

Title: Two-Cell-to-Hatching-Blastocyst Development of Embryos After E-Cig Aerosol Exposure in Adult Female Beginning 3 Days Prior to Ovulation and Continuing to 2-Cell Collection

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Abstract: ABSTRACT Exposure to electronic cigarette (e-cig) juices by vaping has been shown to be as harmful as cigarette smoking, both producing oxidation in lung tissue [1] and endothelial cell inflammatory damage [2]. Many studies focus on the lungs, but little is known about reproductive health. Seven percent of pregnant women reported using e-cigs at one point during their pregnancy. Of these women, 45.2% reported the reason for use was because of the perception that e-cigs are less harmful than cigarettes [3]. To investigate the impact that e-cigs have on the growing embryo, 20 female mice were split into four groups (control, mango-flavored e-cig without nicotine, mango-flavored e-cig with 2.5% nicotine, and spearmint-flavored e-cig with 2.5% nicotine). Each group was placed in a vaping chamber for 10 minutes, three times a day for five days. The experimental groups received a 10 second, 40-watt puff, of e-cig aerosol at the beginning of their chambered time. After the mice were injected to a superovulation protocol [4], each mouse was individually placed with one male mouse on day four. Two-cell embryos were collected from vaginal plug-positive mice on day six and plated on four 96-well plates with prepared M16 media. The stage of development for each embryo was recorded twice a day for four days. The results showed no significant difference between the embryo development of each group. This fails to suggest that there is a harmful effect on embryo development with short-term maternal vaping at this dosage, four days before fertilization until zygote cleavage.

FOOTNOTES

1 Lerner, CA 2014 Vapors Produced by Electronic Cigarettes and E-Juices with Flavorings Induce Toxicity, Oxidative Stress, and Inflammatory Response in Lung Epithelial Cells and in Mouse Lung

2 Barber KE 2016 Endothelial Cell Inflammatory Reactions Are Altered in the Presence of E-Cigarette Extracts of Variable Nicotine

3 Kapaya M 2015 Use of Electronic Vapor Products Before, During, and After Pregnancy Among Women with a Recent Live Birth — Oklahoma and Texas

4 Mitchell MH, et al. 2002 In vivo effect of leukemia inhibitory factor (LIF) and an anti-LIF polyclonal antibody on murine embryo and fetal development following exposure at the time of transcervical blastocyst transfer. *Biology of Reproduction* 67:460-464