Electronic Supplementary Material (ESI) for Lab on a Chip

Supporting Information

An Ultracompact Optofluidic Cytometer with Integrated Oil-core/PDMS-cladding Waveguides

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1. Supporting Figures

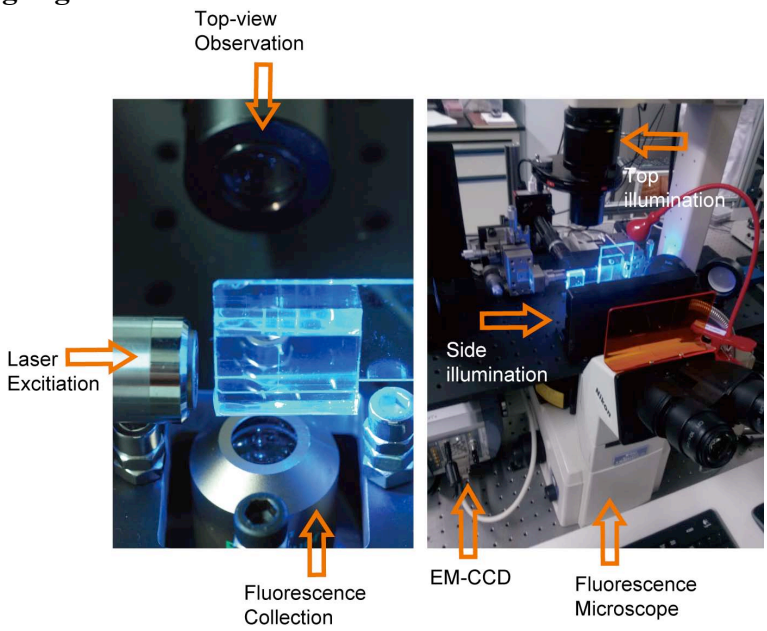

Fig. S1 The homebuilt apparatus for performance test of the cytometer chip. We machined an optical breadboard and mount it on a Nikon inverted fluorescence microscope. The semiconductor CW laser, sample holder, and objective for excitation are mounted on this breadboard with wide and precise tunability. We also built a horizontal imaging system containing a long working-distance objective lens and a CCD camera to provide the "top-view" observation of the device. Two imaging systems are integrated together to monitor the dynamic process and to count the cells simultaneously.

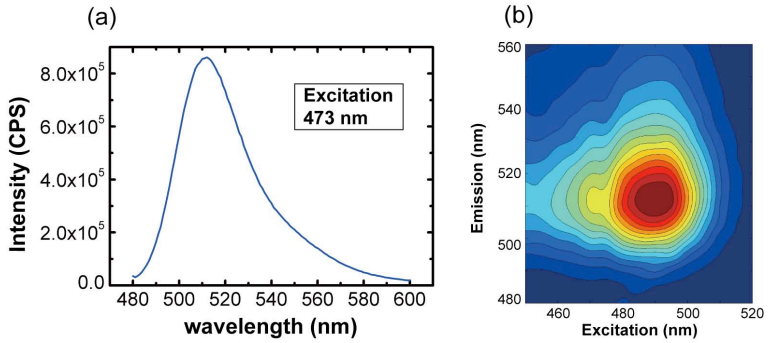

Fig. S2 The fluorescence spectrum of the suspension of live cells stained with calcein-AM. (a) The emission spectrum of the cell under 473nm excitation. (b) The two-dimensional spectrum revealing the relationship between the excitation and emission.

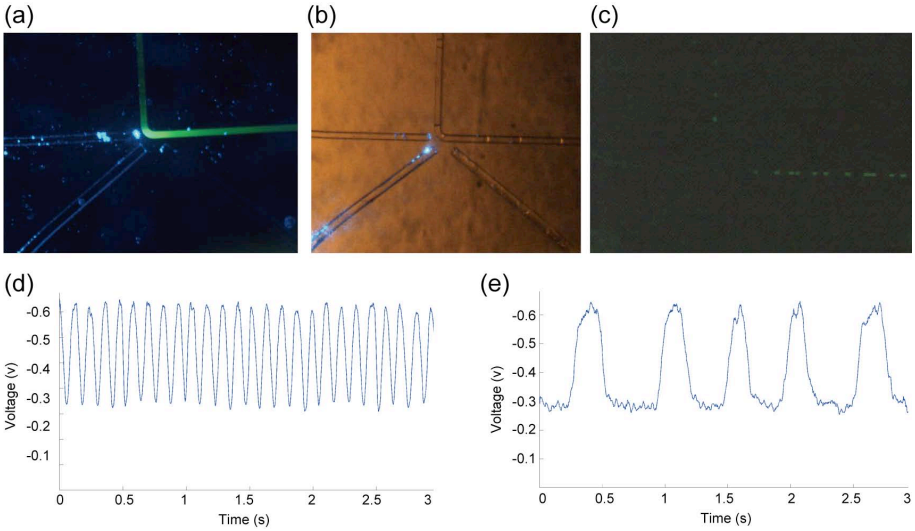

Fig. S3 Counting the fluorescence of the micro-droplet emulsions. (a) The precisely guided excitation causes a laser induced fluorescence (LIF) at a localized region. (b) The bright field image of the chip. The fluorescence aqueous droplets are formed in a stream of water-immiscible fluorinated carrier fluid. The droplets are separated by the carrier fluid and flow through the sensor region one by one. The size, velocity, and fluorescein concentration of the droplets can be changed easily. (c) The fluorescence image of the aqueous droplets. (d) and (e) show the counting result of the droplets with different size and velocity. Besides counting, we can also assess the size of the droplets from the plots.