

BIOENGINEERING

PRESENTS

Microfluidic Engineering of Molecular Bioassays towards Clinical Diagnosis



FRIDAY, JANUARY 29, 2016

1:00 PM – 2:00 PM

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ABSTRACT:

We are entering the era of precision medicine where personal molecular characteristics are used to design and tailor diagnostic, prognostic and therapeutic strategies. Progress towards precision treatment of diseases, such as cancer, demands better biomarkers and assays to measure risk, diagnose disease, and predict patient prognosis and therapy response. Microfluidics offer an enabling platform for leveraging quantitative and systems analysis of molecules and cells. This presentation will discuss the development of different microfluidic systems for sensitive and quantitative molecular analysis and their applications to clinical diagnosis of cancer. The first part of the talk will be focused on microfluidic engineering of bioaffinity assays on the pico- to femtoliter scales to substantially improve the quantitative detection and glycan profiling of protein biomarkers associated with tumors. In the second part, I will discuss developing new nano-interfaced microfluidic systems to investigate circulating exosomes in patient plasma as liquid biopsy for non-invasive cancer diagnosis. We demonstrate that these new methods enables quantitative detection and molecular profiling of tumor-derived exosomes directly from minimally invasive amount of plasma samples with markedly improved detection sensitivity and speed. These findings would suggest the feasibility of translating these microfluidics-enabled bioassays into biomedical studies and clinical utilities.

BIOGRAPHY:

Dr. Yong Zeng is an assistant professor of Chemistry and affiliated faculty with the Bioengineering Graduate Program at the University of Kansas. He is also a full member of the KU Cancer Center. Dr. Zeng received his Ph.D. in Chemistry from the University of Alberta with Jed Harrison in 2007. He completed his postdoctoral training with Richard Mathies at the University of California, Berkeley, where his research was focused on single cell analysis of early-stage carcinogenic mutations in blood cancer using microfluidic technology. Dr. Zeng started his independent career at the KU In 2012 and a primary aim of his research is to develop new enabling micro- and nanoscale technologies for precision molecular measurements in complex biological systems.