Application of AFM in biology

M. Lekka

The Henryk Niewodniczański Institute of Nuclear Physics, Polish Academy of Sciences
Radzikowskiego 152, 31-342 Kraków, Poland

During past decades, atomic force microscopy has been widely used in studies of structure and functions of variety of biological systems due to its ability to measure in liquid environment, providing natural conditions for biological samples. Much effort has been made in order to obtain high–resolution images of DNA and the topography of surfaces of both living and fixed cells. Beyond the imaging of the surface topography, high sensitivity of the interaction force measurements and their local character have led AFM to other applications related to the sample mechanical properties, mainly to determination of the cell stiffness or of the interaction forces between single pair of molecules. Cell stiffness can be attributed to the state of cytoskeleton structure of living cells [1]. Its value can be a significant indicator of changes induced by distinct stimuli, both internal and external ones. The ability to measure the force acting within the contact area of the AFM tip and the cell surface with the resolution of tens of picoNewtons enables studies of interaction forces on a single molecule level [2].

With such wide range of capabilities, AFM can be a versatile tool for variety of biological applications, since changes in cell mechanical properties are related to the cell state (normal or abnormal).

---

[1] M. Lekka, A.J. Kulik, "Quantitative nanomechanical measurements in biology" in "*Applied Scanning Probe Methods II*", eds. B. Bhushan, H. Fuchs, Springer, New York, 205, 2006.
[2] P. Laidler, J. Dulińska, M. Lekka, J. Lekki, Arch. Biochem. Biophys. **435(1)** (2005) 1.

Name of the presenting author (oral): Małgorzata Lekka
e-mail address: Malgorzata.Lekka@ifj.edu.pl
url's: http://chall.ifj.edu.pl/~dept2/nz2s/mjl/mlekka/spm.htm