IDENTIFICATION OF PEPTIDE MARKERS FOR SPECIFIC DIAGNOSIS OF JAPANESE ENCEPHALITIS

PD Pushpakumara[1#], JMKC Jeewandara[2], GN Malavige[2] and CL Goonasekara[1]

1 Faculty of Medicine, General Sir John Kotelawala Defence University
2 Centre for Dengue Research, University of Sri Jayawardanapura
#For correspondence; bpdpushpakumara@gmail.com

Japanese encephalitis (JE) is one of the major viral diseases in Asian countries, and there are more than 70,000 JE cases reported annually. JE virus (JEV) belongs to the same family as the dengue virus and they both coexist geographically. Because of the cross reactivity between these two viruses, the detection of a past JEV infection has been difficult in a background of immunity to dengue virus. The currently available diagnostic kits for JEV show cross reactivity towards antibodies against dengue virus. The current study, therefore, aimed to develop an assay for the detection of pre-existing immunity specifically against JEV in a background of immunity to dengue. Bioinformatic analyses was conducted to identify short peptides from JEV proteins, which are conserved in JEV. Thirty six peptides are highly unique to JEV. The synthesis of 22 of the 36 peptides were successful in commercial synthesis and they were subjected to Enzyme Linked ImmunoSorbent Assay (ELISA), to identify peptides that respond to antibodies generated specifically against JEV. Sera were collected from healthy volunteers who have been JE vaccinated and non-vaccinated, with or without a past dengue infection. Seven of these peptides gave responses only to sera of individuals who had been vaccinated with JE and there were no antibody responses to sera of those who had not been vaccinated for JE but had past dengue infection. When those 7 peptides were assayed together as a pool, the specificity and sensitivity of detecting an individual with pre-existing immunity was 100% and 85% respectively. Therefore, those peptides can be utilized as a marker for the diagnosis of a JEV infection in the background of dengue infection.

Keywords: JEV, Diagnosing marker, ELISA, Dengue