Exploring E-Cigarette Condensate Toxicity of Menthol and Nicotine in PCLS

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Vaping has become one of the most popular substitutes for smoking. Often touted as an healthier alternative to cigarettes, its increase in popularity has led to an alarming increase in addiction. Consequently, there have been greater incidences of lung damage that have followed. This research aimed to contextualize the damage done to the lung when a smoker transitions to vaping. Different e-cigarette derived compounds were examined based on their effect on the immune response of the complex lung parenchyma. Precision cut lung slices (PCLS) were exposed to nicotine, menthol, and a combination of nicotine and menthol (nicotine+menthol) from C-57-black 6 mice. The PCLS were provided by my mentor from an independent study. 60 PCLS were stained using a Hematoxylin and Eosin stain. An Alcian Blue Periodic acid-Schiff stain was used to track mucin production. Each PCLS was imaged and ranked from 0-5 based on damage. Exposure to menthol and nicotine+menthol was extremely toxic, with extreme cell exfoliation and cell lysing occurring in the bronchioles of the PCLS. An overexpression of mucin was also found. This research verifies the PCLS model as a versatile framework for investigating vape toxicity and establishes the nicotine+menthol complex as an area for further research. The use of the nicotine+menthol complex has been banned by the FDA in menthol based cigarettes. However, this same approach has not been applied to menthol-based vape fluids. As flavored vapes become more prominent, this research can inform new health policies regarding flavored e-cigarettes accessibility.

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