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Atomic Force Microscopy Study of Changes to the Mechanical Properties of *Pseudomonas aeruginosa* Cells Induced By Antimicrobial Peptides SHUN LU, JOHN DUTCHER, University of Guelph — The cell envelope of Gram-negative bacteria plays a key role in the maintenance of cell shape and the selective transfer of small molecules in and out of the cell. Both the inner and outer membranes of the cell envelope can be major targets for antimicrobial peptides, which can ultimately compromise the mechanical integrity of the cell. We have applied a new, AFM-based creep deformation technique (1) to study changes to the mechanical properties of individual *Pseudomonas aeruginosa* cells as a function of time of exposure to polymyxin B (PMB), a well-known cyclic antimicrobial peptide. The results can be understood in terms of simple viscoelastic models of arrangements of springs and dashpots. These measurements provide a direct measure of the mechanical integrity of the bacterial cell, and time-resolved creep deformation experiments reveal that the time of action for PMB is very fast (of the order of a minute). This measurement provides new insight into the mechanism of action of antimicrobial peptides. (1) V. Vadillo-Rodriguez, T. J. Beveridge, and J. R. Dutcher, *J. Bacteriol.* **190**, 4225-4232 (2008).

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