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Steric Repulsion and Compressibility of Protein Resistant Brushes MARIA SANTORE, Department of Polymer Science and Engineering University of Massachusetts — End-grafted polymer brushes, such as polyethylene glycol, have become commonplace as biocompatibilizers for medical devices and diagnostic surfaces. Key to their non-fouling character is the brush's steric repulsion towards biomolecules and cells. By functionalizing the substrate with small (order 10 nm) bioadhesive features around which the brush is placed, we gain insight into the repulsion between biomolecules and cells with the brush itself. While approximately exponential compression profiles are to be expected, some features of protein interactions with these brushes are unexpected, especially for small proteins whose dimensions are within a factor of 2 or 3 of the brush persistence length. The scaling of the compressive force, for example inferred from series of studies that vary the amounts and spacings of the adhesive elements, is weakly dependent on protein size, while one might expect a proportionality between this force and the effective protein footprint. These results are consistent with entropically inexpensive chain reconfigurations around the smaller proteins and the penetration of these proteins at least partially into the brush.

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