

## *pH and H<sub>2</sub>O<sub>2</sub> dual-responsive nanoparticles for monitoring intracellular protein Delivery*

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### *Abstract*

Protein therapy holds enormous promise for cancer treatment due to its potential high potency. However, its clinical application is severely limited due to poor membrane permeability of proteins as well as lack of efficient delivery vehicles and methods of real-time protein-tracking. Here a pH and H<sub>2</sub>O<sub>2</sub> dual-responsive NIRF (near-infrared fluorescence) turn-on protein delivery system incorporating an NIRF turn-on probe and protein into one single nanoparticle was rationally designed and fabricated based on tumor microenvironment for monitoring intracellular protein delivery. The nanoparticles can be taken up efficiently by A549 cells, where protein release and NIRF recovery happen simultaneously in response to low pH and excessive H<sub>2</sub>O<sub>2</sub>. More importantly, the delivery of protein via such a delivery system didn't compromise on the activity of the protein. Thus, we provide a new approach to fabricate biocompatible and efficient stimuli-responsive turn-on systems for monitoring intracellular protein delivery. We believe that the strategy developed in this work may find broad applications in drug release monitoring and cancer cell imaging.

### *Speaker Publications:*

1. Tumor Microenvironment Responsive Supramolecular Glyco-Nanovesicles Based on Diselenium-Bridged Pillar[5]arene Dimer for Targeting Chemotherapy; *Chemical Communications/*
2. Morphology transformation of pillararene-based supramolecular nanostructures; *Chemical Communications/Volume 56/Issue 70*
3. Supramolecular nanoprodug based on boronate ester linked curcumin complexing with water-soluble pillar[5]arene for synergistic chemotherapies; *Chemical/Volume 56/Issue62*
4. Host-guest interaction based supramolecular photodynamic therapy system: a promising candidate in the battle against cancer; *Chemical Communications/Volume 56/Issue44*
5. NIR Turn-on Nanoparticles Based on Tumor Microenvironment for Monitoring Intracellular Protein Delivery; *Chemical Communications/Volume 55/Issue99*

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### *Biography:*

Yuxin Pei did her PhD in 1998 in material science at China Textile University (Donghua University at present) in Shanghai. After a two-year postdoctoral training at Zhejiang University, she moved to Europe and worked as post-doctoral fellow at Lund University, Royal Institute of Technology, Technical University of Denmark, and Heidelberg University. Since 2010, she has been a full professor of chemistry at Northwest A&F University. Her current research interest is drug delivery systems and target.