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**Probing Micromechanical Properties of Biological Cells by Oscillatory Optical Tweezers**[1] ANGELA ZAORSKI, Lehigh University, MING-TZO WEI, National Yang-Ming University, Taipei, Taiwan, HUSEYIN C. YALCIN, JING WANG, SAMIR N. GHADIALI, Lehigh University, ARTHUR CHIOU, National Yang-Ming University, Taipei, Taiwan, H. DANIEL OU-YANG, Lehigh University — We used oscillatory optical tweezers to probe the micromechanical properties of cultured alveolar epithelial cells in vitro. The frequency-dependent viscoelasticity of these cells was measured by optical trapping and forced oscillation of either a submicron endogenous intracellular organelle (intra-cellular) or a 1.5$\mu$m silica bead attached to the cytoskeleton through trans-membrane integrin receptors (extra-cellular). Both the storage modulus and the magnitude of the complex shear modulus followed weak power-law dependence with frequency. These data are comparable to data obtained by other measurement techniques. The exponents of power-law dependence of the data from the intra- and extra- cellular measurements are similar, whereas, the differences in the magnitudes of the moluli from the two measurements are statistically significant.

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