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AFM-based nano-mechanical clues for cancer metastasis LYNDON BASTATAS, Department of Physics, Texas Tech University, RAUL MARTINEZ-ZAGUILAN, Departments of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, SOYEUN PARK[1], Department of Physics, Texas Tech University — We have evaluated if the nano-biomechanical properties of cells with distinct metastatic potential could provide a reliable indicator of cancer progression using lowly (LNCaP) and highly (CL1) metastatic prostate cancer cells. From the AFM force-distance curves, we determined the cellular elastic moduli and adhesiveness in the local nano-domain of cells by applying the standard Hertz model and the advanced models. Using the AFM force spectroscopy, the two dimensional topographic, elastic, adhesive maps of an individual cell were successfully delineated. We found that the elastic moduli in CL1 are higher than in LNCaP. These results are paradoxical since greater cell deformability -hence low elastic moduli- is needed for highly metastatic cells to intra/extra-vasate for metastasis to ensue. However, our result also showed that CL1 strongly adheres on the substrate while the LNCaP poorly adheres. We postulate that the tensional force originated from the enhanced adhesion generates higher cortical tension, elicit dynamic intracellular calcium transit, and lead to the highly metastatic behavior.

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