

## Study Links The Liquid Used In E-cigarettes To An Increased Risk Of Viral Infections

Researchers say whether the liquid contains nicotine or not, inhaling its vapor can damage epithelial cells from human airways and increase the risk of infections

---

DECEMBER 26, 2014

DENVER, CO —

The liquid used in electronic cigarettes has been linked to a significantly higher risk of respiratory viral infections, whether the liquid contains nicotine or not, according to a published study by researchers at [National Jewish Health](#) in Denver.

“We took cells from the airways of young, healthy non-smokers and exposed them to the liquid or vapors from e-cigarettes in the lab and in as little as 10 minutes we saw a dramatic reaction,” said [Hong Wei Chu, MD](#), director of the Basic Science Section at National Jewish Health and leader of the study. “The cells showed a strong pro-inflammatory response and the risk of viral infection in those cells rose significantly,” he said.

The findings come as the popularity of e-cigarettes is surging, particularly in young people. In 2010 less than 2 percent of adults in the U.S. had tried e-cigarettes. Last year that number topped 40 million, an increase of more than 620 percent. The number of children and teenagers who use them is on the rise as well.

“In the last 4 or 5 years, it’s exploded,” said [David Tinkelman, MD](#), medical director of health initiatives at National Jewish Health. “Unfortunately, the science behind e-cigarettes has not exploded at the same time. We still don’t fully understand the effects e-cigarettes have on our bodies or the risks they might pose,” he said.

For this study, researchers used a machine with human cells from the airways in a sterile container at one end, and at the other end they attached an electronic cigarette. The machine applied suction to the e-cigarette to simulate human use. The vapors produced by that suction traveled through tubes to the container holding the human cells and once there damaged the cells almost immediately.

“Epithelial cells are the first line of defense in our airways and they protect our bodies from anything dangerous we might inhale,” said Qun Wu, MD, PhD, who conducted the study. “Once those cells were exposed to the liquid or vapors from e-cigarettes, it triggered a strong immune response,” she said.

Specifically, scientists noted a significant increase in the level of IL-6 protein from the cells, which indicates an immune response to the e-cigarette exposure. “The epithelial cells were damaged after only a few minutes of exposure and the immune response lasted up to 48 hours,” said Dr. Chu. “That indicates to us that these cells responded quickly to the presence of e-cigarette liquid or vapors by producing IL-6 protein, which contributes to the lung inflammation and injury,” he said.

This study adds to the mounting evidence that e-cigarettes are not harmless, and experts worry that they are falling into the hands of children and teenagers who assume they are safe.

“Many of these products are marketed to young consumers with flavors like bubblegum or cherry, and when you flavor them in that way, not only are they more appealing but young people might falsely assume they are safe to use,” said Dr. Tinkelman. “That is an inherently dangerous situation when you’re talking about use among children and

An error occurred.

Try watching this video on [www.youtube.com](http://www.youtube.com), or enable JavaScript if it is disabled in your browser.

teenagers, especially.”

“We have provided strong evidence that the liquid used in e-cigarettes, whether it contains nicotine or not, has negative effects on the airways and on the lungs,” said Dr. Chu. “The problem is, these products aren’t regulated and there are no standards to control how much nicotine or other chemicals they contain. I think e-cigarettes could prove dangerous, especially with long-term consumption,” he said.

The study is published by PLOS-One, the Public Library of Science. [Learn more about the findings.](#)

**National Jewish Health** is the leading respiratory hospital in the nation. Founded 123 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the media resources page.

## Media Contacts

Our team is available to arrange interviews, discuss events and story ideas.

**Jessica Berry**  
303.398.1082  
berryj@njhealth.org

**Sean Andersen-Vie**  
303.398.1002  
andersenvies@njhealth.org