

**Institut d'Alembert Seminar / June 19th, 2023 at 11:00 am
Amphi Simondon – 1B26 – South-West- Building -**

ONE MOLECULE, THREE BIOMIMETIC APPLICATIONS



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Presentation:

Biomimesis is a scientific and design approach that involves studying and emulating biological systems and processes to create new materials, products, or technologies that are more sustainable, efficient, and adaptable. In chemistry, it involves the design and synthesis of molecules, catalysts, and materials that mimic or are inspired by biological systems and processes, such as enzyme catalysis, photosynthesis, and molecular recognition. Cyclodextrins are cyclic oligosaccharides possessing a cavity used in our daily life as deodorants, excipients or in chiral stationary phases. In these applications, they are unfunctionalized or randomly functionalized. The concept of "artificial enzyme" has been proposed by Breslow using these cavitand molecules^[1] assimilating their cavity to the active site of an enzyme. However, a bottle-neck for their development was the lack of efficient functionalization. Over the years, we delineated several strategies to access poly-hetero-functionalized cyclodextrins.^[2] The ability to place a function anywhere on a complex cavitand allowed us to mimic proteins. Hence we could add reactive center to imitate metallo-enzymes.^[3] We also conferred the ability to self-assemble around DNA as capsid proteins^[4] and we designed a kinesin-like molecular motor^[5]...

Biography:

Matthieu Sollogoub is Professor of Molecular Chemistry at Sorbonne University where he conducts his research team on various aspects of organic, biological and supramolecular chemistry. He focuses mainly on cyclodextrin functionalization for catalysis, supramolecular assembly and molecular motors. He obtained his PhD at the Ecole Normale Supérieure (ENS) in Paris in 1999 with Prof. P. Sinaÿ. He carried out postdoctoral research at the University of Southampton with Prof. T. Brown and joined the faculty of ENS and Sorbonne in 2001. In 2011, he received the Carbohydrate Research Award for Creativity in Glycoscience, in 2020 he became Chemistry Europe Fellow.

References

- 1 - Breslow, R.; Overman, L. E. J. Am. Chem. Soc. 1970, 92, 1075-1077.
- 2 - Sollogoub, M. et al. Nature Commun. 2014, 5, 5354; Angew. Chem. Int. Ed. 2021, 60, 12090
- 3 - Sollogoub, M. et al. Chem 2017, 3, 174.
- 4 - Sollogoub, M. et al. Angew. Chem. Int. Ed. 2018, 57, 7753.
- 5 - Sollogoub, M. et al. Chem 2023, 9, 10.1016/j.chempr.2022.12.017.