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First clues to understand red blood cell interactions: numerical studies of vesicle suspensions[1] MARINE THIÉBAUD, CHAOUQI MISBAH, Laboratoire Interdisciplinaire de Physique, UMR 5588, DYFCOM TEAM — The scientific community started raising questions on blood flow for nearly two centuries, a period traced back to the pioneering work of Poiseuille. This topic has known a considerable upsurge of interest during the past decade. Vesicles capture several essential features shared with red blood cells. A single vesicle is now fairly understood, whereas study of suspensions is still unclear. We conduct bidimensionnal numerical studies by mean of the boundary integral method. Confinement plays a major role in that it introduces an interaction cut-off length. I will present results on the behavior of relative viscosity as function of the viscosity contrast between the fluid encapsulated by vesicles and the ambient fluid. This viscosity contrast is a key parameter: it triggers transition from tank-treading to tumbling regimes. Historical characterization of blood have led to the discovery of the Fahraeus-Lindqvist effect. I will introduce some results on this effect with a rheological study as function of concentration and confinement. I will report on non-standard behavior induced by a subtle spatio-temporal organization of the suspension.

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