



Southern Illinois University System

### Applications

- Contrast agent for medical imaging via MRI
- Detection or monitoring of pathological conditions within mammals

### Inventor(s)

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*Dr. Gao is an associate professor of chemistry and biochemistry at SIU Carbondale. His research focuses on novel carbon-based materials for fuel cells, CO<sub>2</sub> separation, and other clean energy projects.*

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*Dr. Goodson is a professor of chemistry and biochemistry at SIU Carbondale. His research focuses on increasing the sensitivity of medical imaging via novel MRI contrast agents and imaging paradigms.*

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## Biocompatible pH-Sensitive Imaging Agents

Magnetic Resonance Imaging (MRI) is a ubiquitous medical imaging tool, but often lacks the sensitivity and specificity of more invasive or expensive procedures. MRI performance can be enhanced by altering the contrast agent injected into a patient or tissue sample prior to imaging. Paramagnetic contrast agents can offer increased overall sensitivity, for example, while the addition of other environmentally sensitive moieties can allow local chemical profiles associated with disease or injury to be detected. One environmental measure of interest is pH, as differential cell metabolisms associated with injury, inflammation, and certain cancers can cause local shifts in tissue pH.

### Invention

SIU researchers have developed a biocompatible imaging agent (and accompanying method of use) featuring a paramagnetic core and a pH-sensitive macromolecule. The invention allows for MRI detection of lower- and higher-pH regions within biological tissue to enable enhanced detection, diagnosis, and tracking of injury, ischemia, inflammation, and various cancers.

### Key Advantages

- High sensitivity
- Low toxicity
- Sensitive to pH changes in physiologically-relevant regimes (6 – 8)
- Applicable to living organisms, excised tissues, cell cultures, and more

### Status

U.S. patent #9,682,157 issued June 20, 2017. The technology is available for license.

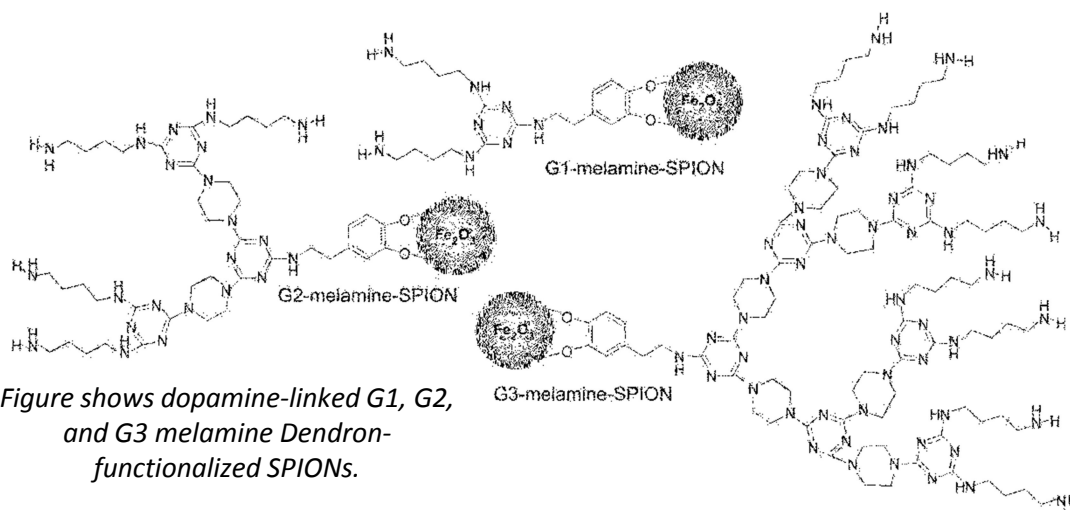


Figure shows dopamine-linked G1, G2, and G3 melamine Dendron-functionalized SPIONs.

*Other opportunities related to this technology, included but not limited to sponsored and/or collaborative research, may be available.*