Abstract Submitted
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Flexibility of bacterial type IV pili determined using atomic force microscopy JOSH MOGYOROS, SHUN LU, University of Guelph, HANJEONG HARVEY, LORI BURROWS, McMaster University, ROBERT WICKHAM, JOHN DUTCHER, University of Guelph — Type IV pili (T4P) are very thin protein filaments extended and retracted from the surface of certain Gram-negative bacteria. Pili play a major role in processes such as adhesion, twitching motility and biofilm formation. We used atomic force microscopy (AFM) to perform force spectroscopy measurements on T4P of *P. aeruginosa*. Bacteria were adhered to the end of an AFM cantilever that was brought into contact with a substrate, allowing the pili to adhere. Force-separation curves were collected by retracting the cantilever, corresponding to the stretching of the T4P that was well described by the worm-like chain (WLC) model. Distinct peaks were observed in the distributions of the best-fit values of the persistence length L_p on two different surfaces, providing strong evidence for close-packed bundling of very flexible T4P [1]. Surprisingly, the most prominent value of $L_p \sim 1$ nm is significantly less than the ~ 8 nm length of the PilA subunit. We have investigated this intriguing result by refining our protocol to combine AFM with fluorescence microscopy to isolate a single bacterium on a colloidal probe, as well as critically examining the applicability of the WLC model. [1] S. Lu et al., Biophys. J. **108**, 2865 (2015).

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