Master/3e année ingénieur research internship Février- Juillet 2023

Charge-Transfer Templated Ligation of Peptide Bioconjugates.

Period: 6 months from January/February to June/July 2023, 600 euros/months
Internship tutors: Pr. Gilles Subra IBMM, Dr. Muriel Amblard gilles.subra@umontpellier.fr, muriel.amblard@umontpellier.fr
in close collaboration with the IBMM Oligonucleotide team (F. Morvan, M. Smietana).
Internship locations: IBMM, Pole Chimie Balard, Montpellier, Peptides *www.ibmmpeptide.com* Team

Summary
This Master's research project in chemobiology is part of the ANR CHAMELEON project, which aims to develop an innovative, **traceless** and universal **ligation** strategy to generate DNA-DNA, peptide-DNA and peptide-peptide conjugates, at low concentrations in water. Our strategy is based on charge transfer interactions between the electron-rich dialkoxynaphthalene (DAN) donor and the electron-deficient naphthalene-tetracarboxyliquediimide (NDI). The Master's internship will be dedicated to the development of **Peptide-Peptide conjugates**. Another internship is offered in the IBMM oligonucleotide team for the synthesis of DNA-DNA conjugates. **Depending on the achievements of the Master, a PhD funding may be proposed.**

Student work
The synthesis and supramolecular assembly of novel phosphodiester-bound water-soluble polyDAN and polyNDI motifs has recently been developed by the IBMM Oligonucleotide team. Based on this expertise, these tags will be covalently linked via a peptide cleavable linker to induce directed ligations in an aqueous medium. The Master student will carry out the synthesis, analysis and purification of peptide precursors using support synthesis methods. He or she will synthesize the conjugates with polyDAN or polyNDI and evaluate their introduction via an acido labile group of type Hmb. He or she will characterize the biomolecules by LC/MS and NMR (H and P). Finally, he will perform fragment coupling or cyclization tests and study the influence of concentration to evaluate the Charge-Transfer Templated Ligation recognition effect of polyDNA and polyNDI.

Competencies required
1. Synthesis of peptides, synthesis on support
2. Ligation
3. Characterization of biomolecules (LC/MS, NMR).

Required skills and soft skills
1. Scientific English, Organic Chemistry and Analytical Chemistry Master's level.
2. Autonomy, scientific curiosity
3. Rigor, capacity for work
4. Good interpersonal skills, ability to report