Gold nanoparticle-decorated reduced-graphene oxide targeting anti hepatitis B virus core antigen

ABSTRACT

Hepatitis B virus core antigen (HBcAg) is the major structural protein of hepatitis B virus (HBV). The presence of anti-HBcAg antibody in a blood serum indicates that a person has been exposed to HBV. This study demonstrated that the immobilization of HBcAg onto the gold nanoparticles-decorated reduced graphene oxide (rGO-en-AuNPs) nanocomposite could be used as an antigen-functionalized surface to sense the presence of anti-HBcAg. The modified rGO-en-AuNPs/HBcAg was then allowed to undergo impedimetric detection of anti-HBcAg with anti-estradiol antibody and bovine serum albumin as the interferences. Upon successful detection of anti-HBcAg in spiked buffer samples, impedimetric detection of the antibody was then further carried out in spiked human serum samples. The electrochemical response showed a linear relationship between electron transfer resistance and the concentration of anti-HBcAg ranging from 3.91 ng mL−1 to 125.00 ng mL−1 with lowest limit of detection (LOD) of 3.80 ng mL−1 at 3 σ m−1. This established method exhibits potential as a fast and convenient way to detect anti-HBcAg.

Keyword: Hepatitis B virus; Antibody; Impedimetric biosensor; Reduced graphene oxide; Gold nanoparticles