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Numerical simulation of red blood cell suspensions behind a moving interface in a capillary[1] SHIHAI ZHAO, TSORNG-WHAY PAN, Department of Mathematics, University of Houston, Houston, TX, USA — Computational modeling and simulation are presented on the motion of red blood cells behind a moving interface in a capillary. The methodology is based on an immersed boundary method and the skeleton structure of the red blood cell (RBC) membrane is modeled as a spring network. The computational domain is moving with either a designated RBC or an interface in an infinitely long two-dimensional channel with an undisturbed flow field in front of the domain. The tanking-treading and the inclination angle of a cell in a simple shear flow are briefly discussed for the validation purpose. We then present the results of the motion of red blood cells behind a moving interface in a capillary, which show that the RBCs with higher velocity than the interface speed form a concentrated slug behind the interface. It is a key mechanism responsible for penetration failure in a capillary behind the meniscus.

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