkey)
Jean Vacher (Canada)
Maria Teresa Valenti (Italy)
Jeroen van de Peppel (Netherlands)
Bram van der Eerden (Netherlands)
Marjolein Van Driel (Netherlands)
Wim Van Hul (Belgium)
Laurence Vico (France)
Anna Villa (Italy)
Ning Wang (United Kingdom)
Timur Yorgan (Germany)
Vit Zikan (Czech Republic)
Carola Zillikens (Netherlands)
Phillipe Zysset (Switzerland)

HYPODD patients treated with cholecalciferol (C-cohort) or with placebo (P-cohort) were evaluated at enrollment and 2 months after for changes in the cardiovascular risk profiles. It resulted in the correction of vitamin D deficiency in all patients in the C-cohort (42.6 vs 78.1 nmol/l, $p < 0.05$). Also, a significant reduction in the serum levels of intact parathormone (4.75 vs 4.39 pmol/l, $p < 0.05$), total cholesterol (4.67 vs 4.23 mmol/l, $p < 0.05$), and low-density lipoprotein (LDL) cholesterol (2.72 vs 2.02 nmol/l, $p < 0.05$) were observed at the same timings ($p < 0.05$). No significant change in any biochemical parameter measured was observed in the patients receiving placebo treatment. The miR-21 circulating levels were measured in four C-cohort patients and five P-cohort patients. In vitro, the miR-21 levels were measured in HEK-293 cells treated with calcitriol or with ethanol vehicle control. Cholecalciferol treatment increased 25OHD levels and reduced parathormone, total cholesterol, and low-density lipoprotein cholesterol levels in C-cohort patients, whereas no significant changes in these parameters were observed in P-cohort patients. The miR-21 circulating levels did not change in the C- or the P-cohort patients upon treatment. Calcitriol treatment did not affect miR-21 levels in HEK-293 cells.

In conclusion, hypovitaminosis D correction ameliorated the cardiovascular risk profiles in hypertensive patients treated with cholecalciferol but did not influence the miR-21 expression.

P141

Region-specific differences of marrow adipogenesis in mesenchymal stromal (stem) cells of human acetabulum and femur: involvement of fatty acid oxidation

Drenka Trivanović¹, Ivana Okić Djordjević¹, Milena Živanović¹, Marko Vujačić², Nikola Bogosavljević², Diana Bugarski¹, Aleksandra Jauković¹

¹*Institute for Medical Research- University of Belgrade, Group for Hematology and Stem Cells, Belgrade, Serbia*

²*Institute for Orthopedy Banjica, Orthopedic Surgery, Belgrade, Serbia*

Abstract Text

Aging and disease-induced adipogenesis in skeletal system has been described as detrimental process for bone tissue metabolism. Dynamic of adipogenic program is controlled by microenvironmental factors and activity of bone marrow (BM) mesenchymal stromal (stem) cells (MSC)s. As different skeletal locations are not affected by extrinsic factors in same manner, we assumed that marrow adipogenic program can be distinct in acetabular (aMSCs) and femoral MSCs (fMSCs).

Here, we compared expanded aMSCs and fMSCs from matched patients undergoing hip arthroplasty (n=6, Ethical approval I-97/11). Cellular and molecular assays were performed to investigate differences in MSC features. Statistical significance was estimated by ANOVA.

Results showed that adipogenic stimuli triggered stronger adipogenesis in fMSCs when compared to acetabular counterparts ($p = 0.036$). Tissue non-specific alkaline phosphatase (TNAP) activity and protein expression was higher in fMSCs than in aMSCs, along with significantly higher TNAP levels detected in mitochondrial-enriched fraction proteins in fMSCs. Stronger expression of mitochondrial electron transport chain (ETC) proteins, supercomplexes I and V was found in fMSCs than in aMSCs. This coincided with increased β -galactosidase and total intracellular reactive oxygen species (ROS) production in fMSCs. Lipid droplet accumulation was followed by upregulated tissue beta-galactosidase and TNAP activities, expression of glyceraldehyde 3-phosphate dehydrogenase

(GAPDH), in parallel with stimulated ROS and mitochondrial superoxide production in both MSCs. Presence of fatty acid oxidation (FAO) inhibitor etomoxir increased gene expression of fatty acid binding protein (*Fabp4*), while decreased protein and gene expression of GAPDH in both populations. Although etomoxir supported adipogenic differentiation and β -galactosidase activity in aMSCs only, TNAP activity and ROS content stayed unaltered.

These results indicate that mitochondrial pathways required for energy production, ETC and FAO are bone-specific, and differently affect marrow adipogenesis in acetabular and femoral regions. Further elucidation of marrow adipogenesis can contribute to development of pharmacologic strategies to support skeletal and metabolic health.

P143

Acute hyperglycemia increases osteokine expression in osteoblasts, while long-term exposure has an opposing effect

Niki Jalava¹, Milja Arponen¹, Terhi J. Heino¹, Kaisa K. Ivaska¹

¹*University of Turku, Institute of Biomedicine, Turku, Finland*

Abstract Text

Background: Impaired glucose metabolism negatively affects bone strength and quality. Elevated glucose levels may directly affect osteoblasts and impair their function. Osteoblasts communicate with other organs via hormone-like proteins, i.e. osteokines, such as osteocalcin (*Ocn*), sclerostin (*Sost*), and matrix extracellular glycoposphoprotein (*Mepe*). However, the effect of elevated glucose on osteokines is not known.

Purpose: To study how high extracellular glucose (hyperglycemia, HG) affects mature osteoblasts *in vitro*.

Methods: Primary rat bone marrow stromal cells were differentiated into osteoblasts for 10 days and exposed to HG (25mM) acutely for the last 24 or 72 hours prior to RNA collection. Cultures at normoglycemia (5.5mM) served as control. Long-term exposure was evaluated by differentiating osteoblasts in HG for 10 days. Global changes in transcriptome were assessed by mRNA sequencing (RNA-seq). Expression of selected osteokines were verified by qPCR. Cell numbers were assessed by measuring confluence after calcein staining.

Results: RNA-seq revealed 1927 (134 after adjusting for multiple comparison) differentially expressed genes after 24h HG exposure. Pathway analysis revealed significant changes in genes related to e.g. bone metabolism and advanced glycation end-product signaling. Several osteokines such as *Sost*, *Mepe*, and *Ocn* were upregulated in response to 24h HG in RNA-seq and by qPCR ($p < 0.05$). Interestingly, 72h HG resulted in more modest global changes, only 757 (3 after adjusting) differentially expressed genes and no enriched pathways were identified. No changes in osteokines were observed. In contrast, long-term 10-day HG exposure resulted in opposing outcome on osteokines. In qPCR analysis, long-term HG significantly decreased the expression of *Ocn*, *Sost*, and *Mepe* ($p < 0.05$). Cell numbers were also decreased ($p < 0.05$).

Conclusions: Short-term HG affects osteoblast activity by increasing the expression of e.g. *Ocn*, *Sost*, and *Mepe*. Osteoblasts seem to adapt to HG during 72h exposure. Long-term HG significantly decreases osteokine expression and osteoblast numbers suggesting impaired osteoblast function.