Nanotoxicology in Education, Industry, and the Regulatory Environment

Thursday, August 28th 2014; RFM 5242; 3.30pm

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Bio: Dr. Christie M. Sayes is senior scientist and program manager for the Toxicology & Pharmacology in Nanotechnology Group at RTI International. She was formerly a professor of toxicology at Texas A&M University. She has more than a decade of experience in the fields of nanotechnology and nanotoxicology and has authored numerous publications, including original research, invited reviews and book chapters. She is a member of the Society of Toxicology and currently serves at the President of the NC Chapter. In Addition, Sayes serves on the Editorial Board of the journals *Nanotoxicology, Toxicology Letters,* and *Toxicological Sciences*.

Abstract: Nanotechnology is most commonly driven by the increasing importance of very small particles in a variety of applications. These applications mainly reside in technologies stemming from the electronic or optical sensing approaches. With the advent of surface functionalization on very small particulates, however, gave way to the birth of nanomedicine and nanotoxicology. Our research continues to investigate the interface between the hydrophobic nature of inorganic nanostructures and the hydrophilic nature of biology. As part of the R&D in biological applications, we also study the unintended implications of engineered nanomaterials. Particles are carefully selected in groups of similar physicochemical properties, characterized as they transform over time, and exposed to mammalian and bacterial systems. Properties such as particle size, surface charge, and chemical composition are related to specific pathway-specific biological responses such as apoptotic, oxidative stress, or other immune or inflammatory events. Results of these studies provide insights on how engineered nanomaterial features influence cellular responses and thereby outline possible approaches for developing and applying predictive models for biological responses caused by exposure to nanomaterials.