

Infection Control Today

Far-UVC Light Safely Kills Airborne Flu Virus, Study Finds

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Continuous low doses of far ultraviolet C (far-UVC) light can kill airborne flu viruses without harming human tissues, according to a new study at the Center for Radiological Research at Columbia University Irving Medical Center (CUIMC). The findings suggest that use of overhead far-UVC light in hospitals, doctors' offices, schools, airports, airplanes, and other public spaces could provide a powerful check on seasonal influenza epidemics, as well as influenza pandemics.

The study was published online today in Scientific Reports.

Scientists have known for decades that broad-spectrum UVC light, which has a wavelength of between 200 to 400 nanometers, or nm), is highly effective at killing bacteria and viruses by destroying the molecular bonds that hold their DNA together. This conventional UV light is routinely used to decontaminate surgical equipment. "Unfortunately, conventional germicidal UV light is also a human health hazard and can lead to skin cancer and cataracts, which prevents its use in public spaces," said study leader David J. Brenner, PhD, the Higgins Professor of Radiation Biophysics Professor of Environmental Health Sciences and director of the Center for Radiological Research at CUIMC.

Several years ago, Brenner and his colleagues hypothesized that a narrow spectrum of ultraviolet light called far-UVC could kill microbes without damaging healthy tissue. "Far-UVC light has a very limited range and cannot penetrate through the outer dead-cell layer of human skin or the tear layer in the eye, so it's not a human health hazard. But because viruses and bacteria are much smaller than human cells, far-UVC light can reach their DNA and kill them," he said.

In their earlier studies, Brenner's team demonstrated that far-UVC light was effective at killing MRSA (methicillin-resistant *S. aureus*) bacteria, a common cause of surgical wound infections, but without harming human or mouse skin.

Influenza virus spreads from person to person mainly through fine liquid droplets, or aerosols, that become airborne when people with flu cough, sneeze, or talk. The new study was designed to test if far-UVC light could efficiently kill aerosolized influenza virus in the air, in a setting similar to a public space. In the study, aerosolized H1N1 virus--a common strain of flu virus--was released into a test chamber and exposed to very low doses of 222 nm far-UVC light. A control group of aerosolized virus was not exposed to the UVC light.

The far-UVC light efficiently inactivated the flu viruses, with about the same efficiency as conventional germicidal UV light.

"If our results are confirmed in other settings, it follows that the use of overhead low-level far-UVC light in public locations would be a safe and efficient method for limiting the transmission and spread of airborne-mediated microbial diseases, such as influenza and tuberculosis," said Brenner.

At a price of less than \$1,000 per lamp—a cost that would surely decrease if the lamps were mass produced—far-UVC lights are relatively inexpensive. "And unlike flu vaccines, far-UVC is likely to be effective against all airborne microbes, even newly emerging strains."

The study is titled, "Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases." The other contributors are David Welch, Manuela Buonanno, Veljko Grilj, Igor Shuryak, Connor Crickmore, Alan Bigelow, Gerhard Randers-Pehrson, and Gary Johnson (all at CUIMC).

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Source: Columbia University Irving Medical Center