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Rapid detection of emerging infectious diseases using real-time colorimetric Reverse Transcriptional Loop-mediated Isothermal Amplification (RT-LAMP)

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Recent increased cases of human infection with emerging infectious viruses such as Avian Influenza Virus (AIV), Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) and Severe Fever with Thrombocytopenia Syndrome Virus (SFTSV) are concerns of public health. We developed a simple and rapid detection system using Reverse Transcriptional Loop-mediated Isothermal Amplification (RT-LAMP) method for multiple emerging infectious viruses including MERS-CoV, SFTSV and multiple influenza viruses infecting human (type B, H1N1, H3N2, H5N1, H5N6, H5N8 and H7N9). In addition, for more feasible application, the RT-LAMP method was optimized with real-time colorimetric visualization and portable diagnostic platform such as pocket warmer. The RT-LAMP detection system performed high sensitivity that can detect up to 0.1 infectious viral genome copies of the viruses within 60 minutes compared to the conventional RT-PCR based methods which usually take more than 120 minutes. Moreover, the test has no cross-reactivity with other human infectious viruses including *JEV, Dengue, Enterovirus, Zika virus*, human coronavirus 229E (229E), human Metapneumovirus (hMPV), human Respiratory Syncytial Virus (hRSV) and other subtypes of influenza viruses including H2, H4, H6, H9, H10, H11 and H12. Thus, this study suggests that our diagnostic assay may provide a rapid, sensitive, cost-effective, multiplex detection system for emerging infectious viruses that can play a crucial role in control of virus outbreak and contribute to the field diagnosis in resource-limited field settings.

Biography

Min-Suk Song has completed his undergraduate degree majoring in Biology, MSc and PhD degree in Virology at Chungbuk National University College of Medicine. He has formerly worked as a Post-Doctoral Research Fellow at St. Jude Children's Research Hospital. He is currently an Assistant Professor at Chungbuk National University College of Medicine and Research Institute since 2014. He has published papers particularly in the areas of virology which include pathogenicity, molecular studies and diagnosis of influenza viruses. Recently, he has expanded his research on other viruses such as Enterovirus and MERS-coV. His other research interest includes vaccines and antiviral resistance.

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