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| Title: | Liquid crystal biosensors: New approaches |
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| Abstract: | This review describes recent advances in the area of research involving the interfacial design of liquid crystal (LC) based biosensors. The first advance revolves around the design and modulation of LC based interfaces for developing LC based stimuli responsive materials. For example, designing nanostructured thin films of LC-based colloidal gels exhibit the sensitivity and specificity with the added benefits of mechanical robustness and processability and can be used to report adsorption of biological and synthetic amphiphiles at aqueous-LC interfaces. In addition, a new pathway for the easy formation of spontaneous uniform LC droplets has been reported that provides a high spatial resolution of micrometers with a very high sensitivity. A second development has focused on the investigations of the ordering of LCs at aqueous interfaces for qualitative and quantitative understanding of important biomolecular interactions for bedside diagnostics and laboratory applications. These important biomolecular interactions include: (i) protein endotoxin interactions as these lead to divergent effects on lipopolysaccharide (LPS)-induced responses, (ii) pH induced conformation change of cardiolipin (CL) which is known to affect a range of cellular processes and (iii) endotoxin interactions with bacterial cell wall components.Thirdly this study involves design of LC based sensors that hold promise to act as a marker for cells and cell based interactions. Overall, this review illustrates new approaches for developing LC based stimuli responsive materials that are anticipated with fundamental understanding of biomolecular interactions and provide a gateway for further advances involving LCs. |
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