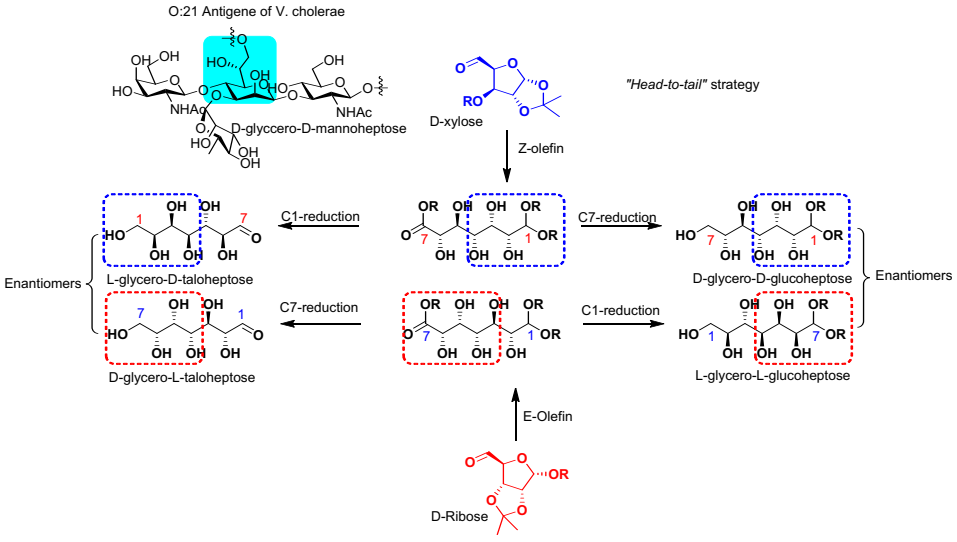
Stereoselective Access to Heptoses and Regioselective Functionalization Towards the Assembly of a Heptose-containing Oligosaccharide of O:21 Antigen of *Vibrio cholerae*

Francis Agwom[1] Junping Su[1] and Peter Goekjian[1]

[1] *ICBMS, Villeurbanne, 69100, France*

E-mail: francis.agwom@etu.univ-lyon1.fr

Heptose sugars are higher-carbon monosaccharides that play essential roles in the inner core region of lipopolysaccharides (LPS) of Gram-negative bacteria, where they contribute to membrane stability, virulence, and immune recognition[1-2]. However, access to well-defined heptose derivatives presents a persistent challenge not only for efficient synthesis but also for unambiguous stereochemical assignment. Consequently, the efficient and consistent assignment of stereochemistry across the full set of heptose isomers remains a relevant methodological gap in carbohydrate synthesis. The *'head-to-tail'* strategy offers a good alternative solution to this challenge by enabling stereochemical correlation through sequential transformation of structurally related intermediates along the carbon chain[3-4]. This approach provides a unified platform for accessing multiple members of the heptose stereochemical family while maintaining predictable stereochemical relationships derived from the starting pentoses[5-6]. In this strategy, the stereochemical information from a known precursor is propagated through controlled chain extension and functional group manipulation, allowing direct comparison of stereochemical outcomes without reliance on external reference standards.The stereo-selective access to heptoses and in parallel, the development of efficient glycosyl building blocks remains essential for the assembly of biologically relevant oligosaccharides. Specifically, the synthesis of suitably protected D-glycero-D-glucoheptose, fluorous-tagged D-galactose and L-rhamnose derivatives, as well as D-glucosamine acceptor as important steps toward the assembling of β-D-glycero-D-mannoheptose-containing target oligosaccharides[7] will be presented.



References

[1] Gaudet, Ryan G., and Scott, Gray-Owen D. *PLoS Pathogens* **2016**, *12*.
[2] Wang, Hua, et al. *Biochemistry* **2008**, *47*, 710-720.
[3] Fischer, Emil., *Ber. Dtsch. Chem. Ges.* **1891**, *24*, 2683
[4] Lichtenthaler, F.W. *Angew. Chem. Int. Ed. Engl.* **1992**, 31, 1541-1556
[5] Brimacombe, John S., and Abdul, Kabir KMS. *Carbohydrate research* **1986**, *150*, 35-51.
[6] Brimacombe, John S., and Abdul, Kabir KMS. *Carbohydrate research* **1986**, *152*, 329-334.
[7] Ansari, Akbar A., et al. *Carbohydrate research* **1986**, *150*, 213-219.