Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Material for

Bubble pump: Strategy for in-plane liquid routing

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Supplementary Video Captions

Supplementary Movie 1. Video showing the bubble pump in operation with working fluids of ethanol and air. With the following operational conditions:

T_{act}=500ms
T_{wd}=500ms
P_{act}= 0.25 psi
P_{wd}= 0 psi
P_{ps}=0.1 psi

Supplementary Movie 2. Video showing the bubble pump in operation with working fluids of mineral oil and air. With the following operational conditions:

T_{act}=1500ms
T_{wd}=1500ms
P_{act}= 0.3 psi
P_{wd}= 0 psi
P_{ps}= 0.15 psi

Supplementary Movie 3. Video showing the bubble pump in operation with working fluids of culture medium and air. The gas and liquid channel dimensions were reduced to prevent foaming of the culture medium. The bubble pump is operating with the following operational conditions:

T_{act}=500ms
T_{wd}=900ms
P_{act}= 0.55 psi
P_{wd}= 0.17 psi
P_{ps}= 0.45 psi

Supplementary Movie 4. Video showing two bubble pumps operating in parallel with working fluids of mineral oil and air. The parallel configuration was devised to enhance the flowrate output. Both bubble bumps operating in parallel with the following conditions:

T_{act}= 500ms
T_{wd}= 1000ms

P_{act}= 0.3psi
P_{wd}= 0psi
P_{ps}= 0.15psi

Supplementary Movie 5. Video showing a scaled-up device with twelve independent liquid lines each equipped with a bubble pump which drives the working liquid of mineral oil from the inlet well towards the outlet. All twelve bubble pumps operate under the following conditions:

T_{act}=1000ms
T_{wd}=1000ms
P_{act}= 0.3 psi
P_{wd}= 0 psi
P_{ps}= 0.16 psi