

SAMHD1 Enhances Chikungunya and Zika Virus Replication in Human Skin Fibroblasts



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Abstract

Chikungunya virus (CHIKV) and Zika virus (ZIKV) are emerging arboviruses that pose a worldwide threat to human health. Currently, neither vaccine nor antiviral treatment to control their infections is available. As the skin is a major viral entry site for arboviruses in the human host, we determined the global proteomic profile of CHIKV and ZIKV infections in human skin fibroblasts using Stable Isotope Labelling by Amino acids in Cell culture (SILAC)-based mass-spectrometry analysis. We show that the expression of the interferon-stimulated proteins MX1, IFIT1, IFIT3 and ISG15, as well as expression of defense response proteins DDX58, STAT1, OAS3, EIF2AK2 and SAMHD1 was significantly up-regulated in these cells upon infection with either virus. Exogenous expression of IFITs proteins markedly inhibited CHIKV and ZIKV replication which, accordingly, was restored following the abrogation of IFIT1 or IFIT3. Overexpression of SAMHD1 in cutaneous cells, or pretreatment of cells with the virus-like particles containing SAMHD1 restriction factor Vpx, resulted in a strong increase or inhibition, respectively, of both CHIKV and ZIKV replication. Moreover, silencing of SAMHD1 by specific SAMHD1-siRNA resulted in a marked decrease of viral RNA levels. Together, these results suggest that IFITs are involved in the restriction of replication of CHIKV and ZIKV and provide, as yet unreported, evidence for a proviral role of SAMHD1 in arbovirus infection of human skin cells.

Biography:

Dr. Sineewanlaya Wichit has completed her PhD from University of Montpellier, France. She is the permanent staff of Department of Clinical Microbiology and Applied Technology, Faculty of Medical Technology, Mahidol University, Thailand. She has published more than 16 papers in reputed journals. She works mainly on Virology especially arbovirus such as Chikungunya, Zika and Dengue virus. After Master degree in Tropical Medicine, Dr. Wichit worked as a research assistant at Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand for 8 years. Then, she took three years to do her PhD in Virology as well.



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