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Concentration Dependence of Gold Nanoparticles for Fluorescence Enhancement[1] JOEL SOLOMON, BRUCE WITTMERSHAUS, School of Science, Pennsylvania State University: Erie, The Behrend College — Noble metal nanoparticles possess a unique property known as surface plasmon resonance in which the conduction electrons oscillate due to incoming light, dramatically increasing their absorption and scattering of light. The oscillating electrons create a varying electric field that can affect nearby molecules. The fluorescence and photostability of fluorophores can be enhanced significantly when they are near plasmonic nanoparticles. This effect is called metal enhanced fluorescence (MEF). MEF from two fluorescence organic dyes, Lucifer Yellow CH and Riboflavin, was measured with different concentrations of 50-nm colloidal gold nanoparticles (Au-NP). The concentration range of Au-NP was varied from 2.5 to 250 pM. To maximize the interaction, the dyes were chosen so their emission spectra had considerable overlap with the absorption spectra of the Au-NP, which is common in MEF studies. If the dye molecules are too close to the surface of Au-NP, fluorescence quenching can occur instead of MEF. To try to observe this difference, silica-coated Au-NP were compared to citrate-based Au-NP; however, fluorescence quenching was observed with both Au-NP.

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