

RESEARCH LINES OF THE FUNCTIONAL ONCOGENOMIC LABORATORY

The Laboratory has been involved for some years in molecular and cellular biology studies in the context of some human diseases. Particular attention is dedicated to the identification and functional characterization of regulatory sequences within the autophagic process. Currently the following research lines are active which concern:

1) Development of preclinical antitumor protocols in human astrocytomas

Fundings: FAR (2018); ATEC srl (2018-2019); Celeghin Foundation (2018-2020)

Main techniques used: cell cultures and transfection; isolation, characterization and modification of exosomes; immunoblotting, immunofluorescence; Real-time PCR; flow cytometry; functional assays

Identification of biomarkers to aid histopathological diagnosis and important in the stratification of patients (molecular subtyping) and for, in general, personalized medicine approaches; whole exome sequencing, RNAseq; isolation, characterization and modification of exosomal vesicles

Development of preclinical protocols to induce programmed cell death processes by activation of the autophagic process. Translational medicine studies with development of experimental preclinical therapeutic protocols for the treatment with chemotherapy or radiotherapy. Currently we are trying to develop a carrier system based on the use of allogeneic tumor exosomes enriched with molecules able to interfere favorably with the processes of cell death programmed into human glioblastoma stem cells.

2) The autophagic process in celiac disease

Funding: PRIN MIUR (2017-2020); "The Child and its Pediatrician" Foundation (2018-2020).

Main techniques used: cell cultures; immunoblotting, immunofluorescence, Real-time PCR, flow cytometry; fluorimetric analysis; single cell analysis; functional and immunological assays

Development of characteristic cellular models for studies in celiac disease, with which to test preclinical therapeutic protocols, based on the possibility of molecularly or pharmacologically modulating a cellular degradation process, autophagy, capable of potentially degrading gluten, in particular reducing the tendency to form large molecular aggregates that are toxic to the cell and can activate the immune response incorrectly. Currently we are trying to evaluate the possibility of favorably modulating the autophagic process in dendritic cells isolated from patients with celiac disease and of evaluating the immunological response.

3) Behavioral genetics

Main techniques used: genotypic analysis (PCR, Sanger sequencing); association studies and bioinformatic analysis

After the study published by our group that has identified a genetic determinant in "prosopagnosia" (difficulty in the recognition of faces), two new behavioral genetic studies will be activated concerning Bipolar Disorders and Pathological Gambling, associating genetic variants with pathological and psychological profiles.