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# Manganese enhancement magnetic resonance imaging (MEMRI) as imaging biomarker of calcium channels

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Manganese-enhanced Magnetic Resonance Imaging (MEMRI) evolved in the late nineties and relies upon the following three main properties of $Mn^{2+}$: 1) it is a paramagnetic ion and an excellent *T1* relaxivity; 2) it is a calcium ($Ca^{2+}$) analog that can enter excitable cells (voltage-gated calcium receptor and calcium sensing receptor) and, 3) once in the cells $Mn^{2+}$ can be transported along axons by microtubule-dependent axonal transport.

The above mentioned properties of $Mn^{2+}$ make it a particularly attractive contrast agent for MRI in order to study physiology and physiopathology of:

1. Brain
2. Heart
3. Salivary glands
4. Cancer

Different animal models were prepared to investigate the application of Manganese as contrast agent by using a clinical 3T MR scanner and a prototype birdcage coil.

The results of our study highlighted the potential utility of MEMRI as "functional tool" in order to study the physiological activity of the brain, heart and salivary glands and the different expression of calcium sensing receptor in breast and prostate cancer.

In conclusion, our results open the exploration of MEMRI as a new possible "imaging biomarker" of calcium metabolism in human disease.

## Biography

Francesca Rosa is a medical undergraduate student at the School of Medicine, at the University of Genoa, Italy. Her field of research is on the application of new contrast agent for tumor targeting. Actually, she is involved in a research project about autoimmune disease and the application of Manganese as "imaging biomarker". She was recently, awarded with the "Magna Cum Laude" at the European Congress of Radiologist (ECR) in Vienna (6-10 March 2014).

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