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Multicomponent model of deformation and detachment of a blood clot under fluid flow SHIXIN XU, ZHILIANG XU, MARK ALBER, ACMS, University of Notre Dame — A novel model derived by using the Energetic Variational Approach coupled with the phase field method, is developed for simulating deformation and detachment of blood clot under flow. Volume fractions of components of the blood clot, namely, fibrin, platelets and the plasma are denoted by phase field functions. Interactions among these components are included in the model by using different mixed energy and elasticities of the platelets and fibrin network are both considered in the model. Rheological property of blood clot under flow is determined by mechanical properties of components of the blood clot. An energy stable numerical scheme based on the energy split method is implemented for solving the coupling system. Model simulations predict that higher viscosity, elasticity and surface tension proved greater resistance to the deformation and removal by the flow. Moreover, the higher elasticity of the blood clot also causes lower pressure inside the blood clot, which contributes to its contraction.

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