



L4H Seminar CHRISTINE K. PAYNE 'Fluorescent Nanoparticles for Live Cell Imaging: Unraveling Nanoparticle-Cell Interactions'

CHRISTINE K. PAYNE

School of Chemistry and Biochemistry, Georgia

April 08, 2014

Tuesday, April 8, 2014, 10:30. Seminar Room

CHRISTINE K. PAYNE

School of Chemistry and Biochemistry, Georgia Tech, Atlanta, UNITED STATES

Nanoparticles offer exciting new approaches for biomedicine ranging from drug delivery to cellular imaging. In the course of these applications, nanoparticles are exposed to a complex mixture of extracellular proteins that are adsorbed onto the surface of the nanoparticle. This "protein corona" dominates the interaction of nanoparticles with cells. We have investigated how proteins found in blood serum affect the cellular binding of protein-nanoparticle

complexes. Using fluorescence microscopy, we find that the cellular binding of cationic nanoparticles is enhanced by the presence of serum proteins while the binding of anionic nanoparticles is inhibited. Competition assays show that these protein-nanoparticle complexes use distinct cellular receptors. The protein-nanoparticle complexes formed from cationic nanoparticles bind to scavenger receptors on the cell surface. Protein-nanoparticle complexes formed from anionic nanoparticles bind to native albumin protein receptors. This trend is independent of nanoparticle composition; quantum dots formed from semiconductors, colloidal gold nanoparticles, and low-density lipoprotein particles all show the same behavior. We are currently using CD and fluorescence spectroscopy to probe the structure of the adsorbed proteins. As nanoparticles become increasingly important for biomedical applications, our results show that the complete nanoparticle-protein-cell interaction must be considered.

Tuesday, April 8, 2014, 10:30. Seminar Room

Hosted by Prof. Melike Lakadamyali