M_{kit}: A Cell Migration Assay Based on Microfluidic Device and Smartphone

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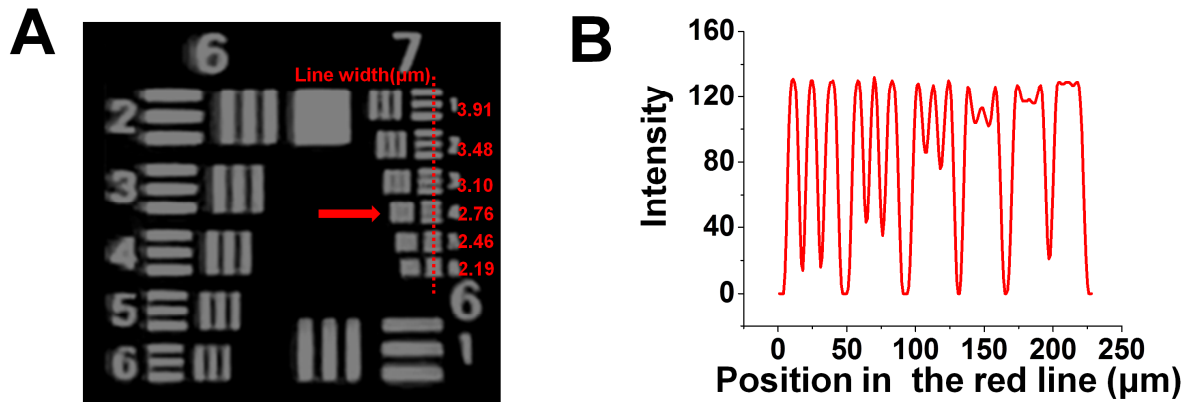# Supplementary Information

Figure S1

Figure S1. **Imaging performance of the smartphone system.** (A) The resolution target can be resolved by the smartphone system at (group 7, elements 4) with the corresponding resolution of 2.76 µm as indicated by the red arrow and the scale. (B) The plot shows the corresponding image intensity profile along the red line in (A) (from top to down).
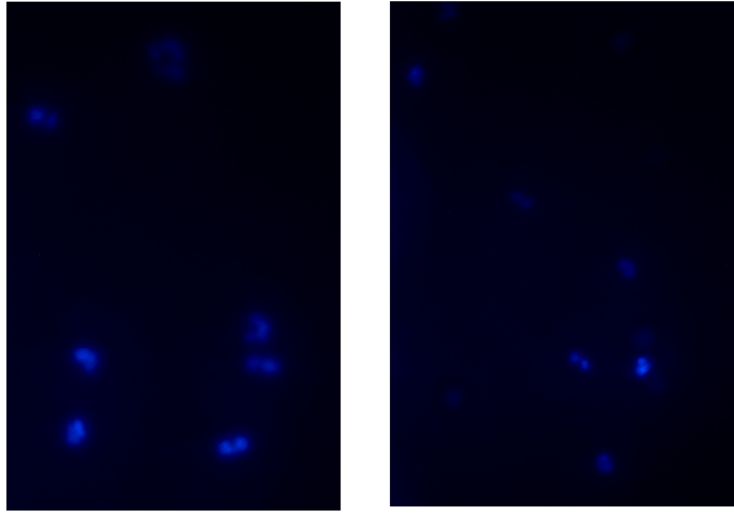
Figure S2

Figure S2. **Two representative DAPI staining images showing polymorphonuclear cells.**

Figure S3

Migration distance:51.7±3.6μm

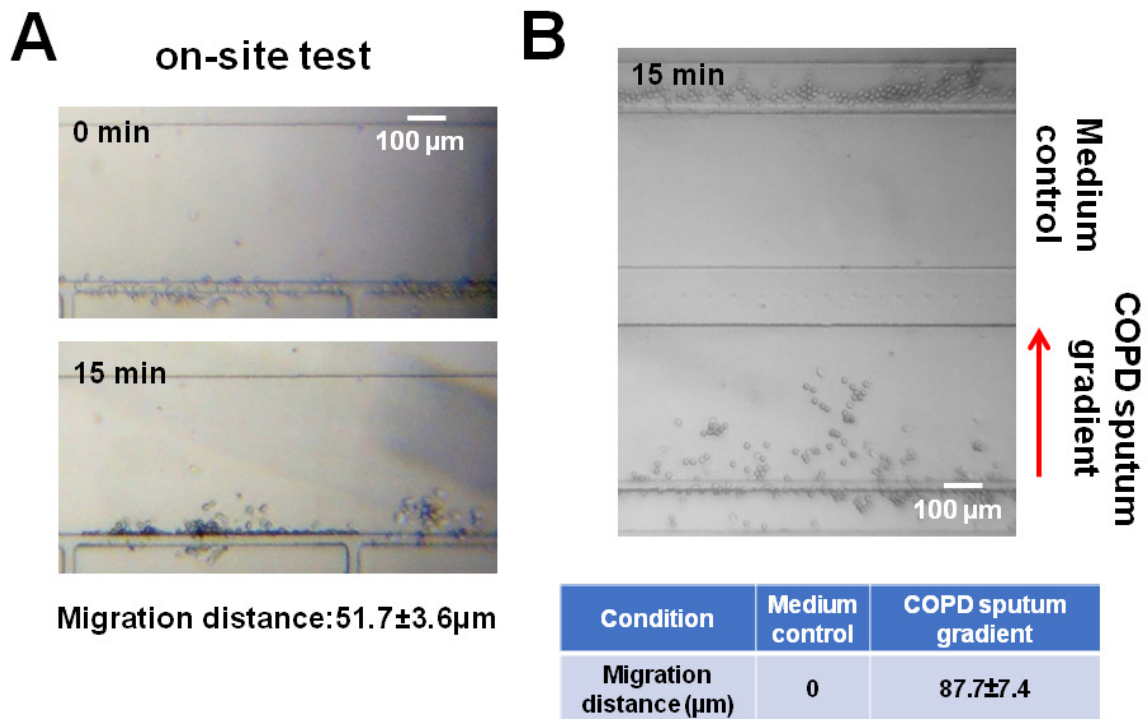| Condition	Medium control	COPD sputum gradient
Migration distance (μm)	0	87.7±7.4

Figure S3. **On-site test and clinical sample test using the M$_{kit}$.** (A) Representative chemotaxis test of neutrophils from healthy donors directly at a local hospital (Victoria General Hospital in Winnipeg) without specialized cell culture and imaging facilities. The cell images in the device at the beginning and the end of the test to a 100nM fMLP gradient are shown. The average cell migration distance toward the gradient is indicated. The error is the standard error of the mean (s.e.m.). (B) To demonstrate the effective use of the M$_{kit}$ for potential clinical diagnostic application, we tested human blood neutrophils from healthy donor to a gradient of sputum supernatant from patient with chronic obstructive pulmonary disease (COPD) using the M$_{kit}$. The cell images in the device to the medium control and a COPD sputum gradient at the end of the experiment are shown. The average cell migration distance toward the gradient is indicated. The error is the standard error of the mean (s.e.m.).

Supplemental Movie 1. Demonstration of parallel neutrophil chemotaxis test to a 100 nM fMLP gradient in duplicate using the M$_{kit}$.