Characterization of liposomes formed by lipopolysaccharides and their interaction with hybrid antimicrobial peptides.

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Lipopolysaccharides (LPSs) are amphiphilic macromolecules indispensable for the growth and the survival of Gram-negative bacteria, one of the most diffuse classes of pathogenic bacteria. [1] LPS are composed of a hydrophilic heteropolysaccharide unit, covalently linked to a lipophilic moiety called lipid A, which is embedded in the outer leaflet and anchors these macromolecules to the lipid membrane. Recent studies have revealed that presumably the physical characteristics of these molecules are correlated to their biological activity.

Here we present an investigation with a twofold goal. First, we try to connect LPS aggregation behavior to their molecular structure. Second, we attempt to investigate on a possible interaction mechanism between LPS model membranes and hybrid antimicrobial peptides used in the cystic fibrosis therapy treatment.

All the investigations have been performed using an experimental strategy which has been proved to be extremely informative, [2,3] combining dynamic light scattering (DLS) to estimate liposome dimension, small angle neutron scattering (SANS) to analyze the aggregate morphology and for estimating the thickness of the lipid bilayer and electron paramagnetic resonance spectroscopy (EPR) to investigate the dynamics of the lipids in the bilayer. These techniques have also been useful to give insights on the effect of antimicrobial peptides on the lipid bilayer. [4]

References

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