Séminaire LIONS

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Model functional self-assemblies: towards biologically active nanostructures

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Nowadays, there is a major interest in the design of bioactive polymeric materials. Some of the prominent examples are the developments of platforms for tissue engineering and the design of medical devices as well as carriers for drug or gene therapy. In this context, soft templates based on self-assembled nucleotide-based amphiphilic copolymers present a new class of very promising biologically active materials. Such potential bioactive self-assemblies have therefore been prepared by the polymer modification of a short nucleotide sequence with a hydrophobic polymer segment. Self-assembly into vesicular structures in dilute aqueous solution has been assessed by the functional incorporation of native proteins in the polymeric membrane. These self-assembled structures could further be immobilized on surfaces via base pairing between the nucleotide sequences composing the self-assembled copolymers and the surface-tethered complementary sequences. Using E.coli K12 wild and mutant strains, the influence of the modified surfaces on the dynamic of bacterial attachment as well as on the number and the motility of adherent bacteria has eventually been investigated through real-time observations via confocal laser scanning microscopy.
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