Bilayers at the ILL

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A multi-technique approach for the characterization of the self-assembling of cyclic peptides into nanotubes at biological model membranes

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Bacterial resistance is presently a major public health concern, due to excessive and misuse of antibiotics. This has stressed the research on new antibiotics with new mechanisms of action [1]. Antimicrobial peptides are part of our innate immune system and represent a new antibiotic paradigm, as they aim the bacterial membrane, have been studied in the past decade [2]. Within this research effort, a new class of potential antimicrobial peptides has emerged [3] - Cyclic Peptides (CP) with an even number of alternating D and L-α-amino acids that assume a planar conformation and form the active species, Self-assembling Cyclic Peptide Nanotubes (SCPNs), when in contact with bacterial membranes. We used different biophysical experimental techniques (DSC, Fluorescence, solid state NMR, ATR-FTIR) together with an in-silico approach to characterize the interaction of these antimicrobial SCPNs with different model membranes, aiming ultimately at unveiling their possible mechanism of action.
Results from these techniques will be shown and compared, allowing us to characterize the formation and orientation of SCPNs at different membranes, and to discriminate the most important factors ruling these peptides/membrane interactions.

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