Nanohour

Wednesday, October 29, 2014, 3:00 pm

Beckman Institute – Room 4269

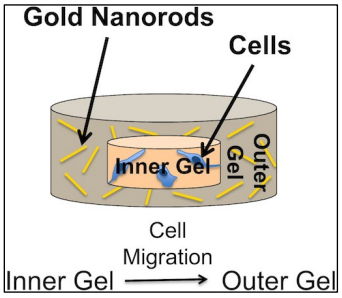
Gold Nanorods in a Model Extracellular Matrix Promote Migration of MDA-MB-231 Human Breast Cancer Cells

Elissa Grzincic, Materials Chemistry

Graduate Student with Professor Catherine J. Murphy

Gold nanorods are widely studied for use in biological settings as imaging, therapeutic and detection agents. Their successful application in the human body depends on many factors, including the interactions of the gold nanorods with biomolecules, cells and the extracellular matrix. While much research has been conducted to elucidate the effects of nanomaterials on cell viability and growth, little is known about how gold nanorods alter the matrix and cell-matrix interactions.

We have used 3D nested type I collagen gel matrices to model the extracellular matrix of MDA-MB-231 metastatic human breast cancer cells in order to measure the effects of gold nanorods on cell migration (a highly matrix-dependent process). It was observed that gold nanorods in the extracellular matrix promoted spontaneous cell migration and altered the migratory phenotype of the MDA-MB-231 cells via a mesenchymal-amoeboid transition. It was hypothesized that these changes were due to changes in either the mechanical and microstructural properties of the collagen network, or the creation of soluble biochemical gradients. Gold nanorods were found to alter both the mechanical/structural properties and molecular diffusion, along with cellular adhesion, morphology, locomotion strategy and protease expression. Overall, gold nanorods were found to affect complex cell-matrix interactions in ways that impact cancer cell migration.

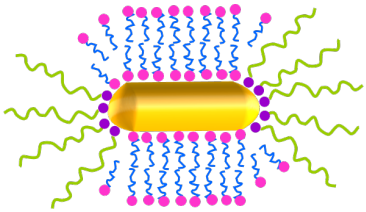


NMR Spectroscopy of Gold Particles: Insights into the Surface

Ariane Vartanian, Materials Chemistry

Graduate Student with Professor Catherine J. Murphy

Anisotropic gold nanoparticles, such as “patchy” particles or nanorods, are challenging to characterize on the molecular level. Our group and others have functionalized gold nanorods with organic ligands, polymers, and biomolecules, but many applications require a thorough understanding of the surface morphology. For example, nanorods are passivated by a bilayer of cetyltrimethylammonium bromide (CTAB), but little is known about the packing density, bilayer homogeneity, or other features that affect the rods’ reactivity and stability. In this research, we use a series of one- and two-dimensional NMR techniques to decipher the ligand morphology of anisotropic gold particles.



Coffee and cookies will be served

http://nanohour.beckman.illinois.edu/Nanohour/Nanohour.html