

Example 1

- **Award year: 2025**
- **Name of the awarded researcher: Ghezzi Beatrice**
- **Position at the time of the award:** PhD student
- **Home laboratory**
 - Audrito Valentina
 - Dept. of Science and Technological Innovation, Piemonte Orientale University
 - Alessandria, Italy
- **Host laboratory**
 - Sara Sdelci
 - Centre for genomic regulation (CRG)
 - Barcelona, Spain
- **Research area**

Molecular oncology
- **Keywords**
 - Metastatic melanoma
 - Therapy resistance
 - NAMPT
 - NNMT
 - Nuclear metabolism
 - Chromatin regulation
- **Duration of the exchange: 06/10/2025- 05/01/2026**
- **Granted budget: €1000**
- **Project summary**

Therapy resistance in metastatic melanoma is frequently associated with metabolic adaptations and cellular stress responses. My project focused on two the metabolic enzymes Nicotinamide Phosphoribosyltransferase (NAMPT) and Nicotinamide N-methyltransferase (NNMT), previously implicated in melanoma progression and resistance, to characterize their subcellular localization and behavior in BRAF inhibitor-sensitive and -resistant melanoma cell lines.

During the research stay, I optimized protocols for nuclear fractionation and chromatin-associated protein extraction in melanoma cells. These methods were applied to assess the presence of NAMPT and NNMT in different cellular compartments. Both enzymes were detected in nuclear fractions associated with the chromatin, with higher levels observed in BRAF inhibitor-resistant cell lines compared to sensitive counterparts under basal conditions.

To further characterize conditions influencing nuclear localization, I performed a confocal microscopy-based screening to evaluate changes in NAMPT and NNMT nuclear signal under different cellular stress conditions. Quantitative single-cell analyses were conducted by measuring nuclear fluorescence intensity and stratifying cells according to their cell cycle phase. These analyses revealed condition-dependent and cell cycle-associated variations in nuclear NAMPT and NNMT levels.

In addition, I performed confocal imaging analyses of melanoma cell lines engineered to overexpress nuclear-localized NAMPT. These cells displayed reproducible alterations in cellular and nuclear morphology when compared to control lines. Further experiments are required to define the molecular basis and functional relevance of these observations.

Overall, this work presents optimized experimental approaches and provides descriptive cellular data on the nuclear localization of NAMPT and NNMT in melanoma models, thereby establishing a robust experimental framework for future mechanistic and chromatin-based studies.

- **Major outputs and impact of the project**

During the project, I optimized a robust protocol for extracting nuclear and chromatin-associated proteins in melanoma cell lines, which represents a valuable methodological output for my PhD work. The project generated solid preliminary data on the nuclear localization of NAMPT and NNMT, enabling further progression of my doctoral research. These data provide a strong foundation for future mechanistic studies and are expected to contribute to a peer-reviewed publication currently in preparation. In addition, the research stay established a productive collaboration with the host laboratory, which is expected to continue in the coming years and support the further development of the project.

- **Optional elements**



This research stay allowed me to experience a high-quality research environment at an international centre of excellence. I particularly appreciated the inspiring leadership of the group leader, which has motivated me in my own development as a woman scientist.

Example 2

- **Award year:** 2024
- **Name of the awarded researcher:** Laurane Beckers
- **Position at the time of the award:** PhD student
- **Home laboratory**
 - PI : Pr. Pierre Sonveaux
 - Institution : FATH / IREC / UCLouvain
 - City, country : Brussel, Belgium
- **Host laboratory**
 - PI : Pr. Sofia Avnet
 - Institution : Biomedical Science and Technologies and Nanobiotechnology Lab / Istituto Ortopedico Rizzoli di Bologna
 - City, country : Bologna, Italy
- **Research area / keywords :** Prostate cancer / Bone metastasis
- **Duration of the exchange :** 10th of June - 5th of July 2024
- **Granted budget :** €1000.00
- **Project summary**

Prostate cancer is the second most common cancer in men worldwide and a leading cause of cancer-related mortality. While localized disease is often managed successfully with surgery or radiotherapy, frequently combined with androgen deprivation therapy, advanced stages frequently spread to bone—occurring in approximately 84% of cases. These bone lesions cause severe complications such as pain, fractures, and spinal cord compression, dramatically worsening prognosis. Current systemic treatments, including androgen deprivation and chemotherapy, do not specifically prevent or eliminate bone metastases.

Metastasis is not random; it follows a pattern known as organotropism. In 1889, Stephen Paget introduced the “seed and soil” hypothesis, proposing that metastatic spread depends on a match between the needs of premetastatic progenitor cells (the “seed”) and the resources provided by a given organ (the “soil”). In this project, we revisit this concept through a metabolic lens, asking: How do metabolic changes—potentially triggered by nutrient limitations in the primary tumor—drive cancer cells to initiate metastasis and guide their dissemination to specific tissues?

To address this question, we generate prostate cancer cell variants that preferentially metastasize to bone through *in vivo* selection strategies. Once these bone-tropic models are established, we are performing metabolic profiling to identify distinctive features. We will then use RNA sequencing to uncover candidate metabolic regulators associated with bone metastasis. Finally, functional validation through knockout and overexpression approaches will establish causal relationships between these metabolic adaptations and metastatic behavior.

By elucidating the metabolic determinants of bone metastasis, this research aims to uncover actionable targets for therapeutic intervention, paving the way for strategies that specifically prevent or treat metastatic prostate cancer.

- **Major outputs and impact of the project**

The one-month exchange in Bologna aimed to strengthen my expertise in bone biology and its relevance to prostate cancer metastasis. The primary objectives were to master techniques for working with bone tissue, deepen my understanding of bone metastasis through interdisciplinary collaboration, and integrate new methodologies into my PhD research on the metabolic control of bone metastasis in prostate cancer.

During this program, I acquired hands-on experience in culturing human osteoblasts (hHOB) and differentiating mesenchymal stem cells (MSC), including inducing mineralization using specialized media. I also learned to characterize osteoblasts through markers such as alkaline phosphatase and Alizarin Red staining. Additionally, I gained practical skills in bone tissue processing—covering fixation, decalcification, dehydration, paraffin embedding, and slide preparation for immunohistochemistry.

Beyond technical training, the exchange fostered valuable interdisciplinary collaboration. Engaging with experts in bone biology and nanobiotechnology provided insights into advanced methodologies and experimental design, which will significantly enhance the scope and impact of my ongoing research.

Example 3

- **Award year:** 2024
- **Name of the awarded researcher:** Valentina Giansante
- **Position at the time of the award:** PhD student
- **Home laboratory**
 - Head of laboratory: Prof.ssa Roberta Di Pietro
 - Institution: University “G. d’Annunzio” of Chieti Pescara
 - City, country: Chieti, Abruzzo, Italia
- **Host laboratory**
 - Head of laboratory: Prof. Luigi Leanza
 - Institution: University of Padova
 - City, country: Padova, Veneto, Italia
- **Research area / keywords:** Pancreatic Cancer, Mitochondria, Extracellular Vesicles
- **Duration of the exchange** (start and end dates): 1st-31st September 2024
- **Granted budget:** 600€
- **Project summary:** During my work in Prof. Luigi Leanza’s laboratory, the aim was to compare the bioenergetic profile of pancreatic tumor cell lines (BXPC3 and PANC-1) and to verify the mitochondrial nature of extracellular vesicles. Cellular metabolism was analyzed by assessing ATP production, mitochondrial enrichment, oxygen consumption, and extracellular acidification using the Seahorse XF24, with the HPDE cell line as a control. Cell proliferation was also evaluated over time. Finally, the presence of mtDNA in extracellular vesicles was confirmed by quantification through Real Time PCR following genomic DNA extraction.
- **Major outputs and impact of the project**
ongoing: getting ready for paper submission;
- **Optional elements**

This experience was truly an opportunity for both professional and personal growth; it allowed me to build new collaborative networks that gradually developed into relationships of mutual respect and friendship.