

# 13<sup>th</sup> International Conference on Bone Morphogenetic Proteins

Dubrovnik, Croatia October 8-12, 2022

Venue: Valamar Hotels Dubrovnik  
Lacroma Conference Hall



## PROGRAM

*(The time used in the program is Central European Summer Time – UTC+2:00)*

### DAY 1 (8<sup>th</sup> October 2022, Saturday)

From 10:00

#### Registration

15:00

#### Opening Remarks

Slobodan Vukicevic, Zagreb/Croatia

#### BMP Forum: the appetizer of the BMP conference

An Zwijsen, Leuven/Belgium and Petra Knaus, Berlin/Germany

#### Welcome on behalf of the Croatian Academy of Sciences and Arts

Marko Pecina, Zagreb/Croatia

#### Welcome and opening of the conference by the Croatian Minister of Science and Education

Radovan Fuchs, Zagreb/Croatia

#### Traditional Croatian music - Klapa Kaše

16:00 – 17:45

#### Bone: diseases and regeneration

Chair: Yuji Mishina, Michigan/US and Vicky Rosen, Boston/US

##### LT1 Vicki Rosen, Boston/US

*BMP2 activity regulates skeletal stem cell niche function*

##### LT2 Yuji Mishina, Michigan/US

*New modes for spatio-temporal coupling of bone formation and bone resorption governed by osteoclasts*

##### ST1 Susumu Itoh, Tokyo/Japan

*Involvement of mitogen and stress activated protein kinase (MSK)1 in BMP-induced chondrocyte differentiation*

##### ST2 Shingo Maeda, Kagoshima/Japan ([online](#))

*Evaluation of phosphorylated Smad1/5 expression in a novel animal model of shoulder cuff tear arthropathy*

##### ST3 Danka Grcevic, Zagreb/Croatia

*Periosteal progenitors in fracture healing*

##### ST4 Aimee Zuniga, Basel/Switzerland

*Grem1-mediated modulation of BMP signalling in limb mesenchymal progenitors*

**LT3** Mihaela Peric, Zagreb/Croatia  
*Translational aspects of rhBMP6-based drug development*

17:45 – 18:00

**Coffee break**

18:00 – 19:00

**Genomic regulation by BMP signalling**

Chair: Danny Huylebroeck, Rotterdam/Netherlands

**LT5** Danny Huylebroeck, Rotterdam/Netherlands

*Genomic regulations during cell state transitions in cell differentiation in BMP-controlled development and repair*

**ST5** Daniel Graf, Alberta/Canada

*BMP7 exerts molecular control over tissue properties in craniofacial cartilages*

**ST6** John A. Chiorini, Bethesda/US

*Lysosomal exocytosis of HSP70 stimulates monocytic BMP6 expression in Sjögren's syndrome*

**ST7** Jerome Jatzlau, Berlin/Germany

*BMP9 and Fluid Shear Stress regulate endothelial chromatin accessibility and expression of SMAD low affinity target genes*

20:00

**Welcome cocktail**

## DAY 2 (9th October 2022, Sunday)

08:30 – 09:50

**BMP from Structure to Function**

Chair: Thomas B. Thompson, Cincinnati/US and Christian Siebold/UK

**LT6** Thomas B. Thompson, Cincinnati/US

*Molecular differences in ligand: Receptor interactions drives specificity*

**LT7** Hilary Ashe, Manchester/UK

*Interpretation of the BMP gradient at single cell resolution*

**ST8** Erich Goebel, Tarryton/US

*The orphan ligand, Activin C, signals through activin receptor-like kinase 7*

**ST9** Wiktor Burdzinski, Berlin/Germany

*Ligand Surface Binding Analysis (LSBA) as a tool for characterization of BMP ligand: receptor interactions*

**LT8** Andrew P. Hinck, Pittsburgh/US

*Structural basis for the potentiation of InhA and InhB antagonism of activin by the coreceptors TβRIII and TβRIII-like*

09:50 – 10:20

**Coffee break**

10:20 – 11:20

### **The EMBO Keynote Lecture**

Carl-Henrik Heldin, Uppsala/Sweden, EMBO Member  
*TGF- $\beta$  signaling and promotion of tumor progression*

Introduction: Slobodan Vukicevic, Zagreb/Croatia

11:20 – 12:40

### **BMPs in Cancer**

Chair: Carl-Hendrik Heldin, Uppsala/Sweden and Toril Holien, Trondheim/Norway

**LT9** Aristidis Moustakas, Uppsala/Sweden

*Cancer stemness under the control of BMP and TGF- $\beta$  signalling*

**LT10** Toril Holien, Trondheim/Norway

*FKBP12 is a major regulator of ALK2 activity in multiple myeloma cells*

**ST10** Qiaoran Xi, Beijing/China (online)

*ALK2 mutations in pediatric brain tumor DIPG*

**ST11** Derek Brazil, Belfast/UK

*New insights into the signalling of GREM1, a BMP antagonist, in colorectal cancer*

**LT11** Kohei Miyazono, Tokyo/Japan

*Mechanisms of the differentiation of glioma-initiating cells by BMPs*

12:40 – 13:10

### **Poster - flash talks 1**

Moderator: An Zwijsen

Reviewed by: Danny Hylebroeck, Daniel Graf, John Lees Shepard

13:10 – 14:40

### **Lunch break & Poster Session 1**

14:40

Award for best poster from Session 1 (presented by A. Zwijsen and D. Huylebroeck)

14:40 – 16:00

### **Vascular BMP signalling I**

Chair: Sabine Bailly, Grenoble/France and Paul Yu, Boston/US

**LT12** Mark Ormiston, Kingston/Canada

*Regulation of endothelial function by BMPR2-derived circRNAs*

**LT13** Christophe Guignabert, Paris/France

*Key roles of the TGF- $\beta$  superfamily in the integrity of the pulmonary vascular bed*

**ST12** Rozenn Quarck, Leuven/Belgium

*Drugs targeting endothelial dysfunction partially restore sprouting angiogenesis in BMPR2-silenced pulmonary microvascular endothelial cells*

**ST13** Fumiko Itoh, Tokyo/Japan

*BMP, but not TGF- $\beta$ , signal is important for vascular homeostasis*

**LT14** An Zwijsen, Leuven/Belgium

*Lymphatic vessel type-specific functions of BMP signalling*



16:30

**ARBORETUM tour** – Visit and tour at Arboretum Trsteno (owned by Croatian Academy of Sciences and Arts) –the oldest (15th century) arboretum in this part of the world (transportation by bus; refreshment included).

### Evening session

20:45 – 22:15

#### Young Investigator Award Lectures: New voices in BMP Research

Chair: A. Hari Reddi, Sacramento/US and Rik Derynck, San Francisco/US

**LT15** Rik Derynck, San Francisco/US

*Directing your research toward impact*

**Y1** Tim Herpelinck, Leuven/Belgium

*In silico analysis of BMP signalling and pathway activity in the developing and adult skeleton using an integrated single-cell atlas*

**Y2** Gonzalo Sanchez-Duffhues, Leiden/Netherlands

*In vitro modelling of endothelial function through TGF- $\beta$  signalling*

**Y3** Nikola Stokovic, Zagreb/Croatia

*Synthetic ceramics as a scaffold in BMP-mediated bone formation*

**Y4** Johanna Bolander, Winston-Salem/US

*Pro-regenerative immune cells direct articular repair in post-traumatic osteoarthritis through BMP-signalling*

## DAY 3 (10th October 2022, Monday)

08:00 – 09:20

#### BMP receptors, co-receptors and pro-domains

Chair: Mary C. Mullins, Philadelphia/US and Wei Li, Cambridge/UK

**LT16** Christian Siebold, Oxford/UK

*Molecular mechanisms of BMP ligand signal modulation by Repulsive Guidance Molecule and Twisted Gastrulation*

**LT17** Wei Li, Cambridge/UK

*Molecular basis of ALK1:BMP10:BMPRII signalling complex and its implication in pulmonary arterial hypertension*

**ST14** Yoav I. Henis, Tel Aviv/Israel

*Regulation of SMAD signalling pathways by competition between type I receptors for ACVR2*

**ST15** Paul-Lennard Mendez, Berlin/Germany

*Atheroprone fluid shear stress regulated ALK1-Endoglin-SMAD signalling originates from early endosomes*

**LT18** Mary C. Mullins, Philadelphia/US

*GS domain regulatory constraints in wild-type and mutant FOP ACVR1 receptors in BMP signalling*

09:20 – 09:40

#### Coffee break

09:40 – 11:00

**BMPs in patterning and organoids**

Chair: Diana Monsivais, Houston/US and John Lees-Shepard, Tarrytown/US

**LT19** Diana Monsivais, Houston/US

*Modeling the regenerative potential of the endometrium with 3D organoid cultures*

**LT20** Gudrun Valdimarsdottir, Reykjavik/Iceland

*The role of transient SMAD1/5 activation in trophoblast invasion of maternal spiral arteries*

**ST16** Monika Horvat Mercnik, Graz/Austria

*Endothelial to mesenchymal transition (EndoMT) of preeclamptic fetoplacental endothelial cells (PE fpEC) is governed by BMP signalling*

**ST17** TechTalk – Christian Hiepen, Berlin/Germany

*Stem cell resources for BMP research – opportunities and challenges from a public (bio)database perspective*

**LT21** Menno Oudhoff, Trondheim/Norway ([online](#))

*Intestinal-epithelial intrinsic BMP signalling as a feedback loop in gut type 2 immune responses*

11.00 – 11.30

**Poster - flash talks 2**

11:30 – 12:15

**Poster Session 2**

Moderator: An Zwijsen

Reviewed by: Mihaela Peric, Kuber Sampath, Susumu Itoh

12:30

**Old Dubrovnik City guided tour** (transportation by bus; lunch box will be provided)

17:00

Award for best poster from Session 2 (presented by A. Zwijsen and M. Peric)

17:00 – 18:20

**Vascular BMP signalling II**

Chair: Petra Knaus, Berlin/Germany and Franck Lebrin Leiden/Netherlands

**LT22** Sabine Bailly, Grenoble/France

*BMP9 and BMP10 in vascular control*

**LT23** Franck Lebrin, Leiden/Netherlands

*Endoglin regulates cerebral blood flow by modulating TGF- $\beta$  bioavailability*

**ST18** Elizabeth Jones, Leuven/Belgium ([online](#))

*Role of SMAD signalling in early arterial differentiation*

**ST19** Tristin A. Schwartz, Pittsburgh/US

*Structural basis for biosynthesis of BMP-9 and BMP-10 in a monomeric form*

**LT24** Paul B. Yu, Boston/US  
*BMP9/ALK1 in pulmonary vascular endothelial function*

18:20 – 19:30

**BMP in Metabolism**

Chair: Kohei Miyazono, Tokyo/Japan and Alexander Banks, Boston/US

**LT25** Jodie Babitt, Boston/US (*online*)

*BMP and iron regulation*

**ST20** Erica Mina, Turin/Italy

*A novel approach to target BMP-resistance in cancer cachexia skeletal muscle atrophy*

**ST21** Alexander Banks, Boston/US

*Gdf3, the ambidextrous ligand that plays for both teams BMP and TGF- $\beta$*

**ST22** Tatjana Bordukalo Niksic, Zagreb/Croatia

*Bone morphogenetic protein 6 and serotonin: potential interaction and their influence on glucose metabolism*

**LT26** Heinrich E. Lob, Tarrytown/US

*TMPRSS6 inhibition with a monoclonal antibody REGN7999 improves red blood cell health and reduces hepatic iron loading in mouse models of beta-thalassemia*

**DAY 4 (11th October 2022, Tuesday)**

08:00 – 09:00

**Meet the Expert Breakfast – career mentoring**

*(registration sheets will be posted on the announcement board on Sunday morning)*

09:00 – 10:00

**Cardiovascular BMP signalling**

Chair: Serena Zacchigna, Trieste/Italy and Marie-José Goumans Leiden/Netherlands

**LT27** Marie-José Goumans Leiden/Netherlands

*BMP signalling in control of cardiovascular function in PAH*

**LT28** Serena Zacchigna, Trieste/Italy

*The challenging rise of biotherapeutics in the cardiovascular field*

**ST23** Ilse Luyckx, Edegem/Belgium

*SMAD6-deficiency in cardiovascular disease*

**ST24** William D. Carlson, Boston/US

*Thr-123, a novel BMP-7 mimetic inhibits cardiomyocyte apoptosis and inflammation in rat model, is a novel therapeutic target for myocardial infarction/injury*

10.00 – 10:30

**Coffee break**



10:30 – 12:00

**Round table – Translational medicine and clinical study testing of novel drugs for rare bone diseases**

Chair: Frank Luyten, Leuven/Belgium and Hermann Oppermann, Zagreb/Croatia

Susan Rhee, Tarrytown/US

*Challenges in FOP clinical trials*

Katarina Oreskovic, Zagreb/Croatia

*Clinical development strategy - Success stories*

Jenn Lachey, Lexington/US

*Transitioning from preclinical to clinical-the challenges and rewards*

Radan Spaventi, Zagreb/Croatia

*Intro to orphan drug development*

**12:00 - 12:30**

**Poster - flash talks 3**

12:30 – 13:30

**Lunch break & Poster Session 3**

Moderator: An Zwijsen

Reviewed by: Wei Li, Danka Grcevic, Christian Hiepen

**BMP Steering Committee**

13:30

Award for best poster from Session 3 (presented by A. Zwijsen and W. Li)

13:30 – 14:30

**Marshall Urist Lecture** - Peter ten Dijke, Leiden/Netherlands

*TGF- $\beta$  family receptor signalling and disease*

Introduction by A. Hari Reddi, Sacramento/US

14.30 -16:00

**Heterotopic ossifications**

Chair: Eileen Shore, Philadelphia/US and Nadine Großmann, Berlin/Germany

**LT29** Maurizio Pacifici, Philadelphia/US

*Activin A promotes genetic and non-genetic heterotopic ossification and is targeted by Palovarotene*

**LT30** Sarah Hatsell, Tarrytown/US

*A new physiologically relevant mouse model of fibrodysplasia ossificans progressiva (FOP) that bypasses the need for conditionality*

**ST25** Francesc Ventura, Barcelona/Spain

*PI3Ka inhibition blocks osteoprogenitor specification and the hyper-inflammatory response to prevent heterotopic ossification*

**ST26** John B. Lees-Shepard, Tarrytown/US

*Activin A-induced activation of ACVR1[R206H] drives skeletal patterning defects in fibrodysplasia ossificans progressiva (FOP) mice*

**LT31** Takenobu Katagiri, Saitama/Japan ([online](#))

*ALK2 in fibrodysplasia ossificans progressiva (FOP)*

**ST27** Sho Tsukamoto, Saitama/Japan ([online](#))

*Establishment of a novel mouse model of human fibrodysplasia ossificans progressiva*

16:00 – 16:30

**Coffee break**

16:30 – 17:30

**Charles Huggings Lecture** - Eileen Shore, Philadelphia/US

*Heterotopic ossification, tissue identity, and the BMP signalling pathway*

Introduction by A. Hari Reddi, Sacramento/US

17:30 – 18.45

**Crosstalk between Smad2/3 and Smad1/5/8 signalling**

Chair: Sarah Hatsell, Tarrytown/US and Peter ten Dijke, Leiden/Netherlands

**LT32** Aris N. Economides, Tarrytown/US | Vincent Idone, Tarrytown/US

*To signal or not to signal? A synthesis of the roles of signalling mediated by ACVR1*

**LT4** Maria Macias, Barcelona/Spain

*Structural insights into SMAD function*

**ST28** Alexander Löwer, Darmstadt/Germany

*State- and stimulus-specific SMAD signalling in individual living cells*

**ST29** Ahmad Abdullah Nasir, Umeå/Sweden

*Ligand specific regulation of BMP signalling by LRIG proteins*

**LT33** Caroline Hill, London/UK

*The role of SMAD1/5 signalling in breast cancer metastasis*

19:30

**Gala Dinner** (Konavoski dvori) (transportation by bus)

## DAY 5 (12th October 2022, Wednesday)

08:30 – 10:00

**BMP in Translational and Clinical Medicine**

Chair: Mihaela Peric, Zagreb/Croatia and David Ke, Guangzhou/China

**LT34** Frank P. Luyten, Leuven/Belgium

*Joint regeneration: From repairing symptomatic joint surface lesions to building a living joint prosthesis*

**ST30** Vera Kufner, Zagreb/Croatia

*BMP1.3 protein as potential target in treatment of fibrosis*

**ST31** Alex N. Bullock, Oxford/UK ([online](#))

*Update on ALK2: clinical mutations and drug trials*

**ST32** Masato Morikawa, Tokyo/Japan ([online](#))

*Follistatin-like 3-based ligand trap increases muscle mass in mice*



**ST33** Natalia Ivanjko, Zagreb/Croatia  
*Osteogrow (rhBMP6/ABC) vs. Infuse (rhBMP2/ACS) in animal models of bone induction and critical size defect healing*

**LT35** Terence D. Capellini, Boston/US ([online](#))  
*GDF5 and joint disease*

10:00 – 10:30

**Coffee break**

10:30 – 12:00

**BMP in Clinical Development**

Chair: Kuber T. Sampath, Holliston/US and Daniel Graf, Alberta/Canada

**LT36** Reinhard Windhager, Vienna/Austria ([online](#))  
*Clinical testing of OSTEOGROW family members in patients with long bone fractures, fracture nonunions and posterolateral spinal fusion*

**LT37** Jasbir Seehra, Lexington/US | Jenn Lachey, Lexington/US  
*KER-012: A novel, investigational Activin Type II Receptor ligand trap being developed for the treatment of bone and pulmonary disorder*

**ST34** Remya Nathan, Lexington/US  
*A comparison of anabolic effects on muscle mass of wild-type ActRIIB-Fc and the novel ActRII-Fc ligand trap KER-065*

**LT38** Catherine Picart, Grenoble /France ([online](#))  
*Differential bioactivity of four BMP-family members as function of biomaterial stiffness*

**LT39** Nick Morrell, Cambridge/UK ([online](#))  
*The pulmonary vascular effects of BMP9*

12:00

**Concluding Remarks and Closing of the Conference**