Supplemental Information for: *Integration of Multiple Components in Polystyrene-based Microfluidic Devices Part 1: Fabrication and Characterization*

Contact Angle Measurements on Polydimethylsiloxane (PDMS) mold

The PDMS mold was modified with (3-mercaptopropyl)-trimethoxysilane in order to reduce bubble formation at the PDMS polystyrene (PS) interface during heating. Contact angle measurements on PDMS show that before modification, the water droplet has a contact angle of 124º whereas after modification with (3-mercaptopropyl)-trimethoxysilane, the drop has completely wetted the surface. The before and after images before show this change in contact angle.

A) Before Modification B) After Modification

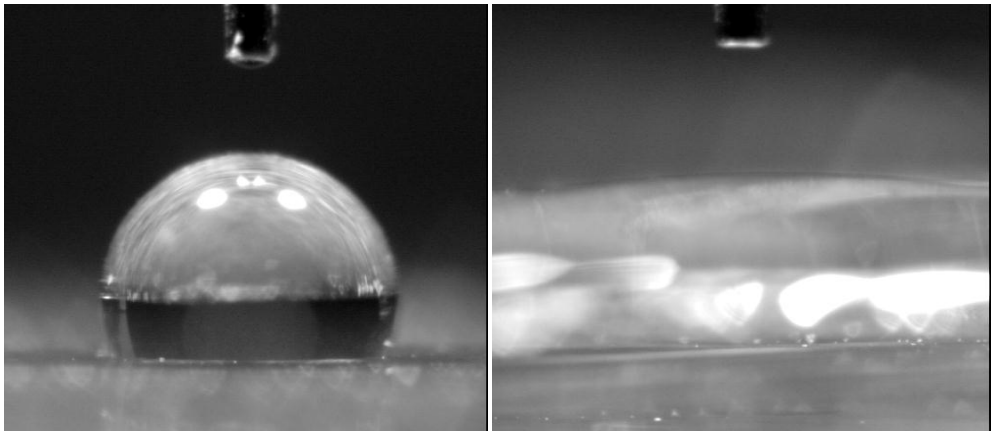

Figure S1. Contact angle measurements on PDMS. A) Before modification with (3-mercaptopropyl)-trimethoxysilane, the droplet has a contact angle of 124º B) After modification with (3-mercaptopropyl)-trimethoxysilane, the droplet completely wets the surface of the PDMS.

Scanning Electron Microscopy (SEM) Images of Master, PDMS mold and PS

Images of the master, PDMS mold and corresponding PS device were taken using SEM. The PDMS mold and PS device were sputter coated with gold prior to imaging. The master contains recessed channels, which correspond to raised channels on the PDMS mold. The PS device, which is made from the PDMS mold, also has recessed channels. The SEM images below illustrate the successful transfer of features from the PDMS mold to the PS device.

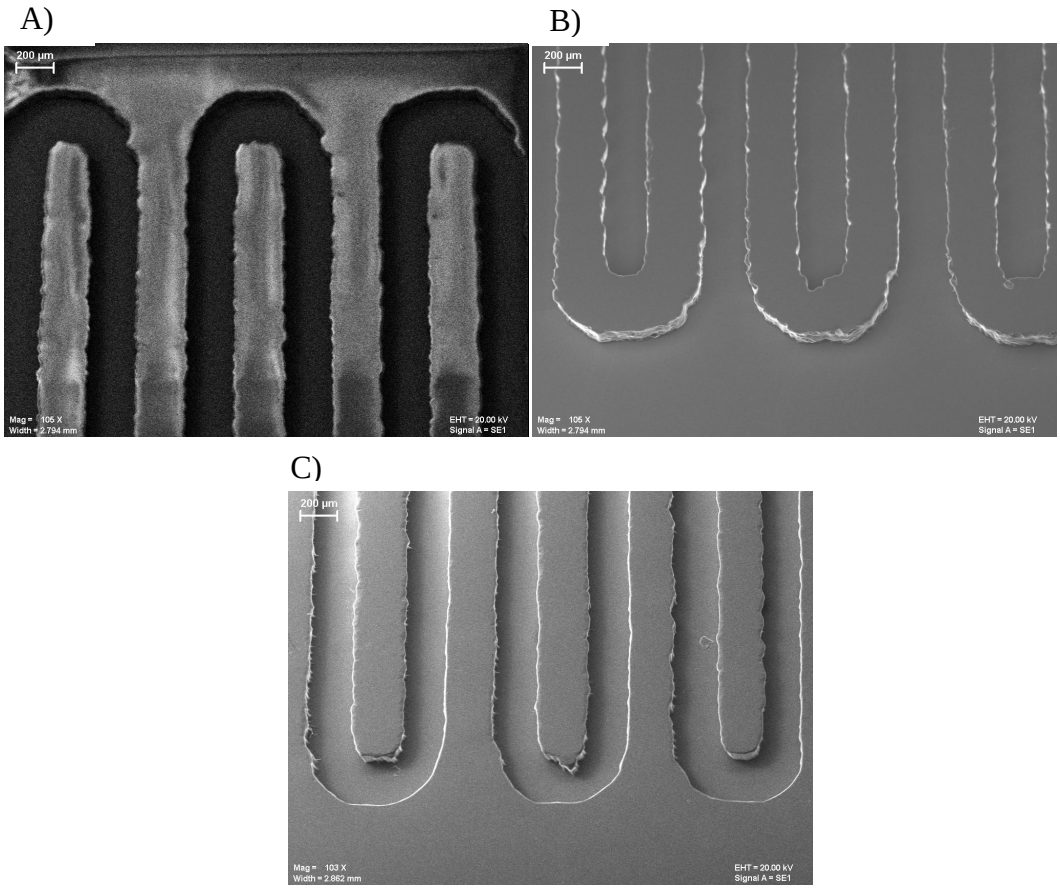

Figure S2. SEM Images of master, PDMS mold and PS device.A) Image of sample master with recessed channels. B) Image of PDMS mold with raised channels. C) Image of corresponding PS device made from PDMS mold. PS device has recessed channels.

Analysis of Clopidogrel using Mass Spectrometry

Clopidogrel solutions were prepared by dissolving in 0.1 M HCl, and then diluting in PSS. Standards for MRM MS analysis were prepared by diluting 9 µL of sample in 80 µL of acetonitrile containing 1 µM ciprofloxacin (Sigma Aldrich, St Louis, MO) as an internal standard. Samples were prepared in the same manner. 10 µL was then injected onto a Ascentis Express C18 column, 3 cm in length, 2.1mm in diameter, containing 2.7 µm particles. LC was performed at 0.45 mL/min, with the gradient shown below.

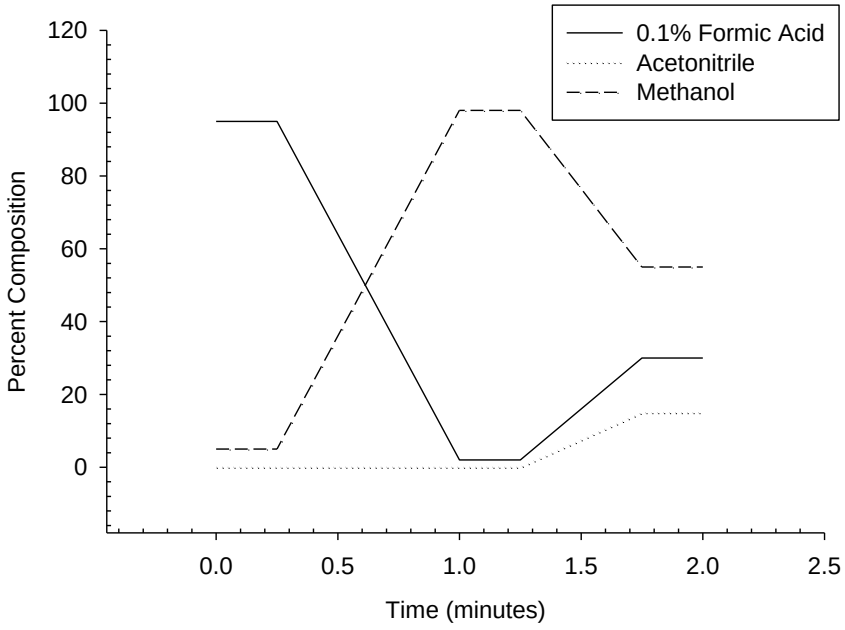

Figure S3. LC gradient used prior to the MS analysis.

After chromatography, the samples were ionized using electrospray ionization and then analyzed with the Quattro Micro in multiple reaction monitoring mode. The cone voltage and collision energy for Clopidogrel were 22 V and 16 V, respectively. The cone voltage and collision energy

for Ciprofloxacin were 34 V and 22 V, respectively. An internal standard calibration using peak area was then performed using ciprofloxacin as an internal standard.

Microchip-based Electrophoresis in Polystyrene Microchannels

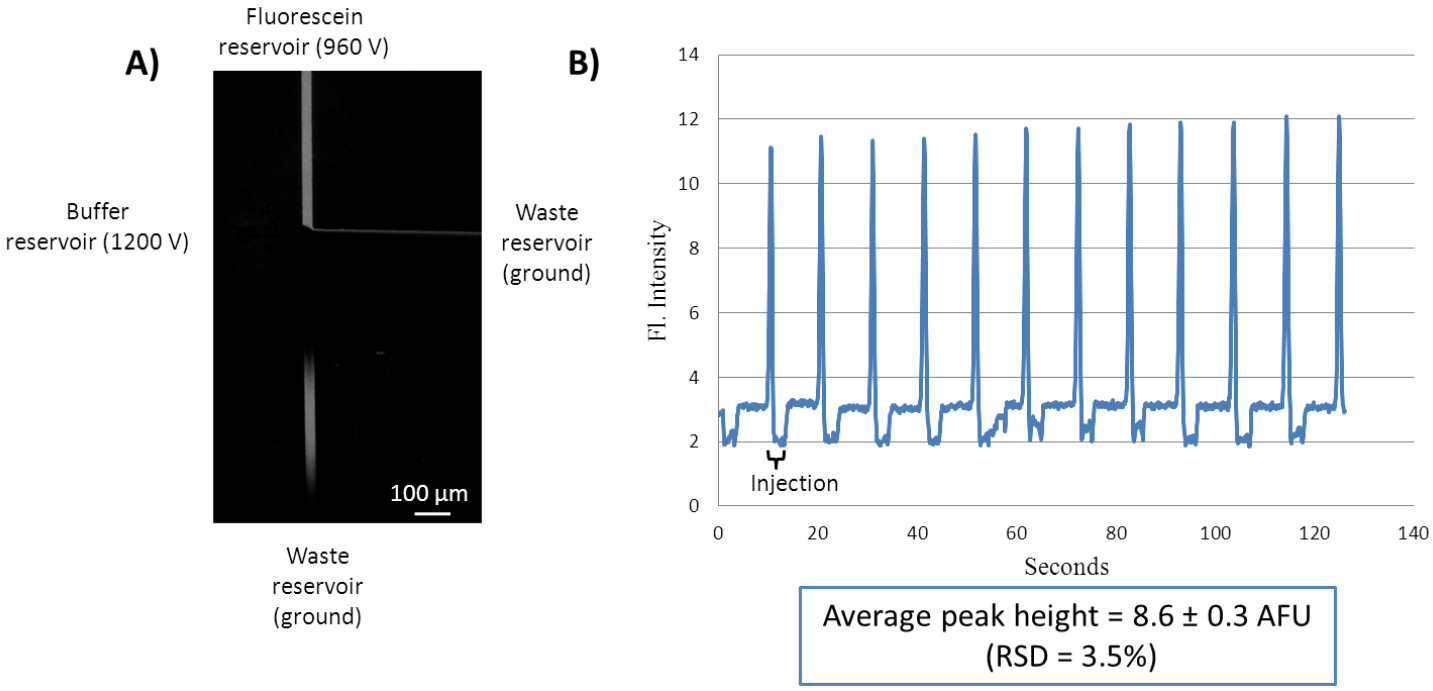

Figure S4. Use of polystyrene microchannels for microchip electrophoresis **A)** Fluorescence micrograph of gated injection in a polystyrene microchannel (45 µm wide, 9 µm tall) after the voltage applied to the buffer reservoir was floated for 1 sec. The gated injection was utilized to discretely inject a 250 pL plug and a field strength of 220 V/cm was used. The buffer was 10 mM boric acid with 25 mM SDS (pH=9.2). **B)** Results from monitoring the repetitive gated injections of 50 µM fluorescein, 1 cm from injection tee, with the same microchip and experimental conditions. The detection window size was 200 µm x 50 µm.