Development of a Loop-Mediated Isothermal Amplification (LAMP) Assay for the Detection of Powassan Virus

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Powassan virus is a causative agent of tick-borne encephalopathy that has shown a 375% increase in the United States in the last five years alone. There is currently no cure for infection by this newly pathogenic virus, and approximately 10% of cases result in death after transmission from the Ixodes scapularis tick vector. Different assays have been developed for detection via serum or CSF samples, but many of these require complicated lab equipment and techniques. An emerging detection technique of viral RNA under field conditions is reverse transcription loop-mediated isothermal amplification (RT-LAMP). Success of RT-LAMP depends on the design of LAMP primers to amplify cDNA following reverse transcription of viral RNA. In this experiment, LAMP primers for amplification of cDNA encoding for the Powassan E gene were identified and tested. In these experimental assays, different primer sets and varying cDNA concentrations were used to optimize amplification using a commercial LAMP kit. The success of this experiment indicates the assay can be further expanded to RT-LAMP, which would be a valuable tool for detecting viral infection. Such a tool would be particularly relevant to those living in upper midwestern regions of North America for the detection of this potentially lethal virus.

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