Docket #: S19-548

In Vivo Cell Trafficking and Disease Imaging using a NIR-II Molecular Tracker

Tracking in vivo cell distribution, migration, and engraftment using conventional techniques including MRI, PET/CT and conventional optical imaging is often hindered by low resolution, radioactive risks, and limited tissue penetration depth. To combat these limitations, the Cheng group has developed a single molecule, NIR-II fluorescing tracker (CelTrac1000) for real-time monitoring of in vivo cell behavior. CelTrac1000 has shown complete cell labeling with low cytotoxicity and long-term tracking ability for 30 days. The tracker displayed high temporospatial resolution for semi-quantification of the biodistribution of primary mesenchymal stem cell and induced pluripotent stem cell-derived endothelial cells. Additional studies have shown that CelTrac1000 is effective for real-time tracking of migration and distribution in single cell resolution, long contraction, and heart beats. Overall, this development allows for millisecond temporospatial resolution to better evaluate and understand stem cell therapies.

Stage of Research

- in vivo

Applications

- **Cell labeling, and trafficking**
- In vivo animal imaging

Advantages

- **NIR-II: Improved tissue penetration and signal to noise**

- High sensitivity, temporal resolution, and excellent maneuverability

Patents

- Published Application: 20210252167
- Issued: 11,951,187 (USA)

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