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Electronic Supplementary Information

Droplet contact-based spheroid transfer technique as a multi-step assay tool for spheroid array

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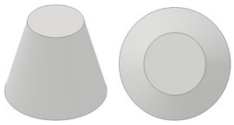
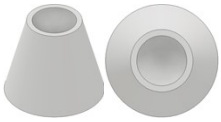
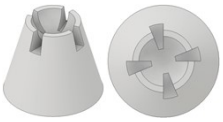
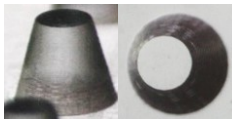
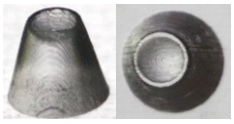
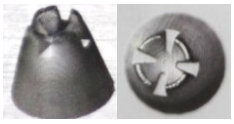
Table S1 Comparison of three pillar designs (width of the pillar top: 1 mm, size of the spheroid: 450 μm).

Type of pillar	Flat plateau	Concave plateau	Concave plateau with air channels
Schematics			
Real image			
Volume of transferred drop	0.24 ± 0.05 μL	0.21 ± 0.01 μL	0.27 ± 0.05 μL
Spheroid transfer rate	79.2 ± 20.1%	93.8 ± 6.2%	100%
Cause of transfer failure	Slip of spheroid while repetitive drop contact	Bubble trap on the plateau	-

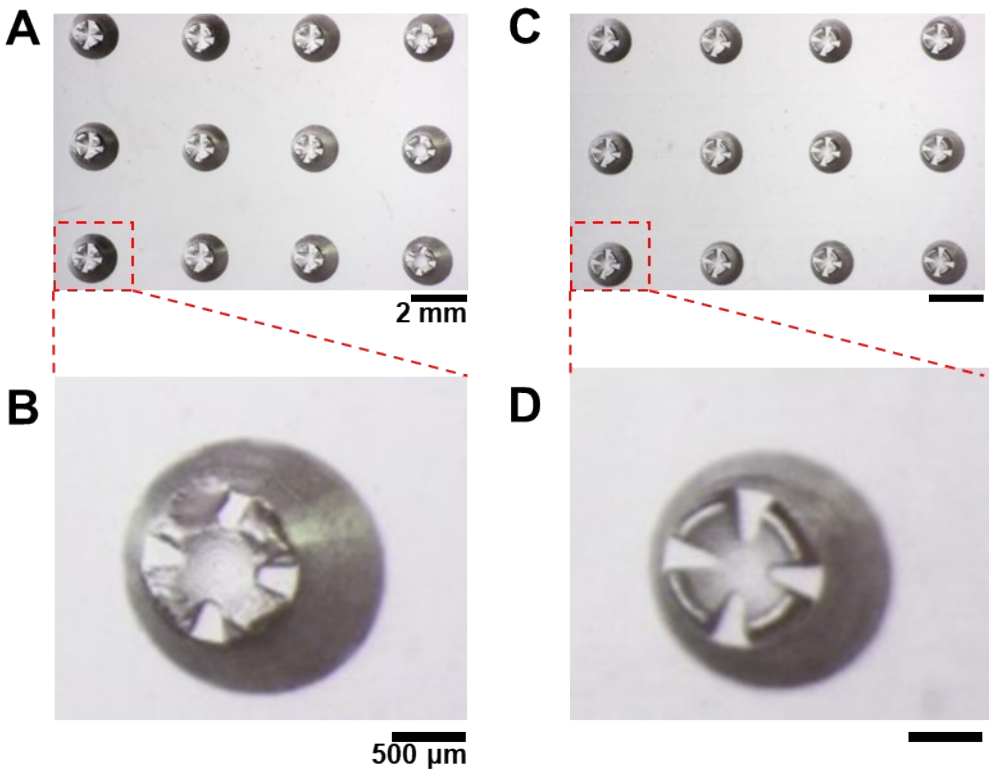


Fig. S1 Effect of silanization on PDMS molding. (A,B) PDMS-based pillar array chip made from uncoated PlasCLEAR mold (A) and its magnified image (B). (C,D) PDMS-based pillar array chip made from silanized PlasCLEAR mold (C) and its magnified image (D).

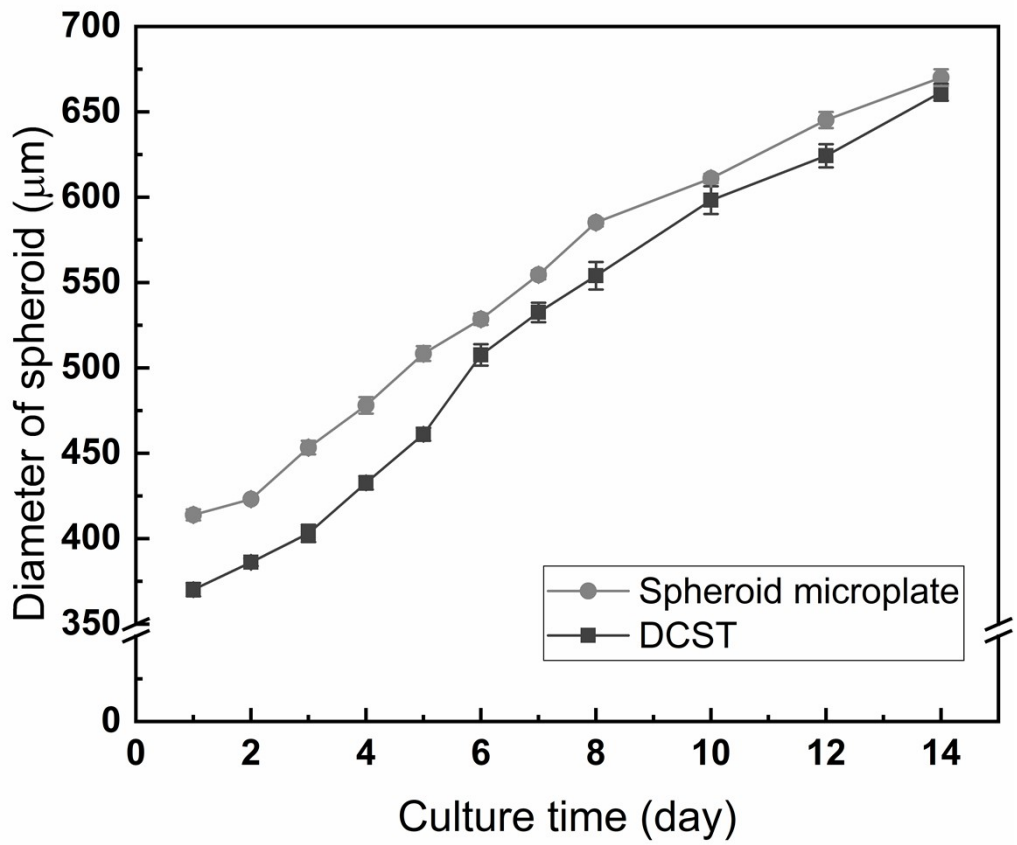


Fig. S2 Growth of BT-474 spheroids for 14 days in a 384-well spheroid microplate using manual pipetting and a drop array chip using droplet contact-based spheroid transfer (DCST). The initial seeding number of BT-474 cells was 4000 for both devices.

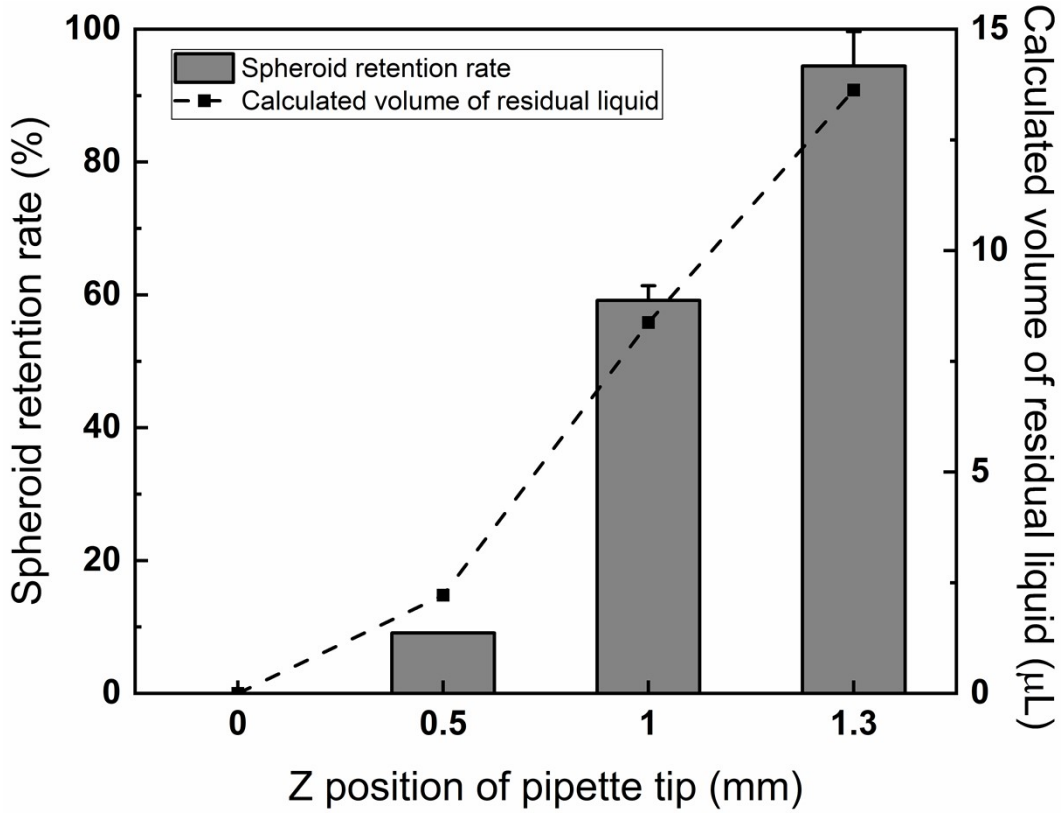


Fig. S3 Spheroid retention rate using an automated pipetting platform and calculated volume of residual liquid according to the z position of the pipette tip.

Fig. S4 A picture of spheroids sticking to the device that has not been coated with BSA. The white dots pointed by the red arrows are the spheroids attached to the drop array chip. Scale bar = 5 mm.

Video S1. Transfer of the BT-474 spheroid array from drop array chip to pillar array chip using droplet contact-based spheroid transfer.

Video S2. Transfer of the BT-474 spheroid array from pillar array chip to drop array chip using droplet contact-based spheroid transfer.

Video S3. Serial confocal images along the z-axis of BT-474 spheroids cleared by various clearing techniques. The z-axis interval is 10 μm.