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Hyaluronan-mediated cellular adhesion JENNIFER CURTIS, CHRISTIAN SCHMITZ, JOACHIM SPATZ, Biophysical Chemistry, University of Heidelberg, Max Planck Institute for Metals Research — Many cells surround themselves with a cushioning halo of polysaccharides that is further strengthened and organized by proteins. In fibroblasts and chrondrocytes, the primary component of this pericellular matrix is hyaluronan, a large linear polyanion. Hyaluronan production is linked to a variety of disease, developmental, and physiological processes. Cells manipulate the concentration of hyaluronan and hyaluronan receptors for numerous activities including modulation of cell adhesion, cell motility, and differentiation. Recent investigations by identify hyaluronan's role in mediating early-stage cell adhesion. An open question is how the cell removes the 0.5-10 micron thick pericellular matrix to allow for further mature adhesion events requiring nanometer scale separations. In this investigation, holographic optical tweezers are used to study the adhesion and viscoelastic properties of chondrocytes' pericellular matrix. Ultimately, we aim to shed further light on the spatial and temporal details of the dramatic transition from micron to nanometer gaps between the cell and its adhesive substrate.

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