New nanotoxicity framework

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For the first time, investigators have a framework for assessing what health risks novel manmade nanomaterials might pose humans, experts told UPI's Nano World.
A new report from government, industry and non-profit researchers maps out a strategy for scientists nationwide to follow to best understand what hazards these compounds might present.

"If we are to see public trust of these new materials, we've got to understand the possible hazards and how to minimize the risks associated with those hazards," said Andrew Maynard, chief science adviser for the Woodrow Wilson Center's Project on Emerging Nanotechnologies in Washington.

"We're going to have to carry out many, many studies to understand those hazards, and those studies will have to be carried out with a common basis," Maynard added. The new report "is a major step" in developing that basis.

When it comes to providing recommendations to companies, "I think this report represents an excellent beginning framework," said David Warheit, a staff toxicologist at DuPont's Haskell Laboratory in Delaware.

As U.S. researchers confer with their colleagues abroad in the coming months, this framework "could help work towards global harmonization of approaches," noted Jim Willis, director of the Environmental Protection Agency's Office of Pollution Prevention and Toxics'

Chemical Control Division in Washington.

The strategy has three key elements. The first involves distinguishing the unique chemical and physical structures of each nanomaterial. In the past, when scientists tested how toxic compounds were, properties such as the size or shape that material came in were often not considered important. Research now shows the toxic properties of a material can vary dramatically on how these other properties change, Maynard said. The report notes that until scientists have a better understanding of how these characteristics may render a nanomaterial more or less hazardous, they should consider all such properties potentially significant and measure them as best possible.

The strategy's other elements involve testing how toxic a nanomaterial is against cells or tissues grown in labs (in vitro studies) and how toxic it is against live animals (in vivo studies). While in vitro studies are cheaper, Warheit noted in vitro studies could get directly opposite effects from in vivo studies. Until the accuracy of in vitro studies in nanomaterial toxicology are validated, "in my opinion, they're not they're yet" as useful screens, he said.

A major consideration researchers should have when it comes to nanomaterial toxicology is how inhaled nanomaterials could move from the lungs into the blood and lymph and then distant organs to a greater extent than bulk materials such as fibers would. "A screening strategy should look at the impact of particles on other organs," Warheit said.

The report will appear in the journal *Particle and Fibre Toxicology*.