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On physical changes on surface of human cervical epithelial cells during cancer transformations IGOR SOKOLOV, MAXIM DOKUKIN, Tufts University, NATALIYA GUZ, CRAIG WOODWORTH, Clarkson University — Physical changes of the cell surface of cells during transformation from normal to cancerous state are rather poorly studied. Here we describe our recent studies of such changes done on human cervical epithelial cells during their transformation from normal through infected with human papillomavirus type-16 (HPV-16), immortalized (precancerous), to cancerous cells. The changes were studied with the help of atomic force microscopy (AFM) and through the measurement of physical adhesion of fluorescent silica beads to the cell surface. Based on the adhesion experiments, we clearly see the difference in nonspecific adhesion which occurs at the stage of immortalization of cells, precancerous cells. The analysis done with the help of AFM shows that the difference observed comes presumably from the alteration of the cellular “brush,” a layer that surrounds cells and which consists of mostly microvilli, microridges, and glycocalyx. Further AFM analysis reveals the emergence of fractal scaling behavior on the surface of cells when normal cells turn into cancerous. The possible causes and potential significance of these observations will be discussed.

Igor Sokolov
Tufts University

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