



FONDAZIONE  
INTERNAZIONALE  
MENARINI

MAY 30<sup>TH</sup>-31<sup>ST</sup>

2019

FLORENCE, ITALY  
PALAZZO PUCCI

**BIOMINERALIZATION IN  
HEALTH AND DISEASE:**

**FROM THE OCEAN  
TO THE STARS  
TO THE LAND**



ORGANIZED BY:


**University  
of Florence**  
Florence,  
Italy

**Mayo Clinic**  
Rochester,  
Minnesota,  
USA

**University of Oxford** &  
O.C.D.E.M.  
Churchill Hospital  
Headington, Oxford, UK

**Fondazione  
Internazionale  
Menarini**





The symposium will bring together basic, translational, and clinical scientists from different disciplines who study the chemistry, structural biology, paleontology, molecular biology, physiology, and pathophysiology of biomineralization.

Biomineralization is a process that started 750 million years ago, and refers to the utilization of minerals by living organisms to harden or stiffen tissues, and this includes the production of mineralized skeletons. Biomineralization is widespread amongst organisms to produce structures such as seashells and bone in mammals and birds. Moreover, biologically-formed minerals often have specialized functions such as magnetic sensors, gravity sensing devices, and iron storage and mobilization.

The program will feature recent research on the roles of biomineralization in: skeletal and dental development and physiology; tissue calcification of blood vessels, kidneys, and eyes; mineral metabolism; and parathyroid physiology and vitamin D metabolism. Clinical uses of drugs to treat human disorders, evolutionary, structural and molecular aspects of biomineralization, and the long-term effects of interplanetary and space exploration will be highlights.

The program will include lectures from keynote speakers, oral presentations, poster discussion sessions, and forums for young investigators to meet senior experts.

**Maria Luisa Brandi, Bart Clarke and Rajesh Thakker**  
**Co-Presidents of the Symposium**



**PRESIDENTS OF THE MEETING:**

**Maria Luisa BRANDI**  
University of Florence  
Florence, IT

**Bart L. CLARKE**  
Mayo Clinic  
Rochester, MN, US

**Rajesh V. THAKKER**  
University of Oxford  
Oxford, UK

**CO-ORGANIZED BY**

**FONDAZIONE INTERNAZIONALE MENARINI:**

Centro Direzionale Milanofiori  
20089 Rozzano (Milan, Italy)  
Edificio L – Strada 6  
Phone: +39 02 55308110  
Fax: +39 02 55305739  
E-mail: milan@fondazione-menarini.it  
Http:\\www.fondazione-menarini.it

**ORGANIZING SECRETARIAT**

**EVE-LAB FORMAZIONE**

Viale Dei Mille, 137 - 50131 - Firenze  
Tel: +39 055 0671000 – Fax: + 39 055 0988319  
www.eve-lab.it - info@eve-lab.it

# PROGRAMME

THURSDAY, MAY 30<sup>TH</sup>, 2019  
PALAZZO PUCCI, FLORENCE

08.30 a.m.	<b>OPENING OF THE CONGRESS</b> <b>M. L. Brandi, B. L. Clarke, R. V. Thakker</b>
09.00 a.m.	<i>Main Lecture:</i> <b>Lord Robert Winston</b> (London, UK) Value of Interdisciplinary Meetings and their Potential Impact on Health and Environment

## SESSION I – THE BASICS OF MINERALIZATION AND BIOMINERALIZATION

Chairpersons:	<b>C. Luchinat</b> (Florence, IT) <b>R. V. Thakker</b> (Oxford, UK)
09.30 a.m.	<b>S. Weiner</b> (Rehovot, IL) Biomineralization: Definition
10.00 a.m.	<b>F. Matteucci</b> (Trieste, IT) The Distribution of Biogenic Chemical Elements in the Cosmos
10.30 a.m.	<i>Coffee Break</i>
11.00 a.m.	<b>J. Kirschvink</b> (Caltech, US) Biomineralization in Evolution
11.30 a.m.	<b>P. D. Taylor</b> (London, UK) The Fossils to Read the History of Biomineralization

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SESSION II – PHYSIOLOGY OF BIOMINERALIZATION IN CALCIFIED TISSUES

Chairpersons:	<b>B. L. Clarke</b> (Rochester, MN, US) <b>S. Minisola</b> (Rome, IT)
12.00 p.m.	<b>N. Fratzl-Zelman</b> (Wien, AT) Biom mineralization of the Skeleton in Health and Diseases
12.30 p.m.	<b>E. P. Paschalis</b> (Wien, AT) Methods to Quantify Biom mineralization in Bone
01.00 p.m.	<i>Lunch</i>
02.00 p.m.	<b>A. Arnold</b> (Farmington, CT, US) Calcitropic Hormones
02.30 p.m.	<b>C. S. Kovacs</b> (St. John's, NL, CA) Fetal Development of the Skeleton
03.00 p.m.	<b>P. Osdoby</b> (St. Louis, MO, US) Tooth Development and Biom mineralization

SESSION III – DISORDERS OF MINERALIZATION IN HUMANS

Chairpersons:	<b>L. Cianferotti</b> (Florence, IT) <b>S. Colagrande</b> (Florence, IT)
03.30 p.m.	<b>P. R. Ebeling</b> (Clayton, AUS) Defects in Mineralization: Osteoporosis and Atypical Femoral Fractures
04.00 p.m.	<b>L. Sangiorgi</b> (Bologna, IT) Congenital Skeletal Low Mineralization Disorders
04.30 p.m.	<b>M. Collins</b> (Bethesda, MD, US) Congenital Skeletal High Mineralization Disorders
05.00 p.m.	<i>Coffee Break</i>
05.30 p.m.	<b>C. Chaussain</b> (Paris, FR) Congenital Dental Disorders
06.00 p.m.	<b>G. Beltrami</b> (Florence, IT) Congenital Biom mineralization of the Joints
06.30 p.m.	<b>M. L. Bouxsein</b> (Boston, MA, US) How to Evaluate Bone Quality and Quantity in Metabolic Bone Disorders

FRIDAY, MAY 31<sup>ST</sup>, 2019

SESSION IV – MINERALIZATION OF SOFT TISSUES

Chairpersons:	<b>A. Franchi</b> (Pisa, IT) <b>F. Sofi</b> (Florence, IT)
08.30 a.m.	<b>D. A. Towler</b> (St. Louis, MO, US) Biomineralization of the Arteries
09.00 a.m.	<b>J. A. Cauley</b> (Pittsburg, PA, US) Common Pathogenetic Mechanisms in the Association between Low Bone Density and Artery Calcification
09.30 a.m.	<b>R. Kumar</b> (Rochester, MN, US) Biomineralization of the Kidney
10.00 a.m.	<b>H.-J. Anders</b> (Munich, DE) Crystallopathies
10.30 a.m.	<i>Coffee Break</i>

SESSION V – VITAMINS AND MINERALS IN BIOMINERALIZATION

Chairpersons:	<b>P. Chiarugi</b> (Florence, IT) <b>L. Masi</b> (Florence, IT)
11.00 a.m.	<b>R. Rizzoli</b> (Geneva, CH) Vitamin D and Vitamin K in Biomineralization
11.30 a.m.	<b>E. Dennison</b> (Southampton, UK) Calcium Requirements in Bone Mineralization
12.00 p.m.	<b>M. Mannstadt</b> (Boston, MA, US) Phosphate and Pyrophosphate in Biomineralization
12.30 p.m.	<i>Lunch</i>

## SESSION VI – PHARMACOLOGICAL INTERVENTIONS IN BONE MINERALIZATION

Chairpersons:	<b>M. L. Brandi</b> (Florence, IT), <b>E. Masini</b> (Florence, IT)
01.30 p.m.	<b>G. Russell</b> (Oxford, UK) Anti-Resorptives as Bone Therapeutics
02.00 p.m.	<b>D. W. Dempster</b> (New York, NY, US) Effects of osteo-anabolic agents on bone formation and mineralization
02.30 p.m.	<b>M. P. Whyte</b> (St. Louis, MO, US) Alkaline Phosphatase in Biomineralization
03.00 p.m.	<i>Coffee Break</i>
03.30 p.m.	<b>T. Shimada</b> (Tokyo, JP) FGF23: From its Discovery to the Development of a Therapy
04.00 p.m.	<b>A. Lingart</b> (Paris, FR) Clinical Lessons and Potential Solutions for XLH
04.30 p.m.	<b>J. M. Lane</b> (New York, NY, US) Bone Morphogenetic Proteins in Bone Mineralization
05.00 p.m.	<b>R. Weston</b> (Manchester, UK) Inhibitors of Biomineralization

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## GENERAL INFORMATION

### **MEETING VENUE**

The venue for the Meeting will be Palazzo Pucci

### **SECRETARIAT DESK DURING THE MEETING**

The secretariat desk will be open open at the following times:

Thursday, May 30<sup>th</sup>, from 07.30 a.m. to 06.30 p.m.

Friday, May 31<sup>st</sup>, from 07.30 a.m. to 06.00 p.m.

### **OFFICIAL LANGUAGE**

The official language of the Meeting will be English.

### **REGISTRATION**

For more information and to register please visit the following website:

**[www.fondazione-menarini.it](http://www.fondazione-menarini.it)**

### **TECHNICAL FACILITIES**

Facilities will be available for computer presentations and overhead projections.

A business center with PC (Powerpoint for Windows) will be available for check and preview of presentations. It is essential that speakers take their presentation to the business center at least one hour before the session starts.

The center will be open at the following times:

Thursday, May 30<sup>th</sup>, from 07.30 a.m. to 06.30 p.m.

Friday, May 31<sup>st</sup>, from 07.30 a.m. to 06.00 p.m.

### **LUNCHESS AND COFFEE BREAKS**

Lunches and coffee breaks will be served in the Meeting area.

### **ABSTRACTS BOOK**

Participants will receive the Abstract Book at the Meeting.

## FACULTY LIST

### **Hans-Joachim Anders**

University of Munich  
Munich, DE

### **Andrew Arnold**

University of Connecticut  
Farmington, CT, US

### **Giovanni Beltrami**

University of Florence  
Florence, IT

### **Mary Larsen Bousein**

Center for Advanced Orthopaedic  
Studies One Overland Street  
Boston, MA, US

### **Maria Luisa Brandi**

University of Florence  
Florence, IT

### **Jane A. Cauley**

University of Pittsburgh  
Pittsburg, PA, US

### **Catherine Chaussain**

University Paris Descartes  
Paris, FR

### **Paola Chiarugi**

University of Florence  
Florence, IT

### **Luisella Cianferotti**

University of Florence  
Florence, IT

### **Bart L. Clarke**

Mayo Clinic  
Rochester, MN, US

### **Stefano Colagrande**

University of Florence  
Florence, IT

### **Michael Collins**

National Institutes of Health  
Bethesda, MD, US

### **David W. Dempster**

Columbia University  
New York, NY, US

### **Elaine Dennison**

Southampton University  
Southampton, UK

### **Peter R. Ebeling**

School of Clinical Sciences  
at Monash Health  
Clayton, AUS

### **Alessandro Franchi**

University of Pisa  
Pisa, IT

### **Nadja Fratzl-Zelman**

Ludwig Boltzmann  
Institute of Osteology  
Wien, AT

### **Joseph Kirschvink**

Division of Geological  
and Planetary Sciences  
Caltech, US

### **Christopher S. Kovacs**

Memorial University of Newfoundland  
St. John's, NL, CA

### **Rajiv Kumar**

Mayo Clinic  
Rochester, MN, US

### **Joseph M. Lane**

Hospital for Special Surgery  
New York, NY, US

## FACULTY LIST

### **Agnes Linglart**

Service d'Endocrinologie  
et Diabète de l'Enfant  
Paris, FR

### **Claudio Luchinat**

University of Florence  
Florence, IT

### **Michael Mannstadt**

Massachusetts General Hospital  
Boston, MA, US

### **Laura Masi**

Careggi Hospital  
Florence, IT

### **Emanuela Masini**

University of Florence  
Florence, IT

### **Francesca Matteucci**

University of Trieste  
Trieste, IT

### **Salvatore Minisola**

University of La Sapienza  
Rome, IT

### **Philip Osdoby**

Washington University  
St. Louis, MO, US

### **Eleftherios P. Paschalis**

Ludwig Boltzmann  
and Institute of Osteology  
Wien, AT

### **Rene' Rizzoli**

University of Geneva  
Geneva, CH

### **Graham Russell**

Oxford University  
Oxford, UK

### **Luca Sangiorgi**

University of Bologna  
Bologna, IT

### **Takashi Shimada**

Kyowa Kirin International  
Marlow, UK

### **Francesco Sofi**

University of Florence  
Florence, IT

### **Paul D. Taylor**

Department of Earth Sciences  
Natural History Museum  
London, UK

### **Rajesh V. Thakker**

University of Oxford  
Oxford, UK

### **Dwight Towler**

Washington University  
St. Louis, MO, US

### **Stephen Weiner**

Weizmann Institute of Science  
Rehovot, IL

### **Ria Weston**

Manchester Metropolitan  
University School of Healthcare Science  
Manchester, UK

### **Michael P. Whyte**

Washington University  
St. Louis, MO, US

### **Lord Robert Winston**

Imperial College  
London, UK

# NOTES

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**Fondazione Internazionale Menarini**  
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