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Difference in cellular mechanics of cancer and normal cervical cells as seen with the AFM IGOR SOKOLOV, SWAMINATHAN IYER, VENKATESH SUBBA-RAO, CRAIG WOODWORTH, Clarkson University —
Oncogenically transformed cells differ from their normal counter parts in many aspects, including organization and the amount of cytoskeleton. Consequently it is natural to expect to see the difference in cellular mechanics. Here we will present the study of such differences by using atomic force microscopy (AFM) *in-vitro*. So far the present research is the first study of mechanics of cervical cells, and the third comparative study of differences between mechanics of cancer and normal cells down with the help of AFM. Using a micron size silica ball as the AFM probe, we presumably do not overstress the cell surface as it can be in the case of the sharp AFM tip, and consequently, we may use the classical Hertz model. In contrast to the reported previously studies (bladder and fibroblast cells), we found that oncogenically transformed cervical cells are more rigid than the normal cells. The reason for such difference will be discussed. To demonstrate the complexity of the problem, we study cell mechanics in detail. The Young's modulus of rigidity clearly shows two separate regions of rigidity depending on the depth of the probe penetration. There may be two alternative explanations of the difference in rigidity of this top layer: it is either the cell membrane layer or detected long-range (presumably steric) forces due to the molecular "brush" of glycocalyx molecules. Experiments and modal calculations will be presented to choose between these two possibilities.

Igor Sokolov
Clarkson University

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