

Abstract Submitted
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Shear-enhanced adhesion of *Pseudomonas aeruginosa* SIGOLENE LECUYER, ROBERTO RUSCONI, Harvard University SEAS, YI SHEN, ALISON FORSYTH, HOWARD STONE, Princeton University MAE — Bacterial adhesion is the first step in the development of surface-associated communities known as biofilms, which are the cause of many problems in medical devices and industrial water systems. However the underlying mechanisms of initial bacterial attachment are not fully understood. We have investigated the effects of hydrodynamics on the probability of adsorption and detachment of *Pseudomonas aeruginosa* strain PA14 on model surfaces under flow, in straight microfluidic channels, and measured the distribution of bacteria residence time as a function of the shear rate. Our main discovery is a counter-intuitive enhanced adhesion as the shear stress is increased over a wide range of shear rates. In order to identify the origin of this phenomenon, we have performed experiments with several mutant strains. Our results show that shear-enhanced adhesion is not regulated by primary surface organelles, and that this process is not specific to a certain type of surface, but rather appears a general feature of the adhesive behavior of *P. aeruginosa*. These results suggest that shear-induced adhesion could be a very widespread strategy in nature.

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