Postdoc position in bioorganic chemistry
available in Grenoble, France

Synthesis and study of proteins for the sequence-specific recognition and modification of DNA

Molecular tools that permit detection of a gene and control of its expression are on high demand for biological research and its medical applications. In 2018, we started a collaborative research program named RECODNA and funded by the French National Research Agency, that involves three research groups in Grenoble (France) and one in Bordeaux (France). We aim at designing and studying proteins functionalized with chromophores that are able to bind in a sequence-specific manner to double stranded DNA of at least 16 base pairs (which exist as a single copy in the human genome) and that are able to trigger DNA modification under photo-irradiation. In this respect, two zinc finger protein that dimerize upon binding to the target DNA will be functionalized each by a chromophore to create a FRET system. The accepting chromophore in the FRET pair will be a photosensitizer that will create oxidative damages in the target DNA, bound to the two proteins. Such a photoactivatable damaging agent should be extremely selective. This is what we intend to demonstrate during this postdoc.

The selected candidate will be in charge of the chemical synthesis of the proteins, which relies on native chemical ligation as well as on click chemistry for the grafting of the chromophores. Functionalized proteins will be studied by molecular biology techniques, including EMSA, foot-printing, PAGE) to characterize the DNA/protein interaction and photo-induced damages with the help of specific repair proteins. Mass spectrometry analyses will complement these analyses for the identification and quantification of DNA lesions.

We are looking for a bioorganic Ph.D. chemist with a strong experience in peptide synthesis et/or chemical synthesis and functionalization of proteins. The selected candidate must master HPLC purification of biomolecules. Knowledge in photochemistry, molecular biology or mass spectrometry will be appreciated although not strictly required.

The selected candidate will work in three research groups in Grenoble:

- two at the Interdisciplinary Research Institute of Grenoble of the CEA for protein synthesis (Metallopeptide group, PI: Olivier Sénèque, https://www.cbm-lab.fr/en/Pages/PMB/Metallopeptides.aspx) and for mass spectrometry analysis of photo-damages (CIBEST group, PI: Jean-Luc Ravanat, https://www.symmes.fr/en/Pages/CIBEST/Mechanism/UV-and-DNA-damage.aspx)
- one at the Department of Molecular Chemistry of the University of Grenoble for molecular biology (I2BM group, PIs: Jean-François Constant et Muriel Jourdan, https://dcm.univ-grenoble-alpes.fr/research/i2bm-team/research-areas/biophysical-studies-biomolecular-interactions).

Currently, a Ph.D. student is working on the project, who will still be present during the first six months of the postdoc, in order to ensure maximal knowledge transmission concerning the protein synthesis.

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Application: https://emploi.cnrs.fr/Offres/CDD/UMR5250-JEACON-001/Default.aspx