

LSPR sensor chip for the detection of hepatitis B virus surface antigen (HBsAg) based on sandwich-immunoassay

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This study aimed to develop a more sensitive method for the detection of hepatitis B surface antigen (HBsAg) using heteroassembled gold nanoparticles (AuNPs). A single layered localized surface plasmon resonance (LSPR) chip format was developed with antigen-antibody reaction-based detection symmetry using AuNPs, which detected HBsAg at 10 pg/mL. To further improve the detection limit, a modified detection format was fabricated by fixing a secondary antibody (to form a heteroassembled sandwich format) to the AuNP monolayer, which enhanced the detection sensitivity by about 100 times. The developed heteroassembled AuNPs sandwich-immunoassay LSPR chip format was able to detect as little as 100 fg/mL of HBsAg within 10-15 min. These findings confirm that the proposed detection strategy of heteroassembled AuNPs sandwich-immunoassay LSPR chip format may provide a new platform for early diagnosis of various human diseases.