Photodynamic effect on cytomechanical and morphological properties of HeLa cell lines

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High resolution imaging of biological structures and their changes induced by different agents such as drugs and toxins is commonly performed by fluorescence and electron microscopy (EM). Recently, AFM has been shown to be a suitable tool for imaging biological structures and their modifications [1]. In addition to accurate morphological and cytomechanical information atomic force microscopy (AFM) provides a unique opportunity to study of living individual cells at the nanometer scale. Although high-resolution imaging is possible with EM, the requirements for fixation and staining of samples for image contrast severely limits the study of living organisms. AFM would be an attractive technique for studying these organisms because they could be maintained and imaged in biocompatible conditions. Moreover, AFM is capable of simultaneous nanometer spatial resolution and piconewton force detection allowing for detailed studies of cell surface morphology and monitoring of cell-tip interaction [2]. We present a method that images and mechanically characterized whole cells are studied by atomic force microscopy. We used a HeLa cell line (cervix carcinoma cell), which is sensitive to photodynamic therapy (PDT), DMEM growth media as a scanning surrounding, atomic force microscopy NT-MDT Aura for cytomechanical measurement, and scanning electron microscopy Hitachi Su 6600 for control images of the cells. In summary, elastic properties of intact cell can indicate mechanical characteristics of cells. On the other hand, cell elasticity changes can offer the degree or value of cells damage for example after PDT.

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Reference

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