

Detection and precipitation of hepatitis B core antigen using a fusion bacteriophage

ABSTRACT

The nucleocapsids of hepatitis B virus (HBV) are made of 180 or 240 subunits of core proteins or known as core antigens (HBcAg). A fusion bacteriophage bearing the WSFFSNI sequence that interacts tightly to HBcAg was employed as a diagnostic reagent for the detection of the antigen using the phage-enzyme-linked immunosorbent (phage-ELISA), dot blot and immunoprecipitation assays. The results from phage-ELISA and dot blot assay showed that as low as 10 ng of HBcAg can be detected optimally by 1.0×10^{12} pfu/ml fusion M13 bacteriophage. The sensitivity of the dot blot assay corresponds with that of the phage-ELISA. HBcAg in HBV positive serum samples can also be detected using the fusion phage via the phage-ELISA and phage-dot blot assay. The phage cross-linked to cyanogen bromide (CNBr) activated agarose can also be used to precipitate HBcAg in bacterial lysate. The optimum amount of phage needed for cross-linking to 1 g of agarose is about 7.0×10^6 pfu/ml which could also precipitate purified and unpurified HBcAg in bacterial lysate. This study demonstrates the potential of fusion bacteriophage bearing the sequence WSFFSNI as a diagnostic reagent and a ligand for the detection and purification of HBcAg respectively.

Keyword: Fusion phage; Hepatitis B virus; Immunoassays; Precipitation