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Red Blood Cell Dynamics, Deformation and Rheology via Microfluidic Experiments

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Blood is principally made of a calibrated suspension of red blood cells (RBC). Depending on the flow, RBCs move alone or in aggregates (rouleaux), often in capillaries of smaller sizes than their own radius. Blood is an “intelligent” fluid, as its rheological properties adapt according to the different situations of the flow. This capacity, which is not fully understood, comes partly from the significant deformability of RBCs. The understanding of the flow behavior of a single confined RBC is a first step to understand the basic rheological properties of the blood in arteries. To achieve this goal, we used microfluidic technology as a tool to explore hydrodynamics of a single cell and the hydrodynamic interactions among cells. We are also using such measurements to infer the individual mechanical properties of their membrane.

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