



**International College of Prosthodontists**  
**19<sup>th</sup> Biennial Scientific Session - VIRTUAL - September 22 – 25, 2021**

**Program Speaker – Lina Niu**

**Title**

Intrafibrillar Biomineralization for Bone Regeneration

**Abstract**

Over the last decade, bone grafting has been the second most common transplantation procedure. Currently, the artificial bone replacements do not perform as well as autogenous bone grafts due to the lack of hierarchical organization, osteoinductivity and angiogenic potential. Thus, contemporary tissue engineering research has resorted to mimicking biological processes to produce improved bone substitutes. The objective of our research was to develop optimized intrafibrillarly mineralized collagen scaffolds for bone regeneration by mimicking the principles of biomineralization found in nature. By manipulating the processes of biomimetic silicification and calcification, we have invented a series of intrafibrillarly mineralized collagen scaffold with hierarchical organization, increased mechanical properties, osteogenic potential and angiogenic potential. They are very promising materials for bone regeneration. We also pursued the intrafibrillar mineralization mechanism and the osteogenic stimulating mechanism of the scaffold. This will be of great significance to the uncovering of the secrets in natural bone mineralization. At the same time, we reported a new mechanism for the formation of collagen intrafibrillar mineralization. It is found that the need to balance electroneutrality and osmotic equilibrium simultaneously to establish Gibbs–Donnan equilibrium in a polyelectrolyte-directed mineralization system establishes a new model for collagen intrafibrillar mineralization that supplements existing collagen mineralization mechanisms.

**Biography**

Dr. Li-Na Niu is the Chair of the Department of Prosthodontics, School of Stomatology, the Fourth Military Medical University, Xi'an, China. She has been engaged in the field of Prosthodontics for 15 years. Dr. Li-Na Niu's research investigates the biomimetic mineralization for bone regeneration. Her team actively develops, validates, and applies bio-inspired materials to solve challenges in restoration of alveolar bone defect. She has 75 publications as first/ corresponding author in the peer-reviewed journals, such as Nat Mater, Prog Mater Sci, Adv Mater, J Dent Res, etc. Among them, 15 publications have an impact factor higher than 10. She has been authorized with 9 national patents. She has been awarded with the first prize of Shaanxi Science and Technology Award, the first prize of Chinese Academy of Stomatology Science and Technology Award and the Centennial Emerging Leader Award of International Association of Dental Research.