

## Lab-on-a-Chip Zika Detection with Reverse Transcription Loop-Mediated Isothermal Amplification–Based Assay for Point-of-Care Settings

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### Abstract

Zika virus (ZIKV) infection, primarily transmitted by mosquitoes, causes various neurologic disorders. To differentiate ZIKV from other arboviruses, such as dengue, chikungunya, and yellow fever viruses, a highly specific, sensitive, and automated detection system is needed for point-of-care (POC) settings. To detect ZIKV at POC settings, we have developed a fully automated lab-on-a-chip microfluidic platform for rapid disease detection by using reverse transcription loop-mediated isothermal amplification. The developed setup consists of a microfluidic chip, a platform for magnetic actuation, and a heater along with the sensor to precisely control the temperature for the target amplification. The platform accurately controls the movement of the magnetic beads that enable the isolation and purification of the target nucleotides adhered to their surface for the amplification and disease detection on the microfluidic chip. Within 40 minutes, change in color due to the presence of ZIKV amplicons was visually observed with the spiked plasma samples in the end

point analysis. Also, we have accurately and specifically identified ZIKV in a small number of de-identified clinical samples.

### Biography

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