Nucleic Acid Visualization Assay for Middle East Respiratory Syndrome Coronavirus (MERS-CoV) by Targeting the UpE and N Gene

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Abstract

Since its first emergence in 2012, cases of infection with Middle East respiratory syndrome coronavirus (MERS-CoV) have continued to occur. In this study, we present two nucleic acid visualization assays that target the MERS-CoV UpE and N genes as a panel that combines reverse transcription recombinase polymerase amplification with a closed vertical flow visualization strip (RT-RPA-VF). The limit of detection was 1.2×10ˆ1 copies/μl for the UpE assay and 1.2 copies/μl for the N assay. The two assays exhibited no cross-reactivity with multiple CoVs, including the bat severe acute respiratory syndrome related coronavirus (SARSr-CoV), the bat coronavirus HKU4, and the human coronaviruses 229E, OC43, HKU1 and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The RT-RPA-VF assay does not require sophisticated equipment and provides rapid detection within 30 min, so it has potential for use in surveillance and detection of MERS-CoV in low-resource settings.

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