Dr. Natthapatt Sooppapipatt
2026 Research Aid Award
University of Illinois-Chicago

1. Biography

Dr. Natthapatt Sooppapipatt is an orthodontic resident at UIC with a strong background in oral sciences. She earned her dental degree from the Faculty of Dentistry, Mahidol University, where she conducted both laboratory and clinical research focused on molecular and translational sciences. Her research achievements have been recognized with multiple honors, including the Excellence Award in Basic Science (2021, 2022) and first place in the Dental Association of Thailand Oral Science Research Competition (2022). She has presented her work internationally at the 2023 FDI World Dental Congress and is an active member of the American Dental Association, American Association of Orthodontists, and Dental Association of Thailand. Her academic excellence was further recognized through a merit scholarship awarded throughout her dental curriculum.

2. Brief project description

Calvarial bone is a highly dynamic mineralized connective tissue that constantly undergoes remodeling, a process coordinated by osteoclasts, osteoblasts, bone lining cells, and osteocytes. Initially, the calvarial bones are separated by fontanelles, which mature into sutures. These sutures are fibrous connective tissue bands that allow for uniform cranium growth during brain development and prevent premature bone separation/fusion. Osteocytes are the most abundant bone cells that play an important mechanosensory role and are a major source of Rankl, an osteoclast differentiating factor, in reinforcing well-balanced bone homeostasis. To respond to changes in loading and bone environment, osteocytes secrete various signaling biomolecules such as proteins and microRNAs (miRs). There are two critical proteins abundantly expressed in osteocytes, Dentin matrix protein-1 (Dmp1) and Sclerostin (Sost). serving as marker genes at different stages of osteocytes. MiRs are small, endogenous, single-stranded, non-coding RNAs that play a vital role in bone remodeling. Our preliminary study demonstrated that miR-145 is a potential loading-mediated osteocyte signaling miRNA, and the femoral bone of miR-145-deficient mice driven by Sost promoter (miR-145/Sost KO) exhibited defective shape compared to the controls. Mice lacking miRs specific to osteocytes exhibited abnormal calvarial and suture phenotypes. To gain insight into how miR-145 plays roles in craniofacial bone development, we propose to compare calvarial bone phenotypes between miR-145/Sost KO and miR-145-deficient mice driven by Dmp1 promoter (miR-145/Dmp1KO) and their controls (miR-145 flox, Sostcre, and Dmp1cre mice). This research holds significant potential for the discovery of an innovative treatment modality for the field of craniofacial biology, as it would offer new insights into the functions and mechanisms of osteocytes and miR-145 in craniofacial and suture biology.

3. A Statement of how orthodontic education will benefit from your award

Osteocytes are cells that play important roles in bone remodeling and perception of the loading forces onto the bones, which are the critical steps for orthodontic tooth movement. Loss of microRNA-145, a critical microRNA in shear-stress-loaded osteocytes, has never been reported, especially at different stages of osteocytes, and this new information will enhance our understanding of how these biomolecules control bone modeling during skull and face formation, and eventually, the mechanism of how miR-145 affects osteocyte biosynthesis and function. Furthermore, the project involves advanced methodologies, including micro-CT imaging, geometric morphometric analysis, and transgenic animal models, which promote translational approaches to craniofacial biology. Ultimately, the knowledge and results from this project may support the development of future biologically targeted therapies to modulate bone remodeling, thereby directly affecting the outcomes of orthodontic and orthopedic treatment.

4. Why the foundation is important to your project

The foundation's support is essential for the development and completion of this project, as the funding will directly support costs associated with animal housing, microcomputed tomography imaging, histologic analyses, and molecular studies using real-time PCR. In addition, the foundation's support will allow Dr. Sooppapipatt the opportunity to present the study findings at future national meetings, facilitating knowledge exchange with other clinicians and researchers, thus, increasing the visibility of the topic and may lead to further scientific collaboration and advancement.

5. How foundation funding is expected to or has benefitted your career

The foundation funding will have a significant impact on my development as an academic orthodontist. This funding will provide opportunities to further develop my research skills through the design, execution, and dissemination of the proposed study. Conducting this project will strengthen my abilities in experimental design and data analysis, while presenting the findings at national meetings will allow me to engage with other clinicians and researchers, receive constructive feedback, and build meaningful professional collaborations. Collectively, these experiences will help establish a strong foundation for a career dedicated to advancing evidence-based orthodontics and contributing to the scientific understanding of craniofacial growth and bone biology.