Summary

The mechanical properties of live cells are apparently correlated with their functionality in states of health as much as in states of disease. The aim of the present labor was to study the mechanical characteristics of live cells with the use of atomic force microscope (AFM). For this purpose, cell cultures of murine renal podocytes (E11 podocyte line, CELL LINES SERVICE, Heidelbergh, Germany; Immorto-Mouse H-2k^{b}-tsA58 strain) as well as human HeLa cells (cell line CCL-2, ATCC, USA), were performed according to the guidelines of the supplier. AFM measurements were performed in contact mode with the use of SMENA SOLVER SPM (NT-MDT) and silicon nitride probes with a cone-shaped tip, spring constant 0,01 N/m, tip radius 6nm and opening corner 18^{o}. All measurements were made in room temperature, in liquid (medium or PBS) within the fluid cell of the apparatus. After topographic imaging of the cells, we performed indentation of the samples in multiple sites (10x10 array), which yielded the z-position-deflection curves. With the use of Hertz model, we obtained the corresponding indentation force-depth and pointwise elastic modulus-indentation depth curves. Regional differences within the cells in force and elastic modulus probably reflect the contribution of the various structures of the cell (eg nucleus, cytoskeleton) in its mechanical behaviour. Further studies with the use of AFM combined with inverted fluorescent/confocal microscope are warranted, in order to standardize and validate these measurements and correlate them with cell functionality.