Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Biomimetic surface coatings from modular amphiphilic proteins
JAMES HARDEN, Physics Department, University of Ottawa, FAN WAN, Physics, University of Ottawa, STEPHEN FISCHER, Materials Science and Engineering, Johns Hopkins University, SCOTT DICK, Physics, University of Ottawa — Recombinant DNA methods have been used to develop a library of diblock protein polymers for creating designer biofunctional interfaces. These proteins are composed of a surface-active, amphiphilic block joined to a disordered, water soluble block with an end terminal bioactive domain. The amphiphilic block has a strong affinity for many synthetic polymer surfaces, providing a facile means of imparting biological functionality to otherwise bio-neutral materials through physical self-assembly. We have incorporated a series of bioactive end domains into this diblock motif, including sequences that encode specific cell binding and signaling functions of extracellular matrix constituents (e.g. RGD and YIGSR). In this talk, we show that these diblock constructs self-assemble into biofunctional surface coatings on several model synthetic polymer materials. We demonstrate that surface adsorption of the proteins has minimal impacts on the presentation of the bioactive domains in the soluble block, and through the use of microscopic and cell proliferation assays, we show that the resulting biofunctional interfaces are capable of inducing appropriate cellular responses in a variety of human cell types.

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Date submitted: 20 Nov 2009 Electronic form version 1.4