

Interfacing Nanomaterials with Biology: Applications in Therapeutics and Diagnostics

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A key issue in the use of nanomaterials is controlling how they interact with themselves and with the outer world. Our research program focuses on the tailoring of nanoparticles of surfaces for a variety of applications, coupling the atomic-level control provided by organic synthesis with the fundamental principles of supramolecular chemistry. Using these nanoparticles, we are developing new strategies for biological applications. This talk will focus on the interfacing of nanoparticles with biosystems, and will discuss the application of self-assembled nanoparticles as delivery vehicles, demonstrating the use of nanoparticle-based capsules for direct delivery of small molecules, proteins, and nucleic acids into the cytosol. Finally, this presentation will also feature the use of nanoparticles for diagnostic applications, focusing on using selective nanoparticle-protein interactions to generate array-based ("chemical nose") sensors for detection of cancer and high throughput screening of therapeutic agents.