



**MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2021**  
**EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS**

**HOST INSTITUTION**

NOVA University Lisbon | NOVA Medical School

**RESEARCH GROUP AND URL**

Molecular Nutrition and Health laboratory – Cláudia Nunes dos Santos Laboratory  
<http://cedoc.unl.pt/molecular-nutrition-and-health/>

**SUPERVISOR (NAME AND E-MAIL)**

Cláudia Nunes dos Santos  
[claudia.nunes.santos@nms.unl.pt](mailto:claudia.nunes.santos@nms.unl.pt)

Inês Figueira  
[ines.figueira@nms.unl.pt](mailto:ines.figueira@nms.unl.pt)

**SHORT CV OF THE SUPERVISOR**

Dr Cláudia Nunes dos Santos (PhD) is a European Research Council grantee (ERC-2018-Starting grant – LIMBo, N° 804229) and the principal investigator of Molecular Nutrition and Health laboratory at CEDOC. The research of her lab is centered in human nutritional biochemistry focusing on nutrients/bioactives components and its derivatives, their metabolism, physiological processes, and the molecular mechanisms behind their effects on health and disease. Experimental approaches used combine metabolism and nutritional mechanistic studies in humans, animals and in relevant cellular models and organisms. Dr Cláudia Nunes dos Santos is interested in the study of polyphenol metabolism in humans and animal models by metabolomics approaches: bioaccessability (in vitro digestion), bioavailability, kinetics parameters (human intervention studies), brain permeability and cellular metabolism; and polyphenol metabolites bioactivity towards neurodegenerative diseases, focusing on Parkinson's disease (PD), neurodegeneration, neuroinflammation and blood-brain barrier (BBB) permeability. Mechanistic studies are performed using yeast, relevant cell models of disease and animals, combining state-of-art cellular and molecular approaches to unravel the molecular mechanisms mediated by polyphenol-derived metabolites.

Inês Figueira (PhD, Post-doc researcher at Molecular Nutrition and Health lab, CEDOC) research has been focused on the understanding of the cellular and molecular mechanisms that trigger brain diseases, especially age-related diseases (PD), as well as chronic diseases (brain metastases formation from breast cancer), focusing on blood-brain barrier (BBB) disfunction as a central hallmark and as a target to be tackled/overcome. Trained as a neuroscientist and as a cell biologist, Inês has a solid background in biochemistry and molecular biology, with a strong expertise in the development of improved cell models of brain diseases, oxidative stress and neuroinflammation, aiming to disclose bioavailable polyphenol metabolites potential in the prevention of brain disorders.

**5 SELECTED PUBLICATIONS**

- Carecho R, Carregosa D, **Santos CN** (2020) Low Molecular Weight (poly)Phenol Metabolites Across the Blood-Brain Barrier: The Underexplored Journey. *Brain Plasticity*, 6 (2),193-214, doi: 10.3233/BPL-200099
- Carregosa D, Carecho R, **Figueira I, Santos CN** (2019). Low-Molecular Weight Metabolites from Polyphenols as Effectors for Attenuating Neuroinflammation. *Journal of Agricultural and Food chemistry*. 68(7),1790-1807. doi: 10.1021/acs.jafc.9b02155

- **Figueira I**, Tavares L, Jardim C, Costa I, Terrasso AP, Almeida AF, Govers C, Mes JJ, Gardner R, Becker JD, McDougall GJ, Stewart D, Filipe A, Kim KS, Brites D, Brito C, Brito MA, **Santos CN** (2019) Blood-brain barrier transport and neuroprotective potential of blackberry-digested polyphenols: an in vitro study. *European Journal of Nutrition*, 58(1), 113-130. doi: 10.1007/s00394-017-1576-y
- Angelino D, Carregosa D, Domenech-Coca C, Savi M, **Figueira I**, Brindani N, Jang S, Lakshman S, Molokin A, Urban JF Jr, Davis CD, Brito MA, Kim KS, Brighenti F, Curti C, Bladé C, Del Bas JM, Stilli D, Solano-Aguilar GI, **Santos CN**, Del Rio D, Mena P (2019) 5-(Hydroxyphenyl)- $\gamma$ -Valerolactone-Sulfate, a Key Microbial Metabolite of Flavan-3-ols, Is Able to Reach the Brain: Evidence from Different in Silico, In Vitro and In Vivo Experimental Models. *Nutrients*, 11(11), 2678. doi: 10.3390/nu11112678
- **Figueira I**, Garcia G, Pimpão RC, Terrasso AP, Costa I, Almeida AF, Tavares L, Pais TF, Pinto P, Ventura MR, Filipe A, McDougall G, Stewart D, Kim KS, Palmela I, Brites D, Brito MA, Brito C, **Santos CN** (2017) Polyphenols journey through blood-brain barrier towards neuronal protection. *Scientific Reports*, 7, 11456. doi: 10.1038/s41598-017-11512-6

## PROJECT TITLE AND SHORT DESCRIPTION

### ***Bridging polyphenol intake, neuroinflammation and Parkinson's disease: from blood to the brain***

Short description: The project aims to assess the neuroprotective potential of bioavailable low molecular weight polyphenol metabolites (LMWPM) in the brain, screening their role in attenuating brain neuroinflammation. Molecular effects of the LMWPM in brain cells will be pursued, seeking to evaluate their potential to protect the BBB from a systemic inflammatory insult, investigating their ability to activate/inhibit inflammatory signaling in microglia cells and how they can modulate microglia-neuron-astrocyte crosstalk during inflammation and within the scope of neurodegenerative disorder (Parkinson's disease, PD). This project will be carried out in a multidisciplinary team and in an excellence Portuguese research institute, combining state-of-art cell models as well as relevant animal models of the disease. The solid background of the supervisor team in LMWPM regarding their chemical synthesis, their BBB permeability and brain accessibility, as well as proven neuroprotective and anti-neuroinflammatory potential, provide the ideal conditions for a successful Marie Skłodowska-Curie Postdoctoral fellowship accomplishment.

## SCIENTIFIC AREA WHERE THE PROJECT FITS BEST\*

Life Sciences (LIF)