Supplementary materials

Video descriptions

Movie 1

With the use of micropipette 3D micromanipulations, a single living Raji cell was captured and placed into the micropillar array under the guidance of fluorescent field.

Movie 2

Comparison of micropillar-based physical immobilization of Raji cells for AFM detection. Without micropillar immobilization, the AFM probe pushed away the Raji cells. With the use of micropillar substrate, the Raji cell could be effectively immobilized, allowing AFM to perform indentation assay on the cell.

Movie 3

With the use of micropipette micromanipulation, a single HEK 293 cell was detached, captured, and placed into the micropillar array.

Movie 4

A single HEK 293 cell grown on micropillar array during the first 12 hours.

Movie 5

A single C2C12 cell grown on micropillar array during the first 10 hours.

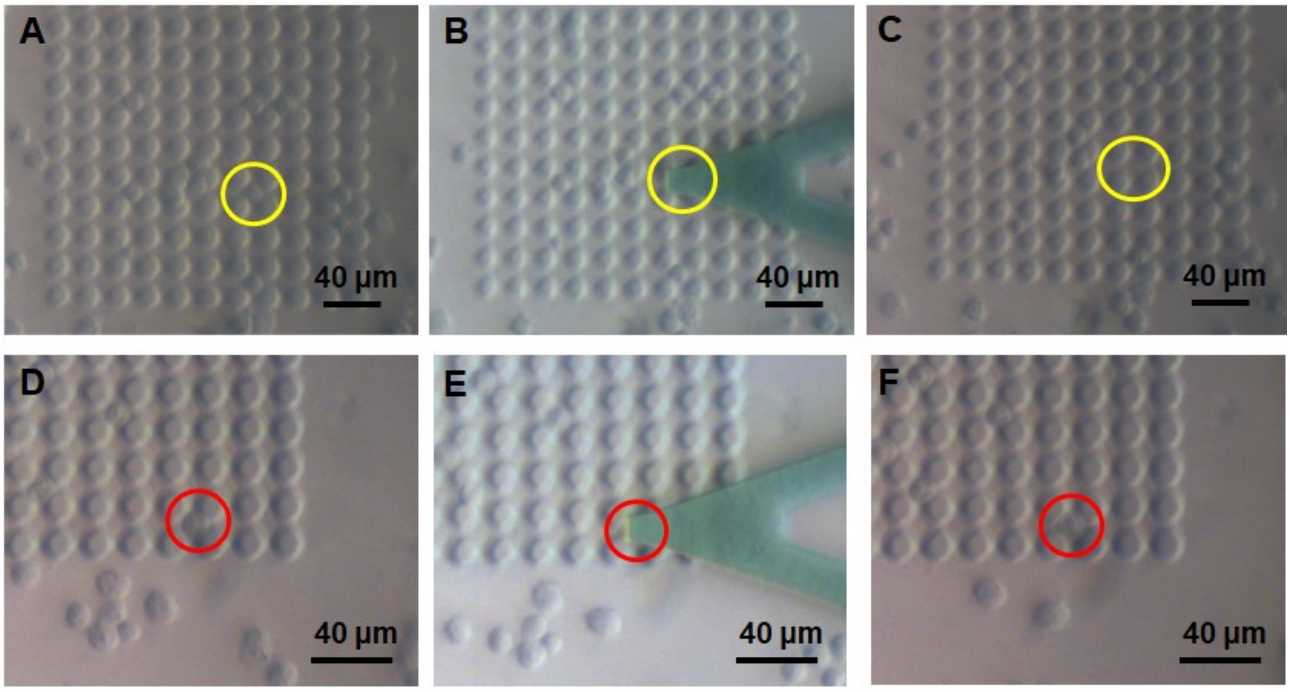

Fig. S1 Optimizing the heights of the fabricated micropillars to effectively immobilize cells for AFM detection. (A-C) Results of immobilizing Raji cells by 5-μm-height micropillars. After AFM detection, the cell left its original position. (D-F) Results of immobilizing Raji cells by 8-μm-height micropillars. The cell was still in its original position after AFM detection.

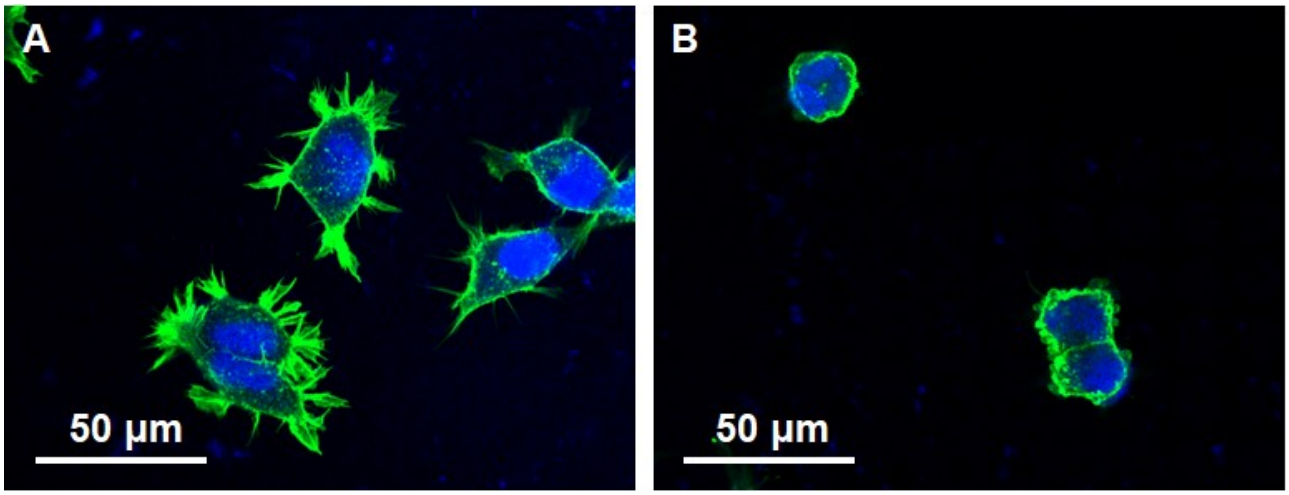

Fig. S2 Confocal fluorescence microscopy images showing the structural differences of HEK 293 cells in adherent states (A) and suspended (B) states. Actin molecules were stained with green fluorescence and nuclei were stained with blue fluorescence.

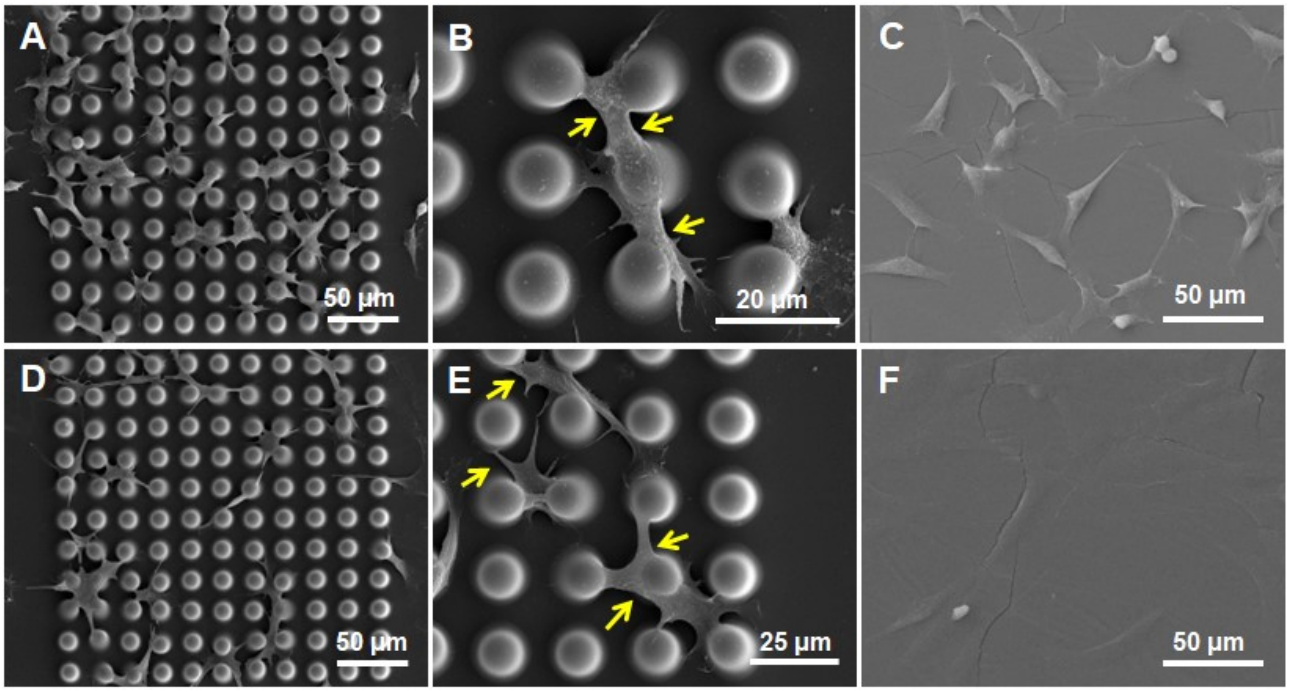

Fig. S3 SEM images of adherent cells (HEK 293 and C2C12) grown on PDMS micropillar array (A, B, D, E) and PDMS flat surface (C, F). (A, B, C) HEK 293 cells. (D, E, F) C2C12 cells. The yellow arrows denote the gaps between cells and substrates.

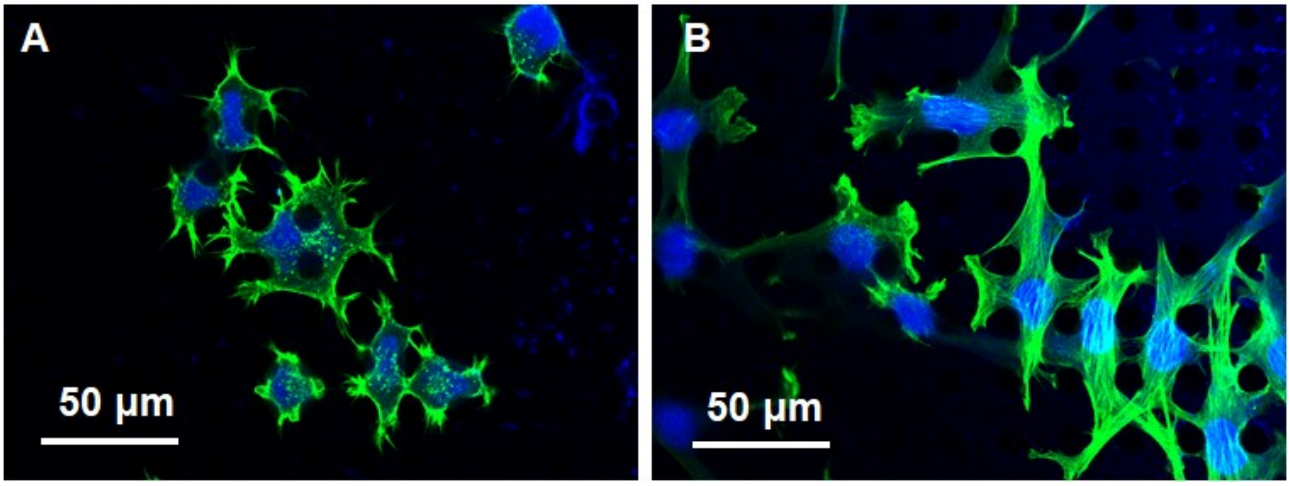

Fig. S4 Confocal fluorescence microscopy images of HEK 293 cells (A) and C2C12 cells (B) grown on micropillar array. Actin molecules were stained with green fluorescence and nuclei were stained with blue fluorescence.