Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Multiplexed microfluidic quantification of proteins in serum

NITIN RAJAN, SUKUMAR RAJAURIA, ANDREW CLELAND, Univ of California - Santa Barbara — Rapid and low cost immunoassays targeting proteins in blood or other bodily fluids are highly sought after for point-of-care devices and early screening of patients. Immunoturbidimetric assays utilize latex particles functionalized with antibodies, with particle aggregation in the presence of the analyte detected by a change in absorbance. Using a high throughput micro-fluidic particle analyzer based solely on electrical signals (resistive pulse sensing), we are able to accurately quantify the degree of aggregation by analyzing the changes in the particle size distribution. Thus we study the aggregation of streptavidin (SAv) coated beads in the presence of biotinylated bovine serum albumin as a proof-of-principle assay and extract the binding capacity of the SAv beads from the dose-response curve. We also use our aggregation measurement platform to characterize a commercial C-reactive protein (CRP) immunoturbidimetric assay (hsCRP, Diazyme Inc.). We obtain a linear calibration curve as well as a better limit of detection of CRP than that obtained by absorbance measurements. By using different bead sizes functionalized with different antibodies, multiplexed analyte detection is also possible. We demonstrate this by combining the commercial anti-CRP functionalized beads (0.4 microns) with biotin coated beads (1.0 microns), and carry out the simultaneous detection of SAv and CRP in a single sample.

Nitin Rajan
Univ of California - Santa Barbara

Date submitted: 13 Nov 2014 Electronic form version 1.4