Abstract ID: 1759324

Submission Type: Poster 423

ARE E-CIGARETTES SAFER THAN COMBUSTIBLE TOBACCO ON HUMAN TYPE II ALVEOLAR CELLS AND MESENCHYMAL STEM CELLS?

Jessica Saliba[1,2], Abdullah Shaito[3], Nadine El Hajj[4], Mira Abou Daher[4], Rawya Hijazi[1], Marwan El-Sabban[4]

[1]Department of Biology, Faculty of Sciences, Lebanese University, Beirut, Lebanon
[2]Department of Public Health, Faculty of Health Sciences, University of Balamand, Beirut, Lebanon; Jessica.Saliba@balamand.edu.lb
[3]Biomedical Research Center, Qatar University, Doha, Qatar; abdshaito@qu.edu.qa
[4]Department of Anatomy, Cell Biology and Physiological Sciences, Faculty of Medicine, American University of Beirut, Beirut, Lebanon; me00@aub.edu.lb

Abstract:

Electronic cigarettes (e-cigarettes) are promoted as safer alternatives to combustible cigarettes. However, the health burden and effects of their long-term use remain unidentified. This study evaluates the extent and reversibility of cellular damage following exposure to cigarette and e-cigarette smoke aerosols, in vitro, of human type II alveolar cells (A549) and bone marrow-derived mesenchymal stem cells (BM-MSCs). The survival, levels of reactive oxygen species (ROS) generation and expression of epithelial-to-mesenchymal transition (EMT) markers are reported for A549 cells. BM-MSCs are evaluated for their survival and their differentiation potential into the osteogenic lineage. Cigarette smoke aerosols irreversibly reduce cell proliferation in A549 cells and enhance ROS production. E-cigarette smoke aerosols also permanently reduce proliferation of A549 cells, downregulated the gene expression of connexin 43 and E-cadherin and upregulated that of N-cadherin; promoting EMT. The integrity of BM-MSC- mediated cellular repair, described in terms of BM-MSC proliferation and osteogenic differentiation, was compromised by both cigarette and e-cigarette aerosol extracts. However, BM-MSCs were able to recover their proliferative ability and osteogenic differentiation upon e-cigarette, but not

combustible cigarette, washout. The cellular damage caused by cigarette aerosols is irreversible in A549 cells and on BM-MSCs; while e cigarettes were associated with less alterations and greater, albeit incomplete, recovery of some cellular functions after smoke washout. These results shed light on the safety of e-cigarettes, attempt to explain long-term illnesses in chronic smokers and feed into future public policies on tobacco control.

Keywords: Electronic cigarettes; Combustible cigarettes; *in vitro* models; cell damage

Funding Source: This work was partly supported by a grant (ARG/FHS/22-23/002) from the University of Balamand.

Presenting Author: Jessica Saliba, Assistant Professor

Department: Public Health Organization: University of Balamand