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Electronic cigarette liquids impair protein synthesis and alter proteomic profiles in V79 cells

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Abstract

Electronic cigarettes (e-cigarettes) have been found to affect range of cellular processes including oxidative stress, inflammation, DNA damage and cell death among others. The full extent of consequences of e-cigarettes use, especially their long term effect, is still largely unknown. Better understanding and characterization of their biological effects is needed in estimating their health consequences.

We performed in-depth proteomic analysis in V79 lung fibroblasts treated with sub lethal concentrations of e-cigarette liquid (ECL), with and without nicotine (1.38%, 250µg/ml nicotine), for 72h via high resolution, trapped ion mobility mass spectrometry (TimsTOF). We found that both ECLs induced significant depletion in total number of proteins in treated cells. Mitochondrial proteins were among most significantly depleted cell components in treatments, while focal adhesion constituents were upregulated. In addition, there was an inclusion of glutamine metabolic process, all indicative of increased demand for ATP and increased cell motility. Decrease in translation aspect was evident in cell components, molecular functions and biological processes in both treatments. We also observed increased presence of posttranslational modifications including carbonylations, direct oxidative modifications and modifications most likely caused by ECL such as acetaldehyde, ethylation, dichlorination of tyrosine, etc.

Our results point to significant proteome alterations under influence of e-cigarette liquids, effects of which need to be further investigated.

Footnotes

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Shama Ahmad et al., *American Journal of Physiology - Lung Cellular and Molecular Physiology*, 2018

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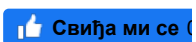
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