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MRI images transplanted islet cells with help of positively charged nanoparticles

Peer-Reviewed Publication

CELL TRANSPLANTATION CENTER OF EXCELLENCE FOR AGING AND BRAIN REPAIR

Tampa, Fla. (Oct. 1, 2012) – In a study to investigate the detection by MRI of six kinds of positively-charged magnetic iron oxide nanoparticles designed to help monitor transplanted islet cells, a team of Japanese researchers found that the charged nanoparticles they developed transduced into cells and could be visualized by MRI while three kinds of commercially available nanoparticles used for controls could not. The study is published in a recent special issue of *Cell Medicine* [3(1)], now freely available on-line at: <http://www.ingentaconnect.com/content/cog/cm>.

"Our data suggests that novel, positively-charged nanoparticles can be useful MRI contrast agents to monitor islet mass after transplantation," said study co-author Hirofumi Noguchi, MD, PhD, of the Department of Gastroenterological Surgery, transplant and Surgical Oncology at the Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences. "Significant graft loss immediately after islet transplantation occurs due to immunological and non-immunological events. With MRI an attractive potential tool for monitoring islet mass in vivo, efficient uptake of MRI contrast agent is required for cell labeling."

The researchers note that recent techniques of labeling islet cells with magnetic iron oxide has allowed detection of transplanted islet cells, however commercially available magnetic nanoparticles are not efficiently transduced because the cell surface is negatively charged and the negative charge of the nanoparticles. The researchers developed positively charged nanoparticles that were efficiently transduced.

"This approach could potentially be translated into clinical practice for evaluating graft survival and for monitoring therapeutic intervention during graft rejection," concluded Dr. Noguchi.

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This research was among those studies presented at the 37th Annual Meeting of the Japan Society for Organ Preservation and Medical Biology (JSOPMB). Sixteen studies were published in this special issue of *Cell Medicine*. The theme of the issue is "Organ/Cell Transplantation and Regenerative Medicine."

Citation. Oishi, K.; Noguchi, H.; Saito, H.; Yukawa, H.; Miyamoto, Y.; Ono, K.; Murase, K.; Sawada, M.; Hayashi, S. Novel positive-charged nanoparticles for efficient magnetic resonance imaging of islet transplantation. *Cell Med.* 3(1):43-49; 2012.

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