MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2024

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

NOVA Medical School (NMS)

RESEARCH GROUP AND URL

Degeneration and Ageing
https://nms.unl.pt/en-us/research/research-groups/research-group/n/sandra-tenreiro-lab

SUPERVISOR (NAME AND E-MAIL)

Sandra Tenreiro
stenreiro@nms.unl.pt

SHORT CV OF THE SUPERVISOR

Sandra Tenreiro holds a degree in Biochemistry and a MSc in Cell Biology from University of Coimbra, Faculty of Sciences, and a PhD in Biotechnology from Instituto Superior Técnico, Lisbon. She heads the Degeneration and Ageing Lab at NOVA Medical School, Universidade Nova de Lisboa, Portugal, since April 2022. Her research is primarily focused on unraveling the molecular mechanisms behind retinal degeneration within the framework of aging-related diseases, utilizing retinal organoids. S Tenreiro is also collaborating with ophthalmologists and actively involved in clinical studies (ClinicalTrials.gov database identifier: NCT06355830).

S Tenreiro has served as the Principal Investigator (PI) and Co-PI in several research projects and has been extensively involved in advanced training, overseeing post-doctoral researchers (6), PhD candidates (6), and MSc students (18). Additionally, she collaborates with various PhD and MSc programs at both Universidade Nova de Lisboa and Coimbra University.

She is currently the Chair of the Retina & Vision thematic research line in her institute, which encompasses seven research groups comprising 28 PhDs and clinicians. Also, S Tenreiro is Co-Coordinator of The Ageing Strategic Area at NOVAhealth, a programme from NOVA University aiming to increase research, knowledge, and innovation in ageing, through the work of its nine schools (since 2023).

S Tenreiro am a member of the Management Committee (MC) of COST ActionBenBedPhar, "Bench to bedside transition for pharmacological regulation of NRF2 in non-communicable diseases" (CA20121, 2021-2025).

Overall, her scientific career is exemplified by 57 peer-reviewed publications, with an H-index of 32 and about 4000 citations, as reported by Scopus. Moreover, S Tenreiro has 2 patents under review (Application no. PT118368/EU 22217331.2 and application 102021000032849, Italy).

5 SELECTED PUBLICATIONS

- de Lemos L, Antas P, Ferreira IS, Santos IP, Felgueiras B, Gomes CM, Brito C, Seabra MC. Modelling neurodegeneration and inflammation in early diabetic retinopathy using 3D human retinal organoids. In vitro models. 2024 3, 33–48 https://doi.org/10.1007/s44164-024-00068-1
- Dias SB, de Lemos L, Sousa L, Bitoque DB, Silva GA, Seabra MC, Tenreiro S. Age-Related Changes of the Synucleins Profile in the Mouse Retina. Biomolecules. 2023 Jan 15;13(1):180. doi: https://doi.org/10.3390/biom13010180
- Flores R, Fradinho AC, Pereira RS, Mendes JM, Seabra MC, Tenreiro S, Carneiro Â. Identifying Imaging Predictors of Intermediate Age-Related Macular Degeneration Progression. Transl Vis Sci Technol. 2023 Jul 3;12(7):22. https://doi.org/10.1167/tvst.12.7.22
- Escrevente C, Falcão AS, Hall MJ, Lopes-da-Silva M, Antas P, Mesquita MM, Ferreira IS, Cardoso MH, Oliveira D, Fradinho AC, Ciossek T, Nicklin P, Futter CE, Tenreiro S, Seabra MC. Formation of Lipofuscin-Like Autofluorescent Granules in the Retinal Pigment Epithelium Requires Lysosome Dysfunction. Invest Ophthalmol Vis Sci. 2021 Jul 1;62(9):39. https://doi.org/10.1167/iovs.62.9.39
- Macedo D, Jardim C, Figueira I, Almeida AF, McDougall GJ, Stewart D, Yuste JE, Tomás-Barberán FA, Tenreiro S, Outeiro TF, Santos CN. (Poly)phenol-digested metabolites modulate alpha-synuclein

toxicity by regulating proteostasis. Sci Rep. 2018 May 3;8(1):6965. https://doi.org/10.1038/s41598-018-25118-z

PROJECT TITLE AND SHORT DESCRIPTION

Innovating diabetic retinopathy disease models: dissecting pathophysiology and pioneering therapeutic strategies

Diabetic retinopathy (DR), a common complication of diabetes, is a primary cause of vision impairment on a global scale, affecting ~30% of patients within five years of their diabetes diagnosis. Presently, there are no definitive treatments for DR; existing interventions primarily target advanced stages of the disease, often after significant vision loss has occurred. There is an urgent need for innovative therapeutic approaches addressing early-stage DR to impede its progression to severe forms that compromise vision integrity. The current disease models employed for studying DR and conducting pre-clinical trials possess notable limitations.

Here we aim to pioneer the development of a comprehensive human model of DR encompassing neuroretinal, vascular components, and microglia. We are in a unique position to do so as we recently patented a simpler model of early DR based on retinal organoids (de Lemos et al., 2024), that reproduces DR features. These advanced in vitro models of DR will be used for drug discovery, and to elucidate whether these pharmacological interventions can effectively delay the progression of vascular alterations in DR development.

In parallel, we aim to improve protocols to obtain retinal organoids where ageing features are reproduced, exploring transdiferentiation approaches.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Life Sciences (LIF)