Amphiphilic b-C-glycosylbarbiturates as Interfacial Layer of Liquid Crystals-Based Biosensors for Pathogenic Lectin Detection & as Hydrogelators Leading to Supramolecular Hydrogels

Speaker : Sami HALILA

Auteurs: Sa Yao SHUN [1], François PORTIER [1], Anne IMBERTY [1], Patrice RANNOU [2], Sami HALILA [1]

[1] CERMAV CNRS-Univ. Grenoble Alpes, [2] SyMMES (CNRS-CEA-Univ. Grenoble Alpes)
E-mail address: sami.halila@cermav.cnrs.fr

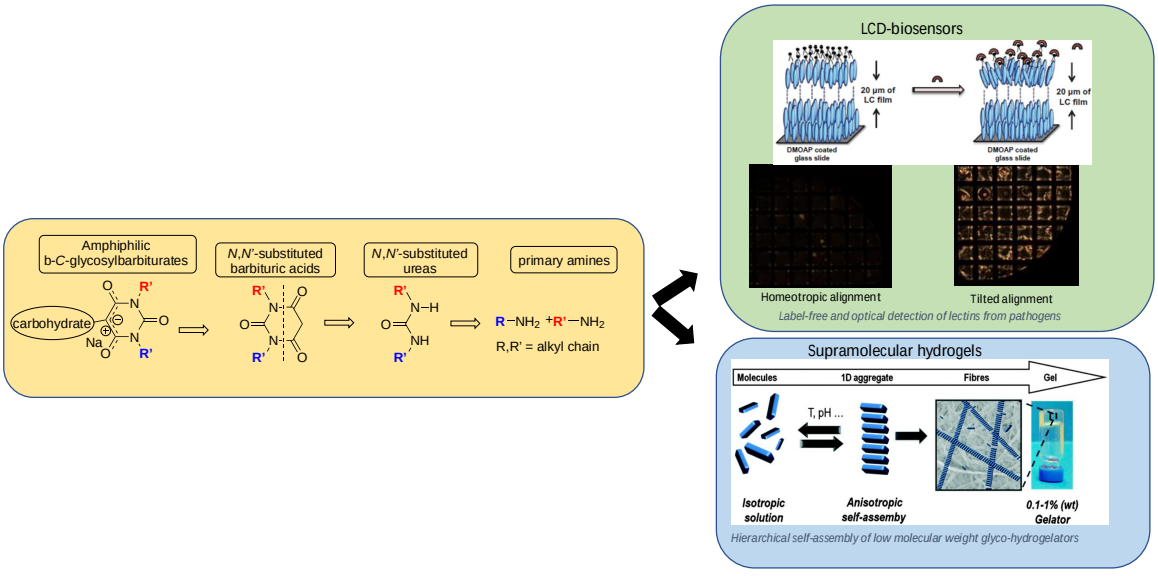
Abstract

Synthesis of glycoconjugates is an important task because of their multiple roles in biological processes by interacting with carbohydrate-acting proteins. Thus, reducing-end modification of sugars is highly mandatory and glycochemists are still looking for efficient synthetic methodologies.

In this communication, Knoevenagel condensation onto free protecting-group carbohydrates will be highlighted by using a modular chemical platform consisting in N,N'-substituted barbituric acids.[1],[2] The ease of synthesis of barbituric acid derivatives and related b-C-glycosylbarbiturates allows to consider this "glyco-click" coupling as a valuable chemical toolbox for glycosciences and some examples of applications will be exposed. Indeed, the barbituric acid-mediated Knoevenagel condensation approach allows us to design libraries of glyco-amphiphiles (GAs) obtained in water.

Preliminary results will show how those GAs have been used as active layers adsorbed at the hydrophobic thermotropic liquid crystal/aqueous interface to develop specific recognition patterns with targeted lectins leading to a simple, label-free, and fast optical detection method.

Secondly, thanks to a rational design of GAs, stimuli-responsive supramolecular hydrogels have been achieved owing to hierarchical self-assembly through non-covalent interactions.



Bibliographic references

[1] F. Portier, J. Solier, S. Halila (2019), Eur. J. Org. Chem. (36) 6158–6162.

[2] F. Portier, A. Imberty, S. Halila (2019), Bioconjugate Chem. (30) 647–656.