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How malaria merozoites reduce the deformability of infected RBC MAJID HOSSEINI, JAMES FENG[1], Department of Chemical and Biological Engineering, University of British Columbia, Vancouver, BC V6T 1Z3, Canada — This talk presents a three-dimensional particle-based model for the red blood cell (RBC), and uses it to explore the changes in the deformability of RBC due to presence of malaria parasite. The cell membrane is represented by a set of discrete particles connected by nonlinear springs that represent shear and bending elasticity. The cytoplasm and the external liquid are modeled as homogeneous Newtonian fluids, and discretized by particles as in standard smoothed-particle-hydrodynamics models. The merozoite is modeled as an aggregate of particles constrained to rigid-body motion. The fluid flow and membrane deformation are computed, via the particle motion, by a two-step explicit scheme, with model parameters determined from experiments. The stretching of healthy and infected RBC by optical tweezers has been simulated to investigate the contribution of rigid merozoites to the decrease in deformability.

[1]Department of Mathematics, University of British Columbia, Vancouver, BC V6T 1Z2, Canada

James Feng
Dept of Chemical and Biological Engineering,
University of British Columbia, Vancouver, BC V6T 1Z3, Canada

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