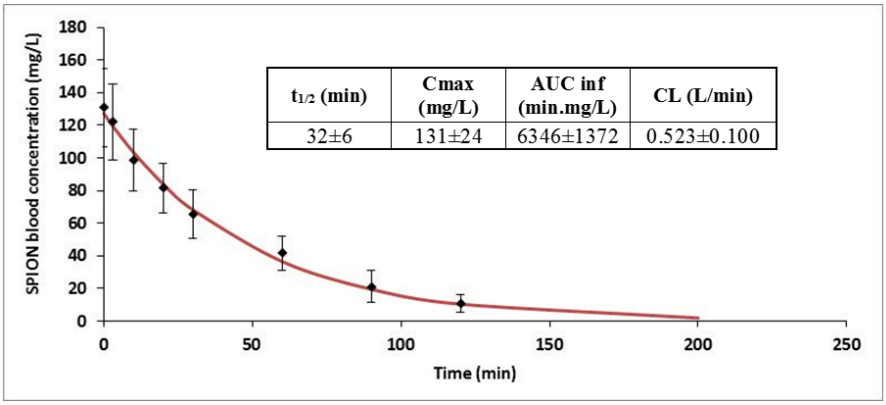
Particle pharmacokinetics and quantitative particle biodistribution

A quantitative biodistribution study at several time points after injecting the magnetic particles was performed on rats and mice. When the quantitative pEPR method is combined with MRI for accurate location of the magnetic nanolabels, it offers the solution for quantitative distribution studies.

The distribution of the particles in-vivo was determined with a 7T MRI, T2 weighted images before and at several time points after injection:

Bloodclearance time measurement with pEPR:
Pharmacokinetic parameters after one-Compartment Analysis of the SPION blood concentration with pEPR versus time profile (n =7, mean ± SD). $t_{1/2}$ = half-life; C_{max} = maximum concentration; AUC = area under the curve; CL = clearance:



$t_{1/2}$ (min)	Cmax (mg/L)	AUC inf (min.mg/L)	CL (L/min)
32±6	131±24	6346±1372	0.523±0.100

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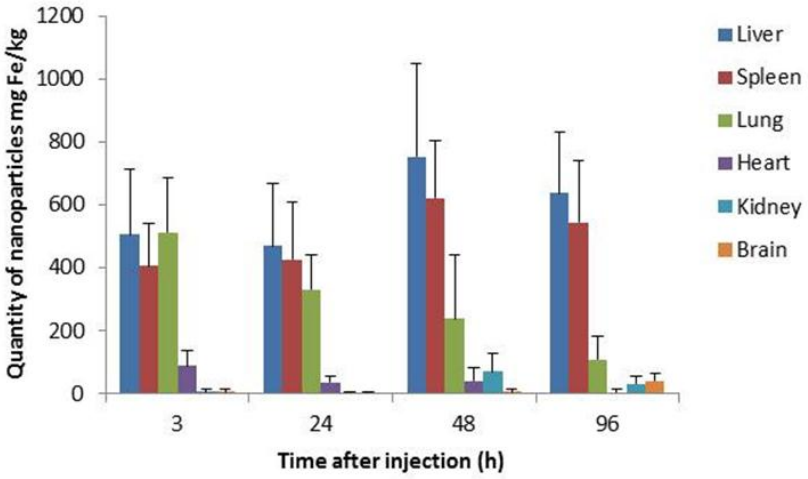
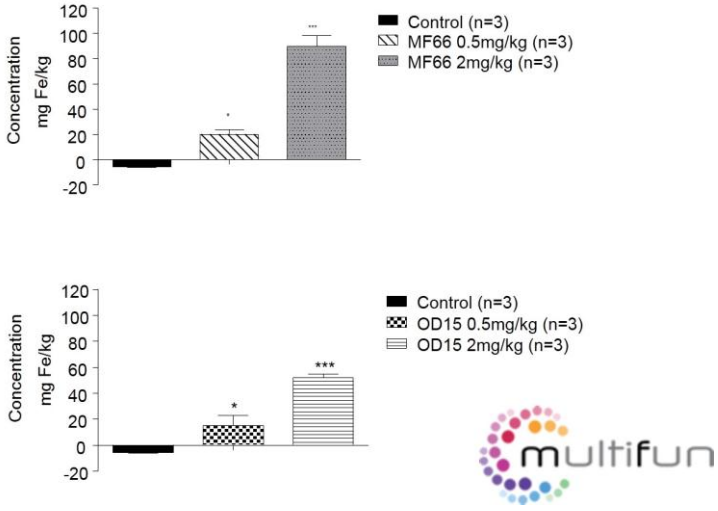
And particle distribution as a function of time, measured ex-vivo with pEPR:



Quantifiaction with pEPR of particles in lung biopsies of pigs injected with magnetic particle MF66 or OD15 demonstrated the dose dependency of particle accumulation in the lung.



Experiments were performed within the MULTIFUN project, an pan-European research project partly funded by the European Community's Seventh Framework program. Results will be submitted for publication by TCD, Trinity College Dublin, Ireland and UCC, University College Cork, Ireland.

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