



PhD Position in Synthetic Chemistry and Bioconjugation

Overview of the Post

Research Group	BioFunctional Chemistry
Location	UMR7199 – Faculty of Pharmacy – University of Strasbourg 74 route du Rhin, 67400 Illkirch
Salary	Approximately 20 220 € per annum
Hours	Full-time
Contract type	36-month fixed term position funded by <i>Agence Nationale de la Recherche</i>
Reporting to	Dr Guilhem Chaubet and Dr Alain Wagner
Website	http://www.biofunctional.eu/
Social networks	CAMB.UMR7199 BFC_UMR7199 BioFunctional Chemistry Lab

Job Description

The BioFunctional Chemistry group is looking for a competent and highly motivated synthetic chemist for a PhD project in the field of organic chemistry applied to protein bioconjugation.

Our team has developed a strong interest in proteins bioconjugation and more particularly in the chemical coupling between an antibody and molecules with various biological properties (fluorescent probe, oligonucleotides, cytotoxic agent). The resulting molecular complexes, which include the family of antibody-drug conjugates (ADC), are considered the future of targeted therapies, particularly in the field of cancer where tumours (over-)express certain cellular markers, specifically recognised by appropriate antibodies. Despite the development of multiple conjugation methods over the past few years, the synthesis of antibody conjugates faces a major problem: low site selectivity, i.e. the virtual absence of control of the precise area of the antibody on which the coupling reaction will take place.

Building on previous work (see scheme), this thesis project is thus aimed at designing chemical strategies for the bioconjugation of native antibodies using original approaches, such as multi-component reactions, in order to access site specificity. Key parameters to guide the optimization of these reactions will be the degree of conjugation (number of molecules attached on average per antibody) and site specificity (number of sites affected by a reaction). The main objective will be to optimize the chemical system in order to achieve a stoichiometric modification affecting only one site. All characterizations will be carried out thanks to a hand in hand collaboration with experts in native mass spectrometry located on the Cronenbourg campus (LSMBO team, Sarah Cianferani).

In case of promising results, this chemistry will be used to produce ADCs. The effect of conjugation on various determining parameters such as binding to the receptor, induction of non-specific interactions, internalization rate, cytological quantity delivered and cytotoxicity will be evaluated on several cancer cell lines, routinely cultured in the team.

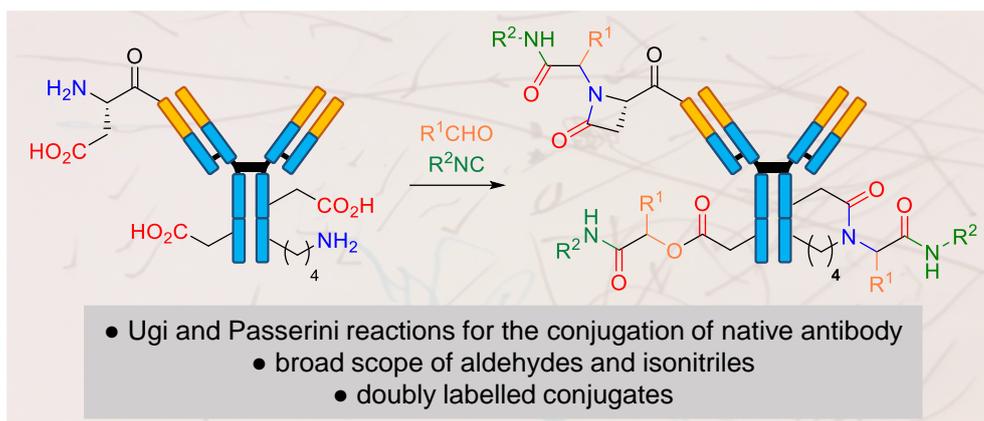
This thesis work will therefore cover fundamental chemistry aspects, bioanalytical aspects, protein chemistry aspects and even *in-cellulo* chemistry. The possibility for the PhD student to be involved at each step of the conjugate design – from their synthesis to their biological test – and their characterization – in particular by native mass spectrometry – gives this project a very high degree of interdisciplinarity and ensures a highly valuable training at the chemistry-biology interface.



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The responsibilities of the candidate will be as follow:

- Synthesize new reagents for bioconjugation
- Optimize and develop bioconjugation procedures
- Prepare and characterize novel ADC
- Work alongside mass spectrometry researchers and biologists
- Collaborate in the preparation of scientific reports and journal articles
- Take a share in the laboratory-based collective tasks
- Attend and participate actively in group meetings

The ideal candidate will have to demonstrate the following skills:

- Broad knowledge and experience in organic synthesis
- Understanding of the principles of bioconjugation methodology
- High degree of self-organization, discipline in documentation and reporting
- Be able to work effectively as part of a group, assume group responsibilities and supervise junior team members

In addition, good communication skills in both French and English, as well as practical experience in handling biomolecules (e.g. proteins, antibodies), will be sought after.

The BFC Group

The BioFunctional Chemistry group is currently run by Dr Alain Wagner and Dr Guilhem Chaubet and comprises 17 researchers – 3 permanent researchers, 3 engineers and technicians, 1 postdoctoral researcher, and 10 PhD students – possessing a strong knowledge in synthetic chemistry, bioconjugation techniques, cell culture, and protein expression and purification. This in-house multidisciplinary expertise allows the group to be competitive in the expanding field of bioconjugation, by being able to perform every step of the research in this area, from the synthesis of the molecules to their biological testing. For more information, please visit <http://www.biofunctional.eu>

How to Apply

Applicants are invited to send a CV, a summary of their research achievement, transcripts from undergraduate studies as well as details of two referees to Alain Wagner (alwag@unistra.fr) and Guilhem Chaubet (chaubet@unistra.fr).

