

Study reports iron oxide nanoparticles effective for labeling human endothelial cells

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A team of researchers from three medical institutions in Guangzhou, China, have found that iron oxide nanoparticles (INOPS) are a useful contrast agent for in vivo magnetic resonance tracking of transplanted human endothelial cells. However, the impact of INOPS on the cells varies with a number of factors including the INOPS load. They found that the percentage of iron-labeled cells was significantly lower after 48 hours post-transplantation than at 24 hours post-transplantation. They also found that high INOPS concentration can affect cell activity. High INOPS concentration can induce cell death (apoptosis).

Their study is published in the current issue of [Cell Transplantation](#).

"A good MRI contrast agent must possess a number of features," said study co-author Dr. Wen-Li Chen, at South China Normal University's MOE Key Laboratory of Laser Life Science. "Those features are: low toxicity and good stabilization, high sensitivity, good solubility and the ability to remain in the [target cell](#) for a long time. In our study, we found that INOPS are sensitive and can perturb the static magnetic field and provide a string change in MR signals."

The researchers found that the INOPS could be taken up by the cell rather than adhering to the exterior of the cell membrane. However, they also found that a proportional relationship might exist between the number of labeled cells and signal intensity.

"For the first time, we identified that autophagy death could take place

at high INOPS loading concentrations," said the researchers.

They also discovered that an increased incubation time, from 24 to 48 hours, did not increase [cellular uptake](#) of INOPS and that the percentage of labeled cells declined after 24 hours to be significantly lower by 48 hours.

"It is possible that when the intracellular iron becomes saturated, the particles may start to be expelled out of cells," they concluded. "Thus, the determination of optimal loading concentration is an important step in maintaining the quality of cell labeling and cell activity."

More information: Yang, F-Y.; Yu, M-X.; Zhou, Q.; Chen, W-L.; Gao, P.; Huang, Z. Effects of Iron Oxide Nanoparticle Labeling on Human Endothelial Cells. *Cell Transplant.* 21(9):1805-1820; 2012.

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