Immobilization and Imaging of Bacterial Cells

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Immobilization of particulates, especially biomolecules and cells, onto surfaces is critical for imaging with the atomic force microscope (AFM). We have discovered that gelatin coated mica or glass provide a stable surface for the immobilization and imaging of both gram positive, *Staphylococcus aureus,* and gram negative bacteria, *Escherichia coli,* in both air and liquid environments. Further, we find that gelatin coated surfaces are far superior to poly-L-lysine coated surfaces commonly used for the immobilization of cells. We are applying this cell immobilization technique for live cell imaging of *Rhodopseudomonas palustris.* The genome of *R. palustris* has been sequenced and the organism is the target of intensive studies aimed at understanding genome function due to its metabolic diversity. In this study, we present images of *R. palustris* grown both aerobically and anaerobically in liquid media. Images in liquid media show the bacteria to be rod shaped and smooth while images in air show a marked irregularity and folding of the surface. Significant differences in the vertical dimension are also apparent with the height of the bacteria in liquid being substantially greater than images taken in air. In air the bacterial flagella are clearly seen while in liquid this structure is not visible.

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