## Determination of Manufactured Nanoparticles' Toxicity Using Novel Rapid Screening Methods

Supporting/Contributing Agency: EPA

Nanomaterials have received tremendous national attention because of the potential for creating new analytical tools for biotechnology and life sciences. There are over 500 products containing nanoparticles within the 1-100 nm size range, on the commercial market (Woodrow Wilson International Center for Scholars, http://www.nanotechproject.com/44), and this number is rapidly increasing. Despite the widespread application of these nanoparticles, there is a serious lack of information concerning the toxicity of these nanoparticles. Using the prolonged approach, we are determining the cross-kingdom toxicity of well-characterized nanoparticles to bacteria, *Drosophila malanogaster* and mammalian cell lines.

Initial results showed that silver nanoparticles have antimicrobial properties causing toxicity to *Escherchia coli* (MS under preparation). On the other hand, silver nanoparticles are able to enter mammalian cells, and caused DNA damage and ultimately cell death (Ahamed et al. 2008). Further, we are determining the toxicity of other nanoparticles in three model systems, at cellular, molecular, and organismal levels.

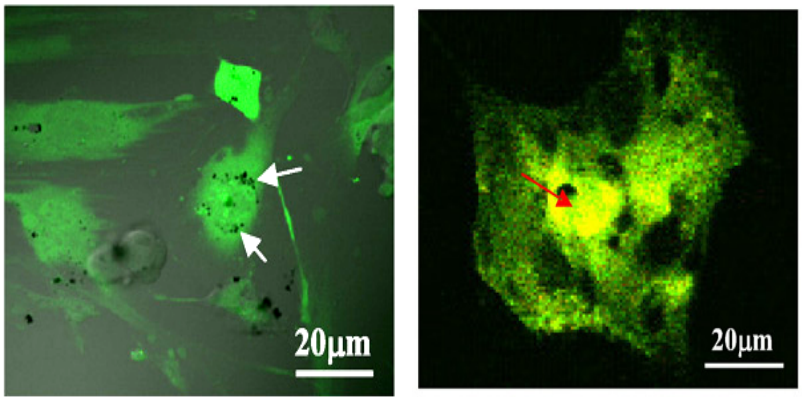


Figure. Inhalation model in *Drosophila* showing that nanoparticles enter into tracheal system.

### References/Publications

Ahamed M, Karns M, Goodson M, Rowe J, Hussain S, Schlager J, Hong Y. 2008. DNA damage response to different surface chemistry of silver nanoparticles in mammalian cells. *Toxicology and Applied Pharmacology* 233: 404-410. Publication acknowledges NSF support

Goodson, Michael S., Alison J. DesJardins, Ravi Ramasamy, Maqusood Ahamed, Jayne B. Robinson, John J. Schlager, Saber M. Hussain, and John J. Rowe. Assessment of the antimicrobial effects of silver. (in manuscript)