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Viability of adhered bacterial cells: tracking MinD protein oscillations MATT BARRETT, University of Guelph, KEEGAN COLVILLE, Dalhousie University, CHRIS SCHULTZ-NIELSEN, University of Guelph, MANFRED JERICHO, Dalhousie University, JOHN DUTCHER, University of Guelph — To study bacterial cells using atomic force microscopy, it is necessary to immobilize the cells on a substrate. Because bacterial cells and common substrates such as glass and mica have a net negative charge, positively charged polymers such as poly-L-lysine (PLL) and polyethyleneimine (PEI) are commonly used as adhesion layers. However, the use of adhesion polymers could stress the cell and even render it inviable. Viable *E. coli* cells use oscillations of Min proteins along the axis of the rod-shaped cells to ensure accurate cell division. By tagging MinD proteins with GFP, oscillations can be observed using fluorescence microscopy. For a healthy cell in an ideal environment, the oscillation period is measured to be $\sim$40 s. Prior experiments have shown that PLL increases the oscillation period significantly (up to 80%). In the present study, we have used epifluorescence and total internal reflection fluorescence (TIRF) to track MinD protein oscillations in *E. coli* bacteria adhered to a variety of positively charged polymers on mica as a function of polymer surface coverage.

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