

FeraSpin™ XS

MRI agent for pre-clinical imaging

1 vial (5 x 100 µL injections)
5 vials (25 x 100 µL injections)

130-095-140
130-095-141

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1. Description

Components 850 µL FeraSpin™ XS, MRI agent (ultrasmall superparamagnetic iron oxide [USPIO] nanoparticles)
or
5 x 850 µL FeraSpin™ XS, MRI agent (ultrasmall superparamagnetic iron oxide [USPIO] nanoparticles).

Capacity 5 x 100 µL injections
or
25 x 100 µL injections.

Product format FeraSpin XS is supplied as a sterile isotonic solution with an iron concentration of 10 mM.

Appearance Clear, amber liquid.

Storage Store at 2–8 °C. Do not freeze. The expiration date is indicated on the vial label.

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.

1.1 Background information

FeraSpin XS is a nanoparticulate ultrasmall-sized superparamagnetic iron oxide imaging agent specifically formulated for pre-clinical magnetic resonance imaging (MRI). It is an imaging agent of high relaxivity increasing the signal intensity in T₁-weighted MRI due to a shortening of the spin-lattice relaxation time (T₁). Upon intravenous injection, FeraSpin XS exhibits a prolonged blood circulation time due to delayed uptake by the macrophages of the reticuloendothelial system (RES).

FeraSpin XS accumulates in the liver and spleen and is degraded within a few days with its iron being transferred into the physiological iron stores.

1.2 Applications

FeraSpin XS is indicated for use in MRI of small animals, for example mice, to facilitate the visualization of the vasculature and to measure the steady state blood volume. Examples include MR angiography and determination of the vascular volume fraction as an indicator of tumor angiogenesis.

1.3 Physico-chemical properties

Mean particle size: 18 nm (hydrodynamic diameter).
Narrow size distribution.

Relaxivity (37 °C, 1.41 T) in water	Relaxivity (37 °C, 1.5 T#) in plasma	Relaxivity (37 °C, 1.5 T#) in water
r ₁ = 13 L mmol ⁻¹ s ⁻¹ r ₂ = 49 L mmol ⁻¹ s ⁻¹	r ₁ = 11 L mmol ⁻¹ s ⁻¹ r ₂ = 38 L mmol ⁻¹ s ⁻¹	r ₁ = 13 L mmol ⁻¹ s ⁻¹ r ₂ = 49 L mmol ⁻¹ s ⁻¹

*measured with clinical device

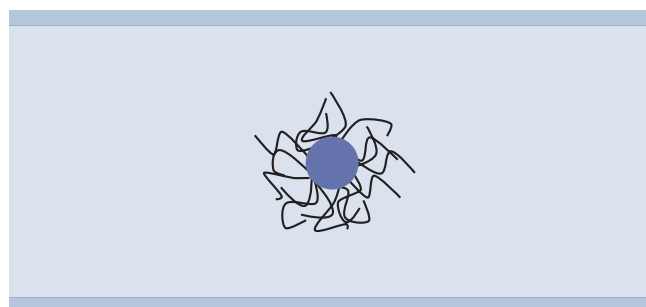


Figure 1: Schematic diagram of a FeraSpin XS nanoparticle.

1.4 Requirements

- ☞ Sterile syringes and needles (27–30 G)
Note: To allow sufficient volume for 5 x 100 µL injections per vial, the syringe/needle dead volume should be kept below 70 µL.
Tip: Use insulin or tuberculin syringes.
- ☞ 70 % ethanol

2. Protocol

2.1 Preparation

- ☞ Read the entire protocol before starting.
Tip: For optimum device settings perform initial studies in a suitable imaging phantom.
- ☞ The imaging agent is ready for injection as provided.

For a mouse weighing 20–30 g the typical injection volume is 100 µL corresponding to a dose of 40 µmol Fe/kg body weight (for a 25 g mouse).

For steady state blood volume measurements the typical injection volume is 200 µL corresponding to a dose of 80 µmol Fe/kg body weight (for a 25 g mouse).

Note: Standard animal-handling procedures and local regulations must be followed.

2.2 Injection

Vortex the vial to ensure thorough mixing.

Disinfect the septum with 70% ethanol. Let septum dry.

Warm the mouse tail to dilate the veins and enhance their visibility.

Inject FeraSpin XS via the lateral tail vein of the mouse.

Note: FeraSpin XS contains no preservatives. Avoid microbial contamination and discard any unused material after 24 hours.

2.3 Imaging

Imaging can be performed on a multitude of devices at all commonly used field strengths including high-field MRI.

For MR angiography T₁-weighted imaging is particularly suited but FeraSpin XS can also be detected by T₂^{*}- and T₂^{*}-weighted sequences.

For steady state blood volume measurements use T₂^{*}-weighted sequences.

Taking a pre-contrast image is recommended.

Begin imaging immediately after injection.

Find examples of FeraSpin XS-enhanced MR images at www.viscover.berlin.

3. References

- Allkemper *et al.* (2002) Contrast-enhanced blood-pool MR angiography with optimized iron oxides: effect of size and dose on vascular contrast enhancement in rabbits. *Radiology* 223: 432–438.
- Persigehl, T. *et al.* (2007) Antiangiogenic tumor treatment: early noninvasive monitoring with USPIO-enhanced MR imaging in mice. *Radiology* 244: 449–456.
- Persigehl, T. *et al.* (2007) Prediction of antiangiogenic treatment efficacy by iron oxide enhanced parametric magnetic resonance imaging. *Invest. Radiol.* 42: 791–796.
- Rohrer, M. *et al.* (2005) Comparison of magnetic properties of MRI contrast media solutions at different magnetic field strengths. *Invest. Radiol.* 40: 715–724.

4. Related products

FeraSpin™ R	# 130-095-138, # 130-095-139
FeraSpin™ S	# 130-095-166, # 130-095-167
FeraSpin™ M	# 130-095-168, # 130-095-169
FeraSpin™ L	# 130-095-170, # 130-095-171
FeraSpin™ XL	# 130-095-172, # 130-095-173
FeraSpin™ XXL	# 130-095-174, # 130-095-175
GadoSpin™ M	# 130-095-134, # 130-095-135
GadoSpin™ P	# 130-095-136, # 130-095-137
GadoSpin™ F	# 130-095-162, # 130-095-163
GadoSpin™ D	# 130-095-164, # 130-095-165

A comprehensive product portfolio for the imaging modalities MRI, CT, US, OI, SPECT, and PET is available at www.viscover.berlin.

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