

Abstract Submitted  
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**Multiscale Modeling of Red Blood Cells Squeezing through Sub-micron Slits** ZHANGLI PENG, HUIJIE LU, University of Notre Dame — A multi-scale model is applied to study the dynamics of healthy red blood cells (RBCs), RBCs in hereditary spherocytosis, and sickle cell disease squeezing through submicron slits. This study is motivated by the mechanical filtration of RBCs by inter-endothelial slits in the spleen. First, the model is validated by comparing the simulation results with experiments. Secondly, the deformation of the cytoskeleton in healthy RBCs is investigated. Thirdly, the mechanisms of damage in hereditary spherocytosis are investigated. Finally, the effects of cytoplasm and membrane viscosities, especially in sickle cell disease, are examined. The simulation results provided guidance for future experiments to explore the dynamics of RBCs under extreme deformation.

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