PhD position "Study of the rare earth elements selective detection in *Pseudomonas putida* and development of chelating architectures"

General information

Job title : PhD position in Biochemistry/Microbiology
Place of work : Cadarache
Contract start date : 01/10/2026
Contract end date : 30/09/2029
Recruiter's name : Camille HENRY – camille.henry@cea.fr

Missions

Within the framework of the research focus of the IPM team (Interaction Protein-Metal), the mission of the PhD student will be to study the molecular mechanisms involved the selective detection of rare earth elements (REE) in *Pseudomonas putida.* The goal of the PhD is to acquire fundamental knowledge on the selective REE detection mechanism orchestrated by *P. putida* and further develop new biotechnologies, such as metal chelating architectures. The thesis subject proposed will be organized in three aims:

- Characterization of the metal binding site of REE binding protein newly identified
- Generation of a genetic screen testing the REE binding capacity of several variants of the protein
- Proof of concept for possible REE separation with the chelating architectures identified

Activities

- Review the state of the art (bibliography)
- Design and plan experiments
- Learn to use cutting edge technologies
- Realize wet experimentations (microbiology, molecular biology, biochemistry, biophysics, microscopy)
- Collection, management and analysis of the data
- *In silico* predictions and analysis (prediction tools, AI)
- Scientific reports (written and oral)
- Take part of the teamwork

Skills

The candidate must hold a Master or Engineer degree in microbiology, biochemistry or biotechnology. The position requires experience in biochemistry and/or microbiology. Knowledge or experience in cell biology, molecular biology, structural biology or bioinformatic will be appreciated. The position required rigor and curiosity, with a high propensity to experimental work.

Work context

The BIAM (Institute of Biosciences and Biotechnologies of Aix-Marseille), is a Joint Research Unit that brings together CEA, CNRS and Aix-Marseille University (UMR 7265), located on two strategic geographical sites: the CEA Cadarache center in Saint-Paul-lez-Durance and the Luminy science faculty in Marseille. The BIAM is interested in the responses of living organisms to environmental constraints, and in the mechanisms of conversion of solar energy into a biomass rich in energy. It develops biotechnologies aimed at preserving the quality of the environment and health or at producing biofuels.

The recruited person will work in the IPM team. The research focus of the team is centered on the interaction between protein and metals with particular interest on how microorganisms adapt and respond to metals. Our research mainly focuses on radionuclides and rare earth elements (REE). REE are widely used in high technology, and demand for REE is set to double over the next 30 years. The selective extraction and recycling of REE has a triple challenge: economic, technological and ecological. The development of bio-sourced methods could be a key element in unlocking current selectivity and extraction barriers. The aim of this thesis is to acquire fundamental data on the molecular mechanism of a biological system for selective REE perception in order to take advantage of it for the development of selective chelating architectures.

Application

Please send CV, personal statement and a contact for reference to camille.henry@cea.fr
IPM group website : IPM - Cité des énergies
Personal profile : Camille HENRY - Cité des énergies