Sensitive detection of hepatitis B surface antigen in real samples using gold nanoparticles via an immunoassaySensitive detection of hepatitis B surface antigen in real samples using gold nanoparticles via an immunoassay

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Gold nanoparticles (AuNPs) are widely used in a variety of applications, including DNA complementary binding and single nucleotide polymorphism analysis, immunoassay, photocatalytic efficiency improvement, heavy metal ion analysis, pathogenicity detection, protein activity analysis, cancer cell diagnosis, drug delivery, etc. In this study, a lateral flow analysis (LFA) strip was fabricated to detect the hepatitis B surface antigen (HBsAg) using a surface-modified AuNPs to confirm the detection result with a colorimetric signal. AuNPs were surface-modified using dihydrolipoic acid and conjugated with an antibody against HBsAg (anti-HB). The pristine AuNPs was also bound with an antibody against HBsAg (anti-HB) and compared with the detection limit of HBsAg of D-AuNPs. The AuNPs and D-AuNPs were characterized by TEM, FT-IR, and Zeta potential. And The degree of aggregation and antibody conjugation conditions were measured through Uv-vis spectroscopy. As a result of comparing detection limit through the LFA system, it was observed that up to 10 ng/mL detections were possible with D-AuNPs, whereas up to 1 μg/mL detections were possible with AuNPs.