ABSTRACT

The emergence of SARS-CoV-2 variants is primarily attributed to mutations in the S protein, diminishing the efficacy of existing vaccines that aim to generate antibodies against this S protein. As antibodies become less efficient, T cell-mediated immune response becomes essential in eliminating the virus. Three predominant HLA Class II alleles in the Indonesian population; HLA-DRB1*12:02, HLA-DRB1*15:02, and HLA-DRB1*07:01 play an important role in presenting viral peptide antigen to T-cells. Previously, peptides derived from SARS-CoV-2 N protein, namely, $NP^{263-280}$, $NP^{352-371}$, and $NP^{387-406}$ were predicted to bind to the predominant HLA class II alleles in the Indonesian population. Notably, $NP^{352-371}$ and $NP^{387-406}$ lacked IEDB reports. ELISpot assay was employed to validate the immunogenicity, confirming a positive T-cell response for $NP^{263-280}$ and $NP^{352-371}$. ELISA assay were conducted to assess donor antibody levels, revealing significant differences in anti-SARS-CoV-2 (N) IgG between donors with and without COVID-19 history. Moreover, the study found that memory T cells persist longer in circulation compared to antibodies, emphasizing the importance of T-cell responses for long-term immunity.

Keywords: SARS-CoV-2, COVID-19, Nucleocapsid protein, HLA, T cell-mediated immunity, Indonesian population immunogenicity