Year: 2023 **Type of Awards (Elite)**

Name of Principal Investigator: Chen Xiaoyan **Affiliated Institution:** Stomatology Hospital, School of Stomatology, Zhejiang University School of Medicine

About of the PI

- **Introduction & Education:**

The PI is the deputy chief of the department of orthodontic, the Stomatology Hospital of Zhejiang University School of Medicine, a master and doctor's tutor. Graduated with a doctorate in orthodontics from the Fourth Military Medical University and studied under Professor Yin Ding and Professor Yan Jin.

- **Career Trajectory:**

Joined the Affiliated Stomatological Hospital of Zhejiang University School of Medicine since 2012. As a postdoctoral fellow in the University of California, Los Angeles (UCLA) during the year 2016-2017.

- **Research Contributions, Impact & Recognition:**

The PI has long been engaged in basic and clinical research on orthodontic force, periodontal tissue reconstruction and craniofacial bone development. The research results were published in more than 20 papers in journals including Cell Death & Differentiation, Cell Death & Disease, JBMR, and Chinese Journal of Stomatology.

- **Personal Insights:**

Try to learn more about the effect and mechanism of Nell-1 on alveolar bone remodeling during OTM, as to provide something new knowledge for maintaining alveolar bone morphology and to improve orthodontic efficacy.

- **Future Directions:**

In future the PI intends to figure out the mechanism by which Nell-1 regulates alveolar bone remodeling, especially to clarify the effect of Nell-1 on different types of cells in alveolar bone tissue based on animal models, in vitro mechanical tensile 3D cell models and omics analysis; to explore the mechanism of Nell-1 affecting alveolar bone remodeling at the level of cell differentiation and apoptosis; to verify the effect of targeted regulation of Nell-1 on precise regulation of alveolar bone remodeling.

Brief Summary of the Project:

The remold ability of alveolar bone is the biological basis of orthodontic tooth movement (OTM). How to accurately control the remodeling of alveolar bone during the OTM and

improve the orthodontic efficacy are the major sticking points in orthodontic treatment. Our team have previously explored the relationship between Nell-1 and alveolar bone remodeling via the comparison of alveolar bone morphology before and after OTM, the effect of mechanical force on alveolar bone remodeling, and interaction of Nell-1 and alveolar bone remodeling. However, the mechanism by which Nell-1 regulates alveolar bone remodeling remains unclear. We have previously found that the expression of Nell-1 in different parts of the alveolar bone was different during the process of alveolar bone remodeling, indicating that alveolar bone remodeling may be related to the differential regulation of Nell-1. Therefore, this project intends to clarify the effect of Nell-1 on different types of cells in alveolar bone tissue and its effect on alveolar bone remodeling based on animal models, in vitro mechanical tensile 3D cell models and omics analysis; to explore the mechanism of Nell-1 affecting alveolar bone remodeling at the level of cell differentiation and apoptosis; to verify the effect of targeted regulation of Nell-1 on precise regulation of alveolar bone remodeling. The aim of our study is to build a deeper understanding of the biological mechanism of alveolar bone remodeling, but also provide theoretical basis and new strategies for maintaining alveolar bone morphology, expanding the limit of tooth movement, and improving orthodontic efficacy.