

## Synthesis of liposomal gold nanoparticles with hydrophobic/hydrophilic fluorescent molecules

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Dual-modality imaging nanoparticles based on liposomes are considered as one of ideal biomedical imaging agents because they could provide more accurate imaging for precision medicine. Generally, those nanoparticles are produced by the sonication of a thin lipid film with both colloidal metal nanoparticles and fluorescent molecules. However, this method suffers from poor yield and low selectivity, and has been limited to hydrophobic fluorescent molecules. Here we propose the facile synthesis of liposomal gold nanoparticles with both hydrophobic and hydrophilic fluorescent molecules. The hydrophobic fluorescent molecules are embedded in lipid bilayer of liposome and the hydrophilic fluorescent molecules are selectively encapsulated within the liposome with ascorbic acid. Next, gold nanoparticle is grown inside the liposome by diffusion and reduction of gold precursors. The resulting hybrid nanoparticles are extensively characterized by fluorescence microscope, TEM, UV-vis spectroscopy, and dark-field spectroscopy, respectively.