Abstract Submitted
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A viscoelastic model of shear-induced blood damage[1] GILAD ARWATZ, ALEXANDER SMITS, Princeton University — The mechanisms responsible for blood damage (hemolysis) have been studied since the mid-1960s, and it is now widely accepted that the level of shear stress and exposure time play important roles. Several models for hemolysis have been previously proposed. However, these models are purely empirical and limited to a narrow range of shear stress and exposure time and mostly, they lack any physical basis. In this study, we propose a new non-dimensional model that captures the mechanics of the red blood cells breakdown by taking into account the viscoelastic nature of their membrane. We validate our model against experimental measurements of hemolysis caused by laminar shear stress ranging from 50Pa to 500 Pa and exposure times extending from 60 s to 300 s.

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