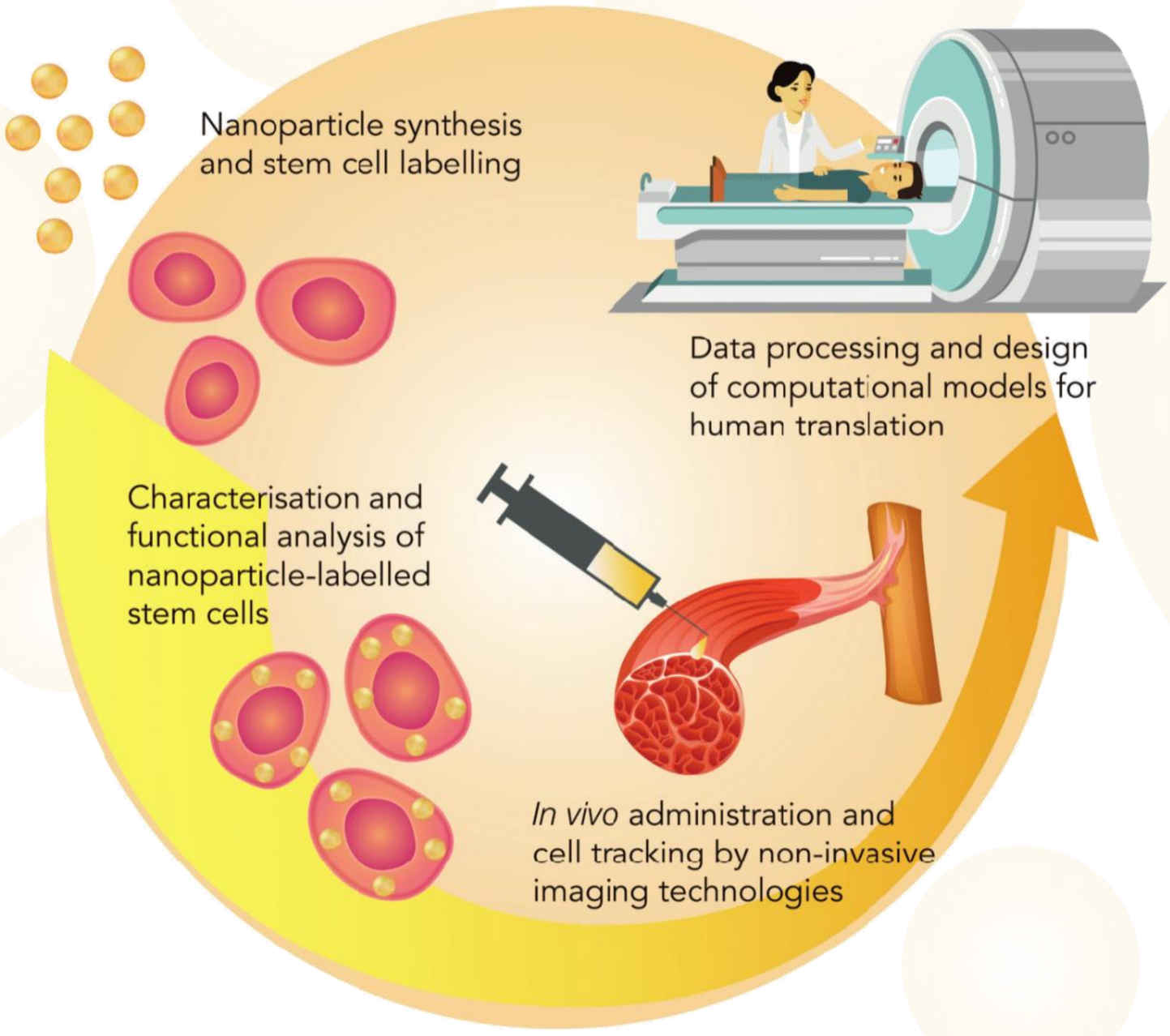
Multimodal Nanoparticles for Structural and Functional Tracking of Stem Cell Therapy on Muscle Regeneration

nTRACK develops a safe, scalable and highly sensitive multimodal cell nano-imaging agent ready for testing in humans. The nTRACK approach enables a non-invasive monitoring of the entire body, longitudinal and quantitative discrimination of living stem cells in humans using CT, MRI, and PET, simultaneously.

Functioning



- Stem cells will be labeled with magnetic core gold shell nanoparticles and fully functional and safety characterized to be ready for clinical stage.
- The labelled stem cells will be injected into an injured muscle and tracked, including cell functionality and long-term viability, using structural and functional imaging modalities that are clinically available.
- Functionality, activity and non-clinical safety will be evaluated.
- Regulatory and commercialization aspects will be addressed to foster a prompt clinical translation and exploitation.

Objectives

- Facilitate stem cell labelling by delivering a standard operating procedure to be transferred to third parties
- Provide vital functional information on the therapeutic stem cells by machine learning algorithms.
- Enable non-invasive whole body and long-term cell monitoring with clinical applicable imaging.
- Design protocols for human translation that can recommend optimal imaging conditions.
- Increase the sensitivity of the imaging methods up to a single cell detection level.
- Provide early assessment of cell therapy effectiveness based on prompt evaluation of the migration and bio-distribution patterns.

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