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# A physicochemical study on the role of LPS and CPS on the Lung Surfactant properties

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The last pandemic highlighted the importance of understanding the interaction between external sources and eukaryotic membranes. Membrane models have been widely studied, but our knowledge of the interaction between them and external sources is far from fully understood. This gap limits the ability to achieve the next level of selectivity, efficiency, and targeting. Target of respiratory diseases is lung's alveoli, composed of a complex of lipids and proteins known as lung surfactants. The lipid component that makes up this membrane is crucial in the interaction with external sources such as Gram(-) bacteria, which are responsible for many physiological and pathogenic processes and are involved in biofilm formation due to the presence of lipopolysaccharide (LPS), and capsular polysaccharide (CPS). We examined how the lipids affect the physicochemical properties of the system itself. Cholesterol lowers the lung surfactant layer transition temperature, making the membrane less rigid. Although only the precise lipid composition makes the lung surfactant stable at physiological temperature and able to withstand mechanical stresses. The adhesiveness of LPS to synthetic surfaces is essentially attributable to the structure of the polysaccharide and the charge distribution on the chain. While the affinity of CPS seems to be mediated by the presence of LPS. Also the affinity of CPS with natural membranes has been demonstrated this could be the precursor process of biofilm formation

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