



2025 Research Aid Award
Dr. Natnicha Praneetpong, University of Illinois, Chicago

1) a short biography

Dr. Natnicha Praneetpong is a second-year orthodontic resident at the University of Illinois Chicago. Born and raised in Bangkok, Thailand, she developed a deep passion for research and clinical practice at Chulalongkorn University, where she earned her DDS.

To seek greater involvement in an intensive research environment after graduation, she joined the Dental Stem Cell Biology Research Unit at the Faculty of Dentistry, Chulalongkorn University, and later joined the Ono & Ono Laboratory at the UTHealth Houston School of Dentistry, where she had an opportunity to learn various research methods, including dental stem cell culturing and in vivo studies using genetically engineered mice.

Dr. Natnicha is passionate about research in tooth development and how advancements in this field could improve clinical practice. After completing the orthodontic residency program, she plans to pursue a doctoral degree and continue her path in an academic career.

In her free time, she enjoys reading, doing puzzles and paper crafting.

2) a brief description of the project

This project focuses on the effect of miR-145 deficiency under the sclerostin promoter in osteocytes during calvarial bone development and suture phenotype in genetically modified mice.

According to previous study, mir-145 has been proven to play a role in osteocytes mechanotransduction. Osteocytes are the primary mechanosensory cells that detect mechanical strain and coordinate bone remodeling and sclerostin is a key regulatory protein secreted by osteocytes.

Transgenic mice will be genotyped from tail samples and divided into three groups based on their genotype: Sostcre, MiR-145 flox and mir-145/Sost KO. Calvaria bones from all mice will be harvested for study at 4 weeks and 8 weeks. 3D microCT analysis will be used to evaluate the bone phenotypes, and the findings will be confirmed through H&E histological staining. The collected data will be analyzed by descriptive statistics and nonparametric statistical analyses.

3) a statement of how orthodontic education will benefit from your award

Orthodontic tooth movement is predominantly explained by the pressure-tension theory and due to the time-consuming remodeling process, the treatment is lengthy. The key cellular contributors include osteoclasts, which are responsible for bone resorption, and osteoblasts, which are involved in bone formation. These cells are regulated by various mediators such as

cytokines, RANK/RANKL/OPG signaling pathway, and microRNAs. However, the role of microRNAs in osteocytes remains unclear. In this study, we focus on the role of miR-145 in osteocytes which could provide valuable insights into the molecular mechanisms in bone remodeling, furthering the understanding of tooth movement. Therefore, it would benefit orthodontists by broadening the scope of diagnosis and treatment to accelerate or decelerate tooth movement at the desired levels and locations in the alveolar bone.

4) why the Foundation is important to your project

Without the generous support from the foundation, making impactful discoveries would be much more challenging and would take a significantly longer period of time. We would not be able to use genetically modified mice and do a thorough analysis of the samples due to the costly animal maintenance and the costly sample analysis methods. With the grant provided, we not only make discoveries, but also make the most use of each animal's lives that are included in the study.

The foundation's support is critical because the knowledge gained from this study will become a valuable tool for understanding the bone remodeling process and therefore help to modify tooth movement to be more favorable. Apart from the breakthrough made in this study, it would also serve as a foundation for future studies of the role of microRNAs and other glycoprotein to help us better understand the process of bone formation.

5) how Foundation funding is expected to or has benefitted your career

Over the years, the Research Aid Award has opened many doors for its recipients in the field of academia. The findings from this project will offer insights into the bone remodeling process and bridge our understanding with what we see in clinical practice. For me, the foundation has granted me an opportunity to gain intense research experience, allowing me to learn various research methods that have broadened my vision in the field. This experience has also made me certain that I would like to pursue a doctorate degree after graduating from the orthodontic residency program, aligning with the foundation's goal of excellence in research and patient care.