Modelling of the Blood Coagulation Cascade in an In Vitro Flow System.

We derive a mathematical model of a part of the blood coagulation cascade set up in a perfusion experiment. Our purpose is to simulate the influence of blood flow and diffusion on the blood coagulation pathway. The resulting model consists of a system of partial differential equations taking into account the spatial distribution of the biochemical species. An important issue is inclusion of a dynamic boundary condition describing adhesion of activated platelets on a collagen coated top lid in the perfusion chamber. The validity of the model is established through criteria on the reaction diffusion and flow equations, which guarantee non negative concentrations at all times. The criteria is applied to the model of the blood coagulation cascade.