Minicolloque n° CPR3 ☒ **Oral** ☐ **Poster**

Biomimetic cyclodextrin nanotubes for Ion-channel Applications

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For several years, we observe the development of biomimetic channels for DNA sequencing such as carbon nanotubes, inserted into bilayers despite their hydrophobic properties or aerolysin nanopore for the discrimination of polymers, oligonucleotides, or peptides [1]. Recently, we discriminated polysulfides oligomer complexed with cyclodextrins at the single-sulfur atom level to design smart batteries [2]. Besides, biomimetic synthetic channels were developed to design new tools for DNA sequencing.

Based on our knowledge of modified cyclodextrin channels, we synthetized biomimetic cyclodextrin nanotubes while keeping a cylindrical confined geometry [3]. As the synthesis of these nanotubes is precisely controlled, we modify their diameter using α-, β- or γ-cyclodextrins, their lengths with a monodisperse distribution according to TEM imaging, and their functionalization to enhance their lifetime [4,5]. We show that the conductance of these sub-nanometer nanotubes is governed by the same ionic transport as in gramicidin channels. These synthetic channels are not cytotoxic, leading to biomedical applications.

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