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Cellular nanomechanics, a new drug sensitivity marker for ovarian cancer

Shivani Sharma
University of California, USA

Abstract

Ovarian cancer (OC) is a chemotherapy-sensitive disease. However, the presence of primary platinum resistance disease in 15% of all patients, and the development of platinum-resistance in recurrent OC is one of the major obstacles in the treatment of OC. Currently, there are no biomarkers to predict the response of cancer to common platinum based chemotherapy drugs such as cisplatin. Cell stiffness (Young's modulus), as determined by nano-mechanical measurements using Atomic Force Microscopy (AFM) is a newly recognized cellular phenotype characteristic associated with cancer cells. We show distinct nanomechanical profiles in human OC cells measured using AFM. Cisplatin resistant OC cells display a greater cell stiffness compared to the cisplatin sensitive cell. Furthermore, Stimulated Emission Depletion (STED) super resolution confocal microscopy shows that cisplatin resistant OC cells possess more robust and organized actin cytoskeleton organization compared to cisplatin sensitive cells. In this talk, I will discuss AFM based cellular nanomechanics aimed towards developing a new personalized, nanomechanical biomarker to predict the chemosensitivity of OC.

Biography

Dr Shivani Sharma is a Project Scientist at the California Nanosystems Institute at *University of California, Los Angeles, CA.* Her research focuses on biological and medical applications of Scanning Probe Microscopy including cellular mechanics for cancer diagnostics, actin structural remodeling induced by actin binding proteins and nanoscale characterization of exosomes. She also serves as Regional Editor (USA) for International Journal of Bioassays and Editorial Board member for Exosomics and Journal of Analytical Oncology.