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Nanoscale sensor design via *in situ* labeling of gold nanoparticles onto protein scaffolds

Recent research efforts in the area of nanosensors are focused on labeling proteins with gold nanoparticles. Protein labeled gold nanoparticles (AuNPs) serve as colorimetric sensors due to their characteristic plasmon absorption band, thus, identifying whether the protein is in its folded or unfolded configuration. One of the important steps in developing AuNP based protein sensor is to design biocompatible gold nanoparticles and to develop protocols to conjugate AuNPs to proteins. In our present study, we have developed a novel protocol to label protein-A with gold nanoparticles. Protein-A is a 42 KD biomolecule that has four repetitive domains rich in glutamic and aspartic acids, but deficient in cysteine. This protein is typically found on the surface of Staphylococcus aureus and it binds to most mammalian derived immunoglobins, particularly the IgG class, through its interaction with the Fc end of the antibody. Our new methodology involves the dual generation of gold nanoparticles followed by simultaneous labeling of protein-A matrix. The protein-A conjugated gold nanoparticles will provide new generation of colorimetric sensors with potential applications in sensor design to better understand the interactions of proteins with specific antibodies. This poster will present details of the direct generation of protein-A coated gold nanoparticles, photophysical properties, TEM analysis, and their application in nanoscale sensor design.