ICMRS Education Newsletter

May 2015

ICMRS Education Committee
Executive Editor: Minyi Hu, PhD

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I. News Report from 2015 ICMRS-ORS Membership Meeting

Message from Dr. James H-C. Wang, the President-Elect and Program Chair, ICMRS

The 2015 ICMRS-ORS membership meeting was held successfully in Las Vegas on 3/29/2015. About 100 ICMRS members attended the meeting, which included exciting activities such as a presidential speech, a keynote presentation, and the Webster Jee Young Investigator Award ceremony. The keynote speech was delivered by Dr. Regis J. O'Keefe from the Washington University School of Medicine on the topic "Cells and Signals and the Regulation of Tissue Regeneration." The speech was well received as evidenced by the interesting questions and discussion that followed.

After the keynote, three WJ Awards were presented to three winning presentations: Liang Chao from the HK Baptist University, Hongchuan Yu from the Brown University, and Hao Xu from the University of Rochester.

The award ceremony was followed by a brief report on the current status of the society delivered by the President-Elect, Dr. James Wang. Members were inquisitive about the ICMRS operations in general and specific societal activities. Former presidents Drs. Yi-Xian Qin and Ling Qing (HK) responded by presenting the details of ICMRS sponsored meetings/activities and Dr. Ling Qing (UPenn), the current membership chair, provided more details on the work of her membership committee. The Education committee Chair, Dr. Herb Sun, also gave a brief introduction of his committee's work. The meeting was concluded with brief remarks by the incoming president Dr. James Wang, who invited members to join the 2015 ICMRS-ASBMR Membership Meeting that will be held in Seattle on Oct. 9 and also encouraged members to be actively involved in the societal operations.

The success of this meeting was due to the diligent efforts of the program committee, including Drs. Ling Qin (UPenn), Herb Sun, Neil Dong, Minyi Hu, and Bin Li.

Audience in the Meeting Room

Dr. James H-C. Wang, the President-Elect and Program Chair, ICMRS

Keynote Speaker – Dr. Rejis J. O'Keefe

Dr. Ling Qin Asking Questions after the Keynote Presentation

Dr. Yi-Xian Qin and Dr. James H-C. Wang

Dr. Hui (Herb) B. Sun and Dr. James H-C. Wang

Dr. Ling Qin and Dr. James H-C. Wang

II. The ICMRS Conference and Xiangya Osteoporosis Forum

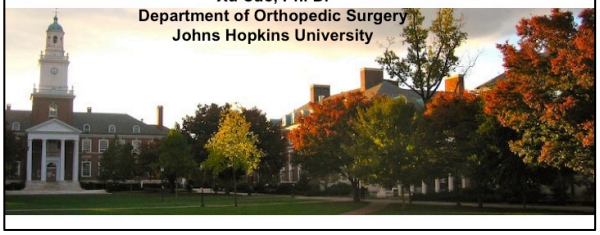
The ICMRS Conference and Xiangya Osteoporosis Forum was held with great success on April 9-11, 2015 in Changsha, China. It was hosted by the Second Xiangya Hospital of Central South University, and co-sponsored by International Chinese Musculoskeletal Research Society (ICMRS) and American Society of Bone and Mineral Research (ASBMR). The meeting reached its aim to highlight leading-edge research in the musculoskeletal field worldwide. The areas of interest included Skeletal Development and Regeneration, Genetic Skeletal Disorders, Bone Tumors, Biomechanics, Osteoporosis, Stem Cell Therapy, Biomaterials and Orthopaedic Implants (See meeting website: http://1.hnhwly.com and *a detailed report from the meeting organizers is coming soon).*

In particular, in the session "How to conduct scientific research: From experiments to paper publication," Dr. Xu Cao and Dr. Fanxin Long each gave beautiful presentations entitled "How to Conduct a Research Project" and "How to write a scientific paper," respectively. Both were very well received by the audience. Given the great value of these talks, with agreement and support by Xu and Fanxin, we are happy to present the slides of their presentations and believe it will be of interest and helpful to you.

Presentation from Dr. Xu Cao

How to Conduct a Research Project

Xu Cao, Ph. D.
Department of Orthopedic Surgery
Johns Hopkins University



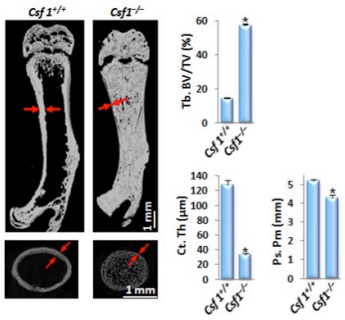
Identify Your Research Project

- Research is discovery to bring new knowledge.
- Biomedical research is to understand diseases for better treatment.
- Novelty is the key for research. Funding, sophisticated techniques and equipment are important, but not determining factors.

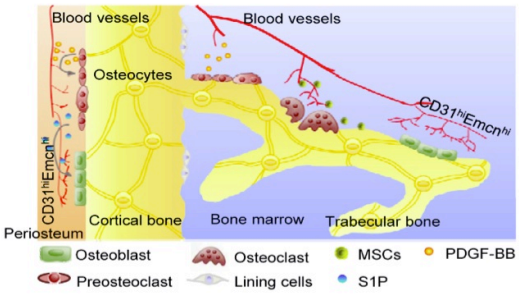
Form Your Hypothesis

- Understand the whole picture of a disease from clinic observation to in vitro results .
- Identify the most important question.
- Logic is the key.

Reduced cortical bone thickness in CSF-1 KO mice



PDGF-BB secreted by preosteoclasts induces angiogenesis during ostegensis



Xie H, et al. Nature Medicine. Oct 5, 2014

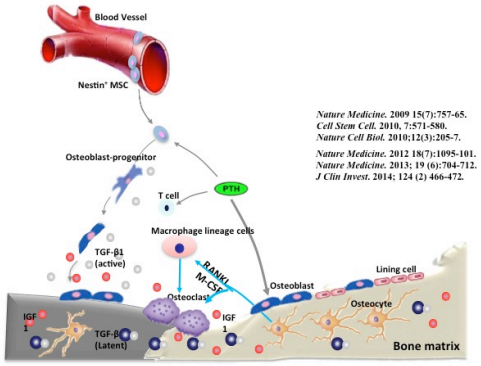
Test Your Hypothesis

- The objective of experiments is to test your hypothesis.
- Do not rush into experiments.
- Experiments should focus on function.
- Always chose quick, simple and inexpensive experiment.

Execute the Project

- **Importance of a disease is the guidance principle.**
- **In vivo results lead the research direction.**
- **In vitro experiments reveal the signaling mechanisms.**

PTH orchestrating signaling TGFb, Wnt, BMP and IGF-1.



Nature Medicine. 2009 15(7):757-65.
Cell Stem Cell. 2010. 7:571-580.
Nature Cell Biol. 2010;12(3):205-7.
Nature Medicine. 2012 18(7):1095-101.
Nature Medicine. 2013; 19 (6):704-712.
J Clin Invest. 2014; 124 (2) 466-472.

Presentation from Dr. Fanxin Long

How to write a science paper

Fanxin Long, Ph. D.
Professor
Washington University School of Medicine
St. Louis, MO
USA

Outline

- Preparation for writing
  - Do I have enough?
  - Where to send?
- Writing the manuscript
  - Writing Mechanics
  - Results
  - Title and Abstract
  - Discussion

Preparation

- Do I have enough data for a manuscript?
- How do my data advance knowledge?
- Which audience do I want to target?
- Authorship

Do I have enough data for a paper?

- Do the results support a clear conclusion?
- Do I have all the appropriate controls?
- *Go beyond the "minimal publishable unit"*
- *One high quality paper has more impact than a few lower quality papers*

How do my data advance knowledge?

- Do my data:
  - Describe a new phenomenon?
  - Identify a new mechanism?
  - Establish a new model?
  - Discover a new function of a gene/protein?
  - Identify a new approach to treatment?
- *Lack of novelty is the leading reason for rejections*

How do my data advance knowledge?

- Little advance of knowledge when results merely confirm previous reports
  - Not always accepted for publication
- *Really know the field! Study the literature in depth!*

Which audience do I want to target?

- Write for an audience, not for yourself
- Consider who would be most interested in your new data
- Critical considerations
  - General vs. specialty audience
  - Journal rating and likelihood of success

Authorship

- Should be resolved at the outset
- Some journals require details on role of each author at submission
- Ethical and legal issues

Writing mechanics

- Spelling, grammar
- Always start with an outline of paragraphs
- Logical flow from paragraph to paragraph, smooth transitions
- First sentence of each paragraph: topic sentence encompassing content in whole paragraph.
- One main idea for each paragraph
- Last sentence of each paragraph: summary sentence to draw conclusion

Writing the manuscript

- Write the Results section first
  - Write an outline by following a logical thread of the figures/tables
  - Describe the message for each figure/table
  - Organize figures/tables with similar messages into same section (subtitles)
  - Avoid lengthy interpretation (save for Discussion)
  - Avoid redundant or non-pertinent data (can be published elsewhere, more is not always better)

Things Forbidden

- Use figures (even part of) already published elsewhere
- Verbatim quotations from others' work (plagiarism)
  - Can use quotation marks, if necessary, but always cite and acknowledge original work
- Submit the same paper or parts of it to another journal at the same time
- Embellish, falsify or fabricate data

Importance of title and abstract

- Title should attract the interest of the reader
- Title should provide the main message
- Most readers will read only the abstract
- Abstract should provide sufficient information and attract readers to the paper

Writing an effective title

- Indicative titles
  - Tell what the study is about
    - *Morphological characterization of skeletal cells in Cbfa1-deficient mice*
- Informative titles
  - Tell the results of the study
  - Include a verb and read like a newspaper headline
    - *Estrogen reduces the risk of hip fractures in postmenopausal women*

Things to avoid in a title

- Too many words
- Too many acronyms
- Ambiguous statements
- Passive verb form
- Questions

Writing an effective abstract

- Should contain enough information to understand the work without reading the paper
- Start with 1-2 sentences of background
- State your objective in one sentence
- Describe the results, with brief mention of the methodological approach
- Link the findings with a logical thread
- Concluding sentence(s) (no more than 2) highlighting significance of study

Things to avoid in abstracts

- Too many words
  - Comply with journal word limitation
- Too long introduction
  - Limit to 1-2 statements
- Too many methodological details
  - Include only general approach and models
- Too many details in results
  - Avoid too many numbers, statistical data, etc.

Writing the discussion

- The most creative and most challenging part of the manuscript
- First paragraph to recapitulate main discoveries, do NOT repeat the results
- Put current findings in perspective with published results, agreements and discrepancies
- Acknowledge limitations of current study, point to future directions
- Speculate on potential applications, medical treatments, etc.

How to approach the discussion

- Make a list of 4-6 main themes that you would like to address (avoid too much)
- Avoid discussing material not directly relevant to actual findings
- Highlight the innovative features of your study (focus on impact, actual or potential)
  - Original study design, or sample
  - New experimental approaches, in vivo models
  - New mechanism on disease

Things to avoid in the discussion

- Do NOT repeat the same statements in the Introduction
- Do NOT engage in re-interpreting or reviewing previous work
- Do NOT over-interpret the findings
  - Use hedging words, "potentially", "likely", etc.
- Do NOT be hypercritical or overly detailed in your criticisms
  - Avoid antagonistic, inflammatory language
  - Avoid singling out a specific author

Questions?

Acknowledgement

I thank my colleague Dr. Roberto Civitelli for his valuable input.

III. Center Introductions from Key Laboratory for Bioscience and Biotechnology-ICMRS Collaborating Center for Bone Health Research

Continuing with our efforts to enhance communication and interactions among the ICMRS Collaboration Centers, we are happy to present a report from the Key Laboratory for Bioscience and Biotechnology-ICMRS Collaborating Center for Bone Health Research. Thanks to Drs. Jingbao Li and Ai-Rong Qian for their contribution of this report.

Key Laboratory for Bioscience and Biotechnology-ICMRS Collaborating Center for Bone Health Research

空间生物实验模拟技术重点实验室-国际华人骨研学会
骨骼健康联合研究中心

http://www.spacebiotech.org.cn

- Dean of collaborating center
- Dean of the Key Laboratory for Space Biosciences & Biotechnology
- IAA member of life science
- Member of council of Chinese Society of Space Research
- He specialize in Space Biology, investigating the molecular and cellular mechanism of bone loss during space flight and focusing on how bones sense weightlessness and various mechanical environments
- He also have expertise in developing countermeasures for bone loss induced by weightlessness, studying the effect of magnetic fields on anti-angiogenesis and tumor metastasis

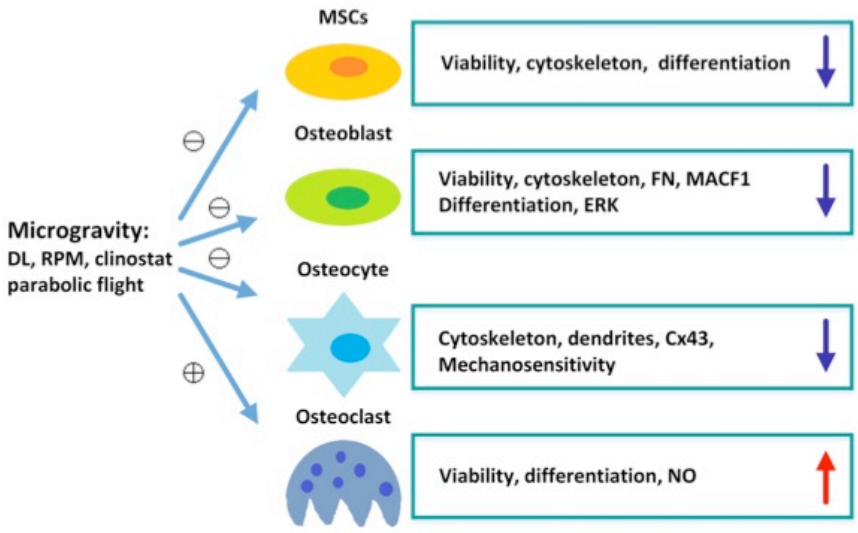
Professor Peng SHANG

Characteristic Research Platforms

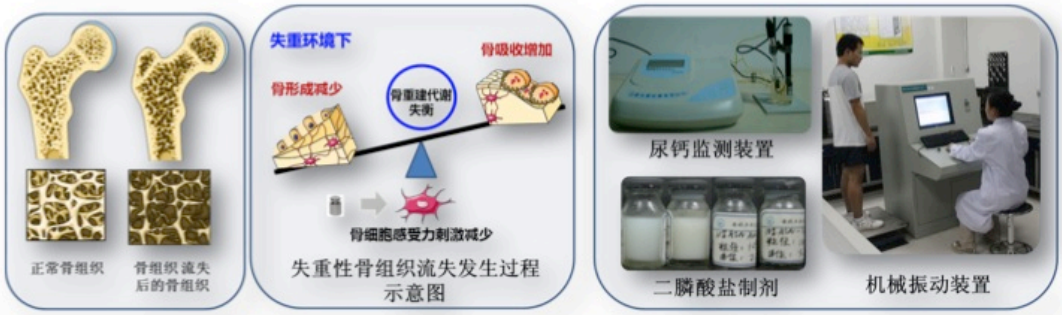
Long-term and stable diamagnetic levitation platform to stimulate weightlessness

Characteristic Research Platforms

Series magnetic fields
From “hypo” to “hype”



Simulated microgravity modulates multiple behaviors of bone cells. Microgravity negatively influences mesenchymal lineages including MSCs, osteoblast and osteocyte. On the contrary, osteoclast function was promoted. Some regulatory molecules may be involved in the responses.



Mechanical or medicinal countermeasures to weightlessness induced bone loss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KLFSND
Key Laboratory of Fundamental Science for National Defense
ICMRS
International Chinese Musculoskeletal Research Society
國際華人骨研學會
http://www.spacebiotech.org.cn

IV. Message from the Chair of ICMRS Education Committee

Dear ICMRS Members,

I would like to express my sincere thanks to each ICMRS member and the Educational committee members who contributed to this newsletter. In particular, I would like to thank **Dr. Minyi Hu** for her outstanding job as the Executive Editor for this issue of the Newsletter.

We are committed to improving the newsletter in order to keep up with the quick pace of this cyber communication era. I would like to thank you for your attention, your effort to support, and in particular, your feedback on the newsletter. I am excited to announce that based on your suggestions, all contents in the newsletter starting from this issue will be presented in their original contributed form with minimal editing. Since the primary aim of our newsletter is educational, we have included in this issue, a deck of slides on the topic "How to conduct scientific research" presented by Dr. Xu Cao and Dr. Fanxin Long at the recent ICMRS Conference and Xiangya Osteoporosis Forum in Changsha, China. The newsletter will be updated more frequently and will also include new sections such as special reports and other information depending on ICMRS member requests.

This is a quarterly newsletter, which aims to share exciting news, events and progress related to our society, and to facilitate communication among ICMRS members. **This is your newsletter and we are here to serve you, the ICMRS members!** With great appreciation, we look forward to your contributions on the following topics:

- Meeting information and progress
- News and updates from ICMRS collaborating centers and ICMRS-sponsored journals
- Members' research highlights including but not limited to: major publications of high scientific and/or social impact, reports from principal investigators, and/or grant awards.
- Member recognition and achievements
- Educational opportunities and mentoring requests
- Job opportunities
- Any information that may be interesting and important to share among our members
- Any comments, suggestions, feedback regarding our service and the newsletter

The Educational Committee encourages contributions from highly motivated ICMRS members. Young members with strong desire to serve are particularly welcome. Please feel free to reach me anytime. We look forward to hearing from you.

Sincerely,

Hui (Herb) B. Sun, PhD
Chair, ICMRS Education Committee
herb.sun@einstein.yu.edu