Cell stiffness is a biomarker of the metastatic potential of ovarian cancer cells WENWEI XU, ROMAN MEZENCEV, BYUNGKYU KIM, LIJUAN WANG, JOHN MCDONALD, TODD SULCHEK, Georgia Institute of Technology, SULCHEK TEAM, MCDONALD TEAM — The metastatic potential of cells is an important parameter in the design of optimal strategies for the personalized treatment of cancer. Using atomic force microscopy (AFM), we show that ovarian cancer cells are generally softer and display lower intrinsic variability in cell stiffness than non-malignant ovarian epithelial cells. A detailed study of highly invasive ovarian cancer cells (HEY A8) and their less invasive parental cells (HEY), demonstrates that deformability can serve as an accurate biomarker of metastatic potential. Comparative gene expression profiling indicate that the reduced stiffness of highly metastatic HEY A8 cells is associated with actin cytoskeleton remodeling, microscopic examination of actin fiber structure in these cell lines is consistent with this prediction. Our results indicate that cell stiffness not only distinguishes ovarian cancer cells from non-malignant cells, but may also be a useful biomarker to evaluate the relative metastatic potential of ovarian and perhaps other types of cancer cells.

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