CYCLE DE CONFÉRENCES DE CHIMIE

Avec le concours de : Université Clermont Auvergne
INP Clermont Auvergne

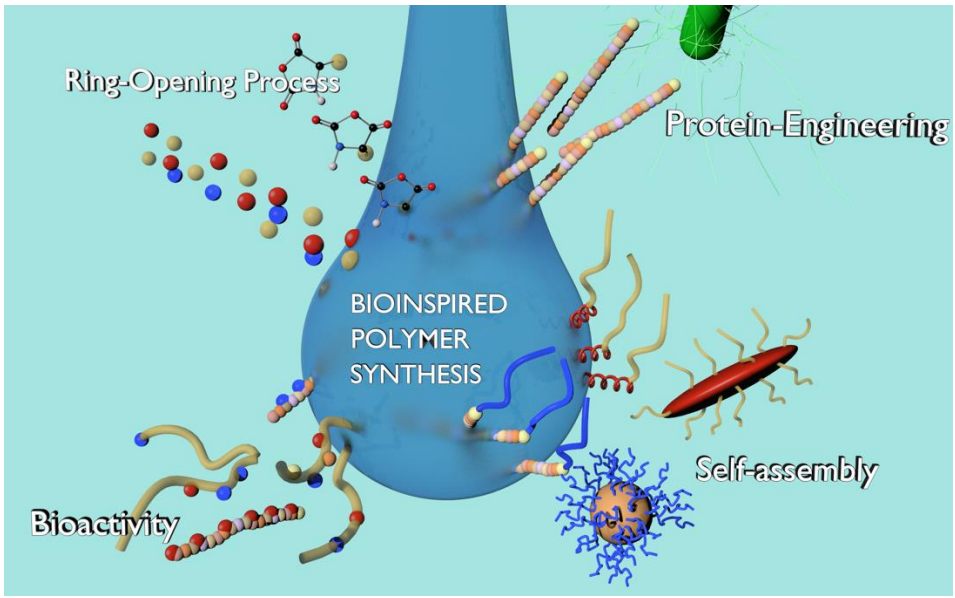
Jeudi 2 mai à 16 h

Amphi Rémi (site des Cézeaux)

Elisabeth GARANGER et Colin BONDUELLE

Laboratoire de Chimie des Polymères Organiques (LCPO), UMR 5629, Université de Bordeaux, Bordeaux INP, ENSMAC, Pessac

Polypeptides: from the post-modifications of elastin-like recombinamers to new approaches in polymer synthesis



Proteins are natural polymers that have many features still unrivaled by their synthetic counterparts, including chemical diversity, hierarchical structure, specific chemical modification, programmed system dynamics, etc. Combined with their possible metabolism in living systems (biodegradation, etc.), these properties make proteins very interesting for designing the polymers of tomorrow. While significant advances in genetic engineering have been achieved, major challenges still remain such as long and tedious molecular cloning steps and optimization of recombinant proteins' large-scale production and isolation. To somehow circumvent these limitations, we have developed a dual biotechnological and chemical approach consisting in producing recombinant polypeptides and applying orthogonal post-modification reactions at their chain ends or at the side chain of specific residues, so as to considerably enlarge the diversity of accessible macromolecular structures. In this direction, **this talk will first present examples of post-modified elastin-like polypeptide bioconjugates for biomedical applications**. Alternatively, the most economical and efficient route to polypeptides is a chemical methodology: the ring-opening polymerization (ROP) of amino acid *N*-carboxyanhydride (NCA) monomers. Compared to proteins,

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Coordinateurs : Alain DEQUIDT ☎ 33 473 407 194 courriel : alain.dequidt@uca.fr
Kévin LEMOINE ☎ 33 473 407 513 courriel : kevin.lemoine@uca.fr
Institut de Chimie de Clermont-Ferrand (ICCF-UMR 6296)
Université Clermont Auvergne, 24, avenue Blaise Pascal, TSA 80026 63178 AUBIERE cedex-France

peptidic polymers are much simpler macromolecules in which amino acids are statistically repeated. However, those polypeptides combine advantageous features of synthetic polymers (solubility, process, etc.) with those of natural proteins (secondary structure, functionality, etc.). In this context, **this talk will also illustrate how aqueous ROP of NCA is becoming an accessible tool to chemistry to afford relevant biomimetic scaffolds**.