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Inactivation and disinfection of Zika virus in the presence and absence of blood

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Statement of the Problem: The Zika virus (ZIKV) outbreak has caused thousands of birth defect cases in 2016. The virus is transmitted primarily through mosquito bites, but other routes of transmission such as sexual contact and laboratory infection were also reported. Additionally, ZIKV has been isolated from multiple tissues such as blood, saliva, urine, semen and genital secretions. It thus represents a threat not only to the public health but also to the blood supply in infected areas. However, the survivability of ZIKV in environment and its resistance to inactivation was largely unknown.

Methodology & Theoretical Orientation: The survivability of ZIKV, and its susceptibility to several commonly used physical and chemical treatments were examined using glass carriers and a viral infectivity assay. Two levels of organic load, 5% serum and 90% blood, were used to assess the impact of blood on viral survivability. Both the viral infectivity and genome copies were examined. Additionally, the susceptibility of ZIKV was compared to two other flaviviruses -West Nile Virus (WNV) and Bovine Viral Diarrhea Virus (BVDV).

Findings: ZIKV in 90% blood displayed much higher stability than in 5% serum. ZIKV was susceptible to dry heat treatment (56-60°C) in 5% serum, but so less in 90% blood. Quats and alcohol caused complete inactivation of ZIKV regardless of the organic load. Efficacy on ZIKV by chlorine and peracetic acid was highly dependent on the organic load. pH 4.0 or pH 10.0 seemed to be ineffective against ZIKV.

Conclusion & Significance: ZIKV displays susceptibility to commonly employed disinfectants similar to that of other flaviviruses; however, blood may impact the susceptibility significantly. This must be considered in the design and implementation of an appropriate infection control strategy for hospitals, public facilities, and research laboratories; and during assessment of blood supply safety.

Biography

S Steve Zhou has served as the Director of Virology and Toxicology at Microbac Laboratories, Inc. since 2006. He has more than 16 years of experience in Virology, Molecular Biology and Toxicology Studies. He has to-date designed and directed over 500 viral inactivation studies for disinfectants and biopharmaceutical products. He is also a qualified Clinical Principle Investigator. He is an active publisher and a member of several scientific and trade associations and committees. He sits on the Editorial Board of the ARC *Journal of Hematology*. He has delivered many presentations in conferences. In 2015, he was invited to a scientific expert panel by the US Environmental Protection Agency (EPA). He holds a PhD from John Hopkins University School of Medicine. Prior to joining Microbac, he served as a Laboratory Director of Viral Clearance at BioReliance Corporation and worked at Merck on Antiviral Drug Development.

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