Targeted Molecular Imaging Contrast Agents: The Challenge

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Molecular imaging is a young and growing discipline which aims at the development of new diagnostic technologies using specific reporters for the visualization of molecular processes *in vivo*, and in particular of those involved in pathological mechanisms. Their early detection may represent a decisive advantage for the choice and the follow-up of the therapeutic strategies.

Among the contemporary methods of medical imaging, MRI offers the unique advantage of furnishing simultaneously - and with a high spatial resolution -anatomical, physiological and molecular information. Nevertheless, the quite low efficiency of MRI contrast agents represents a challenge with respect to the improvement of more efficient reporters and to the development of MR protocols adapted to their detection.

A contrast agent for MR molecular imaging (MRMI) is a complex assembly made of a magnetic reporter, the “contrastophore”, linked to a vectorizing moiety specific to the structure to be targeted. The specific molecular vector can be selected among peptides identified by phage display or among the non-peptidic mimetics proposed by the literature. The lecture will present an overview of the current state of the field.