

# Multimodal nanoparticles for structural and functional tracking of stem cell therapy on muscle regeneration



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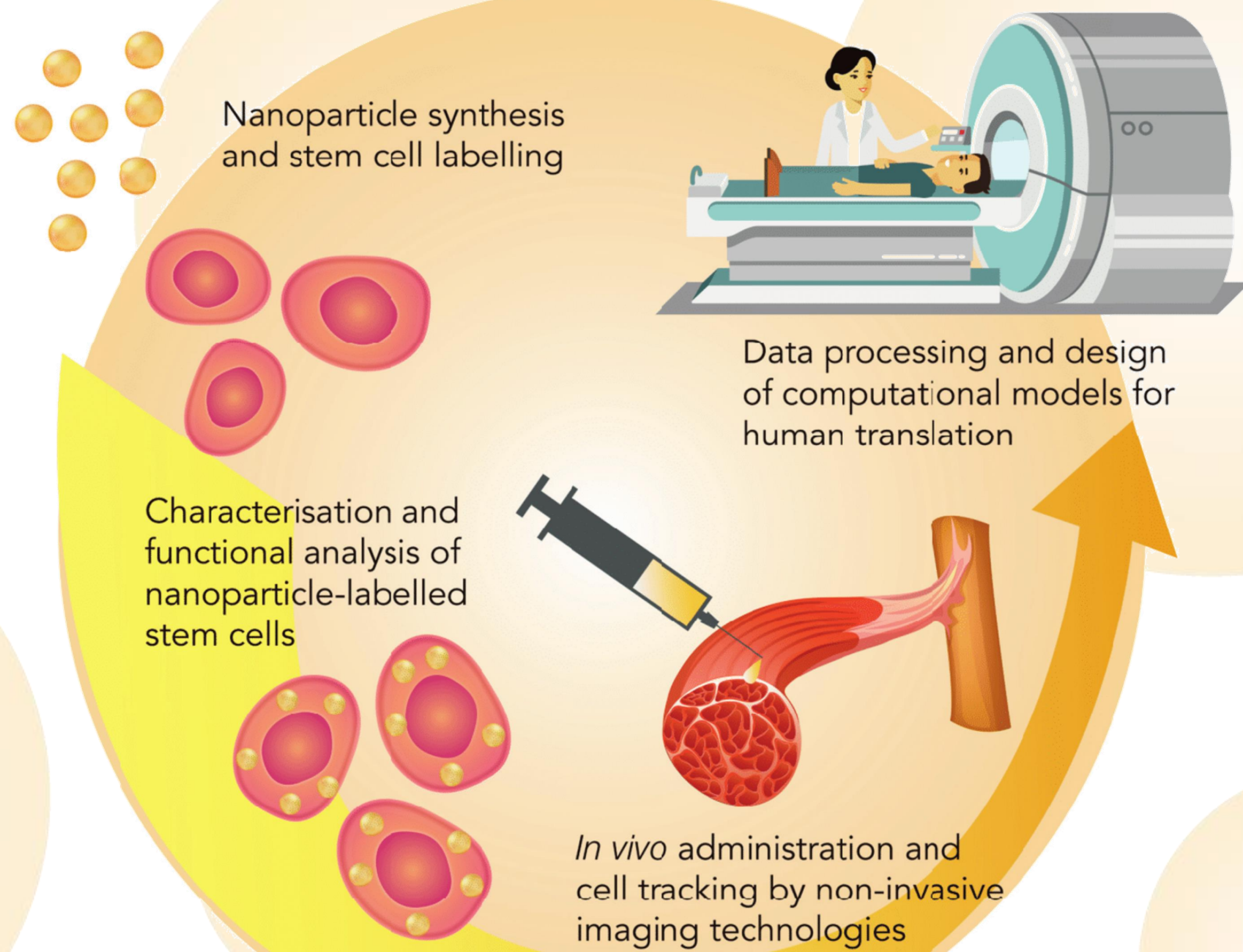
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## Overview

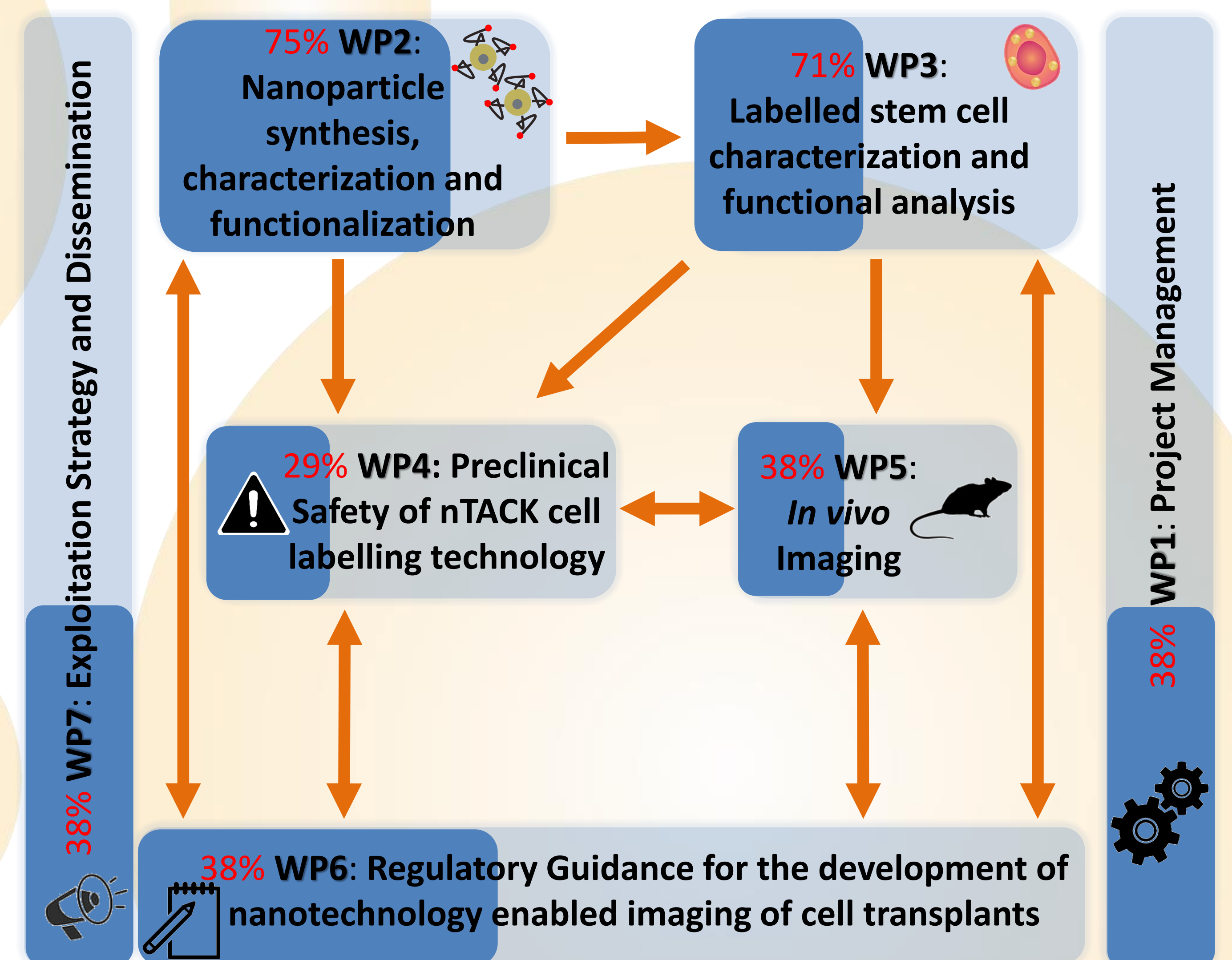
nTRACK focus on the development of a safe and highly sensitive multimodal nanoimaging agent enabling noninvasive, quantitative and longitudinal stem cell tracking and whole body biodistribution.



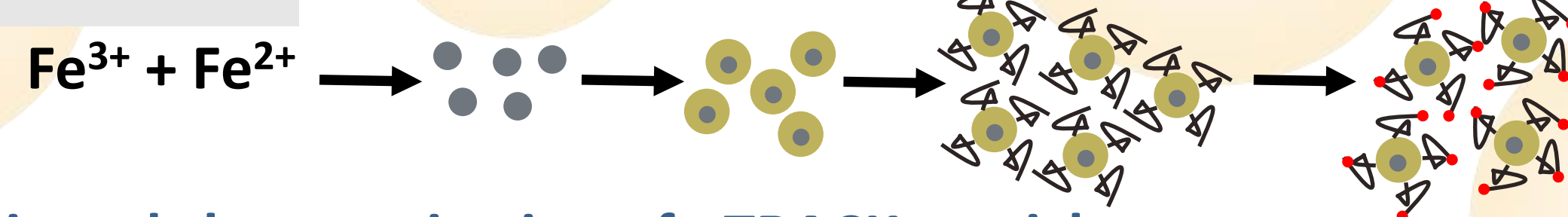
nTRACK will also provide a non invasive information on cell (long-term) viability using the combination of CT, MRI and PET, which are imaging modalities that are clinically available.

## Status of the project

### IMPLEMENTATION | MONTH 18

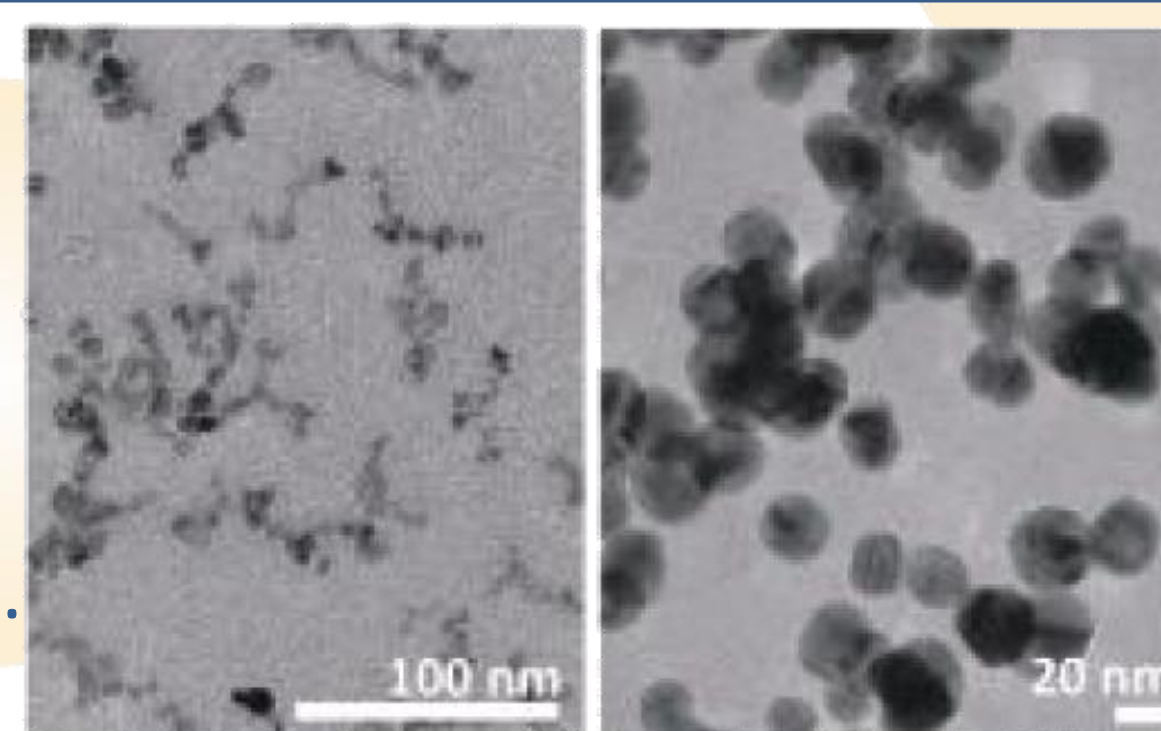


## Results



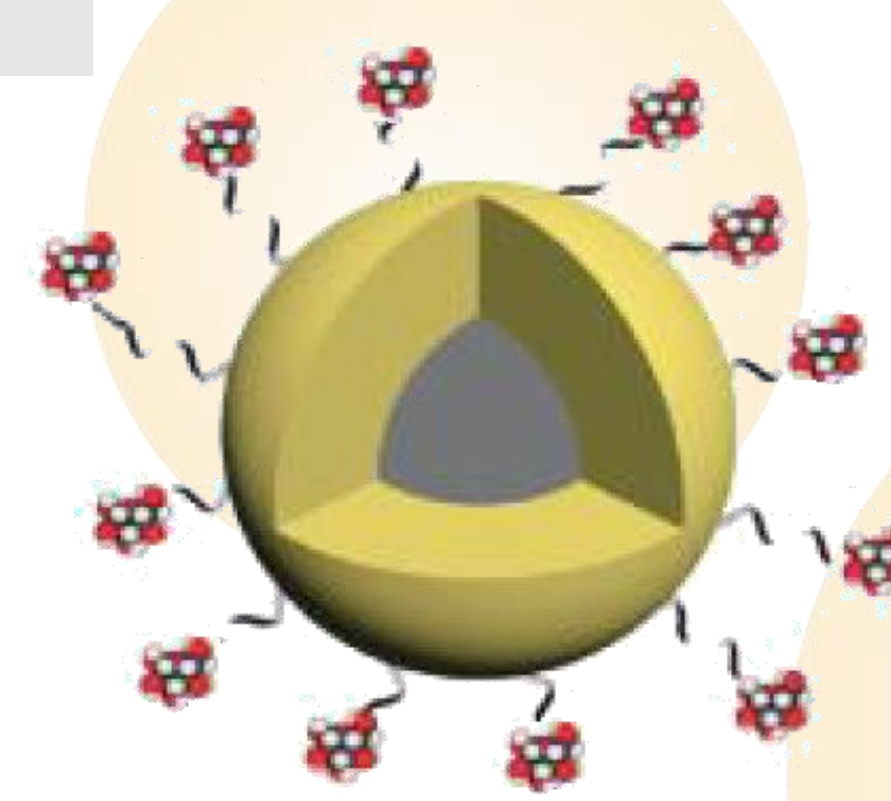
### 1) Synthesis and characterization of nTRACK particles

- 1.1 Magnetic core: Co-Precipitation methodology
- 1.2 Magnetic core Gold shell: Gold Deposition on magnetic core surface.
- 1.3 Surface Functionalization: SH-PEG-COOH. Gold/S chemistry.
- 1.4 Surface Decoration: D-(β)-glucosamine Surface decoration. Amide Chemistry.

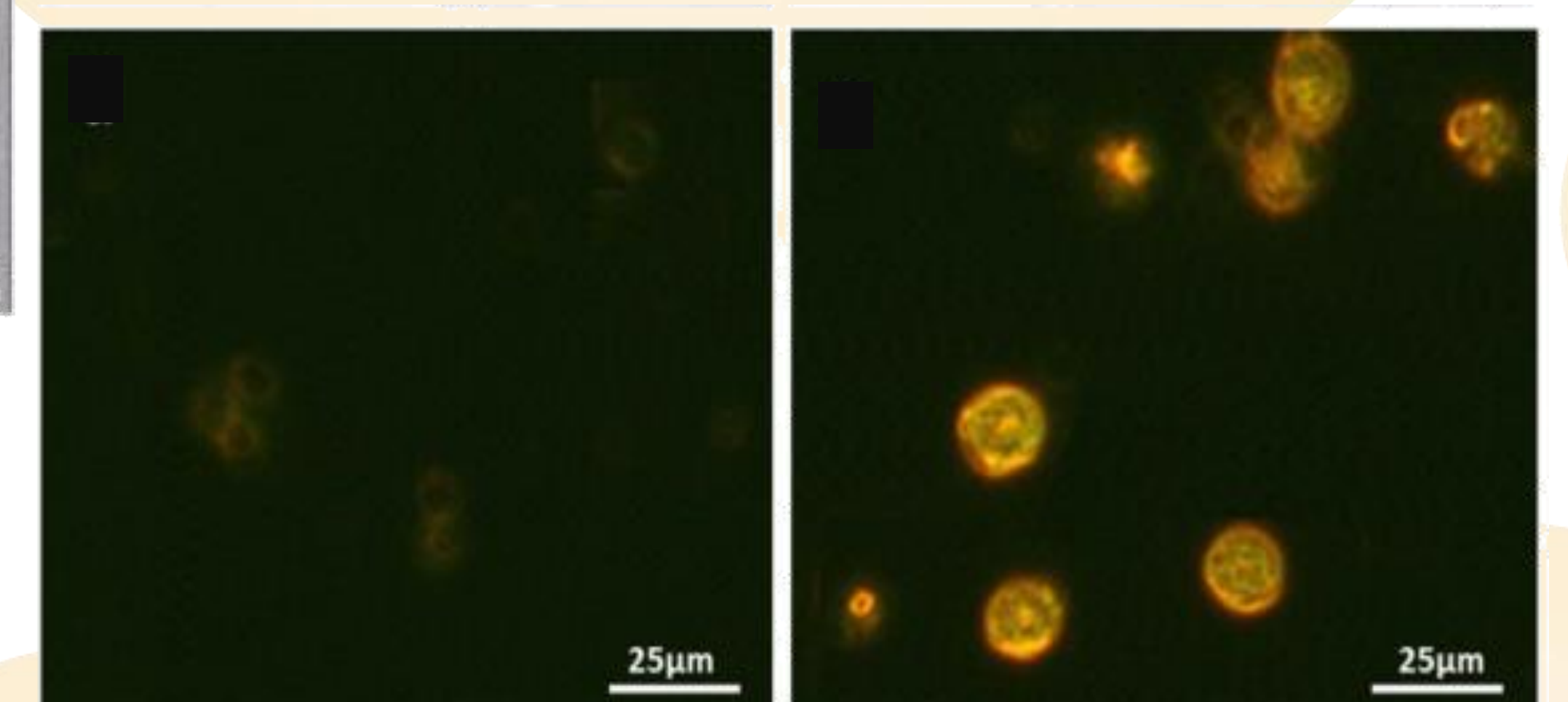


### 2) Contrast Activity

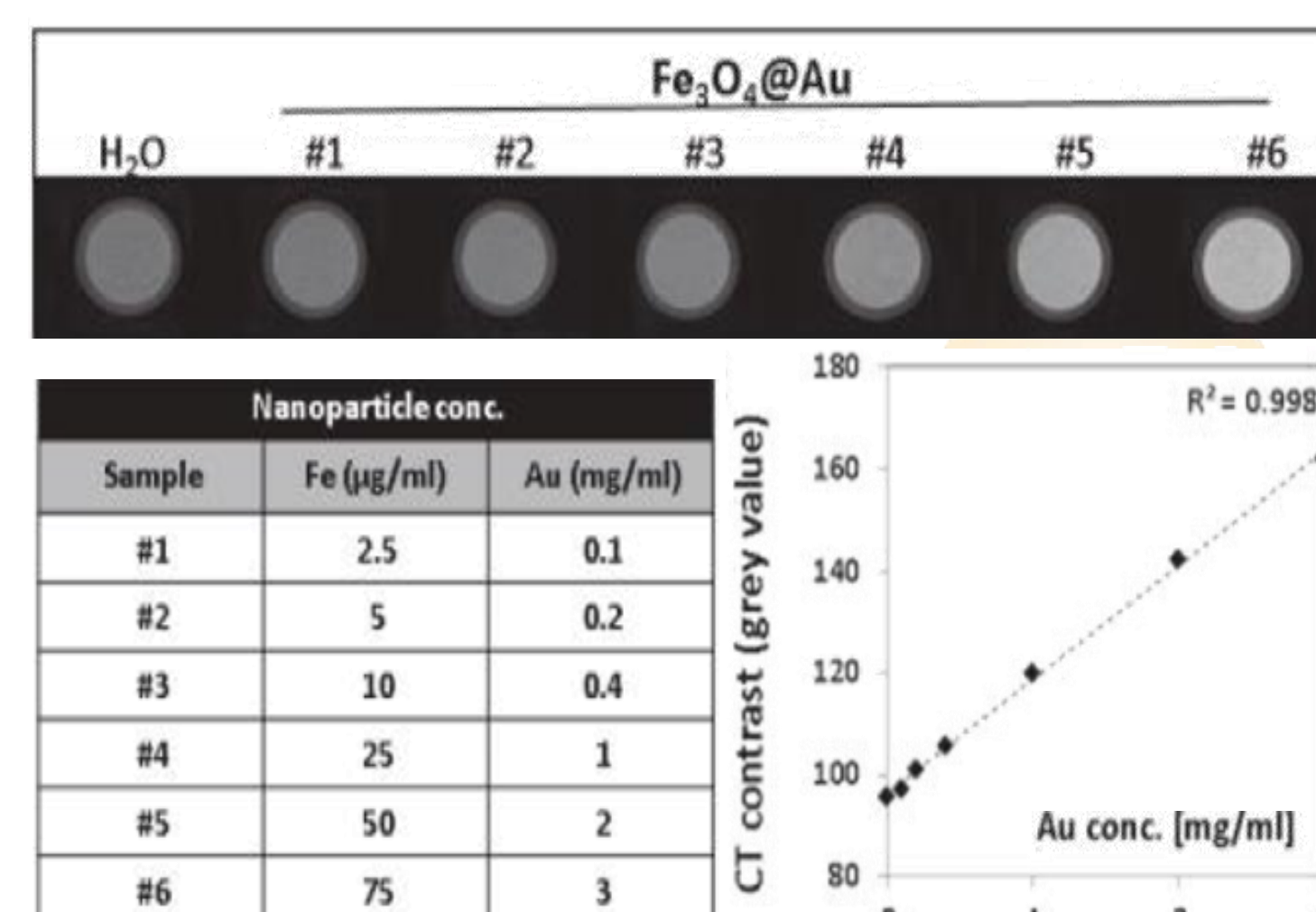
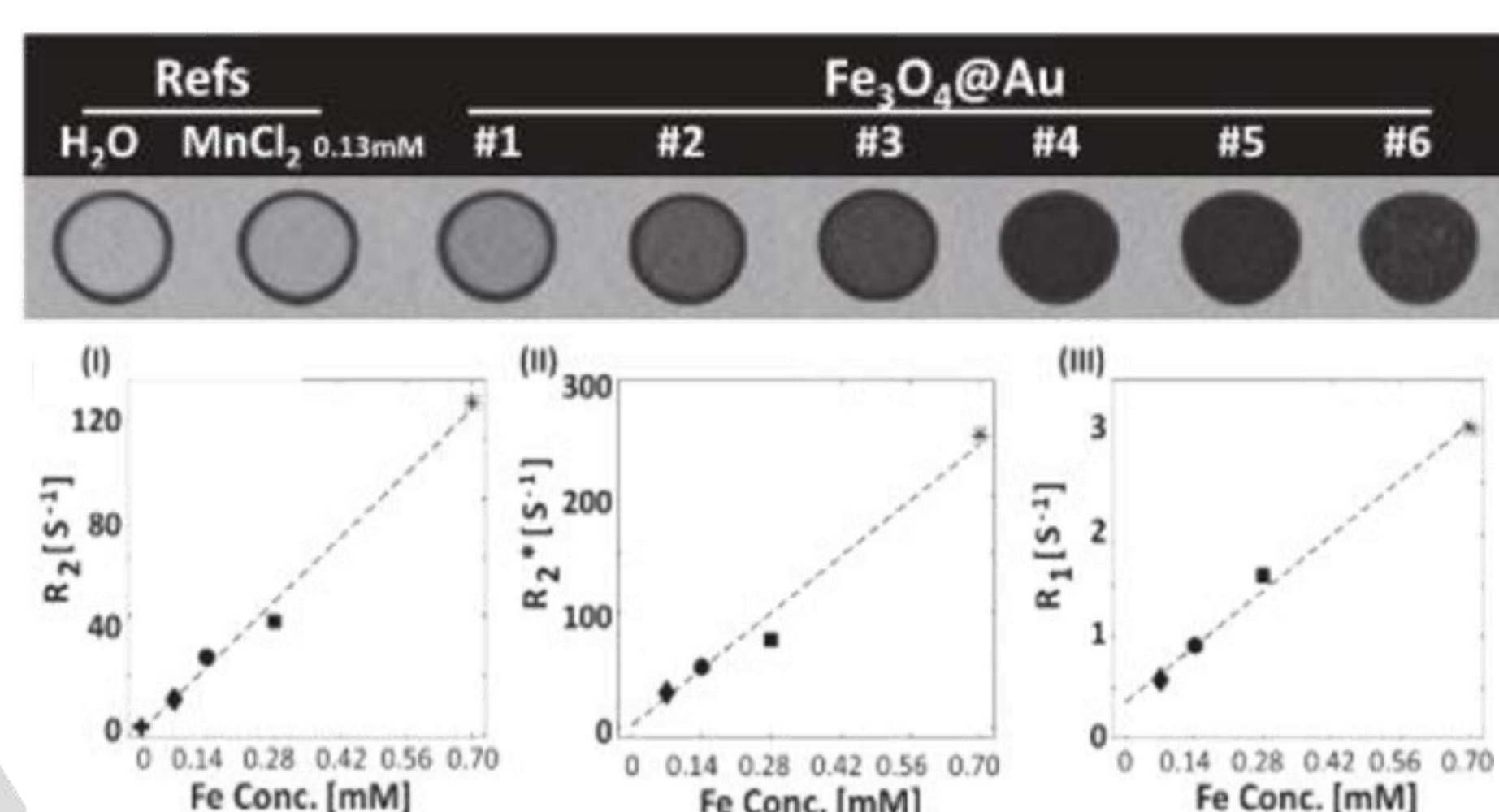
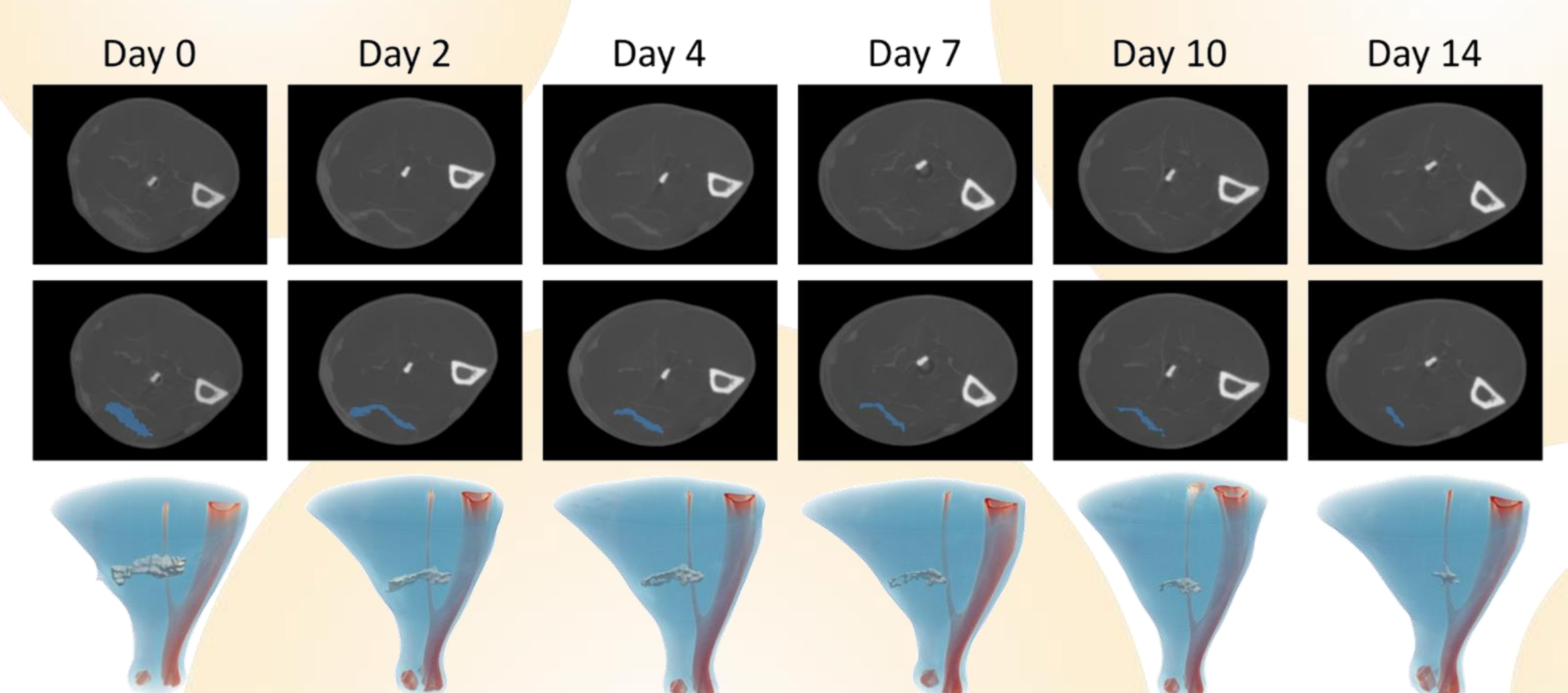
- 2.1  $\text{Fe}_3\text{O}_4@Au$  Nanoparticles  $T_2$  Contrast agent  
Linear relaxation response with concentration of  $R_2(1/T_2)$ ,  
 $R_2^* (1/T_2^*)$  y  $R_1 (1/T_1)$
- 2.2  $\text{Fe}_3\text{O}_4@Au$  Nanoparticles cytometry contrast agent  
Linear grey value response with concentration



### 3) Stem Cell labelling (ongoing)



### 4) In vitro and In vivo tissue regeneration experiments (ongoing)



Trimodal Nanoparticle Contrast Agent for CT, MRI and SPECT Imaging: Synthesis and Characterization of Radiolabeled Core/Shell Iron Oxide@Gold Nanoparticles; Motiei M. et al., Chem. Lett. 2019, 48, 291-294. DOI: 10.1246/cl.180780

## Partners

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