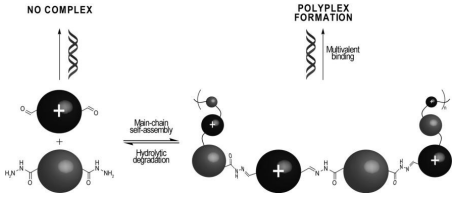
Séminaire externe

"Dynamic Expression of Multivalency in DNA Recognition."

Our research projects are directed toward the generation of bioactive self-assembled systems by rational design [1] and dynamic combinatorial approaches [2]. We are particularly interested in harnessing the power of multivalency, by using self-assembly processes, in order to achieve effective biomolecular recognition of nucleic acids. The use of self-assembly processes if of great current interest since it should enable access to responsive and adaptive bioactive systems. For instance, we recently showed that dynamic covalent chemistry can be successfully used for self-assembling functional monomers into hybrid dynamic covalent polymers that are i) degradable in a pH-dependent manner, and ii) capable of effectively complexing DNA through multivalent interactions, even in biological serum (Scheme 1) [3]. More recently, we expanded this approach to the self-assembly of peptide-based clusters for DNA recognition. Using chemoselective ligations [4], we demonstrated that cluster formation can be achieved *in situ* and leads to effective DNA complexation through multivalent interactions. The reversibility of the ligation was exploited to demonstrate that component exchange reactions take place and can be used to trigger DNA release [5]. The implementation of dynamic covalent chemistry is therefore a promising approach for generating, in a programmed fashion, self-synthesizing materials that 1) express bioactivity through multivalency, and 2) are adaptive and responsive [6].



Scheme 1. Generation of dynamic covalent polymers for the multivalent recognition of DNA.

References
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[5] E. Bartolami, Y. Bessin, V. Gervais, P. Dumy, S. Ulrich, *Angew. Chem. Int. Ed.*, **2015**, *54* (35), 10183-10187; E. Bartolami, Y. Bessin, N. Bettache, M. Gary-Bobo, M. Garcia, P. Dumy, S. Ulrich, *Org. Biomol. Chem.*, **2015**, *13*, 9427-9438
[6] For a recent review, see E. Bartolami, C. Bouillon, P. Dumy, S. Ulrich, *Chem. Commun.*, **2016**, *52*, 4257-4273

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Salle de conférence du CBM