

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Non-monotonic blood viscosity and cell free layer dependence on cell aggregation**<sup>1</sup> YENG-LONG CHEN, CHIH-TANG LIAO, Academia Sinica — In blood flow, large proteins in the blood plasma induces attraction between red blood cells (RBCs) and form columnar aggregates. As inter-cell attraction increases due to increased protein concentration as result of physiological changes, aggregate size and shape change. Such structural changes could strongly affect blood flow in micro-vessels where aggregate size is comparable to vessel diameter. We employ hybrid lattice Boltzmann – Langevin dynamics to investigate how increasing inter-cell attraction affect the aggregate structure, flow-induced cell free layer, and blood viscosity in micro-vessels. We find that the cell free layer thickness exhibits non-monotonic dependence on aggregation, leading to shear-thinning and shear-thickening dependence on inter-cell attraction. We identify the structure-dynamics coupling mechanisms responsible for the complex dependence.

<sup>1</sup>Ministry of Science and Technology, Taiwan

Yeng-Long Chen  
Academia Sinica

Date submitted: 29 Jul 2019

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