

# 4<sup>th</sup> Global Summit on **Toxicology**

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## **The need for nanomaterial evaluation in a physiologically relevant model: Connecting environmental variables and NM behavior to toxicological responses**

**Kristen K Comfort**

University of Dayton, USA

Due to their distinctive physiochemical properties, nanomaterials (NMs) have been incorporated into an increasing number of products and applications. However, studies have identified that these same properties introduce a serious health concern, with NM-dependent toxicity directly correlating to specific physiochemical variables, such as size, composition, and surface coating. While much has been accomplished with regard to basic nanotoxicology, significant alterations to basal biological functionality can occur, even in the absence of cytotoxicity; introducing a novel subset of health concerns. For example, we have shown that chronic exposure to low, sub-toxic dosages of silver NMs produced a long term stress response, genetic modification, and altered cell functionality. Moreover, as NM transport and agglomeration differs from traditional chemicals, due to their insoluble nature, their behavior following cellular exposure is directly relevant to toxicological outcomes. We have identified that multiple *in vitro* variables, such as fluid composition, dynamic flow, and cellular models modify both NM characteristics and biological responses. A combination of surface chemistry and the composition of the surrounding environment were the critical factors for NM behavior, such as degree of agglomeration and ionic dissolution. The introduction of shear stress through dynamic flow modified the nano-cellular interface through changes to cell morphology and NM deposition efficiency; producing a subsequent shift in the biological response. Therefore, these studies highlight the need for nanotoxicological evaluation to be carried out in a physiologically relevant system in order to best predict potential health concerns associated with NM exposure.

### **Biography**

Kristen K Comfort obtained her PhD in Chemical Engineering from North Carolina State University and completed her Postdoctoral studies as a National Research Council fellow with the Air Force Research Laboratories at Wright Patterson Air Force Base. She is currently an Assistant Professor of Chemical Engineering at the University of Dayton with a joint appointment in Bioengineering. Her research focus is evaluating nanomaterial behavior and subsequent biological responses in enhanced *in vitro* environments; an area in which she currently has over 10 publications, many of which in high impact journals.

[kcomfort1@udayton.edu](mailto:kcomfort1@udayton.edu)