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Evolution to increase the matrix composition of clinical biofilm infections makes them stiffer, consistent with a mechanical fitness benefit MEGAN DAVIS-FIELDS, KRISTIN KOVACH, VERNITA GORDON, University of Texas at Austin — *Pseudomonas aeruginosa* is an opportunistic, bacterial pathogen that forms biofilms in long-term infections. Biofilms are aggregates of bacteria in a matrix composed of extracellular polymeric substance (EPS). Biofilm *P. aeruginosa* infections in the lungs of cystic fibrosis patients can persist for decades, ample time for the infecting microbes to evolve. Evolutionary pressures include clearance by antibiotics and the immune system; being within a biofilm makes the bacteria more resistant to both of these. To date, most research has focused on chemical benefits conferred on the biofilm by the EPS matrix. Other researchers have recently found that long-term lung infections of *P. aeruginosa* increase production of Psl, one type of EPS polysaccharide. Increasing Psl must therefore confer some benefit to *P. aeruginosa* in the lung. We do bulk rheological measurements of biofilms grown from chronological clinical isolates from cystic fibrosis patients and find that strains that have evolved higher production of Psl have increased storage modulus – *i.e.*, they are stiffer. From others' estimates of the stresses that phagocytotic cells can apply, we estimate that the stiffening we measure could provide a mechanical benefit to biofilms, helping them avoid immunological clearance.

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