

MRI-CEST approach for investigating tumor metabolism

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Background: A novel approach based on the radiation-free MRI-CEST method has been proposed to investigate cancer metabolism, by exploiting native glucose (glucoCEST) as an alternative to FDG-PET¹, but a proper optimization of the acquisition protocol and validation in a preclinical tumor model is needed to improve the detectability in clinical low-field MRI scanners [2].

Methods and Results: Chemical exchange rates of glucose hydroxylic protons were characterized at 14T and at several pH values from which simulation studies were exploited to optimize the acquisition and the irradiation parameters to improve the detectability of the glucoCEST contrast in tumor tissues and at two magnetic field strengths (3T and 7T). The unique expertise in MRI-CEST imaging of the Research Unit of Torino of the IBB-CNR within the EuroBioImaging Research Infrastructure (RI) provided the validation studies in preclinical tumor murine models needed to confirm the results obtained from the simulations. The maximum achievable contrast with the GlucoCEST technique predicted by simulations was confirmed by the in vivo studies [3].

Conclusions and Significance: The EuroBioimaging RI can support in vivo validation studies where specific expertise in novel imaging approaches can be provided by the nodes of the RI. The results obtained in this study will allow to improve the clinical translation of the GlucoCEST MRI technique for investigating tumor metabolism.

Keywords (max 5): imaging, tumor, acidosis, metabolism, MRI

References:

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Thematic area:

To be selected from the following areas of diseases and disorders:

- Neurodegenerative
- Neuromuscular
- Neurodevelopmental
- Psychiatric

Infrastructures: EUROBIOIMAGING