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IAPME Seminar

Nanoplatforms Overcoming Physiological Barriers for Tissue Regeneration and Precision Imaging

12 June 2025

Prof. Wei TANG
Shenzhen Institutes of Advanced Technology,
Chinese Academy of Sciences

Venue: N23-4018
Time: 10:30 - 11:30
Hosted by: Prof. Guichuan XING

Abstract

Recent advances in nanomedicine have opened new avenues for targeted drug delivery and controlled release, yet the dense extracellular matrices and physiological barriers in tissues such as bone, cartilage, and brain severely hinder the penetration and efficacy of both therapeutic molecules and nanomaterials. Overcoming these physiological barriers to achieve rapid penetration and therapeutic efficacy remains a critical challenge. To address these issues, we have developed a series of strategies and nanoplatforms capable of traversing tissue barriers for tissue regeneration and precision imaging, including: (1) Hydrogen-releasing biomaterials that modulate deep tissue microenvironments through in situ H2 penetration; (2) Specifically assembled nanomaterials enabling long-term retention in pathological microenvironments; and (3) Ultrasmall nanoprobes for precise visualization of deep-seated bacterial infections. This presentation will highlight our recent progress in: Pathological microenvironment-responsive H2-releasing nanomaterials for remodeling senescent and chronic inflammatory microenvironments, with applications in aged bone repair, arthritis therapy, and stroke treatment; Self-assembled cartilage-targeting lubricating layers to prevent arthritis progression; Glycosylated polydopamine-based ultrasmall aggregation-induced emission nanoparticles for precision bacterial imaging in complex biological environments.

Biography

Prof. Wei TANG, Professor at the Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences (SIAT, CAS), obtained her B.S. (2009) and Ph.D. (2016) in Materials Science and Engineering from the East China University of Science and Technology under the supervision of Academician Changsheng LIU, subsequently joining SIAT where she currently conducts research at the Research Center for Neural Engineering, focusing on hydrogen-releasing biomaterials for aging-related tissue repair (bone, cartilage, neural), publishing 17 first/corresponding-author papers (e.g., Nat Commun, Sci Adv) and leading 3 NSFC projects, with recognitions including the Young Top-notch Talents of Guangdong, CAS Youth Innovation Promotion Association, and global top 2% scientist status.

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