Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Measuring the energy landscape of complex bonds using AFM
ESSA MAYYAS, PETER HOFFMANN, LINDSAY RUNYAN, Wayne State University, HOFFMANN TEAM — We measured rupture force of a complex bond of two interacting proteins with atomic force microscopy. Proteins of interest were active and latent Matrix metalloproteinases (MMPs), type 2 and 9, and their tissue inhibitors TIMP1 and TIMP2. Measurements show that the rupture force depends on the pulling speed; it ranges from 30 pN to 150 pN at pulling speeds 30nm/s to 48000nm/s. Analyzing data using an extended theory enabled us to understand the mechanism of MMP-TIMP interaction; we determined all physical parameters that form the landscape energy of the interaction, in addition to the life time of the bond and its length. Moreover, we used the pulling experiment to study the interaction of TIMP2 with the receptor MT1-MMP on the surface of living cells.

Essa Mayyas
Wayne State University

Date submitted: 17 Dec 2008 Electronic form version 1.4