# An Efficient E-Cigarette Aerosol Generation And Exposure System For Rodents

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## OTHER INFORMATION

### KEYWORDS

electronic cigarette, aerosol generator,

aerosol exposure chamber

### CATEGORIZED AS

- **Biotechnology**
  - Health
- **Environment**
  - Other
- **Research Tools**
  - Other

### RELATED CASES

2016-400-0

## SUMMARY

UCLA researchers have developed an efficient electronic cigarette aerosol generator and exposure system for use in mice to study the health effects of electronic cigarette aerosol.

## BACKGROUND

Electronic cigarettes (E-cigs) deliver nicotine to users without burning tobacco. As E-cigs are relatively new products, their health benefits and risks are subjects of public health dispute. E-cig smoke is an aerosol, defined as a suspension of small particles in air. Mainstream and secondhand E-cig aerosols may contain detectable levels of toxins including carcinogens and heavy metals such as cadmium and lead. Lack of appropriate method for E-cig delivery to animals and lack of appropriate animal models are major barriers of the field.

## INNOVATION

UCLA researchers have developed an E-cigarette aerosol exposure chamber device that uses pressurized air to activate E-cig, and at the same time the airflow generated by pressure accelerates distribution of E-cig aerosol in the animal chamber, which can hold 3 mice or 1 rat. Animals are not connected to tubing nor do they have to enter any additional chamber to be exposed to aerosols. E-cig aerosol generation and rodent exposure system is an external attachment device on the rodent cage, connected with a mouse chamber panel. This system closely resembles the properties of the aerosol inhaled into the respiratory system of vaping humans.

## APPLICATIONS

Principal applications of this invention are for studies of:

- Toxicology
- Addiction potential of E-cigs
- Effects of acute or chronic intermittent exposure to E-cigs on the lungs, metabolism, the cardiovascular and nervous systems
- Effects on pregnancy and fetal development of maternal smoking of E-cigs

Potentially, this invention can be also used for studies of the effects of chemical products, airborne particles and microorganisms on rodents.

## ADVANTAGES

- Rodents can freely move in the chamber. This system is non-invasive and does not stress the animals.
- E-cig aerosol dose can be well controlled by the number of E-cigs (up to 6) simultaneously activated and the timing.
- The outlets of the mouthpiece (the tank) of E-cigs are opened in the rodent chamber without connection tubing nor additional chamber for smoke dilution. This design minimizes coagulation, condensation and vaporization of the aerosol particles (droplets), and consequently, minimizes dynamic changes of the particle size distribution and other physical properties of the E-cig aerosol. Therefore it closely resembles the properties of the aerosol inhaled into the respiratory system of vaping humans.

## STATE OF DEVELOPMENT

Prototype exists and in vivo studies have been performed. In vivo studies reveal characteristics of the E-cig aerosol in the breathing zone of rodents are similar to those inhaled into the respiratory system of E-cig smokers, making the E-cig aerosol generator and rodent exposure system an efficient and good model to study human vaping (n=9 mice).

## PATENT STATUS

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| United States Of America | Issued Patent | 11,000,065 | 05/11/2021 | 2016-400 |