

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Characterization of mechanical properties of Type IV pili (Tfp) using atomic force microscopy** SHUN LU, University of Guelph, HANJEONG HARVEY, LORI BURROWS, McMaster University, JOHN DUTCHER, University of Guelph — Type IV pili (Tfp) are thin flexible protein filaments that extend from the cell envelope of Gram- negative bacteria. The mechanical properties of Tfp are important since they allow bacteria to establish contact with various surfaces, as a first step in the formation of biofilms. We have used atomic force microscopy (AFM) for both imaging and pulling on Tfp filaments from hyper-piliated mutants of *P. aeruginosa* PAO1 that cannot retract their pili. Bacterial cells were adhered to AFM probes using poly-L-lysine. Force-extension curves were obtained for single pili and were fitted using the worm-like-chain (WLC) model. The statistical distributions obtained for pili contour length and persistence length were used to evaluate the mechanical properties of a single pilus and the biogenesis functions of different proteins (pilA, pilT) involved in its assembly and disassembly. The difference in rupture force between Tfp and different surfaces (mica, gold) was also measured. Our results shed new light on the role of mechanical forces that mediate bacteria-surface interactions and biofilm formation.

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Date submitted: 19 Nov 2009

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