

**Title of the PhD subject: Alterocin and antibiofilm strategies**

**Acronym:** ALTER

**Research team:** Laboratoire de Biotechnologie et Chimie Marines (LBCM), Institut Universitaire Européen de la Mer (IUEM), Université de Bretagne-Sud (Lorient site), France.

**Supervision:** Dr. Alexis Bazire and Pr. Alain Dufour

**Contact:** alain.dufour@univ-ubs.fr

**Context:** Biofilms (organized microorganism populations) formed by bacteria generate numerous problems in a variety of domains. We isolated a marine bacterium, *Pseudoalteromonas* 3J6, which secretes an antibiofilm protein, named alterocin. Its activity is original, since it prevents bacteria to form a biofilm without affecting these bacteria when they are planktonic. Different bacteria are sensitive to alterocin, among which *Vibrio tapetis* (clam pathogen) and *Pseudomonas aeruginosa* (human pathogen, more particularly for cystic fibrosis patients), and alterocin is not toxic towards human cells or animals. The *Pseudoalteromonas* 3J6 genome was just sequenced and we identified the alterocin gene.

**Objectives and scientific interests:** The objectives are the following: to study the expression of the alterocin gene and overproduce alterocin, either from the natural *Pseudoalteromonas* 3J6 strain or by overexpressing its gene in an heterologous bacterium; to analyse the alterocin mode of action using a transcriptomic approach; to examine if sensitive bacteria can acquire a resistance to alterocin; to examine if additive or synergic effects can be obtained by combining alterocin and antibiotic(s); to define the possible utilization modes (preventive and/or curative) of alterocin and its producing strain in various contexts of host-pathogen interactions. The interests are both on basic (understanding of the alterocin mode of action) and applied levels (set up of antibiofilm strategies to fight against pathogenic bacteria such as *V. tapetis* and *P. aeruginosa*).

**Project summary:** This project aims at providing new insights on the knowledge of alterocin functioning and at setting up antibiofilm strategies to fight against several pathogenic bacteria.

**Partnership:** LEMAR (IUEM, UBO), LUBEM (UBO), LMSM (Université de Rouen), Faculté de Médecine de Nantes. This project will be performed in the frameworks of the thematic axis "Marine biotechnologies marines" of IUEM, of the GDR 3625 MuFoPAM (Multi-functions of antimicrobial peptides), and of the Fédération de Microbiologie du Grand Ouest.

**Expected applicant:** The applicant must have a solid formation in microbiology, molecular biology and biochemistry. Competences on biofilms would be an advantage, but it is not absolutely required.