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Research Article

Synthesis and Bioconjugation of Gold Nanoparticles as Potential Molecular Probes for Light-Based Imaging Techniques

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Abstract

We have synthesized and characterized gold nanoparticles (spheres and rods) with optical extinction bands within the “optical imaging window.” The intense plasmon resonant driven absorption and scattering peaks of these nanoparticles make them suitable as contrast agents for optical imaging techniques. Further, we have conjugated these gold nanoparticles to a mouse monoclonal antibody specific to HER2 overexpressing SKBR3 breast carcinoma cells. The bioconjugation protocol uses noncovalent modes of binding based on a combination of electrostatic and hydrophobic interactions of the antibody and the gold surface. We discuss various aspects of the synthesis and bioconjugation protocols and the characterization results of the functionalized nanoparticles. Some proposed applications of these potential molecular probes in the field of biomedical imaging are also discussed.