

Elastic reversible valving on centrifugal microfluidic platforms

Mohammad Mahdi Aeinehvand,^a Laura Weber,^b Martín Jiménez,^a Andrea Palermo,^b Maria Bauer,^c Felix F. Loeffler,^d Fatimah Ibrahim,^e Frank Breitling,^b Jan Korvink,^b Marc Madou,^{a,c} Dario Mager^b and Sergio O. Martínez-Chapa^{a*}

The following schematic demonstrate the suitability of the FER and TER valves for mass.

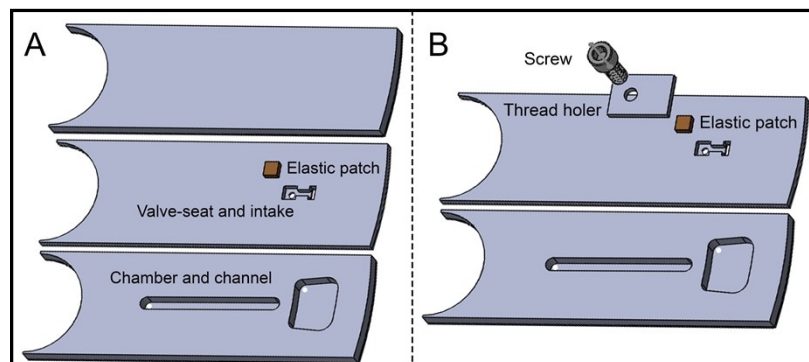


Figure S1. Disc with TER or FER valves can be mass manufactured by binding of three inject-molded discs (A), or assembly of two discs with separately fabricated valves (B).

Value of parameters used for theoretical calculations of FER and TER valve behavior are available in Table S1.

Table S1. Value of the parameters used for theoretical drawing the curve of FER and TER valves behaviour.

Parameter	Description	Value
E	PDMS young modulus	2.7 Mpa
I_0	PDMS initial length	2 mm
R_0^*	Radial positions of the liquids in the disc.	15 mm
R_1		17 mm
R_2		29 mm
L	leads size	0.5 mm
ρ	Liquid density	kg/m ³
* R_0 for testing liquid flow volume control by FER and TER valve is 20mm.		

Table S2. Summary of the incubation steps for multiplexed immunoassay based on the peptide microarray.

Incubation Step	Buffer	Duration	Fig
Pre-Swelling	PBS-T ^A	10 min	4a
Blocking	RB ^b	30 min	4b
Washing	PBS-T	3 x 30 sec	
Incubation with Serum diluted 1:500	PBS-T-RB ^c	16 hours	4c
Washing	PBS-T	3 x 30 sec	
Incubation with Secondary Antibody Mixture	PBS-T-RB	1 hour	4d
Washing	PBS-T	3 x 30 sec	4e
Washing	Deionized water	30 sec	
<p>^APBS-T: 1 x PBS, Sigma Aldrich, pH 7.4, 0.05 % v/v Tween 20, Sigma Aldrich, Saint Louis, USA</p> <p>^BRB: Rockland Blocking Buffer, Rockland, Limerick, USA</p> <p>^CPBS-T-RB: PBS-T with 10 % v/v blocking buffer</p>			

Table S3. Summary of the number experiment conducted for obtaining the graphs in Figure 5.

Graph	Fluidic units	Repetition	Total number of measurement
5.a FER	36 (on 3 CD)	3	216 measurements of rotational frequencies.
5.b FER	3 (on 2 CD)	3 and 2	136 measurement of liquid volume displacement.
5.c TER	4 (on 3 CD)	3	252 adjustment of valve's screw rotation degree and 504 measurement of rotational frequencies.
5.d TER	3 (on 2 CD)	3 and 2	72 adjustment of the valve's screw rotation degree and measurement of liquid displacement volume.

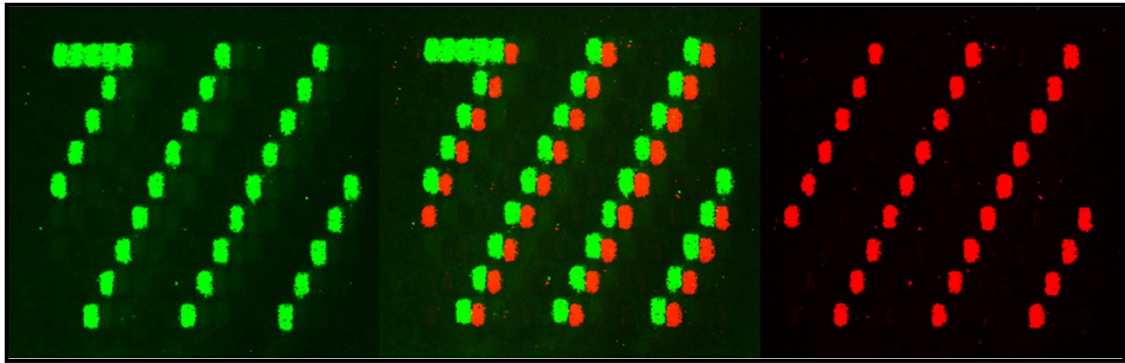


Figure S2. The following figure confirms the specificity of anti-HA and anti-Flag antibodies and the integrity of the disc experiment. The experiment was conducted under the same conditions as the one presented in the manuscript. In this experiment, anti-HA antibodies were labelled with Dylight550 (green) and anti-Flag antibodies with Cy5 (red). As there is no spectral overlap of these fluorophores and the distance between the excitation wavelengths and the emission filters for these fluorophores is higher, no crosstalk is observed. However, it must be mentioned that auto fluorescence is usually higher in the green channel.