

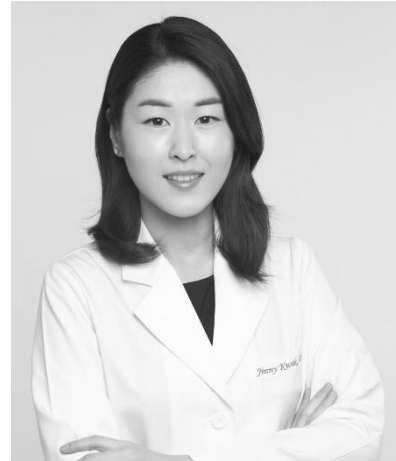
## Biomedical Research Award

Dr. Jin Hee Kwak, *University of California, Los Angeles*

**TITLE: BP-NELL-PEG systemic therapy regenerates spaceflight-induced bone loss in the craniofacial skeleton**

### **BIOGRAPHY**

Jin Hee Kwak, D.D.S., M.S., is an Associate Professor and Clinic Director of the UCLA Section of Orthodontics. Dr. Kwak received her dental degree in 2009 from Yonsei University, South Korea, her orthodontics certificate in 2013 from UCLA, and her ABO certification in 2014. In addition to her clinical training, Dr. Kwak has immersed herself extensively in the field of skeletal regenerative research since 2009 at UCLA. She is a recipient of K08 grant from NIDCR and a co-investigator and project manager of CASIS-funded NASA-collaborated spaceflight research mission entitled Rodent Research-5 (RR-5).



### **PROJECT DESCRIPTION**

NELL-1 is a potent osteogenic and anti-osteoclastic growth factor that was most studied for its capacity to regenerate appendicular and axial bones as a local and systemic therapeutics in various animal models. This research proposes to examine the therapeutic potential of **BP-NELL-PEG**, which describes PEGylated NELL-1 that is further engineered by conjugation with inactive bisphosphonate (BP) as a bone-targeted molecule, particularly in craniofacial bones. We will utilize samples collected from the RR-5 mission. The fact that BP-NELL-PEG can target both the postcranial (bones outside the skull) and craniofacial bones to fight the same bone degenerative effect would have a far-reaching clinical impact. This study is entirely novel as it is the first spaceflight research that focuses on the craniofacial bones, and the first study investigating the efficacy of NELL-1-based systemic therapy in the craniofacial region. As such, this innovation will not only provide a huge insight into craniofacial versus postcranial bone's response to long-term space travel and osteoporosis, but also present a new strategy to provide optimal dental care for osteoporotic patients who also demonstrate condylar resorption, osteoarthritis and/or reduced quality and quantity of alveolar bone.

### **CONTRIBUTION TO ORTHODONTIC EDUCATION**

The outcome of this research will help find new strategies to enhance the quality of dental care for osteoporotic patients, expand bone biological knowledge, and support research training for post-graduate orthodontic education requiring an M.S. thesis.

### **SIGNIFICANCE OF THE FOUNDATION TO THE PROJECT**

Dr. Kwak has received the OFDFA award for 3 consecutive years prior to receiving the current BRA award. The awards from AAOF signifies support from the orthodontics community for the development of its own faculty. This support and encouragement has helped Dr. Kwak obtain Associate Professorship and a K08 award from the NIDCR. Dr. Kwak aspires to receive support from the AAOF throughout her development as a fulltime orthodontic faculty. In appreciation of the loyalty and friendship established herein, she hopes ultimately to become a part of the AAO and the Foundation support group to continuously promote high-level education and research in the field of orthodontics.