SCIENTIFIC SEMINAR

Irene Marco

Institute of Bioengineering of Catalonia (IBEC)

Hyperpolarization-enhanced NMR and MRI methods for tissue engineering applications

There is a need for non-invasive and reliable methods to diagnose, stage, and monitor treatment response in diseases like cancer and non-alcoholic fatty liver disease. Magnetic resonance (MR) techniques offer a way to identify metabolic biomarkers in real time. By combining carbon-13 spectroscopy to detect and quantify metabolites with imaging (MRI), MR enables simultaneous probing of spatial (biodistribution) and temporal (kinetics) aspects of metabolism in vivo.

This is made possible by hyperpolarized (HP) MR methods, such as Dynamic Nuclear Polarization (DNP), which transiently enhance carbon-13 MR signals by several orders of magnitude compared to traditional methods. DNP enables real-time measurement of enzymatic reactions in cell suspensions, tissue samples, and in vivo models. Multiple HP 13C-labeled substrates have been successfully used to investigate key metabolic pathways, including glycolysis, the pentose-phosphate pathway, and cellular redox states.

In this presentation, I will demonstrate the potential of HP MR to study metabolism in various systems, from cell suspensions to animal models. I will also share recent progress at IBEC, including efforts to use HP MR to monitor metabolic processes in organ-on-chip platforms. These advances highlight how HP MR can provide transformative insights into disease mechanisms and therapeutic responses, paving the way for innovative approaches in precision medicine.

CIC bioGUNE
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
EXCELENCIA SEVERO OCHOA

Wednesday
October 1
Atrio 800
12.00H

BRTA
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