Laboratoire PPSM – UMR CNRS 8531

Photochimie et Photophysique Supramoléculaires et Macromoléculaires

Séminaire PPSM

Mercredi 29 novembre 2017 - 10h30

Auditorium D. Chemla - Bâtiment IDA

Professeur Jose M. GARCIA FERNANDEZ

Instituto de Investigaciones Químicas. CSIC, Universidad de Sevilla, Espagne

Invité par : Joanne Xie

«Janus cyclooligosaccharides: from molecular nanoparticles to self-assembled superstructures»

In order for a given device to fulfill a precise task in a biological context it must be directional, that is, it must be possible to modulate the surface properties of this object so that it can interact with the environment in an anisotropic fashion. From the structural point of view, this requirement implies the presence of at least two different regions in the same construct, that is, the so-called “Janus” (from the roman two-faces God) feature. The concept behind is that a three-dimensionally dissymmetrical distribution of certain physical/chemical features, such as size, shape and composition, shall lead to the formation of specific hierarchical superstructures with novel properties. Cyclodextrins are particularly well adapted for that purpose given the pre-existence of two levels of spatial organization, namely the inside/outside spatial separation provided by the presence of a hydrophobic cavity and the up/down differential orientation of the hydroxyl groups resulting from their arrangement in two well-differentiated faces. Moreover, their small sizes and the possibility of precise chemical tailoring make cyclodextrins ideally suited for the incorporation of functional and structural hierarchy while keeping monodispersity at the molecular level (molecular nanoparticles).[1] Cyclotrehalans represents a different family of cyclooligosaccharides for which the Janus character can be created a posteriori by bringing together two differently elaborated halves. In this lecture a few snapshots from our laboratory will be presented to illustrate how this chemical versatility can be translated into controlled supramolecular interactions and then into specific biological functions, including drug/gene encapsulation and controlled release, environment sensitiveness or targeting of specific biological receptors.[2,3]

PPSM
ENS Cachan – 61 avenue du Président Wilson
94235 Cachan Cedex – France
***Tél :** +33 1 47 40 53 38 – **Fax :** +33 1 47 40 24 54*
***e-mail :** ahusson@ppsm.ens-cachan.fr*
***site web :** http://www.ppsm.ens-cachan.fr*

Références

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ENS Cachan – 61 avenue du Président Wilson
94235 Cachan Cedex – France
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***e-mail :** ahusson@ppsm.ens-cachan.fr*
***site web :** http://www.ppsm.ens-cachan.fr*