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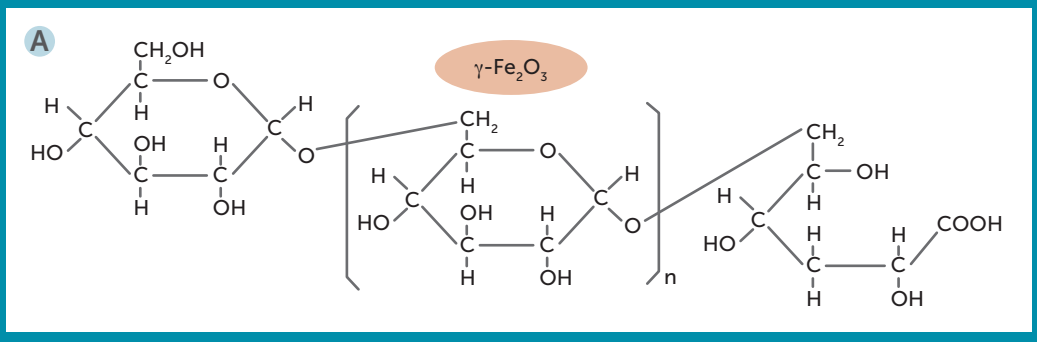
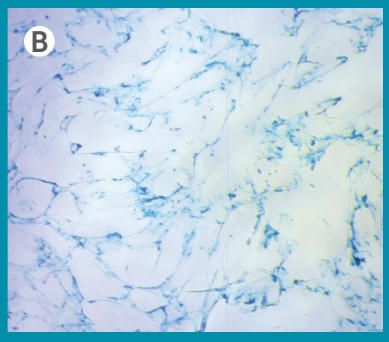
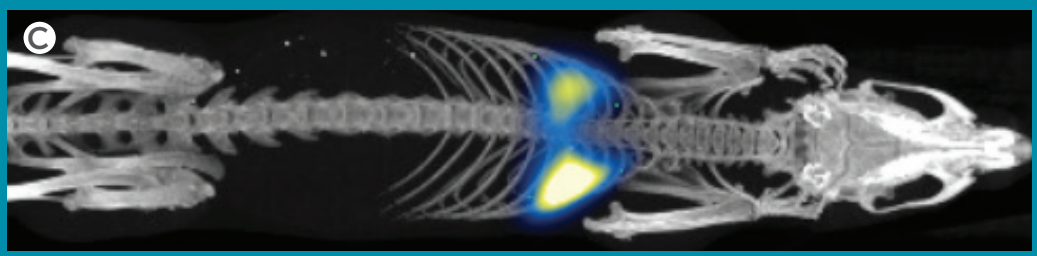
VivoTrax™

Super-paramagnetic iron oxide tracer for pre-clinical Magnetic Resonance and Magnetic Particle Imaging

P/N MIVT01	5 vials
P/N MIVT01X	10 vials
Components:	Each vial contains 1.1 mL of VivoTrax superparamagnetic iron oxide (SPIO) dextran magnetite nanoparticle solution
Format:	Each vial contains ~5.5 mg/mL total iron in sterilized PBS Endotoxins<0.5 EU/mg Fe
Storage:	Refrigerate at 2–8°C and away from sunlight
Properties:	Hydrophilic colloidal solution of super-paramagnetic iron oxide coated with carboxydextran, with a mean hydrodynamic diameter of 62 nm
Appearance:	Red-brown liquid
Stability:	Guaranteed 6 months after shipment







A Molecular structure of VivoTrax tracer.

B Prussian blue staining of VivoTrax-labeled mesenchymal stem cells.[3]

C Tracking I.V. injected mesenchymal stem cells.[3]

For laboratory and animal research use only.
Warning: Not for human or animal therapeutic or diagnostic use. Make sure to comply with all laws and regulations governing research on animals.

Applications

Cell Tracking

Loading procedure, time of incubation and total uptake may differ based on cell line used. Please consider past publications for optimized protocols. The standard protocol below was developed based on bone marrow-derived human mesenchymal stem cell tracking[3].

- Add 100 µL of VivoTrax tracer to 5 mL growth medium in T25 culture flasks (or at 100 µg/mL) containing adherent cells at 50% to 80% confluence to achieve desired Fe concentration.
- Incubate for 24 hours at 37°C with 5% CO_2.
- After labeling, wash cultures twice with PBS to remove remaining free and surface-bound VivoTrax particles. Trypsinize cells, centrifuge and resuspend in PBS.
- Do not keep on ice for more than 2 hours before injection.

Blood Pool Imaging (4)*

Liver/Spleen	8 µmol Fe/kg	Bolus Injection
Perfusion	4–16 µmol Fe/kg	Bolus Injection
Angiography	10 µmol Fe/kg	Bolus Injection

MRI and Magnetic Particle Imaging

Have been shown to work in the majority of field strength MRI and MPI systems[4], however please refer to manufacturer's imaging protocol.

VivoTrax is optimized for T2 and T2* weighted imaging MRI.

Relaxivities (1 mM^{-1} s^{-1})[1]

r_1: 7.2±0.1 (1.5 T and 37°C)
r_2: 82.0±6.2 (1.5 T and 37°C)

References

1. Capacity of human monocytes to phagocytose approved iron oxide MR contrast agents *in vitro*. Metz S, Bonaterra G, Rudelius M, Settles M, Rummeny E, Daldrup-Link H. *Eur Radiol*, 2004.
2. Impact of surface coating and particle size on the uptake of small and ultrasmall superparamagnetic iron oxide nanoparticles by macrophages. Saito S, Tsugeno M, Koto D, Mori Y, Yoshioka Y, Nohara S, Murase K. *Int J Nanomedicine*, 2012.
3. Quantitative Magnetic Particle Imaging Monitors the Transplantation, Biodistribution, and Clearance of Stem Cells *In Vivo*. Zheng B, von See MP, Yu E, Gunel B, Lu K, Vazin T, Schaffer DV, Goodwill PW, Conolly SM. *Theranostics* 2016; 6(3):291–301. doi:10.7150/thno.13728.
4. Superparamagnetic iron oxide contrast agents: physicochemical characteristics and applications in MR imaging. Wang YX, Hussain SM, Krestin GP. *Eur Radiol* 11:2319–2331.

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