

Tracking Nanomaterials In Vivo

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Researchers at Northwestern University have been developing a toolbox of synthetic amino acids (related to building blocks of proteins) that assemble themselves into complex structures that may prove useful in drug delivery and tissue engineering applications. Now, that same research team has devised a noninvasive method of imaging these nanostructured materials within the body, providing a way of tracking the fate of these materials in a living organism.

Samuel Stupp, Ph.D., and his colleagues have been creating complex, self-assembled, nanoscale materials that can serve as scaffolds for tissue regeneration following surgery or injury, and as targeted, multifunctional drug delivery devices. Once these materials have served their purpose, the body would degrade them slowly and gradually eliminate them, but tracking such a process would be difficult because of the similarity of these materials to those found in the body.

To provide a handle on how the body handles these materials, Dr. Stupp and his collaborators teamed with Thomas Meade, Ph.D., also at Northwestern, to create another synthetic amino acid that can bind strongly to gadolinium ions. Other compounds containing gadolinium ions are employed by radiologists today to enhance images obtained using magnetic resonance imaging (MRI).

When these gadolinium-binding amino acids were incorporated into a variety of different self-assembling nanostructures, they were readily visible in images obtained using MRI. By studying various nanostructures, the investigators were able to determine how to

maximize the MRI signal with a minimum amount of gadolinium, which can be toxic in large amounts. Dr. Stupp and his team are now using this gadolinium-containing amino acid to study degradation and migration of their self-assembled nanostructures in vivo.

This work is detailed in a paper titled, “Magnetic resonance imaging of self-assembled biomaterial scaffolds,” which appeared in the journal *Bioconjugate Chemistry*. An abstract of this paper is available through PubMed. ([View abstract](#))

Source: National Cancer Institute

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