Asymmetric Bead Immunoaggregation for Label-free Protein Detection

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This talk presents a novel immunoaggregation assay based detection of target protein up to femto-molar concentration for detecting A H1N1 influenza. This detection assay is a sandwich assay using specific antibody immobilized magnetic nanoparticles (MG) and polystyrene micro-particles (PS). A label-free detection is achieved by using a portable CMOS image sensor (CIS). Influenza type A H1N1 nucleoprotein (NP) triggered aggregation of MG and PS is selectively imaged by CIS, using magnetic attraction, to measure the size and count the number of beads. The number of beads counted represents the concentration of target protein. Our verification procedure includes fluorescence verification of molecular protocol and comparison with conventional single-type bead assay. This protein detection is rapid, label-free, and capable of the quantitative measurement of protein concentration and has potential for incorporating other contents. Our platform opens up new applications for protein detection.