C'NANO 2020
The Nanoscience Meeting
TOULOUSE
Centre des congrès Pierre Baudis
POSTPONED
NEW DATES
November 23, 24, 25 2021

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CV/ biography

Teresa Pellegrino received the 'Laurea' degree in Chemistry in 2000 and the PhD in Chemical synthesis in 2005 from the University of Bari, Italy. She started working in nanoscience, after the Master when she was a visiting student for 18 months in the group of Prof. P. Alivisatos at University of Berkeley (California) and later, during her PhD, when she moved for additional 18 months in the group of Prof. W.J. Parak at the Center for Nanoscience in Munich (Germany). After a Post Doc at the National Nanotechnology Laboratory in Lecce (Italy), she became permanent staff scientist at the Nanotech Center of CNR-Lecce. Since 2014, she is Tenured Team Leader of the Nanomaterials for Biomedical Applications group at the Italian Institute of Technology, Genoa (Italy).

Her research group at IIT focuses on the development of organic-inorganic nanostructured materials and their in vitro and in vivo preclinical studies for applications ranging from magnetic hyperthermia, to drug delivery, photo-thermal ablation and radiotherapy.

COMBINING MAGNETIC HYPERTHERMIA WITH OTHER THEREPAUTIC STRATEGIES TO TACKLE CANCER

Magnetic hyperthermia" (MHT) exploits the magnetic heat losses of magnetic nanoparticles under an alternating magnetic fields (AMF) to produce heat and 'burn' tumor cells. This treatment can be applied at magnetic field conditions (100 kHz and up to 24kA/m) that are clinically safe for patients with no tissue-depth attenuation for magnetic nanoparticle actuation. This peculiar feature enables to provide a more selective heat treatment with less side effects.

This talk aims at providing an overview of our last five years research efforts to combine magnetic hyperthermia with chemotherapy and intrinsic nanoparticle cytotoxicity. I will first focus on our progress on non-hydrolytic methods for the preparation of magnetic nanoparticles with optimal heat performance in MHT and our attempt to scale up the production of magnetic materials. Then I will introduce the thermo-responsive polymer coated iron oxide nanocubes as drug carrier for doxorubicin with a heat-mediated drug release mechanism. I will report about our in vitro study on tumor spheroids from colorectal cancer cell model to determine the magnetic hyperthermia effects, with or without the association of chemotherapeutic drugs, on different subpopulations of cancer cells. Finally, I will discuss our preclinical results to evaluate the magnetic hyperthermia efficacy of some of our magnetic materials on xenograft murine tumor model and the bio-distribution study of some of the best performing materials we have developed.

Keywords: magnetic hyperthermia, magnetic nanoparticles, doxorubicin, nanoparticles alignment, in vivo efficacy study, Cu64-radiolabelling