Author Contributions

Dmitriy V. Zhukov, Eugenia M. Khorosheva, Tahmineh Khazaei, Wenbin Du, David A. Selck, Alexander Shishkin, and Rustem F. Ismagilov. 2019. "Microfluidic SlipChip device for multistep multiplexed biochemistry on a nanoliter scale." Lab on a Chip. 19(19):3200-3211.

SI

Contributions of Non-Corresponding Authors

Dmitriy V. Zhukov

- Based on the initial prototype by D.A.S., improved, fabricated, and tested initial drop-in device prototypes.
- Designed, fabricated, and tested final drop-in device prototypes, with feedback from E.M.K.
- Performed experiments to generate data for figures 3 and 4.
- Performed on-device steps of the experiments to generate data for figure 6, together with E.M.K.
- Analyzed sequencing data results for figure 6.
- Generated figures 1, 2, 3, 4, 5 (right panel), 6, S1, S2, S3, S4.
- Contributed to writing of all sections of the manuscript and supporting information.

Eugenia M. Khorosheva

- Major contributor to the idea of making the device for barcoding for RNAseq.
- Re-designed RNAtag-Seq protocol (from extraction to barcoding) to perform it as an additive protocol on device. Key additions/changes: selected published lysis methods that work for bacteria and does not impair ligation performance; each step works well for small initial number of loaded RNA molecules; used surfactants, and step-wise added buffers allow for performing a pipeline of biochemical reactions on device without any intermediate clean ups; wash buffer stops ligation and allow for pooling nucleic acids well enough so the loss on water/oil interface is neglectable.
- Contributed to writing Experimental and SI sections.

Tahmineh Khazaei

- Developed pipeline to process and analyze sequencing data.
- Analyzed data shown in figure 6.

Wenbin Du

- Theorized the drop-in idea in the context of microfluidic SlipChip devices.
- Generated figure 5 (left panel).

David A. Selck

- Designed the initial drop-in device prototype.
- Optimized the automatic spotting process.

Alexander A. Shishkin

- Major contributor to the idea of making the device for barcoding for RNAseq.
- Re-designed RNAtagSeq protocol off device to work for small initial number of loaded RNA molecules. Key additions/changes: suggested addition UMIs to p38 sequence, suggested modified R14 and P38 sequences; optimized intermediate clean up between off device reactions using MyOneSilane beads and final 0.6 - 0.7 v/v EtOH for size selection.