

A Facile Surface Modification of Polyethylenimine-Stabilized Gold Nanoparticles and Their Enhanced Cytotoxicity

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For biomedical applications, in particular for in vivo applications, surface modification of nanoparticles is prerequisite. We report a simple route to ligand exchange of polyethylenimine (PEI)-stabilized Au nanoparticles to polyethylene glycol (PEG) or polyvinylpyrrolidone (PVP), simply by adjusting the pH of solution. Transmission electron microscopy (TEM) and UV-vis analyses revealed that there was no size change or aggregation during the ligand exchange reaction. We also found that decrease of the electrostatic attraction between PEI and the Au nanoparticles by increasing pH of the solution is important for the ligand exchange reaction. PEG-stabilized Au nanoparticles also exhibited the enhanced biocompatibility and reduced cytotoxicity (apoptotic activity) in human dermal fibroblasts (hDFs) compared with PEI-stabilized Au nanoparticle.