Abstract: P545

Impact of cigarette smoke, next generation tobacco and nicotine products on the cytotoxic, oxidative and pro-inflammatory status of THP-1 cells

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Monocytes exhibiting a pro-inflammatory phenotype play a key role in adhesion and development of atherosclerotic plaques. Next generation tobacco and nicotine products (NGPs) are now widely used globally as an alternative to smoking. Little is known about their pro-inflammatory effects on monocytes. We investigated cell viability, anti-oxidant and pro-inflammatory gene and protein expression in THP-1 monocytes exposed to aqueous extracts of conventional cigarettes (CSE), a tobacco heating product (THP) and an electronic cigarette (EC). Pure nicotine was used as additional control.

Treatment with CSE reduced cell viability in a dose-dependent manner, whereas all other test agents showed no difference to control. At the highest non-lethal dose of CSE (20%) the following notable mRNA expression changes were observed for CSE, THP and EC respectively, relative to control; HMOX1 (6-fold, <2-fold, <2-fold), NQO1 (3.5-fold, <2-fold, <2-fold), CCL2 (4-fold, 3.5-fold, 2.5-fold), IL1B (4-fold, 3-fold, <2-fold), IL8 (5-fold, 2-fold, 2-fold), TNF (2-fold, 2-fold, <2-fold), CD31 and ICAM1 were below the 2-fold threshold for all products. With respect to protein expression; IL1B (3-fold, <2-fold, <2-fold) and IL8 (3.5-fold, 2-fold, 2-fold) were elevated over the 2-fold threshold, whereas, CD31, ICAM1, TNF and CCL2 were below 2-fold expression for all products. At higher doses, greater inductions were observed with all extracts; however NGP responses were typically lower than CSE.

In conclusion, anti-oxidative and pro-inflammatory processes were activated by all products. NGPs showed similar or lower responses relative to controls than CSE exposed cells.