



## PhD Contract 2024

We offer one fully-funded four-year FPI contract financed by Severo Ochoa Project MATTRANS24 (CEX2023-001263-S):

### Exploring New Molecular Platforms Anchored to Medical Implants to Prevent and Treat Infections

#### RESEARCH PROJECT DESCRIPTION

The project aims to develop innovative antimicrobial coatings for medical implants, mainly dental and orthopedic implants. Dental implants often fail due to bacterial infections, particularly peri-implantitis, which leads to poor bone integrity and implant rejection. Existing solutions, such as silver-based coatings or antibiotics may induce toxicity and antibiotic resistance. Therefore, this project seeks to create novel, safe, and efficient molecular coatings to prevent bacterial colonization and biofilm formation focusing on odontology with the vision to extend the approach to orthopaedics.

The project will focus on two key molecular systems: icosahedral boron clusters and curcuminoids, both exhibiting antimicrobial properties. These molecules will be designed to incorporate anchoring groups to allow for effective surface functionalization of metal-based implants like titanium. The project includes synthesizing the new molecular platforms, functionalizing implant surfaces, and developing nanostructures (e.g., hydrogels and nanocarriers) for additional sustained antimicrobial release. The aim is to strike a balance between antimicrobial efficacy, biocompatibility, and stability.

The PhD candidate will carry out the research project within a multidisciplinary team encompassing various ICMAB research groups, led by Dr. Arántzazu González Campo and Dr. Rosario Núñez. The project also involves key contributors such as Dr. Anna Roig, Dr. Imma Ratera and Dr. Nora Ventosa. Collaboration between these groups and external industry/medical partners will be essential for achieving the project's objectives.

The project is designed to align with the strategic goals of the Matrans42 research initiative, addressing a pressing medical need while pushing forward the development of safer and more effective implant technologies.

#### POSITION REQUIREMENTS

To be considered for this PhD position, candidates should hold the following requirements:

- Bachelor's degree in Chemistry, accompanied by an MSc in Biomedicine, Biotechnology, or a related field. This interdisciplinary background is advantageous due to the nature of the project.
- Proficiency in chemical synthesis and laboratory techniques is essential, with prior experience in molecular synthesis and liquid-based characterization techniques.
- A solid understanding of biological principles is expected. Expertise in bacterial and cell studies and/or surface functionalization will also be a strong asset. The contracted PhD



candidate will carry out research 'secondments' with the different groups participating in this project to take advantage of each one's experience.

- Candidates must demonstrate fluency in English and possess excellent verbal and written communication skills.
- The ability to collaborate effectively in a multidisciplinary team environment is crucial.
- Attention to detail in both experimental work and literature review, along with a proactive attitude toward learning and strong analytical skills, are key to success in this role.

Overall, the ideal candidate should demonstrate academic excellence, interdisciplinary expertise, practical laboratory skills, effective communication, and a collaborative, research-oriented mindset.

### PHD CO-DIRECTORS:

Dr. Arántzazu González Campo

Dr. Rosario Núñez

Contact: Interested candidates should send a detailed CV including his/her academic record and a list of references with contact details directly by e-mail to Dr. Arántzazu González ([agonzalez@icmab.es](mailto:agonzalez@icmab.es)) and Rosario Núñez ([rosario@icmab.es](mailto:rosario@icmab.es)).