



# PhD in BIOINGEGNERIA / BIOENGINEERING - 39th cycle

## PNRR 117 Research Field: TARGETING G PROTEIN-COUPLED RECEPTORS (GPCRS) AS A STRATEGY AGAINST PROSTATE CANCER BONE METASTASES

### Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

### Context of the research activity

#### Motivation and objectives of the research in this field

Presently, no cure is available for bone metastatic prostate cancer and new drugs are needed to prevent or slow metastatic colonization. Recently, it has been discovered that the inhibition of specific receptors, belonging to the GPCR family, influences metastatic progression. However, some of these receptors are poorly conserved between species, rendering it difficult to study their role in animal models. The project thus aims at generating an advanced 3D in vitro model of prostate cancer bone metastasis, based on human cells, to investigate deeper the possibility to target these receptors as a therapeutic strategy. In parallel, to design suitable inhibitors and/or ligands for the selected GPCR, computational free-binding energy simulations will be exploited.

#### Methods and techniques that will be developed and used to carry out the research

The project will be highly multidisciplinary, involving engineering, biology and computational techniques. In particular, biofabrication techniques such as bioprinting will be developed to generate the bone model with adequate properties for the investigation to be performed. 3D culture and co-culture techniques will be also employed for model generation. To analyze the results originating from the model, other biological techniques such as immunofluorescence, confocal microscopy, ELISA, PCR or similar assays will be applied. Finally, for the design of GPCR inhibitors, computational methods including free-binding energy calculations will be used.



	including free-binding energy calculations will be used.
<b>Educational objectives</b>	The PhD candidate is expected to develop high-level skills in the design and exploitation of 3D in vitro models for the study of pathophysiological mechanisms. Furthermore, he will develop computational skills on atomistic simulations. Finally, abilities in revising the specific literature, in elaborating and successfully presenting data and results, in writing and successfully submitting papers to international scientific journals and conferences will be achieved.
<b>Job opportunities</b>	The specific knowledge acquired will allow the candidate to apply for and be selected for R&D positions in public and private research centers and companies. In particular, their profile will be highly interesting for pharma companies within the preclinical drug screening pipeline
<b>Composition of the research group</b>	1 Full Professors 0 Associated Professors 5 Assistant Professors 3 PhD Students
<b>Name of the research directors</b>	DUBINI GABRIELE - MATTEO MORETTI

<b>Contacts</b>	
Prof. Matteo Moretti matteo.moretti@eoc.ch	
Prof. Gabriele Dubini gabriele.dubini@polimi.it	

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>National Operational Program for Research and Innovation</b>
---



<b>Company where the candidate will attend the stage (name and brief description)</b>	Ente Ospedaliero Cantonale, Bellinzona (CH)
<b>By number of months at the company</b>	6
<b>Institution or company where the candidate will spend the period abroad (name and brief description)</b>	da definire
<b>By number of months abroad</b>	6

**Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information**

**Educational activity:** The student will be encouraged to attend to courses at POLIMI or abroad in International Schools.

**Teaching assistantship:** There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

**Computer and desk availability:** the student will be allowed to access facilities of the DEIB.