

## **ERYTHROCYTE DEFORMATION IN ATOMIC FORCE MICROSCOPY**

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Due to their shape and great flexibility, erythrocytes have proven impossible to image by atomic force microscopy on planar substrates without chemical fixation. We present a simple procedure of spreading erythrocytes on a poly-aminoacid layer to an average contact area of  $60 \mu\text{m}^2$ , as shown most precisely by reflective interference microscopy. This spreading not only immobilizes the cells but also tenses the upper membrane and generates a spherical cap, facilitating afm imaging. Images were obtained in tapping mode at low scan rates avoiding damage and proving highly reproducible. On both red cells and ghost cells, indentation was deep enough to reach the steric core of the two membranes (upper and lower) and was measured to be  $42 \pm 15 \text{ nm}$  (126 cells). Comparing this data with low force contact mode images of glutaraldehyde fixed and spread erythrocytes, the fixed cells showed the undeformed spherical shape of the upper membrane allowing measurements of volume and quantitative insights into the interference patterns. Detailed images of the membrane glutaraldehyde-fixed and unfixed further provide estimates of interfacial roughness. Imaging of the unfixed erythrocyte membrane showed a significant attachment of membrane components to the afm tip for low scan rates, indicative of the semi attractive stick-slip character of the glycocalyx.