Investigating the glycocalyx using atomic force microscopy REBECCA BOREN, ADAM RAFI, JESSICA FARRELL, ANTONIO PERAMO, W. GARRETT MATTHEWS, Dept. of Physics, University of South Florida — The extracellular surfaces of the peripheral vascular system are coated with an outer filamentous layer of proteoglycan (PG) molecules, forming a brush-like structure known as the glycocalyx. The mechanical properties of PGs have become of increased interest due to their roles in a variety of interactions, including the adhesion of metastatic cells and their use as flow sensors. The goal of this project is to investigate the mechanical properties of the glycocalyx as a function of differing environmental conditions (i.e. pH, various ion concentrations, etc). We use as an experimental model of the glycocalyx an end-tethered brush of PGs oriented so that the protein backbone is upright, emulating their in vivo formation. We have developed a technique for patterning PG onto substrates allowing the exposure of the PG layer to different biologically relevant solvents. Resulting brush height changes will be measured using atomic force microscopy. The compression and extension of these PG molecules also will be measured and used to explain the imaged structures and the behaviors relevant to their biological function.

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