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MEDICAMENTOS INNOVADORES
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PhD Position in Microbial Natural Products Chemistry

Are you interested in being part of an exciting multidisciplinary European network of young scientists to address current challenges in marine biotechnology and pharmacology?

We are looking for one PhD candidate with expertise in marine natural products biotechnology to discover new natural antibiotics from marine microorganisms active against human, plant and fish pathogens.

Position Description

A 3-year PhD Studentship is available for an independent and highly motivated individual to work in the **Departments of Chemistry and Microbiology** at Fundación MEDINA.

This position is associated to the **Doctoral Network HOTBIO** funded by the European Commission under the Horizon Europe Program. The successful candidate will join a multidisciplinary team working in the field of microbial natural products chemistry to develop a PhD project focused on the identification of new antibiotics from marine derived microbial sources. Starting from an available collection of microbial extracts from ~200 marine derived strains already available at MEDINA, generated using a One Strain Many Compounds (OSMAC) approach by growing each strain in 5 different selected culture media, the candidate will perform:

- 1) Testing of this extract collection against human, plant, and fish pathogens.
- 2) Dereplication of the best bioactive hits using LC/HRMS and LC-MS/MS analyses combined with the use of internal spectral databases, the Dictionary of Natural Products (DNP) and the Global Natural Products Social Molecular Networking (GNPS) and selection of the best candidates for fractionation.
- 3) Scaled-up fermentation, extraction, and fractionation of best candidates (3-30 L) for the bioassay-guided purification of the bioactive molecules.
- 4) Structural elucidation of new molecules obtained using HRMS and NMR approaches.
- 5) Full profiling of the bioactive compounds against an extended panel of pathogens and other assays available from different consortium partners as well ADME-Tox assessment of the new molecules.
- 6) Genome mining of the strains yielding the most interesting candidates to identify the biosynthetic gene clusters (BGC) responsible for their production.

Two secondments at other participants institutions are foreseen to expand knowledge on GNPS dereplication methodology and perform biological testing against fish pathogens (secondment 1) and to perform extended biological testing of purified compounds and ADME-T assessment of best hits (secondment 2).

Position requirements for candidates:

- A Master Degree, preferably in Chemistry, Pharmacy, or Biochemistry is mandatory to fulfil the criteria of the University of Granada awarding the PhD (please see UGR rules at <https://escuelaposgrado.ugr.es/doctorado/estudiantes/requisitos?lang=en>).
- Experience in isolating natural products from complex mixtures, especially from culture broths of microorganisms.



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- Experience in the development and/or use of dereplication strategies for the early identification of known natural products in extracts and metabolomics analyses
- Knowledge of chromatography and other purification methods, in particular HPLC.
- Basic knowledge of 1D, 2D NMR and MS techniques to elucidate natural product structures.
- Basic knowledge of natural products biosynthesis and tools to mine the genome of microorganisms
- Ability to work independently on its own initiative and in a team environment.
- Excellent oral and written communication skills in English are expected for an effective interaction with our multidisciplinary research team and other members of the Doctoral Network.

Who can apply?

Applicants must be doctoral candidates, i.e. not already in possession of a doctoral degree at the date of the recruitment. The Doctoral Network program requires transnational mobility and candidates must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their date of recruitment.

Interested applicants meeting these requirements should send to the following email address: hotbio@medinaandalucia.es

- A complete CV (personal details, academic/education history, research experience, experimental skills, publications, other)
- Names and contact information for qualified personal references
- A personal statement of interest/motivation letter (Provide authorization to handle personal data according to EU General Data Protection Regulation).
- Applications must be submitted as one PDF file containing all materials to be given consideration.

Enquiries about the position will be answered through the same e-mail address. Applications will be considered until January 31, 2023. The starting date is planned to be mid-2023.

The selected candidate will be employed for three years at Fundación MEDINA (Granada, Spain; <https://www.medinadiscovery.com/>).

Gross salary will be of 2.353,46 €/ month plus the Marie Curie mobility allowance according to the rules established for Doctoral Networks under the Horizon Europe Program (<https://marie-sklodowska-curie-actions.ec.europa.eu/actions/doctoral-networks>). It is possible to apply for family allowance. Contract will extend for a fixed period of three years and will be in accordance with the Spanish legislation.

We would like to encourage all nationalities to apply. HOTBIO supports balanced gender representation by promoting genuine equal access opportunities throughout the recruitment process.

Horizon Europe MSCA DN HOTBIO

The HOTBIO project is a Horizon Europe MSCA Doctoral Network project that aims to train doctoral fellows in the field of marine biology and pharmacology.



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HOTBIO is a marine biodiscovery project developing secondary metabolites from marine microorganisms into well-characterised compounds that can be applied in medicine, agriculture, or aquaculture. This collaborative action comprises a network of leading institutions and offers a first-class research and training program in an international, multidisciplinary environment.

The consortium will welcome 13 early-stage researchers, who will develop their individual research projects for three years in one of our excellent beneficiary institutions. Within this network, the candidates will be introduced to every stage of the marine biodiscovery pipeline, while their individual research projects will be dedicated to certain steps of this pipeline. High quality training in transferable skills will also be provided by the network. The main research activities of the PhD students will be accompanied by secondments at different sites, as well as meetings, courses and practical workshops specifically crafted for the project. Furthermore, the fellows will be enrolled in local doctoral schools, where they will get additional training and collaboration opportunities.

The goal of this extensive training program is to complement the day-to-day scientific training with the experiences and tools needed to pursue a future career in any sector of science, both inside and outside academia. Students graduating from HOTBIO will be in a unique position to enter a challenging labour market, as they will have received multidisciplinary training at world-leading research groups in academia and industry partners.

Project background

The HOTBIO consortium will train a new generation of researchers to develop marine microbial natural products from the seabed to the bedside. This project expands a conventional marine biodiscovery pipeline by employing cutting edge technology, including computer aided drug design, chemical synthesis of optimised compounds (i.e. medicinal chemistry), target deconvolution and extensive ADMET profiling. This will advance the bioactive microbial secondary metabolites to the later stages of preclinical development.

Just like the field of marine biodiscovery, this consortium is highly multidisciplinary, with experts from the fields of microbiology, chemistry, high throughput screening, genome mining, innovation, commercialization, molecular biology, and computational chemistry. The partners will work synergistically to optimise the learning experience for the candidates.

The consortium is composed of seven European beneficiaries from six different countries (Germany, Spain, Italy, Poland, Belgium and Norway), three partners from Switzerland and the United Kingdom, as well as associated partners from Austria, Ghana and India. The project will be coordinated by UiT - The Arctic University of Norway.

About Fundación MEDINA

Fundación MEDINA (www.medinadiscovery.com) is a Research Organization established in the Health Sciences Technology Park, Granada (Spain) as a private-public partnership between the Government of Andalucía (Spain), the University of Granada and Merck Sharp and Dohme de España S.A.

MEDINA is an independent and non-profit entity with innovative research collaborations and contracts with academic and industrial partners worldwide. We are engaged in the discovery of novel drug candidates and new biomarkers with Pharma and Biotech companies and research groups, as well as of new biotechnological products for use in crop protection for the



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Agrofood industry, Consumer products (Cosmetic and Nutrition) and new enzymes for industrial processes.

MEDINA owns one of the largest Collections of Microbial Strains (190.000 strains) and the most chemically diverse Natural Products Libraries (200.000 extracts) with a longstanding, successful track record in delivering novel drug candidates for development as pharmaceuticals. Our team has unique expertise in natural products microbiology, chemistry, high throughput screening, as well as a strong analytical chemistry platform for molecular structure elucidation and bioanalysis.

We are currently active in drug and biomarker discovery programs in infectious diseases (including tuberculosis and parasitic diseases), cancer, CNS, and rare diseases. Leveraging our unique strengths in high precision-high throughput analytics and bioanalytics we are collaborating with clinical investigators in translational research programs for biomarker discovery and metabolomic profiling of patient samples.

MEDINA has 2.300 square meters of laboratories equipped with state-of the-art technology to carry out the full process leading to the discovery of new bioactive molecules. This includes, among others, cutting edge technology platforms in Molecular microbiology and fermentation, Natural products chemistry and metabolomics, and High Throughput Screening.