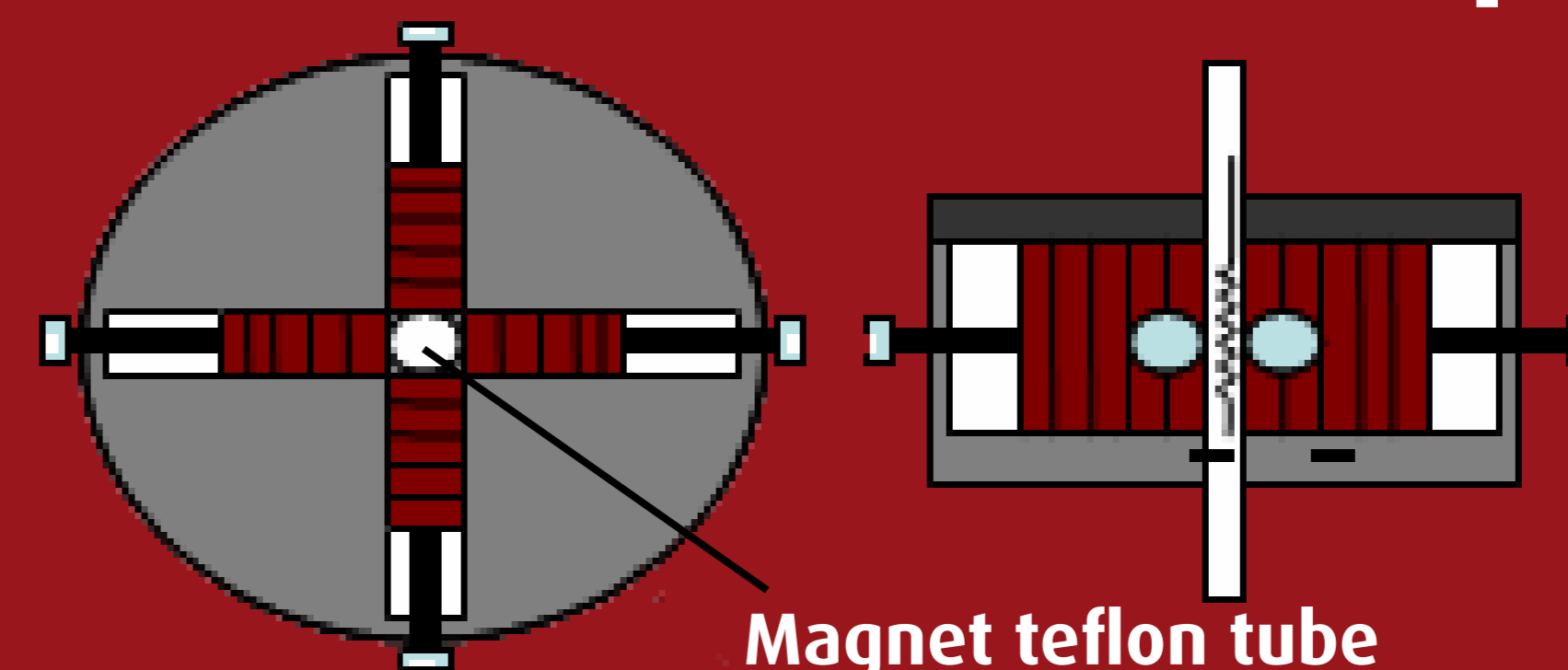


Development of novel nanotechnology based diagnostic systems for Rheumatoid Arthritis and Osteoarthritis

M. Hofmann-Antenbrink & A. Hool, MatSearch Consulting Hofmann, Pully (CH)

- NanoDiaRA (FP7 NMP4-LA-2009-228929) develops a nanoparticle based approach as a generic platform for the development of novel diagnostic technologies for Rheumatoid Arthritis and Osteoarthritis
- Microarray and imaging technologies will detect disease-related molecular and cellular processes with sensitivity and specificity
- Such a comprehensive approach addresses key requisites for modern therapy.

Standardized Nanoparticles



Magnet teflon tube

Fixed Bed Reactor: Coating and derivatization to:

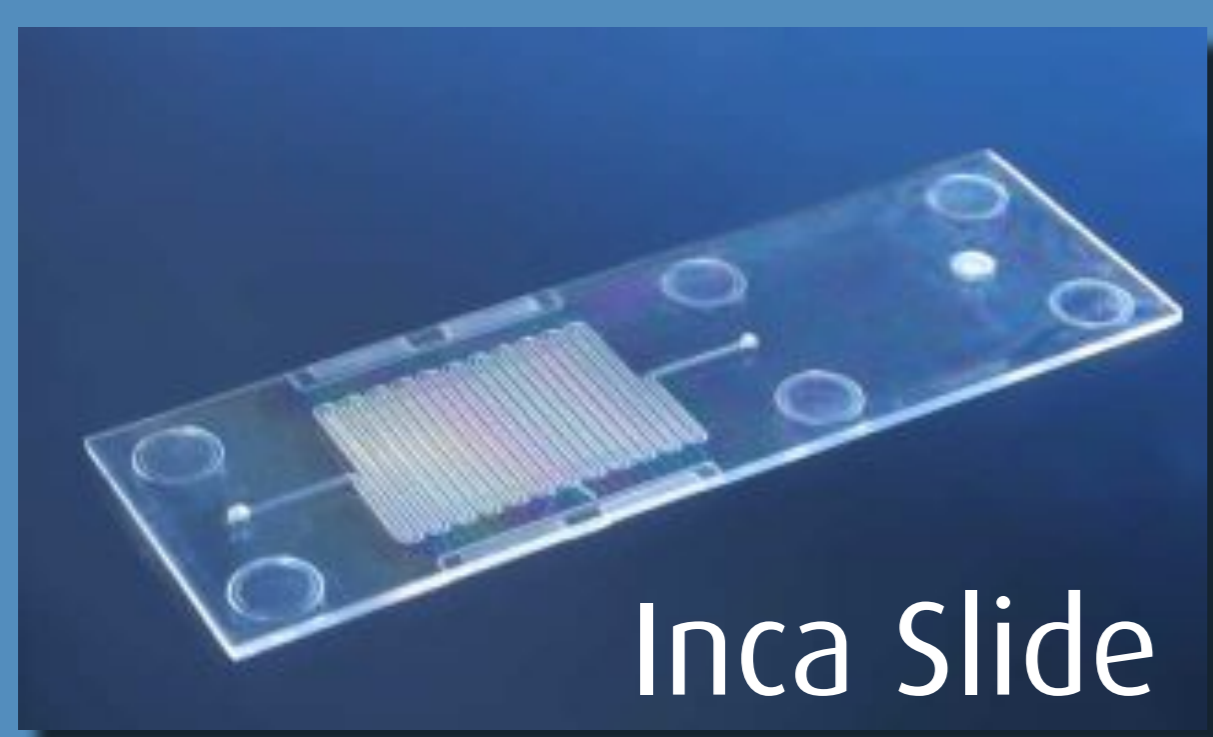
- Improve reproducibility
- Reduce size distribution
- Facilitate the upscaling

Ecole Polytechnique Fédérale de Lausanne (CH): B. Steitz et al., „Fixed Bed Reactor for Solid-Phase Surface Derivatization of Superparamagnetic Nanoparticles“, Bioconjugate Chem. 2007, 18, 1684-1690

Multiplex protein analytics and microfluidics

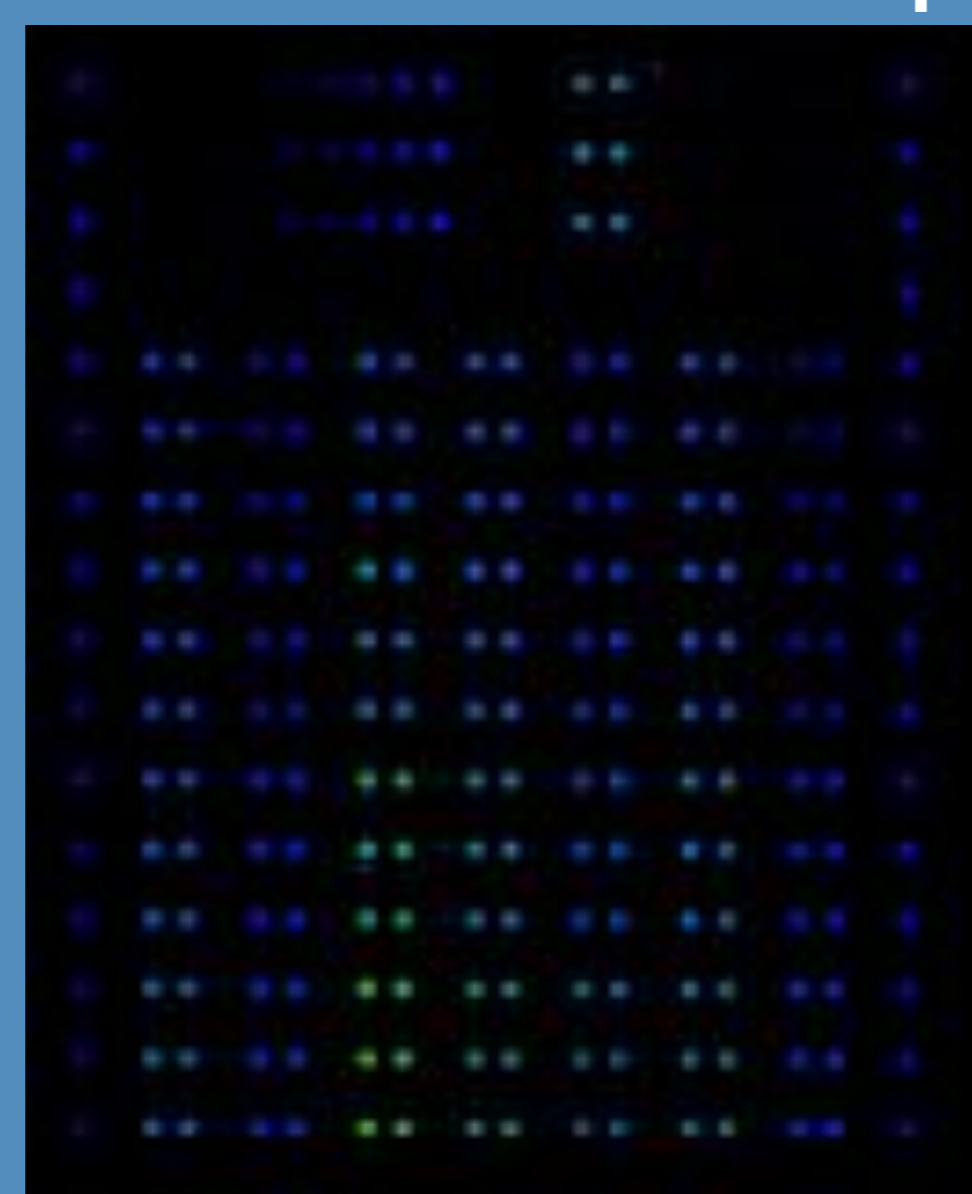


Inca Trace



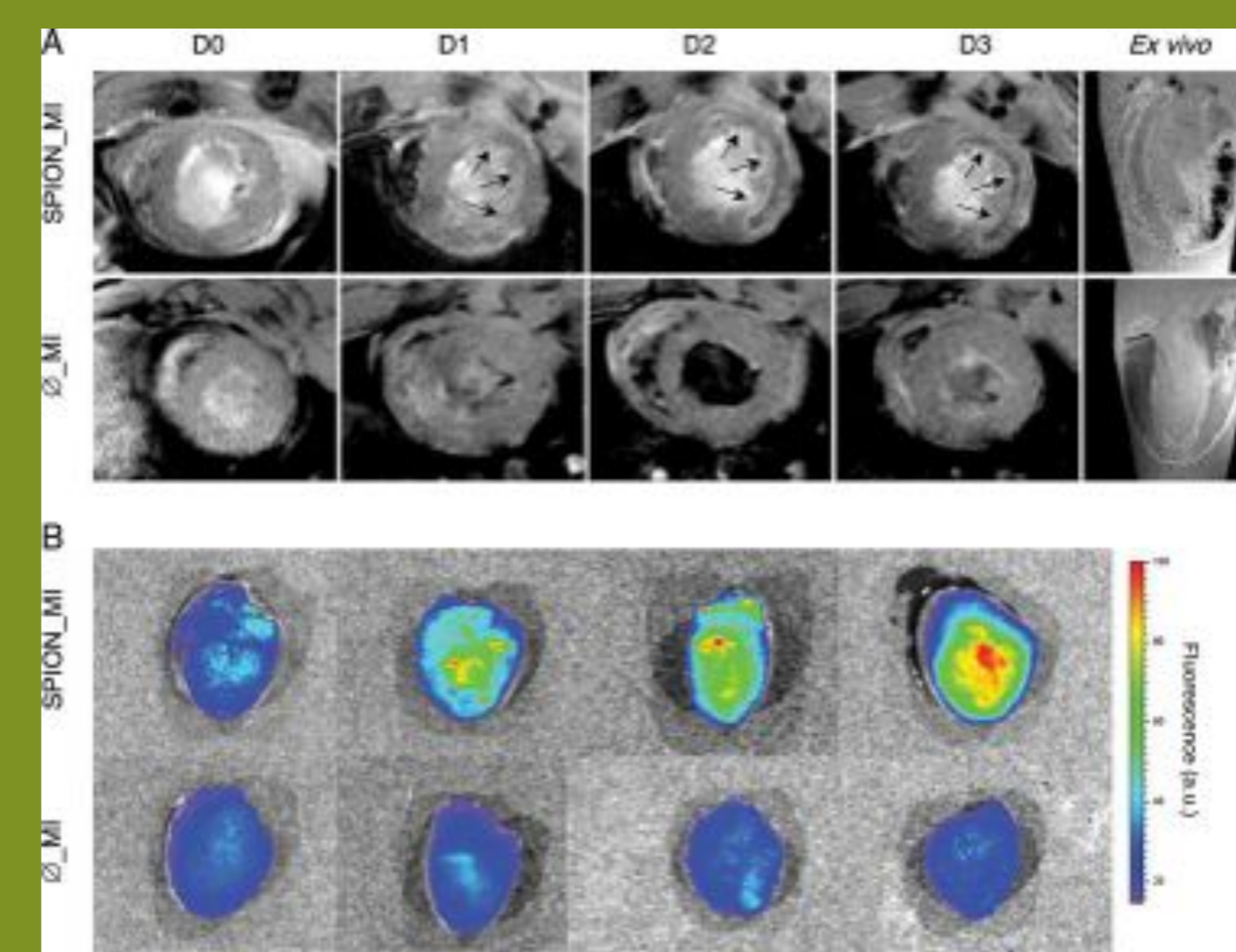
Inca Slide

Fluorescent Microspots



- IncaArray Bioanalytics (www.arrayon.com)

MRI Diagnostics



In vivo MRI of the infarcted rats.

- First line: shows the appearance over time of a hypointense (black) signal in the myocardial infarction area (arrows) due to the SPION.
- Second line: does not show any hypointense signal (no SPION)

• *Ex vivo* MRI (last column) and *ex vivo* reflectance fluorescence (B) confirms the *in vivo* results

University Hospital Geneva (CH): K.Montet-Abou et al., Eur Heart J (2010) 31 (11): 1410-1420 (results on which RA investigations are based)

Switzerland: Ecole Polytechnique Fédérale de Lausanne, EPFL - Powder Technology Laboratory, University Hospital of Geneva - Radiology, University of Fribourg- Chemistry, CSEM - Microfluidics & Liquid Handling, Merck Serono SA, Arrayon Biotechnology SA, MatSearch Consulting Hofmann

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Estonia: University of Tartu, Rheumatology

Canada: (Consultant) Dr. A. Robin Poole, Professor Emeritus at McGill University and Scientific Director Emeritus, Canadian Arthritis Network

NanoDiagnostics
In vitro - Bioassay

NanoDiagnostics
In vivo - MRI

NanoDiagnostics
Biomarker

Clinical investigations

Ethical and Social Aspects of Nanotechnology/-medicine

Regulatory Framework (incl. toxicology, environmental aspects)

Intellectual Property Rights

Education and training of young investigators