Breakthroughs in nanotechnology on edge of 'knowledge frontier'

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University of Missouri scientist Kattesh Katti recently discovered how to make gold nanoparticles using gold salts, soybeans and water. Katti's research has garnered attention worldwide and the environmentally-friendly discovery could have major applications in several disciplines.

Gold nanoparticles are tiny pieces of gold, so small they cannot be seen by the naked eye. Researchers believe gold nanoparticles will be used in cancer detection and treatment, the production of "smart" electronic devices, the treatment of certain genetic eye diseases and the development of "green" automobiles.

While the nanotechnology industry is expected to produce large quantities of nanoparticles in the near future, researchers have been worried about the environmental impact of typical production methods. Commonly, nanoparticles have been produced using synthetic chemicals. Katti's process, which uses only naturally occurring elements, could have major environmental implications for the future. Since some of the chemicals currently used to make nanoparticles are toxic to humans, Katti's discovery also could open doors for additional medical fields. Having a 100-percent natural "green" process could allow medical researchers to expand the use of the nanoparticles.

"Typically, a producer must use a variety of synthetic or man-made chemicals to produce gold nanoparticles," said Katti, professor of radiology and physics in the School of Medicine and College of Arts and Science at MU, senior research scientist at the MU Research Reactor

(MURR) and director of the University of Missouri Cancer Nanotechnology Platform. “To make the chemicals necessary for production, you need to have other artificial chemicals produced, creating an even larger, negative environmental impact. Our new process only takes what nature has made available to us and uses that to produce a technology already proven to have far-reaching impacts in technology and medicine.”

The new discovery has created a large positive response in the scientific community. Researchers from as far away as Germany have commented on the discovery’s importance and the impact it will have in the future.

“Dr. Katti’s discovery sets up the beginning of a new knowledge frontier that interfaces plant science, chemistry and nanotechnology,” said Herbert W. Roesky, a professor and world-renowned chemist from the University of Goettingen in Germany.

Katti and his long-time collaborator and colleague, Raghuraman Kannan, assistant professor of radiology, sowed the seeds of Nanomedicine at MU through their groundbreaking discoveries in 2004. MU now has an internationally recognized research program in nanomedicine. The research was funded by grants from the National Cancer Institute and the National Institutes of Health.

Katti’s research in the field of nanomedicine, biomedicine, cancer diagnostics/therapeutics and optical imaging have earned him numerous awards and recognition. The latest honor bestowed upon Katti is the “Outstanding Missourian” award, which he will receive Tuesday, March 4 in Jefferson City. The award is presented as “acknowledgement of the most accomplished citizens of the state of Missouri” and for making an “outstanding contribution to his state or nation.” He is scheduled to receive the award at the beginning of the morning session of the Missouri House of Representatives.

In a recent interview, he expressed his gratefulness for the recognition, but attributes much of the credit to others, including his wife, Kavita Katti, who is a senior research chemist at MU, and his parents in India who supported him in his education.

“I feel excited about the recognition, and I attribute my selection to our institution, my research group and my collaborators,” Katti said. “This award is the culmination of several factors, including departmental leadership, a plethora of outstanding collaborators at MU, the deans and, of course, the chancellor. A faculty member could not possibly succeed just by his or her own efforts. We have been very blessed with this team effort. I am very excited to receive this recognition. I think it speaks highly of our school and of our nanomedicine program.”

Source: University of Missouri-Columbia