Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Mechanical and Structural Changes of the Pericellular Coat during Cell Proliferation LOUIS T. MCLANE, School of Physics, Georgia Institute of Technology, ANNA GRANQVIST, The Renal Center, The Wallenberg Laboratory for Cardiovascular Research, Sahlgrenska University Hospital, PATRICK CHANG, ANTHONY KRAMER, JENNIFER E. CURTIS, School of Physics, Georgia Institute of Technology — The organization of a hyaluronan and proteoglycan-rich pericellular coat at the cell surface has been shown to facilitate cell migration and mitosis. These several microns thick, swollen grafted polymer matrices are directly correlated with efficient proliferation, migration, and in extreme cases have been associated with the metastatic spread of cancer. For example, hyaluronan synthesis is enormously increased when oncogenic viruses transform fibroblasts and elevated levels of hyaluronan are associated with the hyperproliferative and malignant phenotypes in melanoma and various carcinomas. Studies on cancer cell lines have shown that overproduction of hyaluronan and excess proteoglycan enhances their anchorage independent growth, tumorigenicity and metastatic potential. It has long been suspected that the mechanical and structural changes associated with enhanced pericellular matrix are in part responsible for these effects. Here we present measurements of pericellular coat mechanics and structure, investigating how it changes with cell cycle as well as increased or decreased proteoglycan content.

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Date submitted: 11 Nov 2011 Electronic form version 1.4