

Call of Abstracts - "International conference on the E-Cigarette: patterns of use and health impacts"



Call of abstracts

"International conference on the E-Cigarette: patterns of use and health impacts" - Paris, on 5-6th December 2022

Submission form

Poster & oral presentation

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Comparison of chemical composition and toxicity effects of emissions from electronic cigarettes, heated tobacco products and tobacco cigarettes in human bronchial epithelial cells

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Abstract details (poster & oral)

Background, method, results and conclusions

Background: Electronic cigarettes (e-cig) and more recently heated tobacco products (HTP) provide an alternative for smokers as they are generally perceived to be less harmful than conventional cigarettes. These new devices can quickly gain popularity, even before there is sufficient scientific evidence that they are safe for users. This work was performed to compare the chemical composition and toxicity of e-cig, HTP and cigarette emissions.

Method: Emissions were generated by a Vitrocell smoking machine. Toxicity was studied on human bronchial epithelial BEAS-2B cells cultured at air-liquid interface.

Results: HTP emitted less carbonyls and polycyclic aromatic hydrocarbons than the conventional cigarette. However, amounts of these compounds in HTP aerosols were still higher than in e-cig emissions. Results of ATP test and comet assay showed that HTP emissions exhibited reduced cytotoxicity and DNA strand breaks, respectively, compared to cigarette smoke but higher than e-cig aerosols. Chromosomal aberrations were evidenced by micronucleus test only after cigarette exposure. Then, a pangenomic transcriptomic analysis was performed to better understand the potential mechanisms involved in the toxicity of the different devices. While e-cig exposure deregulated only 573 transcripts, a comparable HTP exposure of 120 puffs altered the expression of 1641 genes. A two-dimensional hierarchical clustering showed two main clusters: one branch grouped tobacco products (HTP and cigarette) and the second branch showed a specific signature for e-cig. The mRNA profiles of HTP- and cigarette-exposed cells showed an increase of the Nrf2-mediated oxidative stress response, glycolysis and cholesterol biosynthesis. By contrast, e-cig induced in particular interferon signalling, ErbB and MAP kinase pathways, cholesterol biosynthesis and senescence pathway.

Conclusions: These results demonstrate that e-cig could be less harmful than both tobacco products (HTP and conventional cigarette)

Main messages

Based on the chemical composition and the in vitro toxicity of the different emissions, this study provides important data necessary for risk assessment by demonstrating that e-cig may be considerably less harmful than HTP and cigarette.

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Yes

Pharmaceutical Industry Source

No

Tobacco/E-Cigarette Industry Source

No

Declaration of interest

The submitter declares that during the past 5 years have a direct nor indirect link (professional*, personal or financial) with the tobacco and e-cigarette companies**

No