

BIOENGINEERING AND MEDICAL-SURGICAL SCIENCES

MUR DM 118 - Development and characterization of biological models in the biomedical field

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Context of the research activity	<p>The research topic is in line with the PNRR thematic areas of intervention, and specifically with the thematic area "Health". The research will focus on the design, development and characterization of advanced biological models of diseases with high social impact. Cutting-edge bioengineering technologies and a wide range of wet-lab laboratory techniques will be used for model preparation and characterization, respectively. The aim is to create 3D models suitable to overcome the current limitations of 2D models and to be interrogated in terms of response to treatment/drugs.</p> <p>Progetto finanziato nell'ambito del PNRR – DM 118/2023 - CUP E14D23001560006</p>
Objectives	<p>The research activity of the PhD candidate will be in the context of the development of advanced 3D biological models with a view to offering new tools in the biomedical field, i.e. biological models that can recapitulate the physiological and pathological state of a specific body district and be exploited as a basis for the implementation of models in the context of precision/personalized medicine.</p> <p>An important challenge for the realization of most of the advanced 3D biological models is the insertion of the vascular component which must be functional, maintained over time and responsive to stimuli. The PhD candidate will have to consider the vascularization issue for the model development.</p> <p>The main research objectives of this PhD thesis include (not necessarily all): i) design and preparation of one or more 3D biological models of human tissues/organs/districts based on advanced bioengineering technologies (e.g., 3D bioprinting), and devoted to recapitulate normal and pathological</p>

states, ii) model characterization through different laboratory techniques (e.g., biochemical and biomolecular methods, imaging and omics), ii) model testing in terms of response to the administration of drug/other treatments.

Skills and competencies for the development of the activity

Candidates should have a solid bioengineering background and strong motivation to learn through advanced research. In particular the knowledge of the main current bioengineering approaches for the development of advanced 3D biological models as well as proven practical experience in laboratory activity are required.

Knowledge in material science, microfluidics, chemistry, biochemistry and cell biology as well as problem solving ability are preferred. Desirable attitude to work in team as well as independently.