Abstract Submitted
for the TSF13 Meeting of
The American Physical Society

Cell Elasticity-based Microfluidic Isolation of Metastatic Tumor Cells MUHYMIN ISLAM, SAMIR IQBAL, Department of Electrical Engineering, University of Texas at Arlington, Arlington, TX 76011, USA, YOUNG-TAE KIM, Department of Bioengineering, University of Texas at Arlington, Arlington TX 76010, USA — Circulating tumor cells (CTCs) have significant diagnostic value for cancer patients. We report a label-free, simple and rapid microchannel filter type device for isolation of metastatic cancer cells based on their mechano-physical properties like size and deformability. The microdevice fabricated in polydimethylsiloxane (PDMS) using soft-lithography contained one inlet and one outlet connected via 400 microchannels. It was observed that metastatic renal cancer cells, derived from real patient's brain tumor were highly elastic and squeezed through microchannels much smaller than their sizes. Using a reverse-selectivity approach, the number of microchannels and their dimensions were varied to optimize and reduce the shear stress on tumor cells such that these did not pass through filtering channels. Consequently, the cancer cells were collected with an efficiency of more than 78% using channels with cross section area of 5 μm x 5 μm. Eventually tumor cells were mixed with blood and successfully isolated. The microfluidic channel device did not require pre-processing of blood (except dilution) or tagging/modification of cells.

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Date submitted: 11 Sep 2013 Electronic form version 1.4