Title:	Toxin-Induced Ordering Transitions of Liquid Crystals at Biomolecular Interfaces.
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Abstract:	Confinement of liquid crystals (LCs) within constrained geometries immersed in an aqueous medium holds potential as responsive interfaces for biomolecular recognition. One captivating feature of liquid crystalline interfaces lies in the ability of LC molecules to amplify biomolecular events into readily measurable optical signals. This discourse will explore the applicability of thermotropic nematic LC in investigating the remodelling of lipids induced by various toxins at their interfaces. The significance of this study becomes apparent in light of the enduring challenges we face during the ongoing pandemic. Each of the four instances presented will spotlight a distinct fundamental challenge and elucidate how the interfacial properties of LC can be harnessed to address it. The first study underscores the capacity of LC- aqueous interfaces to extract crucial information regarding lipid-protein crosstalk, specifically in the context of the interactions between the β-barrel pore-forming toxin, Vibrio Cholerae Cytolysin (VCC), and cholesterol within membranes. The research demonstrates that the cholesterol-mediated activity of the toxin can be amplified at concentrations relevant to physiological conditions through LC biomimetic interfaces. The second illustration underscores the significance of two specific amino acids in the largest pore-forming toxin produced by Listeria monocytogenes, namely Listeriolysin O (LLO), using the LC-aqueous platform. The third example portrays the ability of LC-aqueous interfaces to investigate the forces implicated in the misfolding of cellular prion proteins, which serve as the underlying cause of fatal neurodegenerative diseases. The fourth study revealed the responsive nature of LC-aqueous interfaces to spatiotemporal evolution in the lipidome of mycobacterium. The study also sheds light on the mycobacterium lipid remodelling in the presence of antimicrobial peptides and their mode of action. These studies collectively highlight that the development of LC-based biosensors opens a new therapeutic avenue in the realm of point-of-care diagnostics.
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