## Abstract

There had been a number of historical dengue epidemics (either regional or island wide) over the last century (1915, 1931, 1942-1943, 1981, 1987-1988, 1991, 1994, 1995, 1998 and 2000) in Taiwan. Among these, 1915, 1931 and 1942-1943 outbreaks were island wide large epidemics. For seroepidemiologic study, plaque reduction neutralization test (PRNT) remains the gold standard for the confirmation and serotyping of past dengue infections in the regions where two or more flaviviruses are co-circulating. This is due to high cross-reactivity of envelope (E)- and membrane (M)-specific IgG antibodies produced from Japanese encephalitis/Yellow fever vaccination and sequential flavivirus The PRNT, however, is time consuming and difficult to perform, infections. and not as amenable to testing large numbers of sera such as ELISA. To solve this problem, an NS1 serotype-specific indirect ELISA was developed to differentiate primary and secondary dengue infections and serotypes of primary dengue infection. We had previously reported retrospective seroepidemiologic studies on serum samples collected from residents of Liuchiu Hsiang, Pingtung County in the southern Taiwan during 1997-1998. The results demonstrated that NS1 serotype-specific IgG ELISA can replace PRNT for seroepidemiologic study to differentiate JE and dengue infections and for the dengue serotyping. The age-dependent increase in NS1-specific IgG positive sera from older individuals provided strong support that the 1942-1943 and 1931 outbreaks were indeed dengue infections.

In this study, we carry out retrospective seroepidemiologic studies on serum samples collected from residents of Kaohsiung city. The dengue seroprevalences were investigated at three administration districts including Samin, Cianjhen, and Cianjin. For each administration district, serum samples collected from the volunteer residents of two communities, one with high epidemic record and another with low epidemic record were analyzed for comparison. For this study, age-related infection rate, number of infection times, and infected dengue virus serotypes of the volunteer residents will be analyzed. We have so far completed the analysis of NS1 serotype-specific IgG antibodies in those serum samples collected from Samin district with high epidemic community. The result showed an age-dependent increase in NS1-specific IgG positive sera. Therefore, for these volunteers with their ages lower than 19 years old (born after the 1986), most of the serum samples tested were NS1-IgG antibody negative. For those volunteers between 55-70 years old (born between 1950-1935), 45% were found to be NS1-IgG antibody positive. For those volunteers higher than 70 years old (born before 1935), 70% were found to be NS1-IgG antibody positive. This result accorded with the historical records that Taiwan had large dengue outbreaks in 1931, 1942-1943, and 1987-1988. Further analysis in the differentiation of dengue virus serotypes showed that dengue 1 serotype was the major serotype causing dengue outbreaks in Taiwan. The result also showed that older individuals had been infected with dengue serotype 2 or 3, but not serotype 4. The result is very encouraging and suggests that integrated control measures against Ae. Aegypti are very successful during the last 20 years in Kaohsiung city.

Keyword: Dengue fever, Japanese encephalitis, ELISA, Nonstructural protein1 (NS1)