

Characterization of GBCAs by Magnetic Methods: *in vitro* studies

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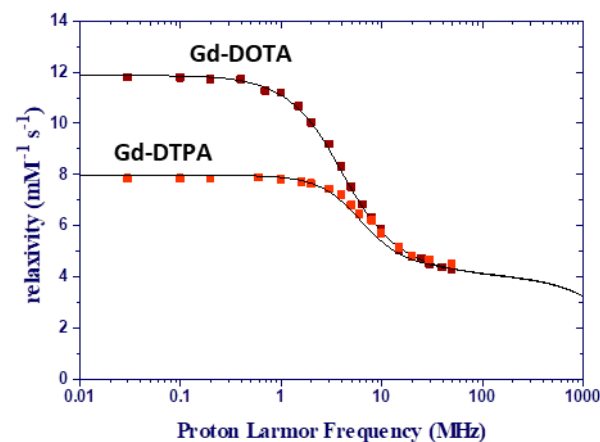
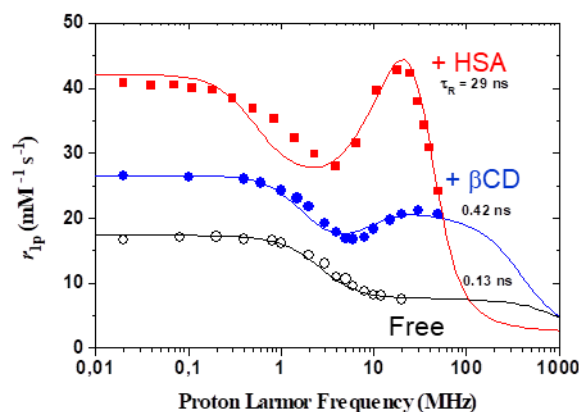
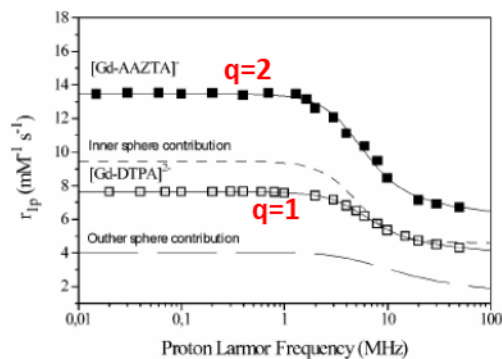
Conflicts of Interest

Bracco imaging, scientific advisory board, consultant, research support.

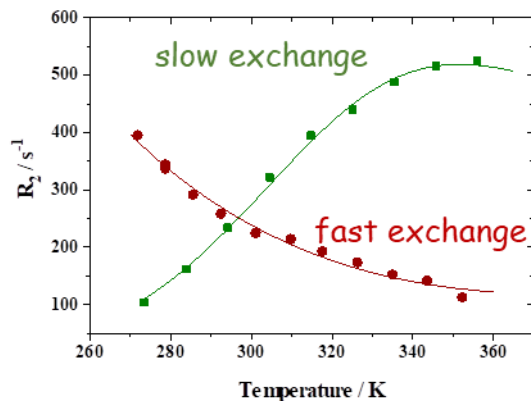
Characterization of GBCAs by Magnetic Methods: in vitro studies

- High Resolution NMR spectra: not informative, too broad lines
- ESR spectra: not very informative
- ENDOR: it has been applied for assessing Gd-OH₂ distance
- **Relaxometry**: main technique to report on hydration, size, dynamics, overall symmetry...

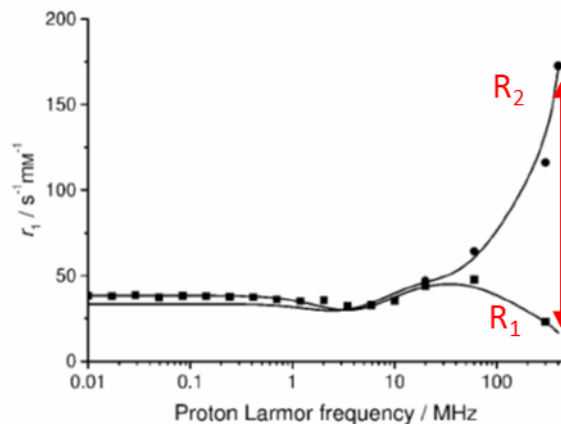
¹H-Relaxation



¹⁷O-Relaxation



T_2 vs T_1 : information on size, dynamics, compartmentalization



Peters JA et al. *Chem Eur J* 2005, 11:4799-4807.

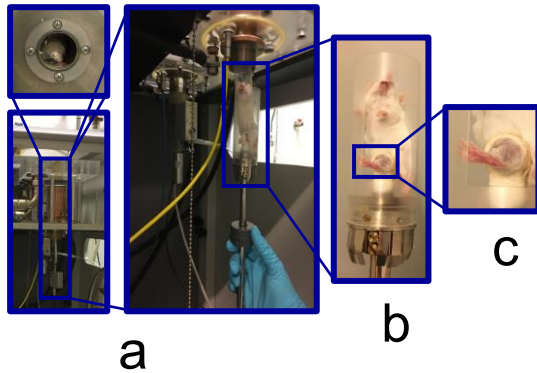
Characterization of Gd-containing systems by Magnetic Methods:

«in vivo» studies

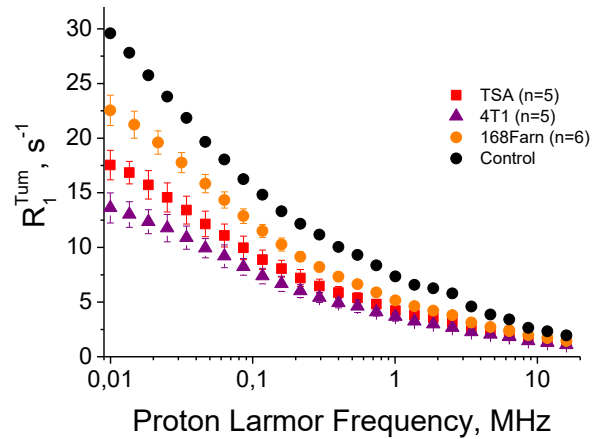
- Hyperintensity in MR images: Not possible to transform the observed relaxation enhancements into relaxivity values without the knowledge of [Gd].
- Some insight may be gained from the acquisition of MR images at two magnetic fields (this approach parallels what **is** extensively done for Iron-containing systems exploiting changes in the field dependence of R_2 and magnetic susceptibility).
- Some insight may be gained from MRI by comparing changes in T1 and T2 (size, dynamics, compartmentalization).

Knowledge gaps: the *in vivo* characterization of GBCAs *may* rely on the transfer of *in vitro* methods to living systems – but unknown contributions to speciation

- **FFC-Relaxometer in vivo**

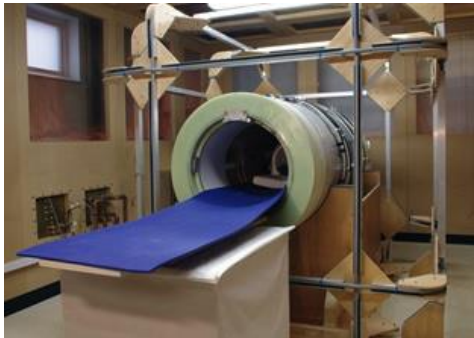


FFC-2000 relaxometer by Stelar



S. Aime et al, unpublished results

- **FFC-MRI: Acquisition of image-difference at selected magnetic field strengths**



Prototype of FFC-MRI scanner (University of Aberdeen, Scotland)

- **New pulse sequences and timing to extract information on characteristics of Gd-containing systems**