



Part A. PERSONAL INFORMATION



CV date	07/09/2023
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First name	Miguel		
Family name	Palomino Segura		
Gender (*)	Male	Date of Birth	25/07/1989
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A.1. Current position

Position	Ramón y Cajal Researcher		
Initial date	01/01/2023		
Institution	University of Extremadura		
Department/Centre	Physiology	Faculty of Sciences	
Country	Spain	Phone number	(+34) 654607761
Keywords	Immunology, Innate immunity, Intravital microscopy, Neutrophils, Infectious diseases, Cardio-vascular pathology, Vaccines		

A.2. Previous positions (research activity interruptions)

Period	Position/Institution/Country/Cause of the interruption
2020 - 2022	Postdoctoral researcher / Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC), Spain
2019 - 2019	Postdoctoral researcher / Institute for Research in Biomedicine (IRB), Switzerland
2013 - 2018	PhD student / Institute for Research in Biomedicine (IRB), Switzerland
2012 - 2013	Product Specialist / CYTOGNOS, S.L. , Spain

Part B. CV SUMMARY

I currently am a Ramón y Cajal Post-doctoral fellow in the Department of Physiology at the University of Extremadura and member of the *Immune System Pathologies Unit* led by Dr. Eduardo Ortega at the *Instituto Universitario de investigación Biosanitaria de Extremadura* (INUBE). My research career has been dedicated to the study of innate immunity and the development of therapeutic strategies to modulate immune responses. I have a keen interest in understanding the molecular mechanisms associated with protective and pathogenic inflammatory responses during sterile and infectious challenges.

During my undergraduate studies I obtained an Erasmus placement fellowship to join the laboratory of microbiology of Prof. Dr. Csaba Fekete (Sept 2010-Jun 2011) at the University of Pécs (Hungary). Seeking for experience in the industrial sector before committing to a graduate program, I worked at a private company where I learned the basics of management in the biotech sector and participated in R&D projects of the company (Jun 2012-Sept 2013). It was at this stage that I realized that I wanted to pursue a career in basic research. To this end, I for my PhD in the "Infection and Immunity" lab led by Dr. González, at the IRB (Switzerland). During my PhD and a brief period as a Post-doc there after my thesis defense (Sept 2013-Sept 2019), I focused on the role of the innate immunity in the early defense against influenza infection and the activation of adaptive immunity as a strategy to develop therapeutics against infections. The first part of my studies yielded two publications on the development of optimal adaptive responses after vaccination (*Cell Reports*. 2017/ **co-author**



and *Cell Reports*. 2019/**co-author**). The second part of my PhD focused on early innate immune responses in the upper respiratory tract during influenza infection, which led to the publication of two manuscripts as first author (*Nature Microbiology*. 2019/**first author** and *EJL* 2020/**first author**). In these studies, I discovered molecular targets that modulate innate immune responses against influenza infection. Importantly, during this period I developed state-of-the-art skills for complex in vivo imaging modalities using multiphoton microscopy, which I applied here to the infected murine trachea infection (*JOVE*. 2018/**first author** and *Methods in Molecular Biology*. 2019/**first author**). As a result of an international collaboration, I also published a manuscript describing neutrophil-based mechanism that shape antigen-specific T cell responses during vaccinia infection (*Nature vaccine* 2021 / **first author**).

After my PhD, I wished to extend my skills in the field of innate immunity, with a focus towards the broad immune mechanisms that allow preservation of tissue physiology and homeostasis, which is where I envisioned the greatest challenges of biomedicine remain. During this period, I successfully applied to two prestigious postdoctoral fellowships, one from the *FEBS* and the second from *EMBO* (*long-term fellowships*) to move to the *lab* of Dr. Hidalgo at CNIC. During the past 3 years, I have focused my work on the field of neutrophil biology and circadian rhythms that already yielded published work as a Commentary and a Review (*Current Biology* 2020/**first author**, *Journal of Experimental Medicine* 2021 / **first author**). Also, I was able to apply my expertise on intravital microscopy to develop an exciting new methodology to describe immune heterogeneity in vivo purely based on imaging. Specifically, I could generate behavioral descriptors of individual cells at sites of active inflammation. The use of high-dimensional datasets containing hundreds of morpho-kinetic parameters over tens of thousands of cells demonstrated that rich biology can be described using behavioral outputs, and we could in fact discover a continuum of neutrophil states inside blood vessels, including one that is associated with pathogenic inflammation. This work, and its associated methodology, has been a major breakthrough in the field of immunology as indicated by its recent publication on two high-impact journals (*Nature* 2022 / **co-first author** and *Medical Image Analysis* 2022/**co-author**).

From 2023, I work as a RyC scientist to lead my own line of research within the field of innate immunity. My research pursues my recent findings that demonstrate that inflammatory behaviors within vessels are molecularly deterministic rather than stochastic. This has important implications in biomedicine, since it opens the opportunity of targeting vascular inflammation without interfering with antimicrobial immunity. Therefore, my next goal will be to define for the first time the molecular build-up of inflammatory leukocytes in vivo. To this end, I have recently obtained funding to lead a correlative behavioral, proteomic and transcriptomic analysis at the single cell level to unveil the signals that triggers transitions between immune states and reprogram complex immune behaviors in multiple pathogenic scenarios.