

# E-cigarette aerosol exposure causes craniofacial abnormalities in mice

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At the 47th Annual Meeting of the American Association for Dental Research (AADR), held in conjunction with the 42nd Annual Meeting of the Canadian Association for Dental Research (CADR), Suraj Kandalam, Virginia Commonwealth University, Richmond, presented a poster titled "E-cigarette Aerosol Exposure Causes Craniofacial Abnormalities in Mice." The AADR/CADR Annual Meeting is in Fort Lauderdale, Fla. from March 21-24, 2018.

E-cigarettes are battery powered [nicotine](#) delivery systems that vaporize e-liquids, a solution primarily composed of propylene glycol (PG), glycerol or vegetable glycol (VG), nicotine, flavorant and colorants. While cigarettes are known to affect craniofacial structures in utero, causing diverse congenital abnormalities, little is known about the effects of e-cigs on craniofacial development. This study aimed to determine the effects of e-cig aerosol mixtures (e-cigAM) on shape changes of craniofacial structures in developing murine embryos in vivo.

E-cigAM was produced by bubbling 10 puffs of e-cig aerosol into PBS using a custom made pump device. E-cigAMs were generated for four e-liquids—research grade and nut flavor with nicotine and research grade and nut flavor without nicotine. Osmotic pumps loaded with e-cigAM were implanted into 10 week-old female mice, which were mated seven days later.

Embryos were harvested and imaged on a high resolution micro-CT scanner. The images were reconstructed and 3D constructs were created.

Craniofacial landmarks were analyzed using geometric morphometric analysis and compared to embryos from PBS-treated controls.

"In vivo exposure to e-cigAM during pregnancy decreased embryo number," said Suraj Kandalam. "E-cigAM exposure also generated shape changes including narrowing and shortening of the orofacial area in RG and flavored e-cigAMs. "Significant differences in distance between the mandible and premaxilla and of the occipital bone in both research grade with and without nicotine were observed compared to control. The nut flavor with nicotine showed significant differences in all orofacial aspects as compared to control, including length of zygoma, premaxilla, malar process and mandible."

Flavored e-cigAM showed greater detrimental effects than RG in all treatment. The addition of nicotine in flavored groups enhanced these effects. The results indicate that fetal exposure to e-cigAM alters [craniofacial development](#).

Provided by International & American Associations for Dental Research

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