Research Team: Monica Rinaldi, Sandra Iurescia, Daniela Fioretti

For years the research team, composed of M. Rinaldi (orcid.org/0000-0002-6889-9388), S. Iurescia (orcid.org/0000-0002-8200-9775) and D. Fioretti (orcid.org/0000-0003-2879-4028), has been involved in preclinical research, in the field of Red Biotechnology, aimed at developing new biotechnological drugs and nanomaterials in oncology and regenerative medicine. We focused on preclinical \textit{in vitro} and \textit{in vivo} studies to validate the efficacy of treatments and predict their outcome in translational medicine.

One of the main research field involves the “Development and study of \textit{in vitro} and \textit{in vivo} preclinical models for the evaluation of anticancer therapies” based on: i) combined use of optically-sensitive graphene-based biomaterials and photothermal therapies; ii) biocompatibility and immune response studies for the validation of 3D graphene scaffolds for anticancer therapy and bone regeneration; iii) \textit{in vivo} biodistribution and \textit{in vitro}/\textit{in vivo} biocompatibility evaluations of nanomaterials (nanoparticles and QDots); iv) study of the mechanisms of the innate immune response for the development of immunotherapies. The research team works as collaborative partner in the project AIRC N°IG2019-ID.23124 (PI Università Cattolica del Sacro Cuore, IRCCS Fondazione Policlinico Universitario A. Gemelli). Our collaboration network include A. Lisi and M. Ledda of IFT-CNR, M. Papi (IRCCS Fondazione Policlinico Universitario A. Gemelli), V. Palmieri (ISC-CNR), S. Foglia (IMEM-CNR) and Di Gioia (Università ‘La Sapienza’) and the recent scientific production is as follows:

- “Graphene Quantum Dots’ Surface Chemistry Modulates the Sensitivity of Glioblastoma Cells to Chemotherapeutics” \textit{International Journal of Molecular Sciences} 2020;
- “Biocompatibility assessment of sub-5 nm silica-coated superparamagnetic iron oxide nanoparticles in human stem cells and in mice for potential application in nanomedicine” \textit{Nanoscale} 2020;
- “\textit{In vitro} biocompatibility study of sub-5 nm silica-coated magnetic iron oxide fluorescent nanoparticles for potential biomedical application” \textit{Scientific Reports} 2017;
- “Targeting Cytosolic Nucleic Acid-Sensing Pathways for Cancer Immunotherapies” \textit{Frontiers in Immunology} 2018

A further research area of interest involves the “Development of \textit{in vivo} preclinical models of severe organ damage/tissue injury and cell transplantation experiments, and the study of functional recovery and molecular pathways involved in the physiological regenerative response”. Our collaboration network include A. Lisi and M. Ledda of IFT-CNR, M. Sanchez (Istituto Superiore di Sanità), E. Carico (Sant’Andrea Hospital), R. Marchese (S. Peter Hospital FBF) and A. Durrbach (Inserm UMR 1014, Paul Brousse Hospital Paris) and the main scientific production is as follows:

- “Combination of cord blood-derived human hepatic progenitors and hepatogenic factors strongly improves recovery after acute liver injury in mice through modulation of the Wnt/\beta-catenin signaling” \textit{Journal of Tissue Engineering and Regenerative Medicine} 2019;
- “Cord blood CD133 cells define an OV6-positive population that can be differentiated in vitro into engraftable bipotent hepatic progenitors” \textit{Stem Cells and Development} 2011

Our group was also involved in the \textit{in vitro} identification and functional analysis of polymorphic alleles in patients with depressive neurological diseases: identification of polymorphic variants of the promoter of the human gene encoding the serotonin transporter. The main scientific production, in collaboration with D. Seripa (IRCCS Casa Sollievo della Sofferenza) is as follows:

- deposited nucleotide sequences of the allelic variants (GenBank KM054527; KM054528; KM054529);
- “Looking Beyond the 5-HTTLPR Polymorphism: Genetic and Epigenetic Layers of Regulation Affecting the Serotonin Transporter Gene Expression” \textit{Molecular Neurobiology} 2017;