Health Effects of Electronic Cigarette Aerosols Induce on Murine Tissue

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The use of the electronic nicotine delivery system, also known as electronic cigarette (e-cig), is tremendously rising in young adults in the US. E-cigs are the most commonly used tobacco-related product among youth. This study investigated whether e-cig aerosol exposures impact respiratory and reproductive murine tissues, with intergenerational effects. Compared to air-controls, serum levels of cotinine were significantly increased, confirming exposure to e-cig. E-cig significantly decreased coiled sperm percentages, indicating lower sperm membrane integrity; and up-regulated (3/10) gene expression of Inf-?, Epx, and Il10 in adult male murine lung tissue. Significantly increased respiratory system elastance showed elastic rigidity of female murine lung tissue. In contrast to male e-cig murine tissue, (3/10) inflammatory genes Ccl8, Epx, and Il4 were down-regulated, suggesting that pregnancy may modulate respiratory responses to e-cig. Lung tissue of in utero-exposed offspring had significantly increased Mean Linear Intercept values, suggesting that in utero exposures to e-cig affect alveolarization processes. This was supported by dysregulation of Fos, Fosl, Dixdc1, Wnt9a, and Fzd2: 5 WNT signaling pathway genes involved in lung organogenesis. Overall, this study shows that e-cig use can negatively impact physiological responses, and that in utero exposures affect lung development through 4 weeks of age.

Awards Won:

American Statistical Association: Certificate of Honorable Mention