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Cellular mechanics on the nano-patterned scaffolds SOYEUN PARK, JUSTIN MCANALLY, Texas Tech University — It is expected that modulation in adhesion of cells such as endothelial cells and fibroblasts lead to the changes in cells' viscoelstic properties as well as cell motility through the mechanical signaling mediated by the cellular acto-myosin machinery. The studies on the roles of mechanical parameters, such as stress from spreading restrictions and substrate elasticity, on the mechanical properties have been challenged due to the technical difficulties both in controlling the mechanical properties of the substrate where cells adhere and in precisely determining the mechanical properties. By combining a surface-initiated polymerization and nano-sphere lithography, we successfully grow polymers on a nano-patterned substrate that allows us to direct cellular adhesion sites to controlled nanoareas with defined elastic modulus. In addition, we utilized our AFM-based microrheology that allows us to fully quantify the local viscoelastic moduli by accounting the substrate effect on the thin samples such as adherent cells. Based on the AFM-based microrheology on normal and cancerous fibroblasts, we found that cellular responses such as viscoelastic properties and cell motility are correlated with the cell adhesions.

Soyeun Park
Texas Tech University

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