

Séminaire PPSM

Mardi 12 octobre 2021 - 11h00

Amphithéâtre Lagrange (1Z14)

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Invité par : Joanne Xie

«Oligosaccharide-based nucleic acid delivery: precision chemistry for precision medicine»



Cyclodextrins (cyclomatooligosaccharides, CDs), can be considered as cyclic pieces of the maltodextrin chains of starch. They are composed of glucose monomers with $\alpha(1\prime4)$ -linkages that feature a troncoconic torus with a hydrophobic inner space and a hydrophilic exterior. This unique type of amphiphilicity make CDs capable of including a variety of guests in the cavity and improve their solubility (and often their stability) in biological media, which has been largely exploited in the pharmaceutical industry. Most interestingly, CDs can be chemically modified to build nanosized multifunctional systems with (hierarchical) self-assembling, biological recognition and/or stimuli responsive properties. The incorporation of CDs in linear and star-type polymers and dendrimers has been realized. Through precision macromolecular synthetic methods, full homogeneity can be preserve, thereby accessing monodisperse molecular nanoparticle-type entities. The strategy can be extended to de novo synthesized (cyclo)oligosaccharides, further expanding the palette of customizable supramolecularly-competent platforms. The amalgamation of diastereomeric purity and multifunctionality (as natural proteins do) is particularly appealing in the biomedical feel. Examples of oligosaccharide-based systems with programmed drug/gene delivery properties will be presented [1-6].

References

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- [2] L. Gallego-Yerga et al., *Chem. Eur. J.* 2018, 24, 3825-3835.
- [3] T. Neva et al., *Chem. Eur. J.* 2020, 26, 15259-15269.
- [4] A. I. Carbajo-Gordillo et al., *Biomacromolecules* 2020, 21, 5173-5188.
- [5] L. Gallego-Yerga et al., *Carbohydr. Polym.* 2021, 252, 117135.
- [6] A. I. Carbajo-Gordillo et al., *Chem. Eur. J.* 2021, 27, 9429-9438.

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