



CICbiomaGUNE
MEMBER OF BASQUE RESEARCH
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Basque Foundation for Science

BIOENGINEERING IN REGENERATION AND CANCER GROUP

Group leader:

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**CIPITRIA
LAB**
Bioengineering in
Regeneration and
Cancer

Biogipuzkoa Health Research
Institute
Onkologikoa
20014 San Sebastián

In collaboration with:

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JOB OPENING: PhD Project

Biocatalytic materials for in vitro protein synthesis with applications in regenerative medicine

Biotechnology, Chemistry, Biochemistry, Biomedical Engineering, Chemical Engineering or similar

at Biogipuzkoa Health Research Institute
in collaboration with CIC biomaGUNE

Research team: We are an interdisciplinary team (<https://cipitrialab.com>) and seek to understand how biophysical and biochemical properties of native extracellular matrix and synthetic biomaterials guide cell response in tissue regeneration, cancer dormancy and metastasis.

This project will be carried out in collaboration with the **Heterogeneous Biocatalysis Lab** (<https://flg802.wixsite.com/flopezgallego>) led by **Dr. Fernando López** at **CIC biomaGUNE**. This group works on the development of enzymatic systems and cellular machineries for in vitro biotechnological applications.

Research project: This project aims to develop biocatalytic materials for in vitro synthesis of proteins with applications in regenerative medicine. First, the expression of proteins of therapeutic interest will be evaluated in vitro by trapping the transcription/translation machinery in hydrogels (1). Cytokines such as interleukin-2 (IL-2), cell adhesion proteins such as cadherin type II and growth factors such as bone morphogenic protein 2 (BMP-2) will be investigated. The diffusion kinetics of cytokines and growth factors in alginate-based 3D hydrogels and scaffolds will be analyzed. The physical and/or chemical crosslinking of alginates, different degree of crosslinking and degradation properties (2-5), will determine the mesh size, mechanical characteristics and diffusion of biomolecules. Finally, the biological functionality of these cytokines and growth factors will be evaluated in cell cultures in vitro and in pre-clinical animal models by means of different molecular and cellular biology techniques (i.e. western blot, histology).

Profile: Background in biotechnology, chemistry, biochemistry, biomedical engineering, chemical engineering or similar. Knowledge in hydrogel fabrication and cell culture will be an asset.

References: (1) Benítez-Mateos, ACS Synth Biol 2020; (2) Cipitria et al., Acta Biomater, 2017; (3) Lueckgen et al., Biomaterials 2018; (4) Lueckgen et al., Biomaterials 2019, (5) Garrido et al., Biomater Adv 2023

Starting date: between November-December 2023

Payment: doctoral researcher contract for 36 months

Want to join? Please send your application as a single PDF file of maximum size 5 MB by e-mail to amaia.cipitria@biodonostia.org and flopez@cicbiomagune.es, including a motivation letter describing your research experience and interests, your CV, complete academic record and contact details of 2-3 references. Please indicate "PhD - Biocatalytic materials" in the subject line.