

## Vigilance needed in nanotechnology

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University of Calgary chemistry professor David Cramb is a step closer to helping solve a complex problem in nanotechnology: the impact nanoparticles have on human health and the environment.

Cramb, director of the Faculty of Science's <u>nanoscience</u> program, and his researchers have developed a methodology to measure various aspects of nanoparticles in the <u>blood stream</u> of chicken embryos. Their discovery is published in the March online edition of *Chemical Physics Letters*.

"With the boom in nanomaterials production there is an increasing possibility of environmental and/or human exposure. Thus there is a need to investigate their potential detrimental effects," says Cramb. "We have developed very specialized tools to begin measuring such impacts."

Nanoparticles are particles or groups of atoms or molecules nanometers in size. One millimetre (or the diameter of the head of a pin) is equal to one-million nanometres. Nanoparticles are already used in the cosmetics industry and are being developed for drug delivery, <u>diagnostic imaging</u> and tissue engineering, to name only a few applications. It is estimated investments in <u>nanotechnology</u> globally will reach about \$12 trillion US by 2012.

Cramb is looking for ways to help answer questions including: If embryos are exposed to nanoparticles, where will the nanoparticles go? How will the embryo respond? What regulatory approaches can be recommended to mitigate accidental exposure? How can nanotechnology



be made green and sustainable?

"Bioaccumulation studies involving embryos are being conducted in our laboratory," says Cramb. "These studies are important since chronic nanotoxicity in an adult organism could be related to exposure during the development process. Additionally, acute exposure may affect embryonic viability."

Cramb and his researchers studied motion and light induced changes in nanoparticles by focusing a laser beam into a blood vessel containing nanoparticles and measuring fluorescence. (The measurements provide a determination of particles aggregation in the vessel). This is unique because it has never been done in a live embryo. The results will now allow measurement and understanding of uptake into embryonic tissues.

## More information:

http://www.sciencedirect.com/science/journal/00092614

Provided by University of Calgary

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