Year: ___2024_____ **Type of Awards (Young/Elite/Clinical)**
Name of Principal Investigator:Yating Yi **Affiliated Institution: __Sichuan University___**

About of the PI (within 300 words, 12-point single-spaced font.)

Please provide a profile picture

- Introduction & Education:

Overview of your academic background and research focus, highlighting milestones of your journey as a researcher.
I received my bachelor degree from Sichuan University in 2014, and my PhD degree in 2019. From 2017 to 2021, I worked as a visiting scholar in Texas A&M University, School of Dentistry. In 2021, I joined Zhao Lab at Chinese Institute of Brain Research as a senior visiting scholar and worked there for 1 year. I am mainly engaged in developing new tissue clearing technologies, and periodontal stem cell research, especially the mechano-responsive properties of MSCs.

- Career Trajectory:

Pivotal moments in your career, including positions held, significant projects, and notable achievements.
I work as an assistant professor and postdoctoral researcher at West China School of Stomatology, Sichuan University. I am now in charge of one project granted from NSFC and one postdoctoral grant program from Sichuan University.

- Research Contributions, Impact & Recognition:

Highlight major findings and contributions to your field, emphasizing the impact of your research.
We developed a new transparent embedding Solvent System (TESOS) method, which combines tissue clearing, transparent embedding, sectioning and block-face imaging. We used TESOS to acquire volumetric images of uniform resolution for an adult mouse whole-body sample, and achieved uniform sub-micron resolution in the whole sample to reveal the complete projection of individual nerve axons within the central or peripheral nervous system for the first time. We published this new method in *Cell Research* in 2024 with me as the first author.

- Personal Insights:

Offer insights into your personal interests, values, and motivations as a researcher, sharing anecdotes that have influenced your perspective.
My interests as a researcher are driven by a combination of curiosity, a desire to contribute to societal betterment, and a passion for exploring the intersection of diverse fields. My

values are shaped by a commitment to excellence, ethical practices, and collaboration, while my motivations are reinforced by experiences and mentorship that have highlighted the transformative potential of research.

- Future Directions:

Outline your envisioned research directions and aspirations, detailing how you plan to continue advancing knowledge and addressing emerging challenges in your field.
In the future, I wish I could be a leader in academic society in my research field, which would give me more opportunities to help improve the development of orthodontic research.
As my expertise is stem cell research, tissue clearing and 3D imaging, I'm willing to collaborate with researchers in similar area. The collaborations will continue and deepen in the future. Apart from basic research, we are now seeking collaborations with professionals in biomedical engineering, who can help to develop better delivery system for our newly testified proteins to aid orthodontic treatment.

Brief Summary of the Project:

To achieve safe and efficient tooth movement is the ultimate goal for current orthodontic clinical practice. Clarifying the underlying mechanisms associated with mechanical force–regulated alveolar bone remodeling and uncovering new strategies to optimize this process have been urgent research problems. Mesenchymal stem cells are suggested to be involved in the whole tooth movement process, but their in vivo characteristics and regulating mechanisms remain unclear. Osteolectin is a newly reported mechano-responsive growth factor with osteogenic potentials. While its role in orthodontic alveolar bone remodeling has not yet been investigated. Based on literature and our preliminary data, we have raised our hypothesis in this research project: Gli1+ MSCs are the main MSC populations involved in orthodontic tooth movement, Osteolectin could be secreted by Gli1+ MSCs and regulate mechano-responsive osteogenesis in an autocrine manner. Osteolection might be a potential drug to improve orthodontic alveolar bone remodeling. To test this hypothesis, our specific aims for this study include:

Aim 1: To identify the role of Gli1+ MSCs in orthodontic alveolar bone remodeling.
Aim 2: To clarify the role of Gli1+ MSC-derived Osteolectin in regulating Gli1+ MSC activity and bone remodeling. Use pharmacological intervention in vitro to study the regulating mechanisms and downstream pathways of Osteolectin.
Aim 3: To testify whether exogeneous recombinant Osteolectin could optimize orthodontic treatment results in mice.

Our study results will shed new light on biological mechanisms in tooth movement, and provide new potentially translational options which would pave a way for a safe and effective orthodontic treatment.


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