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Modification of Platelet Margination Rate via Reduction of Viscosity Ratio[1] DANIEL REASOR, MARMAR MEHRABADI, DAVID KU, CYRUS AIDUN, Georgia Institute of Technology — Experimental investigations of platelet margination have primarily been limited to effects of hematocrit (Ht.) and shear rate. The suspending fluids used commonly have viscosities greater than plasma which can modify the transition in dynamical regimes from tumbling to tank-treading for isolated RBCs. This work focuses on the effects of λ, the ratio of internal to suspending fluid viscosity of RBCs, on the rate of platelet margination in a rigid 41.3 μm diameter vessel. Simulations are performed with a lattice-Boltzmann fluid solver using the standard bounce-back boundary condition coupled with a coarse-grained spectrin-link RBC membrane model and a Newtonian dynamics solver for rigid platelets. Our results are consistent with observations that an increase in Ht. increases the rate of platelet margination for Ht.=20-40%, but we focus on the modification of λ at Ht.=20%. Our results show that rigid RBCs inhibit margination, but modifying λ with deformable RBCs show significant increases in margination rate. Our observations demonstrate an increase in platelet wall-normal velocity fluctuations, enhanced margination rate, and an increase in the wall-normal diffusivity as λ is reduced from the physiological value of five.

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