

# Novel Bioorthogonal Reagents for the Selective Imaging of Glycoconjugates

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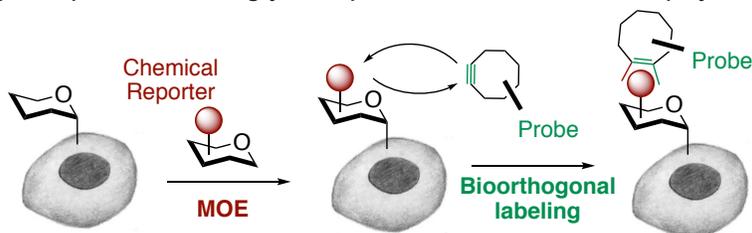
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Glycans are chains of monosaccharides that are often covalently linked to cell surface and secreted proteins. Recently, these astonishingly varied and complex carbohydrate structures have been recognized as key participants in physiological and pathological events including cell adhesion, host-pathogen interactions and cancer progression.<sup>[1]</sup> Despite these intriguing observations, the molecular mechanisms by which these complex carbohydrates influence biological events are not well understood. Consequently, there is an urgent need for novel imaging tools that can help us understand the functional roles of glycans in cell biology.

Due to the posttranslational nature of complex glycans, applications of classical biochemical imaging tools such as the use of fusion fluorescent proteins are not amenable for tracking these complex carbohydrates in living cells. **The bioorthogonal chemical reporter strategy**, which elegantly combines the use of metabolically labeled azido-sugars and highly reactive cyclooctyne probes, is emerging as a versatile technology for labeling and visualizing glycans. (Figure).<sup>[2]</sup> However, the sensitivity of cyclooctyne probes and current reporters in biological environment can significantly increase background signal and false positive imaging.

During this talk, I will present our recent efforts to expand our chemical biology toolbox for a **more selective** visualization of complex glycans through the combined development of novel bioorthogonal probes<sup>[3]</sup> and glyco-reporters<sup>[4]</sup> with enhanced physical properties.



**Figure:** Bioorthogonal chemical reporter strategy for imaging the glycome

## Reference:

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**Biosketch:**

After completing a PhD in chemistry in 2009 on asymmetric organometallic and organic catalysis with Profs Pavel Kočovský and Andrei Malkov (University of Glasgow, UK), I transitioned to the field of Chemical Biology during my postdoctoral fellowship (2009-2014) in the laboratory of Prof Geert-Jan Boons at the Complex Carbohydrate Research Center (GA, USA), where I developed novel chemical probes for imaging the glycome in living cells.

In 2014, I obtained a Junior Chair position in Chemical Biology from the University of Bordeaux and a co-affiliated position at the European Institute of Chemistry and Biology in Bordeaux as a group leader. My research focuses on using organic chemistry to develop novel tools that can probe the biosynthesis and biological influence of glycans in living systems.

**Selected awards:** ACS Outstanding Postdoctoral Research Chemist Award (2012); IdEx Bordeaux Junior Chair of Excellence in Chemical Biology Award (2014); CNRS ATIP-Avenir Award for outstanding young principal investigator (2017).