Irene Caffa

Staff

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Education and training

2014

PhD in Clinical and experimental oncology and hematology

Enhancing the activity of molecularly targeted tyrosine kinase inhibitors through Short-Term Starvation
University of Genoa - Genoa - IT

2009

Statal Exam for the Professional Qualification

University of Genoa - Genova - IT

2009

Master degree in Biological Sciences course of Cellular and Molecular Biology

Development of new experimental therapy for the treatment of Human Neuroblastoma based on the inhibition of proteasoma - 110/110 cum laudae
University of Genoa - Genova - IT

2007

Bachelors degree in Biological Sciences

Are damages due to weightlessness to astrocytes repaired by a rest period - 110/110 cum laudae
University of Genoa - Genova - IT

Academic experience

2020 - ONGOING

Technician category D Technical technical-scientific and data processing area

University of Genoa - Genoa - IT
Cancer research

2018 - 2019

Post-doctoral Fellow researcher

University of Genoa - Genova - IT
Cancer research

2014 - 2016

Post-doctoral Fellow researcher

University of Genoa - Genova - IT
Cancer research

2011 - 2013

Phd student in Clinical and Experimental Hematology and Oncology.

University of Genoa - Genoa - IT
Cancer research

2010 - 2011

Fellow researcher

University of Genoa - Genova - IT
Evaluation of the role of SIRT6 deacetylase in the production of inflammatory and proangiogenic cytokines

Work experience

2019 - 2020

IRCCS San Martino hospital fellowship

IRCCS Policlinico San Martino - Genoa - IT
Study of the effects of cycles of a hypo-proteic diet on circulating markers of neuro-degeneration and oxidative stress

2017 - 2018

Veronesi Post-Doctoral Fellowship

Fondazione Veronesi - Genoa - IT
Inhibition of SIRT6 against the metastatic spread of breast cancer.

2016 - 2017

Co.Co.Co.

IRCCS Policlinico San Martino - Genoa - IT
Cancer research

2009 - 2010

Fellowship at Laboratory of Pediatric Oncology

Gaslini Hospital - Genoa - IT
Cancer research

Language skills

English

Independent

Research interests

Skills:
'In Vitro' culture of bacterial colonies and stabilized tumor cells: evaluation of cell proliferation by incorporation of 3H thymidine; evaluation of cell

viability by staining with trypan-blue or MTT derivatives. Growth in both 'dry' and 'soft-agar' colonies and subsequent staining with crystal violet. Flow cytometry and ELISA analysis. Generation of transiently transfected cell lines and cell lines transduced with retroviral and lentiviral vectors. Molecular biology: evaluation of protein expression by one-dimensional electrophoresis (SDS-PAGE) and Western Blot; RNA extraction and relative retro-transcription in c-DNA for RT-PCR; transient transfections with small-interference RNAs and subsequent analysis with Real-Time PCR; plasmid DNA extraction and identification of gene inserts of interest.
Manipulation of laboratory animals for the development of experimental mouse models for the study of the different stages of progression of neuroblastoma, breast, lung and pancreatic cancer (subcutaneous model, pseudo-metastatic model, which includes inoculation of tumor cells in the caudal vein of the mouse and orthotopic models, obtained by implantation of tumor cells in the organ of origin). Treatments by administering drugs intravenously, intraperitoneally and via oral gavage; immunofluorescence analysis on sections of tumor tissue removed and embedded in paraffin to evaluate specific antigens for cell proliferation, apoptosis and angiogenic proteins. Extraction of protein and tissue from tissue.

Grants

2021 - ONGOING

Endocrine therapy potentiation and mechanisms of drug enhancement in cancer via fasting

AIRC - IT

MFAG-My First AIRC Grant - Participant

2017 - 2022

Periodic fasting-mimicking diet as a strategy to increase the effectiveness of hormone therapies in estrogen receptor-positive breast cancer

U.S. Army Department of Defense Breast Cancer Research Program (BCRP) - IT

Participant

Our project addresses the following two overarching challenges: “Revolutionize treatment regimens by replacing interventions that have life-threatening toxicities with ones that are safe and effective” and “Reduce the mortality associated with metastatic breast cancer”.

- The first challenge is addressed since our data show that the combination of hormone therapies with cycles of starvation, both of which are safe and well tolerated, have exceptional tumor-eradicating properties. Thus the proposed new type of treatment (hormone therapies combined with a fasting-mimicking diet - FMD) could cure most, or at least a good part, of the cases of estrogen receptor (ER)+ BCs, avoiding the need for more toxic treatments, such as chemotherapy. In addition, and just as importantly, our data show

that combining a FMD (or fasting) with tamoxifen prevents one of the most common and serious side effects of this agent, endometrial hyperplasia, which in turn can lead to bleedings and to another life-threatening adverse event, endometrial cancer. Already by itself, such a preventive effect of a FMD in combination with tamoxifen seems of the utmost importance to us and could be sufficient to justify the study of FMDs for the prevention of tamoxifen-induced endometrial pathologies.
- The challenge of eliminating the mortality associated with metastatic BC (MBC) is also addressed in our proposal. Our data clearly indicate that the combination of fasting with commonly prescribed hormone treatments i) increases the ability of these medications to control tumor growth, ii) contrasts several mechanisms responsible for acquired resistance to hormone therapies (e.g. mTOR signalling) and iii) compromises the DNA repair machinery of BC cells, inducing DNA damage accumulation and preventing tumor re-growth after treatment withdrawal (with complete tumor regressions observed in 15-30% of the treated animals after just one-month of hormone treatment and four cycles of fasting; see below, Background). Thus, these data clearly indicate the potential of combined hormone treatments and a FMD (or fasting) to cure metastatic BC (MBC).

We think that our study will indicate FMDs as a safe and inexpensive approach to eliminate or at least strongly reduced the mortality of ER+ BC, while also avoiding anxiety-generating and potentially life-threatening side effects of hormone therapies, such as endometrial hyperplasia and endometrial carcinoma.

2018 - ONGOING

Enhancing the activity of hormone treatments for breast cancer by a fasting-mimicking diet

AIRC - IT

Participant

The aim of the research project is to verify whether short cycles of fasting or a 'fasting-mimicking diet' can improve the response to hormone therapy in women with breast cancer. Short periods of fasting or a fasting-mimicking diet appear to be capable of producing changes that cancer cells struggle to adapt to, which may make cancer treatments more effective. The study aims to study in detail the mechanisms underlying the phenomenon and to verify the safety of this approach in a small number of patients receiving hormone therapy.

2016 - 2018

Preclinical validation of extracellular nicotinamide phosphoribosyltransferase as a target for treating breast cancer

AIRC - IT

Participant