

## INNOVATING CROSS-DOMAIN SOLUTIONS TO DETECT EMERGING BIOLOGICAL THREATS

### Cultivation And Propagation Of Viable Viral Aerosols For Upstream Amplification And Infectivity Analysis

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Viral aerosols have recently garnered significant attention due to the COVID-19 pandemic. This has led to a call for more advanced environmental sampling for infectious aerosols. Currently, collected aerosol samples are typically analyzed for the presence of viral pathogens with detection platforms such as PCR. However, these detection platforms are constrained by their limit of detection and do not provide answers to the infectious nature of the virus. Laboratory culturing of samples have provided some answers to viral viability, though can prove to be difficult due to time and transportation. In our study, we explore the feasibility of integrating a viral propagation phase into an aerosol sampling system. By enriching a portion of the sample with the target host, we aim to provide the viral pathogen of interest an opportunity to multiply. This can potentially lead to an amplification of viral content for enhanced detection sensitivity. Consequently, an increase in target signal compared to pre-propagation will inherently suggest the presence of viable virus thus demonstrating the infectious state of the aerosol. The system holds promise for improving our understanding of viral aerosol viability and infectivity, which is crucial for the development of strategies to mitigate airborne transmission of pathogens.