Title:	Insights into the Formation of a Functional Amyloid from Biofilm Forming Intrinsically Disordered Curli Subunits
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Abstract:	Amyloid deposition is associated with neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease as well as with non-neuropathic systemic and localized amyloidosis. Interaction of transient intermediates on the cellular membrane can perturb membrane integrity, which results in cellular dysfunction and cell death. An emerging body of evidence suggests that the amyloid structure is employed for performing physiological functions and these special amyloids are termed as functional amyloids. Functional amyloids have evolved to regulate the spatiotemporal assembly of amyloid. Curli is a functional amyloid formed in the extracellular matrix of enteric bacteria like E.coli and Salmonella species. The function of curli includes biofilm formation, cell-cell adhesion, and host invasion. Disease-associated amyloids are generally formed due to uncontrolled conversion of soluble form a protein into its insoluble form. However, highly orchestrated machinery is associated with curli biogenesis. CsgA forms the major structural component of curli and CsgB is the nucleator protein. CsgA and CsgB are secreted out to the outer-surface of bacteria as intrinsically disordered proteins (IDPs) and on the membrane, CsgB gets tethered and nucleates the aggregation of CsgA. Interestingly, curli formation occurs on the bacterial membrane without compromising membrane integrity. Using a diverse range of biochemical and biophysical tools including circular dichroism, fluorescence, Raman spectroscopy, and atomic force microscopy imaging, we have characterized the role of the membrane in curli biogenesis. Additionally, curli expressing E.coli is known to interact with many human proteins, which can trigger the proinflammatory and procoagulatory cascades. Fibrinogen is an important substrate in the blood coagulation cascade and binding of curliated bacteria to fibrinogen results in prolonged clot formation. I will also discuss the molecular basis of interaction of major subunit of curli with fibrinogen.
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