



## Targeted nanotherapeutic strategies for chronic and genetic diseases



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### **Abstract**

Natural, physiological processes in the body can act as barriers for effective drug delivery. Here, I will discuss the unique advantages of small, organic micelles and their ability to harness such barriers for the detection and targeted delivery of therapeutics to diseases including cardiovascular and chronic kidney disease. In addition to biomimetic micelles, endogenous nanomaterials namely extracellular vesicles derived from healthy sources contain natural homing properties and therapeutic cargo, and can be leveraged as carriers for targeted delivery. Given their presence in the body, extracellular vesicles can offer enhanced safety as a nanoparticle platform technology particularly in the context of chronic diseases that are present throughout one's lifetime. Thus, in this presentation, I will also discuss how EVs derived from healthy cells can be engineered as agents that inhibit cardiovascular and kidney diseases. Strategies to enable EV surface modification and enhance cargo loading will be presented, and the potential of engineered EVs towards clinical applications will be discussed. In sum, we discuss the promise of biomimetic nanoparticles, the tailored design necessary to match such promise in specific applications, and their potential as next generation platforms for personalized medicine.

### **Biography**

Eunji Chung is an Associate Professor in the Department of Biomedical Engineering at the University of Southern California and the Dr. Karl Jacob Jr. and Karl Jacob III Early Career Chair. She is the Founding Director of the USC Transformative Center for Nanomedicine and Drug Delivery. Dr. Chung has a courtesy appointment in Chemical Engineering, Medicine (Nephrology and Hypertension), Surgery (Vascular Surgery and Endovascular Therapy), and Pharmacy (Pharmacology and Pharmaceutical Sciences) at USC, and is an affiliated faculty of the Norris Cancer Center and the Stem Cells department. Her laboratory is interested in developing nano- to macroscale biomaterials that can be utilized in medicine. Dr. Chung received her B.A. with honors in Molecular Biology from Scripps College, her Ph.D. from the Department of Biomedical Engineering from Northwestern University, and her postdoctoral training from the Pritzker School of Molecular Engineering at the University of Chicago. Dr. Chung is a Fellow of BMES, AIMBE, and AHA, and an Associate Editor for Bioactive Materials. She has garnered a variety of honors including the K99/R00 NIH Pathway to Independence Award, AIChE 35 Under 35, NIH Director's New Innovator Award (DP2), inaugural USC NEMO Prize, and the AHA Transformational Project Award. Currently, her lab takes part of national centers and programs including the NIH U54 Kidney O'Brien Center, Chan Zuckerberg Initiative (CZI) Exploratory Cell Networks, and AHA Collaborative Sciences Award.

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