

Accurate point-of-care diagnosis of AIDS based on label-free one-step-immunoassay

권정현, 장영은, 오재환, 이지원<sup>†</sup>

고려대학교

(leejw@korea.ac.kr<sup>†</sup>)

We developed an accurate, rapid, simple, and label-free assay method for point-of-care diagnosis of AIDS, which quickly produces strong optical signals through one-step-immunoassay. The HIV proteins, gp41, p24, and/or gp120 were used as the probes to detect anti-HIV antibodies in AIDS patient sera. In particular, gp41 and p24 were genetically presented on the surface of engineered protein nanoparticles to prepare sensitive 3-dimensional (3D) probes. The 3D probes also present multi-copies of hexa-histidine peptide (H6) on their surface to chemisorb gold ions ( $Au^{3+}$ ), which is essential to producing strong optical signals. Point-of-care diagnostic performance of the developed one-step-immunoassay was compared with that of conventional lateral flow assay (LFA) using 30 AIDS patient sera. The sensitivity of LFA was only 63% when a single antigen (gp41) was used but enhanced to 90% when three different antigens (gp41, p24, and gp120) were used together as the assay probes. On the contrary, the one-step-immunoassay using gp41 only produced strong optical signals within 15 min without causing any false negative/positive signals, showing 100% sensitivity and 100% specificity.