

Doriane Vesperini¹, Ilyesse Bihi¹ and Anne Le Goff¹

¹*Laboratoire de Biomécanique et Bioingénierie, Université de Technologie de Compiègne UTC, Compiègne, France*

A microfluidic method for capsule and cell sorting based on mechanical properties

Cell mechanical properties depend on their differentiation stage or pathologies such as cancer or infections. Sorting cells according to their stiffness is thus particularly interesting in tissue engineering and diagnostic applications [1]. We propose a microfluidic device that consists of a cylindrical obstacle located at the end of a rectangular straight channel [2]. Upstream of the obstacle, a flow-focusing module centers cells on the obstacle. Downstream of the obstacle, a diffuser ends on 5 symmetrical outlets. Trajectories in the diffuser depend on several parameters, such as cell size, deformability and velocity. Stiff micro-objects are more deflected than soft ones. We already have proven the efficiency of our device for larger micro-objects such as capsules [3]. It is a passive, non-destructive, and sensitive system. We have now downscaled the microfluidic device to adapt its geometry to cell sizes.

[1] Wang et al., Plos One, 8, e75901 (2013)

[2] Zhu et al., Soft Matter, 10, 7705-7711 (2014)

[3] Vesperini et al., Medical Engineering and Physics (Under review)