Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Micromechanics of the pericellular matrix J. E. CURTIS, H. BOEHM, C. H. J. SCHMITZ, J. P. SPATZ, University of Heidelberg, Institute of Physical Chemistry and Max Planck Institute for Metals Research, Dept. of New Materials and Biosystems — In recent years, much attention has been directed towards the properties and activities of the cell surface. In particular, the coupling of the membrane to the underlying protein polymer network called the actin cortex plays an important role in many events. The other side of the cell surface is less studied, although it too has a bound polymer network comprised of gigantic cross-linked polysaccharides (sugars). Called the pericellular matrix (PCM), it is associated with many cells including fibroblasts, chondrocytes, endothelial and smooth muscle cells. Its thickness can vary from 10's of nanometers to 10 microns and it is associated with adhesion dependent events like migration and mitosis. Biologists often hypothesize that its viscoelastic properties are responsible for the modulation of cell adhesion activities. To investigate this proposal, we measure the PCM's viscoelasticity using microrheology and probe the sharpness of its edge and its mesh size. The elastic modulus of the PCM under different condition is determined, and we characterize the long, elastic cables that can be pulled from the PCM. These results are compared with an externally reconstituted model PCM on the cell surface.

J. E. Curtis

Date submitted: 30 Nov 2005 Electronic form version 1.4