

SIMULATION OF RED BLOOD CELL AGGREGATION AND BLOOD RHEOLOGY

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Blood rheology is mainly governed by viscoelastic properties of red blood cells (RBCs), their concentration and interactions. In experiments, a shear-thinning behavior of blood is generally found. However, at low shear rates or in equilibrium RBCs tend to aggregate and form rouleaux structures which resemble coin stacks. RBC aggregation results in a significant increase of blood viscosity at low shear rates. We model blood as a suspension of individual RBCs which incorporate realistic RBC membrane properties and aggregation interactions. Blood rheology as well as the effect of RBC aggregation is investigated through numerical simulations of RBC suspension using the dissipative particle dynamics method. The results are compared with available experiments showing good quantitative agreement.