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FONDAZIONE
RICERCA BIOMEDICA
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V.I.M.M.



European
Research
Council

Ph.D. student position

SPATIAL TRANSLATION IN CARDIOVASCULAR DISEASES

The laboratory of Prof. Massimo Santoro at Dept. of Biology, University of Padua and Venetian Institute Molecular Medicine (<https://massimosantorolab.com>) is seeking a PhD student to address the role of localized mRNA translation in the context of cardiovascular settings.

Once considered as a passive decoding of mRNAs, scientists now perceive mRNA translation as a powerful modulator of gene expression, thus suggesting that translation is a highly and tightly controlled mechanism for cell identity and function. While transcriptomics studies have offered extensive insight into cardiovascular biology and demonstrated the importance of endothelial and myocardial transcriptional regulation in cardiovascular (CVD) tissues, similar approaches investigating translation in CVD remain neglected. CVD is one of the main causes of death and disability worldwide and is often associated with an altered metabolism inside arteries and blood vessels. We are interested in decoding novel mechanisms affecting metabolic-dependent mRNA translation in CVD. We found that messenger RNAs are asymmetrically distributed within endothelial and myocardial cells. Some of these messenger RNAs are transported to the front of these cells where they may be locally translated into proteins that actively participate in cell motility. How and why, this happens is still unknown. In this project you will investigate 1) the role of mTOR-mediated localized translation in CVD cells; 2) the nature of the newly synthesized endothelial and myocardial factors, and 3) the signaling machinery that modulates messenger RNA translation in the context of CVD normal and pathological settings. To explore these themes, you will take advantage of a wide range of in vivo animal models and cell culture techniques. These will be used in combination with genome editing, metabolomics, proteomics, and spatial transcriptomic approaches designed to explore how and why particular messenger RNAs are translated (translatome) into proteins at the front of endothelial cells. Our laboratory has acquired a strong experience in biochemistry, genetic, molecular, and cellular biology of endothelial and mural cells in different vertebrate animal models and human primary cells (Donadon and Santoro, *Development*, 2021; Camillo et al., 2021, *J. Cell Biol.*; Facchinello et al., 2022, *Nature Metabolism*; Oberkersch et al., 2022, *Developmental Cell*, Astone et al., 2023, *Cardiovascular Research*). Mouse and zebrafish animal facility, translatome analyses, STED, multiphoton and light sheet microscopy equipment, FISH, Atomic Force Microscopy, and metabolic/proteomic core facilities are available in the laboratory and department for these studies.

Ph.D. candidates should hold a degree in biomedical sciences, bioengineering, medicine, or any related discipline. Motivated students of all nationalities with a strong commitment to basic and/or clinical research are invited to apply. Any experience in molecular biology, cellular and developmental biology, biochemistry, cell culture, metabolism, etc. is an advantage. The candidate should have well-developed social skills and be able to work in a team. Interest in the field of angiogenesis, cell signaling, and metabolism will be an additional asset. Applicants should have good communication skills in spoken and written English.

We offer a dynamic working environment, stimulating scientific surroundings in a young, enthusiastic, motivated team (with English as the main language), and the opportunity to work on high-impact projects. We offer a competitive salary (European Marie Curie Fellow range) and social security contribution. Please send your CV, a letter of motivation, and the contact information of at least two references to Prof. Massimo Santoro at massimo.santoro@unipd.it. The positions will start 2024 (flexible).

As a top European institution of higher education, the University of Padua holds over 30 ERC grantees and offers a strong foundation in cell biology studies with interdisciplinary approaches. This idyllic environment for life science research is located in the northeast of Italy, which is perfect for those seeking a healthy work-life balance thanks to its proximity to the Adriatic Sea and the Dolomite Mountain range.