

Hydrodynamic cell focuser for red blood cell counting

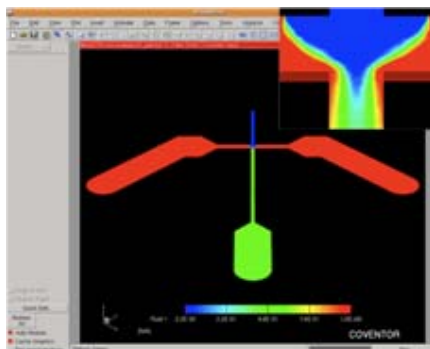


The hydrodynamic cell focuser creates an ordered flow of cells, lining cells up in the centre of a micro-channel. The input to the focuser is a fluid sample containing cells. The hydrodynamic cell focuser has a microfluidic geometry shaped as a cross. The cell sample is inserted in a central channel and water is inserted in the two lateral channels. With controlled pressures and flow rates, focusing is induced, obtaining a "virtual" smaller fluidic channel. Previously the microBUILDER consortium manufactured a Coulter cell counter. The cell focuser and the cell counter are integrated in a new chip design. The focused flux is passed through two electrodes built in the microfluidic channel, where the cells are registered and counted.

The chip is planned to be a part of the sample preparation module in a full biochemical analysis including sample collection, preparation, reactions and detection. The device has been designed, modelled and manufactured within the microBUILDER consortium. The functionality of the chip has been tested on red blood cells. These activities have been developed in the frame of a wider project ("Telematic control system of patients for home chemotherapy") in cooperation with the Molinette Hospital of Torino.

The contributing microBUILDER partners:

- Design & characterization (COREP)
- Device simulations (Coventor)
- Fabrication using MultiMEMS technology (SensoNor)
- Integrations slide, microfluidic interconnections (thinXXS)



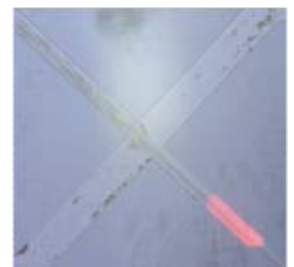
CoventorWare simulations



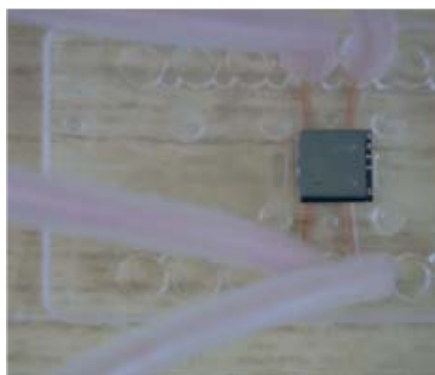
Photo of the chip



a)



b)



The chip inserted in the thinXXS' system for microfluidic management



c)

Experiments done with a) red ink, b) and c) dog's red blood cells

Contributing partners

