Dielectric-based Microfluidics for Label-free Cell Analysis

Microfluidic biosensors capable of performing rapid and accurate analysis on minute amounts of biosamples are promising candidates for medical and biological applications. Dielectric measurement incorporated in microfluidic platforms provide the unique opportunity of label-free analysis of biological phenomena at the cellular level. Cells are individually interrogated based on their intrinsic dielectric properties, without using external markers. In this talk, I discuss recent advancements in dielectric characterization of biological phenomena using microfluidic dielecterophoresis cytometry and impedance spectroscopy. I present the successful application of a developed dielectric-based microfluidic approach for i) detection of electroporation and ii) estimation of viability in pharmaceutical bioreactors. Finally, I discuss future paths towards advancing dielectric techniques for the analysis of single cell protein content.