Red blood cell deformability in erythrocyte sedimentation and *in vivo* partitioning

A. Darras[1], T. John[1], L. Kaestner[1,2] and C. Wagner[1]

[1]*Experimental Physics, Saarland University; D-66123 Saarbrücken, Germany*
[2]*Theoretical Medicine and Biosciences, Saarland University; D-66424 Homburg, Germany*

Erythrocytes, also known as red blood cells, are the most abundant type of cells in the human body. Among the mechanical peculiarities of these cells are their specific shape and high flexibility. These properties are known to be critical for the cells to travel in the capillaries of our circulatory system, whose cross section is sometimes smaller than the erythrocytes diameter. In this presentation, we will see what influence this flexibility has on two extreme regimes of erythrocytes transport: their *in vivo* partitioning in small vessel bifurcation and their *in vitro* sedimentation [1,2]. While the former is a phenomenon occurring at high shear rate and is relevant for oxygen delivery in living organisms, the second occurs at virtually no shear and is used as a diagnostic tool to assess potential inflammation. We will present experimental evidences and characterization that the mechanical properties of erythrocytes have a significant influence on their behavior in both cases. For their sedimentation rate, we also introduce an original model considering this influence and the resulting properties of erythrocytes aggregates.

[1] A. Darras, K. Peikert, A. Rabe, *et al*. Cells, vol. 10, no 4, p. 788 (2021).

[2] A. Rabe, A. Kihm, A. Darras *et al*. Biomolecules, vol. 11, no 5, p. 727 (2021).