

Abstract Submitted
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Changes in the Mechanical Properties of *Pseudomonas aeruginosa* Bacterial Cells Induced by Antimicrobial Peptides SHUN LU, JOHN DUTCHER, University of Guelph — In our research group, we have developed an atomic force microscopy nano-creep technique [1] to study the mechanical properties of individual *Pseudomonas aeruginosa* bacterial cells in a liquid environment. In the present study, we have used this technique to measure changes to the mechanical properties of the cells produced by exposing the cells to well-studied antimicrobial peptides: polymyxin B (PMB) and its derivative polymyxin B nonapeptide (PMBN). We find that the creep response of cells under a fixed applied load is very different after exposure of the cells to PMB and PMBN, which is possibly due to the disruption of its outer membrane. To describe the viscoelastic properties of the cells exposed to PMB and PMBN, we found that it was necessary to use a four element spring and dashpot model, instead of the three element standard linear solid model that describes the viscoelastic properties of cells in Millipore water [1]. We also found that PMB and PMBN have qualitatively different effects on the stiffness of the cell membrane. These measurements provide a first step towards understanding the different mechanisms of action of PMB and PMBN on bacterial cells.

[1] V. Vadillo-Rodriguez, T. J. Beveridge, and J. R. Dutcher, *J. Bacteriol.*, 190, 4225-4232, 2008.

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