

RenalToolBox – Project Description

ESR Number:	ESR15	Host:	UNITO
Project Title:	Determine the role of EVs in mediating the therapeutic effects of MSCs		
Research Field:	Regenerative Medicine		
Contact Person:	benedetta.bussolati@unito.it		
Academic Supervisor(s):	Benedetta Bussolati		
Research Group / Department:	Laboratory of Renal and Vascular Pathophysiology		
Group's website:	https://x027-unito.prod.cineca.it/en/research/research-areas/basic-and-applied-research/regenerative-medicine		
Full Address:	Molecular Biotechnology Center, via Nizza 52 10126 Torino ITALY ww.mbc.unito.it		
Expected Start Date:	March-April 2019		
Description:			
<p>The Molecular Biotechnology Center of the University of Torino is looking for an Early Stage Researcher (ESR) with a focus on the identification of mechanisms underpinning cell-based regenerative medicine therapies for the treatment of kidney disease. The project aims to establish the optimal source of mesenchymal stem cells, assessing potency and understanding mechanisms of action. In particular, this project will focus on the role of Extracellular vesicles (EVs), cell-released small vesicles involved in cell-to-cell communication that actively transfer to target cells various molecules, including proteins and RNA, consequently modulating cell phenotype via transcriptional and stable epigenetic changes. EVs from different MSC subtypes will be characterized for their functional and molecular characteristics, in comparison with apoptotic bodies.</p> <p>About the Laboratory of Renal and Vascular Pathophysiology and the PhD course: The laboratory of Renal and Vascular Pathophysiology at the Molecular Biotechnology Center in Torino has a strong focus on regenerative medicine. In particular, the laboratory has a long-term expertise on stem cell derived EVs and on their application to renal tissue regeneration. The laboratory hosts biologists, biotechnologists and medical doctors from different countries with an international and multicultural atmosphere. Its research activities are aimed to approach the physiopathological aspects of human diseases in different areas (nephrology, angiogenesis, gynaecology and oncology). The center host up-to-date laboratories, an animal facility, a Stem cell Factory (for clinical applications) and an excellence center for molecular imaging (https://www.mbc.unito.it/en/centre).</p> <p>The ESR will be part of the PhD program in Medical Physiopathology. This curriculum is recruiting students with interests in the understanding of the physiopathological mechanisms underlying the processes that impact human health, with a research approach oriented to basic research applied to clinic.</p> <p>Project description: The project is part of renalTollBox, a new European Union's Horizon 2020 research and innovation programme ITN under the Marie Skłodowska-Curie, to develop and apply the tools needed to evaluate and characterise cell-based therapies for kidney disease, and to train the next generation of Translational Scientists for Regenerative Medicine. The candidate will acquire knowledge on extracellular vesicles biogenesis, isolation and functional</p>			

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characterization. The training experience will provide skills in a wide range of research methods including purification and culture of stem cells of different origin, transfection, quantitative PCR, Western Blotting, fluorescence imaging, flow cytometry analysis, ELISA etc. Special emphasizes will be put on the characterization of EV cargo (protein, lipids and microRNA analysis), and functions (immunomodulation, tubular cell repair) in comparison with that of apoptotic bodies. Validation will be performed in collaboration with project Partner (secondments) studying EVs in animal models of ischemia reperfusion injury. The project will contribute to characterize the mechanisms involved in the effect of a number of different sources of stem cell, with promising applications for regenerative medicine therapy in kidney disease.

Eligibility:

The candidate is also required to fulfil the research experience and transnational mobility requirements outlined in <https://renaltoolbox.org/job-positions/>

Required Skills / Qualifications:

- Candidate profile:
BSc degree in a relevant subject (biomedical sciences, bioengineering, molecular biology or other related subjects). A Master degree is desirable.
Prospective students should have an excellent score in their previous classes, a strong undergraduate science background including renal physiopathology and a strong commitment to research.
Interests in developing and translating technology to answer medical questions and solve healthcare problems in the nephrology field.
Good knowledge of basic techniques of cell and molecular biology.
Knowledge or experience in extracellular vesicle and stem cell research is considered as an advantage.
Able to communicate with scientists, engineers and clinicians of different disciplines
Have a motivated, flexible and positive work attitude.

Other requirements:

Proficiency in English language.

Be flexible to travel throughout the Europe in order to exchange expertise between the partners of RenalToolBox consortium.