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Zeroing on Mosquito-borne Viruses: Dengue Virus, Chikungunya Virus and Japanese Encephalitis Virus

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Abstract

Mosquito-borne viral infections are common occurrences in the Philippines with outbreaks sometimes reaching epidemic proportions. Among these, dengue (DENV), Japanese encephalitis (JEV) and chikungunya (CHIKV) viruses have the greatest impact on public heath. All three are transmitted by the mosquitoes from, and to, human, and animal hosts. These viral infections are hard to differentiate since all exhibit similar symptoms at the early stages of the disease thereby needing accurate and rapid diagnostics. Advanced molecular diagnostics include immunoassays, nucleic acid amplification, and sequence-based analyses. In 2008-2012, serum samples from suspected dengue cases were examined for dengue, chikungunya and Japanese encephalitis infection using virus culture and molecular assays. Anti-dengue IgM-capture ELISA showed 16.8% of 2,855 samples to be positive for dengue infection, while RT-PCR exhibited a positive detection rate in 40.9% of 1200 samples. These 491 PCR-positive samples were further serotyped using multiplex RT-PCR: this identified 257 DENV-2, 83 DENV-3, 30 DENV-1, 10 DENV-4, 9 having multiple serotypes, and 102 as untypeable by this method. There were 19 out of 77 samples positive for chikungunya viral non-structural protein 1 (NSP1) gene by RT-PCR, out of which 13 were also positive for envelop gene (E1). Three of these samples harboured co-infections of both DENV and CHIKV. Anti-JEV IgM was detected in 45 out of 1200 samples analyzed by IgM-capture ELISA, of which 14 were co-infected with dengue. The occurrence of co-infections of these 3 viruses indicates that the Philippines is hyperendemic for these mosquito-borne diseases.

Biography

MLG Daroy is a Scientist at the Research and Biotechnology of St. Luke's Medical Center and Assistant Professor in the MS Molecular Medicine Program of the St. Luke's College of Medicine-WHQ Memorial. She has published 18 papers on dengue, Japanese encephalitis, eye infections, genetic markers of various diseases, and microbiology. She is Chair of the Board of Examiners of the Philippine Academy for Microbiology. Current researches include dengue, chikungunya, diarrhea , CNS infections, pathogen genomics, plant antivirals, molecular diagnostics, dengue POC, and genetics of CVD, diabetes, thyroid cancer, and dementia.