

Abstract Submitted
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Blood Clotting-Inspired Control of Single-Chain Molecules in Flows CHARLES SING, ALFREDO ALEXANDER-KATZ, MIT — Recent experimental evidence has demonstrated a clear link between mechanical stimuli and the activation of von Willebrand Factor (vWF), a protein that plays a critical role in the blood clotting cascade. This protein exhibits counter-intuitive conformational and adsorption responses that suggest novel ways of controlling the single-chain dynamics of polymer chains. Specifically, we are using simulation and theoretical approaches to elucidate the fundamental physics that govern globule-stretch transitions in collapsed polymers due to the effect of fluid flows. We begin to extend this general approach to the case of globule adsorption-desorption transitions in the presence of fluid flows, and demonstrate how kinetic considerations must be taken into account to describe the basic features of these transitions. We expect that these results will both allow the development of novel techniques for single-chain targeting and assembly and offer insight into the physiological behavior of vWF.

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