

Synthetic polypeptides as simplified analogues of natural proteins



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Natural proteins are linear macromolecules constituted of amino acids that have the ability to fold into highly organized structures. These nanometric assemblies are crucial and they are at the origin of the essential functions of life. Synthetic polypeptides polymers are simplified proteins analogues that are made of blocks of amino acids.¹ They are perfect materials 1) to design protein mimics able to reproduce some properties of natural proteins, 2) to create innovative polymeric structures for materials science applications. In particular, polypeptide polymers can adopt natural protein secondary structures such as α -helix or β -sheets and this unique feature is, in polymer chemistry, at the origin of intriguing physico-chemical properties. In this context, the first part of the talk will deal with synthetic glycopolypeptides polymers, which are ideal polymeric analogues of natural glycoproteins for material science applications.² Then, the second part of the talk will present how coordination chemistry or DNA binding can be used to prepare smart polymeric systems with polypeptide polymers (figure 1).³

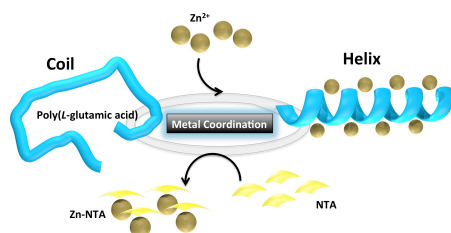


Figure 1. Smart metallopolypeptide polymers : metal coordination induces reversible helix-to-coil transition at neutral pH.

References

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- 3 C. Bonduelle, F. Makni, L. Severac, E. Piedra-Arroni, C. L. Serpentini, S. Lecommandoux and G. Pratviel, *RSC Advances*, 2016, 6, 84694-84697.