

Manipulating nanoparticles' surface chemistry holds medical promise

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(PhysOrg.com) -- Swapping the chemical groups that originally coat iron oxide nanoparticles and making the particles soluble in biological solvents shows great promise for medical applications, such as drug delivery and contrast agents, according to a recent publication by University of Alabama engineers and scientists highlighted in *Nature* magazine.

According to an article published in the Aug. 4 issue of [Nature](#), “the tiny particles of [iron oxide](#) can have their surface chemistry manipulated to make them soluble in water and so more useful in medical application.”

Dr. Yuping Bao, assistant professor of chemical and biological engineering, works with iron oxide [nanoparticles](#), particularly for biomedical applications such as drug delivery and bioimaging. The water solubility and surface functionality of the nanoparticles are key parameters to their interactions with biological systems. Depending on the application, the surface coating of the nanoparticle significantly impacts its efficacy.

The properties of many conventional materials change when formed from nanoparticles because nanoparticles have a greater surface area per weight than larger particles. Therefore, a challenge with using nanoparticles in medical situations is keeping them stable in an aqueous environment like the human body.

Bao and a UA research team found that the process works best when the

original coatings of the iron oxide nanoparticles were trioctylphosphine oxide and replaced with poly (acrylic acid), polyethylenimine or glutathione, which produced charged nanoparticles in an aqueous solution.

The University's Office for Technology Transfer is working with Bao on filing for patent protection and researching commercial opportunities.

Provided by University of Alabama

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