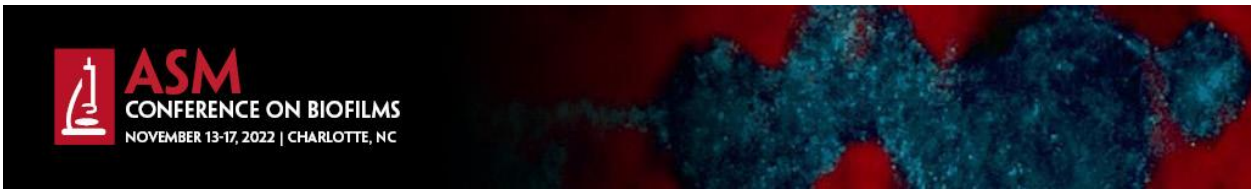

Balancing Biopolymers: Decoding *E. Coli* Biofilm Matrix Composition and Function

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The bacterial cell wall is essential to cell survival and is a major target of antibiotics. Beyond the cell surface, bacteria assemble remarkable architectures to enmesh cells and form biofilm communities implicated in serious and difficult-to-treat infections. We have introduced new antibacterial compounds to target difficult-to-treat antibiotic-resistant and biofilm-associated infections. We also have developed a unique approach using whole-cell and macromolecular solid-state NMR in order to reveal how the biological functions of cell walls and biofilms depend on their chemical composition and architecture. Cellulose is the most abundant biopolymer on Earth and solid-state NMR was uniquely enabling in our discovery of a chemically modified cellulose produced by *E. coli* – phosphoethanolamine cellulose. We further uncovered the genetic and molecular basis for installation of the modification. *E. coli* and other Gram-negative bacteria integrate phosphoethanolamine cellulose and curli amyloid fibers to assemble remarkable community architectures I will present our recent results in defining functional roles for the cellulose modification in bacteria and how the production of these components vary among organisms. Additionally, we have identified selective small molecule probes and inhibitors of these bacterial biofilm matrix components. I will discuss how we have leveraged them in a chemical genetics approach to identify potentially new bacterial polysaccharides.