

# Exploring routes for Cellular and Molecular Magnetic Resonance Imaging with Paramagnetic Lanthanide Complexes

Silvio Aime

*Department of Chemistry I.F.M., University of Torino (Italy)*

The possibility of exploiting the superb anatomical resolution of MR images for molecular imaging applications relies mainly on the availability of high sensitivity imaging probes and on the set-up of their efficient delivery/accumulation at the targeting sites. High sensitivity is pursued through a proper modulation of structural and dynamic properties of the imaging probe to control the determinants of the relaxation process of tissue water.

The huge work carried out in a number of laboratories in the last two decades for the development of Gd-based MRI contrast agents provides an excellent platform for designing a new generation of probes for molecular imaging applications. Several routes are now available for efficient cell-entrapment of paramagnetic Gadolinium complexes at a concentration sufficient for MRI visualization.

Ideal targets of Gd-based MRI contrast agents may be located on the extracellular matrix, lining the blood vessels, on the plasma membrane or intracellularly. The latter may be the most attractive way to accumulate a large enough number of Gd-chelates. The results obtained concerning the uptake of Gd-complexes in cells by different routes (pinocytosis, phagocytosis, receptor, receptor mediated endocytosis, transporters, trans-membrane carrier peptides and electroporation) will be reviewed.

## References

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