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## THE TYPE AND CONCENTRATION OF HEAVY METALS RELEASED FROM VARIOUS ATOMIZER HEAD OF VAPE PODS AND THEIR CYTOTOXIC EFFECTS ON EXPOSED NCI-1299 CELLS

Vapes have been reported to contain several toxins that may enhance lung disease. There have been concerns that the high heat production of vapes is causing the release of heavy metals into the produced vapour. The aim of this study was to investigate if heavy metals common to the vaping coil (iron, chromium, aluminum and nickel) are released from a popular vape and if these concentrations could cause cytotoxic effects in lung epithelial cells (NCI-H1299). Furthermore, this study investigated if higher heat production in a lower resistance vaping coil (0.6 ohm) would cause higher cytotoxicity due to an increase in heavy metal release in comparison to a higher resistance coil (1.4 ohms). Heavy metal concentrations were analyzed using ICP-OES after condensing the produced vapour. The mechanism of cytotoxicity was investigated using DAPI and Nile red staining while cell viability was determined with an MTT assay. Result showed aluminum, magnesium, zinc, iron, and nickel concentrations to be present in the condensed vapour. Aluminum, zinc and iron were present

in significant levels in comparison to the control (vaping juice that had not touched the coil) while magnesium concentrations were only significant in the vape extracts from the 0.6 ohm coil. Staining showed apoptosis to be the main mechanism of cell death in both treatments. Cytotoxicity testing demonstrated that there was a significant decrease in cell viability in vaping extracts from both coils, however, the 1.4 ohm coils was slightly more cytotoxic. It is believed that higher concentration of nickel and aluminum found in the 1.4 ohm extract may be to blame but further research looking at the individual cytotoxicity of each metal would be needed to make further conclusions. This study indicated that heavy metals were released from the vape at concentrations higher than safety recommendation meaning that there could be possible health implication such as metal fume fever and an increased risk of cancer.

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