

# Cold plasma treatment cuts norovirus germs

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Treating surfaces with cold atmospheric pressure plasma (CAPP) may reduce the risk of transmitting norovirus, a contagious virus leading to stomach pain, nausea and diarrhea, according to a new study.

The work, published this week in *mBio*, the online open-access journal of the American Society for Microbiology, showed that CAPP significantly reduced the number of [virus particles](#) in norovirus samples. CAPP, which actually is close to room temperature, is a type of gas used to kill bacteria without harming surfaces or human tissues. It is being used in some medical applications like wound healing. Some scientists also are investigating its potential to remove bacteria from fruits, vegetables and meats.

The finding is exciting because noroviruses typically are very stable in the environment, resisting treatment by detergents or chlorine, freezing or heating, said senior study author Günter Klein, head of the Institute of Food Quality and Food Safety at the University of Veterinary Medicine Hanover in Germany. Noroviruses are the most frequent cause of epidemic nonbacterial acute gastroenteritis worldwide, he said, causing over 19 million cases of illness in the United States each year.

"CAPP is an environmentally friendly, low energy method that decreases the microbial load on surfaces," Klein said. "The technology is effective against viruses with a high tenacity, like noroviruses. Its successful application in medical therapy should be transferred to other areas."

To investigate CAPP's impact on norovirus, Klein and colleagues

prepared on sterile petri dishes three dilutions of a 2011 stool sample from a German soldier infected with norovirus. They treated the samples with CAPP for varying lengths of time, up to 15 minutes, in a plasma chamber.

After treatment, the scientists observed that samples treated for the longest time had the lowest viral load. CAPP reduced the number of potentially [infectious virus particles](#) from 22,000 (similar to what would be found on a [surface](#) touched by someone infected with norovirus) to 1,400 after 10 minutes, and to 500 after 15 minutes. Some reductions in viral load were seen in as little as one to two minutes of treatment.

"Cold plasma was able to inactivate the [virus](#) on the tested surfaces, suggesting that this method could be used for continuous disinfection of contaminated surfaces," Klein said. Although plasma could not eliminate the virus completely, he said, "a reduction is still important to lower the infectious dose and exposure for humans."

In future studies, Klein's team will test plasma's disinfection properties on additional surfaces and types of norovirus, and use electron microscopes to examine the structure of the virus before and after CAPP treatment.

**More information:** *mBio*, [www.asm.org/images/Communicati ...  
APP\\_mBio02300-14.pdf](http://www.asm.org/images/Communicati...APP_mBio02300-14.pdf)

Provided by American Society for Microbiology

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