Docket #: S16-258

Dual-modality Imaging Probe for Combined Localization and Apoptosis Detection of Stem Cells

Researchers at Stanford have developed a ferumoxytol-based dual-modality imaging probe that allows for long-term stem cell tracking through MRI and early diagnosis of cell apoptosis through simultaneous fluorescence imaging. Stem cell transplants have great promise for therapeutic use. However a large portion of the transplanted stem cells undergo apoptosis and are cleared from the transplant site. The inability to recognize this apoptosis at an early stage is an obstacle for long term success of stem cell transplants. To overcome this challenge, the inventors have designed and synthesized a ferumoxytol-based dual-modality imaging probe. The probe allows simultaneous monitoring of the localization and viability of transplanted stem cells. This technology enables stem cells to be visualized and monitored directly, non-invasively and longitudinally to improve the success of stem cell transplants.

Stage of research
Validation studies are ongoing and show great promise.

Applications

- Stem cell therapeutic development:
  - Track the transplanted stem cells through MRI
  - Monitor the stem cell apoptosis through fluorescence imaging
- Research

Advantages

- Allows simultaneous apoptosis detection and stem cell tracking

- Enables faster recognition of complications with stem cell transplants
- Stem cell viability can be determined from fluorescence imaging without need for other histological staining procedures
- Can be used for *in vivo* detection of caspase activity
- Enhanced T2* relaxivity
- Stem cells can be labeled with the probe before transplantation to minimize *ex vivo* manipulation

Patents

- Published Application: 20180036435
- Issued: 10,188,752 (USA)

Innovators

- Kai Li
- Heike Daldrup-Link
- Hossein Nejadnik

Licensing Contact

Jon Gortat

Licensing & Strategic Alliances Director for Physical Science

Email