



PhD in BIOINGEGNERIA / BIOENGINEERING - 40th cycle

THEMATIC Research Field: BEACONSANDEGG. AN ORGANISM-ON-CHIP PLATFORM TO MODEL BREAST CANCER PROGRESSION. CHARACTERIZATION OF THE FIBROTIC TUMOR MICROENVIRONMENT

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	<p>The overarching goal of this project is to create an innovative platform capable of modeling the fibrotic microenvironment of invasive breast cancer in order to better understand its progression and design better targeted cancer therapies. When this goal is met, it will be possible to validate the efficacy and specificity of therapeutic agents at various stages of tumor fibrosis. The long-term goal is to improve our understanding of incurable cancers and to provide a standardized testing platform for new therapeutic products.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The pathology modelled is infiltrating ductal carcinoma of the breast. We will use human cell lines, able to model the genetic progression of the disease, seeded on micro-scaffolds and implanted in avian embryos in vivo. We will monitor the development of fibrotic microenvironments surrounding the cellularised constructs, using fluorescence microscopy.</p> <p>To that end, the candidate will:</p> <ol style="list-style-type: none"> a) In vitro, estimate parameters related to both the response of cancer cells (proliferation, motility, metabolic activity) and, in vivo, the infiltration of cancer-associated cells (macrophages, fibroblasts). b) On the explanted tissue, in addition to cell infiltration, he/she will also evaluate the level of inflammatory parameters (cytokines/chemokines) that can suggest if



	<p>and to what extent the macrophages recruited are active in this sense.</p> <p>c) To assess developmental toxicity, neurotoxicity or organ-specific toxicity, the candidate will assess these aspects by conventional histology on the whole embryos recovered from the validation experiments and, if needed, by further analyses for example of protein content and gene expression.</p> <p>d) Finally, the candidate will compare the findings with all the published data on toxicity effects relevant to the investigated drugs.</p>
Educational objectives	<p>The program will be part of the international project ERC, acronym BEACONSANDEGG, G.A. 101053122 funded by the European Union. The candidate will take part to the research meetings and to the different phases of the project, working in the EU context. Besides acquiring specific expertise on research methodologies, and publishing the obtained results, the candidate will improve on team collaboration, deadline compliance, research reporting.</p>
Job opportunities	<p>The acquired expertise will lead to various job opportunities as a researcher and/or research manager in public research institutions, as well as pharmaceutical and instrumentation companies. Collaborations with a PhD with this level of experience will also benefit companies and institutions interested in applying Nanoscience and Nanoengineering to Regenerative Medicine.</p>
Composition of the research group	<p>1 Full Professors 0 Associated Professors 3 Assistant Professors 1 PhD Students</p>
Name of the research directors	Prof. Manuela T. Raimondi

Contacts

Prof. Manuela T. Raimondi
<https://www.cmic.polimi.it/en/persone/docenti-e-ricercatori/raimondi-manuela-teresa>
 manuela.raimondi@polimi.it , +39 02 2399 4306



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

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Teaching assistantship: availability of funding in recognition of support to teaching activities by the PhD student</p> <p>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</p> <p>Computer availability: 1st year: shared use 2nd year: shared use 3rd year: shared use</p> <p>Desk availability: 1st year: shared use 2nd year: shared use 3rd year: shared use</p> <p>research group http://www.nichoid.polimi.it/mechanobiologylab/</p>