MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2021

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

NOVA University Lisbon | ITQB NOVA – Instituto de Tecnologia Química e Biológica António Xavier

RESEARCH GROUP AND URL

The Matos Lab
URL: available soon

SUPERVISOR (NAME AND E-MAIL)

Pedro Matos Pereira
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SHORT CV OF THE SUPERVISOR

I am a cell biologist with extensive scientific knowledge in microbiology, host-pathogen in-teraction and advanced microscopy approaches. I have over 10 years' experience in scientific project design/management, undergraduate and postgraduate student supervision and writing/communication of scientific information to both expert and non-expert audiences.

I am lead author in several publications with over 2000 citations (H-index of 21), I have co-supervised Master and PhD students, and have been actively involved in several outreach initiatives (e.g. In2Science, ITQB NOVA - open day). I have served in several decision boards in Universidade Nova de Lisboa (NOVA), University College London (UCL) and the Francis Crick Institute (FCI) where I have worked with academic, industrial and political partners to define scientific and institutional vision and impact strategies (e.g. MRC-LMCB and ITQB NOVA postdoc committee, ITQB NOVA bylaws workgroup). Experience that has provided me with a comprehensive view about research and the scientific endeavour.

From a research point of view, I have made significant contributions in the fields of *Staphylococcus aureus* cell biology (e.g. discovering a link between peptidoglycan and wall teichoic acids biosynthesis - during my PhD at ITQB NOVA), host-pathogen interaction (e.g. importance of autolysins for immune evasion, or the role of septins in the recognition of intracellular pathogens - during my PhD at ITQB NOVA and postdoc at UCL and the Crick), hardware, software and probe based technological innovations for microscopy (e.g. NanoJ-Fluidics, NanoJ-SRRF and Super-Beacons, respectively - during my postdoc at UCL).

I´m currently a group leader at ITQB NOVA exploring host-microbe interaction dynamics, for which I was awarded the prestigious "La Caixa" Junior Leader Fellowship and a FCT project grant.

More info:
Google scholar (https://bit.ly/3yu3obz)
Publons (https://bit.ly/3ipiERg)
Linkedin (https://bit.ly/3CgZRQd)

5 SELECTED PUBLICATIONS

(+Contributed equally) (*Corresponding)

- **Pereira PM**+*; Albrecht D+*; (…); Henriques R*; Fix your membrane receptor imaging: Actin cytoskeleton and CD4 membrane organization disruption by chemical fixation; ***Front Immunol***; **2019**

- Almada P+; **Pereira PM+**; (…); Henriques R; Automating multimodal microscopy with NanoJ-Fluidics; ***Nat Commun.*; 2019**

- Krokowski S; Lobato-Márquez D; Chastanet A; **Pereira PM**; (...); Henriques R; Spiliotis ET; Carballido-López R; Mostowy S; Septins Recognise *Shigella* Cell Division for Host Defence; ***Cell Host Microbe*; 2018**

- Gustafsson N; Culley S; Ashdown G; Dylan O; **Pereira PM**; Henriques R; Fast live-cell conventional fluorophore nanoscopy with ImageJ through super-resolution radial fluctuations; **Nat Commun**; **2016**

- Atilano ML+; **Pereira PM+**; (…) Filipe SR; Bacterial autolysins trim cell surface peptidoglycan to prevent detection by the *Drosophila* innate immune system; ***Elife***; **2014**

PROJECT TITLE AND SHORT DESCRIPTION

The Super-Bug inside job: exploring the interaction between facultative intracelular bacterial pathogens and mammalian host cells

In Europe, the burden caused by antibiotic resistant bacterial infections is equivalent to influenza, HIV/Aids and Tuberculosis combined. Infections caused by *Staphylococcus aureus* (*S. aureus*) strains are the second most relevant in this context. A chief factor suggested to contribute for the high incidence and prevalence of S. aureus infections is its capacity to persist and divide inside host cells, escaping antibiotics and extracellular immune recognition.

Formerly regarded as an exclusively extracellular pathogen, we currently have abundant evidence that S. aureus is in fact a facultative intracellular pathogen. S. aureus can infect immune and non-immune cells, where it can survive and divide, while evading autonomous immunity (intracellular recognition of pathogens). This is thought to be a major factor in continuance of carriage, chronicity of infection and dissemination within the host.

Despite its importance, facultative intracellular pathogens, such as *S. aureus*, cell division inside host cells, the role of the bacterial cell surface synthesis/remodelling in autonomous immune recognition, how these relate to persistence and the effect of antibiotics in this context are still poorly understood.

This highly multidisciplinary proposal aims to explore this interaction using a wide range of approaches, from basic microbiology and mammalian cell biology to state-of-the-art microscopy and multi-cell organ-on-a-chip methodologies. The knowledge create from this project will contribute to a better understanding of how facultative intracellular pathogens infect and survive inside mammalian host cells and how host cells employ the arsenal at their disposal to avoid being overrun.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Life Sciences (LIF)