Abstract Submitted
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Measurement of DDR-Collagen interaction Forces with Atomic force Microscopy ANWESHA SARKAR, Department of Physics & Astronomy, Wayne State University, RAFAEL FRIDMAN, ANJUM SOHAIL, Department of Pathology, Wayne State University, PETER HOFFMANN, Department of Physics & Astronomy, Wayne State University, DEPARTMENT OF PATHOLOGY, WAYNE STATE UNIVERSITY AND KARMANOS CANCER INSTITUTE COLLABORATION — Discoidin Domain Receptors (DDR) are membrane proteins of the tyrosine kinase receptor family. The binding of collagen to the extracellular domain of DDR stimulates activation of the tyrosine kinase inside the cell. Two types of DDR, DDR1 and DDR2, have been related to human cancers because of the discovery of alterations of DDR genes in several human cancers. However, not much is known about DDR behavior at the cell-collagen interface. We are combining biological information and force based microscopy to shed light on how DDRs function in physiological and pathological conditions. We have measured the kinetics, bond lengths and activation energy of DDR-collagen interactions at the single molecular level on live cells, including cells that are deficient in DDR and cells that overexpress DDR, as well as cancer cells. We have developed methods to take multiple attachments into account and obtain clean data. Interactions measured on live cells were compared to measurements between extracted extracellular domains of DDR and collagen plated on a substrate to determine how these interactions are altered by the microenvironment of the cell. The distribution of DDR receptors on live cells was determined by using a combination of fluorescence imaging and AFM-based adhesion mapping.

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