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

Supplementary Information

Nanoscale Sorting of Extracellular Vesicles via Optically-Induced Dielectrophoresis on an Integrated Microfluidic System#

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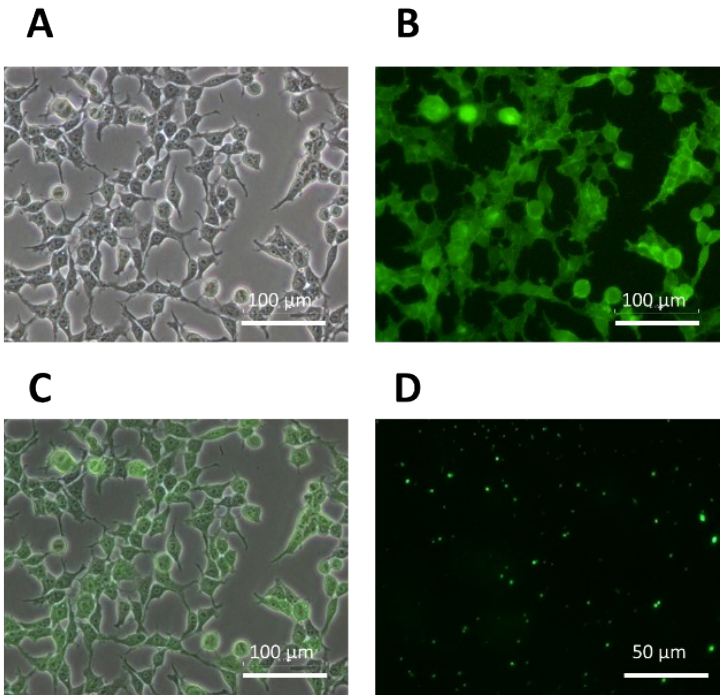

Fig. S1. (A) Luminescence, (B) fluorescence and (C) combined photographs of PalmGRET cells. (D) Fluorescence images of cell-derived exosomes.

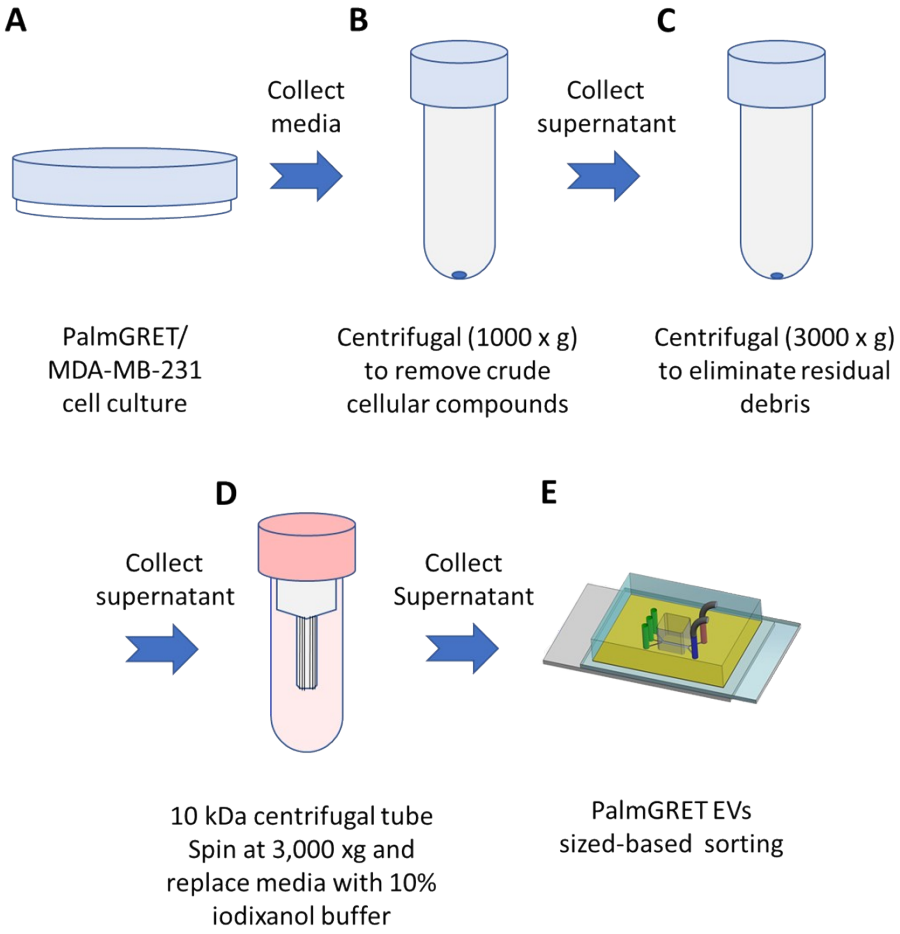

Fig. S2. The experimental procedure for EVs collection. (A) PalmGRET cell culture. (B) The media was centrifuged at 1,000 xg to remove crude cellular compounds. (C) The collected supernatant was centrifugated at 3,000 xg to eliminate residual debris. (D) Amicon Ultra-15 centrifugal filter units were spun at 3,000 xg to concentrate, and media was replaced with a 10% (w/v) iodixanol buffer. (E) The prepared EVs were used in downstream experiments.

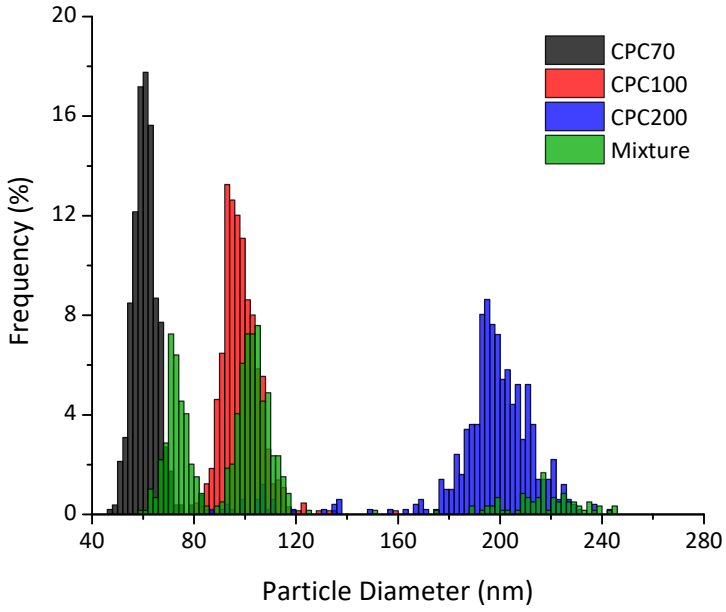

Fig. S3. The qNano results. Calibration beads, which contained three closely-sized distribution particles (CPC70+CPC100+CPC200 with a 1:1:1 (w/w) ratio), were measured to test the size-determining resolution of the qNano, thus resulting in highly-accurate size distribution.

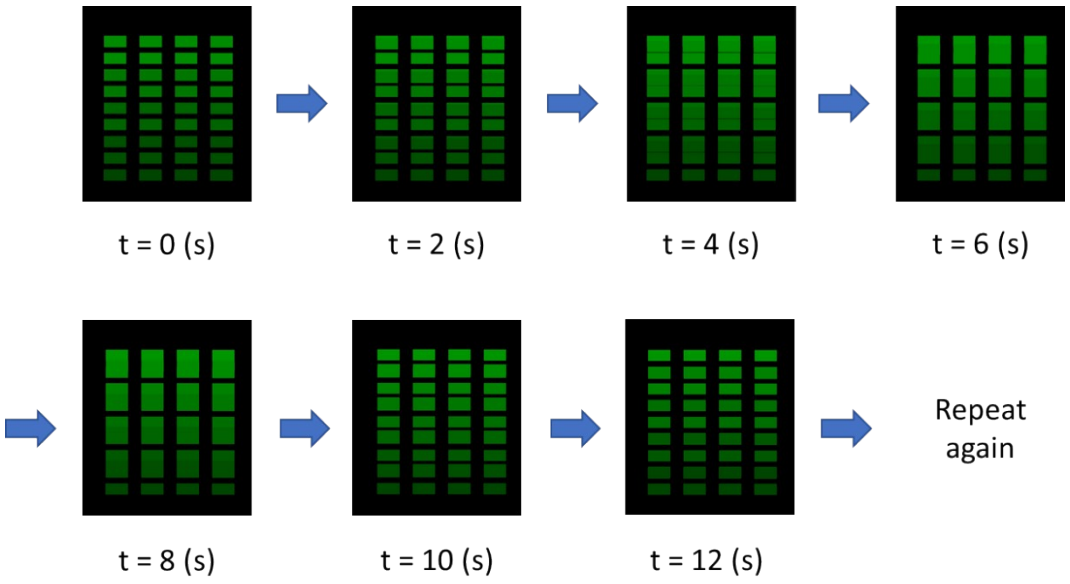

Fig. S4. Light bars moving downwards at 10 μm/s. The intensity of the light bars decreased from the top to the bottom of the channel. At the beginning (t=0 s), the light bars were separated. As they shifted downwards, they began to overlap. Gradually, they began to spread back out again (t=12 s), and the process was repeated for EVs sorting.

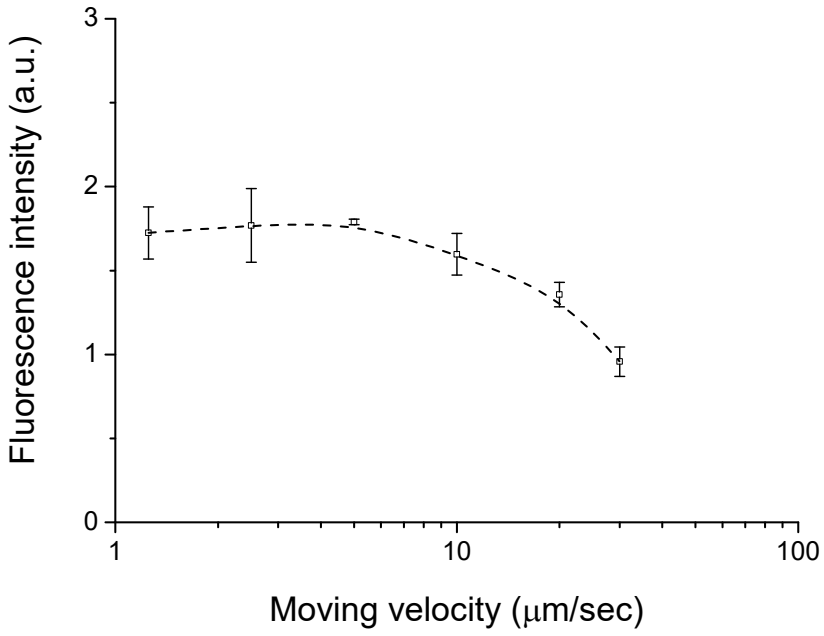

Fig. S5. The fluorescence intensity under different moving velocity of light bars.

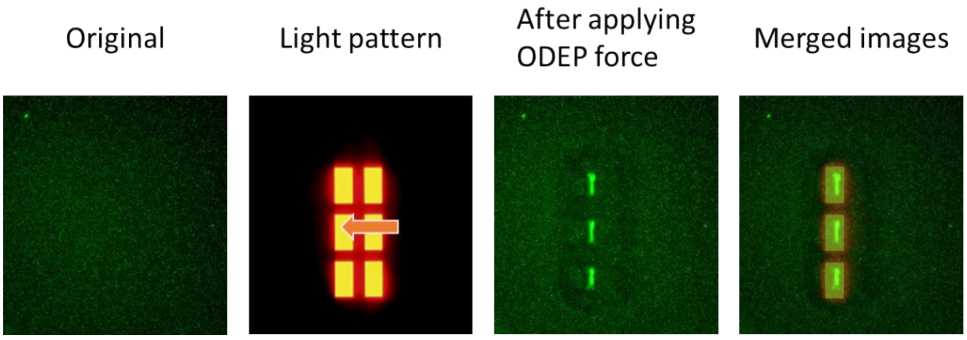

Figure S6. (A) Original image of EVs in the 30-μm-thick microchannel. (B) Light pattern moved from right to left for EVs collection. (C) Image with EVs collected form surrounding by using positive ODEP force. (D) Merged images of the light pattern and collected EVs.

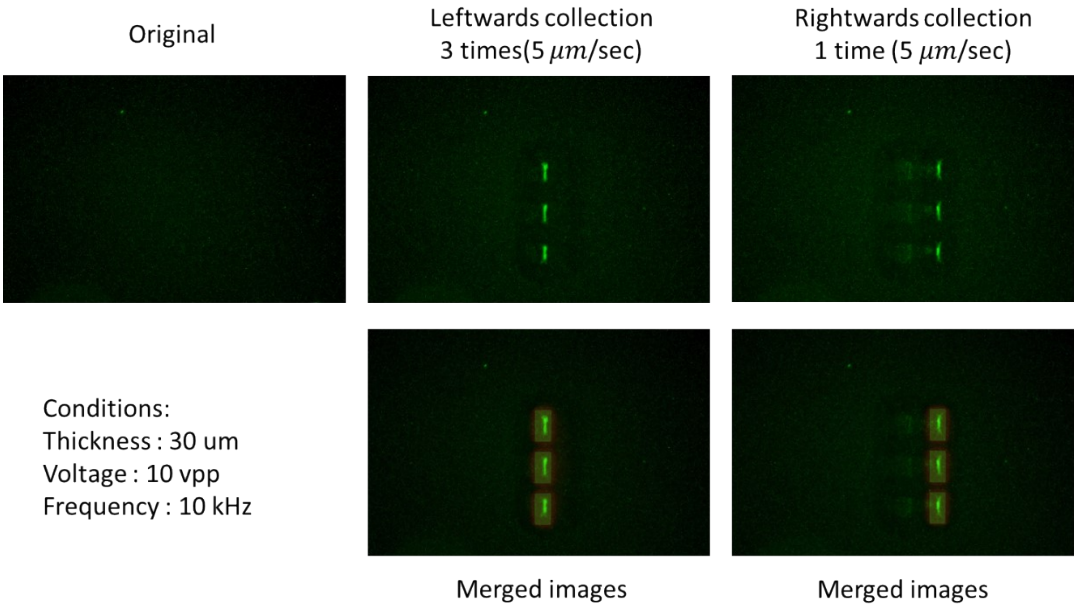

Fig. S7. Experimental procedure when determining the optimal thickness of the microchannel.

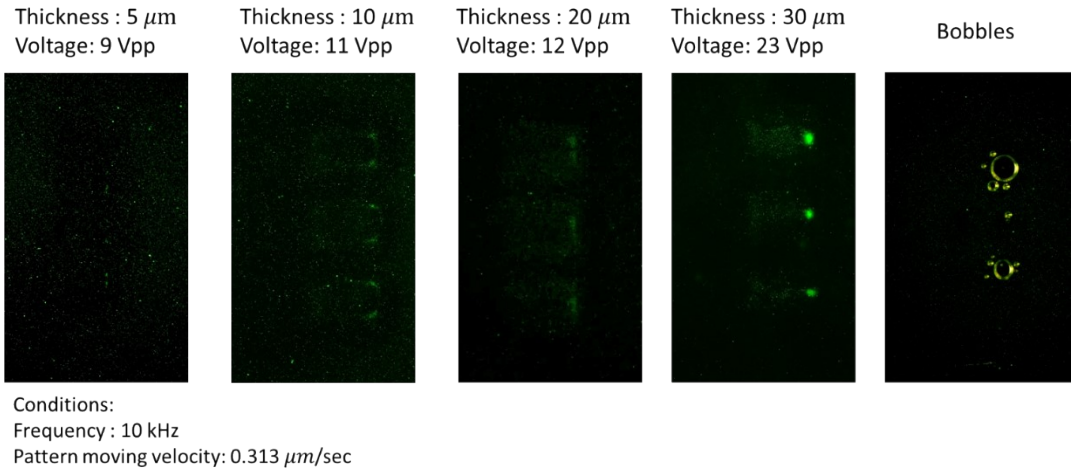

Fig. S8. Fluorescence images of EVs in the double-side-taped microchannel with different thickness.