**Toxicological Inhalation Effects of Metal-Based Nanoparticle Aerosols as Studied by a Portable In Vitro Exposure Cassette**

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**Abstract:**  Inhalation is the highest route of occupational exposure to aerosols. The toxicology of aerosols in occupational settings is often performed through particle collection on a filter followed by reconstitution into cell culture media which can alter the biological effects. Current *in vitro* exposure systems require additional instruments to control temperature and humidity, making the system bulky and difficult to take to the field. The Portable *In Vitro* Exposure Cassette (PIVEC) was designed for personal monitoring, characterized using copper nanoparticles, tested with alveolar cells, and set-up for real-time monitoring. Copper nanoparticles were dispersed as a dry aerosol to determine the deposition efficiency of the system on a mass and particle number basis. A549 cells, a human alveolar adenocarcinoma epithelial line, were exposed to the aerosols and oxidative stress and cell viability were monitored post-exposure. Additionally, rapid monitoring of oxidative stress was performed using an enzyme-based biosensor. The functionalized biosensor uses cytochrome c to measure reactive oxygen species through electrochemical detection during aerosol exposures. When compared to a traditional biological assay, the biosensor response was similar. The PIVEC is a unique device, designed to monitor aerosols using air-liquid interface *in vitro* techniques including a real-time monitor for oxidative stress.

**Biography:**

**Lynn Secondo** is a recent graduate of Virginia Commonwealth University. She holds degrees in chemical engineering from Virginia Commonwealth University, University of Michigan, and Trine University. During her graduate studies, Dr. Secondo performed research in electrochemistry, nanotoxicology, and aerosol science. She has been supported through a Fulbright Fellowship and Graduate School Dissertation Assistantship Award and is a member of Tau Beta Pi and Omega Chi Epsilon. Dr. Secondo has authored and co-authored 5 peer-reviewed journal articles and 1 provisional patent.

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