IJAE
Vol. 122, n. 1 (Supplement): 190, 2017
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

E-cigarettes fluids trigger molecular and morphological response in oral fibroblasts

Laura Sancillo[1], Maria Zingariello[2], Valentina Di Valerio[1], Amelia Cataldi[3], Rosa Alba Rana[1], Silvia Sancilio[3]

[1] Dept of Medicine and Ageing Sciences, University G. d'Annunzio, Chieti-Pescara, Italy
[2] Unit of Microscopic and Ultrastructural Anatomy, Dept of Medicine, University Campus Bio-Medico Roma, Italy
[3] Dept of Pharmacy, University G. d'Annunzio, Chieti-Pescara, Italy

Electronic-cigarettes (e-cigarettes) have been recently advertised as a safe alternative to the traditional ones and a possible smoking cessation tool. This electronic device was designed to transform a solution of variable compounds (some of them approved as food additives), in an inhalable aerosol. However, their safety is still not fully know (Lerner et al. 2016). The cytotoxicity of the fluids on human gingival fibroblasts (HGFs) was demonstrated on a previous study by Sancilio et al. (2016) where the occurrence of oxidative stress and apoptosis was found following the exposure to nicotine containing fluids. The aim of this study was to investigate the HGF biological response to e-cigarettes liquids (with and without nicotine) and to clarify the molecular mechanisms driving the cytotoxicity exerted by fluids themselves. To this purpose, cells were treated with e-cigarette fluids containing nicotine (final concentration 1mg/mL) and the equivalent volume of a fluid without nicotine, for times up to 48 h. Lactate Dehydrogenase Assay (LDH), electronic microscopy analysis, collagen I production, flow cytometry lysosome compartment evaluation and western blotting LC3 (microtubule-associated protein 1A/1B-light chain 3) expression were performed.

Fluids containing nicotine exerted cytotoxicity as demonstrated by the increased levels of LDH, in parallel to the formation of numerous vacuoles in the cytoplasm, as well as a decrease in collagen I production and an augmented LC3 II expression which characterized autophagy occurrence In conclusion E-cigarette fluids (with and without nicotine) trigger modification ultrastructure, collagen production and lysosomal compartment in HGFs, suggesting an involvement in the pathogenesis of oral diseases.

References

Electronic cigarette aerosols and copper nanoparticles induce mitochondrial stress and promote DNA fragmentation in lung fibroblasts. Biochem Biophys Res Comm 2016;477:620-625.
Cytotoxicity and apoptosis induction by e-cigarette fluids in human gingival fibroblasts. Clin Oral Investig 2016;2: 477-483

Keywords
Fibroblast, nicotine, smoking, collagen, cell biology

© 2017 Firenze University Press
http://www.fupress.com/ijae