

Abstract Submitted  
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**Influence of red blood cell clustering on phase separation in capillary networks** THOMAS PODGORSKI, CELINE BOUCLY, GWENNOU COUPIER, LIPhy, CNRS-UJF Grenoble — We investigate the flow of red blood cell suspensions in microfluidic bifurcations and capillary networks. At strong degrees of confinement, such as those encountered in the microcirculation, phase separation takes place at bifurcations of the network, leading to strong heterogeneities and fluctuations of the hematocrit (blood cell concentration). We highlight the influence of the mechanical properties of cells : an increase of membrane or cytoplasm rigidity, as can happen in pathologies such as sickle cell disease tends to reduce the phase separation. The influence of the attractive interaction between cells, that leads to clustering (rouleau formation) was also investigated by varying the concentration of macromolecules in the solution (dextran or fibrinogen). We show that hydrodynamic stresses in bifurcations can lead to rupture of clusters at a critical speed which increases with interaction energy. Overall, the clustering phenomenon tends to increase phase separation and hematocrit heterogeneities.

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