CALL FOR RESEARCH FELLOWSHIP

Fellowship Reference GIMM-BI-24a-2026 and GIMM-BI-24a-2026

Gulbenkian Institute for Molecular Medicine (GIMM) opens a call for 2 (two) Research Fellowships designated "NOS Alive – GIMM 2026 Research Fellowship", within the scope of the partnership established between the GIMM Foundation – Gulbenkian Institute for Molecular Medicine (GIMM) and Everything is New, the promoter of the NOS Alive. For this call, the GIMM Foundation is offering two research projects. The two selected candidates will have the opportunity to choose which project they wish to develop. These fellowships are funded by Everything is New, under the following conditions:

Scientific Area(s): Biology and Life and Health Sciences

Work Plan and Objectives:

Project 1 (Pavel Hanč Lab)

Title: Unraveling direct electrical coupling between nociceptors and dendritic cells

Nociceptors, sensory neurons that trigger the sensation of pain or itch in response to noxious stimuli, communicate with immune cells and modulate immune responses in a context-dependent manner, yet the molecular mechanisms underlying many such neuroimmune interactions remain incompletely understood. Consequently, we have recently developed an in vitro coculture approach enabling the dissection of the underlying communication frameworks, which we applied to dendritic cells (DCs). DCs are myeloid leukocytes crucial for the initiation and regulation of immune responses. For example, in lymph nodes, DCs present antigens to T-lymphocytes to elicit adaptive immunity, while in peripheral tissues, they secrete cytokines and other mediators to orchestrate local inflammation. Interestingly, we found that nociceptors and DCs can form direct electrical connections, through which action potential propagating along nociceptive axons can drive membrane depolarization and calcium influx into DCs, ultimately promoting proinflammatory cytokine production. Importantly, direct electrical coupling between neurons and immune cells outside of the central nervous system (CNS) has not been described before, suggesting that a previously unknown molecular mechanism might be at play. Thus, the proposed project aims to provide insights into the mechanisms and rules that underlie and govern the nociceptor-DC interaction. In particular, we will employ the electrophysiology approach ("patch-clamp") to understand the quantitative parameters of the interaction. We will determine the resting membrane potential in steady-state DCs, assess how it changes after nociceptor activation, and use established pharmacological perturbations of individual classes of ion channels to identify the mechanism of depolarization. In parallel, we will take advantage of the Calcium Modulated Photoactivatable Ratiometric Integrator 2 (CaMPARI2) technology, which allows indelible marking of cells that recently mobilized calcium to conduct a CRISPR screen in DCs to identify the molecules involved in the direct electrical coupling. Finally, to unravel which calcium-responsive molecules link the nociceptor-induced calcium mobilization and enhanced cytokine production in DCs, we will utilize existing small molecule inhibitors of

the respective pathways and test their ability to prevent nociceptor- mediated enhancement of DC responses. Taken together, the work proposed here will delineate the mechanisms underlying direct electrical coupling between nociceptors and DCs and how it potentiates DC responses, thus laying a solid foundation for future research, which will use these insights to assess the role nociceptor-DC communication under in vivo settings.

Project 2 (Daniel Fisch Lab)

Title: Engineering GBP1 into a precision missile against bacteria

The innate immune system is our first line of defense against infection, providing immediate responses to a wide range of pathogens. It comprises physical barriers, soluble factors, and cellular components, which cooperate to control infections and influence adaptive immune responses. Innate immune cells recognize pathogens through pattern recognition receptors (PRRs) that detect conserved pathogen-associated molecular patterns (PAMPs) and trigger inflammatory and antimicrobial responses. However, synthetic approaches to harness the therapeutic potential of innate immunity have largely remained unexplored. This is in stark contrast to mechanisms of the adaptive immune system, for example CAR-T cells, which have already shown great potential in the clinic. This project aims to harness mechanisms of the innate immune system for translational applications. Specifically, we will look into Guanylate-Binding Proteins (GBPs); a family of interferon (IFN)-inducible GTPases that play a pivotal role in defense against intracellular pathogens. The GBPs belong to the dynamin superfamily and feature a globular GTPase domain and a flexible C-terminal helical domain. They target intracellular pathogens and mediate their clearance by forming complexes which destabilize membranes and disintegrate pathogens. Interestingly, GBPs exhibit high specificity in targeting pathogens and lipid membranes thanks to their PRR-like activity. For example, GBP1 recognizes lipopolysaccharide (LPS) in the outer membrane of Gram-negative, cytosolic bacteria, disrupts the outer membrane and exposes the underlying bacterial structures to other immune effectors. While GBPs are primarily known for their intracellular functions, they can also be secreted via an unconventional pathway. The extracellular function of GBPs is unexplored but could have significant implications for understanding their role in systemic defense. The overarching goal of this project is to re-purpose GBP1 as a broad-spectrum anti microbial drug against bacteria. Specifically, we want to: 1. Test the targeting activity of GBP1 against a large panel of bacteria and its influence on bacterial growth 2. Re-engineer GBP1 into a vehicle that targets extracellular bacteria for clearance and stimulation of beneficial immune activities. To do so, we will express fluorescently-tagged, farnesylated GBP1 (e.g. with hfYFP) in a bacterial (but LPS-free) system with subsequent affinity purification. Normal protein function will be tested in quality control experiments. Next, we will assemble a large panel of bacteria encompassing facultative and obligate extracellular/intracellular species. The final panel will include biologically-diverse species with various types of LPS, capsulated and non-capsulated as well as flagellated (i.e. motile) vs. immotile cells. Targeting by GBP1 will be tested in vitro, by mixing fluorescently labelled bacteria and GBP1 in presence or absence of GTP followed by microscopy analysis. The proportion of coated cells will be determined using automated image analysis and classification by AI computer vision models. We will further establish a microplate reader-based high throughput growth assays for all bacteria and test the effect of GBP1 coating on bacterial growth and fitness. These data will be scrutinized by classical CFU assays. This line of experiments will

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establish the bacterial targeting spectrum of GBP1 and record its baseline antimicrobial activities. Next, we will turn GBP1 into a precision targeting vehicle for bacteria by engineering chimeric fusion proteins with novel functions. To promote bacterial clearance, GBP1 will be fused to immune effector domains that enhance opsonization, phagocytosis, complement activation, and potentially bacterial neutralization. To dampen harmful inflammation, GBP1 will be fused to a high-affinity lipid A–binding domain to mask LPS and limit PRR activation. These fusion proteins will be evaluated for antimicrobial, targeting, and immune-modulatory activities with the ultimate goal of creating a single construct that promotes clearance of bacteria while preventing excessive inflammation.

Fellowship recipients / Admission requirements*:* Any National, foreign and stateless candidate(s) that fulfils the necessary conditions to be enrolled in a non-academic degree course (in area related to the work plan) can apply. Are considered "Non-academic degree courses" the ones referred in *paragraph e) of number 3 of article 4 of Decree-Law nr 74/2006, from 24th March*, in its current version, as long as they are developed in association and cooperation between a higher education institution and at least one R&D Unit in accordance with the provisions of paragraph e) of Article 3 of FCT Fellowship Regulation.

Applicants must meet the following requirements:

- Holder of a bachelor's and/or master's degree in biology or a related field (mandatory requirement), with the most recent degree completed after January 2022;
- Excellent command of spoken and written English.

Legislation and Applicable Regulation: Estatuto do Bolseiro de Investigação (Lei n.º 40/2004, de 18 de Agosto, republished in attachment to Decreto-Lei n.º 202/2012, de 27 de Agosto, changed by Decretos-Leis n. º 123/2019, 28 de Agosto e nº 65/2024, 1 de outubro) and current Regulation of Fellowships of GIMM.

Predicted start date, duration and renewal conditions: The fellowship contract is predicted to start in January 2027, for a period of 12 (twelve) months on an exclusive basis, non-renewable.

Workplace and Scientific orientation: The research work will be carried out in one of the following laboratories at GIMM, with the possibility of conducting part of the work (maximum of one month) in a laboratory abroad:

– Project 1: Pavel Hanč Lab
– Project 2: Daniel Fisch Lab

Application process: The call will be open from 2026-07-02 until 2026-09-10. Applications must be submitted by email to **positions@gimm.pt**.
Failure to comply with these requirements will result in the rejection of the application.

Non-discrimination and equal access policy: GIMM promotes a non-discrimination and equal access policy, wherefore no candidate can be privileged, benefited, impaired or deprived of any rights whatsoever, or be exempt of any duties based on their ancestry, age, sex, sexual preference, marital status, family and economic conditions, instruction, origin or social conditions, genetic heritage, reduced work capacity, disability, chronic illness, nationality, ethnic origin or race, origin territory, language, religion, political or ideological convictions and union membership.

International environment and experience: Diversity is a fundamental aspect of the essence of GIMM, where researchers and non-researchers of different nationalities, backgrounds and areas of study work together, promoting the exchange of experiences and interactions, contributing to the personal and professional development of each person and to the existence of an international, inclusive and stimulating environment.

Research Fellows Support Centre: The Research Fellows Support Centre works everyday from 09:00AM to 11:00AM at People & Culture Unit Office.

Fellowship financial conditions: The fellow will benefit from a monthly between the amounts of entre os 1090,98 € (bachelor) e 1359,64 (master), while abroad, in accordance with the applicable regulations. The amount will be paid by wire transfer at the end of each month. The fellow will also benefit from a personal accident insurance to execute the proposed research activities as well as the right to Social Security through Voluntary Social Insurance regimen, if wanted, under the terms of Código dos Regimes Contributivos do Sistema Previdencial de Segurança Social, and the contributions costs will be supported by the research project.

Application documents:

- Motivation Letter;
- Detailed CV;
- BSc and/or MSc certificate;
- Contact of 1 reference;
- Candidate's declaration of honor indicating previous fellowships, if any, its typology and duration.

The non-compliance with these requirements determines the immediate rejection of the application.

Jury evaluation and selection: The applications will be evaluated by a selection panel composed of the following members:

- Pavel Hanč, Gulbenkian Institute of Molecular Medicine (GIMM)
- Daniel Fisch, Group Leader, Gulbenkian Institute of Molecular Medicine (GIMM)

- Lisa Bergman, Gulbenkian Institute of Molecular Medicine (GIMM)

Selection methods: The evaluation of applications and respective selection will be based on the following methods:

1. **Document Evaluation (50%)** – In this phase, the candidates' Curriculum Vitae and motivation letter will be assessed on a scale from 0 to 10. Only candidates who score above 7 in this phase will be invited for an interview;

2. **Interview (50%)** – The selected candidates for this phase will be evaluated, also on a scale from 0 to 10.

The final score will result from the weighted average of the two phases (document evaluation and interview), each accounting for 50% of the total. The 2 (two) highest-ranked candidates will subsequently be invited to choose the research project they wish to develop, in order of ranking.

Deadlines and application process: The period to submit applicants starts on 2/07/2025 and ends on 10/09/2025. Applications should be submitted to the GIMM People & Culture Unit via email at *positions@gimm.pt*. The email subject line must include the reference "*NOSAlive2026 - GIMM-BI-24a-2026 and GIMM-BI-24a-2026".*

Notification of results: Within 90 days after the termination of the applications submission deadline, both admitted and excluded candidates list and final classification list shall be communicated to all admitted candidates through email.

Preliminary Hearing and Final Decision Deadline: After notification, all candidates have 10 working days to respond. Panel's final decisions are pronounced within a period of 90 days, from application deadline.

Fellowship contracting: The Fellowship is granted through the signature of a *contract* between GIMM and the selected fellow and after the fellow send the following mandatory documents: copy of identification document.

(in case of non-European citizens is mandatory the work visa / valid resident permit), document proving the required academic degree and the document proving the enrollment in a non-academic degree course.

For each Fellowship **period an *Activity Report* must be prepared by the fellow as well as the *Report* by the supervisor.**

Oeiras, 1st of July 2026

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