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The 36th International Sun Valley Workshop on Skeletal Tissue Biology

Foreword

The 36th International Sun Valley Workshop on Skeletal Tissue Biology was held July 30-August 2, 2006, Sun Valley, Idaho, USA. There were 114 Workshop attendees representing a wide range of clinical, basic science and social science disciplines. The program consisted of a mixture of clinical and basic science topics, with attempts to vertically and horizontally integrate these topics. Several young investigators told me that this Workshop was "the best meeting I have ever attended." One veteran of the Sun Valley experience said that this was the best Workshop he could recall.

The W.S.S. Jee Remodeling in Bone (RIB) Award was given to Dr. Lynda Bonewald for her pioneering studies on osteocyte biology and mechanical signaling in bone. Dr. Bonewald's plenary lecture "Osteocytes as Multifunctional Cells" was a very comprehensive and lucid description of the role that osteocytes play in mechanical signaling and in regulatory mechanisms related to mineral exchange, with an introduction to the idea, later expounded upon by Sarah Dallas, that osteocytes are more motile than anyone has realized. The plenary lecture was followed by a poster session that highlighted posters from the fourteen young investigators who received the Alice L. Jee Travel Award. The Workshop program was also highlighted by podium talks Monday evening from six young investigators who were selected winners of the ASBMR/Harold M. Frost Young Investigator Awards, which came with a $1,500 prize (supported in part by the ASBMR) and certificate. About 30% of all attendees were classified as young investigators.

As you can see in the ensuing pages, sessions concentrated as usual on osteoporosis (Bone in Microgravity Environments: Houston We Have A Problem) as well as treatments for osteoporosis (The Role of Vitamin D in Skeletal Health). Attempts were made (successfully I think) to integrate basic understanding of osteocytes and osteocyte-related genes with translational approaches that may result in future therapies (Osteocyte Control of Bone Formation via Sost/Sclerostin). Because of the interest in bone quality, a session on Bone Matrix highlighted the functional role of non-collagenous proteins, the dynamics of signaling and the properties of matrix assembly. And the Workshop provided an update in the area of Osteoarthrosis, concentrating on new imaging modalities, age-related changes, and the source of pain in joint disease.

The Sun Valley Workshop historically has provided the opportunity for attendees to discuss issues of current importance even though those issues are not on the agenda. (Because of current funding deadlines, we must have our program outlined by Fall of the previous year, and so important issues that may arise between that time and the meeting the following August, although critically important, may not be on the program.) There were two such impromptu sessions this year, both initiated at the request of attendees. Both occurred immediately after the morning session, and lasted for about an hour (a tribute to the dedication of the attendees who could have been out in the sunshine swimming, hiking, playing golf or white water rafting, but instead were inside discussing science). The first was a session on molecular imaging directed by Dr. Clemens Lowik. This session reviewed current approaches for microscopic imaging using molecular and fluorescent markers. Some respondents to our survey (see below) characterized this presentation and discussion as a "highlight" - "outstanding." A second session did not include any presentation, but involved a discussion of the current controversy over ostenecrosis of the jaw (ONJ). This discussion was directed by Don Kimmel and resulted in a better understanding of what we know (or think we know) and what we don't know about this condition. Because of the importance of this topic, we have included a session on "Osteonecrosis and ONJ" for the 2007 Sun Valley Workshop. By that time, I expect that we will have even more data upon which to base a lively discussion.

This year we instituted an evaluation process to allow participants feedback into what they enjoyed about the Workshop, or what they think could improve the Workshop in future years. We received a response rate of about 25% of attendees, and their comments and suggestions were enlightening. The survey elicited a number of excellent suggestions for topics in future years. The Advisory Committee – currently consisting of Teresita Bellido, Bob Recker, Mitch Schaffler, Rick Sumner and Charles Turner – will use these suggestions to construct future meetings. Satisfaction with the sessions was high; more than 80% of attendees found all the sessions excellent or good, and 100% of the attendees felt that the ASBMR/Harold M. Frost Award presentations were in this highest category. Nearly all attendees indicated that they planned to return to the Sun Valley Workshop next year – given that 50% of respondents were young investigators within 10 years of their degree, this bodes well for the future of the Workshop (as well as indicating that the younger investigators felt the program was worthwhile for their own scientific and career development).

The Workshop was supported by grants from the National Institutes of Health (NIAMS) and the Orthopaedic Research and Education Foundation (OREF). In addition, contributions from industry came from pharmaceutical concerns (Alliance for Better Bone Health; Amgen; Eli Lilly and Co.; Mission Pharmacal; NPS Pharmaceuticals; Pfizer Global Research and Development; Wyeth-Ayerst Pharmaceuticals); orthopaedic appliance manufacturers (OrthoLogic); contract research companies (MDS Pharma Services, Charles River Laboratories) and manufacturers of imaging and diagnostic equipment and services (Immunodiagnostic Systems Inc., Micro Photonics Inc., Osteometrics, and Scanco USA, Inc).

Finally, several attendees took pictures of various activities and award ceremonies during the Workshop. These can be found on the Workshop website: www.sunvalleyworkshop.org. Take a look – a tentative schedule for next year's Workshop (August 5-8, 2007) is also on the website. Hope to see you in Sun Valley in 2007!

David B. Burr, PhD

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36th International Sun Valley Workshop
on Skeletal Tissue Biology
Associate Editor of JMNI

36th International Sun Valley Workshop On Skeletal Tissue Biology

July 30-August 2, 2006, Sun Valley, Idaho, USA

Sunday Morning (8 am-Noon)

Bone in Microgravity Environments: "Houston, we have a problem"
(Chair: **S. Bloomfield**)

1. What Do We Know About Alteration in the Osteoblast Phenotype with Microgravity? - **Laurence Vico**, Bone Biology Laboratory, University of St. Etienne, France
2. What Do We Know About Fracture Risk Incurred with Long-duration Spaceflight? - **Tom Lang**, Associate Professor in Radiology (UCSF)
3. Microgravity and Drug Effects on Bone - **Jay Shapiro**, Kennedy Krieger Institute, Johns Hopkins University
4. Does Altered Blood Flow to Bone in Microgravity Impact on Mechanotransduction? - **Susan Bloomfield**, Bone Biology Laboratory, Texas A&M University
5. A Simulated Weightlessness State Diminishes Cortical Bone Healing Responses - **Ron Midura**, Associate Professor, Cleveland Clinic Biomedical Engineering

Sunday Evening (7:30 pm-10 pm)

RIB Award/Plenary Session
Osteocytes as Multifunctional Cells - Lynda Bonewald

Monday Morning (8 am-Noon)

The Role of Vitamin D in Musculoskeletal Health
(Chair: **N. Binkley**)

1. Vitamin D - The Iceberg Nutrient - **Robert P. Heaney**, Osteoporosis Research Center, Creighton University
2. Molecular Regulation of Calcium and Bone Metabolism Through the Vitamin D Receptor - **James C. Fleet**, Dept of Foods and Nutrition, Purdue University
3. Vitamin D: Clinical Measurement and Use - **Neil Binkley**, University of Wisconsin
4. Vitamin D Analogs as Anabolic Agents - **Thomas A. Brown**, Pfizer
5. Vitamin D as a Defensin - **John Adams**, UCLA, David Geffen School of Medicine

Monday Evening (7:30 pm-10 pm)

Presentations by ASBMR/Harold M. Frost Award Recipients

1. TGF-ß Regulation of Osteoblast Differentiation and Bone Matrix Properties - **Tamara Alliston**, University of California, San Francisco
2. The Dysfunctional Muscle-Bone Unit in Juvenile Idiopathic Arthritis - **Jon (Sandy) Burnham**, University of Pennsylvania School of Medicine
3. The Mechanical Impact of Bone Turnover: A Structural Analysis of the Effects of Remodeling Cavities on Cancellous Bone Strength - **Christopher Hernandez**, Case Western Reserve University School of Medicine
4. Non-invasive Imaging of Osteoclast Activity Via Near-infrared Cathepsin-K Activatable Optical Probe - **Kenneth Kozloff**, Harvard Medical School
5. Indian Hedgehog is Required for Endochondral Bone Formation After Birth - **Yukiko Maeda**, Harvard School of Dental Medicine
6. Mechanical stimulation *in vivo* reduces osteocyte expression of sclerostin - **Alexander Robling**, Indiana University School of Medicine

Tuesday Morning (8 am-Noon)

Osteocyte Control of Bone Formation via Sost/Sclerostin
(Chair: **T. Bellido**)

1. Human genetics of Sost - **Wim Van Hul**, Department of Medical Genetics, University of Antwerp, Belgium
2. Wnt but not BMP Signaling is Involved in the Inhibitory Action of Sclerostin on BMP-Stimulated Bone Formation - **Clemens Löwik**, Department of Endocrinology and Metabolic Diseases, Leiden University Medical Center, Netherlands
3. Downregulation of Sost/Sclerostin by PTH: A Novel Mechanism of Hormonal Control of Bone Formation Mediated by Osteocytes - **Teresita Bellido**, Division of Endocrinology, Department of Internal Medicine and Center for Osteoporosis and Metabolic Bone Diseases, University of Arkansas for Medical Sciences
4. Bone Anabolism Achieved by Reducing Sclerostin Bioavailability with an Anti-sclerostin Antibody - **David Ke**, Amgen Inc

Wednesday Morning (8 am-Noon)

Bone Matrix
(Chair: **M. Schaffler**)

1. Small Leucine-Rich Proteoglycans in the Aging Skeleton - **Marian Young** (NIH)
2. Fibrillin Microfibrils: Connective Tissue Pathways That Regulate Shape and Signaling - **Lynn Sakai**, Shriners Hospital, Portland
3. Contextual Regulation of Bone Development, Remodeling and Regeneration by Thrombospondin Matricellular Proteins - **Kurt Hankenson**, School of Veterinary Medicine, University of Pennsylvania
4. Dynamics of Bone Extracellular Matrix Assembly and Mineralization - **Sarah Dallas**, School of Dentistry, Department of Oral Biology, University of Missouri
5. The Mineralized Extracellular "Matrix" Reloaded: a Tissue Engineering Perspective - **Charles Sfeir**, University of Pittsburgh

Wednesday Evening (7:30 pm-10 pm)

Osteoarthrosis: Animal models and Imaging
(Chair: **S. Goldring**)

1. Clinical Aspects, Pathology and Pathophysiology of Osteoarthritis - **Steve Goldring**, Beth Israel Deaconess, Harvard
2. Cellular, Molecular, and Matrix Changes in Cartilage During Aging and Osteoarthritis - **Walter Horton**, Northeastern Ohio University College of Medicine
3. MR Imaging and Early Cartilage Degeneration and Strategies for Monitoring Regeneration - **Sharmila Majumdar**, University of California, San Francisco
4. Pain and OA - **Jason McDougall**, University of Calgary