

Exposure to e-cigarette vapor fails to induce pneumonia in mouse models

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Exposure to e-cigarette vapor containing nicotine had no impact on the ability of *Streptococcus pneumoniae* strain TIGR4 to infect mouse models. The research is published December 2nd in *Applied and Environmental Microbiology*.

In light of the booming popularity of e-cigarettes and the rising number of deaths from vaping, a team of researchers from the University of Louisiana at Lafayette set out to determine whether e-cigarettes might boost the risk of pneumonia. "S. pneumonia is the most frequent cause of pneumonia in children five years and under, as well as adults older than 65, and immune-compromised individuals," according to the report. Exposure to smoke from [conventional cigarettes](#) is a critical risk factor for pneumonia.

In the study, the investigators compared the effects on S. pneumoniae of exposure to strawberry-flavored [e-cigarette vapor](#) containing nicotine, the same vapor with no nicotine, cigarette smoke, and with no cigarette-related exposure.

As compared to controls, nicotine containing e-cigarette vapor induced major changes in gene expression of pneumococcus, affecting 264 genes, mostly involved in metabolism and [stress response](#). Nicotine free e-cigarette vapor changed altered expression of just 14 genes, and only modestly, said corresponding author Ritwij Kulkarni, Ph.D., Assistant Professor of Immunology, University of Louisiana at Lafayette. The latter genes are involved in sugar transport and metabolism. By comparison, cigarette smoke altered expression in 982 genes, also mostly involved in metabolism and stress response.

"Interestingly, neither nicotine containing nor nicotine free e-cigarette vapor altered the ability of pneumococci to cause [lung infection](#) in a mouse model of infection," said Dr. Kulkarni. However, both nicotine-containing e-cigarette vapor and cigarette smoke caused moderate induction of biofilm formation," according to the report.

"Our work is part of a long series of observations coming from a number of research labs trying to define what effects e-cigarette vapor exposure may have on [human health](#), and to differentiate between the effects of

flavoring chemicals and nicotine," said Dr. Kulkarni.

"Every day on my way to my classroom I see a lot of students vaping," said Dr. Kulkarni. "We don't know the effects [e-cigarette vapor](#) has on us or on our microbiome. Since our lab's focus is bacterial respiratory infections, we decided to work on pneumococcus, which is a deadly pathogen and a colonizer of the upper respiratory tract.

Pneumonia causes about 50,000 deaths annually in the US, making it one of the greatest causes of death by infectious disease. "Exposure to [cigarette smoke](#) is a key risk factor for pneumonia because it affects the physiology and immune responses of the respiratory tract and augments the virulence of pathogens colonizing the nasopharyngeal mucosa," according to the report.

Provided by American Society for Microbiology

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