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Collective behavior of heterogeneous platelets during blood clotting.[1] YUEYI SUN, Georgia Inst of Tech, DAVID MYERS, WILBUR LAM, Emory University, ALEXANDER ALEXEEV, Georgia Inst of Tech — Blood clotting disorders prevent the body's natural ability to achieve hemostasis and lead to bleeding, stroke or heart attack. Understanding the underlying physics behind the clotting process is essential to developing treatment of these disorders. Interaction between platelet and fibrin network leading to blood clot contraction is a complex multiscale process taking place in blood flow. We develop and experimentally validate a mesoscale computational model to examine the biophysics of clot contraction. The model considers platelets actively contracting polymerized fibrin mesh. The model correctly predicts bulk clot volume contraction and kinetics. The model shows that the heterogeneities involved in platelet contraction behavior enhance both clot volume contraction and clot force. We use the model to examine how fibrin network properties affects blood clotting and forces generated by the clot.

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