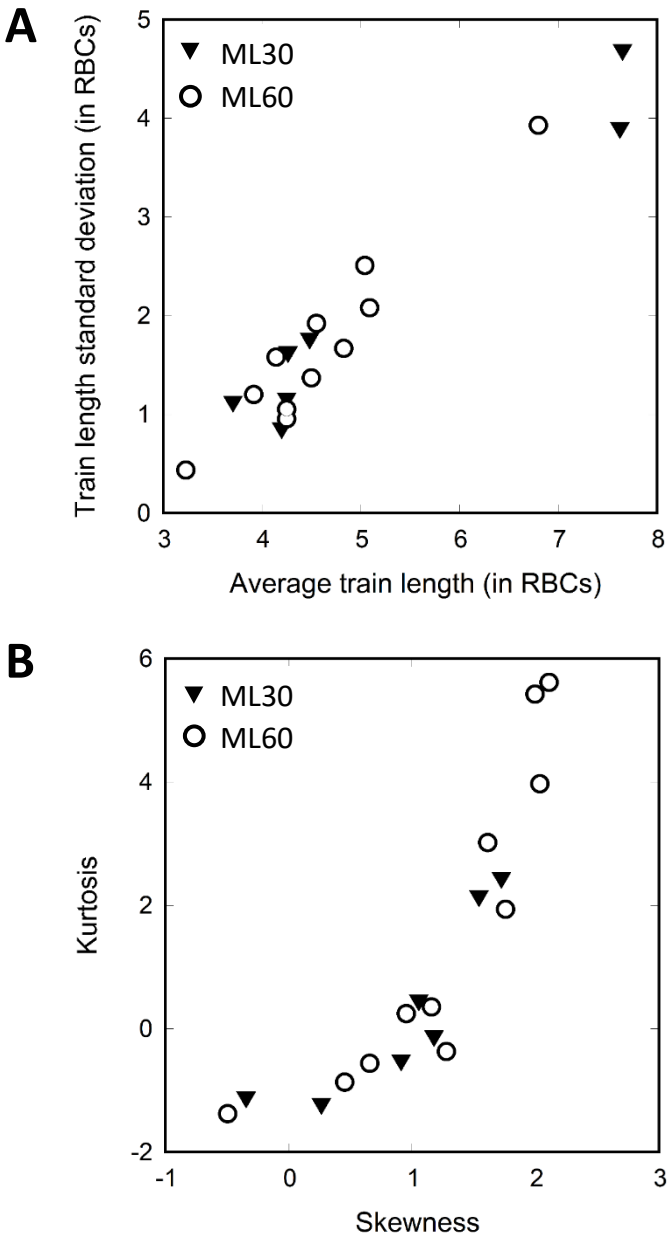
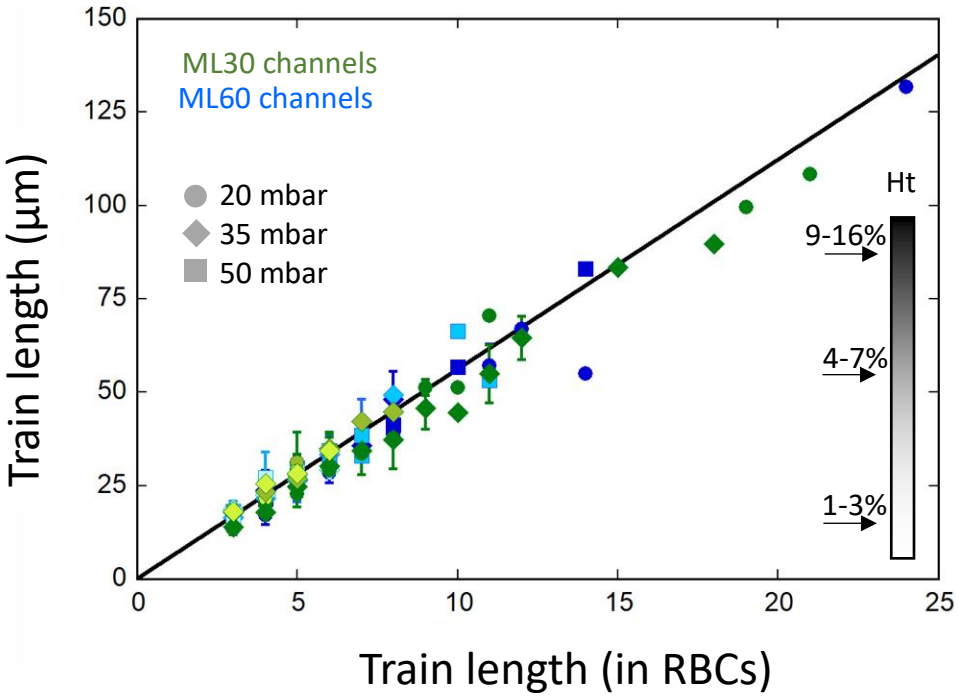
Self-organization of red blood cell suspensions under confined 2D flows

Cécile Iss, Dorian Midou, Alexis Moreau, Delphine Held, Anne Charrier, Simon Mendez, Annie Viallat and Emmanuèle Helfer

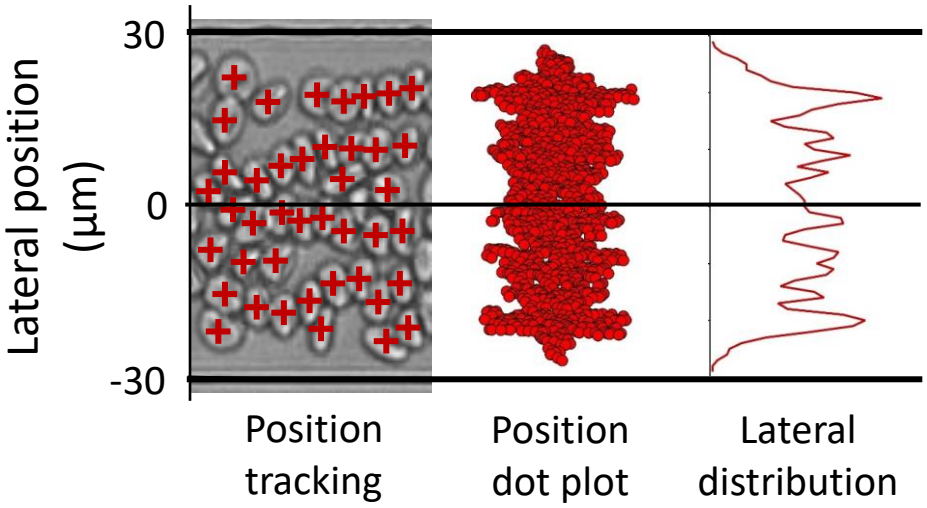
Supplementary Material



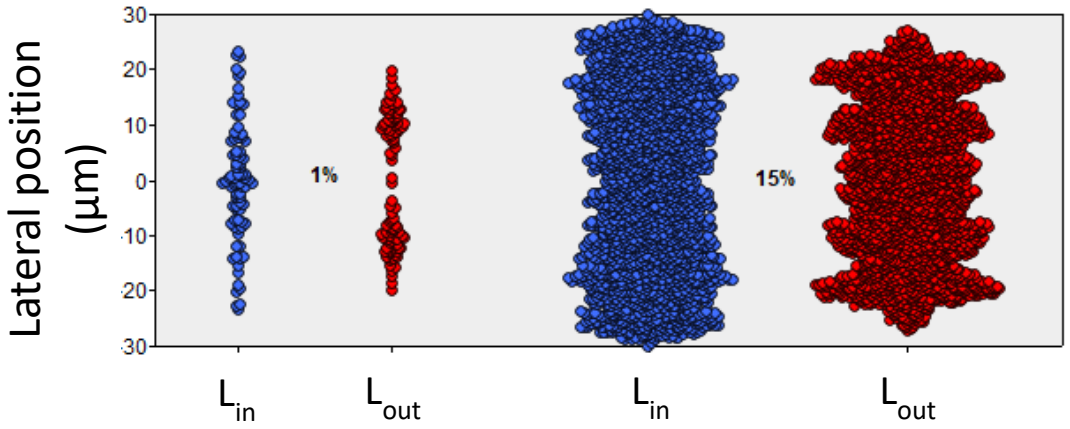
Supp. Figure S1. Analysis of the distributions of the number of RBCs per train.
Standard deviation versus average length (A) and kurtosis versus skewness (B) in ML30 (triangles) and ML60 (circles) for Ht ranging from 2% to 16% and various pressure drops (20 and 35 mbar for ML30 channels; 20, 35 and 50 mbar for ML60 channels).



Supp. Figure S2. Train length as function of RBC content in ML30 and ML60 channels, at varying Ht and under different pressure drops.



Supp. Figure S3. Tracking of individual RBCs in the channel is used to make a dot plot of the cell y-positions (scatter dot plot function in Igor software) and to plot the lateral distribution of the RBCs over the channel width (60 µm here).



Supp. Figure S4. RBC y-positions at entry (L_{in}, blue) and exit (L_{out}, red) of an ML60 channel, at 1% (left) and 15% (right) Ht, under a pressure drop of 20 mbar. Tracked positions have been pooled over a half-channel [0;30] then symmetrized over the whole channel width [-30;30] to improve the visual effect.

Supplemental Movies

Supp. Movie M1. RBC flow at entry (L_{in}, top) and exit (L_{out}, bottom) of a 60-µm wide channel (ML60) under a pressure drop ΔP = 20 mbar, at Ht 15%. Scale bar: 20 µm. The movie is 10× slowed down.

Supp. Movie M2. RBC flow at exit (L_{out}) of 60- and 30-µm wide channels (ML60 and ML30) under a pressure drop ΔP = 20 mbar, at Ht 12.5%. Scale bar: 20 µm. The movie is 10× slowed down. It corresponds to Fig. 2B.

Supp. Movie M3. Rigidified RBCs in discoid shape do not organise under flow and display tumbling motion. ML60, ΔP = 20 mbar, Ht 5%. Scale bar: 20 µm. The movie is 10× slowed down.

Supp. Movie M4. In a suspension mixing deformable (85%) and stiffened (15%) RBCs, the deformable ones form linear clusters while the rigid ones remain single and slowly move along the channel walls. ML60, ΔP = 35 mbar, Ht 4%. Scale bar: 20 µm. The movie is 20× slowed down.

Supp. Movie M5. Numerical simulation of RBC flow at 12% Ht in a 30-µm wide channel. The movie corresponds to a travel of approximately 2 mm in the flow direction.

Supp. Movie M6. RBC flow in an ML30 channel at 7% Ht, alternatively displaying one-band and two-bands. ΔP = 20 mbar. Scale bar: 20 µm. The movie is 10× slowed down.