



Call for Expressions of Interest to apply for a MSCA-IF grant

The institute

The **Institute for Advanced Chemistry of Catalonia (IQAC)** is one of the research centres of the Spanish National Research Council (CSIC). The Institute is located in Barcelona and it was created in 2007 with the mission to perform research of excellence in Chemical Sciences with the broad goal of improving the quality of life. The general strategy to achieve this mission involves the application of chemical approaches to address and solve societal challenges, mainly those related to human health, the sustainability of chemical processes and products, and the needs for novel materials for different applications. Since its establishment, IQAC has been in a permanent attitude to transfer its knowledge and technology results to the industrial sector.

The research developed at IQAC is organized around two main nodes: **Biological Chemistry** and **Nanobiotechnology** and it is facilitated by a number of Key Enabling Technologies. Considering the objectives pursued, many of the investigations carried out by the Research Groups at IQAC lie at the intersection between nodes.

In addition, our Institute holds a set of scientific and technical facilities run by highly qualified scientists and technical personnel with a solid background and long lasting expertise. These facilities are available not only to IQAC research groups, but also to potential users from both academia and private institutions. In any case, the technical services from IQAC are always wide open to attend any inquiry and to offer their best efforts to find adequate responses to specific needs.

The group

The Nb4D group (<https://nb4d.csic.es/>) aims at conducting **pioneering research to improve the quality of life of society** through the development of **new diagnostic and therapeutic approaches** that will redefine the healthcare landscape, with the clear intention to be a **reference in the clinical field** and to translate our expertise into **tangible market-ready solutions**.

The backbone of our research is based on the design, production and characterization of antibodies of interest in different areas such as environment analysis, food safety and clinical

field. We have four fully equipped laboratories for organic synthesis, immunoassays development, molecular biology, hybridoma handling, as well as a BSL2 laboratory. We are a group of around 20 enthusiastic scientist that involves staff scientist, PhD students, post-docs and technicians.

The role

The potential candidate would work on the project “**ASSESSMENT OF THE POTENTIAL THERAPEUTIC VALUE OF *P. AERUGINOSA* QS ANTIBODIES, FOCUSING ON BOTH INFECTION PARTNERS**”.

The fast growing emergence of bacterial resistance processes together with the development of very few new antibiotics are driving towards **the need for designing alternative therapeutic strategies to treat infectious diseases**. In this sense, a promising approach to reduce this threat would consist on **interrupting or attenuating the process of bacterial communication, the Quorum Sensing (QS) system**. Quenching key targets of the QS networks would translate on blocking important pathogenic outcomes such as the production of virulence factors (minimizing their cytotoxic effects), the formation of biofilms (important for the chronification of many different bacterial infections), the inhibition of the immunomodulatory effect caused by different QS molecules on the host cells and finally will also disrupt the process of bacterial communication itself. Thus, as the concept of Quorum Quenching (QQ) relies on blocking bacterial pathogenic effects rather than killing bacteria, **this approach could emerge as a very useful method to overcome the conventional resistance mechanisms**.

In this context, strategies based on **the use of monoclonal antibodies (mAbs) to treat bacterial infections are gaining ground due to the high specificity and affinity** that these immunoreagents show for their targets, which **minimize possible side effects**. Moreover, currently Nb4D group has already available mAbs against different QS signaling molecules and virulence factors and also has some promising first results regarding the potential therapeutic value of these immunoreagents. Following this goal, host cell based *in vitro* systems will be used and also bacterial assays and bacteria-host cell co-cultures will need to be set up to assess the QQ activity of different QS mAbs, to evaluate the dysregulation effect of the QS targets on the host immune system and to unravel the feedback mechanisms between the different QS networks. All these results together will drive us to finally evaluate the prophylactic and therapeutic effect of the studied mAbs on *in vivo* infection models.

What do we look for?

- **Qualifications**
PhD in Biology, Biotechnology or Chemical Engineering
- **Professional experience**
No more than 8 years research expertise after PhD obtention (career breaks do not count)
- **Competences**
Cell cultures techniques
Bacterial cultures handling
Microscopy
2D cultures set-up (co-culture)
Immunochemical methods

Working conditions

- **Contract duration:** The MSCA-IF grant covers a minimum of 12 months and a maximum of 24.
- Estimated annual gross salary: Stipulated by the MSCA-IF call.
- Target start date: 1st March 2024

How to apply?

Those interested may email their **CV** and **motivation letter** to **Lluïsa Vilaplana** at lluisa.vilaplana@cid.csic.es, copying nb4d-projectmanager@cid.csic.es, adding **EoI MSCA-IF Nanobodies** to the email subject.

Deadline: 15th July 2023