

FUTURE LEADER TO WATCH

Future leader to watch – Tania Martins-Marques

First Person is a series of interviews with the first authors of a selection of papers published in Biology Open, helping early-career researchers promote themselves alongside their papers. Tania Martins-Marques is first author on 'Connecting different heart diseases through intercellular communication', published in *BiO*. Tania is a postdoc in the Faculty of Medicine, at Coimbra Institute for Clinical and Biomedical Research (iCBR), Portugal, investigating the impact of proteostasis and intercellular communication derailment in cardiac diseases.

What is your scientific background and the story of how you got to where you are today?

I obtained my bachelor's in Biochemistry, followed by a master's in Cellular and Molecular Biology. Following my growing interest in the field of cardiovascular sciences and, particularly in understanding the molecular mechanisms underlying cardiac diseases, I joined the recently established GUIC lab (Group of Ubiquitin-dependent proteolysis and Intercellular Communication) led by Dr Henrique Girão, in 2014, where I started to investigate the mechanisms whereby gap junction proteins (connexins) are degraded in cardiac cells. At the same time, the pioneering work of the GUIC lab uncovered the unanticipated role of connexins in cell–cell communication at longer distances, involving extracellular vesicles. I became fascinated with the versatile nature of connexins, which led me to pursue my PhD studies focusing on the impact of myocardial ischemia upon connexin-mediated communication, not only at the level of gap junctions, but also by extracellular vesicles. Along the path, the close collaboration with clinicians, both cardiologists and cardiothoracic surgeons, has certainly contributed to leverage the translation of our research, which I intend to consolidate in the years to come.

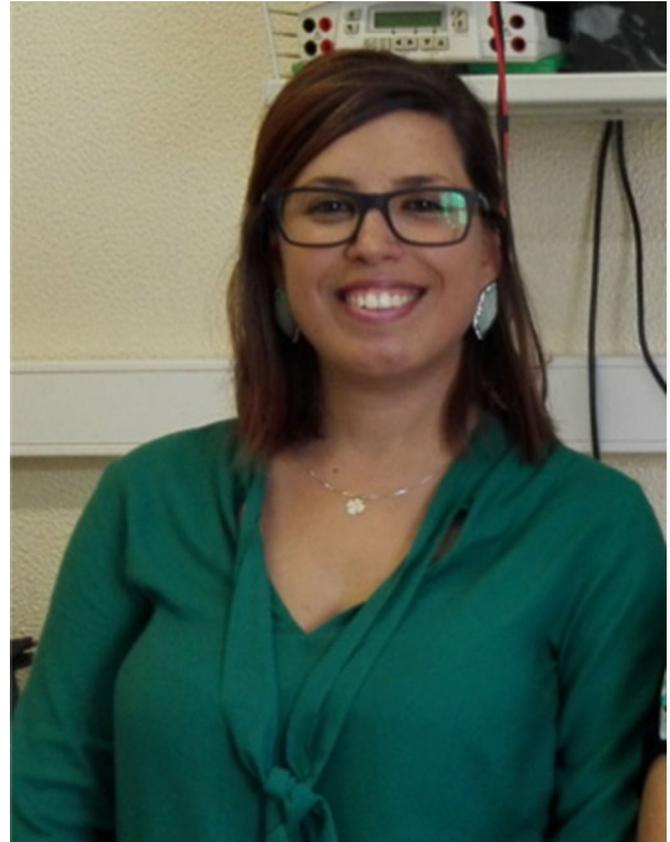
What is the most important take-home message of your Review?

The heart is a specialized contractile organ, the major function of which is to pump blood throughout the body to supply oxygen and nutrients to peripheral tissues. In order to correctly perform this function, a rapid propagation of the electrical impulses is required to trigger efficient mechanical contraction of the heart, which is supported by highly efficient communication networks involving all cardiac cell populations. Not surprisingly, defects in intercellular communication have been associated with the onset and progression of multiple heart disorders, including myocardial infarction and hypertrophy.

Given the complexity and diversity of cell–cell crosstalk pathways, a comprehensive and integrated perspective of their regulatory mechanisms in health and disease conditions, is instrumental not only to identify novel molecular targets, but also to enhance the efficacy of current therapies.

What has surprised you the most while researching this Review?

How rapidly the field has grown and evolved. For example, 50 years ago, extracellular vesicles were considered as mere 'platelet dust',



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and currently have inspired the development of a multitude of therapeutic strategies, not only for cardiovascular diseases. This represents a major opportunity for future research aiming to narrow the gaps between bench work and the clinical arena.

“...50 years ago, extracellular vesicles were considered as mere ‘platelet dust’...”

What do you feel is the most important question that needs to be answered to move the field forward?

Although recent evidence has suggested that different forms of intercellular communication represent appealing druggable targets, I believe that an holistic understanding of the cell–cell crosstalk pathways and their reciprocal regulation is crucial to improve the success of those strategies. For that, it is vital to find more appropriate and reliable models, either *in silico*, *in vivo* or resorting to innovative 3D heart-on-chips that consider the complexity of intercellular communication and anticipate their behavior under physiological and disease-modeling conditions.

What changes do you think could improve the professional lives of early-career researchers?

In my opinion, mentorship is key to allowing young researchers to thrive in a highly competitive world and to prepare them to make

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important career decisions. I believe that career development toolkits, as well as the contact with researchers at different stages of their professional lives, including the ones that followed alternative or unconventional paths is crucial to empowering the next generation of scientists.

“In my opinion, mentorship is key...”

What's next for you?

I am thrilled with the idea of uncovering other unconventional functions of connexins and their implications in cardiovascular diseases, striving to make my research more clinically oriented, with benefits for patients in the near future.

Reference

Martins-Marques, T. (2021). Connecting different heart diseases through intercellular communication. *Biology Open*. **10**, bio058777. doi:10.1242/bio.058777