

Exploiting Bioorthogonal Chemical Reporters for Controlling the Processing of Sialosides by Glyco-enzymes in Living cells

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Sialic acids are anionic nine-carbon carbohydrates generally found as terminal sugars of mammalian cell-surface glycoproteins and glycolipids. Because of their distinct cellular location, sialo-glycoconjugates (also known as sialosides) are often key mediators of physiological and pathological events, including cell adhesion, host-pathogen interactions, and cancer progression.^[1]

Due to the posttranslational nature of sialoconjugates, 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 sialosides. (Figure).^[2] This strategy relies on the fact that bioorthogonal chemical reporters are highly reactive species while being biologically noninvasive.

During this talk, I will present our recent efforts to show that chemical bioorthogonal reporters may actually impact sialosides processing enzymes activity,^[3] providing us with novel, **more selective**, chemical biology tools for studying the biological roles of cell-surface sialosides.

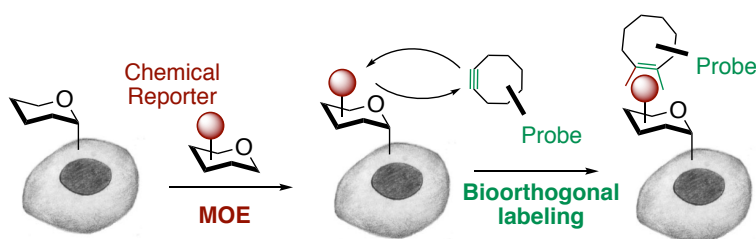


Figure: Bioorthogonal chemical reporter strategy for imaging the glycome

Reference:

[1] A. Varki, *Nature* **2007**, *446*, 1023.

[2] Chinoy, Z. S.; Friscourt, F.: Bioorthogonal Chemical Ligations Towards Neoglycoproteins. In: *Comprehensive Glycoscience*, 2nd Edition (J. J. Barchi, Jr ed.), Elsevier, **2021**, Volume 2, *Chapter* 56, 660.

[3] a) Chinoy, Z.; Bodineau, C.; Favre, C.; Moremen K. W.; Durán R. V.; Friscourt, F. *Angew. Chem. Int. Ed.* **2019**, *58*, 4281. b) Chinoy, Z. S.; Montembault, E.; Moremen, K. W.; Royou A.; Friscourt, F. *ACS Chem. Biol.* **2021**, *16*, 2307.

Biosketch:



After completing in parallel a M.Sc. in Chemistry and a Chemical Engineering diploma (2004) from the University of Clermont-Ferrand, France, I moved to Scotland to do my PhD in Chemistry on asymmetric organometallic and organic catalysis under the supervision of Prof Pavel Kočovský at the University of Glasgow, UK.

I then 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, France and a co-affiliated position at the European Institute of Chemistry and Biology in Bordeaux as a group leader. I was recently promoted to Associate Professor in Chemical Biology at the University of Bordeaux, France (2021). 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: CNRS ATIP-Avenir Award for outstanding young principal investigator (2017) | IdEx Bordeaux Junior Chair of Excellence in Chemical Biology Award (2014) | ACS Outstanding Postdoctoral Research Chemist Award (2012).