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Viscoelastic properties of vascular endothelial cells exposed to uniaxial stretch[1] KATHRYN OSTERDAY[2], MAE Dept, THOMAS CHEW, PHILLIP LOURY, JASON HAGA, Dept of Bioengineering, JUAN C. DEL ALAMO, MAE Dept., SHU CHIEN, Depts. of Bioengineering and Medicine, University of California San Diego — Vascular endothelial cells (VECs) line the interior of blood vessels and regulate a variety of functions in the cardiovascular system. It is widely accepted that VECs will remodel themselves in response to mechanical stimuli, but few studies have analyzed the mechanical properties of these cells under stretch. We hypothesize that uniaxial stretch will cause an anisotropic realignment of actin filaments, and a change in the viscoelastic properties of the cell. To test this hypothesis, VECs were grown on a thin, transparent membrane mounted on a microscope. The membrane was stretched, consequently stretching the cells. Time-lapse sequences of the cells were taken every hour with a time resolution of 10 Hz. The random trajectories of intracellular endogenous particles were tracked using in-house algorithms. These trajectories were analyzed using a novel particle tracking microrheology formulation that takes into account the anisotropy of the cytoplasm of VECs.

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