

SUMMER INTERNSHIPS 2017

TITLE: Discovery and Use of Ureasases as Advanced Biohybrid Materials for Remediation and Sensing

DESCRIPTION (Objectives, tasks, materials, equipment,...):

Ureasases have shown to be useful in a broad number of fields. Among current applications of ureasases, urea or creatine biosensors, removal of urea from beverages (i.e., wine) or development of artificial kidneys to regenerate the dialysate, have been commercialized. Unfortunately, the final compounds of urea hydrolysis -ammonia and carbon dioxide, which removal currently remains in challenge- inhibit and inactivate the urease itself due to an increase in the pH value. In addition, the number of commercial ureasases is rather limited and evolved ureasases from distinct and adapted ecological niches have not been retrieved so far.

In the frame of this internship, the candidate will learn the state-of-the-art techniques, in order to discover new ureasases and improve their stability at high pH, based on genetic engineering –metagenomic approach- and their encapsulation inside inorganic cages. Main objective will be focused on the development of new encapsulated enzymes with improved performance under harsh conditions that should show an increased durability. Cow rumen and contaminated marine sediments have been aimed as a potential ecological niche to explore the urease diversity, from which new enzymes will be detected and analyzed. Subsequently, sorted enzymes will be encapsulated using polymeric materials. As this is an interdisciplinary project, the student will gain knowledge on molecular biology and biochemical procedures, organic chemical synthesis, polymer chemistry, and physical characterization of the biohybrids that he/she will develop.

SUPERVISOR: Dr. Ana Beloqui, CIC nanoGUNE

SHORT DESCRIPTION OF THE GROUP: The Nanomaterials group at CIC nanogune is currently working in two research lines: (1) application of nanoscale coatings through various infiltration procedures for the fabrication of new functional materials; and (2) encapsulation and immobilization of biomacromolecules using inorganic compounds in order to improve their stability and fabricate new biomaterials. Thus, the research of the group is interdisciplinary and includes aspects of chemistry, materials science, biochemistry, physics and engineering.

TIMETABLE: 9:00-13:00, 15:00-17:00

COMMENTS: Internship duration from 1.5 to 2 months (to be discussed).

Applicants should send an email to jm.pitarke@nanogune.eu including their academic record.

More info: <http://www.nanogune.eu/summer-internship>

Deadline for applications: 5 February 2017

SUITABLE FOR: Biologists, Chemists, Biochemist

