Abstract

Analysis of Humoral Immune Responses in Chikungunya Virus (CHIKV)-Infected Patients and Individuals Vaccinated with a Candidate CHIKV Vaccine †

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Abstract: Chikungunya virus (CHIKV) is a mosquito-transmitted alphavirus that causes severe flu-like symptoms. The acute symptoms disappear after one week, but chronic arthralgia can persist for years. Here, humoral immune responses in CHIKV-infected patients and vaccinees were analyzed. Alphavirus neutralization activity was analyzed with pseudotyped lentiviral vectors and antibody epitope mapping was performed with a peptide array. The greatest CHIKV neutralization activity was observed 60–92 days after onset of symptoms. The amount of CHIKV-specific antibodies, their binding avidity, and cross-reactivity with other alphaviruses increased over time. CHIKV and o'nyong-nyong virus (ONNV) were both neutralized to a similar extent. Linear antibody binding epitopes were mainly found in E2 domain B and the acid-sensitive regions (ASRs). In addition, serum samples from healthy volunteers vaccinated with a measles-vectored Chikungunya vaccine candidate, MV-CHIK, were analyzed. Neutralization activity in the samples from the vaccine cohort was lower than in samples from CHIKV-infected patients. In contrast to infection, vaccination induced cross-neutralization with ONNV and the E2 ASR1 was the major antibody target. These data could assist vaccine design and enable the identification of correlates of protection necessary for vaccine efficacy.

Keywords: chikungunya virus; vaccination; immune response