

## Call for Expressions of Interest to apply for a MSCA Postdoctoral Fellowship



### Anti-inflammatory peptide amphiphilic-based (AIF-PAs) self-assembled structures for mucosal health

#### STATE OF THE ART

The treatment of inflammatory disorders often implies the use of non-specific small molecule drugs that can cause a wide range of undesired side effects due to high toxicity and low selectivity. Currently, alternative and more selective **anti-inflammatory therapies**, including the use of peptides, are being particularly addressed for their use against chronic inflammatory conditions. **Synthetic peptides** are able to inhibit and/or modulate functional protein complexes, showing higher potency, selectivity and specificity for the molecular targets involved in inflammatory processes [La Manna, S. et al. *Int. J. Mol. Sci.*, 19, 2714, 2018]. The therapeutic use of peptides as anti-inflammatory agents in the treatment of different inflammation-related diseases has been reviewed focusing attention on several endogenous peptides secreted during inflammatory response and other peptides deriving from interacting regions of protein complexes triggered by inflammatory mediators. Most of these peptides are short sequences that require chemical optimization to improve their therapeutic efficiency. Within this context, chronic mucosal inflammation, such as inflammatory bowel disease (IBD) or cervicitis, is often due to non-infectious causes; and acute mucosal inflammation is one of the main innate immune responses to pathogens including HIV. Furthermore, the loss of mucosal integrity due to inflammation increases the susceptibility to mucosally transmitted pathogens [Masson, L. et al. *Sex Transm Infect.* 90, 580, 2014; Fichorova, RN. et al. *J Infect Dis.* 184, 418, 2001].

#### OBJECTIVE

The main aim of the project is to develop broad spectrum anti-inflammatory peptides amphiphiles (AIF-PAs) and to explore their targeting capacity to mucosal surfaces as a novel strategy for treatment of chronic mucosal inflammation and for prevention of HIV transmission. In this sense, we aim to obtain AIF-PAs capable of forming self-assembled nanostructures for the administration of short linear anti-inflammatory peptides that will be studied in collaboration with Dr. Herrera (Eastern Virginia Medical School, USA), who is an expert in mucosal infection and inflammation studies using *ex vivo* tissue models.

## WHAT DO WE LOOK FOR?

### • Conditions:

- **PhD thesis defended** at the time of deadline for applications (11<sup>th</sup> September 2024).
- **Max. 8 years experience in research**, from the date of the award of their PhD degree.
  - o **Exception:** For **nationals or long-term residents of EU Member States or Horizon Europe Associated Countries** who wish to reintegrate to Europe, years of experience in research in third countries will not be counted.
- **Must not have resided or carried out main activity in Spain for more than 12 months between 11<sup>th</sup> September 2021 and 11<sup>th</sup> September 2024.**

### • Qualifications

PhD in Chemistry, Biochemistry, Biomedicine or Pharmacy.

### • Professional experience

Expertise in peptide chemistry (synthesis and characterization). Experience in biophysics (fluorescence-based assays) will be valued.

### • Competences

Independent researcher with good oral and written communication skills. Interest in training undergraduate and master students.

## WORKING CONDITIONS

- **Contract duration: Minimum of 12 months and maximum of 24 months.**
- Estimated annual gross salary: Stipulated by the MSCA-PF call.
- Target start date: April 2025 onwards.

## THE GROUP

There is an exponential growth in the application of synthetic peptides as new therapeutic or diagnostic agents since, on the one hand, they are molecules that do not usually present as many problems of toxicity or accumulation in tissues as those of non-peptidic nature, and on the other, they can make structural modifications and incorporate non-proteinogenic motifs. Hence, the study and development of synthetic peptides can be targeted to obtain compounds with the potential use in Biomedicine. In the **Unit of Synthesis and Biomedical Applications of Peptides** (USiBAP) the **scientific interests focus on the chemistry of peptides under three different points of view: design, synthesis and study of the possible therapeutic value of peptide molecules.** The general objectives of the USiBAP research are summarized in the use of synthetic peptides in the field of **Biomedicine**, both in the **improvement of current diagnostic systems** and in the **design of new therapeutic targets.**

More information is available in the web page:

<https://www.iqac.csic.es/research/departments/biological-chemistry/synthesis-and-biomedical-applications-of-peptides/>

## THE INSTITUTE

The **Institute for Advanced Chemistry of Catalonia (IQAC)** is one of the research centers 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.

## HOW TO APPLY?

Those interested may email their **CV, motivation letter and two reference letters from mentors** to **Isabel Haro** (isabel.haro@iqac.csic.es) and **María José Gómara** (mariajose.gomara@iqac.csic.es), adding "**MSCA Postdoctoral Fellowship**" to the email subject.

**DEADLINE: 14<sup>th</sup> July 2024**

**Early applications are encouraged.**