

Better insight into brain anatomical structures

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Magnetic resonance imaging is a very effective method for revealing anatomical details of soft tissues. Contrast agents can help to make these images even clearer and allow physiological processes to be followed in real time. Conventional gadolinium complexes currently used as MRI contrast agent cannot reveal anatomic structures.

As reported in the journal *Angewandte Chemie*, Korean researchers led by Jung Hee Lee at Samsung Medical Center and Taeghwan Hyeon at Seoul National University have now developed a new MRI contrast agent using manganese oxide nanoparticles that produces images of the anatomic structures of mouse brain which are as clear as those obtained by histological examination.

Magnetic resonance images after injection of the manganese oxide nanoparticles gave a view into different areas of the mouse brains—in excellent resolution. "We have developed the first truly biocompatible MRI contrast agent for anatomical brain imaging," Lee and Hyeon point out. "With this agent, we are able to get high-contrast views of the anatomical details of live mouse brain." The researchers hope that their new contrast agent will allow better research and diagnosis of brain diseases involving the CNS (central nervous system), such as Alzheimer's disease, Parkinson's disease, strokes, and tumors.

Furthermore, the Korean team was able to attach antibodies to the manganese oxide nanoparticles. These antibodies recognize and specifically bind to receptors on the surface of breast cancer cells. In

mouse brains with breast cancer metastases, the tumors were clearly highlighted by the antibody-coupled contrast agent. The same principle should allow other disease-related changes or physiological systems to be visualized by using the appropriate antibodies.

Citation: Taeghwan Hyeon, Development of a T1 Contrast Agent for Magnetic Resonance Imaging Using MnO Nanoparticles, *Angewandte Chemie International Edition*, doi: 10.1002/anie.200604775

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