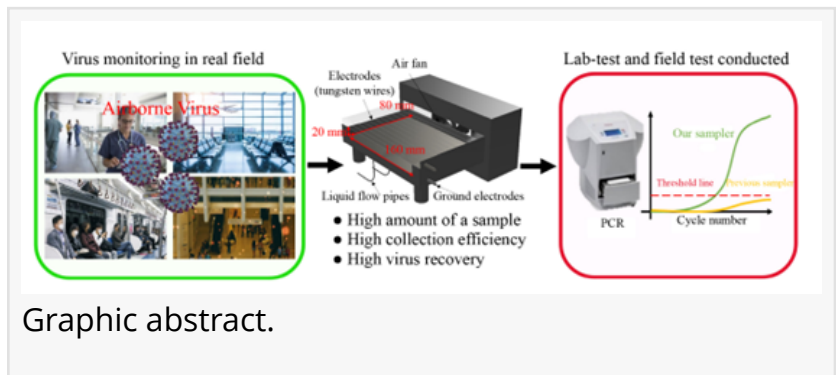


New Electrostatic Sampler Boosts Indoor Virus Detection Speed

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-- Researchers have developed a groundbreaking electrostatic air sampler that enhances the rapid monitoring of airborne influenza and coronavirus. The device, capable of high air flow rates, offers significant advancements in detecting viral presence in indoor environments through polymerase chain reaction (PCR) analysis.



Graphic abstract.

Airborne transmission of viruses, including SARS-CoV-2, has been a focal point for infection prevention in multi-use facilities with dense populations. Traditional air samplers often require long sampling times, increasing the risk of false negatives due to RNA degradation. The newly developed electrostatic sampler addresses this issue by increasing the airflow rate and improving collection efficiency.

Researchers from Yonsei University, in collaboration with the Korea Research Institute of Standards and Science, have developed a groundbreaking electrostatic air sampler that enhances the rapid monitoring of airborne influenza and coronavirus. The device, capable of high air flow rates, offers significant advancements in detecting viral presence in indoor environments through polymerase chain reaction (PCR) analysis. More information can be found in the article (DOI: [10.1007/s11783-024-1845-y](https://doi.org/10.1007/s11783-024-1845-y)) published in the Frontiers of Environmental Science & Engineering.

This device is designed to operate at an exceptionally high air flow rate of 250 liters per minute, a significant leap from conventional samplers. Its unique feature is the ability to attract and capture viral particles through an enhanced electrostatic method, ensuring that the integrity of the viral RNA remains intact for reliable PCR analysis. In practical tests, this innovative sampler has been able to collect and prepare samples for PCR within just 40 minutes, far surpassing the efficiency of existing technologies. The rapid turnaround is crucial in environments such as classrooms, hospitals, and public transportation systems, where timely detection can lead to immediate action, potentially preventing virus spread. This capability also opens new avenues for continuous monitoring in various settings, providing a continuous assessment of air quality.

and safety.

Highlights

- Electrostatic virus sampler was designed and evaluated in a pandemic scenario and real indoor field environment.
- Airborne virus was gently sampled with high aerosol sampling performance.
- Viral samples detectable for PCR were produced within 40 min.

Professor Jungho Hwang, lead researcher, stated, "Our electrostatic air sampler's capability to quickly collect and detect viral particles is a game-changer for public health safety. It ensures rapid response and containment measures can be implemented more effectively."

This technology is pivotal for facilities like hospitals, schools, and public transportation, where high-density populations are present. The ability to monitor and detect viral loads swiftly allows for timely interventions, potentially curbing transmission rates and alerting health authorities to emergent outbreaks.

DOI

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Lucy Wang

BioDesign Research

[email us here](#)

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