Title: **Clot-in-chip fabrication by continuous flow approaches**

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Nowadays, ischemic stroke is one of the most common and dangerous medical conditions, occurring when a blood clot blocks an artery in the brain vascular system. As a leading cause of mortality worldwide, there is an ever-increasing drive to improve diagnosis and treatment for hemostatic diseases. Microfluidic devices have proved to be one the best experimental platform to study hemostasis' mechanism, being able to reproduce the interaction between hemodynamics and thrombus. Therefore, clots with mechanical and biological properties closer to native blood clots can be created and studied inside microfluidic chips.

In this work, we aim to develop and optimize a 5-inlet microfluidic device to create blood clots by mimicking the physiological environment during blood coagulation. In particular, our goal is to induce coagulation by co-flowing whole blood with tissue factor, simulating the extrinsic pathway of coagulation cascade. Creating a reaction-diffusion area inside the chip will allow us to modulate the reagents mixing point and the blood clot location, as the mixing event is governed by diffusion rates. Toward that goal, we evaluated the effect of flow rate and viscosity inside our device to finally create two controlled blood clots with different sizes and locations. This approach of providing a fine control over blood clots will serve in the future as an *in vitro* testing platform for drug screening assays.

Keywords: Hemostasis, blood clot, coagulation, microfluidics, co-flow.