

Abstract Submitted
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Migration and conformational dynamics of von Willebrand Factor in the near wall region of a channel flow¹ DENNIS OZTEKIN, ZIXIANG LIU, YUANZHENG ZHU, MUSTAFA USTA, CYRUS AIDUN, Georgia Inst of Tech — Von Willebrand Factor, vWF, is a glycoprotein suspended in blood with central role in hemostasis. In particular, it is shown that the local concentration and conformation of vWF has significant effect on high shear thrombosis. In this study, we investigate the migration and conformation of suspended vWF in a channel flow using a coupled Langevin-Dynamics and Lattice Boltzmann method [1]. A wide range of Weissenberg numbers, Wi , changing from 60 to 1200, has been considered to reflect the high-shear condition observed in arterial thrombosis. Results indicate a correlation between trajectories of the vWF and its conformational dynamics for the Wi numbers studied. In particular, sudden “jumps” in vWF migration are observed under specific vWF conformation, which is quantified in terms of the polymer’s end-to-end length, orientation, and tortuosity to identify the mechanisms that causes such “jumping” behavior. This study provides insights to the near-wall availability of vWF that is essential to the high-shear thrombus formation. [1] Liu, Zhu, Clausen, Lechman, Rao, Aidun, *Int. J. Num. Methods Fluids* 91 (5), 228-246, 2019.

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