488c Determining the Effect of Cytoskeleton Disruption on Cell Rheology

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Understanding cell mechanics is a prerequisite for a detailed understanding of mechano-transduction, which is involved in numerous biological processes such as cell motility and differentiation. Previous studies have shown cells exhibit a power law shear modulus over several decades. The rheology ($G \sim \omega^{\beta}$) varies between $0.1 < \beta < 0.3$ for different cell types. Using techniques such as magnetic twisting cytometery, two point microrheology and passive laser tracking we studied the role of major cytoskeleton components in determining the rheology. Surprisingly treatment of cells with common cytoskeletal disruptors, latrunculin-A, colchicine and poly-acrylamide did not change the power law exponent. Instead a loss of power rheology was observed in cells attached non-specifically to poly-l-lysine coated surfaces. The inability of cells to maintain their characteristic rheology under these conditions suggests an important role for integrins and stress in determining the cell's mechanical properties.