



Techniques to increase R_1 in nanoparticle contrast agents for MRI

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Inventor

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Invention Description

Noninvasive imaging systems, such as PET, SPECT, MRI, and CT, have become an essential part of modern medicine. Though MRI provides good contrast between the different soft tissues, contrast agents may be used to enhance the appearance of blood vessels, tumors, inflammation, or joints. When a contrast agent is specified, it is important to use one giving as high a contrast as possible, preferably by increasing R_1 .

Researchers at the Biodesign Institute of Arizona State University have developed an innovative MRI contrast agent with a per-ion R_1 relaxivity at least twice as great as that of existing agents. By combining paramagnetic materials with magnetoferritin under controlled conditions, an MRI contrast agent with a per-ion R_1 of $330\text{mM}^{-1}\text{s}^{-1}$ was synthesized. In addition to its high R_1 value, this agent is small (~ 10 nm) and spherical, allowing for easier delivery than existing agents.

In addition to the immediate usefulness of the novel contrast agent, the method of synthesis may be used to produce contrast agents with even higher R_1 relaxivity or other tailored properties.

Potential Applications

- MRI contrast agent

Intellectual Property

Status:

Patent Pending

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Benefits and Advantages

- R_1 values at least twice as high ($330\text{mM}^{-1}\text{s}^{-1}$) than existing contrast agents
- Less susceptible to confounding image artifacts than contrast agents that increase T_2 .
- Easier delivery than existing agents, due to its small size (~ 10 nm) and spherical shape