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Title: **Multi-scale models of Blood Clotting**

Abstract:

The high morbidity and mortality rates (about 900,000 incidences and 300,000 deaths annually just from venous thromboembolic disease) underscore the biomedical importance of studying roles of components of thrombi, in particular, fibrin network (FNW) and platelets under flow conditions. This collaborative project develops 3D Multiscale Blood Clot Modeling Environment (MBCME-3D) and Combines model simulations and specifically designed experiments using optical tweezers and microfluidic chambers, to study two specific mechanisms: 1) Deformation of FNW structure by blood flow affects the rheological properties of a clot and impedes transport of proteins from circulating blood to activated platelets embedded in the FNW of the thrombus, thus providing a negative feedback mechanism to regulate coagulation reactions; 2) The FNW helps prevent occlusion of major vessels by responding to blood flow such that it binds less to activated platelets when the FNW experiences fluid flow associated shear-stress.

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