

E-cigarettes 'poison the airways and weaken the immune system'

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Electronic cigarettes expose the lungs to toxicity, reduce the effectiveness of the immune system and encourage bacterial activity, potentially making superbugs more deadly, according to research published in the *Journal of Molecular Medicine*.



E-cigarettes are shown to promote bacterial virulence and inflammation in the latest study.

In the US, the use of [e-cigarettes](#) tripled from 4.5% in 2013 to 13.4% in 2014 among high school students, and from 1.1% in 2013 to 3.9% in 2014 among middle school students, surpassing rates of youth cigarette smoking. In the 25-44-year age group, 20% of Americans smoke e-cigarettes.

While teens smoke them because they are trendy, older smokers are turning to them in an attempt to give up smoking. Interestingly, many [teens who smoke e-cigarettes then move on to conventional cigarettes](#) just 1 year later, as reported recently by *Medical News Today*.

In using the device, smokers are risking their airways and immune systems. They are also enhancing the conditions for colonizing bacteria, including some deadly strains.

Researchers at the University of California-San Diego (UCSD) carried out mouse studies to examine the effects of e-liquids from seven different manufacturers.

Superbug MRSA more deadly after smoking e-cigarettes

The scientists exposed mice to e-cigarette vapors for 1 hour a day, 5 days a week over 4 weeks.

Results showed that inflammatory markers in the airways and blood of mice after inhaling e-vapors were 10% higher than those in unexposed mice. Bacteria that had been exposed to e-cigarette vapor were more virulent in mice infected with [pneumonia](#).

When mice were infected with normal methicillin-resistant *Staphylococcus aureus* (MRSA), an antibiotic-resistant "superbug," they survived; but 25% of mice that were infected with MRSA after being exposed to e-cigarette vapor died. In other words, *S. aureus* becomes more virulent when exposed to e-cigarette vapor.

The researchers observed that exposing bacterial pathogens to e-cigarette vapor caused them to thrive. The vapor helped *S. aureus* bacteria to form biofilms, to adhere to and invade airway cells and to resist the defenses of the human immune system.

Some of the changes observed in mice are common to those seen in the airways and blood of conventional cigarette smokers. Others are characteristic of human [cancers](#) or inflammatory lung disease.

The results were the same regardless of the brand of vapor used.

Dr. Laura E. Crotty Alexander, of the UCSD School of Medicine, says:

"This study shows that e-cigarette vapor is not benign; at high doses, it can directly kill lung cells, which is frightening. We already knew that inhaling heated chemicals, including the e-liquid ingredients nicotine and propylene glycol, couldn't possibly be good for you. This work confirms that inhalation of e-cigarette vapor daily leads to changes in the inflammatory milieu inside the airways."

Dr. Crotty Alexander says it is not yet clear which lung and systemic diseases will be caused by inhaling e-cigarette vapor, but data suggest that acute toxicities will result from the inflammatory changes involved.

The team recently reported that [MRSA](#) bacteria exposed to conventional cigarette smoke are less likely to be killed by the immune system than unexposed bacteria.

Meanwhile, a news outlet recently revealed that a 20-year-old German man's [teeth were blown out](#) when an e-cigarette that he was trying in a store exploded in his mouth. He suffered severe facial injuries.

Findings reported in *MNT* also associate [e-cigarettes with the development of cancer cells](#).

References:

Electronic cigarette inhalation alters innate immunity and airway cytokines while increasing the virulence of colonizing bacteria, John H. Hwang et al., *Journal of Molecular Medicine*, doi:10. 1007/ s00109-016-1378-3, published online 25 January 2016, [abstract](#).

UC San Diego [news release](#), accessed 29 January 2016 via EurekAlert.

Additional source: American Lung Association, [E-cigarettes and lung health](#), accessed 29 January 2016.

Additional source: *The Local*, [Cologne man's teeth blown out while smoking e-cigarette](#), accessed 29 January 2016.