

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

AFM method to study mechanics of biological cells with real brushy surface. IGOR SOKOLOV, SWAMINATHAN IYER¹, RAVI GAIKWAD, VENKATESH SUBBA-RAO², CRAIG WOODWORTH, Clarkson University — AFM is particularly useful for studying biological systems because it can be used on viable cells directly in physiological media. Most of the time, the deformation curves measured with AFM on cells have typical “two layer” behavior. As we see from confocal fluorescent images of cells, the cell surface is not flat and covered by a brush-like structure. Here we describe a simple two-layer model to decouple the force response of these two “layers”, the cell body and brush. In contrast with the existent biological methods, AFM is a highly sensitive technique that can provide precise quantitative data on both lengths and grafting densities of the brush while measured directly on viable cells. Moreover, it allows one to decouple true cell rigidity from the contribution of the brush layer. This novel method can be applied to virtually any kind of cells. Ignoring this layer may result in incorrect values of cell rigidity derived from the AFM measurements. We demonstrate the developed method on the example of cancerous and normal human cervical cells.

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Date submitted: 23 Nov 2007

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