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A smartphone-based electrochemical immunosensor for hepatitis B virus detection

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A label-free electrochemical immunosensor for the determination of hepatitis B virus (HBV) based on poly- β -cyclodextrin (P β -CD)/gold nanoparticles (AuNPs) modified electrode was developed. P β -CD provided the ability to capture the anti-HBV by host-guest interaction. In the presence of HBV, the specific interaction between HBV and anti-HBV brought HBV to the electrode, which leads to a lower accessibility of [Fe(CN) $_6$] $^{3-/4-}$ redox molecules to reach the electrode surface. The electrochemical signal of [Fe(CN) $_6$] $^{3-/4-}$ before and after binding with HBV could be clearly distinguished. The electrochemical detection of the proposed system was demonstrated using the smartphone-based point-of-care testing (POCT) platform. The proposed concept was successfully applied with the clinical sample. Moreover, this simple-to-fabricate label-free electrochemical immunosensor using a smartphone-based measurement system has the potential to be developed as an alternative diagnostic device for simple, low-cost, sensitive and selective HBV detection.

Biography

Prinjaporn Teengam is a postdoctoral researcher at Department of Chemistry, Faculty of Science, Chulalongkorn University. Her project interests are in the areas of Analytical Chemistry, Nanotechnology and Materials Chemistry. The existing research focuses on the development of DNA biosensors for biologically relevant analytes (e.g. bacteria, viruses and disease biomarkers).

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