Nutrient-dependent role of the outer membrane porin OprF in *Pseudomonas aeruginosa* biofilm formation

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Bacterial biofilms contaminate essential life support systems on NASA space vessels, threatening the health of astronauts and future commercial passengers. Biofilms are surface-attached communities of bacteria encased in a self-produced extracellular matrix. Eliminating biofilm bacteria is difficult as living in biofilms affords the resident bacteria increased tolerance to various stressors (e.g., ultraviolet radiation, desiccation, antibacterial compounds, evasion of host immune defenses). While our understanding of how bacteria construct biofilms is expanding, what remains unclear are the precise conditions and components that underlie bacterial biofilm construction. Multiple proteomic analyses of the biofilms of the opportunistic pathogen *Pseudomonas aeruginosa* have identified the porin OprF as an abundant matrix protein. Much has been published on the cell-associated functions of OprF, including its role in virulence. However, little is known about its roles in the extracellular biofilm matrix. Here we examined the functions of OprF in biofilm formation. We observed nutrient-dependent effects on biofilm formation of an OprF mutant strain ("Δ*oprF*"). In the presence of glucose or reduced-sodium chloride concentrations, Δ*oprF* forms significantly less biofilm than the wild-type strain. Interestingly, these effects do not begin until late static biofilm formation, between 16-24 hours. We are currently investigating the underlying cell-associated mechanisms driving these condition-dependent effects. We are testing the hypothesis that the alternate Δ*oprF* biofilm phenotypes result from a differential stress response when grown in different nutrient conditions. Furthermore, we hypothesize that the matrix-associated effects of OprF are related to its role in outer membrane vesicles, which are a component of the biofilm matrix. Overall, we anticipate these studies will help differentiate between the biofilm functions of cell-associated versus matrix-associated OprF, which may provide novel targets for biofilm eradication in space.