

ABSTRACT

Hepatitis B is a liver disease caused by the Hepatitis B virus (HBV) and becomes one of major health problems in Indonesia with 2.5% -10% of the population having serum Hepatitis B surface antigen (HBsAg). HBV has a wide variety of serotypes in Indonesia which can put a risk of vaccination failure caused by the incompatibility of the subtype used to create the vaccine and the circulating subtype in the population. This study aims to predict HBsAg B cell epitopes compatible with the HBV type circulating in the Indonesian population so that they can be used for serodiagnosis or vaccination. Determination of sequences conservation and epitope prediction is done in silico with reverse vaccinology. 152,106 HBV protein sequences were downloaded from NCBI (as of October 18, 2018) and used as a BLAST + database. HBsAg sequences of HBV genotypes B and C were sought from the BLAST + database. From the BLAST + search, a total of 2,715 HBsAg sequences were found with adw, ayw, ayr, and adr serotypes. Antigenic variability analyzer (AVANA) was then used to search for conserved regions, in which 16 were identified in the HBsAg dataset of this study. Peptide prediction was performed using the BepiPred, LBTope, and epitope prediction tools on the Immune Epitopes Database Analysis Resource (IEDB). The results of the analysis showed that a peptide in the position 128-142 of HBsAg is conserved in HBV serotypes adw, ayw, and adr (genotypes B and C) and ayr (genotype C) with a conservation level > 80%. This peptide is also predicted to be a B cell epitope. Seven or more amino acids similarity to human protein is not found in this peptide, so no cross-reactivity is predicted with human proteins. Confirmation of antigenicity was done using HBsAg rapid test and enzyme-linked immunosorbent assay (ELISA). Both gave negative test results. In conclusion, a new HBsAg epitope in position 128 to 142 is predicted to be antigenic, but this has not been proven by in vitro testing.

Keywords: *Antigenicity, ELISA, HBsAg, HBV, reverse vaccinology*