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### Microfluidic platforms for isolating tumor cells from blood samples

Over the last decade, there has been great interest in utilizing the peripheral blood circulating tumor cells (CTCs) to predict response to therapy and overall survival of cancer patients. CTCs shed from the tumor are thought to contribute to the hematogenous spread of cancer to distant sites. Despite the clinical importance of CTCs, current knowledge of these cells is extremely poor, largely owing to the fact that their isolation and enumeration is very challenging. CTCs are very rare, typically ranging from 1 to 10 cells per milliliter of blood. One important advantage of using a CTC blood test is that it possesses a significantly lower risk to the patient compared to surgically obtaining a fresh tissue biopsy. Recently, several groups started developing microfluidic platforms for CTCs isolation. Microfluidics, first introduced two decades ago, presents an attractive approach for engineering and miniaturizing bioassays by accurately controlling biological samples and their microenvironments. Microfluidics has the potential to achieve high throughputs, sensitivity and selectivity for innovative single cell analysis platforms. This talk will highlight our efforts in developing a microfluidic device for isolating plasma CTCs from multiple myeloma (MM) blood samples. MM is a cancer caused by malignant plasma cells in bone marrow. The device was able to detect a low (<10 cell/mL) level of plasma cells in normal blood, which increased significantly in MM patients. The device showed superior sensitivity and was able to detect an elevated CTCs count in MM patients that have otherwise normal peripheral blood indicators of MM.

### Biography

Mohammad A Qasaimeh is an Assistant Professor of Mechanical and Biomedical Engineering at NYU Abu Dhabi (NYUAD), and the Tandon School of Engineering, New York University, Brooklyn, USA. His current research interests include developing microfluidic devices for clinical applications and point of care diagnostics. Prior to joining NYUAD, he was a Post-doctoral Associate at Massachusetts Institute of Technology and Harvard Medical School. He completed his PhD degree in Biomedical Engineering from McGill University, and his research has been published in several journals including Nature Communications, Lab on a Chip, and Scientific Reports. He delivered more than 15 keynotes and invited speeches at national/international conferences, and is involved in organizing several local/international conferences.

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