MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2026

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

NOVA Medical School, iNOVA4Health-research unit

RESEARCH GROUP AND URL

Membrane Traffic in Disease

SUPERVISOR (NAME AND E-MAIL)

Duarte Barral (duarte.barral@nms.unl.pt)

SHORT CV OF THE SUPERVISOR

Duarte Barral (DB; ORCID: 0000-0001-8867-2407; Ciência ID: 8810-DEBC-025E) is a tenured Associate Professor with Habilitation at NMS-UNL, with over two decades of expertise in investigating the mechanisms underlying membrane trafficking in both health and disease contexts.

DB earned his Degree in Microbiology and Genetics from the Faculty of Sciences of the University of Lisbon, followed by a PhD in Cell Biology from Imperial College London. He then transitioned to the field of immunology, undertaking a Post-Doctoral Fellow position at Brigham and Women's Hospital, Harvard Medical School. DB became a Principal Investigator (PI) at NMS-UNL, where he established the Membrane Traffic in Disease group, which has made significant contributions to the fields of molecular cell biology, skin pigmentation, and oncobiology. Before attaining his current position, through an international competitive selection process, DB secured his own salary through several competitive calls: undergraduate, PhD and Post-Doctoral fellowships, as well as Principal Investigator contracts (Ciência 2008 and FCT Investigator).

DB's research aims to unravel the regulatory roles of GTPases belonging to the Rab and Arf families in the trafficking of lysosomes and lysosome-related organelles such as melanosomes, and elucidating how dysregulation of these processes contributes to human diseases, notably cancer. Indeed, DB has helped uncover the previously unknown role of several of these proteins, namely Rab27a (Stinchcombe et al., J Cell Biol., 2001; Hume et al., Traffic, 2002; Barral et al., J Clin. Invest., 2002), Rab35 (Kuhns et al., EMBO Rep., 2019), Arl8b (Garg et al, Immunity, 2011), and Arl13b (Barral et al., PNAS, 2012; Casalou et al., J. Cell Sci., 2014; Casalou et al., Cancers, 2019).

As a PI, DB has demonstrated a strong track record in securing competitive funding, having raised over €2.75M for research projects, and in successfully overseeing the completion of 14 funded grants. This funding track record, achieved through consistent competitiveness in national, including from Fundação para a Ciência e a Tecnologia – FCT and Liga Portuguesa Contra o Cancro – LPCC, as well as from international sources, namely the European Commission, demonstrates DB's capacity to build, lead and manage successfully multidisciplinary research programmes. He also has a solid and consistent track record of publishing impactful studies, with 60 publications in peer-reviewed international journals and over 3700 citations (h-index 35 - Scopus).

Since 2009, DB has mentored 12 post-docs, 17 PhD students and 14 MSc students. Of these, 7 are pursuing their careers in international research institutions, in Europe and the USA, and 6 have successfully transitioned to industry. Moreover, his group has attracted 2 foreign post-docs and 1 foreign PhD student, further enhancing the global impact of his research efforts. In total, he was involved in training over 70 researchers, demonstrating his commitment to nurturing talent and fostering both academic and professional excellence.

DB is currently committed on exploring the complex membrane trafficking pathways governing skin pigmentation and how these are exploited by cutaneous melanoma cells. With a unique set of skills and expertise spanning both fields, he aims to leverage the fundamental knowledge acquired to develop innovative therapeutic strategies for pigmentary disorders and cutaneous melanoma. Additionally, his efforts encompass exploring cosmetic applications aimed to modulate skin pigmentation. Thus, through a comprehensive approach, DB will keep striving to make significant contributions to both cancer research and derma-cosmetic fields.

5 SELECTED PUBLICATIONS

- Barral DC, Delevoye C, Larue L, Seabra MC, Raposo G, Setty SRG. Insights into lysosome-related organelle biogenesis: melanosome as a model organelle. Front Cell Dev Biol. 2026 Jan 12;13:1758081. doi: 10.3389/fcell.2025.1758081.
- Neto MV, Hall MJ, Charneca J, Escrevente C, Seabra MC, Barral DC. Photoprotective Melanin Is Maintained within Keratinocytes in Storage Lysosomes. J Invest Dermatol. 2025 May;145(5):1155-1165.e3. doi: 10.1016/j.jid.2024.08.023.
- Hall MJ, Lopes-Ventura S, Neto MV, Charneca J, Zoio P, Seabra MC, Oliva A, Barral DC. Reconstructed human pigmented skin/epidermis models achieve epidermal pigmentation through melanocore transfer. Pigment Cell Melanoma Res. 2022 Jul;35(4):425-435. doi: 10.1111/pcmr.13039. Epub 2022 Apr 7.
- Barral DC, Staiano L, Guimas Almeida C, Cutler DF, Eden ER, Futter CE, Galione A, Marques ARA, Medina DL, Napolitano G, Settembre C, Vieira OV, Aerts JMFG, Atakpa-Adaji P, Bruno G, Capuozzo A, De Leonibus E, Di Malta C, Escrevente C, Esposito A, Grumati P, Hall MJ, Teodoro RO, Lopes SS, Luzio JP, Monfregola J, Montefusco S, Platt FM, Polishchuck R, De Risi M, Sambri I, Soldati C, Seabra MC. Current methods to analyze lysosome morphology, positioning, motility and function. Traffic. 2022 May;23(5):238-269. doi: 10.1111/tra.12839.
- Correia MS, Moreiras H, Pereira FJC, Neto MV, Festas TC, Tarafder AK, Ramalho JS, Seabra MC, Barral DC. Melanin Transferred to Keratinocytes Resides in Nondegradative Endocytic Compartments. J Invest Dermatol. 2018 Mar;138(3):637-646. doi: 10.1016/j.jid.2017.09.042.

PROJECT TITLE AND SHORT DESCRIPTION

Molecular Mechanisms of Melanin Transfer and Processing in Skin Photoprotection

Skin pigmentation is largely conferred by melanin, and depends on the crosstalk between two cell types: melanocytes and keratinocytes. Melanocytes localize to the basal layer of the epidermis and synthesize melanin. Keratinocytes are the final recipients of this photopigment and differentiate from the basal to the apical layers of the skin epidermis. Melanin synthesis and transfer ensure protection of skin cells against the genotoxic effects of ultraviolet radiation (UVr)-induced damage, which can lead to the onset of skin cancers. Indeed, skin cancer is a major and growing global health burden, with millions of new cases each year, with chronic UVr exposure also contributing to photoaging and pigmentation changes.

Melanin synthesis occurs in melanosomes, which are specialized membrane-bound lysosome-related organelles. Once fully mature and located at the tips of melanocyte dendrites, melanosomes are transferred to keratinocytes. This process underlies the formation of epidermal melanin units, in which melanocytes deliver pigment to neighboring keratinocytes through their dendrites. However, several key questions remain to be elucidated, namely the nature of the crosstalk between melanocytes and keratinocytes at the yet uncharacterized pigmentary synapse; the phagocytic receptor(s) involved in melanin phagocytosis by keratinocytes; the role of autophagy in melanin processing within keratinocytes; and the polarization of melanin within keratinocytes to form supra-nuclear caps. In addition, understanding how keratinocytes process photo-oxidized melanin, maintain supranuclear cap architecture, and balance protection with potential cytotoxicity is essential to define the mechanisms that sustain skin photoprotection and shield keratinocyte nuclear DNA effectively.

The answers to these questions will shed light on fundamental membrane trafficking processes that remain elusive. Since the function of melanin is to protect skin cells from the toxic effects of UVr, the elucidation of these processes is essential to understand the mechanisms of protection against skin cancer, and allow their manipulation for health and cosmetic purposes. Thus, by elucidating the molecular basis of melanin transfer and processing in keratinocytes, this work will provide new fundamental insights into how the skin cells achieve protection from UVr while controlling pigment-associated damage. Ultimately, these findings can guide future strategies to improve photoprotection and reduce the burden of UVr-induced skin cancers, photoaging, and pigmentary disorders.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Life Sciences (LIF)

***Scientific Area where the project fits best** – Please select/indicate the scientific area according to the panel evaluation areas: Chemistry (CHE) • Social Sciences and Humanities (SOC) • Economic Sciences (ECO) • Information Science and Engineering (ENG) • Environment and Geosciences (ENV) • Life Sciences (LIF) • Mathematics (MAT) • Physics (PHY)