

Endowing Protein Materials with Intelligence

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ABSTRACT

Through centuries of evolution, nature has developed biopolymers capable of folding and assembling into discrete structures with a functional consequence. Inspired by this, our lab focuses on engineering “intelligent” protein materials with entirely new properties and function. In particular, our lab has fabricated protein-derived nanomaterials: helix-elastin block polymers and coiled-coil fibers. We investigate the fundamental self-assembly and molecular recognition capabilities of these systems. More importantly, we are able to harness these structures as well as others to interface with small molecule therapeutics, genes, cells and inorganic metals. Central to this work is the integration of stimuli-responsive domains through rational and computationally-assisted design. Specifically, we demonstrate that these protein nanomaterials serve as effective responsive vehicles for drug and gene delivery.

BIOGRAPHY

Dr. Jin Kim Montclare is an Associate Professor in the Department of Chemical and Biomolecular Engineering, who is performing groundbreaking research in engineering proteins to mimic nature and, in some cases, work better than nature. She works to customize artificial proteins with the aim of targeting human disorders, drug delivery and tissue regeneration as well as create nanomaterials for electronics.

Prior to joining NYU-Poly, Montclare was a postdoctoral fellow at the California Institute of Technology in the Division of Chemistry and Chemical Engineering. She received a Bachelor of Science in Chemistry from Fordham University in 1997, a Master of Science and a PhD in Bioorganic Chemistry from Yale University in 2001 and 2003, respectively. Her honors and awards include the Executive Leadership in Academic Technology and Engineering Fellowship, American Chemical Society PROGRESS /Dreyfus Lectureship, the Dreyfus Special Grants Program Award, the Air Force Office of Scientific Research Young Investigator Award, the Wechsler Award for Excellence, the Othmer Junior Fellow Award, the National Institute’s of Health Postdoctoral Fellowship, and the National Science Foundation Pre-doctoral Fellowship.