



Masters Internship Offer

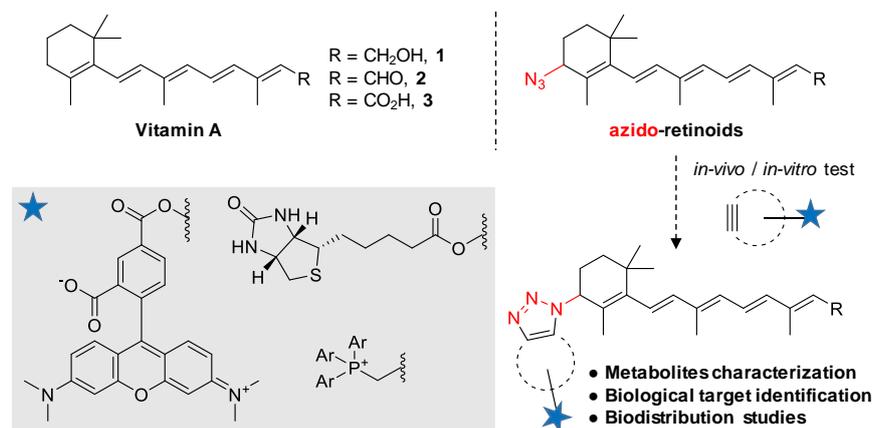
BioFunctional Chemistry Team (led by Alain Wagner)
University of Strasbourg

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Topic	Synthesis of azido- analogues of natural retinoids

The BioFunctional Chemistry (BFC) group is looking for a competent and highly motivated organic chemist for a Master's project in the field of synthetic chemistry applied to in-vivo bioorthogonal reactions. This project will be conducted in close collaboration with biologists (Dr Wojciech Krezel, Institut de Génétique et de Biologie Moléculaire et Cellulaire - CNRS UMR 7104 - Inserm U 1258, Strasbourg) and mass spectrometry experts (Dr François Fenaille, Laboratoire d'Études du Métabolisme des Médicaments, CEA, Saclay), and aims at **discovering the *in-vivo* active form of vitamin A.**

This project has already received a funding from the Agence Nationale de la Recherche for a PhD, which could be attributed to the student in case of fruitful results.

Vitamin A is a micronutrient critical for normal development and physiology in vertebrates, which corresponds to a collection of structurally related polyene compounds, including retinol **1**, retinal **2** and all-*trans*-retinoic acid **3**. While the latter is currently considered as



the major active form of vitamin A, results obtained in Dr Krezel's team indicate otherwise and suggest the existence of other bioactive forms of vitamin A. This project thus aims at identifying the structures of such species thanks to a **combination of in-**

vivo bioorthogonal chemistry and mass spectrometry analyses.

Bioorthogonal chemistry is the ability to perform synthetic transformations in living organisms and complex media (in plasma, cells, tissues, etc.) without interfering with any natural chemical process. Azide groups are classically employed in this regard as they are naturally absent from biomolecules and can thus be easily functionalised with alkynes via Huisgen 1,3-dipolar cycloaddition with little or no side reactions. By designing unnatural azido-analogues of retinol, retinal and all-*trans*-retinoic acid, we would be able to functionalise them on demand with various alkyne probes that will also be developed in the frame of this project. These probes will be equipped with different functional groups (e.g.

fluorophore, mass spectrometry tag, biotin), which will allow us to **capture, identify and characterize all metabolites produced *in-vivo* from the unnatural azido-retinoids.**

Thus this project offers a unique opportunity for organic chemists to use their knowledge in an applied research project at the interface of synthetic chemistry and biology, by developing new conjugation tools and familiarise themselves with all cutting-edge techniques of a multidisciplinary environment.

The responsibilities of the candidate will be as follow:

- Synthesise a new family of unnatural retinoids
- Work alongside mass spectrometry researchers and biologists
- 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:

- Good knowledge of organic synthesis
- Understanding of the principles of bioconjugation methodology
- High degree of self-organisation, discipline in documentation and reporting
- Be able to work effectively as part of a group, assume group responsibilities

In addition, good communication skills in both French and English will be sought after.

About the BFC Group

The BFC group is currently run by **Dr Alain Wagner** and comprises 13 researchers – 3 permanent researchers, 3 engineers and technicians, 2 postdoctoral researchers, and 5 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 details, please visit us at <http://www.biofunctional.eu/> or follow us on Twitter [@BFC_UMR7199](https://twitter.com/BFC_UMR7199)

How to Apply

Applicants are invited to send a CV and transcripts of Master's studies (including grades) to Alain Wagner (alwag@unistra.fr) and Guilhem Chaubet (chaubet@unistra.fr).

References

Ursuegui *et al.*, *Nature Commun.*, **2017**, 8, 15242.

