## Supplementary material A

## **Micro-system fabrication**

We used polymer-based micro-systems in our research; they are made from PDMS (PolyDiMethylSiloxane), a transparent elastomer which is commercially available as Sylgard 184 (Dow Corning, Midland, Michigan, U.S.A). This material was chosen as it is suitable for fast, easy and cheap fabrication and does not require a dedicated clean-room environment for processing.

PDMS micro-systems are fabricated using molding techniques against a silicon master and the production was performed as illustrated in Fig. A1. In a first step a silicon-based master is made in the clean-room using photolithography techniques and a dry-etching step. The height of the system is determined by the thickness of the layer of photoresist spin-coated on the silicon wafer. With one mask it is possible to make molds for systems of varying heights by changing this layer thickness. Thereafter the resulting etched mold undergoes a hydrophobic coating step. This facilitates removal of the elastomer after curing.

PDMS is prepared using a two-component commercial kit that consists of a pre-polymer and a curing agent. Both components are mixed together and the resulting mixture is poured on the mold after a degassing step. Subsequently, the material is thermally cured (e.g. 2 hours at 600 C); thereby the curing agent enables further polymerization of the PDMS chains. At the end of the curing process, the PDMS slab is removed from the mold. Access channels to the reservoirs are punched in the systems and the systems are bonded to a glass cover slip. For good bonding, the PDMS surface and the cover slip must be thoroughly cleaned and activated through an O2 plasma after which they are pressed together.

Finally tubing is inserted into the punched holes and glued into place.



Figure A1: Fabrication process of PDMS lab-on-a-chip systems. Starting from blank silicon wafer (1), to micro-fluidic system (5).