Bio-Nano Science: A Precursor to Nanomedicine

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A major focus in nanomedicine is the design and engineering of particles for targeted therapy and diagnostics. Self-assembly technologies have been used extensively to engineer a diverse array of particles for such applications. This presentation will focus on our research on the development of particles and their interactions with biological barriers. Aspects of the physicochemical properties of the particles as well as post-assembly biological modification through ligand targeting and the formation of a protein corona will be covered. Particle variants based on metal–ligand complexation, assembled through the deposition of metal ions and polyphenols, will also be presented. Our studies are aimed at obtaining detailed knowledge of complex bio–nano interactions, which is expected to aid in the rational design of nanoengineered materials for applications including HIV, hearing loss and cancer targeting.