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Lipid droplets – mitochondria contact as a key driver for cancer progression

Supervisor: Prof. Saverio Marchi

Department of Clinical and Molecular Sciences – Histology Lab
https://www.disclimo.univpm.it/

UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Prof. Saverio Marchi

Brief Description of the Supervisor

Prof. **Saverio Marchi** has long-standing expertise in the study of cellular signalling, with special focus on the role of mitochondria in different physio-pathological conditions.

Past job positions: Saverio Marchi obtained his PhD at the University of Ferrara (UNIFE) in the 2011, under the supervision of Prof. R. Rizzuto. Then, he worked as post-doc in the laboratory of Prof. G. Kroemer (INSERM, Paris – EMBO fellow), and at the University of Hawaii Cancer Center (M. Carbone's Lab). In Italy, he worked at UNIFE in the P. Pinton's Lab, supported by a FIRC grant (3 years) and an U. Veronesi Fellowship. He became Assistant Professor at UNIVPM in December 2018 and Associate Professor in December 2021.

Research interests: Our research is focused on the study of mitochondrial dynamics at both morphological and functional levels. We are interested in clarify the role of specific mitochondrial rearrangements in different physio-pathological conditions.

Teaching activity: UNIVPM, Faculty of Medicine and Surgery: **2022-present**: Prof. of Histology, (degree course: Dentistry and Dental Prosthetics); **2019-present**: Prof. of Histology, (degree course: Nursing); **2020-2021**: Prof. of Histology, (degree course: Dietistic Sciences); **2020-2021**: Prof. of Histology, (degree course: Imaging and Radiotherapy Technique); **2019-2021**: Prof. of Histology, (degree course: Biomedical Laboratory Techniques). UNIFE, Faculty of Medicine and Surgery: **2011-2018**: Adjunct Prof. of General Pathology - (degree course: Nursing); **2010-2013**: Adjunct Professor of General Pathology (degree course: Pharmacy).

Research grants: ; **2024**: Principal Investigator, "Project GJC23065" Fondazione Telethon/Cariplo grant; **2023**: Head of Operative Unit, "Progetti di Rilevante Interesse Nazionale" (PRIN_PNRR_2022) of the Italian Ministry of University and Research; **2023**: Principal Investigator, "Progetti di Rilevante Interesse Nazionale" (PRIN_2022) of the Italian Ministry of University and Research; **2023**: Head of Operative Unit, PNRR Grant: M6/C2_CALL 2022 of the Italian Ministry of Health; **2022**: Collaborator, Grant from the European Union - NextGenerationEU through the Italian Ministry of University and Research under PNRR - M4C2-I1.3; **2018**: Principal Investigator, "Young Researchers Grant" of the Italian Ministry of Health (Ricerca Finalizzata).

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Research Group Description

Publications: **87** publications on "peer-reviewed" journals, 34 as First (or Co-first) Author - Last Author - Corresponding Author.
H-index: **45**; n° of citations > **9000**; i10-index: **75**. Source: Scopus).
SCOPUS ID: 23473694600 https://www.scopus.com/authid/detail.uri?authorId=23473694600
ORCID: 0000-0003-2708-1843 https://orcid.org/0000-0003-2708-1843

Research group: **Marchi's Team** is a part of the Histology Group (**MorpHis Lab**), composed by one Full Professor, two Associate Professors, one Lab technician, five Post-Docs, and two PhD students.

Our research group aims 1) to understand the mechanisms regulating mitochondrial dynamics and remodelling and how they govern cell fate decisions, 2) to identify and functionally characterise new pathways regulating mitochondria-organelle contact sites, and 3) to elucidate how mitochondria react to bacterial infection. We investigate the relevance of these pathways in cell death and survival, cellular metabolism, inflammation as well as to human diseases including cancer.

Marchi's Team*: *Investigating the molecular mechanisms and functions of mitochondrial dynamics and membrane contact sites

S. Marchi
Group Leader

F. Marcheggiani
RTT

N. Dhaouadi
Post-doc fellow

L. Rao
Post-doc fellow

I. Nunzi
PhD student

UNIVERSITÀ POLITECNICA DELLE MARCHE

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Department of Clinical and Molecular Sciences (DISCLIMO)

16 SCIENTIFIC AREAS

BIOS-13/A MEDS-02/A
MEDS-02/B MEDS-02/C
MEDS-05/A MEDS-08/A
MEDS-09/A MEDS-09/B
MEDS-09/C MEDS-10/A
MEDS-10/C MEDS-18/A
MEDS-19/A MEDS-25/B
MEDS-26/A MEDS-26/D

MARCHEBIOBANK

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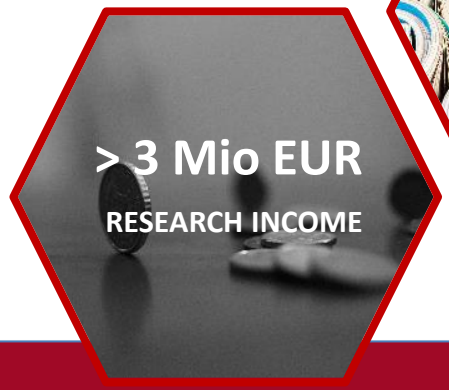
VITALITY

11
CLINICAL RESEARCH UNITS



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Project Idea

Title: Lipid droplets – mitochondria contact as a key driver for cancer progression

Background: For cells to function properly, it is necessary for cell organelles to communicate with each other. In this context, mitochondria establish functionally crucial connections with virtually all other intracellular structures. These interactions not only impact mitochondrial behavior and activity but also influence a wide variety of cellular functions. In recent years, it has been showed that mitochondria interact with lipid droplets (LDs) and this association induces a drastic remodelling of the cellular bioenergetics. However, the mechanisms regulating the LDs-mitochondria contacts, or their potential role in driving some pathological conditions (i.e cancer development), are still elusive.

Main Goal: In this project, we aim to elucidate different aspects of the LDs-mitochondria tethering in the context of cancer progression, by providing fundamental clues on the molecular pathways that control contact formation, how the mitochondrial network rearranges, the metabolic changes that occur at these contact sites, and how they affect the tumorigenic potential of cancer cells.
We recently collected some interesting preliminary findings on clear cell renal cell carcinoma (ccRCC), ensuring a perfect starting point for a MRSCA post-doctoral fellowship.