

The Impact of Tobacco Exposure on the Lung's Innate Defense System
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Abstract:

Whilst nicotine and polyethylene glycol are common to most e-cigarettes, e-cigarettes are now sold in different flavors as varied as tobacco, pizza, banana pudding, hot cinnamon candy and menthol. However, little is known about (i) which chemicals provide flavor, (ii) their biological (iii) their psychophysiological effects and (iv) the psychosocial influences that contribute to their addictive properties. For example, whilst many flavorings are relatively safe to ingest as food, inhalation may be a different matter and may induce lung damage. As a case in point, diacetyl, which provides a buttery flavor, can cause bronchiolitis obliterans when chronically inhaled. The sense of taste is provided by taste buds on the tongue which, in the case of bitter, savory and sweet, are sensed by a class of taste receptors that belong to the G-protein coupled receptor superfamily. Interestingly, taste receptors are most highly expressed in the lung, where they serve to warn of inhalation of potentially toxic compounds. Activation of sweet taste receptors in the lung, through altered cell signaling, impairs innate lung defense, raising the possibility that sweet e-cigarette liquids may elicit a similar adverse response. We hypothesize that inhaling flavors can exert strong biological effects such as altered cell signaling. Additionally, menthol, can also exert strong reinforcing effects, and increase the propensity for addiction beyond what is seen with nicotine. Little is known about the possible reinforcing effects of other flavors found in e-cigarettes. Thus, in this administrative supplement, we seek to provide data that will inform the FDA regarding the chemical constituents of flavored e-cigs, the potential adverse biologic effects and the addictability induced by the e-cigarette flavorings, above and beyond what is seen with nicotine and polyethylene glycol.