

Lab 8: Atomic force microscopy imaging of cells

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Summary

In this laboratory, you will use the atomic force microscope to image the structure and stiffness of living and chemically fixed human microvascular endothelial cells. The pN- to nN-scale mechanical force used to create these images allows you to observe both the micrometer-scale height of these cells, as well as the nanometer-scale cytoskeletal network beneath the cell surface. Because the cells are living and imaged under near in vitro conditions, it is possible to observe cell processes in real time, including migration, response to drugs added to the imaging media, and of course apoptosis. It is also possible to compare the near-surface structure of living and diseased cells. If time allows, you will also observe the near-field optical / fluorescent image of these cell surfaces.

Recommended Reading

D. Pesen and J. H. Hoh, "Micromechanical Architecture of the Endothelial Cell Cortex," *Biophys. J.* **88**.

N. Almqvist *et al.*, "Elasticity and Adhesion Force Mapping Reveals Real-Time Clustering of Growth Factor Receptors and Associated Changes in Local Cellular Rheological Properties," *Biophys. J.* **86**.

