viscover

FeraSpin™ Series: FeraSpin™ M

MRI agent for pre-clinical imaging

1 vial (5 x 100 µL injections) # 130-095-168
5 vials (25 x 100 µL injections) # 130-095-169

Contents

1. Description

Components **850 µL FeraSpin™ M,** MRI agent (superparamagnetic iron oxide nanoparticles)
or
5 × 850 µL FeraSpin™ M, MRI agent (superparamagnetic iron oxide nanoparticles).

Capacity **5 × 100 µL injections**
or
25 × 100 µL injections.

Product format FeraSpin M 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 M is a nanoparticulate superparamagnetic iron oxide imaging agent specifically formulated for pre-clinical magnetic resonance imaging (MRI).
FeraSpin M belongs to the FeraSpin Series, which encompasses size-selected, narrowly distributed nanoparticulate agents with well-defined particle sizes derived from FeraSpin R (for details refer to the product portfolio at www.viscover.berlin). The FeraSpin Series includes FeraSpin XS, FeraSpin S, FeraSpin M, FeraSpin L, FeraSpin XL, and FeraSpin XXL. Their identical composition allows for exclusive size-dependent studies and selection of the most suitable imaging agent for the intended application.
FeraSpin XS, S, M, L, XL, and XXL are agents of high relaxivity. They enhance the contrast in T_2- and T_2*-weighted MRI due to a shortening of the spin-spin relaxation time (T_2) and increase the signal intensity in T_1-weighted MRI due to a shortening of the spin-lattice relaxation time (T_1). The T_2-effect increases with increasing particle size whereas the T_1-effect increases with decreasing particle size. On accumulation in cells, the T_1-effect diminishes and the T_2-effect increases.
Upon intravenous injection, all agents of this series circulate in the bloodstream and are taken up by macrophages. They accumulate in the liver and spleen and are degraded within a few days with their iron being transferred into the physiological iron stores. The macrophage uptake varies in dependence of particle size. Increased uptake by the Kupffer cells (macrophages of the liver) with increasing particle size leads to a rapid accumulation in the liver and spleen and a short blood circulation time. With decreasing particle size, the uptake by the Kupffer cells is reduced leading to a prolonged circulation time and increased uptake by other macrophages.
The following schematic diagram shows the characteristics of the FeraSpin imaging agents in dependence of their particle size.

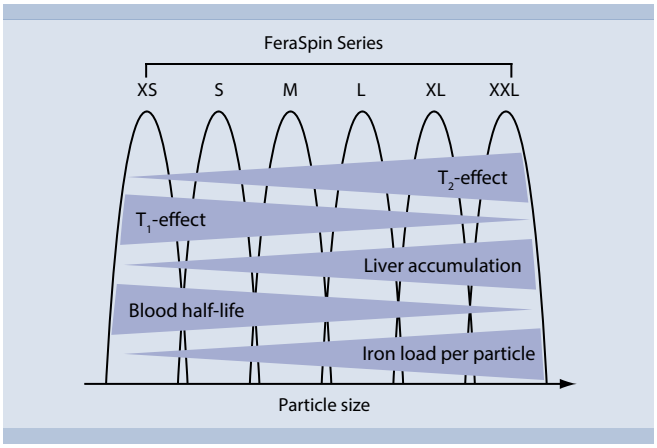

Figure 1: Characteristics of the FeraSpin Series in dependence of particle size.

1.2 Applications

The FeraSpin Series is an innovative research toolbox that offers solutions for a wide range of imaging applications.
It provides the possibility for selection of the MR contrast properties, the pharmacokinetic properties as well as the iron oxide load and, thus, allows a tailoring of the imaging agent to customer needs.
FeraSpin XS, S, M, L, XL, and XXL are indicated for use in MRI of small animals, for example, mice. They can be used in various applications, such as *ex vivo* cell labeling or *in vivo* macrophage labeling for inflammation imaging.

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Principally, all agents of this series can be used to facilitate the visualization of the liver and spleen as well as visualization of the vasculature.

Note: For liver and spleen imaging the use of FeraSpin R is recommended. In applications where a long blood circulation time and a strong T_1-effect are favorable, for example in MR angiography, the use of FeraSpin XS is most suited. For more details refer to the product portfolio at www.viscover.berlin.

Note: The imaging agents of this series are provided with equal composition for reasons of comparability. For custom-tailored concentrations please contact the customer support.

1.3 Physico-chemical properties

FeraSpin	Mean particle size[#]	Relaxivity $[r_2/r_1]$[##]
XS	10–20 nm	3-5
S	20–30 nm	5-9
M	30–40 nm	9-22
L	40–50 nm	22-32
XL	50–60 nm	32-39
XXL	60–70 nm	39-46

[#]hydrodynamic diameter, [##]in water, 37 °C, 1.41 T

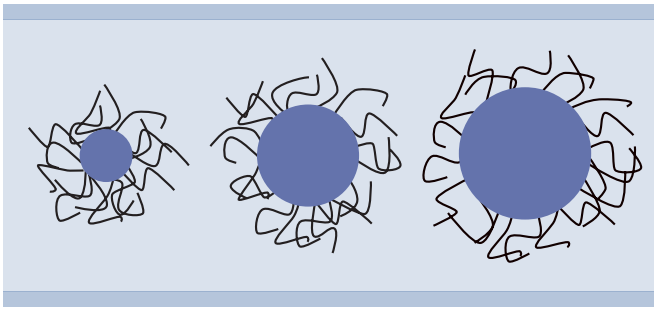

Figure 2: Schematic diagram of small, medium, and large-sized nanoparticles of the FeraSpin Series.

1.4 Requirements

- Sterile syringes and needles (27–30 G)

  Note: To allow sufficient volume for 5 × 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.
- The dosing varies in dependence of the intended application as well as the selected FeraSpin imaging agent and, thus, has to be adapted accordingly.
- For a mouse weighing 20–30 g an injection volume of 100 µL corresponds to a dose of 40 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 M via the lateral tail vein of the mouse.

  Note: FeraSpin M 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.
- FeraSpin M can be detected by T_1- as well as T_2- and T_2*-weighted sequences.
- Taking a pre-contrast image is recommended.
- The time interval between injection and imaging depends on the application. For applications involving imaging of the vasculature begin imaging immediately after injection. For other applications imaging over an extended time period after injection, for example 24 hours, is recommended.

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

3. References

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4. Related products

FeraSpin™ R	# 130-095-138, # 130-095-139
FeraSpin™ XS	# 130-095-140, # 130-095-141
FeraSpin™ S	# 130-095-166, # 130-095-167
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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