Featured Publication Note: Novel ^{89}Zr cell labeling approach for PET-based cell trafficking studies

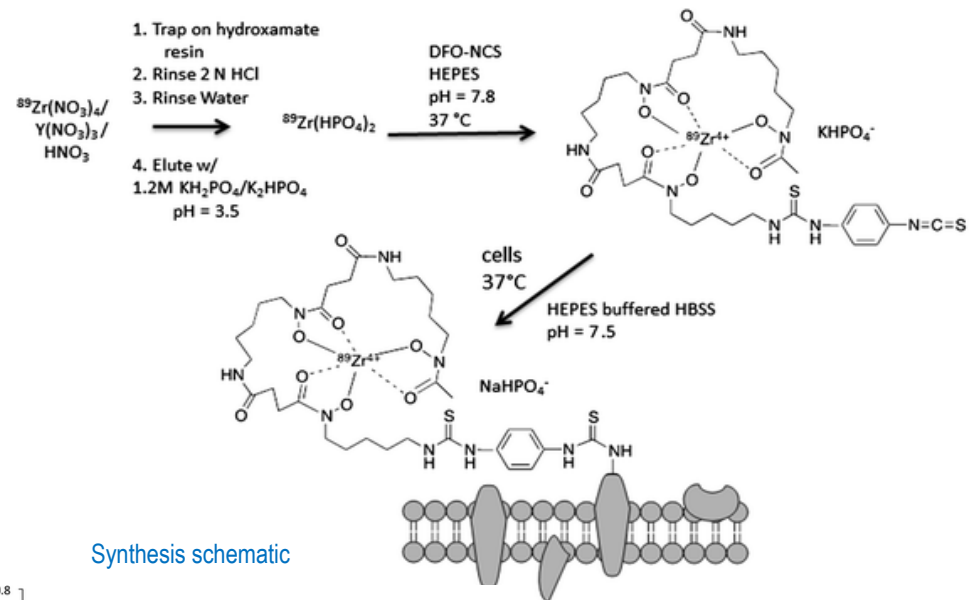
Drs. Aditya Bansal, Timothy DeGrado and colleagues
Mayo Clinic (Rochester, MN, USA)

PerkinElmer
For the Better

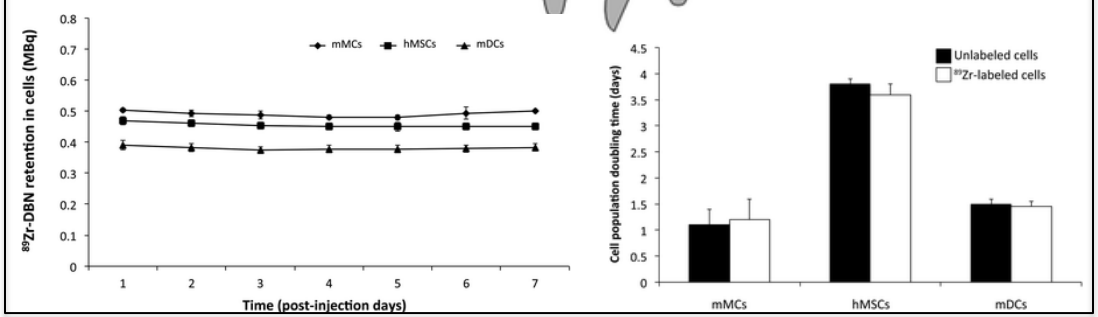
Recent increases in the number of studies investigating cell-based therapies has illuminated the need for a robust and quantitative longitudinal imaging method for tracking cells non-invasively *in vivo*. Nuclear imaging offers the potential to meet this need, however current methodologies suffer from several shortfalls. The authors describe a novel labeling technique for efficient labeling and tracking of cells *in vivo*. They utilized ^{89}Zr, a radionuclide that not only offers high spatial resolution but with its $T_{1/2}$ of 78.4 h, opens the possibility of imaging cells for several weeks and exploits the high sensitivity advantage of PET imaging.

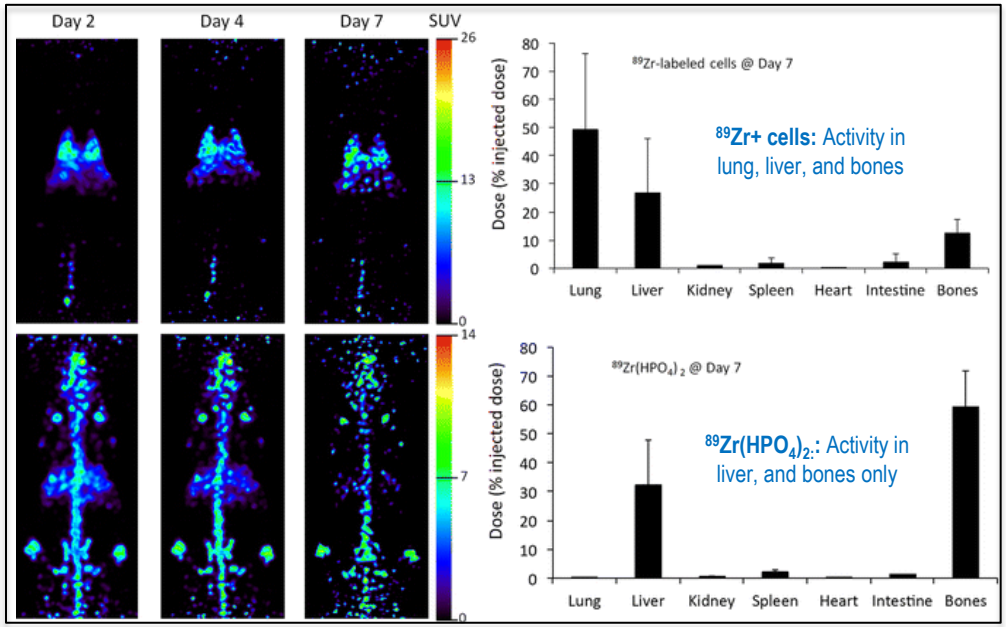
Advantages of this novel ^{89}Zr-DBN-based cell labeling technique over traditional techniques:

- DBN is a flexible platform that covalently binds ^{89}Zr-DFO-labeled agents to cells regardless of type
- Compared to other methods (10-80% efflux), this technique shows negligible efflux over 7 days
- Labeling had no significant adverse effect on cellular viability and proliferation rates



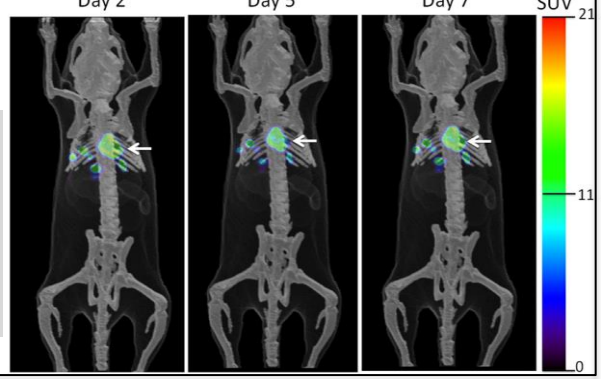
Synthesis schematic





Biodistribution of ^{89}Zr-labeled hMSCs in a ischemia/reperfusion mouse model (cardiac delivery)

The authors used the G4 PET/X-ray system to track ^{89}Zr labeled cells *in vivo* (IV and IC models) over a period of 7 days. The G4's 14% PET facilitates detection of low amounts of radioactivity that remained after several half-lives of decay.



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