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Investigating the toxic effect of biosensor nanoparticles using the *Caenorhabditis elegans* nematode

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Nanoparticles have recently developed for a variety of applications in energy, medicine, safety, and defense products. The anthrax bioterrorism attacks of 2001 have prompted attention to the employment of nanoparticles and nanotechnologies to develop novel methods of detecting bacterial and viral pathogens, but little is known about their toxic effects on multicellular organisms. Interestingly, the nematode *Caenorhabditis elegans* (*C. elegans*) may serve as a good animal model to study the possible toxicological effects of nanoparticles on organisms as it has been widely used in many toxicological studies. Therefore, in this study we investigated the toxicity of three nanoparticles, amine, carboxyl, and pani-alanine using *C. elegans*. Briefly, N2 Bristol wildtype *C. elegans* nematodes were grown and cultured on nematode growth media plates seeded with OP50 bacteria food source, and exposed at the egg stage to either single nanoparticle types (mixed into their food source) or with food source alone and assed when they reached the adult stage for any effects on longevity, fertility, metabolism, and response to increased oxidative stress, a measure of normal cellular activity. Our findings demonstrate that exposure of *C. elegans* to single nanoparticle types does not correspond with a statistically significant toxic effect on fertility, metabolism, longevity or their ability to respond to oxidative stress. These results suggest that exposure to single nanoparticles may not be harmful, but future studies should be conducted to determine if combined nanoparticle exposure would result in similar findings, as it is rare that contact would be limited to only one type.

Biography

Sylvia A. Vetrone received her Ph.D. in Molecular, Cellular and Integrative Physiology from the University of California, Los Angeles in 2008. He has been teaching at Whittier College sine 2006. Along with her teaching and research, she also serves as a coordinator for the Mellon Mays Undergraduate Fellowship and the HHMI STEM Research & Teaching Fellowship. Vetrone is a member of the HACU Advisory Committee and Faculty Caucus, the Society for Advancement of Chicanos and Native Americans in Science, and the Institute for Biological Engineering. Her research interests are disease pathology, cellular oxidative processes, and biosensor applications.

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