00159 Point-of-care Ultra-fast Nucleic Acid Detection of Zika, Chikungunya and Dengue Viruses in a Multiplex Assay

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Aims: The recent emergence of Zika virus(ZIKV) has added to the global burden of arthropod borne viruses(arboviruses) such as Dengue virus(DENV) and Chikungunya virus(CHIKV). They pose a public health challenge as they result in significant mortality and morbidity due to complications. Accurate diagnosis of the virus is a challenge as ZIKV, CHIKV and DENV have a similar spectrum of clinical presentations. Laboratory diagnosis using serological testing is not specific, antigen testing of NS-1 can have low sensitivity in secondary DENV infection. Reverse transcription polymerase chain reaction (RT-PCR) is a sensitive and specific test, however its use in endemic areas is limited by its high cost and technical demands. The aim was to develop a viable method of detection that is specific, low cost and rapid.

Methodology: This report outlines an ultra-fast PCR method which uses a single reaction mix to identify either ZIKV, CHIKV or DENV from crude samples without the need for RNA extraction. The reaction mixture was validated using conventional RT-PCR and the novel in-house thermocycler was also calibrated for precision.

Result: It has been shown in this report that the viruses can be identified from the sample in 9 minutes using a novel in-house developed thermocycler for all three viruses without any RNA extraction. Additionally, we also report the capability of a trioplex assay to detect any of the three viruses in a single reaction in 9 minutes.

Conclusion: This method developed is cost effective, convenient and fast while still preserving the specificity of molecular testing. Thus, it has the potential be a viable point-of-care test for effective diagnosis of the viruses, especially so in endemic and low-resource settings where they could have significant effects on public health and healthcare costs.