GENETIC TAILORING OF INORGANIC-BINDING PEPTIDES FOR BIONANOTECHNOLOGY

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In Nature, high selectivity and precise organization of materials in biological systems lead to control of their unique and unprecedented functions. Biological molecular building blocks, in particular proteins and peptides, in addition to lipids and polysaccharides, play a major role in biological design for controlling assembly of materials hierarchically, from the nanometer to the macroscale. We utilize peptides and protein constructs as molecular building blocks in synthesizing, assembling, and fabricating materials systems for applications in bionanotechnology. In this multidisciplinary approach, we genetically select and tailor solid-binding peptides towards specific functions, as molecular linkers, couplers and growth modifiers. For example, these peptides are used as inorganic catalyzers in the controlled formation of nanoparticles (gold and phosphates), molecular linkers in the targeted assembly of enzymes for advanced functionality, and as assemblers in the formation of nanostructures with controlled architectures, such as those used in bioenabled nanophotonics. The presentation will provide an overview of the approaches carried out in our collaborative groups by presenting proof-of-principle examples in the implementation of bionanotechnology.

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